Environmental Assessment

# Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators

# CIP 1-70-9000

# HUD ID 4339-0019

Toa Alta, Puerto Rico

*February 2025*

**Puerto Rico Department of Housing - Disaster Recovery Office**
Community Development Block Grant - Mitigation(CDBG-MIT)
Hazard Mitigation Grant Program - Global Match Set Aside
606 Barbosa Avenue, Building Juan C. Cordero Dávila Río
Piedras, PR 00918

**U.S. Department of Housing and Urban Development**
451 Seventh Street, SW
Washington, DC 20410

# Environmental Assessment
# 24 CFR Part 58.36

## Project Information

**Project Name:** Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators

**Project ID:** CIP 1-70-9000; HUD ID 4339-0019

**Responsible Entity:** Puerto Rico Department of Housing

**Commonwealth/Local Identifier:** Puerto Rico

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**Agency or Agencies providing funding:**

| Agency | Grant Number | Program | Funding Amount |
|---|---|---|---|
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| FEMA | 4339-DR-PR | Hazard Mitigation Grant Program (HMGP-MIT) | $16,502,820.72 |

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$18,700,321.00 CDBG-DR Funds (HUD)

$16,502,820.00 FEMA Funds

$35,203,141.72 Total Project Cost (*this is the sum of all sources of funding listed above*)

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# LIST OF ACRONYMS

| | |
|---|---|
| **AADT** | **Annual Average Daily Traffic** |
| **ABFE** | **Advisory Base Flood Elevation** |
| **amsl** | **above mean sea level** |
| **ASP** | **Agency Specific Procedures** |
| **APE** | **Area of Potential Effects** |
| **BFE** | **Base Flood Elevation** |
| **BMP** | **Best Management Practices** |
| **CAA** | **Clean Air Act** |
| **CEQ** | **Council on Environmental Quality** |
| **CFR** | **Code of Federal Regulations** |
| **CO** | **carbon monoxide** |
| **COR3** | **Central Office for Recovery, Reconstruction and Resiliency** |
| **CWA** | **Clean Water Act** |
| **cy** | **cubic yard(s)** |
| **dBA** | **Decibels (A-weighted)** |
| **DCH** | **Designated Critical Habitat** |
| **DNL** | **Day Night Average Sound Level** |
| **EA** | **Environmental Assessment** |
| **EIS** | **Environmental Impact Statement** |
| **EO** | **Executive Order** |
| **EPA** | **U.S. Environmental Protection Agency** |
| **ESA** | **Endangered Species Act** |
| **FAA** | **Federal Aviation Administration** |
| **FEMA** | **Federal Emergency Management Agency** |
| **FHWA** | **Federal Highway Administration** |
| **FIRM** | **Flood Insurance Rate Map** |
| **FONSI** | **Finding of No Significant Impact** |
| **FPPA** | **Farmland Protection Policy Act** |
| **ft** | **feet** |
| **FWCA** | **Fish and Wildlife Coordination Act** |
| **ICP** | **Institute of Puerto Rican Culture** |
| **IPaC** | **Information for Planning and Consultation** |
| **HUD** | **U.S. Department of Housing and Urban Development** |
| **JPA** | **Joint Permit Application** |
| **km** | **kilometer(s)** |
| **$km^2$** | **square kilometer(s)** |
| **m** | **meter(s)** |
| **$m^3$** | **cubic meter(s)** |
| **MBTA** | **Migratory Bird Treaty Act** |
| **MGD** | **million gallons per day** |
| **mi** | **mile(s)** |
| **$mi^2$** | **square mile(s)** |
| **Mcy** | **million cubic yard(s)** |
| **$Mm^3$** | **million cubic meter(s)** |
| **MOT** | **Maintenance of Traffic** |
| **NAAQS** | **National Ambient Air Quality Standards** |
| **NEPA** | **National Environmental Policy Act** |
| **NFIP** | **National Flood Insurance Program** |
| **NHPA** | **National Historic Preservation Act** |
| **NMFS** | **National Marine Fisheries Service** |

| | |
|---|---|
| **$NO_2$** | **nitrogen oxide** |
| **NPDES** | **National Pollutant Discharge Elimination System** |
| **NRCS** | **Natural Resource Conservation Service** |
| **NRHP** | **National Register of Historic Places** |
| **OGPe** | **Puerto Rico Permit Management Office (Spanish acronym)** |
| **OSHA** | **Occupational Safety and Health Administration** |
| **PA** | **Programmatic Agreement** |
| **PEIS** | **Preliminary Environmental Impact Statement** |
| **$PM_{2.5}$** | **particulate matter less than 2.5 micrometers** |
| **$PM_{10}$** | **particulate matter less than 10 micrometers** |
| **PMO** | **Puerto Rico Permit Management Office (English for OGPe)** |
| **PRASA** | **Puerto Rico Aqueduct and Sewer Authority** |
| **PREQB** | **Puerto Rico Environmental Quality Board** |
| **PRDNER** | **Puerto Rico Department of Natural and Environment Resources** |
| **PRDOH** | **Puerto Rico Department of Housing** |
| **PRDTOP** | **Puerto Rico Department of Transportation and Public Works** |
| **PRHTA** | **Puerto Rico Highway and Transportation Authority** |
| **PR&G** | **Principles, Requirements, and Guidelines** |
| **PRPB** | **Puerto Rico Planning Board** |
| **RCRA** | **Resource Conservation and Recovery Act** |
| **RWI** | **Raw Water Intake** |
| **SEA** | **Supplemental Environmental Assessment** |
| **SFHA** | **Special Flood Hazard Area** |
| **SHPO** | **State Historic Preservation Office** |
| **SIP** | **State Implementation Plan** |
| **SPCC** | **Spill Prevention, Control, and Countermeasures** |
| **SWPPP** | **Stormwater Pollution Prevention Plan** |
| **T&E** | **Threatened and Endangered Species** |
| **TCLP** | **Toxicity Characteristic Leaching Procedure** |
| **TMDL** | **Total Maximum Daily Load** |
| **USACE** | **U.S. Army Corps of Engineers** |
| **U.S.C.** | **U.S. Code** |
| **USCB** | **U.S. Census Bureau** |
| **USDA** | **U.S. Department of Agriculture** |
| **USDHS** | **U.S. Department of Homeland Security** |
| **USDOT** | **U.S. Department of Transportation** |
| **USFWS** | **U.S. Fish and Wildlife Service** |
| **USGS** | **U.S. Geological Service** |
| **VOC** | **volatile organic compounds** |
| **WOTUS** | **Waters of the U.S.** |
| **WQC** | **Water Quality Certification** |
| **yr** | **year** |

# 1 PROPOSED ACTION INTRODUCTION

Puerto Rico Department of Housing (PRDOH) proposes the construction of the Enrique Ortega Water Treatment Plant (WTP) Raw Water Intake Power Generators (CIP 1-70-9000, HUD ID 4339-0019). The proposed action consists of the construction of an emergency power generators facility adjacent to Represa del Lago La Plata to allow the operation of the existing raw water pump station that provides water to Enrique Ortega WTP during grid power outages. The Enrique Ortega WTP is part of the Metropolitan Potable Water System (PWSID 2591), with a service area covering several areas within the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal. The proposed action addresses the supply of safe drinking water to a population of 369,000 inhabitants. (CSA, 2022)

The proposed action includes the installation of 4 (four) emergency generators, aboveground diesel storage tanks, construction of an electrical room and the associated components to allow equipment operation during grid power outages. The proposed action also includes the construction of an asphalt access road over an existing dirt road and the construction of a 6 m x 42 m concrete platform for diesel fuel storage tanks and related components. The Staging Area to support the proposed action construction activities is proposed to be located in a previously disturbed area (coordinates: 18.343236°N, -66.241250°W). The Proposed Action is consistent with PRASA's goals to reduce the vulnerability of critical facilities to natural hazards. (**Appendix A Figure 1 Site Location**)

The proposed action geographic location is southwest of San Juan, approximately 28 kilometers from the Luis Muñoz Marín International Airport in Carolina; approximately 15 kilometers south from the north coast in Dorado; approximately 5 kilometers south from downtown Toa Alta. The proposed action area surroundings are the mountains of Toa Alta at elevations between 16 m and 110 m. (**Appendix A Figure 2 Geographic Location**)

## 1.1 Proposed Action Description

The Represa del Lago La Plata (circa 1974) is located on Road PR-827, km 5.6 in the Ortiz Ward, municipality of Toa Alta, Puerto Rico. The emergency generators facility preferred location is west of Represa del Lago La Plata (Coordinates: 18.343583°N, -66.238678°W) in the Quebrada Cruz Ward, Toa Alta. Coming from the town of Toa Alta, the construction vehicles will be using Road PR-861, then Road PR-824 till km 5.0 to access the Camino Recreativo La Plata to enter the access road to the proposed action site.

The generators platform would occupy an area of approximately 1,278 $m^2$. The estimated area for the access road is 4,773 $m^2$ for a total of 6,051 $m^2$. A preliminary area of approximately 917 $m^2$ has been identified to be used as staging area during construction activities. The proposed action (generators, access road, staging area) would occupy an area of approximately 6,968 $m^2$ (1.72 acres). The Municipal Revenue Collection Center (CRIM by its Spanish acronym) cadastral number for the subject property where the access road has been proposed is #112-000-006-71. The associated parcel where part of the access road will be built has the CRIM # 141-000-001-05. PRASA owns the property where the emergency generators facility has been proposed. This property has an approximate acreage of 41,440 $m^2$ (10.24 acres) and has not been registered at the CRIM, therefore no cadastral number has been identified.

The Proposed Action includes:

1. Installation of four emergency generators with a capacity of 2,500 kW each, two diesel storage tanks with a capacity of 40,000 gallons each, an electrical room, three parking areas, and a fuel dispensing area.
2. Construction of a concrete platform measuring approximately 20 meters x 40 meters for the installation of the generators, including other necessary infrastructure components required for equipment operation.
3. Paving the existing dirt road with approximate dimensions of 740 meters in length and 4 meters in width, with 1-meter-wide ditches at the edges to divert runoff.
4. Leveling the area where the generators are proposed to be installed to elevate them above the flood level.
5. Removal of the topsoil to improve the access road to comply with current codes for fuel deliveries to the Proposed Action.
6. Installation of an access gate at the entrance.
7. Installation of underground electrical lines that will run from the generators to the dam's pump building.
8. Installation of conduits attached to the dam's structure to connect to the existing electrical infrastructure, extending to the dam's intake tower.
9. Construction of a temporary preparation area for the placement of heavy machinery during the Proposed Action's construction phase.

The installation of the generators and their components will provide backup power to Represa La Plata Raw Water Intake Pump Station, sump pump, Represa del Lago La Plata gate system engine, office buildings, exterior lighting, and security systems of La Plata Raw Water Intake during power blackouts or service interruptions from the PREPA/LUMA electrical grid or power generation problems from Genera PR.

The Proposed Action has the following advantages: (1) proposed action partial area has been previously impacted as it was used as part of a project to repair the scours found at the base of Represa del Lago La Plata structure between 2021 and 2022, it contains fast-growing grasses, shrubs and scattered trees, typical of previously disturbed areas, (2) maximize the use of the available space of approximately 6,968 $m^2$ for diesel tanks pad, a fuel receiving area, generators platform, an electrical room, and staging area, (3) proximity to the dam site reduces the electrical costs from the installation of underground electrical lines that will go from the generators to the dam's pump building, approximately 244 meters long, (4) any potential fuel spill will not jeopardize the Enrique Ortega Water Filtration Plant operation, because the proposed action is downstream Lago La Plata, (5) adequate space for vehicle maneuvering, (6) no nearby residences that could be affected by noise and fumes from the generators, the nearest residence is at the other side of Río La Plata at approximately 250 meters from the proposed action, (7) no known infrastructure that could affect the construction phase, (8) the constructed access road will serve as an alternate route to the dam site once the proposed action is completed, and (9) the new infrastructure would be located in the same site.

This Environmental Assessment (EA) was prepared in accordance with HUD Environmental Review Format Environmental Assessment per 24 Code of Federal Regulations [CFR] Part 58.36.

# 2 PURPOSE AND NEED

The purpose of the Hazard Mitigation Grant Program (HMGP-MIT) is to reduce the risk to community services that benefit human health and safety or economic security, from being severely affected by natural disasters.

CDBG-MIT defines mitigation as activities that increase resilience to disasters and reduce or eliminate the long-term risk of loss of life, injury, damage to and loss of property, and suffering and hardship by lessening the impact of future disasters.

## 2.1 Project Purpose

Hurricane Maria made landfall on Puerto Rico on September 20, 2017, causing severe damage due to the heavy wind and flooding across Puerto Rico. The entire system of the Puerto Rico Electric Power Authority (PREPA) collapsed leaving the entire Island without electric power for several weeks, including the Enrique Ortega Water Treatment Plant and the Raw Water Intake Pump Station at Represa del Lago La Plata. (STANTEC, 2023)

Currently the Represa del Lago La Plata is considered a critical facility (CSA, 2022) to provide raw water for Enrique Ortega WTP. The La Plata Raw Water Intake (RWI) is located at Represa del Lago La Plata where the dam facilities have three existing emergency generators of 750 kW, 250 kW and 50 kW. Their capacities only allow the operation of dam gates and other dam facility components, leaving the raw water pump station without coverage when the power grid system fails. Under no grid power conditions the raw water pump station becomes inoperable, therefore Enrique Ortega WTP becomes inoperant due to raw water shortage associated with power outage conditions. The proposed action will provide an emergency energy source for the raw water pump station to allow Enrique Ortega WTP continuous operation during grid power outages. Also, the new emergency generators facility will provide a robust and resilient power source to allow safe operations under atmospheric events, where power outages are common, and the operation of this critical facility is needed. The proposed action purpose is to maintain the raw water supply to Enrique Ortega WTP during grid power outages to maintain the supply of safe drinking water to a population of approximately 369,000 inhabitants.

The installation of four 2,500 kW emergency generators to provide power to Represa Lago La Plata RWI Pump Station during grid power outages, reduces the risk of raw water stoppage to Enrique Ortega WTP, which supplies 75 MGD of safe drinking water to part of the Metropolitan Potable Water System. The proposed action achieves the purpose of reducing the risk of a shortage of potable water to community services that benefit human health and safety or economic security, from being severely affected by natural disasters. The proposed action accomplishes the purpose of a reliable emergency energy source for the raw water pump station to allow Enrique Ortega WTP continuous operation during grid power outages.

The proposed action therefore meets the objectives of the HMGP and CDBG-MIT objectives to increase resilience to disasters and reduce or eliminate the long-term risk of loss of life due to lack of potable water supply.

## 2.2 Project Need

Once completed the proposed action would serve to satisfy the following needs:

- The Represa La Plata Raw Water Pump Station will have a backup power source to continuously supply raw water to Enrique Ortega WTP during grid power outages.
- The proposed action will establish a secure and resilient infrastructure that mitigates the impact of future natural disasters, by providing a continuous and safe water potable service to the Enrique Ortega WTP service area.
- The economic segments, private and public, served by Enrique Ortega WTP will benefit from having a continuous potable water service. Approximately 6,000 commercial clients within the service area could provide regular services during power outage events in the Represa del Lago La Plata Intake area. (CSA, 2022)
- The absence of the proposed action would close partially or totally the services of hospitals, clinics, and schools during times of emergency and during grid outages.
- The experience of a guaranteed continuous potable water service would encourage new businesses to open within the Enrique Ortega WTP service area.
- The operation of the Enrique Ortega WTP, as a critical facility, is crucial to guarantee the health and safety for approximately 124,000 residential clients (369,000 inhabitants) within the Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal Municipalities. (CSA, 2022)
- A power outage would have a direct and critical impact on Represa La Plata Raw Water Pump Station causing a potable water shortage that may close partially or totally the services of four hospitals, fifteen clinics, seventy-three public schools, five city halls, five government centers, two judicial centers and six offices of the Department of Family Affairs in the Enrique Ortega WTP Service Area.

# 3 PROJECT BACKGROUND

The condition of Puerto Rico's energy system infrastructure, for many years, has been fragile with a succession of failures, especially after the passage of Hurricanes Irma and María in September 2017. (CSA, 2022) These atmospheric phenomena marked the history of Puerto Rico's electrical system by destroying the energy system and causing a blackout Island wide. In September 2022, Hurricane Fiona again knocked out 100% of the grid for as long as four weeks in parts of Puerto Rico, highlighting the continuing need for grid modernization on the island.

During Hurricane Maria the Enrique Ortega WTP was out of service during a period of nineteen (19) days (from September 20 to October 9, 2017). These blackout events and the consequent service interruptions limit the supply and availability of drinking water for several days and even months in several sectors island wide, including the Enrique Ortega WTP service area. By October 9$^{th}$, the Puerto Rico Electric Power Authority (PREPA) was able to fix the system and supply electric power to Represa del Lago La Plata facilities, and with it, the Raw Water Intake Pump Station.

Represa del Lago La Plata has three emergency generators with capacities (750 kW, 250 kW and 50 kW) to provide electric power only to the dam gate's engine, office, and illumination in case of an emergency (**Appendix A Figure 3 Existing Conditions**). The generators capacities only allow the operation of dam gates and other dam facility components, leaving the raw water pump station without coverage when the power grid system fails. The Represa del Lago La Plata RWI Pump Station was designed to pump one hundred million gallons per day (100 MGD). This facility supplies between 65 to 80 MGD to the Enrique Ortega WTP using a combination of seven (7) pumps (five with 20 MGD capacity each and two with 10 MGD capacity each). Enrique Ortega WTP has a design capacity of 75 MGD to supply safe drinking water to a population of 369,000 inhabitants.

After Hurricane Maria the communities within the Dorado, Guaynabo, Toa Alta, Toa Baja, Vega Alta, Bayamón, and Cataño Municipalities suffered the lack of potable water for nineteen or more days until the Enrique Ortega WTP reached normal operation conditions. A power interruption in Represa La Plata Raw Water Pump Station starts a domino effect on the operation of Enrique Ortega WTP and the lack of water over healthcare facilities, educational schools and universities, and public institutions. Communities in the mountains, Naranjito, Toa Alta, Bayamón, and Corozal suffered for a prolonged period (over 19 days), until the water lines operational pressure was achieved, and distribution tanks water levels reached normal conditions. Private and public economic segments were affected due to the lack of potable water. Industries and small businesses alike were affected. Without potable water, locals' hygiene could not be maintained at food businesses to serve the population that was eager to get a hot meal that they could not provide for themselves at home. Potable water is essential to avoid food cross contamination that may result in disease outbreaks. Bakeries, cafeterias, fast food chains, and restaurants had to find ways to prepare the food and serve their clients with the best hygiene possible. It resulted in a vast use of disposable cutlery, plates, packing and bags that ended up in our landfill systems.

## 3.1 Existing Conditions and Trends

The 24 Code of Federal Regulations [CFR] Part 58.40(a) states "*58.40* ***Preparing the environmental assessment****. The Departmental Environmental Clearance Officer (DECO) shall establish a prescribed format that the responsible entity shall use to prepare the EA. The DECO may prescribe alternative formats as necessary to meet specific program needs. In preparing an EA for a particular proposed project or other action, the responsible entity must:*

*(a) Determine existing conditions and describe the character, features and resources of the project area and its surroundings; identify the trends that are likely to continue in the absence of the project."*

The proposed action area is adjacent to the La Plata Reservoir Wildlife Refuge and Finca Vizcarrondo, however the site is not located within or is considered part of the natural reserve area. Lago La Plata Wildlife Refuge: located east of the proposed area, this reservoir was built in 1973. This lake is administered by the Puerto Rico Aqueduct and Sewer Authority (PRASA); its waters are used to produce drinking water and for recreation. Finca Vizcarrondo Protected Natural Area (ANP): located south of the proposed area, Finca Vizcarrondo has an extension of 205.55 acres. This farm has been designated ANP by the Department of Natural Resources since 2008. The Río La Plata: located north of the proposed property, the Río La Plata flows into the main channel between Toa Alta and Dorado. The proposed action will not affect nor have an impact on these systems. The proposed action area surroundings are the mountains of Toa Alta at elevations between 16 m and 110 m. (**Appendix A Figure 4 Proposed Site Surroundings**).

The Proposed Action area where the generators are proposed to be installed has a slope ranging from 6.1 to 37.0%. No special soil conditions, foundation issues, settling, have been identified in areas within the proposed action. The Proposed Action area has an existing dirt road that provides access to the facility premises. The Proposed Action area (access road, power generators site, staging area) was previously disturbed as part of a project to repair the scours found at the base of Represa del Lago La Plata structure between 2021 and 2022. (**Appendix A Figure 5 Proposed Site Historical Aerial Views**) The 2021 Impacted Area from previous activities was estimated to be 15,453 square meters which includes the dirt access road extended in the sides, the staging area, the cleared leveled area and the operations area at the side of Represa del Lago La Plata. (**Appendix A Figure 6 Previous Impacted Area**)

The proposed action would disturb an estimated area of 9,814 $m^2$ (2.42 acres). The staging area would be the same area used as part of a project to repair the scours found at the base of Represa del Lago La Plata structure, approximately 917 $m^2$ (0.23 acre). This was preferred to minimize impacts to forested areas and reduce earthworks materials leveling/extraction and costs associated with these activities. The staging area is in Zone X (minimal flood hazard).

Through the extension of the proposed site boundary, one (1) main vegetative association was classified as: Areas of previously impacted land (100%). The vegetation observed throughout these areas are fast-growing grasses and shrubs typical of previously disturbed areas. Outside the footprint, particularly to the east of the property where the dam is located, the proposed action would impact scattered trees. Outside the site area, the proposed action would also impact forest patches of secondary succession, which were observed to border much of the extension of the dirt road. The estimated area with vegetation to be affected is approximately 3,799 $m^2$. (**Appendix B Cut & Pruning Report - Tree Inventory, October 3, 2023**)

The existing site conditions are driven more by the character, features, and resources in the service area of the Enrique Ortega WTP than the surroundings of the power generators site area. The city of Bayamón has four major hospitals to attend the population. The service area has fifteen clinics that depend on a potable water reliable source. The children and youth from approximately seventy-three public schools of various levels received potable water from Enrique Ortega WTP. The absence of the proposed action would close partially or totally the services of hospitals, clinics, public, private and pre-schools during times of emergency and grid outages.

In the absence of the proposed action, the surroundings would maintain a vegetation of fast-growing grasses, shrubs, and scattered trees on the sides of the existing access dirt road and the site area. The proposed action adjacent area and service area would run the risk of a stoppage of potable water during grid power outages at the Represa La Plata RWI Pump Station.

# 4 ALTERNATIVES

Several location alternatives have been evaluated to address the proposed action needs, including the No Action Alternative. The alternative analysis took into consideration engineering constraints, environmental impacts, and available properties; however, the proposed equipment layout and generators capacity and proposed staging area are the same for the evaluated alternatives. **Appendix A Figure 7 Location of Evaluated Alternatives** includes the proposed locations for each site location alternative evaluated.

## 4.1 No Action

The no action alternative considers that no installation of the emergency power generators will occur, therefore the existing conditions of La Plata Raw Water Intake would not change. The No Action alternative would result in the following negative impacts:

- Without emergency backup power Represa La Plata Raw Water Pump Station would stop operation during grid outages.
- The raw water flow to Enrique Ortega WTP would stop causing malfunction of the potable water treatment operation.
- The Enrique Ortega WTP malfunction operation would cause shortages of potable water throughout the Metropolitan Potable Water System.
- During power outages or atmospheric events, the communities within the service area would lack a safe and continuous potable water service.
- Without potable water, communities would be affected in their daily operations: like the preparation of food, cleanup of food businesses' kitchens.
- The lack of potable water would affect the sanitation of rooms in hospitals and clinics, lectures in schools and universities, and sanitary toilets in buildings and homes.
- No potable water supply would affect the hygiene of the population in the service area, making people creative in the pursuit of water in rivers nearby.
- Overall, the stopping of potable water would adversely impact population health and quality of life.
- An unreliable potable water service will remain as the existing condition for the Enrique Ortega WTP service area, mining the reliability and sustainability of the drinking water system and the economic and health impacts associated to undependable services.

Represa del Lago La Plata has three existing emergency generators of 750 kW, 250 kW and 50 kW, but they only supply backup power to the dam gate system, office buildings, and exterior lighting, leaving the Represa La Plata Raw Water Pump Station with no power during an outage. The No Action would not address the proposed action purpose of providing backup power to Represa La Plata Raw Water Pump Station during grid power outages to allow the continuous operation of Enrique Ortega WTP to fulfill the need of the proposed action which is to have backup power to supply raw water to Enrique Ortega WTP during a power outage to provide the surrounding communities with safe potable water.

The Enrique Ortega WTP service area (Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal) has an estimated population of 369,000 inhabitants. In the area are in operation four hospitals, fifteen clinics, seventy-three public schools, five city halls, five government centers, two judicial centers and six offices of the Department of Family Affairs to service their respective citizens. A power outage can cause a potable water shortage that may close partially or totally the services of these institutions. In addition to the services above, outages would adversely impact a number of private schools, pre-schools, restaurants, cafeterias, fast food locations. (**Appendix A Figure 8 Hospitals in Service Area**, **Figure 9 Public Schools in Service Area**, and **Figure 10 Public Buildings in Service Area**)

## 4.2 Proposed Action – Construction of a Backup Power Facility, west to Represa del Lago La Plata facilities.

The **Proposed Action** includes the construction and installation of an access road, a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room, underground electrical and control-communications lines, aboveground electrical and control-communications lines fixed to the concrete dam walls up to the existing raw water pump station. The proposed action is located west of the dam wall (coordinates: 18.343583°N, -66.238678°W) and approximately 200 meters from Lago La Plata pump control building. The proposed access is along the Camino Recreativo La Plata, which abuts Road PR-824, km 5.0. (**Appendix A Figure 11 Site Plan of the Project**)

The proposed action parcels and adjoining areas are undeveloped. Portions of the proposed action area are owned by PRASA while some portions of the access road will require a right-of-way acquisition to allow proposed action development. The proposed action construction would take an estimate of 840 days (120 weeks).

The **Proposed Action** would disturb an area of approximately 9,814 $m^2$ (2.42 acres). The proposed action core is the installation of four Prime emergency power generators with a capacity of 2,500 kW/per unit. A 40 m x 20 m generator platform will serve as the base for the four generators and the electrical room. Two aboveground diesel tanks with capacity of 40,000 gallons will be double-walled and would be installed inside a concrete dike as an extra measure to provide additional containment to spills. Two fuel tanks have been proposed on top of a concrete platform of 6 m x 42 m. The estimated area for the generator pad is approximately 1,278 $m^2$ (0.31 acre). From the electrical room, electrical conduits run underground to the dam structure and continue with 183 m long exposed conduits anchored on the dam bridge wall from the starting point of the dam structure to the dam intake tower to connect the existing electrical infrastructure. (See **Appendix A Figure 12 Proposed Action**)

The proposed action includes the improvement of an existing access dirt road to be paved from the road Camino Recreativo La Plata to Represa del Lago La Plata access gate. The access road proposed dimensions for improvement are approximately 740 m long and 4 m wide with 1 m wide ditches on the sides to divert the runoff. The estimated area for the access way is 4,773 $m^2$ (1.18 acre). The proposed staging area during construction activities would be the same area used as part of a previous project to repair the scours found at the base of Represa del Lago La Plata structure, the area occupies approximately 917 $m^2$ (0.23 acre).

The **Proposed Action** has the following advantages:

- Most of the proposed areas to develop the proposed action have been previously impacted as it was used as part of a project to repair the scours found at the base of Represa del Lago La Plata structure between 2021 and 2022.
- This alternative will maximize the use of the available space near the existing dam facilities.
- The proximity to the dam site reduces the costs associated with the installation of underground electrical lines that will go from the generators to the dam's pump station building.
- Any potential fuel spill will not jeopardize the Enrique Ortega Water Filtration Plant operation, due to the relative far distance from the nearby waterbodies.
- Provide adequate space for vehicle maneuvering during construction and operations.
- No nearby residential areas that could be affected by noise levels and air emissions associated with generators operation.
- No known infrastructure that could be affected or relocated during the construction phase.
- The proposed new access road would serve as an alternate route to Represa del Lago La Plata facilities once the proposed action is completed.
- All the new infrastructure would be located within the subject property boundaries.

The **Proposed Action** has the following disadvantages:

- A portion of the parcel proposed to build the backup power facility to install the emergency generators have been classified as Zone A and Shaded X according to the Advisory Base Flooding Elevation maps prepared by FEMA. The Project Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators is in a FFRMS floodplain. (**Appendix A Figure 13 FEMA Flood Insurance Rate Map**)
- The proposed site would affect approximately 346 trees that must be removed following the provisions of Chapter 3.4, Single Incidental Operational Permit of the Joint Regulations (2021). Each tree would be mitigated depending on its Diameter at Breast Height (DBH). Section 3.4.2, Requirements for Mitigations and Tree Planting requires the planting of 3, 4 or 5 trees for each tree to be removed depending on their DBH. (**Appendix B Cut & Pruning Report - Tree Inventory, October 3, 2023**) (**Appendix C Flora and Fauna Study**)
- The proposed new access road requires land acquisition for the right-of-way.
- The proposed location for the new Generators Area is outside of wetlands on the USFWS National Wetlands Inventory (USFWS 2020). The Riverine Wetland of Río La Plata (R2UBH) is outside of 100 feet north of the project limits. (**Appendix A Figure 14 Wetlands Protection**). The Riverine Wetland of an unnamed creek that may possibly be affected is located within a radius of 100 feet west of the project limits at two points on the existing dirt road where paved access would be constructed. The Project Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators is located within a radius of 100 feet of a riverine wetland. (**Appendix A Figure 15 Unnamed Creek – Riverine Wetland**).

During Phase 1 - Project Planning and Development, the location proposed to install the power generators was the east end of Represa del Lago La Plata, identified at the beginning as Original Site, identified in this document as Alternative 4 Northeast Next to the Electrical Facilities of Represa del Lago La Plata at Road PR-827, Cruz Ward, Toa Alta. The original site is located approximately 100 meters away from the electrical facilities with an area of 3,200 square meters.

During the site visit performed on January 20, 2022, PRASA personnel indicated that the 54-inch raw water force line runs close or very close to the proposed site. PRASA's Infrastructure Department conducted an investigation to validate the information given during the site visit. Several sets of as-built and construction drawings were analyzed and confirmed that the raw water pipeline was indeed passing beneath the proposed construction site. The generators pad location was proposed above the existing 54" Ø Raw Water Pipeline and its ROW, limiting future maintenance. Also, there would be considerable earth movement to prepare the site for construction. Working on the proposed site could expose the pipeline to breakage and/or have a portion of it under the concrete pad for the generators. So, the alternative 4 (Original Site) was preliminarily discarded due to the proximity to a 54-inch raw water force line. (**Appendix D Site Visit Report)**

Phase 1 continued identifying potential new sites for the installation of the generators. Five potential sites were identified in the surroundings of Represa del Lago La Plata, in Road PR-827, in the municipal road towards Represa del Lago La Plata from Road PR-827 and at the west end of Represa del Lago La Plata. Information was gathered to determine the advantages and disadvantages together with cost estimates for each site. The preferred site was identified as Site 4, identified in this document as Alternative 3 West Next to Represa del Lago La Plata Bridge. The location is in the open area "south" (correct is west) of the dam bridge. Alternative 3 provides an added benefit from being located closer to the Represa La Plata Pump Room. After another site visit it was found that the area makes it very difficult to accommodate the equipment and provide space for adequate truck maneuvering in a two-story structure. It would also require a containment wall on the side facing the dam structure and affects an area covered by trees. Alternatively, the site could be expanded through extensive earthwork. The cost associated with this or with the two-story structure would be significant.

All aforementioned forced the decision to accept the Proposed Action location as the best to address the purpose and need for this proposed action.

The Proposed Action addresses the need to provide backup power to Represa La Plata Raw Water Pump Station during grid power outages to allow the continuous operation of Enrique Ortega WTP and the need to supply raw water to Enrique Ortega WTP during a power outage to provide the communities within the service area with reliable and continuous potable water.

The project alternatives were evaluated during the planning phase and considered at the time, Alternatives 3, 4, 5a to 5c, with a different designation, but same alternatives. The Alternatives Sites Evaluation and Recommendation for Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators Phase I report was sent to PRASA for the alternative's sites.(**See Appendix E Alternatives Evaluation Report**) A matrix was developed to assign values and weight factors for each key factor under evaluation. In that way we can score each option to determine which could be the best option for PRASA. The higher the overall scoring the better the alternative should be. It is important to mention that the provided cost estimates are based on dollars for 2021. The cost estimate for the Proposed Action and Alternative 2 are based on a developed design. (See Section 4.4 Summary Table 2)

Proposed Action obtained a value of 3.44 in Table 2 key evaluation factors' matrix. The value confirmed the preferred alternative.

## 4.3 Alternatives

A description of the alternatives that were analyzed to address the Proposed Action needs have been included below:

### 4.3.1 Alternative 2 – Construction of a Backup Power Facility, west to Represa del Lago La Plata facilities

The **Alternative 2** site is located west of Represa del Lago La Plata, approximately 50 meters shifted southwest of the Preferred Alternative (coordinates: 18.343470°N, -66.239136°W), see **Appendix A Figure 7 Location of Evaluated Alternatives**. This alternative site would occupy an area of approximately 6,051 $m^2$ (1.50 acres), which are divided into access road, road extension for truck turning path, generators, and diesel tanks. (See **Appendix A Figure 16 Alternative 2**).

The access road route and potential impacts for Alternative 2 are the same needed for the Proposed Action. This location presents a variable topography with no visible runoff conveying areas. Additional 2,470 square meters of land acquisition should occur to provide space to install the generators and related equipment. This site is outside of the FFRMS floodplain. The access road between the generator's platform and Represa del Lago La Plata would be within FFRMS floodplain. The estimated area within FFRMS floodplain is 3,950 $m^2$. The earthwork would require 103 cubic yards of cut, 17,717 cubic yards of rock excavation, and 3,078 cubic yards of fill. The alternative infrastructure can fit in the same concrete pad. It is necessary to run underground electrical conduits from the site up to the dam structure and then continue exposed conduits from where the dam structure starts to the dam intake tower to intercept the existing electrical infrastructure.

**Alternative 2** has the following advantages:

- The ground grading or levels for the generators and equipment would be above the ABFE level and outside the FFRMS floodplain as per FEMA maps,
- Any potential fuel spill will not jeopardize the Enrique Ortega Water Filtration Plant operation, due to the relative far distance from the nearby waterbodies.
- No nearby residential areas that could be affected by noise levels and air emissions associated with the generator's operation,
- No known infrastructure that could be affected or relocated during the construction phase,
- The proposed new access road will serve as an alternate route to Represa del Lago La Plata facilities once the alternative is completed,
- All the new infrastructure would be located within the subject property boundaries.

**Alternative 2** has the following disadvantages:

- The area identified to install the new generators has a steep slope with vegetation and trees that require to be removed for this site.
- The topography and site conditions make it exceedingly difficult for trucks and heavy equipment maneuvering.
- The alternative site would need 2,470 square meters of land acquisition to place the generators platform out of FFRMS floodplain and for the right-of-way of the access road.
- A Riverine Wetland of an unnamed creek is located within a radius of 100 feet west of the project limits on the existing dirt road where paved access would be constructed.
- The calculation for the earthwork required for this location increases considerably to accommodate the site resulting in an increase in the alternative cost. The estimated cost for this action is $2,190,000. This estimate does not include the cost for the tree mitigation compensation. The alternative site would affect approximately 1,038 trees, resulting in an estimated monetary compensation fee of approximately $103,800.

Alternative 2 obtained a value of 2.93 in Table 2 key evaluation factors' matrix. The value was under a preferred alternative.

### 4.3.2 Alternative 3 – Construction of a Backup Power Facility, next to Represa del Lago La Plata facilities

**Alternative 3** is located next to Represa del Lago La Plata wall (coordinates: 18.342664°N, -66.237135°W) and approximately 200 meters from Lago La Plata pump control building. (see **Appendix A Figure 7 Location of Evaluated Alternatives**).

The generators and equipment would be located west of Represa del Lago La Plata bridge wall. **Alternative 3** would occupy a total area of 7,362 $m^2$ (1.82 acres) of land, which is into the areas for access road, road extension for truck turning path, and the generators and diesel tanks. This location presents a variable topography with no visible runoff conveying areas. Additional land acquisition (1,800 square meters) activities would occur to provide the Alternative with a maneuvering area for large trucks and maintenance vehicles. The land acquisition cost is approximately $93,600. The approximate earth movement would cover an area of 8,250 square meters (2.04 acres), estimated to be 9,500 cubic meters of cut and 3,500 cubic meters of fill. The access road route and potential impacts for Alternative 3 are the same needed for the Proposed Action. The access road between the valley and Represa del Lago La Plata would be within FFRMS floodplain. The estimated area within FFRMS floodplain is 3,950 $m^2$. The alternative components would be within FFRMS floodplain. Under this option it is necessary to run underground electrical conduits from the site up to the dam structure and then continue exposed conduits from where the dam structure starts to the dam intake tower to intercept the existing electrical infrastructure. (See **Appendix A Figure 17 Alternative 3**).

**Alternative 3** has the following advantages:

- This alternative will maximize the use of the available space near the existing dam facilities.
- The proximity to the dam site reduces the costs associated with the installation of underground electrical lines that will go from the generators to the dam's pump station building,
- The alternative site is downstream of Represa del Lago La Plata, but still remarkably close to Río La Plata. In case of an accidental spill, diesel fuel would not jeopardize Enrique Ortega WFP operation but would impact the river downstream Represa del Lago La Plata.
- No nearby residential areas that could be affected by noise and fumes from the generators,
- No known infrastructure that could be affected or relocated during the construction phase,
- All the new infrastructure would be located within the subject property boundaries.
- The proposed action components are located mostly within the FFRMS floodplain.
- PRASA owns the 10.24-acre lot which contains an alternative site.

**Alternative 3** has the following disadvantages:

- The topography and site conditions make it exceedingly difficult for trucks and heavy equipment maneuvering.
- This location would require a terraced site with a two-story structure to accommodate proposed equipment, including a containment wall on the side facing the dam structure which is heavily forested.
- A Riverine Wetland of an unnamed creek is located within a radius of 100 feet west of the project limits on the existing dirt road where paved access would be constructed.
- The alternative site would need the land acquisition of the right-of-way for the access road and additional acquisition of approximately 1,800 square meters for cut and fill activities required to provide a maneuvering area for maintenance vehicles.
- The land acquisition cost is approximately $93,600 in full dominion and $207,324 in right-of-way for a total of $300,924.

Alternative 3 obtained a value of 2.55 in Table 2 key evaluation factors' matrix. The value was under a preferred alternative

### 4.3.3 Alternatives Locations Considered and Dismissed

Several locations were evaluated as alternative sites for the location of the proposed action; however, these have been eliminated as feasible after detailed study and evaluation. These are briefly described as follows.

- Alternative (4) Site Located Next to Represa del Lago La Plata Existing Electrical Facilities: (coordinates: 18.344463°N, -66.234653°W) This alternative site is located approximately 100 meters northeast next to the electrical facilities of Represa del Lago La Plata see **Appendix A Figure 7 Location of Evaluated Alternatives**. This site was the originally preferred location for the proposed action; however, this location was discarded after further analysis revealed that a 54" Ø raw water underground pipeline runs beneath the proposed site. Repositioning of proposed equipment was evaluated however the site remained unfeasible for the development of the proposed action. (See **Appendix A Figure 18 Alternative 4**). Land acquisition requirements for this alternative cannot be determined until a title research study and boundary survey are completed.

During the site visit performed on January 20, 2022, PRASA personnel indicated that the 54-inch raw water force line runs close or very close to the alternative site. PRASA's Infrastructure Department conducted an investigation to validate the information given during the site visit. Several sets of as-built and construction drawings were analyzed and confirmed that the raw water pipeline was indeed passing beneath the construction site. The generators pad location was proposed above the existing 54" Ø Raw Water Pipeline limiting future maintenance. The alternative site needs to be rearranged to avoid the existing 54"Ø raw water pipeline and its ROW. There is considerable earth movement to prepare the flat area for the generators concrete pad and area for maintenance vehicles estimated in 2,970 cubic meters of cut and 606 cubic meters of fill. There are possible needs of retaining walls to provide an area for fuel tank and maintenance vehicles maneuvering. Working on the site could affect the integrity of the line and expose the pipeline to breakage and/or have a portion of it under the concrete pad for the generators. The site is located upstream of the dam; any accidental fuel spill would jeopardize Enrique Ortega WFP operation for hours or days. The site is less than 40 meters from the nearest residence. (**Appendix D Site Visit Report)**

Alternative 4 obtained a value of 2.01 in Table 2 key evaluation factors' matrix. The value was under a preferred alternative

Therefore, based on the considerable earth movement to prepare of the site area, site is located upstream of the dam, any accidental fuel spill would impact Enrique Ortega WFP operation; the known proximity to a 54-inch raw water force line the site needs to be rearranged to avoid the existing pipeline and its ROW; the lack of available space for truck maneuvering; the proximity to the nearest residence, alternative 4 Next to Represa del Lago La Plata Existing Electrical Facilities ("Original Site") was dismissed.

- Alternatives (5 a-c) Sites Located Adjacent to PREPA's Piñas Electrical Substation: Three sites (5a (coordinates: 18.347603°N, -66.230531°W), 5b (coordinates: 18.346479°N, -66.230915°W), and 5c (coordinates: 18.345230°N, -66.230239°W)) adjacent to the Piñas Electrical Substation were evaluated see **Appendix A Figure 7 Location of Evaluated Alternatives**. These locations were evaluated as potential sites to develop the proposed action, however, the distance to existing raw water intake pump station, the elevated electrical construction cost, and proximity to residential areas resulted in the dismissal when compared to other more favorable locations. (See **Appendix A Figure 19 Alternative 5a, Figure 20 Alternative 5b, Figure 21 Alternative 5c**).

The installation of conduits for power wire and fiber optic cable along State Road PR-827 and municipality road to Represa del Lago La Plata would be approximately 710 to 900 meters long to the parallel switchgear at Represa del Lago La Plata main access gate.

Land acquisition and earth movement requirements are detailed in the following table:

| Alternative | Land Acquisition ($m^2$) | Earth Movement ($m^3$) |
|---|---|---|
| 5a | 3,850 | 14,340 |
| 5b | 1,600 | 2,300 |
| 5c | 2,160 | 5,640 |

Alternatives 5a, 5b, and 5c obtained values of 2.05, 2.52 and 2.10 respectively, in Table 2 key evaluation factors' matrix. The values were under a preferred alternative.

Therefore, based on the distance to dam site, a high electrical construction cost, the proximity to the nearest residence, alternatives 5a, 5b, and 5c, Adjacent to PREPA's Piñas Electrical Substation were dismissed.

- Alternative (6) Site Located Northwest to Represa del Lago La Plata: (coordinates: 18.345681°N, -66.237817°W) This alternative site is located approximately 275 meters northwest to Represa del Lago La Plata see **Appendix A Figure 7 Location of Evaluated Alternatives**. This potential site was discarded early in the evaluation due to the existence of high voltage lines that run over a portion of the site. PREPA's (LUMA) typical right of way for 115 KV is 100 feet (30.5 meters) to allow service and maintenance and to comply with safety requirements. When the Right of Way is superimposed on top of the proposed location, the available area for development is reduced considerably, limiting the equipment space and site potential when compared to evaluated alternatives. (See **Appendix A Figure 22 Alternative 6**).

The report Alternatives Sites Evaluation and Recommendation for Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators Phase I included the evaluation of Alternative 6, but it was not valued.

Therefore, based on high voltage lines cross the site in the middle, infrastructure that interfered with alternative, concrete pad would fall in a highly steep terrain, the proximity to the nearest residence, alternative 6 northwest from Represa del Lago La Plata was dismissed.

## 4.4 Summary

Upon analysis of the rural characteristics of the proposed action area and existing infrastructure, it was determined that consideration of sites located north to Represa La Plata Raw Water Intake Pump Station facilities are not compatible with the PRASA's purpose and need for the proposed action. After analysis of alternatives considered, it was determined that:

- The No Action Alternative would not address the project purpose to provide backup power to Represa La Plata Raw Water Pump Station during grid power outages, therefore the continuous operation of the Enrique Ortega WTP will cease due to a shortage of raw water, resulting in the interruption of potable water service to more than 369,000 residential clients, more than 6,000 commercial clients, schools, hospitals, within the Metropolitan area. Lack of potable water carries serious consequences like illness and loss of quality of life, among others.
- Alternative 2 (west to Represa del Lago La Plata facilities) is not deemed appropriate to be selected as the proposed action preferred location due to the environmental impacts associated with earthwork and deforestation of heavily forested areas. The construction costs associated with the alternative is considerably higher when compared to Preferred option.
- Alternative 3 (next to Represa del Lago La Plata facilities) has topography and site conditions make it exceedingly difficult for truck and heavy equipment maneuvering. It would require a terraced site with a two-story structure to accommodate proposed equipment, including a containment wall on the side facing the dam structure which is heavily forested.
- Alternative 4 (next to Represa del Lago La Plata Existing Electrical Facilities) was discarded after further analysis revealed that a 54" Ø raw water underground pipeline runs beneath the proposed site. Repositioning of proposed equipment was evaluated however the site remained unfeasible for the development of the proposed action.
- Alternative 5a (north next to PREPA's Piñas Electrical Substation) would require land acquisition of approximately 3,850 square meters. The installation of conduits for power wire and fiber optic cable along roads would have a length of approximately 900 meters.
- Alternative 5b (south next to PREPA's Piñas Electrical Substation) would require land acquisition of approximately 1,600 square meters. The installation of conduits for power wire and fiber optic cables along roads would have a length of approximately 710 meters.
- Alternative 5c (southeast from PREPA's Piñas Electrical Substation) would require land acquisition of approximately 2,160 square meters. The installation of conduits for power wire and fiber optic cable along roads would have a length of approximately 770 meters.
- Alternative 6 (northwest of Represa del Lago La Plata) was discarded early in the evaluation because high voltage lines cross it right in the middle.
- Proposed action is considered the preferred alternative to be analyzed in this document for compliance with NEPA. It is important to indicate that the design of this proposed action will incorporate measures to prevent the identified risks associated with base flood elevations suggested for the site.
- Therefore, based on the location, proximity to the dam site, the need for a broad flat piece of land structurally sound to withhold an outstanding load, land best accommodates the generators with its related appurtenances, maximizes the use of the available space near dam, land ownership, lower costs associated to the installation of underground electrical lines to pump station building, construction does not affect any known infrastructure, project is not nearby residential areas, new access road would serve as an alternative route to Represa del Lago La Plata facilities.

**Table 1: Alternatives and constraints considered to make a decision[1].**

| | No Action Alternative | Proposed Action | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5a | Alternative 5b | Alternative 5c | Alternative 6 |
|---|---|---|---|---|---|---|---|---|---|
| | | West to Represa del Lago La Plata | West to Represa del Lago La Plata | Next to Represa del Lago La Plata | Northeast next to electrical facilities of Represa del Lago La Plata | North, next to the Piñas Electrical Substation | South, next to the Piñas Electrical Substation | Further South, adjacent to the Piñas Electrical Substation | Northwest to Represa del Lago La Plata |
| Distance to existing raw water intake pump station | NA | 200 meters | 210 meters | 50 meters | 100 meters | 900 meters | 710 meters | 770 meters | 275 meters |
| Electrical construction cost | NA | $11,965,535 | $11,965,535 | $9,776,580 | $8,766,296 | $10,483,480 | $10,109,880 | $10,429,080 | Not Evaluated |
| Earthmoving and grading costs | NA | $236,600 | $1,165,995 | $330,212 | $606,900 | $460,205 | $290,833 | $354,527 | Not Evaluated |
| Proximity to residential areas | NA | 250 meters | 260 meters | 320 meters | 40 meters | 40 meters | 40 meters | 20 meters | 20 meters |
| Proximity to other utility lines | NA | 250 meters | 260 meters | 320 meters | 175 meters | 15.2 meters | 50 meters | 170 meters | 15.2 meters |
| Property within FFRMS floodplain | Yes | Yes | Yes | Yes | No | No | No | No | No |
| Requires land acquisition | NA | ROW | Yes | ROW | Yes | Yes | Yes | Yes | Yes |
| Acquisition cost | NA | $207,324 | $335,764 | $300,924 | Refer to Section 4.3.3 | $200,200 | $83,200 | $112,320 | Refer to Section 4.3.3 |

[1] Direct construction cost is presented. Original cost estimate from 2022 during the planning phase except for the Proposed Action which presents the 30% design planning cost estimate.

**Table 2: Key evaluation factors[2]**

| Key Evaluation Factor | Weight Factor | Proposed Action | Alternative 2 | Alternative 3 | Alternative 4 | Alternative 5a | Alternative 5b | Alternative 5c | Alternative 6 |
|---|---|---|---|---|---|---|---|---|---|
| Closeness to dam site | 0.12 | 4 | 4 | 4 | 5 | 1 | 3 | 2 | |
| No interference with the dam or any other structure that can be considered potentially historical | 0.10 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | |
| Lower electrical construction cost and ease of maintenance logistics | 0.05 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | |
| Impact of fuel spill in the Enrique Ortega WFP operation | 0.15 | 5 | 5 | 4 | 1 | 3 | 3 | 2 | |
| No known infrastructure that could interfere during the construction phase | 0.13 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | |
| Available space for tank truck maneuvering | 0.15 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | |
| Earth movement | 0.05 | 5 | 1 | 2 | 4 | 1 | 5 | 3 | |
| Noise levels affecting nearby residences | 0.12 | 4 | 4 | 4 | 1 | 3 | 2 | 2 | |
| Land acquisition requirement | 0.05 | 2 | 2 | 1 | 3 | 2 | 5 | 4 | |
| Environmental permits and endorsement complexity | 0.08 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | |
| Total | 1.0 | 3.44 | 2.93 | 2.55 | 2.01 | 2.05 | 2.52 | 2.10 | |
| Cost estimate | N/A | $30,122,536 | $32,312,536 | $20,458,655 | $17,883,060 | $22,155,419 | $20,801,946 | $21,736,906 | Not evaluated |

[2] The cost estimate for the Proposed Action and Alternative 2 are based on a developed design. The cost estimate for the remaining alternatives was developed during the project planning phase. The cost are not comparable in terms of detail.
Key evaluation factors: 1 to 5. The higher the overall scoring the better the alternative should be.

# 5 EXISTING CONDITIONS AND AFFECTED ENVIRONMENT

The environmental assessment (EA) is one of the five levels of environmental reviews listed in 24 CFR Part 58 and 24 CFR Part 50. Environmental assessments are essential in determining how a project may affect the environment and how the environment may affect the project.

An Environmental Assessment is required when a proposed project has activities such as new construction or a change in land use. When an environmental assessment is required under 24 CFR 58.36 or 24 CFR Part 50 Subpart E, responsible entities, recipients, applicants, and partners must thoroughly investigate the impacts of the project on the surrounding environment, community, and population and the impacts of the surrounding conditions on the project.

HUD environmental review is the process of reviewing a project and its potential environmental impacts to determine whether it meets federal, state, and local environmental standards. The environmental review process is required for all HUD-assisted projects to ensure that the proposed project does not negatively impact on the surrounding environment and that the property site itself will not have an adverse environmental or health effect on end users. The Project potential environmental impacts are reviewed under the Impact Categories of Land Development, Socioeconomic, Community Facilities & Services, Natural Features, Climate & Energy. Each Impact Category is conformed with several Environmental Assessment Factors.

**Table 3: Environmental Assessment Factors and Categories**

| Impact Categories | Environmental Assessment Factors |
|---|---|
| Land Development | Conformance with Plans |
| | Land Use and Zoning |
| | Scale and Urban Design |
| | Soil Suitability |
| | Slope |
| | Erosion |
| | Drainage/Stormwater Runoff |
| | Hazards and Nuisances |
| | Additional Resources |
| Natural Features | Unique Natural Features |
| | Water Resources |
| | Vegetation |
| | Wildlife |
| | Additional Resources |
| Community Facilities and Services | Educational and Cultural Facilities |
| | Commercial Facilities |
| | Health Care Services |
| | Solid Waste and Sanitary Sewer |
| | Water Supply |
| | Public Safety – Police, Fire, and Emergency Medical |
| | Parks, Open Space, and Recreation |
| | Transportation and Accessibility |
| | Additional Resources |
| Socioeconomic | Employment and Income Patterns |
| | Demographic Character Changes |
| | Displacement |
| | Additional Resources |
| Climate and Energy | Energy Efficiency |

This section discusses the potential impacts and mitigation measures of the **No Action Alternative, Proposed Action, Alternative 2 and Alternative 3**. In accordance with NEPA, the affected environment includes ecological, aesthetic, historic, cultural, economic, social, or health impacts in which the proposed activities would occur, including restorative actions. This EA presents a qualitative evaluation of potential impacts to the affected environment.

Table 3 lists environmental assessment factors to review the project potential environmental impacts, Table 4 presents the impact codes HUD use to describe the impact to the environment while Table 5 describes the duration of the impact. Additionally, impacts to a resource may be **direct, indirect, or cumulative**.

The impact codes established by HUD evaluating impacts for EAs. Based on the relevant information and analysis that is entered for each factor, environmental assessment preparers can make a determination using one of four codes:

**Table 4: Impact Codes to Evaluate Impacts to Environment**

| Impact Code | Description |
|---|---|
| Minor beneficial impact | An outcome of the project is positive in some way, but the community improvement is limited. |
| No impact anticipated | The proposed project will likely have no beneficial or adverse effect on the community. |
| Minor adverse impact | Analysis of the proposal shows that some aspect(s) of the project will negatively affect the community, but the impact can be easily mitigated.<br>While not required, mitigation may be appropriate to improve project and environmental quality. |
| Significant or potentially significant impact | When project impacts would significantly change conditions from this baseline (40 CFR 1501.3(b)), especially in a manner that is adverse and affects one of the environmental assessment factor categories, this is considered a "significant impact." |
| | When there is potential significant impact, NEPA requires either:<br>i. Identification of mitigation measures that reduce the impact below the level of significance (which, for HUD projects, often involves mitigating changes that are adverse).<br>ii. Preparing an Environmental Impact Statement |

**Table 5: NEPA Time Scale**

| Terminology | Definition |
|---|---|
| Temporary | Impacts and recovery occurring only during the construction period. |
| Short-Term | Impacts and recovery occurring during a limited, predictable amount of time up to three years. |
| Long-Term | Impacts and recovery occurring over a period longer than three years but into the reasonably foreseeable future. |

For this EA, the definitions used throughout the document are as follows:

- **Direct impacts**: Caused by the action and occur at the same time and place as the project construction such as vegetation removal, vehicle emissions, or erosion control.
- **Indirect impacts**: Reasonably foreseeable effects occurring later in time or in a different location from the action such as the accumulation of sediments downstream or increased traffic on alternate roads.
- **Cumulative impacts**: Occur when impacts from the project area add to the impacts of other past, present, or reasonably foreseeable future actions such as transportation projects funded by other federal sources.

No adverse impacts have been anticipated by the Proposed Action and Alternatives to the following environmental resources evaluated as part of this Environmental Assessment.

**Water Resources - Sole Source Aquifers**

The Lago La Plata vicinity is on top of limestone and alluvial deposits that occupies a superficial area of approximately 650 square miles in the North Region of Puerto Rico, forming two important aquifers, currently identified as the Shallow or Upper Aquifer, and the Deep or Lower Aquifer.

A Sole Source Aquifers (SSA) is defined by the EPA defines as one where:

- The aquifer supplies at least 50 percent of the drinking water for its service area.
- There are no reasonably available alternative drinking water sources should the aquifer become contaminated.

Under the Safe Drinking Water Act, EPA's SSA program enables the Agency to designate an aquifer as a sole source of drinking water and establish a review area.

The closest Sole Source Aquifer (SSA) is the Miami SSA34a in Florida, about 1,654 km (1,028 miles) from the project limits. (**Appendix A Figure 23 Sole Source Aquifers**). The proposed action would have no impact anticipated to sole source aquifers within or in the vicinity of the project area.

**Water Resources - Wild and Scenic Rivers**

The rivers designated as Wild and Scenic Rivers in Puerto Rico are in El Yunque National Forest administered by U.S. National Forest. (National Parks Service 2024)[3] The Wild and Scenic Rivers in Puerto Rico are the Río Icacos, Río de la Mina, and Río Mameyes, all within the El Yunque National Forest boundaries and located approximately 48 kilometers from the project area. (**Appendix A Figure 24 Wild and Scenic Rivers**).

No impact anticipated to wild and scenic rivers in the vicinity of the proposed action area.

**Natural Features - Unique Natural Features**

Unique natural features are primarily—though not universally—geological features that are rare or of special social/cultural, economic, educational, aesthetic, or scientific value. The key criterion in defining a unique natural feature is the rareness of the feature, a characteristic often recognized as a local landmark. Another characteristic is information content. Some unique natural features contain a great deal of information concerning natural history, such as geological evolution or paleontological history.[4]

One example of unique natural features is an endemic (i.e., localized) plant/animal communities. The Elfin-Woods Warbler (Reinita de Bosque Enano) (*Setophaga angelae*) (50 CFR 17)[5] , endemic bird to Puerto Rico, USFWS determined to be a threatened species. The Toa Alta area was not included as critical habitat for the species.

No unique natural features have been identified within or adjacent to the proposed action area, therefore, no impact anticipated to these environmental resources by the proposed action.

[3] National Parks Service. (2024). Wild and Scenic Rivers. Retrieved from Wild & Scenic Rivers (arcgis.com) on February 8, 2024.
[4] HUD Exchange https://www.hudexchange.info/programs/environmental-review/environmental-assessment/guide/natural-features/
[5] Federal Register / Vol 81, No. 120 / Wednesday, June 22, 2016 / Rules and Regulations 50 CFR Part 17

**Coastal Resources - Coastal Barrier Resources**

Coastal resources[6] include all natural resources occurring within coastal waters and their adjacent shorelands such as islands, transitional and intertidal areas, salt marshes, wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as fish and wildlife and their respective habitats within these areas.

Coastal resources and ecosystems are particularly vulnerable to the effects of development. They encompass sensitive soils and vegetation as well as unique land forms like barrier reefs and wetlands that play an important part in the health and protection of upland areas.[7]

Potential measures to mitigate impacts range from hard engineering structures, designed to physically shield the coast, to softer, more environmentally harmonious approaches. Understanding these diverse methods is key to implementing effective coastal protection strategies.

Hard engineering approaches involve constructing physical structures to protect coastlines against the forces of nature. These methods are often visible and immediate in their impact, offering robust defense against erosion and sea level rise.

The Coastal Barrier Resources Act (CBRA) of 1982 designated relatively undeveloped coastal barriers along the Atlantic and Gulf coasts as part of the John H. Chafee Coastal Barrier Resources System (CBRS) and made these areas ineligible for most new Federal expenditures and financial assistance. The Coastal Barrier Improvement Act (CBIA) of 1990 reauthorized the CBRA and expanded the CBRS to include undeveloped coastal barriers along the Florida Keys, Great Lakes, Puerto Rico, and U.S. Virgin Islands.[8]

The Proposed Action is located approximately 14.2 kilometers from the nearest coastal barrier resource system of Punta Salinas, which is located at the north coast, (see **Appendix A, Figure 25 - Nearest Coastal Barrier Resource System**). There are no Coastal Barrier Resource System units in the vicinity of the project area and the town of Toa Alta, therefore no impact anticipated to coastal barrier resources. The Proposed Action is in compliance with the Coastal Barrier Resources Act.

**Coastal Resources - Coastal Zone Management**

In the context of environmental conservation and sustainable development, the continuing importance of coastal management is to combat the detrimental and increasingly widespread effects of coastal erosion, a phenomenon that poses significant threats to various aspects of both human and natural environments.

Coastal management involves strategies and actions designed to protect and preserve coastal areas. It plays a crucial role in preventing erosion, a natural process accelerated by human activities. Effective coastal management not only helps in maintaining the natural landscape but also ensures sustainable development along coastlines, balancing ecological preservation with human needs.

Coastal management employs a variety of techniques, each tailored to address specific challenges posed by coastal erosion and human impact. Understanding the various techniques of coastal management is crucial in the efforts to protect and preserve our coastlines safeguarding towns, heritage sites, landmarks, beaches, and wildlife. It calls for a collective effort from communities, policymakers, and businesses to adopt sustainable practices in coastal management. Continued research and innovation in this field are imperative to adapt to the ever-evolving environmental challenges, ensuring the longevity and health of our coastal environments.

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[6] FAA Desk Reference https://www.faa.gov/media/31116 Coastal Resources
[7] HUD Exchange
https://www.hudexchange.info/programs/environmental-review/coastal-zone-management/
[8] HUD Exchange
https://www.hudexchange.info/programs/environmental-review/coastal-barrier-resources/

The Coastal Zone Management Program (CZMP) is authorized by the Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451 et seq) and administered at the federal level by the Coastal Programs Division within the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management (NOAA-OCRM).

NOAA's Coastal Programs Division is responsible for advancing national coastal management objectives and maintaining and strengthening state and territorial coastal management capabilities. It supports states through financial assistance, mediation, technical services and information, and participation in priority state, regional, and local forums. Federal assistance to applicant agencies for activities affecting any coastal use or resource is granted only when such activities are consistent with Federally approved state coastal zone management plans.

Projects that can affect the coastal zone must be carried out in a manner consistent with the state coastal zone management program under Section 307(c) and (d) of the Act, as amended.

The Proposed Action is approximately 10.6 kilometers from the nearest coastal zone management area. (see **Appendix A Figure 26 Nearest Coastal Zone Management Area**). The proposed action would occur on land outside of the Coastal Zone Management Area (CZMA), therefore, no impact anticipated to this resource. The Proposed Action is in compliance with the Coastal Zone Management Act.

**Cultural Resources - American Indian/Native Hawaiian/Native Alaskan Cultural/Religious Sites**

No American Indian/Native Hawaiian/Native Alaskan Cultural/Religious Sites within the area.

Puerto Rico Historic Preservation Office reviewed the proposed action in accordance of Section 106 of the National Historic Preservation Act and agreed that the proposed project with the established conditions will have no adverse effect upon historic properties. (see **Appendix F SHPO Section 106 Consultation**).

The Proposed Action would have no impact anticipated to American Indian/Native Hawaiian/Native Alaskan Cultural/Religious Sites.

**Airport Hazards**

No adverse impacts have been identified associated to airports' locations or operations. The proposed action site is located approximately 84,320 ft. (25.7 km, 15.96 miles) from the Luis Muñoz Marín International Airport, a Joint Use (civil and military) / military airport, in Carolina (outside of the 15,000 feet regulated distance for the Accident Potential Zone), and 61,655 ft. (18.8 km, 11.67 miles) from the Fernando Luis Ribas Dominicci Regional Airport, the nearest civil airport in Isla Grande, San Juan (outside of the 2,500 feet regulated distance for the Runway Protection Zone). (see **Appendix A, Figure 27 - Luis Muñoz Marín International Airport and Figure 28 Fernando Luis Ribas Dominicci Regional Airport Locations**).

The location of the Proposed Action is not within 15,000 feet from a military airport or within 2,500 feet of a civil airport, therefore, no impact anticipated to airport facilities. The proposed action complies with Airport Hazards requirements (24 CFR Part 51 Subpart D). Further, based on the distances, the proposed action is not located within the Runway Protection Zone (RPZ) or Accident Potential Zone (APZ) of these airports. No mitigation is required.

## 5.1 Land Development

The Land Development impact category consists of the physical elements of the potential project and project area. Environmental Assessment Factors to evaluate are Conformance with Plans, Compatible Land Use and Zoning, Scale and Urban Design, Soil Suitability, Slope, Erosion, Drainage/Stormwater Runoff, and Hazards and Nuisances. This section reviews the extent to which their project will affect or be affected by topography, geology, hydrology, and other potential impacts.

Land development is a dynamic and intricate process that shapes the physical and social fabric of our communities. It involves a series of meticulous steps, from initial evaluation and planning to construction and beyond. Through careful consideration of environmental factors, collaboration with stakeholders, and adherence to regulations, land development endeavours to strike a balance between economic prosperity, social well-being, and environmental sustainability.

The types of land development such as residential, commercial, industrial, infrastructure, recreational, agricultural cater to diverse human needs and aspirations. Each type serves a unique purpose in enhancing the liveability, functionality, and resilience of our built environment. From providing housing and employment opportunities to preserving natural habitats and fostering leisure activities, land development plays a vital role in shaping the places to live, work, and play.

### 5.1.1 Conformance with Plans

Comprehensive land use plans determine land use within the vicinity of urban and rural areas. These plans specify the types of present and future land development that can occur within a specified area. In most cases, the preparation of comprehensive land use plans occurs through a public participation process. Once finalized, publicly elected officials approve the land use plans. The intent of this process, which involves public participation, is to capture local values and attitudes towards future development. Within Puerto Rico, zoning ordinances and land use regulations vary substantially depending upon location and municipality.

The Puerto Rico Land Use Plan (Land Use Plan), enacted in 2015, establishes general classifications of land use according to its characteristics and values (existing and potential) (PRPB 2015)[9]. Based on the Land Use Plan, both PRPB and the municipalities update the zoning maps and the municipal zoning plans, respectively. Updates to the plan comply with due process regarding public participation and the Uniform Administrative Procedure Law (Law 170-1988, as amended).

PRASA acquired the parcel considered for the emergency generators facility when Represa del Lago La Plata was built (circa 1974), and no other uses have been proposed other than infrastructure/institutional uses.

The Enrique Ortega Water Treatment Plant is part of the Metropolitan Potable Water System (PWSID 2591), with a service area of a population of 369,000 inhabitants. Currently the Represa del Lago La Plata is considered a critical facility to provide raw water for Enrique Ortega WTP. The La Plata Raw Water Intake (RWI) is located at Lago La Plata. The proposed action will provide an emergency energy source for the raw water pump station to allow Enrique Ortega WTP continuous operation during grid power outages.

The proposed action addresses the need to maintain continuous operation of Enrique Ortega WTP during grid power outages. The proposed action is part of PRASA medium (5-year) to long-range (25-year) plans for the La Plata vicinity, the Quebrada Cruz Ward, the municipality of Toa Alta or the Metropolitan Service Area.

[9] Puerto Rico Planning Board (PRPB). 2015. Land Use Plan Land Management Guidelines. November 2015.

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain. Alternative 2 addresses the need to maintain continuous operation of Enrique Ortega WTP during grid power outages.

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building. Alternative 3 addresses the need to maintain continuous operation of Enrique Ortega WTP during grid power outages.

No specific comprehensive plan has been developed for the community of Quebrada Cruz Ward. The proposed action improves the reliability of the potable water system for the community.

**No Action**

Under the No Action alternative, the Conformance with Plans would not change. No Action would have no impact anticipated on the Conformance of Plans.

**Proposed Action**

The proposed action makes reliable PRASA potable water infrastructure for the service area. The proposed action would have a direct, long-term, beneficial impact on future comprehensive plans. The proposed action is in compliance with the Statutes, Executive Orders or Regulations.

**Alternative 2**

Alternative 2 makes reliable PRASA potable water infrastructure for the service area. Alternative 2 would have a direct, long-term, beneficial impact on future plans.

**Alternative 3**

Alternative 3 makes reliable PRASA potable water infrastructure for the service area. Alternative 3 would have a direct, long-term, beneficial impact on future plans.

### 5.1.2 Land Use and Zoning

The way humans use land, and how land use is changing, has many impacts on the environment. Effects of land use choices and changes by humans include, for example urban sprawl, soil erosion, soil degradation, land degradation and desertification.

Land use changes occur constantly and at many scales and can have specific and cumulative effects on air and water quality, watershed function, generation of waste, extent and quality of wildlife habitat, climate, and human health.

Human alteration of landscapes from natural vegetation (e.g., wilderness) to any other use can result in habitat loss, degradation, and fragmentation, all of which can have devastating effects on biodiversity. Land conversion is the single greatest cause of extinction of terrestrial species.

Zoning regulates development patterns including the density, construction, alteration, and use of buildings, structures, or land. A community's zoning ordinance is the principal legal tool available for the implementation of its comprehensive plan and the definition of the community's land use policies.

Within the project area, the land classifications are mainly Specially Protected Rustic Land – Hydric, specifically where the generators and its components and part of the paved access are proposed .The objective of this classification is to protect land designated as rustic land that has a special hydric value because it is associated with reservoirs, as well as with main rivers and catchment areas. The eastern end of the access road is classified as Common Rustic Land.

The Proposed Action site has been zoned as Watershed Conservation (CR-C), equivalent to Resources Conservation (C-R)(PRPB, 2023) and Rural General (R-G), according to the Zoning Map of the Municipality of Toa Alta, effective on October 18, 2012. (see, **Appendix A, Figure 29 - Land Use & Zoning**). The OGPe 2023 Joint Regulation kept the R-G zoning as part of the equivalences made to municipal maps to standardize zoning requirements Islandwide.
The Represa del Lago La Plata was constructed in the early 1970's decade. The Proposed Action site is adjacent to the reservoir dam, and it has been vegetated open land for years since the construction of the dam. A dirt road also exists in the proposed action site. This area was previously impacted as it was used as part of a project to repair the scours found at the base of Represa del Lago La Plata structure between 2021 and 2022.

The Proposed Action development would disturb a vegetated open land, although previously impacted, as a result of previous activities performed to repair the scours found at the base of Represa del Lago La Plata structure. The proposed action is considered an allowed use in the zoning districts that affect the proposed action site. (see **Appendix A, Figure 29 - Land Use & Zoning**). The Resources Conservation (C-R) district allows facilities for infrastructure services that are necessary for the allowed uses. The Rural General (R-G) district allows general infrastructure uses. The location of the proposed action does not contribute to urban sprawl.

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain. This alternative will require land acquisition to accommodate the project components.

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building. Additional land acquisition (1,800 square meters) activities should occur to provide the Alternative with a maneuvering area for large trucks and maintenance vehicles.

**No Action**

Under the No Action alternative the Land Use and Zoning would not change. No Action would have no impact anticipated on the Land Use and Zoning.

**Proposed Action**

No impact anticipated is associated to the development of the Proposed Action on existing land uses or zoning within or adjacent to the Proposed Action area. The proposed action is in compliance with the Statutes, Executive Orders or Regulations, as applicable. The Land Use and Zoning would be suitable / compatible with proposed action.

**Alternative 2**

No impact anticipated is associated to the development of the Alternative 2 on existing land uses or zoning within or adjacent to the alternative area.

**Alternative 3**

No impact anticipated associated to the development of the Alternative 3 on existing land uses or zoning within or adjacent to the alternative area.

### 5.1.3 Scale and Urban Design

Site Planning shows the existing and proposed conditions of a parcel of land, including topography, vegetation, drainage, floodplains, waterways, open spaces, walkways, means of ingress and egress, utility services, landscaping, proposed structures and signs, lighting, screening devices, and other information. Site planning is key to balancing or mitigating the impacts of a proposed project in the context of existing site and community conditions. Visual impacts are changes to the landscape scenic attributes and the human experience of it. Visual quality derives from the way elements of the natural and built environments relate to each other to create a sense of harmony.

The project area is adjacent to the La Plata Reservoir Wildlife Refuge and Finca Vizcarrondo, however the site is not located within or is considered part of the natural reserve area. The Río La Plata: located north of the proposed property, the Río La Plata flows into the main channel between Toa Alta and Dorado. The project will not affect nor have an impact on these systems. The project area surroundings are the mountains of Toa Alta at elevations between 16 m and 110 m.

The Project area where the generators are proposed to be installed has a slope ranging from 6.1 to 37.0%. No special soil conditions, foundation issues, settling, have been identified in areas within the Proposed Action. The Proposed Action area has an existing dirt road that provides access to the facility premises. The project area (access road, power generators site, staging area) was previously impacted as it was used as part of a project to repair the scours found at the base of Represa del Lago La Plata structure between 2021 and 2022. (**Appendix A Figure 5 Proposed Site Historical Aerial Views**)

Through the extension of the proposed site boundary, one (1) main vegetative association was classified as: Areas of previously impacted land (100%). The vegetation observed throughout these areas is fast-growing grasses and shrubs typical of previously disturbed areas. Outside the footprint, particularly to the east of the property where the dam is located, the Proposed Action would impact scattered trees. Outside the proposed action area, the project would also impact forest patches of secondary succession, which are observed to border much of the extension of the dirt road. **Appendix C Flora and Fauna Study**

The Project Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators is in a FFRMS floodplain. The area identified to install the new generators has a level grading with few trees. The layout will require limited earthworks in this area due to the current condition. Project area within FFRMS floodplain is estimated in 7,043 square meters. The proposed grading or levels for the generators and equipment will be 2.0 feet (0.61 m) above the 0.2PFA

The proposed location for the new Generators Area is outside of wetlands on the USFWS National Wetlands Inventory (USFWS 2020). The Riverine Wetland of Río La Plata (R2UBH) is outside of 100 feet north of the project limits. (see **Appendix A, Figure 14 - Wetlands Protection**). The Riverine Wetland of an unnamed creek that may possibly be affected is located within a radius of 100 feet west of the project limits at two points on the existing dirt road where a paved access would be constructed. The Project Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators is located within a radius of 100 feet of a riverine wetland. (see **Appendix A, Figure 15 - Unnamed Creek Riverine Wetland**). The visual quality from the Camino Recreativo La Plata, La Plata Reservoir Wildlife Refuge is maintained intact due to the topography of the site that maintains the project site hidden or covered. The project design considered the riverine wetland, as mentioned above, there should be minimal impact during the construction phase. The Engineer included notes on the drawings notifying the Contractor to obtain all required permits during the construction phase. One of those permits is soil erosion control. No additional design efforts are deemed required to protect the riverine wetland.

The generators platform would occupy an area of approximately 1,278 $m^2$. The parcel of the site has an area of 200,288 $m^2$. The platform would occupy 0.638% of the parcel area.

Alternative 2 requires land acquisition. The alternative site would need 2,470 square meters to place the generators platform and would affect approximately 1,038 trees causing visual impacts inside the parcel. The visual quality from the Camino Recreativo La Plata, La Plata Reservoir Wildlife Refuge is maintained intact due to the topography of the site that maintains the alternative site hidden or covered.

Alternative 3 requires additional land acquisition (1,800 square meters) activities should occur to provide the Alternative with a maneuvering area for large trucks and maintenance vehicles. The visual quality from the Camino Recreativo La Plata, La Plata Reservoir Wildlife Refuge is maintained intact due to the topography of the site that maintains the alternative site hidden or covered.

**No Action**

Under the No Action alternative, the project will not occur, and land would not be developed. The No Action alternative would have no impact anticipated upon the area's site planning.

**Proposed Action**

The action would have direct, temporary, minor adverse impact on the visual quality of the proposed action area, mostly during the construction activities. Once construction activities have been completed the Proposed Action components will be part of Represa del Lago La Plata, softening the potential aesthetic impacts of the area. The proposed action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

The action would have direct, long term, minor adverse impact on the visual quality of the Project area, mostly during the construction activities. Once construction activities have been completed the alternative components will be part of Represa del Lago La Plata, softening the potential aesthetic impacts of the area.

**Alternative 3**

Alternative 3 would have direct, short term, minor adverse impact on the visual quality of the Project area, mostly during the construction activities. Once construction activities have been completed, the alternative components will be part of Represa del Lago La Plata, softening the potential aesthetic impacts of the area.

### 5.1.4 Soil Suitability

Soil suitability is a measure of how well the qualities of the soil support the requirements of the proposed land use. Surface and bedrock geological conditions also affect site suitability for development. Most soils are suited for development, and adverse soil conditions can be overcome by installing drainage, replacing soil with structural fill, or using special foundations. However, these measures can significantly add to project costs or conflict with resource management goals such as the preservation of floodplains, wetlands, or farmlands.

**Geology**

Geologic and topographic characteristics such as shallow bedrock, steep slopes or excessive erodibility can affect the engineering design, method of construction, potential environmental impacts of the alternatives under evaluation and the effectiveness of impact minimization measures. Soil characteristics within a given area rest on the composition of material in the area and described by "soil series" based on their origins, chemical and physical properties, and slope.

The geological materials that emerge in the Municipality of Toa Alta are the product of the extrusive and intrusive igneous activity that initially dominated the nature of geological processes. These include the Santa Olaya Lava, Cerro Gordo Lava, Cancel Breccia, Toba Pájaros and other volcanic rocks. These geological materials were formed during the Cretaceous period, in the late Mesozoic and early Tertiary periods. On the other hand, the Karst region is comprised of limestone rocks and varied sediments that formed under the sea in the middle of the Tertiary period. These include the Lares, Aguada, Cibao Formations, including the Arena Mucarabones and the San Sebastian Formation. The alluvial deposits, alluvial sediments, alluvial terraces, detrital flows, and landslides are of Quaternary age, mostly from Holocene or more recent. Alluvial materials consist of varying proportions of silt, sand, gravel, pebbles, and boulders. The terrace deposits consist of clay, silt, and sand that were part of an ancient floodplain that was elevated as a result of fluvial dissection processes in the area adjacent to the banks of the Río La Plata. (see **Appendix A, Figure 30 - Geology**) The USGS describes the geologic formations of the areas where the project components are proposed as:

- ***Kcn*** (Canóvanas Formation) – Basaltic, volcanic sandstone, shale. Estimated maximum thickness, 200 m. Exhibited in the quadrilaterals of Gurabo and El Yunque.
- ***Ks*** (Sabana Grande Formation) – volcanic rocks, conglomerates, sandstones and siltstones, and minor flows of basalt and limestone lenses. Estimated minimum thickness 1 m. Exposed in the quadrilaterals of Sabana Grande, San Germán, Puerto Real, Mayagüez and Rosario.

The geological formations in the area where the proposed generators will be installed, its components and a portion of the access road (north and northeast area) correspond to tuff and tuff breccias (Kcn). The remainder of the access road to the project is in the geological formation of solidified volcanic fine sediment, breccias, limestone, and high lava in pyroxenes (Ks).

The geological materials that emerge in the Municipality of Toa Alta are the product of extrusive and intrusive igneous activity. No special soil conditions, foundation issues, or settling have been identified in areas within the Proposed Action. The Action manages storm water runoff appropriately to prevent erosion.

As part of the proposed action, cut and fill activities will be performed to guarantee project components elevation complies with FEMA ABFE 0.2% requirements. No special soil conditions, foundation issues, settling, have been identified in areas within the Proposed Action as determined in the Geotechnical Investigation conducted by Geo Cim. (See **Appendix G Geotechnical Investigation Report**). Soil depth is adequate for the excavation of basements, underground utility trenches. Surface and bedrock geological conditions are suitable for development.

Alternative 2 earthwork would require 103 cubic yards of cut, 17,717 cubic yards of rock excavation, and 3,078 cubic yards of fill. Requires land acquisition.

Alternative 3 earthwork would cover an area of 8,250 square meters (2.04 acres) with an estimated to be 9,500 cubic meters of cut and 3,500 cubic meters of fill. Additional land acquisition (1,800 square meters) activities should occur to provide the Alternative with a maneuvering area for large trucks and maintenance vehicles.

**No Action**

Under the No Action alternative, the geologic characteristics of the project area would not change. There would be no effects on the Geology of the area. Since the No Action Alternative does not involve subsoil or above-ground activities, it would have no impact anticipated upon the area geology.

**Proposed Action**

The modification of current site topography is considered minimal; therefore, no impacts anticipated to topography and geology within proposed action area. No impacts anticipated have been identified to the physical features, including Karst areas, or any other existing geological characteristic of the land or neighboring properties.

**Alternative 2**

The modification of the Alternative 2 site topography is considered major when compared to the proposed action; therefore, direct, long-term, minor adverse impact to topography and potential soil stabilization measures will need to be implemented to minimize landslides within alternative area.

**Alternative 3**

As Alternative 3, the modification of the existing site topography is considered a major disturbance when compared to the proposed action; therefore, direct, long-term, minor adverse impact to topography and potential soil stabilization measures will need to be implemented to minimize landslides within project area.

**Soils**

According to the USDA Natural Resource Conservation Service (NRCS) Web Soil Survey database, the land where the proposed action is proposed (asphalt access roads, generator installation area, diesel storage tank area, and electric room) contain diverse types of soils (**Appendix A Figure 31 Soils Map**). Below is the description of these by classification:

- ***Lomic clay caguabo*** *(CaF):* 40-60% inclination. Shallow, well-drained, slightly acidic soil, moderately fine texture, very craggy. The permeability is moderate and the moisture holding capacity is low. Runoff is rapid. Natural fertility is high. It is difficult to work with due to its excessive drained soil.
- ***Clay reeds*** *(JuC):* 5-12% incline. It is deep, well-drained, slightly acidic to neutral soils, fine texture, slow permeability, moderate water-holding capacity, rapid runoff, and erosion is a hazard. Landslides are common in road cuts, ditches, and drains. This soil is difficult to work with due to the slope and plasticity of the clay. The root zone is deep. Natural fertility is high.
- ***Clay Mabi*** *(MaB):* 0-2% slope. Deep soils, somewhat poorly drained soils, very strongly acidic to moderately alkaline, fine texture, slow permeability, high water holding capacity and slow runoff. The root zone is deep, and the angle of the soil surface is slightly inclined. This soil is difficult to work with due to the plasticity and stickiness of the clay. The root zone is deep, and the natural fertility is high.
- ***Clay mucara*** *(MxF):* 40-60% slope. Soil moderately deep to volcanic rock, well drained, fine texture, slightly acidic, very craggy with permeability and moderate erosion. The water holding capacity is low. Runoff is very rapid, and fertility is moderate. The subsurface has a high potential for expansion.
- ***Clay mucara*** *(MxE):* 20-40% slope. Moderately deep, well-drained, slightly acidic to neutral soils, fine texture, moderate permeability, low water holding capacity, very fast runoff, and erosion hazard. Landslides are common on roads, ditches, and drains. The soil is difficult to work because they are craggy and because of the stickiness of the clay. The root zone is moderately deep. This soil is fertile.
- ***Quarries and Gravel Sheds*** *(GPQ).* Soils with deposits of rocks, sands, or minerals.

The proposed four (4) new 2,500 kW generators, including two new diesel storage tanks, will be installed on mostly classified *MxF* and *GPQ* soil types. The soil where the construction phase staging area is proposed is classified as a *CaF* soil type. The soils where the new access road will be built are classified as MxF, *CaF, MxE, MaB and JuC*. The deposit of rocks at the edge of the slope towards Río La Plata provides a natural solid containment wall and basement that prevents the possibility of landslides occurrence.

The proposed action cut, and fill activities will be performed to guarantee project components elevation complies with ABFE 0.2% requirements. The modification of current ground elevation is considered minimal; therefore, no adverse effects have been identified to the physical features of the land or neighboring properties.

The project would disturb an estimated area of 9,814 $m^2$ (2.42 acres). The staging area would be the same area used as part of a project to repair the scours found at the base of Represa del Lago La Plata structure, approximately 917 $m^2$ (0.23 acre). This was preferred to minimize impacts to forested areas and reduce earthworks materials leveling/extraction and costs associated with these activities.

MxF soil is described as *moderately deep to volcanic rock, well drained, fine texture, slightly acidic, very craggy with permeability and moderate erosion. The water holding capacity is low. Runoff is very rapid*. Soil suitability is the physical capacity of soil to support a particular land use. To be suitable for a building, for example, the soil must be capable of adequately supporting its foundation without settling or cracking. MxF soil is suitable to withhold an outstanding load of the emergency generators platform. The soil should be well drained so that basements remain dry.

**No Action**

The physical feature of Soils would not change under the No Action alternative. The area is outside the Karst Zone. Land surface erosion would continue and may increase due to poor areas' stormwater management. No Action would cause direct, long-term, minor adverse impact on Soils nearby.

**Proposed Action**

Soil depth is adequate for the excavation of basements, underground utility trenches. Surface soils are capable of supporting plantings. The generators platform construction will include a design of a stormwater management system to control runoff to and from site. The proposed action would manage storm water runoff appropriately to prevent erosion. Soil types encountered in the generator's platform and the access road sites would be suitable / compatible with Proposed Action. The Proposed Action would cause direct, long-term, minor impact to the soil of the site. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

The project area is outside the APE-ZC Karst Zone (APE-ZC for its Spanish acronym, Area de Planificación de la Zona Cársica) as shown in (**Appendix A Figure 32 Karst Special Planning Area (PRAPEC)**). The project would cause no impact anticipated on Karst areas.

**Alternative 2**

Alternative 2 location has a steep slope. The earthwork would require 103 cubic yards of cut, 17,717 cubic yards of rock excavation, and 3,078 cubic yards of fill, considered a major leveling, clearing, and grubbing activities. Best Management Practices (BMPs) refers to a practice, or combination of practices, which are effective and practical in preventing or reducing the amount of pollution generated by nonpoint sources. BMPs can be structural (e.g., silt fence, groundcover vegetation) or administrative (e.g., maintenance frequency). BMPs can be classified as Erosion Prevention, Sediment Control, Runoff Control, among others. Examples of practices include the installation of geotextile material, fiber rolls, hay bales and silt fences. The design stormwater management system would control runoff.

Alternative 2 project would cause direct, long-term, minor adverse impact to the soil of the site. The action would cause no impact anticipated on Karst areas.

**Alternative 3**

This location presents a variable topography with no visible runoff conveying areas. The earthwork would cover an area of 8,250 square meters (2.04 acres) with an estimated to be 9,500 cubic meters of cut and 3,500 cubic meters of fill. Additional land acquisition (1,800 square meters) activities should occur to provide the Alternative with a maneuvering area for large trucks and maintenance vehicles. BMPs can be classified as Erosion Prevention, Sediment Control, Runoff Control, among others. The design stormwater management system would control runoff.

Alternative 3 project would cause direct, long-term, minor adverse impact to the soil of the site. The action would cause no impact anticipated on Karst areas.

**Floodplains**

HUD's regulations in 24 CFR Part 55, outlines HUD's procedures for complying with EO 11988, Floodplain Management, Executive Order 11990, Protection of Wetlands, and Executive Order 13690, Federal Flood Risk Management Standard (FFRMS). Part 55 applies to all HUD actions that could be harmed or cause harm if located in floodplains or wetlands. Covered actions include the proposed acquisition, construction, demolition, improvement, disposition, financing, and use of properties located in floodplains or wetlands for which approval is required either from HUD, under any HUD program. Part 55 does not prohibit approval of actions in a floodplain or wetlands but provides a consistent method for implementing HUD interpretation of the EO in the projects approval decision-making processes to comply with EO 11988, EO 11990, and EO13690 and avoid unnecessary impacts.

Executive Order 13690 established a Federal Flood Risk Management Standard (FFRMS) and a Process for Further Soliciting and Considering Stakeholder Input (2015) – revised EO 11988 established a new FFRMS to address current and future flood risk, improve resiliency, and ensure that projects funded with taxpayer dollars last as long as intended.

The ***Executive Order 14030*** – ***Climate-Related Financial Risk*** (2021) reinstates EO 13690 (revoked in 2017) and clarifies that the FFRMS and the guidelines for floodplain management under EO 11988 remain in effect.

On March 24, 2024 the Housing and Urban Development Department (HUD) published a final rule - *Floodplain Management and Protection of Wetlands; Minimum Property Standards for Flood Hazard Exposure; Building to the Federal Flood Risk Management Standard.* This final rule became in effect a regulatory requirement on June 24, 2024. This 8 Step decision making process has been performed to comply with FFRMS new final rule. The Final Rule defines a new floodplain of concern from the 1-percent-annual-chance-floodplain to the FFRMS floodplain, designated based on projected future flood risk, to ensure that HUD projects are designed with a more complete picture of a proposed project site's flood risk over time. This final rule expands the floodplain to a higher vertical elevation and corresponding horizontal floodplain area (FFRMS floodplain) that addresses current and future flood risk due to future changes. Implementing the FFRMS, the Federal agencies were to select among the following three approaches for establishing the flood elevation and hazard area in siting, design, and construction.

EO 13690 established three approaches for determining the FFRMS flood elevation: **Climate-Informed Science Approach (CISA), 0.2-Percent-Annual-Chance (500-Year) Flood Approach (0.2PFA), Freeboard Value Approach (FVA)**. Under Part 55, HUD has adopted these approaches and established a preference for the Climate-Informed Science Approach (CISA) where it is available and actionable.

**Climate-Informed Science Approach (CISA)** defines the FFRMS floodplain as the elevation and flood hazard area that results from using a CISA that uses the best-available, actionable, hydrologic, and hydraulic data. HUD permits the voluntary use of federal CISA data where available and actionable and permits the voluntary use of formally adopted local CISA data, as described in 24 CFR 55.7.

**0.2 Percent Annual Chance Floodplains (or 500-Year Floodplains)** are areas with at least a 0.2% chance of flood occurrence in any given year. HUD requires critical actions (e.g., hospitals, nursing homes, police stations, fire stations, and roadways providing sole egress from flood-prone areas) to comply with Part 55 when they are located in the 500-Year floodplain. 500-Year floodplains are designated as a shaded Zone X.

**Freeboard Value Approach (FVA)** defines the FFRMS floodplain as the elevation and flood hazard area that result from adding 2 feet to the base flood elevation (BFE) for non-critical actions or adding three feet to the BFE for critical actions. This approach is used for noncritical actions if neither CISA data nor FEMA-mapped 0.2-percent-annual-chance floodplain data is available or actionable. For critical actions, the higher, 0.2PFA or FVA must be used.

Climate-Informed Science Approach (CISA) is not available. Instead, HUD Exchange Floodplain Management advice to use 0.2-Percent-Annual-Chance (500-Year) Flood Approach (0.2PFA), or Freeboard Value Approach (FVA).

As the administrator of the NFIP, FEMA created the Advisory Base Flood Elevation (ABFE). The ABFE information serves as a guide to understand current flood hazard conditions and higher elevations that communities should build to reduce impacts of similar storm events in the future. Following Hurricane María, FEMA re-evaluated and re-mapped the floodplain based on high- water marks from the disaster and prepared the ABFE. The PRPB issued a resolution (JP-ABFE-01 and ABFE-02) in 2018 requiring the use of the ABFE maps for permitting processes.

**Critical Actions** defined in EO 13690 as any activity for which even a slight chance of flooding is too great. Examples of critical actions are siting structures such as (but not limited to):

- Those which produce or store highly volatile, toxic, radioactive, or water-reactive materials.
- Those with occupants who may have limited mobility (e.g., hospitals, nursing homes, prisons, schools, animal care facilities).
- Research facilities of significant value to research communities.
- Emergency operations centers.
- Data centers that hold physical or electronic records without copies or backup.
- Utilities, critical equipment, system, networks, or functions that are essential or irreplaceable (e.g., water, power, communication, evacuation routes).
- Those that hold items of substantial cultural significance.
- Infrastructure that provides access to critical facilities or services.

HUD's regulations in 24 CFR Part 55 outline HUD's procedures for complying with EO 11988, Floodplain Management, and Executive Order 13690, Federal Flood Risk Management Standard (FFRMS). HUD's Final Rule to implement FFRMS was published on April 23, 2024. The Final Rule defines a new floodplain of concern, the FFRMS floodplain, which extends beyond the 100-year floodplain. The Final Rule also defines the viable approaches to determining the extent of the FFRMS floodplain designed to account for increased flood risk over time. The Final Rule requires an increased elevation for new construction and substantially improved structures in the FFRMS floodplain and provides other clarifications and updates. Compliance with the Part 55 Rule is required after June 24, 2024, for most HUD grant and subsidy programs; however, compliance with this Final Rule's amendments to Part 55 is required no later than January 1, 2025. Part 55 applies to HUD actions that could be harmed or cause harm if located in floodplains or wetlands.

HUD Exchange Floodplain Management webpage advises to use 0.2-Percent-Annual-Chance (500-Year) Flood Approach (0.2PFA), or Freeboard Value Approach (FVA). The latest source to determine whether the project is in or near a floodplain: Flood Hazard Boundary Map – Advisory Base Flood Elevations (ABFE) (Panel 72000C0705J, April 13, 2018) for the 8-step decision-making process. HUD regulations on conducting the 8-Step Process are contained in 24 CFR Part 55 for complying with EO 11988 (as amended by EO 13690), Floodplain Management, Executive Order 11990, Protection of Wetlands, and Executive Order 13690, Federal Flood Risk Management Standard (FFRMS). The 8-Step Decision Making Process document is included as **Appendix H 8-Step Decision Making Process.** The Public Notice for the draft EA will be published by HUD and will include the notice for the 8-Step process.

**No Action**

Under the No Action alternative the FFRMS Floodplain would not change. No Action would cause no impact anticipated on the area's FFRMS floodplain.

**Proposed Action**

The proposed location for the new Generators Area is within the Flood Zones A and Shaded X (or ABFE 1% and FFRMS 0.2% Chance, respectively) areas with a 1% and 0.2% annual chance, respectively, of flooding as per FEMA Advisory Base Flood Elevation Maps, Panel 72000C0705J, effective date April 13, 2018 (**Appendix A Figure 33 FEMA Advisory Data**). The proposed site is between the FFRMS 0.2% elevations 33.51 m and 35.04 m The proposed action is a critical action. The power generators platform and part of the access road are within FFRMS floodplain and Zone Shaded X.

The proposed grading or levels for the generators and equipment will be 2.0 feet (0.61 m) above the 0.2PFA as recommended by FEMA. The area identified to install the new generators has a level grading with few trees. The layout will require limited earthworks in this area due to the current condition. Project area within FFRMS floodplain is estimated in 7,043 square meters. (**Appendix A Figure 34 Project Area within FFRMS Floodplain**). FFRMS 0.2% Chance Zone Shaded X overlaps ABFE 1.0% Chance Zone A in **Figure 34**. Structure floodproofing is not necessary with the proposed elevation.

The proposed site layout ground elevation in this area will be filled to level it to comply with the ABFE minimum ground elevation to keep this area over the FFRMS flood zone. The ground levels in this area have been previously modified as it was used as part of the project to repair the scours found at the base of Represa del Lago La Plata structure between 2021 and 2022. As part of the proposed action, cut and fill activities will be performed to guarantee project components elevation complies with FFRMS requirements. The modification of current ground levels is considered minimal; therefore, no adverse effects have been identified to floodplain or neighboring properties. Critical Actions requires measures to protect FFRMS floodplain: the elevation of structures at 0.2PFA, engineering controls like double wall tanks and secondary containment for tanks and fuel receiving area.

The Proposed Action would result in direct, long-term, minor adverse impact to FFRMS floodplain as result of site preparation with implementation of proposed BMPs. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 access road route and potential impacts are the same needed for the Proposed Action. The access road between the generator's platform and Represa del Lago La Plata would be within FFRMS floodplain. The estimated area within FFRMS floodplain is 3,950 $m^2$. Critical Actions requires measures to protect FFRMS floodplain: the elevation of structures at 0.2PFA.

The action would result in direct, long-term, minor adverse impact to FFRMS floodplain as result of site preparation with implementation of proposed BMPs.

**Alternative 3**

Alternative 3 access road route and potential impacts are the same needed for the Proposed Action. The access road between the valley and Represa del Lago La Plata would be within FFRMS floodplain. The estimated area within FFRMS floodplain is 3,950 $m^2$. The alternative components would be within FFRMS floodplain, an area of 7,362 $m^2$. Critical Actions requires measures to protect FFRMS floodplain: the elevation of structures at 0.2PFA, engineering controls like double wall tanks and secondary containment for tanks and fuel receiving area.

The action would result in direct, long-term minor adverse impact to FFRMS floodplain as result of site preparation with implementation of proposed BMPs.

**Flood Insurance**

FEMA uses the Flood Insurance Rate Maps (FIRM) to identify the floodplains for the National Flood Insurance Program (NFIP). The Puerto Rico Planning Board (PRPB) is the local agency that coordinates the NFIP in Puerto Rico. FEMA Flood Insurance Rate Maps (FIRMs) (Panel 72000C0705J, November 18, 2009). (**Appendix A Figure 13 FEMA Flood Insurance Rate Map**).

The proposed location for the new Generators Area is within the FIRM Flood Zone A (or ABFE 1.0% Chance) areas with a 1.0% annual chance of flooding.

Elevation Contours (**Appendix A Figure 35 Elevation Contours**) shows the steeped slope from the basin of Rio La Plata to the project site. The Project Site is approximately 15 meters higher in elevation than the basin of Río La Plata in an approximate distance of 60 meters. Río La Plata upstream drains into Lago La Plata, constructed to collect water. Lago La Plata makes certain flood control on Río La Plata downstream by managing dam gates. Local conditions reduce the risks of flooding, potential property losses or an increase of flood insurance.

**No Action**

Under the No Action alternative the FFRMS Floodplain would not change. Flood Insurance would not have changes with No Action. No Action would result in no impact anticipated on Flood Insurance.

**Proposed Action**

The estimated cost of flood insurance for the proposed action is $437,365. This does not include insurance for the contractor's equipment.

Proposed Action would result in no impact anticipated on Flood Insurance.

**Alternative 2**

Alternative 2 access road route and potential impacts are the same needed for the Proposed Action. The access road between the generator's platform and Represa del Lago La Plata would be within FFRMS floodplain. The estimated area within FFRMS floodplain is 3,950 $m^2$.

The estimated cost of flood insurance for the alternative 2 is similar to proposed action: $437,365. This does not include insurance for the contractor's equipment.

Alternative 2 would result in no impact anticipated on Flood Insurance.

**Alternative 3**

Alternative 3 access road route and potential impacts are the same needed for the Proposed Action. The access road between the valley and Represa del Lago La Plata would be within FFRMS floodplain. The estimated area within FFRMS floodplain is 3,950 $m^2$. The alternative components would be within FFRMS floodplain, an area of 7,362 $m^2$.

The estimated cost of flood insurance for the alternative 3 is similar to proposed action: $437,365. This does not include insurance for the contractor's equipment.

Alternative 3 would result in no impact anticipated on Flood Insurance.

**Farmlands Protection**

The Farmland Protection Policy Act (FPPA) of 1981 (7 U.S.C. §4201, et seq.) protects designated prime and unique farmlands and farmlands of importance from conversion to non-agricultural uses. Prime farmland is land with the best physical and chemical characteristics to produce food, feed, forage, fiber, and oilseed crops. The FPPA is intended to minimize the impact federally funded programs have on the unnecessary and irreversible conversion of farmland to non-agricultural uses. It assures that to the extent possible federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. The FPPA applies to not just lands currently under agricultural production but also forestland, pastureland, or other land types that farmers can convert into farmland or ranchland. According to the FPPA, the activities subject to FPPA requirements include projects which may permanently convert (either directly or indirectly) farmland, as defined under the 1981 Act and the final rules published in 1994, to nonagricultural use and are completed by a federal agency or completed with financial or technical assistance from a federal agency. (See **Appendix A Figure 36 Prime Farmlands**).

**No Action**

Under the No Action alternative the Quebrada Cruz Ward parcels would not change. The area's prime farmland resources will be kept the same. No action would have no effect on Farmlands.

**Proposed Action**

A small portion of the existing access road, at the beginning access from Camino Recreativo La Plata, located south of the project, is classified as prime farmland. (**Appendix A Figure 36 Prime Farmlands**). Farmland Protection Policy Act (FPPA) protects designated prime farmlands from conversion to non-agricultural uses. The proposed action meet the exemption of construction limited to on-farm structures needed for farm operations.[10] The Project selected an existing dirt road to develop the access road. The total approximate construction area within the prime farmland parcel is 600 $m^2$. The dirt access road was used in a project to repair the scours found at the base of Represa del Lago La Plata structure between 2021 and 2022. The construction of the access road preserves farmland from being developed and would become the same access road for future agricultural land uses. The construction of the access road will not affect the prime farmland.

**Table 6 Extension of Access Road in Prime Farmlands**

| Station | Coordinates | Construction Area |
|---|---|---|
| 1+00 | Lat: 18.341115°N, Lon: -66.240564°W | 300 $m^2$ |
| 1+20 | Lat: 18.341273°N, Lon: -66.240469°W | |
| 1+40 | Lat: 18.341424°N, Lon: -66.240376°W | 300 $m^2$ |
| 1+60 | Lat: 18.341591°N, Lon: -66.40304°W | |
| 1+80 | Lat: 18.341767°N, Lon: -66.240289°W | |
| Total | | 600 $m^2$ |

The Proposed Action would have no impact anticipated on Farmlands. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

[10] HUD Exchange https://www.hudexchange.info/programs/environmental-review/farmlands-protection/

**Alternative 2**

Alternative 2 access road route and potential impacts are the same needed for the Proposed Action. The Alternative selected an existing dirt road to develop the access road. The Alternative meet the exemption of construction limited to on-farm structures needed for farm operations. The total approximate construction area within the prime farmland parcel is 600 $m^2$.

Alternative 2 would have no impact anticipated on Farmlands.

**Alternative 3**

Alternative 3 access road route and potential impacts are the same needed for the Proposed Action. The Alternative selected an existing dirt road to develop the access road. The Alternative meet the exemption of construction limited to on-farm structures needed for farm operations. The total approximate construction area within the prime farmland parcel is 600 $m^2$.

Alternative 3 would have no impact anticipated on Farmlands.

### 5.1.5 Slope

Slope refers to changes in the physical features of the land: its elevation, orientation, and topography. Construction on hillsides often requires alteration of the slope, especially where changes in the visual character of the site may occur and where slope instability, erosion, and/or drainage problems may result. In some localities, hillsides are likely to house native plant communities which could be lost as a result of topographic alteration.

Improper grading often alters the surface water flow and may cause flooding for the site and the surrounding property owners. Excessive grading may also alter the groundwater level, which may cause the slow death of trees and ground cover, and in turn destroy wildlife habitats.

Since erosion, slope stability, and drainage characteristics depend not only on the steepness of the slope but also on the materials of which it is composed, any analysis of slope conditions must consider soil suitability.

As discussed under the Stormwater section, certain projects require that the developer produce a Stormwater Pollution Prevention Plan (SWPPP), which contains project-specific strategies to control onsite stormwater (including strategies that prevent onsite stormwater from running offsite). In addition, an SWPPP, which is required as part of the National Pollutant Discharge Elimination System (NPDES) process, considers erosion, slippage, settlement, subsidence, or other related problems and incorporates measures to reduce issues related to soil suitability.

Elevation Contours (**Appendix A Figure 35 Elevation Contours**) shows the steeped slope from the basin of Rio La Plata to the project site. The deposit of rocks at the edge of the slope towards Río La Plata provides a natural solid containment wall and basement that prevents the possibility of landslides occurrence.

**No Action**

Under the No Action alternative the Quebrada Cruz Ward land surface would not change. No Action would cause no impacts upon the area's land surface and slope. The area topography will not have changes. No action would have no impact anticipated on Slope.

**Proposed Action**

The Project area where the generators are proposed to be installed has a slope ranging from 6.1% to 37.0%. No special soil conditions, foundation issues, settling, have been identified in areas within the Proposed Action as determined in the Geotechnical Investigation conducted by Geo Cim. (See **Appendix G Geotechnical Investigation Report**).

As part of the proposed action, cut and fill activities will be performed to guarantee project components elevation complies with ABFE 0.2% requirements. The modification of current ground elevation is considered minimal; therefore, no adverse effects have been identified to the physical features of the land Slope.

The project would disturb an estimated area of 9,814 $m^2$ (2.42 acres). The staging area would be the same area used as part of a project to repair the scours found at the base of Represa del Lago La Plata structure, approximately 917 $m^2$ (0.23 acre). This was preferred to minimize impacts to forested areas and reduce earthworks materials leveling/extraction and costs associated with these activities.

The proposed site for the generators pad has a formation classified *GPQ*, quarries and gravel scheds located northeast of the generators pad towards Rio La Plata. (**Appendix A Figure 31 Soils Map**) The deposit of rocks provides a natural solid containment wall and basement on the side facing the slope before Rio La Plata reducing the possibility of landslides in the project area.

The layout will require limited earthworks in this area due to the current condition. Slopes would be modified to stable conditions preventing landslides occurrence. The proposed action would cause direct, temporary, minor beneficial, impact on Slopes. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 would occupy a total area of 6,051 $m^2$ (1.50 acres) of land. Alternative 2 location has a steep slope with mature trees and diverse vegetation, which will require major leveling, including clear and grubbing activities. Alternative 2 access road route and potential impacts are the same needed for the Proposed Action. The layout will require limited earthworks in this area due to the current condition. Slopes would be modified to stable conditions preventing landslides occurrence.

Alternative 2 would cause direct, temporary, minor beneficial impact on Slopes.

**Alternative 3**

Alternative 3 would occupy a total area of 7,362 $m^2$ (1.82 acres) of land. Alternative 3 location presents a variable topography with no visible runoff conveying areas. Additional land acquisition (1,800 square meters) activities should occur to provide the Alternative with a maneuvering area for large trucks and maintenance vehicles. Alternative 3 access road route and potential impacts are the same needed for the Proposed Action. The layout will require limited earthworks in this area due to the current condition. Slopes would be modified to stable conditions preventing landslides occurrence.

Alternative 3 would cause direct, temporary, minor beneficial impact on Slopes.

### 5.1.6 Erosion

Erosion[11], transport, and sedimentation are the processes by which wind and water wear away the land surface or move it to another location. Erosion in the urban context, resulting from land clearance and construction, can be a serious problem. Erosion can cause structural damage in buildings by undermining foundational support. It can pollute surface waters with sediment and increase the possibility of downgradient flooding by sediment-laden water entering the drainage system or watercourses. It can also increase the possibility of slope collapse. A key factor in erosion is the land cover. Undisturbed vegetated areas are less susceptible to erosion than surfaces with less vegetation. The greater the slope, the more likely the occurrence of erosion because steep slopes (often defined as >12%) increase the velocity of runoff. The project design manages storm water runoff appropriately as mitigation measures to prevent erosion and landslides.

The BMPs and guidelines recommended in the Puerto Rico Erosion and Sediment Control Handbook for Developing Areas (PRDNER/PREQB 1998) will be implemented by PRASA for the preferred alternative.

**No Action**

No Action alternative will remain the Quebrada Cruz Ward land surface without change. Erosion of the land surface will continue and may increase due to poor area's stormwater management and may receive a direct, long-term, minor adverse impact to erosion on the parcel.

**Proposed Action**

The Project area where the generators are proposed to be installed has a slope ranging from 6.1% to 37.0%.

As part of the proposed action, cut and fill activities will be performed to guarantee project components elevation complies with ABFE 0.2% requirements. The modification of current ground elevation is considered minimal.

The proposed action would disturb an estimated area of 9,814 $m^2$ (2.42 acres). The staging area would be the same area used as part of a project to repair the scours found at the base of Represa del Lago La Plata structure, approximately 917 $m^2$ (0.23 acre).

The selection of the existing dirt road to develop the project access road preserved natural ground from being developed. BMPs are necessary to avoid or minimize the migration of sediments out of the project construction areas. BMPs can be classified as Erosion Prevention, Sediment Control, Runoff Control, among others. Examples of practices include the installation of geotextile material, fiber rolls, hay bales and silt fences. The design stormwater management system of the proposed action would control runoff preventing erosion to occur.

The proposed action would cause direct, temporary, minor beneficial, impact on Erosion. The proposed action is in compliance with the Statutes, Executive Orders or Regulations.

[11] HUD Exchange https://www.hudexchange.info/programs/environmental-review/environmental-assessment/guide/land-development/erosion/

**Alternative 2**

Alternative 2 access road route and potential impacts are the same needed for the Proposed Action. The design stormwater management system of the proposed action would control runoff preventing erosion to occur.

The action would cause direct, temporary, minor beneficial impact on Erosion on the parcel.

**Alternative 3**

Alternative 3 access road route and potential impacts are the same needed for the Proposed Action. The design stormwater management system of the proposed action would control runoff preventing erosion to occur.

The action would cause direct, temporary, minor beneficial impact on Erosion on the parcel.

### 5.1.7 Drainage/Stormwater Runoff

Stormwater management[12] and its relationship to a proposed new development can be an essential determinant of whether to construct a project. Natural flow, storm sewers, or combined (storm and sanitary) sewers usually remove stormwater from an impermeable surface (e.g., pavement and buildings). The first consideration should be the potential to incorporate design features such as landscaping and the use of pervious rather than impervious surfaces to help limit stormwater runoff. When stormwater runoff cannot be avoided, the water is usually sent to a surface water body, a permeable recharge area, or temporary storage areas.

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the U.S. (WOTUS) and regulating quality standards for surface waters. Section 401 of the CWA also requires state certification of federal licenses and permits in which there is a "discharge of fill and/or dredged material into navigable waters of the United States."

Section 402 of the CWA established the NPDES program, which authorizes EPA to issue permits for the point source discharge of pollutants into WOTUS. Under the NPDES, EPA regulates both point and non-point pollutant sources, including stormwater and stormwater runoff for projects with ground disturbance of more than 0.4 hectare (1 acre). The NPDES permit requires the preparation of a SWPPP for each project that qualifies under the program.

**No Action**

Under the No Action alternative the Quebrada Cruz Ward land surface would not change. Erosion of the land surface will continue and may increase due to poor area's stormwater management and may receive a direct, long-term, minor adverse impact.

**Proposed Action**

The Project area where the generators are proposed to be installed has a slope ranging from 6.1% to 37.0%. No special soil conditions, foundation issues, settling, have been identified in areas within the Proposed Action as determined in the Geotechnical Investigation conducted by Geo Cim. (See **Appendix G Geotechnical Investigation Report**).

[12] HUD Exchange https://www.hudexchange.info/programs/environmental-review/environmental-assessment/guide/land-development/drainage-stormwater-runoff/

As part of the proposed action, cut and fill activities will be performed to guarantee project components elevation complies with ABFE 0.2% requirements. The modification of current ground elevation is considered minimal; therefore, no adverse effects have been identified to the physical features of the land or neighboring properties.

The project would disturb an estimated area of 9,814 $m^2$ (2.42 acres). The staging area would be the same area used as part of a project to repair the scours found at the base of Represa del Lago La Plata structure, approximately 917 $m^2$ (0.23 acre). This was preferred to minimize impacts to forested areas and reduce earthworks materials leveling/extraction and costs associated with these activities.

The proposed site for the generators pad has a formation classified *GPQ*, quarries and gravel scheds located northeast of the generators pad towards Rio La Plata. (**Appendix A Figure 31 Soils Map**) The deposit of rocks provides a natural solid containment wall and basement on the side facing the slope before Rio La Plata reducing the possibility of landslides in the project area. The project design manages storm water runoff appropriately as mitigation measures to prevent erosion and landslides.

The generator platform could cause localized interruptions to local drainage patterns, such as ponding in the areas adjacent to the new proposed facilities. To mitigate potential flood damage to adjacent areas, the generators platform construction will include a design of a stormwater management system to control runoff to and from site. The civil site drawings will comply with PR Planning Board Regulation 13, which addresses the control and management of runoff waters for newly developed areas.

The selection of the existing dirt road to develop the project access road preserved natural ground from being developed. BMPs are necessary to avoid or minimize the migration of sediments out of the project construction areas. BMPs can be classified as Erosion Prevention, Sediment Control, Runoff Control, among others. Examples of practices include the installation of geotextile material, fiber rolls, hay bales and silt fences.

The preferred leveled site over Alternative 3 moved the project area away from terrain slopes near the Río La Plata. The proposed action would cause direct, temporary, minor beneficial impact on Stormwater Runoff. The proposed action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 access road route and potential impacts are the same needed for the Proposed Action. The design stormwater management system of the proposed action would control runoff preventing erosion to occur.

The action would cause direct, temporary, minor beneficial impact on Stormwater Runoff.

**Alternative 3**

Alternative 3 access road route and potential impacts are the same needed for the Proposed Action. The design stormwater management system of the proposed action would control runoff preventing erosion to occur.

The action would cause direct, temporary, minor beneficial impact on Stormwater Runoff.

### 5.1.8 Hazards and Nuisances

Hazards and Nuisances addresses whether a project's location and design reduce natural and man-made risks to people or property damage for both the public or project users. Many of these hazards may be subject to municipal regulation. Local zoning, building, and health codes usually address maintenance and cleanliness. Their enforcement is often independent of environmental assessment procedures. Proper siting, sound planning, and good project design can correct many of these issues. Mitigation measures can also be included as integral components of a proposed project's design (e.g., seismic resistance. engineering designs, fire protection, and/or flood elevation or proofing) and can be implemented with the proposed project. Hazards to be evaluated are natural hazards, air pollution generators, man-made site hazards.

**Seismicity**

Puerto Rico and the nearby Caribbean islands are in a seismically active region. In the 20th century alone, there have been several very large earthquakes north of Puerto Rico, with known magnitudes of 7.0 between 1946 and 1953 and magnitude 8.0 in 1946 and four major aftershocks of magnitude 7. An earthquake sequence in southwest Puerto Rico began on December 28, 2019, with a magnitude 4.7 earthquake (USGS 2020). Minor earthquakes causing land slumps and slides are common in the mountainous areas of Puerto Rico (Larsen and Torres Sanchez 1998). (**Appendix A Figure 37 Seismic Activity**). The Proposed Action has been designed taking into consideration the latest building code to minimize the impact of seismic events.

**No Action**

There would be no site preparation, construction, generators operation, or demobilization activities under the No Action. No Action does not involve subsoil or above-ground activities. No Action would have no impact anticipated upon the area's seismicity.

**Proposed Action**

The site preparation and construction activities such as clearing, grubbing, and grading associated with road and the site for the generators pad would result in soil cut, fill, compaction, erosion, and sedimentation. The demobilization activities would also disturb soils associated with removal of office trailers. These activities would occur within areas that have previously experienced soil disruption. The proposed activities would have no impacts on seismicity because project activity would not entail the use of explosives or mining activities.

The proposed location for core of the project, the emergency generators platform, was determined mainly considering the need for a relatively leveled piece of land structurally sound to withhold an outstanding load, adjacent to the existing Represa La Plata Pump Station. NRCS Soil Survey database classifies the land for the generators platform to be ***Clay mucara*** *(MxF)* with a large parcel of ***Quarries and Gravel Sheds*** *(GPQ)* in the north side. (see **Appendix A Figure 31 Soils**). The Puerto Rico Seismic Network registered the Seismic Activity at a radius of 10 km of the project from June 2004 to July 2024, earthquakes with a maximum magnitude range of 3.1 to 4.0. (see **Appendix A Figure 37 Seismic Activity**) The design of the soil cut, fill, compaction and construction of the generators' platform considered any seismic risk of the project area. Engineering design is the mitigation measure in the event of an adverse impact.

Proposed Action would have no impact anticipated on Seismicity of the area. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 would occupy a total area of 6,051 $m^2$ (1.50 acres) of land. Alternative 2 location has a steep slope with mature trees and diverse vegetation, which will require major leveling, including clear and grubbing activities. The earthwork would require 103 cubic yards of cut, 17,717 cubic yards of rock excavation, and 3,078 cubic yards of fill. Requires land acquisition. Alternative 2 access road route and potential impacts are the same needed for the Proposed Action.

The Action would have no impact anticipated on Seismicity of the area.

**Alternative 3**

Alternative 3 would occupy a total area of 7,362 $m^2$ (1.82 acres) of land. Alternative 3 location presents a variable topography with no visible runoff conveying areas. The earthwork would cover an area of 8,250 square meters (2.04 acres) with an estimated to be 9,500 cubic meters of cut and 3,500 cubic meters of fill. Alternative 3 access road route and potential impacts are the same needed for the Proposed Action.

The Action would have no impact anticipated on Seismicity of the area.

**Air Quality**

Under the administration of the CAA, EPA has adopted multiple tiers of emission standards. The implementation of Tier 1, Tier 2, Tier 3, and Tier 4 standards progressively require compliance with more stringent emission standards. In 2004, EPA published the final rule (40 CFR Parts 9, 69, et al.) introducing Tier 4 emission standards, which were phased-in from 2008-2015. To meet the Tier 4 emission standards, engine manufacturers began producing engines with advanced emission control technologies. EPA has also adopted requirements for in-use diesel fuel to decrease sulfur levels by more than 99%. The resulting Ultra Low Sulfur Diesel Fuel has a maximum sulfur concentration of 15 parts per million (EPA a).

On November 29, 2018, EPA approved Puerto Rico's revised SIP dated February 1, 2016, effective December 31, 2018. The purpose of the revision was to address the interstate transport of air pollution that may interfere with attainment and maintenance of NAAQS. In this action, the approval is pertaining to the 1997 and 2008 ozone $O_3$, 1997 and 2006 fine particulate matter ($PM_{2.5}$), and 2008 lead NAAQS (EPA 2018).

As of December 31, 2022, EPA's Green Book classified several of Puerto Rico's municipalities as nonattainment areas or in maintenance for criteria pollutants lead and sulfur dioxides and maintenance for particulate matter. If the air quality in a geographic area meets or is cleaner than the national standard, the area is called an attainment area (designated "attainment/unclassifiable"). As of December 2022, and pursuant to 40 CFR 81.355, the municipality of Toa Alta has a designation of attainment/unclassifiable for the NAAQS. The Puerto Rico Environmental Quality Board (PREQB), under the Puerto Rico Department of Natural and Environmental Resources (PRDNER), monitors, manages, and regulates air quality standards using its approved SIP. Activities that generate emissions or air pollutants must comply with the Regulation for the Control of Atmospheric Pollution and Regulation with a General Permit from PRDNER.

However, according to Air Quality Designations for the 2010 SO2 (83 FR 1098) the nearest non-attainment designation area for Sulfur Dioxide has been located within the Municipality of Toa Baja at Sabana Seca Ward and Palo Seco Ward. (**Appendix A Exhibit 38– Puerto Rico Nonattainment Maintenance Status**). The Proposed Action is 15.6 km from the Palo Seco Ward non-attainment designation area for Sulfur Dioxide. The Action would emit an estimate of 3.15 tons per year of Sulfur Dioxide during the 2.5 years of construction. Considering an operation time of 500 hours per year, generators would emit an estimate of 4.56 tons per year of Sulfur Dioxide.

**No Action**

There would be no site preparation, construction, generators operation, or demobilization activities under the No Action. No Action does not involve subsoil or above-ground activities. No emissions that may affect air quality would occur with No Action. No Action would have no impact anticipated on Air Quality.

**Proposed Action**

The site preparation/construction, equipment demobilization and operation during maintenance checks and power outage under this alternative would have minor direct adverse short-term impacts on air quality within the project area and neighboring area with implementation of BMPs and regulatory requirements.

Emissions from site preparation, construction, generators operations, and demobilization activities have the potential to affect air quality. The proposed action activities would include equipment such as employee-owned trucks and cars, power generators, on-road construction-related vehicles, and dust-generating construction activities; vehicles and equipment used for demobilization. The proposed action would result in temporary emissions associated with the fuel-burning equipment required to perform the proposed activities. The $PM_{2.5}$ and $PM_{10}$ levels would increase during the site preparation, construction activities within the staging area, and generators site area. The total emissions of criteria pollutants released into the atmosphere (Nitrogen Oxides, Sulfur Oxides, and Particulate Matter and Volatile Organic Compounds) are estimated to be 107.8 tons per year. The potential for fugitive dust following the completion of construction activities would be reduced to negligible levels as project areas would be stabilized.

In case an emergency occurs, the generators must be in full operation. By regulation, the use of emergency generators has a cap of 500 hours per year. If generators are operated up to the 500 hours threshold, an increase in the total emission of Diesel Particulate Matter EJ index* and the Diesel Particulate Matter* (µg/m3) could occur. The total emissions of criteria pollutants released into the atmosphere (Nitrogen Oxides, Sulfur Oxides, and Particulate Matter 10 microns or less) are estimated to be 78.4 tons per year (**Appendix A Exhibit 39 – Emissions Estimates**). The power generators would require construction, and operation permits in compliance with local and federal air emissions requirements. A General Permit for Electricity Generators application will be prepared and submitted for the operation of emergency generators.

Implementing BMPs and strict adherence to regulatory requirements and standards would limit adverse impacts to air quality associated with the proposed action activities. BMPs would include measures such as traffic management techniques, fugitive dust control, proper vehicle maintenance, and minimizing vehicle idling time, among others. PRDNER, formerly PREQB, Rule 404 Fugitive Emissions requires the implementation of BMPs that would assist in limiting adverse impacts to air quality (PREQB 1995). Ultra-low sulfur diesel fuel would be used, as required by the Clean Air Nonroad Diesel Rule, for the generators.

The Proposed Action would result in direct, short-term, minor adverse impact to Air Quality of the area. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations.

**Alternative 2**

Alternative 2 construction constraints, generators capacity, access road route and the potential impacts are the same needed for the Proposed Action.

The Action would result in direct, short-term, minor adverse impact to Air Quality of the area.

**Alternative 3**

Alternative 3 construction constraints, generators capacity, access road route and the potential impacts are the same needed for the Proposed Action.

The Action would result in direct, short-term, minor adverse impact to Air Quality of the area.

**Noise**

Noise is defined by EPA as unwanted or unwelcomed sound measured in decibels (dBA) on the A-weighted scale. The scale classifies noise based on the range of sounds that the human ear can hear. Noise that occurs between 10 p.m. and 7 a.m. is more disturbing than those sounds that occur during normal waking hours between 7 a.m. and 10 p.m. The Noise Control Act of 1972 required EPA to create a set of noise criteria. In response, EPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* in 1974 which explains the impact of noise on humans (EPA 1974). The Day Night Average Sound Level (DNL) is an average measure of sound. The DNL descriptor, accepted by federal agencies, is the standard for estimating sound impacts and establishing guidelines for compatible land uses. The EPA report found that keeping the maximum 24-hour DNL value of 65 dBA and below protects most people from hearing loss. The Noise Control Act, however, only charges implementation of noise standards to those federal agencies that operate noise-producing facilities or equipment.

**Table 7: Site Acceptability Standards**

| Noise Zone | Day-Night Average Sound Lebel (dB) | Special Approvals and Requirements |
|---|---|---|
| Acceptable | Not exceeding 65 dB | None |
| Normally Unacceptable | Above 65 dB but not exceeding 75 dB | Environmental assessment and attenuation required for new construction.<br>Attenuation strongly encouraged for major rehabilitation |
| Unacceptable | Above 75 dB | Environmental impact statement required.<br>Attenuation required for new construction with approval |

HUD Noise Standards (24 CFR Part 51, Subpart B)

The Quiet Communities Act of 1978 enabled the development of state and local noise control programs to provide an adequate federal noise control research program. According to published lists of noise sources, sound levels and their effects causes pain starting approximately at 120 to 125 dBA and can cause immediate irreparable damage at 140 dBA. The Occupational Safety and Health Administration (OSHA) has adopted a standard of 140 dBA for maximum impulse noise exposure.

There are no potential noise generators in the vicinity of the project area. Road PR-22 is 8,250 meters (27,000 feet), and Road PR-2 is 7,550 meters (24,700 feet) from the project area.

Within Puerto Rico, PRDNER/PREQB regulates noise in accordance with the Noise Pollution Control Regulation (PREQB 2011). The regulation establishes the threshold for industrial, commercial, residential, and quiet zones, as indicated in Table 8. Quiet Zones are areas that have additional considerations including hospitals, schools, court houses, and daycare centers for the elderly and children. The rule states that signs must be conspicuously posted in Quiet Zones indicating the designation.

**Table 8: Puerto Rico Noise Emission Standards**

| Emitting Sources | Receptors[a,b,c] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Zone I (Residential) | | Zone II (Commercial) | | Zone III (Industrial) | | Zone IV (Quiet) | |
| | Day-time | Night-time | Day-time | Night-time | Day-time | Night-time | Day-time | Night-time |
| Zone I | 60 | 50 | 65 | 55 | 70 | 60 | 55 | 50 |
| Zone II | 65 | 50 | 70 | 60 | 75 | 65 | 55 | 50 |
| Zone III | 65 | 50 | 70 | 65 | 75 | 75 | 55 | 50 |
| Zone IV | 65 | 50 | 70 | 65 | 75 | 75 | 55 | 50 |

[a] Sound Levels Exceeded by 10% during monitoring period (L10).
[b] The daytime, or diurnal, period corresponds to the period between 7:00 a.m. and 10:00 p.m.
[c] The nighttime, or nocturnal, period corresponds to the period between 10:01 p.m. and 6:59 a.m.

Noise levels would depend on the sound level generated by existing activities and the observer's distance from the source. The Proposed Action would be in a vacant area adjacent to the reservoir dam. The existing background noise in the project area is mainly from vehicular noise.

Noise levels for noise reports are typically reported in terms of A-weighted decibels or dBA. The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. Typical A-weighted noise levels for various noise sources are described in the following Table 9 (Caltrans, 2013).

**Table 9: Typical A-Weighted Noise Levels**

| Common Outdoor Activities | Noise Level (dBA) | Common Indoor Activities |
|---|---|---|
| | 110 | Rock band |
| Jet flyover at 1,000 feet | | |
| | 100 | |
| Gas lawnmower at 3 feet | | |
| | 90 | |
| Diesel truck at 50 feet at 50 mph | | Food blender at 3 feet |
| | 80 | Garbage disposal at 3 feet |
| Noisy urban area, daytime | | |
| Gas lawnmower, 100 feet | 70 | Vacuum cleaner at 10 feet |
| Commercial area | | Normal speech at 3 feet |
| Heavy traffic at 300 feet | 60 | |
| | | Large business office |
| Quiet urban daytime | 50 | Dishwasher in next room |
| Quiet urban nighttime | 40 | Theater, large conference room (background) |
| Quiet suburban nighttime | | |
| | 30 | Library |
| Quiet rural nighttime | | Bedroom at night, concert hall (background) |
| | 20 | |
| | | Broadcast/recording studio |
| | 10 | |
| | 0 | |

Source Caltrans. 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol

Noise emitted by the site preparation, construction, and demobilization equipment would result in a temporary short-term increase in ambient noise levels near the proposed project site. The site preparation and construction activities would take place between 7 a.m. and 10 p.m., the diurnal period. The noise level would vary during the site preparation, construction period, depending on the number of construction equipment and the distance to the noise receptor. The sound levels generated by typical equipment are included in Table 10.

**Table 10: Typical Noise Levels Generated by Construction Equipment**

| Equipment Description | Noise Level at 50 ft in dBA |
|---|---|
| Backhoe | 80 |
| Chain Saw | 85 |
| Compactor (ground) | 80 |
| Compressor (air) | 80 |
| Crane | 85 |
| Dozer | 85 |
| Dump Truck | 84 |
| Excavator | 85 |
| Front End Loader | 80 |
| Generator | 82 |
| Pumps | 77 |
| Roller | 85 |
| Scrapper | 85 |

Source: Adapted from Federal Highway Administration (FHWA) Highway Construction Noise Handbook (2006)

As seen in Table 11, noise levels associated with site preparation and construction would be between 77 and 85 dBA at approximately 15 m (50 ft). Proposed Action would require the use of construction equipment to prepare the staging area, build the access road, build the generators site pad, and the installation of the 4 emergency power generators, diesel storage tanks, an electrical room, and the associated components. The staging area as well as the access road construction would experience the highest noise levels. BMPs to keep sound levels within accepted thresholds could include controlling working hours and using noise attenuating equipment. Noise intensity decreases exponentially with increased distance from the source. One of the advantages of the Proposed Action is its location away from residences that could be affected by noise from the construction phase activities.

The Inverse Square Law, formula to calculate sound attenuation over distance for a point source is:

- **Lp(R2) = Lp(R1) – 20 x log(R2/R1)**
- **Lp(R1)**: is the known sound pressure level at the first location
- **Lp(R2)**: is the unknown sound pressure level at the second location
- **R1**: is the distance from the noise source to the location of known sound pressure level
- **R2**: is the distance from noise source to the second location

**Table 11: Nearest receptors to the proposed project area**

| Receptor | Distance from project limits | Noise Level Range dBA Construction | Noise Level dBA Operation |
|---|---|---|---|
| Residential unit | 235 m north | 53-61 | 52.5 |
| La Plata Reservoir Recreational Area | 470 m south | 47-55 | 46.5 |
| Residential unit | 1,113 m east | 40-48 | 39.0 |
| Residential unit | 418 m west | 48-56 | 47.5 |
| Piñas CDT | 3,550 m north | 30-38 | 28.9 |
| Abelardo Díaz Alfaro School | 2,943 m east | 31-39 | 30.5 |

Noise Levels dBA calculated with Inverse Square Law. Known noise levels: Construction 77-85 dBA at 50 feet and Operation 83 dBA at 23 feet.

During the operation phase the main noise source would be the generators. According to specifications the generators would emit 83 dBA at 23 feet. Generators are provided with weatherproof insulated enclosures as well as silencers (critical grade[13]), that would be maintained for optimal performance. To a lesser extent, noise would also come from light trucks for maintenance activities and trucks to refuel generators tanks. Note that the operation of the generators would be limited to maintenance checks as well as to emergency periods when a power outage occurs. As indicated before, one of the advantages of the Proposed Action is its location away from residences that could be affected by noise from the generators, resulting in an exponential noise decrease.

Actions under this project would expose construction workers to elevated levels of noise. The PRASA would follow OSHA regulations and would provide the appropriate level of personal protective equipment to minimize adverse impacts during proposed daily activities.

The grade of a silencer is based on the range of decibels it can reduce, and the grades range from industrial to super extreme. The noise level of a generator with a silencer depends on the grade of the silencer and how far away the generator is placed.

- **Industrial**: Reduces exhaust noise by 15–20 decibels (dBA)
- **Residential**: Reduces exhaust noise by 20–25 dBA
- **Critical**: Reduces exhaust noise by 25–32 dBA
- **Super critical**: Reduces exhaust noise by 30–38 dBA
- **Hospital**: Reduces exhaust noise by 35–42 dBA
- **Hospital plus**: Reduces exhaust noise by 35–50 dBA
- **Extreme**: Reduces exhaust noise by 40–55 dBA
- **Super extreme**: Reduces exhaust noise by 45–60 dBA

[13] Generator silencers rating to measure the sound attenuation.

**No Action**

There would be no site preparation, construction, generators operation, or demobilization activities under the No Action. No Action would remain the areas noises without change. No Action would have no impact anticipated on area's Noise.

**Proposed Action**

The site preparation, construction, generators operation, or demobilization activities under the Proposed Action would occur between 7:00 a.m. and 10:00 p.m. Project noise emissions during construction would be between 77 and 85 dBA at approximately 50 feet. The potential noise at the nearest residential receptor in daytime would be in the range of 53-61 dBA, under the threshold standard of 65 dBA for Zone I. Project noise during operation would be 83 dBA at 23 feet. The noise at the nearest residential receptor during daytime would be 52.5 dBA, under the threshold standard of 65 dBA for Zone I, while the potential noise impact would surpass the nighttime standard of 50 dBA for Zone I. In case an emergency occurs, the generators must be in full operation. By regulation, the use of emergency generators has a cap of 500 hours per year. The installation of silencers should be considered as an attenuation to comply with the nighttime threshold standard.

The proposed action could emit an attenuated noise impact by distance, below 65 dB, which would be acceptable for the nearest residential receptor. The action would have direct, short-term, minor adverse impact on the existing conditions of the vicinity area. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 construction constraints, generators capacity, access road route and the potential impacts are the same needed for the Proposed Action.

Alternative 2 action could emit an attenuated noise impact by distance, below 65 dB, which would be acceptable for the nearest residential receptor. The action would have direct, short-term, minor adverse impact on the existing conditions of the vicinity area.

**Alternative 3**

Alternative 3 construction constraints, generators capacity, access road route and the potential impacts are the same needed for the Proposed Action.

Alternative 3 action could emit an attenuated noise impact by distance, below 65 dB, which would be acceptable for the nearest residential receptor. The action would have direct, short-term, minor adverse impact on the existing conditions of the project area.

**Hazardous Materials**

Hazardous substances, materials, and wastes constitute a solid, liquid, contained gaseous or semisolid material, or combinations of materials that pose a substantial present or potential hazard to human health and the environment. Hazardous materials constitute a type of substance that receives extensive regulation by various federal and local environmental, safety occupational, and transportation laws and regulations. Hazardous materials include asbestos, lead, petroleum products, and toxic, highly reactive chemicals. Improper management and disposal of hazardous substances can lead to the pollution and/or contamination of groundwater, surface water, soil, and air.

There are numerous federal and local laws that contain lists of hazardous materials, hazardous substances, and hazardous wastes that require special handling if encountered during project construction. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §9601, et seq.) and Resource Conservation and Recovery Act (RCRA), Subtitle D are the primary federal laws for the management and disposal of hazardous substances. The Puerto Rico counterparts are the Law to Promote the Reduction of Hazardous Wastes in Puerto Rico, Law 10 of January 19, 1995, and the Regulation for the Control of Hazardous Solid Wastes, as amended (1998). The EPA regulates the management of non-hazardous solid waste according to RCRA. Under RCRA, EPA oversees regulating the handling and disposal of hazardous wastes. The U.S. Department of Transportation (USDOT) establishes regulations and training requirements for the transport of hazardous materials by land, water, and air within, from, or through the U.S. and its territories. The PRDNER administers Puerto Rico laws and regulations for hazardous materials, substances, and wastes.

HUD's environmental regulations at 24 CFR 58.5(i)(2)(i) and (ii)4 state that, [i]t is HUD's policy that all properties that are being proposed for use in HUD programs be free of hazardous materials, contamination, contamination, toxic chemicals and gases, and radioactive substances, where a hazard could affect the health and safety of occupants or conflict with the intended utilization of the property. Common fluids encountered in a project are lubricants, fuels (gasoline and diesel), and hydraulic fluids.

Enforcement of these laws ensures the protection of the environment and human health through the establishment of management systems that include their identification, use, storage, treatment, transportation, and disposal. Hazardous waste regulation is meant to manage waste from cradle to grave. If this management system fails, these laws provide for the adequate investigation and cleanup of contaminated sites from the release of hazardous materials and hazardous wastes.

Some BMP practices to manage hazardous materials may include, but would not be limited to,

- the use of Hazardous Material System Label to inform workers about on-the-job hazards related to manufactured or imported chemicals. This label categorizes hazards as health, fire, specific, and instability;
- training on Material Safety Datasheet to make workers aware of the risks handling hazardous chemicals;
- the designation of special storage areas for hazardous materials;
- be aware of incompatible materials, and materials shelf-life;
- preparation of and compliance with a hazardous materials and waste plan that includes responsible parties, procedures for hazardous waste and hazardous materials transport, containment, and storage BMPs during construction and operation;
- containment berms, coverage from rain, and concrete washout areas.

The US Department of Housing and Urban Development (HUD) has regulations for the siting of HUD-assisted projects near hazardous operations that handle diesel fuel or other flammable or explosive chemicals. 24 CFR Part 51 Subpart C. The purpose of 24 CFR Part 51 Subpart C is to "*Establish safety standards which can be used as a basis for calculating acceptable separation distances (ASD) for HUD-assisted projects from specific, stationary,* ***hazardous operations which store, handle, or process hazardous substances****;*"

The term **hazardous substance** is defined under 24 CFR 51.201 as "*petroleum products (petrochemicals) and chemicals that can produce blast overpressure or thermal radiation levels in excess of the standards set forth in § 51.203. A specific list of hazardous substances is found in appendix to this subpart.*" Appendix says **No. 2 Diesel Fuel** is considered a hazardous substance. For this EA ERR evaluation purposes, using a stricter approach consider the diesel fuel to be used by the proposed action to be No. 2 Diesel Fuel.

The term **Acceptable separation distance (ASD)** means the *distance beyond which the explosion or combustion of a hazard is not likely to cause structures or individuals to be subjected to* ***blast overpressure or thermal radiation flux*** *levels in excess of the safety standards* in § 51.203. The ASD is consistent with HUD standards of **blast overpressure** (0.5 psi-buildings) and **thermal radiation** (450 BTU/ft2 - hr - people and 10,000 BTU/ft2 - hr - buildings).

**Blast overpressure** means the pressure, in pounds per square inch, in excess of normal atmospheric pressure on the surrounding medium caused by an explosion.

**Thermal radiation level** means the emission and propagation of heat energy through space or a material medium, expressed in BTU per square foot per hour (BTU/ft.2 hr.).

The term **Hazard** means any stationary container which stores, handles, or processes hazardous substances of an explosive or fire prone nature.

In *§ 51.201*, *"Facilities that are shielded from a proposed HUD-assisted project by the topography, because these topographic features affectively provide a mitigating measure already in place"* are not considered "**hazard**".

The Environmental Planning Division (EPD) has developed an electronic-based assessment tool that calculates the Acceptable Separation Distance (ASD) from stationary hazards. The ASD is the distance from above ground stationary containerized hazards of an explosive or fire prone nature, to where a HUD assisted project can be located. Calculation of the ASD is the first step to assess site suitability for proposed HUD-assisted projects near stationary hazards.

The Acceptable Separation Distance Assessment Tool requires hazardous material field specific information to calculate ASD.

For the proposed action, two diesel storage tanks with a capacity of 40,000 gallons each:

- Is the container above ground? YES
- Is the container under pressure? NO
- Is the container diked? YES
- What is the Diked Area Length (ft)? 136.73 ft
- What is the Diked Area Width (ft)? 16.78 ft

The Acceptable Separation Distance Assessment results were:

- Diked Area (sqft) 2294.3294 sqft
- ASD for Blast Over Pressure (ASDBOP) Not Applicable
- ASD for Thermal Radiation for People (ASDPNPD) 218.90 ft
- ASD for Thermal Radiation for Buildings (ASDBNPD) 38.97 ft

The Acceptable Separation Distance of approximately 219 feet (66.75 m) is short enough (**Appendix A Figure 40 Hazard Diesel Fuel ASD**) to the nearest buildings in all directions beyond which the explosion or combustion of a hazard is not likely to cause structures or individuals to be subjected to blast overpressure or thermal radiation flux levels. **Appendix A Figure 35 Elevation Contours** shows topographic features affectively providing a mitigating measure already in place.

HUD EXCHANGE Programs

## Acceptable Separation Distance Assessment Tool

| | |
|---|---|
| Is the container above ground? | Yes: ☑ No: ☐ |
| Is the container under pressure? | Yes: ☐ No: ☑ |
| Does the container hold a cryogenic liquified gas? | Yes: ☐ No: ☐ |
| Is the container diked? | Yes: ☑ No: ☐ |
| What is the volume (gal) of the container? | |
| What is the Diked Area Length (ft)? | 136.73 |
| What is the Diked Area Width (ft)? | 16.78 |
| Calculate Acceptable Separation Distance | |
| Diked Area (sqft) | 2294.3294 |
| ASD for Blast Over Pressure (ASDBOP) | |
| ASD for Thermal Radiation for People (ASDPPU) | |
| ASD for Thermal Radiation for Buildings (ASDBPU) | |
| ASD for Thermal Radiation for People (ASDPNPD) | 218.90 |
| ASD for Thermal Radiation for Buildings (ASDBNPD) | 38.97 |

**Contamination and Toxic Substances.**

NEPAssist is a tool from EPA that facilitates the environmental review process and project planning in relation to environmental considerations including, among others, hazardous wastes, air pollution, water dischargers, toxic releases, Superfund, and Brownfields. According to the NEPAssist report, no known superfund designation has been identified within a 3000 ft. radius from the project site (See **Appendix A Exhibit 41 NEPAssist report**). However, two facility sites have been identified within the radius of facilities with environmental consideration: (1) Improvements to Lago La Plata with an NPDES permit and (2) the Caribbean Cast Stone Inc with a minor unpermitted facility under NPDES. (See **Appendix A Exhibit 42 EPA ECHO reports**) A risk management plan is in place for the Enrique Ortega Water Treatment Plant[14] for chlorine. The chlorination process at the filtration plant uses chlorine, a regulated hazardous toxic gaseous substance. Because of these characteristics the filtration plant observes several safety precautions in the management of this substance to protect employees, contractors, visitors as well as immediately surrounding areas, including a written emergency program to respond to any chlorine release that may occur.

Site reconnaissance was conducted by several field visits (initial visit April 26, 2023, June – July 2023) (see **Appendix I Environmental Site Inspection Photographic Record**) to observe indications of spills, empty drums, or storage tanks. No hazardous materials, toxic chemicals or wastes were found at the project site. There were no indications of distressed vegetation; monitoring wells; pits, ponds, or lagoons; heavily stained soil; pungent, foul, or noxious odors; or waste piles or mounds or disposal of wastes. The site (including access road, staging area) was previously disturbed as part of a project to repair the scours found at the base of Represa del Lago La Plata structure between 2021 and 2022. The former use would not have any impact on the proposed use of the property.

ASTM Phase I ESA E1527-13 standard states the REC definitions for environmental professionals. A recognized environmental condition (REC) is defined as the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property:

- due to any release to the environment;
- under conditions indicative of a release to the environment; or
- under conditions that pose a material threat of a future release to the environment.

A historical recognized environmental condition (HREC) is defined as a past release of any hazardous substances or petroleum products that occurred in connection with the property and

- has been addressed to the satisfaction of the applicable regulatory authority or
- meeting unrestricted use criteria established by a regulatory authority,

without subjecting the property to any required controls (e.g., property use restrictions, AULs, institutional controls, or engineering controls). Before calling the past release an HREC, the EP must determine whether the past release is a REC at the time the Phase I ESA is conducted (e.g., if there has been a change in the regulatory criteria).

The determination of an HREC is intended to be used for properties that would have previously been determined a REC, but that have undergone remediation of risk-based cleanup. These sites are not subject to any known restricted land use requirements. In addition, the Environmental Professional (EP) must also verify that no changes have taken place, such as updates to the cleanup standards that would deem the release a REC today. HRECs currently have no restrictions and thus do not need to be listed as a REC.

[14] Source: Toxic Risk.Com. February 12, 2024. La Plata Toa Alta Filtration Plant. Retrieved from https://toxicrisk.com/reports/11874/summary.htm
Toxic Pollution and schools - Latest Toxic Release Inventory TRI Google Maps - EPA Risk Management Plans (toxicrisk.com)

A controlled recognized environmental condition (CREC) is defined as a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable authority

- as evidenced by the issuance of a NFA letter or equivalent, or
- meeting risk-based criteria established by a regulatory authority,

with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (e.g., property use restrictions, AULs, institutional controls, or engineering controls). a CREC shall be listed in the Findings Section of the Phase I ESA report, and as a REC in the Conclusions Section of the report. Controlled REC refers to a REC with past releases that have been addressed, but where contamination still remains and is subject to the implementation of required activity use limitations (AULs) such as institutional or engineering controls. CRECs are considered RECs and must be listed in the findings section as a REC and in the conclusion.

HUD Notice CPD-23-103 addresses radon gas must now be considered in the contamination analysis required under HUD's contamination regulations at 24 CFR Part 50.3(i) and 58.5(i). The policy encourages the testing of radon as the most effective means by which site-specific levels of radon can be identified, though the policy does not require testing.

Radon is a radioactive gas that forms when radium and certain other radioactive metals break down in rocks, soil, and water. It is found in nearly all soils and moves through the soil to the air and into structures through cracks and other areas of permeability.

The goal for mitigating radon in buildings is to reduce radon concentrations in indoor air as low as reasonably achievable and practicable considering the efficacy of current industry standard radon reduction systems and environmental conditions (e.g., geology and climate). The most effective strategy to protect the health and safety of occupants is to prevent radon from entering the building by using radon resistant construction techniques; another effective strategy is to reduce the level of radon inside existing buildings by installing and operating a radon reduction system. An effective radon reduction system achieves two main goals: it reduces the concentration of radon gas in the home by venting it safely outside the structure and removes the radon gas from under the foundation before it can come into the home.

**No Action**

There would be no site preparation, construction, generators operation, or demobilization activities under the No Action. No Action does not involve hazardous materials, toxic substances, the risk of water or soil contamination. No Action would have no impact anticipated on contamination and toxic substances.

**Proposed Action**

Site reconnaissance conducted in June - July 2023 did not find contamination or waste in the project site. The site preparation, construction, generators operation, or demobilization activities under the Proposed Action would temporarily use, potentially encounter, or generate hazardous materials and wastes such as lubricants and fuels. PRASA would be responsible for complying with applicable federal and local laws and regulations in determining the absence or presence of hazardous materials or waste. If PRASA encounters contaminated soil, sediments, surface water, or groundwater during construction, work would stop and PRDNER and other regulators would be notified in accordance with applicable permits. The PRASA would be responsible for adhering to PRDNER guidance before resuming work. PRASA would be responsible for handling and disposing of hazardous materials and wastes during operation in accordance with federal and local regulations and specific BMPs. For circumstances where the CWA requires the implementation of a SPCC plan, implementation of appropriate BMPs would contain and limit impacts of hazardous materials to the immediate area of the release.

The proposed action includes the installation of four emergency power generators with a capacity of 2,500 kW per unit, two diesel storage tanks with a capacity of 40,000 gallons each, and a fuel receiving area. Potential spills may gain access to surface or groundwater during site preparation/construction and generators operation phases, as indicated before. Potential contaminants could include fuel, oil, and hydraulic fluids from leaky equipment or during refueling activities. A SPCC Plan would be required and would describe the BMPs for oil handling operations, spill prevention practices, discharge or drainage controls, and the personnel, equipment and assigned resources that would be used to prevent oil spills from reaching navigable waters or adjoining shorelines. The engineering controls to be included as part of the design include double wall tanks and secondary containment for tanks and fuel receiving area.

No on-site or nearby toxic, hazardous, or radioactive substances that could affect the health and safety of project occupants or conflict with the intended use of the property were found. The site visit findings on toxic, hazardous, or radioactive substances will not constitute a Recognized Environmental Condition (REC) nor Historically Recognized Environmental Condition (HREC), neither a Controlled Recognized Environmental Condition (CREC).

The PRASA would ensure that on-site personnel receive appropriate job specific safety training in accordance with OSHA regulations. Clearing and grubbing activities would be in accordance with federal and local laws and regulations regarding the handling and disposal of hazardous materials and hazardous wastes. Appropriate signage and construction barriers would be installed prior to construction to alert the public of project activities and risks and prevent unauthorized personnel from gaining access to the project area. For Proposed Action, there would be direct, temporary, minor adverse impacts due to contamination and hazardous materials risks with implementation of BMPs. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 two diesel storage tanks with a capacity of 40,000 gallons each, and a fuel receiving area would have the potential impacts same needed for the Proposed Action.

For Alternative 2, there would be direct, temporary, minor adverse impact due to contamination and hazardous materials risks with implementation of BMPs.

**Alternative 3**

Alternative 3 two diesel storage tanks with a capacity of 40,000 gallons each, and a fuel receiving area would have the potential impacts same needed for the Proposed Action.

For Alternative 3, there would be direct, temporary, minor adverse impact due to contamination and hazardous materials risks with implementation of BMPs.

**Explosive and Flammable Hazards.**

The US Department of Housing and Urban Development (HUD) has regulations for the siting of HUD-assisted projects near hazardous operations handling conventional fuels or chemicals of an explosive or flammable nature. 24 CFR Part 51 Subpart C

Liquefied Petroleum Gas including propane (LPG/propane) is among the fuels originally identified as potentially hazardous under 24 CFR Part 51 Subpart C. LPG/propane fuel is also widely used for cooking and heating in residential applications, particularly in rural areas. Tanks used in LPG/propane applications have been demonstrated to be durable, and in most states are regulated by well-developed industry standards published by the National Fire Protection Association (NFPA) Code 58. The NFPA setback requirements in these safety standards differ from those in 24 CFR 51C. The process of compliance with disparate safety standards, specifically the requirement for additional setback areas or mitigation measures such as barrier walls due to the HUD standard, adds significant cost to routine residential development associated with LPG/propane storage without a perceptible increase in safety.

HUD has revised the regulation to exempt from coverage above-ground storage tanks with a water gallon capacity of 1,000 gallons or less that are used to store LPG/propane if the storage tank complies with the 2017 edition of NFPA Code 58 (Liquefied Petroleum Gas Code). Aboveground LPG/propane tanks with a water capacity up to 1,000 gallons that are in compliance with NFPA Code 58 (2017) are excluded from the definition of "hazard", and thereby from coverage under the rule. In addition, the definition of hazard has also been revised to codify longstanding HUD interpretation excluding below ground storage containers hazards from coverage under 24 CFR 51C.

During a site visit performed on April 27, 2023, flammable or explosive operations related to above storage tanks were identified within a 1-mile radius of the project site. Facilities such as food service (restaurants), and gas station were identified. The La Plata Filtration Plant (Enrique Ortega) is reported in the Facility Registry Service FRS. According to the EPA RCRA information web this facility is not engaged in an RCRA activity. (See **Appendix A Figure 43 Explosive Hazard Facilities**).

The food service facilities identified are Colmado Cafetín 3 Hermanos located in Road PR-824 at 1,100 meters from the project and El Tocón Pizzeria and Restaurant at 580 meters located in Road PR-824. Both places have 454 liters (120 gallons) propane gas tanks. The identified food service facilities are not explosive hazards and excluded from coverage under 24 CFR 51C.

The site visit findings on LPG/propane tanks will not constitute a Recognized Environmental Condition (REC) nor Historically Recognized Environmental Condition (HREC), neither a Controlled Recognized Environmental Condition (CREC).

**No Action**

There would be no site preparation, construction, generators operation, or demobilization activities under the No Action. No Action does not involve explosive and flammable hazards. No Action would have no impact anticipated on explosive and flammable hazards.

**Proposed Action**

The site preparation, construction, generators operation, or demobilization activities under the Proposed Action would use diesel fuel, considered a hazardous material, specifically a Class C Combustible. The PRASA would be responsible for handling the diesel fuel in accordance with federal and local regulations and specific BMPs. The proposed action includes two diesel storage tanks with a capacity of 40,000 gallons each, with tank design non-pressurized, double walled, diked containment and a fuel receiving area.

The PRASA would ensure that on-site personnel receive appropriate job specific safety training in accordance with OSHA regulations. Clearing and grubbing activities would be in accordance with federal and local laws and regulations regarding the handling of fuels. Appropriate signage and construction barriers would be installed prior to construction to alert the public of project activities and risks and prevent unauthorized personnel from gaining access to the project area.

For Proposed Action, there would be minor direct adverse long-term impacts to explosive and flammable hazards with implementation of BMPs. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain. Alternative 2 would occupy a total area of 6,051 $m^2$ (1.50 acres) of land. Alternative 2 location has a steep slope with mature trees and diverse vegetation, which will require major leveling, including clear and grubbing activities. The earthwork would require 103 cubic yards of cut, 17,717 cubic yards of rock excavation, and 3,078 cubic yards of fill. Requires land acquisition.

For Alternative 2, there would be minor direct adverse long-term impacts to explosive and flammable hazards with implementation of BMPs.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building. Alternative 3 would occupy a total area of 7,362 $m^2$ (1.82 acres) of land. Alternative 3 location presents a variable topography with no visible runoff conveying areas. The earthwork would cover an area of 8,250 square meters (2.04 acres) with an estimated to be 9,500 cubic meters of cut and 3,500 cubic meters of fill. Additional land acquisition (1,800 square meters) activities should occur to provide the Alternative with a maneuvering area for large trucks and maintenance vehicles.

For Alternative 3, there would be minor direct adverse long-term impacts to explosive and flammable hazards with implementation of BMPs.

## 5.2 Natural Features

The Natural Features impact category consists of the natural features surrounding or on the site of potential projects. This category includes topics such as water resources, endangered species, local wildlife.

### 5.2.1 Water Resources

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the U.S. (WOTUS) and regulating quality standards for surface waters. Section 401 of the CWA also requires state certification of federal licenses and permits in which there is a "discharge of fill and/or dredged material into navigable waters of the United States." The process of obtaining a Section 401 Water Quality Certification (WQC) establishes whether an activity, as described in the federal license or permit, would impact site-specific water quality standards. Prior to the issuance of a relevant federal license or permit, Section 401 of the CWA requires that the state first issue a WQC for the project. In Puerto Rico, PRDNER is the local agency with jurisdiction to evaluate and grant the WQC. The most common federal license or permit requiring a WQC is the USACE-issued CWA Section 404(d) permit.

PRDNER takes an active role in water quality-based permitting through the CWA Section 401 certification process. PRDNER issues a local WQC under the authority of the Puerto Rico Water Quality Standards Regulation. The EPA reviews applications for completeness and requests PRDNER certification prior to development of a draft permit. The PRDNER can include water quality-based effluent limits and special conditions in the water quality certificates they develop. The PRDNER has adopted an anti-degradation policy and regulations are in place to protect coastal, surface, and ground waters.

Section 402 of the CWA established the NPDES program, which authorizes EPA to issue permits for the point source discharge of pollutants into WOTUS. Under the NPDES, EPA regulates both point and non-point pollutant sources, including stormwater and stormwater runoff for projects with ground disturbance of more than 0.4 hectare (1 acre). The NPDES permit requires the preparation of a SWPPP for each project that qualifies under the program.

Section 305(b) of the CWA requires states, territories, and other jurisdictions of the U.S. to biannually submit reports to EPA on the quality of their surface waters. These entities have determined the appropriate uses of each waterbody within their jurisdiction, which in Puerto Rico includes recreation, aquatic life, and drinking water sources. Section 305(b) reports provide information on the water quality status of waters in Puerto Rico, whereas section 303(d) lists are a subset of these waters – reporting those waters that are impaired by a pollutant and in need of a Total Maximum Daily Load (TMDL) plan (EPA b)[15]. A TMDL is the calculation of the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet and continue to meet water quality standards for pollutants. The EPA approves and establishes TMDLs for the assessment unit/pollutant combination. Once the TMDL for a specific waterway is determined, a plan is developed and implemented to improve the waterway's water quality (EPA b).

The Represa del Lago La Plata (circa 1974) was constructed to collect water from rivers and rainfall within the Toa Alta-Bayamón-Naranjito-Comerío basin for consumption. The principal river that drains into Lago La Plata is the Río La Plata. The purpose of the dam is to serve as a raw water reservoir for the Enrique Ortega Water Filtration Plant. The dam is in acceptable condition as per the latest PRASA report. There are no structural problems identified. PRASA completed in 2022 a project to repair the base scours of the dam.

[15] EPA b Overview of Total Maximum Daily Loads (TMDLs) https://www.epa.gov/tmdl/overview-total-maximum-daily-loads-tmdls

**Water Quality**

According to the 305(b) and 303(d) Integrated Report, there are nineteen probable causes of impairment for rivers and streams (PRDNER 2024). The potential sources of pollution are wastewater collection systems failure, confined animal feeding operations, onsite wastewater systems, and urban runoff/storm sewers. The following paragraphs summarize the findings of the 2024 303(d) report for Lago La Plata.

The 2024 PRDNER 303(d) list of impaired waters indicates that Lago La Plata is impaired for aquatic life and drinking water. Potential pollution sources are collection system failure, confined animal feeding operations, landfill, and onsite wastewater systems. The causes of impairment are changes in the levels of arsenic, dissolved oxygen, lead, pH, temperature, total nitrogen, and total phosphorus and implementation of a TMDL plan is required to improve the dam's water quality (PRDNER 2024). A TMDL plan of Lago La Plata for fecal coliform was approved in September 2003 (PRDNER 2024). TMDL plans of Lago La Plata for total phosphorous and total nitrogen are development status of final draft. Lago La Plata met the water quality standard for turbidity.

The site preparation and construction include activities such as clearing and grubbing as well as earth cut, fill and compaction. The site preparation/construction activities could result in sediment runoff, mainly from clearing and grubbing which would expose soil. Mitigation of potential temporary impacts to surface water during the site preparation/construction phase would be achieved using BMPs to control erosion due to surface water runoff. BMPs for runoff impacts would include implementing a SWPPP, as required by local and federal agencies. Another potential water quality impact would be potential spills that may gain access to surface or groundwater during site preparation/construction and generators operation phases. Potential contaminants could include fuel, oil, and hydraulic fluids from leaky equipment or during refueling activities, construction dust, and treated wood. A Spill Prevention Control and Countermeasure (SPCC) Plan would be required and would describe the BMPs for oil handling operations, spill prevention practices, discharge or drainage controls, and the personnel, equipment and assigned resources that would be used to prevent oil spills from reaching navigable waters or adjoining shorelines. Engineering controls part of the design includes double wall tanks and secondary containment for tanks and fuel receiving area. Mitigation measures are in compliance with the Clean Water Act (CWA) and DNER regulations.

**No Action**

Under the No Action alternative, the Water Resources would not change. Water Quality of Río La Plata and a Riverine Wetland would depend on the area's stormwater management. No Action would cause no impact anticipated on Water Resources nearby.

**Proposed Action**

The Water Resources available in the project area are Río La Plata, Lago La Plata, a Riverine Wetland and the FFRMS Floodplain.

The Proposed Action is located downstream of Lago La Plata, so the project will not cause impacts on the Water Quality of Lago La Plata therefore the Enrique Ortega WTP RWI. The proposed action is planned to occur upland. The Proposed Action would provide energy back-up to La Plata RWI. The intake would not install or expand a local water connection. The Proposed Action would not have an impact on the water supply.

The Proposed Action would cause direct, short-term, minor adverse impact to Rio La Plata during site preparation/construction, and demobilization and operation with implementation of proposed BMPs. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would cause direct, short-term, minor adverse impact to Rio La Plata during site preparation/construction, and demobilization and operation with implementation of proposed BMPs.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would cause direct, short-term, minor adverse impact to Rio La Plata during site preparation/construction, and demobilization and operation with implementation of proposed BMPs.

**Wetlands**

Executive Order 11990 – Protection of Wetlands requires Federal activities to avoid construction or management practices that would adversely affect wetlands unless that agency finds that there is no practicable alternative, and the proposed action includes the practicable measures to minimize harm to the wetlands. Wetlands are identified on the National Wetlands Inventory (NWI) or else consult directly with the Department of Interior-Fish and Wildlife Service (FWS). HUD or grantees may also consult with the USDA/NRCS National Soils Survey or the U.S. Army Corp of Engineers (USACE).

Wetlands are areas saturated or inundated by surface or ground water with a frequency enough to support, or that under normal hydrological conditions does or would support, a prevalence of vegetation or aquatic life typically adapted for these soil conditions. Examples of wetlands include swamps, marshes, estuaries, bogs, beaches, wet meadows, sloughs, mud flats, among others. Wetlands are important because they protect and improve water quality, provide fish and wildlife habitats, provide economic and social benefits, store floodwaters, and maintain surface water and groundwater flow during dry periods. Executive Order (EO) 11990 Wetlands Management requires federal agencies to avoid funding activities that directly or indirectly support occupancy, modification, or development of wetlands, whenever there are practicable alternatives.

The USACE, through its permit program, regulates the discharge of dredged or fill material into WOTUS, including wetlands, pursuant to Section 404 of the CWA. In addition, EPA has regulatory oversight of the USACE permit program, allowing the agency under Section 404c to comment on USACE issued permits with unacceptable environmental impacts.

The PRDNER Regulation for the Conservation and Management of Wildlife, Exotic Species and Hunting (Regulation 6765) does not define wetlands or establish criteria for their delineation. The PRDNER uses the federal process, implemented by USACE through Section 404 of the CWA, to regulate activities in wetlands areas. The PRDNER participates in the federal regulatory process implementation.

HUD Exchange Wetlands Protection webpage advises to use the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory, state-specific mapping tools and on-site surveys to identify wetlands and evaluate actions with the potential to impact wetlands using the 8-step decision-making process. The agency's regulations on conducting the 8-Step Process are contained in 24 CFR Part 55 for complying with Executive Order 11990, Protection of Wetlands. The 8-Step Decision Making Process document is included as **Appendix H 8-Step Decision Making Process**. The Public Notice for the draft EA will be published by HUD and will include the notices for the 8-Step process.

Wetlands within Puerto Rico span a vast range of types, from interior montane wetlands of the rain forest to intertidal mangrove swamps along the coast. The United States Fish and Wildlife Service (USFWS) National Wetland Inventory classifies Río La Plata, located north of the project, as a Riverine Lower Perennial Unconsolidated Bottom Permanently Flooded System (R2UBH). The Lago La Plata is also classified as a Riverine Lower Perennial Unconsolidated Bottom Permanently Flooded System. The Riverine Wetland of Río La Plata (R2UBH) is outside 100 feet north of the project limits. (**Appendix A Figure 14 Wetlands Protection**). The Riverine Wetland of an unnamed creek that may possibly be affected is located within a radius of 100 feet west of the project limits at two points on the existing dirt road where a paved access would be constructed. (**Appendix A Figure 15 Unnamed Creek – Riverine Wetland**). Note that the project's eastern end area lies on the dam axis, where the electric lines to be connected to the pump station will be attached.

The proposed location for the new Generators Area is outside of identified wetlands in the area. (USWFS National Wetlands Inventory, October 2020). Riverine Wetlands of Río La Plata (R2UBH) and an unnamed stream are nearby the project site. No areas with wetland characteristics were observed on the proposed site. As indicated before, the project does not entail works on the water body. The unnamed creek that may possibly be affected is located west of the project, within a radius of 100 feet from the project limits at two points on the existing dirt road. The project area was evaluated and does not present the biotic and hydrological characteristics of a wetland. There is a buffer strip between the existing dirt road and the riverine wetland. The nearest distance from the access road limits to the wetland is approximately 6 meters (21 feet) at Station 1+00, near Camino Recreativo La Plata. (**Appendix A Figure 11 Site Plan of the Project**).

The existing access dirt road will be improved and paved from the Camino Recreativo La Plata Road to the access gate of Lago La Plata. Considering whether stormwater runoff would flow into the offsite wetland, it is necessary to implement construction BMPs to protect the wetland (**Appendix A Figure 15 Unnamed Creek - Riverine Wetland**). BMPs can be classified as Erosion Prevention, Sediment Control, Runoff Control, among others. Examples of practices include the installation of geotextile material, fiber rolls, hay bales and silt fences. The Proposed Action would not make any modification of wetlands. The 8-Step Decision Making Process confirmed the proposed action is located within a 100 feet radius to a Riverine Wetland. The access road work will require to implement erosion control best management practices BMPs to avoid sediment migration to nearby wetlands. The access road for the proposed action is practicable considering the buffer strip between the existing dirt road and the riverine wetland, the vegetation observed throughout these areas, and the implementation of erosion control best management practices (BMPs) during construction.

The PRASA will use preventive measures and construction BMPs to minimize impacts to riverine wetlands that are within 100 feet of the project. The Proposed Action does not have works affecting wetlands. No USACE permit is required

**No Action**

Under the No Action alternative, the Water Resources would not change. Land surface erosion would continue and may increase due to poor areas' stormwater management. No Action would cause direct, temporary, minor adverse impact on a Riverine Wetland nearby.

**Proposed Action**

The site preparation/construction, equipment demobilization and operation during maintenance checks and power outage under this alternative may have no impact on wetlands within the proposed action area and neighboring area with implementation of BMPs and regulatory requirements. Proposed Action may have a direct, temporary, minor adverse impact on Wetland. The proposed action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 access road route and potential impacts are the same needed for the Proposed Action.

Alternative 2 would have a direct, temporary, minor adverse impact on Wetland.

**Alternative 3**

Alternative 3 access road route and potential impacts are the same needed for the Proposed Action.

Alternative 3 would have a direct, temporary, minor adverse impact on Wetland.

### 5.2.2 Vegetation

Several field visits were conducted to perform a survey of the Flora and Fauna (**Appendix C Flora and Fauna Study**) in the proposed property. The purpose of this study was to evaluate and describe the general wildlife on the property where the construction of the project is going to take place. The study identified different existing ecological associations, determining the presence of critical, threatened, or endangered species in the project area and recommending measures to reduce or eliminate the possible impacts of the project on these resources.

In the proposed area, eighty-five (85) plant species corresponding to thirty-eight (38) families were identified during the field visits. Through the extension of the proposed site boundary, one (1) main vegetative association was classified as: Areas of previously impacted land (100%). The vegetation observed throughout these areas are fast-growing grasses and shrubs typical of previously disturbed areas. Among the flora species that occupy these areas are observe the grasses such as the Paragüita rosada (*Chloris barbata*), Pata de gallina (*Digitaria horizontalis*), Yerba rosada (*Melinis repens*), herbaceous like, Margarita silvestre (*Bidens alba*), Hierba socialista (*Cyanthillium cinereum*), *Eupatorium capillifolium*, Guaco falso (*Mikania micrantha*), Pancha (*Tridax procumbens*), shrubs like the Matraca (*Crotalaria juncea*), Capulín (*Muntigia calabura*), Mimosa (*Mimosa pigra*) e Higuereta (*Ricinus communis*).

Outside the footprint, particularly to the east of the property where the dam is located, the Proposed Action would impact scattered trees consisting of the species of Acacia amarilla (*Senna siamea*), Guara (*Cupania americana*), Guaraguao (*Guarea guidonia*), Pitanga (*Eugenia uniflora*), among others. Outside the project area, the Proposed Action would also impact forest patches of secondary succession, which are observed to border much of the extension of the dirt road. In these patches, species such as Yagrumo hembra (*Cecropia schreberiana*), Moca (*Andira inermis*), Guano (*Ochroma pyramidale*), Palma real (*Roystonea borinquena*), Tulipán africano (*Spathodea campalulata*), Guaraguao (*Guarea guidonia*) and Espino rubial (*Zanthoxylum martinicensis*) are observed.

**No Action**

There would be no site preparation, construction, generators operation, or demobilization activities under the No Action. No Action does not involve any impact to a unique natural feature that may be in the project area. In the absence of the project, the surroundings would maintain a vegetation of fast-growing grasses, shrubs, and scattered trees on the sides of the existing access dirt road and the project area. No action would have no impact anticipated on Vegetation of the area.

**Proposed Action**

The area identified to install the new generators has a level grading with few trees. The layout will require less earthworks due to the actual condition. The Proposed Action footprint will require the removal of vegetation from an approximate area of 9,814 $m^2$ where the generators would be installed, slopes and the way not paved in existing land from the Camino Recreativo La Plata Road to the access gate to Lago La Plata. A total of 346 trees would be removed from the property. The Proposed Action would occupy a total of 6,051 $m^2$ (1.50 acres) of land. The contractor would have a suggested staging area of 917 $m^2$ (0.23 acre). It was notable that the cutting and pruning for the development of the project in other possible alternative sites would be greater. The Proposed Action impacts the flora and fauna, trees, and loss of green space.

The vegetation observed throughout the proposed project areas are fast-growing grass and shrubs typical of previously disturbed areas. The Proposed Action footprint is approximately 4.9% of the nearby parcels area. Impacts on vegetation are considered direct, temporary, minor adverse, impact. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable. A permit will be required for tree cutting prior to beginning clearing.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain. Alternative 2 would occupy a total area of 6,051 $m^2$ (1.50 acres) of land. Alternative 2 location has a steep slope with mature trees and diverse vegetation, which will require major leveling, including clear and grubbing activities.

The vegetation observed mature trees and diverse vegetation. Impacts on vegetation are considered direct, short-term, minor adverse impact.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building. Alternative 3 would occupy a total area of 7,362 $m^2$ (1.82 acres) of land.

The vegetation observed mature trees and diverse vegetation. Impacts on vegetation are considered direct, short-term, minor adverse impact.

### 5.2.3 Wildlife and Fish

Several field visits were conducted to perform a survey of the Flora and Fauna (**Appendix C Flora and Fauna Study**) in the proposed property. The purpose of this study was to evaluate and describe the general wildlife on the property where the construction of the project is going to take place. The study also identified different existing ecological associations, determining the presence of critical, threatened, or endangered species in the project area and recommending measures to reduce or eliminate the possible impacts of the project on these resources.

Regarding fauna, a total of thirty-three (33) species were observed, with birds being the dominant group. The most common bird species on the property and surrounding areas Tórtola aliblanca (*Zenaida asiatica*), Paloma turca (*Patagioenas squamosa*), Ruiseñor (*Mimus polyglottos*), Mozambique (*Quiscalus niger*), Reinita mariposera (*Dendroica adeaidae*) and the Pitirre (*Tyrannus dominicensis*). These species were observed mostly between the areas of previously impacted land and the patches of shrubby vegetation on the dirt road and project area. Birds like Pájaro bobo menor (*Coccyzus minor*), Bienteveo de Puerto Rico (*Vireo latimeri*), Julián chiví (*Vireo altiloquus*), San Pedrito (*Todus mexicanus*) and the Comeñame de Puerto Rico (*Loxigilla portoricensis*) were observed in secondary succession forest patches that the footprint of the project would not impact.

**No Action**

There would be no site preparation, construction, generators operation, or demobilization activities under the No Action. The dominant group of wildlife in the area, birds, would not have any impact with No Action. There are no aquatic species (including fish) in the area of No Action. No action would have no impact anticipated on Wildlife and Fish of the area.

**Proposed Action**

The action will require the removal of vegetation from an approximate area of 9,814 $m^2$ where the generators would be installed, slopes and the way not paved in existing land from the Camino Recreativo La Plata Road to the access gate to Lago La Plata. A total of 346 trees would be removed from the property. The proposed action would occupy a total of 6,051 $m^2$ (1.50 acres) of land.

The proposed action footprint is approximately 4.9% of the nearby parcels area. The area identified to install the new generators has a level grading with few trees. The layout will require less earthworks due to the actual condition. The vegetation observed throughout the Proposed Action areas are fast-growing grass and invasive shrubs typical of previously disturbed areas.

The proposed action is not a risk to wildlife and fish in the area. The Proposed Action would result in direct, short-term, minor adverse impact to wildlife as result of site preparation with implementation of proposed BMPs. The action area is upland. There are no aquatic species (including fish) in the action area. Proposed Action would have no impact anticipated on Fish. The proposed action is in compliance with the Statutes, Executive Orders or Regulations.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain. Alternative 2 would occupy a total area of 6,051 $m^2$ (1.50 acres) of land. Alternative 2 location has a steep slope with mature trees and diverse vegetation, which will require major leveling, including clear and grubbing activities.

Alternative 2 action is not a risk to wildlife and fish in the area. Alternative 2 would result in direct, short-term, minor adverse impact to wildlife as result of site preparation with implementation of proposed BMPs. The project area is upland. There are no aquatic species (including fish) in the area. Alternative would have no impact anticipated on Fish.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building. Alternative 3 would occupy a total area of 7,362 $m^2$ (1.82 acres) of land. Alternative 3 location presents a variable topography with no visible runoff conveying areas. Additional land acquisition (1,800 square meters) activities should occur to provide the Alternative with a maneuvering area for large trucks and maintenance vehicles.

Alternative 3 action is not a risk to wildlife and fish in the area. Alternative 3 would result in direct, short-term, minor adverse impact to wildlife as result of site preparation with implementation of proposed BMPs. The project area is upland. There are no aquatic species (including fish) in the area. Alternative would have no impact anticipated on Fish.

### 5.2.4 Threatened and Endangered Species and Critical Habitat

The U.S Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) website was consulted to obtain an Official Species List identifying any threatened, endangered, proposed and candidate species, as well as proposed and designated critical habitats within the project area.

According to IPaC, the listed species that may be present in the proposed area is one (1) reptile: *Chilabothrus inornatus* (listed yet as *Epicrates inornatus*). Although the species has a defined distribution range that covers the entire Island, no critical habitat has been designated. (**Appendix J USFWS Consultation Letter**)

No Puerto Rican boas were observed, nor any other critical, threatened, or endangered species during the field visits. The Action is not likely to adversely affect the Puerto Rican Boa. Even though the Puerto Rican Boa has a status of Endangered, USFWS on July 13, 2022[16] proposed to delist the species.

USFWS developed conservation measures with the purpose of assisting others to avoid or minimize adverse effects to the Puerto Rican boa and its habitat.

1. Inform all project personnel about the potential presence of the PR boa in areas where the proposed work will be conducted. An educational poster or sign with photo or illustration of the species should be displayed at the project site.
2. The boundaries of the project and areas to be excluded and protected should be clearly marked in the project plan and in the field in order to avoid further habitat degradation into forested and conservation areas.
3. A biologist or personnel with experience on this species should survey the areas to be cleared to verify the presence of any PR boa within the work area prior to the use of heavy machinery and any construction activity.
4. Vegetation should first be cleared by hand to the maximum extent possible prior to the use of heavy machinery for land clearing. Cutting vegetation by hand will allow boas present on site to move away on their own to adjacent available habitat.
5. If a PR boa is encountered, working will cease until it moves off the site. Do not capture the boa. If boas need to be moved out of harm's way, designated personnel shall immediately contact the Puerto Rico Department of Natural and Environmental Resources (PRDNER) Rangers for safe capture and relocation of the animal, in accordance with the USFWS Puerto Rican Boa Conservation Measures guidelines. (PRDNER phone numbers: ((787) 724-5700, (787) 230-5550, (787) 771-1124).
6. Any heavy machinery left on site (staging) or near potential PR boa habitat (within 50 meters of potential boa habitat), needs to be thoroughly inspected each morning before work starts to ensure that no boas have sheltered within engine compartments or other areas of the equipment.

[16] Federal Register / Vol 88, No 20 / Tuesday, January 31, 2023 / Proposed Rules 50 CFR Part 17

PRDOH consulted USFWS for concurrence on the findings of listed critical, threatened, or endangered species that may be present in the proposed area. USFWS consultation letter (**Appendix J USFWS Consultation Letter**) confirmed the determination that the proposed project may affect but is not likely to adversely affect the Puerto Rican boa with the implementation of the conservation measures.

According to USFWS current distribution range in which the Puerto Rican harlequin butterfly (*Atlantea tulita*) is known to or is believed to occur includes the following 32 municipalities: Adjuntas, Aguadilla, Añasco, Arecibo, Barceloneta, Camuy, Ciales, Coamo, Florida, Guayanilla, Hatillo, Hormigueros, Isabela, Jayuya, Juana Díaz, Lares, Las Marías, Manatí, Maricao, Mayagüez, Moca, Morovis, Orocovis, Peñuelas, Ponce, Quebradillas, Sabana Grande, San Germán, San Sebastián, Utuado, Villalba and Yauco.

In 12/01/2022 (87 FR 73655 73682 Citation Page)[17], critical habitat units were designated for this species. Units include Isabela, Quebradillas, Camuy, Arecibo, Florida, Ciales, Utuado, Maricao, Yauco, Sabana Grande, and San German municipalities. Within these areas, essential physical or biological features are present for the conservation of the Puerto Rican harlequin butterfly.

USFWS published on June 22, 2016, a final rule to determine threatened species status for the Elfin-Woods Warbler (Reinita de Bosque Enano) (*Setophaga angelae*) (50 CFR 17)[18] , endemic bird to Puerto Rico. On June 30, 2020[19], USFWS published the final rule to designate critical habitat for the elfin-woods warbler (*Setophaga angelae*) to extent the Endangered Species Act of 1973 protections. The municipalities in Puerto Rico that fall within the boundaries of the critical habitat designation are Maricao, San Germán, Sabana Grande, Yauco; Río Grande, Canóvanas, Las Piedras, Naguabo, Ceiba; Cayey, San Lorenzo, Guayama, and Patillas.

**No Action**

No Action would maintain conditions for the threatened and endangered species listed Puerto Rican boa. The Lago La Plata is not a critical habitat unit of the Puerto Rican harlequin butterfly nor critical habitat for the elfin-woods warbler. No Action would have no impact anticipated on threatened and endangered species in the area.

**Proposed Action**

The one threatened and endangered species listed in the USFWS IPaC is the reptile Puerto Rican boa (*Chilabothrus inornatus*), not observed during the field visits. The proposed action area may be considered as critical habitat by the same IPaC report. There are no critical habitat units in the surroundings of Lago La Plata and the municipality of Toa Alta of the Puerto Rican harlequin butterfly (*Atlantea tulita*).

PRDNER classified the quality of the habitat as Natural Habitat with High Potential to Become Essential Habitat, Habitat of High Ecological Value or Habitat of Ecological Value (Category 5). The Proposed Action footprint is approximately 4.9% of the nearby parcels area. The area identified to install the new generators has a level grading with few trees. The layout will require less earthworks due to the actual condition. The project will require the removal of vegetation from an approximate area of 9,814 $m^2$ where the generators would be installed, slopes and the way not paved in existing land from the Camino Recreativo La Plata Road to the access gate to Lago La Plata. A total of 346 trees would be removed from the property. The project would occupy a total of 6,051 $m^2$ (1.50 acres) of land. The Proposed Action would result in direct, short-term, minor adverse impact to threatened and endangered species.

There is no designated critical habitat in or adjacent to the project area. Proposed Action would have no impact anticipated on critical habitat. The proposed action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

[17] Federal Register / Vol. 87, No. 230 / Thursday, December 1, 2022 / Rules and Regulations 50 CFR Part 17

[18] Federal Register / Vol 81, No. 120 / Wednesday, June 22, 2016 / Rules and Regulations 50 CFR Part 17

[19] Federal Register / Vol 85, No. 126 / Tuesday, June 30, 2020 / Rules and Regulations 50 CFR Part 17

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain. Alternative 2 would occupy a total area of 6,051 $m^2$ (1.50 acres) of land. Alternative 2 location has a steep slope with mature trees and diverse vegetation, which will require major leveling, including clear and grubbing activities.

The Alternative would result in direct, short-term, minor adverse impact to threatened and endangered species. There is no designated critical habitat in or adjacent to the area. Alternative 2 would have direct, short-term, minor adverse impact on critical habitat.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building. Alternative 3 would occupy a total area of 7,362 $m^2$ (1.82 acres) of land. Alternative 3 location presents a variable topography with no visible runoff conveying areas. Additional land acquisition (1,800 square meters) activities should occur to provide the Alternative with a maneuvering area for large trucks and maintenance vehicles.

The Alternative would result in direct, short-term, minor adverse impact to threatened and endangered species. There is no designated critical habitat in or adjacent to the area. Alternative 3 would have direct, short-term, minor adverse impact on critical habitat.

## 5.3 Public Services and Utilities

The Community Facilities and Services impact category consists of the community assets and services impacted by, and necessary for, a potential project. Included in this category are factors such as health care offerings, waste and recycling services, public safety teams, and public transit and accessibility.

A public utility is an organization that maintains the infrastructure for a public service. The interruption of service from public utilities can cause public health concerns. A reduction in the reliability of public utility services affects areas of daily life. The Proposed Action seeks to improve the reliability of the source water for PRASA's service area.

PRASA owns and operates Puerto Rico's public water and wastewater system. It maintains five operational regions: Metro, North, South, East, and West.

### 5.3.1 Educational & Cultural Facilities

Schools include the traditional elementary and high school systems and may include centers of higher education and adult education. The need for educational facilities is related to the age structure of the population and it may also be influenced by the economic structure of the community.

Schools are a different underwriting/environmental factor to assess. Generally, schools are built in response to need and not in anticipation of need. Capacity is influenced by changing household characteristics, shifting service area boundaries, curriculum revisions, changing educational concepts, and busing strategies. Nevertheless, capacity and accessibility are the fundamental issues to address.

Cultural resources are also considered to be educational facilities. These resources include art galleries, libraries, dance facilities, museums, theaters, community centers, and other facilities for artistic and cultural purposes. Demand and supply for cultural facilities is a function of factors that include the size of the community, density of development, income, and demographics.

No educational or cultural facilities were identified adjacent or within the proposed site. Enrique Ortega WTP Service Area has seventy-three public schools in the Metropolitan Area. (**Appendix A Figure 9 Public Schools in Service Area**)

**No Action**

No Action alternative would remain educational or cultural facilities in the area without change. The absence of the project would close partially or totally the services of educational or cultural facilities during times of emergency and during grid outages. No Action would have a direct, long-term, minor adverse impact on educational or cultural facilities.

**Proposed Action**

The Proposed Action is located in Quebrada Cruz Ward, Toa Alta, Road PR-824, km 5.0, Camino Recreativo La Plata. The Proposed Action consists of the construction of an emergency power generators facility at Represa del Lago La Plata for the operation of La Plata Raw Water Intake (RWI) during grid power outages to provides water to Enrique Ortega WTP.

The Proposed Action would affect positively on public services and utilities: educational & cultural facilities because the project will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to the population served in the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal.

The schools, museums, community centers, historic sites, libraries, private and public, served by Enrique Ortega WTP would benefit from having a continuous potable water service during power outage events.

During the construction stage, no impact to educational and cultural facilities is expected.

The Proposed Action would have a direct, long-term minor beneficial impact on the sustainability of the educational & cultural facilities of the Metropolitan Area. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would have a direct, long-term, minor beneficial impact on the sustainability of the educational & cultural facilities of the Metropolitan Area.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct, long-term minor beneficial impact on the sustainability of the educational & cultural facilities of the Metropolitan Area.

**Cultural Resources**

Cultural and historic resources are subject to review under federal and local laws and regulations. The National Historic Preservation Act (NHPA) enacted in 1966, established State Historic Preservation Offices (SHPO) and the National Register of Historic Places (NRHP). The NRHP is the U.S.' official list of significant historic properties and is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archaeological resources. The Secretary of the Interior administers the NRHP through the National Park Service.

Historic properties include districts, buildings, structures, objects, landscapes, archaeological sites, traditional cultural properties, and other resources that are significant in American history, architecture, archaeology, engineering, and culture. The NHPA only applies to historic properties, including archaeological resources, determined eligible for listing in the NRHP. To be eligible for listing, a property must meet eligibility criteria delineated by the Secretary of the Interior and retain sufficient integrity to convey its significance to American culture. Detailed eligibility criteria for listing a property on the NRHP is 36 CFR Part 60.

Section 106 of the NHPA, as amended, and implemented by 36 CFR Part 800, requires federal agencies to consider the impacts of their actions on historic properties and provide the Advisory Council on Historic Preservation, interested parties, and the public an opportunity to comment. This process must take place prior to the expenditure of federal funds. Federal regulation 36 CFR 800.4(a)(1) defines the Area of Potential Effects (APE) as the geographic area(s) within which the undertaking may directly or indirectly affect cultural resources. The APE is influenced by the scale and nature of an undertaking and may be different for diverse kinds of effects caused by the undertaking.

**Historic Properties**

Represa del Lago La Plata was constructed in 1974 (51 years ago). The Represa del Lago La Plata is potentially eligible to be included in the National Register of Historic Properties under criteria A or C.

A Section 106 NHPA Effect Determination Form was prepared for Project PR-HMGP-4339-0019 Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators Phase I and submitted to SHPO for the review and approval process.

Identification of Historic Properties - Architecture

Existing information on previously identified historic properties has been reviewed by a Program contracted Historic Preservation Specialist meeting with the Secretary of the Interior's Professional Qualification Standards (36 CFR Part 61), to determine if any such properties are located within the APE of this undertaking. The review of this existing information shows that the project area is within the boundaries of the National Register of Historic Places (NRHP) potentially eligible property identified as Represa del Lago La Plata.

This property is potentially eligible to the NRHP under Criteria A and/or C as follows:

- Criterion A: Represa del Lago La Plata is significant for its association with events that have made a significant contribution to the broad patterns of our history. The dam plays a vital role in providing potable water to a large region of Puerto Rico, marking it as an essential infrastructure project in the development of the area.
- Criterion C: The dam embodies the distinctive characteristics of a type, period, or method of construction. As a structure built in the mid- to late 20th century, it represents the engineering and architectural practices of its time.

Based on this narrative, the Seven Aspects of Integrity recognized by the National Register of Historic Places are addressed for this property as follows:

- Location: The dam remains in its original location, maintaining its historical context and relationship with the surrounding landscape.
- Design: The original design of the dam, including its structural components and layout, has been preserved. The Proposed Action includes measures to mitigate visual impacts, ensuring that the design integrity is maintained.
- Setting: The dam's setting, characterized by its rural and natural surroundings, remains largely unchanged. The proposed installations are designed to blend with the environment, minimizing visual disruption.
- Materials: The materials used in the original construction of the dam are still present. Any new materials introduced for the project are chosen to be compatible with the existing ones.
- Workmanship: The craftsmanship of the original construction is evident and preserved. The proposed improvements will respect and maintain the quality of workmanship.
- Feeling: The dam continues to convey its historical significance as a mid- to late 20th-century infrastructure project. The Proposed Action includes measures to ensure that the dam's historical feeling is not compromised.
- Association: The dam retains its association with the historical events and functions it was originally intended for, continuing to serve as a crucial water source.

**No Action**

Under the No Action alternative cultural and historic resources would not change. No Action would have no impact anticipated on historic properties.

**Proposed Action**

Based on the results of a historic property identification efforts, the Program has determined that there are historic properties within the Area of Potential Effect.

The proposed installation of generators and associated infrastructure near the dam determines that the project may have effects on historic properties, specifically direct and visual impacts on Represa del Lago La Plata.

Nevertheless, the project's area has been previously impacted by the construction of the existing access road and by routine maintenance operations of PRASA's properties. The proposed project area was used as part of a project to repair the scouring found at the base of Represa del Lago La Plata structure. Represa del Lago La Plata area has undergone significant disturbances since 1968, eliminating the natural layer of the land.

In summary, while the project introduces modifications to the landscape, particularly through the installation of generators and other facilities, the proposed mitigation strategies are recognized. Therefore, the determination is that the project may have a direct effect on the visual integrity of the area, but steps have been taken to minimize this impact.

The proposed action includes the installation of 183 m long exposed conduits anchored on the dam bridge wall from the starting point of the dam structure to the dam intake tower to connect the existing electrical infrastructure. The installation of the exposed conduits will be on downstream side of the dam bridge wall. The conduits will run over and under two galvanized steel strut beams. The visual impact to the dam bridge wall is to be minimized using 60 inches wide expanded metal galvanized steel protective barrier that will cover a vertical strut, the strut beams, and the conduits.

The Proposed Action would result in a direct, long-term minor adverse impact to historic properties, as result the installation of exposed conduits anchored on the dam bridge wall. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would result in a direct, long-term minor adverse impact to historic properties, as result the installation of exposed conduits anchored on the dam bridge wall.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would result in a direct, long-term minor adverse impact to historic properties, as result the installation of exposed conduits anchored on the dam bridge wall.

**Archaeological Resources**

In the database maintained by the ICP Archaeology and Ethnohistory Program there are no archaeological resources recorded within a 1 km radius around the proposed project. Within the established radius there is a previous archaeological study at the Phase I level (A and B), prepared by Marisol Martínez Garayalde for the project titled: Improvements to the Drying and Sedimentation Bed System of the Enrique Ortega Drinking Water Filtration Plant, Phase I and Rehabilitation of the Drinking Water Pumping Station and New Power Line of Represa De La Plata Phase II (ICP-TA-07-10-06). Archaeologist Martínez reported negative results regarding the presence of archaeological material in the studied area.

Martinez Garayalde's Phase II archaeological study indicates the dam area presented a situation of mountain cutting to construct the dam, building, and roads. Improvements were proposed within the dam, and an electrical line was to be installed along the road. The area shows mountain cutting to construct the dam, structure, and road. The Pumping Station, built in 1969, was to be rehabilitated. This structure was not demolished; the extraction pumps were to be improved. No cultural or historical resources were to be impacted as per Martinez Garayalde's findings and recommended that agency endorsement of the project should be granted. Although the dam is a historic property, it does not hold archaeological potential based on Martinez Garayalde's findings.

**No Action**

Under the No Action alternative would remain archaeological resources without change, No Action would have no impact anticipated on archaeological resources.

**Proposed Action**

No archaeological studies have been conducted within the APE of this project.

Based on the nature of the proposed actions evaluation, a recommendation of No Adverse Effect to cultural resources for this undertaking contingent to the implementation of the cultural resources management strategies.

The area identified to install the new generators has a level grading. The layout will require less earthworks due to the actual condition.

The project will require the removal of vegetation from an approximate area of 9,814 $m^2$ where the generators would be installed, slopes and the way not paved in existing land from the Camino Recreativo La Plata Road to the access gate to Lago La Plata. The area has been previously modified as it was used as part of the project to repair the undercuts found at the base of Represa del Lago La Plata between 2021 and 2022.

In the event that, during the development of the project, any deposit, element, structure, or vestige of an archaeological nature is discovered or impacted, the contractor must notify PRASA immediately and within a period of twenty-four hours to the Archaeology and Ethnohistory Program and proceed to implement protective actions to avoid the impact of the newly discovered cultural resource.

The Proposed Action require less earthworks, it would have no impact anticipated to archaeological resources. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain. Alternative 2 would occupy a total area of 6,051 $m^2$ (1.50 acres) of land.

Alternative 2 would have no anticipated impact on archaeological resources in the area.

In the event that, during the development of the project, any deposit, element, structure, or vestige of an archaeological nature is discovered or impacted, the contractor must notify PRASA immediately and within a period of twenty-four hours to the Archaeology and Ethnohistory Program and proceed to implement protective actions to avoid the impact of the newly discovered cultural resource.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building. Alternative 3 would occupy a total area of 7,362 $m^2$ (1.82 acres) of land.

Alternative 3 would have no anticipated impact on archaeological resources in the area.

In the event that, during the development of the project, any deposit, element, structure, or vestige of an archaeological nature is discovered or impacted, the contractor must notify PRASA immediately and within a period of twenty-four hours to the Archaeology and Ethnohistory Program and proceed to implement protective actions to avoid the impact of the newly discovered cultural resource.

### 5.3.2 Commercial Facilities

To assess commercial facilities, consider

- **The adequacy of existing commercial facilities to service the project.**
- **The impact on surrounding commercial establishments.**

Generally, three types of retail areas might be affected by the proposed project:

- **Neighborhood**: These consist of small businesses usually within 5-10 minutes of travel time including food, drug, cleaning, and convenience stores organized around a supermarket.
- **Community**: A central business district contains multifunctional economic and service enterprises including banks and specialty stores with access provided either by private or public transportation. In larger metropolitan areas, this usually does not include a food store.
- **Regional**: This may be either the central business district of a metropolitan area or a regional shopping center, usually with two or more department stores and various specialty stores.

No commercial facilities were identified adjacent or within the proposed site. There are approximately 6,000 commercial clients served by Enrique Ortega WTP.

**No Action**

No Action alternative would remain commercial facilities in the area without change. The absence of the project would close partially or totally services of commercial facilities during times of emergency and during grid outages. The experience of a guaranteed continuous potable water service would encourage new businesses to open in the Metropolitan Area. No Action would have a direct, long-term, minor adverse impact on commercial facilities.

**Proposed Action**

The Proposed Action consists of the construction of an emergency power generators facility at Represa del Lago La Plata for the operation of La Plata Raw Water Intake (RWI) during grid power outages to provides water to Enrique Ortega WTP.

The Proposed Action would affect positively on commercial facilities because the project will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to the population served in the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal.

The economic segments, private and public, served by Enrique Ortega WTP will benefit from having a continuous potable water service. Approximately 6,000 commercial clients within the service area could provide regular services during power outage events in the Represa del Lago La Plata Intake area. The experience of a guaranteed continuous potable water service would encourage new businesses to open within the Enrique Ortega WTP service area.

During the construction stage, surroundings commerce could benefit from the increase in personnel from the Contractor and Subcontractors. Businesses like hardware stores, cafeterias, and the like could reflect a sales increase.

The Proposed Action would have a direct long-term minor beneficial impact on the sustainability of commercial facilities of the Metropolitan Area. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would have a direct long-term minor beneficial impact on the sustainability of commercial facilities of the Metropolitan Area.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct long-term, minor beneficial impact on the sustainability of commercial facilities of the Metropolitan Area.

### 5.3.3 Health Care Services

Health care services are those regular and emergency dental, medical care, mental health, and substance abuse services which private doctors, dentists, and other trained medical staff at a hospital; outpatient clinic; public, private or community health facility; home-care medical programs; or an emergency treatment facility (e.g., trauma unit, special cardiac pulmonary resuscitation (CPR) unit) provide.

Consider whether a proposed project provides adequate:

- Access to hospitals, emergency facilities, clinics, and physician services
- Access to mental health and substance abuse service providers
- Health services to accommodate the special needs of certain populations (i.e., families, elderly, and persons with disabilities)
- Capacity for existing health care services to accommodate an increase in use.

No health care services were identified adjacent or within the proposed site. There are approximately four hospitals, fifteen clinics served by Enrique Ortega WTP. It cannot quantify the number of medical offices that are also in the service area. (**Appendix A Figure 8 Hospitals in Service Area**)

**No Action**

No Action alternative would remain health care services in the area without change. The absence of the project would close partially or totally health care services facilities during times of emergency and during grid outages. The experience of a guaranteed continuous potable water service would encourage maintain and open new health care facilities in the Metropolitan Area. No Action would have a direct, long-term, minor adverse impact on health care facilities.

**Proposed Action**

The Proposed Action consists of the construction of an emergency power generators facility at Represa del Lago La Plata for the operation of La Plata Raw Water Intake (RWI) during grid power outages to provides water to Enrique Ortega WTP.

The Proposed Action would affect positively on health care services facilities because the project will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to the population served in the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal.

The economic segments, private and public, served by Enrique Ortega WTP will benefit from having a continuous potable water service. Approximately four hospitals, fifteen clinics served within the service area could provide regular services during power outage events in the Represa del Lago La Plata Intake area. The experience of a guaranteed continuous potable water service would encourage new businesses to open within the Enrique Ortega WTP service area.

The Proposed Action would have a direct long-term minor beneficial impact on the sustainability of health care facilities of the Metropolitan Area. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain. Alternative 2 would occupy a total area of 6,051 $m^2$ (1.50 acres) of land.

Alternative 3 would have a direct long-term minor beneficial impact on the sustainability of health care facilities of the Metropolitan Area.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct long-term minor beneficial impact on the sustainability of health care facilities of the Metropolitan Area.

### 5.3.4 Social Services

Social services include, but are not limited to, programs for drug addiction, alcoholism, and mental health; halfway houses and drop-in centers; family counseling centers; daycare centers; services for senior citizens and persons with disabilities; nutrition centers; Meals on Wheels; income maintenance; manpower programs; and cooling centers in areas prone to severe heat risk. Governmental social service agencies or public or private groups typically provide these services.

When assessing a proposed action's impact on an area's social services, consider the availability and accessibility of daycare, elderly centers, and neighborhood centers to accommodate existing and future residents.

The evaluation of the impact of proposed action considers the action to be a residential development and evaluates the location besides the area's social services available. The proposed action is a utility infrastructure, so no analysis and mitigation is required. The evaluation of impacts on Social Services is driven more by Social Services within the service area of the Enrique Ortega WTP.

No social services were identified adjacent or within the proposed site. **Appendix A Figure 44 Social Services in Service Area** shows the identified social services: centers for drug addiction, alcoholism, and mental health; family counseling centers; daycare centers; centers for senior citizens, veterans and persons with disabilities; and nutrition centers that are served by Enrique Ortega WTP. **Appendix A Figure 44 Social Services in Service Area** shows the identified social services: centers for drug addiction, alcoholism, and mental health; family counseling centers; daycare centers; centers for senior citizens, veterans, and persons with disabilities; and nutrition centers that are served by Enrique Ortega WTP.

**No Action**

No Action alternative would remain social services in the area without change. The absence of the project would close partially or totally social services facilities during times of emergency and during grid outages. The experience of a guaranteed continuous potable water service would encourage maintain and open new social services facilities in the Metropolitan Area. No Action would have a direct, long-term, minor adverse impact on social services facilities.

**Proposed Action**

The Proposed Action consists of the construction of an emergency power generators facility at Represa del Lago La Plata for the operation of La Plata Raw Water Intake (RWI) during grid power outages to provides water to Enrique Ortega WTP.

The Proposed Action would affect positively on social services facilities because the project will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to the population served in the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal.

The economic segments, private and public, served by Enrique Ortega WTP will benefit from having a continuous potable water service. Approximately seventy five social services facilities served within the service area could provide regular services during power outage events in the Represa del Lago La Plata Intake area. The experience of a guaranteed continuous potable water service would encourage new businesses to open within the Enrique Ortega WTP service area.

The Proposed Action would have a direct long-term minor beneficial impact on the sustainability of social services facilities of the Metropolitan Area. The Proposed ActionThe proposed project is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain. Alternative 2 would occupy a total area of 6,051 $m^2$ (1.50 acres) of land.

Alternative 3 would have a direct long-term minor beneficial impact on the sustainability of social services facilities of the Metropolitan Area.Alternative 3 would have a direct long-term, minor beneficial impact on the sustainability of social services facilities of the Metropolitan Area.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct long-term minor beneficial impact on the sustainability of social services care facilities of the Metropolitan Area.

### 5.3.5 Solid Waste Disposal and Recycling

Solid waste disposal is regarded as an essential service. Its availability for supporting a newly proposed project is an essential determinant of whether a project should proceed. Generally, trucks transport solid waste materials to a common, usually remote, site for either recycling, compost, burial/disposal in a sanitary landfill, or incineration (where allowed). Consider:

- The proximity of the service to appropriate disposal sites.
- The disposal site capacity to accommodate the types and quantities of wastes that the project may generate both during construction and upon completion.
- The likely disposal site's climate resilience, including its susceptibility to erosion and flooding from sea level rise.

PRASA uses private solid waste management and disposal companies to service the Enrique Ortega WTP and other utility facilities. The nearest solid waste disposal facility is the Toa Alta Landfill, Road 165, Toa Alta, or other the next nearest available solid waste disposal facility.

**No Action**

No Action alternative would remain public services of solid waste disposal in the area without change. No Action would have no impact anticipated on solid waste disposal.

**Proposed Action**

The proposed action does not have demolition of structures. The amount of non-hazardous solid waste during construction is approximately 304 tons. The solid construction waste would be collected in 20 cubic yards containers, to be transported by an authorized transport company. The nearest solid waste disposal facility is the Toa Alta landfill.

The surrounding community of Sector El Tocón, Quebrada Cruz Ward would not be adversely impacted by the generated solid waste resulting from the construction and operation of the power generators.

The Proposed Action would have no impact on solid waste disposal issues. The Proposed Action would have no impact anticipated on solid waste disposal. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would have no impact anticipated on solid waste disposal.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have no impact anticipated on solid waste disposal.

### 5.3.6 Wastewater and Sanitary Sewer

Wastewater treatment and disposal are essential for all new developments. In most urban areas, a system of sanitary sewers conveys wastewater to a “downstream” treatment facility. After treatment, the effluent is either recycled as biosolids (where permitted) or is discharged into surface water or a permeable recharge area for an underground aquifer. Less developed areas use on-site septic systems or package treatment plants.

When analyzing impacts to wastewater treatment/disposal facilities, consider two factors: proximity of the service to the site and capacity of the service to accommodate the project.

The vicinity does not have a sanitary sewer system. The vicinity is served by onsite/decentralized wastewater treatment systems – otherwise known as septic systems. PRASA sanitary sewer system is serve by Toa Alta WWTP and Bayamón WWTP in the Metropolitan Area. The Toa Alta WWTP design capacity is 0.75 MGD. The Bayamón WWTP design capacity is 88 MGD.

**No Action**

No Action alternative would remain wastewater public services in the area without change. The absence of the project would stop the flushing of toilets in the Enrique Ortega WTP service area during times of emergency and during grid outages. No Action would have a direct, long-term minor adverse impact on the Metropolitan Area sanitary sewer system.

**Proposed Action**

The Proposed Action consists of the construction of an emergency power generators facility at Represa del Lago La Plata for the operation of La Plata Raw Water Intake (RWI) during grid power outages to provides water to Enrique Ortega WTP.

The proposed action would not generate wastewater during operation. The proposed action would not add a septic system.

The Proposed Action would affect positively on wastewater issues because the project will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous water supply to the population served.

The Proposed Action would have a direct long-term minor beneficial impact on population served. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would have a direct long-term, minor beneficial impact on population served.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct long-term minor beneficial impact on population served.

### 5.3.7 Water Supply

Adequate water supply refers to the delivery of sufficient quantities of potable water under adequate pressure at affordable costs to the project site.

Enrique Ortega WTP serves the need for potable water for the facility and the public water system with a capacity of 75 MGD.

**No Action**

No Action alternative would remain potable water public services in the area without change. The absence of the project would cause a potable water shortage from the Enrique Ortega WTP service area during times of emergency and during grid outages. The operation of Enrique Ortega WTP, as a critical facility, is crucial to guarantee health and safety for approximately 369,000 inhabitants. No Action would have a direct, long-term minor adverse impact on the Metropolitan Area potable water system.

**Proposed Action**

The Proposed Action consists of the construction of an emergency power generators facility at Represa del Lago La Plata for the operation of La Plata Raw Water Intake (RWI) during grid power outages to provides water to Enrique Ortega WTP. Lago La Plata is the source of water supply for Enrique Ortega WTP. Enrique Ortega WTP has a capacity of 75 MGD of safe potable water for 369,000 inhabitants of the Metropolitan Area potable water system.

The Proposed Action would affect positively on public services and utilities: water supply because the project will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to the population served in the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal. The power generators ensure the delivery of sufficient quantity of reliable, safe potable water supply to the service area during emergencies. The adequacy of water pressure depends on the Metropolitan Area potable water system.

The Proposed Action would have a direct long-term minor beneficial impact on the Metropolitan Area potable water system. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would have a direct long-term, minor beneficial impact on the Metropolitan Area potable water system.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct long-term minor beneficial impact on the Metropolitan Area potable water system.

### 5.3.8 Public Health and Safety

Adequacy of existing fire, police, and ambulance services should be considered for the project site. Although many communities have sophisticated protective services, the consistency of adequate service differs from place to place. Within communities, one site may be better served than another.

Factors in the variability of protective services include the availability of funds for additional coverage and the degree to which building and growth are coordinated with the provision of new municipal services. Key variables within each city are emergency equipment, emergency service personnel, response time, and access. These factors influence the availability and adequacy of required emergency services.

Within Puerto Rico, the primary public health and safety services include fire protection, law enforcement, and medical emergency services. The following describes the primary authorities tasked with ensuring public health and safety:

- The 9-1-1 system is operational throughout Puerto Rico and is the first call in case of emergency.
- The closest fire station to Represa del Lago La Plata is the Toa Alta Fire Station, located at José Pepe Ramirez Street, in Toa Alta, 6.4 kilometers from the project by road. The station can be reached 24 hours a day.
- Local police departments provide law enforcement and emergency services for each community and the surrounding areas. The closest state police office to the project area is the Puerto Rico State Police – Toa Alta District located at Luis Muñoz Rivera Street in Toa Alta Municipality, at 6.8 kilometers of the project by road. A central phone number provides access to the state police 24 hours a day. The Toa Alta Piñas Municipal Police is located at Road PR-861, Toa Alta, at 9.0 kilometers of the project by road.
- Emergency medical services include hospitals, clinics, and local medical professionals' offices within the service area. There are four hospitals, fifteen clinics, and numerous medical professionals who support the public health of the service area. The Diagnostic and Treatment Center (CDT) of Toa Alta in Road PR-165R is at 6.5 kilometers of the project by road. CDT Piñas in Road PR-861 is at 9.0 kilometers of the project by road.

**No Action**

Under the No Action alternative public health and safety services would not change. The absence of the project would close partially or totally public health and safety services during times of emergency and during grid outages. No Action would have a direct, short-term minor adverse impact on public health and safety services.

**Proposed Action**

Coming from the town of Toa Alta, the construction vehicles will be using Road PR-861, then Road PR-824 till km 5.0 to access the Camino Recreativo La Plata to enter the access road to the project site. The proposed action construction would take an estimate of 840 days (120 weeks). Construction traffic to Quebrada Cruz Ward is expected to have no effect on public health and safety emergency response times. Quebrada Cruz Ward has alternate routes like Road PR-804.

The Proposed Action would affect positively on public health and safety services because the project will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to medical and safety facilities served in the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal.

The Proposed Action would have a direct long-term minor beneficial impact on the sustainability of public health and safety services of the Metropolitan Area during emergencies. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would have a direct long-term minor beneficial impact on the sustainability of public health and safety services of the Metropolitan Area during emergencies.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct long-term minor beneficial impact on the sustainability of public health and safety services of the Metropolitan Area during emergencies.

### 5.3.9 Parks & Recreation

The development of community services such as open space, recreation, and cultural resources has become a necessary component of community development. Whether these facilities are government-owned, such as public parks and libraries, or private entities, such as YMCAs and private museums, contribute to the quality of life and quality environment of a community and are essential to the continuity of a viable neighborhood.

Demand and supply for both specific recreation and cultural facilities is a function of factors that include the size of the community, density of development, income, and demography. Wealthier communities have these services and facilities more often than poorer communities. Communities with a large percentage of children have greater needs for active recreational facilities than communities with many elderly or persons with disabilities, who may prefer passive recreation.

High-density communities with little private open space have a greater need for access to public parks and recreation areas than small towns with ample open spaces, or suburban areas where the homes have large yards. Higher-density communities also benefit more from the health benefits (e.g., mitigating urban heat island effects, improving air quality) of these public open spaces.

The parks & recreation areas within a 400 m radius are: (**Appendix A Figure 4 Proposed Site Surroundings**).

- the Priority Conservation Area (APC) Lago La Plata Wildlife Refuge, located east of the proposed area, this reservoir was built in 1973. This lake is administered by the Puerto Rico Aqueduct and Sewer Authority (PRASA; its waters are used to produce drinking water and for recreation.
- the Finca Vizcarrondo Protected Natural Area (ANP), located south of the proposed area, Finca Vizcarrondo has an extension of 205 acres. This farm has been designated ANP by the Department of Natural and Environmental Resources since 2008.

**No Action**

Under the No Action alternative the parks & recreation areas would not change. The absence of the project would close partially or totally the services of parks & recreation areas during times of emergency and during grid outages. No Action would have a direct, short-term, minor adverse impact on parks & recreation areas.

**Proposed Action**

The Proposed Action consists of the construction of an emergency power generators facility at Represa del Lago La Plata for the operation of La Plata Raw Water Intake (RWI) during grid power outages to provides water to Enrique Ortega WTP. Lago La Plata is the source of water supply for Enrique Ortega WTP. Enrique Ortega WTP has a capacity of 75 MGD of safe potable water for 369,000 inhabitants of the Metropolitan Area potable water system.

The Proposed Action would affect positively on parks & recreation areas because the project will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to the population served in the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal.

The Proposed Action would have a direct long-term minor beneficial impact on the sustainability of the parks & recreation areas of the Metropolitan Area. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would have a direct long-term minor beneficial impact on the sustainability of the parks & recreation areas of the Metropolitan Area.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct long-term minor beneficial impact on the sustainability of the parks & recreation areas of the Metropolitan Area.

### 5.3.10 Transportation and Accessibility

Assessing transportation impacts involves analyzing four sub-elements of transportation:

- **Access** - The user must be able to reach a destination within reasonable limits of time, cost, and convenience.
- **Safety** - System design plays a strong role in safety, particularly elements such as traffic signals, turning lanes, and railroad grade crossings.
- **Balance** - A balanced transportation system offers and encourages the choice of travel mode, namely, by automobile, bicycle, walking, public transit, or a combination thereof.
- **Level of Service (LOS)** - This addresses several operational factors including speed, travel delay, freedom to maneuver, safety, and frequency/hours of operation.

The Puerto Rico Department of Transportation and Public Works (PRDTOP) is responsible for managing both maritime and non-maritime transportation facilities. PRDTOP is comprised of four agencies: the Puerto Rico Highway and Transportation Authority (PRHTA), the Puerto Rico Port Authority, the Maritime Transport Authority, and the Metropolitan Bus Authority. PRHTA is a government-owned corporation responsible for constructing, operating, and maintaining roads, bridges, avenues, highways, tunnels, public parking, tolls, and other transit facilities.

The principal access road to Lago La Plata is Road PR-827, km 5.6 in the Ortiz Ward, municipality of Toa Alta. The project is adjacent to Road PR-824, km 5.0, and the municipal road Camino Recreativo La Plata, in the Quebrada Cruz Ward, Toa Alta. The new access road will serve as an alternate route to the dam site once the project is completed.

The Project area is considered rural and limited public transportation services are available; however, the construction and operation of the facility would not require major transportation services. The Annual Average Daily Traffic (AADT) is a metric that measures the average number of vehicles that travel on a road or highway in a year. The AADT for Road PR-824 is not known.

**No Action**

Under the No Action alternative the Transportation in area's roads would not change. No Action would have no impact anticipated on Transportation in area's roads.

**Proposed Action**

The site preparation, construction, or demobilization activities under the Proposed Action would temporarily increase traffic of heavy vehicles and equipment thru Road PR-824, and the municipal road Camino Recreativo La Plata which are considered a rural vicinity. Traffic control measures would be implemented by contractor to manage heavy vehicles in Road PR-824 and the municipal road Camino Recreativo La Plata, to prevent impacts to the accessibility, safety, level of service and traffic flow of the area during construction. The construction days estimate is 840 days to complete.

The generators' operation activities under the Proposed Action would increase traffic of heavy vehicles through the access road during the construction period.

The action would have a direct, temporary, minor adverse impact on the existing and proposed conditions of the roads in the project area. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

The generators' operation activities under the Alternative 2 would increase traffic of heavy vehicles through the access road during the construction period. The action would have a direct, temporary, minor adverse impact on the existing and proposed conditions of the roads in the project area.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

The generators' operation activities under the Alternative 3 would increase traffic of heavy vehicles through the access road during the construction period. The action would have a direct, temporary, minor adverse impact on the existing and proposed conditions of the roads in the project area.

## 5.4 Socioeconomic

The Socioeconomic impact category consists of human-level elements that may be affected by a project. These categories can include topics such as relocation, available jobs, resulting economic changes, and local demographics.

The Council on Environmental Quality (CEQ) guidance states that "minority populations should be identified where either: "a) the minority population of the affected area exceeds 50%; or b) the population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis" (CEQ 1997). Low-income is typically defined as family income that is below the federal poverty level; however, it may also be divided into individuals, households, and/or families with children below the poverty level.

### Environmental Justice

On January 21, 2025, President Donald Trump issued the Executive Order 14173 titled "Ending Illegal Discrimination and Restoring Merit-Based Opportunity", which revoked Executive Order 12898 and eliminated federal mandates requiring agencies to assess environmental justice impacts. Consequently, there is no longer a federal requirement to address environmental justice concerns in the environmental compliance review process.

### 5.4.1 Employment And Income Patterns

A project can impact employment and income patterns in several ways. Most projects involve temporary construction jobs and permanent jobs required for the operation of the new facility. The purpose of the assessment is first to identify anticipated changes in employment and income patterns and then to evaluate how many of what types of jobs will be created. While increased job opportunities are generally considered beneficial, it is important to determine what the skills and income profile of new employment opportunities are likely to be. Some new development projects serve to displace existing employment.

Measure employment and income patterns either by identifying the occupations and income levels characteristic of an area's resident population or by identifying major employers within the area. Some of the commonly used measures include: (Refer to **Table 13**)

- Per capita income
- Median household income
- Unemployment levels 2023
- Total employment and employment by industry sectors

Low-income communities are defined as those with a median household income in a county, census tract, or block group lower than Puerto Rico's median household income. The USCB treats Puerto Rico's municipality legal divisions as equivalents to counties for purposes of data presentation (USCB 2021a). As per a July 1, 2023 estimate, the percentage of the population of the Municipality of in poverty (aka low income) is 32.3%.

| Income & Poverty | Toa Alta Municipio, Puerto Rico | Bayamón Municipio, Puerto Rico | Cataño Municipio, Puerto Rico | Toa Baja Municipio, Puerto Rico |
|---|---|---|---|---|
| **Population estimates, July 1, 2023, (V2023)** | **65,957** | **180,835** | **22,108** | **71,888** |
| PEOPLE | | | | |
| **Income & Poverty** | | | | |
| Median household income (in 2022 dollars), 2018-2022 | $32,456 | $29,403 | $22,407 | $28,719 |
| Per capita income in past 12 months (in 2022 dollars), 2018-2022 | $16,887 | $16,905 | $14,094 | $16,260 |
| Persons in poverty, percent | 32.3% | 34.8% | 45.6% | 35.4% |

**Table 12: DP03 Selected Economic Characteristics**

| US Census Bureau DP03 Selected Economic Characteristics | | |
|---|---|---|
| Toa Alta Municipio, Puerto Rico | | |
| Characteristic | Estimate | Percent |
| 2023 Estimate Population 16 years and over | 57,260 | N/A |
| 2023 Estimate In labor force | 31,589 | 55.2% |
| 2023 Estimate In labor force Armed Forces | 258 | 0.5% |
| 2023 Estimate Civilian labor force | 31,331 | 54.7% |
| 2023 Estimate Civilian labor force Unemployed | 1,582 | 5% |
| 2023 Estimate Civilian labor force Employed | 29,749 | 52.0% |
| 2023 Inflation-Adjusted Per capita income | $19,689 | N/A |
| 2023 Inflation-Adjusted Median household income | $31,635 | N/A |
| 2023 Estimate Employed Agriculture, mining | 155 | 0.5% |
| 2023 Estimate Employed Industry Construction | 2158 | 7.3% |
| 2023 Estimate Employed Industry Manufacturing | 992 | 3.3% |
| 2023 Estimate Employed Industry Wholesale trade | 1763 | 5.9% |
| 2023 Estimate Employed Industry Retail trade | 4307 | 14.5% |
| 2023 Estimate Transportation, warehousing, utilities | 1715 | 5.8% |
| 2023 Estimate Employed Industry Information | 775 | 2.6% |
| 2023 Estimate Finance, insurance, real estate | 2962 | 10.0% |
| 2023 Estimate Professional, scientific, management | 2999 | 10.1% |
| 2023 Estimate Educational, health care, social assist. | 5818 | 19.6% |
| 2023 Estimate Arts, entertainment, food services | 2629 | 8.8% |
| 2023 Estimate Employed Public administration | 1775 | 6.0% |
| 2023 Estimate Employed Other services | 1701 | 5.7% |

(See **Appendix K US Census Bureau DP03 Selected Economic Characteristics**)

**No Action**

No Action alternative would remain employment and income patterns in the Metropolitan Area with downward trend. The absence of the project would continue potable water shortages during power blackouts, close partially or totally industries affecting employment. All communities, including low income households, would be affected. The experience of a guaranteed continuous potable water service would encourage new businesses to open in the Metropolitan Area and offer employment opportunities. No Action would have a direct, short-term minor adverse impact on employment and income patterns and on low income households in the Metropolitan Area.

**Proposed Action**

The Proposed Action consists of the construction of an emergency power generators facility at Represa del Lago La Plata for the operation of La Plata Raw Water Intake (RWI) during grid power outages to provides water to Enrique Ortega WTP. Lago La Plata is the source of water supply for Enrique Ortega WTP. Enrique Ortega WTP has a capacity of 75 MGD of safe potable water for 369,000 inhabitants of the Metropolitan Area potable water system.

According to the PR Planning Board employment calculator, the project will generate approximately 212 direct employments, 148 indirect employments and 21 induced employees. For a total of 381 jobs created. The jobs would be temporary, and nearby residents are typically hired to provide support during construction, maintenance, and operation activities.
The Proposed Action would have a direct, long-term minor beneficial impact on the employment and income patterns because with the installation of the emergency generators and its components will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply in the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal. The experience of a guaranteed continuous potable water service would encourage new businesses to open in the Metropolitan Area and offer employment opportunities. The project would allow a continuous drinking water supply under power outage conditions having a direct, long-term minor beneficial impact on minority populations and low-income communities near the project. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would have a direct, long-term, minor beneficial impact on the employment and income patterns because with the installation of the emergency generators and its components will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply in the Metropolitan Area. Alternative 2 would allow a continuous drinking water supply under power outage conditions, having a direct, long-term minor beneficial impact on minority populations and low-income communities near the project.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct, long-term minor beneficial impact on the employment and income patterns because with the installation of the emergency generators and its components will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply in the Metropolitan Area. Alternative 3 would allow a continuous drinking water supply under power outage conditions having a direct, long-term minor beneficial impact on minority populations and low-income communities near the project.

### 5.4.2 Demographic Character Changes

*Community* commonly refers to people living within a defined geographic area such as a neighborhood or a small town.

Communities can be highly diverse or highly homogeneous places. They can be strictly residential or characterized by mixed land uses. "Community" is often difficult to define because it carries physical, social, and psychological dimensions.

Central to the definition of community is both the presence of a residential population and a sense of common bond and collective identity which defines the community as distinct from other neighborhoods.

A community is created in three dimensions:

- Physical – Quality and type of housing units and commercial, public, and social services.
- Social – Demographic characteristics such as population size, density, age, ethnic and minority composition, household size and composition, and income and employment characteristics.
- Phycological – Residents' perceived relationship with their surroundings, known as sense of community.

In many municipalities, neighborhoods exist in which residents have strong ties to the area, each other, and the local stores, and institutions. Often, these are ethnic areas where residents share a common cultural and religious heritage. It is important that HUD-assisted activities not destroy the social networks and institutional ties in these areas and that they primarily benefit low- and moderate-income households.

Applying the definition of minority within the project area in Puerto Rico is complicated since most of the population would meet the definition of minority as defined by the EO. In Puerto Rico, most people identify as of Hispanic/Latino origin. According to the U.S. Census Bureau (USCB) QuickFacts, Puerto Rico's racial makeup is 98.7% Hispanic or Latino (USCB 2021). The Census of Population and Housing allows respondents identifying as Hispanic to select additional races. Within the category of Hispanic, the Puerto Rican population self-identified as 65.9% white, 11.7% black, 5.3% mixed, 0.2% American Indian or Alaska Native, and 0.2% Asian.

According to the 2020 Census, the demographic character of Toa Alta in Race and Hispanic Origin was registered with: Race (White 52.9%, Black 5.3%, A. Indian and A. Native 0%, Asian 0.2%, N. Hawaiian 0%, and two or more races 25.6%). 99.1% consider to be Hispanic or Latino and 0.6% consider to be White alone, nor Hispanic or Latino.

Considering the three major cities of the service area, the population of Toa Alta, Bayamón and Cataño registered in the 2020 Census was 275,194 inhabitants.

| Race and Hispanic Origin | Toa Alta Municipio, Puerto Rico | Bayamón Municipio, Puerto Rico | Cataño Municipio, Puerto Rico | Toa Baja Municipio, Puerto Rico |
|---|---|---|---|---|
| Population estimates, July 1, 2023, (V2023) | 65,957 | 180,835 | 22,108 | 71,888 |
| PEOPLE | | | | |
| **Race and Hispanic Origin** | | | | |
| White alone, percent | 52.9% | 36.8% | 41.0% | 39.6% |
| Black or African American alone, percent (a) | 5.3% | 6.9% | 10.3% | 8.3% |
| American Indian and Alaska Native alone, percent (a) | 0.0% | 0.1% | 0.2% | 0.4% |
| Asian alone, percent (a) | 0.2% | 0.2% | 0.1% | 0.0% |
| Native Hawaiian and Other Pacific Islander alone, percent (a) | 0.0% | 0.0% | 0.0% | 0.0% |
| Two or More Races, percent | 25.6% | 32.3% | 40.1% | 16.9% |
| Hispanic or Latino, percent (b) | 99.1% | 98.8% | 98.8% | 99.1% |
| White alone, not Hispanic or Latino, percent | 0.6% | 0.6% | 0.8% | 0.8% |

**No Action**

No Action alternative would remain demographic character in the Metropolitan Area without change. The absence of the project would affect the potable water service during times of emergency and during grid outages. The population of the Enrique Ortega WTP service area, considered all as minority, would be affected by potable water shortage during power blackouts. The experience of a guaranteed continuous potable water service would allow the population to consider staying. No Action would have direct, short-term, minor adverse impact on demographic character in the Metropolitan Area.

**Proposed Action**

The Proposed Action consists of the construction of an emergency power generators facility at Represa del Lago La Plata for the operation of La Plata Raw Water Intake (RWI) during grid power outages to provides water to Enrique Ortega WTP. Lago La Plata is the source of water supply for Enrique Ortega WTP. Enrique Ortega WTP has a capacity of 75 MGD of safe potable water for 369,000 inhabitants of the Metropolitan Area potable water system.

There are no residences adjacent to the proposed project area. The proposed action will not result in displacement, marginalization and adverse human health or environmental effect on surrounding populations.

The Proposed Action would have a direct, long-term, minor beneficial impact on the demographic character because with the installation of the emergency generators and its components will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to the minority population served by this critical infrastructure facility. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would have a direct, long-term, minor beneficial impact on the demographic character because with the installation of the emergency generators and its components will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to the minority population served by this critical infrastructure facility.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct, long-term, minor beneficial impact on the demographic character because with the installation of the emergency generators and its components will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to the minority population served by this critical infrastructure facility.

### 5.4.3 Displacement

*Displacement* refers to the dislocation of people, businesses, institutions, or community facilities as a result of a project.

Displacement may be either direct or indirect:

- **Direct displacement** involves involuntary displacement of a person who occupies property that is acquired, rehabilitated, or demolished for a HUD-funded activity; whose property is vacated to comply with HUD-assisted code enforcement; or whose property is specifically identified in a grant application as the site of a leveraged activity.
- **Indirect displacement** results from an activity or event that is not HUD-assisted but which is supported by concentrated HUD activities. For example, this includes displacement caused by rapidly increasing rents made possible by the revitalization of an area in which HUD-funded rehabilitation or street improvements are taking place.

Considering the three major cities of the service area, the population of Toa Alta, Bayamón and Cataño registered in the 2010 Census was 310,322 inhabitants. The 2020 Census registered a 11.3% population reduction for the same area with 275,194 inhabitants. The US Census estimates for 2022 a population reduction of 1.9% with 269,982 inhabitants. The 2010-2022 total displacement was estimated to be 13.0% or 40,340 inhabitants.

| Population | Toa Alta Municipio, Puerto Rico | Bayamón Municipio, Puerto Rico | Cataño Municipio, Puerto Rico | Toa Baja Municipio, Puerto Rico |
|---|---|---|---|---|
| **Population estimates, July 1, 2023, (V2023)** | **65,957** | **180,835** | **22,108** | **71,888** |
| **PEOPLE** | | | | |
| **Population** | | | | |
| **Population estimates, July 1, 2023, (V2023)** | **65,957** | **180,835** | **22,108** | **71,888** |
| Population estimates base, April 1, 2020, (V2023) | 66,852 | 185,187 | 23,155 | 75,293 |
| Population, percent change - April 1, 2020 (estimates base) to July 1, 2023, (V2023) | -1.3% | -2.4% | -4.5% | -4.5% |
| Population, Census, April 1, 2020 | 66,852 | 185,187 | 23,155 | 75,293 |
| Population, Census, April 1, 2010 | 74,066 | 208,116 | 28,140 | 89,609 |

**No Action**

No Action alternative would remain the population displacement in the Metropolitan Area with a movement trend. The absence of the project would affect the potable water service during times of emergency and during grid outages. The experience of a guaranteed continuous potable water service would allow the population to consider staying. No Action would have a direct, short-term, minor adverse impact on displacement in the Metropolitan Area.

**Proposed Action**

The Proposed Action consists of the construction of an emergency power generators facility at Represa del Lago La Plata for the operation of La Plata Raw Water Intake (RWI) during grid power outages to provides water to Enrique Ortega WTP. Lago La Plata is the source of water supply for Enrique Ortega WTP. Enrique Ortega WTP has a capacity of 75 MGD of safe potable water for 369,000 inhabitants of the Metropolitan Area potable water system.

There are no residential or commercial facilities adjacent to the proposed project area. The experience of a guaranteed continuous potable water service would incentive for people to move to the surrounding areas based on a reliable potable water service. The proposed action will not result in displacement, marginalization and adverse human health or environmental effect on surrounding populations, including low-income populations.

The Proposed Action would have a direct, long-term, minor beneficial impact on the displacement because with the installation of the emergency generators and its components will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply in the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal, allowing the population to consider staying in the area. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would have a direct, long-term, minor beneficial impact on the displacement because with the installation of the emergency generators and its components will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply in the Metropolitan Area, allowing the population to consider staying in the area.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct, long-term, minor beneficial impact on the displacement because with the installation of the emergency generators and its components will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply in the Metropolitan Area, allowing the population to consider staying in the area.

## 5.5 Climate and Energy

The Energy impact category considers the two-way relationship between HUD-assisted projects and the surrounding environment. Determine the extent to which the project will contribute to issues like greenhouse gas emissions and energy consumption, as well as how projects may be in turn affected by these factors.

**Climate Change**

On January 20, 2025, President Donald Trump issued the Executive Order 14148 titled "Initial Rescissions of Harmful Executive Orders and Actions", which revoked Executive Order 14008 and eliminated federal mandates requiring agencies to assess climate change impacts. Consequently, there is no longer a federal requirement to address climate change concerns in the environmental compliance review process.

### 5.5.1 Energy Efficiency

Lowering energy use (and related carbon emissions) has become increasingly important in both the *design* and the *location and siting* of new facilities.

Maximizing opportunities for energy efficiency can be incorporated in nearly all phases of project planning, location selection, site development, and building design:

- The **location** of new facilities in central areas with close proximity to public transportation, shops, schools, and services can reduce energy consumed for transportation.
- The **reuse of existing buildings** can often cost less and save more energy than new construction.
- **Site planning** should consider the role of building orientation and natural features in lowering energy use. Trees can shelter a structure from extreme weather events (wind, heat, and cold). South-facing sites receive maximum solar input, an important consideration in northern climates during colder months.
- **Smaller parking lots** encourage carpooling and public transit usage.
- The following **building design** elements can reduce energy requirements:
    - Added insulation and air sealing
    - Efficient heating and cooling
    - Domestic hot water systems
    - On-site or rooftop solar, geothermal, or wind energy
    - High-performance double- or triple-glazed windows and doors
    - High-efficiency LED lighting

**No Action**

Under the No Action alternative Energy Efficiency would not change. The absence of the project would maintain Represa La Plata Raw Water Pump Station without a backup power source to continuously supply raw water during times of emergency and during grid outages. No Action would have a direct, short-term, minor adverse impact on Energy Efficiency of Represa La Plata Raw Water Pump Station.

**Proposed Action**

The Proposed Action is located in Quebrada Cruz Ward, Toa Alta, Road PR-824, km 5.0, Camino Recreativo La Plata. The siting of the action allows construction vehicles access from Toa Alta using Road PR-861. The project is near the Lago La Plata and Represa La Plata Raw Water Intake Pump Station to energize during power blackouts.

The project design includes four prime emergency power generators with a capacity of 2,500 kW/per unit, Led lighting fixtures and associated electrical components. The operation during blackouts would be with three power generators and one power generator for back-up. The estimated energy available would be 7,500 kW for 500 hours per year to cover power interruptions from the utility provider. Three of four power generators would produce 78.4 tons per year of criteria emissions.

Due to the limited space available and site characteristics, no photovoltaic or wind facilities were deemed feasible to support backup energy sources.

The best alternative to provide backup power the Enrique Ortega WTP during a power outage is using backup generators to cover the raw water pump station that will guarantee the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to the population served.

Proposed Action would have a direct, long-term, minor benefcial impact on Energy Efficiency of Represa La Plata Raw Water Pump Station. The Proposed Action is in compliance with the Statutes, Executive Orders or Regulations, as applicable.

**Alternative 2**

Alternative 2 relocates proposed action components (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) out of the FFRMS floodplain.

Alternative 2 would have a direct, long-term, minor benefcial impact on Energy Efficiency of Represa La Plata Raw Water Pump Station.

**Alternative 3**

Alternative 3 moves the action (a concrete platform, four power generators, two aboveground fuel storage tanks, an electrical room) approximately 200 meters from the Lago La Plata pump control building.

Alternative 3 would have a direct, long-term, minor benefcial impact on Energy Efficiency of Represa La Plata Raw Water Pump Station.

# 6 CUMULATIVE IMPACTS

Evidence is increasing that the most devastating environmental effects may result not from the direct effects of a particular action, but from the combination of individually minor effects of multiple actions over time. The passage of time has only increased the conviction that cumulative effects analysis is essential to effectively managing the consequences of human activities on the environment. Without incorporating cumulative effects into environmental planning and management, it will be impossible to move towards sustainable development.

In accordance with NEPA, this EA considers the overall cumulative impact of proposed action, alternative 2, and similar actions in Puerto Rico's vulnerable natural, cultural, and socioeconomic resources. The statutory basis for considering cumulative impacts for federal actions under NEPA is in Title 42 U.S.C. 4321, et seq. In addition to NEPA, the CWA, CAA, Section 106 of the NHPA, and Section 7 of the ESA individually require an evaluation of cumulative impacts for resources covered under their authorities.

According to the Council on Environmental Quality's (CEQ) regulations for implementing the National Environmental Policy Act (NEPA), cumulative impacts represent the "...impact on the environment which results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what federal agency or person undertakes such actions. Cumulative impacts can result from individually minor but collectively consequential actions taking place over a period" (40 CFR 1508.7). When combined with other actions affecting utilities and similar resources, the activities covered by this EA could lead to cumulative impacts. The scale of those impacts would depend on the number of projects implemented, the size of the projects, and locality and proximity of the projects.

The area of interest for the cumulative impacts of the project in relation to other proposed actions would be the La Plata Reservoir adjoining sub-watersheds, which includes partial areas in the municipalities of Bayamón, Comerío, Naranjito, Toa Alta, and Aguas Buenas. Capital improvement and recovery projects, respectively, databases were revised to identify ongoing and foreseeable future actions. (The information of projects other than local or federal government related projects was not available from the PRPB or OGPe.)

The most relevant cumulative impacts would be related to air quality, water quality, floodplain, and noise, based on the activities that the proposed action and other action alternative would entail.

### Federal Actions

Multiple projects are in divergent phases of implementation to rehabilitate the infrastructure of the island that was damaged as result of the passage of Hurricanes Irma, María and Fiona, as well as the earthquakes that took place in 2020. They include potable water, wastewater, and stormwater systems, as well as the electrical grid and the communications facilities. Most of the sources of funding come from different federal agencies including housing, communications, health and human services, energy, and education (COR3 2018, as quoted in FEMA, 2022).

Funding was recently obligated by FEMA to rebuild PRASA's water and wastewater infrastructure (PRASA 2021, as quoted in FEMA, 2022). The FEMA reserved the obligated funds to repair, improve, or replace PRASA's infrastructure as per FEMA's Public Assistance Alternative Procedures. The PRASA is required to provide safe water and wastewater service and supply the 1.2 million active clients through their island wide infrastructure that include water filtration plants, wastewater treatment plants, buildings, dams, tanks, pump stations and distribution and collection systems. (PRASA 2021, as quoted in FEMA, 2022).

These efforts taking place in Puerto Rico for improvements to most infrastructure have triggered substantial construction work which will continue over the coming 10 to 20 years. This has resulted in heavy competition for human, equipment, financial and materials resources.

Within the described project area and time frame criteria of past, present, and reasonably foreseeable future, the following utility projects are proposed by FEMA and PRASA.

- According to the Puerto Rico Recovery, Reconstruction and Resiliency Office (COR3) official website 102 projects are proposed within the area of interest previously described. Refer to **Appendix A Figure 48 Projects in the Area of Interest**). Projects, in different development phases, are related to water, municipal improvements, and transportation. Most projects are related to the transportation sector (roads and bridges) (88%). Only four projects are related to the water sector (rural aqueducts). In terms of project phases, approximately 59 percent of the projects have been completed. The funding source for these projects is from various agencies.
- According to the PRASA Tracktool and website databases, the following capital improvement projects, included in Table 16, are reflected within the area of interest for this analysis. The funding source for these projects are FEMA Accelerated Awards Strategy (FAASt)

**Table 13: Proposed Projects as per PRASA Databases**

| Project Number | Project Description | Project Phase |
|---|---|---|
| 1-70-6048 / CIP.1706048 | Improvements to Lago La Plata – Scour Repair (Design Build Project), Toa Alta | Completed |
| 1-70-9000 / CIP.1709000 | Enrique Ortega Water Treatment Plant - Raw Water Intake Power Generator (HMGP-) (Proposed Action), Toa Alta | Design |
| 2-09-6007 / CIP.2096007 | Improvements to the Enrique Ortega Water Filtration Plan and Pumping Station, Phase IV (FAAST-25), Toa Alta | Construction |
| 2-54-7001 / CIP.2547001 | New Naranjito Water Filtration Plant (ARPA), Naranjito | Bidding |
| 2-54-7002 / CIP.2547002 | Intake at Río La Plata for the New Naranjito Water Filtration Plant, Naranjito | Bidding |
| 2-54-9000 / CIP.2549000 | Improvements to the Naranjito Transmission and Distribution System (FAAST), Naranjito | Design |
| CIP.0800074 | Filtration Plant Barrio Nuevo – Emergency Generators – Phase 2 Metro, Bayamón | Construction |
| CIP.0801002N | Pumping Station Achiotes 1 - Emergency Generators – Phase 3 North, Naranjito | Construction |
| CIP.0801002N | Pumping Station Loma del Viento - Emergency Generators – Phase 3 North, Naranjito | Construction |
| CIP.0801002N | Pumping Station and tank Achiotes 2 - Emergency Generators – Phase 3 North, Naranjito | Construction |
| CIP.0801002N | Pumping Station and tank Los Cerros - Emergency Generators – Phase 3 North, Naranjito | Construction |

Although most of these projects are restorations and replacement for existing facilities, and therefore would not result in substantial environmental impacts individually, the cumulative adverse impact of these projects could result in short- and long-term impacts to multiple environmental resources including, air, water, natural and cultural resources, noise, and transportation. These projects would also contribute to the demand for products and services. However, the rehabilitation of these facilities does not imply changes in land use or major impacts to existing resources.

**Summary of Cumulative Impacts**

Cumulative impacts occur when the impacts of a proposed action are added to past, present, and future projects within the same general area. Such activities increase pressure on environmental and human resources, for example:

- Deforestation from clearing of land for agriculture, urban development, and other infrastructure.
- Increased demands on water resources and generation of waste and other pollution.
- Increased air emissions due to construction of new roads, public utilities, and infrastructure.
- Increased traffic congestion and road repairs due to additional construction, utility, and staff and contractor vehicles on the roads.
- Impacts to possible endangered flora and fauna species, wildlife habitats, and ecosystems in general.
- Increased noise levels due to multiple new projects constructed near one another.

Development activity in Puerto Rico has experienced a downward trend due to the contraction of the population of Puerto Rico in recent years which is the result of increasing emigration, in part related to post-Hurricane María impacts and a reduction in the birth rate, among other demographic phenomena. However, even at a slow pace, it is expected that the demand for goods and services from the current population would continue triggering development activity in Puerto Rico. In addition, post-Hurricane María reconstruction work will trigger an increased demand for goods and services.

The Proposed Action, Alternative 2 and Alternative 3, Construction of a Backup Power Facility, west to Represa del Lago La Plata facilities, would meet PRASA's existing resiliency needs, and no new development is expected associated to such alternatives. These alternatives would support PRASA's ability to provide a steady, reliable water source the Enrique Ortega WTP operation under power outage conditions to allow a continuous drinking water supply to the population served by this important infrastructure facility.

Based on the proposed activities for Proposed Action, Alternative 2 and Alternative 3, the most relevant cumulative environmental impacts would be related to erosion, stormwater runoff, air quality, hazardous materials, vegetation, and traffic. BMPs would be implemented by PRASA to avoid and minimize impacts to these resources in the project site area, so as not to contribute to the overall impact to such resources. BMPs can be classified as Erosion Prevention, Sediment Control, Runoff Control, among others. Examples of practices include the installation of geotextile material, fiber rolls, hay bales and silt fences. The design stormwater management system would control runoff. Minimization measures would also be coordinated as part of the environmental review process with PRDNER and OGPe.

A relatively small portion of the project access road and the proposed generators platform would be within the FFRMS floodplain. The project footprint area within FFRMS floodplain is approximately 7,043 square meters (1.74 acres). The ground levels on this area has been previously modified as it was used as part of the project to repair the scours found at the base of the Represa del Lago La Plata structure between 2021 and 2022. Cut and fill activities will be performed to guarantee project components elevation would be 2 feet (0.61 m) above 0.2PFA. The modification of current ground levels is considered minimal; therefore, no adverse effects have been identified to floodplain or neighboring properties.

Adverse impacts of the proposed action, Alternative 2, and Alternative 3 would be minor, direct, and short-term for the resources studied when combined with other past, on-going, or planned projects, since most of the federal funding actions involve the repair, replacement, or rehabilitation of projects that are similar in function, size, and locality to the existing systems. Therefore, most cumulative impacts from the initial installation and temporary restoration of the projects on the human environment have already occurred prior to the mentioned disasters. The construction of the Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators would have beneficial, direct long-term impacts its service area and Puerto Rico by reducing the vulnerability of critical facilities to natural hazards and address the continuity of service and supply of potable water to the population.

For Alternative 3, most impacts would be like those for Proposed Action for the resources studied. However, Alternative 3 would result in minor to moderate direct long-term impacts to noise considering that the nearest residential units are 74% nearer in average than the Proposed Action. Cumulative impacts of Alternative 3 and other past, on-going, or planned projects would not be major for the other resources considered in this EA for the same reasons as those for Proposed Action. Alternative 3 would also support PRASA's ability to provide a steady, reliable water source for the Enrique Ortega WTP operation under power outage conditions.

The nearest contiguous action to the Proposed Action is the **Replacement of 6"Ø pipe in Sector El Tocón Quebrada Cruz Ward at PR-824**. The project **Replacement of 6"Ø pipe in Sector El Tocón Quebrada Cruz Ward at PR-824** CIP 2-70-9001 was a project of the Capital Improvement Program located at 40 meters of the Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators access road. The project consisted in the installation of approximately 70 linear meters of 4"Ø pipeline in the Camino Recreativo La Plata, next to the access road entrance, and the replacement of approximately 860 linear meters of 6"Ø pipeline in State Road PR-824, from km 5.0 to km 5.8. The construction started in October 2, 2023 and ended in August 6, 2024. The project provided the community of Sector El Tocón a reliable potable water supply. One adverse impact was the trench along the road and the traffic in a narrowed road. The impact was direct, short-term, minor adverse (309 days).

The Proposed Action, Alternative 2, and Alternative 3 would impact State Road PR-824 till km 5.0 to Camino Recreativo La Plata for an estimate of 840 days (120 weeks) with the intermittent traffic of heavy trucks. The community of Sector El Tocón will not have the same continuous experience as the piping replacement project. It is expected that the intermittent traffic of heavy trucks will not accumulate discomfort in the community of Sector El Tocón of Quebrada Cruz Ward.

There are no significant cumulative effects of the both projects on resources, ecosystems, and the community of Sector El Tocón of Quebrada Cruz Ward.

# 7 SUMMARY OF IMPACTS

Section 7 presents a Summary of Impacts for No Action, Proposed Action, Alternative 2 and Alternative 3.

## 7.1 No Action

| No Action Environmental Assessment Factor/ Category | Impacts | Agency Coordination /Permits | Mitigation/BMPs |
|---|---|---|---|
| **Conformance with Plans/ Land Development** | No impact anticipated | None | None |
| **Land Use & Zoning/ Land Development** | No impact anticipated | None | None |
| **Scale & Urban Design/ Land Development** | No impact anticipated | None | None |
| **Geology/ Land Development** | No impact anticipated | None | None |
| **Soils/ Land Development** | Direct, long-term, minor adverse impact | None | None |
| **Floodplains/ Land Development** | No impact anticipated | None | None |
| **Flood Insurance/ Land Development** | No impact anticipated | None | None |
| **Farmlands/ Land Development** | No impact anticipated | None | None |
| **Slope/ Land Development** | No impact anticipated | None | None |
| **Erosion/ Land Development** | Direct, long-term, minor adverse impact | None | None |
| **Stormwater/ Land Development** | Direct, long-term, minor adverse impact | None | None |
| **Seismicity/ Hazards and Nuisances** | No impact anticipated | None | None |
| **Air Quality/ Hazards and Nuisances** | No impact anticipated | None | None |
| **Noise/ Hazards and Nuisances** | No impact anticipated | None | None |
| **Contamination & Toxic Substances/ Hazards & Nuisances** | No impact anticipated | None | None |
| **Explosive and Flammable Hazards/ Hazards & Nuisances** | No impact anticipated | None | None |
| **Water Resources/ Natural Features** | No impact anticipated | None | None |
| **Wetlands/ Natural Features** | Direct, temporary, minor adverse impact | None | None |
| **Vegetation/ Natural Features** | No impact anticipated | None | None |
| **Wildlife and Fish/ Natural Features** | No impact anticipated | None | None |
| **Threatened and Endangered Species/ Natural Features** | No impact anticipated | None | None |

| No Action Environmental Assessment Factor/ Category | Impacts | Agency Coordination /Permits | Mitigation/BMPs |
|---|---|---|---|
| **Critical Habitat/ Natural Features** | No impact anticipated | None | None |
| **Educational & Cultural Facilities/ Public Services and Utilities** | Direct, long-term, minor adverse impact | None | None |
| **Historic Properties/ Public Services and Utilities** | No impact anticipated | None | None |
| **Archaeological/ Public Services and Utilities** | No impact anticipated | None | None |
| **Commercial Facilities/ Public Services and Utilities** | Direct, long-term, minor adverse impact | None | None |
| **Health Care Services/ Public Services and Utilities** | Direct, long-term, minor adverse impact | None | None |
| **Social Services/ Public Services and Utilities** | Direct, long-term, minor adverse impact | None | None |
| **Solid Waste Disposal/ Public Services and Utilities** | No impact anticipated | None | None |
| **Wastewater/ Public Services and Utilities** | Direct, long-term, minor adverse impact | None | None |
| **Water Supply/ Public Services and Utilities** | Direct, long-term, minor adverse impact | None | None |
| **Public Health and Safety/ Public Services and Utilities** | Direct, short-term, minor adverse impact | None | None |
| **Parks & Recreation/ Public Services and Utilities** | Direct, short-term, minor adverse impact | None | None |
| **Transportation/ Public Services and Utilities** | No impact anticipated | None | None |
| **Employment and Income Patterns/ Socioeconomic** | Direct, short-term, minor adverse impact | None | None |
| **Low Income Households/ Socioeconomic** | Direct, short-term, minor adverse impact | None | None |
| **Demographic Character Changes/ Socioeconomic** | Direct, short-term, minor adverse impact | None | None |
| **Displacement/ Socioeconomic** | Direct, short-term, minor adverse impact | None | None |
| **Energy Efficiency/ Climate & Energy** | Direct, short-term, minor adverse impact | None | None |

## 7.2 Proposed Action: Construction of a Backup Power Facility, west to Represa del Lago La Plata facilities

| Proposed Action: West to Represa del Lago La Plata facilities<br>Environmental Assessment Factor/ Category | Impacts | Agency Coordination/Permits | Mitigation/BMPs |
|---|---|---|---|
| **Conformance with Plans/ Land Development** | Direct, long-term beneficial impact | None | None |
| **Land Use & Zoning/ Land Development** | No impact anticipated | None | None |
| **Scale & Urban Design/ Land Development** | Direct, temporary, minor adverse impact | None | None |
| **Geology/ Land Development** | No impact anticipated | None | None |
| **Soils/ Land Development** | Direct, long-term, minor beneficial impact | PMO / Single Incidental Operational Permit DNER / SPCC Plan | Minimize disturbance to erodible soils. Preserve native topsoil with proper separation techniques. |
| **Floodplains/ Land Development** | Direct, long-term, minor adverse impact | HUD NEPA HUD 8-Step | Elevating structures 2 feet (0.61 m) above 0.2PFA |
| **Flood Insurance/ Land Development** | No impact anticipated | Flood Insurance /equipment protection | None |
| **Farmlands/ Land Development** | No impact anticipated | None | None |
| **Slope/ Land Development** | Direct, temporary, minor beneficial impact | None | Minimize disturbance to erodible slopes. |
| **Erosion/ Land Development** | Direct, temporary, minor beneficial impact | PMO / Single Incidental Operational Permit PMO / General Permit for Other Works | Design stormwater management system to control runoff. BMP (Erosion Prevention, Sediment Control, Runoff Control) Minimize disturbance to erodible soils |
| **Stormwater/ Land Development** | Direct, temporary, minor beneficial impact | PMO / Single Incidental Operational Permit PMO / General Permit for Other Works | Design stormwater management system to control runoff. BMP (Erosion Prevention, Sediment Control, Runoff Control) Minimize disturbance to erodible slopes. |
| **Seismicity/ Hazards and Nuisances** | No impact anticipated | None | None |
| **Air Quality/ Hazards and Nuisances** | Direct, short-term, minor adverse impact | PMO / General Permit Electricity Generators | Use of Low Sulfur Diesel Fuel |

| Proposed Action: West to Represa del Lago La Plata facilities | | | |
|---|---|---|---|
| **Environmental Assessment Factor/ Category** | **Impacts** | **Agency Coordination/Permits** | **Mitigation/BMPs** |
| **Noise/ Hazards and Nuisances** | Direct, short-term, minor adverse impact | None | Use of mufflers and sound suppressors |
| **Contamination & Toxic Substances/ Hazards & Nuisances** | Direct, temporary, minor adverse impact | PMO / Single Incidental Operational Permit<br>DNER Emergency Plan<br>EPA / SPCC | Double wall<br>Spill containment<br>SPCC plan<br>Safety Labeling<br>MSDS<br>Proper storage |
| **Explosive and Flammable Hazards/ Hazards & Nuisances** | Direct, temporary, minor adverse impact | PMO / Single Incidental Operational Permit<br>DNER / Emergency Plan<br>EPA / SPCC | Spill containment<br>SPCC plan<br>Safety Labeling<br>MSDS<br>Proper storage |
| **Water Resources/ Natural Features** | Direct, short-term, minor adverse impact | DNER / EPA SPCC<br>PMO / SWPP | Spill containment<br>SPCC plan<br>Runoff control |
| **Wetlands/ Land Development** | Direct, temporary, minor adverse impact | PMO SWPP | Buffer strip<br>Runoff control |
| **Vegetation/ Natural Features** | Direct, short-term, minor adverse impact | PMO / Single Incidental Operational Permit | Delineate the limits between impact areas and conservation zones |
| **Wildlife and Fish/ Natural Features** | Direct, short-term, minor adverse impact on wildlife<br>No impact anticipated on fish | None | None |
| **Threatened and Endangered Species/ Natural Features** | Direct, short-term, minor adverse impact | USFWS Consultation Letter | USFWS Conservation Measures for Puerto Rican Boa |
| **Critical Habitat/ Natural Features** | No impact anticipated | DNER Habitat Categorization | None |
| **Educational & Cultural Facilities/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Historic Properties/ Public Services and Utilities** | Direct, long-term, minor adverse impact | SHPO, ICP | None |
| **Archaeological/ Public Services and Utilities** | No impact anticipated | ICP | Implement protective actions |
| **Commercial Facilities/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Health Care Services/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Social Services/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Solid Waste Disposal/ Public Services and Utilities** | No impact anticipated | PMO General Permit for Other Works | None |
| **Wastewater/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Water Supply/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |

| Proposed Action: West to Represa del Lago La Plata facilities | | | |
|---|---|---|---|
| **Environmental Assessment Factor/ Category** | **Impacts** | **Agency Coordination/Permits** | **Mitigation/BMPs** |
| **Public Health and Safety/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Parks & Recreation/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Transportation/ Public Services and Utilities** | Direct, temporary, minor beneficial impact | DTOP | MOT |
| **Employment and Income Patterns/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Low Income Households/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Demographic Character Changes/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Displacement/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Energy Efficiency/ Climate & Energy** | Direct, long-term, minor beneficial impact | None | None |

## 7.3 Alternative 2 – Construction of a Backup Power Facility, west to Represa del Lago La Plata facilities

| Alternative 2 – West to Represa del Lago La Plata facilities<br>Environmental Assessment Factor/ Category | Impacts | Agency Coordination/Permits | Mitigation/BMPs |
|---|---|---|---|
| **Conformance with Plans/ Land Development** | Direct, long-term beneficial impact | None | None |
| **Land Use & Zoning/ Land Development** | No impact anticipated | None | None |
| **Scale & Urban Design/ Land Development** | Direct, long-term, minor adverse impact | None | None |
| **Geology/ Land Development** | Direct, long-term, minor adverse impact | None | None |
| **Soils/ Land Development** | Direct, long-term, minor adverse impact | PMO / Single Incidental Operational Permit<br>DNER / SPCC Plan | Minimize disturbance to erodible soils. Preserve native topsoil with proper separation techniques. |
| **Floodplains/ Land Development** | Direct, long-term, minor adverse impact | HUD NEPA<br>HUD 8-Step | Elevating structures 2 feet (0.61 m) above 0.2PFA |
| **Flood Insurance/ Land Development** | No impact anticipated | Flood Insurance /equipment protection | None |
| **Farmlands/ Land Development** | No impact anticipated | None | None |
| **Slope/ Land Development** | Direct, temporary, minor beneficial impact | None | Minimize disturbance to erodible slopes. |
| **Erosion/ Land Development** | Direct, temporary, minor beneficial impact | PMO / Single Incidental Operational Permit<br>PMO / SWPP | Design stormwater management system to control runoff. BMP (Erosion Prevention, Sediment Control, Runoff Control) Minimize disturbance to erodible soils. |
| **Stormwater/ Land Development** | Direct, temporary, minor beneficial impact | PMO / Single Incidental Operational Permit<br>PMO / SWPP | Design stormwater management system to control runoff. BMP (Erosion Prevention, Sediment Control, Runoff Control Minimize disturbance to erodible soils. |
| **Seismicity/ Hazards and Nuisances** | No impact anticipated | None | None |
| **Air Quality/ Hazards and Nuisances** | Direct, short-term, minor adverse impact | PMO / Electricity Generators Permit | Use of Low Sulfur Diesel Fuel |
| **Noise/ Hazards and Nuisances** | Direct, short-term, minor adverse impact | None | None |

| Alternative 2 – West to Represa del Lago La Plata facilities<br>Environmental Assessment Factor/ Category | Impacts | Agency Coordination/Permits | Mitigation/BMPs |
|---|---|---|---|
| **Contamination & Toxic Substances/ Hazards & Nuisances** | Direct, temporary, minor adverse impact | PMO / Single Incidental Operational Permit<br>DNER Emergency Plan<br>EPA / SPCC | Double wall<br>Spill containment<br>SPCC plan<br>Safety Labeling<br>MSDS<br>Proper storage |
| **Explosive and Flammable Hazards/ Hazards & Nuisances** | Direct, temporary, minor adverse impact | PMO / Single Incidental Operational Permit<br>DNER / Emergency Plan<br>EPA / SPCC | Spill containment<br>SPCC plan<br>Safety Labeling<br>MSDS<br>Proper storage |
| **Water Resources/ Natural Features** | Direct, short-term, minor adverse impact | DNER / EPA SPCC<br>PMO / SWPP | Spill containment<br>SPCC plan<br>Runoff control |
| **Wetlands/ Natural Features** | Direct, temporary, minor adverse impact | PMO SWPP | Buffer strip<br>Runoff control |
| **Vegetation/ Natural Features** | Direct, short-term, minor adverse impact | PMO / Single Incidental Operational Permit | Delineate the limits between impact areas and conservation zones |
| **Wildlife and Fish/ Natural Features** | Direct, short-term, minor adverse impact on wildlife<br>No impact anticipated on fish | None | None |
| **Threatened and Endangered Species/ Natural Features** | Direct, short-term, minor adverse impact | USFWS Consultation Letter | USFWS Conservation Measures for Puerto Rican Boa |
| **Critical Habitat/ Natural Features** | No impact anticipated | DNER Habitat Categorization | None |
| **Educational & Cultural Facilities/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Historic Properties/ Public Services and Utilities** | Direct, long-term, minor adverse impact | SHPO, ICP | None |
| **Archaeological/ Public Services and Utilities** | No impact anticipated | ICP | Implement protective actions |
| **Commercial Facilities/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Health Care Services/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | | |
| **Social Services/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Solid Waste Disposal/ Public Services and Utilities** | No impact anticipated | PMO General Permit for Other Works | None |
| **Wastewater/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Water Supply/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Public Health and Safety/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |

| Alternative 2 – West to Represa del Lago La Plata facilities | | | |
|---|---|---|---|
| **Environmental Assessment Factor/ Category** | **Impacts** | **Agency Coordination/Permits** | **Mitigation/BMPs** |
| **Parks & Recreation/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Transportation/ Public Services and Utilities** | Direct, temporary, minor beneficial impact | DTOP | MOT |
| **Employment and Income Patterns/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Low Income Households/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Demographic Character Changes/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Displacement/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Energy Efficiency/ Climate & Energy** | Direct, long-term, minor beneficial impact | None | None |

### 7.4 Alternative 3 – Construction of a Backup Power Facility, next to Represa del Lago La Plata facilities

| Alternative 3 – Next to Represa del Lago La Plata facilities<br>Environmental Assessment Factor/ Category | Impacts | Agency Coordination/Permits | Mitigation/BMPs |
|---|---|---|---|
| **Conformance with Plans/ Land Development** | Direct, long-term beneficial impact | None | None |
| **Land Use & Zoning/ Land Development** | No impact anticipated | None | None |
| **Scale & Urban Design/ Land Development** | Direct, short-term, minor adverse impact | None | None |
| **Geology/ Land Development** | Direct, long-term, minor adverse impact | None | None |
| **Soils/ Land Development** | Direct, long-term, minor adverse impact | PMO / Single Incidental Operational Permit<br>DNER / SPCC Plan | Minimize disturbance to erodible soils. Preserve native topsoil with proper separation techniques. |
| **Floodplains/ Land Development** | Direct, long-term, minor adverse impact | HUD NEPA<br>HUD 8-Step | Elevating structures 2 feet (0.61 m) above 0.2PFA |
| **Flood Insurance/ Land Development** | No impact anticipated | Flood Insurance /equipment protection | None |
| **Farmlands/ Land Development** | No impact anticipated | None | None |
| **Slope/ Land Development** | Direct, temporary, minor beneficial impact | None | Minimize disturbance to erodible slopes. |
| **Erosion/ Land Development** | Direct, temporary, minor beneficial impact | PMO / Single Incidental Operational Permit<br>PMO / SWPP | Design stormwater management system to control runoff.<br>BMP (Erosion Prevention, Sediment Control, Runoff Control)<br>Minimize disturbance to erodible soils. |
| **Stormwater/ Land Development** | Direct, temporary, minor beneficial impact | PMO / Single Incidental Operational Permit<br>PMO / SWPP | Design stormwater management system to control runoff.<br>BMP (Erosion Prevention, Sediment Control, Runoff Control)<br>Minimize disturbance to erodible soils. |
| **Seismicity/ Hazards and Nuisances** | No impact anticipated | None | None |
| **Air Quality/ Hazards and Nuisances** | Direct, short-term, minor adverse impact | PMO / Electricity Generators Permit | Use of Low Sulfur Diesel Fuel |

| Alternative 3 – Next to Represa del Lago La Plata facilities | | | |
|---|---|---|---|
| **Environmental Assessment Factor/ Category** | **Impacts** | **Agency Coordination/Permits** | **Mitigation/BMPs** |
| **Noise/ Hazards and Nuisances** | Direct, short-term, minor adverse impact | None | None |
| **Contamination & Toxic Substances/ Hazards & Nuisances** | Direct, temporary, minor adverse impact | PMO / Single Incidental Operational Permit<br>DNER Emergency Plan<br>EPA / SPCC | Double wall<br>Spill containment<br>SPCC plan<br>Safety Labeling<br>MSDS<br>Proper storage |
| **Explosive and Flammable Hazards/ Hazards & Nuisances** | Direct, temporary, minor adverse impact | PMO / Single Incidental Operational Permit<br>DNER / Emergency Plan<br>EPA / SPCC | Spill containment<br>SPCC plan<br>Safety Labeling<br>MSDS<br>Proper Storage |
| **Water Resources/ Natural Features** | Direct, short-term, minor adverse impact | DNER / EPA SPCC<br>PMO / SWPP | Spill containment<br>SPCC plan<br>Runoff control |
| **Wetlands/ Natural Features** | Direct, temporary, minor adverse impact | PMO SWPP | Buffer strip<br>Runoff control |
| **Vegetation/ Natural Features** | Direct, short-term, minor adverse impact | PMO / Single Incidental Operational Permit | Delineate the limits between impact areas and conservation zones |
| **Wildlife and Fish/ Natural Features** | Direct, short-term, minor adverse impact on wildlife<br>No impact anticipated on fish | None | None |
| **Threatened and Endangered Species/ Natural Features** | Direct, short-term, minor adverse impact | USFWS Consultation Letter | USFWS Conservation Measures for Puerto Rican Boa |
| **Critical Habitat/ Natural Features** | No impact anticipated | DNER Habitat Categorization | None |
| **Educational & Cultural Facilities/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Historic Properties/ Public Services and Utilities** | Direct, long-term, minor adverse impact | SHPO, ICP | None |
| **Archaeological/ Public Services and Utilities** | No impact anticipated | ICP | Implement protective actions |
| **Commercial Facilities/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Health Care Services/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Social Services/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Solid Waste Disposal/ Public Services and Utilities** | No impact anticipated | PMO General Permit for Other Work | None |
| **Wastewater/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Water Supply/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |

| Alternative 3 – Next to Represa del Lago La Plata facilities | | | |
|---|---|---|---|
| **Environmental Assessment Factor/ Category** | **Impacts** | **Agency Coordination/Permits** | **Mitigation/BMPs** |
| **Public Health and Safety/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Parks & Recreation/ Public Services and Utilities** | Direct, long-term, minor beneficial impact | None | None |
| **Transportation/ Public Services and Utilities** | Direct, temporary, minor beneficial impact | DTOP | MOT |
| **Employment and Income Patterns/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Low Income Households/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Demographic Character Changes/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Displacement/ Socioeconomic** | Direct, long-term, minor beneficial impact | None | None |
| **Energy Efficiency/ Climate & Energy** | Direct, long-term, minor beneficial impact | None | None |

# 8 PERMITS CONDITIONS

Puerto Rico Department of Housing (PRDOH) and Puerto Rico Aqueduct and Sewer Authority PRASA are responsible for obtaining applicable federal and Puerto Rico permits, including authorizations and environmental compliance for project implementation prior to construction, and adherence to permit conditions and regulatory requirements. Any substantive change to the approved scope of work will require re-evaluations by HUD for compliance with NEPA and other laws and EOs.

The PRASA must also adhere to the following conditions during project implementation and consider the below conservation recommendations:

## 8.1 Environmental

PRASA must comply with the environmental and historic preservation applicable laws. Federal funding is contingent upon acquiring the necessary federal, Puerto Rico and local permits. Noncompliance with this requirement may jeopardize the receipt of federal funds.

The Division of Environmental Compliance evaluated the project Environmental Assessment 2024-575571-DEA-300221 to adequately consider and analyze the environmental impacts (PRDNER/PREQB 2016) that the action entails and determined to be in compliance with the requirements of the Environmental Public Policy Law (CPR 2004) on June 11, 2024.

This Environmental Assessment (EA) was prepared in accordance with HUD Environmental Review Format Environmental Assessment per 24 Code of Federal Regulations [CFR] Part 58.36.

## 8.2 Utility Clearance

For ground disturbing activities, PRASA is responsible for locating utilities. The OSHA mandates (OSHA 1989) that if a utility provider cannot respond to a request to locate underground utility installations or cannot establish the exact location of these installations, the contractor may proceed, provided they use detection equipment or other acceptable means to locate utility installations.

## 8.3 Stormwater and Soils

A Construction NPDES permit (EPA 2022a) and a SWPPP (EPA 2022b) will be prepared and implemented by PRASA. The agency will implement BMPs to manage any piles of soil or debris, minimize steep slope disturbance, preserve native topsoil unless infeasible, and minimize soil compaction and erosion.

## 8.4 Erosion and Sediment Control

The BMPs and guidelines recommended in the Puerto Rico Erosion and Sediment Control Handbook for Developing Areas (PRDNER/PREQB 1998) will be implemented by PRASA for the preferred alternative. The agency will be responsible for obtaining the necessary permits such as an NPDES permit (EPA 2022a) and a PMO General Permit for Other Works implementing the associated erosion and sediment control plans included as part of the PRPB Joint Regulation Single Incidental Operational Permit (PRPB) and SWPPP (EPA 2022b).

## 8.5 Spill Prevention, Control and Countermeasure

A SPCC Plan (EPA 2002) will be prepared by PRASA to establish procedures, methods, and equipment requirements to prevent fuel or lubricants from reaching navigable waters and adjoining shorelines, and to contain discharges of harmful substances.

## 8.6 Endangered Species Act

The U.S Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) website identified the Puerto Rican Boa (*Chilabothrus inornatus*) as threatened, or endangered species. Please refer to **Appendix J Consultation Letter**

USFWS developed conservation measures with the purpose of assisting others to avoid or minimize adverse effects to the Puerto Rican boa and its habitat.

1. Inform all project personnel about the potential presence of the PR boa in areas where the proposed work will be conducted. An educational poster or sign with photo or illustration of the species should be displayed at the project site.
2. The boundaries of the project and areas to be excluded and protected should be clearly marked in the project plan and in the field in order to avoid further habitat degradation into forested and conservation areas.
3. A biologist or personnel with experience on this species should survey the areas to be cleared to verify the presence of any PR boa within the work area prior to the use of heavy machinery and any construction activity.
4. Vegetation should first be cleared by hand to the maximum extent possible prior to the use of heavy machinery for land clearing. Cutting vegetation by hand will allow boas present on site to move away on their own to adjacent available habitat.
5. If a PR boa is encountered, working will cease until it moves off the site. Do not capture the boa. If boas need to be moved out of harm's way, designated personnel shall immediately contact the Puerto Rico Department of Natural and Environmental Resources (PRDNER) Rangers for safe capture and relocation of the animal, in accordance with the USFWS Puerto Rican Boa Conservation Measures guidelines. (PRDNER phone numbers: ((787) 724-5700, (787) 230-5550, (787) 771-1124).
6. Any heavy machinery left on site (staging) or near potential PR boa habitat (within 50 meters of potential boa habitat), needs to be thoroughly inspected each morning before work starts to ensure that no boas have sheltered within engine compartments or other areas of the equipment.

## 8.7 Fish and Wildlife Coordination Act

On November 10, 2023, PRDOH consulted USFWS for concurrence on the findings of listed critical, threatened, or endangered species that may be present in the proposed area. USFWS consultation letter (**Appendix J USFWS Consultation Letter**) confirmed the determination that the proposed project may affect but is not likely to adversely affect the Puerto Rican boa with the implementation of the conservation measures.. Please refer to **Appendix J USFWS Consultation Letter**.

## 8.8 Work Affecting Water

The project does not have works affecting water. No USACE permit is required.

## 8.9 Wetlands

The PRASA will use preventive measures and construction BMPs to minimize impacts to riverine wetlands that are within 100 feet of the project. The project does not have works affecting wetlands. No USACE permit is required.

## 8.10 Noise

PRDNER/PREQB regulates noise in accordance with the Noise Pollution Control Regulation (PREQB 2011). The regulation establishes the threshold for industrial, commercial, residential, and quiet zones. Quiet Zones are areas that have additional considerations including hospitals, schools, court houses, and daycare centers for the elderly and children. The rule states that signs must be conspicuously posted in Quiet Zones indicating the designation.

Noise emitted by the site preparation/construction, dredging operations, and demobilization equipment would result in a temporary short-term increase in ambient noise levels near the proposed project sites. The site preparation/construction activities would take place between 7 a.m. and 10 p.m., the diurnal period. The noise level would vary during the site preparation/construction period, depending on the number of construction equipment and the distance to the noise receptor.

## 8.11 Historic Preservation/Archaeological Resources

A Section 106 NHPA Effect Determination Form was prepared for Project PR-HMGP-4339-0019 Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators Phase I and submitted to SHPO for the review and approval process. The Puerto Rico Historic Preservation Office reviewed the proposed action in accordance of Section 106 of the National Historic Preservation Act and agreed *that the proposed project with the established conditions will have no adverse effect upon historic properties*. (see **Appendix F SHPO Section 106 Consultation**).

## 8.12 Built Historic Heritage and Terrestrial Archaeology

The PRASA consulted the ICP through an archaeological recommendation 2023-503258-SRA-073503 to obtain concurrence and recommendations on the proposed action. The Historic Built Heritage Program (ICP-PPHE) examines the project to determine whether it affects Properties of Historic and Architectural Value that are protected or are eligible. The Archaeology and Ethnohistory Program (PAE) evaluates the proposed project site for the probabilities of impacting an archaeological resource. **Appendix L Archaeological Recommendations** includes the ICP communication and recommendations regarding the proposed action. The ICP letters indicated that there were no objections to the proposed project as presented.

In the event that, during the development of the project, any deposit, element, structure, or vestige of an archaeological nature is discovered or impacted, the contractor must notify PRASA immediately and within a period of twenty-four hours to the Archaeology and Ethnohistory Program and proceed to implement protective actions to avoid the impact of the newly discovered cultural resource.

## 8.13 Construction Material and Debris

The PRASA is responsible for obtaining required permits (PMO General Permit for Other Works) for the handling and transportation of construction material and debris. It will identify, handle, transport, and dispose of hazardous materials and/or toxic waste in accordance with EPA and PRDNER requirements, including the details associated with the proposed action construction materials and debris handling as part of the PRPB Joint Regulation, General Consolidated Permit of the Single Incidental Operational Permit. It is also responsible for ensuring that non-recyclable debris generated from project activities will be disposed at a PRDNER permitted landfill.

## 8.14 Clean Air Act

The PRASA is responsible for complying with applicable EPA and PRDNER requirements for fugitive dust suppression. Vehicular emission and airborne dust particulates resulting from construction activities and equipment operation shall be de minimis. An Operation Plan to implement emissions control measures would be included as part of the General Permit for Other Works application, as required by the PRPB Joint Regulation.

## 8.15 Atmospheric Pollution Control

The PRASA will evaluate the proposed equipment associated with the proposed action to comply with Regulation 5300 and PRDNER requirements. A General Permit for Electricity Generators application will be prepared and submitted for the operation of emergency generators.

## 8.16 Tree Cutting

The PRASA is responsible for complying with the requirements of the PRPB Joint Regulation on the requirements to mitigate trees that are impacted by the proposed action. A tree inventory was prepared by an OGPe Planting Authorized Inspector to identify trees within the proposed action areas, as part of the Single Incidental Operational Permit as required by the PRPB Joint Regulation. A permit will be required for tree cutting prior to beginning clearing and grubbing. (**Appendix B Cut & Pruning Report - Tree Inventory, October 3, 2023**)

## 8.17 Invasive Species

The PRASA is responsible for restoring disturbed soils with planting native, non-invasive species once project activities are completed. Construction equipment should be power washed prior to initial transport to the construction site and prior to changing locations to prevent the spread of noxious weeds.

## 8.18 Compliance With State (Local) Permit Requirements

The PRASA will submit to the OGPe and PRDNER the corresponding applications to obtain, if required, the following environmental protection permits and endorsements:

a. Natural Habitat Categorization Certification – PRASA submitted to the PRDNER an application to request concurrence on the habitat classification for the proposed project.

   On December 8, 2023, PRDNER determined that "*As a result of this evaluation, we have categorized the property as Natural Habitat with High Potential to Become Essential Habitat, Habitat of High Ecological Value or Habitat of Ecological Value (Category 5). Article 2.03 of Regulation 6765, supra, establishes the following for this category: "The goal of mitigation is to have an increase in the quality and quantity of the habitat to be protected. The Department must act to protect the habitat by recommending or requiring:*

   *1. Avoiding the impact through alternatives to the proposed projects.*
   *2. If the impact is unavoidable, mitigation will be carried out through actions that contribute to the improvement of essential habitat, of high ecological value or of ecological value...*

   *The green areas of the project must be reforested with native or endemic flora species.*"

b. Determination of Environmental Compliance for Environmental Assessment – PRASA submitted to OGPe an environmental assessment to request environmental compliance with all the requirements of the Law on Environmental Public Policy, and with the RPEA.

   On June 11, 2024, Environmental Compliance Assessment Division (DECA) determined that "*In said environmental document, the environmental impacts that the action entails were adequately considered and analyzed, and therefore it is approved, thus concluding the environmental assessment process*."

c. Infrastructure and Utilities Recommendations – The proposed action information is presented for consideration and comments for conformity with State Utility agencies for building requirements.
d. Maintenance of Public Infrastructure Works Permit – Required for maintenance of public infrastructure facilities.
e. Single Incidental Operational Permit – This permit includes the Incidental Activity Permit for Public Infrastructure Works, Trees Cutting and Pruning Authorization, and the General Consolidated Permit.

# 9 AGENCY COORDINATION & PUBLIC INVOLVEMENT

Add Public Notice

This Environmental Review Record (ERR) is available for agency and public review and comment for a period of 15 days, from XXXXXX ##, 2024. The public information process will include a public notice in both English and Spanish with information about the proposed action in the XXXXX newspaper with targeted outreach to environmental justice populations through notices to community organizations. A Spanish translation of the Final EA ERR, Executive Summary, and Finding of No Significant Impact (FONSI) notice publication and dissemination list will also be posted on websites of PRDOH, HUD, PRASA, and COR3. The Spanish translation also help establish awareness of the project and promote public participation. If comments / recommendations are received, they will be discussed and documented in this EA. No public hearings/meetings have been scheduled as part of the environmental review.

The Final EA ERR is available for download at the following websites:

- HUD: https://www.recuperacion.pr.gov
- PRASA: https://www.acueductospr.com/cumplimiento
- COR3: https://recovery.pr.gov/es/document-library#

The website link for the ERR will also be posted on the following Facebook pages:

- PRASA: https://www.facebook.com/Acueductospr/

A hard copy of the ERR will be available for review at the following locations:

- Toa Alta Municipality - Development Office at, Pueblo Ward, Toa Alta, Puerto Rico.
- PRASA Central Office - Sergio Cuevas Bustamante Building, 604 Barbosa Avenue, Hato Rey, Puerto Rico

Additional project information is contained in the Environmental Review Record (ERR) on file at 606 Barbosa Avenue, Juan C. Cordero Dávila Building, Río Piedras, PR and available for review, examination and copying Monday through Friday from 8:30 AM to 4:00 PM. The ERR will also be available for review on the PRDOH Disaster Recovery website (reference material www.recuperacionm.pr.gov)

Any individual, group, or agency may submit written comments on the ERR to the Puerto Rico Department of Housing, as Responsible Entity. Comments should specify which Notice they are addressing. PRDOH encourages electronic submittal of comments at environmentcdbg@vivienda.pr.gov with the following subject: "**COMMENTS TO PRDOH's CDBG-MIT ENVIRONMENTAL REVIEW, Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators (4339-0019)**". The number to get information is (787)274-2527 ext. 4320. In the alternative, comments may be submitted on paper to PRDOH.

**Public comment periods.**

Required notices must afford the public the following minimum comment periods, counted in accordance with § 58.21:

| | |
|---|---|
| a) Notice of Finding of No Significant Impact (FONSI) | 15 days when published in a general circulation newspaper or on a Government website that is accessible to individuals with disabilities and provides meaningful access for individuals with Limited English Proficiency or, if no publication, 18 days when mailing and posting. |
| b) Notice of Intent to Request Release of Funds (NOI-RROF) | 7 days when published in a general circulation newspaper or on a Government website that is accessible to individuals with disabilities and provides meaningful access for individuals with Limited English Proficiency or, if no publication, 10 days when mailing and posting. |
| c) Concurrent or combined notices | 15 days when published in a general circulation newspaper or on a Government website that is accessible to individuals with disabilities and provides meaningful access for individuals with Limited English Proficiency or, if no publication, 18 days when mailing and posting. |

# 10 MITIGATION

Best Management Practices (BMPs) refers to a practice, or combination of practices, which are effective and practical in preventing or reducing the amount of pollution generated by nonpoint sources. BMPs can be structural (e.g., silt fence, groundcover vegetation) or administrative (e.g., maintenance frequency or fuel requirement).

PRASA is committed to implementing BMPs that will make this project more compatible with the surrounding natural and anthropogenic environment. Specific plans and permits, such as the plans required by the Single Incidental Permit from of Puerto Rico Permit Management Office (PRPMO) and the NPDES Permit from the EPA will include project-specific requirements to be designed at a later stage of this Proposed Action; however, below are some generic BMPs that address the anticipated potential impacts. PRASA has adopted all practicable means to mitigate environmental harm from the Proposed Action.

## 10.1 Land Development

Implementing BMPs and strict adherence to regulatory requirements and standards would limit adverse impacts with the proposed action activities.

a. Compliance with the Puerto Rico Erosion and Sediment Control Handbook for Developing Area.
b. Compliance with NPDES permit requirements acquired from the EPA.
c. Compliance with Single Incidental Operational Permit requirements from PRPMO.
d. Minimize disturbance to erodible soils and slopes.
e. Preserve native topsoil with proper separation techniques.
f. Maintain a buffer strip as mitigation for impacts to the Riverine Wetland.
g. Develop runoff control in the access road as mitigation for impacts to the Riverine Wetland.
h. Use curtains for erosion control during site preparation, construction, and demobilization equipment.
i. Elevate structures 2 feet above 0.2PFA to mitigate impacts to FFRMS floodplain.
j. Design stormwater management system to control runoff throughout the project.
k. BMP (Erosion Prevention, Sediment Control, Runoff Control)
l. Fugitive dust control – complying with the EPA NPDES Construction General Permit (CGP) in accordance with PRR100000 for the Commonwealth of Puerto Rico.
    i. Water sprinklers or spraying from a truck-mounted tank, frequent washing of trucks carrying material, and covering the trucks that carry material while they are in movement to avoid particulate matter emissions.
    ii. For bare-soil areas that may be eroded by the wind or vehicular traffic, sprinkle water as needed.
m. Minimize combustible emissions – monitoring air quality, traffic management techniques, barriers such as fugitive dust control, proper vehicle maintenance, minimizing vehicle idling time, and complying with the Clean Air Non-Road Diesel Rule by using ultra-low sulfur diesel fuel for on-road and nonroad project uses.

**Hazards and Nuisances**

The site preparation, construction, generators operation, or demobilization activities under the Proposed Action would temporarily use, potentially encounter, or generate hazardous materials and wastes such as lubricants and fuels. The PRASA would be responsible for handling and disposing of hazardous materials and wastes in accordance with federal and local regulations and specific BMPs. Some practices may include, but would not be limited to,

- the use of Hazardous Material System Label to inform workers about on-the-job hazards related to manufactured or imported chemicals. This label categorizes hazards as health, fire, specific, and instability;
- training on Material Safety Datasheet to make workers aware of the risks handling hazardous chemicals;
- the designation of special storage areas for hazardous materials;
- be aware of incompatible materials, and materials shelf-life;
- preparation of and compliance with a hazardous materials and waste plan that includes responsible parties, procedures for hazardous waste and hazardous materials transport, containment, and storage BMPs during construction and operation;
- containment berms, coverage from rain, and concrete washout areas.

Potential contaminants could include fuel, oil, and hydraulic fluids from leaky equipment or during refueling activities. A Spill Prevention Control and Countermeasure (SPCC) Plan would be required and would describe the BMPs for oil handling operations, spill prevention practices, discharge or drainage controls, and the personnel, equipment and assigned resources that would be used to prevent oil spills from reaching navigable waters or adjoining shorelines. For diesel fuel, considered a hazardous material, specifically a Class C Combustible, The engineering controls to be included as part of the design includes double wall tanks and secondary containment for tanks and fuel receiving area

Mitigation practices:

a. Use of Low Sulfur Diesel Fuel
b. Double wall tanks
c. Spill containment (SPCC Plan)
d. Safety Labeling MSDS
e. Proper storage

Noise is defined by EPA as unwanted or unwelcomed sound measured in decibels (dBA) on the A-weighted scale. The scale classifies noise based on the range of sounds that the human ear can hear. Noise that occurs between 10 p.m. and 7 a.m. is more disturbing than those sounds that occur during normal waking hours between 7 a.m. and 10 p.m.

a. Maintenance of vehicles and construction equipment according to manufacturers' specifications should be performed.
b. The use of mufflers and sound suppressors, while operating close to residences and quiet zones areas.
c. Traffic management techniques by routing construction traffic through commercial neighborhoods instead of through residential areas.
d. Utilize noise attenuating enclosures for combustion engines.
e. Minimize idling of vehicles and motors not in use.
f. Select the equipment necessary to perform the proposed activities, control working hours, install sound barriers, use enclosures, perform noise monitoring activities, and include specification limits on contract documents.

## 10.2 Natural Features

Mitigation of potential temporary impacts to biological resources during the site preparation/construction phase would be achieved by the implementation of proposed BMPs.

a. SWPPP – required for projects qualifying under the program; implement techniques and equipment necessary to protect WOTUS from sediment and earth crust disturbance generated as part of the construction activity.
b. SPCC – developed for project sites meeting the guideline thresholds; implement measures to prevent fuel and oil spills during fueling of equipment.
    i. Cover from the weather storage of chemicals and supplies.
    ii. Equipment maintenance. Daily inspection of vehicles, machinery, and hydraulic equipment for leaks.
    iii. Secondary containment. Establish wherever there is storage of hydrocarbons, other potentially toxic liquids.
    iv. Spill kits. Maintain on site, to contain spills, to collect contaminated materials (soil, rags, etc.) and transfer contaminated materials by licensed contractor.
    v. Fueling operation shall be during daylight hours and during favorable weather conditions.
c. Delineate the limits between impact areas and conservation zones.
d. Place barriers between the disposal, staging areas, and conservation zones.
e. Minimizing the use of off-road areas, erosion control measures, and placing barriers that delineate the limits between impact areas and conservation zones (such as forested areas).
f. Power wash construction equipment prior to initial transport to the construction sites and prior to changing locations to prevent the spread of noxious weeds.
g. Restore disturbed soils with native, non-invasive species once project activities have been completed.

The U.S Fish and Wildlife Service (USFWS) developed conservation measures with the purpose of assisting others to avoid or minimize adverse effects to the Puerto Rican boa and its habitat.

1. Inform all project personnel about the potential presence of the PR boa in areas where the proposed work will be conducted. An educational poster or sign with photo or illustration of the species should be displayed at the project site.
2. The boundaries of the project and areas to be excluded and protected should be clearly marked in the project plan and in the field in order to avoid further habitat degradation into forested and conservation areas.
3. A biologist or personnel with experience on this species should survey the areas to be cleared to verify the presence of any PR boa within the work area prior to the use of heavy machinery and any construction activity.
4. Vegetation should first be cleared by hand to the maximum extent possible prior to the use of heavy machinery for land clearing. Cutting vegetation by hand will allow boas present on site to move away on their own to adjacent available habitat.
5. If a PR boa is encountered, working will cease until it moves off the site. Do not capture the boa. If boas need to be moved out of harm's way, designated personnel shall immediately contact the Puerto Rico Department of Natural and Environmental Resources (PRDNER) Rangers for safe capture and relocation of the animal, in accordance with the USFWS Puerto Rican Boa Conservation Measures guidelines. (PRDNER phone numbers: ((787) 724-5700, (787) 230-5550, (787) 771-1124).
6. Any heavy machinery left on site (staging) or near potential PR boa habitat (within 50 meters of potential boa habitat), needs to be thoroughly inspected each morning before work starts to ensure that no boas have sheltered within engine compartments or other areas of the equipment.

## 10.3 Public Services and Utilities

### Archaeological

Represa del Lago La Plata was constructed in 1974 (50 years ago). The proposed action includes the installation of exposed conduits anchored on the dam bridge wall to connect the existing electrical infrastructure. The installation of the exposed conduits will be on downstream side of the dam bridge wall. The conduits will run over and under two galvanized steel strut beams. The visual impact to the dam bridge wall is to be minimized using 60 inches wide expanded metal galvanized steel protective barrier that will cover a vertical strut, the strut beams, and the conduits.

There are no historic properties or archaeological resources, nor American Indian/Native Hawaiian/Native Alaskan Cultural/Religious Sites in the project site.

In the event that, during the development of the project, any deposit, element, structure, or vestige of an archaeological nature is discovered or impacted, the contractor must notify PRASA immediately and within a period of twenty-four hours to the Archaeology and Ethnohistory Program and proceed to implement protective actions to avoid the impact of the newly discovered cultural resource.

### Transportation

The site preparation, construction, or demobilization activities under the Proposed Action would temporarily increase of traffic of heavy vehicles and equipment thru Road PR-824, and the municipal road Camino Recreativo La Plata which are considered a rural vicinity.

The generators' operation activities under the Proposed Action would not significantly increase the traffic of heavy vehicles through the access road.

a. Traffic management techniques, fugitive dust control, proper vehicle maintenance, and minimizing vehicle idling time, among others.
b. Management of traffic plan – would include public notices through traditional and social media regarding traffic changes and detours.
c. Compliance with requirements of PRHTA.

## 10.4 Climate & Energy

Mitigation practices towards future changes:

a. Use of Low Sulfur Diesel Fuel
b. Design stormwater management system to control runoff
c. Elevating structures 2 feet (0.61 m) above 0.2PFA

## 11 DETERMINATION & CO SIGNATURE

☐ **This Project Converts to EXEMPT,** per § 58.34(a) (12),
because it does not require any mitigation for compliance with any listed statutes or authority, nor requires any formal permit or license.

Funds may be draw down for this now EXEMPT project.

☒ **Finding of No Significant Impact** [24 CFR 58.40(g)(1); 40 CFR 1508.27]

The project will not result in a significant impact on the quality of the human environment.

☐ **Finding of Significant Impact** [24 CFR 58.40(g)(2); 40 CFR 1508.27]

The project may significantly affect the quality of the human environment.

**Preparer Signature:** _____ Date: February 20, 2025

Name/Title/Organization: Julio Correa Flores/Deputy Program Manager/CSA WSP JV

**HUD Responsible Entity Certifying Officer Signature:** _____

Name/Title: Aldo A. Rivera Vázquez / PRDOH Director – Permits and Environmental Compliance Division

Date: 2/21/2025

This original, signed document and related supporting material must be retained on file by the Responsible Entity in an Environmental Review Record (ERR) for the activity/project (ref: 24 CFR Part 58.38) and in accordance with recordkeeping requirements for the HUD program(s).

## 12 LIST OF PREPARERS

PRASA, Office of Engineering, Strategic Planning Office. San Juan, Puerto Rico.

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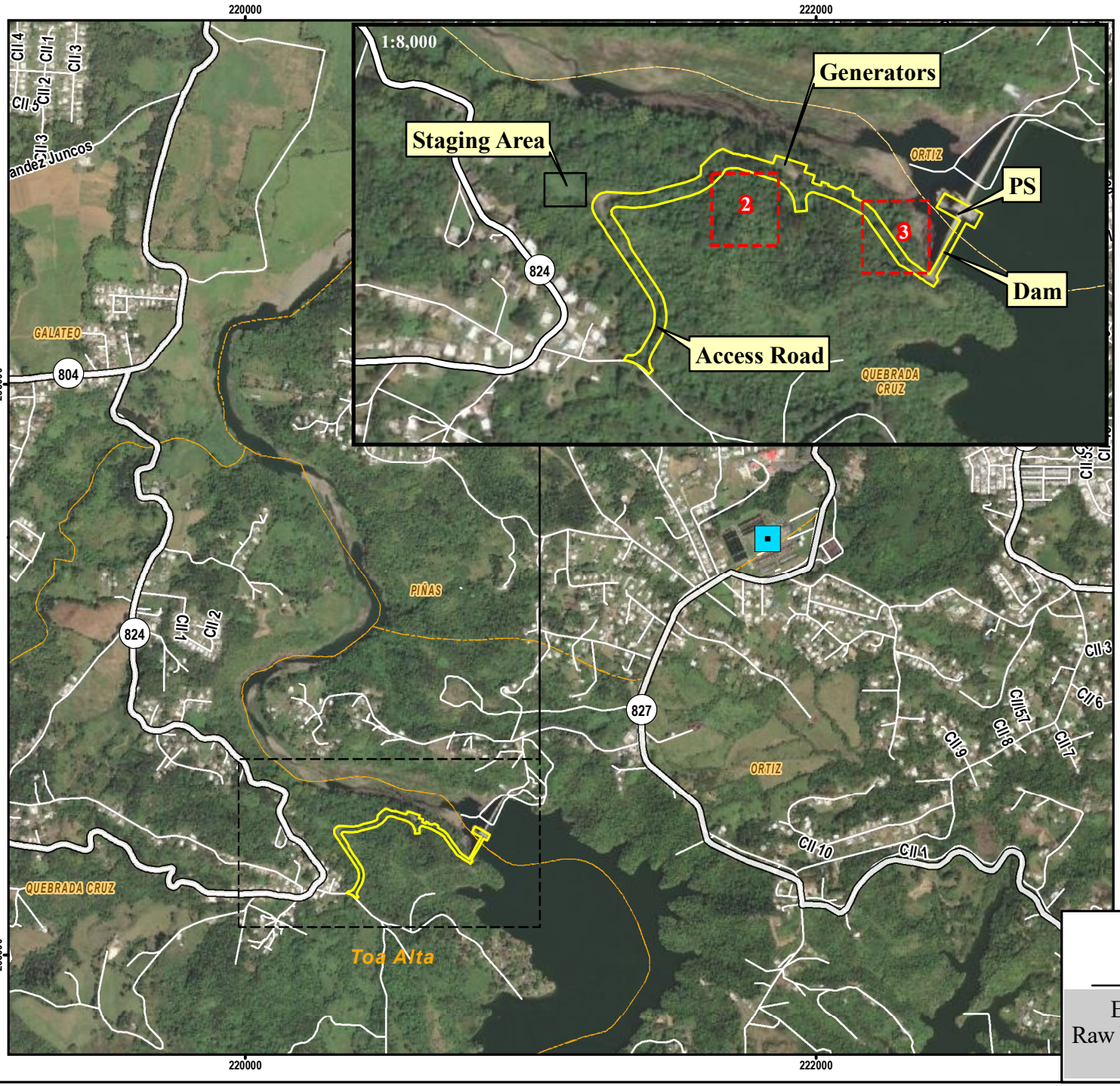
Lymarie Urbina Damiani
Diana Ferro Díaz
Tania M. Marrero Rodríguez
Daniel O. Rendón Cruz
Marisol Medina García
Elena Vázquez Moyet

## 13 APPENDICES

# APPENDIX A FIGURES & EXHIBITS

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X: 220,581.893 m
Y: 256,488.487 m

**Legend**

- Enrique Ortega WTP[1]
- Project Boundary[2]
- Evaluated Alternatives
- State Road[3]
- Municipal Road[4]
- Ward Limit[5]

Note: Project boundary is approximate.

Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, septiembre de 2023.
3. Puerto Rico Highways and Transportation Authority (ACT, in Spanish), 2020.
4. U.S. Department of Commerce, U.S. Census Bureau, Geography Division, 2010, TIGER/Line 2010 Census, Census Tract national-based.
5. Puerto Rico Planning Board, 2015.
6. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011)
Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Site Location

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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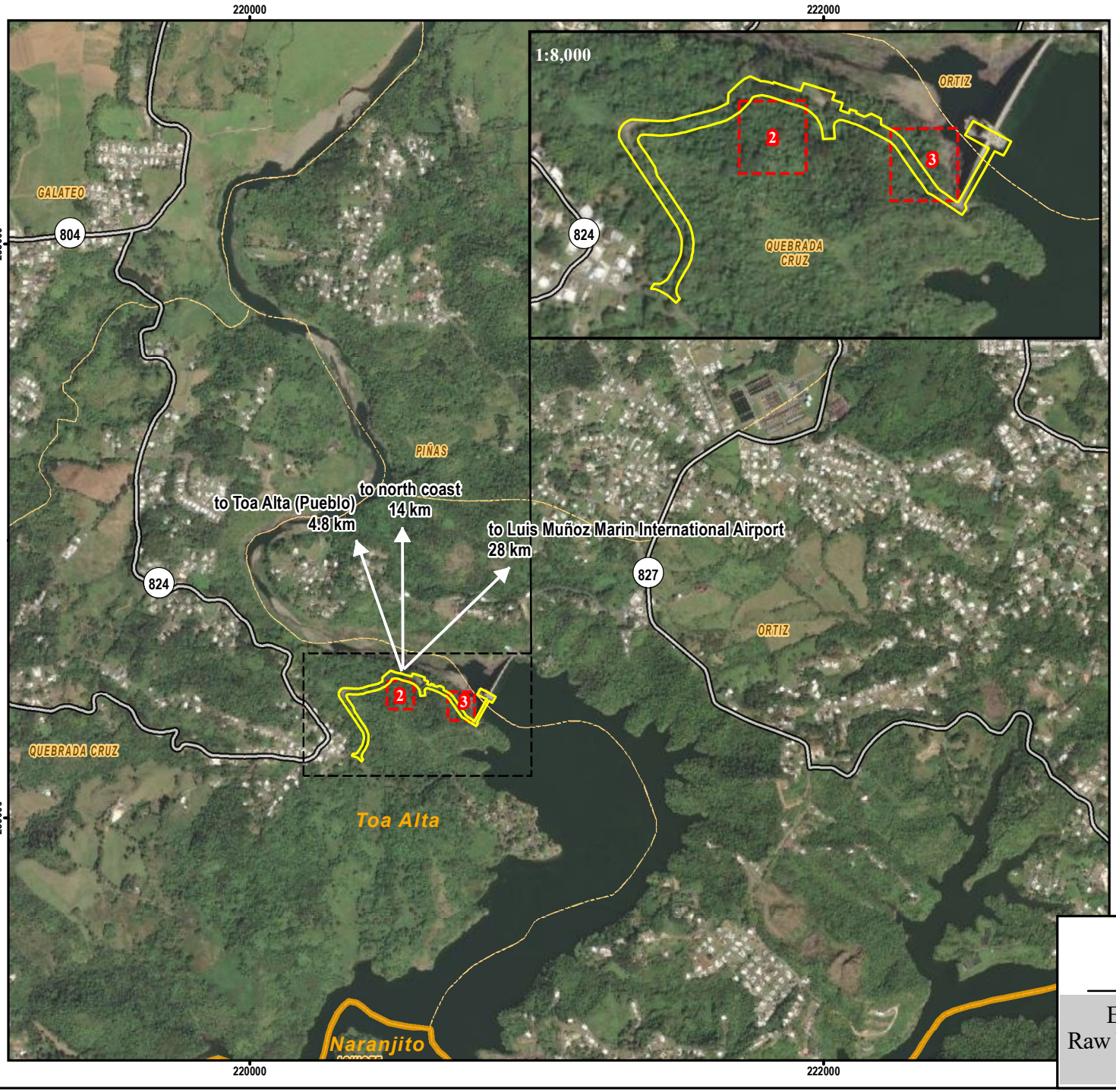


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X: 220,581.893 m
Y: 256,488.487 m

**Legend**

- Project Boundary[1]
- Evaluated Alternatives
- State Road[2]
- Ward Limit[3]
- Municipal Boundary[3]

Note: Project boundary is approximate.

Sources:
1. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, septiembre de 2023.
2. Puerto Rico Highways and Transportation Authority (ACT, in Spanish), 2020.
3. Puerto Rico Planning Board, 2015.
4. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Geographic Location

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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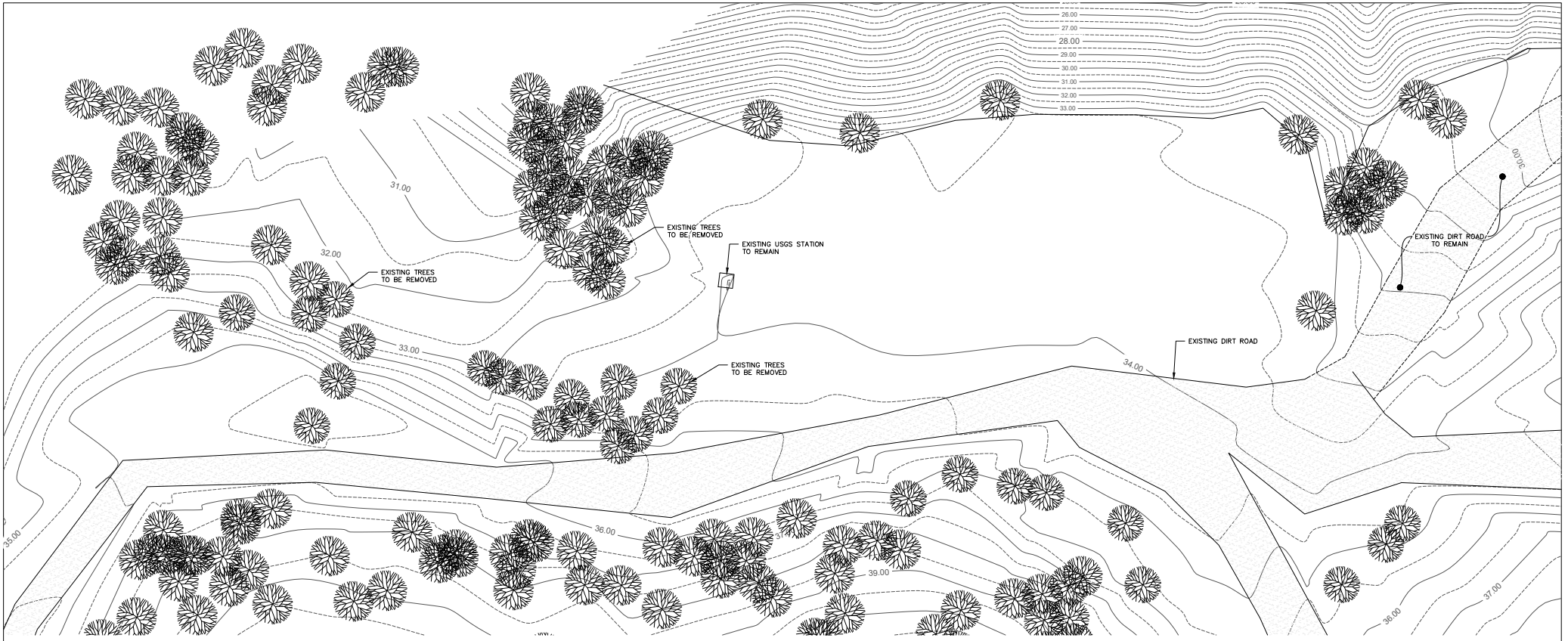


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EXISTING CONDITIONS AND DEMOLITION PLAN

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NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, SEE DWG. 000–C–01.

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**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

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| APPR. BY | GN |

Stantec

87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT - RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - EXISTING CONDITIONS AND DEMOLITION PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.

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ACCESS ROAD -
EXISTING CONDITIONS AND DEMOLITION PLAN
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**PRELIMINARY NOT FOR CONSTRUCTION**

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Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT - RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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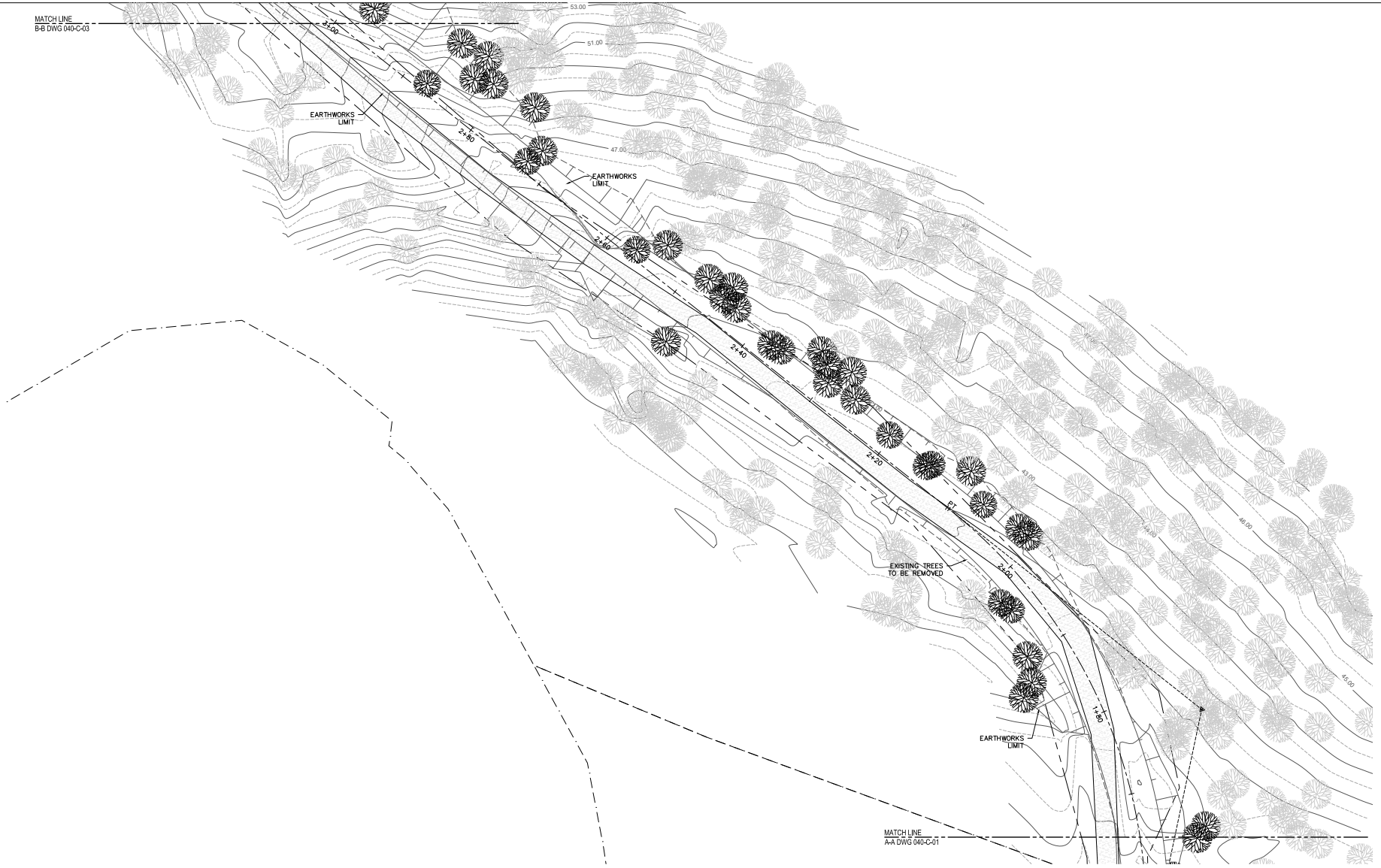


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## ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

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NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.

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**PRELIMINARY NOT FOR CONSTRUCTION**

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Stantec

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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT - RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

| | |
|---|---|
| C.I.P. No. | 1-70-9000 |
| PSWID | - |
| DATE: | JUNE / 2023 |
| SCALE: | 1:200 |
| SHEET NO. | XX OF XX |
| DWG. NO. | 040-C-02 |

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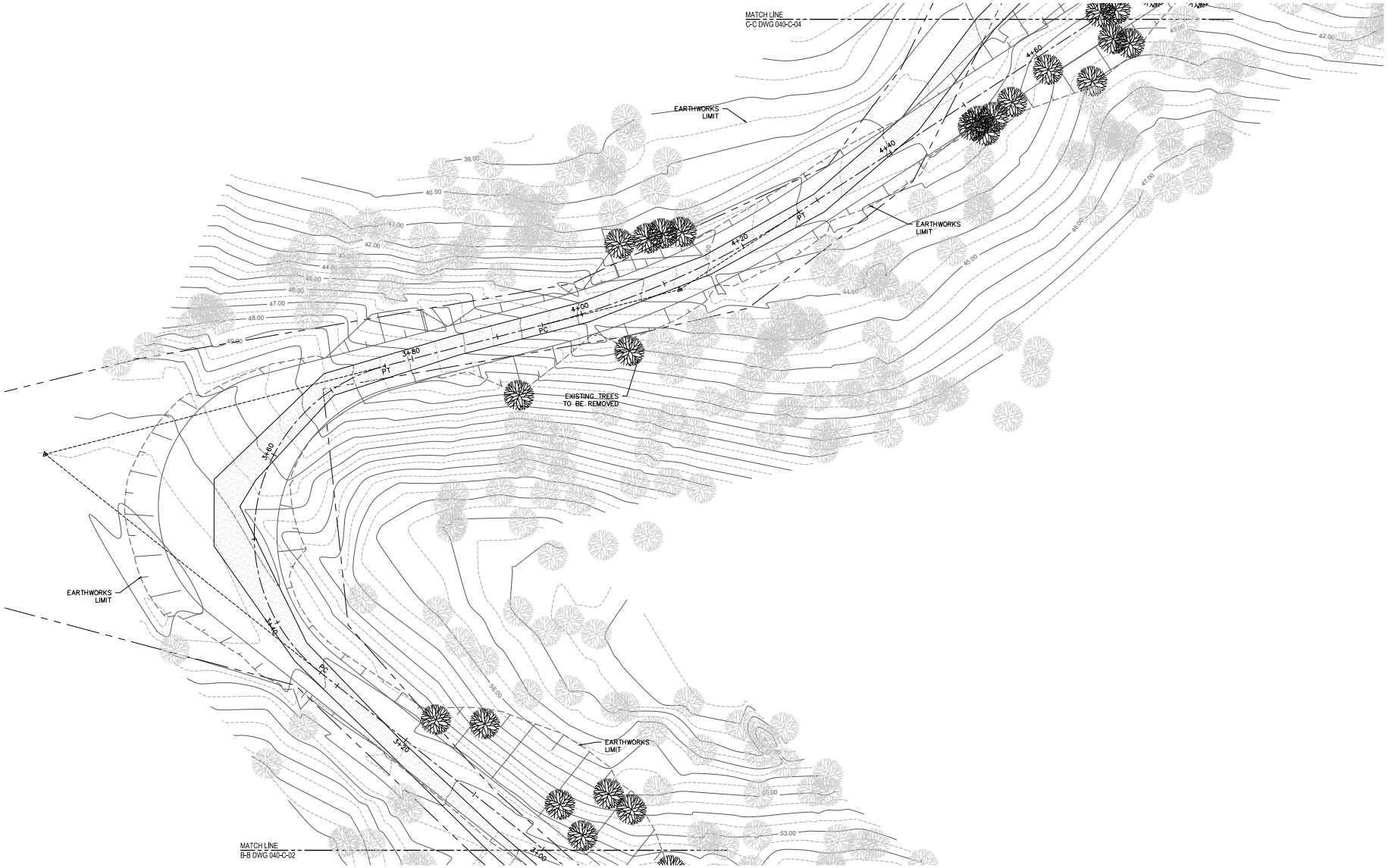


## ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1:200

NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.

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SCALE: 1:200

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| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

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| DRAWN BY | AM |
| DESIGNED BY | MVM |
| CHECKED BY | LMR |
| APPR. BY | GN |

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT - RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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|---|---|
| C.I.P. No. | 1-70-9000 |
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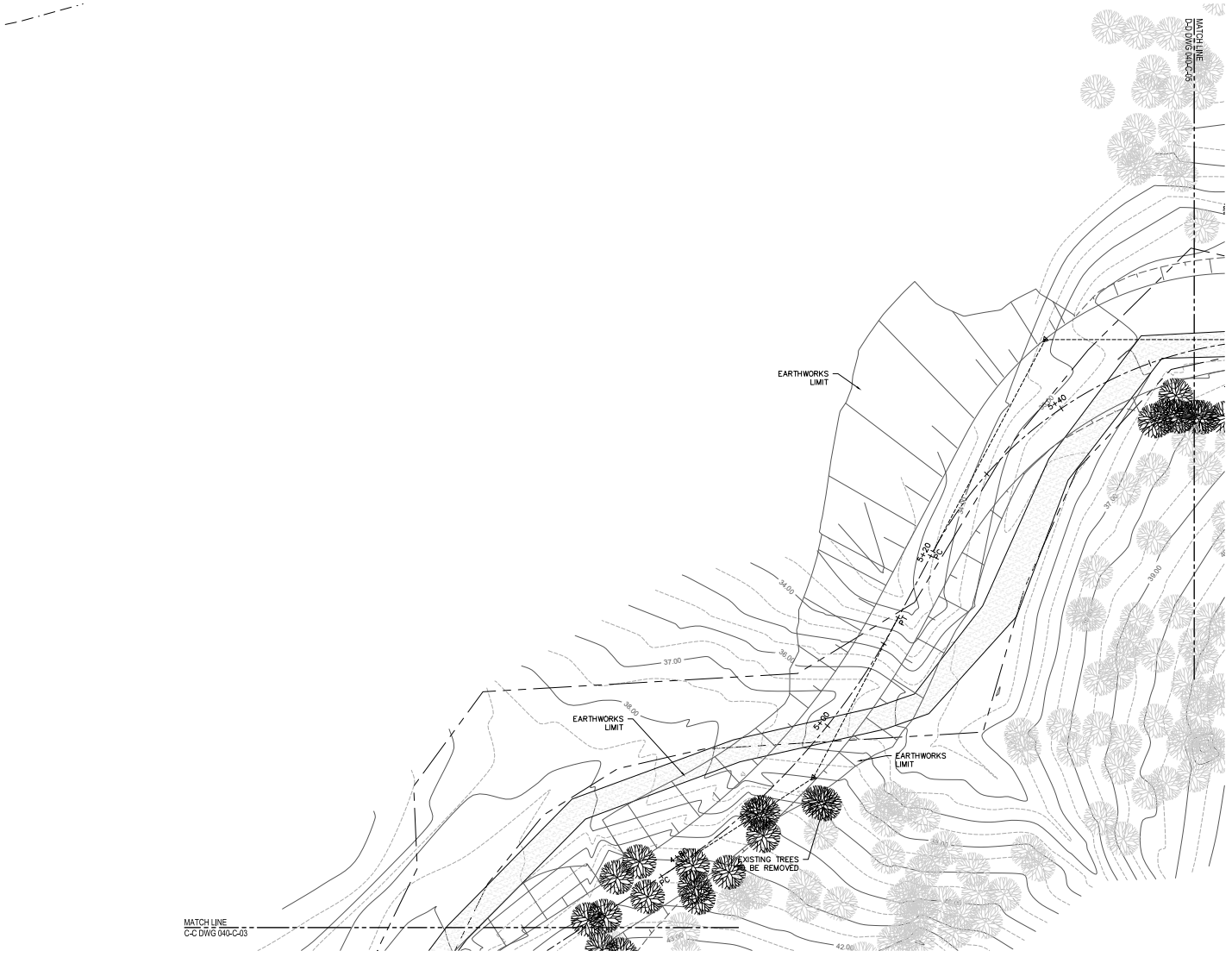


## ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1:200

NOTE:

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SCALE: 1:200

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TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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| C.I.P. No. | 1-70-9000 |
| PSWID | - |
| DATE: | JUNE / 2023 |
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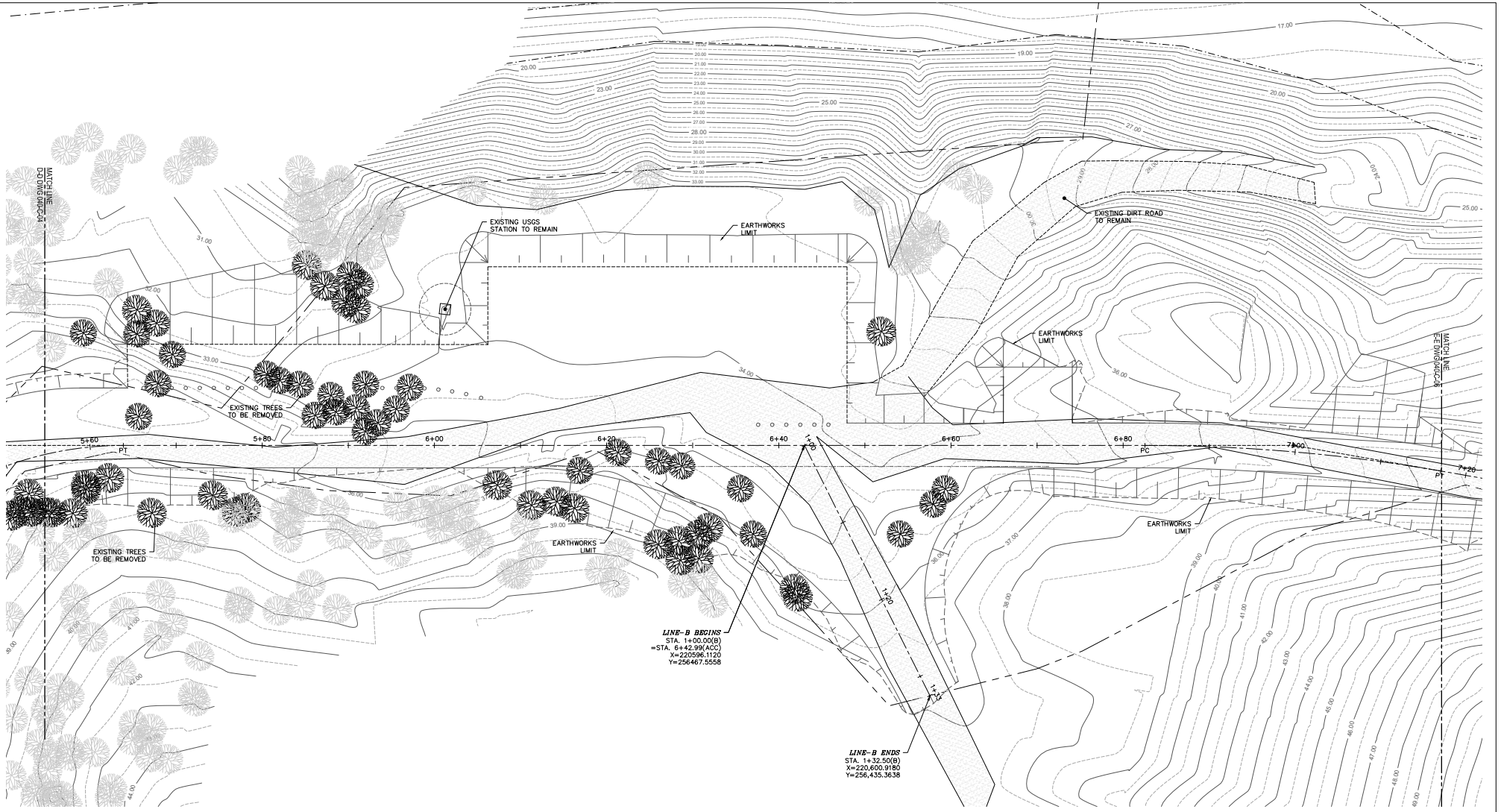


## ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1:200

NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.

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SCALE: 1:200

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TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

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GOBIERNO DE PUERTO RICO

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DATE: JUNE / 2023
SCALE: 1:200

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## ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1:200

NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.

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TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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PSWID: -
DATE: JUNE / 2023
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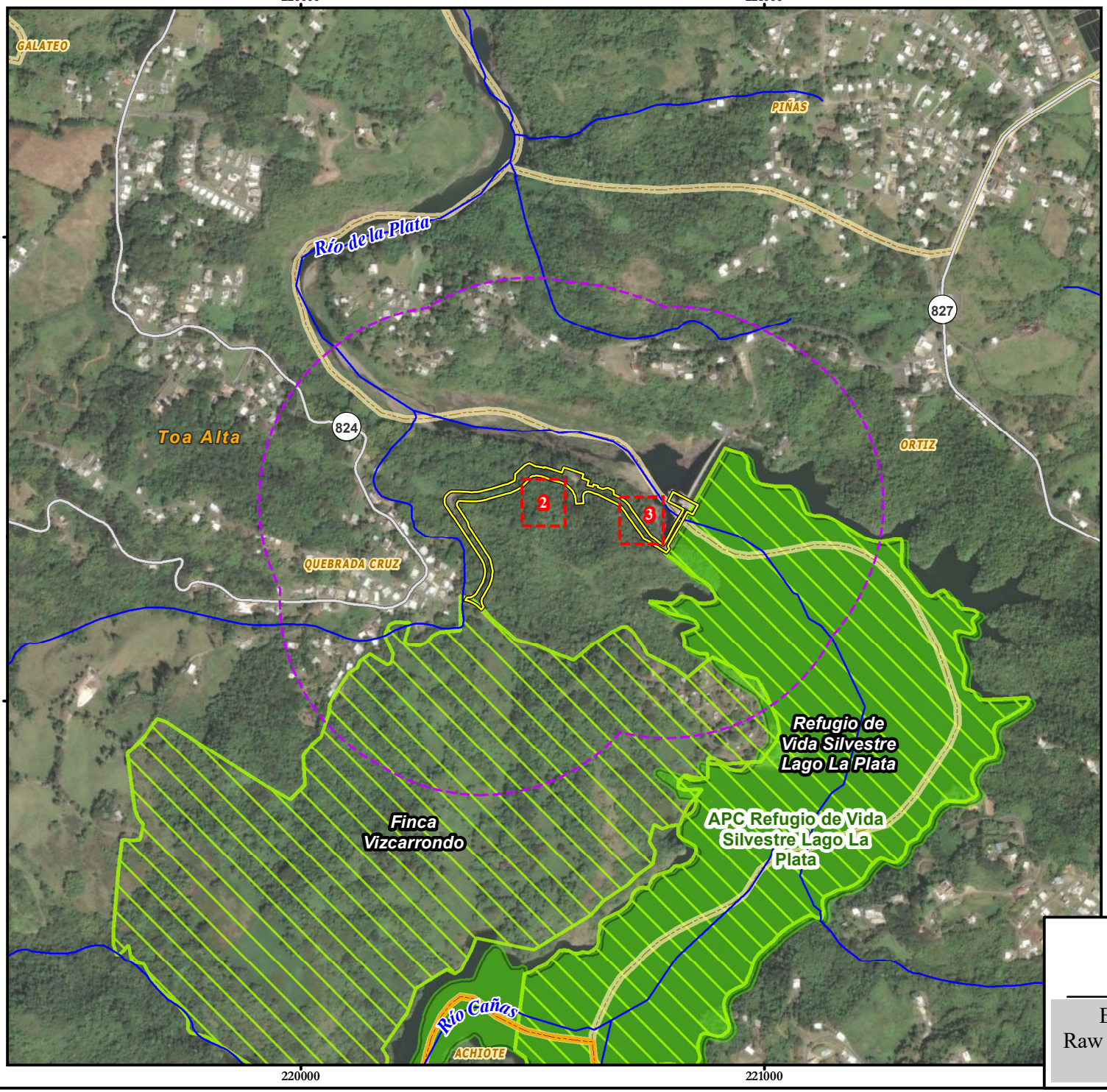


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Scale: 1:12,000

0 75 150 300 450

Meters

## Legend

- Hydrography[1]
- State Road[2]
- Project Boundary[3]
- Evaluated Alternatives
- Ward Limit[4]
- Municipal Limit[4]
- Natural Protected Area[5]
- Priority Conservation Area[6]
- 400-Meter Radius

Note: Project boundary is approximate.

Sources:
1. USGS National Hydrography Dataset, 2022.
2. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
3. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
4. Puerto Rico Planning Board, 2015.
5. Protected Areas Conservation Action Team (PA-CAT), Puerto Rico Protected Areas Database, GIS data, version of December 2018.
6. Department of Natural and Environmental Resources (DNER), Natural Heritage Program, 2009
7. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Proposed Project Surroundings

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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csagis evazquez 1/30/2025 8.5x11

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csagis evazquez 5/21/2024 8.5x11

**August 25, 2021**

**January 23, 2022**

**Proposed Site**
**Historical Aerial Views**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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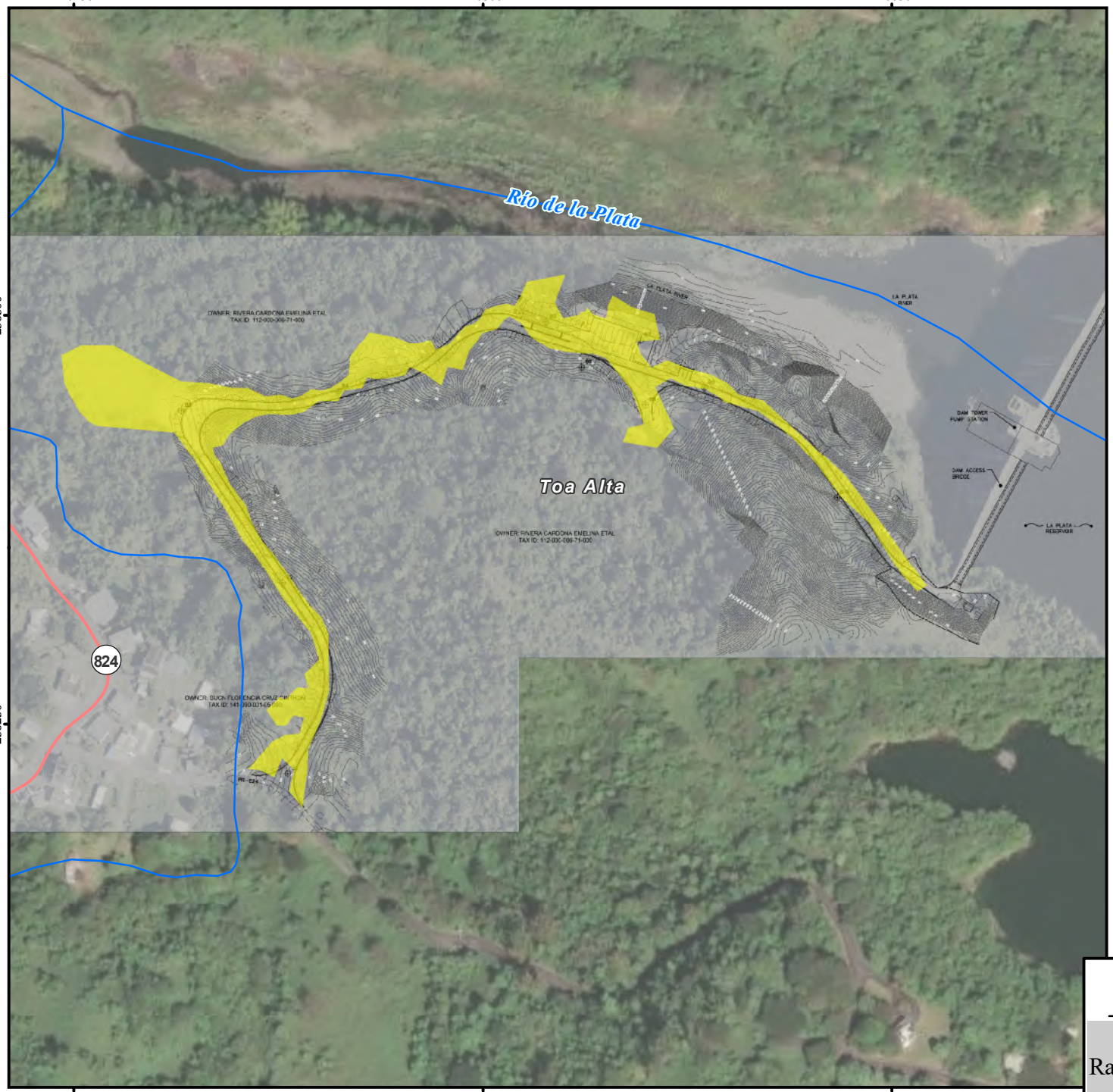


Scale 1:3,500

0 25 50 100 metros

## Legend

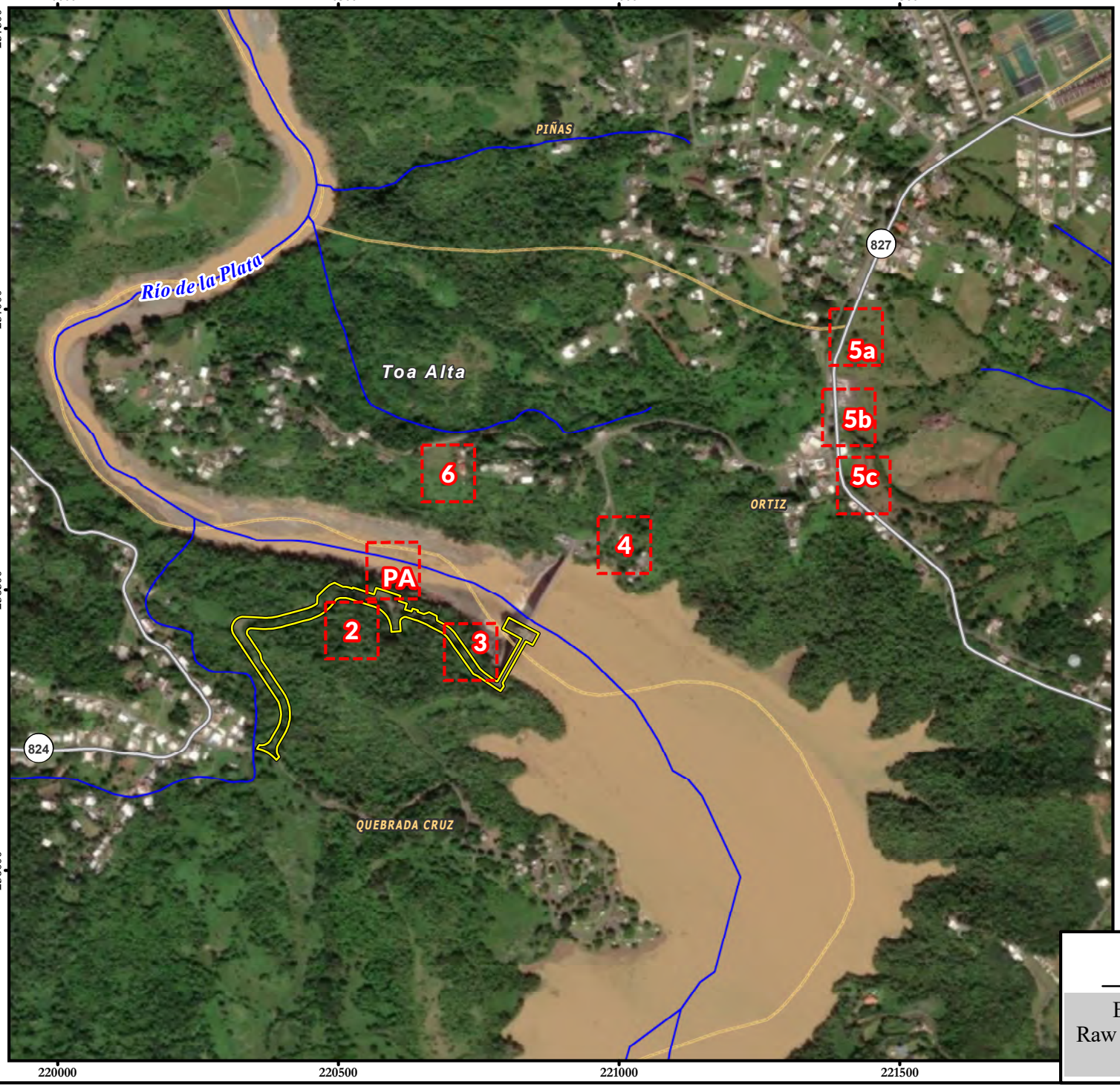
- State Road[1]
- Hydrography[2]
- Previously impacted land (15,453m² approximately)

Sources:
1. Puerto Rico Highways and Transportation Authority (ACT in Spanish), 2020.
2. USGS National Hydrography Dataset, 2022.
3. Stantec, Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators Phase I Project Toa Alta Puerto Rico CIP 1-70-9000, Issued for 30% Design, July 2023.
4. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011)
Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Previous Impacted Areas

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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Scale: 1:10,000

0 50 100 200 300 Meters

**Legend**

- Hydrography[1]
- State Road[2]
- Project Boundary[3]
- Ward Limit[4]
- Site

Note: Project boundary is approximate.

Sources:
1. USGS National Hydrography Dataset, 2022.
2. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
3. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
4. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011)
Puerto Rico and Virgin Islands FIPS 5200 (Meters)

## Site Alternatives

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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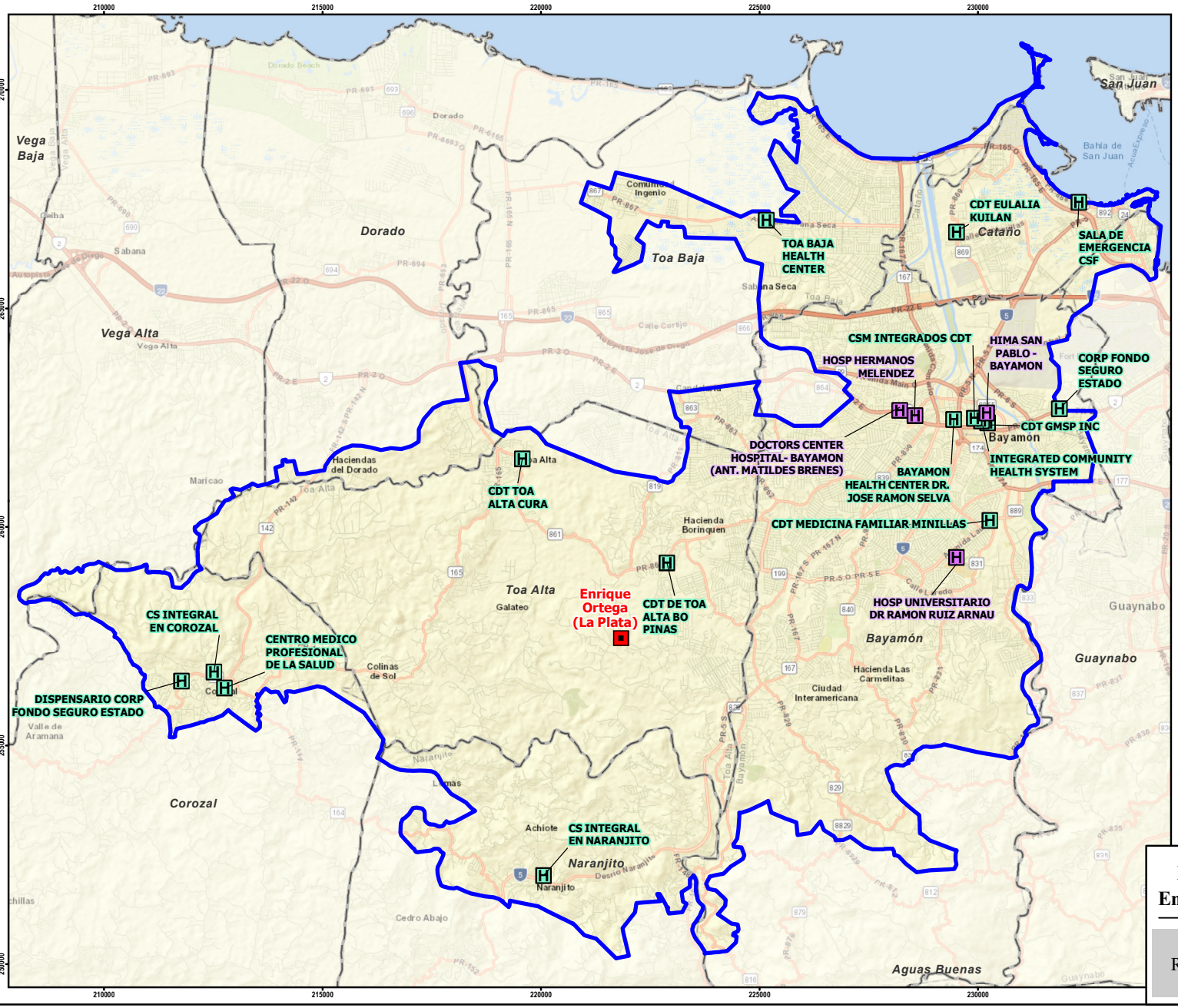
csagis evazquez 7/10/2024 8.5x11

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Scale: 1:86,000

0 0.5 1 1.5 2 2.5 3 Kilometers

## Legend

- Enrique Ortega Water Treatment Plant (WTP)[1]
- Hospital[2]
- Diagnosis and Treatment Center (CDT, in Spanish)[2]
- Enrique Ortega WTP Service Area[3]
- Municipal Boundary[4]

Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. Puerto Rico Department of Health, Office of Public Health Preparedness and Response Coordination, 2009.
3. Puerto Rico Aqueduct and Sewer Authority, 2020.
4. Puerto Rico Planning Board, 2015.
5. Service layer credits (Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community)

State Plane NAD83 Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Hospitals in the Service Area of the Enrique Ortega Water Treatment Plant

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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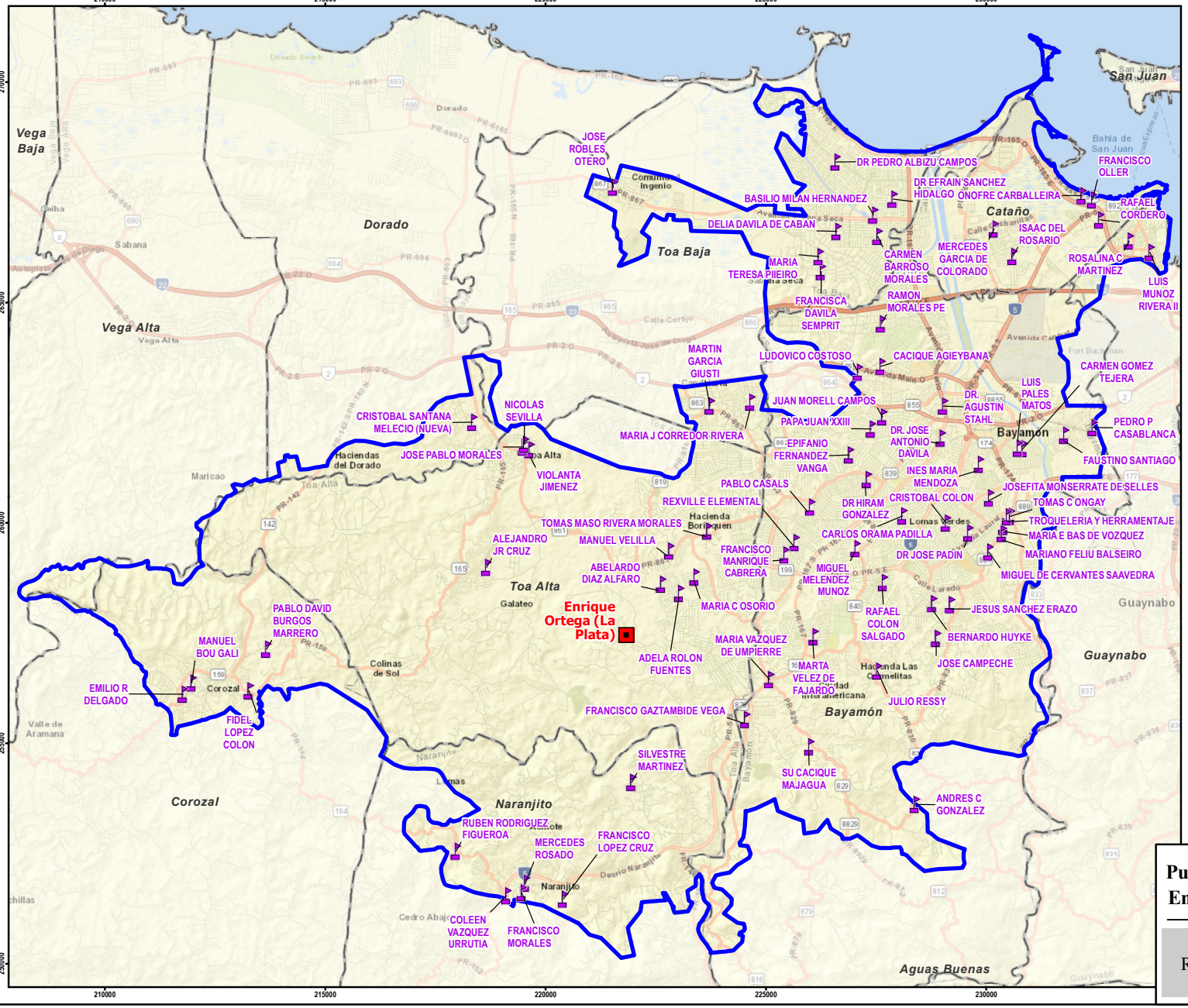


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Scale: 1:86,000

0 0.5 1 1.5 2 2.5 3 Kilometers

## Legend

- Enrique Ortega Water Treatment Plant (WTP)[1]
- Public School[2]
- Enrique Ortega WTP Service Area[3]
- Municipal Boundary[4]

Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. Puerto Rico Department of Education, 2021.
3. Puerto Rico Aqueduct and Sewer Authority, 2020.
4. Puerto Rico Planning Board, 2015.
5. Service layer credits (Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community)

State Plane NAD83 Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Public Schools in the Service Area of the Enrique Ortega Water Treatment Plant

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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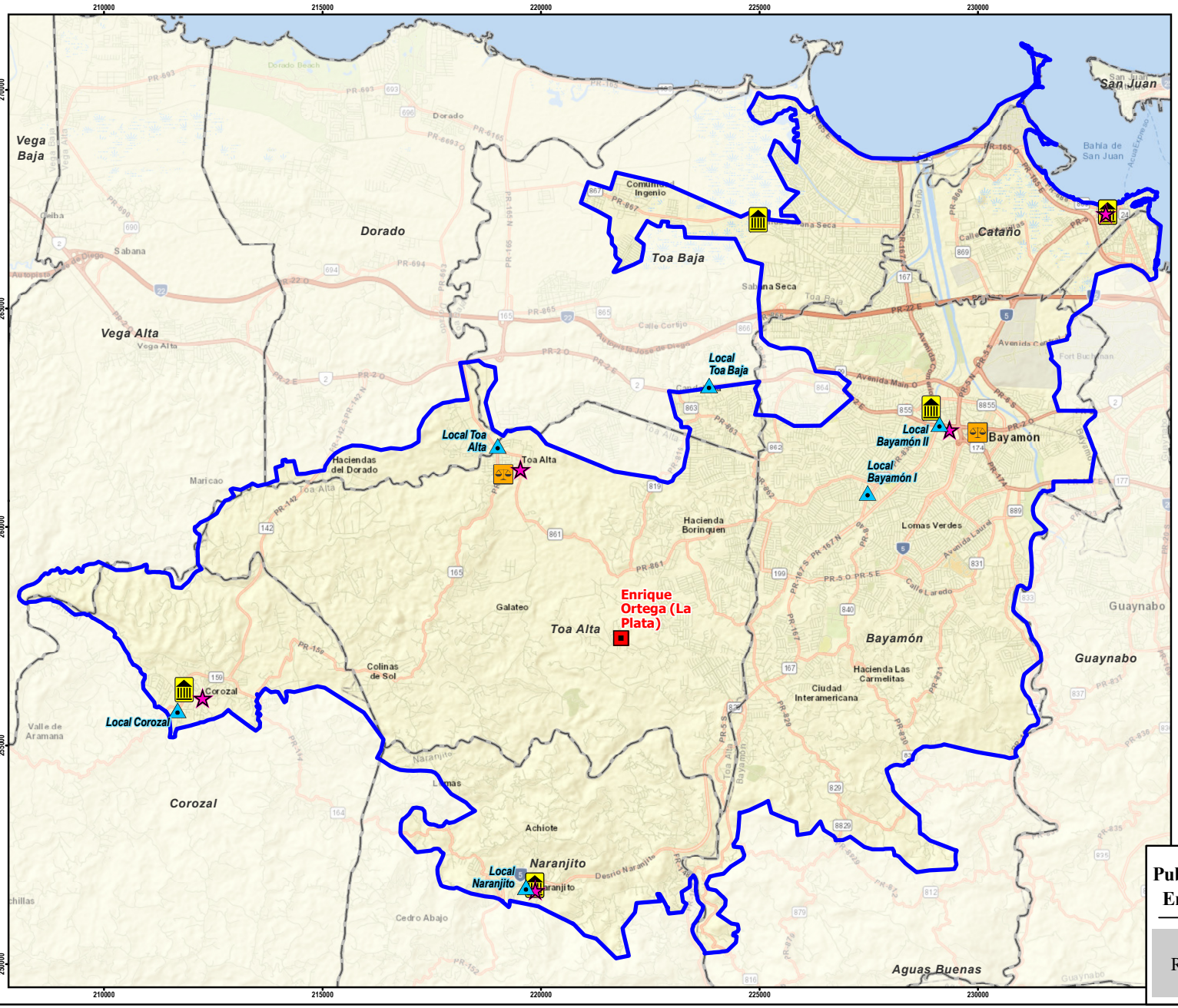


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Scale: 1:86,000

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## Legend

- Enrique Ortega Water Treatment Plant (WTP)[1]
- Enrique Ortega WTP Service Area[2]
- Municipal Boundary[3]

**Public Building**

- City Hall[4]
- Government Center[5, 6]
- Judicial Center/Court[5]
- Department of Family Affairs Office[6,7]

Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. Puerto Rico Aqueduct and Sewer Authority, 2020.
3. Puerto Rico Planning Board, 2015.
4. U.S. Geological Survey (USGS), Geographic Names Information System, GNIS Non-populated places, 2012.
5. Puerto Rico Public Buildings Authority, downloaded from gis.pr.gov on 1/22/2020.
6. Google Earth, 2024.
7. Puerto Rico Department of Family Affairs Web Page (familia.pr.gov), Local and Regional Offices, accessed on April 22, 2024.
8. Service layer credits (Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community)

State Plane NAD83 Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Public Buildings in the Service Area of the Enrique Ortega Water Treatment Plant

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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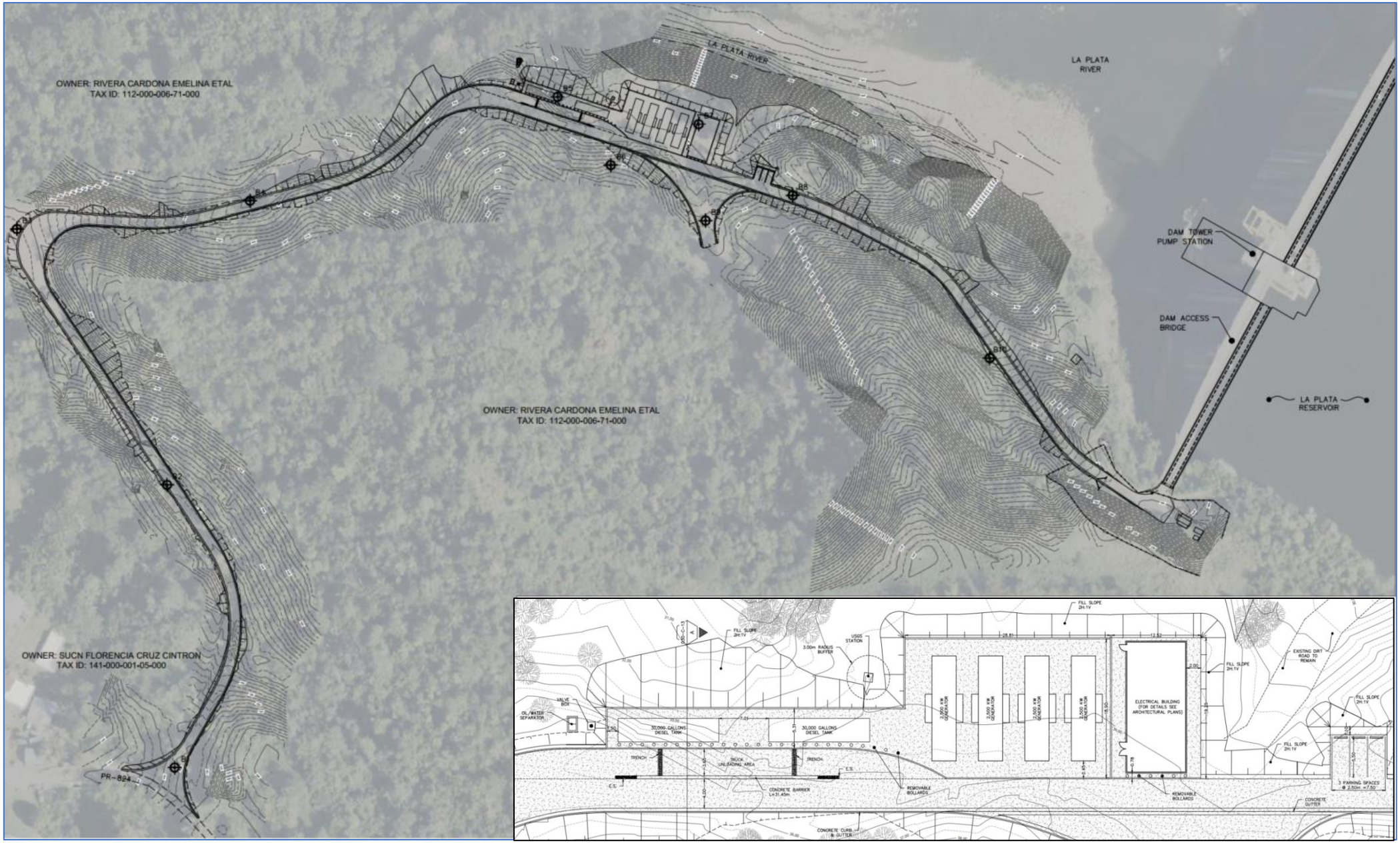
csagis csa evazquez 4/23/2024 8:5x11L

## Site Plan of the Project



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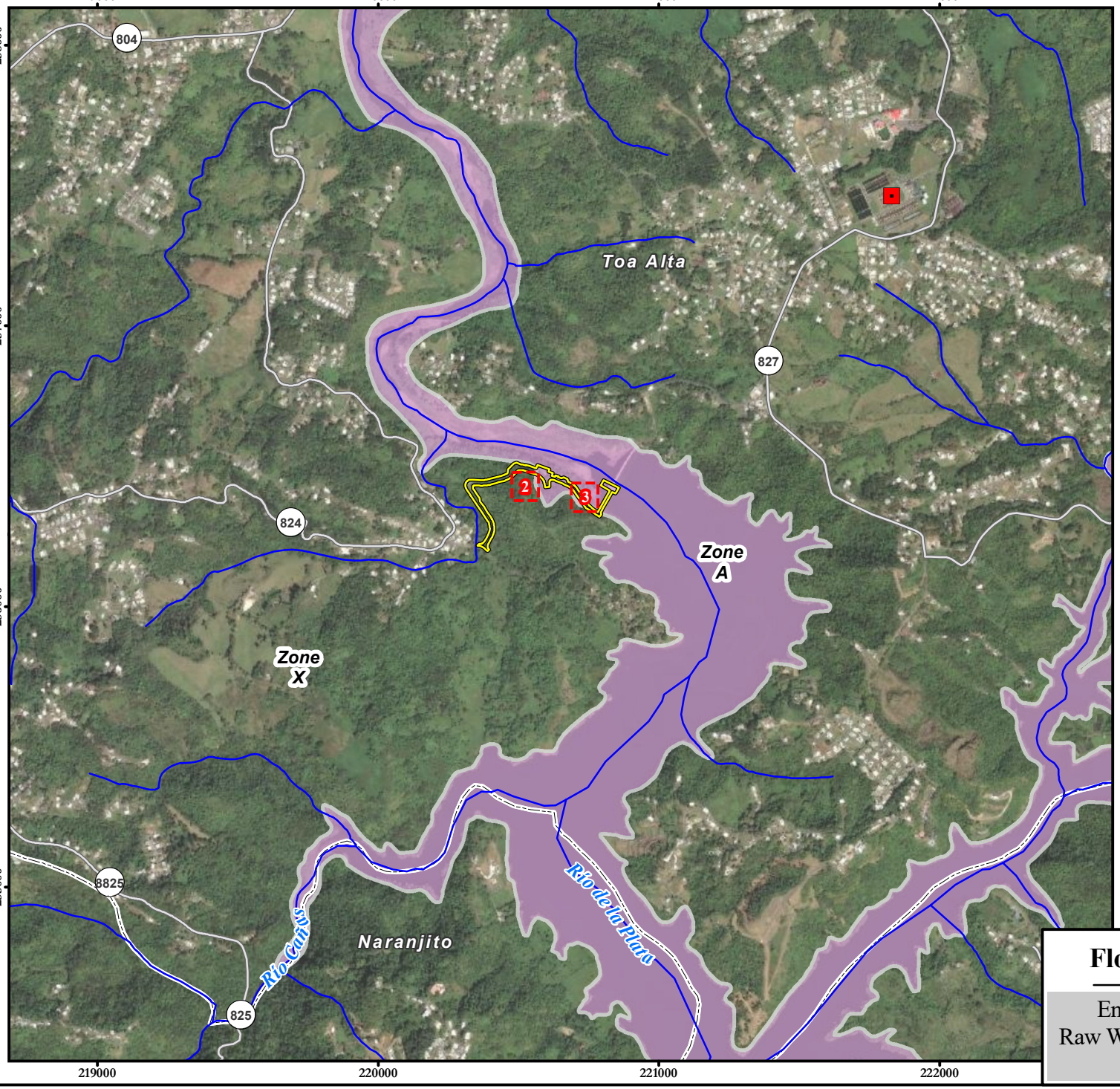
**Proposed Action**
**Construction Backup Power Facility**
**west to existing La Plata Dam facilities**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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Scale: 1:20,000

0 100 200 400 600 Meters

## Legend

- Enrique Ortega WTP[1]
- Hydrography[2]
- State Road[3]
- Project Boundary[4]
- Evaluated Alternatives
- Municipal Limit[5]

**Flood Hazard Zones[6]**

- Zone A: Areas with a 1% annual chance of flooding, detailed analyses have not been performed
- Zone X: Area of Minimal Flood Hazard

Note: Project boundary is approximate.

Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. USGS National Hydrography Dataset, 2020.
3. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
4. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
5. Puerto Rico Planning Board, 2015.
6. Federal Emergency Management Agency, Digital Flood Insurance Rate Map (DFIRM) database, Commonwealth of Puerto Rico and Municipalities, FIRMette/NFHLREST_FIRMette (MapServer). Panel: 72000C0705J (eff. 11/18/2009).
7. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Flood Insurance Rate Map

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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csagis nmedina rev evazquez 1/30/2025 8.5x11

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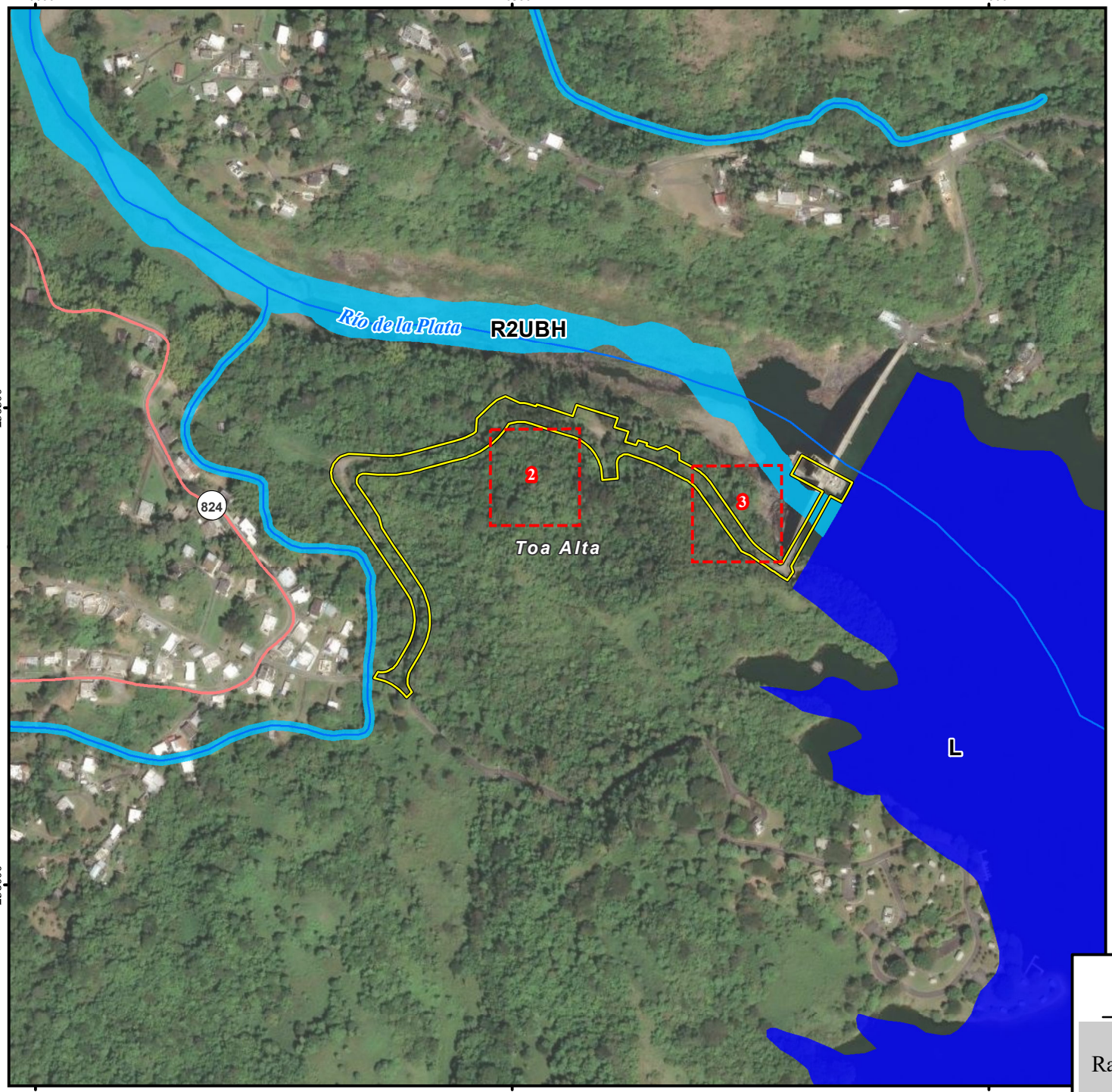
csagis evazquez 1/30/2025 8.5x11




N
W E
S

Scale: 1:6,000

0 25 50 100 150 200
Meters

## Legend

- State Road[1]
- Hydrography[2]
- Project Boundary[3]
- Evaluated Alternatives

**NWI Wetlands[4]**

- Lake
- Riverine

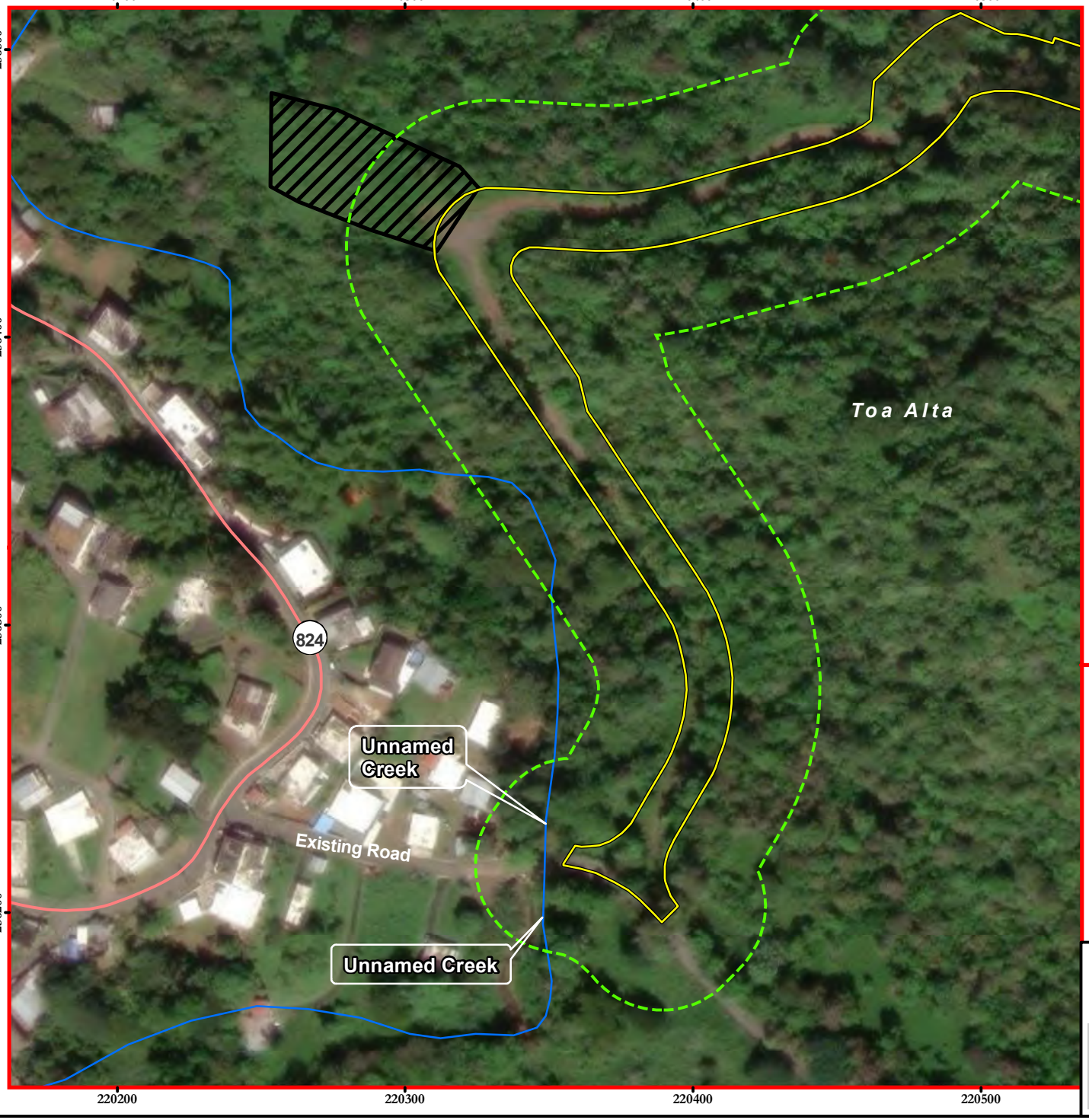
Note: Project boundary is approximate.

Sources:
1. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
2. USGS National Hydrography Dataset, 2022.
3. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
4. U. S. Fish and Wildlife Service, National Wetlands Inventory, October 2020.
5. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011)
Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Wetland Protection

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000




N
W E
S

Scale: 1:2,000

0 25 50 100 150 200
Feet

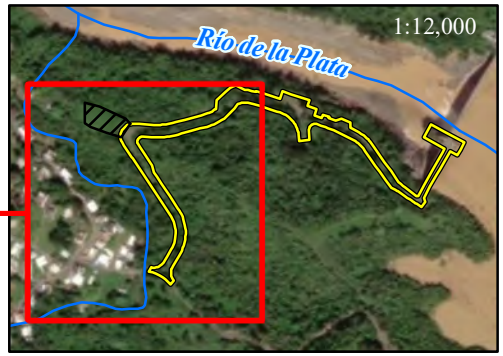
## Legend

- State Road[1]
- Hydrography[2]
- Project Boundary[3]
- Staging Area
- 100-ft radius from the Project boundary

Note: Project boundary is approximate.

Sources:
1. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
2. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
3. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)



# Unnamed Creek Near the Project Boundary

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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csagis evazquez 6/7/2024 8.5x11

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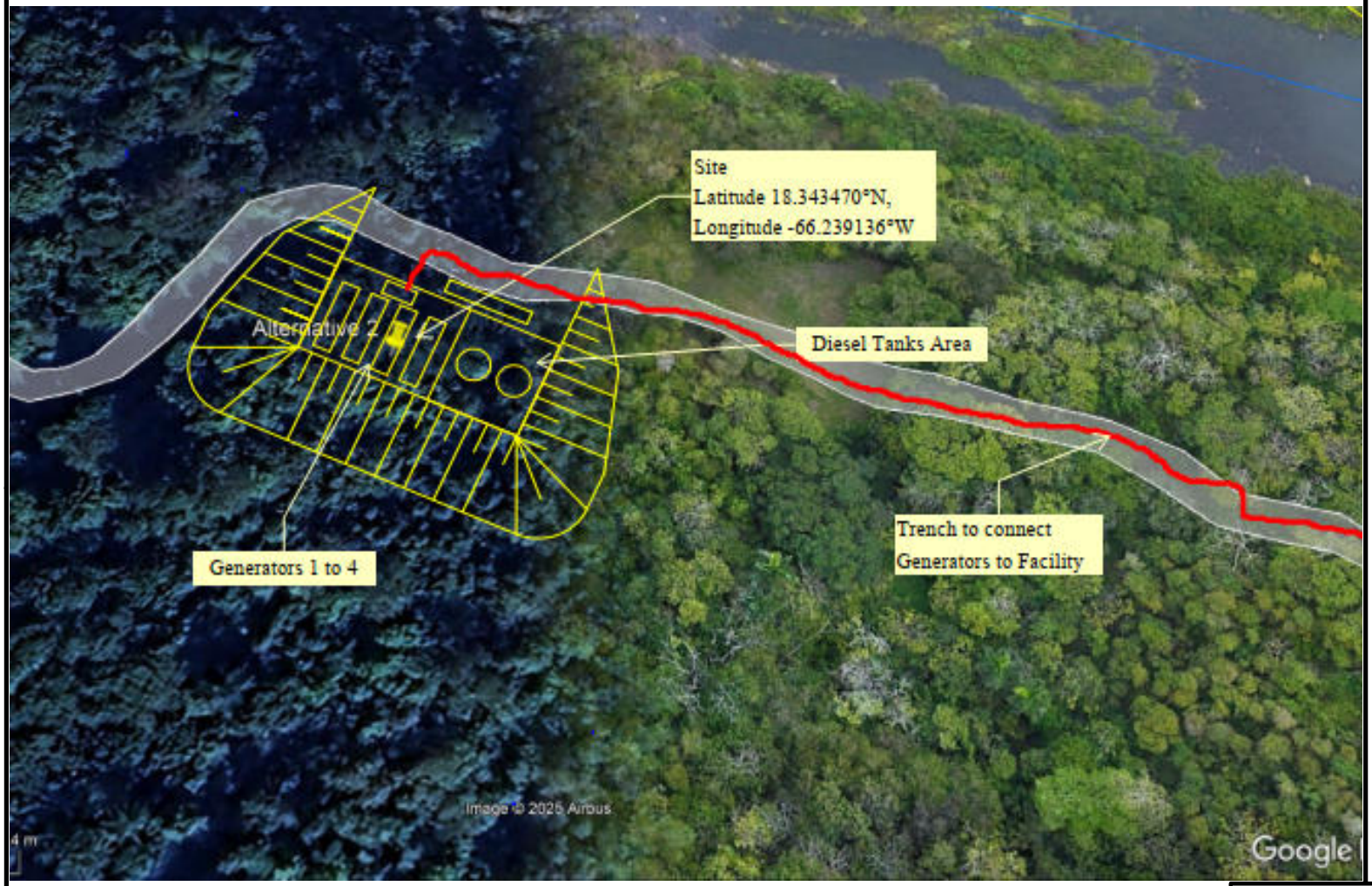

**Alternative 2**
**Construction Backup Power Facility southwest to existing La Plata Dam facilities**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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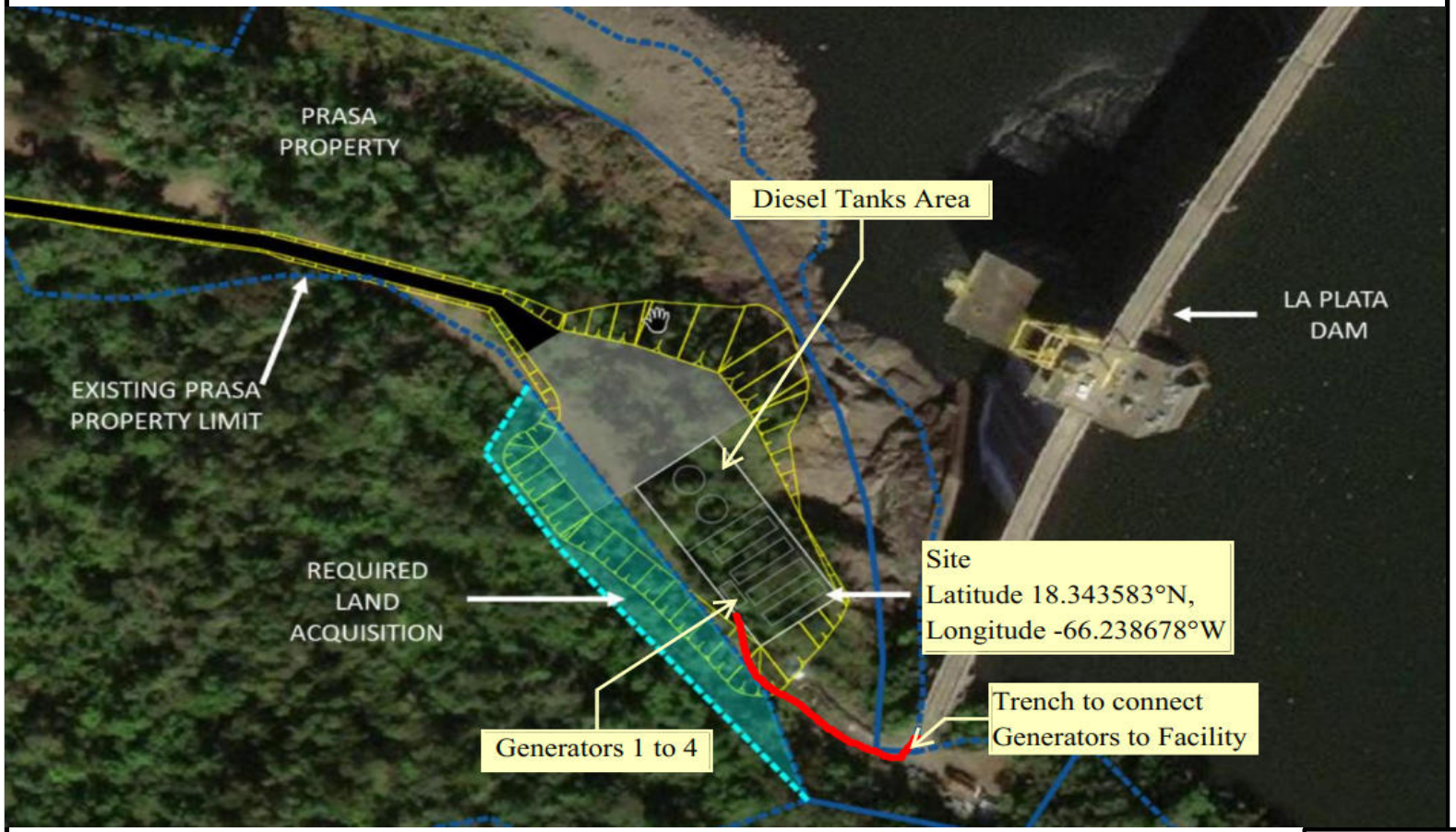

**Alternative 3**
**Construction Backup Power Facility**
**next to existing La Plata Dam facilities**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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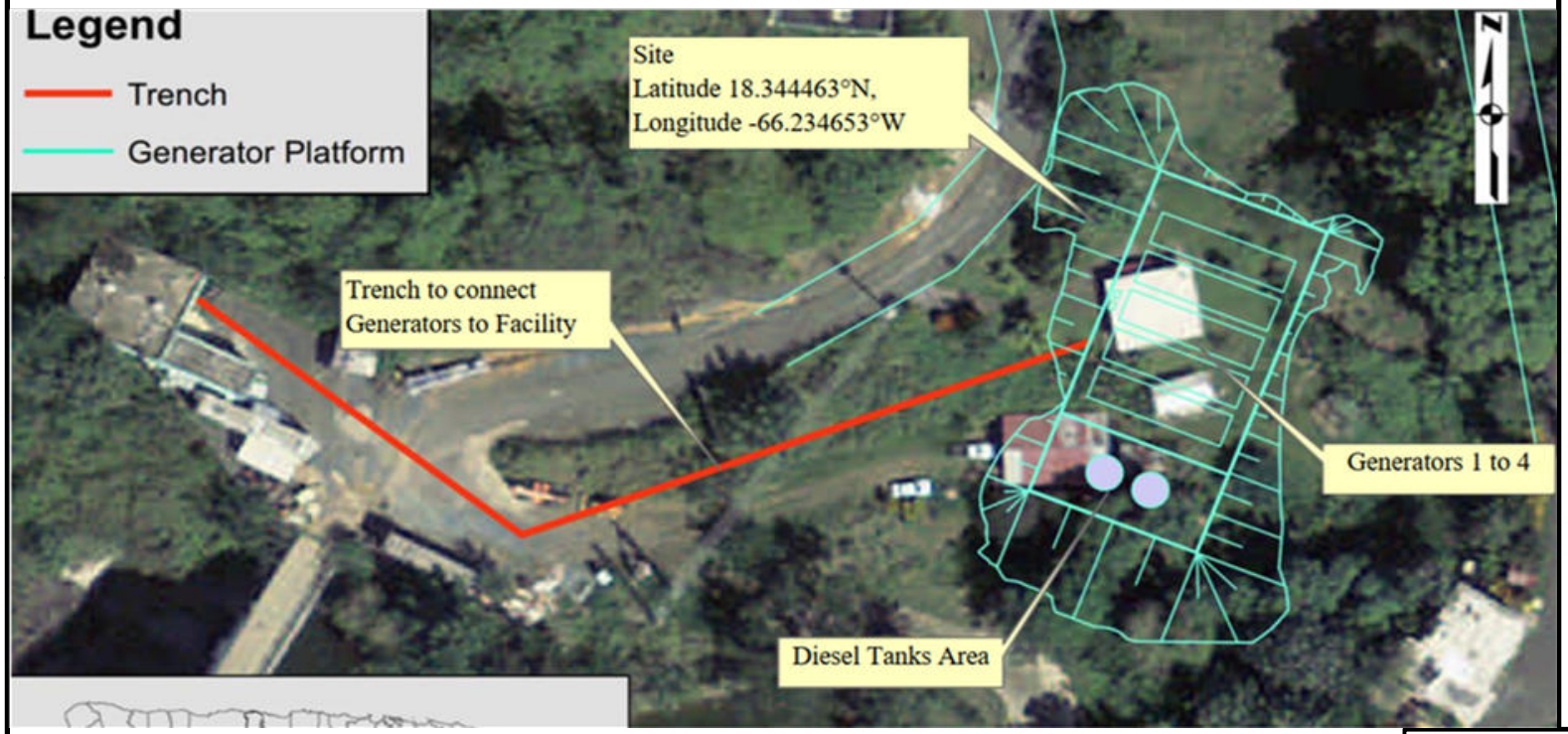

**Alternative 4**
**Construction Backup Power Facility next to La Plata Dam Existing Electrical Facilities**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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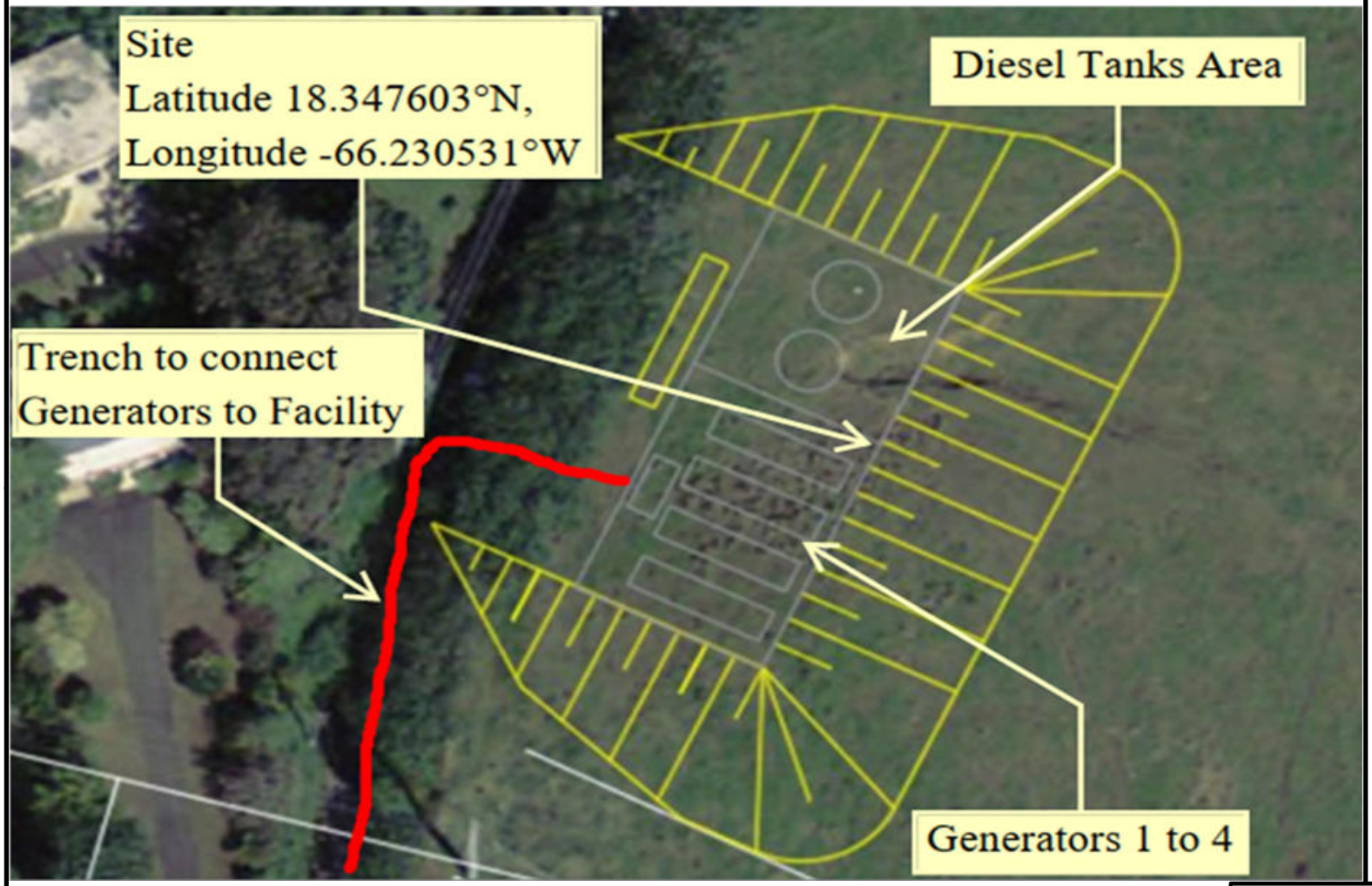

**Alternative 5a**
**Construction Backup Power Facility adjacent north of PREPA's Piñas Electrical Substation**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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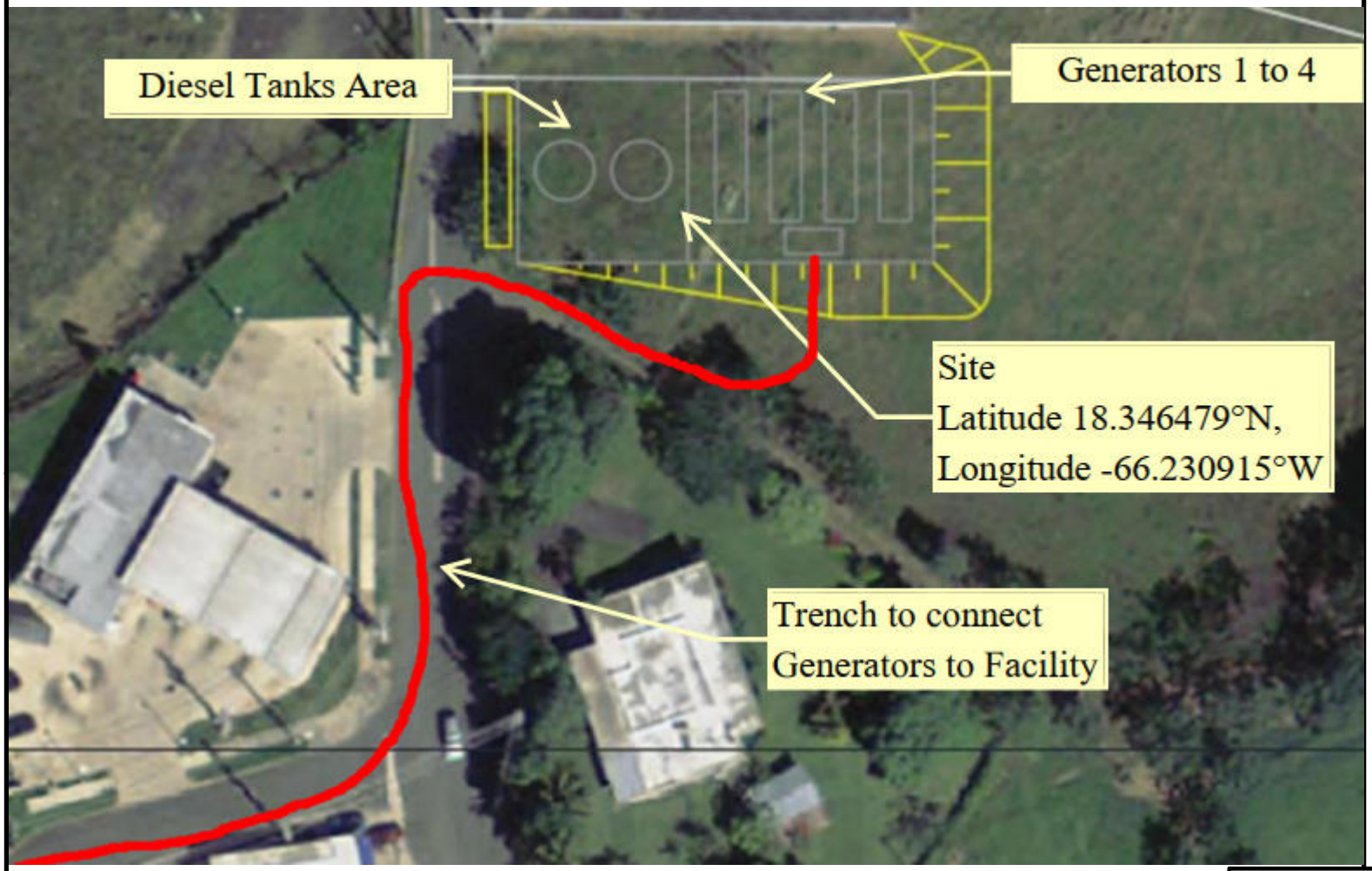

**Alternative 5b**
**Construction Backup Power Facility adjacent south of PREPA's Piñas Electrical Substation**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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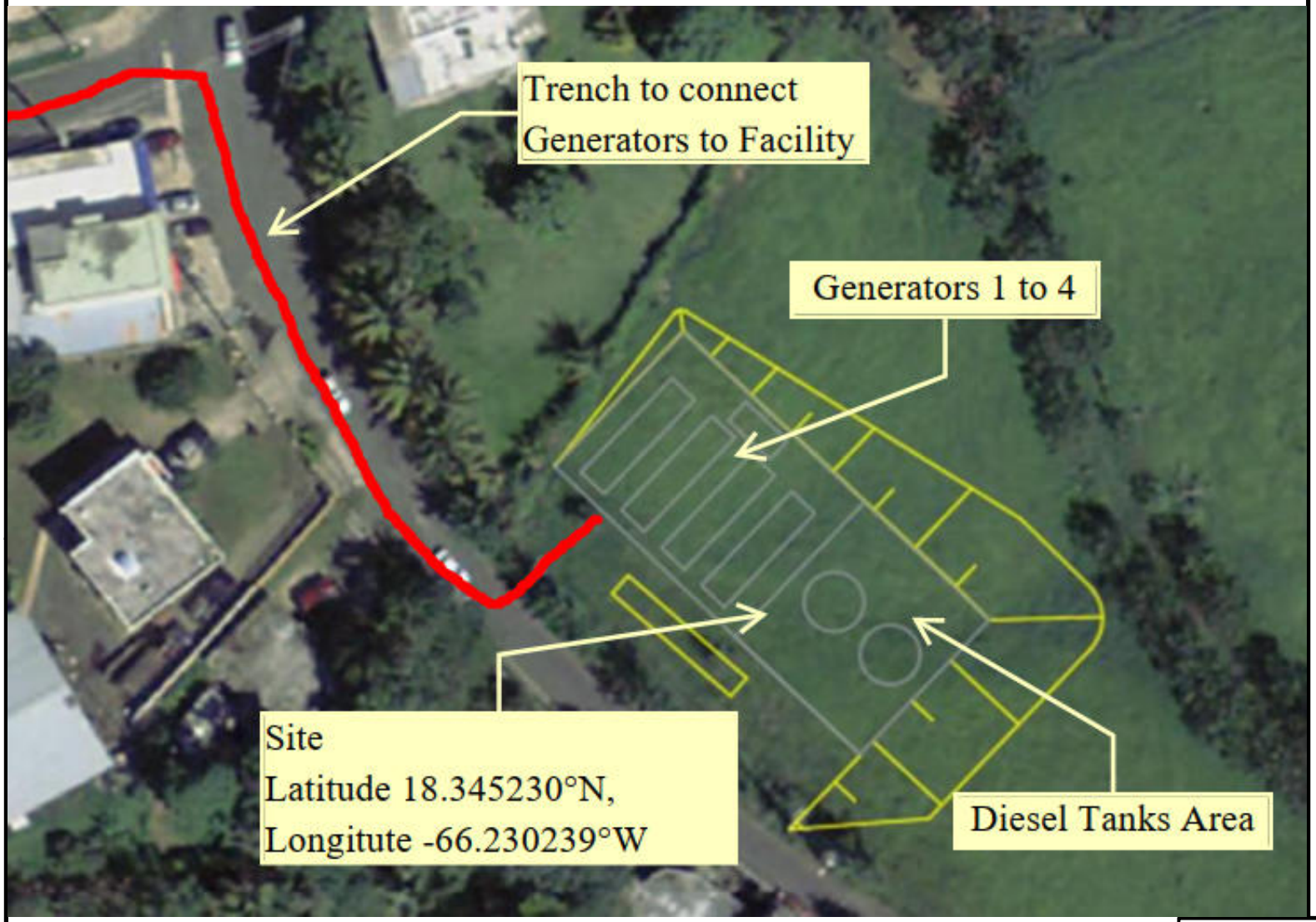

**Alternative 5c**
**Construction Backup Power Facility south of PREPA's Piñas Electrical Substation**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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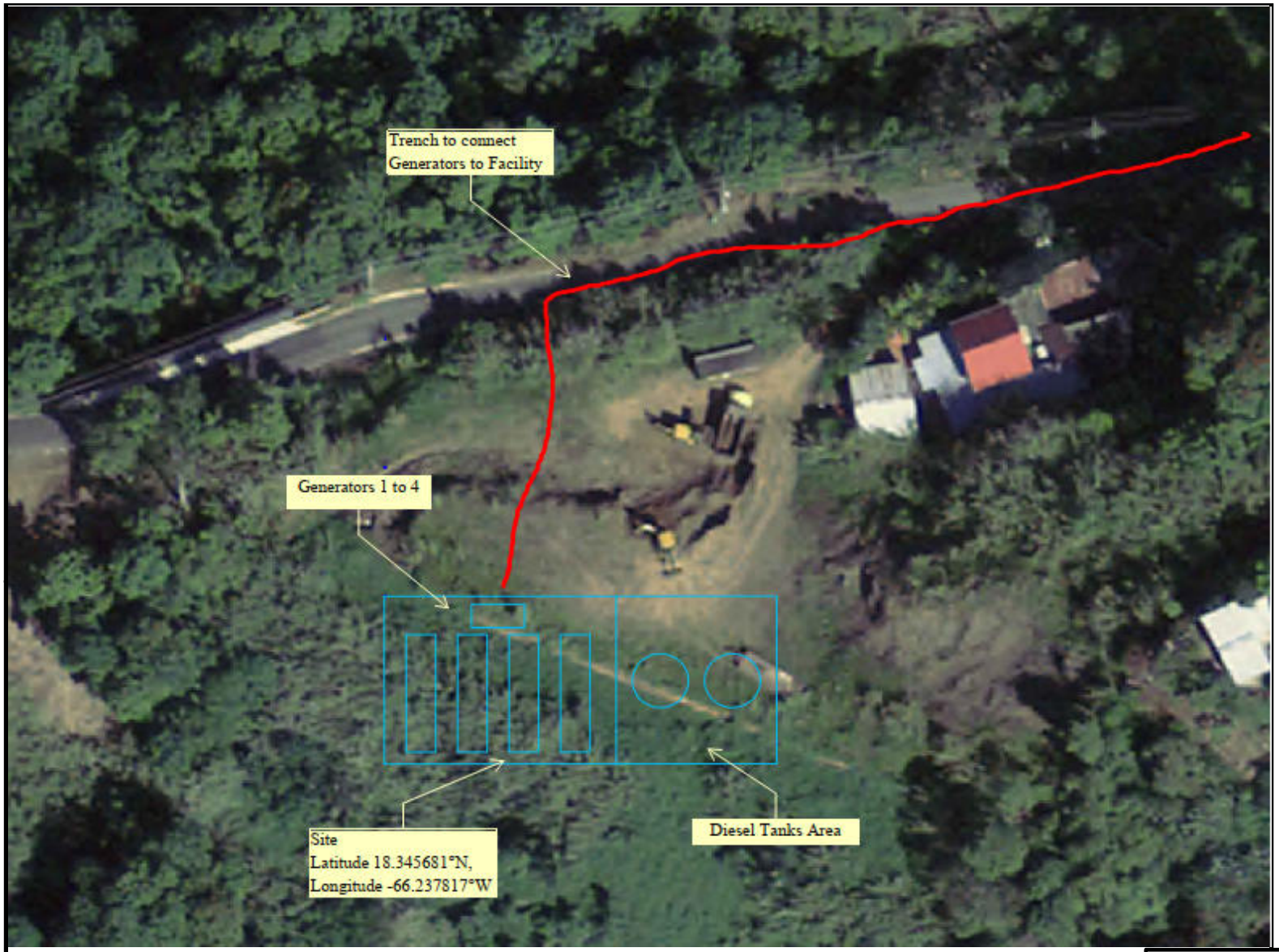

**Alternative 6**
**Construction Backup Power Facility northwest to La Plata Dam**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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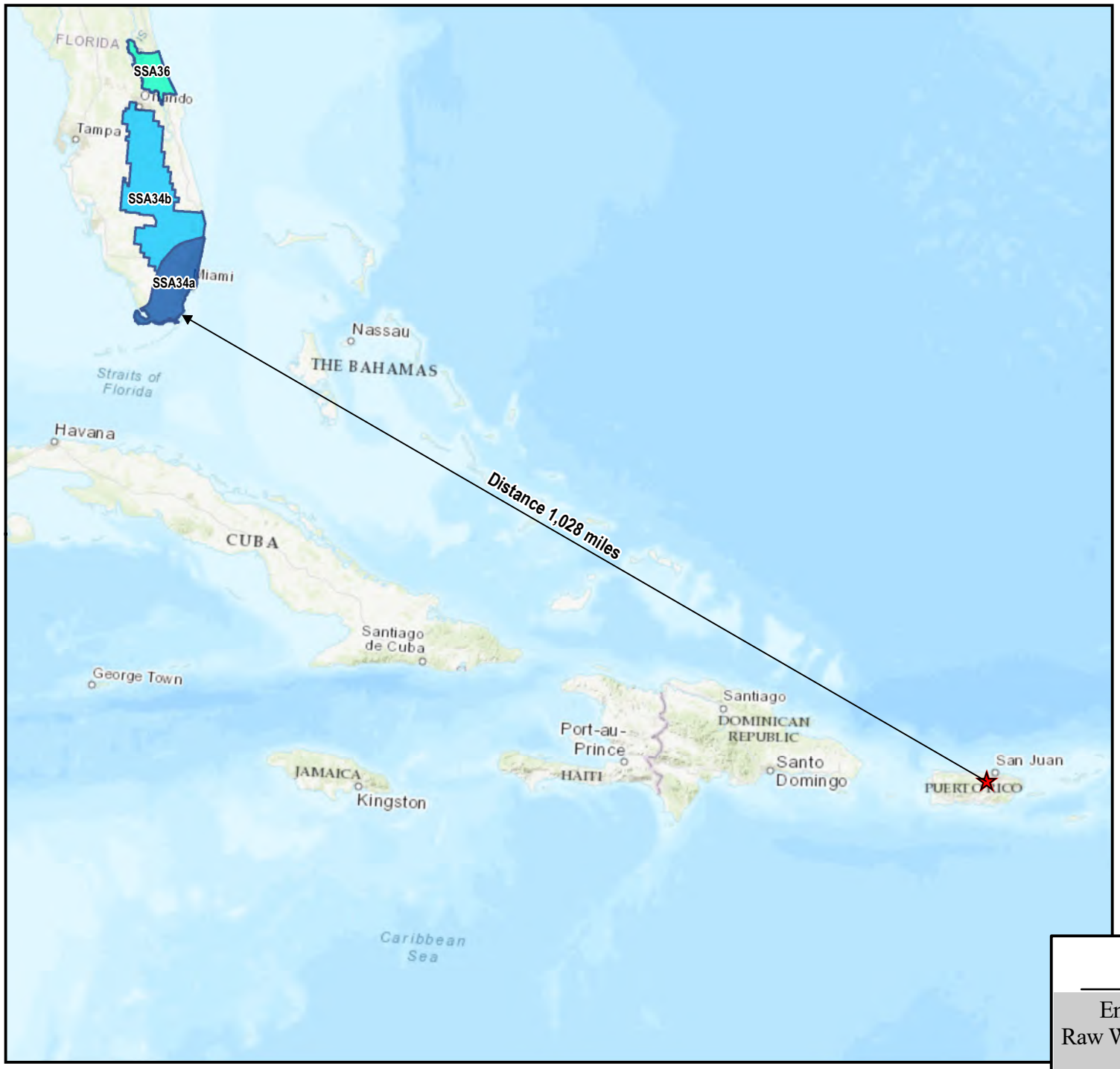


N
W E
S

Scale 1:10,000,000

0 100 200
Miles

## Legend

Project Location

**Sole Source Aquifer**

- Biscayne Aquifer SSA (SSA34a)
- Biscayne Aquifer SSA Streamflow and Recharge Source Zones (SSA34b)
- Volusia-Floridan Aquifer SSA (SSA36)

Sources:
1. U.S. EPA Office of Water, EPA National Sole Source Aquifers GIS Layer, 2020.
2. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Sole Source Aquifers

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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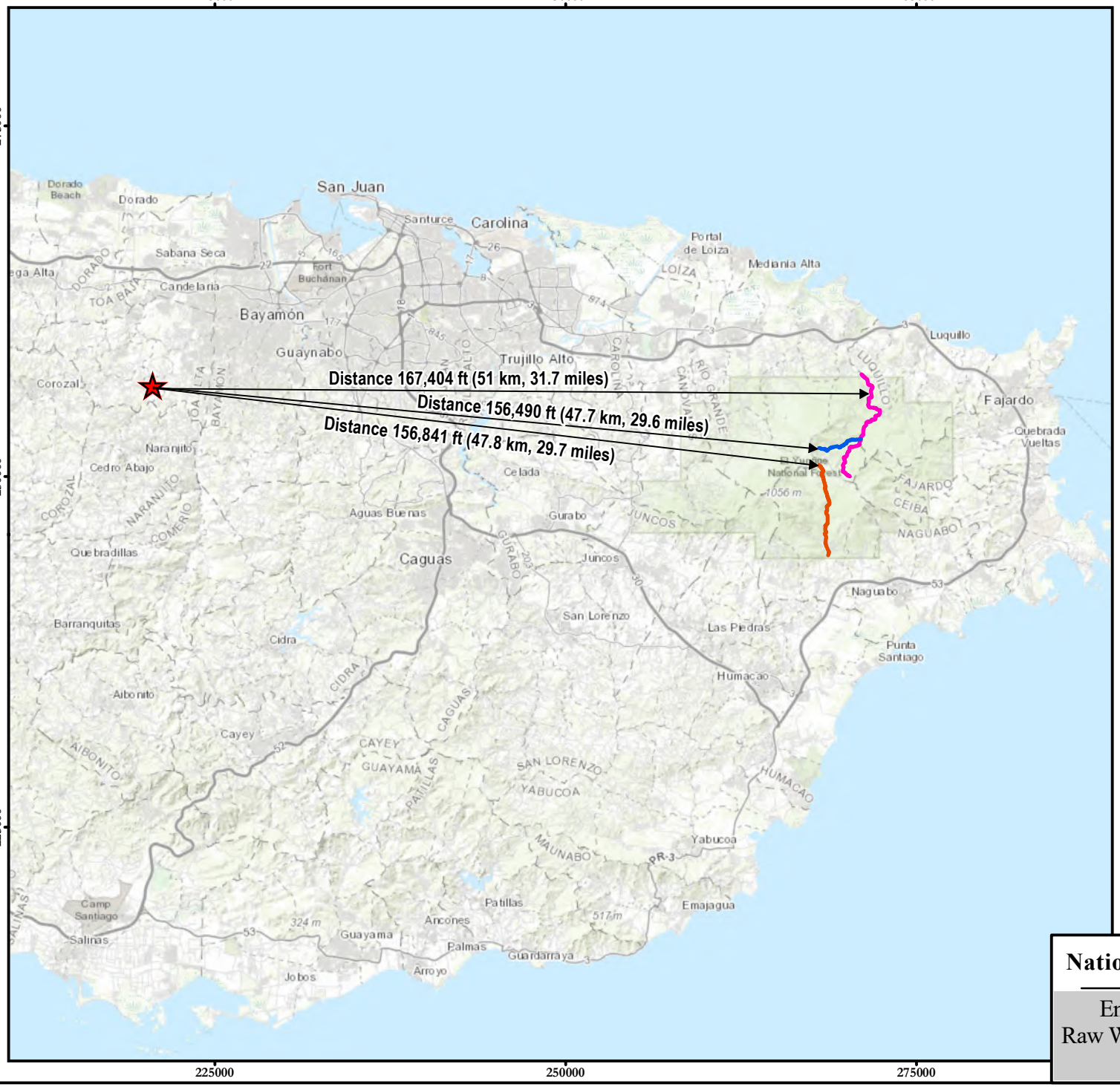


Scale 1:400,000

0 2.5 5 7.5 10

Kilometers

## Legend

Project Location

**National Wild and Scenic Rivers[1]**

- Rio De La Mina
- Rio Icacos
- Rio Mameyes

Sources:
1. US Forest Service, National Park Service, Bureau of Land Management, and US Fish and Wildlife Service, 2019.
2. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# National Wild Scenic River System

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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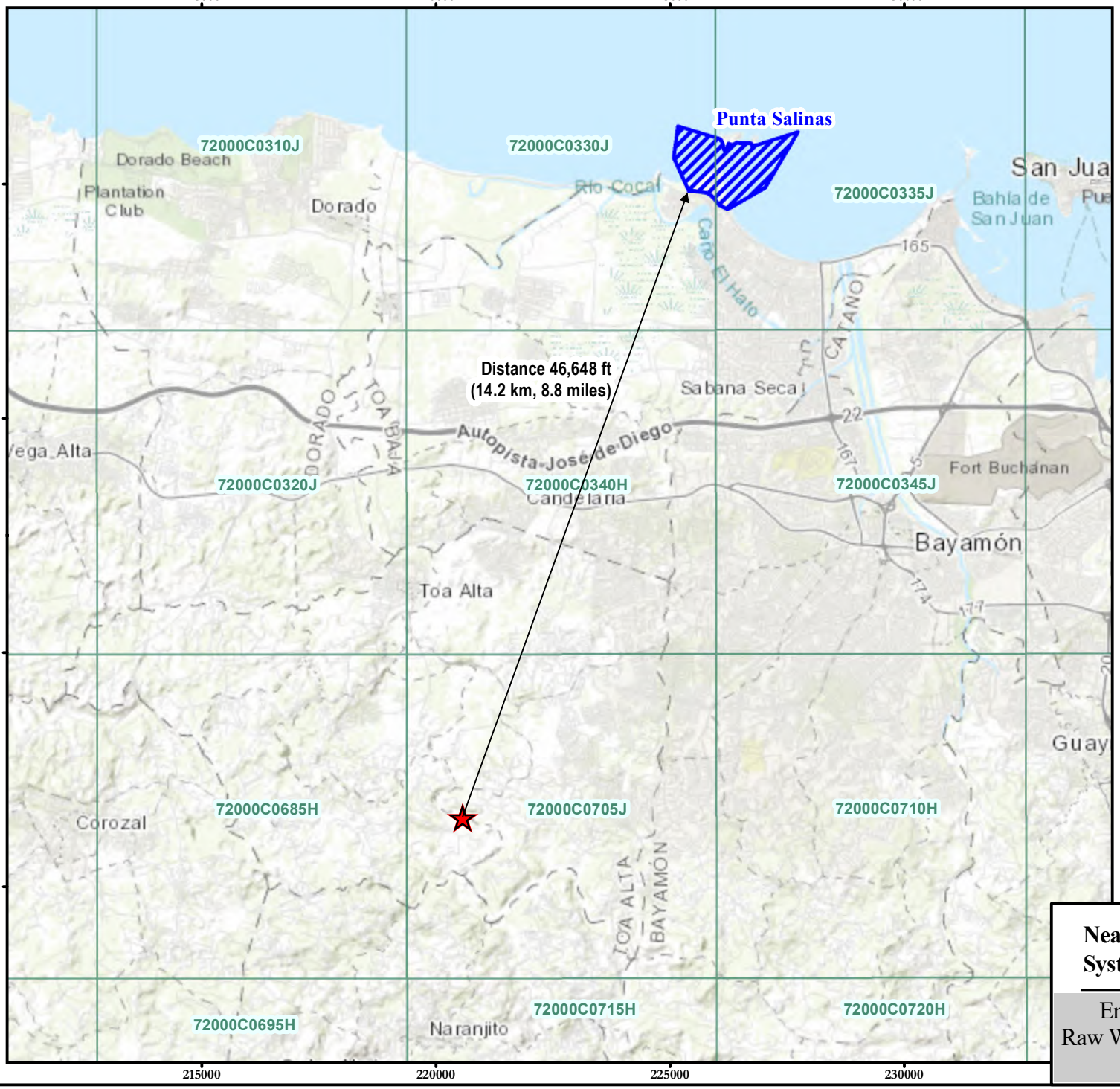
csagis evazquez 11/7/2024 8.5x11

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csagis evazquez 12/2/2024 8.5x11

N
W E
S

Scale 1:120,000

0 0.5 1 1.5 2 2.5 3
Kilometers

## Legend

- Project Location
- FEMA Flood Insurance Rate Map Panel Index[1]

**Existing Coastal Barrier Resources System (CBRS) Unit[2]**

- Otherwise Protected Area

Sources:
1. Federal Emergency Management Agency (FEMA), Digital Flood Insurance Rate Map (DFIRM) database, Commonwealth of Puerto Rico and Municipalities, November 18, 2009.
2. US Fish and Wildlife Service, CBRS_Polygons vector digital data, November 25, 2024.
3. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Coordinate System: State Plane NAD83 (2011)
Puerto Rico and Virgin Islands FIPS 5200 (Meters)

**Nearest Coastal Barrier Resources System (CBRS) Unit to the Project**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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csagis evazquez 1/30/2025 8.5x11

N
W E
S

Scale 1:150,000

0 1 2 3 4 5
Kilometers

## Legend

- Project Location
- Coastal Zone Management Act Boundary[1]

Sources:
1. Office for Coastal Management, 2025: Coastal Zone Management Act Boundary from 2010-06-15 to 2010-08-15. NOAA National Centers for Environmental Information, https://www.fisheries.noaa.gov/inport/item/53132.
4. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Coastal Zone Management Act Boundary Nearest to the Project

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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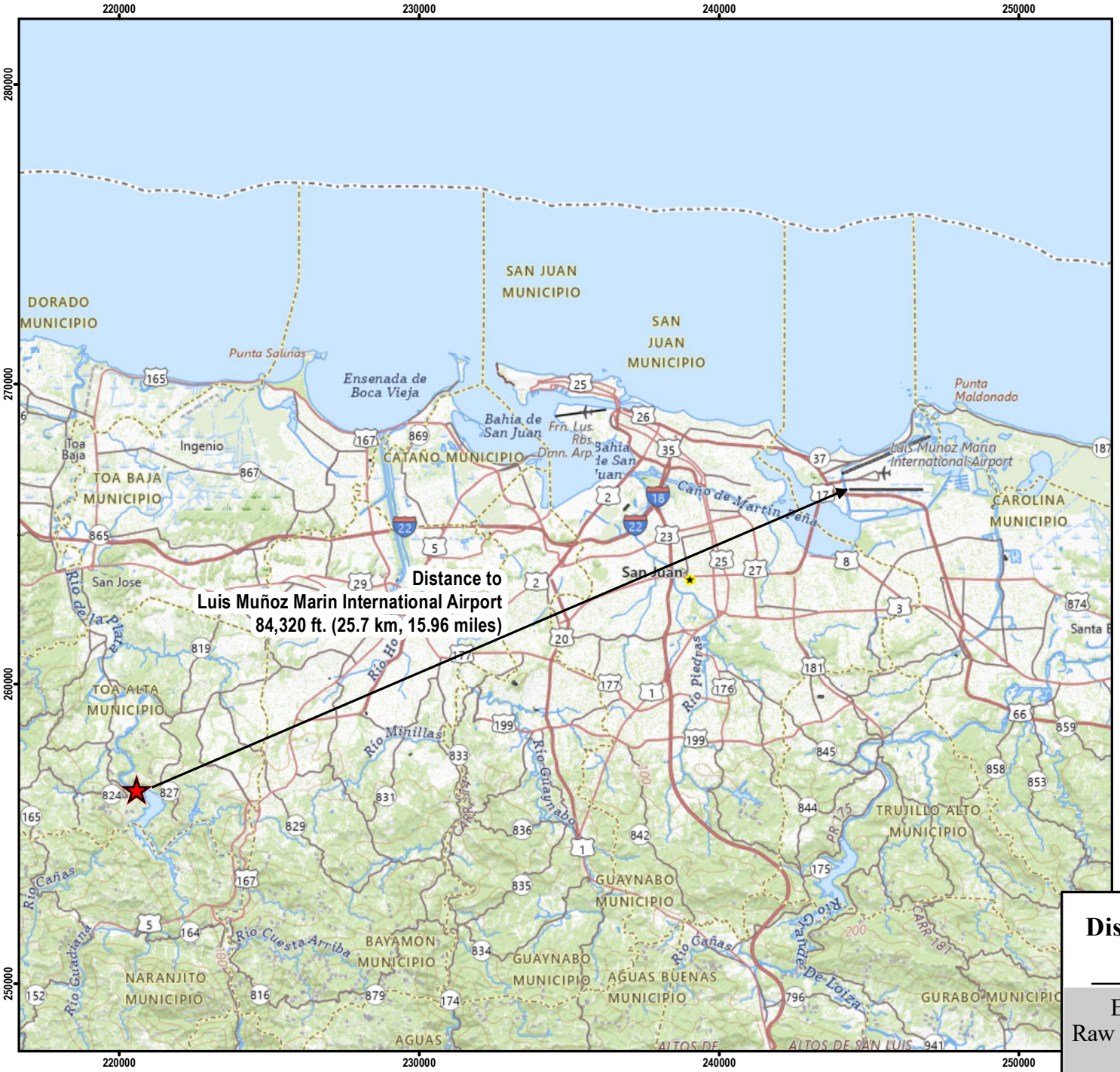


N
W E
S

Scale 1:190,000

0 1.25 2.5 3.75 5 Kilometers

## Legend

★ Project Location

Source:
1. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road data; Natural Earth Data; U.S. Department of State HIU; NOAA National Centers for Environmental Information

# Distance to Luis Muñoz Marín International Airport

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

N
W E
S

Scale 1:190,000

0 1.25 2.5 3.75 5 Kilometers

## Legend

★ Project Location

Source:
1. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road data; Natural Earth Data; U.S. Department of State HIU; NOAA National Centers for Environmental Information

# Distance to Fernando Luis Ribas Dominicci Regional Airport

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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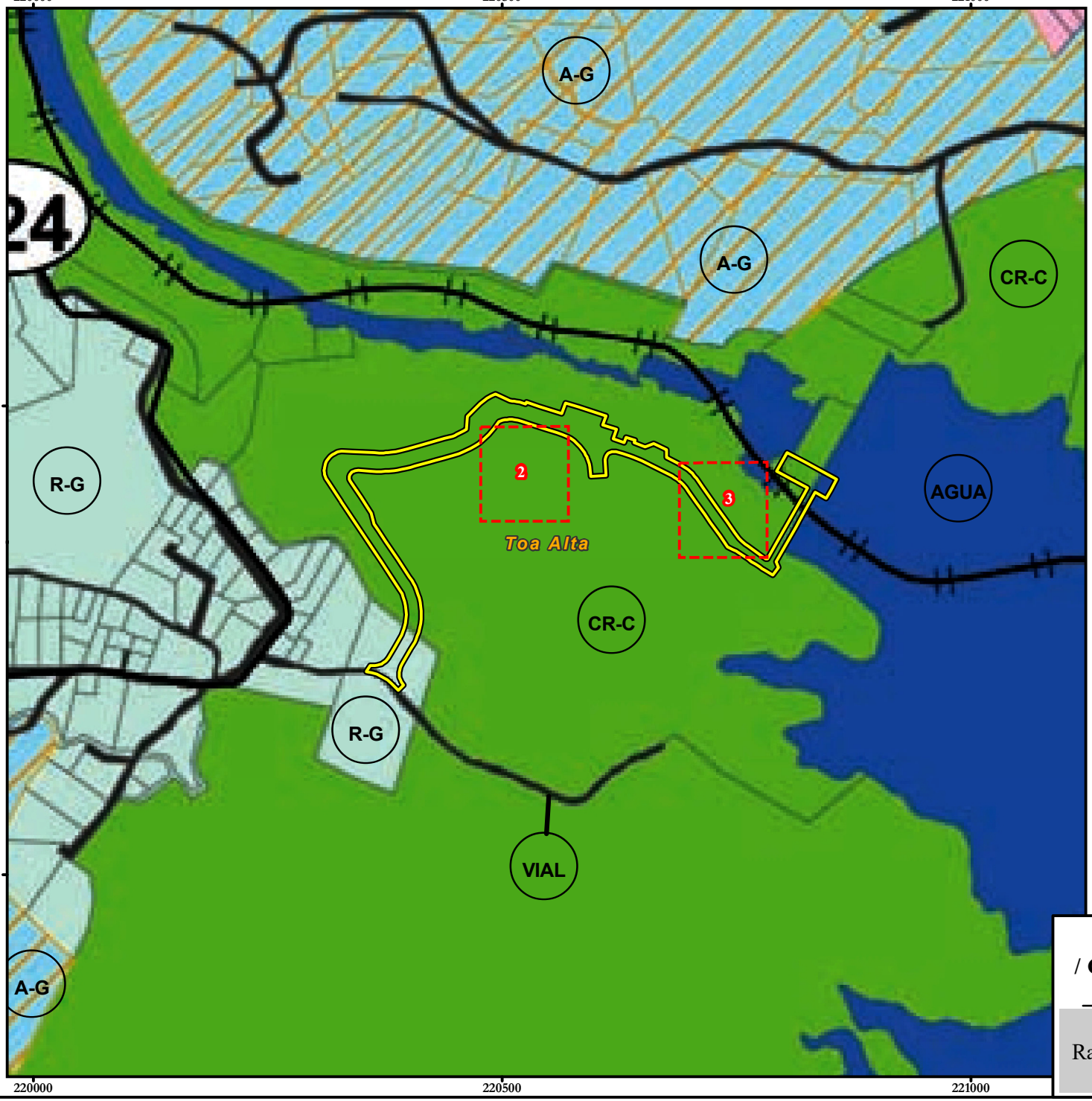


N
W E
S

Scale 1:6,000

0 25 50 100 150 200
Meters

## Legend

Project Boundary[1]

Evaluated Alternatives

## Zoning[2]

- A-G — General Agricultural *(Agrícola General)*
- CR-C — Watershed Conservation *(Conservación de Cuencas)*
- R-G — Rural General *(Rural General)*
- AGUA — Agua *(Agua)*
- VIAL — Vial *(Vial)*

Note: Project boundary is approximate.

Sources:
1. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
2. Zoning Map, Municipality of Toa Alta, Puerto Rico Planning Board, effective date: October 18, 2012.

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Conformance with Plans / Compatible Land Use and Zoning / Scale and Urban Design

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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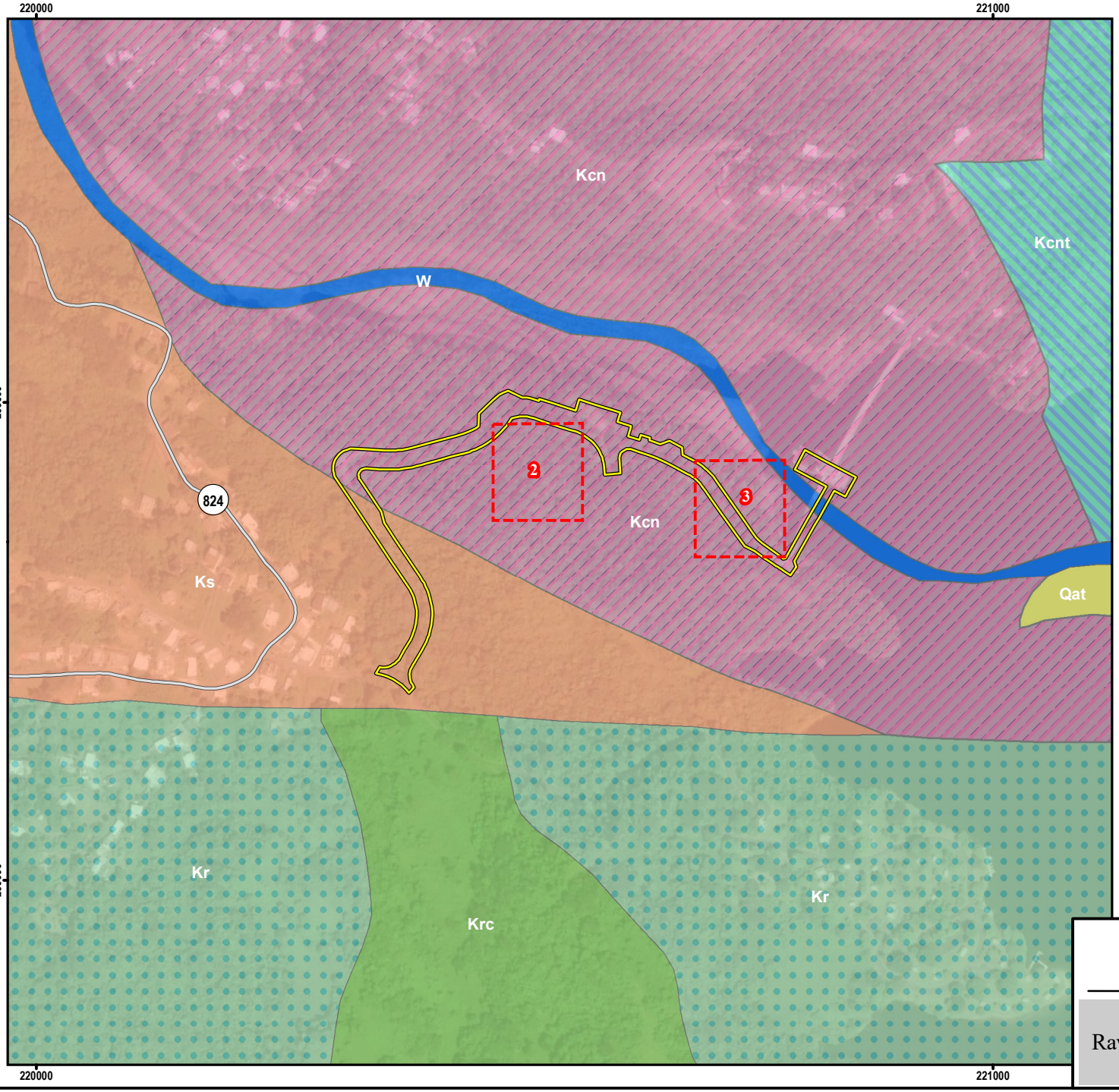
csagis evazquez 1/30/2025 8.5x11

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Path: A:\Projects\SJU_Projects\01\20-0281\CIP1709000\06Technical\X-GIS\mxd\EA_Federal_HUD\HUD_LaPlata_Exhibit29_Geology_8_5x11L_20250130.mxd
csaglg evazquez 1/30/2025 8.5x11L

N
W
E
S

Scale 1:6,000

0 50 100 150 200
Meters

## Legend

State Road[1]

Project Boundary

Evaluated Alternatives

**Geology[2]**

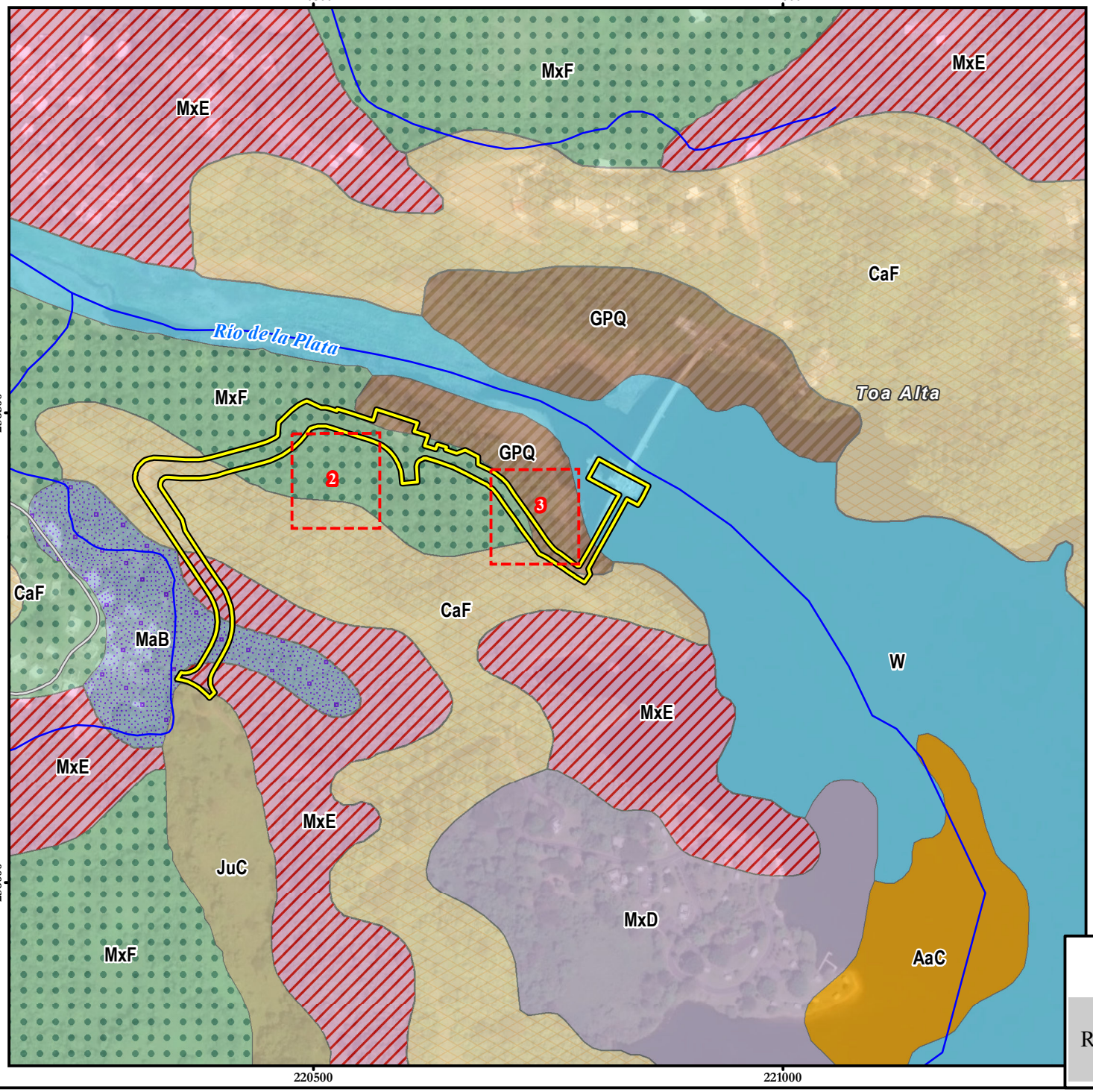
- Kcn: tuff and tuff breccia
- Kcnt: bedded tuff member
- Kr: thin, beddeb tuffaceous sandstone
- Krc: conglomerate member
- Ks: volcanic wacke, breccia, limestone and pyroxene lava
- Qat: alluvium of Rio Culebrinas
- W: water

Sources:
1. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
2. Geologic units digitized from USGS Geologic maps of Puerto Rico at a scale of 1:20,000 by PR Office of Management and Budget, last revision in November 2018. Original scanned map from US Geological Survey, Pease, M.H., 1968, Geologic map of the Naranjito Quadrangle, Puerto Rico: U.S. Geological Survey Miscellaneous Investigations Map I-508, scale 1:20,000.
4. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Geologic Map

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000




N
W E
S

Scale: 1:6,000

0 50 100 200 Meters

## Legend

- Hydrography[1]
- State Road[2]
- Project Boundary
- Evaluated Alternatives
- Municipal Limit[3]

**Soil[4]**

Type, slopes

- AaC: Aceitunas clay, 5-12%
- CaF: Caguabo clay loam, 40-60%
- GPQ: Quarries and Gravel Pits
- JuC: Juncos clay, 5-12%
- MaB: Mabí clay, 2-5%
- MxD: Múcara clay, 12-20%
- MxE: Múcara clay, 20-40%
- MxF: Múcara clay, 40-60%
- W: water

Sources:
1. USGS National Hydrography Dataset, 2022.
2. Puerto Rico Highways and Transportation Authority (ACT, in Spanish), 2020.
3. Puerto Rico Planning Board, 2015.
4. USDA-Natural Resources Conservation, Soil survey mapping units, Puerto Rico, SSURGO database, 2015.
5. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Soil Map

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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csagis mmedina rev evazquez 1/30/2025 8.5x11

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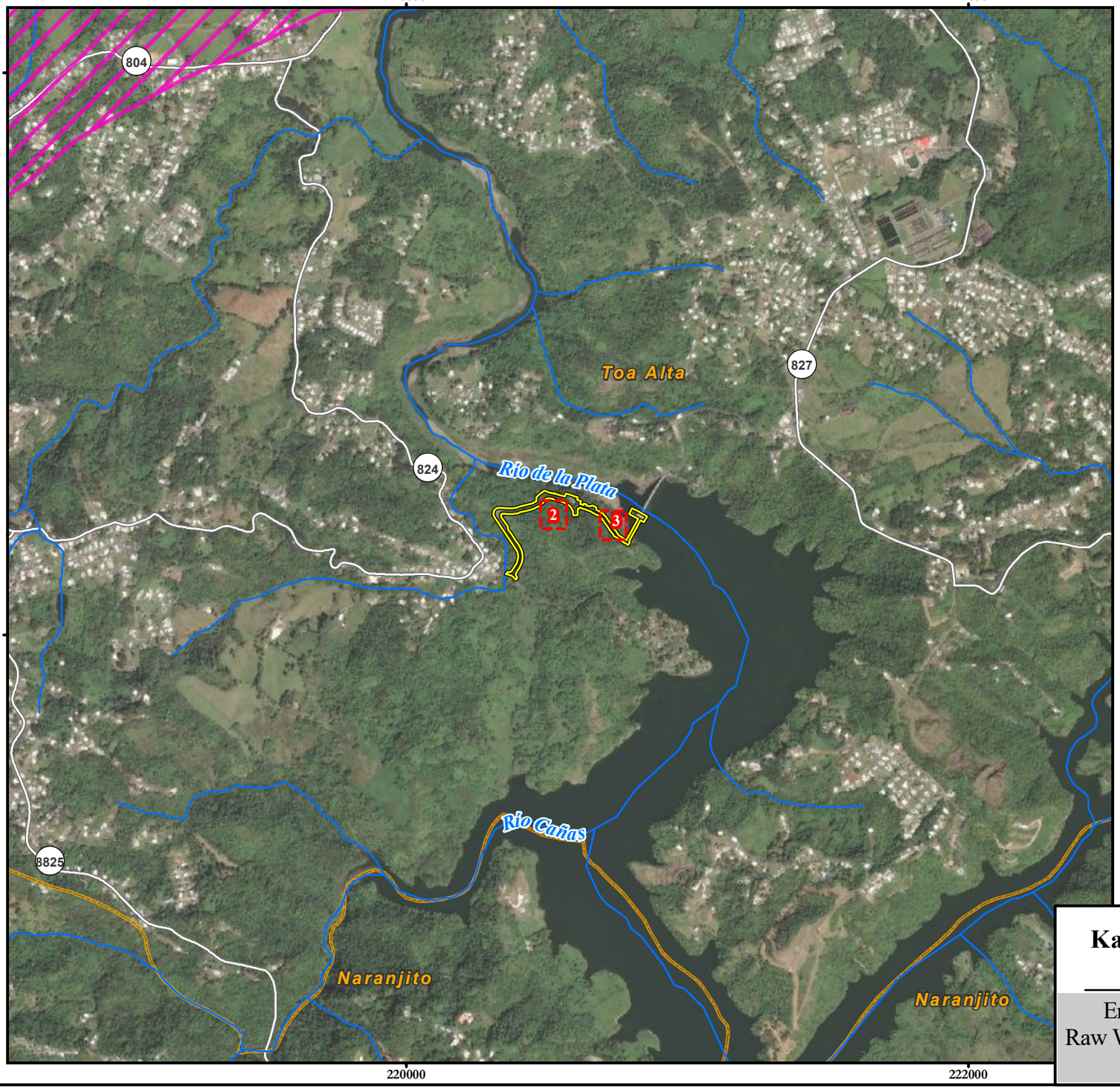



N
W E
S

Scale 1:20,000

0 100 200 400

Meters

## Legend

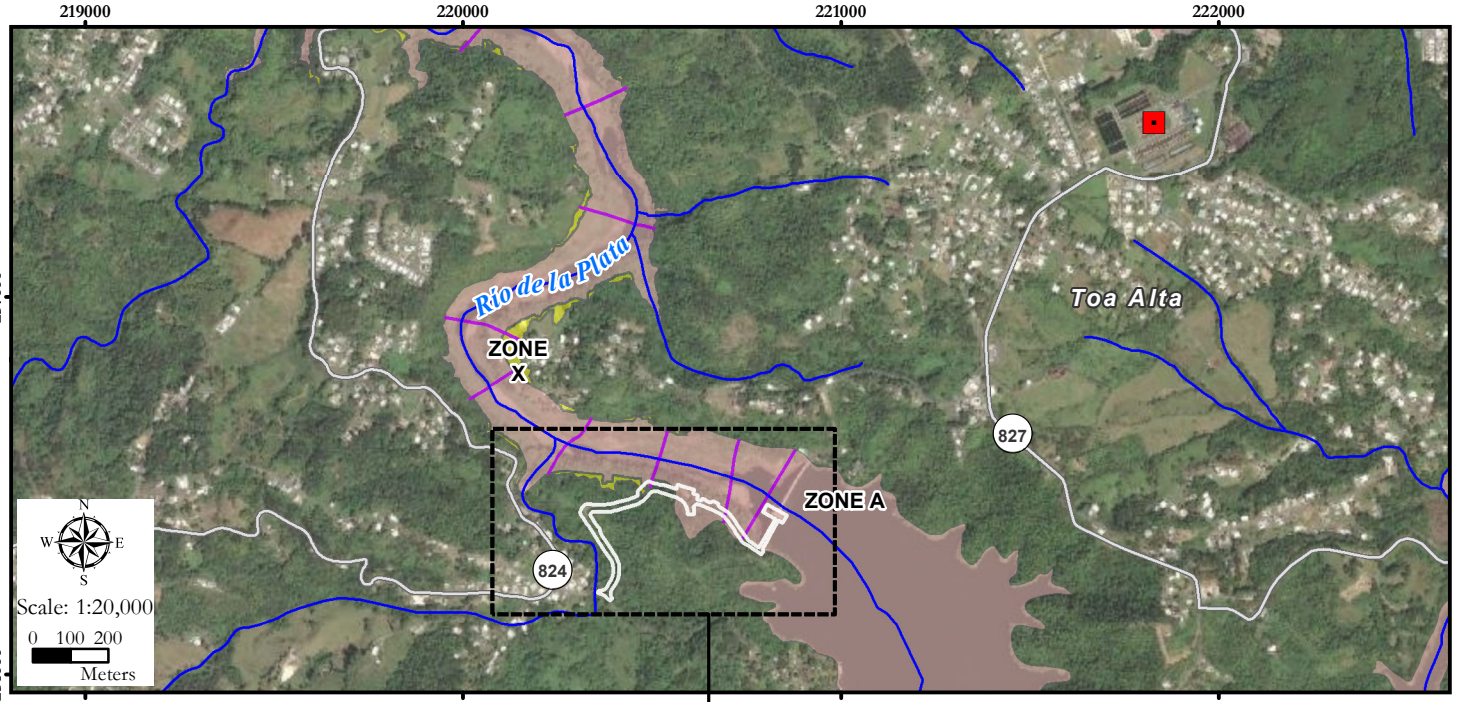
- Hydrography[1]
- State Road[2]
- Project Boundary
- Evaluated Alternatives
- Municipal Limit[3]
- APE-ZC Karst Zone Special Planning Areas *(Área de Planificación Especial de la Zona Cársica)*[4]

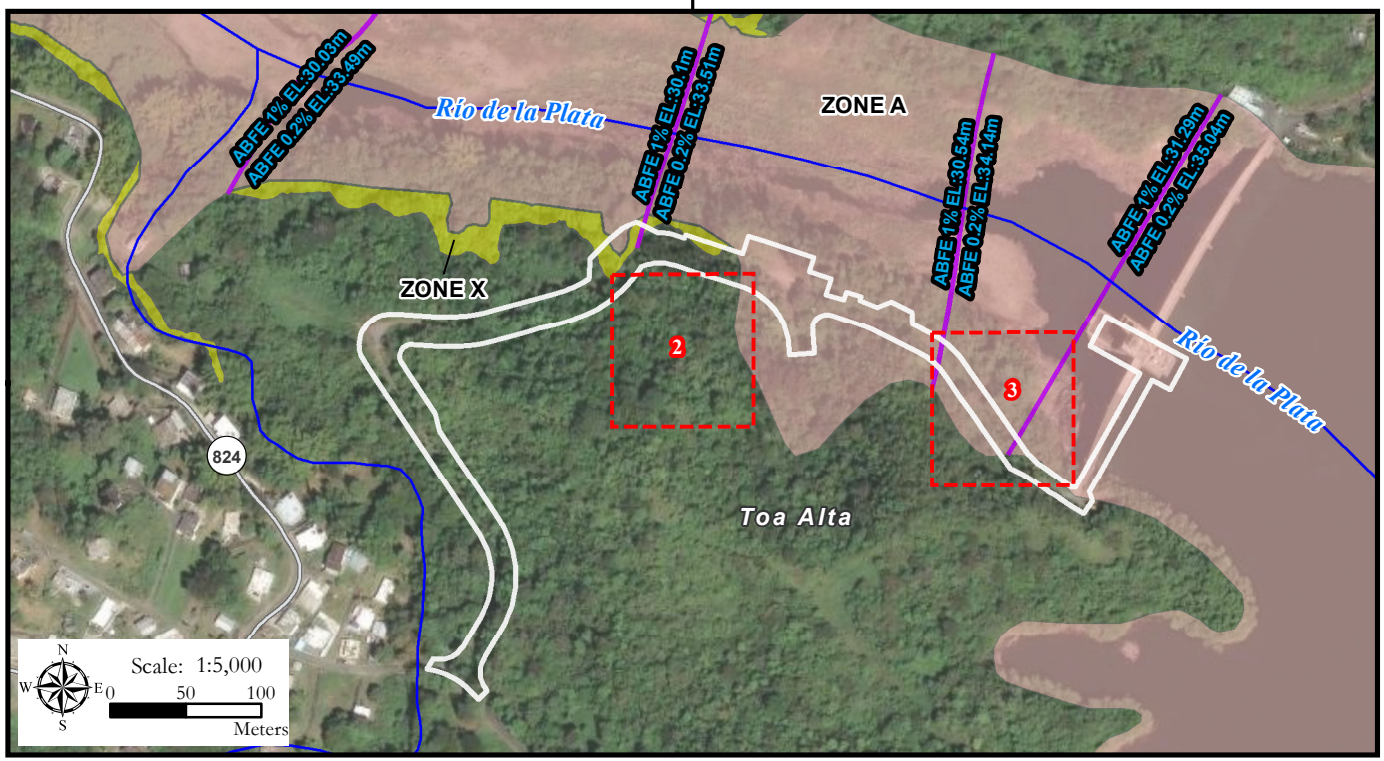
Sources:
1. USGS National Hydrography Dataset, 2020.
2. Puerto Rico Highways and Transportation Authority (ACT in Spanish), 2020.
3. Puerto Rico Planning Board, 2015.
4. Puerto Rico Planning Board and Department of Natural and Environmental Resources, Regulation for the Karst Special Planning Area (PRAPEC, by its acronym in Spanish), 2014.
5. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011)
Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Karst Special Planning Area (PRAPEC)

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000




## Legend

- Enrique Ortega WTP[1]
- Hydrography[2]
- State Road[3]
- Project Boundary[4]
- Evaluated Alternatives
- Municipal Limit[5]

**FEMA Advisory Data**

- A - Areas subject to inundation by the 1-percent annual chance flood event associated with rivers, lakes, and lagoons, among others.
- X - 0.2% Annual Chance Flood
- Advisory Base Flood Elevation (ABFE)

Note: Project boundary is approximate.

Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. USGS National Hydrography Dataset, 2020.
3. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
4. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
5. Puerto Rico Planning Board, 2015.
6. Federal Emergency Management Agency (FEMA), Advisory Maps: Puerto Rico Advisory Data and Products Post-Hurricanes Irma and Maria (Spatial Dataset, March 1, 2018); Panel Number 72000C0705J (effective date: April 13, 2018; geodata revision date: May 12, 2018; map date (pdf): May 25, 2018).
7. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# FEMA Advisory Data

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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csagis mmedina rev evazquez 1/30/2025 8.5x11

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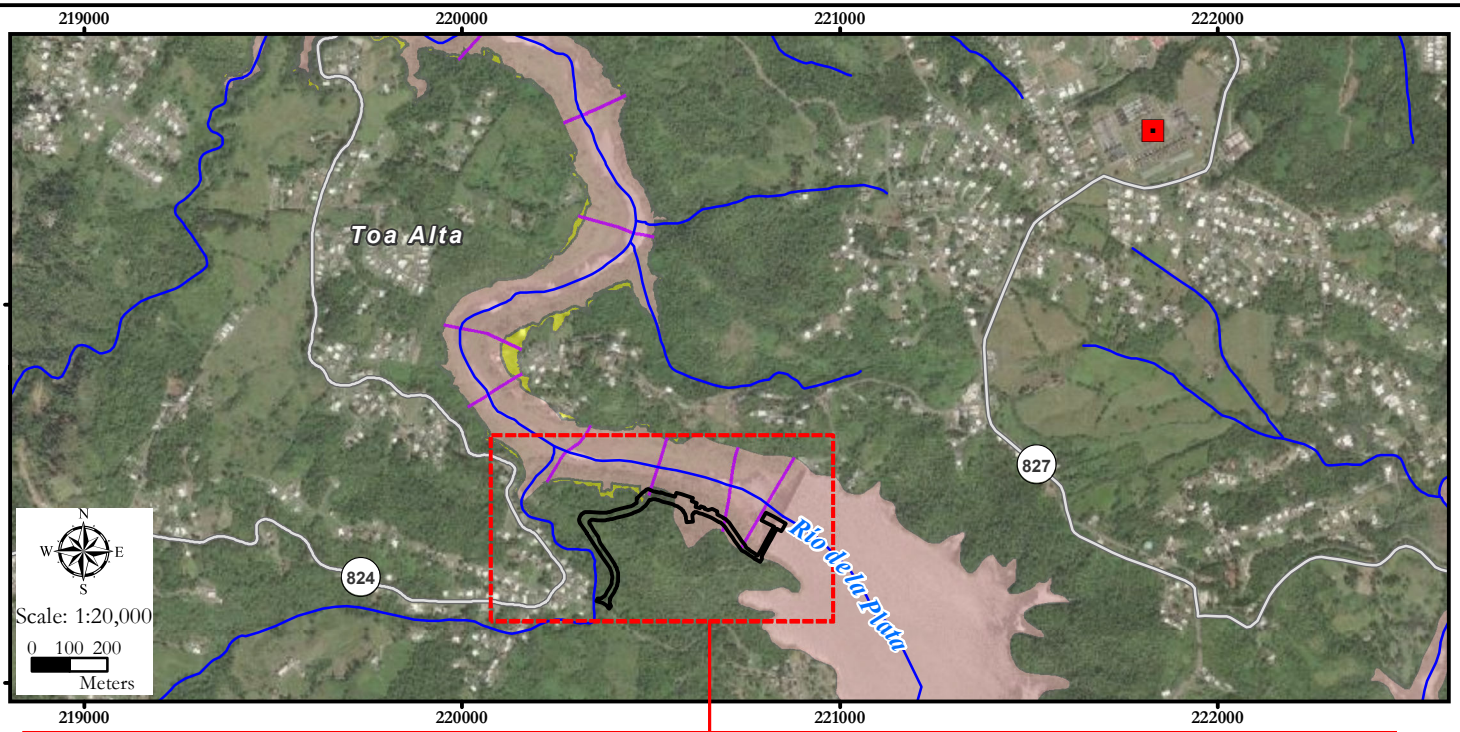


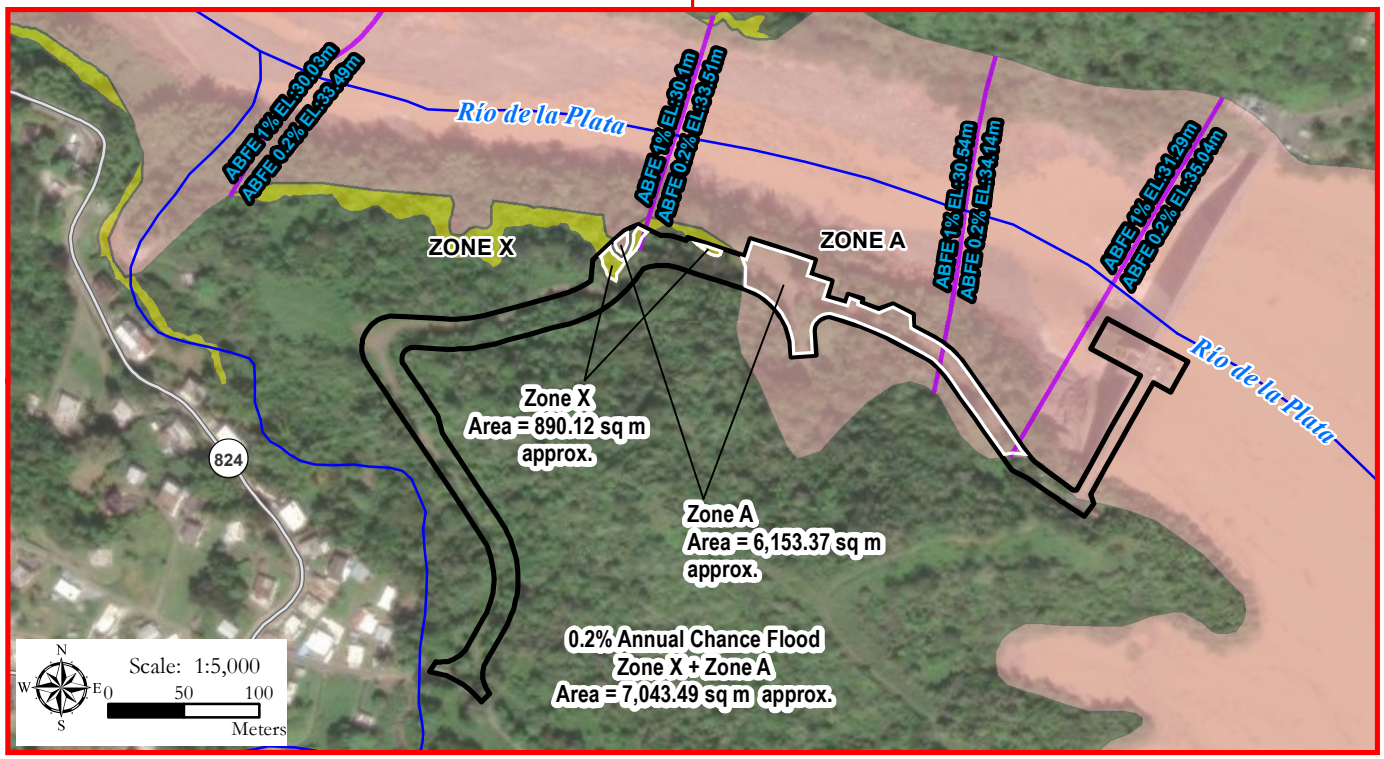


## Legend

- Enrique Ortega WTP[1]
- Hydrography[2]
- State Road[3]
- Project Boundary[4]
- Municipal Limit[5]

### FEMA Advisory Data

- A - Areas subject to inundation by the 1% Annual Chance Flood event associated with rivers, lakes, and lagoons, among others.
- X - 0.2% Annual Chance Flood
- Advisory Base Flood Elevation (ABFE)

Note: Project boundary is approximate.

Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. USGS National Hydrography Dataset, 2020.
3. Puerto Rico Highways and Transportation Authority (ACT, in Spanish), 2020.
4. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
5. Puerto Rico Planning Board, 2015.
6. Federal Emergency Management Agency (FEMA), Advisory Maps: Puerto Rico Advisory Data and Products Post-Hurricanes Irma and Maria (Spatial Dataset, March 1, 2018); Panel Number 72000C0705J (effective date: April 13, 2018; geodata revision date: May 12, 2018; map date (pdf): May 25, 2018).
7. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

**Project Area within FFRMS Floodplain**

Enrique Ortega Water Treat Plant Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

Path: A:\Projects\SJU_Projects\01\20-02611\CIP1709000\06 Technical\X-GIS\mxd\EA_Federal_HUD\HUD_LaPlata_Exhibit_FEMA_Advisory_Calculated_Area_8_5x11_L.mxd
cscagis mmcintire ex execuquest 9/27/2024 4:35:11

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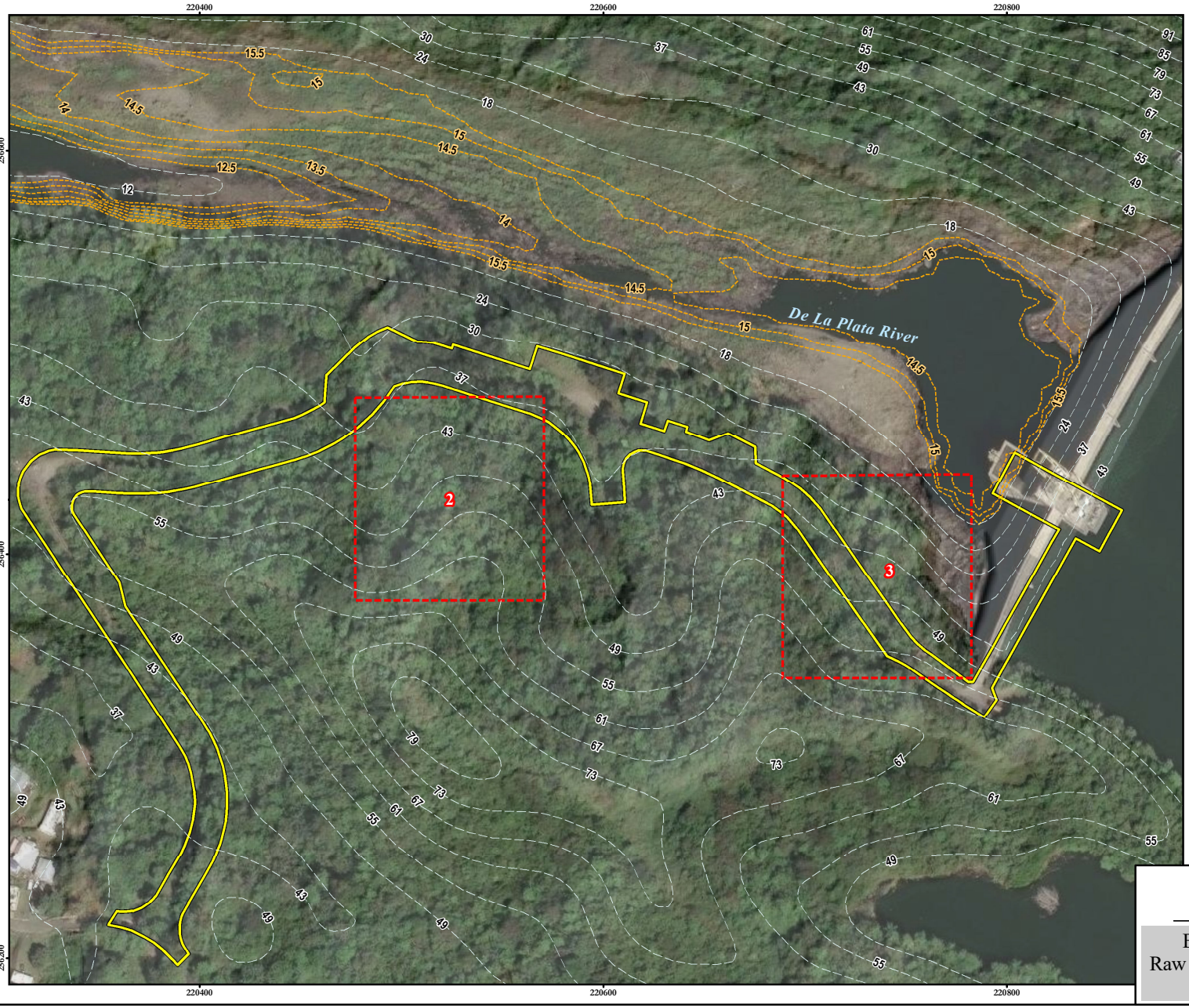
csagis evazquez 1/30/2026 11x17




Scale: 1:1,900

0 12.5 25 50 75 100 Meters

## Legend

- Contour Line (elevation in meters)[1]
- Contour Line (elevation in meters)[2]
- Project Boundary[3]
- Evaluated Alternatives

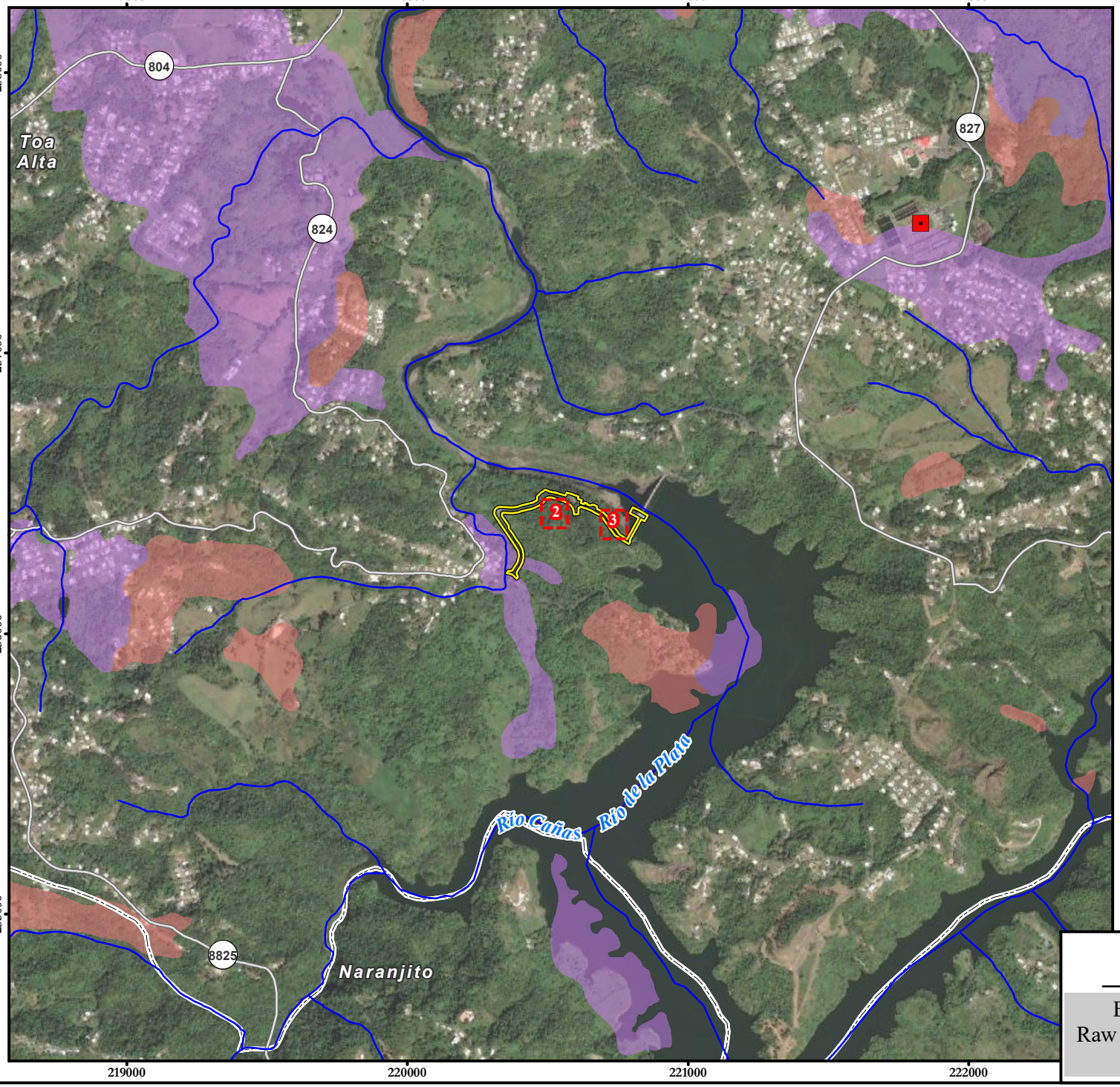
Note: Project boundary is approximate.

Sources:
1. Elevation contours derived from the National Elevation Dataset, U.S. Geological Survey, National Geospatial Program, USGS NED 1/3 arc-second Contours for Puerto Rico C, Puerto Rico 20181106 1 X 1 degree FileGDB 10.1, vector digital data, 20181106.
2. Elevation contours derived from U.S. Geological Survey, USGS 1/3 arc-second n19w067 1 x 1 degree TIFF, raster digital data, 20200506.
3. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
3. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community USGS National Map 3D Elevation Program (3DEP). August 27, 2024.

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Elevation Contours

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000




N
W E
S

Scale: 1:20,000

0 100 200 400 600 Meters

## Legend

- Enrique Ortega WTP[1]
- Hydrography[2]
- State Road[3]
- Project Boundary[4]
- Evaluated Alternatives
- Municipal Limit[5]

**Farmlands[6]**

- All areas are prime farmland
- Farmland of statewide importance

Note: Project boundary is approximate.

Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. USGS National Hydrography Dataset, 2022.
3. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
4. Puerto Rico Planning Board, 2015.
5. USDA-Natural Resources Conservation, Soil survey mapping units, Puerto Rico, SSURGO database, 2015.
6. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011)
Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Prime Farmlands

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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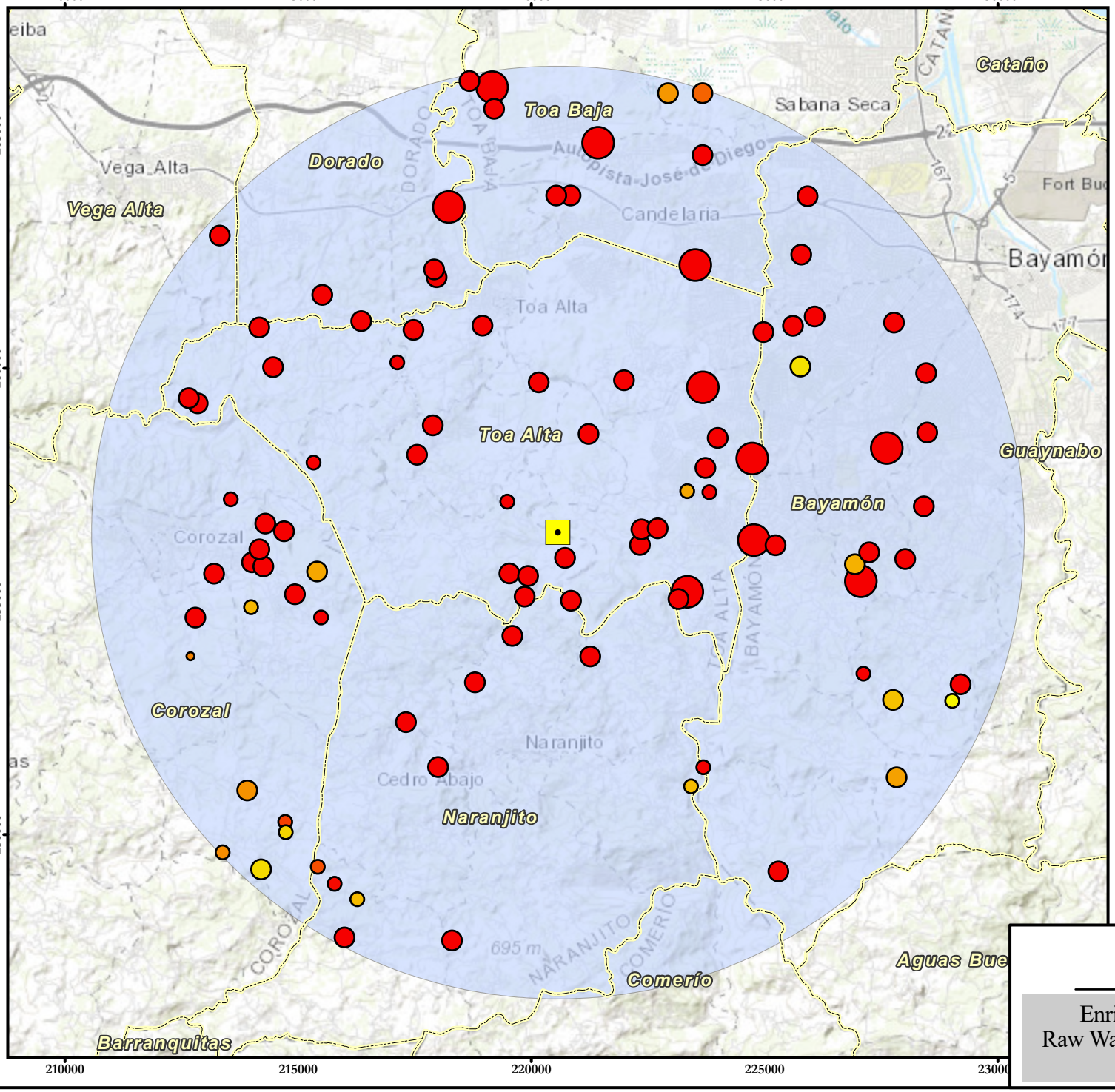


N
W E
S

Scale: 1:120,000

0 0.5 1 2 3

Kilometers

## Legend

- Project Location
- 10 km Radius
- Municipal Limit[1]

**Earthquakes Registry[2]**

**Magnitude**

- 0 - 1
- 1.1 - 2
- 2.1 - 3
- 3.1 - 4

**Depth (Km)**

- 3
- 3 - 50
- 50 - 128

Sources:
1. Puerto Rico Planning Board, 2015
2. Puerto Rico Seismic Network 2024.
3. Service Layer Credits: World Topographic Map: Esri, HERE, Garmin, USGS, NGA.

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Seismic Activity Map

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP 1-70-9000

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logo

**You are here:** EPA Home > Green Book > >National Area and County-Level Multi-Pollutant Information >Puerto Rico Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants

# Puerto Rico Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants

Data is current as of March 31, 2023

Listed by County, NAAQS, Area. The 8-hour Ozone (1997) standard was revoked on April 6, 2015 and the 1-hour Ozone (1979) standard was revoked on June 15, 2005.

* The 1997 Primary Annual PM-2.5 NAAQS (level of 15 μg/m$^3$) is revoked in attainment and maintenance areas for that NAAQS. For additional information see the PM-2.5 NAAQS SIP Requirements Final Rule, effective October 24, 2016. (81 FR 58009)

**Change the State:**
PUERTO RICO GO

Important Notes

Download National Dataset: dbf | xls | Data dictionary (PDF)

| County | NAAQS | Area Name | Nonattainment in Year | Redesignation to Maintenance | Classification | Whole or/ Part County | Population (2010) | State/ County FIPS Codes |
|---|---|---|---|---|---|---|---|---|
| **PUERTO RICO** | | | | | | | | |
| Arecibo Municipio | Lead (2008) | Arecibo, PR | 11 12 13 14 15 16 17 18 19 20 21 22 23 | / / | | Part | 32,185 | 72/013 |
| Bayamon Municipio | Sulfur Dioxide (2010) | San Juan, PR | 18 19 20 21 22 23 | / / | | Part | 22,921 | 72/021 |
| Catano Municipio | Sulfur Dioxide (2010) | San Juan, PR | 18 19 20 21 22 23 | / / | | Whole | 28,140 | 72/033 |
| Guaynabo Municipio | PM-10 (1987) | Mun. of Guaynabo, PR | 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 | 02/11/2010 | Moderate | Part | 90,470 | 72/061 |
| Guaynabo Municipio | Sulfur Dioxide (2010) | San Juan, PR | 18 19 20 21 22 23 | / / | | Part | 23,802 | 72/061 |
| Salinas Municipio | Sulfur Dioxide (2010) | Guayama-Salinas, PR | 18 19 20 21 22 23 | / / | | Part | 23,401 | 72/123 |
| San Juan Municipio | Sulfur Dioxide (2010) | San Juan, PR | 18 19 20 21 22 23 | / / | | Part | 147,963 | 72/127 |
| Toa Baja Municipio | Sulfur Dioxide (2010) | San Juan, PR | 18 19 20 21 22 23 | / / | | Part | 52,441 | 72/137 |

Important Notes

Oneida County (P)

**Rusk and Panola Counties, TX** (Nonattainment)
TEXAS (Region VI)
Panola County (P)
Rusk County (P)

**San Juan, PR** (Nonattainment)
PUERTO RICO (Region II)
Bayamon Municipio (P)
*Juan Sanchez Ward.*
Catano Municipio
Guaynabo Municipio (P)
*Pueblo Viejo Ward.*
San Juan Municipio (P)
*San Juan Antiguo Ward., Santurce Ward., Hato Rey Norte Ward., Gobernador Pinero Ward.*
Toa Baja Municipio (P)
*Palo Seco Ward., Sabana Seca Ward.*

**Southwest Indiana, IN** (Maintenance)
INDIANA (Region V)
Daviess County (P)
*Veale Township*
Pike County (P)
*Washington Township*

**St. Bernard Parish, LA** (Nonattainment)
LOUISIANA (Region VI)
St. Bernard Parish

**St. Clair, MI** (Nonattainment)
MICHIGAN (Region V)
St. Clair County (P)

**St. Lawrence County, NY** (Nonattainment)
NEW YORK (Region II)
St. Lawrence County (P)

**Steubenville, OH-WV** (Maintenance)
OHIO (Region V)
Jefferson County (P)
WEST VIRGINIA (Region III)
Brooke County (P)

**Sullivan County, TN** (Nonattainment)
TENNESSEE (Region IV)
Sullivan County (P)

**Terre Haute, IN** (Maintenance)
INDIANA (Region V)
Vigo County (P)
*Fayette Township, Harrison Township*

**Titus County, TX** (Nonattainment)
TEXAS (Region VI)
Titus County (P)

**Warren, PA** (Nonattainment)
PENNSYLVANIA (Region III)
Warren County (P)

# Emission Estimates for Off Road Construction Equipment

**Cálculos de Emisiones**

**A: Solicitante**

Autoridad de Acueductos y Alcantarillados
Toma de Agua Cruda de la Planta de Tratamiento de Agua Enrique Ortega Generadores Fase I
Barrio Ortíz
Toa Alta, Puerto Rico

| **B: Fuentes de Emisión** | **Combustible** | **Units** | **Load** | **HP** | **h/mes** | **h/año** |
|---|---|---|---|---|---|---|
| Dump Trucks - Camiones de Volteo | Diesel | 10 | 0.59 | 450 | 208 | 2496 |
| Excavator - Excavadora | Diesel | 6 | 0.59 | 60 | 104 | 1248 |
| Bulldozer - Tractor de Arrastre D-6 | Diesel | 3 | 0.59 | 175 | 104 | 1248 |
| Roller - Rodillo | Diesel | 3 | 0.59 | 150 | 104 | 1248 |
| Backhoe (Digger) - Retroexcavadora | Diesel | 6 | 0.59 | 80 | 208 | 2496 |
| Concrete Mixers - Mezcladoras de Hormigón | Diesel | 6 | 0.59 | 400 | 104 | 1248 |
| Water Truck - Camión Tanque de Agua | Diesel | 3 | 0.59 | 350 | 208 | 2496 |

EPA United States Environmental Protection Agency | Air and Radiation | EPA420-P-04-009 April 2004 NR-009c

**Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling--Compression-Ignition**

**C: Resumen de Emisiones**

| **Emisiones por Contaminantes Criterio** | | **Emisiones** | **107.7847 ton/año** |
|---|---|---|---|
| Óxidos de Nitrógeno ($NO_x$) | | | 88.4570 ton/año |
| Monóxido de Carbono (CO) | **(excluido en la Regla 501)** | | 102.1900 ton/año |
| Óxidos de Azufre ($SO_2$) | | | 3.1547 ton/año |
| Material Particulado (PM) | | | 4.9551 ton/año |
| Compuestos Orgánicos Volátiles (VOC) | | | 11.2179 ton/año |

# Emission Estimates for Off Road Construction Equipment

**D: Factores de Emisión**

Table 1. Nonroad CI Engine Emission Standards[a]

| Engine Power (hp) | Model Years | Regulation | Emission Standards (g/hp-hr) | | | | | NONROAD Tech Types |
|---|---|---|---|---|---|---|---|---|
| | | | HC [b] | NMHC+$NO_x$ | CO | $NO_x$ | PM | |
| <11 | 2000-2004 | Tier 1 | | 7.8 | 6.0 | | 0.75 | T1 |
| | 2005-2007 | Tier 2 | | 5.6 | 6.0 | | 0.60 | T2 |
| | 2008+ | Tier 4 | | | | | 0.30 | T4A, T4B [e] |
| ≥11 to <25 | 2000-2004 | Tier 1 | | 7.1 | 4.9 | | 0.60 | T1 |
| | 2005-2007 | Tier 2 | | 5.6 | 4.9 | | 0.60 | T2 |
| | 2008+ | Tier 4 | | | | | 0.30 | T4A, T4B [e] |
| ≥25 to <50 | 1999-2003 | Tier 1 | | 7.1 | 4.1 | | 0.60 | T1 |
| | 2004-2007 | Tier 2 | | 5.6 | 4.1 | | 0.45 | T2 |
| | 2008-2012 | Tier 4 transitional | | | | | 0.22 | T4A |
| | 2013+ | Tier 4 final | | 3.5 | | | 0.02 | T4 |
| 50 to <75 | 1998-2003 | Tier 1 | | | | 6.9 | | T1 |
| | 2004-2007 | Tier 2 | | 5.6 | 3.7 | | 0.30 | T2 |
| | 2008-2012 | Tier 3 [c] | | 3.5 | 3.7 | | | T3 |
| | 2008-2012 | Tier 4 transitional [c] | | | | | 0.22 | T4A |
| | 2013+ | Tier 4 final | | 3.5 | | | 0.02 | T4 |
| ≥75 to <100 | 1998-2003 | Tier 1 | | | | 6.9 | | T1 |
| | 2004-2007 | Tier 2 | | 5.6 | 3.7 | | 0.30 | T2 |
| | 2008-2011 | Tier 3 | | 3.5 | 3.7 | | | T3B |
| | 2012-2013 | Tier 4 transitional | 0.14 (50%) [d] | | | 0.30 (50%) | 0.01 | 50% T4 50% T4N |
| | 2014+ | Tier 4 final | 0.14 | | | 0.30 | 0.01 | T4N |
| ≥100 to <175 | 1997-2002 | Tier 1 | | | | 6.9 | | T1 |
| | 2003-2006 | Tier 2 | | 4.9 | 3.7 | | 0.22 | T2 |
| | 2007-2011 | Tier 3 | | 3.0 | 3.7 | | | T3 |
| | 2012-2013 | Tier 4 transitional | 0.14 (50%) | | | 0.30 (50%) | 0.01 | 50% T4 50% T4N |
| | 2014+ | Tier 4 final | 0.14 | | | 0.30 | 0.01 | T4N |
| ≥175 to <300 | 1996-2002 | Tier 1 | 1.0 | | 8.5 | 6.9 | 0.4 | T1 |
| | 2003-2005 | Tier 2 | | 4.9 | 2.6 | | 0.15 | T2 |
| | 2006-2010 | Tier 3 | | 3.0 | 2.6 | | | T3 |
| | 2011-2013 | Tier 4 transitional | 0.14 (50%) | | | 0.30 (50%) | 0.01 | 50% T4 50% T4N |
| | 2014+ | Tier 4 final | 0.14 | | | 0.30 | 0.01 | T4N |
| ≥300 to <600 | 1996-2000 | Tier 1 | 1.0 | | 8.5 | 6.9 | 0.4 | T1 |
| | 2001-2005 | Tier 2 | | 4.8 | 2.6 | | 0.15 | T2 |
| | 2006-2010 | Tier 3 | | 3.0 | 2.6 | | | T3 |
| | 2011-2013 | Tier 4 transitional | 0.14 (50%) | | | 0.30 (50%) | 0.01 | 50% T4 50% T4N |
| | 2014+ | Tier 4 final | 0.14 | | | 0.30 | 0.01 | T4N |
| ≥600 to ≤750 | 1996-2001 | Tier 1 | 1.0 | | 8.5 | 6.9 | 0.4 | T1 |
| | 2002-2005 | Tier 2 | | 4.8 | 2.6 | | 0.15 | T2 |
| | 2006-2010 | Tier 3 | | 3.0 | 2.6 | | | T3 |
| | 2011-2013 | Tier 4 transitional | 0.14 (50%) | | | 0.30 (50%) | 0.01 | 50% T4 50% T4N |
| | 2014+ | Tier 4 final | 0.14 | | | 0.30 | 0.01 | T4N |
| >750 except generator sets | 2000-2005 | Tier 1 | 1.0 | | 8.5 | 6.9 | 0.4 | T1 |
| | 2006-2010 | Tier 2 | | 4.8 | 2.6 | | 0.15 | T2 |
| | 2011-2014 | Tier 4 transitional | 0.30 | | | 2.6 | 0.075 | T4 |
| | 2015+ | Tier 4 final | 0.14 | | | 2.6 | 0.03 | T4N |
| Generator sets >750 to ≤1200 | 2000-2005 | Tier 1 | 1.0 | | 8.5 | 6.9 | 0.4 | T1 |
| | 2006-2010 | Tier 2 | | 4.8 | 2.6 | | 0.15 | T2 |
| | 2011-2014 | Tier 4 transitional | 0.30 | | | 2.6 | 0.075 | T4 |
| | 2015+ | Tier 4 final | 0.14 | | | 0.5 | 0.02 | T4N |
| Generator sets >1200 | 2000-2005 | Tier 1 | 1.0 | | 8.5 | 6.9 | 0.4 | T1 |
| | 2006-2010 | Tier 2 | | 4.8 | 2.6 | | 0.15 | T2 |
| | 2011-2014 | Tier 4 transitional | 0.30 | | | 0.5 | 0.075 | T4 |
| | 2015+ | Tier 4 final | 0.14 | | | 0.5 | 0.02 | T4N |

[a] These standards do not apply to recreational marine diesel engines over 50 hp. Standards for this category are provided in Table 7.
[b] Tier 4 standards are in the form of NMHC.
[c] For 50 to <75 hp engines, a Tier 3 $NO_x$ standard of 3.5 g/hp-hr was promulgated, beginning in 2008. The Tier 4 transitional standard also begins in 2008; it leaves the Tier 3 $NO_x$ standard unchanged and adds a 0.22 g/hp-hr PM standard.
[d] Percentages are model year sales fractions required to comply with the indicated $NO_x$ and NMHC standards, for model years where less than 100 percent is required.
[e] The T4A tech type is used in 2008-2012. The T4B tech type is used in 2013+.

Table 2. Default Certification Diesel Fuel Sulfur Content for Tier 3 and Tier 4 Engines

| Engine Power | Model Years | Regulation | NONROAD Tech Types | Modeled Default Fuel Sulfur Content (ppm) |
|---|---|---|---|---|
| hp ≤ 75 | 2008-2012 | Tier 4 transitional | T4A | 500 |
| | 2013+ | Tier 4 | T4B, T4 | 15 |
| 75 < hp ≤ 100 | 2008-2011 | Tier 3 transitional [a] | T3B | 500 |
| | 2012+ | Tier 4 transitional and final | T4, T4N | 15 |
| 100 < hp ≤ 175 | 2007-2011 | Tier 3 | T3 | 2000 |
| | 2012+ | Tier 4 transitional and final | T4, T4N | 15 |
| 175 < hp ≤ 750 | 2006-2010 | Tier 3 | T3 | 2000 |
| | 2011+ | Tier 4 transitional and final | T4, T4N | 15 |
| hp > 750 | 2011+ | Tier 4 transitional and final | T4, T4N | 15 |

[a] Since the Tier 3 standard begins in 2008, it is assumed that this new technology introduction will allow manufacturers to take advantage of the availability of 500 ppm fuel that year.

# Emission Estimates for Off Road Construction Equipment

**E: Cálculos de Emisiones**

Nota: Los siguientes cálculos son exclusivos para este caso y están actualizados hasta la fecha de radicación del documento donde son incluidos. El uso posterior a esta fecha, puede resultar en un cifra errónea.

**Formula** **Emissions = # of engines X Load factor or Fraction of available power X Average Horsepower X activity or hours X Emission Standard X correction factor**

** Assume Tier I Emission Standards for CO, NOx, PM/PM10/PM2.5 and 500 ppm Fuel Sulfur Content

| | Number Units | Load Factor | Brake Horsepower | Total Hours | | Emission Standard (pounds per horsepower-hour)** NOx | CO | SO2 | PM | HC | Conversion Factor | Total Emissions (Tons/año) NOx | CO | SO2 | PM10 | VOC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Camiones de Volteo | 10 | 0.59 | 450 | | 2496 | 0.0152 | 0.0187 | 0.0005 | 0.0009 | 0.0022 | 0.0005 | 50.40286 | 62.09048 | 1.797541 | 2.92190476 | 7.304762 |
| Excavadora | 6 | 0.59 | 60 | | 1248 | 0.0152 | 0.0090 | 0.0005 | 0.0007 | 0.0003 | 0.0005 | 2.016114 | 1.197981 | 0.071902 | 0.08765714 | 0.040907 |
| Tractor de Arrastre D-6 | 3 | 0.59 | 175 | | 1248 | 0.0152 | 0.0187 | 0.0005 | 0.0009 | 0.0003 | 0.0005 | 2.940167 | 3.621944 | 0.104857 | 0.17044444 | 0.059656 |
| Rodillo | 3 | 0.59 | 150 | | 1248 | 0.0152 | 0.0082 | 0.0005 | 0.0005 | 0.0003 | 0.0005 | 2.520143 | 1.351381 | 0.089877 | 0.08035238 | 0.051133 |
| (Digger) - Retroexcavadora | 6 | 0.59 | 80 | | 2496 | 0.0152 | 0.0082 | 0.0005 | 0.0007 | 0.0003 | 0.0005 | 5.376305 | 2.882946 | 0.191738 | 0.23375238 | 0.109084 |
| Mezcladoras de Hormigón | 6 | 0.59 | 400 | | 1248 | 0.0152 | 0.0187 | 0.0005 | 0.0009 | 0.0022 | 0.0005 | 13.44076 | 16.55746 | 0.479344 | 0.7791746 | 1.947937 |
| Camión Tanque de Agua | 3 | 0.59 | 350 | | 2496 | 0.0152 | 0.0187 | 0.0005 | 0.0009 | 0.0022 | 0.0005 | 11.76067 | 14.48778 | 0.419426 | 0.68177778 | 1.704444 |
| | | | | | | | | | | | | 88.45701 | 102.19 | 3.154685 | 4.95506349 | 11.21792 |

## Cálculos de Emisiones

**A: Solicitante**

Autoridad de Acueductos y Alcantarillados
Toma de Agua Cruda de la Planta de Tratamiento de Agua Enrique Ortega
Generadores Fase I
Barrio Ortíz
Toa Alta, Puerto Rico

**B: Fuente de Emisión**

Generadores de Electricidad para Emergencias 2,500 kW (tres de cuatro)
Toma de Agua Cruda de la Planta de Tratamiento de Agua Enrique Ortega
Generadores Fase I

| | | |
|---|---|---|
| Capacidad | 8,897 | hp |
| | kVA | |
| Toma de Agua Cruda | 8,427 | |

**C: Combustible**

Diesel

**E: Resumen de Emisiones** **Emisiones totales** **78.4088 ton/año**

**Emisiones por Contaminantes Criterio**

| | | | |
|---|---|---|---|
| $NO_x$ | | 68.9553 | ton/año |
| CO | **(excluido en la Regla 501)** | 14.8587 | ton/año |
| $SO_x$ | | 4.5599 | ton/año |
| $PM_{10}$ | | 4.8936 | ton/año |
| Aldehidos | **(excluido en la Regla 501)** | 1.0299 | ton/año |

**Cálculos de Emisiones**

**A: Solicitante**

Autoridad de Acueductos y Alcantarillados
Toma de Agua Cruda de la Planta de
Tratamiento de Agua Enrique Ortega
Generadores Fase I
Barrio Ortíz
Toa Alta, Puerto Rico

**B: Fuente de Emisión**

Generadores de Electricidad para Emergencias 2,500 kW (tres de cuatro)
Toma de Agua Cruda de la Planta de Tratamiento
de Agua Enrique Ortega
Generadores Fase I

| | | |
|---|---|---|
| Generador | 7,500 | kW |
| Generación | 8,427 | kVA |
| Eficiencia Motor Típico | 88.5% | |
| Power Factor Típico | 0.89 | |
| Capacidad | 8,897 | Hp |

**C: Combustible**

| | | |
|---|---|---|
| Tipo | Diesel | |
| Tiempo de operación | 500 | hr/año máximo |

$$H.P = \frac{kVAxF.PxE}{0,746}$$

kVA = kW / PF

**D: Factores de Emisión**

Table 3.3-1. EMISSION FACTORS FOR UNCONTROLLED GASOLINE AND DIESEL INDUSTRIAL ENGINES[a]

| Pollutant | Gasoline Fuel (SCC 2-02-003-01, 2-03-003-01) | | Diesel Fuel (SCC 2-02-001-02, 2-03-001-01) | | EMISSION FACTOR RATING |
|---|---|---|---|---|---|
| | Emission Factor (lb/hp-hr) (power output) | Emission Factor (lb/MMBtu) (fuel input) | Emission Factor (lb/hp-hr) (power output) | Emission Factor (lb/MMBtu) (fuel input) | |
| $NO_x$ | 0.011 | 1.63 | 0.031 | 4.41 | D |
| CO | 6.96 E-03[d] | 0.99[d] | 6.68 E-03 | 0.95 | D |
| $SO_x$ | 5.91 E-04 | 0.084 | 2.05 E-03 | 0.29 | D |
| PM-10[b] | 7.21 E-04 | 0.10 | 2.20 E-03 | 0.31 | D |
| $CO_2$[c] | 1.08 | 154 | 1.15 | 164 | B |
| Aldehydes | 4.85 E-04 | 0.07 | 4.63 E-04 | 0.07 | D |
| TOC | | | | | |
| Exhaust | 0.015 | 2.10 | 2.47 E-03 | 0.35 | D |
| Evaporative | 6.61 E-04 | 0.09 | 0.00 | 0.00 | E |
| Crankcase | 4.85 E-03 | 0.69 | 4.41 E-05 | 0.01 | E |
| Refueling | 1.08 E-03 | 0.15 | 0.00 | 0.00 | E |

[a] References 2,5-6,9-14. When necessary, an average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr. To convert from lb/hp-hr to kg/kw-hr, multiply by 0.608. To convert from lb/MMBtu to ng/J, multiply by 430. SCC = Source Classification Code. TOC = total organic compounds.

[b] PM-10 = particulate matter less than or equal to 10 μm aerodynamic diameter. All particulate is assumed to be ≤ 1 μm in size.

[c] Assumes 99% conversion of carbon in fuel to $CO_2$ with 87 weight % carbon in diesel, 86 weight % carbon in gasoline, average BSFC of 7,000 Btu/hp-hr, diesel heating value of 19,300 Btu/lb, and gasoline heating value of 20,300 Btu/lb.

[d] Instead of 0.439 lb/hp-hr (power output) and 62.7 lb/mmBtu (fuel input), the correct emissions factors values are 6.96 E-03 lb/hp-hr (power output) and 0.99 lb/mmBtu (fuel input), respectively. This is an editorial correction. March 24, 2009

**E: Resumen de Emisiones**

| **Emisiones por Contaminantes Criterio** | **Emisiones** | **79.4387** | **ton/año** |
|---|---|---|---|
| Óxidos de Nitrógeno ($NO_x$) | | 68.9553 | ton/año |
| Monóxido de Carbono (CO) | **(excluido en la Regla 501)** | 14.8587 | ton/año |
| Óxidos de Azufre ($SO_x$) | | 4.5599 | ton/año |
| Material Particulado ($PM_{10}$) | | 4.8936 | ton/año |
| Aldehidos | | 1.0299 | ton/año |

**F: Cálculos de Emisiones**

Nota: Los siguientes cálculos son exclusivos para este caso y están actualizados hasta la fecha de radicación del documento donde son incluidos. El uso posterior a esta fecha, puede resultar en un cifra errónea.

Generador PF Frontón

Óxidos de Nitrógeno ($NO_x$)

$$\frac{500\ \text{hr}}{\text{año}} \cdot \frac{8897\ \text{hp}}{} \cdot \frac{0.031\ \text{lb}\ NO_x}{\text{hp-hr}} \cdot \frac{1\ \text{ton}}{2000\ \text{lb}} = 68.9553\ \frac{\text{ton}\ NO_x}{\text{año}}$$

Monóxido de Carbono (CO)

$$\frac{500\ \text{hr}}{\text{año}} \cdot \frac{8897\ \text{hp}}{} \cdot \frac{6.68\text{E-}03\ \text{lb CO}}{\text{hp-hr}} \cdot \frac{1\ \text{ton}}{2000\ \text{lb}} = 14.8587\ \frac{\text{ton CO}}{\text{año}}$$

Óxidos de Azufre ($SO_x$)

$$\frac{500\ \text{hr}}{\text{año}} \cdot \frac{8897\ \text{hp}}{} \cdot \frac{2.05\text{E-}03\ \text{lb}\ SO_x}{\text{hp-hr}} \cdot \frac{1\ \text{ton}}{2000\ \text{lb}} = 4.5599\ \frac{\text{ton}\ SO_x}{\text{año}}$$

Material Particulado ($PM_{10}$)

$$\frac{500\ \text{hr}}{\text{año}} \cdot \frac{8897\ \text{hp}}{} \cdot \frac{2.20\text{E-}03\ \text{lb}\ PM_{10}}{\text{hp-hr}} \cdot \frac{1\ \text{ton}}{2000\ \text{lb}} = 4.8936\ \frac{\text{ton}\ PM_{10}}{\text{año}}$$

Aldehidos

$$\frac{500\ \text{hr}}{\text{año}} \cdot \frac{8897\ \text{hp}}{} \cdot \frac{4.63\text{E-}04\ \text{lb Aldehidos}}{\text{hp-hr}} \cdot \frac{1\ \text{ton}}{2000\ \text{lb}} = 1.0299\ \frac{\text{ton Aldehidos}}{\text{año}}$$

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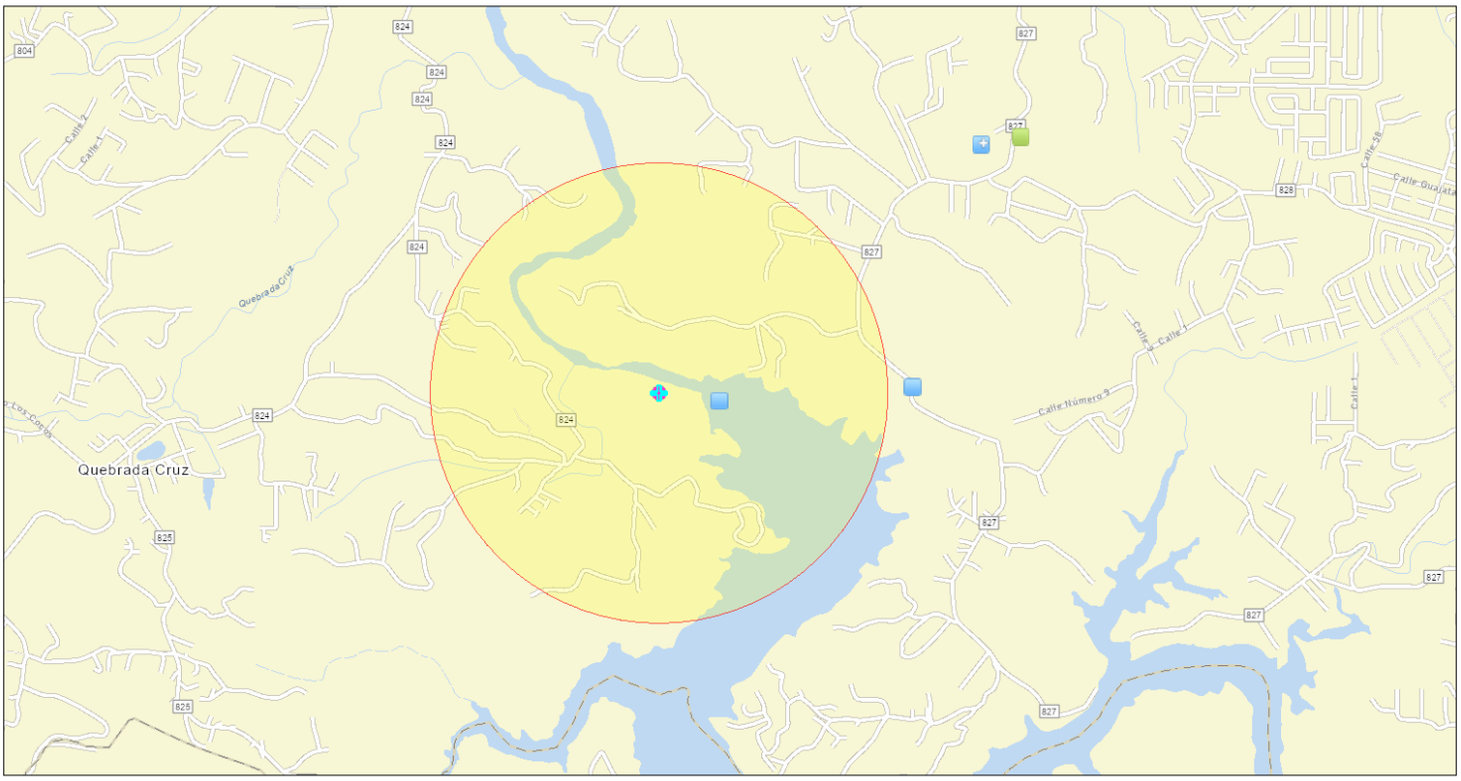
Path: A:\Projects\SJU_Projects\01\20-0261\CIP17090009\Technical\X-GIS\mxd\EA_Federal_HUD\HUD_LaPlata_Figure5_HistoricalAerials_8_5x11_L.mxd
csagis evazquez 5/21/2024 8.5x11

# Hazard Diesel Fuel
# Acceptable Separation Distance

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

# NEPAssist Report

## Represa del Lago La Plata Raw Water Intake Power Generators




February 10, 2025

1:15,287

0 0.17 0.35 0.7 mi

0 0.28 0.55 1.1 km

Water Dischargers (NPDES)

Water Dischargers (NPDES)

Hazardous Waste (RCRAInfo)

Project Buffer

Represa del Lago La Plata Raw Water Intake Power Generators

Esri Community Maps Contributors, Esri, TomTom, Garmin, Foursquare, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, NPS, US Census Bureau, USFWS

| Project Location | 18.343583,-66.238678 |
|---|---|
| Within 3000 feet of an Ozone 1-hr (1979 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of an Ozone 8-hr (1997 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of an Ozone 8-hr (2008 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of an Ozone 8-hr (2015 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of a Lead (2008 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of a SO2 1-hr (2010 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of a PM2.5 24hr (2006 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of a PM2.5 Annual (1997 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of a PM2.5 Annual (2012 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of a PM10 (1987 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of a CO Annual (1971 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of a NO2 Annual (1971 standard) Non-Attainment/Maintenance Area? | no |
| Within 3000 feet of a Federal Land? | no |
| Within 3000 feet of an impaired stream? | no |
| Within 3000 feet of an impaired waterbody? | yes |
| Within 3000 feet of a waterbody? | yes |
| Within 3000 feet of a stream? | yes |
| Within 3000 feet of an NWI wetland? | Available Online |
| Within 3000 feet of a Brownfields site? | no |
| Within 3000 feet of a Superfund site? | no |

| | |
|---|---|
| Within 3000 feet of a Toxic Release Inventory (TRI) site? | no |
| Within 3000 feet of a water discharger (NPDES)? | yes |
| Within 3000 feet of a hazardous waste (RCRA) facility? | no |
| Within 3000 feet of an air emission facility? | no |
| Within 3000 feet of a school? | no |
| Within 3000 feet of an airport? | no |
| Within 3000 feet of a hospital? | no |
| Within 3000 feet of a designated sole source aquifer? | no |
| Within 3000 feet of a historic property on the National Register of Historic Places? | no |
| Within 3000 feet of a Chemical Data Reporting (CDR) site? | no |
| Within 3000 feet of a Land Cession Boundary? | no |
| Within 3000 feet of a tribal area (lower 48 states)? | no |
| Within 3000 feet of the service area of a mitigation or conservation bank? | no |
| Within 3000 feet of the service area of an In-Lieu-Fee Program? | no |
| Within 3000 feet of a Public Property Boundary of the Formerly Used Defense Sites? | no |
| Within 3000 feet of a Munitions Response Site? | no |
| Within 3000 feet of an Essential Fish Habitat (EFH)? | yes |
| Within 3000 feet of a Habitat Area of Particular Concern (HAPC)? | no |
| Within 3000 feet of an EFH Area Protected from Fishing (EFHA)? | no |
| Within 3000 feet of a Bureau of Land Management Area of Critical Environmental Concern? | no |
| Within 3000 feet of an ESA-designated Critical Habitat Area per U.S. Fish & Wildlife Service? | no |
| Within 3000 feet of an ESA-designated Critical Habitat river, stream or water feature per U.S. Fish & Wildlife Service? | no |

Created on: 2/10/2025 7:59:58 AM

# Detailed Facility Report

Facility Summary

**IMPROVEMENTS TO LA PLATA DAM**

**STATE ROAD PR-827 KM. 2.4, TOA ALTA, PR 00953**

**FRS (Facility Registry Service) ID:** 110071074821

**EPA Region:** 02

**Latitude:** 18.3433

**Longitude:** -66.2364

**Locational Data Source:** NPDES

**Industries:** --

**Indian Country:** N

## Enforcement and Compliance Summary

| Statute | CWA |
|---|---|
| Compliance Monitoring Activities (5 years) | -- |
| Date of Last Compliance Monitoring Activity | -- |
| Compliance Status | Terminated Permit |
| Qtrs in Noncompliance (of 12) | 0 |
| Qtrs with Significant Violation | 0 |
| Informal Enforcement Actions (5 years) | -- |
| Formal Enforcement Actions (5 years) | -- |
| Penalties from Formal Enforcement Actions (5 years) | -- |
| EPA Cases (5 years) | -- |
| Penalties from EPA Cases (5 years) | -- |

## Regulatory Information

**Clean Air Act (CAA):** No Information

**Clean Water Act (CWA):** Non-Major, Permit Terminated; Compliance Tracking Off (PRR1000CG)

**Resource Conservation and Recovery Act (RCRA):** No Information

**Safe Drinking Water Act (SDWA):** No Information

## Other Regulatory Reports

**Air Emissions Inventory (EIS):** No Information

**Greenhouse Gas Emissions (eGGRT):** No Information

**Toxic Releases (TRI):** No Information

**Compliance and Emissions Data Reporting Interface (CEDRI):** No Information

Go To Enforcement/Compliance Details

Known Data Problems <https://epa.gov/resources/echo-data/known-data-problems>

Facility/System Characteristics

## Facility/System Characteristics

| System | Statute | Identifier | Universe | Status | Areas | Permit Expiration Date | Indian Country | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| FRS | | 110071074821 | | | | | N | 18.3433 | -66.2364 |
| ICIS-NPDES | CWA | PRR1000CG | Non-Major: General Permit Covered Facility | Terminated; Compliance Tracking Off | Construction Stormwater | 02/15/2022 | N | 18.3433 | -66.2364 |

## Facility Address

| System | Statute | Identifier | Facility Name | Facility Address | Facility County |
|---|---|---|---|---|---|
| FRS | | 110071074821 | IMPROVEMENTS TO LA PLATA DAM | STATE ROAD PR-827 KM. 2.4, TOA ALTA, PR 00953 | Toa Alta Municipio |
| ICIS-NPDES | CWA | PRR1000CG | IMPROVEMENTS TO LA PLATA DAM | STATE ROAD PR-827 KM. 2.4, TOA ALTA, PR 00953 | |

## Facility SIC (Standard Industrial Classification) Codes

| System | Identifier | SIC Code | SIC Description |
|---|---|---|---|

No data records returned

## Facility NAICS (North American Industry Classification System) Codes

| System | Identifier | NAICS Code | NAICS Description |
|---|---|---|---|

No data records returned

## Facility Industrial Effluent Guidelines

| Identifier | Effluent Guideline (40 CFR Part) | Effluent Guideline Description |
|---|---|---|

No data records returned

## Facility Tribe Information

| Reservation Name | Tribe Name | EPA Tribal ID | Distance to Tribe (miles) |
|---|---|---|---|

No data records returned

Enforcement and Compliance

## Compliance Monitoring History

Last 5 Years

| Statute | Source ID | System | Activity Type | Compliance Monitoring Type | Lead Agency | Date | Finding (if applicable) |
|---|---|---|---|---|---|---|---|

No data records returned

*Entries in italics are not included in ECHO's Compliance Monitoring Activity counts because they are not compliance monitoring strategy* <https://www.epa.gov/compliance/compliance-monitoring-programs> *activities or because they are not counted as inspections within EPA's Annual Results* <https://www.epa.gov/enforcement/enforcement-data-and-results>.

## Compliance Summary Data

| Statute | Source ID | Current SNC (Significant Noncompliance)/HPV (High Priority Violation) | Current As Of | Qtrs with NC (Noncompliance) (of 12) | Data Last Refreshed |
|---|---|---|---|---|---|
| CWA | PRR1000CG | No | 06/30/2024 | 0 | 11/29/2024 |

## Three-Year Compliance History by Quarter

| Statute | Program/Pollutant/Violation Type | QTR 1 | QTR 2 | QTR 3 | QTR 4 | QTR 5 | QTR 6 | QTR 7 | QTR 8 | QTR 9 | QTR 10 | QTR 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CWA (Source ID: PRR1000CG) | | 07/01-09/30/21 | 10/01-12/31/21 | 01/01-03/31/22 | 04/01-06/30/22 | 07/01-09/30/22 | 10/01-12/31/22 | 01/01-03/31/23 | 04/01-06/30/23 | 07/01-09/30/23 | 10/01-12/31/23 | 01/01-03/31/24 |
| | Facility-Level Status | No Violation Identified | No Violation Identified | No Violation Identified | Unknown | Terminated Permit | Terminated Permit | Terminated Permit | Terminated Permit | Terminated Permit | Terminated Permit | Terminated Permit |
| | Quarterly Noncompliance Report History | | | | Undetermined | | | | | | | |

## Informal Enforcement Actions

Last 5 Years

| Statute | System | Source ID | Type of Action | Lead Agency | Date |
|---|---|---|---|---|---|

No data records returned

*Entries in italics are not counted as "informal enforcement actions" in EPA policies pertaining to enforcement response tools.*

## Formal Enforcement Actions

Last 5 Years

| Statute | System | Law/ Section | Source ID | Type of Action | Case No. | Lead Agency | Case Name | Issued/ Filed Date | Settlements/ Actions | Settlement/ Action Date | Federal Penalty Assessed | State/ Local Penalty Assessed | Penalty Amount Collected | SEP Value | Comp Action Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

No data records returned

Environmental Conditions

## Watersheds

| 12-Digit WBD (Watershed Boundary Dataset) HUC (RAD (Reach Address Database)) | WBD (Watershed Boundary Dataset) Subwatershed Name (RAD (Reach Address Database)) | State Water Body Name (ICIS (Integrated Compliance Information System)) | Beach Closures Within Last Year | Beach Closures Within Last Two Years | Pollutants Potentially Related to Impairment | Watershed with ESA (Endangered Species Act)-listed Aquatic Species? |
|---|---|---|---|---|---|---|
| 210100050713 | Rio de la Plata near mouth | RIO LA PLATA | No | No | -- | No |

## Assessed Waters From Latest State Submission (ATTAINS)

| State | Report Cycle | Assessment Unit ID | Assessment Unit Name | Water Condition | Cause Groups Impaired | Drinking Water Use | Ecological Use | Fish Consumption Use | Recreation Use | Other Use |
|---|---|---|---|---|---|---|---|---|---|---|

No data records returned

## Air Quality Nonattainment Areas

| Pollutant | Within Nonattainment Status Area? | Nonattainment Status Applicable Standard(s) | Within Maintenance Status Area? | Maintenance Status Applicable Standard(s) |
|---|---|---|---|---|

No data records returned

Pollutants

## Toxics Release Inventory History of Reported Chemicals Released or Transferred in Pounds per Year at Site

| TRI Facility ID | Year | Air Emissions | Surface Water Discharges | Off-Site Transfers to POTWs (Publicly Owned Treatment Works) | Underground Injections | Disposal to Land | Total On-Site Releases | Total Off-Site Transfers |
|---|---|---|---|---|---|---|---|---|

No data records returned

## Toxics Release Inventory Total Releases and Transfers in Pounds by Chemical and Year

| Chemical Name |
|---|

No data records returned

## CWA (Clean Water Act) Discharge Monitoring Report (DMR) Pollutant Loadings

DMR and TRI Multi-Year Loading Report

| NPDES ID | Description |
|---|---|

No data records returned

Community

## Environmental Justice

This section shows indexes from EJScreen, EPA's screening tool for environmental justice (EJ) concerns. EPA uses these indexes to identify geographic areas that may warrant further consideration or analysis for potential EJ concerns. Use of these indexes does not designate an area as an "EJ community" or "EJ facility." EJScreen provides screening level indicators, not a determination of the existence or absence of EJ concerns. For more information, see the EJScreen home page.

**Potential Environmental Justice Concerns**

US Territory

Supplemental/EJ index percentiles >= 90 (Census block group)

Supplemental/EJ index percentiles >= 90 (1-mile average)

### EJScreen Indexes Shown

Index Type: Supplemental (default)

### Related Reports

EJScreen Community Report

Download Data

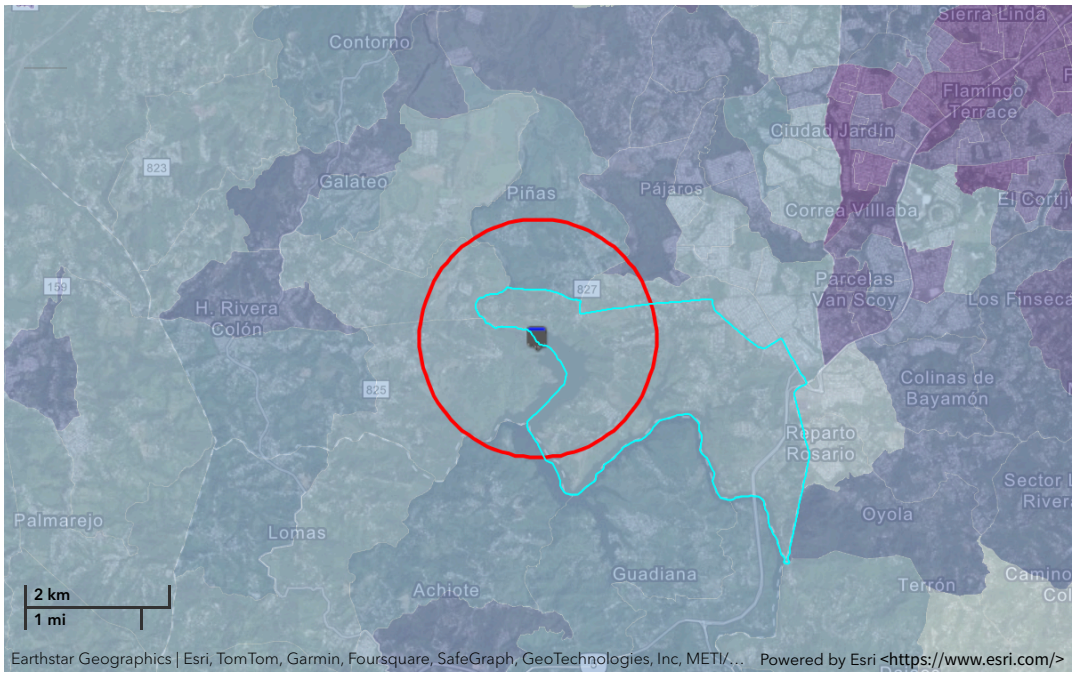
| Census Block Group ID: 721355106012 | US (Percentile) | | | State (Percentile) | | |
|---|---|---|---|---|---|---|
| Supplemental Indexes | Facility Census Block Group | 1-mile Avg | 1-mile Max | Facility Census Block Group | 1-mile Avg | 1-mile Max |
| **Count of Indexes At or Above 90th Percentile** | **5** | **4** | **6** | **0** | **0** | **2** |
| Particulate Matter 2.5 | -- | N/A | -- | -- | N/A | -- |
| Ozone | -- | N/A | -- | -- | N/A | -- |
| Diesel Particulate Matter | 36 | 33 | 54 | 71 | 69 | 84 |
| Air Toxics Cancer Risk | 52 | 34 | 53 | 41 | 0 | 63 |
| Air Toxics Respiratory Hazard Index | 33 | 32 | 35 | 42 | 40 | 64 |
| Toxic Releases to Air | ! 99 | ! 98 | ! 99 | 77 | 76 | 89 |
| Traffic Proximity | 80 | 74 | ! 96 | 32 | 26 | 64 |
| Lead Paint | 86 | 85 | ! 97 | 54 | 51 | 79 |

| Census Block Group ID: 721355106012 | US (Percentile) | | | State (Percentile) | | |
|---|---|---|---|---|---|---|
| Supplemental Indexes | Facility Census Block Group | 1-mile Avg | 1-mile Max | Facility Census Block Group | 1-mile Avg | 1-mile Max |
| Risk Management Plan (RMP) Facility Proximity | ! 98 | ! 98 | ! 99 | 74 | 73 | ! 91 |
| Hazardous Waste Proximity | ! 91 | 87 | ! 94 | 54 | 44 | 60 |
| Superfund Proximity | ! 98 | ! 98 | ! 99 | 64 | 68 | 85 |
| Underground Storage Tanks (UST) | 85 | 50 | ! 93 | 67 | 0 | 73 |
| Wastewater Discharge | ! 99 | ! 99 | ! 99 | 87 | 76 | ! 95 |

Map Display Based on: (●) US ( ) State

Display Map Layer: Summary - Number of Indexes

( ) Facility 1-mile Radius [ ] Facility Census Block Group




## Demographic Profile of Surrounding Area (1-Mile Radius)

This section provides demographic information regarding the community surrounding the facility. ECHO compliance data alone are not sufficient to determine whether violations at a particular facility had negative impacts on public health or the environment. Statistics are based upon the 2021 American Community Survey (ACS) 5-year Summary and are accurate to the extent that the facility latitude and longitude listed below are correct. Census boundaries and demographic data for U.S. Territories are based on the "2020 Island Areas Demographic Profiles" from the U.S. Census Bureau. EPA's spatial processing methodology considers the overlap between the selected radii and ACS census block groups in determining the demographics surrounding the facility. For more detail about this methodology, see the DFR Data Dictionary <https://epa.gov/help/reports/dfr-data-dictionary#demographic>.

| General Statistics (ACS (American Community Survey)) | |
|---|---|
| Total Persons | 3,177 |
| Population Density | 1,089/sq.mi. |
| Housing Units in Area | 1,248 |
| Percent People of Color | 99% |
| Households in Area | 1,003 |
| Households on Public Assistance | 115 |
| Persons With Low Income | 1,934 |
| Percent With Low Income | 61% |

| Geography | |
|---|---|
| Radius of Selected Area | 1 mi. |
| Center Latitude | 18.3433 |
| Center Longitude | -66.2364 |
| Land Area | 93% |

| Age Breakdown (ACS (American Community Survey)) - Persons (%) | |
|---|---|
| Children 5 years and younger | 128 (4%) |
| Minors 17 years and younger | 633 (20%) |
| Adults 18 years and older | 2,544 (80%) |
| Seniors 65 years and older | 473 (15%) |

| Race Breakdown (ACS (American Community Survey)) - Persons (%) | |
|---|---|
| White | 2,210 (70%) |
| African-American | 0 (0%) |
| Hispanic-Origin | 3,130 (99%) |
| Asian | 0 (0%) |
| Hawaiian/Pacific Islander | 0 (0%) |
| American Indian | 0 (0%) |
| Other/Multiracial | 207 (7%) |

| Geography | |
|---|---|
| Water Area | 7% |
| **Income Breakdown (ACS (American Community Survey)) - Households (%)** | |
| Less than $15,000 | 285 (28.5%) |
| $15,000 - $25,000 | 167 (16.7%) |
| $25,000 - $50,000 | 204 (20.4%) |
| $50,000 - $75,000 | 203 (20.3%) |
| Greater than $75,000 | 141 (14.1%) |

| Education Level (Persons 25 & older) (ACS (American Community Survey)) - Persons (%) | |
|---|---|
| Less than 9th Grade | 212 (9.65%) |
| 9th through 12th Grade | 60 (2.73%) |
| High School Diploma | 749 (34.09%) |
| Some College/2-year | 234 (10.65%) |
| B.S./B.A. (Bachelor of Science/Bachelor of Arts) or More | 564 (25.67%) |

# Detailed Facility Report

Facility Summary

**CARIBBEAN CAST STONE, INC.**

**STATE ROAD 827, KM 3.5, ORTIZ WARD, TOA ALTA, PR 00953**

**FRS (Facility Registry Service) ID:** 110028062414

**EPA Region:** 02

**Latitude:** 18.343796

**Longitude:** -66.229085

**Locational Data Source:** ICIS

**Industries:** --

**Indian Country:** N

## Enforcement and Compliance Summary

| Statute | CWA |
|---|---|
| Compliance Monitoring Activities (5 years) | -- |
| Date of Last Compliance Monitoring Activity | 05/13/2016 |
| Compliance Status | Not Applicable |
| Qtrs in Noncompliance (of 12) | 0 |
| Qtrs with Significant Violation | 0 |
| Informal Enforcement Actions (5 years) | -- |
| Formal Enforcement Actions (5 years) | -- |
| Penalties from Formal Enforcement Actions (5 years) | -- |
| EPA Cases (5 years) | -- |
| Penalties from EPA Cases (5 years) | -- |

## Regulatory Information

**Clean Air Act (CAA):** No Information

**Clean Water Act (CWA):** Non-Major, (PRU097532)

**Resource Conservation and Recovery Act (RCRA):** No Information

**Safe Drinking Water Act (SDWA):** No Information

## Other Regulatory Reports

**Air Emissions Inventory (EIS):** No Information

**Greenhouse Gas Emissions (eGGRT):** No Information

**Toxic Releases (TRI):** No Information

**Compliance and Emissions Data Reporting Interface (CEDRI):** No Information

Go To Enforcement/Compliance Details

Known Data Problems <https://epa.gov/resources/echo-data/known-data-problems>

Facility/System Characteristics

## Facility/System Characteristics

| System | Statute | Identifier | Universe | Status | Areas | Permit Expiration Date | Indian Country | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| FRS | | 110028062414 | | | | | N | 18.343796 | -66.229085 |
| ICIS | | 8026585 | | | | | N | 18.343796 | -66.229085 |
| ICIS-NPDES | CWA | PRU097532 | Non-Major: Unpermitted Facility | | | | N | 18.343796 | -66.229085 |

## Facility Address

| System | Statute | Identifier | Facility Name | Facility Address | Facility County |
|---|---|---|---|---|---|
| FRS | | 110028062414 | CARIBBEAN CAST STONE, INC. | STATE ROAD 827, KM 3.5, ORTIZ WARD, TOA ALTA, PR 00953 | |
| ICIS | | 8026585 | CARIBBEAN CAST STONE, INC. | STATE ROAD 827, KM 3.5, ORTIZ WARD, TOA ALTA, PR 00953 | Toa Alta Municipio |
| ICIS-NPDES | CWA | PRU097532 | CARIBBEAN CAST STONE, INC. | STATE ROAD 827, KM 3.5, ORTIZ WARD, TOA ALTA, PR 00953 | Toa Alta Municipio |

## Facility SIC (Standard Industrial Classification) Codes

| System | Identifier | SIC Code | SIC Description |
|---|---|---|---|
| ICIS-NPDES | PRU097532 | 3272 | Concrete Products |

## Facility NAICS (North American Industry Classification System) Codes

| System | Identifier | NAICS Code | NAICS Description |
|---|---|---|---|

No data records returned

## Facility Industrial Effluent Guidelines

| Identifier | Effluent Guideline (40 CFR Part) | Effluent Guideline Description |
|---|---|---|

No data records returned

## Facility Tribe Information

| Reservation Name | Tribe Name | EPA Tribal ID | Distance to Tribe (miles) |
|---|---|---|---|

No data records returned

Enforcement and Compliance

## Compliance Monitoring History

Last 5 Years

| Statute | Source ID | System | Activity Type | Compliance Monitoring Type | Lead Agency | Date | Finding (if applicable) |
|---|---|---|---|---|---|---|---|

No data records returned

*Entries in italics are not included in ECHO's Compliance Monitoring Activity counts because they are not compliance monitoring strategy* <https://www.epa.gov/compliance/compliance-monitoring-programs> *activities or because they are not counted as inspections within EPA's Annual Results* <https://www.epa.gov/enforcement/enforcement-data-and-results>.

## Compliance Summary Data

| Statute | Source ID | Current SNC (Significant Noncompliance)/HPV (High Priority Violation) | Current As Of | Qtrs with NC (Noncompliance) (of 12) | Data Last Refreshed |
|---|---|---|---|---|---|
| CWA | PRU097532 | No | 06/30/2024 | 0 | 11/29/2024 |

## Three-Year Compliance History by Quarter

| Statute | Program/Pollutant/Violation Type | QTR 1 | QTR 2 | QTR 3 | QTR 4 | QTR 5 | QTR 6 | QTR 7 | QTR 8 | QTR 9 | QTR 10 | QTR 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CWA (Source ID: PRU097532) | | 07/01-09/30/21 | 10/01-12/31/21 | 01/01-03/31/22 | 04/01-06/30/22 | 07/01-09/30/22 | 10/01-12/31/22 | 01/01-03/31/23 | 04/01-06/30/23 | 07/01-09/30/23 | 10/01-12/31/23 | 01/01-03/31/24 |
| | Facility-Level Status | Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable | Not Applicable |
| | Quarterly Noncompliance Report History | | | | | | | | | | | |

## Informal Enforcement Actions

Last 5 Years

| Statute | System | Source ID | Type of Action | Lead Agency | Date |
|---|---|---|---|---|---|

No data records returned

*Entries in italics are not counted as "informal enforcement actions" in EPA policies pertaining to enforcement response tools.*

## Formal Enforcement Actions

Last 5 Years

| Statute | System | Law/ Section | Source ID | Type of Action | Case No. | Lead Agency | Case Name | Issued/ Filed Date | Settlements/ Actions | Settlement/ Action Date | Federal Penalty Assessed | State/ Local Penalty Assessed | Penalty Amount Collected | SEP Value | Comp Action Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

No data records returned

Environmental Conditions

## Watersheds

| 12-Digit WBD (Watershed Boundary Dataset) HUC (RAD (Reach Address Database)) | WBD (Watershed Boundary Dataset) Subwatershed Name (RAD (Reach Address Database)) | State Water Body Name (ICIS (Integrated Compliance Information System)) | Beach Closures Within Last Year | Beach Closures Within Last Two Years | Pollutants Potentially Related to Impairment | Watershed with ESA (Endangered Species Act)-listed Aquatic Species? |
|---|---|---|---|---|---|---|
| 210100050710 | Rio de la Plata at Lago La Plata Dam | -- | No | No | -- | No |

## Assessed Waters From Latest State Submission (ATTAINS)

| State | Report Cycle | Assessment Unit ID | Assessment Unit Name | Water Condition | Cause Groups Impaired | Drinking Water Use | Ecological Use | Fish Consumption Use | Recreation Use | Other Use |
|---|---|---|---|---|---|---|---|---|---|---|
| PR | 2022 | PREL110A1 | LAKE LA PLATA | Impaired - 303(d) Listed - With Restoration Plan | METALS (OTHER THAN MERCURY) \| NUTRIENTS \| ORGANIC ENRICHMENT/OXYGEN DEPLETION \| PATHOGENS \| PH/ACIDITY/CAUSTIC CONDITIONS \| TEMPERATURE | Not Supporting | Not Supporting | -- | Not Supporting | -- |

## Air Quality Nonattainment Areas

| Pollutant | Within Nonattainment Status Area? | Nonattainment Status Applicable Standard(s) | Within Maintenance Status Area? | Maintenance Status Applicable Standard(s) |
|---|---|---|---|---|

No data records returned

Pollutants

## Toxics Release Inventory History of Reported Chemicals Released or Transferred in Pounds per Year at Site

| TRI Facility ID | Year | Air Emissions | Surface Water Discharges | Off-Site Transfers to POTWs (Publicly Owned Treatment Works) | Underground Injections | Disposal to Land | Total On-Site Releases | Total Off-Site Transfers |
|---|---|---|---|---|---|---|---|---|

No data records returned

## Toxics Release Inventory Total Releases and Transfers in Pounds by Chemical and Year

| Chemical Name |
|---|

No data records returned

## CWA (Clean Water Act) Discharge Monitoring Report (DMR) Pollutant Loadings

DMR and TRI Multi-Year Loading Report

| NPDES ID | Description |
|---|---|

No data records returned

Community

## Environmental Justice

This section shows indexes from EJScreen, EPA's screening tool for environmental justice (EJ) concerns. EPA uses these indexes to identify geographic areas that may warrant further consideration or analysis for potential EJ concerns. Use of these indexes does not designate an area as an "EJ community" or "EJ facility." EJScreen provides screening level indicators, not a determination of the existence or absence of EJ concerns. For more information, see the EJScreen home page.

**Potential Environmental Justice Concerns**

US Territory

Supplemental/EJ index percentiles >= 90 (Census block group)

Supplemental/EJ index percentiles >= 90 (1-mile average)

### EJScreen Indexes Shown

Index Type: Supplemental (default)

### Related Reports

EJScreen Community Report

Download Data

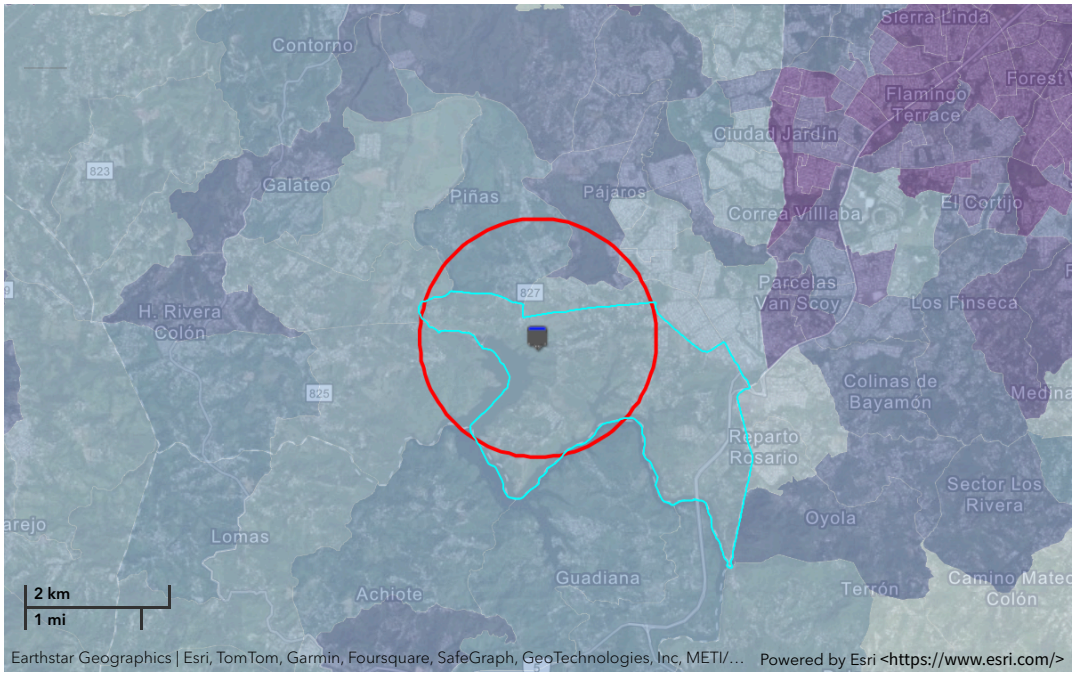
| Census Block Group ID: 721355106012 | US (Percentile) | | | State (Percentile) | | |
|---|---|---|---|---|---|---|
| Supplemental Indexes | Facility Census Block Group | 1-mile Avg | 1-mile Max | Facility Census Block Group | 1-mile Avg | 1-mile Max |
| **Count of Indexes At or Above 90th Percentile** | **5** | **4** | **6** | **0** | **0** | **2** |
| Particulate Matter 2.5 | -- | N/A | -- | -- | N/A | -- |
| Ozone | -- | N/A | -- | -- | N/A | -- |
| Diesel Particulate Matter | 36 | 34 | 54 | 71 | 67 | 87 |
| Air Toxics Cancer Risk | 52 | 34 | 54 | 41 | 0 | 83 |
| Air Toxics Respiratory Hazard Index | 33 | 32 | 38 | 42 | 38 | 83 |
| Toxic Releases to Air | ! 99 | ! 98 | ! 99 | 77 | 74 | ! 93 |

| Census Block Group ID: 721355106012 | US (Percentile) | | | State (Percentile) | | |
|---|---|---|---|---|---|---|
| Supplemental Indexes | Facility Census Block Group | 1-mile Avg | 1-mile Max | Facility Census Block Group | 1-mile Avg | 1-mile Max |
| Traffic Proximity | 80 | 79 | ! 96 | 32 | 30 | 64 |
| Lead Paint | 86 | 88 | ! 97 | 54 | 54 | 79 |
| Risk Management Plan (RMP) Facility Proximity | ! 98 | ! 98 | ! 99 | 74 | 75 | ! 91 |
| Hazardous Waste Proximity | ! 91 | 88 | ! 94 | 54 | 48 | 60 |
| Superfund Proximity | ! 98 | ! 98 | ! 99 | 64 | 65 | 87 |
| Underground Storage Tanks (UST) | 85 | 53 | ! 93 | 67 | 0 | 73 |
| Wastewater Discharge | ! 99 | ! 99 | ! 99 | 87 | 84 | ! 95 |

Map Display Based on: (•) US ( ) State

Display Map Layer: Summary - Number of Indexes

( ) Facility 1-mile Radius [ ] Facility Census Block Group




## Demographic Profile of Surrounding Area (1-Mile Radius)

This section provides demographic information regarding the community surrounding the facility. ECHO compliance data alone are not sufficient to determine whether violations at a particular facility had negative impacts on public health or the environment. Statistics are based upon the 2021 American Community Survey (ACS) 5-year Summary and are accurate to the extent that the facility latitude and longitude listed below are correct. Census boundaries and demographic data for U.S. Territories are based on the "2020 Island Areas Demographic Profiles" from the U.S. Census Bureau. EPA's spatial processing methodology considers the overlap between the selected radii and ACS census block groups in determining the demographics surrounding the facility. For more detail about this methodology, see the DFR Data Dictionary <https://epa.gov/help/reports/dfr-data-dictionary#demographic>.

| General Statistics (ACS (American Community Survey)) | |
|---|---|
| Total Persons | 3,954 |
| Population Density | 1,360/sq.mi. |
| Housing Units in Area | 1,479 |
| Percent People of Color | 98% |
| Households in Area | 1,230 |
| Households on Public Assistance | 125 |
| Persons With Low Income | 2,161 |
| Percent With Low Income | 55% |

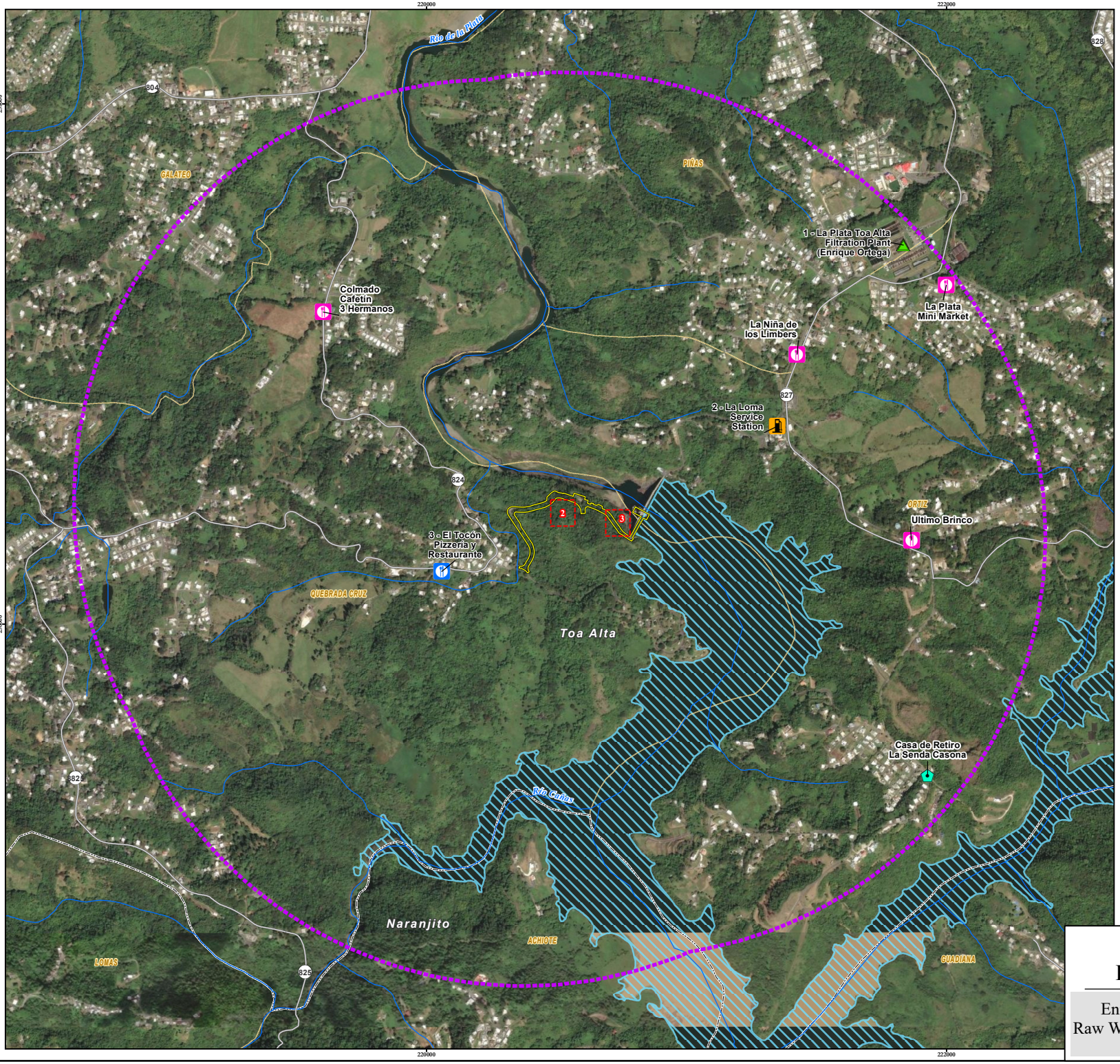
| Geography | |
|---|---|
| Radius of Selected Area | 1 mi. |
| Center Latitude | 18.343796 |

| Age Breakdown (ACS (American Community Survey)) - Persons (%) | |
|---|---|
| Children 5 years and younger | 96 (2%) |
| Minors 17 years and younger | 770 (19%) |
| Adults 18 years and older | 3,184 (81%) |
| Seniors 65 years and older | 534 (14%) |

| Race Breakdown (ACS (American Community Survey)) - Persons (%) | |
|---|---|
| White | 2,677 (68%) |
| African-American | 0 (0%) |
| Hispanic-Origin | 3,874 (98%) |
| Asian | 0 (0%) |
| Hawaiian/Pacific Islander | 0 (0%) |
| American Indian | 0 (0%) |

| Geography | |
|---|---|
| Center Longitude | -66.229085 |
| Land Area | 93% |
| Water Area | 7% |
| **Income Breakdown (ACS (American Community Survey)) - Households (%)** | |
| Less than $15,000 | 245 (19.98%) |
| $15,000 - $25,000 | 206 (16.8%) |
| $25,000 - $50,000 | 292 (23.82%) |
| $50,000 - $75,000 | 237 (19.33%) |
| Greater than $75,000 | 246 (20.07%) |

| Race Breakdown (ACS (American Community Survey)) - Persons (%) | |
|---|---|
| Other/Multiracial | 455 (12%) |
| **Education Level (Persons 25 & older) (ACS (American Community Survey)) - Persons (%)** | |
| Less than 9th Grade | 273 (10%) |
| 9th through 12th Grade | 64 (2.35%) |
| High School Diploma | 832 (30.49%) |
| Some College/2-year | 254 (9.31%) |
| B.S./B.A. (Bachelor of Science/Bachelor of Arts) or More | 770 (28.22%) |




Scale: 1:10,000

0 100 200 400 Meters

0 0.125 0.25 Miles

## Legend

- Spiritual Service[1]
- Food Service[1]
- Food Service[2]
- Gas Station[2]
- EPA Facility Registry Service (FRS): Facility - Hazardous Waste (RCRA)[3]
- State Road[4]
- Hydrography[5]
- Project Boundary[7]
- Evaluated Alternatives
- 1-Mile Buffer
- Municipal Limit[6]
- La Plata Reservoir[5]
- Ward Limit[6]

Note:
Project boundary is approximate.

Sources:
1. Coordinates were taken during a field visit on April 27, 2023.
2 Coordinates from Google Maps, April 24, 2023.
3. U.S. Environmental Protection Agency (EPA), EPA Facility Registry Service (FRS): Facility Interests Dataset, April 2022.
4. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
5. USGS National Hydrography Dataset, 2022.
6. Puerto Rico Planning Board, 2015.
7. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
8. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Explosive and Flammable Hazards

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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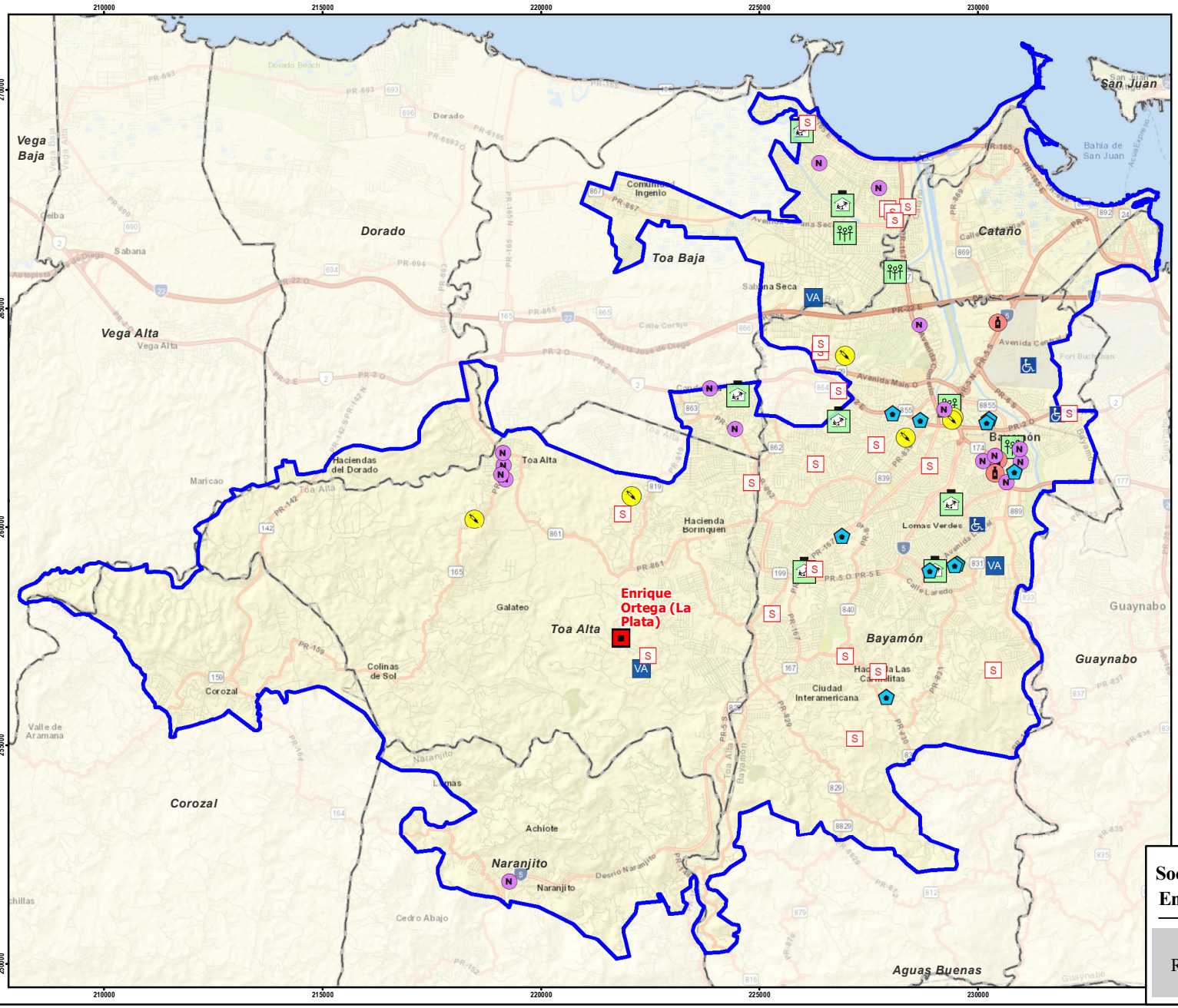
Path: A:\Projects\JUJ_Projects\01\20-0261\CIP 1709000\06Technical\X-GIS\mxd\EA_Federal_HUD\HUD_LaPlata_Exhibit41_Explosive_Hazard_Facilities_17x22_L_20250130.mxd csagis evazquez 1/30/2025




N
W E
S

Scale: 1:86,000

0 0.5 1 1.5 2 2.5 3 Kilometers

## Legend

- Enrique Ortega Water Treatment Plant (WTP)[1]
- Enrique Ortega WTP Service Area
- Municipal Boundary[3]

### Facility

- Alcoholism
- Day Care
- Drug Addition
- Family Counseling
- Mental Health
- Nutrition
- Senior Citizens
- Veterans
- With Disabilities

Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. Puerto Rico Aqueduct and Sewer Authority, 2020.
3. Puerto Rico Planning Board, 2015.
4. Service layer credits (Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community)

State Plane NAD83 Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Social Services in the Service Area of the Enrique Ortega Water Treatment Plant

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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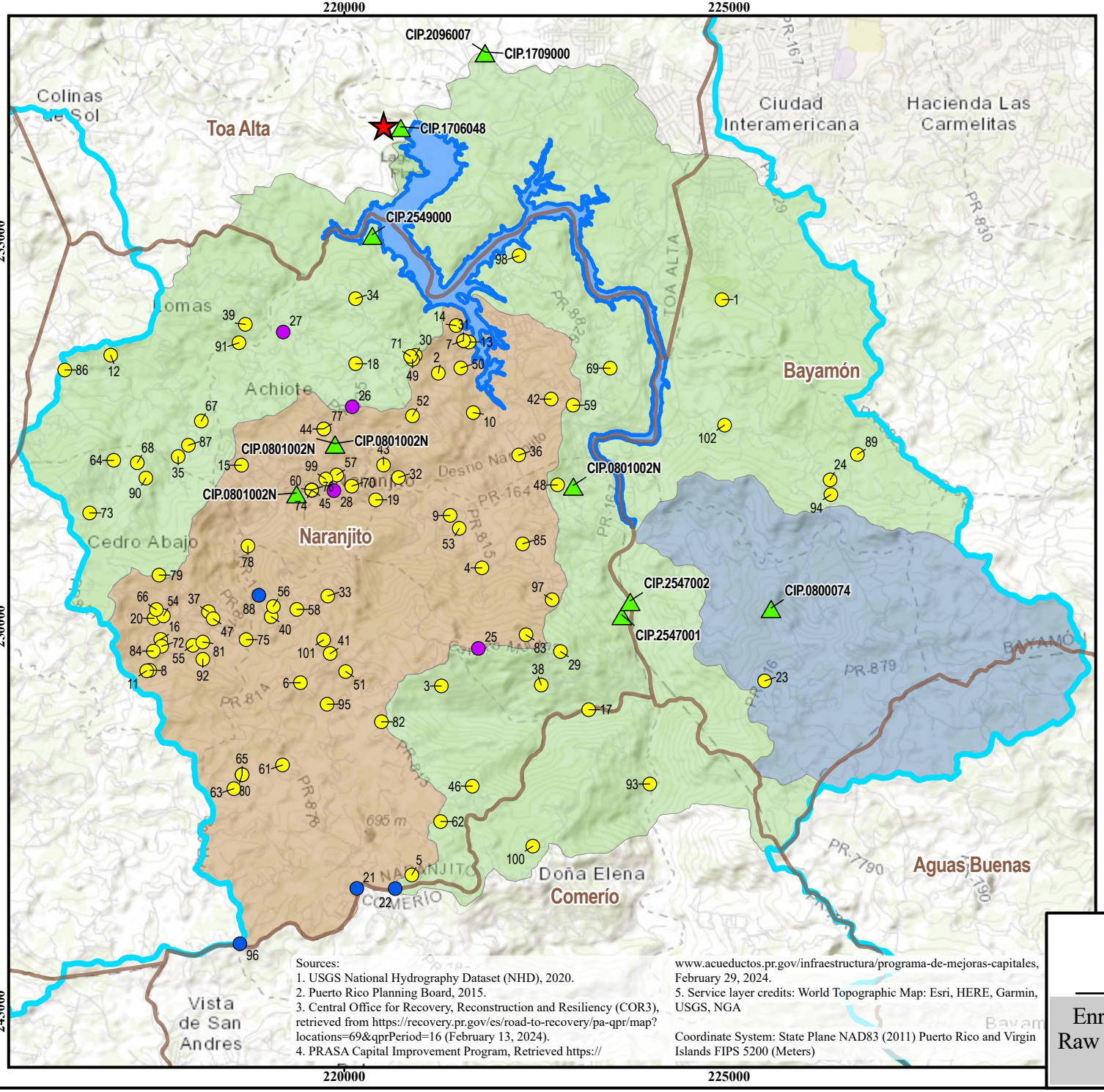
Path: A:\Projects\BJ Projects\120\209\CIP 1709000\006\Technical\N-GIS\mxd\EA_Federal_HUD\SocialServices\HUD_LaPlata_Fig_06_Enrique_Ortega_SocialServices_11x17L_20200210.mxd
caption area: 2/10/2020 5:01 PM




Scale: 1:72,000

0 0.5 1 2

Kilometers

**Legend**

- Proposed Project
- Río de la Plata Watershed[1]
- Reservoir[1]
- Municipal Limit[2]

**Subwatershed[1]**

- Río Cuesta Arriba
- Río Guadiana
- Río de la Plata at Lago La Plata Dam
- PRASA Capital Improvement Project (CIP)[4]

**FEMA Funded Permanent Works Projects Associated to Hurricane María and 2020 Earthquakes[3]**

**Sector**

- Water
- Municipality
- Transportation

Sources:
1. USGS National Hydrography Dataset (NHD), 2020.
2. Puerto Rico Planning Board, 2015.
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5. Service layer credits: World Topographic Map: Esri, HERE, Garmin, USGS, NGA

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

**Capital Improvement and Recovery Projects**

Enrique Ortega Water Treatment Plant
Raw Water Intake Power Gen (HMGP-F)
CIP 1-70-9000

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# APPENDIX B CUT & PRUNING REPORT - TREE INVENTORY

# AUTORIZACION DE CORTE Y PODA

**Instalación de Nuevos Generadores Eléctricos en la Represa La Plata**
**Toa Alta, PR**

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Clausula:

Esta Autorización de Corte, Poda Trasplante y Siembra de Árboles, fue preparada BR&A, LLC. Ninguna otra parte está autorizada a utilizar, copiar o difundir este documento a menos que se acuerde expresamente antes de utilizar el mismo. El uso por cualquier parte que no sea nuestro cliente sin nuestra aprobación será bajo su propio riesgo sin la responsabilidad del preparador.

## 1. RESUMEN EJECUTIVO

Siguiendo las disposiciones del Capítulo 3.4 Permisos de Medio Ambiente del Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operación de Negocios (Reglamento Conjunto) se preparó esta Solicitud de Autorización de Corte, Poda, Trasplante y Siembra de Árboles para la construcción del proyecto Instalación de Nuevos Generadores, Represa La Plata (el "Proyecto" o "Acción Propuesta"), localizado en la Carretera PR-5139, Km. 0.5 en el Barrio Cerrillos del Municipio Autónomo de Ponce.

## 2. OBJETIVOS:

Este estudio se realizó con el propósito de determinar los árboles existentes cercanos al área del proyecto que puedan verse afectados por el Proyecto. Los datos obtenidos serán utilizados para determinar la cantidad de árboles que serán impactados o conservados y la mitigación requerida por el Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operación de Negocios (Reglamento Conjunto) de la Junta de Planificación. Este estudio no provee información sobre el impacto actual o futuro del sistema radicular sobre estructuras existentes o propuestas.

## 3. INSPECTOR AUTORIZADO DE SIEMBRA:

Para la radicación del permiso es necesario que un Inspector Autorizado de Siembra de Siembra y Forestación (IAS) realice:

- Inspección inicial la cual consiste en Certificar que el documento a radicar este completo: Inventario de Árboles, Plano de Localización, Plano de Siembra, Evidencia de Titularidad, Cumplimiento Ambiental, Categorización de Hábitat, Cartas de Autorización y Permiso de Construcción o Notificación.
- Realizar inspección ocular para revisar el Inventario de Árboles.
- Enviar notificación escrita que el documento y el inventario de árboles y el plan de Mitigación está correcto. De no ser así, podrá enviar a revisar el Inventario.
- Una vez emitido el permiso el IAS realizará una inspección intermedia y una final.

- Realizar una inspección cada tres meses para constatar que se está cumpliendo con lo dispuesto en el permiso.
- Realizar una inspección final.
- El IAS será responsable de enviar las inspecciones a la OGPe.
- El IAS no debe realizar la siembra final requerida en el permiso, solo inspeccionar la misma.

## 4. DESCRIPCIÓN DE LAS OBRAS PROPUESTAS:

La Autoridad de Acueductos y Alcantarillados de PR (AAA) a través de BR&A, LLC, proponen el Proyecto de Instalación de 4 Generadores de Emergencia de 2,500 KW, 2 Tanques de Diesel de 30,000 Gal y un cuarto eléctrico para proveer energía y continuar las operaciones de la Represa la Plata en eventos de Emergencia por perdidas en el Suministro Eléctrico.

La Represa La Plata está localizada en la Carretera PR-827 en el Barrio Piñas del municipio de Toa Alta. Esta represa suministra entre 65 y 80 Millones de Galones a la Planta de Filtración Enrique Ortega. Actualmente la Represa cuenta con 3 Generadores, pero los mismo solo proveen energía al sistema de compuertas de la Represa. Es por esto que se instalaran estos 4 Nuevos Generadores para poder suministrar energía a la Planta de Filtración. Este proyecto beneficiará a sobre 369,000 abonados del la AAA que se sirven de esta planta.

Como parte del Proyecto, será necesario mejorar el camino de acceso existente para ampliar el mismo de forma tal que se puedan pasar los equipos para la construcción asi como los camiones que suplirán los materiales de construcción y el transporte de los 4 Generadores y los 2 Tanques de Diesel.

El área de impacto del proyecto se estima en 9,395 Mts$^2$, afectando los árboles existentes en los taludes debido a los cortes y rellenos que serán necesario para la ampliación y estabilización del nuevo camino.

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## 5. UBICACIÓN

El proyecto está ubicado la la Carretera PR-827 en el Barrio Piñas del municipio de Toa Alta.

## 6. ARBOLES EXISTENTES

La Tabla de Inventario de Arboles presenta un listado de los árboles existentes por nombre científico, nombre común, altura, DBH, condición y acción propuesta. El inventario se realizó utilizando el método de cuadriculas de muestreo contabilizando individualmente todos los árboles dentro de las cuadriculas con un Diámetro a la Altura del Pecho (DAP) (4.5 pies medidos desde la base del tronco) mayor de 4 pulgadas.

## 7. RESUMEN DE INVENTARIO:

La tabla 1.1 presenta un resumen de los árboles que se encuentran en el área de impacto del proyecto:

| Nombre Común | Nombre Científico | Total árboles en Cuadriculas | Total a Remover |
|---|---|---|---|
| **Almendro** | ***Terminalia catappa*** | 19 | 72 |
| **Casia de Siam** | ***Cassia siamea*** | 7 | 27 |
| **Ceiba** | ***Ceiba pentandra*** | 1 | 4 |
| **Guaraguao** | ***Guarea guidonia*** | 7 | 27 |
| **Jaguey** | ***Ficus citrifolia*** | 1 | 4 |
| **Maga** | ***Thespesia grandiflora*** | 2 | 8 |
| **Mango** | ***Mangifera indica*** | 3 | 10 |
| **Moca** | ***Andira inermis*** | 2 | 8 |
| **Palma Real** | ***Roystonea bonriquena*** | 5 | 19 |
| **Roble Nativo** | ***Tabebuia heterophylla*** | 1 | 4 |
| **Tulipán Africano** | ***Spathodea campanulata*** | 43 | 163 |
| **Total** | | ***91*** | **346** |

## 8. METODOLOGÍA

El inventario se realizó utilizando el método de cuadriculas de muestreo. Se identificaron individualmente todos los árboles dentro de las cuadriculas con un Diámetro a la Altura del Pecho (DAP) (4.5 pies medidos desde la base del tronco) mayor de 4 pulgadas.

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Una vez identificados los árboles que se afectarán por las obras propuestas, se determinó la mitigación requerida y se revisó que el plan de mitigación cumpliera con las disposiciones reglamentarias.

## 9. INVENTARIO DE ARBOLES – CUADRICULAS DE MUESTREO

**Datos – Área a ser Desarrollada**

- **Cantidad**: 5 cuadriculas
- **Tamaño**: 20 metros X 10 metros= 200 metros cuadrados
- **Área de la Acción propuesta:** 9,477.6137 $Mts^2$
  **Desglose de Áreas:**
- **Área del Nuevo Camino:** 4,564.3793 $Mts^2$ (Previamente Impactado)
- **Área de Const. Nuevos Generadores:** 1,113.5639 $Mts^2$ (No Vegetación)
- **Área de Corte, Relleno Construcción:** 3,799.6705 $Mts^2$ (Con Vegetación)

**Datos de la Cuadrículas:**

**Cantidad de Arboles por Cuadrículas:**

| Numero de Cuadricula | Arboles Por Cuadrículas |
|---|---|
| **1** | 19 |
| **2** | 22 |
| **3** | 19 |
| **4** | 15 |
| **5** | 16 |
| **Total** | **91** |
| **Promedio** | **18.2 por cuadrícula** |

**<u>Determinación Arboles a Removerse en el área del Proyecto:</u>**

$$\frac{18.2}{200} = \frac{X}{3{,}799.6705}$$

$$X = \frac{3{,}799.6705\ (18)}{200} = \textbf{345.77 o 346 árboles a remover}$$

**Mitigación Requerida por arboles a remover:**

346 * 3 (mitigación requerida por corte) = **1,037 árboles a Mitigar**

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**Cantidad de individuos a remover por especie- Estimado basado en la información recopilada en el inventario de árboles.**

| Nombre Común | Nombre Científico | Total árboles en Cuadriculas | Total a Remover |
|---|---|---|---|
| **Almendro** | ***Terminalia catappa*** | 19 | 72 |
| **Casia de Siam** | ***Cassia siamea*** | 7 | 27 |
| **Ceiba** | ***Ceiba pentandra*** | 1 | 4 |
| **Guaraguao** | ***Guarea guidonia*** | 7 | 27 |
| **Jaguey** | ***Ficus citrifolia*** | 1 | 4 |
| **Maga** | ***Thespesia grandiflora*** | 2 | 8 |
| **Mango** | ***Mangifera indica*** | 3 | 10 |
| **Moca** | ***Andira inermis*** | 2 | 8 |
| **Palma Real** | ***Roystonea bonriquena*** | 5 | 19 |
| **Roble Nativo** | ***Tabebuia heterophylla*** | 1 | 4 |
| **Tulipán Africano** | ***Spathodea campanulata*** | 43 | 163 |
| **Total** | | ***91*** | **346** |

**<u>Ejemplo Cálculos para determinar cantidad de árboles a remover por especie</u>**

<u>Almendro</u>

Área total de Cuadrículas= 1,600 mts$^2$ (4 cuadriculas de 400 mts$^2$)

**Área con Cubierta Forestal: 5,226.90 mts$^2$**

$$\frac{19}{1{,}000} = \frac{X}{3{,}799.6705}$$

$$X = \frac{3{,}799.6705\ (19)}{1{,}000} = 72.1937395 \text{ o } 72 \text{ árboles}$$

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## 9. PLAN DE MITIGACIÓN:

Siguiendo las disposiciones del Capítulo 3.4 Permiso Único Incidental Operacional del Reglamento Conjunto (2021) se mitigará cada árbol dependiendo del Diámetro a la Altura del Pecho (DAP) de los árboles propuestos a remover. La sección 3.4.2 Requisitos para Mitigaciones y Siembra de Árboles requiere la siembra de 3, 4 o 5 árboles por cada árbol a removerse dependiendo el DAP de los mismos.

Además, se requiere la siembra de mitigación de siembra por cuerda de terreno. La sección 3.4.2.1 del Reglamento Conjunto indica lo siguiente:

a. Todo proyecto o actividad de construcción deberá sembrar un mínimo de cinco (5) árboles por cada cuerda o fracción que sea impactada por el proyecto o actividad de construcción.
b. No se requerirá mitigación de siembra por cuerda cuando la mitigación por corte de árboles sea mayor a la mitigación por cuerda.
c. Siempre se escogerá la mitigación donde se siembra más árboles
d. No se requerirá la siembra por concepto de cabida, cuando el área de impacto del proyecto sea menor a una (1) cuerda o dicha área se encuentre previamente impactada.

La huella de impacto del Proyecto cubre 18.74 cuerdas por lo que se requiere la siembra de 94 árboles por la siembra por concepto de cabida. No obstante, la siembra por concepto de mitigación es mayor, por lo que no le aplica al Proyecto la siembra por concepto de cabida, según el inciso d de la Sección 3.4.2.1 del R.C.2020.

Además de los parámetros antes discutidos le es de aplicabilidad a este proyecto la Sección 3.4.2.4- Requisitos de Siembra por Concepto de Solares, que requiere la siembra de un árbol por cada solar a formar.

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**La tabla 1.2 muestra un resumen del Plan de Mitigación requerido para este proyecto:**

| ***Tabla 1.2*** **Plan de Mitigación** | | |
|---|---|---|
| **Requerimiento** | **Total** | **Arboles requeridos** |
| **Corte**<br>**DAP igual ó < 24" (3:1)**<br>**24"-40" (4:1)**<br>**>40" (5:1)**<br>**seco** | 346<br>0<br>0 | 1,038<br>0<br>0<br>0 |
| **Estacionamientos** | 0 | 0 |
| **Trasplante** | 0 | 0 |
| **Unidad Familiar** | 100 | 100 |
| **Siembra por Cuerda (5 árboles x cuerda)** | 9,477.6137 Mts$^2$<br>2.41 Cds | N/A Mitigación por corte es Mayor |
| **Total** | | **1,038** |
| ***Nota:** Sección 3.4.2.1 establece que siempre se escogerá la mitigación donde se siembra más arboles entre mitigación y siembra de árboles por cuerda. Para este Proyecto aplica la siembra por mitigación. | | |

El número total de árboles necesarios para mitigar las actividades propuestas será de **1,038** ***árboles*** en base a los Requerimientos del **Capítulo 3.4 Permisos de Medio Ambiente del Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operación de Negocios (Reglamento Conjunto).**

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Este Plan de Mitigación se realizará en cumplimiento con lo establecido en el Reglamento Conjunto, **Sección 3.4.4.5 Siembra de Árboles Mediante Compensación Monetaria, Incisos:**

a. Esta alternativa se considerará para cubrir el costo parcial o total de la siembra y el mantenimiento de árboles en aquellos casos en donde no es posible realizar la misma.
b. La aportación monetaria será ingresada en la cuenta especial de reforestación o a la cuenta especial del Programa de Patrimonio Natural, ambas administradas por el DRNA, y será utilizada al amparo de lo establecido en la Ley 195-1998, según enmendada, conocida como Ley para Crear el Programa de Reforestación, Administración y Conservación de Recursos Vivientes en el DRNA, según enmendada; y la Ley 150-1998, conocida como Ley de Programa de Patrimonio Natural de Puerto Rico.
c. El costo que se establece en este Reglamento para cada árbol es de cien dólares ($100.00). Entiéndase que este es un valor económico estimado comparable con la siembra y mantenimiento de un árbol según los estándares establecidos en este Reglamento. Este costo será revisado por el DRNA cada cinco (5) años, hecho que será notificado a la OGPe.
d. Para proyectos de infraestructura pública, promovidos por el Gobierno o de interés social, el Secretario del DRNA tendrá la discreción de disminuir este valor.

Por lo tanto, para compensar la **Mitigación de 1,038 árboles** requeridos como mitigación el **peticionario realizará el pago correspondiente de $ 103,800.00** los cuáles serán ingresado en la ***Cuenta Especial de Reforestación o a la Cuenta Especial del Programa de Patrimonio Natural,*** ambas administradas por el DRNA.

**Cálculo de Pago por Compensación Monetaria**

**1,038 árboles a mitigar x $100.00 = $103,800.00**

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# 10. PLAN DE MANTENIMIENTO

## Especificaciones de Manejo

Las siguientes especificaciones de manejo deberán ser cumplidas a cabalidad por el proponente y/o los contratistas encargados del proyecto.

**Medidas a seguir para el Movimiento de Tierra**

Durante las actividades de limpieza y movimiento de tierra, antes de comenzar las actividades de construcción, se deben seguir las siguientes recomendaciones para propiciar un manejo adecuado de los suelos presentes en el predio. Las recomendaciones generales para el Proyecto son las siguientes:

1. Toda la capa vegetativa, Horizonte "A", de la superficie del área de impacto deberá removerse y almacenarse para luego usarla. Esta capa generalmente contiene los elementos básicos necesarios para el crecimiento adecuado de los árboles y plantas que sean sembrados en el área.

2. Del suelo del Horizonte "B" o subsuelo se removerá 12 pulgadas y se almacenarán para utilizarlas más adelante.

3. Si al hacer los cortes quedan expuestas áreas en roca, las mismas no se restaurarán.

4. Donde la roca no quede expuesta, estas áreas serán compactadas añadiéndole capa vegetal y grama.

5. Siguiendo las especificaciones para acondicionar el terreno para la siembra de árboles, en dichas áreas se depositará primeramente el suelo del Horizonte "A", con algún material orgánico, de ser posible, y luego se depositará el Horizonte "B" estabilizándose con grama y utilizar el "polyjute" para mantener fijo el terreno.

6. Se procederá con la siembra de árboles en los taludes una vez la grama se haya establecido.

7. No se removerá ni se almacenará material a una distancia no menor de 10 metros de las colindancias o servidumbres de paso existentes. Esto evita que durante periodos de lluvia el material pueda salir del área del Proyecto.

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8. La erosión es un factor detrimental donde haya taludes. Para evitar la erosión al mínimo, los taludes se cubrirán con "Polyjute" dándole oportunidad a que la grama crezca y cubra los mismos, evitando así la posibilidad de que estos sedimentos salgan fuera del área del Proyecto.

9. Se procederá con la siembra de árboles a lo largo de las calles de acceso y en el área propuesta para desarrollo según avancen las tareas de construcción.

**Manejo de Escorrentías**

1. Las escorrentías generadas durante la fase de construcción del proyecto, serán controladas utilizando barreras vegetativas y las prácticas requeridas en el Plan de Control de Erosión y Sedimentación (CES).

2. Se utilizarán todas las medidas disponibles para controlar y evitar la entrada de sedimentos a las servidumbres de paso y colindantes existentes (materiales sintéticos, zanjas de desviación, reinstalación de la cobertura vegetal, pacas de heno, etc.).

3. Las aguas de escorrentía serán dirigidas a áreas con menor riesgo de erosión para controlar la entrada de sedimentos, residuos vegetales o basura que obstruyan el flujo natural de las aguas.

## Sembrado

Es importante hacer el hoyo grande que proporcione el espacio suficiente para las raíces del árbol que será sembrado. El agujero debe tener un diámetro que exceda en dos pies del diámetro de la bola de las raíces y debe tener la misma profundidad. No agregue sustancias para mejorar el suelo.

Se sugiere las siguientes recomendaciones para la siembra del árbol:

1. Limpiar el área de la vegetación, en forma circular, de por lo menos 6 pulgadas más ancho que el diámetro del hoyo que será usado para sembrar el árbol.

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2. Hacer el hoyo más grande y más profundo que la masa de las raíces del árbol que será sembrado (aproximadamente 2 pies más ancho y 6 pulgadas más en la profundidad)

3. Remover el terreno del fondo del hoyo para que las raíces puedan adherirse y crecer más rápido.

4. Guardar la tierra extraída del hoyo para mezclarla en una proporción de 1:1 con material orgánico.

5. Utilizará esta tierra para sembrar el árbol.

6. Saque el árbol del envase sin alterar las raíces. Remueva la tela de saco, sino es de material biodegradable, y retire cualquier cuerda de nilón o alambre para evitar que lo estrangule.

7. Coloque el árbol en el agujero, a la misma profundidad a la cual creció en el vivero. Cerciórese de que el tronco esté derecho.

## Árboles en Envases

Si el árbol a sembrarse está en un envase se proponen las siguientes recomendaciones:

1. Remover con mucho cuidado para no afectar la masa de raíces.

2. Si el envase tiene forma cónica y los lados acanalados se debe recostarlo sobre uno de sus lados y golpearlo varias veces en el borde para aflojar y sacar el árbol.

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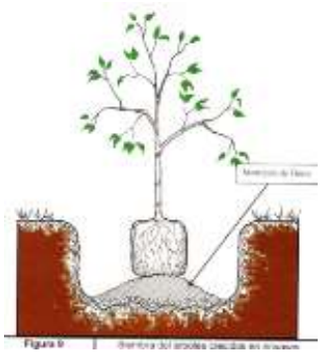
3. Una vez el árbol este fuera del envase se procederá a sembrarlo.
4. Al trasplantar el árbol se sujetará por la masa de raíces y el tallo.
5. Colocar al árbol en el montículo de tierra en el hoyo y echar el resto de la mezcla de tierra.
6. Apretar la tierra alrededor del árbol de manera que se asiente. Asegúrese que no queden bolsillos de aire en el terreno.
7. En este proceso, se debe tener cuidado de no apretar demasiado la tierra, ya que esto puede evitar que el agua penetre a las raíces.
8. Construir un cerco de tierra alrededor del borde del hoyo para formar un pequeño estanque en forma de plato.
9. Finalmente hidrate bien el árbol.



**Árboles de Raíces Descubiertas**

Si el árbol es trasplantado del suelo, debe proceder con las siguientes instrucciones:

1. Colocar las raíces del árbol en un envase con agua o mantenerlas cubiertas para mantener humedad.
2. Colocar la raíz central hacia abajo a través del centro del montículo de tierra.
3. Acomodar cuidadosamente las raíces laterales de forma que puedan crecer naturalmente.
4. Cortar las raíces dañadas.

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5. Llenar dos terceras (2/3) partes del hoyo con tierra preparada, regando la tierra alrededor de las raíces.

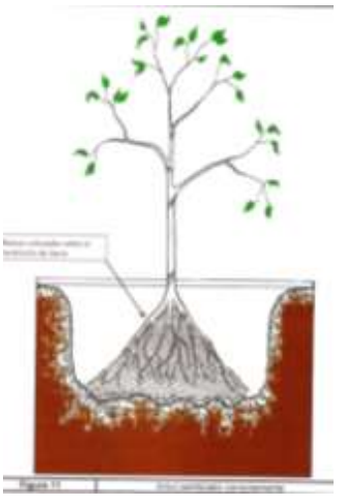
6. Añadir bastante agua para eliminar los sacos de aire en la tierra.

7. Luego que el agua se haya escurrido, acabar de llenar el hoy con la tierra restante.

8. Construir un cerco de tierra alrededor del borde del hoyo para formar un pequeño estanque en forma de plato.

9. Al final, proceda a hidratar bien el árbol.

10. Colocar sobre el terreno de cada árbol una capa de "Proseed Weed Control Tree Ring" para evitar que el árbol pierda humedad rápidamente.



11. Colocar un protector de tronco "TreeMaster Tree Protector" para proteger el tronco del árbol contra daños mecánicos provocados por la podadora u otros materiales o equipos, tales como "trimmers", etc.

**Uso de Estacas**

Utilice estacas solamente si es necesario. Los árboles generalmente se desarrollan mejor si crecen sin estacas. Pero en muchos casos, los árboles necesitan apoyo y protección por una o varios de los siguientes motivos (para proteger el tronco de maquinarias, para impedir movimiento excesivo durante el periodo de desarrollo de las nuevas raíces y/o para sostener un

tronco débil en una posición perpendicular). Luego de haber sembrado el árbol si se determina el uso de las estacas proceda de la siguiente manera:

1. Utilice estacas de 2 pulgadas por 2 pulgadas, tan cortas como sea posible, pero a la vez de una altura adecuada para que el árbol se quede derecho.
2. Amarre el árbol a un mismo nivel
3. No debe permitirse que las estacas rocen el tronco y las ramas
4. Utilice las estacas durante el menor tiempo posible, usualmente durante un año.
5. La colocación de estacas es costosa y tarda en hacerse por lo que deben usase solamente cuando sea necesario.
6. En los árboles pequeños (menos de 3 pies de altura)
    a. Colocar una estaca del lado de donde proviene el viento. Utilizar estacas de madera sin tratar o tubos de metal para evitar que los químicos puedan afectar el árbol. Las estacas serán ancladas fuera del terreno del hoyo.
    b. Sujetar el tallo de árbol con un tensor de alambre. Colocar un pedazo de goma alrededor del alambre de manera que no dañe el tallo.
7. En árboles que midan más de 3 pies de altura:
    a. Utilice tres estacas.
    b. Tener cuidado al proporcionarle tensión, debe ser la misma en todas las estacas.
    c. Verificar mensualmente el estado de las estacas así como el alambre cubierto de goma para evitar que se entierre en el tallo a medida que el árbol crece.

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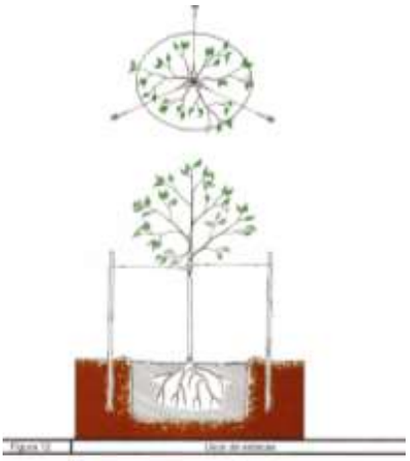
d. Continuar este proceso hasta que el árbol sea lo suficientemente fuerte para sostenerse.

e. Revisar el anclaje mensualmente y verificar si estos están en buenas condiciones y no se han aflojado



**Poda de Árboles Recién Sembrados**

La poda puede ser necesaria en el momento de la siembra, con el propósito de remover ramas secas o estropeadas, ramas entrecruzadas o que se rozan, horquetas muy cerradas o en forma de V, y/o retoños principales múltiples (deje un solo retoño principal). Lo siguiente debe considerarse en el momento de la poda:

1. Podar los árboles mayores de 6 pies al momento de sembrarlos para reducir el consumo de agua hasta que el sistema de raíces se haya establecido.

2. No podar más de una tercera (1/3) parte del follaje del árbol.

3. Utilice la instrumentación adecuada para la práctica de la poda.

Cuando los árboles hayan crecido durante una estación, pódelos para darles la forma deseada. Cuando un árbol joven ese encuentra en periodo de crecimiento, puede utilizarse la poda periódica, para controlar su forma y altura. Es importante proceder con los cortes adecuados para garantizar la salud y el buen estado del árbol.

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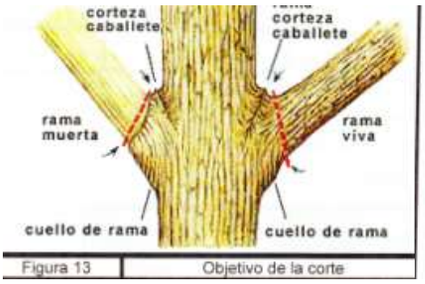
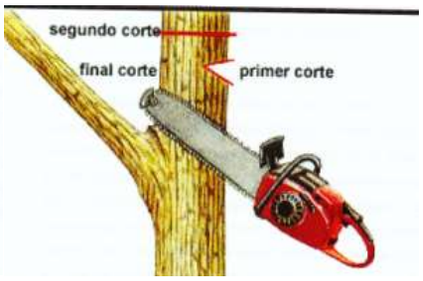



Figura 13 Objetivo de la corte




**Regado**

Durante los primeros años, por lo menos, la supervivencia del árbol depende del riego regular durante las épocas de sequía. Si el árbol se encuentra protegido contra la pérdida de humedad por la viruta bastará regarlo abundantemente una vez por semana.

Inicialmente durante el proceso de adaptación en el cual el árbol esta recién sembrado se debe:

1. Regar los árboles recién sembrados diariamente en periodos largos y profusos por un mínimo de seis (6) meses.
2. Luego irá alternando la frecuencia del riego, haciéndolo más espaciado: cada dos días de seis (6) a nueve (9) meses, cada cuatro (4) días de nueve (9) meses a un (1) año, etc.
3. Instalación de un sistema de riego por goteo podría ser una alternativa para el área, teniendo en consideración lo imitado de la lluvia en el lugar.
4. De ser necesario, extender este proceso de acuerdo a las necesidades de los árboles.
5. Mantener el círculo alrededor del árbol libre de hierbas por varios años.

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**Resumen de Inventario**

Cantidad de individuos a remover por especie- Estimado basado en la información recopilada en el inventario de árboles.

| Nombre Común | Nombre Científico | Total árboles en Cuadriculas | Total a Remover |
|---|---|---|---|
| **Almendro** | ***Terminalia catappa*** | 19 | 72 |
| **Casia de Siam** | ***Cassia siamea*** | 7 | 27 |
| **Ceiba** | ***Ceiba pentandra*** | 1 | 4 |
| **Guaraguao** | ***Guarea guidonia*** | 7 | 27 |
| **Jaguey** | ***Ficus citrifolia*** | 1 | 4 |
| **Maga** | ***Thespesia grandiflora*** | 2 | 8 |
| **Mango** | ***Mangifera indica*** | 3 | 10 |
| **Moca** | ***Andira inermis*** | 2 | 8 |
| **Palma Real** | ***Roystonea bonriquena*** | 5 | 19 |
| **Roble Nativo** | ***Tabebuia heterophylla*** | 1 | 4 |
| **Tulipán Africano** | ***Spathodea campanulata*** | 43 | 163 |
| **Total** | | ***91*** | **346** |

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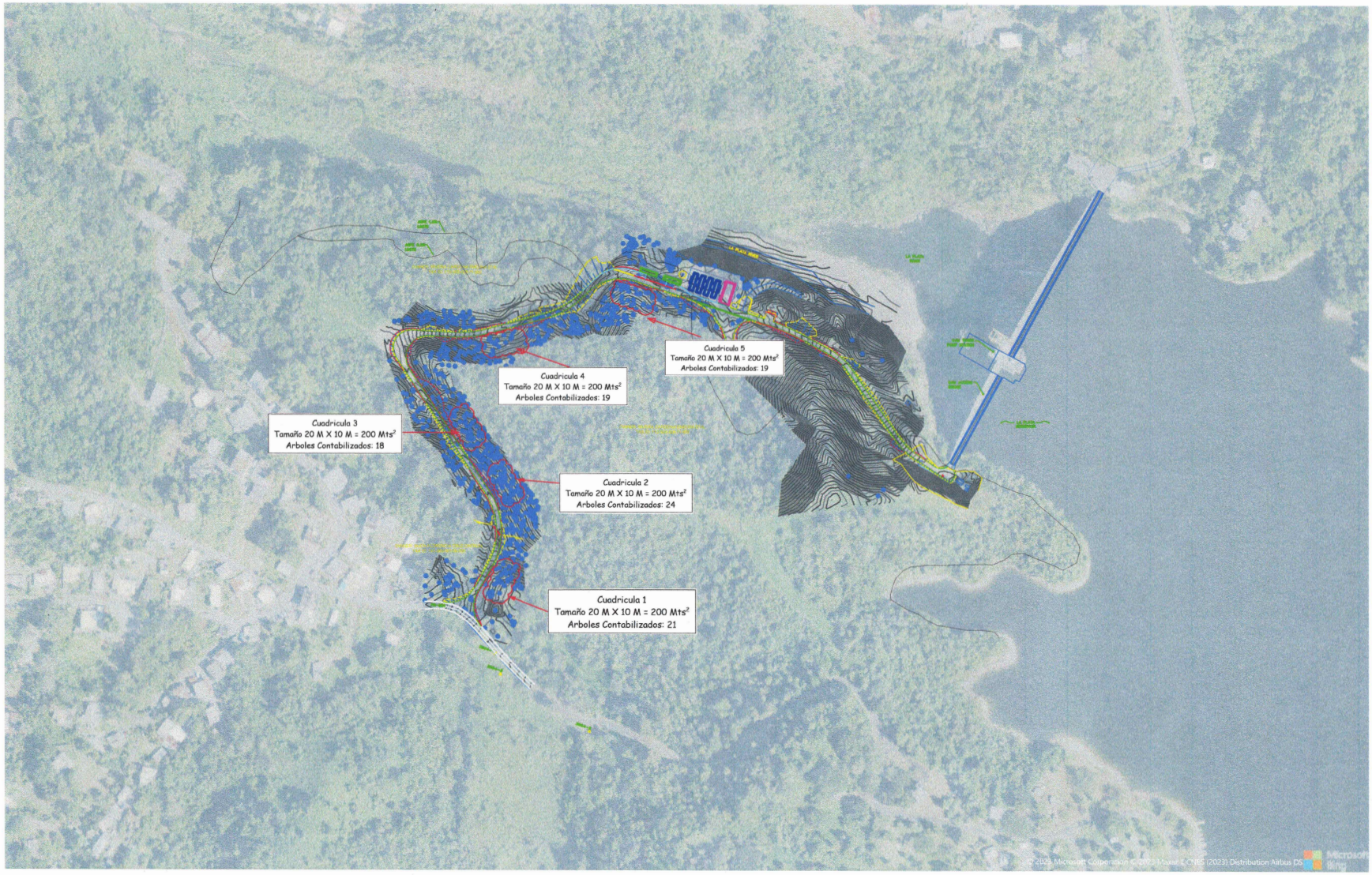
**9 de octubre de 2023**

# PLANO DE INVENTARIO DE ÁRBOLES POR MÉTODO DE CUADRICULAS DE MUESTREO

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS

TOA ALTA, PR

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

SHEET NO. OF

FECHA
9 DE OCTUBRE DE 2023

# APPENDIX C FLORA AND FAUNA STUDY

# ESTUDIO DE FLORA Y FAUNA TERRESTRE

## Construcción de Área de Generadores de Energía en la Toma de Agua Cruda de la Planta de Tratamiento de Agua Enrique Ortega, Toa Alta Puerto Rico

CIP 1-70-9000

Septiembre 2023

Autoridad de Acueductos y Alcantarillados
ESTADO LIBRE ASOCIADO DE PUERTO RICO

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# 1 RESUMEN EJECUTIVO

La Autoridad de Acueductos y Alcantarillados de Puerto Rico (AAA) opera la Toma de Agua Cruda de la Planta de Tratamiento de Aguas Enrique Ortega (Represa La Plata) la cual se encuentra ubicada al suroeste del muro de la Represa La Plata (Coordenadas: 18° 20'36.90" N, -66° 14'19.24" W) en carretera PR-824, km. 5.0 en el Camino Municipal Recreativo La Plata en el barrio Quebrada Cruz del municipio de Toa Alta.

La AAA propone la construcción de un Área de Generadores de Energía en la Toma de Agua Cruda de la Planta de Tratamiento de Aguas Enrique Ortega para abordar el abastecimiento de Agua Potable Segura a una población de más de 369,000 personas de los municipios de Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño y Corozal. Esta acción consiste en la instalación de cuatro generadores y la construcción de una plataforma de concreto donde se instalarán los generadores y sus componentes. Estas actuaciones propuestas implican la adquisición del *right of way* de 2.744,56 $m^2$ de terreno para poder realizar los movimientos de tierra necesarios para que los vehículos asignados puedan maniobrar en el área de mantenimiento. El proyecto respalda los objetivos de la AAA de reducir la vulnerabilidad de las facilidades críticas ante un peligro y/o desastre natural.

*CSA Architects & Engineers* (CSA) ha sido contratado para realizar un Estudio de Flora y Fauna Terrestre, como parte de los estudios suplementarios al documento ambiental que se realizará para el proyecto propuesto. El propósito de este estudio es evaluar y describir la flora y fauna general de los predios propuestos para la construcción del proyecto, las diferentes asociaciones ecológicas existentes, determinar la presencia de especies críticas, amenazadas o en peligro de extinción en el área del proyecto y recomendar medidas para reducir o eliminar los posibles impactos del proyecto sobre estos recursos.

Los hallazgos se resumen a continuación:

- En el área propuesta para el proyecto se identificaron ochenta y cinco (85) especies de plantas correspondientes a treinta y ocho (38) familias.

- Se identificó a través de la extensión del predio propuesto, una (1) asociación vegetativa principal que se clasifica como: *Áreas de terreno previamente impactados (100%)*. Entre las especies de flora identificadas en esta zona se encuentran mayormente yerbas comunes como Paragüita rosada (*Chloris barbata*), Pata de gallina (*Digitaria horizontalis*), Yerba rosada (*Melinis repens*), Margarita silvestre (*Bidens alba*), Hierba socialista (*Cyanthillium cinereum*), Huye-que-te-cojo (*Emilia sonchifolia*), Clavelito colorado (*Emilia fosbergii*), *Eupatorium capillifolium*, Guaco falso (*Mikania micrantha*), Pancha (*Tridax procumbens*).

- En cuanto a la fauna se refiere, se observó un total de treinta y tres (33) especies, siendo las aves el grupo dominante. Las especies de aves más comunes en el predio y áreas circundantes son: Paloma turca (*Patagioenas squamosa*), Comeñame (*Loxigilla portoricensis)*, Reinita mariposera *(Dendroica adelaidae)*, Rolita (*Columbina passerina*), Pitirre (*Tyrannus*

*dominicensis*). Adicional, se observaron especies endémicas como el San Pedrito (*Todus mexicanus*), Pájaro bobo mayor (*Coccyzus vieilloti*) y el Pájaro carpintero (*Melanerpes portoricensis*).

Durante el estudio no se observaron especies críticas, amenazadas o en peligro de extinción. El banco de Datos del Servicio de Vida y Pesca de los Estados Unidos (USFWLS, por sus siglas en inglés) a través de su herramienta de Información para Planificación y Consulta (IPaC, por sus siglas en inglés) identificó para el área una especie catalogada como en peligro o amenazadas.

## 2 INTRODUCCIÓN

La Autoridad de Acueductos y Alcantarillados (AAA) por medio del Programa de Subvención para la Mitigación de Riesgos 404 (HMGO, por sus siglas en inglés), de la Agencia Federal para el Manejo de Emergencias (FEMA, por sus siglas en inglés), propone la instalación de cuatro generadores de 2,500 kW y y la construcción de una plataforma de concreto donde se instalarán los generadores y sus componente en la Toma de Agua Cruda de la Planta de Tratamiento de Aguas Enrique Ortega (Represa La Plata) en el Municipio de Toa Alta.

Actualmente la Toma de Agua Cruda de la Planta de Tratamiento de Aguas Enrique Ortega se encuentra en la Represa La Plata. Sus instalaciones cuentan con tres generadores, pero solo suministran energía de respaldo al sistema de compuerta de la presa, los edificios de oficinas y la iluminación exterior, lo que deja a la estación de bombeo de agua cruda sin energía durante un corte o cuando falla el sistema de la Autoridad de Energía Eléctrica de Puerto Rico (AEE). Como consecuencia, la Planta de Tratamiento de Aguas Crudas Enrique Ortega deja de suministrar Agua Segura Potable a sus clientes. La instalación de los generadores y sus componentes brindará energía de respaldo a la Estación de Bombeo de la Toma de Agua Cruda, bomba de sumidero, motor del sistema de compuertas, uno de los edificios de oficinas, iluminación exterior y sistemas de seguridad de la Toma de Agua Bruta de La Plata.

En el área de estudio no existen líneas de alta tensión, por lo que la acción propuesta requiere la colocación de conductos eléctricos subterráneos desde el predio donde se instalan los generadores hasta la Represa La Plata y continuar la ampliación de los conductos desde donde comienza la represa hasta la torre de la toma para interceptar la infraestructura eléctrica existente en la represa. Además, se colocaría un sistema de iluminación, postes, en el área del proyecto y en las vías pavimentadas.

El proyecto se ubicará al suroeste del muro de la Represa La Plata (Coordenadas: 18° 20'36.90" N, -66° 14'19.24" W) en el Barrio Quebrada Cruz, Toa Alta. (Favor hacer referencia a la ***Figura 1. Foto Aérea Mostrando el Área del Proyecto***). El proyecto ocupará una superficie total de 6.968 $m^2$ de terreno, que se divide en las siguientes zonas:

- Camino de acceso= 4,284 $m^2$
- Ampliación de vía de camino para viraje de camiones = 489 $m^2$
- Área de generadores y tanques de diésel = 1,278 $m^2$
- Área sugerida para el *staging area* para el contratista = 917 $m^2$

El proyecto propuesto incluye:

1. Instalación de cuatro generadores con capacidad de 2,500 kW, dos tanques de almacenamiento de diésel con capacidad de 30,000 galones cada uno, un cuarto eléctrico, tres estacionamientos y un área de despacho de combustible. (Favor hacer referencia a la ***Figura 2. Diseño Conceptual Propuesto para los Componentes del Proyecto***).
2. Construcción de una plataforma de hormigón de 20 m x 40 m para la colocación de los generadores e infraestructuras mencionadas en el punto anterior.

3. Construcción de un camino de acceso asfaltado sobre un camino de tierra de aproximadamente 740 m de largo y 4 m de ancho con zanjas de 1 m de ancho a los lados para desviar el escurrimiento.
4. Rellenar con hormigón el área donde se colocarían los generadores.
5. Remoción de la corteza terrestre para ensanchar el camino pavimentado para un mejor viraje del camión que suministrará el diésel a los generadores.
6. Colocación de portón de acceso en la entrada.
7. Instalación de líneas eléctricas subterráneas que irán desde los generadores hasta la entrada del edificio de bombas de la represa.
8. Instalación de conductos adheridos a la estructura de la represa a la torre de la toma de la represa para conexión a la infraestructura eléctrica existente.
9. Preparación de un área "*staging area*" para la colocación de maquinaria pesada durante la fase de construcción del proyecto.

Este documento constituye el Estudio de Flora y Fauna Terrestre, como parte de los estudios suplementarios al documento ambiental que se realizará para el proyecto propuesto. El propósito de este estudio es evaluar y describir la flora y fauna general del lugar propuesto, las diferentes asociaciones ecológicas existentes, determinar la presencia de especies críticas, amenazadas o en peligro de extinción en el área del proyecto y recomendar medidas para reducir o eliminar los posibles impactos del proyecto sobre estos recursos.

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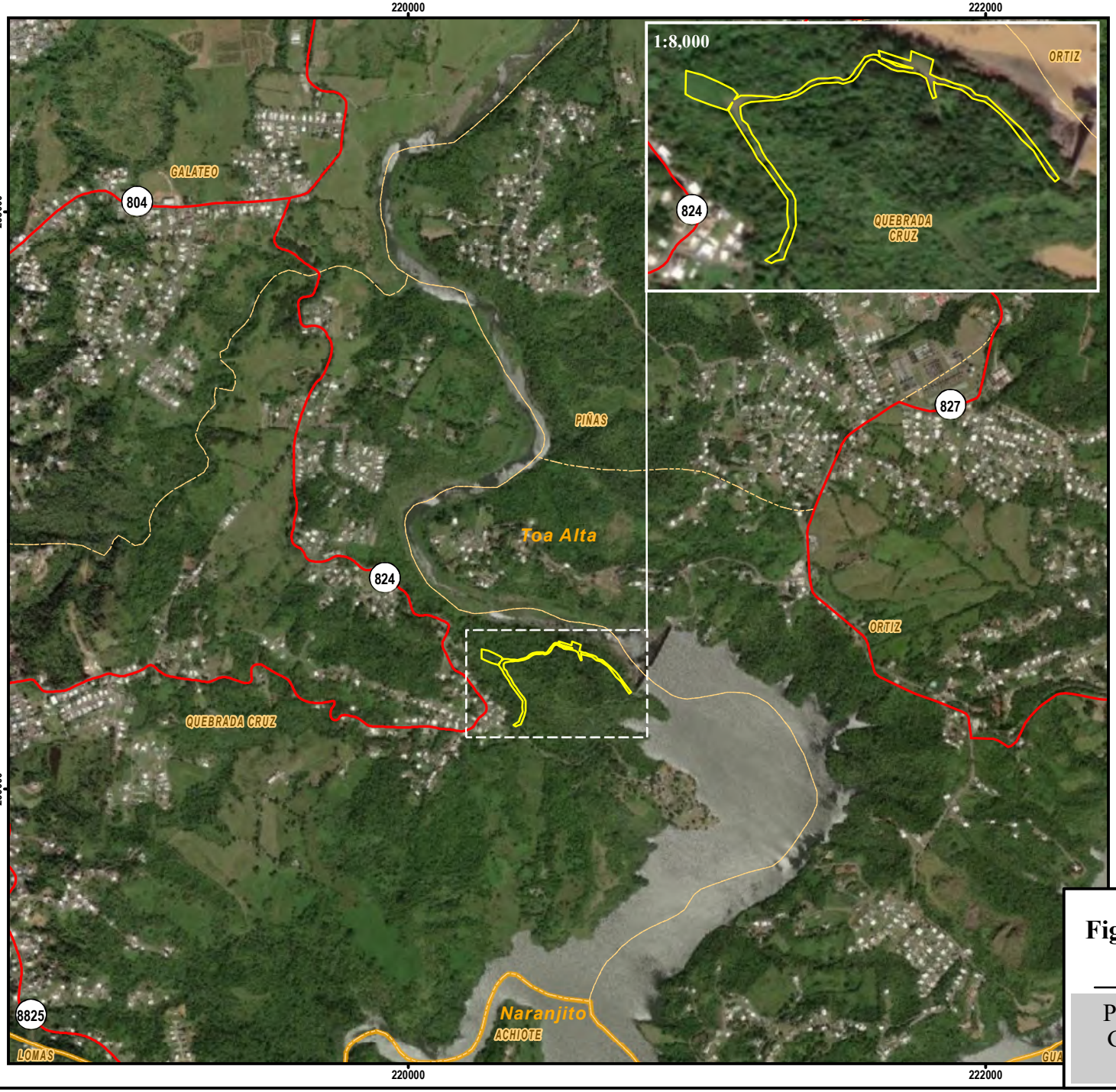


N
W E
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Escala: 1:20,000

0 250 500 metros

X: 220,581.893 m
Y: 256,488.487 m

## Leyenda

- Límite del Proyecto Propuesto*
- Carretera estatal[1]
- Límite de barrio[2]
- Límite municipal[3]

*Límite aproximado

Fuentes:
1. Autoridad de Carreteras y Transportación (ACT), 2020.
2. Junta de Planificación de Puerto Rico, 2015.
3. Créditos de la capa de servicio (Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community)

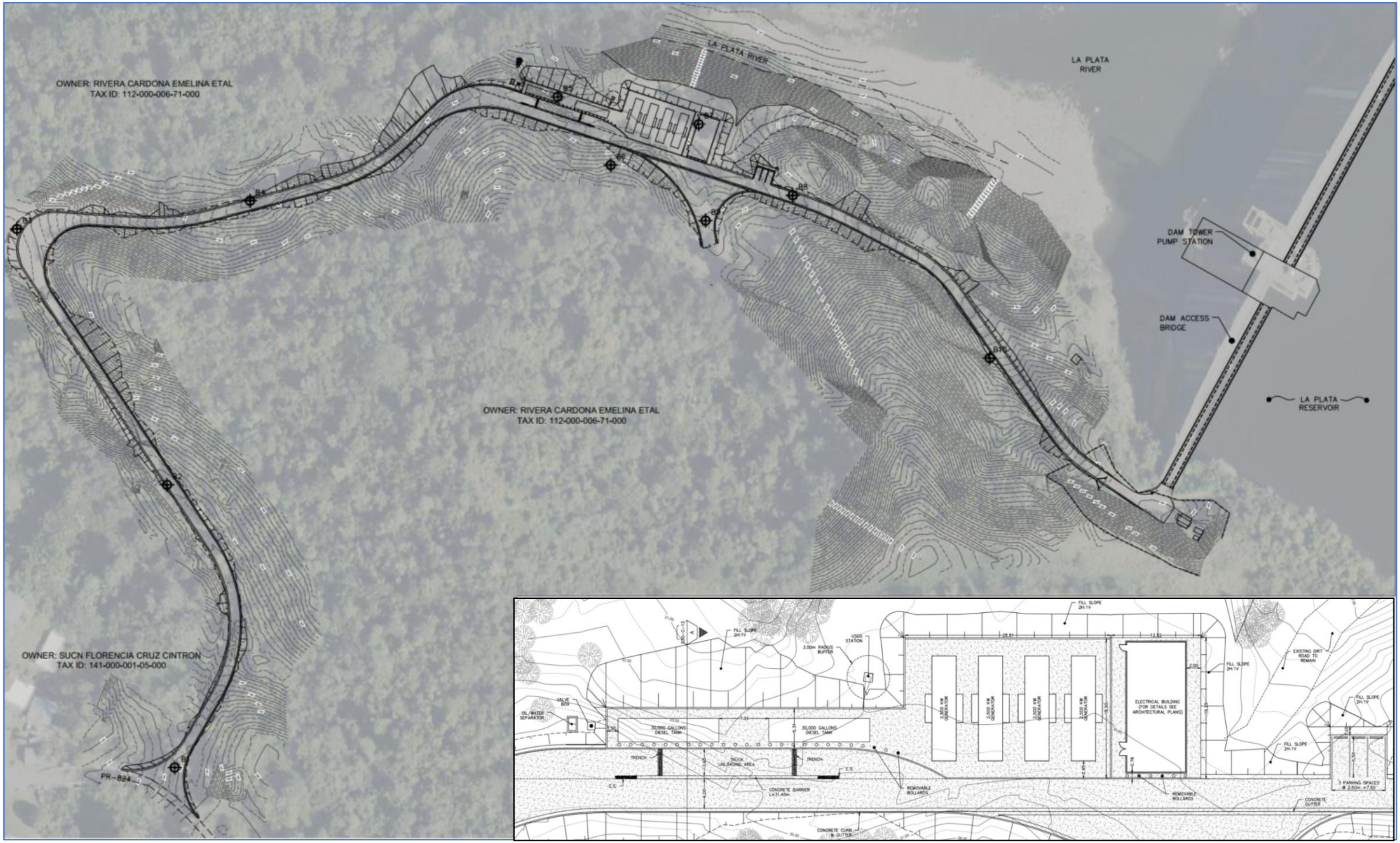
Sistema de Coordenadas:
Coordenadas Planas NAD83 Puerto Rico e Islas Vírgenes
FIPS 5200 (metros)

CSA-LOUIS BERGER JV LLC
PRASA PMC

# Figura 1: Foto Aérea Mostrando el Área del Proyecto

Planta de Filtración Enrique Ortega
Generadores Toma de Agua Cruda
CIP 1-70-9000

**Figura 2. Diseño Conceptual Propuesto para los Componentes del Proyecto**



# 3 DESCRIPCIÓN GENERAL DEL ÁREA

El espacio designado para la colocación de los generadores y su infraestructura ubica en barrio Quebrada Cruz de Toa Alta. El Municipio de Toa Alta; a su vez se localiza en el margen de dos regiones fisiográficas de Puerto Rico: la región del Carso del norte y la del interior montañoso central. Toa Alta pertenece a la porción oriental de la región denominada Llano Costero del Norte.

El área propuesta posee una extensión aproximada de 1,278 $m^{2,}$ y se localiza al suroeste del muro de la Represa La Plata. Esta área pertenece a un lote propiedad de la AAA que colinda con el Refugio de Vida Silvestre del Embalse La Plata y la Finca Vizcarrondo, sin embargo, no forma parte de la delimitación de las reservas naturales. A su vez el área posee un camino de tierra, en buen estado y con poca vegetación, que conduce a la zona donde se propone la colocación de los generadores. La extensión del área propuesta, incluyendo el camino en tierra, fueron utilizados como parte del proyecto de reparación de socavaciones en la base de la Represa La Plata en los años 2021 y 2022. En la actualidad el área donde se instalarán los generadores, está cubierta por pastos, hierbas comunes y arbustos de rápido crecimiento característicos de suelos impactados y áreas abandonadas. En las áreas circundantes, y fuera de la huella que impactaría el proyecto propuesto, se observan, parchos boscosos de sucesión secundaria compuestos por árboles maduros.

A su vez, en el área propuesta objeto de esta evaluación, se encuentra la estación de monitoreo hidrológico del Río de la Plata (USGS 50045010). En la zona aún se puede distinguir parte del relleno de lo que fue el proyecto de reparaciones de la represa.

El proyecto requerirá la adquisición del terreno de servidumbre de vía del camino de acceso y la adquisición adicional de aproximadamente 2,744.56 $m^2$. Esta extensión de terreno se adquirirá a partir de parcelas, con números de catastro 112-000-006-71-000 y 141-000-001-05, según se presenta en el sitio web digital del Centro de Recaudación de Ingresos Municipales (CRIM).

## 3.1 ZONAS ECOLÓGICAS DE VIDA

Las asociaciones de zona de vida de Holdridge se usan comúnmente para describir la vegetación en Puerto Rico (Ewel, y Whitmore, 1973). Los terrenos propuestos localizan dentro de la zona de vida clasificada como *Bosque Muy Húmedo Subtropical*.

> ***Bosque Muy Húmedo Subtropical:*** Esta zona ocupa la mayoría de las partes altas de las cordilleras en Puerto Rico. Es una zona de precipitación abundante, con promedios entre 80 y 160 pulgadas por año. Los helechos, las bromeliáceas y las orquídeas epífitas (que viven sobre otros árboles) son comunes. El bosque es relativamente rico en estas especies y las tasas de crecimiento de algunos árboles son rápidas al compararse con otras zonas boscosas. Restos de bosques maduros existen en los Bosques Estatales de Carite y Toro

Negro y en el Bosque Experimental de Luquillo. Esta zona contiene más de 150 especies de árboles, y forma una cubierta boscosa verde oscuro densa, de hasta 20 metros de altura.

Algunas especies comunes de la zona del ***Bosque Muy Húmedo Subtropical*** son el Tabonuco (*Dacryodes excelsa*), Cacao motillo (*Sloanea berteroniana*), Ausubo (*Manilkara bidentata*), Higuillo (*Piper aduncum*), Guano (*Ochroma lagopus*), Palma de Sierra (*Prestoea montana*), Yagrumo hembra (*Cecropia shreberiana*) y Yagrumo macho (*Schefflera morototoni*).

## 3.2 CLIMATOLOGÍA

El clima del Municipio de Toa Alta está dominado por la influencia oceánica tropical y los vientos alisios. Esta combinación ha hecho que prevalezca un clima tropical marino que esta grandemente influenciado por el efecto orográfico del interior montañoso central. Las vertientes septentrional y oriental de la Isla hacen de estas áreas las de mayor pluviosidad debido al efecto orográfico de la Cordillera Central.

La temperatura promedio anual del municipio es de 77°F y la precipitación promedio anual es de 80 pulgadas, siendo los meses de noviembre hasta abril los más secos, y los meses de mayo, agosto, septiembre y octubre los más lluviosos. La dirección dominante de los vientos es del este, nordeste y sudeste, dominando con mayor frecuencia los dos primeros cuadrantes.

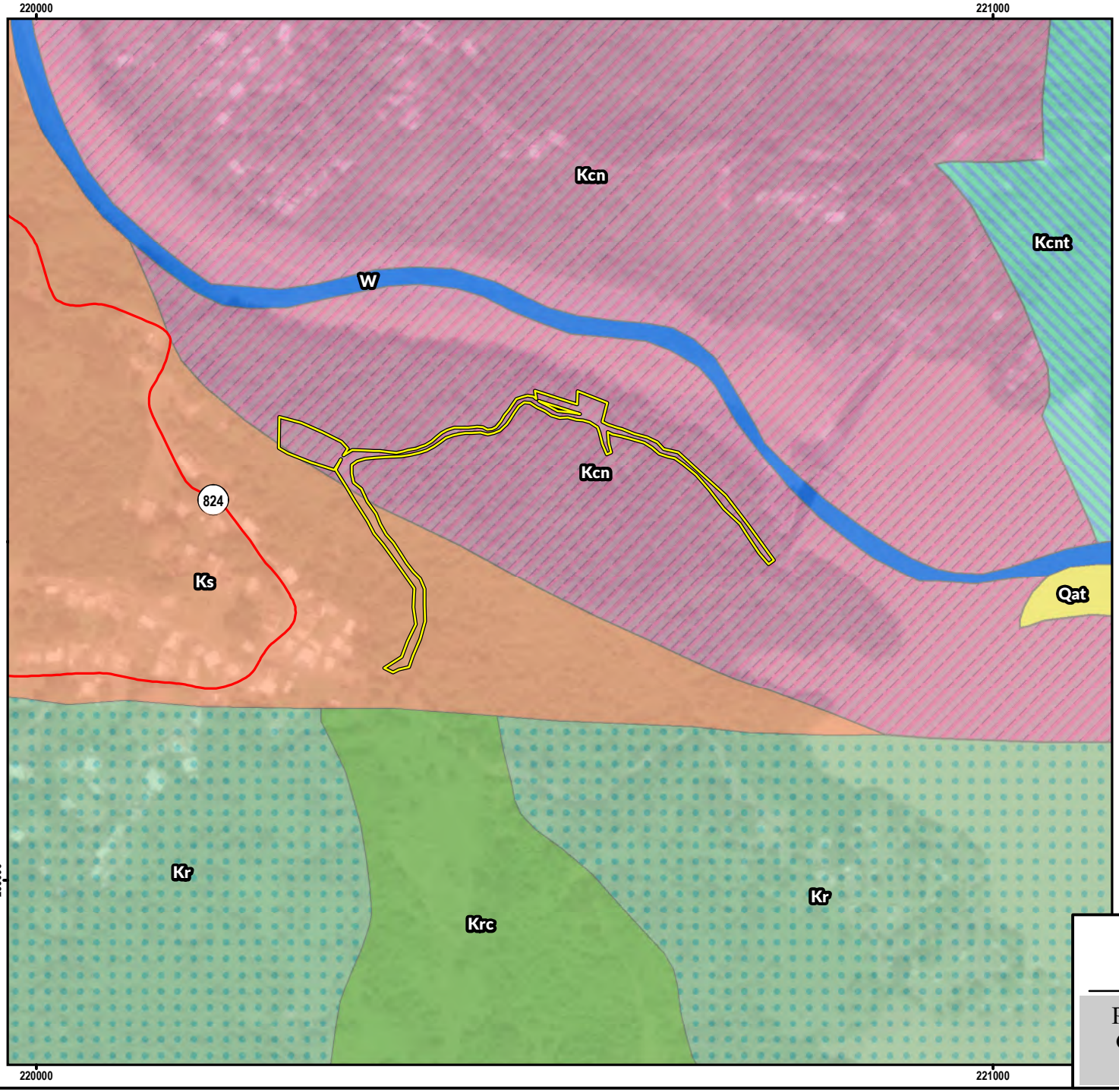
La porción sur del municipio, donde está la fuente del Río La Plata, recibe una mayor precipitación debido al efecto orográfico del interior montañoso Central de Puerto Rico. La lluvia promedio anual en la cuenca es de 66 pulgadas, variando desde 102 pulgadas en la cabecera del Río de La Plata hasta 65 pulgadas cerca de Dorado. Durante sequías intensas, el promedio de lluvia anual puede reducirse a 48 pulgadas.

## 3.3 DESCRIPCIÓN GEOLÓGICA, TOPOGRAFÍA Y SUELOS

**Geología**: Los materiales geológicos que afloran en el Municipio de Toa Alta son producto de la actividad ígnea extrusiva e intrusiva que dominó inicialmente la naturaleza de los procesos geológicos. Estas incluyen la Lava Santa Olaya, Lava Cerro Gordo, Brecha Cancel, Toba Pájaros y demás rocas volcánicas. Todos estos materiales geológicos se formaron durante el periodo Cretácico, a fines de le era Mesozoica y principios del Terciario. Por su parte, la región del Carso está comprendida por rocas calizas y sedimentos variados que se formaron bajo el mar a mediados del periodo Terciario. Estas incluyen las formaciones Lares, Aguada, Cibao, incluyendo la Arena Mucarabones y la Formación San Sebastián. Los depósitos aluviales, terrazas aluviales, abanicos aluviales, flujos detríticos y deslizamientos son de edad Cuaternaria, mayormente del Holoceno o más reciente. Los materiales aluviales consisten en proporciones variables de limo, arena, grava, guijarros y cantos rodados. Los depósitos de terraza consisten en arcilla, limo y arena que formaron parte de una antigua llanura inundable que quedo elevada como resultado de los procesos de

disección fluvial en el área contigua a los márgenes del Río La Plata. El USGS describe las formaciones geológicas de las áreas donde se proponen los componentes del proyecto como (Favor hacer referencia a la ***Figura 3. Geología del Área de Estudio):***

> ***Kcn*** (Formación Canóvanas) – Basáltico, arenisca volcánica, lutita. Espesor máximo estimado, 200 m. Expuestos en los cuadriláteros de Gurabo y El Yunque.
>
> ***Ks*** (Formación Sabana Grande) – Brechas volcánicas, conglomerados, areniscas y limolitas, y flujos menores de basalto y lentes de calizas. Espesor mínimo estimado I.000 m. Expuestos en los cuadriláteros de Sabana Grande, San Germán, Puerto Real, Mayagüez y Rosario.

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Escala: 1:6,000

0 50 100 150 200
metros

## Leyenda

- Límite del Proyecto Propuesto*
- Carreteras principales[1]

**Geología[2]**

- Kcn: Brecha de tobas y tobas
- Kcnt: Miembro de tobas en capas
- Kr: Arenisca con capas de tobas
- Krc: Miembro conglomerado
- Ks: Sedimento fino volcánico solidificado, brechas, calizas y lava alta en piroxenos
- Qat: Depósitos aluviales de Río Culebrinas
- W: Agua

*Límite aproximado

Fuentes:
1. Autoridad de Carreteras y Transportación (ACT), 2020.
2. Unidades geológicas digitalizadas de los mapas geológicos de Puerto Rico del Servicio Geológico de los Estados Unidos a una escala de 1:20,000 por la Oficina de Gerencia y Presupuesto de PR, última revisión en noviembre de 2018.
3. Créditos de la capa de servicio: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community.

Sistema de Coordenadas:
Coordenadas Planas NAD83 Puerto Rico e Islas Vírgenes
FIPS 5200 (metros)

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**Figura 3: Geología del Área de Estudio**

Planta de Filtración Enrique Ortega
Generadores Toma de Agua Cruda
CIP 1-70-9000

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**Topografía:** El Municipio de Toa Alta posee una topografía variada con terrenos de bajo relieve a lo largo del llano aluvial del valle del Río La Plata, así como terrenos con pendientes más pronunciadas hacia el área sur donde se encuentra el interior montañoso central.

Las elevaciones del área de estudio fluctúan entre 17 metros sobre el nivel del mar en los lugares bajos a 52 metros en los más altos. Se logra acceso a los predios a través de la Carretera Estatal PR-824, el Camino Recreativo La Plata y por la entrada principal de la Represa La Plata. Favor hacer referencia a la ***Figura 4. Mapa Topográfico del Área de Estudio***.

**Suelos:** En el Municipio de Toa Alta predominan los suelos de las asociaciones Toa-Bajura Coloso, Humatas-Naranjito-Consumo, Tanamá-Colinas-Soller, y Mucara-Caguabo. Particularmente la asociación Mucara-Caguabo compuesta de suelos con buen drenaje que van de moderadamente profundos a poco profundos, y de moderadamente empinados a muy empinados en áreas montañosas húmedas. Los mismos predominan en la porción sur del municipio.

El Departamento de Agricultura de los EUA (2022) describe los suelos presentes en el área del Proyecto (Favor hacer referencia a la ***Figura 5. Mapa de Suelos y Clasificación USDA*-NRCS**), según se presenta a continuación:

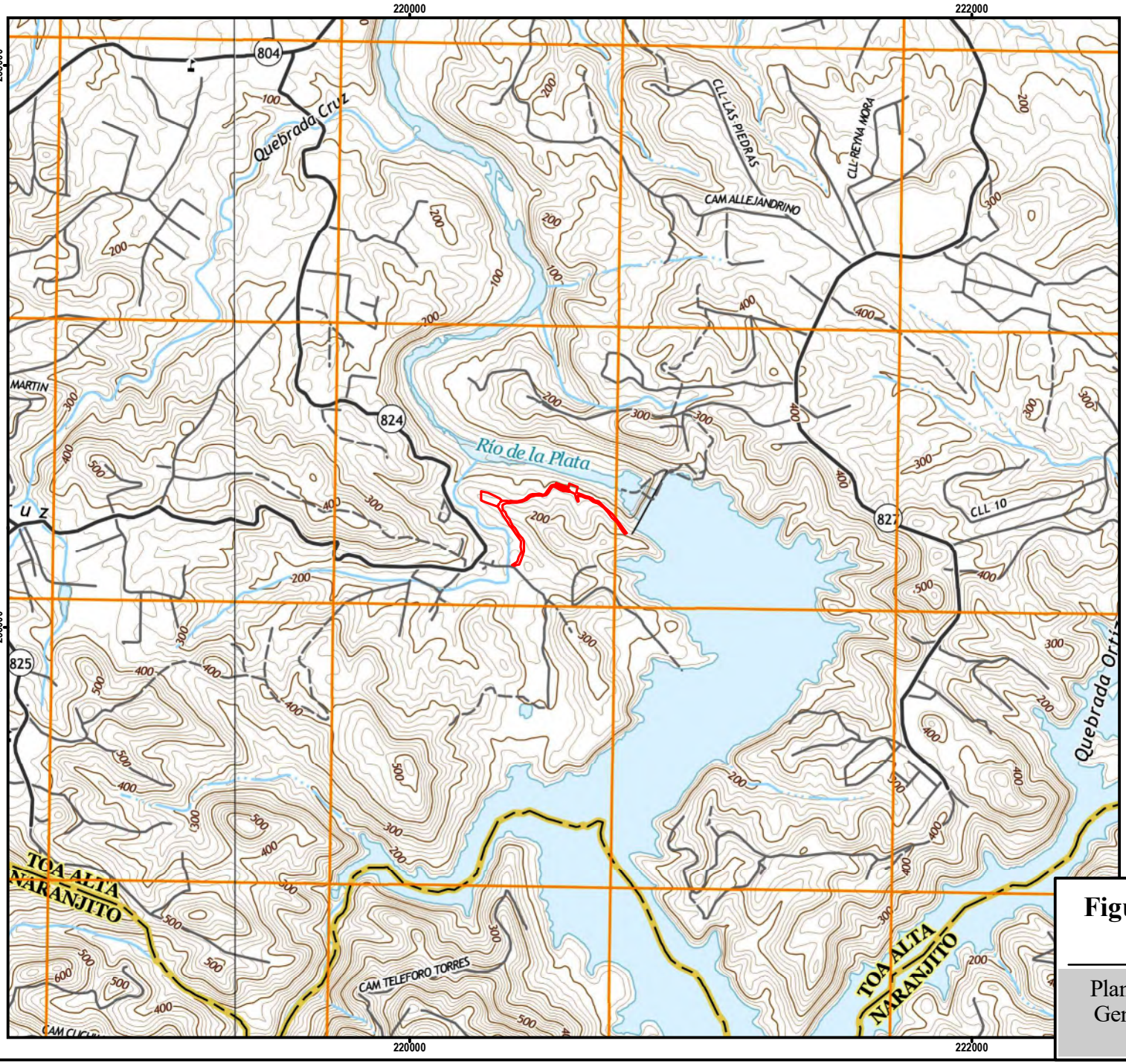
- ***Caguabo arcilloso lomico*** *(CaF)*: 40-60% de inclinación. Suelo poco profundo, bien drenado, ligeramente acido, textura moderadamente fina, muy riscosos. La permeabilidad es moderada y la capacidad de retención de humedad es baja. La escorrentía es rápida. La fertilidad natural es alta. Es difícil de trabajar debido a lo riscoso y poco profundo.

- ***Mabi arcilloso*** *(MaB):* 0-2% de inclinación. Suelos profundos, algo mal drenados, de muy fuertemente ácidos a medianamente alcalinos, textura fina, permeabilidad lenta, capacidad de retención de agua alta y escorrentía lenta. La zona radicular es profunda y son ligeramente inclinados. Estos suelos son difíciles de trabajar debido a la plasticidad y pegajosidad de la arcilla. La zona radicular es profunda y la fertilidad natural alta.

- ***Mucara arcilloso*** *(MxF):* 40-60% de inclinación. Suelo moderadamente profundo a la roca volcánica, bien drenado, textura fina, ligeramente acido, muy riscoso con permeabilidad y erosión moderada. La capacidad de retención de agua es baja. La escorrentía es muy rápida y la fertilidad es moderada. El subsuelo tiene un alto potencial de expansión.

- ***Mucara arcilloso*** *(MxE):* 20-40% de inclinación. Suelos moderadamente profundos, bien drenados, de ligeramente ácidos a neutros, textura fina, permeabilidad moderada, capacidad de retención de agua baja, escorrentía muy rápida y peligro de erosión. Los deslizamientos son comunes en caminos, zanjas y drenajes. Los suelos son difíciles de trabajar debido a que son riscosos y por la pegajosidad de la arcilla. La zona radicular es moderadamente profunda. Estos suelos son fértiles.

- ***Canteras y Graveros*** *(GPQ)*. Suelos con depósitos de rocas, arenas o minerales.

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Escala: 1:20,000

0 200 400 600 800 metros

X: 220,581.893 m
Y: 256,488.487 m

**Leyenda**

Límite del Proyecto Propuesto*

*Límite aproximado

Fuente:
1. Mapa topográfico del Servicio Geológico de los Estados Unidos, Cuadrángulo de Naranjito, 2018. El intervalo de los contornos de elevación es de 20 pies.

Sistema de Coordenadas:
Coordenadas Planas NAD83 Puerto Rico e Islas Vírgenes FIPS 5200 (metros)

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# Figura 4: Mapa Topográfico del Área de Estudio

Planta de Filtración Enrique Ortega
Generadores Toma de Agua Cruda
CIP 1-70-9000

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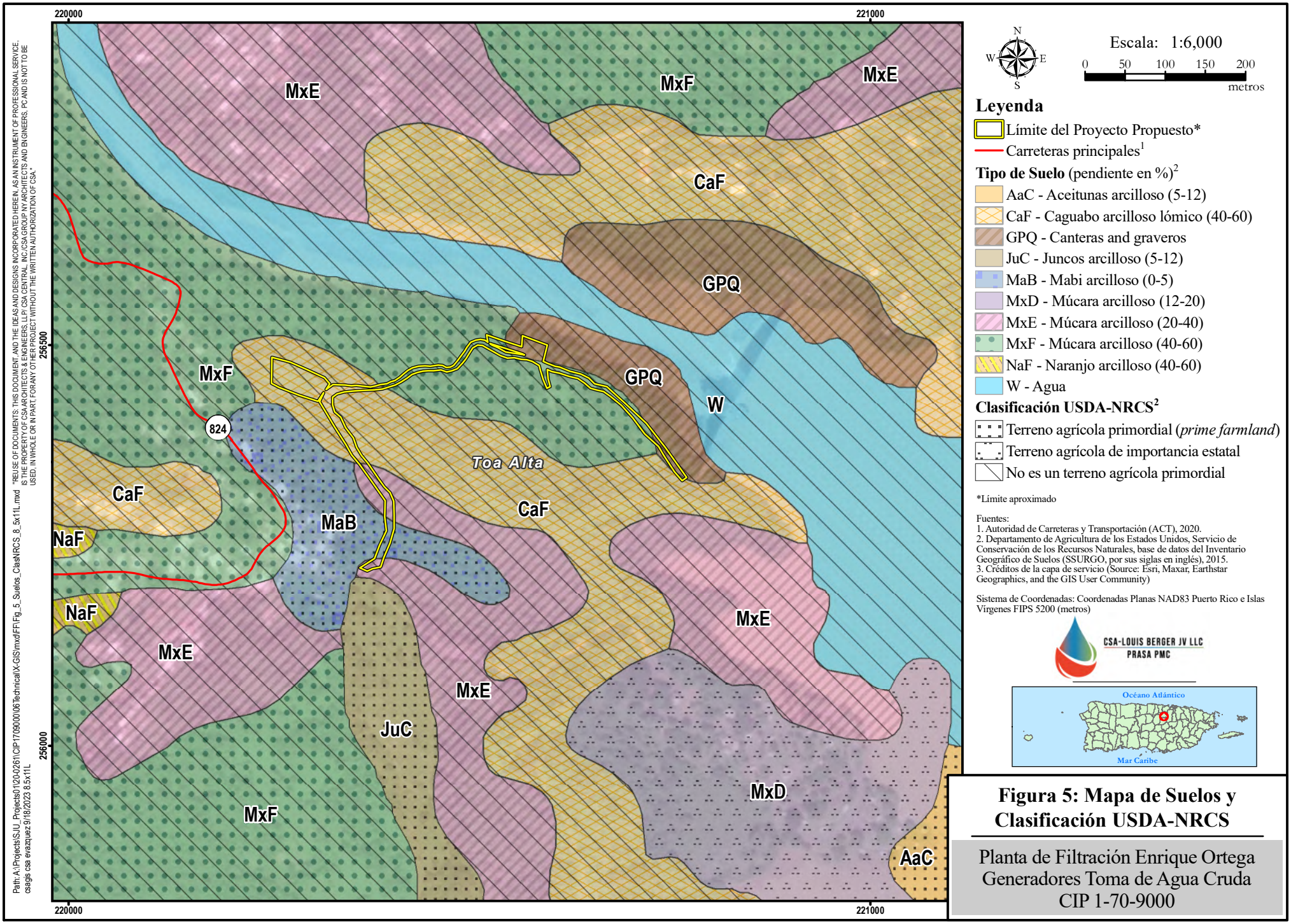


**Figura 5: Mapa de Suelos y Clasificación USDA-NRCS**

Planta de Filtración Enrique Ortega
Generadores Toma de Agua Cruda
CIP 1-70-9000

## 3.4 HIDROLOGÍA Y HUMEDALES

La cuenca hidrográfica del Río La Plata, es la tercera de mayor en extensión en Puerto Rico, con un área de captación de 241 $mi^2$. El Río de la Plata es el de mayor longitud en la isla, con 58.5 millas desde su origen cerca de Cayey hasta su desembocadura al mar cerca de Vega Alta.

Desde la vecindad de Comerío, el río continúa su descenso hacia Toa Alta y la costa norte, fluyendo al Embalse de Toa Alta. Este embalse, construido por la AAA en 1974, provee un promedio de 72.4 mgd (81,159 acres-pies por año) a la Planta de Filtración de Toa Alta, la que abastece agua potable a sectores de la Zona Metropolitana de San Juan, primordialmente en Toa Alta y Bayamón. La AAA extrae del Río de la Plata un promedio de 3.64 mgd para suplir agua potable a Toa Alta y Dorado mediante una galería de pozos horizontales en el valle aluvial contiguos al canal. El río fluye finalmente hacia Dorado descargando al Océano Atlántico al este de esta ciudad.

El Inventario Nacional de Humedales del Servicio de Pesca y Vida Silvestre de los Estados Unidos (USFWS, por sus siglas en inglés) clasifica al Río La Plata como un cuerpo de agua al norte del proyecto como un *Sistema Ribereño Bajo Perenne Fondo no Consolidado Permanentemente Inundado* (***R2UBH***). El embalse La Plata y una quebrada sin nombre que se encuentra al noreste y noroeste del proyecto se clasifica como *Sistema Ribereño Bajo Perenne Fondo no Consolidado Permanentemente Inundado* (***R2UBH***). Favor hacer referencia a la ***Figura 6. Hidrología y Humedales.***

Escala: 1:6,000

0 25 50 100 150 200 metros

N W E S

## Leyenda

- Carretera estatal[1]
- Hidrografía[2]
- Límite del Proyecto Propuesto*

**Humedales[3]**

- Lago
- Ribereño

* Límite de propiedad es aproximado.

Fuentes:
1. Autoridad de Carreteras y Transportación, 2020.
2. Servicio Geológico de los Estados Unidos, Conjunto de Datos de Hidrografía Nacional (NHD, en inglés), 2020.
3. Servicio Nacional de Pesca y Vida Silvestre de lo Estados Unidos (USFWS, en inglés), Inventario Nacional de Humedales, 2020.
4. Créditos de la capa de servicio: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Sistema de Coordenadas: Coordenadas Planas NAD83 (2011) Puerto Rico e Islas Vírgenes FIPS 5200 (metros)

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**Figura 6: Hidrología y Humedales**

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Generadores Toma de Agua Cruda
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### 3.5 SISTEMAS NATURALES EN LA REGIÓN

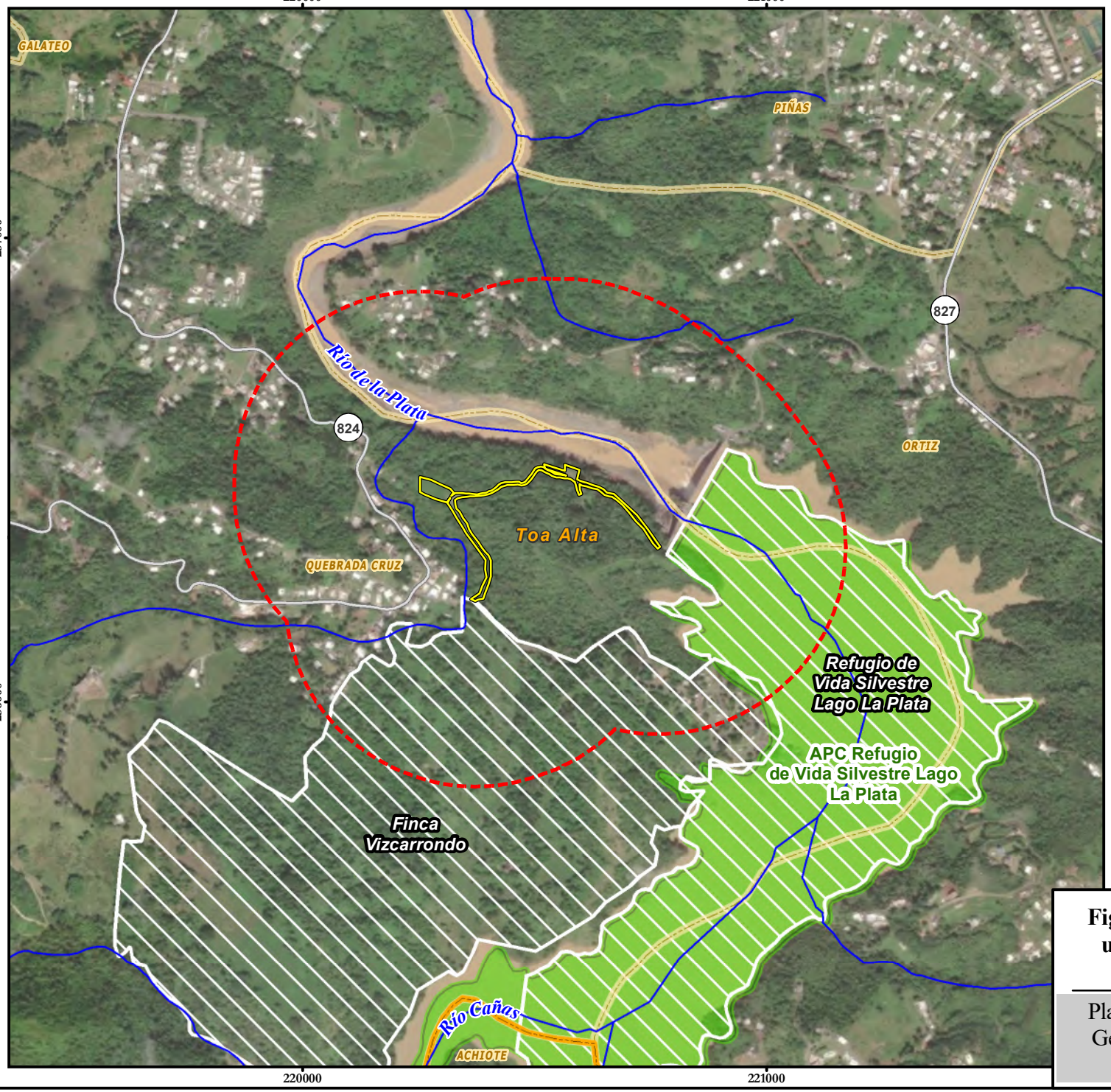
Basado en la información evaluada, la inspección y reconocimiento del área que contendría el Proyecto, dentro en un radio de 400 metros desde el perímetro del Proyecto, se identificaron tres sistemas naturales.

- **Área con Prioridad de Conservación (APC) Refugio de Vida Silvestre Lago La Plata**: Localizado al este del área propuesta, el embalse o lago artificial fue construido para el año 1973. Este es administrado por la Autoridad de Acueductos y Alcantarillados; sus aguas se utilizan para la producción de agua potable y recreación.

- **Área Natural Protegida (ANP) Finca Vizcarrondo**: Localizada al sur del área propuesta la Finca Vizcarrondo cuenta con una extensión de 205.55 acres. Esta finca posee la designación de ANP por el Departamento de Recursos Naturales desde el 2008.

- **Río La Plata**: Localizado al norte del predio propuesto, el Rio La Plata fluye al cauce principal entre Toa Alta y Dorado, aguas arriba de la Planta de Filtración La Virgencita.

El proyecto no afectará y/o tendrá impacto sobre estos sistemas. Favor de hacer referencia a la ***Figura 7. Sistemas Naturales en un Radio de 400 metros desde el Perímetro del Predio***.

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Escala: 1:12,000

0 75 150 300 450
metros

## Leyenda

- Hidrografía[1]
- Carreteras estatales[2]
- Límite del Proyecto Propuesto*
- Límite de barrio[3]
- Límite municipal[3]
- Área Natural Protegida[4]
- Área con Prioridad de Conservación[5]
- Radio de 400 metros

* Límite de propiedad es aproximado.

Fuentes:
1. *National Hydrography Dataset* (NHD, por sus siglas en inglés) del Servicio Geológico de los Estados Unidos, 2020.
2. Autoridad de Carreteras y Transportación, 2020.
3. Junta de Planificación de Puerto Rico, 2015.
4. Equipo de Acción para la Conservación de Áreas Protegidas (PA-CAT, en inglés). Base de datos de áreas protegidas de Puerto Rico, datos de SIG, versión de diciembre de 2018. Autoridad de Acueductos y Alcantarillados, 2015.
5. Departamento de Recursos Naturales y Ambientales, Programa de Herencia Natural, 2009.
6. Créditos de la capa de servicio: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community.

Sistema de Coordenadas:
Coordenadas Planas NAD83 (2011) Puerto Rico e Islas Vírgenes FIPS 5200 (metros)

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**Figura 7: Sistemas Naturales en un radio de 400 metros desde el Perímetro del Predio**

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## 4 REVISIÓN DE LITERATURA Y CONSULTA SOBRE ESPECIES PROTEGIDAS

Previo a la realización del estudio de flora y fauna se llevó a cabo una revisión de la literatura científica disponible sobre estudios en el área del proyecto. El banco de Datos del Servicio de Vida y Pesca de los Estados Unidos (USFWS) a través de su herramienta IPaC[1] incluye todas las especies protegidas por leyes estatales y federales, además de otras especies cuyas poblaciones sean bajas o que sean indicativas de habitáculos específicos. De acuerdo con la información recopilada para este predio, la herramienta identificó para el área, una (1) especie catalogada como en peligro o amenazada. La **Tabla 1** presenta las especies que podrían ser identificadas asociadas al área bajo estudio.

***Tabla 1. Especies Amenazadas y En Peligro***

| Nombre científico | Nombre común | Estatus |
|---|---|---|
| *Epicrates inornatus* | Boa de Puerto Rico | En peligro (*) |

(*) Exclusión de la lista propuesta en 07/13/2022 (87 FR 41641 41655)[2]

El ***Apéndice 2*** presenta la ***Lista de Especies Amenazadas y En Peligro (IPaC)*** que se generó como parte del proceso de consulta preliminar bajo la Ley Federal de Especies en Peligro de Extinción (ESA, por sus siglas en inglés).

A continuación, se presenta una breve descripción de esta especie.

***Epicrates inornatus* (Boa de Puerto Rico)**

Serpiente constrictora no venenosa, endémica de Puerto Rico cuya coloración puede variar entre tonos de marrón pálido u obscuro, gris o negro. Su vientre es de tonalidad negruzca y logra crecer hasta aproximadamente 6.2 pies de longitud. Se caracterizan por tener una serie de manchas o líneas negras a lo largo de la parte dorsal. Tienen unas estructuras conocidas como "espolones", remanentes de extremidades posteriores, localizados cerca de la apertura cloacal. Se alimenta de pequeños mamíferos como roedores y murciélagos, aves y lagartijos.

Es una serpiente nocturna mayormente arbórea que se puede encontrar en una gran diversidad de hábitats, desde bosques costeros hasta bosques húmedos kársticos y montanos, a lo largo de arroyos, bosques y bordes de caminos, y en áreas rurales, suburbanas y algunas áreas urbanas.

[1] U.S. Fish and Wildlife Service Information and Planning Consultation (IPaC) https://ipac.ecosphere.fws.gov/
[2] ECOS Environmental Conservation Online System (USFWS). https://ecos.fws.gov/ecp/species/6628

# 5 METODOLOGÍA DE ESTUDIO

Esta sección describe el procedimiento utilizado para llevar a cabo el estudio de flora y fauna y los criterios de selección para las áreas de estudio. El estudio se llevó a cabo de acuerdo con los procedimientos establecidos por el Departamento de Recursos Naturales y Ambientales de Puerto Rico (DRNA) y el Servicio de Pesca y Vida Silvestre de los Estados Unidos (USFWS, por sus siglas en ingles).

## 5.1 TRABAJO DE CAMPO

El trabajo de campo tuvo inicio con una visita inicial de reconocimiento el 26 de abril 2023, con el objetivo de validar la información recopilada de los mapas topográfico, fotos aéreas, suelos, humedales, así como también para identificar los límites del proyecto propuesto. Esta información fue analizada en conjunto permitiendo tener una mejor comprensión de las condiciones actuales del predio, y establecer así la metodología para obtener los datos necesarios sobre la flora y fauna del lugar. Se revisaron otras fuentes de información entre los cuales se encuentra el Índice de Sensibilidad Ambiental (NOAA por sus siglas en inglés) (2000), el Estudio de las Áreas Críticas para la Vida Silvestre de Puerto Rico (CWA por sus siglas en inglés) (DRNA 2005) y el Proyecto PR-GAP (2007) entre otros.

Para efectos de este estudio, se identificó la extensión de las parcelas propuestas como se presenta en la tabla a continuación.

***Tabla 2. Identificación de los Componentes del Proyecto, Área propuesta y Localización***

| Identificación parcela | Área propuesta ($m^2$) | Coordenadas |
|---|---|---|
| Camino de acceso | 4,284 $m^2$ | *Comienzo: 18.341149, -66.240515<br>Final: 18.342383, -66.237034 |
| Ampliación de vía de camino para viraje de camiones | 489 $m^2$ | 18.343141°, -66.238412° |
| Área de generadores y tanques de *diésel* | 1,278 $m^2$ | 18.343583, -66.238678 |
| Área sugerida para el *staging area* para el contratista | 917 $m^2$ | 18.343236, -66.241259 |

*Coordenadas tomadas desde el comienzo del proyecto, través de la carretera PR-824 que conecta con el Camino Recreativo La Plata y su final es el portón de acceso hacia la Represa La Plata.

La selección de las áreas de muestreo se realizó utilizando como referencia la huella de los componentes del proyecto, fotografías aéreas y mapas topográficos. El análisis de las fotografías y mapas permitió identificar previo a los trabajos de campo la topografía del terreno, cambios en vegetación y las características del paisaje.

Se realizaron recorridos a través de toda la extensión del área propuesta y se anotaron todas las especies de flora y fauna observadas.

En el caso de las aves, se anotaron las especies observadas e identificadas de manera auditiva. Particularmente para los anfibios y reptiles, se realizaron búsquedas en las áreas que pudiesen ser

habitáculos apropiados para estas especies, como debajo de troncos y ramas secas, hendiduras en las rocas, en el suelo y en áreas húmedas. También se revisó la vegetación, tanto árboles y pastos que suelen ser habitáculos de mucha de la fauna. Las búsquedas en el área de estudio se realizaron durante el periodo diurno y nocturno según la metodología presentada por Rivero (1998).

En el predio propuesto se realizó una búsqueda de especies consideradas como elementos críticos por el DRNA y el USFWS. Su propósito fue determinar la presencia de estas especies e identificar con exactitud la ubicación de éstos, de existir alguno, con referencia al proyecto. Durante las visitas se documentó con fotografías las áreas, las especies de flora y fauna observadas en los predios (***Apéndice 1***).

El trabajo de campo dentro de las áreas que contempla la Acción Propuesta se realizó durante el mes de junio y julio del 2023.

Como resultado del trabajo de campo se produjo una lista de las especies de la flora y la fauna presentes en el área bajo estudio.

## 5.2 ANÁLISIS DE DATOS

La identificación de especies se llevó a cabo principalmente durante el periodo de visitas al predio propuesto.

Las especies de flora que no pudieron ser registradas en las visitas, fueron fotografiadas en detalle (hojas, tallos, flores, fruto) y se anotaron datos adicionales como texturas, olores particulares para su posterior identificación.

La identificación de flora y fauna se corroboró utilizando libros de referencia y guías de campo, tales como Little, Woodbury y Wadsworth (1974), Liogier (1985; 1988; 1991; 1995; 1997), Acevedo-Rodríguez y Woodbury (1985), Proctor (1989), Más y García-Molinari (2006), Raffaele et al. (1998), Rivero (1998), Little y Wadsworth (1999) y Acevedo-Rodríguez (2003), Acevedo-Rodríguez y Strong (2005), Acevedo-Rodríguez (1996) y Gann GD, Trejo-Torres JC (2015-2023).

# 6 RESULTADOS

## 6.1 FLORA

En el área propuesta para el proyecto se identificaron ochenta y cinco (85) especies de plantas correspondientes a cuarenta (40) familias. Dentro del área propuesta se identificó una asociación vegetativa: *Áreas de terreno previamente impactados*. Favor de hacer referencia a la ***Figura 8. Asociaciones Vegetativas***.

***Áreas de terreno previamente impactados***

Estas áreas incluyen el camino en tierra existente, así como otras áreas que fueron impactadas para los años 2021 y 2022, como parte de las reparaciones a las socavaciones en la base de la estructura de la Represa (***Apéndice 3***). Estas áreas previamente impactadas serían reutilizadas para acomodar los componentes del proyecto. Entre las especies de flora identificadas en esta zona se encuentran mayormente yerbas como Paragüita rosada (*Chloris barbata*), Pata de gallina (*Digitaria horizontalis*), Yerba de caña (*Lasiacis divaricata*) y Yerba rosada (*Melinis repens*).

*Detalle de la vegetación existente en la zona donde se propone localizar los generadores y tanques diesel*

Otras yerbas comunes en esta zona resultaron ser Margarita silvestre (*Bidens alba*), Hierba socialista (*Cyanthillium cinereum*), Huye-que-te-cojo (*Emilia sonchifolia*), Clavelito colorado (*Emilia fosbergii*), *Eupatorium capillifolium*, Guaco falso *(Mikania micrantha*), Pancha (*Tridax procumbens*). En estas zonas impactadas se observa a su vez el crecimiento de arbustos como Matraca (*Crotalaria juncea*), Capulín (*Muntigia calabura*) y la Mimosa (*Mimosa pigra)*. En el camino en tierra, en dirección hacia los bancos del Río La Plata, se observan especies de arbustos como la Higuereta (*Ricinus communis*), Matraca (*Crotolaria pallida*), así como las hierbas *Paspalum fasciculatum*, *Cyperus ordoratus*, *Rhynchospora ciliata.*

Fuera de la huella que impactaría el proyecto propuesto particularmente al este del predio donde localiza la represa se observan árboles esparcidos de las especies de Acacia amarilla (*Senna siamea*), Guara (*Cupania americana*), Guaraguao (*Guarea guidonia*), Pitanga (*Eugenia uniflora*), entre otros. Parchos boscosos de sucesión secundaria se observan fuera del área que impactaría el proyecto algunos de estos bordeando gran parte de la extensión del camino en tierra. En estos parchos se observan especies como Yagrumo hembra (*Cecropia schreberiana*), Moca (*Andira inermis*), Guano (*Ochroma pyramidale*), Palma real (*Roystonea borinquena*), Tulipán africano (*Spathodea campalulata*), Guaraguao (*Guarea guidonia*) y Espino rubial (*Zanthoxylum martinicensis*). Otras especies que se

identificaron son el Mangó (*Mangifera indica*), Acacia amarilla (*Senna siamea)* y Almendro (*Terminalia catappa*). Entre los arbustos que se distinguen en la zona se encuentran Higuillo (*Piper amalago)*, Cafeíllo (*Casearia sylvestris*), Capulín (*Muntigia calabura*) y Tintillo (*Randia aculeata)*.

A continuación, un desglose de las especies de flora identificadas en las parcelas objeto de este estudio, así como las observadas a través del tramo por donde se contempla localizar la tubería de aguas crudas.

***Tabla 3. Especies de Flora***

| Familia | Nombre científico | Nombre común | Forma de vida | Origen |
|---|---|---|---|---|
| Acanthaceae | *Ruellia blechum* | Yerba de papagayo | Hierba | Nativo |
| | *Thunbergia fragrans* | Flor de nieve | Trepadora | No nativo, naturalizado |
| Anacardiaceae | *Mangifera indica* | Mangó | Árbol | No nativo, naturalizado |
| Araceae | *Dieffenbachia seguine* | Rábano cimarrón | Trepadora | Nativo |
| | *Syngonium podophyllum* | Malanga trepadora | Trepadora | No nativo, naturalizado |
| | *Philodendron giganteum* | Yautía cimarrona | Arbusto | Nativo |
| Arecaceae | *Cocos nucifera* | Palma de coco | Árbol | Nativo |
| | *Roystonea borinquena* | Palma real | Árbol | Nativo |
| Araliaceae | *Schefflera morototoni* | Yagrumo macho | Árbol | Nativo |
| Asteraceae | *Bidens alba* | Margarita silvestre | Hierba | Nativo |
| | *Cyanthillium cinereum* | Hierba socialista | Hierba | No nativo, naturalizado |
| | *Emilia sonchifolia* | Huye-que-te-cojo | Hierba | No nativo, naturalizado |
| | *Emilia fosbergii* | Clavelito colorado | Hierba | No nativo, naturalizado |
| | *Eupatorium capillifolium* | Sin nombre común | Hierba | No nativo, naturalizado |
| | *Mikania micrantha* | Guaco falso | Trepadora | Nativo |
| | *Tridax procumbens* | Pancha | Hierba | No nativo, naturalizado |
| Bignoniaceae | *Spathodea campanulata* | Tulipán africano | Árbol | No nativo, naturalizado |
| | *Tabebuia heterophylla* | Roble blanco | Árbol | Nativo |
| Bixaceae | *Bixa orellana* | Achiote | Arbusto | No nativo, naturalizado |
| Boraginaceae | *Tournefortia hirsutissima* | Nigua | Trepadora | Nativo |
| Calophyllaceae | *Calophyllum antillanum* | Palo de María | Árbol | Nativo |
| Cannabaceae | *Trema micranthum* | Guacimilla | Árbol | Nativo |
| Casuarinace | *Casuarina equisetifolia* | Pino australiano | Árbol | No nativo, naturalizado |

| Familia | Nombre científico | Nombre común | Forma de vida | Origen |
|---|---|---|---|---|
| Combretaceae | *Terminalia catappa* | Almendro | Árbol | No nativo, naturalizado |
| Commelinaceae | *Commelina diffusa* | Cohitre azul | Hierba | Nativo |
| Cucurbitaceae | *Momordica charantia* | Cundeamor | Trepadora | No nativo, naturalizado |
| Cyperaceae | *Cyperus odoratus* | Coquí fragante | Hierba | Nativo |
| | *Kyllinga brevifolia* | Sin nombre común | Hierba | Nativo |
| | *Kyllinga nemoralis* | Fosforito | Hierba | No nativo, naturalizado |
| | *Rhynchospora ciliata* | Yerba estrella | Hierba | Nativo |
| Euphorbiaceae | *Croton flavens* | Adormidera | Arbusto | Nativo |
| | *Euphorbia hirta* | Lechecillo | Hierba | Nativo |
| | *Euphorbia hypericifolia* | Yerba niña | Hierba | Nativo |
| | *Jatropha gossypiifolia* | Tuatúa | Arbusto | Nativo |
| | *Ricinus communis* | Higuereta | Arbusto | No nativo, naturalizado |
| Fabaceae | *Albizia procera* | Acacia blanca | Árbol | No nativo, naturalizado |
| | *Andira inermis* | Moca | Árbol | Nativo |
| | *Crololaria pallida* | Matraca | Hierba | No nativo, naturalizado |
| | *Crotalaria juncea* | Matraca | Hierba | No nativo, naturalizado |
| | *Hymenaea courbaril* | Algarrobo | Árbol | Nativo |
| | *Mimosa pigra* | Mimosa | Arbusto | No nativo, naturalizado |
| | *Mucuna pruriens* | Pica pica | Trepadora | No nativo, naturalizado |
| | *Senna siamea* | Acacia amarilla | Árbol | No nativo, naturalizado |
| | *Peltophorum pterocarpum* | Flamboyán amarillo | Árbol | No nativo, naturalizado |
| Lamiaceae | *Petitia dominguensis* | Capá amarillo | Árbol | Nativo |
| | *Tectona grandis* | Teca | Árbol | No nativo, solo cultivado |
| Lythraceae | *Cuphea hyssopifolia* | Cufia | Arbusto | No nativo, naturalizado |
| Lytraceae | *Ammania baccifera* | Yerba de cangrejo | Hierba | No nativo, naturalizado |
| Malvaceae | *Ceiba pentandra* | Ceiba | Árbol | Nativo |
| | *Hibiscus tiliaceus* | Emajagua | Árbol | Nativo |
| | *Malvastrum coromandelarium* | Escoba blanca | Hierba | Nativo |
| | *Melochia nodiflira* | Bretónica prieta | Arbusto | Nativo |
| | *Thespesia grandiflora* | Maga | Árbol | Nativo |
| | *Sida rhombifolia* | Escoba colorada | Arbusto | Nativo |

| Familia | Nombre científico | Nombre común | Forma de vida | Origen |
|---|---|---|---|---|
| | *Ochroma pyramidale* | Guano | Árbol | Nativo |
| | *Guazuma ulmifolia* | Guácima | Árbol | Nativo |
| Meliaceae | *Guarea guidonia* | Guaraguao | Árbol | Nativo |
| Muntigiaceae | *Muntingia calabura* | Capulín | Árbol | No nativo, naturalizado |
| Myrtaceae | *Myrcia splendens* | Hoja de menuda | Arbusto | Nativo |
| | *Psidium guajava* | Guayaba | Arbusto | Nativo |
| | *Eugenia uniflora* | Pitanga | Arbusto | No nativo, solo cultivado |
| Nephrolepidaceae | *Nephrolepis brownii* | Helecho | Hierba | No nativo, naturalizado |
| Piperaceae | *Piper amalago* | Higuillo de limón | Arbusto | Nativo |
| | *Piper umbellatum* | Baquiña | Arbusto | Nativo |
| Poaceae | *Chloris barbata* | Paragüita rosada | Hierba | Nativo |
| | *Digitaria horizontalis* | Pata de gallina | Hierba | Nativo |
| | *Lasiacis divaricata* | Yerba de caña | Trepadora | Nativo |
| | *Melinis repens* | Yerba rosada | Hierba | No nativo, naturalizado |
| | *Paspalum fasciculatum* | Sin nombre común | Hierba | No nativo |
| Pteridaceae | *Pityrogramma calomelanos* | Helechito blanco | Hierba | Nativo |
| Rhamnaceae | Reynosia vivesiana | Guamá | Arbusto | Nativo |
| Rubiaceae | *Gonzalagunia hirsuta* | Mata de mariposa | Arbusto | Nativo |
| | *Randia aculeata* | Tintillo | Arbusto | Nativo |
| Rutaceae | *Zanthoxylum monophyllum* | Espino rubial | Árbol | Nativo |
| Salicaceae | *Casearia decandra* | Caracolillo | Arbusto | Nativo |
| | *Casearia guianensis* | Cafeillo | Arbusto | Nativo |
| | *Casearia sylvestri* | Café silvestre | Arbusto | Nativo |
| Sapindaceae | *Cupania americana* | Guara | Árbol | Nativo |
| | *Cupania triquetra* | Guara blanca | Árbol | Nativo |
| | *Melicoccus bijugatus* | Quenepa | Árbol | No nativo, naturalizado |
| Solanaceae | *Solanum torvum* | Berenjena cimarrona | Arbusto | Nativo |
| Ulmaceae | *Ulmus pumila* | | Árbol | No nativo |
| Urticaceae | *Cecropia schreberiana* | Yagrumo hembra | Árbol | Nativo |
| Verbenaceae | *Citharexylum spinosum* | Péndula | Arbusto | Nativo |
| | *Stachytarpheta cayennensis* | Verbena | Arbusto | Nativo |

Base de datos: Gann GD, Trejo-Torres JC (2015-2023) Plantas de la Isla de Puerto Rico / Plants of the Island of Puerto Rico. The Institute for Regional Conservation. Delray Beach, Florida, USA.

## 6.2 FAUNA

En lo que respecta a la fauna del área del proyecto, se observó un total de treinta y tres (33) especies, siendo las aves el grupo dominante. Las especies de aves más comunes en el predio y áreas circundantes son: Tórtola aliblanca (*Zenaida asiatica*), Paloma turca (*Patagioenas squamosa*), Ruiseñor (*Mimus polyglottos*), Mozambique (*Quiscalus niger*), Reinita mariposera *(Dendroica adeaidae)* y el Pitirre (*Tyrannus dominicensis*). Estas especies fueron observadas mayormente entre las áreas de terreno previamente impactados y los parchos de vegetación arbustiva en el camino de tierra y área del proyecto. Aves como el Pájaro bobo menor (*Coccyzus minor*), Bienteveo de Puerto Rico (*Vireo latimeri*), Julián chiví (*Vireo altiloquus*), San Pedrito (*Todus mexicanus*) y el Comeñame de Puerto Rico (*Loxigilla portoricensis*) se observaron en las parchos boscosos de sucesión secundaria que la huella del proyecto no impactaría.

En cuanto a reptiles, se identificó a los lagartijos *Anolis pulchellus, y Anolis cristatellus.* Solo un anfibio fue documentado, Coquí común (*Eleutherodactylus coquí*) el cual fue escuchado entre la vegetación.

Entre los invertebrados que se observaron a través del predio se encuentran la Mariposa blanca (*Ascia monuste*), Mariposa sulfur (*Phoebis sennae sennae*), Mariposa zebra (*Heliconius charithonia charithonia*), Libélula verde (*Erythemis vesiculosa*) y la Abeja melífera (*Apis melifera*).

***Tabla 4. Especies de Fauna***

| ***Aves*** | | |
|---|---|---|
| **Familia** | **Nombre científico** | **Nombre común** |
| Accipitridae | *Buteo jamaicensis* | Guaraguao colirrojo |
| Ardeidae | *Ardea alba* | Garza real |
| | *Bubulcus ibis* | Garza ganadera |
| Columbidae | *Patagioenas leucocephala* | Paloma cabeciblanca |
| | *Patagioenas squamosa* | Paloma turca |
| | *Columba livia* | Paloma domestica |
| | *Zenaida asiatica* | Tórtola aliblanca |
| | *Zenaida aurita* | Tórtola cardosantera |
| Cuculidae | *Coccyzus minor* | Pájaro bobo menor |
| | *Coccyzus vieilloti* | Pájaro bobo mayor |
| Icteridae | *Quiscalus niger* | Mozambique |
| Mimidae | *Mimus polyglottos* | Ruiseñor |
| Parulidae | *Dendroica adelaidae* | Reinita mariposera |
| Picidae | *Melanerpes portoricensis* | Carpintero de Puerto Rico |
| Thraupidae | *Coereba flaveola* | Reinita común |
| | *Loxigilla portoricensis* | Comeñame de Puerto Rico |

| *Aves* | | |
|---|---|---|
| **Familia** | **Nombre científico** | **Nombre común** |
| Todidae | *Todus mexicanus* | San Pedrito |
| Tyrannidae | *Myiarchus antillarum* | Juí de Puerto Rico |
| | *Tyrannus dominicensis* | Pitirre gris |
| Vireonidae | *Vireo latimeri* | Bienteveo de Puerto Rico |
| | *Vireo altiloquus* | Julián chiví |
| *Anfibios* | | |
| **Familia** | **Nombre científico** | **Nombre común** |
| Leptodactylidae | *Eleutherodactylus coqui* | Coquí común |
| *Reptiles* | | |
| **Familia** | **Nombre científico** | **Nombre común** |
| Polychrotidae | *Anolis pulchellus* | Lagartijo de jardín |
| | *Anolis stratulus* | Lagartijo manchado |
| *Invertebrados* | | |
| **Familia** | **Nombre científico** | **Nombre común** |
| Apidae | *Apis melifera* | Abeja de miel |
| Cerambycidae | *Solenoptera michelii* | Sin nombre común |
| Chrysomellidae | *Macrohaltica jamaicensis* | Sin nombre común |
| Hesperiidae | *Chorantus vitellius* | Skipper |
| Libellulidae | *Erythemis vesiculosa* | Libélula verde |
| Nymphalidae | *Heliconius charithonia charithonia* | Mariposa cebra |
| Pieridae | *Ascia monuste* | Mariposa blanca |
| | *Phoebis sennae sennae* | Mariposa sulphur |
| Mamíferos | | |
| **Familia** | **Nombre científico** | **Nombre común** |
| Herpestidae | *Herpestes auropunctatus* | Mangosta |

El banco de Datos del Servicio de Vida y Pesca de los Estados Unidos (USFWS) a través de su herramienta IPaC identifico a la Boa de Puerto Rico (*Epicrates inornatus*) ahora *Chilabothrus inornatus* como especie con posible presencia en el área del proyecto propuesto. Sin embargo, durante el periodo de este estudio no se observaron individuos de esta especie, ni rastro de su presencia en las áreas que contempla el proyecto.

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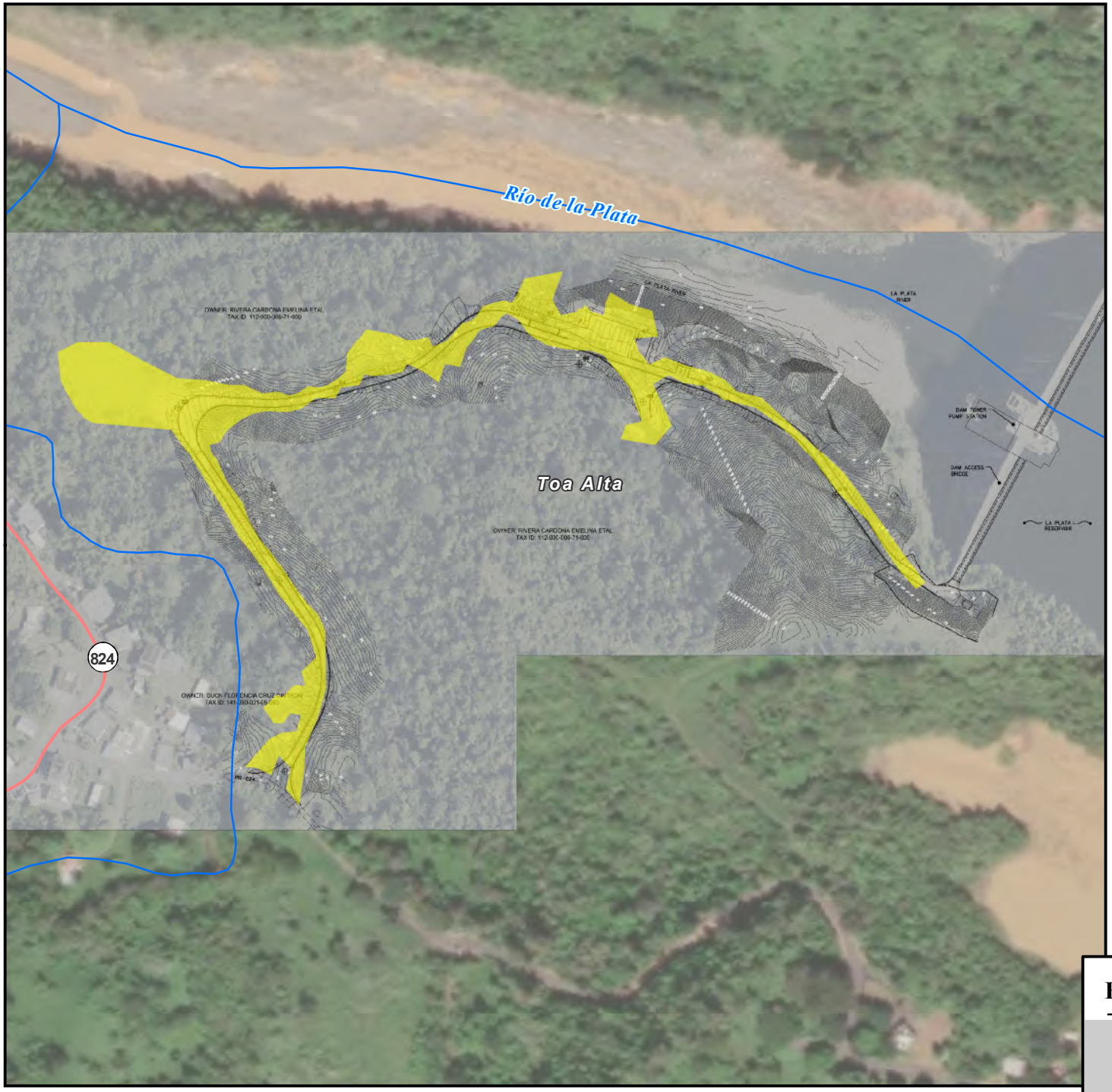

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0 25 50 100 metros

## Leyenda

- Carretera estatal[1]
- Hidrografía[2]
- Área de terrenos previamente impactados

Fuentes:
1. Autoridad de Carreteras y Transportación, 2020.
2. Servicio Geológico de los Estados Unidos, Conjunto de Datos de Hidrografía Nacional (NHD, en inglés), 2022.
3. *Stantec, Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators Phase I Project Toa Alta Puerto Rico CIP 1-70-9000, Issued for 30% Design, July 2023*.
4. Créditos de la capa de servicio: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Sistema de Coordenadas: Coordenadas Planas NAD83 (2011) Puerto Rico e Islas Vírgenes FIPS 5200 (metros)

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**Figura 8: Asociaciones Vegetativas**

Planta de Filtración Enrique Ortega
Generadores Toma de Agua Cruda
CIP 1-70-9000

# 7 DISCUSION

El diseño del proyecto propuesto reutilizaría áreas previamente impactadas por las actividades de reparación de socavación en la Represa La Plata, entre los años 2021 y 2022.

La vegetación que se ha desarrollado en estas áreas son en su mayoría malezas comunes de rápido crecimiento características de zonas impactadas como es el caso de Paragüita rosada (*Chloris barbata*), Pata de gallina (*Digitaria horizontalis*), Yerba de caña (*Lasiacis divaricata*), Yerba rosada (*Melinis repens*), Margarita silvestre (*Bidens alba*), Hierba socialista (*Cyanthillium cinereum*), Huye-que-te-cojo (*Emilia sonchifolia*), Clavelito colorado (*Emilia fosbergii*), *Eupatorium capillifolium*, Guaco falso *(Mikania micrantha*), Pancha (*Tridax procumbens*), Higuereta (*Ricinus communis*), Matraca (*Crotolaria pallida*), *Paspalum fasciculatum*, *Cyperus ordoratus*, *Rhynchospora ciliata.*

Fuera de la huella que impactaría el proyecto propuesto, particularmente al este del predio donde localiza la represa, se observan árboles esparcidos de las especies de Acacia amarilla (*Senna siamea*), Guara (*Cupania americana*), Guaraguao (*Guarea guidonia*), Pitanga (*Eugenia uniflora*), entre otros. Parchos boscosos de sucesión secundaria se observan fuera del área que impactaría el proyecto algunos de estos bordeando gran parte de la extensión del camino en tierra. En estos parchos se observan especies como Yagrumo hembra (*Cecropia schreberiana*), Moca (*Andira inermis*), Guano (*Ochroma pyramidale*), Palma real (*Roystonea borinquena*), Tulipán africano (*Spathodea campalulata*), Guaraguao (*Guarea guidonia*) y Espino rubial (*Zanthoxylum martinicensis*).

En cuanto a la fauna, se observó un total de treinta y tres (33) especies, siendo las aves el grupo dominante. Las especies de aves más comunes en el predio y áreas circundantes son: Tórtola aliblanca (*Zenaida asiatica*), Paloma turca (*Patagioenas squamosa*), Ruiseñor (*Mimus polyglottos*), Mozambique (*Quiscalus niger*), Reinita mariposera *(Dendroica adeaidae)* y el Pitirre (*Tyrannus dominicensis*). Estas especies fueron observadas mayormente entre las áreas de terreno previamente impactados y los parchos de vegetación arbustiva en el camino de tierra y área del proyecto. Aves como el Pájaro bobo menor (*Coccyzus minor*), Bienteveo de Puerto Rico (*Vireo latimeri*), Julián chiví (*Vireo altiloquus*), San Pedrito (*Todus mexicanus*) y el Comeñame de Puerto Rico (*Loxigilla portoricensis*) se observaron en las parchos boscosos de sucesión secundaria que la huella del proyecto no impactaría.

El USFWS a través de su herramienta de IPaC identificó para el área donde ubican los terrenos propuestos una especie catalogada como en peligro o amenazadas: Boa de Puerto Rico (*Epicrates inornatus*). Sin embargo, durante el tiempo de esta evaluación, tanto en los periodos diurnos como nocturnos, esta especie no fue localizada dentro de los límites de las áreas estudiadas.

# 8 CONCLUSIONES Y RECOMENDACIONES

Los predios propuestos para la instalación de los generadores fueron impactados previamente, por el uso de este espacio para las actividades de reparaciones que se le realizaron a la Represa La Plata entre el 2021 y el 2022.

El impacto principal sobre la vegetación será causado por la remoción de vegetación para la instalación de los generadores, diésel, plataforma de hormigón, entre otra infraestructura. Por consiguiente, los efectos más directos a la vida silvestre resultarán de la eliminación, alteración o fragmentación de habitáculos existentes. Sin embargo, aunque estos impactos serán mínimos por la baja biodiversidad del área, se espera que se tomen en consideración las acciones de mitigación que se deben realizar con respecto a los árboles existentes.

No se prevé que ninguna especie de interés para la conservación, ni hábitats de alto valor ecológico se vean afectados significativamente por el desarrollo propuesto.

A continuación, se presentan algunas recomendaciones para la implementación del Proyecto Construcción de Área de Generadores de Energía en la Toma de Agua Cruda de la Planta de Tratamiento de Agua Enrique Ortega, que resultarán en evitar, reducir o minimizar los posibles impactos del proyecto propuesto a la vida silvestre.

- Desarrollar e implementar un plan de control de erosión y sedimentación para la construcción y cumplir con sus condiciones. Este incluirá un sistema de manejo de aguas pluviales para la retención de sedimentos, tales como estructuras, filtros vegetativos, trampas para sedimentos, lavado de llantas, etc.

- Preparar e implementar un plan para la prevención de contaminación de aguas de escorrentía (SWPPP, en inglés) como parte del permiso NPDES de la USEPA para la construcción.

- Solicitar un Permiso General Consolidado (PGC) y cumplir con sus condiciones.

- Los árboles que sean impactados por las instalaciones y/o construcción serán identificados de acuerdo con las disposiciones aplicables del Capítulo 3.4 Permisos de Medio Ambiente del Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operación de Negocios con vigencia de 2 de enero de 2021. Como medida de mitigación se compensará mediante la siembra según los requerimientos en cuanto a razón por Diámetro a la Altura del Pecho (DAP).

- Mientras que algunas especies se adaptan en cierto modo al continuo desarrollo de las áreas verdes, la planificación cuidadosa es necesaria para asegurar que hábitats importantes para la vida silvestre no sean destruidos y que cualquier conflicto que surja sea minimizado y remediado. Por tales razones se cumplirá con la Nueva Ley de Vida Silvestre, según enmendada (Ley Núm. 241 del 15 de agosto de 1999) y la Ley Sobre

Política Pública Ambiental, según enmendada (Ley Núm. 416 de 22 de septiembre de 2004), en relación con la protección del Medio Ambiente y las especies de Flora y Fauna que habitan el mismo.

- Se instruirá a los operadores de las utilidades a mantener una velocidad adecuada mientras transitan a través de los predios, para así minimizar posibles colisiones con aves y otra vida silvestre. De igual manera se instruirá sobre las medidas para reducir posibles fuegos, evitar el uso y manejo de substancias tóxicas, en especial pesticidas y otras formas de control de vegetación.

- No se realizarán actividades de instalación y/o construcción ni demolición durante el período nocturno. Se mantendrá un control de las tareas que se realizarán a diario para cumplir con el horario de trabajo establecido.

- Monitorear los sistemas de control de emisiones de los equipos pesados.

- Solicitar el PGC de OGPe, que incluye un permiso de generación de desperdicios sólidos no-peligrosos, y cumplir con sus condiciones.

- La descarga de la escorrentía de agua de lluvia será canalizada a través de estructuras apropiadas, cunetas. Se debe realizar un monitoreo para verificar que ningún contaminante y/o aceite llegue al cuerpo de agua.

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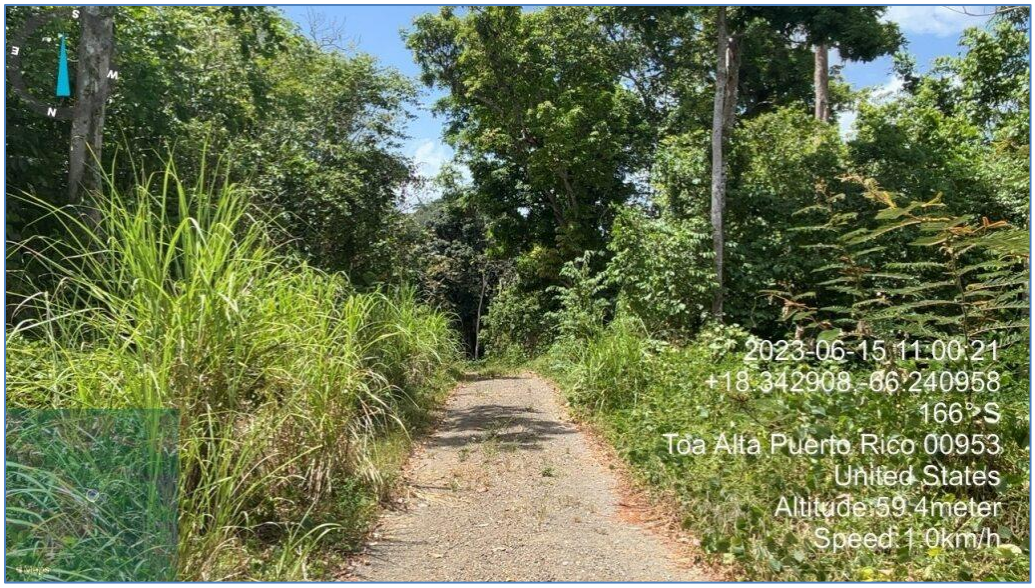
# APENDICES

## Apéndice 1. Documentación fotográfica

*Vista desde el Camino Recreativo La Plata hacia el camino de tierra en el área propuesta.*

*Vista de la condición actual del área propuesta para "staging area".*




*Detalle de la condición actual del camino existente en tierra a través del área propuesta.*

*Vista del área donde se propone la localización de los generadores y todos sus componentes.*

*Lechecillo (Euphorbia hirta)*

*Berenjena cimarrona (Solanum torvum)*

*Arbusto de Capulín (Muntingia calabura)*

*Cafeíllo (Casearia guianensis)*

## Apéndice 2. Lista de especies amenazadas y en peligro

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Caribbean Ecological Services Field Office
Post Office Box 491
Boqueron, PR 00622-0491
Phone: (787) 834-1600 Fax: (787) 851-7440
Email Address: CARIBBEAN_ES@FWS.GOV


In Reply Refer To: April 19, 2023
Project Code: 2023-0071470
Project Name: Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

***THE FOLLOWING SPECIES LIST IS NOT A SECTION 7 CONSULTATION. PLEASE CONTACT OUR OFFICE TO COMPLETE THE CONSULTATION PROCESS***

The purpose of the Endangered Species Act (Act) is to provide a means whereby threatened, and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect those species and/or their designated critical habitat.

Federal agencies are required to "request of the Secretary of Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action". The enclosed species list provides information to assist with the U.S. Fish and Wildlife Service (Service) consultation process under section 7 of the Act. However, **the enclosed species list does not complete the required consultation process.** The species list identifies threatened, endangered, proposed and candidate species, as well as proposed and designated critical habitats, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. A discussion between the Federal agency and the Service should include what types of listed species may occur in the proposed action area and what effect the proposed action may have on those species. This process initiates informal consultation.

Once a species list is obtained for the proposed project, an effect determination for endangered and threatened species should be made. The applicant could make an effect determination by using available keys on IPaC for specific species. For species with no determination keys, the applicant should request concurrence from the Service by sending a project package

to caribbean_es@fws.gov. To obtain guidance for completing this process and the minimum requirements for project packages, please visit:

https://www.fws.gov/southeast/pdf/letter/consultation-under-section-7-of-the-endangered-species-act-with-the-caribbean-ecological%20Services-field-office-template-letter.pdf

When a federal agency, after discussions with the Service, determines that the proposed action is not likely to adversely affect any listed species, or adversely modify any designated critical habitat, and the Service concurs, the informal consultation is complete, and the proposed project moves ahead. If the proposed action is suspected to affect a listed species or modify designated critical habitat, the Federal agency may then prepare a Biological Assessment (B.A.) to assist in its determination of the project's effects on species and their habitat. However, a B.A. is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a B.A. where the agency provides the Service with an evaluation on the likely effects of the action to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a B.A. are described at 50 CFR 402.12.

If a federal agency determines, based on its B.A. or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to further consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation process. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species.

This list is provided pursuant to Section 7 of the Endangered Species Act and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action". Please use this list to determine whether your project requires consultation and to make your effects determination. For more guidance, use the Guideline for Consultation under Section 7 of the Endangered Species Act with the Caribbean Ecological Services Field Office by clicking here.

This species list is provided by:

Caribbean Ecological Services Field Office
caribbean_es@fws.gov

Post Office Box 491
Boqueron, PR 00622-0491
(786) 244-0081

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

# OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Caribbean Ecological Services Field Office**
Post Office Box 491
Boqueron, PR 00622-0491
(787) 834-1600

# PROJECT SUMMARY

Project Code: 2023-0071470

Project Name: Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators

Project Type: Dam - New Construction

Project Description: The project encompasses the installation of four (4) 2,500 KW generators to provide backup power to the Raw Water Intake Pump Station, sump pump, dam gate system engine, one of the office buildings, exterior lighting, and security systems of the La Plata Raw Water Intake located in Toa Alta, Puerto Rico. Three (3) of these generators will be used as primary emergency generator plus one (1) generator as a back-up in case of failure of any of the primary generators. These generators will provide electric power to the Raw Water Intake Pump Station and the entire facility during power blackouts or service interruptions from the Puerto Rico Electric Power Authority (PREPA) electrical grid.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@18.34186125,-66.23899244002445,14z

Counties: Toa Alta County, Puerto Rico

# ENDANGERED SPECIES ACT SPECIES

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## REPTILES

| NAME | STATUS |
|---|---|
| Puerto Rican Boa *Chilabothrus inornatus* | Endangered |

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/6628
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/ENN6KWAYVFAJ3BZZ4JEHZZUBVQ/documents/generated/6941.pdf

## CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

# USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

# MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

THERE ARE NO FWS MIGRATORY BIRDS OF CONCERN WITHIN THE VICINITY OF YOUR PROJECT AREA.

## MIGRATORY BIRDS FAQ

**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?**

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list

of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

**How do I know if a bird is breeding, wintering or migrating in my area?**
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

**What are the levels of concern for migratory birds?**
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

**Details about birds that are potentially affected by offshore projects**
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical

Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

**What if I have eagles on my list?**
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

**Proper Interpretation and Use of Your Migratory Bird Report**
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

# WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

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RIVERINE

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# IPAC USER CONTACT INFORMATION


| | |
|---|---|
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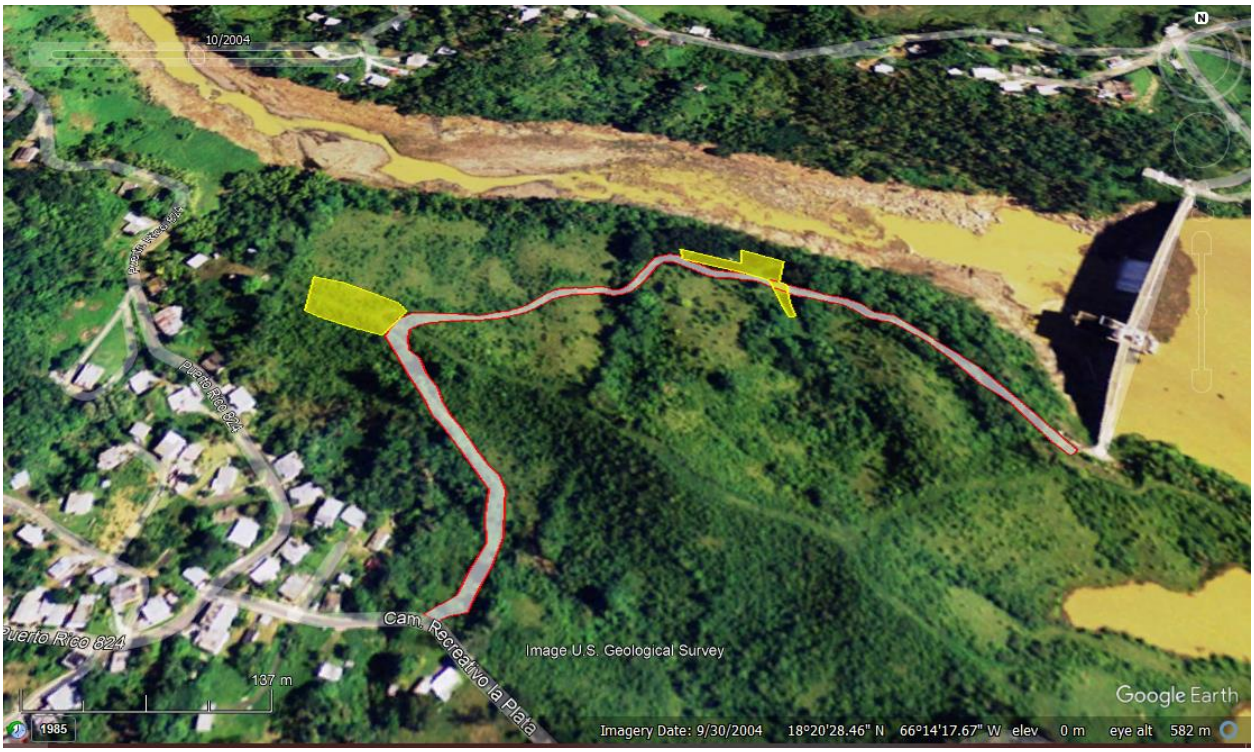
## Apéndice 3. Imágenes históricas de satélite de los predios propuestos entre 1994 al 2023

Año: 1994

Año: 2004



Año: 2012

Año: 2015

Año: 2020

Año: 2021

Año: 2022

Año: 2023

# APPENDIX D SITE VISIT REPORT

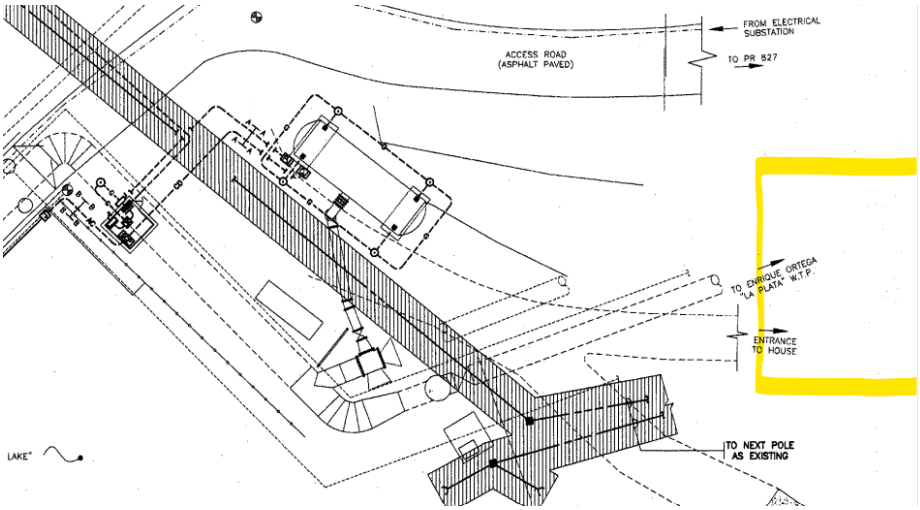
## Correa Flores, Julio H.

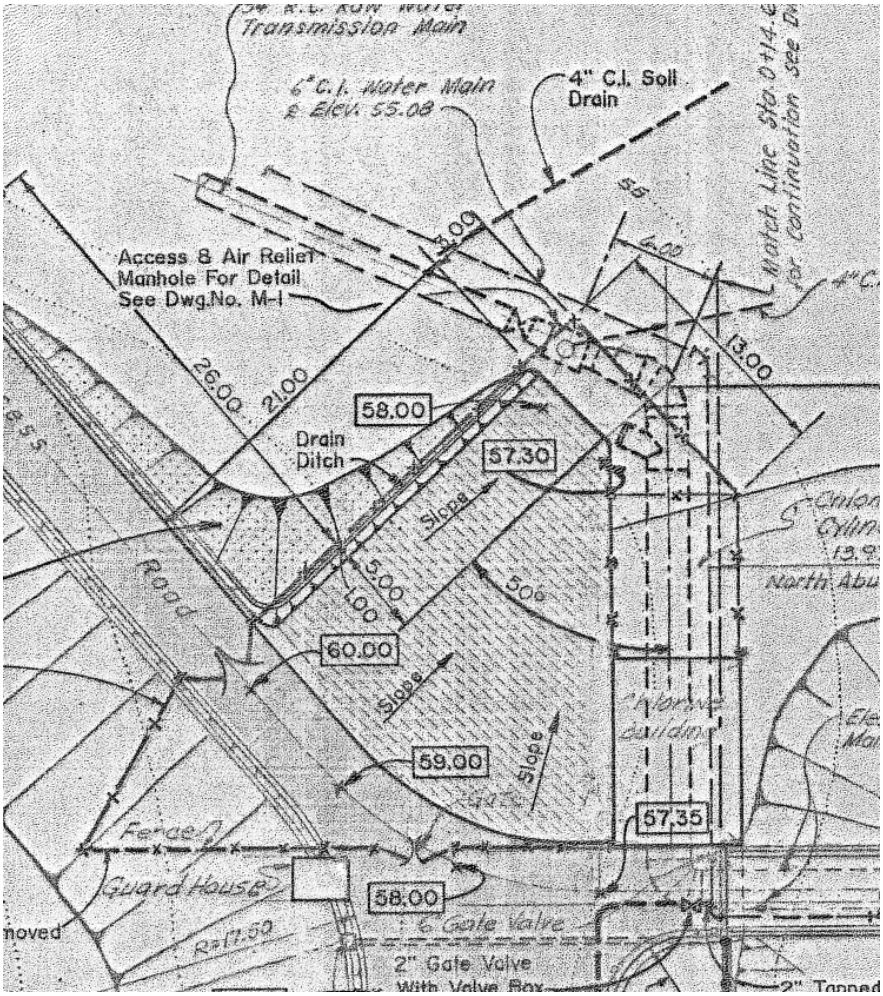
**From:** Correa Flores, Julio H.
**Sent:** Monday, January 24, 2022 4:48 PM
**To:** Ann Ventura Payan
**Subject:** Informacion reciente sobre proyeco generadores La Plata. CIP 1-70-9000

Buenos días Ann

El jueves pasado estuvimos con las firmas de ingeniería que nos aprobaron para participar en el RFO de los generadores. Durante la visita Sergio Suarez (que fue junto con Ricardo Ortiz) nos indicó que la tubería de bombeo de aguas crudas pasa por el sitio propuesto para la instalación de los generadores.

Te incluyo un detalle de los planos del sistema anti-golpe de ariete donde se muestra la tubería de salida al igual que unos planos de 1961 donde se muestra la misma información.






Existen varias alternativas para poder continuar con el proyecto

- Escoger otro sitio – al otro extremo de la represa están instalados los generadores existentes. Se podrían adquirir servidumbres de paso o terrenos en pleno dominio para llegar a este lugar e instalar ahí los generadores. Una de las mayores ventajas de este lugar es que no hay ningún vecino en la cercanía. Una desventaja es que habría que llevar la corrida eléctrica de los nuevos generadores hasta las bombas de agua cruda.

- Cotejar el impacto de la ruta de la tubería de agua cruda en el área propuesta para los generadores – Se puede marcar la ruta de la tubería (ej. usando pitométricos para ir a la segura) y ver si es posible que las estructuras nuevas no queden encima de la línea, o si había que mover un poco esas estructuras nuevas como parte del diseño o si va a ser necesario ampliar el terreno a ser adquirido.
- Relocalizar el tramo de tubería afectado y dejar el área propuesta para los generadores tal y como está contemplado actualmente. Esto causaría al menos un "shut down" para poder hacer las conexiones pertinentes.

Aprovecho para mencionarte algunas cosas que preocuparon a los diseñadores que estuvieron en la visita:

- Las bombas de agua cruda no tienen soft-starter ni VFD para aminorar el golpe de la rampa de amperaje cuando arrancan. Este asunto afecta el cómputo de capacidad de los generadores ya que reciben el impacto directo de la bomba al arrancar.
- Las bombas se operan totalmente en modo manual. No hay un sistema de permisivos que eviten, por ejemplo, que dos bombas se prendan a la misma vez. Eso también afecta el computo de capacidad de los generadores. Nos solicitaron un procedimiento de secuencia de prendido de las bombas para ellos poder establecer la capacidad de los generadores. Esto ya lo trabajé con Keslin, pero lo de la falta de permisivos es totalmente correcto.
- Preguntaron si AAA quería que los generadores nuevos fueran "stand-by" o "prime". En los documentos de SALO no se entra en ese grado de detalle para el modelo de generador propuesto.

Voy a aguantar el proceso de RFP que estaba llevando a cabo hasta saber cómo quieran que procedamos.

Saludos

Julio H. Correa Flores, PE, MEM
Post-Construction Manager

CSAGROUP
EST • 1956

E-mail jcorrea@csagroup.com Phone 787.641.6800 Mobile 787.403.3147

# APPENDIX E ALTERNATIVES EVALUATION REPORT

March 8, 2022

Mrs. Ann Ventura Payan, PE
Design Auxiliary Director
Puerto Rico Aqueduct & Sewer Authority
PO Box 7066
San Juan, PR 00916

**CIP 3-36-6005 Alternate Sites Evaluation and Recommendation for Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators Phase I**

Dear Engineer Ventura:

The Puerto Rico Aqueduct and Sewer Authority (PRASA) issued a notice to proceed (NTP) to CSA-Louis Berger JV LLC (CSA, the Program Manager Consortium or PMC), dated November 8, 2021, to commence the project management for the Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators Phase I.

The Phase I of the project covers procurement of engineering services, schematic engineering design, surveying and testing, preliminary engineering design, environmental compliance and obtaining permits, land acquisition planning, and final design and construction documents. Phase I is 100% funded by FEMA's Hazard Mitigation Grant Program (HMGP) under the Global Match Strategy for an amount not to exceed $661,523.70. Phase II covers land acquisition, bidding, construction, and inspections and shall not exceed $7,677,564.44 and requires FEMA approval for proceeding.

PRASA shared several documents with CSA that were submitted to FEMA as part of the application process for the project funding. One of such documents, titled *Review Comments and Request for Information*, contained detailed information about several aspects of the project planning and scope of work, among other important information. Attachment B contains a schematic showing the proposed location for the 20 x 40 meter concrete pad where the generators would be installed. The document titled *HMGP Project Application,* on item B. Project Location, established that *"The proposed site is located approximately 100 meters away from the electrical facilities and have an area of 3,200 squared meter. The 3,200 square meter will be acquired from a parcel of 94,329 square meter property of the Heirs of Alberto Terrassa."* Appendix A of such document contains several maps where the concrete pad location is showed (see picture below).

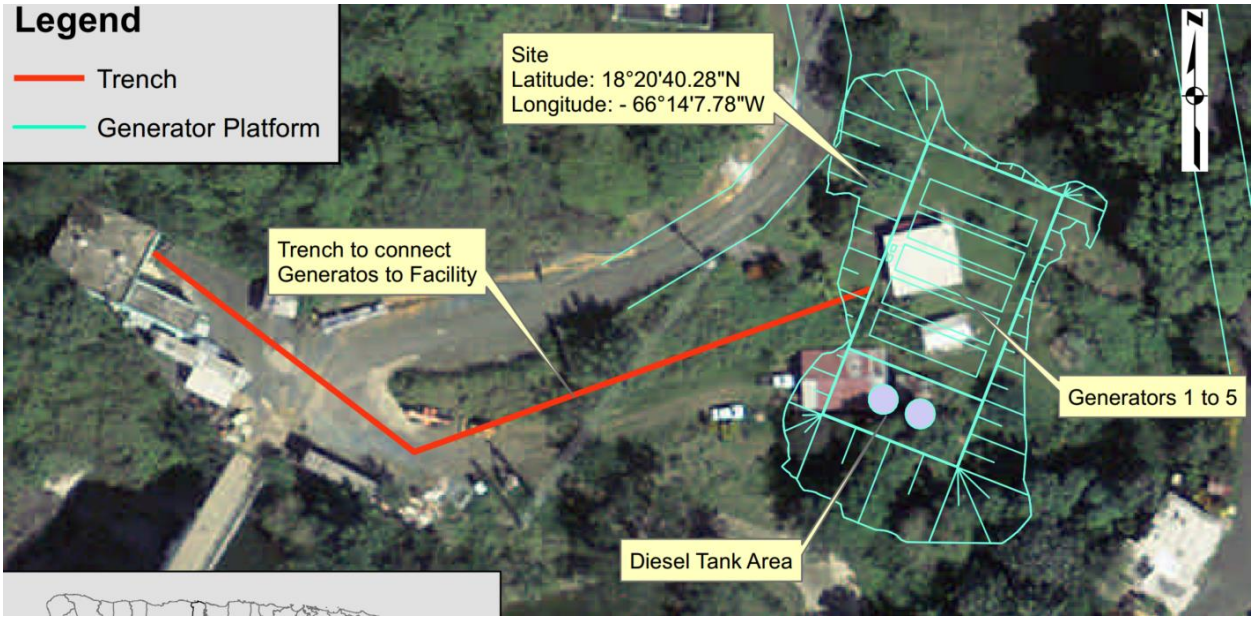



**Figure 1: Proposed generator location**

CSA started the request for proposal process for the design services and performed a site visit with PRASA-approved Project Delivery Consultants (PDC's) on January 20, 2022. During the visit PRASA personnel and one of the PDC's indicated that the 54-inch raw water force line runs close or very close to the proposed site. The information was communicated to PRASA's Infrastructure Department and immediately after, an investigation was conducted to validate the information given during the site visit. Several set of as-built and construction drawings were analyzed and confirmed that the raw water pipeline was indeed passing beneath the proposed construction site (see pictures below).

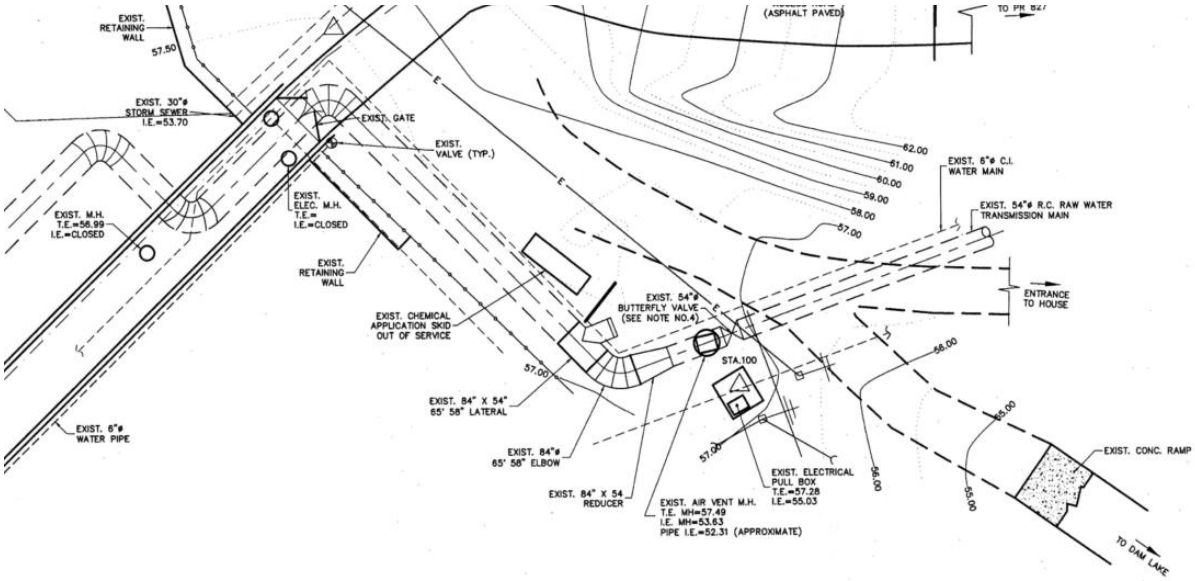



**Figure 2: Extract from sheet number 6.** ***La Plata Dam and Raw Water P.S Existing Condition*****. CIP 7-70-9000**

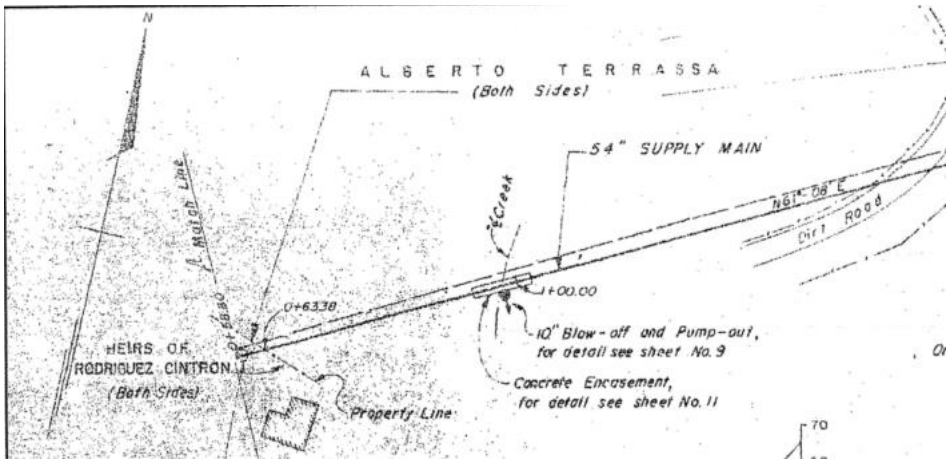



**Figure 3: Extract from *Rio de La Plata Development Raw Water Supply Main Plan and Profile* sheet. As Built drawing from October 1973**

**Figure 4: Approximate raw water pipe location and proposed generator concrete pad shown on Google Earth**

The proposed generators pad location is above the existing 54" Ø Raw Water Pipeline and its ROW, limiting future maintenance. Also, there is a considerable earth movement to prepare the site for construction. Working on the proposed site could expose the pipeline to breakage and/or have a portion of it under the concrete pad for the generators.

On January 31, 2022, PRASA requested CSA to identify potential new sites for the installation of the generators. CSA personnel visited the La Plata Dam on February 10, 2022 and identified five (5) potential sites. Information was gathered to determine the advantages and disadvantages together with cost estimates for each site. This will allow PRASA to make a decision on the alternate new site and continue the process with FEMA HGMP to request a time extension and additional funds to complete the scope of work.

Before entering the details of the different options, let us bring the advantages, disadvantages, and cost estimate for the originally proposed site (base site).

**Base Site**

**Advantages**

- Close to the electrical facilities at the dam site (approximately 100 meters). Reduces electrical installation costs.
- Does not require interfering with the dam or any other structure that can be considered potentially historical.
- Generators, fuel tanks, and control equipment can be placed together in the same concrete pad.
- Ease of logistics for maintenance. Existing and new electrical infrastructure will remain in the same site.

**Disadvantages**

- The proposed site needs to be rearranged to avoid the existing 54"Ø raw water pipeline and its ROW.
- Construction work near to the 54"Ø raw water pipeline could affect the integrity of the line and expose the pipeline to breakage.
- Significant earth movement for the preparation of the flat area required for the generators concrete pad and area for Maintenance vehicles. The approximate earth movement has been estimated to 2,970 cubic meters of cut and 606 cubic meters of fill.
- Possible needs of retaining walls, to provide an area for fuel tank and maintenance vehicles maneuvering.
- Requires land acquisition of approximately 3,200 square meters.
- Site is located upstream of the dam; any accidental fuel spill will jeopardize Enrique Ortega Water Filtration Plant (WFP) operation for hours or days.
- Site is less than 40 meters from the nearest residence. The noise and fumes from the generators can generate discomfort and complaints from the neighbors.

**Cost estimate** – As mentioned previously, FEMA HMGP approved $7,677,564.44 for the construction and land acquisition activities. The cost was updated in December 2021 by CSA and the revised estimate increased to $10,176,517. The most recent estimate takes into consideration items like temporary inspection and contractor facilities, erosion control measures, maintenance of traffic, safety measures, more detailed civil and electrical works, taxes, profit, overhead, contingencies, and land acquisition. The revised cost estimate for the original site is $17,883,060. Please refer to the detailed cost estimate.

CSA selected five potential alternate sites for the installation of the generators. The following picture gives a general view of the five sites for better understanding and sense of location.

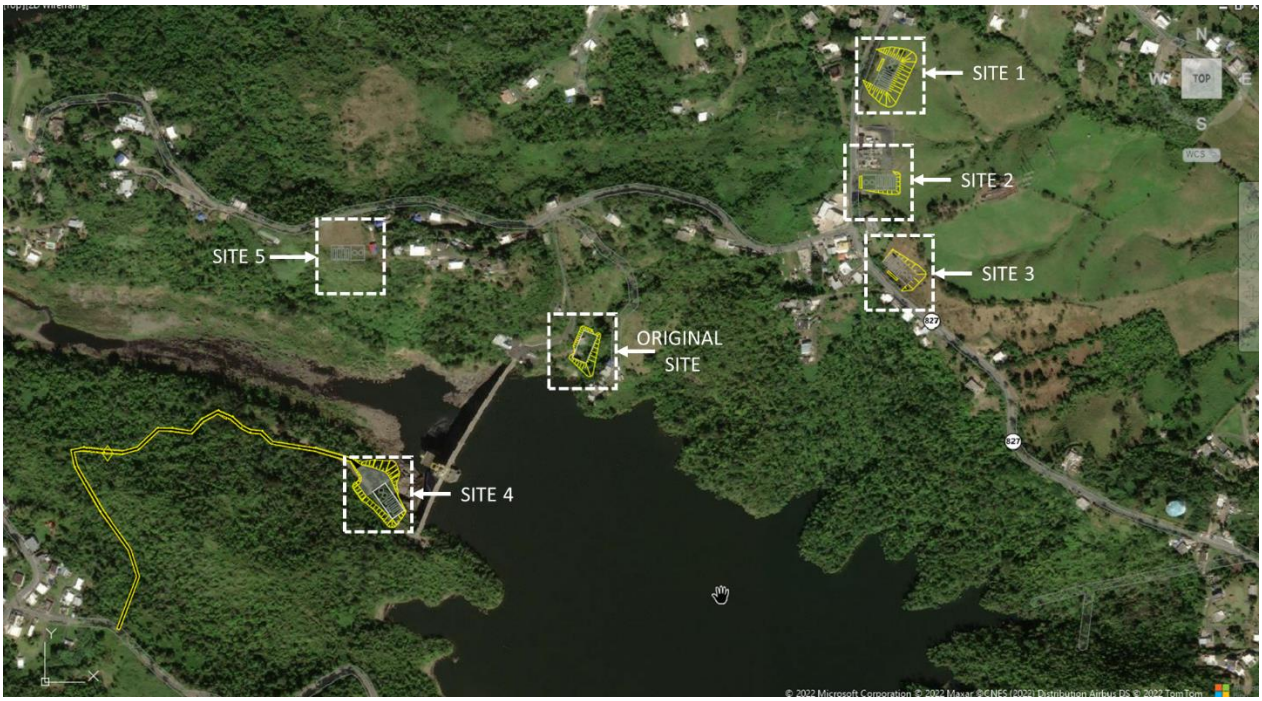



**Figure 5: Approximate location of the five potential sites selected for evaluation**

**<u>Potential Site #1</u>**

Located on state road 827 (coordinates: 18.347603°, -66.230531°), north to PREPA's Piñas Electrical Substation and approximately 900 meters from the La Plata Dam main access gate. Refer to the pictures below.

**Figure 6: Pictures of potential Site #1**

**Figure 7: Aerial view of Site #1**

The place presents a variable topography with a nearby depression were stormwater runoff runs. It is adjacent to the main road and there are high voltage lines passing nearby. It is the farthest site from the La Plata Dam. We considered installing the generators, fuel tanks and switchgear, and running underground electrical conduits from the site to a paralleling switchgear located at the dam site. This paralleling switchgear would be located at the base site but occupying a significantly less area; it might be possible that it could be located entirely on PRASA's property. The land that needs to be acquired is approximately 3,850 square meters, property of Mr. Roberto Álvarez. Earth movement has been estimated around 14,340 cubic meters approximately. Since the proposed site is close to the road, background noise levels are higher, and neighbors' complaints could less than for base site. The following figures shows the proposed generator location and the electrical connection from the site to the La Plata Dam existing electrical infrastructure.

**Figure 8: Concrete pad with generators, fuel tanks and switchgear location at proposed Site #1**

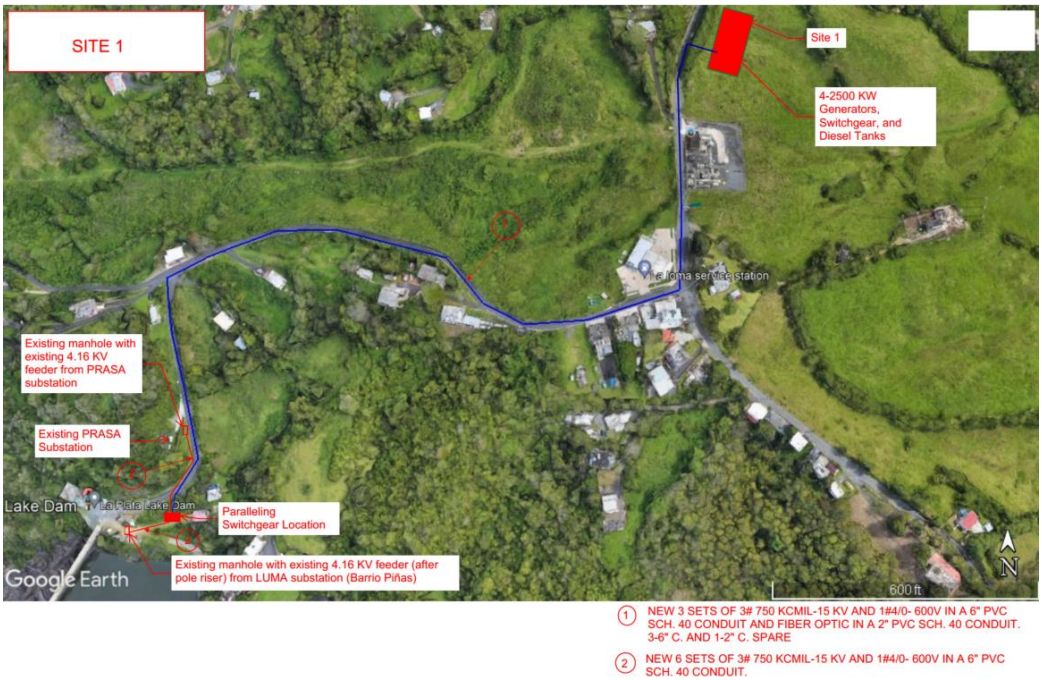



**Figure 9: Electrical schematic for proposed Site #1**

**Advantages**

- Upstream of the La Plata Dam but considerable very far. An accidental fuel spill would take considerable time before reaching a water body, thus increasing reaction time to control and clean it.
- No known infrastructure that could interfere during the construction phase.
- Ample space for tank truck maneuvering.
- Does not require interfering with the dam or any other structure that can be considered potentially historical.
- Paralleling switchgear that needs to be installed at dam site does not pose a spill threat to the La Plata Lake.
- Background noise levels could attenuate complaints from nearby residences.

**Disadvantages**

- Farthest place from the dam site (900 m approximately). Increases electrical costs.
- Requires land acquisition of approximately 3,850 square meters for the new site and potentially 24 square meters from the base site to accommodate the paralleling switchgear.
- Site is less than 40 meters from the nearest residence boundary.

**Cost estimate -** $22,155,419 for this alternative. Please refer to the detailed cost estimate.

**Potential Site #2**

Located on state road 827 (coordinates: 18.346479°, -66.230915°), south to PREPA's Piñas Electrical Substation and approximately 710 meters from the La Plata Dam main access gate. Refer to the pictures below.

**Figure 10: Picture of potential Site #2**

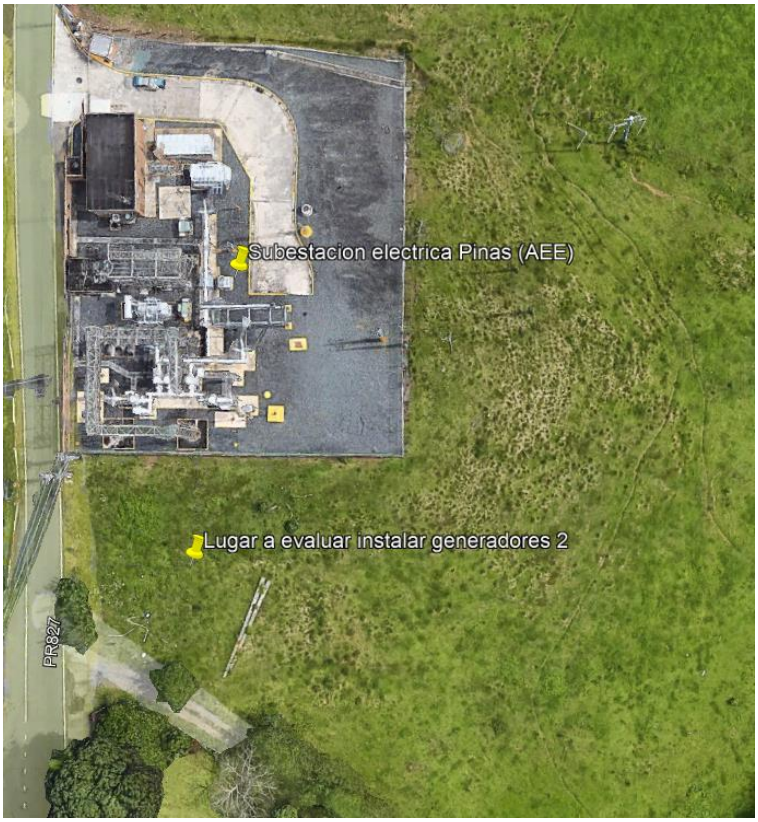



**Figure 11: Aerial view of Site #2**

The place presents a semi-flat topography with no visible runoff conveying areas. It is adjacent to the main road and the high voltages lines passing nearby do not affect the studied site. It has the third largest distance from the La Plata Dam. As for Site #1, we considered installing the generators, fuel tanks and switchgear, and running underground electrical conduits from the site to a paralleling switchgear located at the dam site. This paralleling switchgear would be located at the base site but occupying a significantly less area; it might be possible that it could be located entirely on PRASA's property. The land that needs to be acquired is approximately 1,600 square meters, also property of Mr. Roberto Álvarez. Earth movement has been estimated around 2,300 cubic meters approximately. Since the proposed site is close to the road, background noise levels are higher, and neighbors' complaints could less than for base site. The following figures shows the proposed generator location and the electrical connection from the site to the La Plata Dam existing electrical infrastructure.

**Figure 12: Concrete pad with generators, fuel tanks and switchgear location at proposed Site #2**

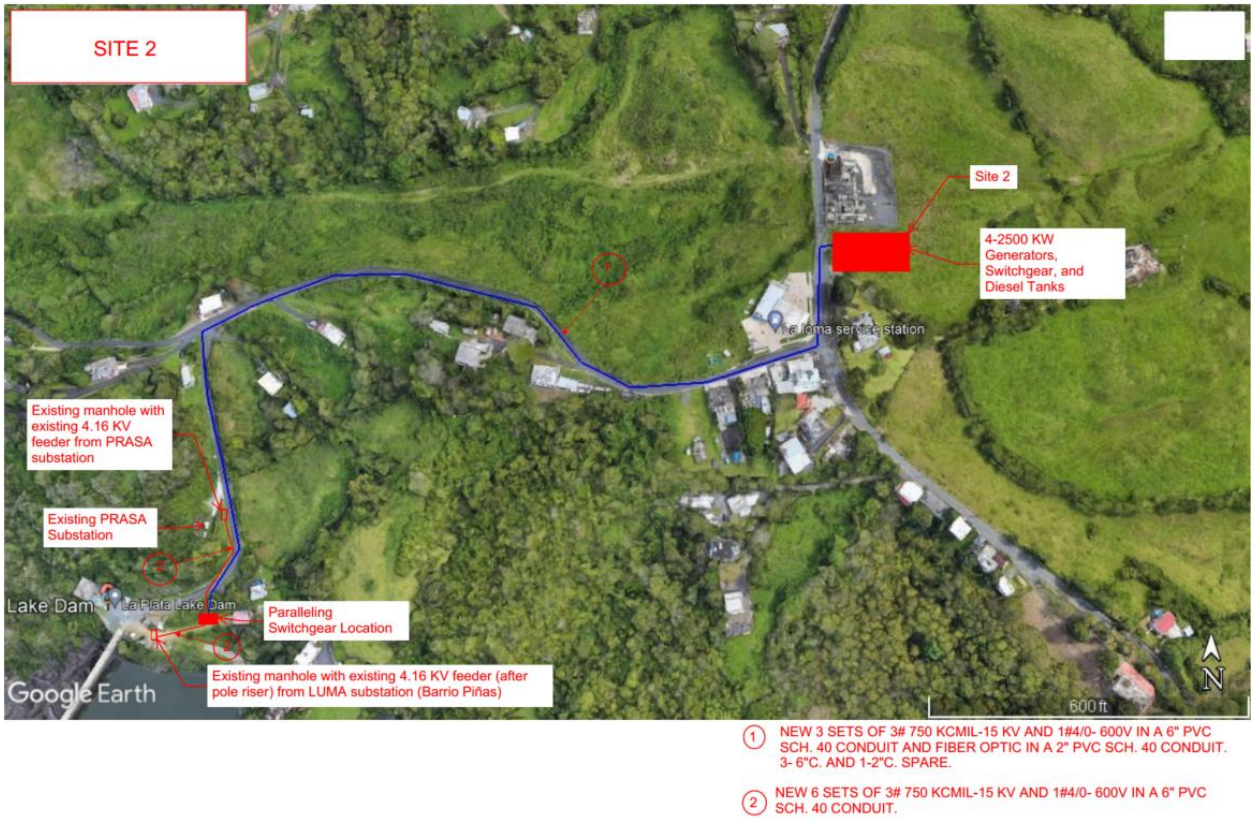



**Figure 13: Electrical schematic for proposed Site #2**

**Advantages**

- An accidental fuel spill would take considerable time before reaching a water body, thus increasing reaction time to control and clean it.
- No known infrastructure that could interfere during the construction phase.
- Ample space for tank truck maneuvering.
- Paralleling switchgear that needs to be installed at dam site does not pose a spill threat to the La Plata Lake.
- Does not require interfering with the dam or any other structure that can be considered potentially historical.
- Comparatively less earth movement than for base site and site #1.
- Background noise levels could attenuate complaints from nearby residences.

**Disadvantages**

- Considerable distance from the dam site (710 m approximately). Increases electrical costs.
- Requires land acquisition of approximately 1,600 square meters for the new site and potentially 24 square meters from the base site to accommodate the paralleling switchgear.
- Site is less than 40 meters from the nearest residence boundary.

**Cost estimate –** $20,801,946 for this alternative. Please refer to the detailed cost estimate.

**Potential Site #3**

Located on state road 827 (coordinates: 18.345230°, -66.230239°), southeast to PREPA's Piñas Electrical Substation and approximately 770 meters from the La Plata Dam main access gate. Refer to the pictures below.

**Figure 14: Picture of potential Site #3**

**Figure 15: Aerial view of Site #3**

The place presents a variable topography with a depression were stormwater runoff runs in the middle. It is adjacent to the main road and there are no high voltage lines passing nearby. It has the second largest distance from the La Plata Dam. As for the first two alternatives, we considered installing the generators, fuel tanks and switchgear, and running underground electrical conduits from the site to a paralleling switchgear located at the dam site. This paralleling switchgear would be located at the base site but occupying a significantly less area; it might be possible that it could be located entirely on PRASA's property. The land that needs to be acquired is approximately 2,160 square meters, property of Mr. Roberto Álvarez. Earth movement has been estimated around 5,640 cubic meters approximately. Since the proposed site is close to the road, background noise levels are higher, and neighbors' complaints could less than for base site. The following figures shows the proposed generator location and the electrical connection from the site to the La Plata Dam existing electrical infrastructure.

**Figure 16: Concrete pad with generators, fuel tanks and switchgear location at proposed Site #3**

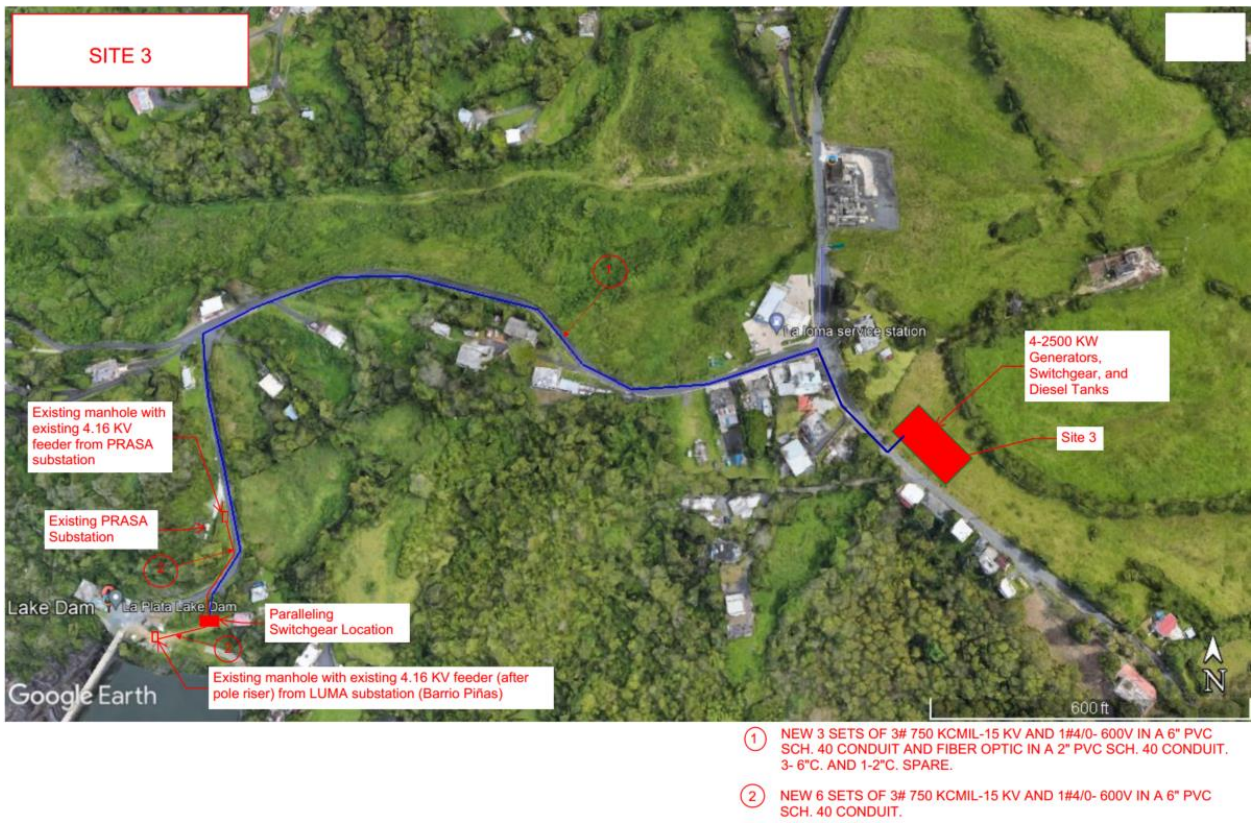



**Figure 17: Electrical schematic for proposed Site #3**

**Advantages**

- An accidental fuel spill would take considerable time before reaching a water body, thus increasing reaction time to control and clean it.
- No known infrastructure that could interfere during the construction phase.
- Ample space for tank truck maneuvering.
- Paralleling switchgear that needs to be installed at dam site does not pose a spill threat to the La Plata Lake.
- Does not require interfering with the dam or any other structure that can be considered potentially historical.
- Comparatively less earth movement than for Site 1
- Background noise levels could attenuate complaints from nearby residences.

**Disadvantages**

- Considerable distance from the dam site (770 m approximately). Increases electrical costs.
- Requires land acquisition of approximately 2,160 square meters for the new site and potentially 24 square meters from the base site to accommodate the paralleling switchgear.
- Site is less than 20 meters from the nearest residence boundary.

**Cost estimate –** $21,736,906 for this alternative. Please refer to the detailed cost estimate.

**Potential Site #4**

Located southwest to the dam wall (coordinates: 18.342664°, -66.237135°) and approximately 200 meters from the La Plata Dam pump control building. Refer to the picture below.

**Figure 18: Aerial view of Site #4**

The place presents a variable topography with no visible runoff conveying areas. There are no high voltage lines passing nearby. The proposed site is located out of the dam flooding zone. It has the closest distance to the La Plata Dam site after the base site. Like the base site, all project infrastructure can be fit in the same concrete pad, with no need to have two different switchgears. Under this option it is necessary to run underground electrical conduits from the proposed site up to the dam structure, and then continue exposed conduits from where the dam structure starts to the dam intake tower to intercept the existing electrical infrastructure.

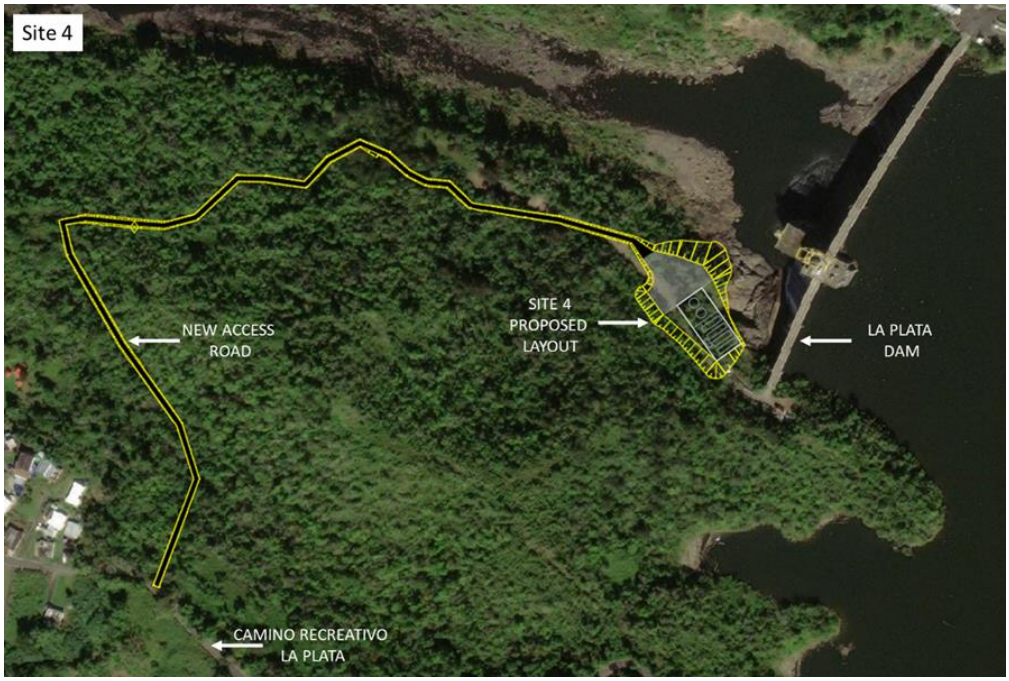



**Figure 19: Project Layout for Site #4**

PRASA owns the 10.24-acre lot which contains the proposed site. PRASA's property limits with a wildlife refuge but the proposed area is not part the natural protected area.

The major issue with this site is the lack of an access which will require the construction of an access road of approximately 740 meters long. The access road and area for generators should be located above the ABFE 0.2% (500 years) of 35.04 meters elevation. The proposed site will need the land acquisition of the right-of-way for the access road and additional acquisition of approximately 1800 square meters for the earth movement required to provide the project with a maneuvering area for maintenance vehicles. PRASA may want to consider the purchase of the access road in eminent domain instead of a right-of-way.

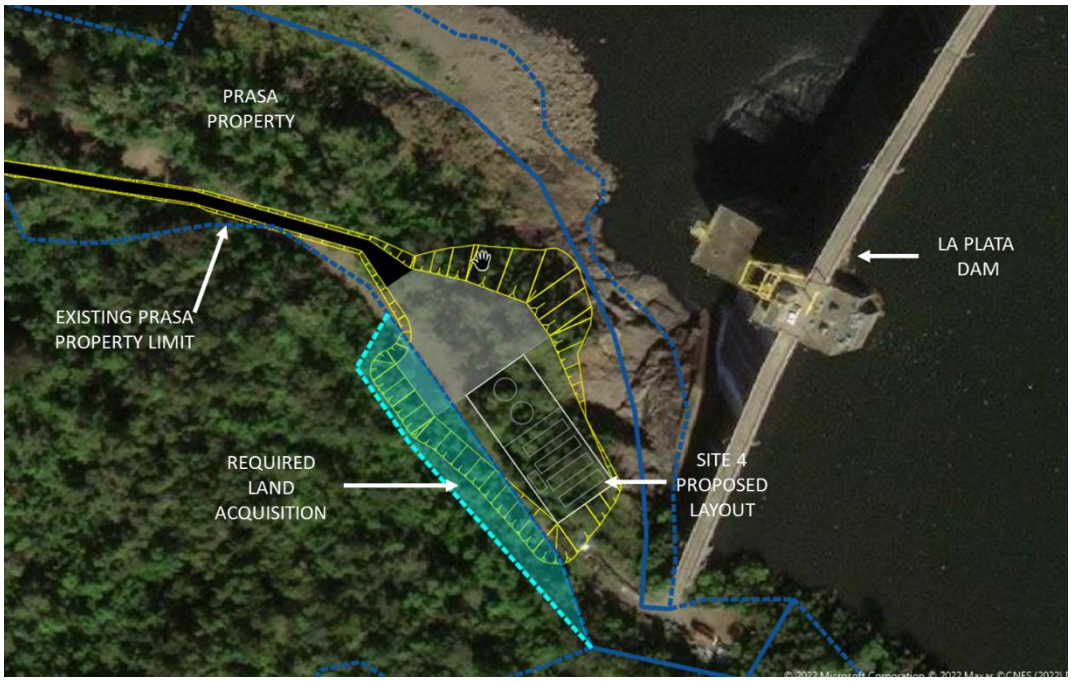



**Figure 20: Site #4 layout with access road and land acquisition requirements**

The site is downstream of the La Plata Dam but still very close to the La Plata River. In case of an accidental spill, diesel fuel will not jeopardize Enrique Ortega WFP operation but can easily reach the river.

The approximate earth movement will cover an area of 8,200 square meters and has been estimated to 9,500 cubic meters of cut and 3,500 cubic meters of fill. Since the proposed site have no residences nearby there should be no noise complaints at all. The following figures shows the proposed generator location and the electrical connection from the site to the La Plata Dam.

**Figure 21: Concrete pad with generators, fuel tanks and switchgear location at proposed Site #4**

1 NEW 12 SETS OF 3# 750 KCMIL-15 KV AND 1#4/0- 600V IN A 6" PVC SCH. 40 CONDUIT.

2 EXISTING 2 -4.16 KV TO REMAIN AND TO BE INTERCEPTED AT PUMP ROOM.

**Figure 22: Electrical schematic for proposed Site #4**

**Advantages**

- An accidental fuel spill will not affect Enrique Ortega WFP operation.
- No known infrastructure that could interfere during the construction phase.
- Ample space for tank truck maneuvering.
- Noise levels should not affect residences.
- Shortest distance from the generators to the La Plata Dam
- All project infrastructure can be accommodated in the same concrete pad
- Ease of logistics for maintenance. Existing and new electrical infrastructure will remain within the PRASA facilities.

**Disadvantages**

- Requires the construction of an access road.
- Requires additional right of way of approximately 6,450 square meters.
- Requires additional acquisition of approximately 1,800 square meters.
- Requires interfering with the dam to install the electrical conduits. The structure can be considered potentially historical.
- A fuel spill can reach the La Plata River in a short time.
- Earth movement has been estimated in 9,500 cubic meters cut and 3,500 cubic meters fill.
- Extensive Tree mitigation will be required.

**Cost estimate –** $20,458,655 for this alternative. Please refer to the detailed cost estimate.

**Potential Site #5**

Located northwest to the La Plata Dam (coordinates: 18.345681°, -66.237817°) and approximately 580 meters from its main access gate. Refer to the picture below.

**Figure 23: Aerial view of proposed Site #5**

This site was discarded early in the evaluation because high voltage lines cross it right in the middle. PREPA's (LUMA) typical right of way for 115 KV lines is 100 ft (50 ft. at each side of the center of the line). When the right of way is projected, there is little space for construction. The concrete pad would fall in a highly steep terrain. Refer to the next picture.

**Figure 24:Available construction area after taking into consideration the required right of way for Site #5**

A matrix was developed to assign values and weight factors for each key factor under evaluation. In that way we can score each option to determine which could be the best option for PRASA. The higher the overall scoring the better the alternative should be. The original site obtained the lowest score. The analysis demonstrates that Site #4 obtained the higher score and thus should be the more feasible alternative for PRASA. Site #2 obtained the second-best score, not very distant from the score for Site #4. Any of these two sites could be selected based on this evaluation matrix.

| Key Evaluation Factor | Weight Factor | Base Site | Site #1 | Site #2 | Site #3 | Site #4 |
|---|---|---|---|---|---|---|
| Closeness to dam site. | 0.12 | 5 | 1 | 3 | 2 | 4 |
| No interference with the dam or any other structure that can be considered potentially historical. | 0.10 | 2 | 2 | 2 | 2 | 1 |
| Lower electrical construction cost and ease of maintenance logistics. | 0.05 | 3 | 1 | 1 | 1 | 2 |
| Impact of fuel spill in the Enrique Ortega WFP operation. | 0.15 | 1 | 3 | 3 | 2 | 4 |
| No known infrastructure that could interfere during the construction phase. | 0.13 | 1 | 2 | 2 | 2 | 2 |
| Available space for tank truck maneuvering. | 0.15 | 1 | 2 | 2 | 2 | 2 |
| Earth movement | 0.05 | 4 | 1 | 5 | 3 | 2 |
| Noise levels affecting nearby residences | 0.12 | 1 | 3 | 2 | 2 | 4 |
| Land acquisition requirement | 0.05 | 3 | 2 | 5 | 4 | 1 |
| Environmental permits and endorsement complexity | 0.08 | 2 | 2 | 2 | 2 | 1 |
| **Total** | 1.0 | 2.01 | 2.05 | 2.52 | 2.10 | 2.55 |

**Table 1. Evaluation matrix with scoring for each site considered**

The next table summarizes the opinion of construction cost for all the alternate sites that were evaluated. The lowest cost corresponds to the original site but taking into consideration the disadvantages the site has in terms of tank truck access, potential accidental spill impact and the buried 54-inch pipe underneath, the second-best alternative is Site #4 followed very closely by Site #2.

| | Base Site | Site #1 | Site #2 | Site #3 | Site #4 |
|---|---|---|---|---|---|
| **Cost estimate** | $17,883,060 | $22,155,419 | $20,801,946 | $21,736,906 | $20,458,655 |

**Table 2. Summary of opinion of construction costs**

CSA recommends Site #4 as the new construction site for the following reasons: is close to the dam site, any potential fuel spill will not jeopardize the Enrique Ortega WFP operation, will have adequate space for vehicle maneuvering, there are no nearby residences that could be affected by noise and fumes from the generators, there is no known infrastructure that could affect the construction phase, the constructed access road might serve as an alternate route to the dam site in the future with some extra civil work and all the new infrastructure would be located in the same site. Site #2 is also a reasonable to consider alternative, but noise and fumes complaints are more likely to occur than for Site #4.

Infrastructure Department should consider discussing the recommendations with Metro Region Operations key personnel to select the option that satisfies the best interest for PRASA.

If you need any additional information to complete the evaluation and selection process do not hesitate to contact me at your earliest convenience.

Respectfully,

Julio Correa Flores, PE
Project Manager

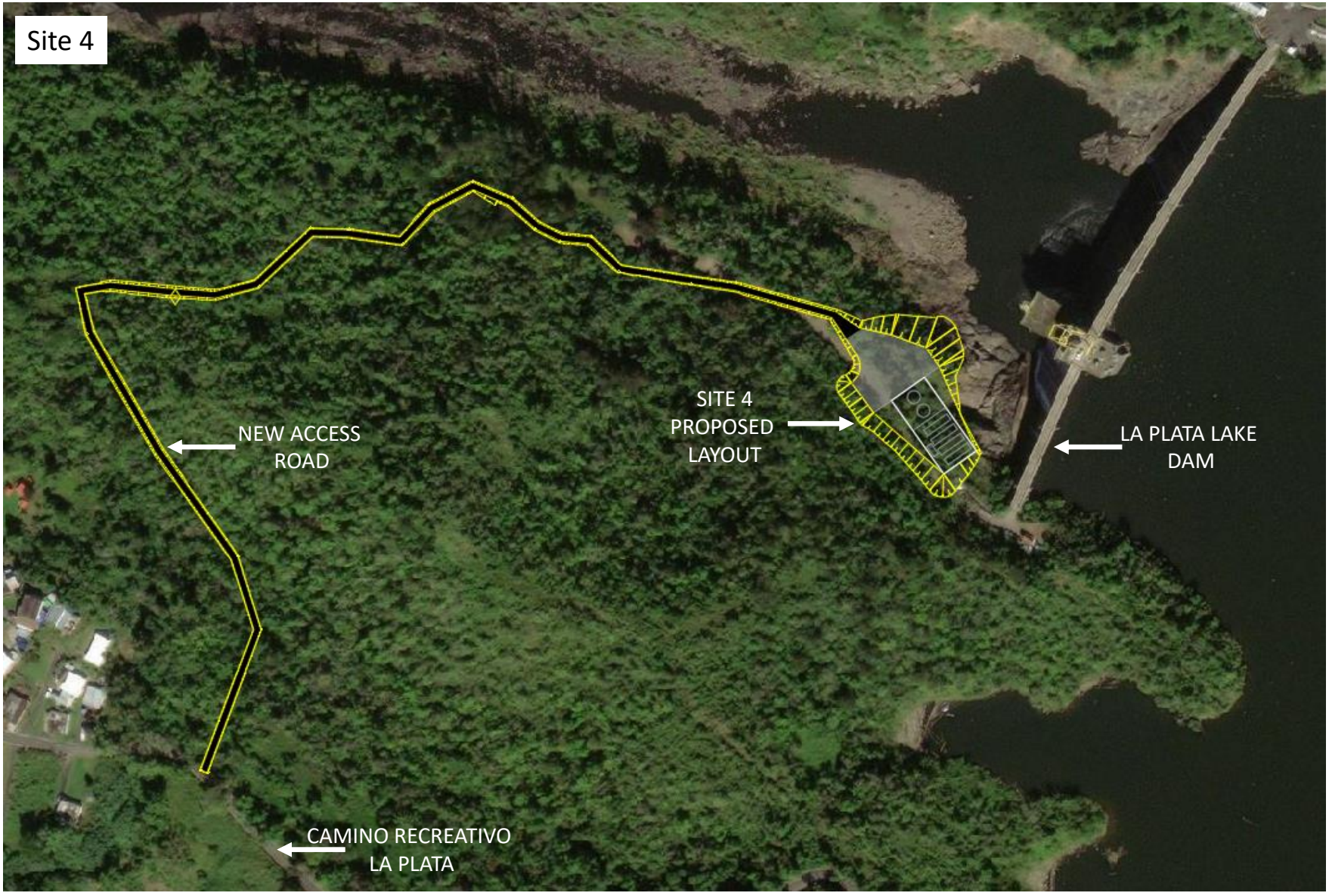
C: Elvin Vélez (PRASA), Hans Figueroa (CSA), Carol Ruiz (CSA), Peter Martínez (CSA), José Prats (CSA)

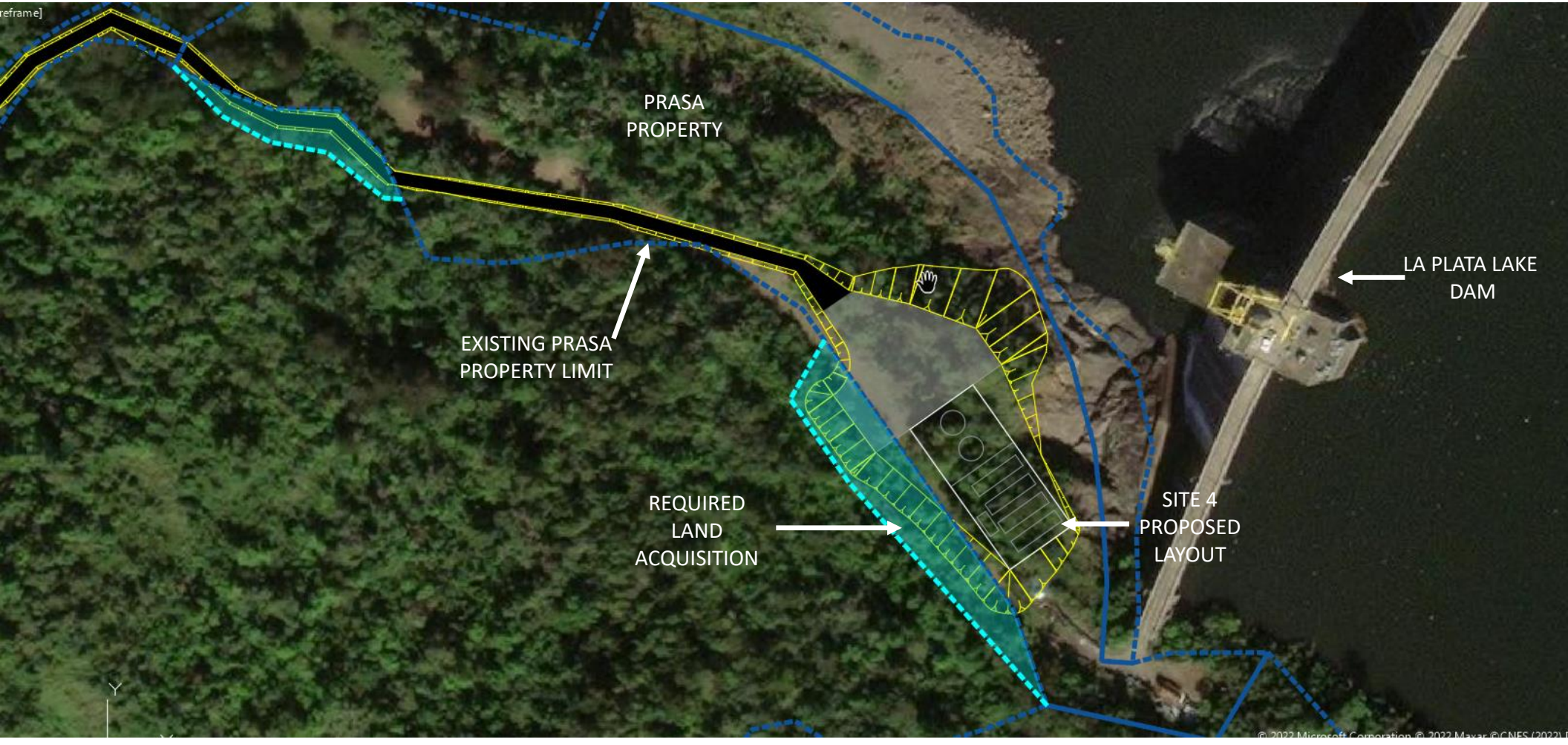
# Attachment A: Potential Site Maps (Civil)

200 ft. AEE ROW
100 ft.
AEE ROW
SITE 1

100 ft.
AEE ROW
SITE 2

SITE 3


Site 4
NEW ACCESS ROAD
SITE 4 PROPOSED LAYOUT
LA PLATA LAKE DAM
CAMINO RECREATIVO LA PLATA


PRASA
PROPERTY
EXISTING PRASA
PROPERTY LIMIT
REQUIRED
LAND
ACQUISITION
SITE 4
PROPOSED
LAYOUT
LA PLATA LAKE
DAM

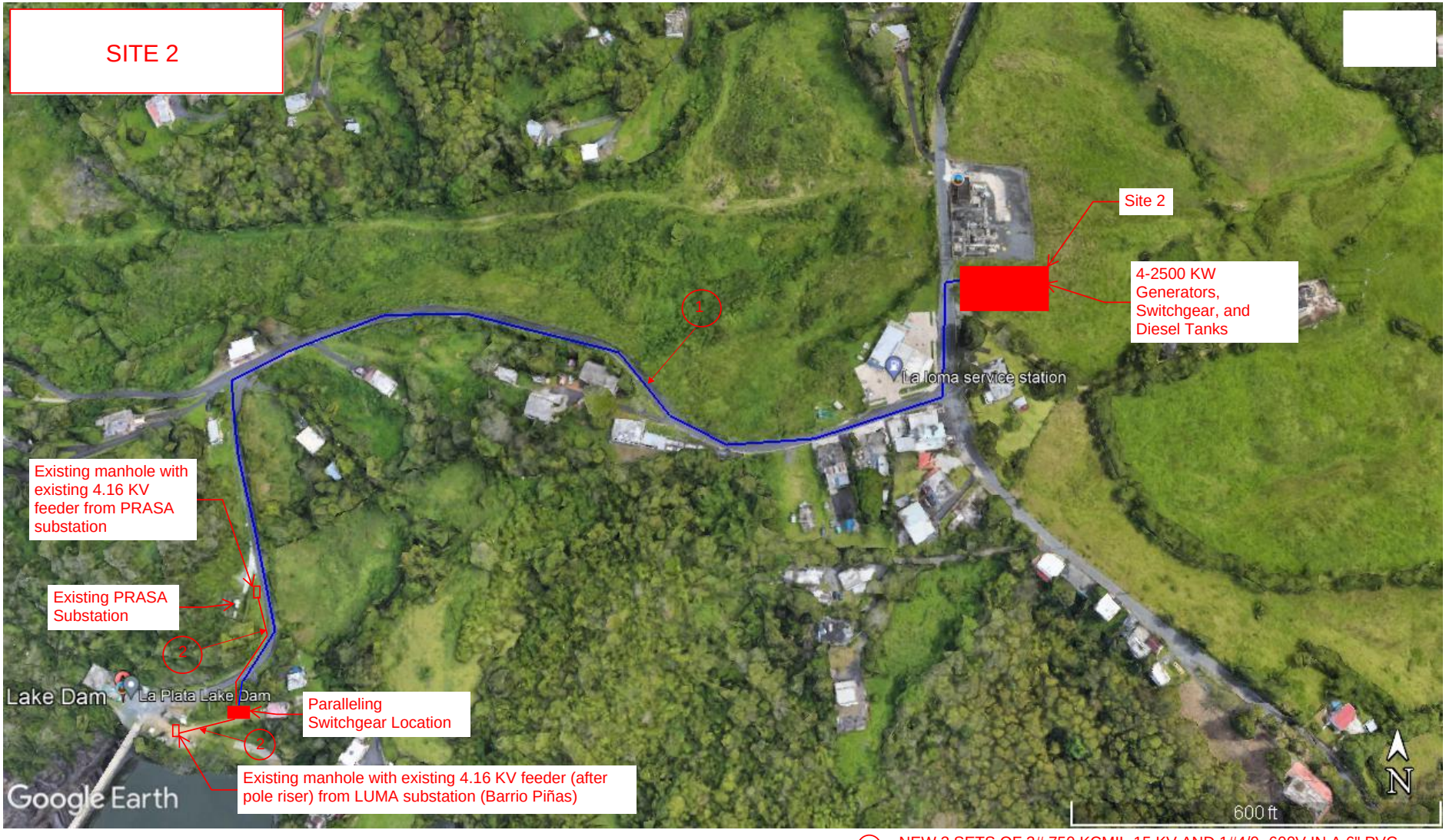
ACCESS ROAD
MAINTENANCE VEHICLES MANEUVERING AREA
LA PLATA LAKE DAM
GENERATORS, FUEL TANKS & SWITCHGEAR CONCRETE PAD
SITE 4 PROPOSED LAYOUT

100 ft. AEE ROW
SITE 5

# Attachment B: Potential Site Maps (Electrical)

1 NEW 3 SETS OF 3# 750 KCMIL-15 KV AND 1#4/0- 600V IN A 6" PVC SCH. 40 CONDUIT AND FIBER OPTIC IN A 2" PVC SCH. 40 CONDUIT. 3-6" C. AND 1-2" C. SPARE

2 NEW 6 SETS OF 3# 750 KCMIL-15 KV AND 1#4/0- 600V IN A 6" PVC SCH. 40 CONDUIT.

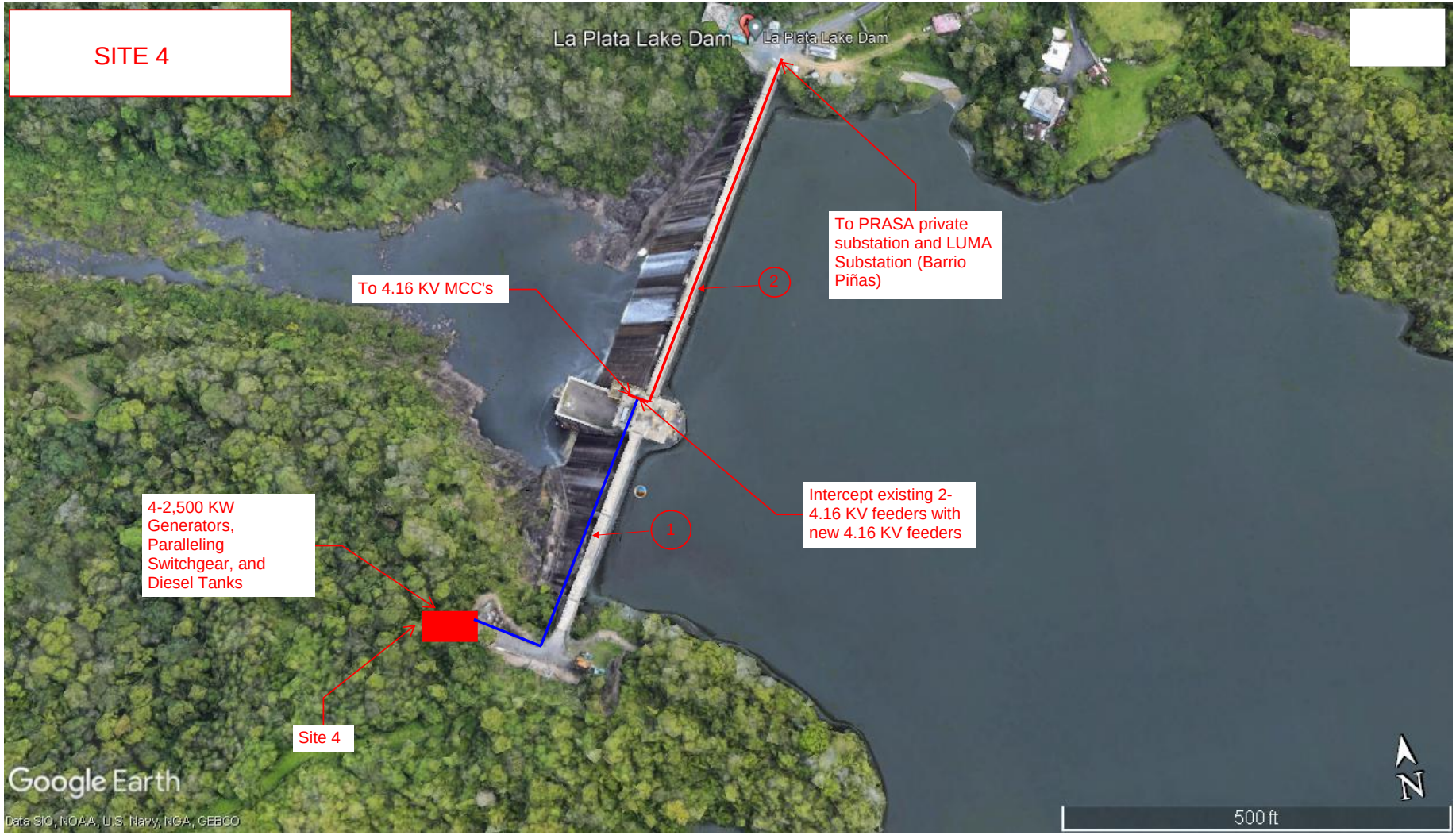



1 NEW 3 SETS OF 3# 750 KCMIL-15 KV AND 1#4/0- 600V IN A 6" PVC SCH. 40 CONDUIT AND FIBER OPTIC IN A 2" PVC SCH. 40 CONDUIT. 3- 6"C. AND 1-2"C. SPARE.

2 NEW 6 SETS OF 3# 750 KCMIL-15 KV AND 1#4/0- 600V IN A 6" PVC SCH. 40 CONDUIT.

1 NEW 3 SETS OF 3# 750 KCMIL-15 KV AND 1#4/0- 600V IN A 6" PVC SCH. 40 CONDUIT AND FIBER OPTIC IN A 2" PVC SCH. 40 CONDUIT. 3- 6"C. AND 1-2"C. SPARE.

2 NEW 6 SETS OF 3# 750 KCMIL-15 KV AND 1#4/0- 600V IN A 6" PVC SCH. 40 CONDUIT.




1 NEW 12 SETS OF 3# 750 KCMIL-15 KV AND 1#4/0- 600V IN A 6" PVC SCH. 40 CONDUIT.

2 EXISTING 2 -4.16 KV TO REMAIN AND TO BE INTERCEPTED AT PUMP ROOM.

# APPENDIX F SHPO SECTION 106 CONSULTATION

GOVERNMENT OF PUERTO RICO
STATE HISTORIC PRESERVATION OFFICE
Executive Director | Carlos A. Rubio Cancela | carubio@prshpo.pr.gov

Thursday, January 9, 2025

Lauren B Poche

269 Avenida Ponce de León, San Juan, PR, 00917

SHPO-CF-12-27-24-03 PR-HMGP-4339-0019 (Toa Alta), Enrique Ortega Water Treatment Plant

Dear Ms. Poche,

Our Office has received and reviewed the above referenced project in accordance with 54 USC 306108 (commonly known as Section 106 of the National Historic Preservation Act, as amended) and 36 CFR Part 800: Protection of Historic Properties from the Advisory Council on Historic Preservation.

After a review of all the documentation, the PRSHPO agrees with your finding that the proposed project with the established conditions, will have no adverse effect upon historic properties:

1. Implementation of the archaeological studies and protection measures listed on page 2 of your letter dated December 27, 2024.

If you have any questions concerning our comments, do not hesitate to contact our Office.

Sincerely,

Carlos A. Rubio Cancela

State Historic Preservation Officer

CARC/GMO/ MB

GOVERNMENT OF PUERTO RICO
DEPARTMENT OF HOUSING

April 30, 2024

**Arch. Carlos A. Rubio Cancela**
Executive Director
Puerto Rico State Historic Preservation Office
Cuartel de Ballajá, Third Floor
San Juan, Puerto Rico 00901

**Re: Authorization to Submit Documents for Consultation**

Dear Arch. Rubio Cancela,

The U.S. Department of Housing (HUD) approved the allocations of Community Development Block Grant (CDBG-DR) funds on February 9, 2018. It also approved the allocation of Community Development Block Grant Mitigation (CDBG-MIT) funds on January 27, 2020. The purpose of these allocations is to address unsatisfied needs as a result of Hurricanes Irma and Maria in September 2017; and to carry out strategic and high-impact activities to mitigate disaster risks and reduce future losses.

To comply with the environmental requirements established by HUD, the Department of Housing of Puerto Rico (PRDOH) contracted Horne Federal LLC to provide environmental review services, among others, that will support the objectives of the agenda for both CDBG-DR and CDBG -MIT Programs.

To expedite the processes, Horne Federal LLC, is authorized to submit to the State Historic Preservation Officer, documentation of projects related to both the CDBG-DR and CDBG-MIT on behalf of PRDOH.

Cordially,

**Aldo A. Rivera Vázquez, PE**
Director
Division of Environmental Permitting and Compliance
Office of Disaster Recovery

HORNE
Puerto Rico

December 27, 2024

Carlos A. Rubio Cancela
State Historic Preservation Officer
Puerto Rico State Historic Preservation Office
Cuartel de Ballajá (Tercer Piso)
San Juan, PR 00902-3935

## Puerto Rico Disaster Recovery, Community Development Block Grant Mitigation (CDBG-MIT): Hazard Mitigation Grant Program (HMGP) Global Match Set-Aside

**Section 106 NHPA Effect Determination Submittal for HMGP-4339-0019, Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico – *No Adverse Effect, Conditioned***

Dear Architect Rubio-Cancela,

The Puerto Rico Department of Housing (PRDOH) has assumed the role of "Lead Agency" for the environmental review of the proposed projects on the Hazard Mitigation Grant Program (HMGP-MIT), under the Community Development Block Grant Mitigation (CDBG-MIT) funds. As the Responsible Entity and Grantee, the PRDOH assumes the responsibility for the environmental review, decision-making, and actions that would otherwise apply to HUD under NEPA and other provisions of law as specified in 24 C.F.R. § 58.5. The PRDOH has contracted Horne Federal LLC (HORNE) to provide environmental registry review services, among others, that supports the objectives of the agenda for both CDBG-DR and CDBG-MIT Programs. The PRDOH has authorized HORNE to conduct consultations with your office on their behalf as part of these services (please see attached authorization letter).

PRDOH is initiating Section 106 review for the above referenced Undertaking as it has been determined that the activities do not conform to programmatic allowances as outlined in the "Programmatic Agreement Among the Federal Emergency Management Agency, the Puerto Rico State Historic Preservation Officer, and the Puerto Rico Central Office of Recovery, Reconstruction and Resiliency," as amended on November 13, 2019, As such, we are providing your office with the opportunity to comment on the proposed Undertaking.

On behalf of PRDOH, HORNE is submitting documentation for the proposed Ortega Water Treatment Plant Raw Water Intake Power Generators project. The project consists of the installation of four (4) generators and the construction of a concrete platform where the generators and their components will be installed. The project will occupy a total of 6,968 square meters of land (1.72 acres), which is divided into the following areas: access road, expansion of the road for truck turning, generator and diesel tank area, and a suggested parking area for the contractor. The full scope of the project, which includes mapping, photographs, and plans, is described in the submitted documentation.

Based on the provided documentation, the Program requests a concurrence with a determination that "**No Adverse Effect**" is appropriate for this undertaking, conditioned to the following:

- Perform a Phase IB archaeological study within the area proposed for the location of the generators
- The project's drawing set issued for construction shall be annotated to identify the La Plata Damn as "Historic Structure" and the protective measures included below.
- During the construction phase Kick-off meeting the Construction Oversight Manager shall inform all stakeholders of the potentially historic nature of the LaPlata Damn and the protective measures established to protect it from impacts during construction
- The project construction plan, contracts and any other construction related legally binding document shall state that:
    - The La Plata Dam structure shall not be used as storage and/or parking area for vehicles, machinery, equipment or materials.
    - No additional modifications to the ones proposed to the dam structure to install conduits and protective barriers are to be performed.
    - Vegetation and trees that serve as visual buffers should not be removed.
    - Monitoring is required during all pre-construction, construction and demobilization activities to ensure that these conditions are met.

Should you need additional information please myself at 225-405-7676 or lauren.poche@horne.com, or Kristin Sanders at kristin.sanders@horne.com.

Kindest regards,

**Lauren Bair Poche, M.A.**
Architectural Historian, EHP Senior Manager
LBP/KPS

Attachments

# PR-HMGP-4339-0019

# Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators Project

# Toa Alta, Puerto Rico

Section 106 Effect Determination Form

| | |
|---|---|
| **CDBG-MIT PROGRAM**<br>**Hazard Mitigation Grant Program (HMGP-MIT)**<br>**Section 106 NHPA Effect Determination Form** | GOVERNMENT OF PUERTO RICO<br>DEPARTMENT OF HOUSING |
| **Subrecipient: PRASA** | |
| **Project Name: PR-HMGP-4339-0019 Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators** | |

| | |
|---|---|
| **Project Location:** State Road PR 824 (interior), Quebrada Cruz Ward, Toa Alta | |
| **Project Coordinates:** 18.343641, -66.238864 | |
| **TPID** (Número de Catastro)**:** 112-000-006-71-000 | |
| **Type of Undertaking**:<br>☐ Substantial Repair/Improvements<br>☒ New Construction | |
| **Construction Date**: 6/2025 to 10/2027 | **Property Size** (acres)**:** 49.5 |

| |
|---|
| **SOI-Qualified Historic Architect/Architectural Historian**: William Feliciano |
| **Date Reviewed**: 8/15/2024 |
| **SOI-Qualified Archaeologist**: Raquel del C. Camacho-Hernandez |
| **Date Reviewed**: 08/15/2024 |

In compliance with Section 106 of the National Historic Preservation Act (NHPA), the Program is responsible for identifying historic properties listed in the NRHP and any properties not listed that would be considered eligible for listing that are located within the geographic area of potential effects (APE) of the proposed project and assessing the potential effects of its undertakings on these historic properties. It has been determined by the SOI-qualified professionals that the project undertaking does not conform to Stipulation II.A (Project Review – Programmatic Allowances) of the Section 106 Programmatic Agreement (PA) among FEMA, SHPO and COR3, as amended (May 3, 2023).

## Project Description (Undertaking)

The project consists of the installation of four (4) generators and the construction of a concrete platform where the generators and their components will be installed. **Appendix A** presents the project plans at 100% completion.

The project will occupy a total of 6,968 square meters of land (1.77 cuerda, 1.72 acre), which is divided into the following areas: access road, expansion of the road for truck turning, generator and diesel tank area, and a suggested parking area for the contractor. Out of the 6,968 square meters, the proposed site for the installation of the generators and their infrastructure will occupy an approximate area of 1,278 square meters (0.32 cuerda, 0.31 acre). The project will require the acquisition of the right-of-way land for the access road. This right-of-way is necessary to allow effective access and equipment maneuvering on the site. The right-of-way will be acquired from parcels with cadastral numbers 112-000-006-71-000 and 141-000-001-05. The PRASA currently owns approximately 40,469 square meters of land (10.29 cuerdas, 10 acres), including the space where the proposed generators will be located.

There are no high-tension power lines in the study area, so the proposed action requires the installation of underground electrical conduits from the site where the generators are to be installed to the La Plata Dam and continuing with the expansion of the conduits from where the dam begins to the dam's intake tower to connect to the existing electrical infrastructure at the dam. Additionally, the installation of a lighting system is proposed, including poles, within the project area and along the paved roads on the site. The estimated section for electrical conduits is 1.80 meters (height) x 1.02 meters (width), over a length of 261 meters. The excavation volume of the trench will be 479.2 cubic meters.

The project activities include:

1. Installation of four emergency generators with a capacity of 2,500 kW each, two diesel storage tanks with a capacity of 40,000 gallons each, an electrical room, three parking areas, and a fuel dispensing area.
2. Construction of a concrete platform measuring approximately 20 meters x 40 meters for the installation of the generators, including other necessary infrastructure components for equipment operation.
3. Paving the existing dirt road with approximate dimensions of 740 meters in length and 4 meters in width, with 1-meter-wide ditches at the edges to divert runoff.
4. Leveling the area where the generators are proposed to be installed to elevate them above the flood level.
5. Removal of the topsoil to improve the access road to comply with current codes for fuel deliveries to the project.
6. Installation of an access gate at the entrance.
7. Installation of underground electrical lines that will run from the generators to the dam's pump building.
8. Installation of conduits attached to the dam's structure to connect to the existing electrical infrastructure, extending to the dam's intake tower.
9. Construction of a temporary preparation area for the placement of heavy machinery during the project's construction phase.

## Area of Potential Effects

As defined in 36 CFR §800.16(d), the area of potential effects (APE) is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties if any such properties exist. Based on this definition and the nature and scope of the Undertaking, the Program has determined that the **direct/indirect APE** for this project is as identified in **Page 14: Project (Parcel) Location – Area of Potential Effect Map (Aerial)**. A portion of the La Plata Dam, a property potentially eligible for inclusion in the National Register of Historic Properties, is located within the APE of this undertaking.

The dimensions of the direct/indirect area of potential effect are as follows:

- Maximum length: 880 m
- Maximum width: 54 m

The surrounding environment is rural, mountainous topography with dense vegetation and residential development. The project is situated away from the homes in Barrio Quebrada Cruz. The Wildlife Refuge and the La Plata Reservoir Recreational Area/Camino Recreativo La Plata are adjacent to the site, both managed by the DRNA.

The Raw Water Intake of the Enrique Ortega Water Filtration Plant and the space selected for the installation of the generators are located away from residences and schools, west-southwest of the La Plata Dam wall on State Road PR-824 in Barrio Quebrada Cruz in the Municipality of Toa Alta. The proposed site is located approximately 373.7 meters from the pump control building installation of the dam, and the access road to the proposed site has a right of way. The project is 234 meters north of the nearest residence.

The visual APE is the viewshed of the proposed project, which refers to the geographic area where a proposed project or development may impact the visual setting or landscape views of historic properties. The dimensions of the visual area of potential effect are defined as a half circle constructed by creating a circle by applying a 1.5 km radius to a centroid defined by the middle point of the proposed electrical conduits to be attached to the La Plata dam. Using the dam's alienation to define the circle's diameter, the visual APE of this project corresponds to the half portion of the circle located on the downstream side of the dam. The visual area of potential effects covers an area of approximately 3.5 square kilometers. (See **Page 18, Photo 1**).

This assessment considers how changes in the project, such as construction or alterations, may affect the visual experience of historically significant sites or structures within this defined area.

To identify the visual APE of this project we started by identifying the area from where the proposed generators and electrical conduits to be attached to the downstream face of the dam would be visible. We did so by identifying a Reference Point (the centroid of the length of the proposed conduits to be attached to the dam) (see **Photo 1**). **Photos 2** to **11** identify the sample points within the viewshed of the La Plata Dam chosen to evaluate the visual impacts of the proposed actions.

| Visual APE Sample Point | Distance KM from Reference Point | View Affected by the proposed actions | Comments |
|---|---|---|---|
| 1 | 0.84 | NO | View obstructed by the natural topography of the area. |
| 2 | 0.55 | NO | View obstructed by the natural topography of the area. |
| 3 | 0.7 | NO | View obstructed by the natural topography of the area. |
| 4 | 1 | NO | Unobstructed visibility to the reference point. Vegetation mitigates potential visual impacts, if any. |
| 5 | 1.13 | NO | Unobstructed visibility to the reference point. Vegetation mitigates potential |

| | | | |
|---|---|---|---|
| | | | visual impacts, if any. |
| 6 | 1.21 | NO | View obstructed by the natural topography of the area. |
| 7 | 0.62 | NO | View obstructed by the natural topography of the area. |
| 8 | 0.41 | NO | View obstructed by the natural topography of the area. |
| 9 | 0.32 | NO | Unobstructed visibility to the reference point. Vegetation mitigates potential visual impacts, if any. |
| 10 | 0.37 | NO | View obstructed by the natural topography of the area. |

Based on the information derived from the analysis of the sample points we perform the following analysis:.

Direct/Indirect Visual Impact: The direct/indirect visual impacts of the project are low due to the natural topography and vegetation of the area, which obstructs views from 7 of 10 sample points. Only 3 sample points have unobstructed visibility to the reference point, but the visual impact of the proposed actions, if any, would be temporary as these are mitigated by the natural vegetation within the APE and by the proposed use of panels or closed compartments to obscure from view the proposed conduits attached to the dam (as discussed in the *Identification of Historic Properties-Architecture* section of this document).

**Identification of Historic Properties - Archaeology**

Existing information on previously identified historic properties has been reviewed to determine if any such properties are located within the APE of this undertaking. The

review of this existing information, by a Program contracted Historic Preservation Specialist meeting the Secretary of the Interior's Professional Qualification Standards (36 CFR Part 61), shows that there are no archaeological resources registered in the ICP or SHPO's inventories within a 400 m radius of the project area.

According to ICP/SHPO inventories, the three areas of historical or archaeological value closest to the project area were identified in the municipalities of Toa Alta and Naranjito. The Municipality of Toa Alta has two archaeological sites: TA0100003 El Cacique and TA0100005 Site 6-4. Meanwhile, in the Municipality of Naranjito, only one archaeological site was identified: NR0100002 Histórico 2. The aforementioned areas of historical and/or archaeological value are outside the project area and beyond a 400-meter radius from it, as previously stated.

Archaeologist Marisol Martinez Garayalde completed a Phase IA archaeological study adjacent to the north limit of this project's APE for a project titled: *Mejoras al Sistema de Lechos de Secado y Sedimentación de la Planta de Filtración de Agua Potable Enrique Ortega, Fase I y Rehabilitación a la Estación de Bombeo de Agua Potable y Nueva Línea Eléctrica de la Represa La Plata Fase II* (ICP-TA-07-10-06) (See **Page 17**).

Martinez Garayalde's Phase IA study indicates that a preliminary inspection was conducted with the aim of visualizing and familiarizing with the existing conditions of the land to make recommendations. The land comprising Phase I was originally cut and removed, more than five meters, to create lagoons for separating sludge from the wash water of the tanks, and four drying beds were constructed (circa 1968). By 1975, the lagoons were eliminated, filled in, and three drying beds were constructed. In 1989, four additional drying beds were added to manage the sludge, bringing the total to fifteen drying beds with various pipes for the process. The area has undergone several impacts, and the natural layer of the land ceased to exist since 1968. No drilling tests were conducted due to the mountain cut. Profiles were cleaned to determine the presence or absence of cultural resources in the cuts. field inspection did not detect archaeological materials within the subsurface of the site studied. The components of the Phase I Project evaluated by Martinez Garayalde are not part of the Area of Potential Effect of La Plata Dam.

In the Phase II area, the dam area presented the same situation of mountain cutting to construct the dam, building, and roads. Improvements were proposed within the dam, and an electrical line was to be installed along the road. The area shows mountain cutting to construct the dam, structure, and road. The Pumping Station, built in 1969, was to be rehabilitated. This structure was not demolished; the extraction pumps were to be improved. No cultural or historical resources were to be impacted as per Martinez

Garayalde's findings and recommended that agency endorsement of the project should be granted. Although the dam is a historic property, it does not hold archaeological potential based on Martinez Garayalde's findings. Please refer to ***Appendix 1: 100% Design Drawings, Page 5: Existing Conditions*** to identify associated above ground and underground utilities structures.

No archaeological studies have been conducted within the limits of the APE of the proposed project.

**Identification of Historic Properties - Architecture**

Existing information on previously identified historic properties has been reviewed to determine if any such properties are located within the APE of this undertaking. The review of this existing information, by a Program contracted Historic Preservation Specialist meeting the Secretary of the Interior's Professional Qualification Standards (36 CFR Part 61), shows that the project area is within the boundaries of the National Register of Historic Places (NRHP) potentially eligible property identified as La Plata Dam. This structure, constructed by PRASA in 1974, creates the La Plata Reservoir, one of the main potable water sources serving the northern and central area of PR.

The history of dam and reservoir construction in Puerto Rico was documented in a report by García-Martinó (2000). The report concludes that the construction of reservoirs has reflected the economic development vision established by local and federal governments, a vision that has, in turn, responded to the historical economic and social needs of Puerto Rican society.

In Puerto Rico, the construction of reservoirs began with the Río Piedras dam, now located on the grounds of the Botanical Garden. Built in 1898 under Spanish rule, this dam was developed to supply water to the Ballajá Barracks in Old San Juan (Sáez, 1988). However, it was during the 20th century that the construction of dams and reservoirs surged, driven by the socio-political transformations the island experienced during this period. There were two main motivations for dam construction during this time: the need to provide electric service to cities and the interest in developing sugar cane agriculture, the cornerstone of Puerto Rico's economy in the early 20th century.

The construction of reservoirs significantly increased water storage capacity to meet the agricultural needs of the early century, the rising demand for energy, the growing need for public water supply, and the necessity for flood control. Between 1913 and 1951, the Government of Puerto Rico and private enterprises built 11 reservoirs for agricultural use, while between 1907 and 1952, 15 reservoirs were constructed for hydroelectric generation. During the period from 1946 to 1996, another seven reservoirs were built for public water supply. More recently, between 1976 and 1991, three reservoirs were

constructed for flood control. The total water storage developed in Puerto Rico during this period amounts to 375,410 acre-feet. However, over the years, the storage capacity of the reservoirs has been reduced due to sedimentation. It is estimated that the current water storage capacity in Puerto Rico's reservoirs is approximately 287,983 acre-feet.

The La Plata reservoir (a concrete structure, as opposed to earthworks), completed in 1974, was part of the second phase of reservoir construction in Puerto Rico. This phase, from 1952 to 1974, was undertaken by the Government of the Commonwealth of Puerto Rico in cooperation with the Corps of Engineers. It focused on developing hydroelectric plants and meeting the water supply needs of the population and industries. The La Plata reservoir was a PRASA project aimed at supplying the Aqueduct System of the Metropolitan Area of San Juan. The construction, which began in the mid-1960s, involved land expropriation, community relocation, river rechanneling, road realignment, and the construction of new roads and bridges (Meléndez-Ortíz, 2021).

La Plata Dam, completed in 1974, has undergone several significant changes and alterations since its original design. These changes are documented in the plans "Dam Intake and Pumping Station" from February 1969, "Bascule Gates Addition La Plata" from September 1977, and "Dam Intake and Pumping Station Expansion" from September 1991. The following details the substantial documented changes made to the dam:

1. "Dam Intake and Pumping Station" Plans (February 1969):

These original plans detail the initial design of the dam's intake and pumping station. The original design included a basic structure for water extraction and pumping, suitable for the projected needs at that time.

2. "Bascule Gates Addition La Plata" Plans (September 1977):

These plans proposed the addition of bascule gates, which were not present in the original design. The gates were constructed in 1981 (as per information received from PRASA personnel), representing a significant modification to the original dam design. These gates allowed for better water flow control and increased flood management capacity, thereby enhancing the dam's functionality and safety.

3. "Dam Intake and Pumping Station Expansion" Plans (September 1991):

This document indicates an expansion of the dam's intake and pumping station. The expansion included the construction of new facilities and the modernization of existing ones to increase pumping capacity and improve operational efficiency. This expansion

was necessary to meet the growing water demand in the metropolitan area of San Juan and to ensure a more reliable water supply. The substantial changes to the original design of La Plata Dam, documented in the plans from 1969, 1977, and 1991, were necessary and beneficial to improve the functionality, capacity, and safety of the infrastructure, responding to the growing and changing needs of the region.

This property is potentially eligible to the NRHP under Criteria A and/or C as follows:

- Criterion A: La Plata Dam is significant for its association with events that have made a significant contribution to the broad patterns of our history. The dam plays a vital role in providing potable water to a large region of Puerto Rico, marking it as an essential infrastructure project in the development of the area.

- Criterion C: The dam embodies the distinctive characteristics of a type, period, or method of construction. As a structure built in the mid- to late 20th century, it represents the engineering and architectural practices of its time.

Based on this narrative, the Seven Aspects of Integrity recognized by the National Register of Historic Places are addressed for this property as follows:

- Location: The dam remains in its original location, maintaining its historical context and relationship with the surrounding landscape.

- Design: The original design of the dam, including its structural components and layout, has been preserved. The proposed project includes measures to mitigate visual impacts, ensuring that the design integrity is maintained.

- Setting: The dam's setting, characterized by its rural and natural surroundings, remains largely unchanged. The proposed installations are designed to blend with the environment, minimizing visual disruption.

- Materials: The materials used in the original construction of the dam are still present. Any new materials introduced for the project are chosen to be compatible with the existing ones.

- Workmanship: The craftsmanship of the original construction is evident and preserved. The proposed improvements will respect and maintain the quality of workmanship.

- Feeling: The dam continues to convey its historical significance as a mid- to late 20th-century infrastructure project. The proposed project includes measures to ensure that the dam's historical feeling is not compromised.

- Association: The dam retains its association with the historical events and functions it was originally intended for, continuing to serve as a crucial water source.

**Determination**

The following historic properties have been identified within the APE:

- Direct Effects:
  - La Plata Dam
- Indirect Effects:
  - None

Based on the results of our historic property identification efforts, the Program has determined that there are historic properties within the Area of Potential Effect. No archaeological studies have been conducted within the APE of this project. Nevertheless, the project's area has previously been impacted by the construction of the existing access road and by routine maintenance operations and significant structural improvements of PRASA's properties. The proposed project area was used as part of a project to repair the scouring found at the base of the La Plata Dam structure. La Plata Dam area has undergone significant disturbances since 1968, eliminating the natural layer of the land. A Phase IB archaeological study is recommended to determine the presence or absence of archaeological materials below the surface, specifically of the area where the platform for the generators would be located.

Based on the analysis provided by William Feliciano (Degree in Specialty and/or Experience in Architectural Restoration-CSA Group) the provided information regarding the proposed installation of generators and associated infrastructure near the dam, determines that the project may have effects on historic properties, specifically direct and visual impacts on La Plata Dam. The main components of the project include the installation of generator structures, parking areas, a concrete platform measuring 20 x 40 meters, and a fuel dispensing area. These installations represent a significant intervention outside the dam's primary structure, especially considering their scale and presence in the surroundings. The project will also have a direct impact on La Plata Dam due to the installation of electrical conduits.

While the installation of underground electrical lines and piping from the generators to the dam (via adjustable braces attached via clips and bolted to the surface of the dam) may present a more direct intervention, the proposal includes measures to mitigate potential visual impacts. Specifically, the use of panels or closed compartments is intended to obscure these elements from, thereby reducing their visual effect on the surrounding area, as well as an expanded metal protective barrier bolted over the braces. (See **Figures 1-7**).

In summary, while the project introduces modifications to the landscape, particularly through the installation of generators and other facilities, the proposed mitigation strategies are recognized. Therefore, the determination is that the project may have a direct effect on the visual integrity of the area, but steps have been taken to minimize this impact, such as the use of panels or closed compartments intended to obscure these elements from view. The project does not contemplate the removal of vegetation and trees, which serve as a natural barrier (mitigation) to the visibility of proposed actions in the dam.

Based on the nature of the proposed actions evaluation, we provide a recommendation of No Adverse Effect to historic properties for this undertaking contingent to the implementation of the historic properties management strategies previously described.

**References:**

Lugo, Ariel, García Martinó, Andrés y Quiñones, Ferdinand. Cartilla del Agua para Puerto Rico. Acta Científica, Vol. 25, Núms. 1-3. Asociación de Maestros de Ciencia de Puerto Rico.

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**Recommendation**

The Puerto Rico Department of Housing requests that the Puerto Rico SHPO concur that the following determination is appropriate for the undertaking (Choose One):

☐ No Historic Properties Affected
☒ No Adverse Effect

Condition (if applicable):

- Perform a Phase IB archaeological study within the area proposed for the location of the generators
- The project's drawing set issued for construction shall be annotated to identify the La Plata Damn as "Historic Structure" and the protective measures included below.
- During the construction phase Kick-off meeting the Construction Oversight Manager shall inform all stakeholders of the potentially historic nature of the La Plata Damn and the protective measures (see next item) established to protect it from impacts during construction.
- The project construction plan, contracts and any other construction related legally binding document shall state that:
    - The La Plata Dam structure shall not be used as storage and or parking area for vehicles, machinery, equipment or materials. No additional modifications to the ones proposed to the dam structure to install conduits and protective barriers are to be performed. Vegetation and trees that serve as visual buffers

should not be removed. Monitoring is required during all pre-construction, construction and demobilization activities to ensure that these conditions are met.

☐ Adverse Effect

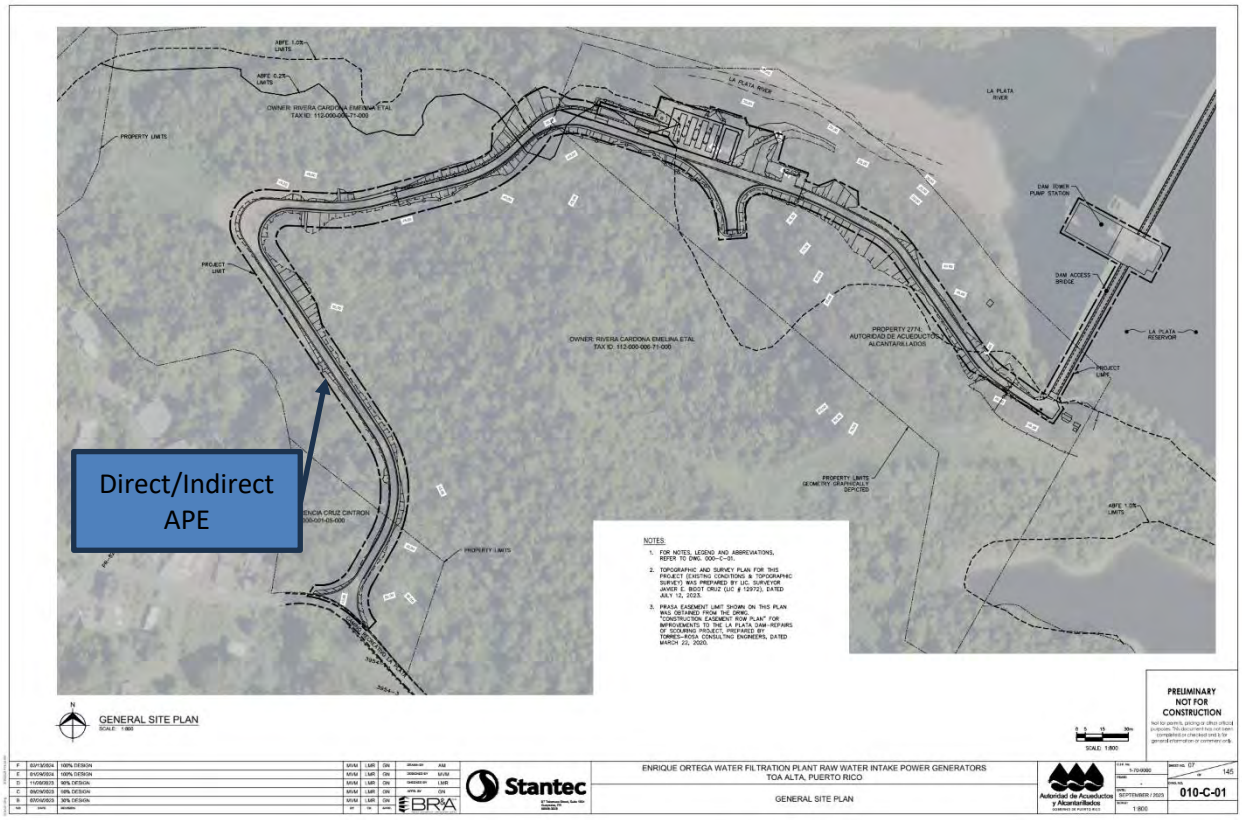
Proposed Resolution (if appliable)

**This Section is to be Completed by SHPO Staff Only**

| | |
|---|---|
| The Puerto Rico State Historic Preservation Office has reviewed the above information and:<br><br>☐ **Concurs** with the information provided.<br>☐ **Does not concur** with the information provided. | |
| **Comments:** | |
| Carlos Rubio-Cancela<br>State Historic Preservation Officer | Date: |

| CDBG-MIT PROGRAM<br>Hazard Mitigation Grant Program (HMGP-MIT)<br>Section 106 NHPA Effect Determination Form | GOVERNMENT OF PUERTO RICO<br>DEPARTMENT OF HOUSING |
|---|---|
| **Subrecipient: PRASA** | |
| **Project Name: PR-HMGP-4339-0019 Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators** | |

## Project (Parcel) Location – Area of Potential Effect Map (Aerial)



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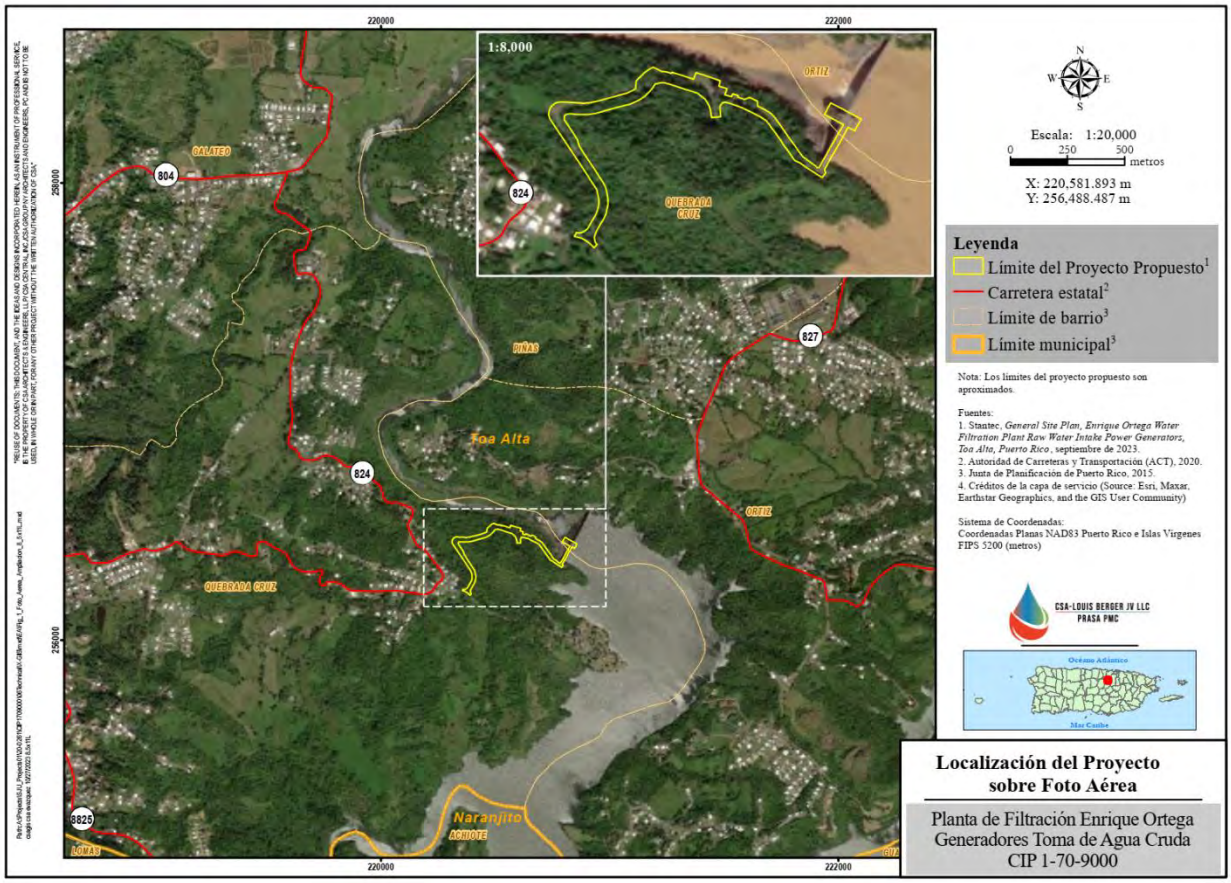
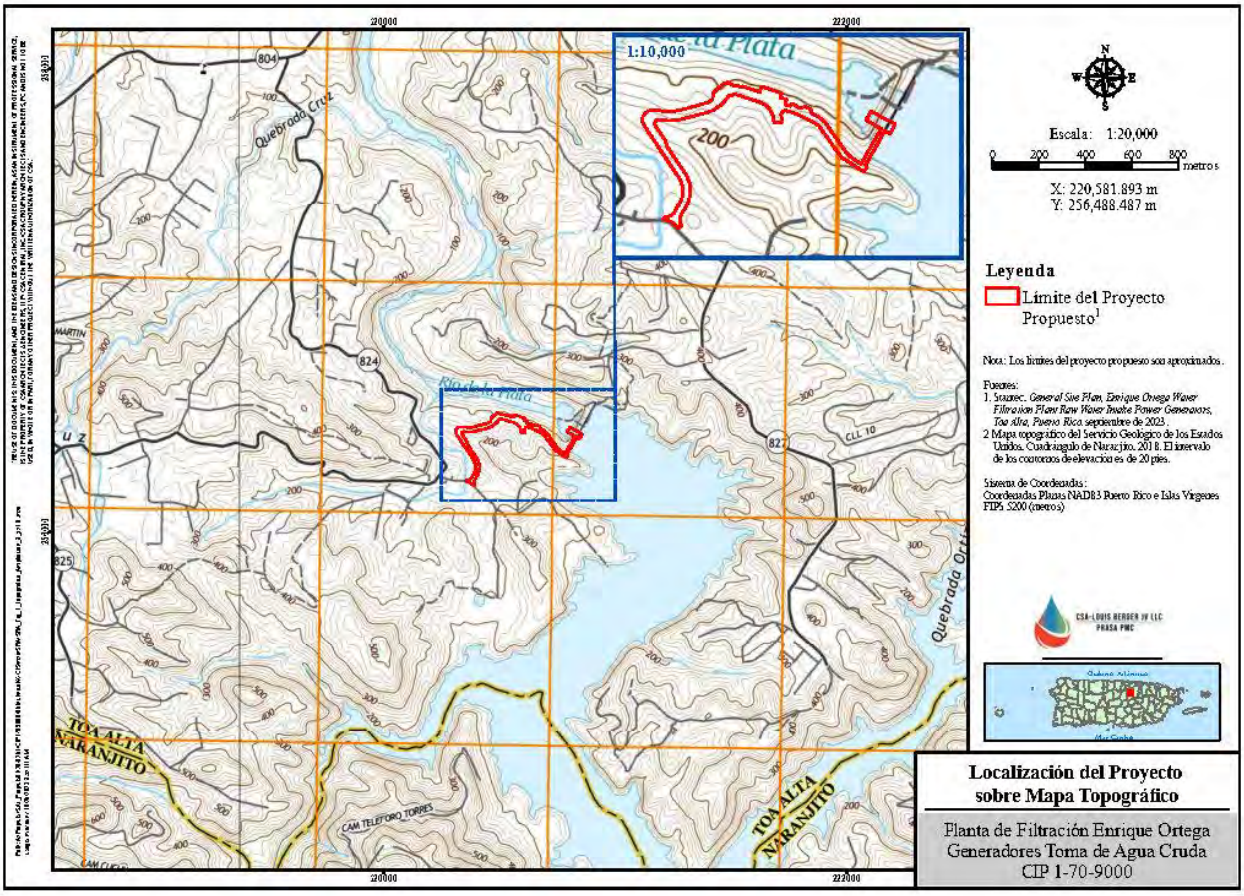
|---|---|
| **CDBG-MIT PROGRAM**<br>**Hazard Mitigation Grant Program (HMGP-MIT)**<br>**Section 106 NHPA Effect Determination Form** | GOVERNMENT OF PUERTO RICO<br>DEPARTMENT OF HOUSING |
| **Subrecipient: PRASA** | |
| **Project Name: PR-HMGP-4339-0019 Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators** | |

## Project (Parcel) Location - Aerial Map



## Project (Parcel) Location - USGS Topographic Map

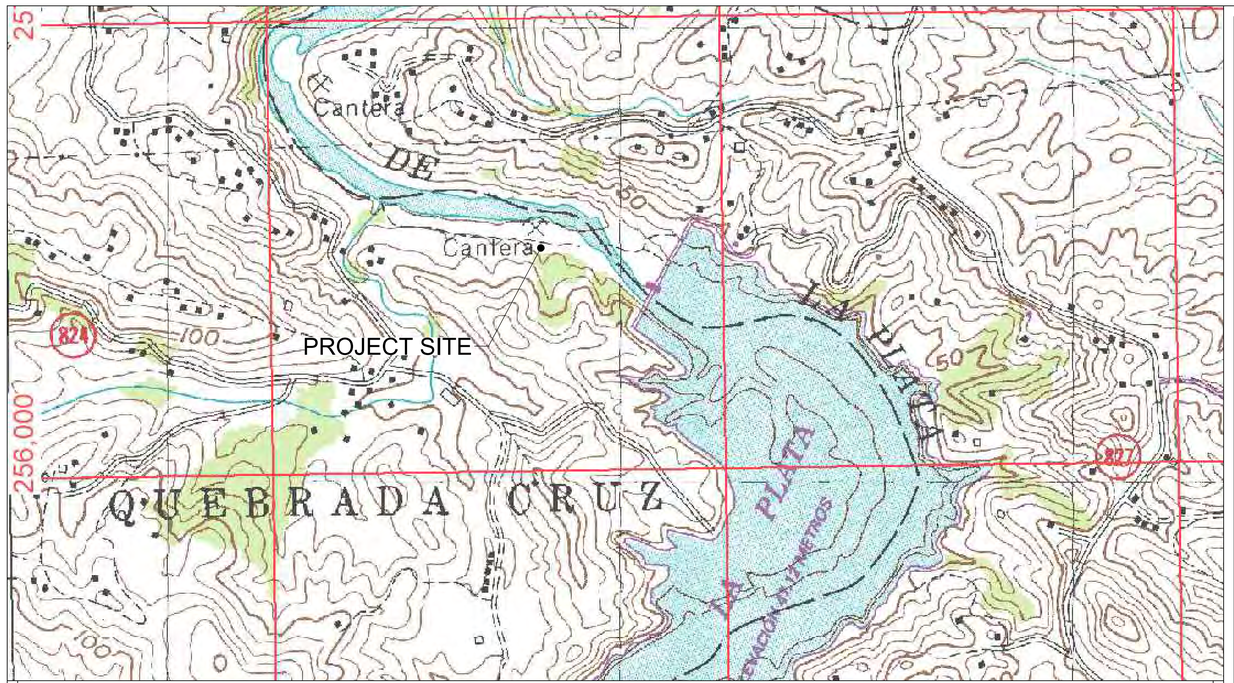


# PR- HMGP-4339-0019

# Enrique Ortega Water Treatment Plant
# Raw Water Intake Power Generators Project

# Toa Alta, Puerto Rico

100% Design Drawings



## LOCATION PLAN

SCALE: N.T.S

GOVERNMENT OF PUERTO RICO

AQUEDUCT AND SEWER AUTHORITY

SUBMITTED:

HANS FIGUEROA SWEET, P.E.
PRE-CONSTRUCTION MANAGER

DATE

APPROVED:

ANN VENTURA PAYAN, P.E.
PRASA DEPUTY DIRECTOR FOR ENGINEERING

DATE

# ENRIQUE ORTEGA WATER TREATMENT PLANT
# RAW WATER INTAKE POWER GENERATORS
# PHASE I PROJECT

## TOA ALTA, PUERTO RICO

## CIP 1-70-9000

**ISSUED FOR 100% DESIGN**

ENGINEER'S CERTIFICATION:

I HEREBY CERTIFY THAT THESE PLANS MEET ALL THE CURRENT APPLICABLE REGULATIONS OF THE PUERTO RICO ENVIRONMENTAL QUALITY BOARD (EQB), THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA); WITH THE DESIGN GUIDELINES OF THE PUERTO RICO AQUEDUCT AND SEWER AUTHORITY (PRASA), THE PUERTO RICO ELECTRIC POWER AUTHORITY (PREPA), AND ANY OTHER PUERTO RICAN AGENCIES CONCERNED WITH THE PROJECT; AND TO THE BEST OF MY KNOWLEDGE THESE DRAWINGS ARE CORRECT.

GASTON G. NOGALES, P.E.
LIC. No. 12367

Autoridad de Acueductos
y Alcantarillados
GOBIERNO DE PUERTO RICO

SURVEYOR'S CERTIFICATION:

I HEREBY CERTIFY THAT THE SURVEY SHOWN ON THESE DRAWINGS WAS PERFORMED BY ME, AND TO THE BEST OF MY KNOWLEDGE IT IS CORRECT.

JAVIER E. BIDOT
CERTIFIED SURVEYOR
LIC. No. 12972

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

GOVERNMENT OF PUERTO RICO
AQUEDUCT AND SEWER AUTHORITY

# ENRIQUE ORTEGA WATER TREATMENT PLANT RAW WATER INTAKE POWER GENERATORS PHASE I PROJECT

**C.I.P. NO. 1-70-9000**

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| D | 11/20/2023 | 90% DESIGN | EN | SH | GN |
| C | 09/29/2023 | 60% DESIGN | EN | SH | GN |
| B | 07/26/2023 | 30% DESIGN | EN | SH | GN |
| A | 06/06/2023 | 15% DESIGN | EN | SH | GN |

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87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

INDEX OF DRAWINGS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 02 OF 145
DWG. NO. 000-G-02

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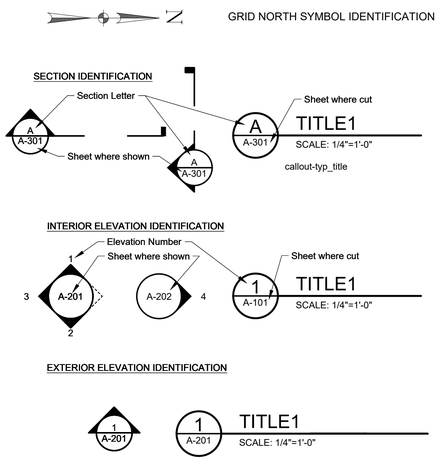
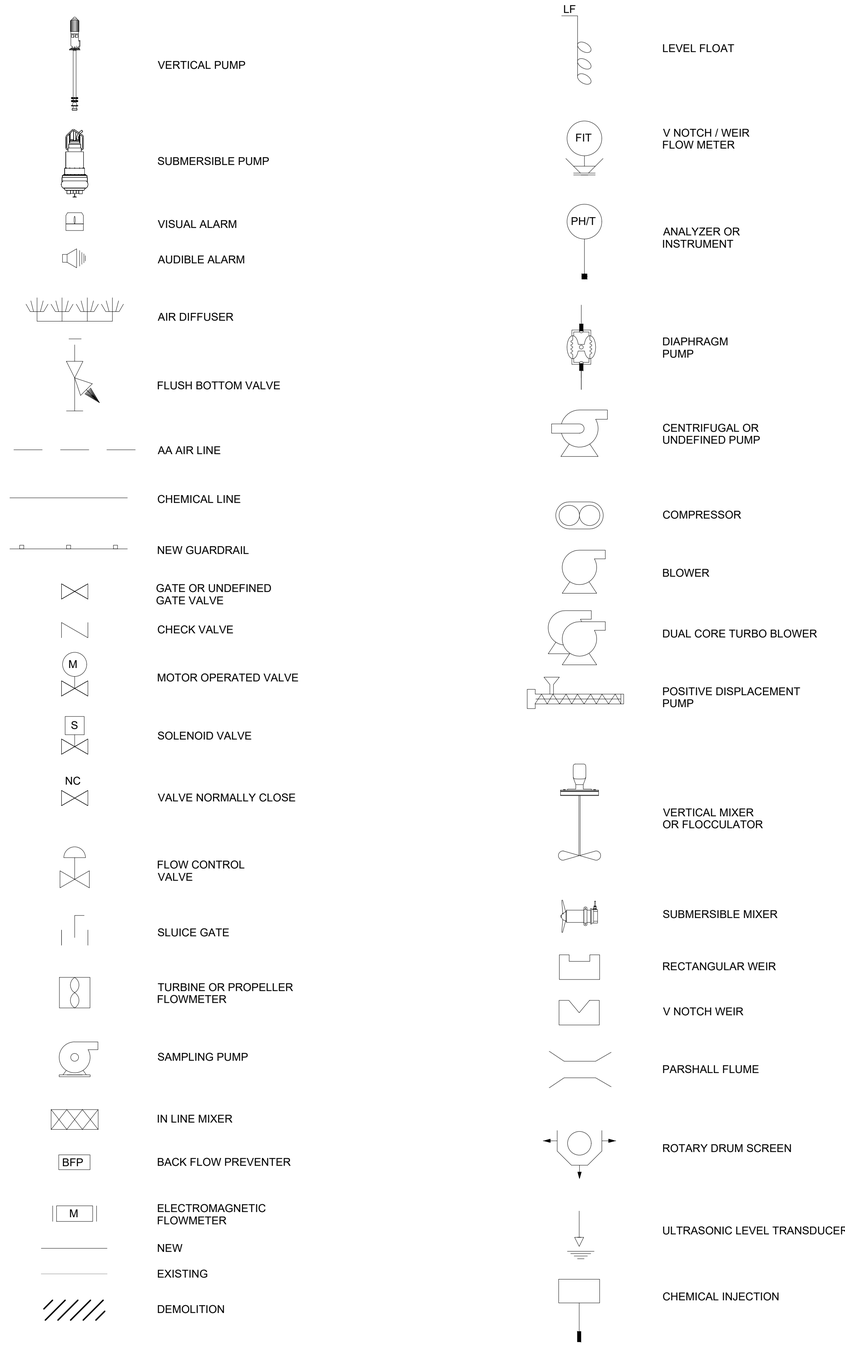
## SYMBOL




## ABBREVIATIONS

| | |
|---|---|
| AVE. | AVERAGE |
| AF.WL | AVERAGE FLOW WATER LEVEL |
| ALUM. | ALUMINUM |
| ALK | ALKALINITY |
| B.E. | BOTTOM ELEVATION |
| BLDG. | BUILDING |
| BWW | BACKWASH WASTE |
| BW | BACK WASH |
| COORD. | COORDINATE |
| CHL-R | CHLORINE RESIDUAL ANALYZER |
| CHL-R | CHLORINE RESIDUAL |
| CL2 | CHLORINE APPLICATION |
| DEPT. | DEPARTMENT |
| DI. | DUCTILE IRON |
| DIA. | DIAMETER |
| DIP. | DUCTILE IRON PIPE |
| D.O.H. | DEPARTMENT OF HEALTH |
| DPT | DIFFERENTIAL PRESSURE TRANSMITTER |
| DWGS. | DRAWINGS |
| (E) | EXISTING |
| EA. | EACH |
| EC | ELECTRICAL CONDUCTIVITY METER |
| EFF | EFFLUENT |
| ELEV. | ELEVATION |
| EMERG. | EMERGENCY |
| EPA. | ENVIRONMENTAL PROTECTION AGENCY |
| F.E. | FINAL ELEVATION |
| FEMA | FEDERAL EMERGENCY MANAGEMENT AGENCY |
| F.F.E. | FINAL FLOOR ELEVATION |
| FIN. | FINISH |
| FTW | FILTER TO WASTE |
| FT. | FEET |
| FM | ULTRASONIC FLOW METER |
| GALV. | GALVANIZED |
| G.P.M | GALLONS PER MINUTE |
| HP. | HORSEPOWER |
| INF | INFLUENT |
| LS | LEVEL SENSOR |
| HT. | HEIGHT |
| HZ. | HERTZ |
| IN. | INCHES |
| I.E. | INVERT ELEVATION |
| IR. | INTERNAL RECYCLE |
| KV.A. | KILOVOLTS AMPERES |
| KV. | KILOVOLTS |
| KW. | KILOWATTS |
| M | METERS |
| MAX. | MAXIMUM |
| MECH. | MECHANIC |
| MGD. | MILLION GALLONS PER DAY |
| MH. | MANHOLE |
| MIN. | MINIMUM |
| N.T.S. | NOT TO SCALE |
| OHWLM. | ORDINARY HIGH WATER LEVEL MARK |
| PH | PH METER |
| PFWL. | PEAK FLOW WATER LEVEL |
| PRASA. | PUERTO RICO AQUEDUCT AND SEWER AUTHORITY |
| PREPA. | PUERTO RICO ENERGY AND POWER AUTHORITY |
| R.L. | ROOF ELEVATION |
| SCM | STREAMING CURRENT MONITOR |
| T.E. | TOP ELEVATION |
| TEMP | TEMPERATURE |
| TU | TURBIDITY |
| TYP. | TYPICAL |
| V. | VOLTS |
| W.L. | WATER LEVEL |

## LEGEND:

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Stantec
87 Tabonuco Street, Suite 1504
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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERAL SYMBOLS

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GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SACLE

SHEET NO. 03 OF 145
DWG. NO. 000-G-03
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

2024-01-24 8:52:08 AM
B98433_000-g-03.dwg

## C

| | |
|---|---|
| A | AIR/ AMPERE |
| A/C | AIR CONDITIONING |
| A/R | AIR RELEASE |
| AASHTO | AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS |
| AB | ANCHOR BOLT |
| ABAN | ABANDON |
| ABND | ABANDONED |
| ABBR | ABBREVIATION |
| ABS | ABSOLUTE TEMPERATURE |
| AC | ACTIVATED CARBON/ ASPHALTIC CONC/ ALTERNATING CURRENT |
| ACI | AMERICAN CONCRETE INTERNATIONAL |
| ACOUS | ACOUSTIC/ ACOUSTICAL |
| ACP | ASBESTOS CEMENT PIPE/ ASPHALTIC CONCRETE PAVEMENT |
| ADD | ADDITIONAL |
| ADH | ADHESIVE |
| ADJ | ADJUSTABLE |
| AFF | ABOVE FINISHED FLOOR |
| AISC | AMERICAN INSTITUTE OF STEEL CONSTRUCTION |
| ALT | ALTERNATE |
| ALUM | ALUMINUM/ ALUM |
| AMB | AMBIENT |
| ANSI | AMERICAN NATIONAL STANDARDS INSTITUTE |
| API | AMERICAN PETROLEUM INSTITUTE |
| APPD | APPROVED |
| APPROX | APPROXIMATE |
| APPURTS | APPURTENANCES |
| ARCH | ARCHITECTURE |
| ASME | AMERICAN SOCIETY OF MECHANICAL ENGINEERS |
| ASPH | ASPHALT |
| ASTM | AMERICAN SOCIETY FOR TEST & MATERIALS |
| AT | ACOUSTICAL TILE |
| ATM | ATMOSPHERE |
| AV/AR | AIR VACUUM AND AIR RELEASE VALVE |
| AVE | AVENUE |
| AWPA | AMERICAN WOOD PRESERVERS ASSOCIATION |
| AWS | AMERICAN WELDING SOCIETY |
| AWWA | AMERICAN WATER WORKS ASSOCIATION |

## B

| | |
|---|---|
| B&S | BELL AND SPIGOT |
| B/W | BACK OF WALL/ BACK OF WALK |
| BC | BEGIN CURVE/ BOLT CIRCLE/ BETWEEN CENTERS/ BACK OF CURVE |
| BCR | BEGIN CURB RETURN |
| BD | BOARD |
| BDRY | BOUNDARY |
| BF | BLIND FLANGE/ BOTTOM OF FOOTING |
| BFP | BACK FLOW PREVENTER |
| BFV | BUTTERFLY VALVE |
| BHP | BRAKE HORSEPOWER |
| BLDG | BUILDING |
| BLK | BLACK/ BLOCK |
| BLKG | BLOCKING |
| BLVD | BOULEVARD |
| BM | BEAM/ BENCH MARK |
| BO | BLOW-OFF ASSEMBLY |
| BOD | BIOCHEMICAL OXYGEN DEMAND |
| BOP | BOTTOM OF PIPE |
| BOT | BOTTOM |
| BPV | BACK PRESSURE VALVE |
| BRK | BRICK/ BREAK |
| BSMT | BASEMENT |
| BT | BOLT |
| BTU | BRITISH THERMAL UNIT |
| BV | BALL VALVE |
| BVC | BEGIN VERTICAL CURVE |
| BWV | BACK WATER VALVE |

## C

| | |
|---|---|
| C | CENTIGRADE/ CHANNEL/ CEMENT |
| C&G | CURB AND GUTTER |
| CAB | CABINET/ CRUSHED AGGREGATE BASE |
| CAP | CAPACITY |
| CATS | CASING TEST STATION |
| CATV | CABLE TELEVISION |
| CB | CATCH BASIN/ CHALKBOARD/ CURB |
| CC | CLOSED CIRCUIT TV/ CENTER TO CENTER |
| CD | CEILING DIFFUSER |
| CEM | CEMENT |
| CF | CURB FACE/ CUBIC FOOT |
| CFH | CUBIC FEET PER HOUR |
| CFM | CUBIC FEET PER MINUTE |
| CFS | CUBIC FEET PER SECOND |
| CHEM | CHEMICAL |
| CHG | CHANGE |
| CHKD | CHECKERED |
| CI | CAST IRON |
| CIP | CAST IRON PIPE/ CAST IN PLACE |
| CIPP | CAST IN PLACE PIPE |
| CJ | CONSTRUCTION JOINT |
| CL | CENTERLINE |
| CL2 | CHLORINE |
| CLF | CHAIN LINK FENCE |
| CLG | CEILING |
| CLOS | CLOSET |
| CLR | CLEAR/ CLEARANCE |
| CMB | CRUSHED MISCELLANEOUS BASE |
| CMC | CEMENT MORTAR-COATED |
| CML | CEMENT MORTAR-LINED |
| CML&C | CEMENT MORTAR-LINED AND COATED |
| CMP | CORRUGATED METAL PIPE |
| CMU | CONCRETE MASONRY UNIT |
| CO | CLEANOUT |
| COL | COLUMN |
| COMM | COMMUNICATIONS CABLE |
| COMP | COMPRESSOR |
| CONC | CONCRETE/ CONCENTRIC |
| COND | CONDENSER/ CONDENSATE |
| CONN | CONNECTION |
| CONST | CONSTRUCT/ CONSTRUCTION |
| CONT | CONTINUED/ CONTINUOUS |
| CONTR | CONTRACTOR |
| COORD | COORDINATE |
| COR | CORNER |
| COTG | CLEANOUT TO GRADE |
| CPLG | COUPLING |
| CPVC | CHLORINATED POLYVINYL CHLORIDE |
| CS | CAST STEEL |
| CSP | CORRUGATED STEEL PIPE |
| CSTS | CURRENT SPAN TEST STATION |
| CT | CERAMIC TILE |
| CTR | CENTER |
| CTS | CORROSION TEST STATION |
| CTSK | COUNTERSUNK |
| CU | COPPER/ CUBIC |
| CULV | CULVERT |
| CV | CHECK VALVE |
| CY | CUBIC YARD |
| CYL | CYLINDER |

## D

| | |
|---|---|
| DC | DIRECT CURRENT |
| DEG | DEGREE |
| DET | DETAIL |
| DF | DRINKING FOUNTAIN/ DOUGLAS FIR |
| DG | DOOR GRILL |
| DH | DOUBLE HUNG |
| DI | DUCTILE IRON |
| DIA | DIAMETER |
| DIAG | DIAGONAL |
| DIAPH | DIAPHRAGM |
| DIFF | DIFFUSER/ DIFFERENTIAL |
| DIP | DUCTILE IRON PIPE |
| DIR | DIRECTION |
| DISCH | DISCHARGE |
| DISP | DISPENSER |
| DL | DEAD LOAD |
| DMH | DROP MANHOLE |
| DN | DOWN |
| DO | DISSOLVED OXYGEN/ DITTO |
| DR | DOOR/ DRAIN |
| DS | DRENCH SHOWER AND EYE WASH |
| DT | DRAIN TILE |
| DWG | DRAWING |
| DWLS | DOWELS |
| DWY | DRIVEWAY |

## E

| | |
|---|---|
| E | EAST |
| E/O | EAST OF |
| EA | EACH |
| EB | EXPANSION BOLT OR ANCHOR |
| EC | END CURVE |
| ECC | ECCENTRIC |
| ECR | END CURB RETURN |
| EF | EACH FACE/ EXHAUST FAN |
| EFF | EFFLUENT |
| EG | EXIST GRADE/ EDGE OF GUTTER/ EXHAUST GRILLE |
| EGL | ENERGY GRADE LINE |
| EL | ELEVATION |
| ELEC | ELECTRICAL/ ELECTRONIC |
| EN | EDGE NAILING |
| ENCL | ENCLOSURE |
| ENG | ENGINE |
| ENGR | ENGINEER |
| ENT | ENTRANCE |
| EP | EDGE OF PAVEMENT |
| EPT | ETHYLENE PROPYLENE |
| EQ | EQUAL |
| EQUIP | EQUIPMENT |
| ESMT | EASEMENT |
| ETB | EMULSION TREATED BASE |
| ETC | ET CETERA |
| EVAP | EVAPORATOR |
| EVC | END VERTICAL CURVE |
| EW | EACH WAY/ EYE WASH |
| EX | EXISTING |
| EXC | EXCAVATION |
| EXH | EXHAUST |
| EX-HY | EXTRA HEAVY |
| EXIST | EXISTING |
| EXP | EXPANSION |
| EXT | EXTERIOR/ EXTENSION |
| EXTR | EXTRUDED |

## F

| | |
|---|---|
| F | FAHRENHEIT/ FINISH |
| F TO F | FACE TO FACE |
| F&C | FRAME AND COVER |
| F&I | FURNISH AND INSTALL |
| FAB | FABRICATE/ FABRICATION/ FABRICATED |
| FAI | FRESH AIR INTAKE |
| FB | FLAT BAR/ FLOOR BEAM/ FIELD BOOK |
| FCO | FLOOR CLEANOUT |
| FD | FLOOR DRAIN |
| FDR | FEEDER |
| FE | FIRE EXTINGUISHER/ FINAL EFFLUENT |
| FEM | FEMALE (PIPE THREAD) |
| FF | FLAT FACE/ FAR FACE/ FINISHED FLOOR |
| FG | FINISHED GRADE |
| FH | FIRE HYDRANT/ FLAT HEAD |
| FIG | FIGURE |
| FIN | FINISHED |
| FIX | FIXTURE |
| FL | FLOWLINE/ FLOOR |
| FLEX | FLEXIBLE |
| FLG | FLANGE/ FLOORING |
| FLGD | FLANGED |
| FLOCC | FLOCCULATOR/ FLOCCULATION |
| FLR | FLOOR |
| FLSG | FLASHING |
| FM | FACTORY MUTUAL (LAB APPRVD)/ FORCE MAIN |
| FMH | FLEXIBLE METAL HOSE |
| FN | FIELD NAILING |
| FND | FOUNDATION |
| FOC | FACE OF CONCRETE/ FIBER OPTIC CABLE |
| FOM | FACE OF MASONRY |
| FOS | FACE OF STUDS |
| FOW | FACE OF WALL |
| FPC | FLEXIBLE PIPE COUPLING |
| FPM | FEET PER MINUTE |
| FPS | FEET PER SECOND |
| FPTS | FOREIGN PIPE TEST STATION |
| FR | FRAME |
| FRP | FIBERGLASS REINFORCED PLASTIC |
| FS | FINISHED SURFACE/ FAR SIDE/ FLOOR SINK / FORGED STEEL |
| FT | FEET/ FOOT |
| FTG | FOOTING |
| FUR | FURRING |
| FUT | FUTURE |
| FV | FIELD VERIFY |
| FWD | FORWARD |

## G

| | |
|---|---|
| G | GAS |
| GA | GAGE / GAUGE |
| GAL | GALLON |
| GALV | GALVANIZED |
| GANC | GUY ANCHOR |
| GB | GRADE BREAK |
| GEN | GENERAL / GENERATOR |
| GFA | GROOVED FLANGE ADAPTER |
| GI | GALVANIZED IRON |
| GIP | GALVANIZED IRON PIPE |
| GL | GLASS / GROUND LINE / GRADE LINE |
| GLB | GLUE LAMINATED BEAM / GLULAM |
| GLV | GLOBE VALVE |
| GM | GAS METER |
| GP | GUY POLE |
| GPD | GALLONS PER DAY |
| GPH | GALLONS PER HOUR |
| GPM | GALLONS PER MINUTE |
| GR | GRADE |
| GRD | GRADE / GROUND |
| GRTG | GRATING |
| GSP | GALVANIZED STEEL PIPE |
| GV | GATE VALVE |
| GYP | GYPSUM |

## H

| | |
|---|---|
| H | HIGH / HEIGHT |
| H&V | HEATING AND VENTILATING |
| H/B | HOSE BIBB |
| HC | HOUSE CONNECTION |
| HDR | HEADER |
| HDW | HARDWARE |
| HDWL | HEADWALL |
| HEX | HEXAGONAL |
| Hg | MERCURY |
| HGL | HYDRAULIC GRADE LINE |
| HGR | HANGER |
| HM | HOLLOW METAL |
| HORZ | HORIZONTAL |
| HP | HIGH POINT / HORSE POWER / HIGH PRESSURE |
| HPG | HIGH PRESSURE GAS |
| HR | HEAT RETURN / HOUR |
| HSL | HORIZONTALLY SLOTTED |
| HSS | HOLLOW STRUCTURAL SECTION |
| HTG | HEATING |
| HTR | HEATER |
| HV | HORIZONTAL AND VERTICAL CONTROL POINT |
| HVAC | HEATING, VENTILATION AND AIR CONDITIONING |
| HW | HOT WATER / HEADWORK |
| HWD | HARDWOOD |
| HWL | HIGH WATER LEVEL |
| HWO | HANDWHEEL OPERATED |
| HYD | HYDRAULIC / HYDRANT |

## I

| | |
|---|---|
| I/O | INPUT/OUTPUT |
| I&O | INSIDE AND OUTSIDE |
| IBC | INTERNATIONAL BUILDING CODE |
| ID | INSIDE DIAMETER |
| IF | INSIDE FACE |
| IJTS | INSULATING JOINT TEST STATION |
| IN | INCH |
| INCL | INCLUDE / INCLUDING |
| INFL | INFLUENT |
| INSL | INSULATION / INSULATING / INSULATED |
| INSP | INSPECTION |
| INST | INSTRUMENT |
| INT | INTERIOR |
| INV | INVERT |
| IP | IRON PIPE |
| IPS | IRON PIPE SIZE |
| IRRG | IRRIGATION |

## J

| | |
|---|---|
| JAN | JANITOR |
| JC | JUNCTION CHAMBER |
| JCT | JUNCTION |
| JS | JUNCTION STRUCTURE |
| JSTS | JOISTS |
| JT | JOINT |

## K

| | |
|---|---|
| k | KILO |
| K | KELVIN/ KARAT |
| kg | KILOGRAM |
| km | KILOMETER |
| kV | KILOVOLT |
| KVA | KILOVOLT AMPERE |
| kW | KILOWATT |
| kWh | KILOWATT HOUR |

## L

| | |
|---|---|
| L | LITER/ LENGTH/ ANGLE |
| LAB | LABORATORY |
| LAM | LAMINATED |
| LAT | LATERAL |
| LAV | LAVATORY |
| LB | POUND |
| LCP | LOCAL CONTROL PANEL |
| LCS | LOCAL CONTROL STATION |
| LD | LOCAL DEPRESSION |
| LDG | LANDING |
| LEV | LEVEL |
| LF | LINEAR FOOT |
| LG | LENGTH/ LONG |
| LH | LAMP HOLE/ LEFT HAND |
| LL | LIVE LOAD |
| LLH | LONG LEG HORIZONTAL |
| LLV | LONG LEG VERTICAL |
| LOC | LOCATION |
| LOL | LAYOUT LINE |
| LONG | LONGITUDINAL |
| LP | LOW POINT/ LOW PRESSURE/ LAMP POST |
| LPG | LIQUID PETROLEUM GAS |
| LT | LEFT/ LIGHT |
| LTS | LIME TREATED SOIL |
| LW | LOW WATER |
| LWL | LOW WATER LEVEL |
| LWR | LOWER |

## M

| | |
|---|---|
| MAT | MATERIAL |
| MAX | MAXIMUM |
| MB | MAIL BOX/ MACHINE BOLT |
| MCC | MOTOR CONTROL CENTER |
| MCR | MIDDLE OF CURB RETURN |
| MEAS | MEASURE |
| MECH | MECHANICAL |
| MED | MEDIUM |
| MEMB | MEMBER |
| MFR | MANUFACTURER |
| MFRD | MANUFACTURED |
| MGD | MILLION GALLONS PER DAY |
| MH | MANHOLE/ MAINTENANCE HOLE |
| MHT | MEAN HIGH TIDE |
| MHW | MEAN HIGH WATER |
| MI | MALLEABLE IRON/ MILE |
| MICRON | 1/1,000,000 METER |
| MIL | MILITARY/ 1/1,000TH INCH |
| MIN | MINIMUM/ MINUTE |
| MIR | MIRROR |
| MISC | MISCELLANEOUS |
| MK | MARK |
| MLW | MEAN LOW WATER |
| mm | MILLIMETER |
| MO | MOTOR OPERATED/ MASONRY OPENING |
| MOD | MODEL |
| MON | MONUMENT |
| MOR | MORTAR |
| MS | MOP SINK |
| MSL | MEAN SEA LEVEL |
| MTC | MECHANICAL-TYPE COUPLING |
| MTD | MOUNTED |
| MTG | MOUNTING |
| MTL | METAL |
| MTR | MOTOR |

## N

| | |
|---|---|
| N | NORTH |
| NaOCl | SODIUM HYPOCHLORITE |
| NaOH | SODIUM HYDROXIDE (CAUSTIC SODA) |
| NC | NORMALLY CLOSED |
| NEC | NATIONAL ELECTRICAL CODE |
| NEMA | NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION |
| NF | NEAR FACE |
| NFPA | NATIONAL FIRE PROTECTION ASSOCIATION |
| NG | NATURAL GRADE/ NATURAL GAS |
| NIC | NOT IN CONTRACT |
| NO | NUMBER/ NORMALLY OPEN |
| NOM | NOMINAL |
| NPS | NOMINAL PIPE SIZE |
| NPT | NATIONAL PIPE THREAD |
| NRCP | NON-REINFORCED CONCRETE PIPE |
| NRS | NON-RISING STEM |
| NS | NEAR SIDE |
| NTS | NOT TO SCALE |

## O

| | |
|---|---|
| OBJ | OBJECT |
| OC | ON CENTER/ OVER-CROSSING |
| OD | OUTSIDE DIAMETER/ OVERALL DIMENSION |
| OE | OUTER EDGE |
| OF | OVERFLOW/ OUTSIDE FACE |
| OFD | OVERFLOW DRAIN |
| OFF | OFFICE |
| OH | OVER HEAD |
| OHW | OVERHEAD WIRES |
| OPER | OPERATOR/ OPERATING |
| OPNG | OPENING |
| OPP | OPPOSITE |
| ORIG | ORIGINAL |
| OS&Y | OUTSIDE SCREW AND YOKE |
| OSA | OUTSIDE AIR |
| OSHA | OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION |
| OWG | OIL. WATER. GAS |
| OZ | OUNCE |

## P

| | |
|---|---|
| P | POLE/ PAGE/ PIPE |
| P/S | POLE AND SHELF |
| PA | PLANTING AREA |
| PART | PARTITION |
| PAVMT | PAVEMENT |
| PB | POLYBUTYLENE/ PULL BOX |
| PC | POINT OF CURVATURE/ PRIMARY CLARIFIER/ PORTLAND CEMENT |
| PCC | PORTLAND CEMENT CONCRETE/ POINT OF COMPOUND CURVE |
| PCOTG | PRESSURE CLEANOUT TO GRADE |
| PCVC | POINT OF COMPOUND VERTICAL CURVE |
| PE | PLANT EFFLUENT/ POLYETHYLENE/ POLYELECTROLYTE POLYMER |
| PG | PRESSURE GAGE |
| pH | RECIPROCAL LOG OF HYDROGEN ION CONCENTRATION |
| PI | PLANT INFLUENT/ POINT OF INTERSECTION |
| PK | PARKING |
| PL | PLATE/ PROPERTY LINE/ PLACE |
| PLAS | PLASTER/ PLASTIC |
| PLT | PLANT |
| PLWD | PLYWOOD |
| PM | PRESSED METAL |
| PNEU | PNEUMATIC |
| PNL | PANEL |
| POB | POINT OF BEGINNING |
| POC | POINT OF CONNECTION |
| POT | POINT OF TANGENT |
| PP | POWER POLE/ POLYPROPYLENE |
| PPD | POUNDS PER DAY |
| PPH | POUNDS PER HOUR |
| PPM | POUNDS PER MINUTE |
| PR | PAIR |
| PRC | POINT OF REVERSE CURVE |
| PRCT | PRECAST |
| PREFAB | PREFABRICATED |
| PRESS | PRESSURE |
| PROF | PROFILE |
| PRV | PRESSURE REGULATING, RELIEF OR REDUCING VALVE |
| PRVC | POINT OF REVERSE VERTICAL CURVE |
| PS | PRESSURE SWITCH |
| PSF | POUNDS PER SQUARE FOOT |
| PSI | POUNDS PER SQUARE INCH |
| PSIA | POUNDS PER SQUARE INCH ABSOLUTE |
| PSIG | POUNDS PER SQUARE INCH GAUGE |
| PT | POINT OF TANGENCY/ PAINT/ PRESSURE |
| PTFE | POLYTETRAFLUOROETHYLENE (TEFLON) |
| PV | PLUG VALVE |
| PVC | POLYVINYL CHLORIDE |
| PVDF | POLYVINYLIDENE FLUORIDE (KYNAR) |
| PW | POTABLE WATER |

## Q

| | |
|---|---|
| QT | QUARRY TILE |
| QTY | QUANTITY |
| QUAD | QUADRANGLE/ QUADRANT |

## R

| | |
|---|---|
| R | RADIUS/ RISER / RATE OF SLOPE |
| R&O | ROCK AND OIL |
| R/W | RIGHT OF WAY |
| RAC | RECYCLED ASPHALT CONCRETE |
| RAG | RETURN AIR GRILLE |
| RAP | RECLAIMED ASPHALT PAVEMENT |
| RAS | RETURN ACTIVATED SLUDGE |
| RC | REINFORCED CONCRETE |
| RCP | REINFORCED CONCRETE PIPE |
| RD | ROAD/ ROOF DRAIN/ ROUND |
| RED | REDUCER/ REDUCING |
| REF | REFERENCE/ REFER/ REFRIGERATOR |
| REG | REGULATING |
| REINF | REINFORCE/ REINFORCED |
| REQD | REQUIRED |
| RESIL | RESILIENT |
| RET | RETAINING/ RETURN |
| REV | REVISION |
| REW | RECLAIMED WATER |
| RF | ROOF/ RAISED FOUNDATION/ ROUGH FACE |
| RFG | ROOFING |
| RGE | REGISTERED GEOTECHNICAL ENGINEER |
| RH | REDHEAD / RIGHT HAND |
| RM | ROOM |
| RO | ROUGH OPENING |
| RPM | REVOLUTIONS PER MINUTE |
| RR | RAILROAD |
| RS | RISING STEM |
| RSL | RAW SLUDGE |
| RT | RIGHT |
| RTP | REINFORCED THERMOSETTING PLASTIC |
| RTU | REMOTE TERMINAL UNIT |
| RW | REDWOOD |
| RWL | RAINWATER LEADER |

## S

| | |
|---|---|
| S | SOUTH/SCUM/SINK/SECOND/SLOPE |
| S/O | SOUTH OF |
| SAM | SAMPLE |
| SAN | SANITARY |
| SBR | STYRENE BUTADIENE (RUBBER) |
| SC | SECONDARY CLARIFIER |
| SCCP | STEEL CYLINDER CONCRETE PIPE |
| SCD | SCREWED |
| SCFM | STANDARD CUBIC FEET PER MINUTE |
| SCH | SCHEDULE |
| SD | SOFT DIG |
| SDR | STANDARD THERMOPLASTIC PIPE DIMENSION RATIO/STORM DRAIN |
| SEC | SECONDARY/ SECTION |
| SER | SERIES |
| SETT | SETTING |
| SF | SQUARE FOOT |
| SH | SHOWER |
| SHELV | SHELVING |
| SHT | SHEET |
| SHTG | SHEATHING |
| SIM | SIMILAR |
| SL | SLUDGE |
| SLDG | SLIDING |
| SLG | SLUICE GATE |
| SOG | SLAB ON GRADE |
| SOLN | SOLUTION |
| SP | STATIC PRESSURE/ SPARE CHEMICAL |
| SPEC | SPECIFICATION |
| SPK | SPIKE |
| SQ | SQUARE |
| SS | STAINLESS STEEL/ SANITARY SEWER/ SERVICE SINK |
| SSB | SELECT SUB-BASE |
| SSPWC | STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION |
| SSU | SECONDS SAYBOLT UNIVERSAL |
| ST | STREET/ STATE |
| STA | STATION |
| STC | SLEEVE-TYPE COUPLING |
| STD | STANDARD |
| STK | STAKE |
| STL | STEEL |
| STM | STEAM |
| STR | STRAIGHT/ STRUCTURAL |
| SU | STEAM LINE |
| SUCT | SUCTION |
| SV | SOLENOID VALVE |
| SW | SIDEWALK |
| SWD | SIDEWALK DRAIN |
| SWGR | SWITCHGEAR |
| SWR | SIDEWALL REGISTER |
| SY | SQUARE YARD |
| SYM | SYMMETRICAL/ SYMBOL |
| SYS | SYSTEM |

## T

| | |
|---|---|
| T | THERMOSTAT/ TREAD OF STAIR/ TANGENT |
| T&B | TOP AND BOTTOM |
| T&G | TONGUE AND GROOVE |
| TAN | TANGENT |
| TB | TACK BOARD |
| TBE | THREAD BOTH ENDS |
| TBM | TEMPORARY BENCH MARK |
| TC | TOP OF CURB |
| TCV | TEMPERATURE CONTROL VALVE |
| TEL | TELEPHONE |
| TEMP | TEMPERATURE/ TEMPORARY |
| TF | TOP OF FOOTING |
| TH | TEST HOLE |
| THK | THICK/ THICKNESS |
| THR | THRESHOLD |
| THR'D | THREADED |
| TK | TANK/ TACK |
| TL | TRAVERSE LINE |
| TOC | TOP OF CONCRETE |
| TOE | THREAD ONE END |
| TOL | TOILET |
| TOM | TOP OF MASONRY |
| TOP | TOP OF PIPE |
| TOPO | TOPOGRAPHIC |
| TOS | TOP OF STEEL |
| TOW | TOP OF WALL |
| TP | TELEPHONE POLE |
| TR | TRACT |
| TRANS | TRANSMITTER/ TRANSITION /TRANSMISSION |
| TS | TRAFFIC SIGNAL |
| TSB | TOP SET BASE |
| TSC | TRAFFIC SIGNAL CONDUIT |
| TV | THERMOSTATIC VALVE/ TELEVISION |
| TW | THERMOMETER WELL /TRAVELED WAY |
| TYP | TYPICAL |

## U

| | |
|---|---|
| UB | UNION BONNET |
| UBC | UNIFORM BUILDING CODE |
| UC | UNDER-CROSSING |
| UG | UNDERGROUND |
| UGC | UNDERGROUND CONDUIT |
| UH | UNIT HEATER |
| UL | UNDERWRITERS LABORATORIES |
| UNID | UNIDENTIFIED |
| UNO | UNLESS NOTED OTHERWISE |
| UOI | UNLESS OTHERWISE INDICATED |
| UPS | UNINTERRUPTABLE POWER SUPPLY |
| UR | URINAL |
| USA | UNDERGROUND SERVICE ALERT |
| USGS | UNITED STATES GEOLOGICAL SURVEY |
| UV | ULTRAVIOLET |
| UW | UTILITY WATER |

## V

| | |
|---|---|
| V | VALVE/ VERTICAL/ VENT/ VOLT/ VOLUME |
| VAC | VACUUM |
| VAR | VARIES/ VARIABLE |
| VB | VALVE BOX |
| VC | VERTICAL CURVE |
| VCP | VITRIFIED CLAY PIPE |
| VERT | VERTICAL |
| VOL | VOLUME |
| VPI | VERTICAL POINT OF INTERSECTION |
| VSL | VERTICALLY SLOTTED |
| VTC | VENT TO CEILING |
| VTR | VENT THROUGH ROOF |
| VWC | VINYL WALL COVERING |
| VWM | VERIFY WITH MANUFACTURE |

## W

| | |
|---|---|
| W | WEST/ WASTE/ WIDTH/ WIDE FLANGE/ WATER |
| W/ | WITH |
| W/O | WEST OF / WITHOUT |
| WC | WATER COLUMN / WATER CLOSET |
| WCO | WALL CLEANOUT |
| WD | WOOD |
| WDW | WINDOW |
| WH | WATER HEATER |
| WI | WROUGHT IRON |
| WM | WATER METER |
| WOG | WATER, OIL, OR GAS |
| WP | WATERPROOFING/ WORKING PRESSURE/ WORK POINT |
| WPJ | WEAKEN PLANE JOINT |
| WS | WATER SURFACE |
| WSTP | WATERSTOP |
| WT | WEIGHT |
| WWF | WELDED WIRE FABRIC |
| WWP | WATER WORKING PRESSURE |

## X

| | |
|---|---|
| XCONN | CROSS CONNECTION |
| XS | EXTRA STRONG |
| XSEC | CROSS SECTION |
| XXS | DOUBLE EXTRA STRONG |

## Y

| | |
|---|---|
| YD | YARD |
| YR | YEAR |

## Z

| | |
|---|---|
| Z | ZERO/ ZONE |
| ZN | ZINC |
| # | POUND |
| & | AND |
| @ | AT |

FOR ADDITIONAL ABBREVIATIONS SEE:

GENERAL: PIPING SCHEDULES (MATERIAL AND FLUID)
CIVIL: GENERAL CIVIL SHEET
STRUCTURAL: GENERAL STRUCTURAL SHEETS
ARCHITECTURAL: GENERAL ARCHITECTURAL SHEETS
INSTRUMENTATION: GENERAL I&C SHEETS
BUILDING MECHANICAL: GENERAL HVAC, PLUMBING AND FIRE PROTECTION SHEETS
HVAC: GENERAL HVAC SHEETS
ELECTRICAL: GENERAL ELECTRICAL SHEETS

OTHER ABBREVIATIONS CONFORM TO ANSI STANDARD REV 010119 ABBREVIATIONS Z32.2.3

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| E | 01/29/2024 | 100% DESIGN | EN | SH | GN |
| D | 11/20/2023 | 90% DESIGN | EN | SH | GN |
| C | 09/29/2023 | 60% DESIGN | EN | SH | GN |
| B | 07/26/2023 | 30% DESIGN | EN | SH | GN |
| A | 06/06/2023 | 15% DESIGN | EN | SH | GN |

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DESIGNED BY EN
CHECKED BY SH
APPR. BY GN

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B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERAL ABBREVIATIONS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SACLE

SHEET NO. 04 OF 145
DWG. NO. 000-G-04

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2CM

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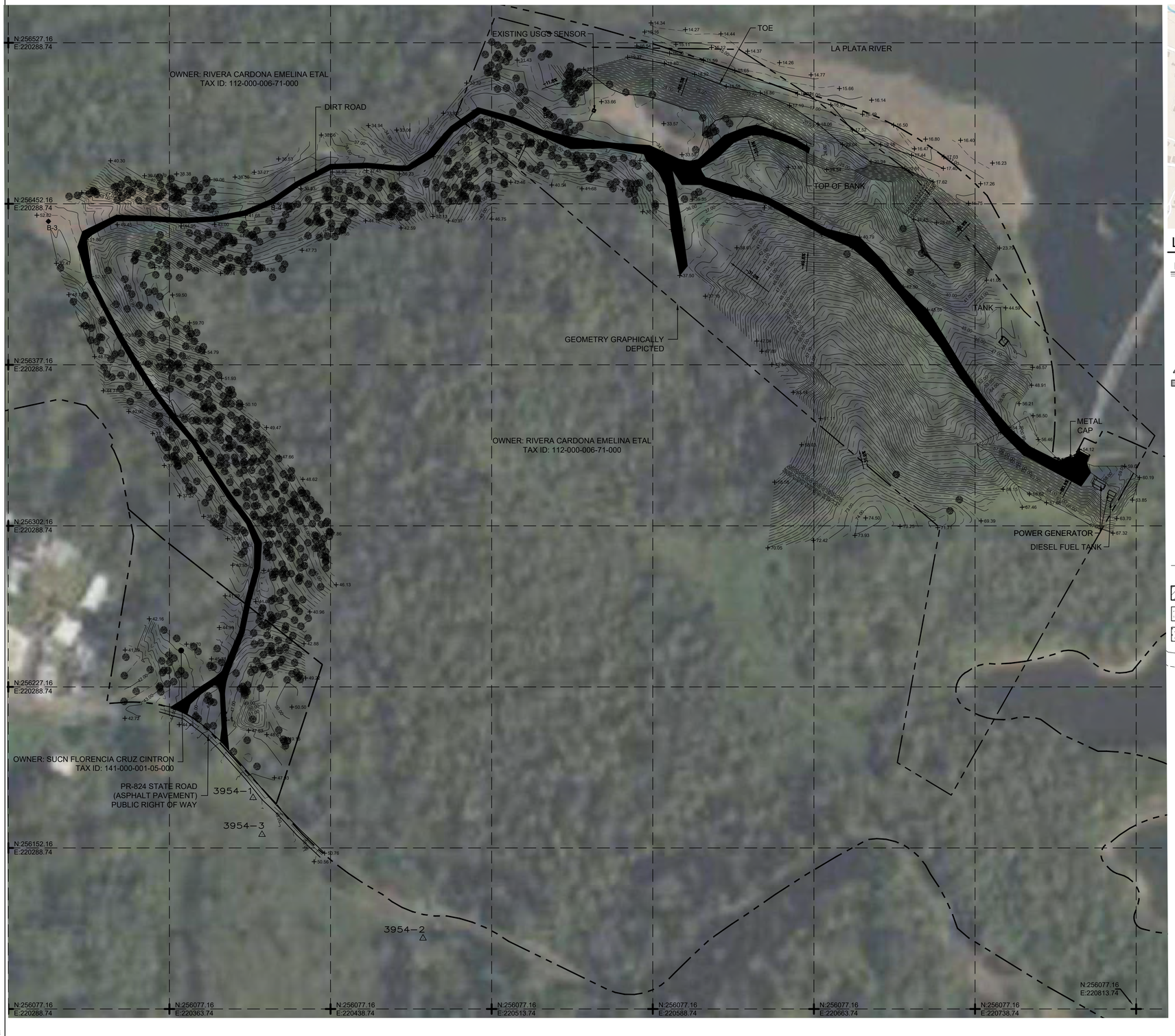
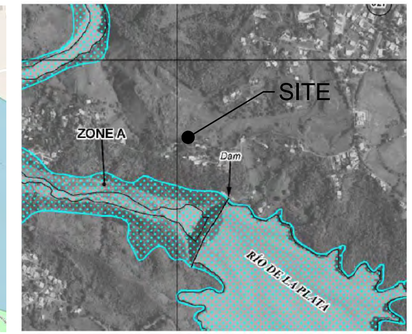


## LOCATION MAP

SCALE 1 : 10,000




## FLOOD MAP

SCALE 1 : 10,000

## LEGEND:

- CONTROL STATION
- PROPERTY POINT
- SANITARY SEWER MANHOLE
- STORM SEWER MANHOLE
- ELECTRIC UTILITY MANHOLE
- TELEPHONE MANHOLE
- WATER MANHOLE
- HEAD WALL
- CATCH BASINS
- WATER METER
- WATER VALVE
- CONCRETE LIGHT POLE
- CONCRETE POWER POLE
- CONCRETE POWER & TELEPHONE POLE
- UTILITY POLE
- GUY POLE
- WOODEN POWER/ TELEPHONE POLE
- TELEPHONE POLE
- WOODEN POWER POLE
- WOODEN LIGHT POLE
- NOT IN USE POLE
- CAMERA POLE
- METAL LIGHT POLE
- METAL POWER POLE
- GUARDRAIL
- 60.00 SPOT ELEVATIONS
- EXISTING STRUCTURES
- CONCRETE SLAB
- METAL CAP
- 6 CONTOUR 1 METER INTERVAL
- 5.5 CONTOUR 0.5 METER INTERVAL
- MW MONITORING WELL
- B BORING
- TWO SIDE METAL LIGHT POLE
- STREET LIGHT POLE
- TWO SIDE METAL LIGHT POLE
- 0.0 KM ID
- SANITARY CLEAN OUT
- FIRE HYDRANT
- CURB INLET
- PUBLIC TELEPHONE BOOTH
- SLB STREET LIGHT BOX
- HANDICAP RAMP
- SIGN
- GUY CABLE
- EXISTING TREE (≥ 4" DIAMETER BREAST HEIGHT)
- EXISTING BUSH
- EXISTING PALM TREE
- VERTICAL PIPE
- BOLLARD
- GATE
- IRON POST
- CONCRETE MONUMENT
- BITT
- FIRE WATER NOZZLE
- CONCRETE GUTTER
- S SANITARY SEWER LINE
- STM STORM SEWER LINE
- W WATER LINE
- TEL TELEPHONE LINE
- E POWER LINE
- CHAIN LINK FENCE
- X BARBED WIRE FENCE
- UE UNDERGROUND POWER LINE
- U/T UNDERGROUND TELEPHONE LINE

## GENERAL NOTES:

1. ALL DISTANCES ARE EXPRESSED IN METERS, UNLESS OTHERWISE NOTED.
2. FIELDWORK PERFORMED THRU MAY 29 THRU JULY 12, 2023.
3. HORIZONTAL CONTROLS ARE REFERRED TO NAD 83 (2011) EPOCH 2010.00.
4. VERTICAL DATUM IS REFERRED TO PRVD02.
5. PLEASE REFER TO SURVEY JEB-3954
6. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULT OF THE SURVEY MADE ON THE DATE INDICATED AND CAN BE ONLY CONSIDERED AS AN INDICATION OF THE GENERAL CONDITIONS EXISTING AT THAT TIME.
7. CONTRACTOR SHALL VERIFY FIELD CONDITIONS AND MEASUREMENTS AND ADVISE ARCHITECT OR OWNER OF ANY DIFFERENCES.
8. PLANIMETRIC MAPPING ENHANCED WITH RECORD AERIAL MAPPING, SHOWN FOR REFERENCE PURPOSES. ONLY INFORMATION COLLECTED ON GROUND SHALL BE USED FOR ENGINEERING DESIGN.
9. UNDERGROUND UTILITIES ARE BASED ON ABOVE GROUND EVIDENCE. THIS DRAWING NEITHER DEPICTS NOR INTEND TO DEPICT ALL UNDERGROUND UTILITIES. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES PRIOR TO ANY WORK.

GRAPHIC SCALE

18 9 0 18 36 54

SCALE 1 : 900

## SURVEY CONTROLS

| STA | COORDINATES | | ELEVATION | DESCRIPTION |
|---|---|---|---|---|
| | NORTHING | EASTING | | |
| 3954-1 | 256,175.561 | 220,402.661 | 48.372 | NAIL AND WASHER |
| 3954-2 | 256,110.141 | 220,481.776 | 58.476 | NAIL AND WASHER |
| 3954-3 | 256,158.377 | 220,406.840 | 51.151 | NAIL AND WASHER |

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|---|---|---|---|---|---|
| E | 02/13/2024 | 100% DESIGN | JC | JBC | GN |
| D | 01/29/2024 | 100% DESIGN | JC | JBC | GN |
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| B | 09/29/2023 | 60% DESIGN | JC | JBC | GN |
| A | 07/26/2023 | 30% DESIGN | JC | JBC | GN |

DRAWN BY AM
DESIGNED BY MVM
CHECKED BY LMR
APPR. BY GN

BR&A LLC PROJECT MANAGEMENT • ENGINEERING • CONSULTING

Stantec
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Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

EXISTING CONDITIONS AND TOPOGRAPHICAL SURVEY PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:900

SHEET NO. 05 OF 145
DWG. NO. 000-TS-01

2/20/2024 5:36:41 AM
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# ABBREVIATIONS

## ROAD ALIGNMENT HORIZONTAL

| | |
|---|---|
| Δ | CENTRAL ANGLE OF CIRCULAR CURVE |
| L | TOTAL LENGTH OF CURVE |
| PC | POINT OF CIRCULAR CURVE |
| PI | POINT OF INTERSECTION OF TWO TANGENTS |
| PT | POINT OF TANGENCY |

## ROAD ALIGNMENT VERTICAL

| | |
|---|---|
| PVC | POINT OF VERTICAL CURVE |
| PVI | POINT OF VERTICAL INTERSECTION |
| PVT | POINT OF VERTICAL TANGENCY |
| VC | VERTICAL CURVE |

## UTILITY COMPANY / AGENCY ABBREVIATIONS

| | |
|---|---|
| AASHTO | AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS |
| ACI | AMERICAN CONCRETE INSTITUTE |
| ASTM | AMERICAN SOCIETY FOR TESTING AND MATERIALS |
| DTPW | DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS |
| FHWA | FEDERAL HIGHWAY ADMINISTRATION |
| PRASA | PUERTO RICO AQUEDUCT AND SEWER AUTHORITY |
| PREPA | PUERTO RICO ELECTRIC POWER AUTHORITY |
| PRHTA | PUERTO RICO HIGHWAY AND TRANSPORTATION AUTHORITY |
| PRTC | PUERTO RICO TELEPHONE COMPANY |
| USGS | UNITED STATES GEOLOGICAL SURVEY |

## MISCELLANEOUS

| | |
|---|---|
| & | AND |
| @ | AT |
| ∠ | ANGLE |
| ⊏ | CHANNEL |
| ℄ | CENTER LINE |
| ∅ | DIAMETER |
| ⅊ | PLATE OR PROPERTY LINE |
| ⊥ | PERPENDICULAR |
| A/E | ARCHITECT/ENGINEER |
| ABUT | ABUTMENT |
| A\C | AIR CONDITIONING |
| A.D.A. | AMERICAN DISABILITY ACT |
| ADJ | ADJUSTABLE |
| A.F.F | ABOVE FINISHED FLOOR |
| AGG | AGGREGATE |
| AL | ALUMINUM |
| ALIGN | ALIGNMENT |
| ALT | ALTERNATE |
| ANCH | ANCHOR |
| ANOD | ANODIZED |
| APP | APPROVED (REF) |
| APPROX | APPROXIMATELY |
| ARCH | ARCHITECT, ARCHITECTURAL |
| ASTM | AMERICAN SOCIETY FOR TESTING AND MATERIALS |
| ASPH | ASPHALT |
| AUTO | AUTOMATIC |
| AUX | AUXILIARY |
| AVE | AVENUE |

| | |
|---|---|
| ABFE | ADVISORY BASE FLOOD ELEVATION |
| BEG | BEGIN OR BEGINNING |
| BF | BOTTOM FACE OR BACK FACE |
| BFP | BACKFLOW PREVENTER |
| BIT | BITUMINOUS |
| BITCONC | BITUMINOUS CONCRETE |
| BK | BACK |
| BL | BASELINE OR BUILDING LINE |
| BLDG | BUILDING |
| BLVD | BOULEVARD |
| BM | BENCH MARK |
| B.O.P | BEGINS OF PROJECT |
| BOT | BOTTOM |
| B.P | BACK PLASTER/PLASTERED |
| BRG | BEARING |
| B.S | BOTH SIDES |
| BVL | BEVELED |
| BW | BOTTOM OF WALL OR BACK OF WALL |
| BWF | BARBED WIRE FENCE |
| B TO B | BACK TO BACK |
| CB | CATCH BASIN OR CONCRETE BASE |
| CEM | CEMENT |
| C.G | CORNER GUARD |
| CHAM | CHAMFER |
| CI | CAST IRON OR CURB INLET |
| CIP | CAST-IN-PLACE |
| CJ | CONSTRUCTION JOINT |
| ℄ | CENTERLINE |
| CLF | CHAIN LINK FENCE |
| CLR | CLEARANCE OR CLEAR |
| CMP | CORRUGATED METAL PIPE |
| CO | CLEANOUT, COUNTRY, OR COMPANY |
| COL | COLUMN |
| COMM | COMMUNICATION |
| CONC | CONCRETE |
| COND | CONDUIT |
| CONN | CONNECT, CONNECTION, OR CONNECTOR |
| CONST | CONSTRUCT OR CONSTRUCTION |
| CONT | CONTINUED, CONTINUOUS, OR CONTINUATION |
| COORD | COORDINATE |
| CORR | CORRUGATE OR CORRUGATED |
| C.P.W. | CONCRETE PAVED WATERWAY |
| CP | CONCRETE PIPE OR CEMENT PIPE |
| CS | CONCRETE SLAB |
| CSW | CONCRETE SIDEWALK |
| CSW | CONCRETE SIDEWALK |
| C TO C | CENTER TO CENTER |
| CULV | CULVERT |
| CMU | CONCRETE MANSORY UNITS |
| CUM | CUBIC METER |
| CTJ | CONTROL JOINT |
| D, d | DEPTH |
| DEG | DEGREES |
| DEPT | DEPARTMENT |
| DESC | DESCRIPTION |
| DET | DETAIL |
| DI | DUCTILE IRON, DROP INLET |
| DIA OR ø | DIAMETER |
| DIAG | DIAGRAM |
| DIM | DIMENSION |
| DIST | DISTANCE |
| DN | DOWN |
| DWG | DRAWING |
| EXP | EXPOSED, EXPANSION |
| EMERG | EMERGENCY |
| EA | EACH |
| EB | EASTBOUND |
| EF | EACH FACE |
| EG | EXISTING GROUND |
| EL | ELEVATION |
| ELEC | ELECTRIC OR ELECTRICAL |
| ELECT | ELECTRIC (REF) |
| ELEV | ELEVATION |
| EMH | ELECTRICAL MANHOLE |
| E.O.P | END OF PROJECT |
| EP | EDGE OF PAVEMENT |
| EQ | EQUAL |
| EQUIP | EQUIPMENT |
| ETC | ETCETERA |
| EW | EACH WAY |
| EX OR EXIST | EXISTING |
| EXP | EXPANSION |
| EXT | EXTERIOR, EXTERNAL |
| ES | END SECTION |
| EST | ESTIMATE |
| EP | ELECTRIC POLE |
| F.A | FIRE ALARM |
| F.D | FLOOR DRAIN |
| FFE | FINISHED FLOOR ELEVATION |
| FG | FINISH GRADE |
| FH | FIRE HYDRANT |
| FIN | FINISH |
| FLR | FLOOR |
| F TO F | FACE TO FACE |
| FWD | FORWARD |

| | |
|---|---|
| G | GAS OR GAS LINE |
| GA | GAUGE (GAGE) |
| GALV | GALVANIZE OR GALVANIZED |
| GAL(S) | GALLON(S) |
| GEN | GENERAL |
| GRD | GROUND |
| GP | GENERAL |
| GRN | GRANITE |
| G.S.M | GALVANIZED SHEET METAL |
| GV | GATE VALVE, GAS VALVE |
| GW | GUY WIRE |
| GYP | GYPSUM |
| H | HEIGHT |
| HB | HOSE BIBB |
| H.D | HEAVY DUTY |
| HORIZ | HORIZONTAL |
| HOV | HIGH OCCUPANCY VEHICLE |
| HP | HIGH POINT |
| HW | HIGH WATER |
| HWY | HIGHWAY |
| HYD | HYDRANT |
| ID | INSIDE DIAMETER |
| IE | INVERT ELEVATION |
| INCL | INCLUDING |
| INV | INVERT |
| INT | INTERIOR |
| JB | JUNCTION BOX |
| J.F | JOINT FILLER |
| JT | JOINT |
| L | LINE, LINING, OR LENGTH OF CURVE |
| LAT | LATERAL |
| LIN | LINEAR |
| LM | LINEAR METER |
| LOC | LOCATION |
| LP | LOW POINT OR LIGHT POLE |
| LT | LIGHTING |
| LW | LIGHTWEIGHT |
| m 2 | SQUARE METERS |
| MAINT | MAINTENANCE |
| MAX | MAXIMUM |
| MECH | MECHANICAL |
| MED | MEDIUM |
| MH | MANHOLE |
| MIN | MINIMUM, MINUTE |
| MISC | MISCELLANEOUS |
| mm | MILLIMITERS |
| MON | MONUMENT |
| MSL | MEAN SEA LEVEL |
| MT | METER |
| MTD | MOUNT, MOUNTED |
| MTG | MOUNTING |
| MTL, MET | METAL |
| MSE | MECHANICALLY STABILIZED EARTH |
| N | NORTH |
| N/A | NOT APPLICABLE |
| NB | NORTHBOUND |
| NF | NEAR FACE |
| NIC | NOT IN CONTRACT |
| NO. OR # | NUMBER |
| NOM | NOMINAL |
| N/R | NON-RATED |
| NS | NEAR SIDE |
| N.T.S | NOT TO SCALE |
| n.f. | NEW FACE OF WALL |
| O/ | OVER |
| O.A | OVERALL |
| OBS | OBSCURE |
| OD | OUTSIDE DIAMETER |
| O.C | ON CENTER, CENTERS |
| OH | OVERHEAD |
| OP | OPAQUE |
| OPP | OPPOSITE |
| V | VALVE, RATE OF SPEED, OR DESIGN SPEED |
| VERT | VERTICAL |
| W | WEST, WATER OR WOOD |
| W/ | WITH |
| WL | WATER LEVEL |
| WM | WATER MAIN OR WATER METER |
| WMH | WATER MANHOLE |
| W/O | WITHOUT |
| WP | WORKING POINT |
| WV | WATER VALVE |
| X-DRAIN | CROSS DRAIN |
| X-ING | CROSSING |
| X-SECT | CROSS SECTION |
| ZR | ZINC ROOF |

| | |
|---|---|
| P | PIPE |
| PAR | PARALLEL |
| PART | PARTIAL |
| PB | PULL BOX |
| PC | PRECAST |
| PCCP | PORTLAND CEMENT CONCRETE PAVEMENT |
| PED | PEDESTRIAN |
| PERF | PERFORATE, PERFORATED |
| PG | PROPOSED GRADE |
| PGL | PROFILE GRADE LINE |
| PLUM | PLUMBING |
| PM | PARKING METER |
| P.R | PUERTO RICO |
| PRASA | PUERTO RICO AQUEDUCT & SEWER AUTHORITY |
| PRHTA | PUERTO RICO HIGHWAY & TRANSPORTATION AUTHORITY |
| PROD | PRODUCT |
| PROJ | PROJECTION OR PROJECT |
| PROP | PROPERTY OR PROPOSED |
| P/STRIP | PLANTING STRIP |
| PT | POINT |
| PVC | POLYVINYL CHLORIDE |
| PVMT | PAVEMENT |
| PWR | POWER |
| Q.T | QUARRY TILE |
| QTY | QUANTITY |
| QUAD | QUADRANT |
| RAD, R | RADIUS |
| RCP | REINFORCED CONCRETE PIPE |
| RD | ROAD |
| RDWAY | ROADWAY |
| REF | REFERENCE |
| REFL | REFLECT, REFLECTED, REFLECTIVE, REFLECTOR |
| REINF | REINFORCE, REINFORCED, OR REINFORCEMENT |
| REQ'D | REQUIRED OR REQUIRE |
| RET | RETAINING |
| RET/W | RETAINING WALL |
| REV | REVISE, REVISED, OR REVISION |
| ROW OR R/W | RIGHT-OF-WAY |
| RT | RIGHT |
| SCHED | SCHEDULE |
| SECT | SECTION |
| SHT | SHEET |
| SMH | SANITARY SEWER MANHOLE |
| SPEC | SPECIFICATION(S) (REF) |
| SQ | SQUARE |
| SQM | SQUARE METER |
| SS | SANITARY SEWER OR STOP SIGN |
| ST | STORM DRAIN |
| STMH | STORM DRAIN MANHOLE |
| ST | STREET |
| STA | STATION |
| STD | STANDARD |
| STL | STEEL |
| STRUCT | STRUCTURE |
| SWK | SIDEWALK |
| SYM | SYMMETRICAL |
| SHDR | SHOULDER |
| TAN | TANGENT |
| T.D | TRENCH DRAIN |
| TE | TOP ELEVATION |
| TEL, OR T | TELEPHONE |
| TEMP | TEMPERATURE OR TEMPORARY |
| THK | THICK, THICKNESS |
| TL | TRAFFIC LIGHT |
| TMH | TELEPHONE MANHOLE |
| T.O.S | TOE OF SLOPE |
| T.O.C | TOP OF CUT |
| T.O.W | TOP OF WALL |
| T.U. | TREN URBANO |
| TV | TELEVISION |
| TW | TOP OF WALL |
| TYP | TYPICAL |
| U.N.O. | UNLESS NOTED OTHERWISE |
| UD | UNDERDRAIN |
| W | WEST, WATER OR WOOD |
| W/ | WITH |
| WL | WATER LEVEL |
| WM | WATER MAIN OR WATER METER |
| WMH | WATER MANHOLE |
| W/O | WITHOUT |
| WP | WORKING POINT |
| WV | WATER VALVE |
| X-DRAIN | CROSS DRAIN |
| X-ING | CROSSING |
| X-SECT | CROSS SECTION |
| ZR | ZINC ROOF |

# LEGENDS

## EXISTING LEGEND

- ASPHALT ROAD
- DIRT ROAD
- EXISTING STRUCTURE
- GUTTER
- EXISTING GUARDRAIL
- EXISTING BARBED WIRE FENCE
- EXISTING CHANGE LINK FENCE
- PROPERTY LIMIT (CRIM)
- OR 244,100 / 109,600 — GRID COORDINATE
- 250 — CONTOUR INTERVAL, 1.00M
- CONTOUR INTERVAL, 0.50M
- 215.03 — FIELD SURVEY SPOT ELEVATION
- × 240.2 — PHOTOGRAMETRY SPOT ELEVATION
- STA.LB1 — CONTROL STATION
- ABFE 1.0% LIMITS (FEMA 100YR FLOOD LIMIT)
- ABFE 0.2% LIMITS (FEMA 500YR FLOOD LIMIT)
- EXISTING ROW LINE
- Km 48.8 — KILOMETER
- WEP — WOOD ELECTRICAL POLE
- WTP — WOOD TELEPHONE POLE
- WLEP — WOOD LIGHT ELECTRICAL POLE
- WLTP — WOOD LIGHT TELEPHONE POLE
- GW — GUY WIRE
- OR — ROAD SIGN
- E — ELECTRICAL POWER LINE
- 43+00 — PROJECT ALIGNMENT
- EXISTING STORM SEWER PIPE (TREATMENT AS SPECIFIED)
- or — EXISTING HEADWALL (TREATMENT AS SPECIFIED)
- CB T=0.00 I=0.00 — EXISTING CATCH BASIN
- PALM TREE
- TREE TO BE REMOVED
- TREE TO REMAIN
- B# — BORING LOG ID (SEE LOCATION ON DWG. 010-C-02)
- N — NORTH ARROW
- W — EXISTING WATER LINE (DIAMETER AS SPECIFIED ON PLANS)
- CONCRETE MONUMENT (HV-2 MARK)

## PROPOSED LEGEND

- 250 — CONTOUR INTERVAL, 1.00M
- CONTOUR INTERVAL, 0.50M
- CONSTRUCTION LIMITS
- 100 YEARS FLOOD LIMIT
- STA.LB1 — CONTROL POINTS
- NEW ROW LIMITS AND MONUMENTS
- FLOW DIRECTION
- TOE OF SLOPE
- TOP OF CUT
- EXISTING ELECTRICAL POWER POLE
- E — ELECTRICAL POWER LINE
- EQUAL
- ℄ — CENTERLINE
- NEW WATER METER
- EXISTING WATER METER
- 1 — NODE ID (SEE TABLE OF COORDINATES ON SITE PLAN)
- TRAFFIC DIRECTION
- SECTION (SEE SECTION ON SITE PLAN)
- PROPOSED CUT SLOPE (1.5:1)
- PROPOSED FILL SLOPE (2:1)
- CROSS GRATE
- CONCRETE GUTTER
- CONCRETE CURB AND GUTTER
- NEW ASPHALT PAVEMENT
- NEW CONCRETE PAVEMENT
- NEW CONCRETE SLAB
- NEW WATER LINE (DIAMETER AND MATERIAL AS SPECIFIED ON PLANS)
- NEW GATE VALVE (DIAMETER AS SPECIFIED ON PLANS)
- NEW INLET (FOR ACCESS ROAD) (REFER TO DWGS. 040-C-027 AND 028 FOR DETAILS)
- NEW INLET (FOR GENERATORS AREA) (REFER TO DWG. 030-C-08 FOR DETAILS)
- NEW HEADWALL (REFER TO DWG. 040-C-028 FOR DETAILS)
- RIPRAP PROTECTION (REFER TO DWG. 040-C-028 FOR DETAILS)

# GENERAL NOTES

1. ALL DISTANCES AND ELEVATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
2. PRIOR TO BEGINNING CONSTRUCTION THE CONTRACTOR SHALL CHECK THE DRAWINGS AGAINST THE SITE CONDITIONS AND NOTIFY THE CONSTRUCTION MANAGER IN WRITING OF ANY DISCREPANCIES IN DIMENSIONS OR SITE CONDITIONS. THE CONTRACTOR SHALL NOT BEGIN CONSTRUCTION IN ANY SUCH AFFECTED AREA UNTIL THE DISCREPANCY HAS BEEN RESOLVED AND AUTHORIZATION IS PROVIDED BY THE CONSTRUCTION MANAGER.
3. THE CONTRACTOR SHALL ABIDE BY ALL APPLICABLE ENVIRONMENTAL PROTECTION STANDARDS, LAWS AND REGULATIONS.
4. ALL EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO BEGINNING WITH ANY EARTHWORK OR EXCAVATION, AND MAINTAINED THROUGHOUT THE DURATION OF THE CONSTRUCTION.
5. THE SIZE AND LOCATION OF EXISTING UTILITIES SHOWN ON THE CONTRACT PLANS, BOTH ABOVE AND BELOW GROUND, IS BASED ON AN EXAMINATION OF EXISTING PLANS AND THE RESULT OF VISUAL FIELD INSPECTION. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING IN THE FIELD THE LOCATION AND SIZE OF ALL UTILITIES INCLUDING ELECTRIC, SANITARY, TELECOMMUNICATION, STORM SEWER AND WATER. ANY MAJOR CONFLICT THAT CANNOT BE RESOLVED IN THE FIELD SHALL BE NOTIFIED TO THE ENGINEER FOR ITS RESOLUTION.
6. ANY DAMAGES CAUSED BY CONSTRUCTION ACTIVITIES TO EXISTING INFRASTRUCTURE WITHIN THE PROJECT AREA SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE PROJECT MANAGER AT NO ADDITIONAL COST TO THE OWNER.
7. UNLESS OTHERWISE NOTED, THE CONTRACTOR SHALL RESTORE DISTURBED AREAS TO THE ORIGINAL CONDITION TO MATCH ADJACENT GRADES AND SHALL REPLACE ANY DISTURBED PAVED OR GRASSED AREAS OF ANY KIND.
8. THE CONTRACTOR SHALL VERIFY ALL HORIZONTAL AND VERTICAL CONTROLS.
9. IN CASE OF DOUBT IN THE INTERPRETATION OF ANY ASPECTS OF THESE DRAWINGS AND/OR SPECIFICATIONS, THE CONSTRUCTION MANAGER SHALL BE CONSULTED.
10. THE CONTRACTOR IS RESPONSIBLE TO PAY THE COSTS ASSOCIATED TO THE LABORATORY TESTS REQUIRED FOR ALL THE MATERIALS AS PER SPECIFICATIONS AND DURING CONSTRUCTION. THE COSTS INCLUDES SAMPLES, TRANSPORTATION, TECHNICAL SUPPORT, TESTS, LABORATORY EXPENSES, AND OTHERS.
11. THE CONTRACTOR SHALL PROVIDE A MAINTENANCE OF TRAFFIC (MOT) PLAN FOR ANY OFFSITE WORKS INCLUDED IN THIS PROJECT THAT MAY AFFECT VEHICULAR AND/OR PEDESTRIAN TRAFFIC.
12. SPECIFICATIONS FOR ROADWAY DESIGN WILL FOLLOW THE PUERTO RICO HIGHWAY AND TRANSPORTATION AUTHORITY STANDARD SPECIFICATIONS PER P.R.A.S.A. SPECIFICATIONS.

# SURVEY NOTES

1. FIELDWORK PERFORMED THRU MAY 29 THRU JULY 12, 2023.
2. HORIZONTAL CONTROLS ARE REFERRED TO NAD 83 (2011) EPOCH 2010.00.
3. VERTICAL DATUM IS REFERRED TO PRVD02.
4. UNDERGROUND UTILITIES ARE BASED ON ABOVE GROUND EVIDENCE. THIS DRAWING NEITHER DEPICTS NOR INTEND TO DEPICT ALL UNDERGROUND UTILITIES. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES PRIOR TO ANY WORK.
5. PLANIMETRIC MAPPING ENHANCED WITH RECORD AERIAL MAPPING, SHOWN FOR REFERENCE PURPOSES. ONLY INFORMATION COLLECTED ON GROUND SHALL BE USED FOR ENGINEERING DESIGN.

**PRELIMINARY NOT FOR CONSTRUCTION**

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| E | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| D | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| B | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

| | |
|---|---|
| DRAWN BY | AM |
| DESIGNED BY | MVM |
| CHECKED BY | LMR |
| APPR. BY | GN |

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

BR&A LLC PROJECT MANAGEMENT • ARCHITECTURE • CIVIL

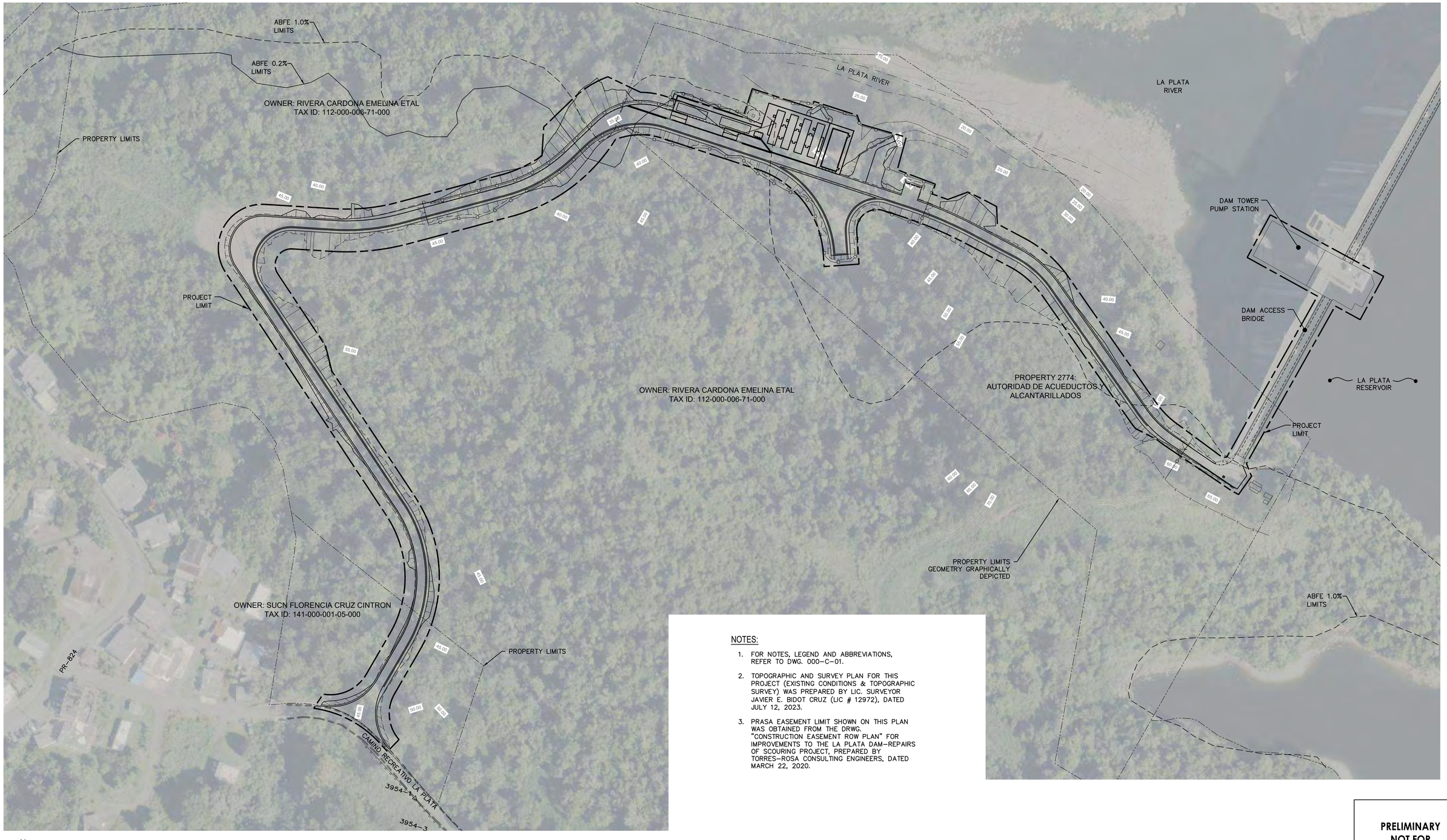
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

LEGEND, GENERAL NOTES AND ABBREVIATIONS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: AS SHOWN
SHEET NO. 06 OF 145
DWG. NO. 000-C-01

2/20/2024 9:36:48 AM
X00-C-01.dwg




NOTES:

1. FOR NOTES, LEGEND AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. TOPOGRAPHIC AND SURVEY PLAN FOR THIS PROJECT (EXISTING CONDITIONS & TOPOGRAPHIC SURVEY) WAS PREPARED BY LIC. SURVEYOR JAVIER E. BIDOT CRUZ (LIC # 12972), DATED JULY 12, 2023.
3. PRASA EASEMENT LIMIT SHOWN ON THIS PLAN WAS OBTAINED FROM THE DRWG. "CONSTRUCTION EASEMENT ROW PLAN" FOR IMPROVEMENTS TO THE LA PLATA DAM-REPAIRS OF SCOURING PROJECT, PREPARED BY TORRES-ROSA CONSULTING ENGINEERS, DATED MARCH 22, 2020.

N

GENERAL SITE PLAN
SCALE: 1:800

0 5 15 30m
SCALE: 1:800

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| F | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| E | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
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| C | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| B | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

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APPR. BY GN

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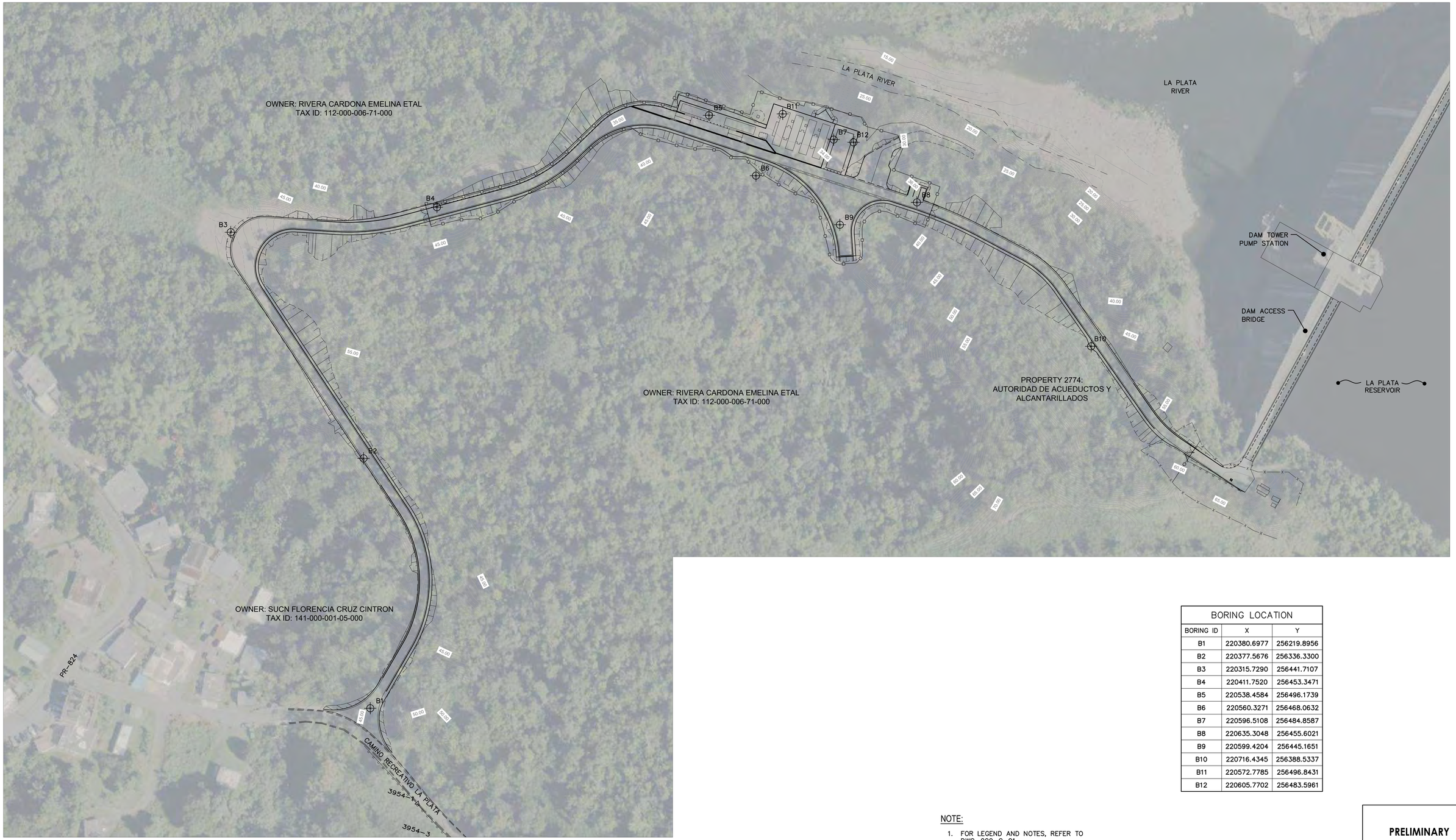
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERAL SITE PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:800
SHEET NO. 07 OF 145
DWG. NO. 010-C-01

010-c-01.dwg 2/20/2024 9:36:53 AM




| BORING LOCATION | | |
|---|---|---|
| BORING ID | X | Y |
| B1 | 220380.6977 | 256219.8956 |
| B2 | 220377.5676 | 256336.3300 |
| B3 | 220315.7290 | 256441.7107 |
| B4 | 220411.7520 | 256453.3471 |
| B5 | 220538.4584 | 256496.1739 |
| B6 | 220560.3271 | 256468.0632 |
| B7 | 220596.5108 | 256484.8587 |
| B8 | 220635.3048 | 256455.6021 |
| B9 | 220599.4204 | 256445.1651 |
| B10 | 220716.4345 | 256388.5337 |
| B11 | 220572.7785 | 256496.8431 |
| B12 | 220605.7702 | 256483.5961 |

NOTE:

1. FOR LEGEND AND NOTES, REFER TO DWG. 000-C-01.

N

## BORINGS LOCATION PLAN

SCALE: 1:800

0 5 15 30m

SCALE: 1:800

**PRELIMINARY NOT FOR CONSTRUCTION**

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|---|---|---|---|---|---|
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| D | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| B | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

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APPR. BY GN

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

BORINGS LOCATION PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

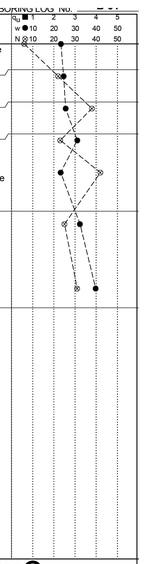
C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:800

SHEET NO. 08 OF 145
DWG. NO. 010-C-02

2/20/2024 9:37:02 AM
010-c-02.dwg

## BORING LOG No. B-01

| DEPTH M FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | 4-2-4 | 6 | (3.0) | 23.3 | | | | Sandy Clay, yellowish brown, trace roots, trace gravel size pockets fragments, medium stiff. Pen. 2.5 |
| | | 5-10-12 | 22 | | 24.6 | | | | Sandy Silt, yellowish brown black veins, black oxidation stains, trace clay pockets, hard. Pen. 3.0 |
| 5 | | 16-16-22 | 38 | | 25.6 | | | | Sandy Silt, yellowish brown, oxidation strains, trace fine sand pockets, very stiff. |
| | | 6-9-14 | 23 | | 31.1 | | | | Sandy silt, yellowish brown black oxidation stains, trace fine sand pockets, very stiff. |
| 10 | | 12-17-25 | 42 | | 23.2 | | | | -same as above, saprolitic structure veins, hard. |
| 15 | | 9-11-14 | 25 | | 32.3 | | | | Sandy Silt, pale yellowish black veins, black oxidation stains, very stiff. 4.5+ |
| 20 | | 14-15-16 | 31 | | 39.7 | | | | -same as above, Pen. 3.75 |
| | | | | | | | | | END OF BORING B-01 AT 20.5 FEET DEPTH. |




DATE HOLE STARTED 7-19-23 COMPLETED 7-19-23
ELEVATION TOP OF HOLE 152.10 ft.46.360 M
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station) N 256,215.1 E 220,389.4
NAME OF DRILLER J. NIEVES DRILLING RIG CME-45 DRILL METHOD / SAMPLER SPT-A/
APPROVED PROJECT No. 5900 BORING No. B-01 1 OF 1 SHEETS

$w_n$ WATER CONTENT IN % | $q_u$ ( ) PENETROMETER, TSF
N BLOWS FROM S. P. T. (ASTM D-1586) | LL LIQUID LIMIT IN %
$q_u$ UNCONFIED COMPRESSIVE STRENGTH, TSF | PL PLASTIC LIMIT IN %
▼ WATER TABLE OR PHREATIC LEVEL | PI PLASTICITY INDEX IN %

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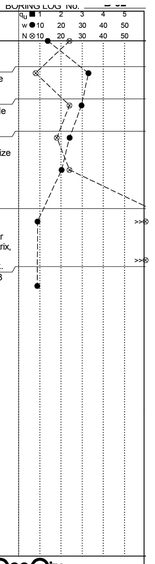
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR

## BORING LOG No. B-02

| DEPTH M FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | 13-15-9 | 24 | | 13.7 | | | | Silty Sand with gravel size rock fragments, brown, angular to subangular, medium dense. |
| | | 2-3-5 | 8 | | 33.0 | | | | Sandy Silt, yellowish brown, trace gravel size rock fragments, medium stiff. |
| 5 | | 3-10-14 | 24 | | 29.7 | | | | Sandy Clay, yellowish brown, pale yellowish brown, angular rock fragments, very stiff. |
| | | 6-8-10 | 18 | | 24.1 | | | | Sandy Silt, pale yellowish brown, pale gray pockets, trace gravel size rock fragments, very stiff. |
| 10 | | 8-10-14 | 24 | | 20.3 | | | | -as above, very stiff. |
| 15 | | 30-45-30 | 75 | | 8.9 | | | | Weathered Rock sampled as gravel size angular to subangular rock fragments on silty sand matrix, very dense. |
| | | 50/4" | 100 | | | | | | -same as above, weathered rock. |
| | | | | | 8.8 | | | | END OF BORING B-02 AT 17.33 FEET DEPTH. |




DATE HOLE STARTED 7-20-23 COMPLETED 7-20-23
ELEVATION TOP OF HOLE 136.60 ft.41.635 M
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station) N 256,336.3 E 220,377.6
NAME OF DRILLER J. NIEVES DRILLING RIG CME-45 DRILL METHOD / SAMPLER SPT-A/
APPROVED PROJECT No. 5900 BORING No. B-02 1 OF 1 SHEETS

$w_n$ WATER CONTENT IN % | $q_u$ ( ) PENETROMETER, TSF
N BLOWS FROM S. P. T. (ASTM D-1586) | LL LIQUID LIMIT IN %
$q_u$ UNCONFIED COMPRESSIVE STRENGTH, TSF | PL PLASTIC LIMIT IN %
▼ WATER TABLE OR PHREATIC LEVEL | PI PLASTICITY INDEX IN %

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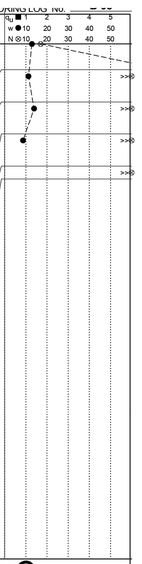
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR

## BORING LOG No. B-03

| DEPTH M FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | 5-13-17 | 17 | | 12.9 | | | | Silty Sand, yellowish brown, fine to medium grained, some sandy silt pockets, medium dense. |
| | | 24-40-50 | 90 | | 11.2 | | | | Silty Sand with gravel size angular to subangular rock fragments, yellow brown, very dense. |
| 5 | | 29-50-35/1" | 100 | | 13.9 | | | | Weathered rock sampled as gravel size angular to subangular rock fragments on silty sand matrix, Very dense. |
| | | 50/5" | 100 | | 8.6 | | | | Silty Sand with gravel size rock fragments, pale yellow brown, angular to subangular, very dense. |
| 10 | | 50/1" | 100 | | | | | | No Recover possible, Rock or hard formation could not drill deeper. |
| | | | | | | | | | END OF BORING B-03 AT 10.08 FEET DEPTH. |




DATE HOLE STARTED COMPLETED
ELEVATION TOP OF HOLE 173.28 ft.52.817 M
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station) N 256,444.0 E 220,307.4
NAME OF DRILLER J. NIEVES DRILLING RIG CME-55 DRILL METHOD / SAMPLER /
APPROVED PROJECT No. 5900 BORING No. B-03 1 OF 1 SHEETS

$w_n$ WATER CONTENT IN % | $q_u$ ( ) PENETROMETER, TSF
N BLOWS FROM S. P. T. (ASTM D-1586) | LL LIQUID LIMIT IN %
$q_u$ UNCONFIED COMPRESSIVE STRENGTH, TSF | PL PLASTIC LIMIT IN %
▼ WATER TABLE OR PHREATIC LEVEL | PI PLASTICITY INDEX IN %

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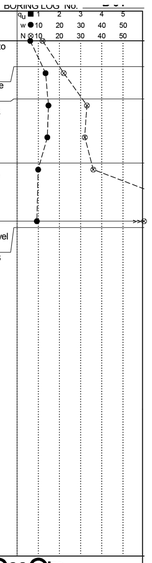
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR

## BORING LOG No. B-04

| DEPTH M FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | 13-7-5 | 12 | | 6.2 | | | | Silty Sand, yellowish brown, fine to medium grained little gravel size angular to subangular rock fragments, medium dense. |
| | | 6-7-15 | 22 | | 13.4 | | | | Sandy Silt, yellowish brown, some gravel size rock fragments, stiff. |
| 5 | | 9-11-22 | 33 | | 14.8 | | | | Sandy Silt, yellowish brown black veins, oxidation stains, trace fine sand pockets, hard. Pen. 3.0 |
| | | 15-15-17 | 32 | | 14.2 | | | | -same as above. |
| 10 | | 16-24-12 | 36 | | 9.9 | | | | Sandy Silt, yellowish brown, pale yellowish brown, trace silty sand pockets, black veins, oxidation stains, hard. |
| | | 35/1" | 100 | | 9.3 | | | | |
| | | | | | | | | | Weathered rock sampled as gravel size rock fragments. |
| | | | | | | | | | END OF BORING B-04 AT 14.08 FEET DEPTH. |




DATE HOLE STARTED 7-20-23 COMPLETED 7-20-23
ELEVATION TOP OF HOLE 133.44 ft.40.671 M
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station) N 256,453.4 E 220,411.8
NAME OF DRILLER J. NIEVES DRILLING RIG CME-45 DRILL METHOD / SAMPLER SPT-A/
APPROVED PROJECT No. 5900 BORING No. B-04 1 OF 1 SHEETS

$w_n$ WATER CONTENT IN % | $q_u$ ( ) PENETROMETER, TSF
N BLOWS FROM S. P. T. (ASTM D-1586) | LL LIQUID LIMIT IN %
$q_u$ UNCONFIED COMPRESSIVE STRENGTH, TSF | PL PLASTIC LIMIT IN %
▼ WATER TABLE OR PHREATIC LEVEL | PI PLASTICITY INDEX IN %

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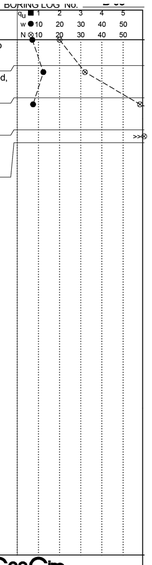
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR

## BORING LOG No. B-05

| DEPTH M FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | 8-10-10 | 20 | | 7.1 | | | | Gravelly Sand, brown, medium to coarse grained angular to subangular, medium dense. |
| | | 6-14-18 | 32 | | 12.3 | | | | Silty Sand, fine to medium grained, with gravel size rock fragments, brown, dense. |
| 5 | | 10-19-39 | 58 | | 7.5 | | | | Silty Sand, reddish brown, with gravel size rock fragments, very dense. |
| | | 50/1" | 100 | | | | | | Weathered Rock sampled as gravel size rock fragments, very dense. |
| 10 | | | | | | | | | Could not drill deeper. |
| | | | | | | | | | END OF BORING B-05 AT 7.58 FEET DEPTH. |




DATE HOLE STARTED 7-20-23 COMPLETED 7-20-23
ELEVATION TOP OF HOLE 107.21 ft.32.679 M
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station) N 256,496.1 E 220,538.5
NAME OF DRILLER J. NIEVES DRILLING RIG CME-45 DRILL METHOD / SAMPLER SPT-A/
APPROVED PROJECT No. 5900 BORING No. B-05 1 OF 1 SHEETS

$w_n$ WATER CONTENT IN % | $q_u$ ( ) PENETROMETER, TSF
N BLOWS FROM S. P. T. (ASTM D-1586) | LL LIQUID LIMIT IN %
$q_u$ UNCONFIED COMPRESSIVE STRENGTH, TSF | PL PLASTIC LIMIT IN %
▼ WATER TABLE OR PHREATIC LEVEL | PI PLASTICITY INDEX IN %

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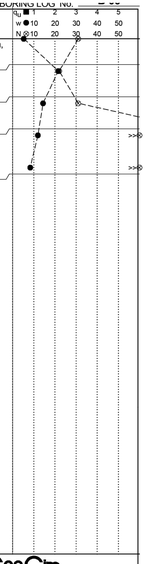
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR

## BORING LOG No. B-06

| DEPTH M FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | 11-15-16 | 31 | | 5.2 | | | | Gravelly Sand, dark grayish brown, medium grained angular _____ dense. |
| | | 7-9-13 | 22 | | 21.5 | | | | Sandy Clay, dark brown, _____ fine grained sand pockets, very stiff. |
| 5 | | 12-14-17 | 31 | | 14.4 | | | | Silty Sand, purple brown, fine to medium grained trace sandy silt, dense. |
| | | 50/6" | 100 | | 11.9 | | | | Weathered Rock sampled as gravel size rock fragments with sand, very dense. |
| 10 | | 50/5" | 100 | | 8.3 | | | | -same as above, very dense. |
| | | | | | | | | | END OF BORING B-06 AT 10.42 FEET DEPTH. |




DATE HOLE STARTED 7-20-23 COMPLETED 7-20-23
ELEVATION TOP OF HOLE 127.34 ft.38.813 M
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station) N 256,468.0 E 220,560.3
NAME OF DRILLER Carlos Calderón DRILLING RIG CME-55 DRILL METHOD / SAMPLER SPT-A/
APPROVED PROJECT No. 5900 BORING No. B-06 1 OF 1 SHEETS

$w_n$ WATER CONTENT IN % | $q_u$ ( ) PENETROMETER, TSF
N BLOWS FROM S. P. T. (ASTM D-1586) | LL LIQUID LIMIT IN %
$q_u$ UNCONFIED COMPRESSIVE STRENGTH, TSF | PL PLASTIC LIMIT IN %
▼ WATER TABLE OR PHREATIC LEVEL | PI PLASTICITY INDEX IN %

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RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR

# BORINGS LOGS

SCALE: NTS

NOTE:

1. FOR LEGEND AND NOTES, REFER TO DWG. 000–C–01.

0 5 15 30m

SCALE: 1:800

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| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

DRAWN BY AM
DESIGNED BY MVM
CHECKED BY LMR
APPR. BY GN

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

BR&A LLC
PROJECT MANAGEMENT / ENGINEERING / CONSULTING

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

BORING LOGS - I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:800

SHEET NO. 09 OF 145
DWG. NO. 010-C-03

2/20/2024 9:37:28 AM
010-C-03-4.dwg

BORING LOG No. B-07

| DEPTH (FT) | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 2-4-7 | 11 | | 17.4 | | | Clayey Sand, dark brown, some gravel size rock fragments, angular to subangular, medium dense. |
| | 7-6-5 | 11 | | 13.4 | | | -same as above, some oxidation stains, medium dense. |
| 5 | 7-5-3 | 8 | | 14.9 | | | Clayey Sand, dark brown with gravel size rock fragments, oxidation stains, brown. |
| | 2-3-2 | 5 | | 14.9 | | | -same as above, _________ . |
| 10 | 3-50/5" | 100 | (2.0) | 19.9 | | | Top: Sandy silt, purple brown, trace silty sand pockets; Bottom: rock fragments. |
| | | | | 4.8 | | | |
| 15 | 50/2" | 100 | | | | | Weathered Rock sampled as gravel size rock fragments, purple brown, very dense. END OF BORING B-07 AT 15.17 FEET DEPTH. |

DATE HOLE STARTED 7-20-23 COMPLETED 7-20-23
ELEVATION TOP OF HOLE 110.46 ft.33.669 M
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station) N 256,484.9 E 220,596.5
NAME OF DRILLER Carlos Calderón DRILLING RIG CME-55 DRILL METHOD / SAMPLER SPT-A/
$w_n$ WATER CONTENT IN % | N BLOWS FROM S. P. T. (ASTM D-1586) | $q_u$ UNCONFIED COMPRESSIVE STRENGTH, TSF | WATER TABLE OR PHREATIC LEVEL | $q_u$ ( ) PENETROMETER, TSF | LL LIQUID LIMIT IN % | PL PLASTIC LIMIT IN % | PI PLASTICITY INDEX IN %
GeoCim GEOTECNIA Y CIMIENTOS GEOTECHNICAL TESTING SERVICES AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR
APPROVED | PROJECT No. 5900 | 1 OF 1 SHEETS | BORING No. B-07

BORING LOG No. B-08A

| DEPTH (FT) | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 16-22-32 | 54 | | 10.4 | | | Silty Sand, dark yellowish brown, fine to medium grained, trace rock fragments, very dense. |
| | 40-50/4" | 100 | | 10.7 | | | Silty Sand, dark yellowish brown, fine to medium grained, trace rock fragments, angular, very dense. |
| 5 | 16-33-43 | 76 | | 13.2 | | | -same as above, very dense. |
| | 42-50/5" | 100 | | 11.9 | | | Weathered Rock sampled as gravel size angular to subangular rock fragments on s silty sand matrix, saprolitic status, veins black, oxidation stains, very dense. |
| 10 | 50/5" | 100 | | 6.9 | | | -same as above. |
| 15 | 50/4" | 100 | | 6.7 | | | -same as above. |
| 20 | 50/6" | 100 | | 6.1 | | | Weathered Rock sampled as gravel size angular to subangular rock fragments, dark yellow brown, very dense. END OF BORING B-08A AT 19.5 FEET DEPTH. |

DATE HOLE STARTED 7-19-23 COMPLETED 7-19-23
ELEVATION TOP OF HOLE 116.90 ft.35.630 M
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station) N 256,455.6 E 220,635.3
NAME OF DRILLER Carlos Calderón DRILLING RIG CME-55 DRILL METHOD / SAMPLER SPT-A/
GeoCim GEOTECNIA Y CIMIENTOS GEOTECHNICAL TESTING SERVICES AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR
APPROVED | PROJECT No. 5900 | 1 OF 1 SHEETS | BORING No. B-08A

BORING LOG No. B-08B

| DEPTH (FT) | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 3-3-7 | 10 | | 23.5 | | | Sandy Silt, dark brown, trace fine silty sand pockets, stiff. Pen. 3.0 |
| | 3-3-4 | 7 | | 19.4 | | | Silty Sand, dark brown, fine grained, some sandy silt pockets, loose. |
| 5 | 4-7-11 | 18 | | 27.4 | | | Sandy Clay, dark brown, trace sand pockets, very stiff. Pen. 3.0 |
| | 4-9-9 | 18 | | 26.8 | | | Silty Sand, dark brown ___________, dark yellow ______, with sandy silt pockets, black veins, medium dense. |
| 10 | 3-7-11 | 18 | 3.56 | 31.7 | | | clay, dark brown, dark yellowish brown, very stoff. Pen. 4.0 |
| 15 | 50/3" | 100 | | 7.8 | | | Weathered Rock sampled as gravel size angular to subangular rock fragments, grayish brown, very dense. |
| 20 | 50/3" | 100 | | 7.9 | | | Weathered Rock sampled as gravel size angular to subangular rock fragments on a silty sand matrix, very dense, dark yellow brown. |
| 25 | 50/6" | 100 | | 3.2 | | | -same as above, weathered rock. END OF BORING B-08B AT 24.5 FEET DEPTH. |

DATE HOLE STARTED 7-19-23 COMPLETED 7-19-23
ELEVATION TOP OF HOLE ft.
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station)
NAME OF DRILLER Carlos Calderón DRILLING RIG CME-55 DRILL METHOD / SAMPLER SPT-A/
GeoCim GEOTECNIA Y CIMIENTOS GEOTECHNICAL TESTING SERVICES AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR
APPROVED | PROJECT No. 5900 | 1 OF 1 SHEETS | BORING No. B-08B

BORING LOG No. B-09

| DEPTH (FT) | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 16-50/6" | 100 | | 4.9 | | | Gravel size angular to subangular rock fragments with silty sand, very dense, brown. |
| | 6-6-7 | 13 | | 12.7 | | | Clayey Sand, very dark grayish brown, some gravel size rock fragments, medium dense. |
| 5 | 3-4-6 | 10 | | 11.2 | | | -same as above. |
| | 3-4-5 | 9 | | 10.5 | | | Silty Sand, dark grayish brown, medium to dense grained with gravel size rock fragments, loose. |
| 10 | 5-6-7 | 13 | | 6.4 | | | -same as above, medium dense. |
| 15 | 16-16-6 | 22 | | 7.2 | | | Silty Sand, grayish brown, medium to coarse grained with gravel size rock fragments, medium dense. |
| 20 | 4-5-2 | 7 | | 16.4 | | | -same as above, loose. |
| | 50/2" | 100 | | 3.1 | | | Weathered rock sampled as gravel size angular to subangular rock fragments, very dense. END OF BORING B-09 AT 24.17 FEET DEPTH. |

DATE HOLE STARTED 7-20-23 COMPLETED 7-20-23
ELEVATION TOP OF HOLE 119.00 ft.36.270 M
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station) N 256,445.2 E 220,599.4
NAME OF DRILLER Carlos Calderón DRILLING RIG CME-55 DRILL METHOD / SAMPLER SPT-A/
GeoCim GEOTECNIA Y CIMIENTOS GEOTECHNICAL TESTING SERVICES AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR
APPROVED | PROJECT No. 5900 | 1 OF 1 SHEETS | BORING No. B-09

BORING LOG No. B-10

| DEPTH (FT) | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 3-3-4 | 7 | | 17.3 | | | Gravel size rock fragments on a clayey sand matrix, angular, dark yellowish brown, loose. |
| | 50/6" | 100 | | 4.6 | | | Gravel size angular to subangular rock fragments, grayish brown, very dense. |
| 5 | 6-6-7 | 13 | | 13.9 | | | Sandy Silt, pale brown, trace fine silty sand pockets, stiff. |
| | 10-13-13 | 26 | | 16.3 | | | Silty Sand, very fine grained pale yellowish brown, trace sandy silt pockets, medium dense. |
| 10 | 11-21-35 | 56 | | 12.2 | | | silty Sand, pale yellowish brown, fine to medium grain, trace rock fragments, angular, very dense. |
| 15 | 50/6" | 100 | | 0.0 | | | Weathered Rock sampled as gravel size angular to subangular on a silty sand matrix. |
| 20 | 50/2" | 100 | | 0.0 | | | -same as above. END OF BORING B-10 AT 19.17 FEET DEPTH. |
| 25 | 50/2 | 10 | | | | | |

DATE HOLE STARTED 7-19-23 COMPLETED 7-19-23
ELEVATION TOP OF HOLE 148.24 ft.45.183 M
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station) N 256,389.1 E 220,716.2
NAME OF DRILLER Carlos Calderón DRILLING RIG CME-55 DRILL METHOD / SAMPLER SPT-A/
GeoCim GEOTECNIA Y CIMIENTOS GEOTECHNICAL TESTING SERVICES AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR
APPROVED | PROJECT No. 5900 | 1 OF 1 SHEETS | BORING No. B-10

BORING LOG No. B-11

| DEPTH (FT) | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 3-11-10 | 21 | | 12.7 | | | Topsoil: Dark brown, trace roots, brown, clayey sand, dark brown medium grained medium tan. |
| | 10-15-13 | 28 | | 9.2 | | | Top Sandy Silt, grayish brown, bottom, silty sand, grayish brown, fine to medium grained trace gravel site rock fragments, fill from site. |
| 5 | 6-5-6 | 11 | | 9.7 | | | Silty Sand, dark brown, ocassionally gravelly angular to subangular rock fragments, medium dense. |
| | 25-13-6 | 19 | | 6.3 | | | |
| 10 | 5-3-5 | 8 | | 12.0 | | | Silty Sand, grayish brown fine to medium grained; little gravel size angular rock fragments, medium dense. Clayey Sand, dark grayish brown, medium grained little gravel size angular rock fragments, loose. |
| 15 | 4-7-7 | 14 | | 12.5 | | | -same as above clayey sand, medium dense. |
| 20 | 8-9-19 | 28 | | 10.9 | | | Silty Sand, dark grayish brown, fine to red grained some gravel size rock fragments, angular medium dense. |
| 25 | 7-8-8 | 16 | | 18.7 | | | Sandy Silt, yellowish brown trace fine sand pocket, saprolitic, very stiff. |
| 30 | 8-8-15 | 23 | | 10.4 | | | Sandy Silt, clay yellowish brown, little silty sand, fine grained trace gravel size rock fragments. END OF BORING NO. B-11 AT 30.5 FEET DEPTH. |

DATE HOLE STARTED 8-7-23 COMPLETED 8-7-23
ELEVATION TOP OF HOLE ft.
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station)
NAME OF DRILLER Carlos Calderón DRILLING RIG CME-55 DRILL METHOD / SAMPLER SPT-A/
GeoCim GEOTECNIA Y CIMIENTOS GEOTECHNICAL TESTING SERVICES AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR
APPROVED | PROJECT No. 5900 | 1 OF 1 SHEETS | BORING No. B-11

BORING LOG No. B-12

| DEPTH (FT) | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | 5-13-9 | 22 | | 21.3 | | | Sandy Clay, dark brown dark yellowish brown, some silty sand pockets very stiff. |
| | 11-13-9 | 22 | | 10.7 | | | Sandy Silt, dark brown, trace gravel size angular rock fragments, very stiff. |
| 5 | 5-5-10 | 15 | | 29.4 | | | Clay, dark yellowish brown, sandy clay pockets, very stiff. Pen 4.5+ |
| | 21-50/6" | 100 | | 9.0 | | | Sandy Silt, yellowish brown black mottled, oxidation stains, trace fine gravel size rock fragments hard. |
| 10 | 50/6" | 100 | | 9.1 | | | Weathered rock, silty sand, fine grained, with gravel size angular to subangular rock fragments, yellowish brown hard. |
| 15 | 50/6" | 100 | | 9.5 | | | Weathered rock sampled as: Silty Sand with gravel size angular to subangular rock fragments, very dense. |
| | 50/4" | 100 | | 8.6 | | | -same as above very dense. END OF BORING NO. B-12 AT 19.33 FEET DEPTH. |

DATE HOLE STARTED 8-7-23 COMPLETED 8-7-23
ELEVATION TOP OF HOLE ft.
ELEVATION GROUND WATER ft.
LOCATION (Coordinates or Station)
NAME OF DRILLER Carlos Calderón DRILLING RIG CME-55 DRILL METHOD / SAMPLER SPT-A/
GeoCim GEOTECNIA Y CIMIENTOS GEOTECHNICAL TESTING SERVICES AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968
RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR
APPROVED | PROJECT No. 5900 | 1 OF 1 SHEETS | BORING No. B-12

## BORINGS LOGS
SCALE: NTS

NOTE:
1. FOR LEGEND AND NOTES, REFER TO DWG. 000-C-01.

0 5 15 30m
SCALE: 1:800

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

DRAWN BY AM | DESIGNED BY MVM | CHECKED BY LMR | APPR. BY GN
BR&A LLC
Stantec
B7 Tabonuco Street, Suite 1504 Guaynabo, PR 00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

BORING LOGS - II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000 | PSWID - | DATE: SEPTEMBER / 2023 | SCALE: 1:800
SHEET NO. 10 OF 145
DWG. NO. 010-C-04

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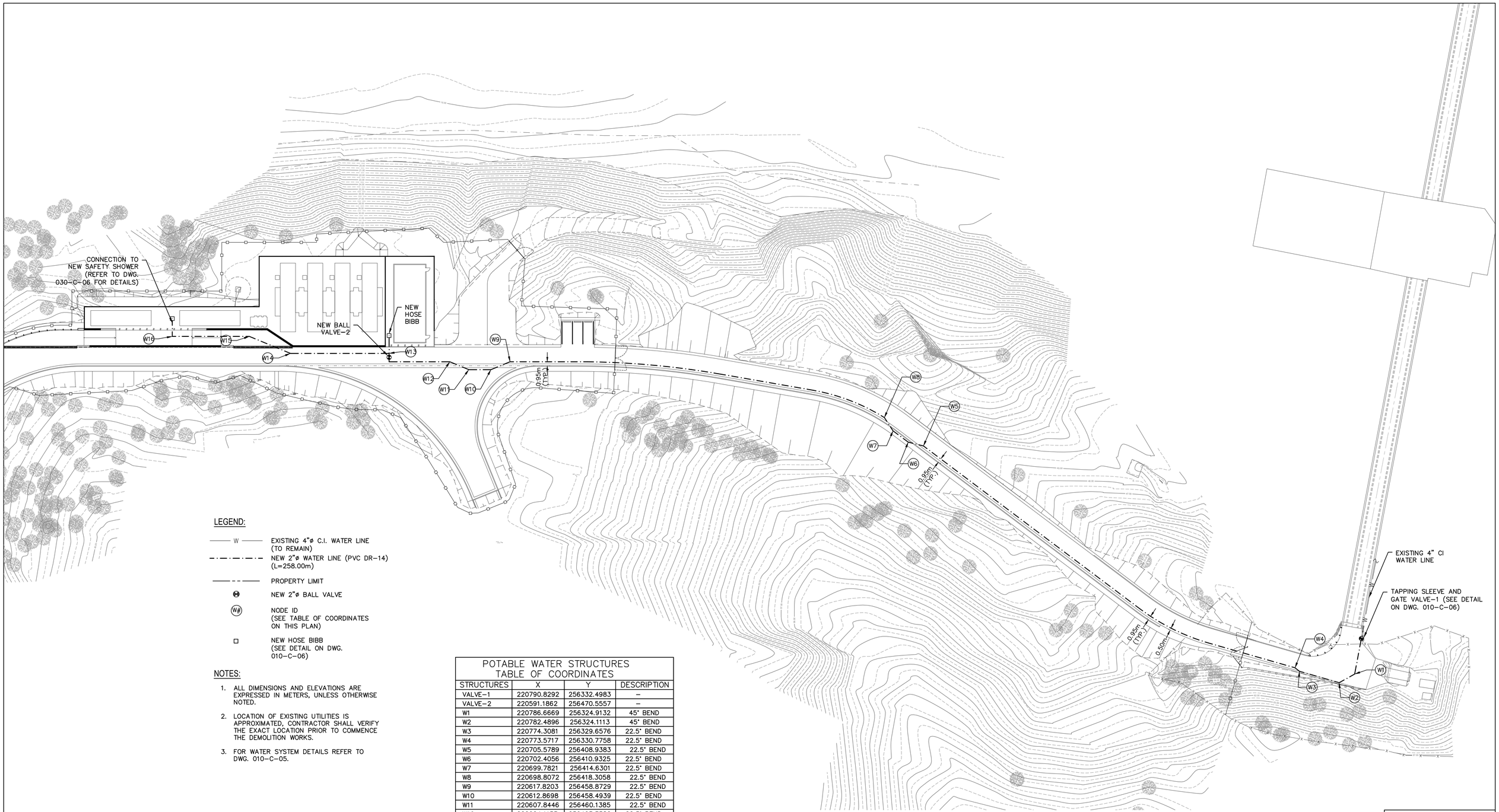


## LEGEND:

| | |
|---|---|
| —— W —— | EXISTING 4"ø C.I. WATER LINE (TO REMAIN) |
| —·—·—·— | NEW 2"ø WATER LINE (PVC DR-14) (L=258.00m) |
| —— - - —— | PROPERTY LIMIT |
| ⊗ | NEW 2"ø BALL VALVE |
| (W#) | NODE ID (SEE TABLE OF COORDINATES ON THIS PLAN) |
| □ | NEW HOSE BIBB (SEE DETAIL ON DWG. 010-C-06) |

## NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE EXPRESSED IN METERS, UNLESS OTHERWISE NOTED.
2. LOCATION OF EXISTING UTILITIES IS APPROXIMATED, CONTRACTOR SHALL VERIFY THE EXACT LOCATION PRIOR TO COMMENCE THE DEMOLITION WORKS.
3. FOR WATER SYSTEM DETAILS REFER TO DWG. 010-C-05.

POTABLE WATER STRUCTURES TABLE OF COORDINATES

| STRUCTURES | X | Y | DESCRIPTION |
|---|---|---|---|
| VALVE-1 | 220790.8292 | 256332.4983 | – |
| VALVE-2 | 220591.1862 | 256470.5557 | – |
| W1 | 220786.6669 | 256324.9132 | 45° BEND |
| W2 | 220782.4896 | 256324.1113 | 45° BEND |
| W3 | 220774.3081 | 256329.6576 | 22.5° BEND |
| W4 | 220773.5717 | 256330.7758 | 22.5° BEND |
| W5 | 220705.5789 | 256408.9383 | 22.5° BEND |
| W6 | 220702.4056 | 256410.9325 | 22.5° BEND |
| W7 | 220699.7821 | 256414.6301 | 22.5° BEND |
| W8 | 220698.8072 | 256418.3058 | 22.5° BEND |
| W9 | 220617.8203 | 256458.8729 | 22.5° BEND |
| W10 | 220612.8698 | 256458.4939 | 22.5° BEND |
| W11 | 220607.8446 | 256460.1385 | 22.5° BEND |
| W12 | 220604.1153 | 256463.3582 | 22.5° BEND |
| W13 | 220590.9314 | 256469.7773 | TEE |
| W14 | 220568.4948 | 256477.1203 | 22.5° BEND |
| W15 | 220560.4209 | 256484.0457 | 22.5° BEND |
| W16 | 220542.8864 | 256489.7824 | 90° BEND |

N

# POTABLE WATER SITE PLAN

SCALE: 1:400

0 5 10 20 30m

SCALE: 1:400

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

DRAWN BY AM
DESIGNED BY MVM
CHECKED BY LMR
APPR. BY GN

BR&A LLC PROJECT MANAGEMENT | ENGINEERING | CONSULTING

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

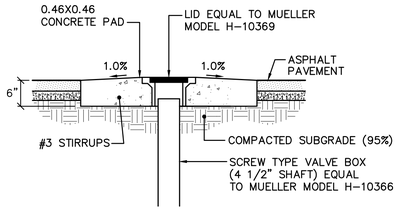
POTABLE WATER SITE PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

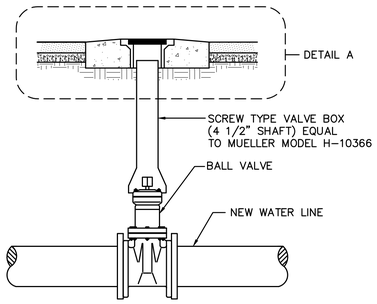
C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:400

SHEET NO. 11 OF 145
DWG. NO. 010-C-05

2/20/2024 9:38:29 AM
010-C-05.dwg

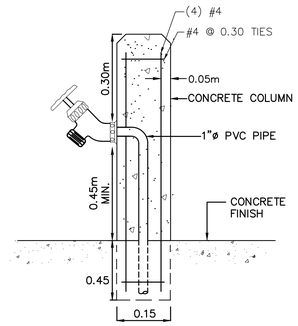



DETAIL A



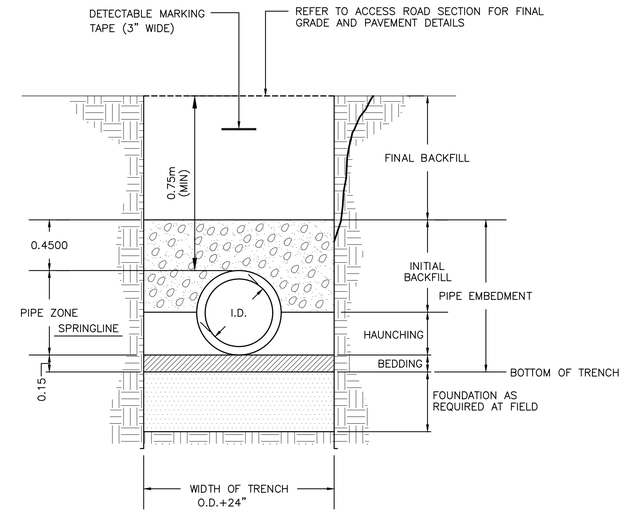

## BALL VALVE DETAIL

SCALE: NTS




## HOSE BIBB DETAIL

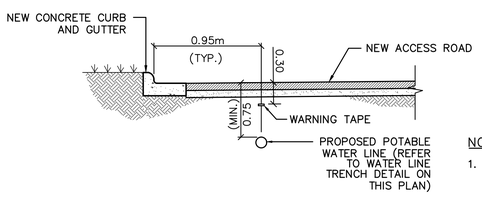
SCALE: NTS




1. REFER TO PRASA SPEC. 15C115 FOR PIPE INSTALLATION AND TRENCH SPECIFICATIONS.

## TRENCH DETAIL FOR P.V.C. PIPE

SCALE: NTS

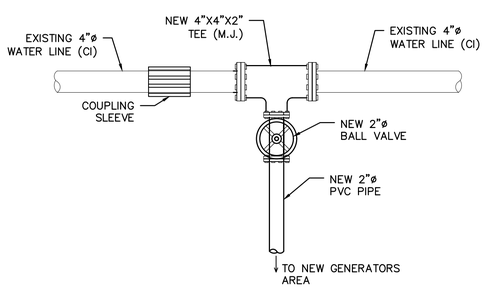



NOTE:

1. TYPICAL DISTANCE PROVIDED FROM CONCRETE CURB TO AVOID CROSSING WITH UNDERGROUND ELECTRICAL LINES AND CONDUITS.

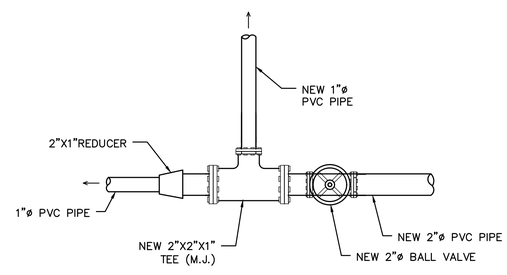
## WATER INSTALLATION DETAIL

SCALE: NTS




## CONECTION TO EXISTING WATER LINE DETAIL

SCALE: NTS




## PIPE TRANSITION DETAIL

SCALE: NTS

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

DRAWN BY AM
DESIGNED BY MVM
CHECKED BY LMR
APPR. BY GN

BR&A LLC

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

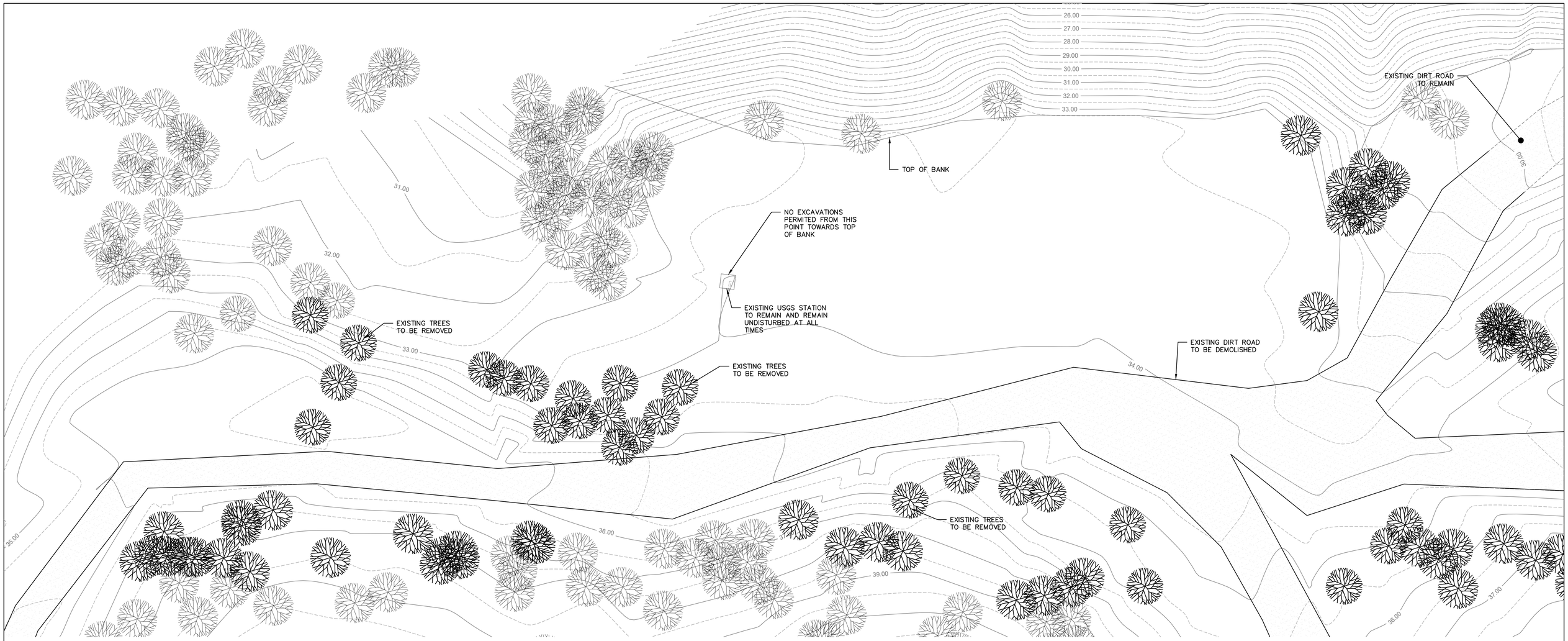
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

POTABLE WATER SYSTEM DETAILS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: AS SHOWN
SHEET NO. 12 OF 145
DWG. NO. 010-C-06

2/20/2024 9:38:58 AM
010-C-06.dwg




N

## EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1:150

NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, SEE DWG. 000–C–01.
2. REFER TO TREE INVENTORY PLANS FOR TREES TO BE REMOVED.
3. ACCESS TO USGS STATION MUST BE PROVIDED AT ALL TIMES DURING CONSTRUCTION.

1 0 1 2 3 4 5

SCALE: 1:150

**PRELIMINARY NOT FOR CONSTRUCTION**

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| E | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| D | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| B | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

DRAWN BY AM
DESIGNED BY MVM
CHECKED BY LMR
APPR. BY GN

BR&A LLC PROJECT MANAGEMENT | ENGINEERING | DESIGN

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - EXISTING CONDITIONS AND DEMOLITION PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:150

SHEET NO. 13 OF 145
DWG. NO. 030-C-01

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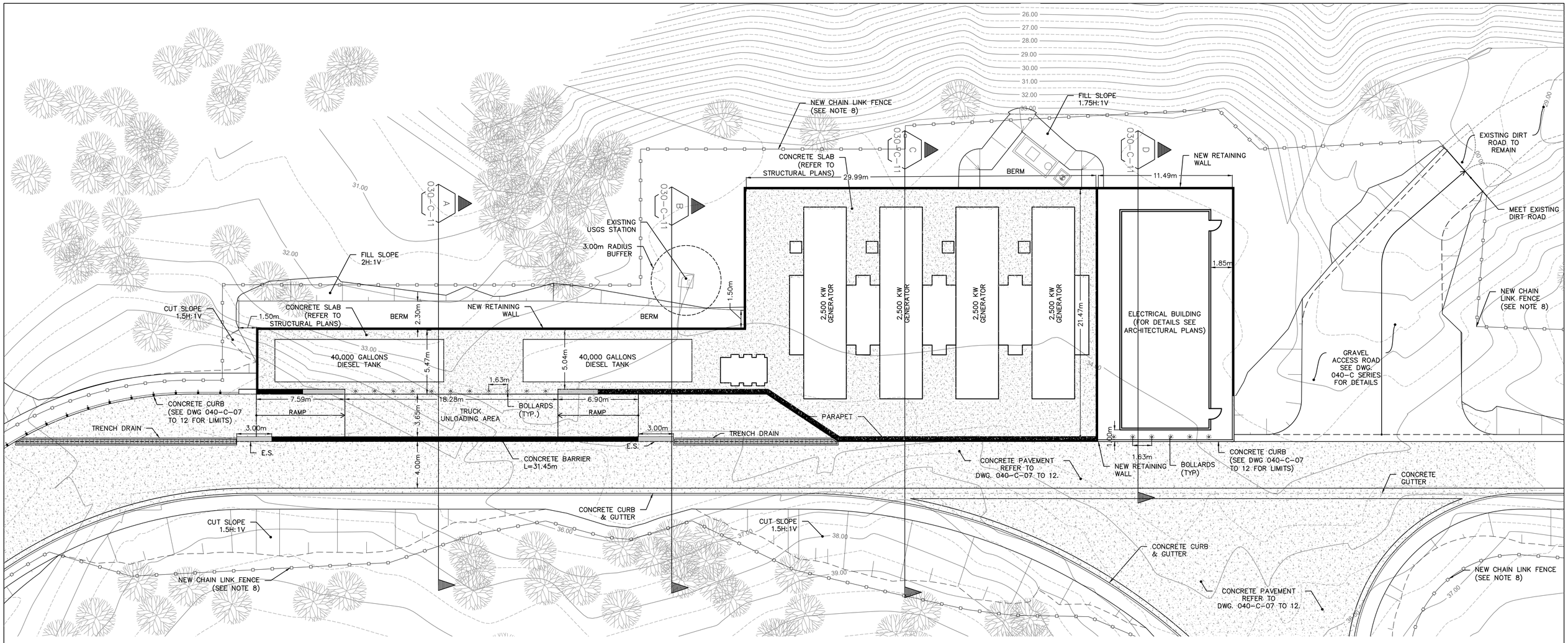


## SITE PLAN

SCALE: 1:150

GENERAL SITE NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS REFER TO DWG. 000-C-01.
2. FOR SECTIONS REFER TO DWG. 03-C-13.
3. REFER TO DWG. 030-C-06 FOR STORM SEWER PLAN.
4. REFER TO MECHANICAL PLANS FOR DIESEL TANK, GENERATOR EQUIPMENT AND DETAILS.
5. REFER TO ELECTRICAL PLANS FOR ELECTRICAL BUILDING DETAILS.
6. REFER TO VERTEX DATA AND COORDINATES TABLES ON DWG. 030-C-03.
7. REFER TO DWG. 030-C-04 FOR PROPOSED GRADING PLAN AND RETAINING WALL TOP OF WALL ELEVATIONS.
8. FOR CHAIN LINK FENCE EXTENTS SEE DWG. 040-C-07 TO 12.

1 0 1 2 3 4 5

SCALE: 1:150

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| F | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| E | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| D | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| C | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| B | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

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00968-3028

BR&A LLC

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - SITE PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
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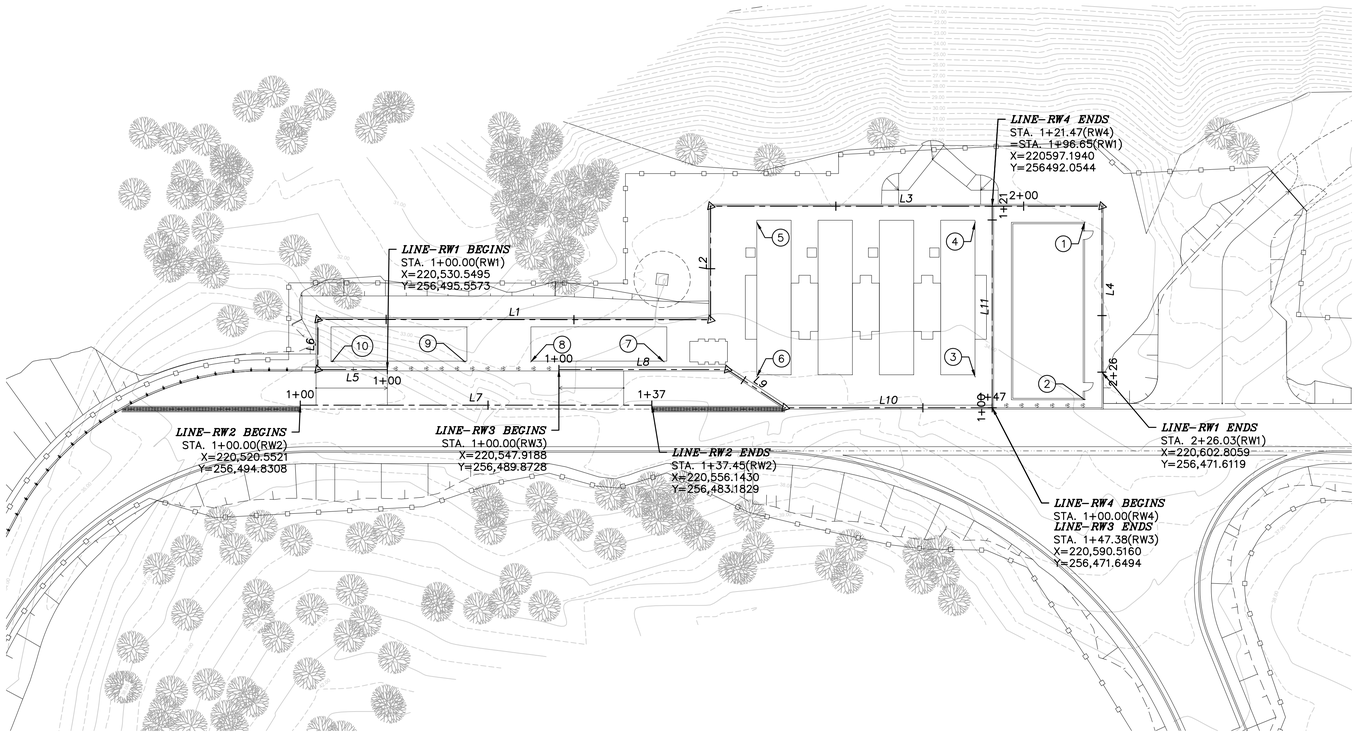


N

## COORDINATES TABLES AND VERTEX DATA

SCALE: 1:300

### LINE-RW1 VERTEX DATA

| LABEL | VERTEX | DIST. | A | R | T | E | L | COORDINATES N | COORDINATES E | BEARING |
|---|---|---|---|---|---|---|---|---|---|---|
| L5 | STA. 1+00.00 | 7.40 | | | | | | 256,495.5572 | 220,530.5497 | N71°52'41"W |
| | STA. 1+07.40 | | | | | | | 256,497.8578 | 220,523.5203 | |
| L6 | STA. 1+07.40 | 5.34 | | | | | | 256,497.8578 | 220,523.5203 | N18°10'32"E |
| | STA. 1+12.73 | | | | | | | 256,502.9273 | 220,525.1847 | |
| L1 | STA. 1+12.73 | 41.83 | | | | | | 256,502.9273 | 220,525.1847 | S71°49'28"E |
| | STA. 1+54.56 | | | | | | | 256,489.8800 | 220,564.9252 | |
| L2 | STA. 1+54.56 | 12.10 | | | | | | 256,489.8800 | 220,564.9252 | N18°07'19"E |
| | STA. 1+66.66 | | | | | | | 256,501.3831 | 220,568.6899 | |
| L3 | STA. 1+66.66 | 41.68 | | | | | | 256,501.3831 | 220,568.6899 | S71°52'41"E |
| | STA. 2+08.35 | | | | | | | 256,488.4178 | 220,608.3061 | |
| L4 | STA. 2+08.35 | 17.68 | | | | | | 256,488.4178 | 220,608.3061 | S18°07'19"W |
| | STA. 2+26.03 | | | | | | | 256,471.6119 | 220,602.8059 | |

### LINE-RW2 VERTEX DATA

| LABEL | VERTEX | DIST. | A | R | T | E | L | COORDINATES N | COORDINATES E | BEARING |
|---|---|---|---|---|---|---|---|---|---|---|
| L7 | STA. 1+00.00 | 37.45 | | | | | | 256,494.8308 | 220,520.5521 | S71°52'41"E |
| | STA. 1+37.45 | | | | | | | 256,483.1829 | 220,556.1430 | |

### LINE-RW3 VERTEX DATA

| LABEL | VERTEX | DIST. | A | R | T | E | L | COORDINATES N | COORDINATES E | BEARING |
|---|---|---|---|---|---|---|---|---|---|---|
| L8 | STA. 1+00.00 | 17.95 | | | | | | 256,489.8728 | 220,547.9188 | S71°52'41"E |
| | STA. 1+17.95 | | | | | | | 256,484.2904 | 220,564.9759 | |
| L9 | STA. 1+17.95 | 7.36 | | | | | | 256,484.2904 | 220,564.9759 | S38°19'32"E |
| | STA. 1+25.31 | | | | | | | 256,478.5135 | 220,569.5424 | |
| L10 | STA. 1+25.31 | 22.07 | | | | | | 256,478.5135 | 220,569.5424 | S71°52'41"E |
| | STA. 1+47.38 | | | | | | | 256,471.6494 | 220,590.5160 | |

### LINE-RW4 VERTEX DATA

| LABEL | VERTEX | DIST. | A | R | T | E | L | COORDINATES N | COORDINATES E | BEARING |
|---|---|---|---|---|---|---|---|---|---|---|
| L11 | STA. 1+00.00 | 21.47 | | | | | | 256,471.6494 | 220,590.5160 | N18°07'19"E |
| | STA. 1+21.47 | | | | | | | 256,492.0544 | 220,597.1940 | |

### TABLE OF COORDINATES

| NOD ID. | X | Y |
|---|---|---|
| 1 | 220606.0166 | 256487.3572 |
| 2 | 220600.1380 | 256469.3947 |
| 3 | 220589.8026 | 256475.3531 |
| 4 | 220594.9220 | 256490.9956 |
| 5 | 220572.8303 | 256498.2256 |
| 6 | 220567.7060 | 256482.5861 |
| 7 | 220558.8002 | 256487.1744 |
| 8 | 220545.3331 | 256491.5818 |
| 9 | 220538.6708 | 256493.7622 |
| 10 | 220525.2037 | 256498.1697 |

LEGEND:

(1) NODE ID (SEE TABLE OF COORDINATES ON THIS PLAN)

NOTE:

1. ALL DIMENSIONS AND ELEVATIONS ARE EXPRESSED IN METERS, UNLESS OTHERWISE NOTED.

2 0 5 10 15m

SCALE: 1:300

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| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - VERTEX DATA TABLES AND COORDINATES

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:150

SHEET NO. 15 OF 145
DWG. NO. 030-C-03

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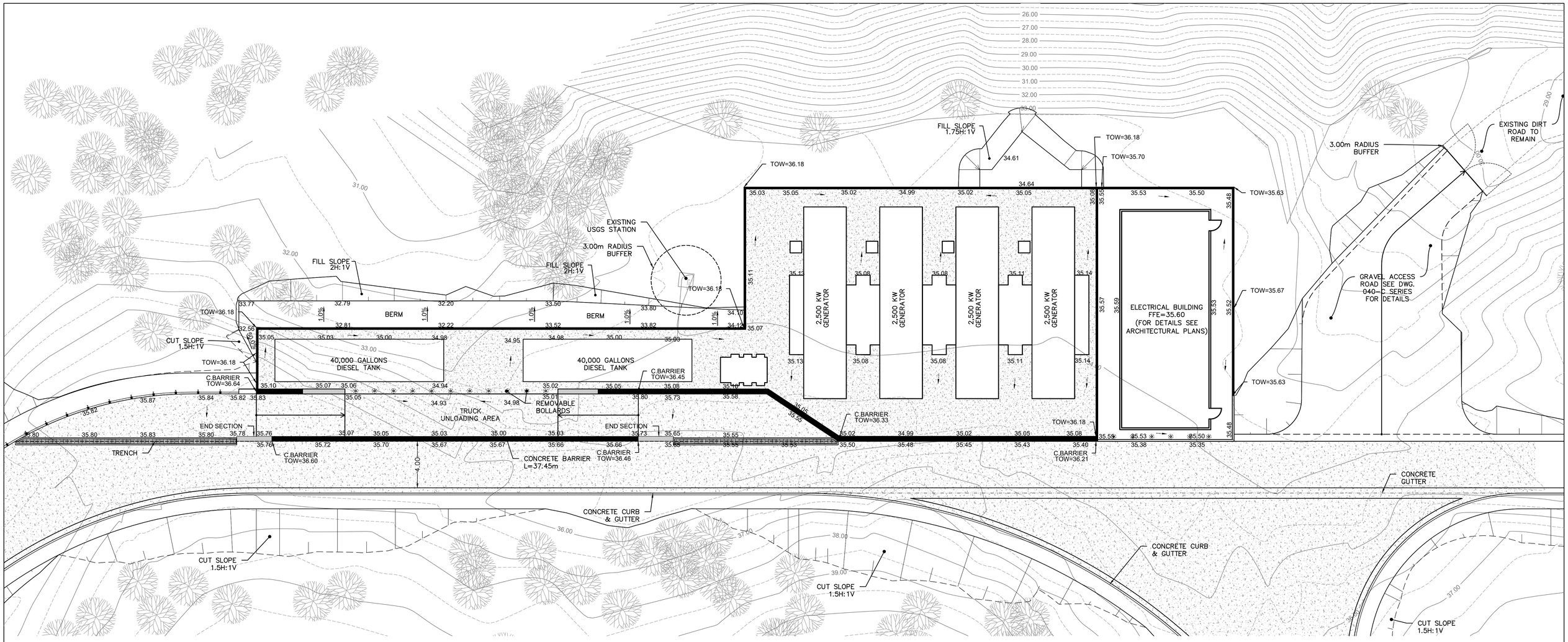


GENERAL NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS REFER TO DWG. 000-C-01.
2. FOR SECTIONS REFER TO DWG. 03-C-13.
3. REFER TO MECHANICAL PLANS FOR DIESEL TANK, GENERATOR EQUIPMENT AND DETAILS.
4. REFER TO ELECTRICAL PLANS FOR ELECTRICAL BUILDING DETAILS.

N

GRADING PLAN
SCALE: 1:150

1 0 1 2 3 4 5
SCALE: 1:150

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - GRADING PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:150

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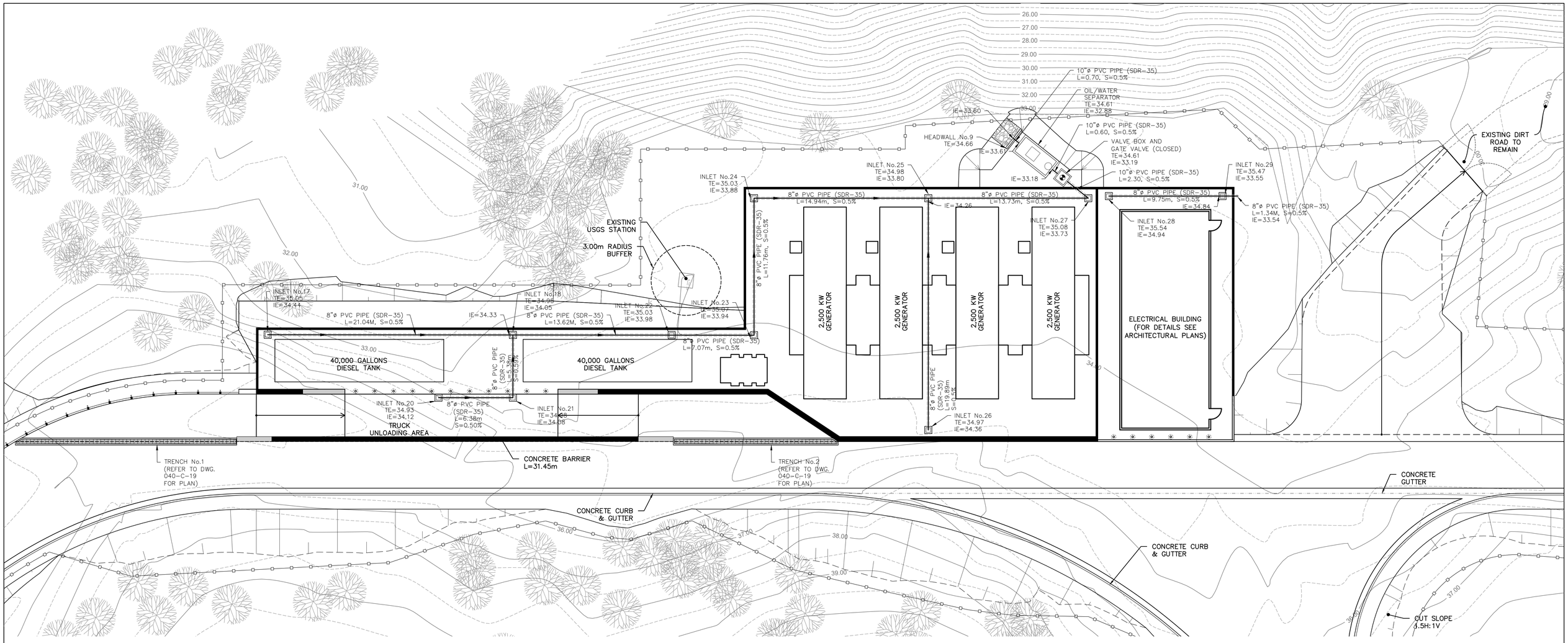


## STORM SEWER SYSTEM PLAN

SCALE: 1:150

GENERAL NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS REFER TO DWG. 000-C-01.
2. FOR SECTIONS REFER TO DWG. 03-C-13.
3. FOR GENERATORS AREA STORM SEWER SYSTEM DETAILS REFER TO DWG. 03-C-07.
4. FOR ACCESS ROAD STORM SEWER PLANS SEE DWGS. 040-C-15 TO 20.
5. REFER TO MECHANICAL PLANS FOR DIESEL TANK, GENERATOR EQUIPMENT AND DETAILS.
6. REFER TO ELECTRICAL PLANS FOR ELECTRICAL BUILDING DETAILS.
7. REFER TO DWGS. 030-C-07 FOR GENERATORS AREA STORM SEWER DETAILS. REFER TO DWG, 030-C-06 FOR STORM SEWER PROFILES.

1 0 1 2 3 4 5

SCALE: 1:150

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| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - STORM SEWER SYSTEM PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:150

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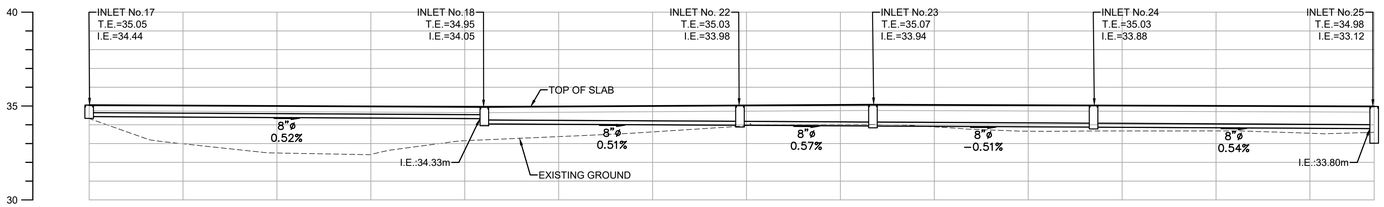


PROFILE LINE FROM INLET No.17 TO INLET No.25
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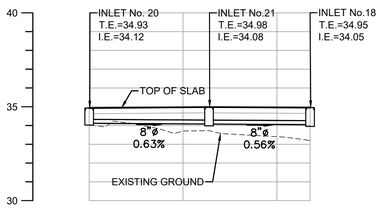
1:150 (V)




PROFILE LINE FROM INLET No.20 TO INLET No.18
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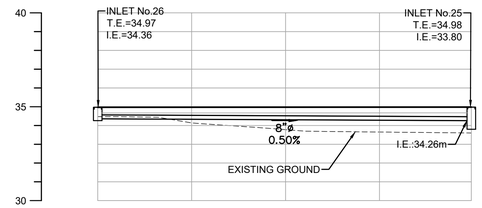


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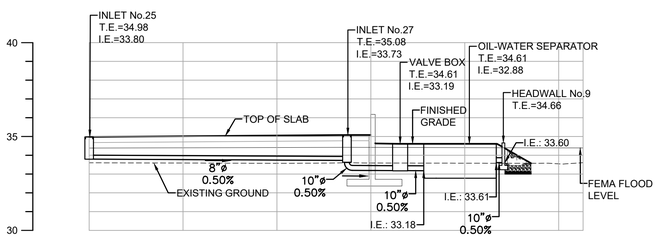


PROFILE LINE FROM INLET No.27 TO HEADWALL No.7
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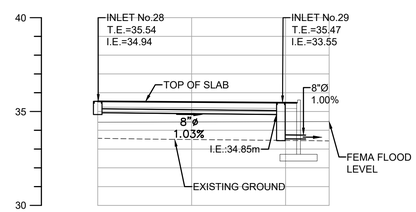


PROFILE LINE FROM INLET No.28 TO INLET No.29
SCALE= 1:150 (H)
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NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS REFER TO DWG. 000-C-01.

## SITE STORM SEWER SYSTEM PROFILES

SCALE: 1:150

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| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - STORM SEWER SYSTEM
PROFILES

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:150

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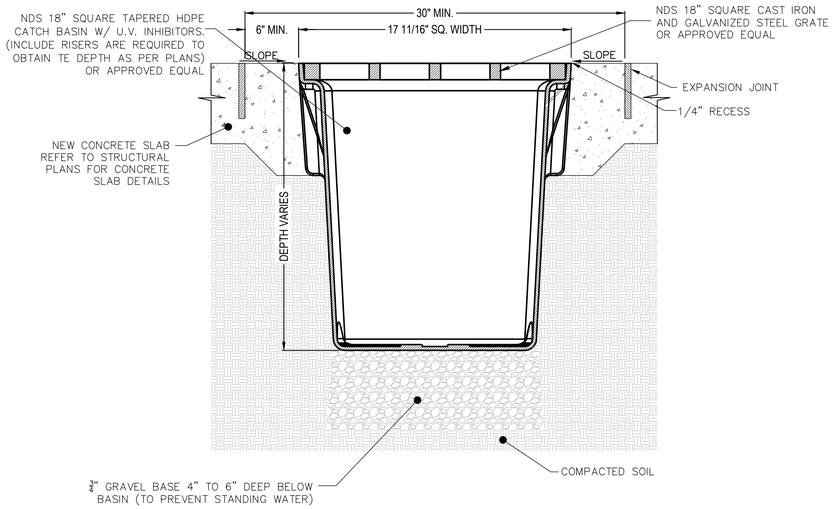



SECTION

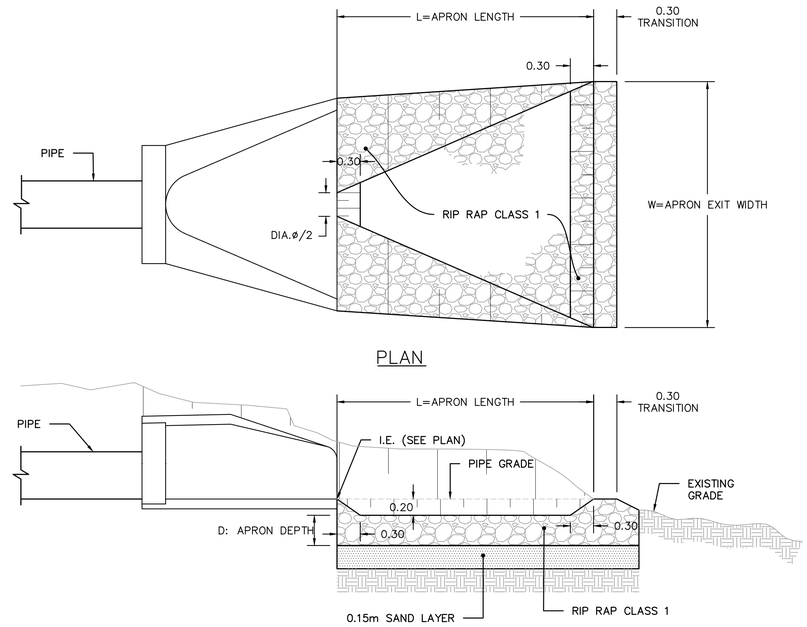
NOTES:

1. GRATE TO BE ATTACHED TO CATCH BASIN WITH SCREW PROVIDED AT TIME OF INSTALLATION.
2. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. ALL INFORMATION CONTAINED HEREIN WAS CURRENT AT THE TIME OF DEVELOPMENT BUT MUST BE REVIEWED AND APPROVED BY THE PRODUCT MANUFACTURER TO BE CONSIDERED ACCURATE.
4. CONTRACTOR SHALL INSTALL RISERS (WHEN REQUIRED) TO OBTAIN THE FINAL CATCH BASIN (INLET) DEPTH AS PER PLANS.

## SQUARE CATCH BASIN DETAILS

SCALE: NTS

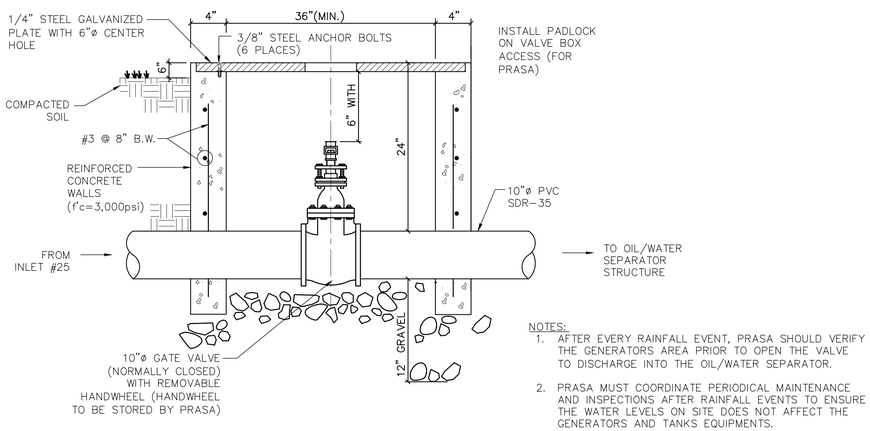
18" SQUARE CATCH BASIN - TYPICAL INSTALLATION FOR VEHICULAR TRAFFIC APPLICATION LOAD CASE C




| TABLE OF DIMENSIONS FOR RIPRAP APRON FOR FLOW SPEEDS EQUAL OR LESS THAN 10 FT/S | | | | |
|---|---|---|---|---|
| RIP RAP CLASS I (D50 = 5") | | | | |
| NO. OF PIPES | DIA. ø | TABLE OF DIMENSIONS | | |
| | | L (m) | D(m) | W(m) |
| 1 | 10" | 1.02 | 0.44 | 0.66 |

## RIPRAP PROTECTION DETAIL

SCALE: NTS

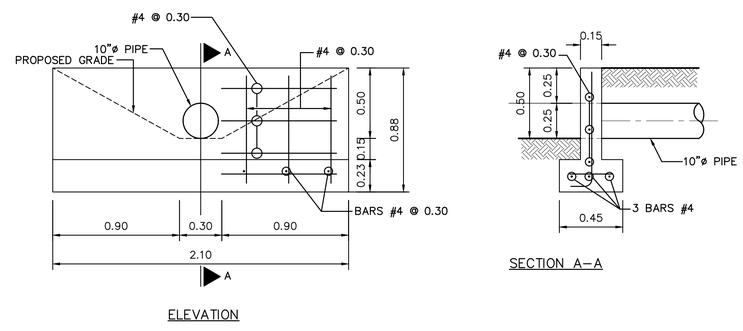



NOTES:

1. AFTER EVERY RAINFALL EVENT, PRASA SHOULD VERIFY THE GENERATORS AREA PRIOR TO OPEN THE VALVE TO DISCHARGE INTO THE OIL/WATER SEPARATOR.
2. PRASA MUST COORDINATE PERIODICAL MAINTENANCE AND INSPECTIONS AFTER RAINFALL EVENTS TO ENSURE THE WATER LEVELS ON SITE DOES NOT AFFECT THE GENERATORS AND TANKS EQUIPMENTS.

## VALVE BOX AND GATE VALVE SECTION

SCALE: NTS




## 10"Ø PIPE HEADWALL DETAILS

SCALE: NTS

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PROJECT MANAGEMENT • ENGINEERING • DESIGN

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

STORM SEWER SYSTEM DETAILS - I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: AS SHOWN

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DWG. NO. 030-C-07

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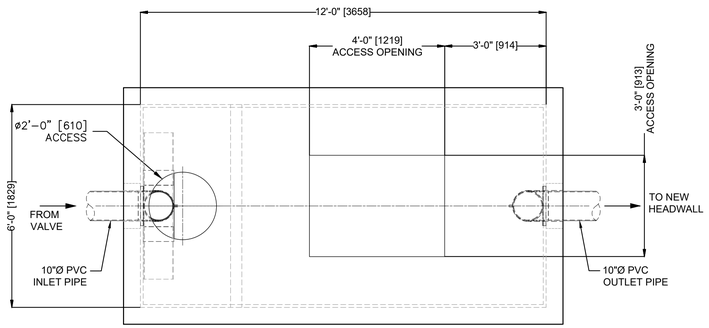
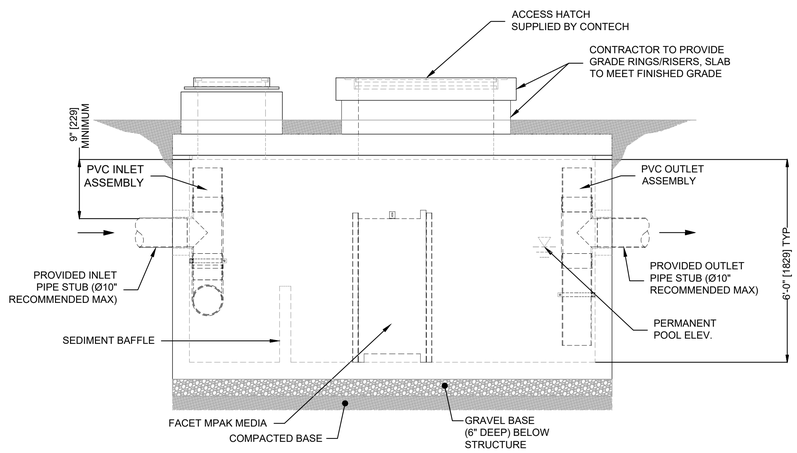
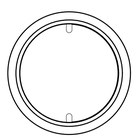


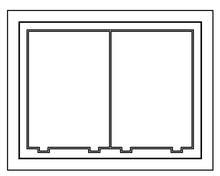

PLAN VIEW




ELEVATION VIEW



24" (610) FRAME
AND COVER



36" x 48" (910 x 1220) ACCESS
HATCH

## OIL/WATER SEPARATOR DETAILS

SCALE: NTS

## DESIGN NOTES

OIL/SEPARATOR SYSTEM VORTCLAREX SYSTEM (VCL60-1) BY CONTECH OR APPROVED EQUAL.

TREATMENT CAPACITY IS 225 GPM [14.19 l/s], OR PER LOCAL REGULATIONS.

THE SYSTEM SHALL REMOVE ESSENTIALLY ALL FREE AND DISPERSED NON-EMULSIFIED OIL FROM THE WATER STREAM AND PRODUCE A DESIRED EFFLUENT BASED ON AN OIL DROPLET TYPICAL OF THE SITE.

THE SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH STOKES LAW AND API BULLETIN NO. 421.

GENERAL NOTES

1. CONTRACTOR TO PROVIDE ALL MATERIALS REQUIRED FOR THE OIL/WATER SEPARATOR CONNECTIONS AS SHOWN ON DETAIL UNLESS NOTED OTHERWISE.
2. CONTRACTOR SHOULD PROVIDE A SUBMITTAL FOR THE OIL/WATER SEPARATOR AS INDICATED ON PLANS OR AN APPROVED EQUAL FOR EVALUATION AND FINAL APPROVAL. ALL CONNECTIONS TO BE PROVIDED AS SHOWN ON DETAILS.
3. SYSTEM WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET AASHTO M306 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION.
5. INLET AND OUTLET PIPES MUST BE PERPENDICULAR TO THE VAULT TO ALLOW CONNECTION WITH PROVIDED PIPE STUBS.
6. FLOW LINE IN AND OUT IS RECOMMENDED TO BE AT THE SAME ELEVATION.
7. ALTERNATE UNITS ARE IN FEET AND MILLIMETERS UNLESS NOTED OTHERWISE.

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED).
2. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
3. CONTRACTOR TO PROVIDE AND INSTALL FERNCO, OR EQUIVALENT, COUPLER TO MATE EXISTING TRUNKLINE TO THE PROVIDED PIPE STUBS. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

STORM SEWER SYSTEM DETAILS - II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: AS SHOWN

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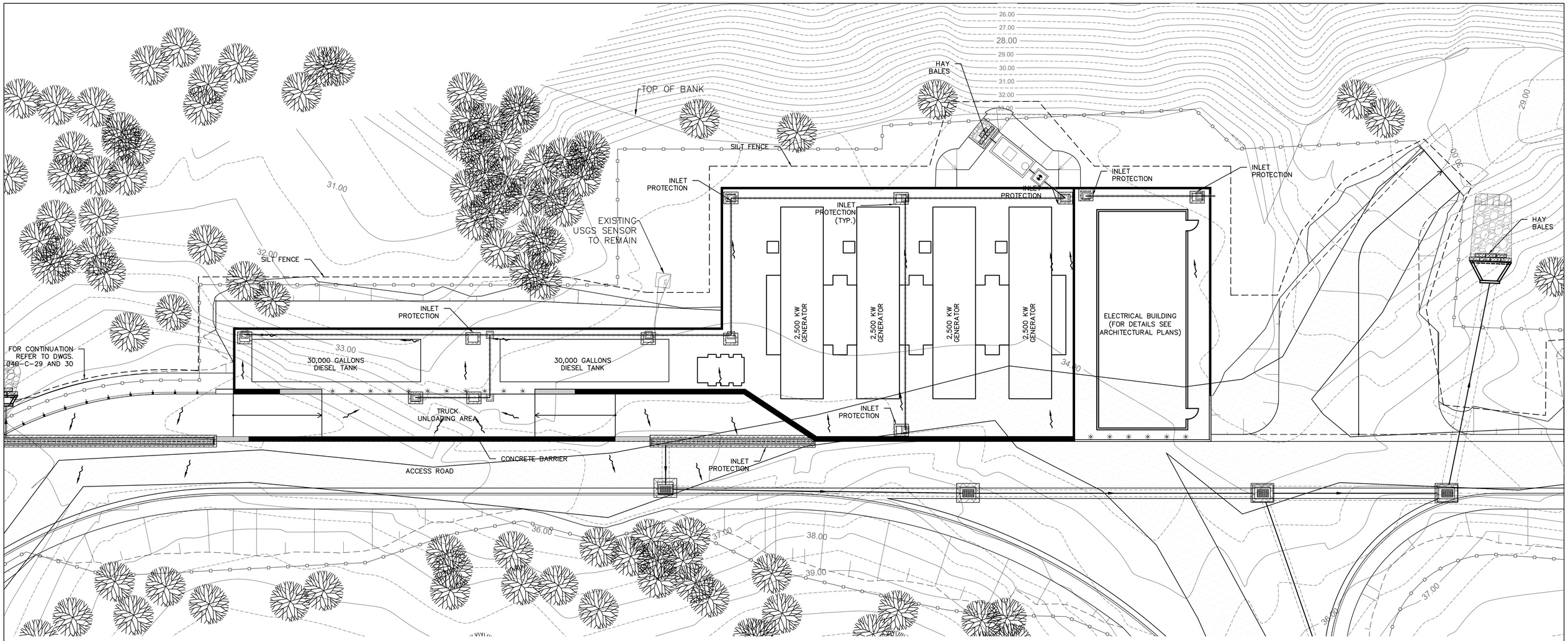


LEGEND:

- INLET PROTECTION
- HAY BALES
- SILT SOCKS
- SILT FENCE
- FLOW DIRECTION
- 3.5 CONTOUR LINES
- ×51.90 EXISTING GRADE

NOTES:

1. ALL DIMENSIONS ARE EXPRESSED IN METERS, UNLESS OTHERWISE NOTED.
2. FOR EROSION AND SEDIMENT CONTROL DETAILS AND NOTES, REFER TO DWG. 030-C-10.
3. ALL EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO COMMENCE WITH ANY DEMOLITION OR EXCAVATION, AND MAINTAINED THROUGHOUT THE DURATION OF THE CONSTRUCTION.
4. TEMPORARY STAGING AREA LOCATION IS SUGGESTED. LOCATION TO BE DETERMINED BY CONTRACTOR. REFER TO DWG. 040-C-29 FOR STAGING AREA LOCATION.
5. REFER TO DWGS. 040-C-29 AND 040-C-30 FOR ACCESS ROAD EROSION AND SEDIMENTATION CONTROL PLAN.

N

## EROSION AND SEDIMENTATION CONTROL PLAN

SCALE: 1:150

1 0 1 2 3 4 5

SCALE: 1:150

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - EROSION AND SEDIMENTATION CONTROL PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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DATE: SEPTEMBER / 2023
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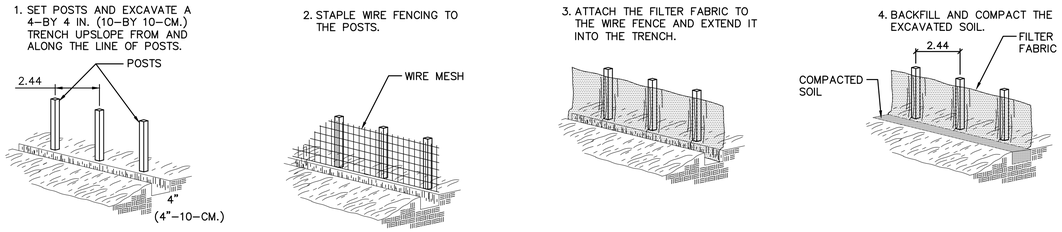


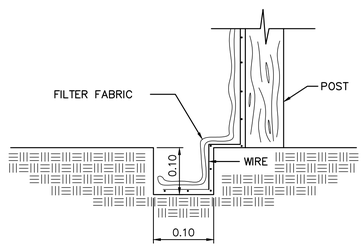


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SILT FENCE INSTALLATION DETAILS
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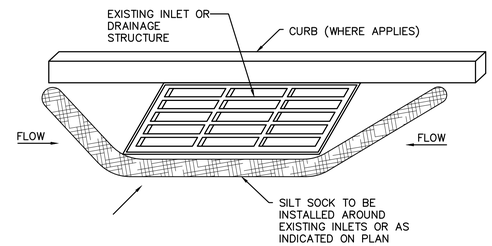


INLET PROTECTIO (SILT SOCK ON INLET) DETAIL
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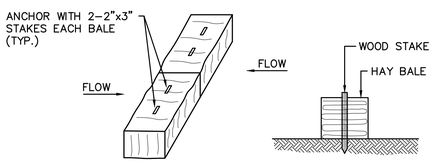


HAY BALE INSTALLATION
SCALE: NTS

EROSION AND SEDIMENTATION CONTROL DETAILS
SCALE: N.T.S.

CES PLAN NOTES

1. THE CONTRACTOR SHALL PROTECT ALL CATCH BASINS, SWALES AND CHANNELS NEAR THE PROJECT AREA THAT COULD BE POTENTIALLY IMPACTED, PRIOR TO START ANY EXCAVATION. ALL MEASURES CAN BE REMOVED WHEN THE LOCAL CONSTRUCTION BE COMPLETED.
2. CONTRACTOR SHALL INSTALL EROSION CONTROL MEASURES IN THE PROJECT AREAS THAT COULD BE POTENTIALLY IMPACTED PRIOR TO START ANY CONSTRUCTION ACTIVITIES IN THAT AREA. THE CONTRACTOR COULD REMOVE THE CONTROL MEASURES WHEN THE AREA IS FULLY STABILIZED AS DETERMINED BY THE CES PLAN INSPECTOR.
3. CONTRACTOR SHALL INSPECT SEDIMENT BARRIERS AFTER EACH RAIN EVENT.REPAIRS SHALL BE DONE AS SOON AS POSSIBLE.SEDIMENT SHALL BE REMOVED FROM THE BARRIERS WHEN THEY REACH HALF THE HEIGHT OF THE BARRIER.
4. THE CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF THE STABILIZED CONSTRUCTION ENTRANCE AS DETAILED ON THIS PLAN.
5. THE CONTRACTOR SHALL MAINTAIN A WATER TANK TRUCK TO SPRAY IT AROUND THE WORKING AREAS WHEN NEEDED OR WHEN THE PROJECT INSPECTOR REQUIRES IT. A WATER HOSE WILL BE INSTALLED NEAR STABILIZED CONSTRUCTION ENTRANCE TO WASH THE CONSTRUCTION VEHICLES WHEELS.
6. THE CONTRACTOR SHALL STRICTLY FOLLOW THE GUIDELINES STATED AT THE CES PLAN APPROVED BY THE ENVIRONMENTAL QUALITY BOARD.
7. THE CONTRACTOR SHALL DISPOSE ALL WASTE MATERIALS AT AN APPROVED LANDFILL.
8. THE CONTRACTOR SHALL RESTORE PAVED AREAS AND RE–SEED GRASS AREAS AS SOON AS POSSIBLE OR AS INSTRUCTED BY THE PROJECT INSPECTOR.
9. ANY MODIFICATION PROPOSAL TO THE CES PLAN SHALL BE CONSULTED WITH THE DESIGNER IN ORDER TO AMEND THE APPROVED PLAN.
10. A SIGN SHALL BE INSTALLED AT EACH PROJECT ENTRANCE AS PER CONSOLIDATED GENERAL PERMIT CONDITION NUMBER 2.
11. CONTRACTOR CAN CHOOSE TO INSTALL DIFFERENT METHODS TO ACHIEVE THE REQUIRED PERFORMANCE.

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - EROSION AND SEDIMENTATION CONTROL DETAILS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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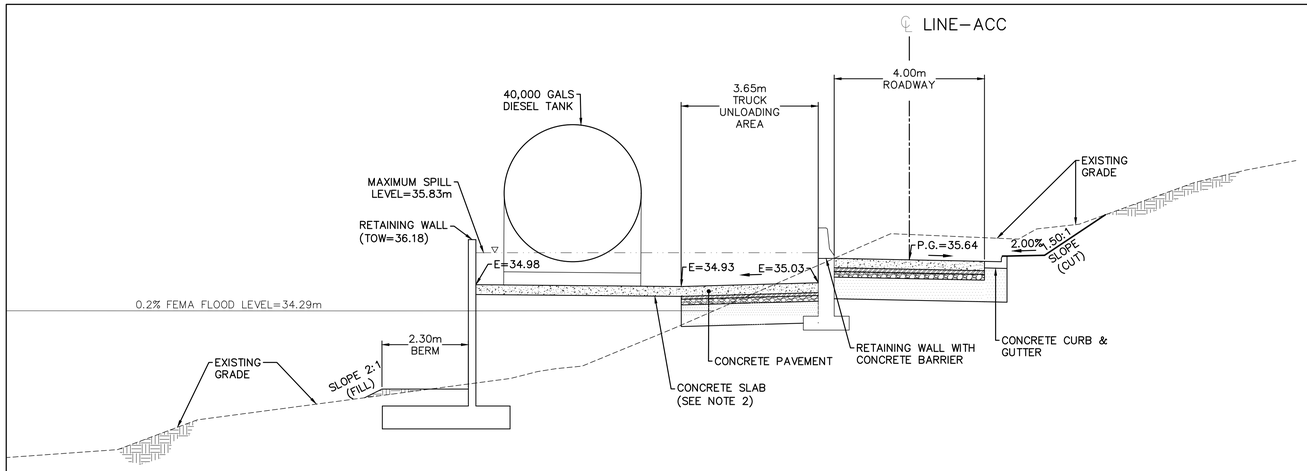


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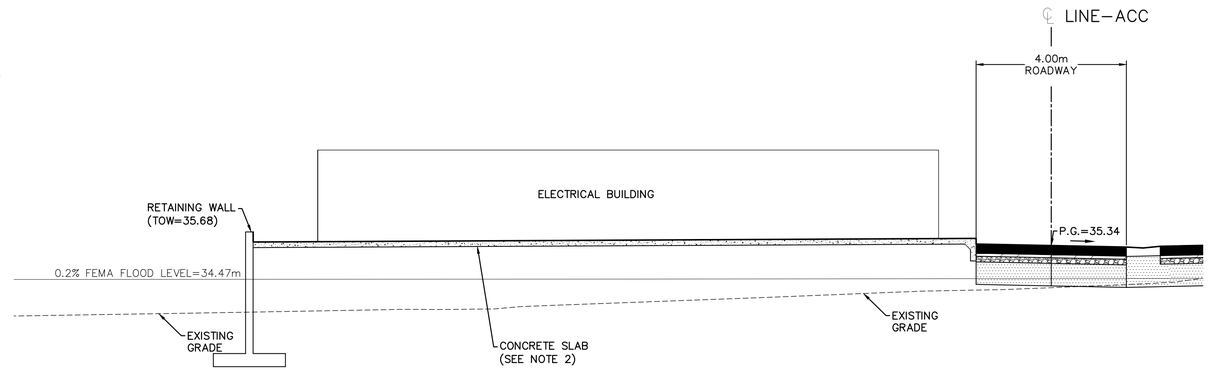


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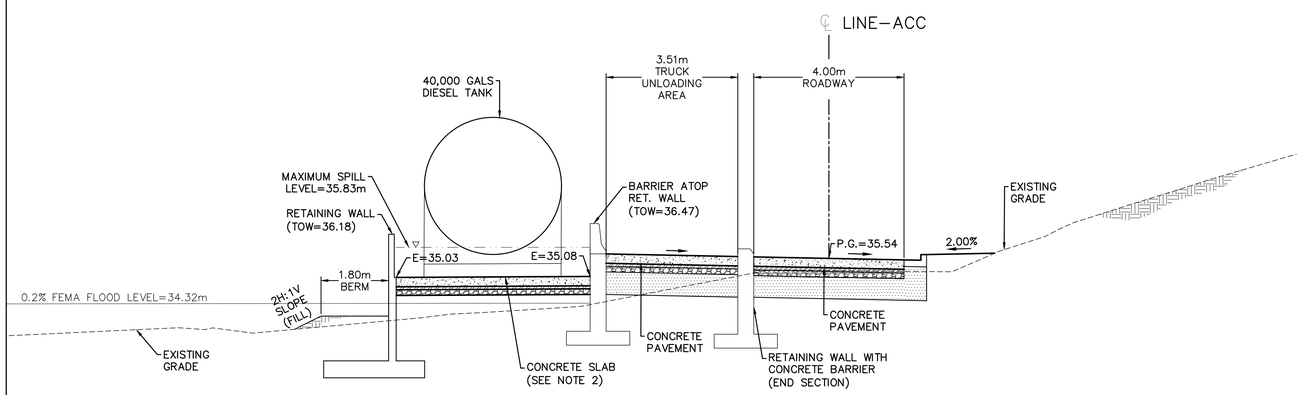


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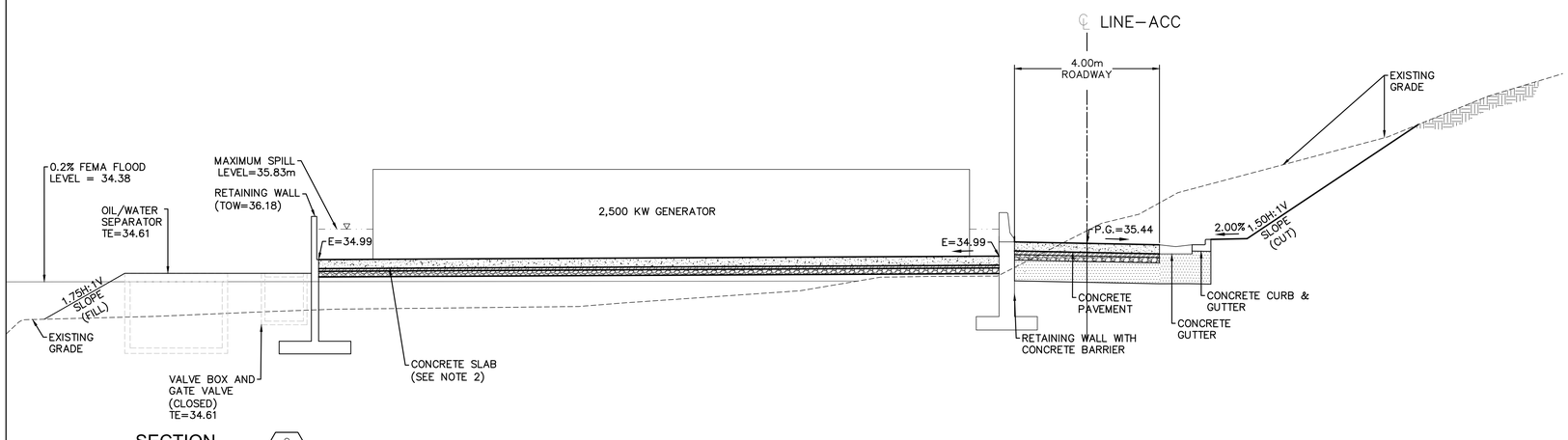


SECTION C
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030–C–02

NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000–C–01.
2. FOR GRADING ELEVATIONS SEE DWG 030–C–04.
3. REFER TO STRUCTURAL PLANS FOR RETAINING WALL AND CONCRETE SLAB DETAILS.

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - TYPICAL SECTIONS

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NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. REFER TO DWG. 040-C-15 TO 04-C20 FOR STORM SEWER SYSTEM PLANS.
3. REFER TO TREE INVENTORY REPORT FOR TREES TO BE REMOVED.

N

ACCESS ROAD -
EXISTING CONDITIONS AND DEMOLITION PLAN
SCALE: 1:200

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SCALE: 1:200

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITION & DEMOLITION PLAN I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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## ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1:200

NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. REFER TO DWG. 040-C-15 TO 04-C20 FOR STORM SEWER SYSTEM PLANS.
3. REFER TO TREE INVENTORY PLAN FOR TREE TO BE REMOVED.

2 0 5 10 15m

SCALE: 1:200

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITION & DEMOLITION PLAN II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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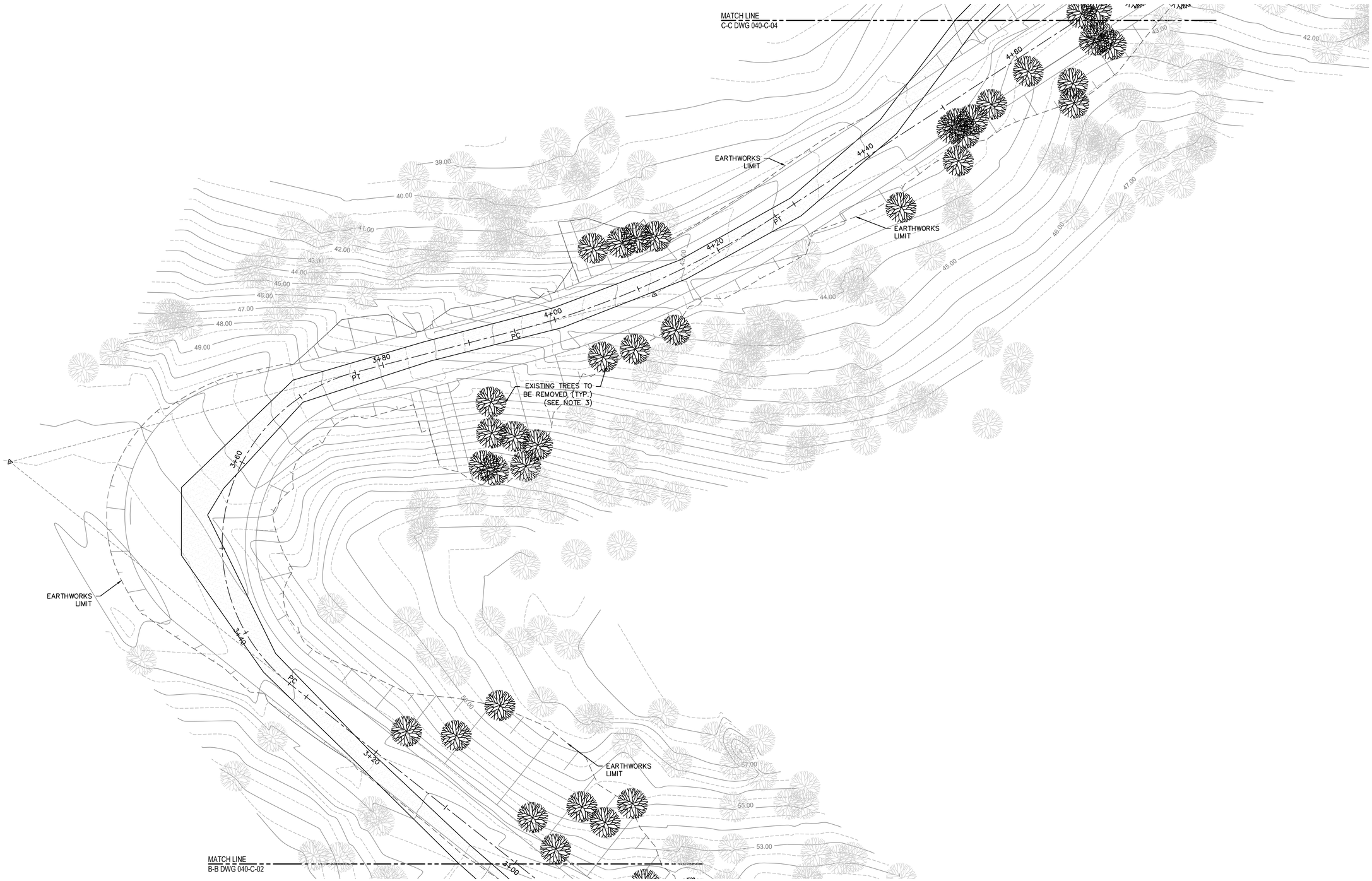


## ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1:200

NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. REFER TO DWG. 040-C-15 TO 04-C20 FOR STORM SEWER SYSTEM PLANS.
3. REFER TO TREE INVENTORY PLAN FOR TREE TO BE REMOVED.

2 0 5 10 15m

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITION & DEMOLITION PLAN III

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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## ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1:200

NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. REFER TO DWG. 040-C-15 TO 04-C20 FOR STORM SEWER SYSTEM PLANS.
3. REFER TO TREE INVENTORY PLAN FOR TREE TO BE REMOVED.

2 0 5 10 15m

SCALE: 1:200

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITION & DEMOLITION PLAN IV

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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## ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1:200

NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. REFER TO DWG. 040-C-15 TO 04-C20 FOR STORM SEWER SYSTEM PLANS.
3. REFER TO TREE INVENTORY PLAN FOR TREE TO BE REMOVED.

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SCALE: 1:200

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITION & DEMOLITION PLAN V

Autoridad de Acueductos y Alcantarillados
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## ACCESS ROAD - EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1:200

NOTE:

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2. REFER TO DWG. 040-C-15 TO 04-C20 FOR STORM SEWER SYSTEM PLANS.
3. REFER TO TREE INVENTORY PLAN FOR TREE TO BE REMOVED.

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Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - EXISTING CONDITION & DEMOLITION PLAN VI

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

SHEET NO. 29 OF 145
DWG. NO. 040-C-06

2/20/2024 9:40:53 AM
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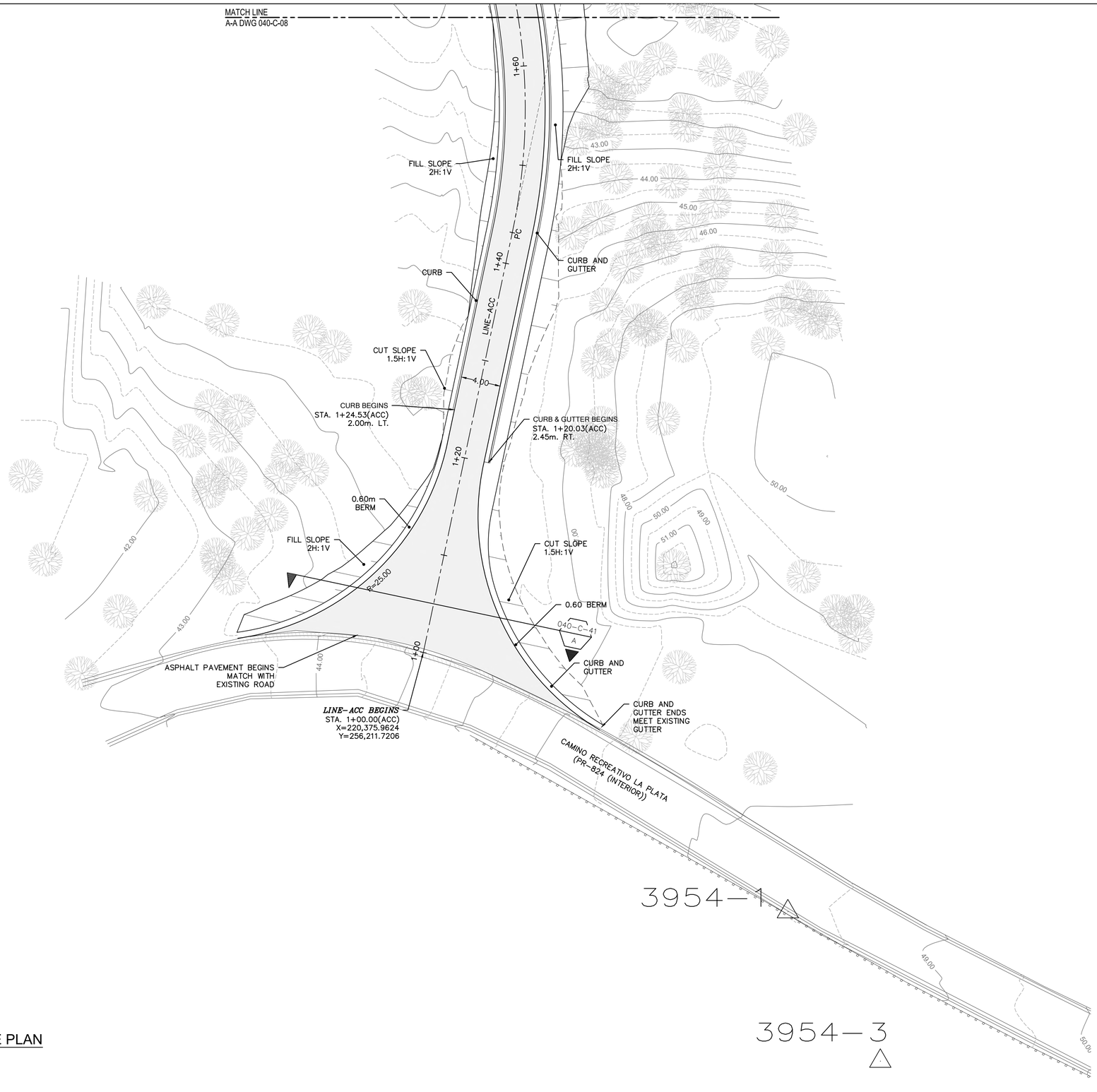


NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. REFER TO DWG. 040-C-40/41-42 FOR SECTIONS AND DETAILS

N

## ACCESS ROAD - SITE PLAN

SCALE: 1:200

2 0 5 10 15m

SCALE: 1:200

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| E | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| D | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| B | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - SITE PLAN I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

SHEET NO. 30 OF 145
DWG. NO. 040-C-07

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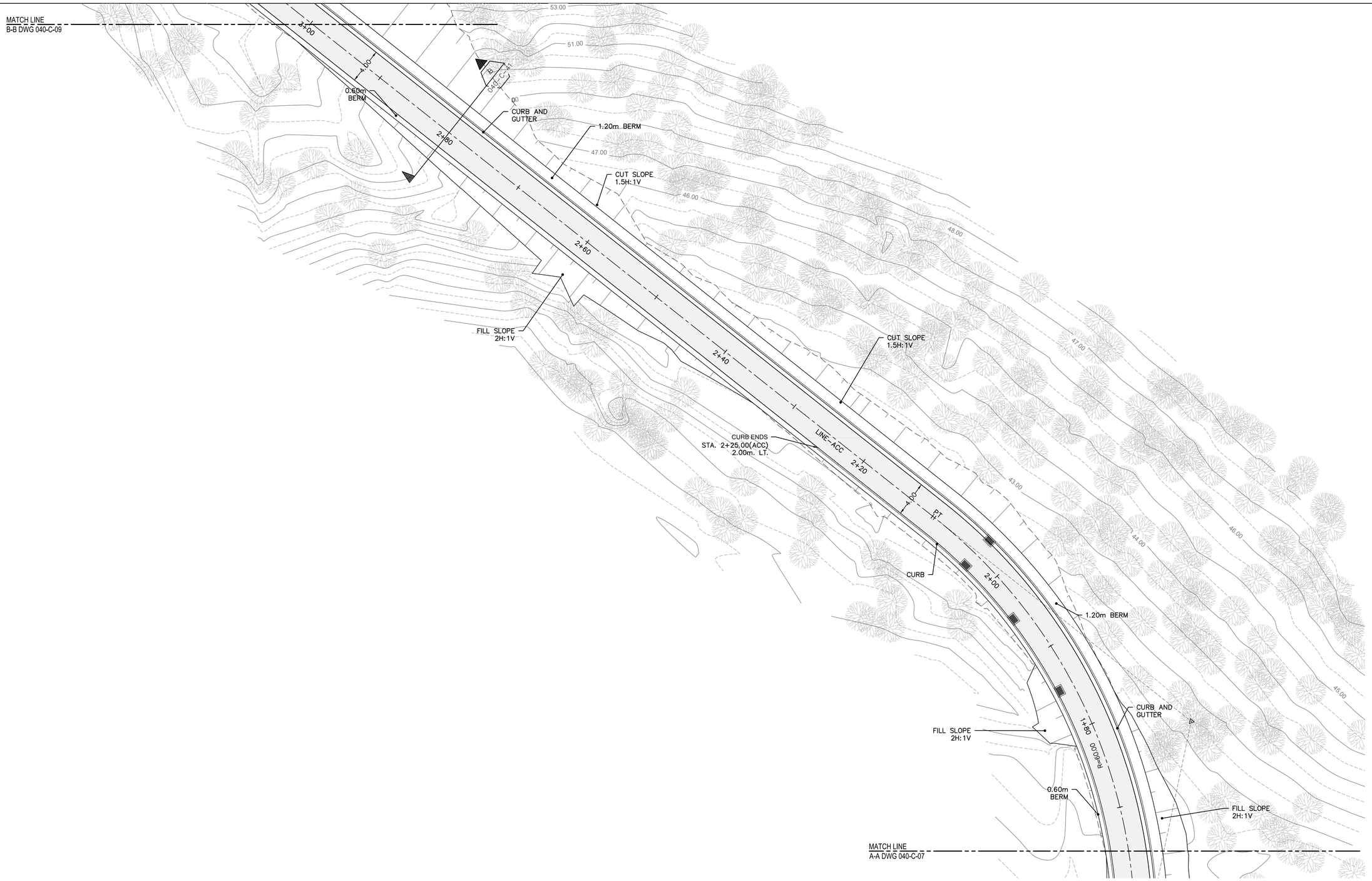


N

## ACCESS ROAD - SITE PLAN

SCALE: 1:200

NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. REFER TO DWG. 040-C-40/41-42 FOR SECTIONS AND DETAILS

2 0 5 10 15m

SCALE: 1:200

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| E | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| D | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| B | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - SITE PLAN II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

SHEET NO. 31 OF 145
DWG. NO. 040-C-08

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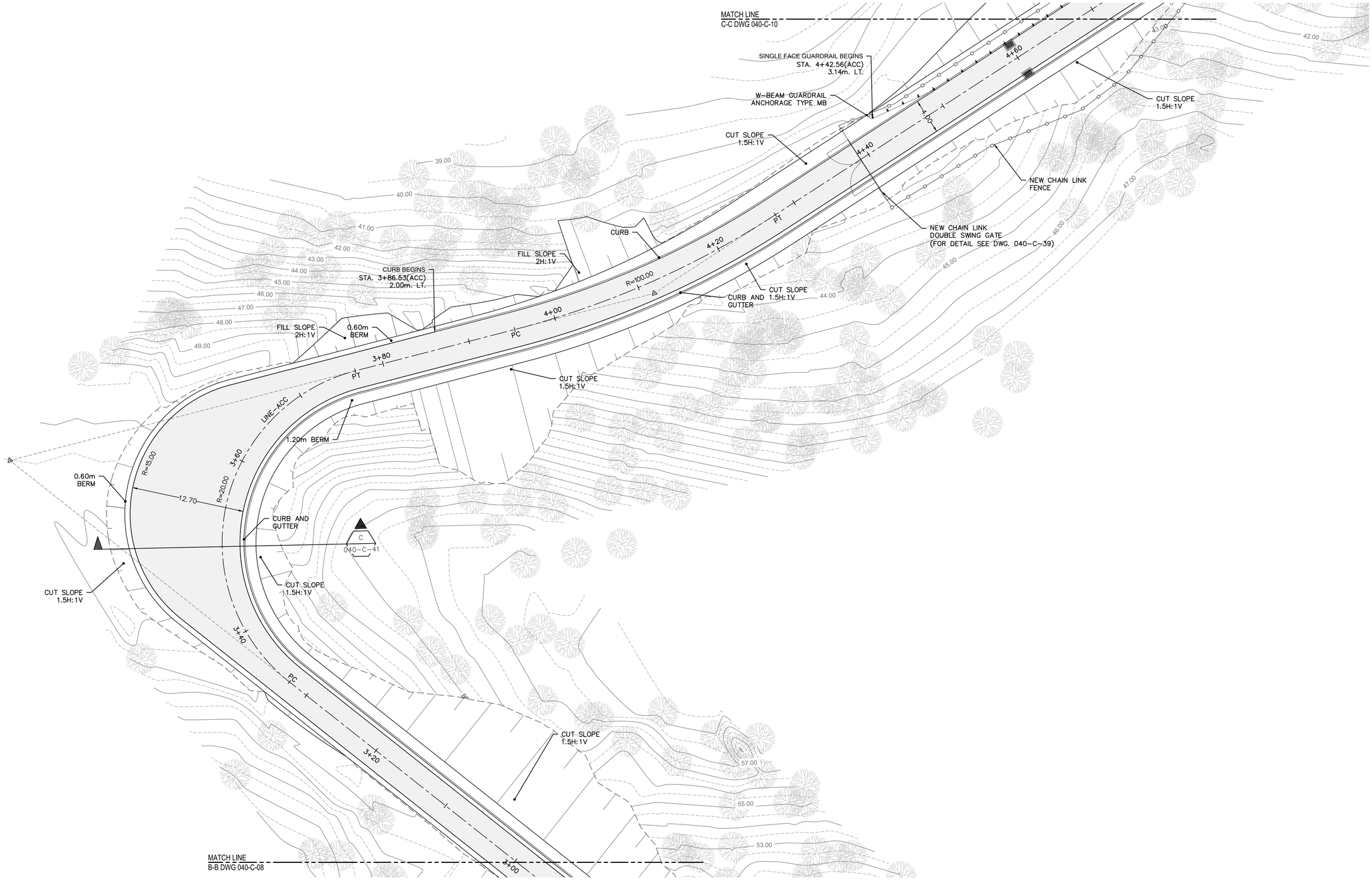


## ACCESS ROAD - SITE PLAN

SCALE: 1:200

NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. REFER TO DWG. 040-C-40/41-42 FOR SECTIONS AND DETAILS
3. FOR GUARDRAIL & TRANSITION BARRIER DETAILS REFER TO PRHTA STANDARD DRAWINGS JUNE 2018 MASH REVISION.

2 0 5 10 15m

SCALE: 1:200

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| E | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| D | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| B | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - SITE PLAN III

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:800

SHEET NO. 32 OF 145
DWG. NO. 040-C-09

2/20/2024 9:41:59 AM
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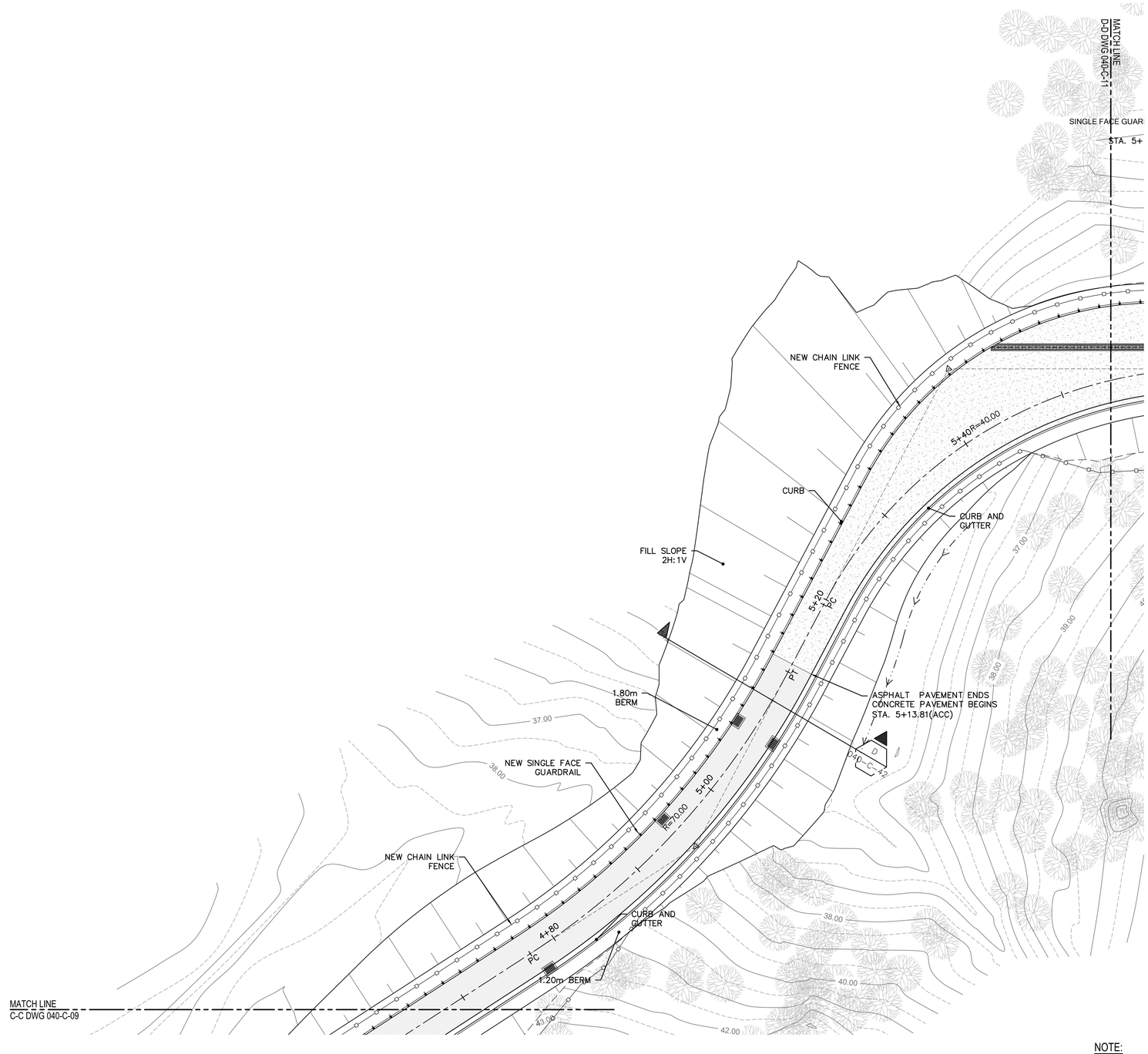


NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. REFER TO DWG. 040-C-40/41-42 FOR SECTIONS AND DETAILS
3. FOR GUARDRAIL & TRANSITION BARRIER DETAILS REFER TO PRHTA STANDARD DRAWINGS JUNE 2018 MASH REVISION.

2 0 5 10 15m

SCALE: 1:200

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## ACCESS ROAD - SITE PLAN

SCALE: 1:200

| NO | DATE | REVISION | BY | CK. | APPR. |
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| D | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| B | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

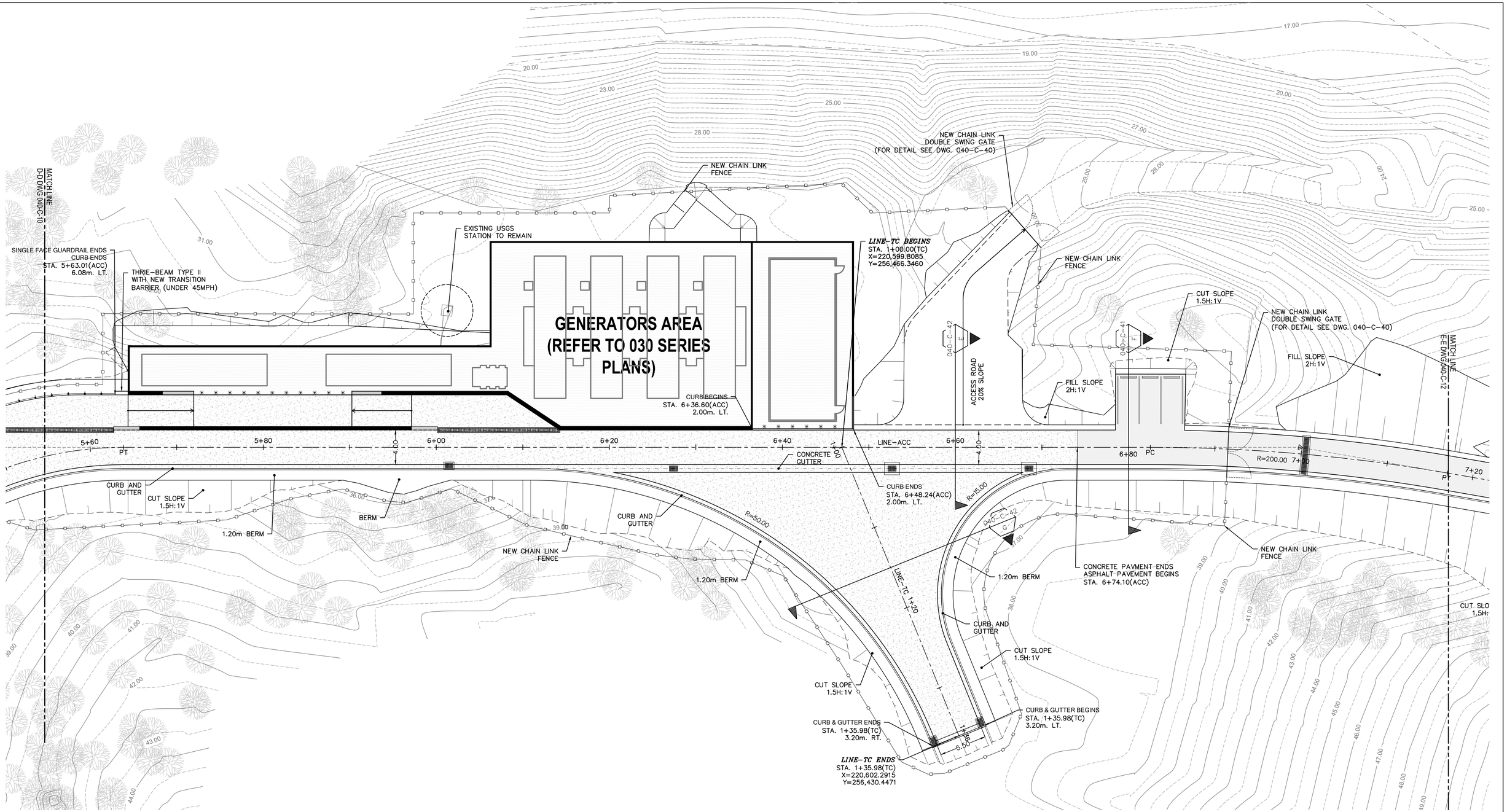
ACCESS ROAD - SITE PLAN IV

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

SHEET NO. 33 OF 145
DWG. NO. 040-C-10

2/20/2024 9:42:24 AM
040-C-07 to 12.dwg




NOTE:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. REFER TO DWG. 040-C-40/41-42 FOR SECTIONS AND DETAILS
3. FOR GUARDRAIL & TRANSITION BARRIER DETAILS REFER TO PRHTA STANDARD DRAWINGS JUNE 2018 MASH REVISION.

2 0 5 10 15m

SCALE: 1:200

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## ACCESS ROAD - SITE PLAN

SCALE: 1:200

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
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| D | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| B | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

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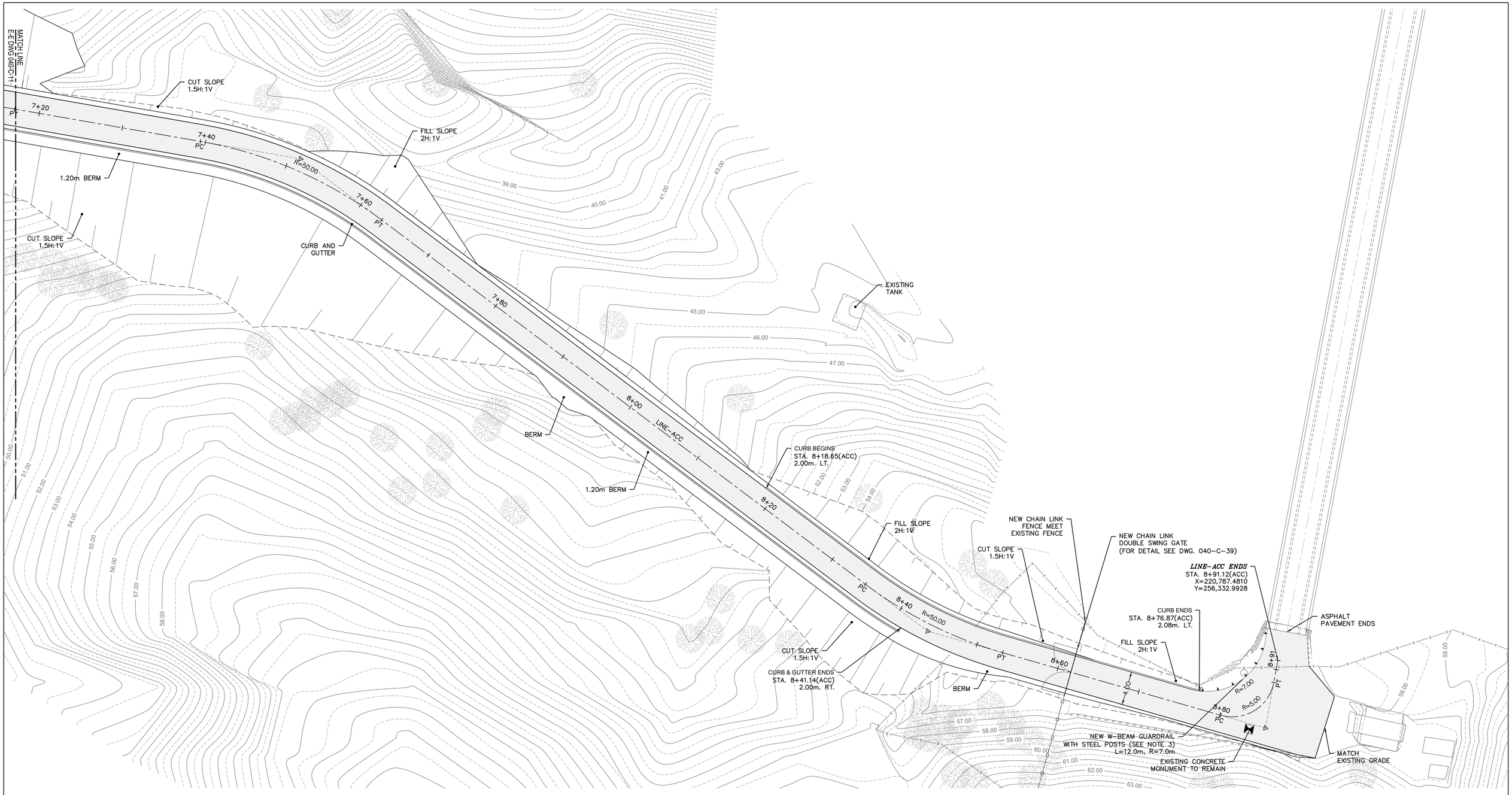
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - SITE PLAN V

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200
SHEET NO. 34 OF 145
DWG. NO. 040-C-11

040-C-07 to 12.dwg 2/20/2024 9:42:49 AM




## ACCESS ROAD - SITE PLAN

SCALE: 1:200

NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. REFER TO DWG. 040-C-40/41-42 FOR SECTIONS AND DETAILS.
3. W-BEAM GUARDRAIL WITH STEEL POSTS SPACED AT 1.905m AND 2-ANCHORAGE TYPE-MB (WITH END SECTIONS). REFER TO W-BEAM GUARDRAIL DETAILS ON PRHTA STANDARD DRAWINGS, MB SERIES (REV.2018).

2 0 5 10 15m

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| B | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

| | |
|---|---|
| DRAWN BY | AM |
| DESIGNED BY | MVM |
| CHECKED BY | LMR |
| APPR. BY | GN |

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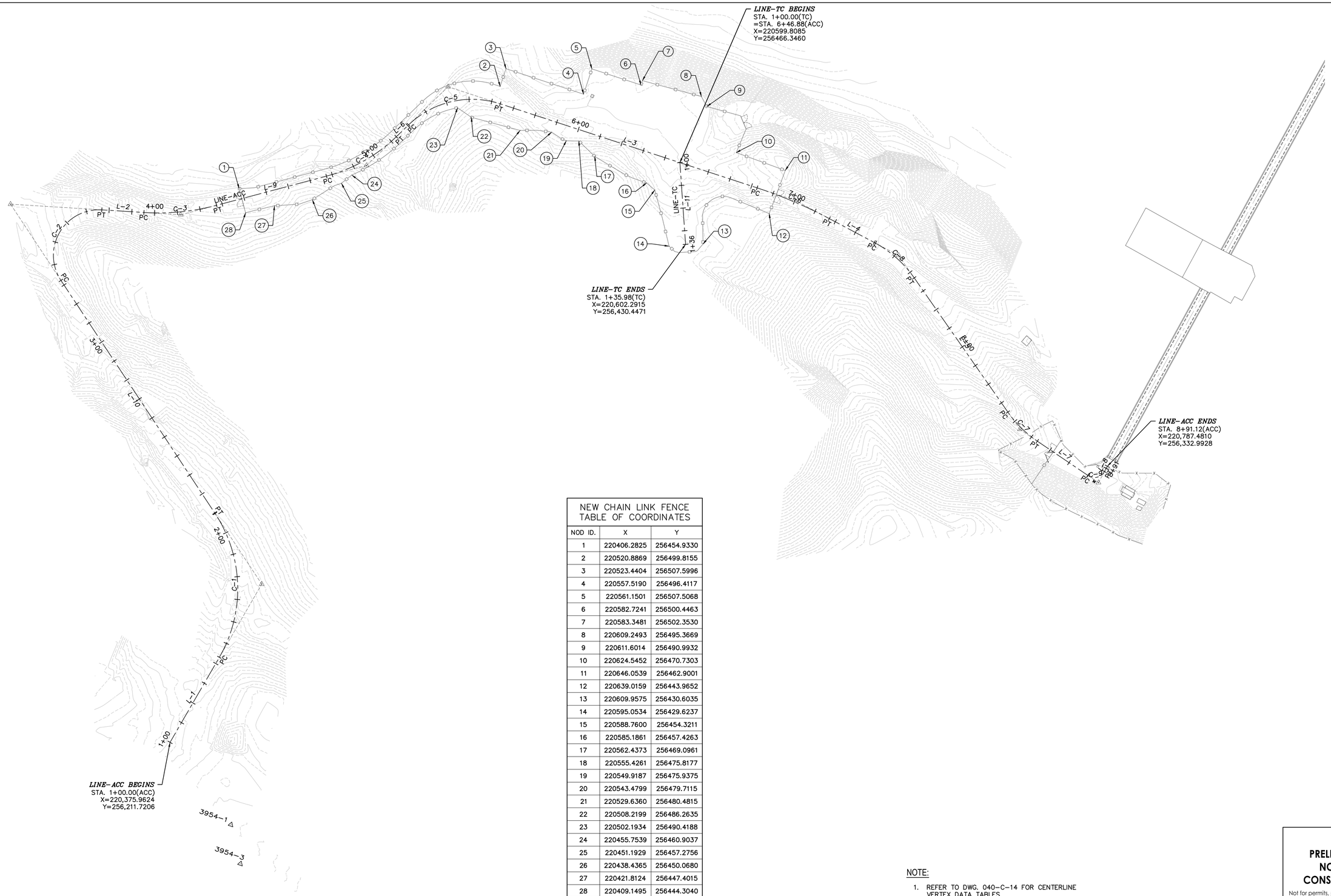
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - SITE PLAN VI

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200
SHEET NO. 35 OF 145
DWG. NO. 040-C-12

2/20/2024 9:43:14 AM
040-C-07 to 12.dwg




| NEW CHAIN LINK FENCE TABLE OF COORDINATES | | |
|---|---|---|
| NOD ID. | X | Y |
| 1 | 220406.2825 | 256454.9330 |
| 2 | 220520.8869 | 256499.8155 |
| 3 | 220523.4404 | 256507.5996 |
| 4 | 220557.5190 | 256496.4117 |
| 5 | 220561.1501 | 256507.5068 |
| 6 | 220582.7241 | 256500.4463 |
| 7 | 220583.3481 | 256502.3530 |
| 8 | 220609.2493 | 256495.3669 |
| 9 | 220611.6014 | 256490.9932 |
| 10 | 220624.5452 | 256470.7303 |
| 11 | 220646.0539 | 256462.9001 |
| 12 | 220639.0159 | 256443.9652 |
| 13 | 220609.9575 | 256430.6035 |
| 14 | 220595.0534 | 256429.6237 |
| 15 | 220588.7600 | 256454.3211 |
| 16 | 220585.1861 | 256457.4263 |
| 17 | 220562.4373 | 256469.0961 |
| 18 | 220555.4261 | 256475.8177 |
| 19 | 220549.9187 | 256475.9375 |
| 20 | 220543.4799 | 256479.7115 |
| 21 | 220529.6360 | 256480.4815 |
| 22 | 220508.2199 | 256486.2635 |
| 23 | 220502.1934 | 256490.4188 |
| 24 | 220455.7539 | 256460.9037 |
| 25 | 220451.1929 | 256457.2756 |
| 26 | 220438.4365 | 256450.0680 |
| 27 | 220421.8124 | 256447.4015 |
| 28 | 220409.1495 | 256444.3040 |

N

## ACCESS ROAD - VERTEX DATA TABLES AND COORDINATES

SCALE: 1:750

NOTE:

1. REFER TO DWG. 040-C-14 FOR CENTERLINE VERTEX DATA TABLES
2. REFER TO DWG. 040-C-40 FOR CHAINLINK FENCE AND GATE DETAILS.

5 0 10 20 30 40m

SCALE: 1:750

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| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - CENTERLINE GEOMETRY PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:1,000
SHEET NO. 36 OF 145
DWG. NO. 040-C-13

040-c-13 to 14.dwg 2/20/2024 9:43:36 AM

## LINE–ACC VERTEX DATA

| LABEL | VERTEX | DIST. | A | R | T | E | L | COORDINATES N | COORDINATES E | BEARING |
|---|---|---|---|---|---|---|---|---|---|---|
| L–1 | STA. 1+00.00 | 43.16 | | | | | | 256,211.7206 | 220,375.9624 | N30°04'52"E |
| | STA. 1+43.16 | | | | | | | 256,249.0645 | 220,397.5935 | |
| C–1 | PC STA. 1+43.16 | | 63°32'32" | 60.00 | 37.16 | 10.58 | 66.54 | 256,249.0645 | 220,397.5935 | |
| | PI VERTEX | | | | | | | 256,281.2193 | 220,416.2190 | |
| | PT STA. 2+09.70 | | | | | | | 256,312.2202 | 220,395.7303 | |
| L–10 | STA. 2+09.70 | 122.73 | | | | | | 256,312.2202 | 220,395.7303 | N33°27'39"W |
| | STA. 3+32.43 | | | | | | | 256,414.6087 | 220,328.0612 | |
| C–2 | PC STA. 3+32.43 | | 127°01'55" | 20.00 | 40.14 | 24.85 | 44.34 | 256,414.6087 | 220,328.0612 | |
| | PI VERTEX | | | | | | | 256,448.0976 | 220,305.9283 | |
| | PT STA. 3+76.77 | | | | | | | 256,445.5973 | 220,345.9922 | |
| L–2 | STA. 3+76.77 | 18.53 | | | | | | 256,445.5973 | 220,345.9922 | S86°25'44"E |
| | STA. 3+95.30 | | | | | | | 256,444.4428 | 220,364.4909 | |
| C–3 | PC STA. 3+95.30 | | 18°26'33" | 100.00 | 16.23 | 1.31 | 32.19 | 256,444.4428 | 220,364.4909 | |
| | PI VERTEX | | | | | | | 256,443.4316 | 220,380.6938 | |
| | PT STA. 4+27.49 | | | | | | | 256,447.5982 | 220,396.3844 | |
| L–9 | STA. 4+27.49 | 49.92 | | | | | | 256,447.5982 | 220,396.3844 | N75°07'43"E |
| | STA. 4+77.41 | | | | | | | 256,460.4099 | 220,444.6314 | |
| C–4 | PC STA. 4+77.41 | | 29°07'16" | 70.00 | 18.18 | 2.32 | 35.58 | 256,460.4099 | 220,444.6314 | |
| | PI VERTEX | | | | | | | 256,465.0763 | 220,462.2045 | |
| | PT STA. 5+12.99 | | | | | | | 256,477.7049 | 220,475.2854 | |
| L–6 | STA. 5+12.99 | 7.52 | | | | | | 256,477.7049 | 220,475.2854 | N46°00'27"E |
| | STA. 5+20.51 | | | | | | | 256,482.9263 | 220,480.6937 | |
| C–5 | PC STA. 5+20.51 | | 62°06'51" | 40.00 | 24.09 | 6.69 | 43.36 | 256,482.9263 | 220,480.6937 | |
| | PI VERTEX | | | | | | | 256,499.6574 | 220,498.0239 | |
| | PT STA. 5+63.87 | | | | | | | 256,492.1649 | 220,520.9178 | |
| L–3 | STA. 5+63.87 | 118.67 | | | | | | 256,492.1649 | 220,520.9178 | S71°52'41"E |
| | STA. 6+82.54 | | | | | | | 256,455.2549 | 220,633.6980 | |
| C–6 | PC STA. 6+82.54 | | 9°53'10" | 200.00 | 17.30 | 0.75 | 34.51 | 256,455.2549 | 220,633.6980 | |
| | PI VERTEX | | | | | | | 256,449.8747 | 220,650.1373 | |
| | PT STA. 7+17.05 | | | | | | | 256,441.7520 | 220,665.4088 | |
| L–4 | STA. 7+17.05 | 22.37 | | | | | | 256,441.7520 | 220,665.4088 | S61°59'31"E |
| | STA. 7+39.41 | | | | | | | 256,431.2491 | 220,685.1553 | |
| C–8 | PC STA. 7+39.41 | | 27°05'51" | 50.00 | 12.05 | 1.43 | 23.65 | 256,431.2491 | 220,685.1553 | |
| | PI VERTEX | | | | | | | 256,425.5910 | 220,695.7930 | |
| | PT STA. 7+63.06 | | | | | | | 256,415.7084 | 220,702.6858 | |
| L–5 | STA. 7+63.06 | 71.84 | | | | | | 256,415.7084 | 220,702.6858 | S34°53'41"E |
| | STA. 8+34.90 | | | | | | | 256,356.7815 | 220,743.7857 | |
| C–7 | PC STA. 8+34.90 | | 20°58'19" | 50.00 | 9.25 | 0.85 | 18.30 | 256,356.7815 | 220,743.7857 | |
| | PI VERTEX | | | | | | | 256,349.1910 | 220,749.0798 | |
| | PT STA. 8+53.20 | | | | | | | 256,343.9983 | 220,756.7399 | |
| L–7 | STA. 8+53.20 | 26.91 | | | | | | 256,343.9983 | 220,756.7399 | S55°52'00"E |
| | STA. 8+80.11 | | | | | | | 256,328.9012 | 220,779.0103 | |
| C–9 | PC STA. 8+80.11 | | 95°36'37" | 5.00 | 5.52 | 2.44 | 8.34 | 256,328.9012 | 220,779.0103 | |
| | PI VERTEX | | | | | | | 256,325.8065 | 220,783.5754 | |
| | PT STA. 8+88.45 | | | | | | | 256,330.6523 | 220,786.2090 | |
| L–8 | STA. 8+88.45 | 2.66 | | | | | | 256,330.6523 | 220,786.2090 | N28°31'23"E |
| | STA. 8+91.12 | | | | | | | 256,332.9928 | 220,787.4810 | |

## LINE–TC VERTEX DATA

| LABEL | VERTEX | DIST. | A | R | T | E | L | COORDINATES N | COORDINATES E | BEARING |
|---|---|---|---|---|---|---|---|---|---|---|
| L–11 | STA. 1+00.00 | 35.98 | | | | | | 256,466.3460 | 220,599.8085 | S3°57'24"E |
| | STA. 1+35.98 | | | | | | | 256,430.4471 | 220,602.2915 | |

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| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - VERTEX DATA TABLES

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: AS SHOWN

SHEET NO. 37 OF 145
DWG. NO. 040-C-14

2/20/2024 9:43:37 AM
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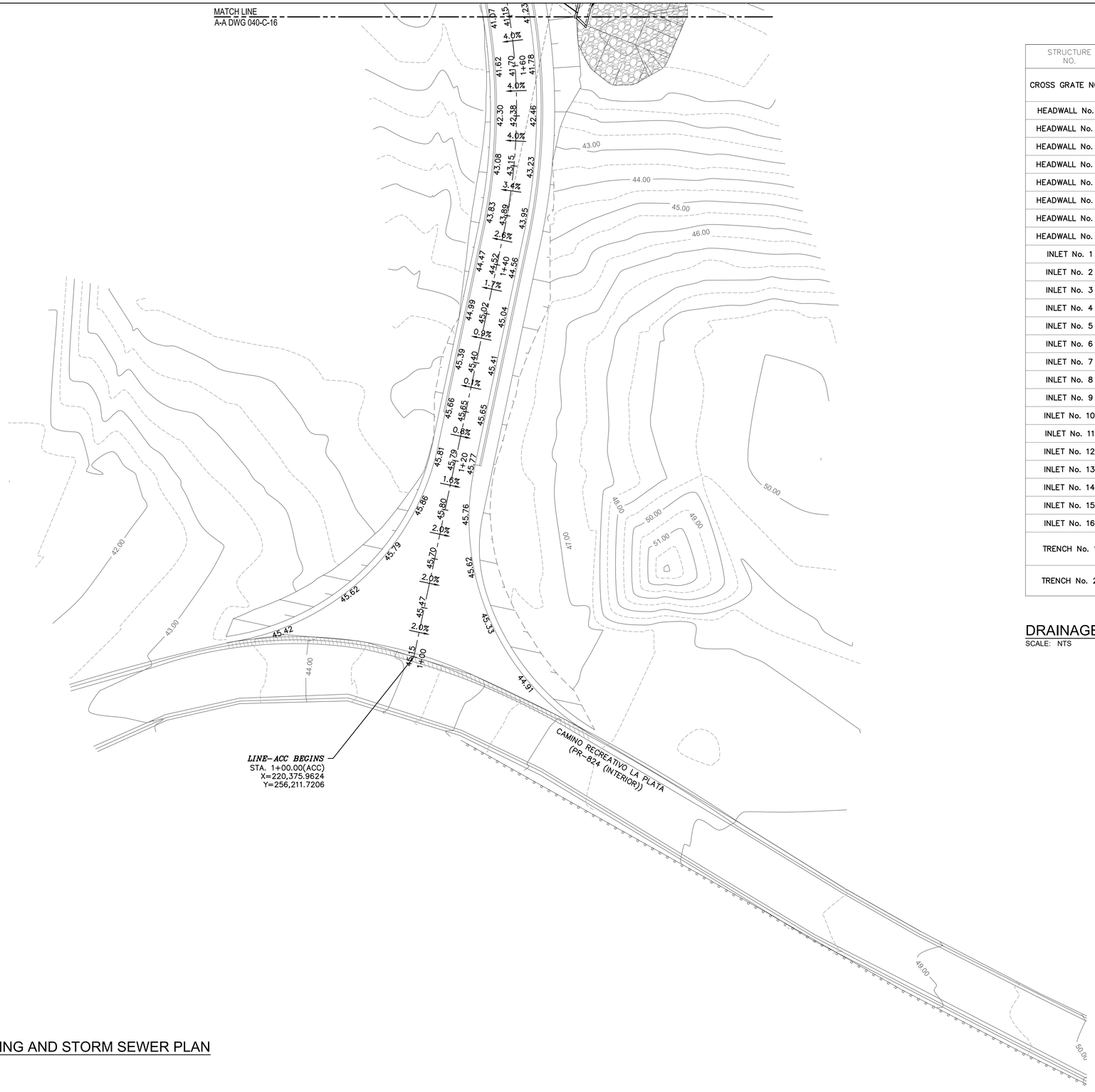


| STRUCTURE NO. | X | Y | T.E. | I.E. | TYPE OF STRUCTURE |
|---|---|---|---|---|---|
| CROSS GRATE NO. 1 | 220651.2429 | 256450.7650 | 36.40 | 35.73 | NEW CROSS GRATE |
| | | | 36.59 | 34.91 | NEW CROSS GRATE AT OUTLET |
| HEADWALL No. 1 | 220411.8695 | 256268.4257 | 39.86 | – | HEADWALL TYPE B (2–36") |
| HEADWALL No. 2 | 220401.0648 | 256283.0998 | 39.76 | – | HEADWALL TYPE B (2–36") |
| HEADWALL No. 3 | 220474.8548 | 256467.8490 | 36.58 | – | HEADWALL TYPE B (42") |
| HEADWALL No. 4 | 220466.7269 | 256478.1978 | 36.38 | – | HEADWALL TYPE B (42") |
| HEADWALL No. 5 | 220627.7584 | 256471.6984 | 33.94 | – | HEADWALL TYPE B (48") |
| HEADWALL No. 6 | 220652.2135 | 256452.7737 | 36.03 | – | HEADWALL TYPE B (30") |
| HEADWALL No. 7 | 220401.3981 | 256288.8398 | 39.99 | – | HEADWALL TYPE B (24") |
| HEADWALL No. 8 | 220503.4393 | 256501.6756 | 35.97 | – | HEADWALL TYPE B (24") |
| INLET No. 1 | 220403.3065 | 256289.1721 | 40.17 | 39.03 | CURB INLET |
| INLET No. 2 | 220400.8432 | 256298.5942 | 40.21 | 39.13 | CURB INLET |
| INLET No. 3 | 220599.5641 | 256430.7358 | 35.60 | 34.25 | CURB INLET |
| INLET No. 4 | 220604.9532 | 256431.1087 | 35.58 | 34.20 | CURB INLET |
| INLET No. 5 | 220604.5576 | 256462.2139 | 35.23 | 32.87 | NEW TYPE III INLET (1.83 X 1.52) |
| INLET No. 6 | 220619.5999 | 256457.2909 | 35.16 | 32.36 | NEW TYPE IIIA INLET (1.83 X 1.52) |
| INLET No. 7 | 220427.4180 | 256457.3921 | 41.32 | 39.67 | CURB INLET |
| INLET No. 8 | 220428.3041 | 256454.0555 | 41.45 | 39.64 | CURB INLET |
| INLET No. 9 | 220445.8533 | 256458.7196 | 41.46 | 37.74 | CURB INLET |
| INLET No. 10 | 220460.1960 | 256468.2122 | 39.10 | 36.43 | CURB INLET |
| INLET No. 11 | 220471.7731 | 256472.0088 | 37.94 | 35.08 | NEW TYPE III INLET (1.83 X 1.52) |
| INLET No. 12 | 220469.6056 | 256474.6959 | 37.80 | 34.92 | NEW TYPE III INLET (1.83 X 1.52) |
| INLET No. 13 | 220556.0339 | 256478.6193 | 35.49 | 34.23 | CURB INLET |
| INLET No. 14 | 220580.5504 | 256470.0708 | 35.37 | 33.97 | NEW TYPE I INLET (1.22 X 1.22) |
| INLET No. 15 | 220397.5782 | 256306.1221 | 40.23 | 39.21 | CURB INLET |
| INLET No. 16 | 220400.6630 | 256307.7276 | 40.36 | 39.24 | CURB INLET |
| TRENCH No. 1 | 220503.4849 | 256499.9746 | 35.78 | 35.18 | NEW TRENCH INLET |
| | | | 35.99 | 35.00 | NEW TRENCH OUTLET |
| TRENCH No. 2 | 220557.2629 | 256482.3745 | 35.62 | 34.27 | NEW TRENCH INLET |
| | | | 35.57 | 34.27 | NEW TRENCH OUTLET |

## DRAINAGE STRUCTURE TABLE

SCALE: NTS

## NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000–C–01.
2. FOR STORM SEWER SYSTEM PROFILES SEE DWGS. 040–C–25/26.
3. FOR STORM SEWER SYSTEM DETAILS SEE DWGS. 040–C–27/28.
4. STORM SEWER SYSTEM STRUCTURES SHOWN ON DWGS. 040–C–15 TO 040–C–18 ARE FOR THE NEW ACCESS ROAD. FOR GENERATOR'S AREA STORM SEWER SYSTEM, REFER TO DWGS. 030–C–05.

## ACCESS ROAD - GRADING AND STORM SEWER PLAN

SCALE: 1:200

2 0 5 10 15m

SCALE: 1:200

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - GRADING AND STORM SEWER PLAN I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

SHEET NO. 38 OF 145
DWG. NO. 040-C-15

2/20/2024 9:44:23 AM
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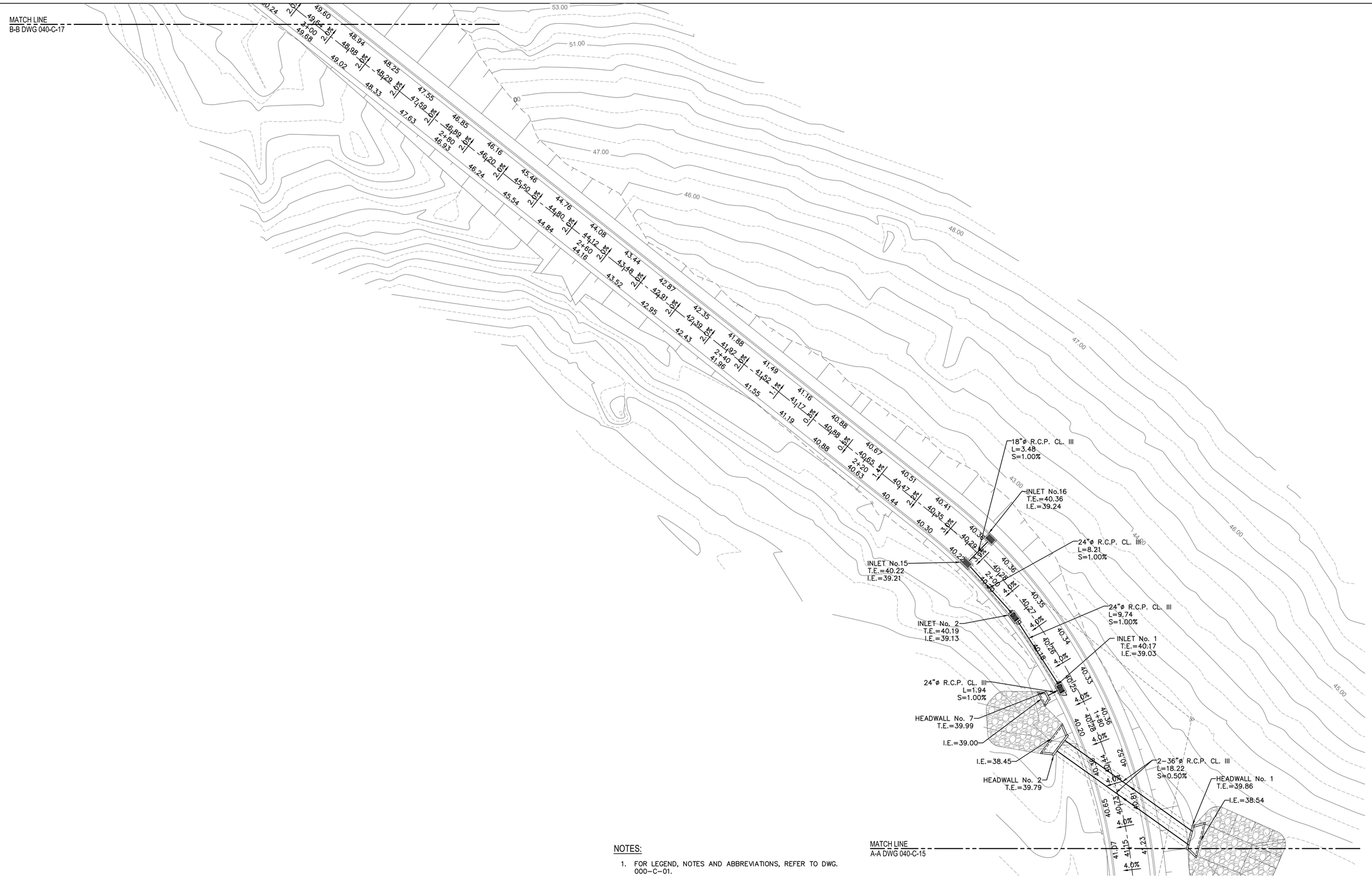


## ACCESS ROAD - GRADING AND STORM SEWER PLAN

SCALE: 1:200

NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. FOR STORM SEWER SYSTEM PROFILES SEE DWGS. 040-C-25/26.
3. FOR STORM SEWER SYSTEM DETAILS SEE DWGS. 040-C-27/28.
4. REFER TO DWG. 040-C-15 FOR DRAINAGE STRUCTURES TABLE.

2 0 5 10 15m

SCALE: 1:200

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| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - GRADING AND STORM SEWER PLAN II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200
SHEET NO. 39 OF 145
DWG. NO. 040-C-16

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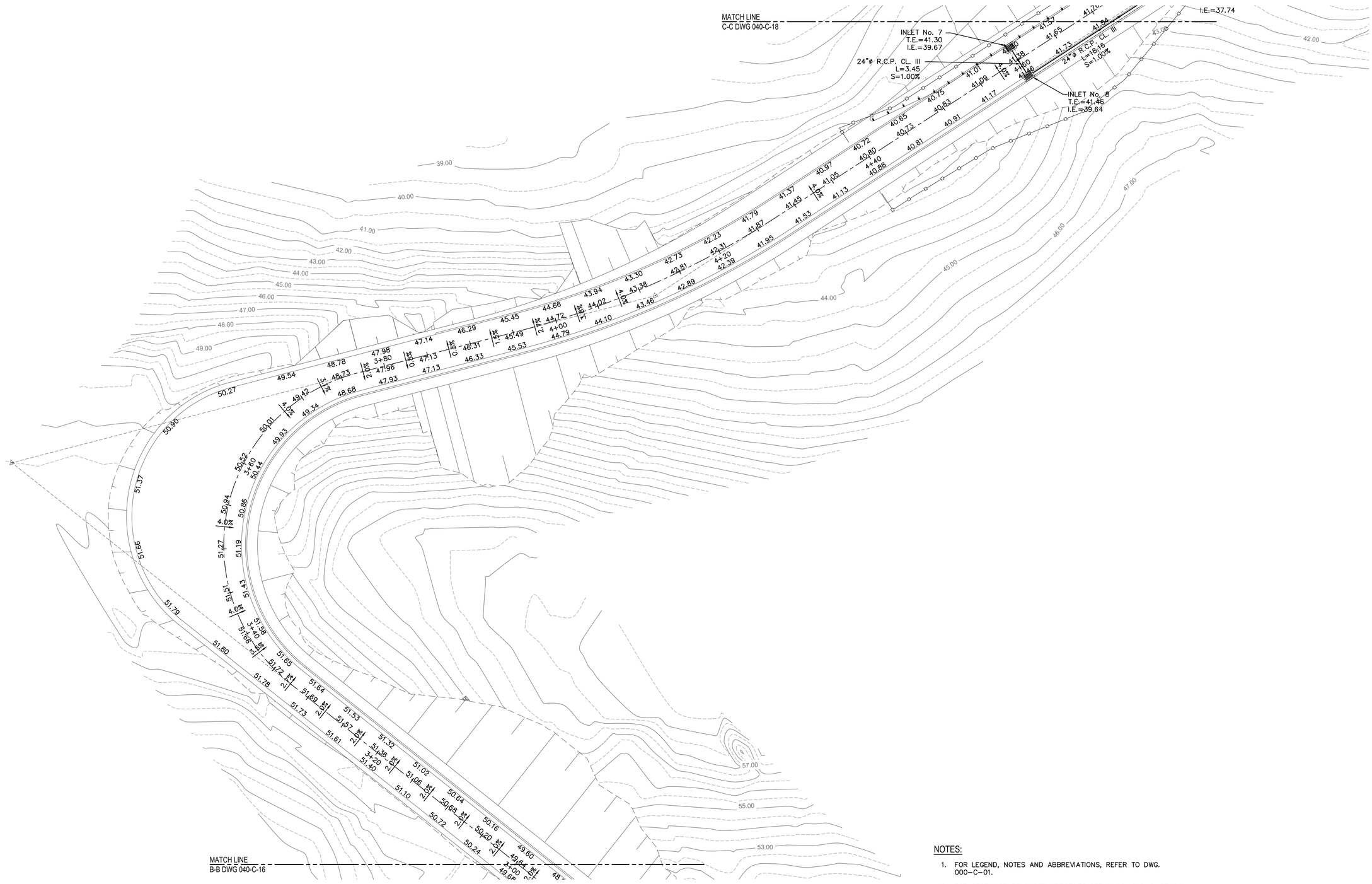


## ACCESS ROAD - GRADING AND STORM SEWER PLAN

SCALE: 1:200

NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000–C–01.
2. FOR STORM SEWER SYSTEM PROFILES SEE DWGS. 040–C–25/26.
3. FOR STORM SEWER SYSTEM DETAILS SEE DWGS. 040–C–27/28.
4. REFER TO DWG. 040–C–15 FOR DRAINAGE STRUCTURES TABLE.

2 0 5 10 15m

SCALE: 1:200

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|---|---|---|---|---|---|
| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - GRADING AND STORM SEWER PLAN III

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:800

SHEET NO. 40 OF 145
DWG. NO. 040-C-17

2/20/2024 9:45:10 AM
040c-c15 to 20.dwg

## NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000–C–01.
2. FOR STORM SEWER SYSTEM PROFILES SEE DWGS. 040–C–25/26.
3. FOR STORM SEWER SYSTEM DETAILS SEE DWGS. 040–C–27/28.
4. REFER TO DWG. 040–C–15 FO DRAINAGE STRUCTURES TABLE.
5. FOR GENERATOR'S AREA STORM SEWER SYSTEM, REFER TO DWG. 030–C–05.

N

## ACCESS ROAD - GRADING AND STORM SEWER PLAN

SCALE: 1:200

2 0 5 10 15m

SCALE: 1:200

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| NO | DATE | REVISION | BY | CK. | APPR. |
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| D | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - GRADING AND STORM SEWER PLAN IV

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

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DWG. NO. 040-C-18

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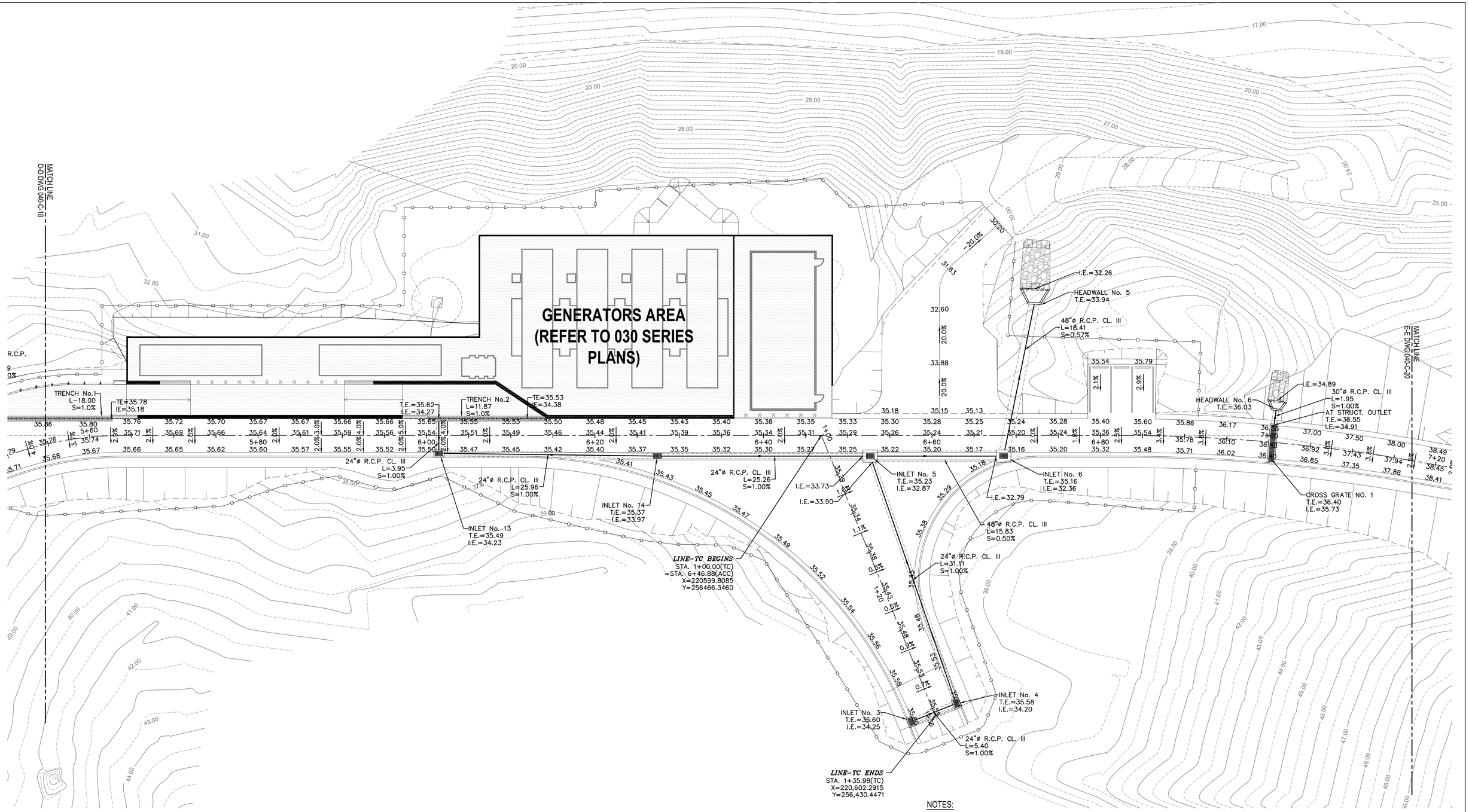


## ACCESS ROAD - GRADING AND STORM SEWER PLAN

SCALE: 1:200

NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. FOR STORM SEWER SYSTEM PROFILES SEE DWGS. 040-C-25/26.
3. FOR STORM SEWER SYSTEM DETAILS SEE DWGS. 040-C-27/28.
4. REFER TO DWG. 040-C-15 FO DRAINAGE STRUCTURES TABLE.
5. FOR GENERATOR'S AREA STORM SEWER SYSTEM, REFER TO DWG. 030-C-05.

2 0 5 10 15m

SCALE: 1:200

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| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - GRADING AND STORM SEWER PLAN V

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

SHEET NO. 42 OF 145
DWG. NO. 040-C-19

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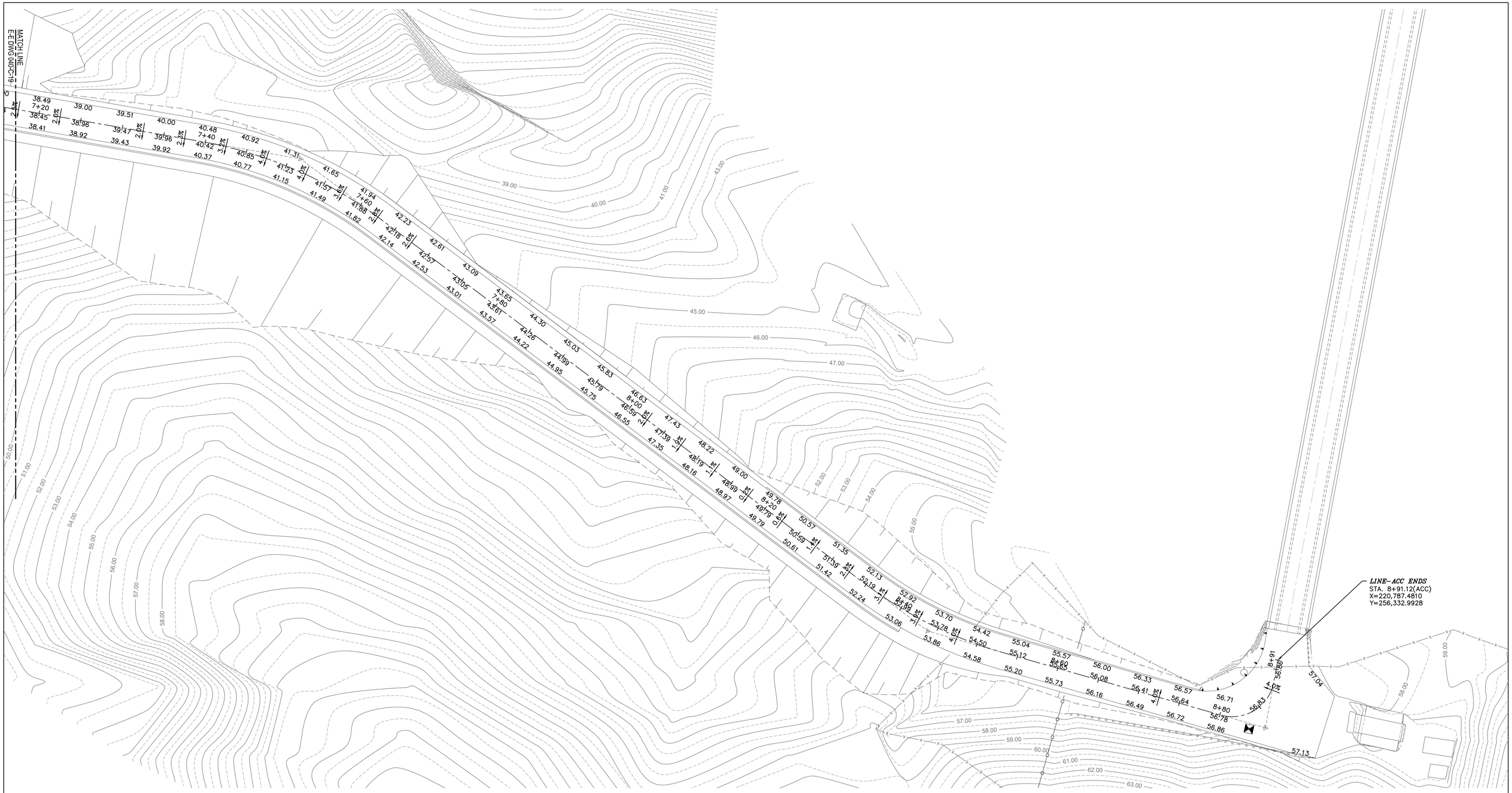


NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS, REFER TO DWG. 000-C-01.
2. FOR STORM SEWER SYSTEM PROFILES SEE DWGS. 040-C-25/26.
3. FOR STORM SEWER SYSTEM DETAILS SEE DWGS. 040-C-27/28.
4. REFER TO DWG. 040-C-15 FOR DRAINAGE STRUCTURES TABLE.

N

## ACCESS ROAD - GRADING AND STORM SEWER PLAN

SCALE: 1:200

2 0 5 10 15m

SCALE: 1:200

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| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - GRADING AND STORM SEWER PLAN VI

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200
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DWG. NO. 040-C-20

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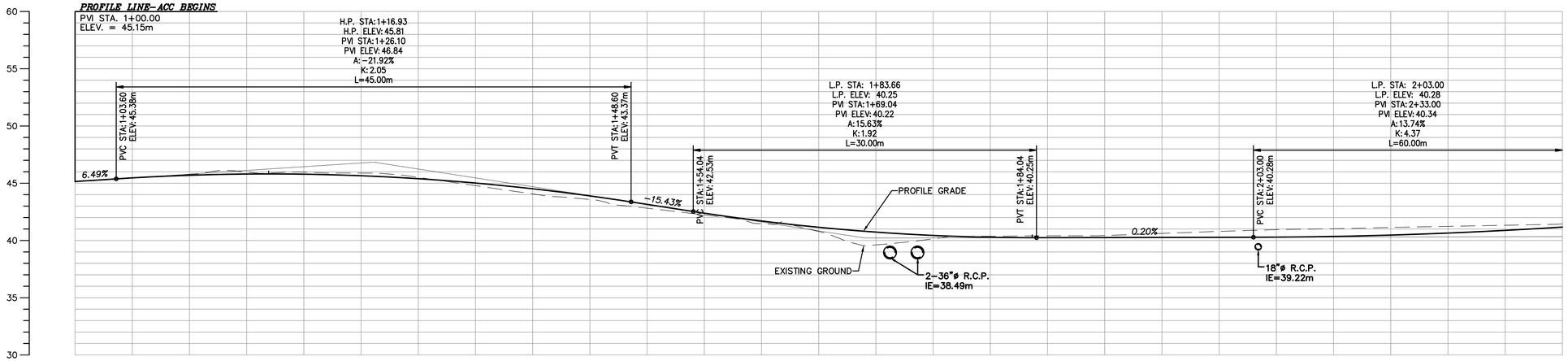
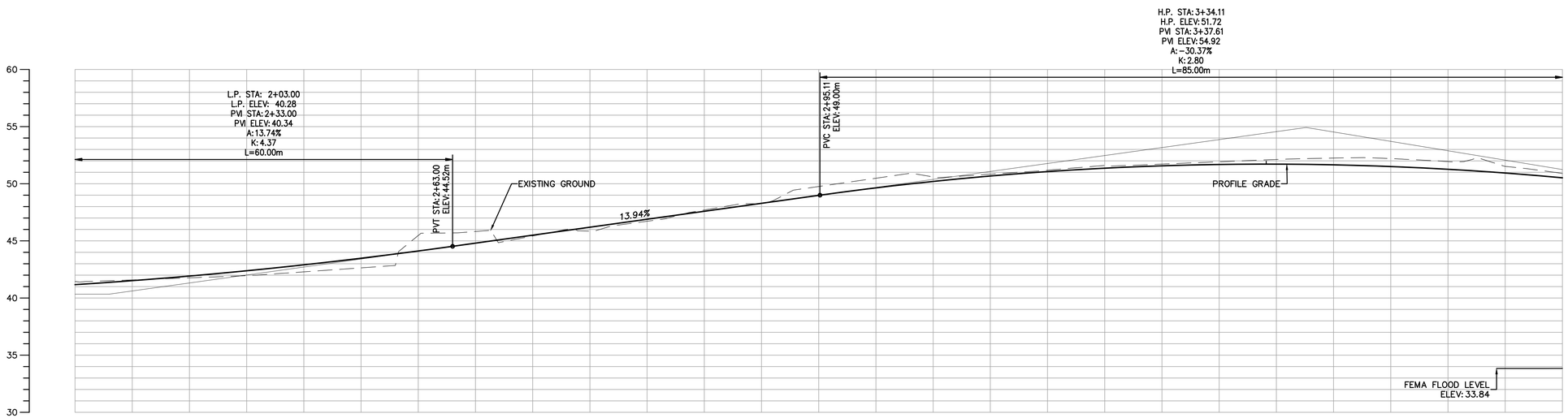



| STATION | PROPOSED GRADE | EXISTING GRADE |
|---|---|---|
| 1+00 | 45.15 | 45.15 |
| 1+05 | 45.47 | 45.44 |
| 1+10 | 45.70 | 45.77 |
| 1+15 | 45.80 | 45.98 |
| 1+20 | 45.79 | 45.96 |
| 1+25 | 45.65 | 45.89 |
| 1+30 | 45.40 | 45.51 |
| 1+35 | 45.02 | 44.79 |
| 1+40 | 44.52 | 44.06 |
| 1+45 | 43.89 | 43.58 |
| 1+50 | 43.15 | 42.82 |
| 1+55 | 42.38 | 42.23 |
| 1+60 | 41.70 | 41.47 |
| 1+65 | 41.15 | 40.78 |
| 1+70 | 40.73 | 39.62 |
| 1+75 | 40.44 | 40.14 |
| 1+80 | 40.28 | 40.37 |
| 1+85 | 40.25 | 40.40 |
| 1+90 | 40.26 | 40.43 |
| 1+95 | 40.27 | 40.62 |
| 2+00 | 40.28 | 40.80 |
| 2+05 | 40.29 | 40.94 |
| 2+10 | 40.35 | 41.02 |
| 2+15 | 40.47 | 41.13 |
| 2+20 | 40.65 | 41.23 |
| 2+25 | 40.88 | 41.33 |
| 2+30 | 41.17 | 41.44 |

PROFILE LINE ACC(FROM STA 1+00(ACC) TO STA 2+30(ACC))
SCALE= 1:200 (H)
1:200 (V)




| STATION | PROPOSED GRADE | EXISTING GRADE |
|---|---|---|
| 2+30 | 41.17 | 41.44 |
| 2+35 | 41.52 | 41.59 |
| 2+40 | 41.92 | 41.77 |
| 2+45 | 42.39 | 41.95 |
| 2+50 | 42.91 | 42.29 |
| 2+55 | 43.48 | 42.64 |
| 2+60 | 44.12 | 45.48 |
| 2+65 | 44.80 | 45.82 |
| 2+70 | 45.50 | 45.43 |
| 2+75 | 46.20 | 45.85 |
| 2+80 | 46.89 | 46.72 |
| 2+85 | 47.59 | 47.71 |
| 2+90 | 48.29 | 48.30 |
| 2+95 | 48.98 | 49.76 |
| 3+00 | 49.64 | 50.48 |
| 3+05 | 50.20 | 50.60 |
| 3+10 | 50.68 | 50.84 |
| 3+15 | 51.06 | 51.19 |
| 3+20 | 51.36 | 51.60 |
| 3+25 | 51.57 | 51.72 |
| 3+30 | 51.69 | 51.92 |
| 3+35 | 51.72 | 52.12 |
| 3+40 | 51.66 | 52.25 |
| 3+45 | 51.51 | 52.20 |
| 3+50 | 51.27 | 51.94 |
| 3+55 | 50.94 | 51.52 |
| 3+60 | 50.52 | 50.90 |

PROFILE LINE ACC(FROM STA 2+30(ACC) TO STA 3+60(ACC))
SCALE= 1:200 (H)
1:200 (V)

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| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - PROFILE I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200
SHEET NO. 44 OF 145
DWG. NO. 040-C-21

2/22/2024 9:46:30 AM
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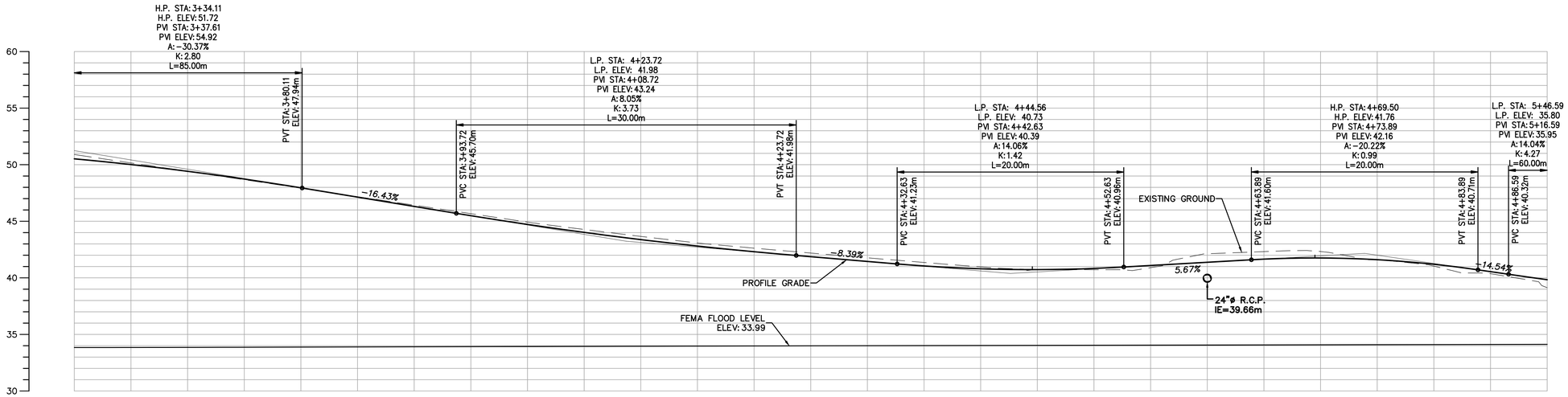
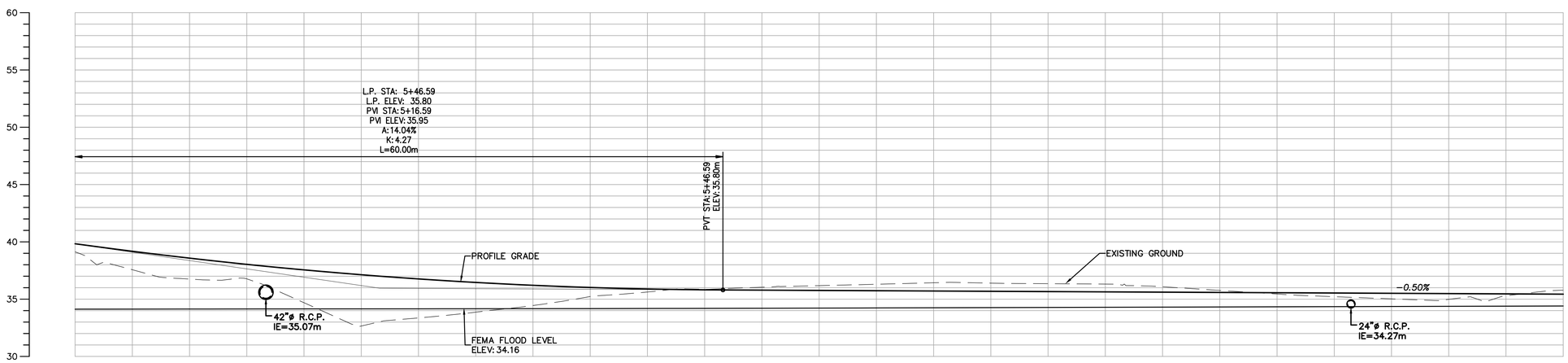



| STATION | PROPOSED GRADE | EXISTING GRADE |
|---|---|---|
| 3+60 | 50.52 | 50.90 |
| 3+65 | 50.01 | 50.15 |
| 3+70 | 49.42 | 49.42 |
| 3+75 | 48.73 | 48.67 |
| 3+80 | 47.96 | 47.92 |
| 3+85 | 47.13 | 47.18 |
| 3+90 | 46.31 | 46.42 |
| 3+95 | 45.49 | 45.67 |
| 4+00 | 44.72 | 44.92 |
| 4+05 | 44.02 | 44.28 |
| 4+10 | 43.38 | 43.66 |
| 4+15 | 42.81 | 43.08 |
| 4+20 | 42.31 | 42.63 |
| 4+25 | 41.87 | 42.19 |
| 4+30 | 41.45 | 41.77 |
| 4+35 | 41.05 | 41.36 |
| 4+40 | 40.80 | 40.97 |
| 4+45 | 40.73 | 40.73 |
| 4+50 | 40.83 | 40.72 |
| 4+55 | 41.09 | 40.90 |
| 4+60 | 41.38 | 42.13 |
| 4+65 | 41.65 | 42.32 |
| 4+70 | 41.76 | 42.33 |
| 4+75 | 41.60 | 41.59 |
| 4+80 | 41.20 | 41.04 |
| 4+85 | 40.55 | 40.37 |
| 4+90 | 39.84 | 39.13 |

PROFILE LINE ACC(FROM STA 3+60(ACC) TO STA 4+90(ACC))
SCALE= 1:200 (H)
1:200 (V)




| STATION | PROPOSED GRADE | EXISTING GRADE |
|---|---|---|
| 4+90 | 39.84 | 39.13 |
| 4+95 | 39.18 | 37.57 |
| 5+00 | 38.58 | 36.75 |
| 5+05 | 38.04 | 36.77 |
| 5+10 | 37.55 | 34.69 |
| 5+15 | 37.13 | 32.66 |
| 5+20 | 36.76 | 33.36 |
| 5+25 | 36.46 | 33.86 |
| 5+30 | 36.21 | 34.44 |
| 5+35 | 36.02 | 35.23 |
| 5+40 | 35.89 | 35.62 |
| 5+45 | 35.81 | 35.87 |
| 5+50 | 35.79 | 36.04 |
| 5+55 | 35.76 | 36.18 |
| 5+60 | 35.74 | 36.30 |
| 5+65 | 35.71 | 36.43 |
| 5+70 | 35.69 | 36.40 |
| 5+75 | 35.66 | 36.35 |
| 5+80 | 35.64 | 36.32 |
| 5+85 | 35.61 | 36.08 |
| 5+90 | 35.59 | 35.76 |
| 5+95 | 35.56 | 35.45 |
| 6+00 | 35.54 | 35.21 |
| 6+05 | 35.51 | 35.02 |
| 6+10 | 35.49 | 34.98 |
| 6+15 | 35.46 | 35.29 |
| 6+20 | 35.44 | 35.79 |

PROFILE LINE ACC(FROM STA 4+90(ACC) TO STA 6+20(ACC))
SCALE= 1:200 (H)
1:200 (V)

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| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - PROFILE II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

SHEET NO. 45 OF 145
DWG. NO. 040-C-22

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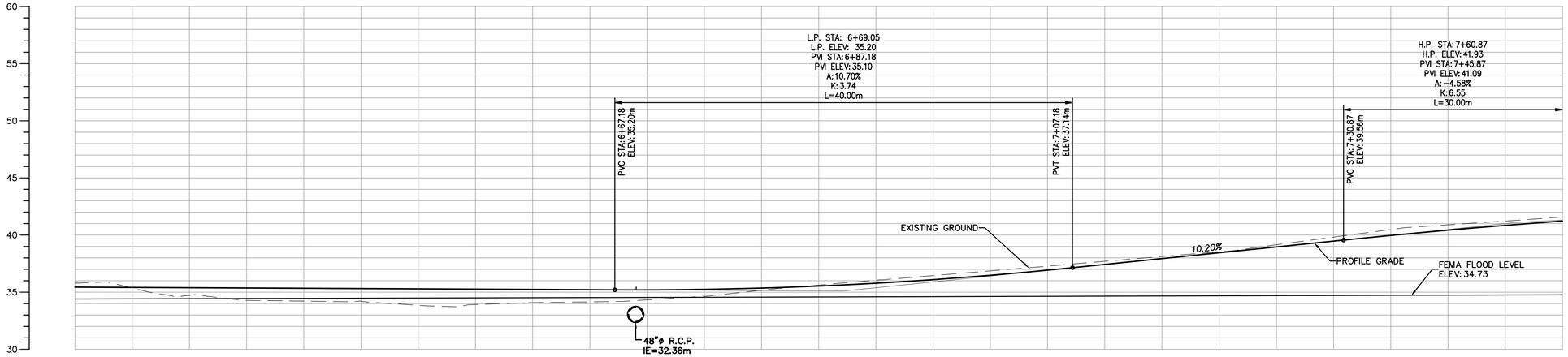
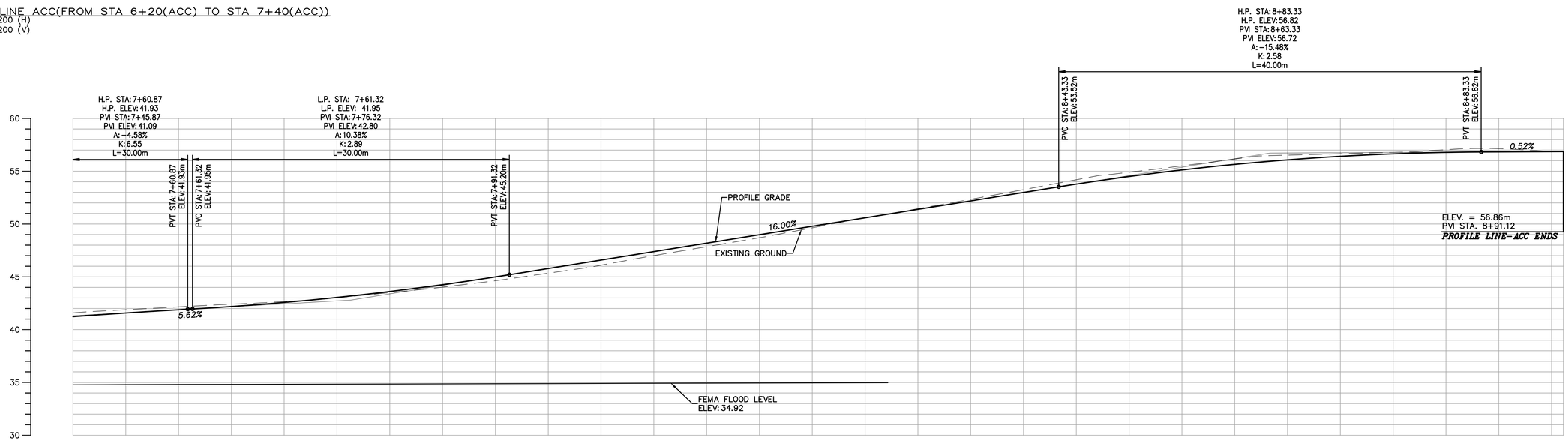



| STATION | EXISTING GRADE | PROPOSED GRADE |
|---|---|---|
| 6+20 | 35.79 | 35.44 |
| 6+25 | 35.36 | 35.41 |
| 6+30 | 34.73 | 35.39 |
| 6+35 | 34.29 | 35.36 |
| 6+40 | 34.22 | 35.34 |
| 6+45 | 34.19 | 35.31 |
| 6+50 | 33.85 | 35.29 |
| 6+55 | 33.91 | 35.26 |
| 6+60 | 34.09 | 35.24 |
| 6+65 | 34.15 | 35.21 |
| 6+70 | 34.33 | 35.20 |
| 6+75 | 34.64 | 35.24 |
| 6+80 | 35.16 | 35.36 |
| 6+85 | 35.62 | 35.54 |
| 6+90 | 36.04 | 35.78 |
| 6+95 | 36.45 | 36.10 |
| 7+00 | 36.86 | 36.48 |
| 7+05 | 37.28 | 36.92 |
| 7+10 | 37.70 | 37.43 |
| 7+15 | 38.12 | 37.94 |
| 7+20 | 38.54 | 38.45 |
| 7+25 | 39.15 | 38.96 |
| 7+30 | 39.82 | 39.47 |
| 7+35 | 40.48 | 39.96 |
| 7+40 | 40.89 | 40.42 |
| 7+45 | 41.22 | 40.85 |
| 7+50 | 41.59 | 41.23 |

PROFILE LINE ACC(FROM STA 6+20(ACC) TO STA 7+40(ACC))
SCALE= 1:200 (H)
1:200 (V)




| STATION | EXISTING GRADE | PROPOSED GRADE |
|---|---|---|
| 7+50 | 41.59 | 41.23 |
| 7+55 | 41.88 | 41.57 |
| 7+60 | 42.15 | 41.88 |
| 7+65 | 42.41 | 42.18 |
| 7+70 | 42.66 | 42.57 |
| 7+75 | 43.00 | 43.05 |
| 7+80 | 43.50 | 43.61 |
| 7+85 | 44.02 | 44.26 |
| 7+90 | 44.63 | 44.99 |
| 7+95 | 45.35 | 45.79 |
| 8+00 | 46.10 | 46.59 |
| 8+05 | 47.01 | 47.39 |
| 8+10 | 47.85 | 48.19 |
| 8+15 | 48.70 | 48.99 |
| 8+20 | 49.64 | 49.79 |
| 8+25 | 50.57 | 50.59 |
| 8+30 | 51.45 | 51.39 |
| 8+35 | 52.34 | 52.19 |
| 8+40 | 53.26 | 52.99 |
| 8+45 | 54.19 | 53.78 |
| 8+50 | 54.90 | 54.50 |
| 8+55 | 55.51 | 55.12 |
| 8+60 | 56.15 | 55.65 |
| 8+65 | 56.52 | 56.08 |
| 8+70 | 56.65 | 56.41 |
| 8+75 | 56.78 | 56.65 |
| 8+80 | 57.04 | 56.78 |
| 8+85 | 57.14 | 56.83 |
| 8+90 | 56.86 | 56.86 |
| 8+91 | 56.86 | 56.86 |

PROFILE LINE ACC(FROM STA 7+40(ACC) TO STA 8+80(ACC))
SCALE= 1:200 (H)
1:200 (V)

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| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - PROFILE III

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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SHEET NO. 46 OF 145
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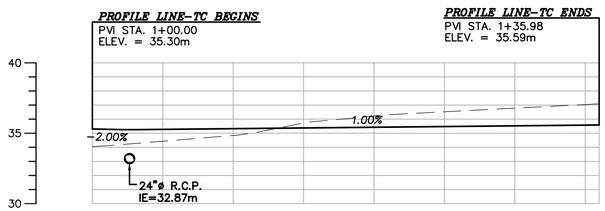


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| PROPOSED GRADE | 35.30 | 35.28 | 35.33 | 35.38 | 35.43 | 35.48 | 35.53 | 35.58 | 35.59 |
| EXISTING GRADE | 34.05 | 34.43 | 34.84 | 35.73 | 36.23 | 36.52 | 36.78 | 37.04 | 37.09 |
| STATION | 1+00 | 1+05 | 1+10 | 1+15 | 1+20 | 1+25 | 1+30 | 1+35 | 1+36 |

PROFILE LINE TC
SCALE= 1:200 (H)
1:200 (V)

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| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - PROFILE IV

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
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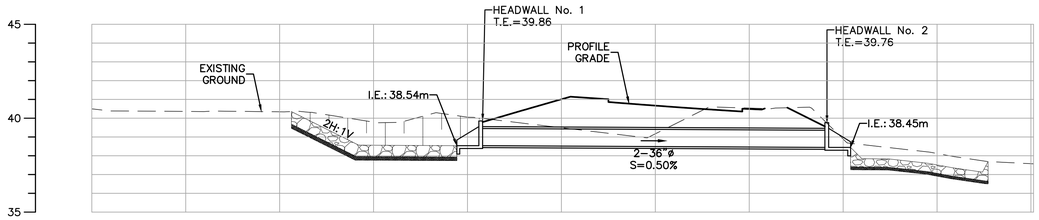


PROFILE FROM HEADWALL No.1 TO HEADWALL No. 2
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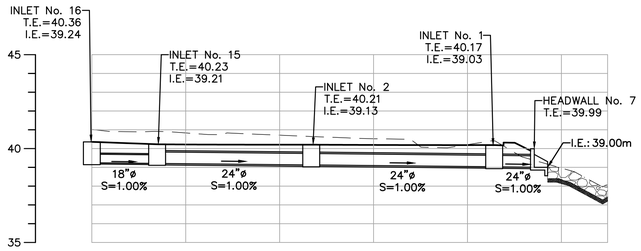
1:150 (V)




PROFILE LINE FROM INLET No. 16 TO HEADWALL No. 7
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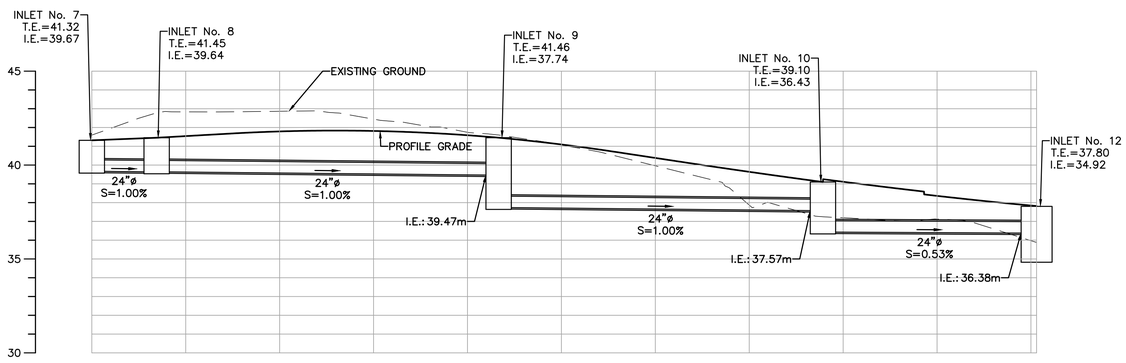


PROFILE LINE FROM INLET No. 7 TO INLET No. 12
SCALE= 1:150 (H)
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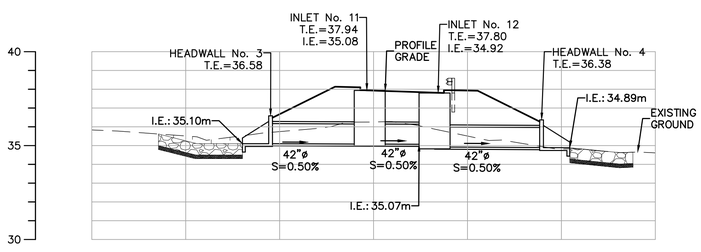


PROFILE FROM HEADWALL No. 3 TO HEADWALL No. 4
SCALE= 1:150 (H)
1:150 (V)

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

DRAINAGE PROFILES - I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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DATE: SEPTEMBER / 2023
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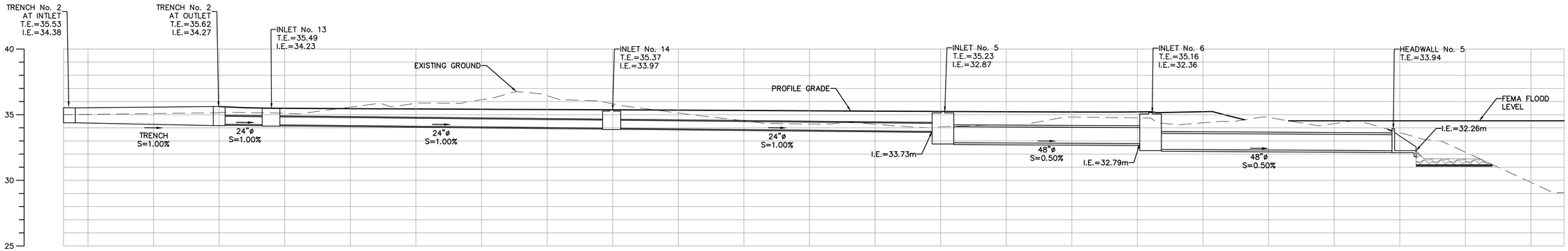


PROFILE LINE FROM TRENCH No.2 TO HEADWALL No. 5
SCALE= 1:150 (H)
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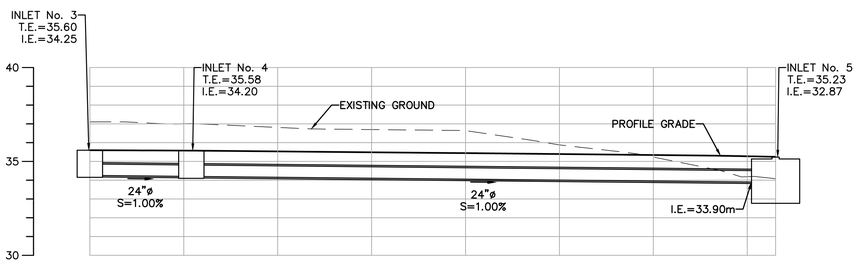


PROFILE LINE FROM INLET No. 3 TO INLET No. 5
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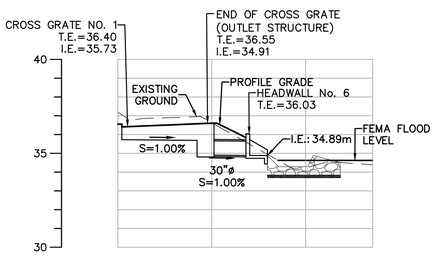
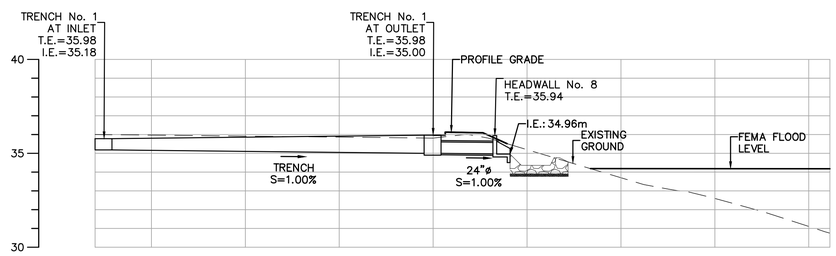



PROFILE LINE FROM CROSS GRATE No. 1
TO HEADWALL No. 6
SCALE= 1:150 (H)
1:150 (V)




PROFILE LINE FROM TRENCH No.1 TO HEADWALL No. 8
SCALE= 1:150 (H)
1:150 (V)

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| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

DRAINAGE PROFILES - II

Autoridad de Acueductos y Alcantarillados
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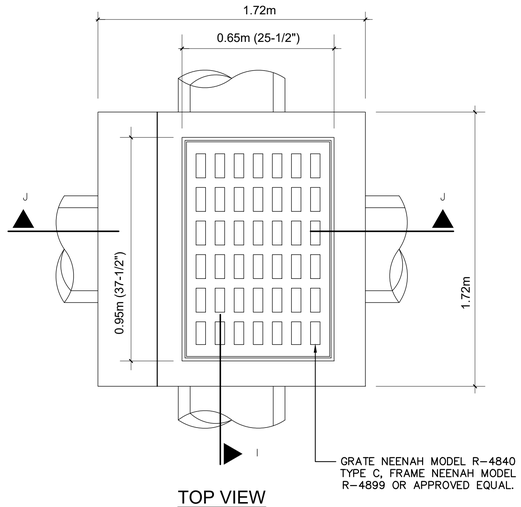
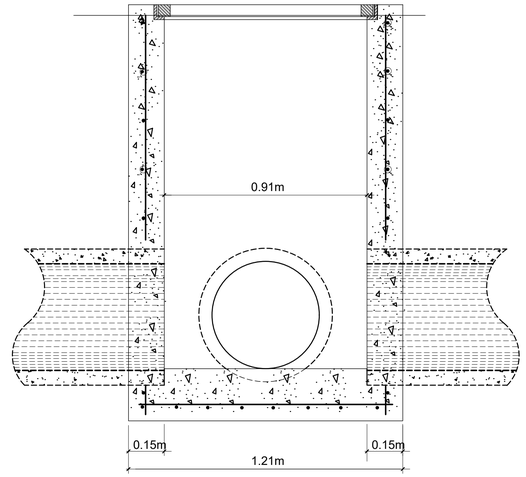



## TOP VIEW

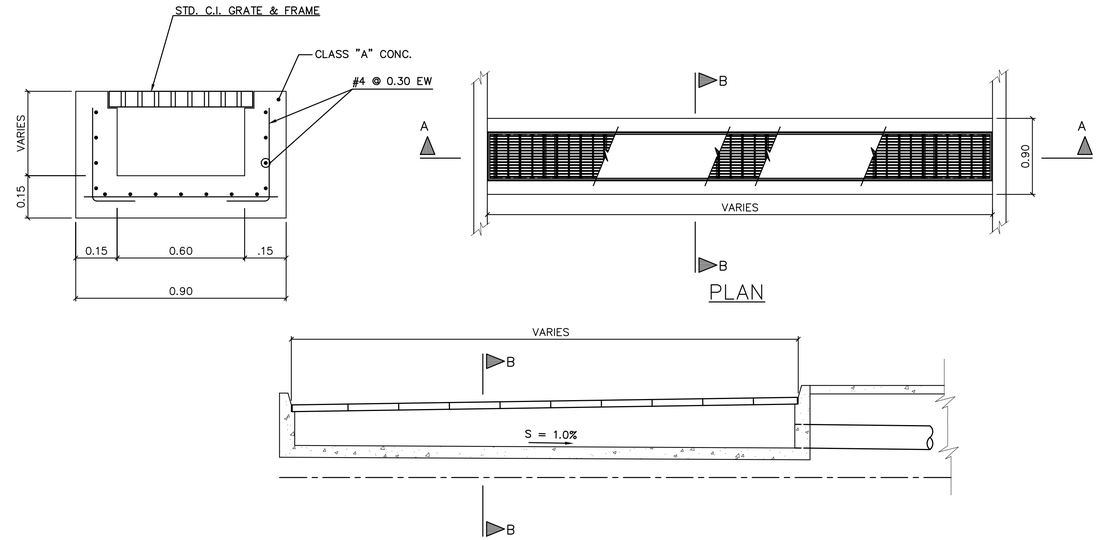
SCALE: NOT TO SCALE




## SECTION I-I

SCALE: NOT TO SCALE

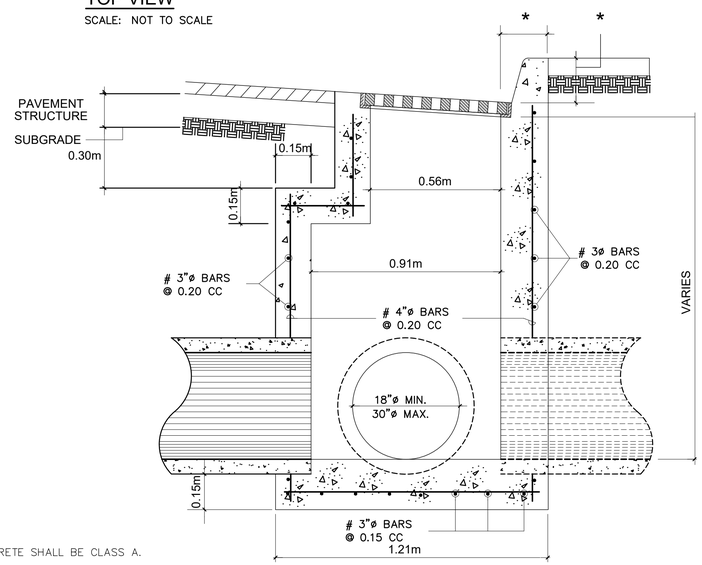
* THESE DIMENSIONS SHALL COMPLY WITH THE TYPE OF CURB, CURB AND GUTTER OR BARRIER AS SPECIFIED IN THE PROJECT.




## PLAN

## TRENCH DETAILS

SCALE: NTS

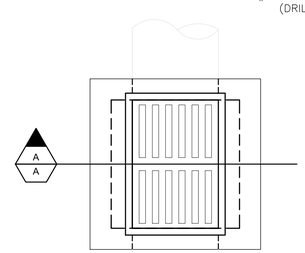



## SECTION J-J

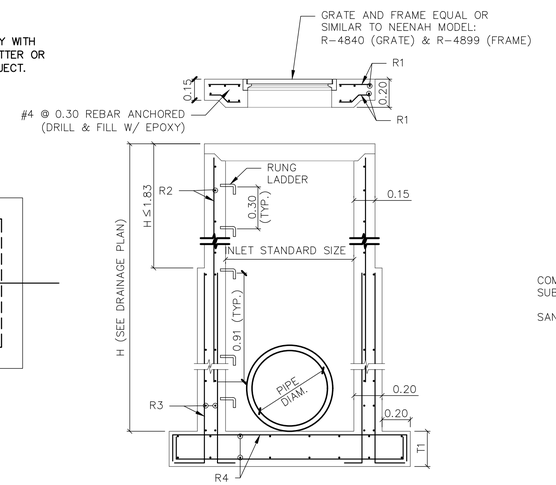
SCALE: NOT TO SCALE

## CURB INLET DETAILS FOR PIPES 18"Ø TO 30"Ø

SCALE: NTS




## PLAN

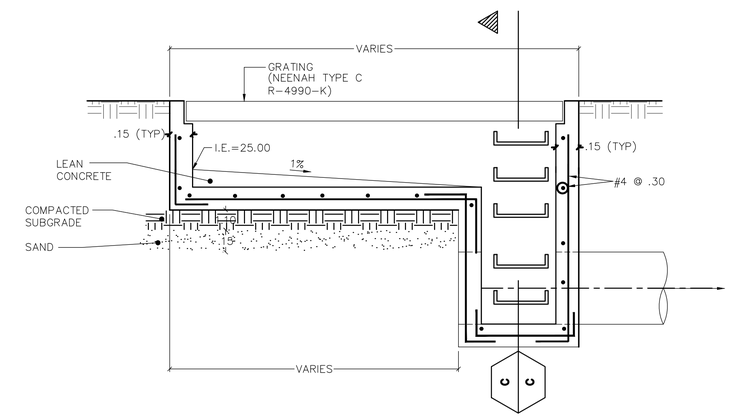



## SECTION A-A

| INLET STANDARD SIZE | R1 | R2 | R3 | R4 | T1 | CONCRETE F'c @ 28 DAYS | PIPE DIAM. |
|---|---|---|---|---|---|---|---|
| 1.22 X 1.22 (4'-0" X 4'-0") | #4 @ .25 | #4 @ .25 H ≤1.83 | #5 @ .25 H >1.83 | #4 @ .25 (H≤1.83) #5 @ .25 (H>1.83) | @ .25 (H≤1.83) @ .36 (H>1.83) | 4,000 psi | 24" @ 30" |

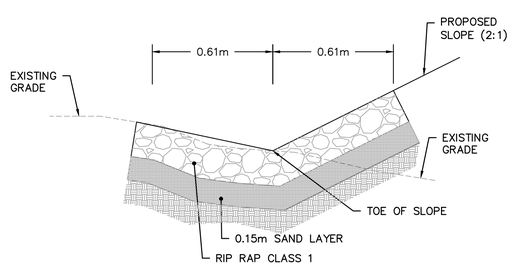
## INLET (TYPE I) DETAILS

SCALE: NTS




## CROSS GRATE DETAILS

SCALE: NTS




## TOE OF SLOPE DETAILS

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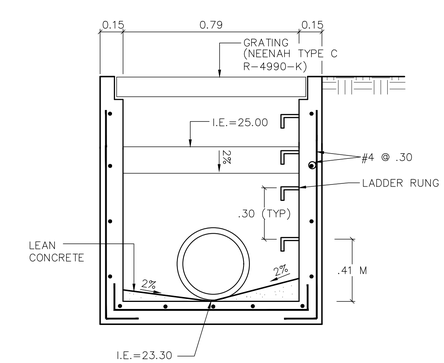


## SECTION C-C (MANHOLE)

SCALE: NTS

## NOTES:

1. PORTLAND CEMENT CONCRETE SHALL BE CLASS A.
2. CASTINGS FOR FRAME AND COVER SHALL BE GRAY CAST IRON, AASHTO SPECIFICATION M-105, CLASS 30B.
3. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE SPECIFIED.
4. REINFORCING STEEL SHALL BE GRADE 60, AASHTO M-31.
5. GRATE SHALL BE NEENAH MODEL R-4840 TYPE C OR EQUIVALENT
6. ANGLE FRAME SHALL BE NEENAH MODEL R-4899.
7. NO ALUMINUM STEPS WILL BE REQUIRED WHERE DEPTH IS 3'-0" OR LESS. INSTALL ONE STEP 15-3/4" ABOVE FLOOR WHEN DEPTH IS MORE THAN 3'-0" BUT LESS THAN 5'-0". WHERE DEPTH IS MORE THAN 5'-0", STEPS SHALL BE EVENLY SPACED AT 1'-0" INTERVALS FROM 15-3/4" ABOVE FLOOR TO WITHIN 2'-0" OF THE TOP OF THE BOX. PLACE STEPS IN WALL WITHOUT PIPE OPENING WHENEVER POSSIBLE, ADJACENT TO FRAME OPENING.

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

STORM SEWER DETAILS - I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: AS SHOWN
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2/20/2024 9:46:57 AM
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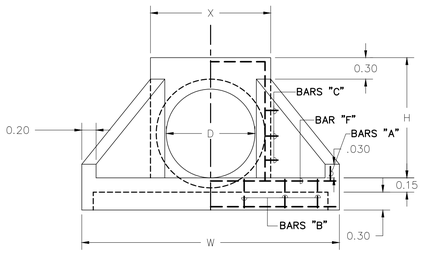
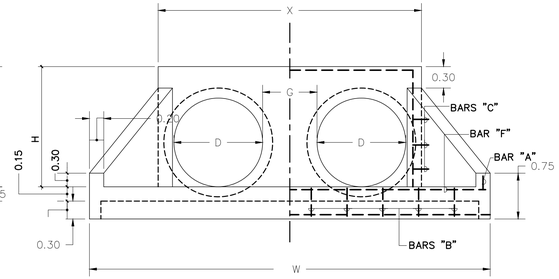
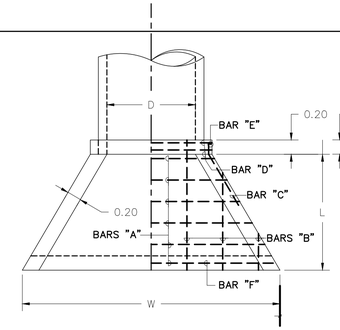


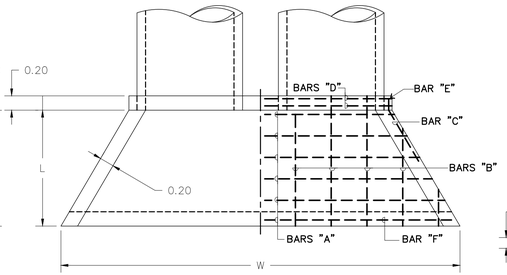

ELEVATION




ELEVATION




PLAN

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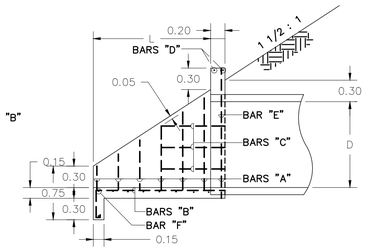


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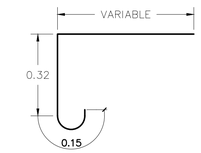



"B" BAR BENDING DETAIL

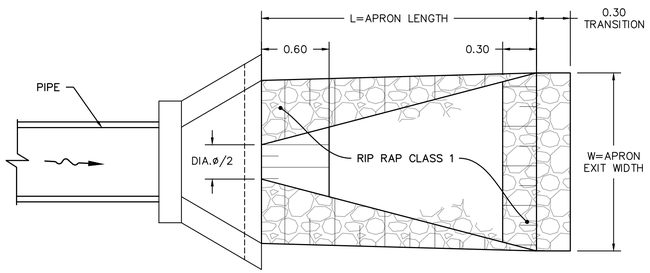
## HEADWALL TYPE B DETAILS

SCALE: NTS

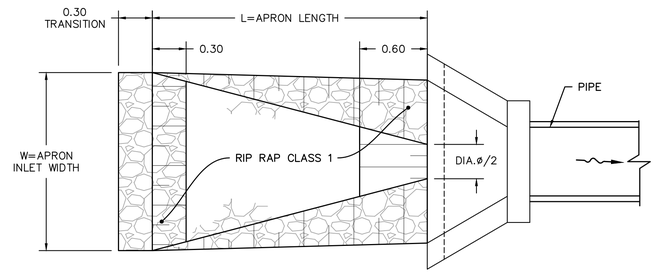
| TABLE OF DIMENSIONS AND APPROXIMATE QUANTITIES FOR TYPE "B" HEADWALLS | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NO. OF PIPES | DIA. | TABLE OF DIMENSIONS | | | | | BILL OF REINFORCING STEEL & QUANTITIES FOR ONE HEADWALL | | | | | | | | | | | | | | | | |
| | | | | | | | 5/8" ø BAR "A" @ 0.30M. C/C | | | | 3/8" ø BAR "B" @ 0.45M. C/C | | | | 3/8" ø BAR "C" @ 0.30M. C/C | | 3/8"ø BARS"D" | | 5/8"0 BARS"E" | | 3/8" ø BAR "F" | QUANTITIES | | |
| | | W | X | H | L | G | NO. | LENGTH | LENGTH | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | NO. | LENGTH | LENGTH | STEEL (LBS.) | CONC. (C.M.) | TRENCH EXC. (C.M.) |
| 1 | 24" | 1.91 | 1.08 | 1.07 | 0.71 | – | " | 2.46 | 2.51 | 2.56 | 4 | 1.22 | | | 2 | 0.91 | 2 | 2.01 | 2 | 1.12 | 2.84 | 67 | .95 | 1 |
| 1 | 30" | 2.31 | 1.23 | 1.22 | 0.94 | | " | 2.87 | 2.92 | 2.97 | 5 | 1.45 | | | 4 | 0.91 | 2 | 1.12 | 2 | 1.27 | 2.21 | 59 | 0.40 | 1 |
| 2 | 36" | 4.23 | 2.88 | 1.37 | 1.17 | 0.58 | " | 4.80<br>4.85 | 4.90 | 4.95 | 7 | 1.68 | 2 | 0.74 | 4 | 0.91 | 2 | 2.77 | 2 | 1.42 | 3.20 | 144 | 0.40 | 2 |
| 1 | 42" | 3.16 | 1.54 | 1.52 | 1.40 | – | " | 3.71<br>3.76 | 3.81 | 3.86 | 4 | 1.91 | 2 | 1.02 | 6 | 0.91 | 2 | 1.42 | 2 | 1.58 | 3.05 | 90 | 0.40 | 2 |
| 1 | 48" | 3.57 | 1.69 | 1.68 | 1.63 | – | " | 4.11<br>4.16 | 4.21<br>4.26 | 4.31 | 5 | 2.13 | 2 | 1.04 | 6 | 0.91 | 2 | 1.58 | 2 | 1.73 | 3.46 | 115 | 0.40 | 2 |

NOTES:

1. PORTLAND CEMENT CONCRETE SHALL BE CLASS A.
2. IN SUCH CASES WHEN THE PIPE IS NOT PERPENDICULAR TO THE HEADWALL AND/OR IF THE NUMBER OF PIPES EXCEED THOSE TABULATED, THE CONTRACTOR SHALL MODIFY THE DIMENSIONS AND QUANTITIES AS REQUIRED AND SUCH ADJUSTMENTS MUST BE APPROVED BY THE RESIDENT ENGINEER.




PLAN

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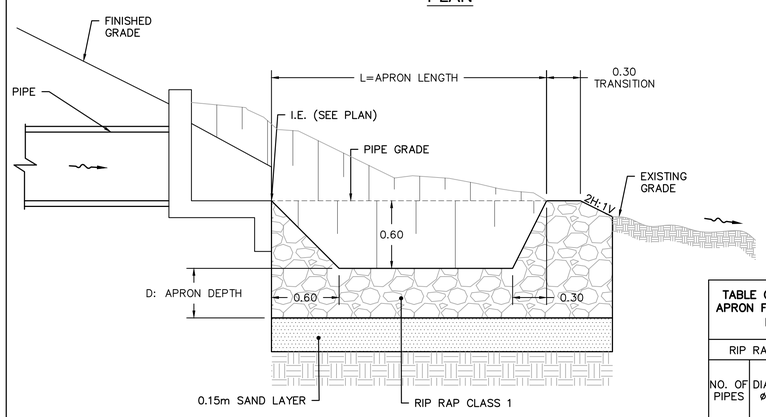
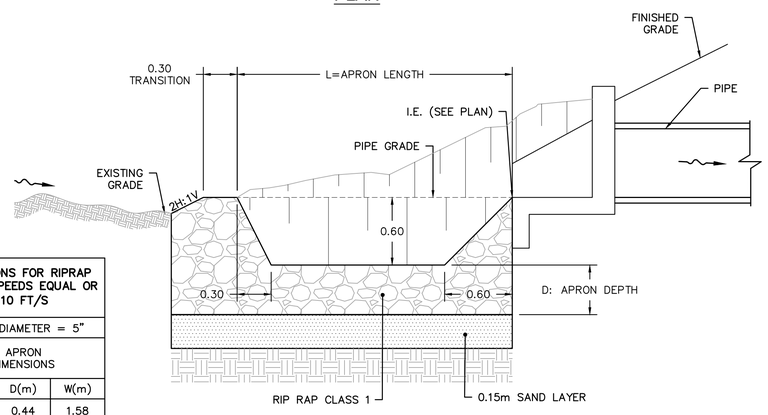



SECTION

RIRAP PROTECTION-OUTLET



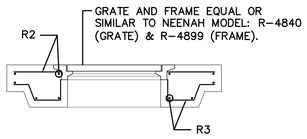

SECTION

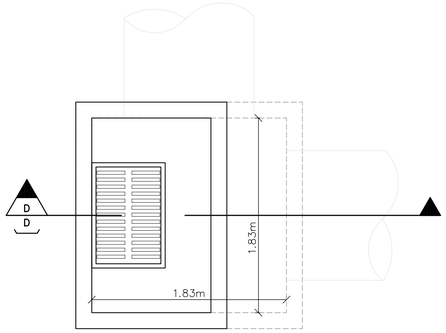
RIRAP PROTECTION-INLET

| TABLE OF DIMENSIONS FOR RIPRAP APRON FOR FLOW SPEEDS EQUAL OR LESS THAN 10 FT/S | | | | |
|---|---|---|---|---|
| RIP RAP CLASS. I DIAMETER = 5" | | | | |
| NO. OF PIPES | DIA. ø | APRON DIMENSIONS | | |
| | | L (m) | D(m) | W(m) |
| 1 | 24" | 2.44 | 0.44 | 1.58 |
| 1 | 30" | 3.05 | 0.44 | 1.98 |
| 1 | 42" | 4.27 | 0.44 | 2.77 |
| 1 | 48" | 4.88 | 0.44 | 3.17 |
| 2 | 36" | 7.32 | 0.44 | 4.75 |

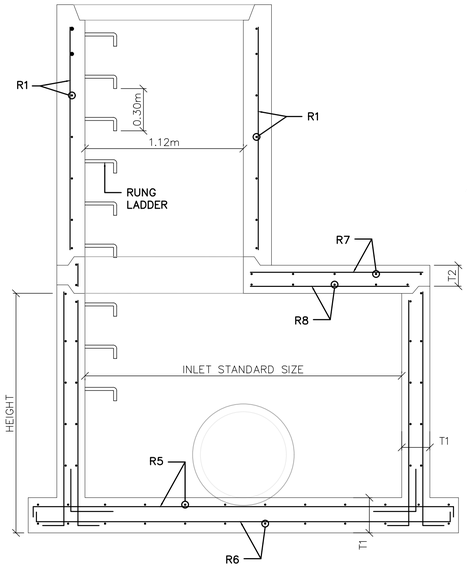
## RIPRAP PROTECTION DETAILS

SCALE: 1:25

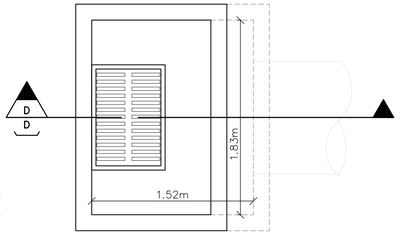



PLAN (TYPE IIIA)




SECTION D-D




PLAN (TYPE III)

| STANDARD SIZES | R1 | R2 | R3 | R5 | R6 | R7 | R8 | T1 | T2 | CONCRETE F'c @ 28 DAYS | PIPE DIAM. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TYPE III (1.83 X 1.52) | #4 @ .25 | #5 @ .25 | #5 @ .25 | #5 @ .25 | #5 @ .25 | #5 @ .25 | #6 @ .25 | .2032 | .1524 | 4,500 psi | 42" @ 48" |
| TYPE IIIA (1.83 X 1.83) | #4 @ .25 | #5 @ .25 | #5 @ .25 | #5 @ .25 | #5 @ .25 | #5 @ .25 | #6 @ .25 | .2032 | .1524 | 4,500 psi | 42" @ 48" |

## INLET TYPE III DETAILS

SCALE: NTS

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| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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BR&A LLC PROJECT MANAGEMENT / ENGINEERING / CONSULTING

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

STORM SEWER DETAILS - II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: AS SHOWN

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DWG. NO. 040-C-28

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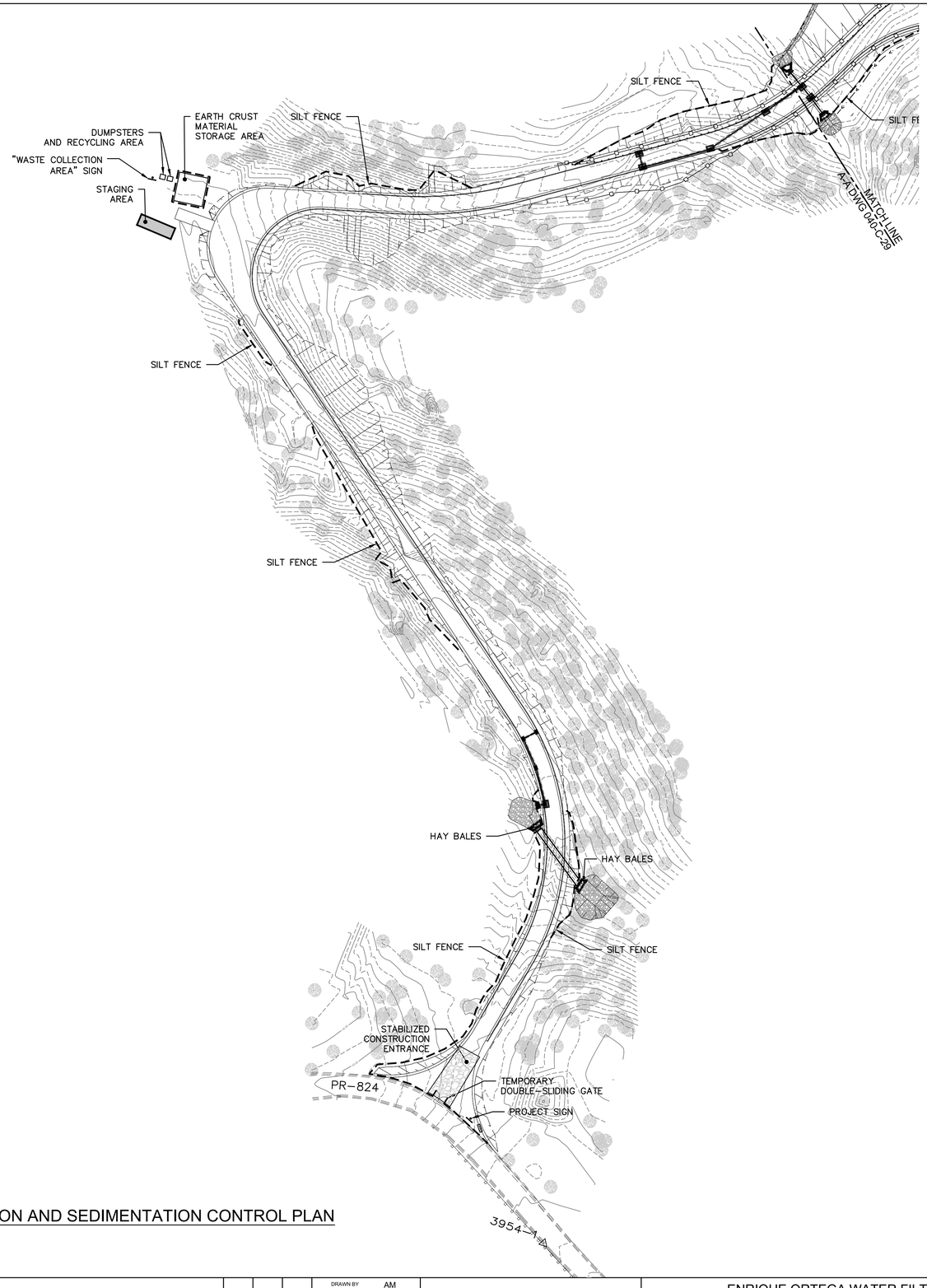


N

## ACCESS ROAD - EROSION AND SEDIMENTATION CONTROL PLAN

SCALE: 1:600

LEGEND:

- INLET PROTECTION
- HAY BALES
- SILT SOCKS
- SILT FENCE
- STABILIZED CONSTRUCTION ENTRANCE
- FLOW DIRECTION
- 3.5 CONTOUR LINES
- ×51.90 EXISTING GRADE

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE EXPRESSED IN METERS, UNLESS OTHERWISE NOTED.
2. FOR EROSION AND SEDIMENT CONTROL DETAILS AND NOTES, REFER TO DWG. 040–C–30.
3. ALL EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO COMMENCE WITH ANY DEMOLITION OR EXCAVATION, AND MAINTAINED THROUGHOUT THE DURATION OF THE CONSTRUCTION.

0 2 5 10 20m

SCALE: 1:600

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| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - EROSION AND SEDIMENTATION CONTROL PLAN - I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
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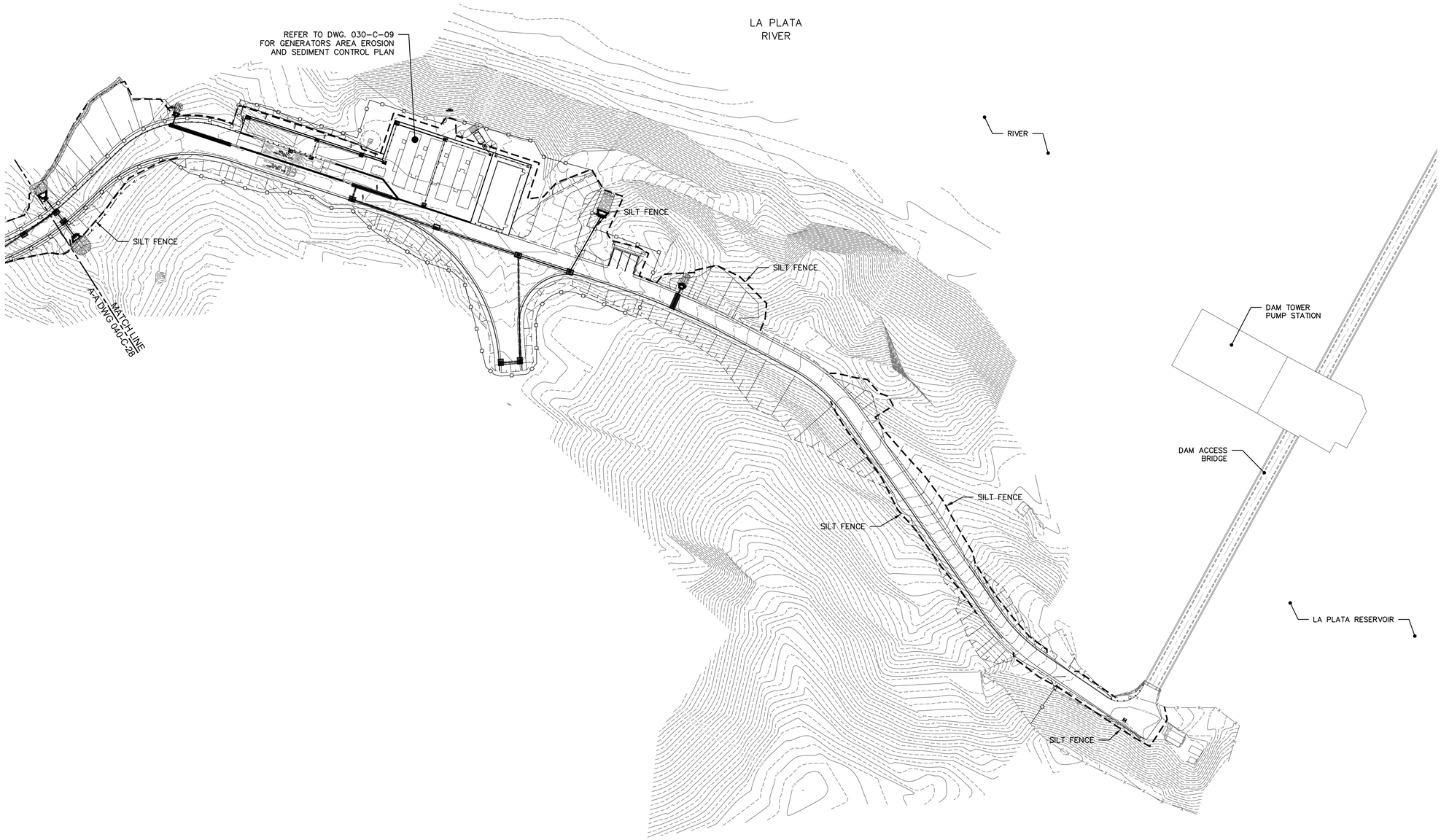


## LEGEND:

- INLET PROTECTION
- HAY BALES
- SILT SOCKS
- SILT FENCE
- STABILIZED CONSTRUCTION ENTRANCE
- FLOW DIRECTION
- 3.5 — CONTOUR LINES
- ×51.90 — EXISTING GRADE

## NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE EXPRESSED IN METERS, UNLESS OTHERWISE NOTED.
2. FOR EROSION AND SEDIMENT CONTROL DETAILS AND NOTES, REFER TO DWG. 040-C-30.
3. ALL EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO COMMENCE WITH ANY DEMOLITION OR EXCAVATION, AND MAINTAINED THROUGHOUT THE DURATION OF THE CONSTRUCTION.

N

## ACCESS ROAD - EROSION AND SEDIMENTATION CONTROL PLAN

SCALE: 1:600

0 2 5 10 20m

SCALE: 1:600

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| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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DESIGNED BY: MVM
CHECKED BY: LMR
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - EROSION AND SEDIMENTATION
CONTROL PLAN - II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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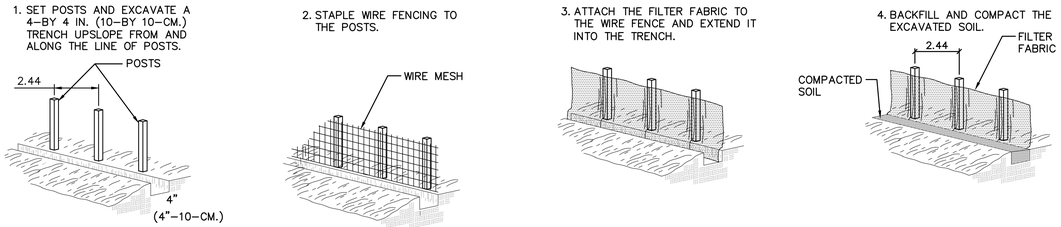
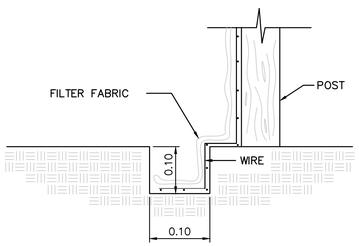
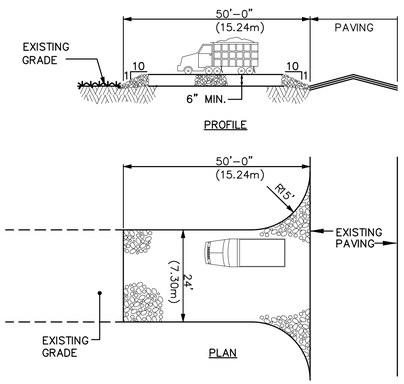



SILT FENCE CONSTRUCTION DETAIL
SCALE: NTS

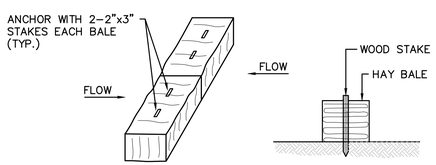
SILT FENCE INSTALLATION DETAILS
SCALE: NTS




NOTES:

1. PROVIDE APPROPRIATE TRANSITION BETWEEN STABILIZED CONSTRUCTION ENTRANCE AND EXIST. PAVEMENT.
2. STONE SIZE: USE AASHTO M–43 SIZE No. 2 STONE.

STABILIZED CONSTRUCTION ENTRANCE
SCALE: NTS




HAY BALE INSTALLATION
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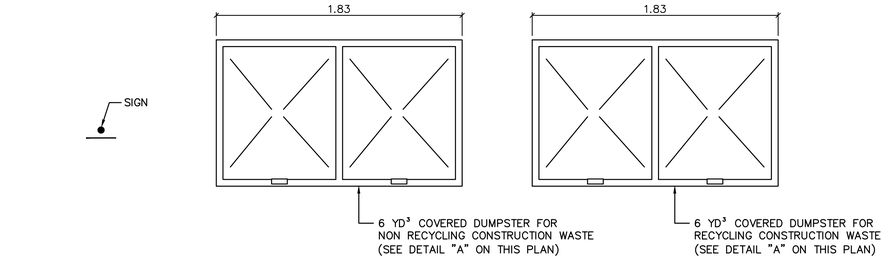
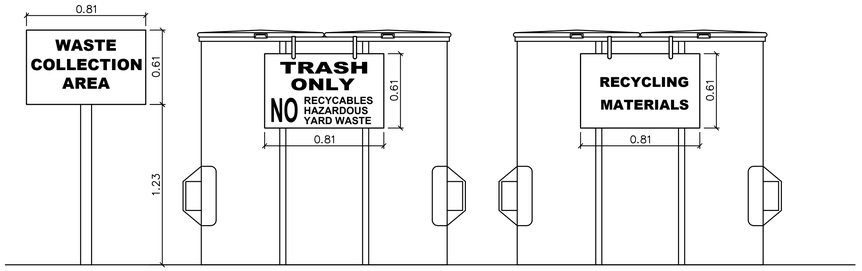



PLAN VIEW



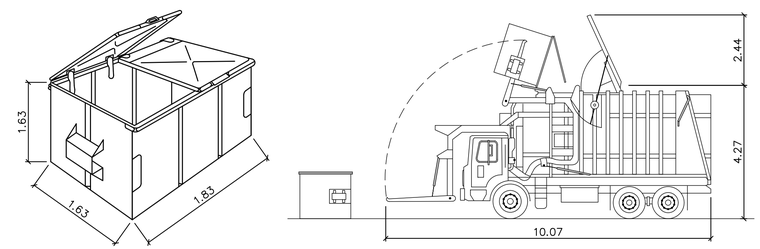

TRASH ONLY
DUMPSTER SIGN SPECS

- 5/8" PAINTED BOARD
- 6" METAL HANGER
- RED LETTERS

RECYCLING
MATERIALS

- 5/8" PAINTED BOARD
- 6" METAL HANGER
- RED LETTERS

FRONT VIEW

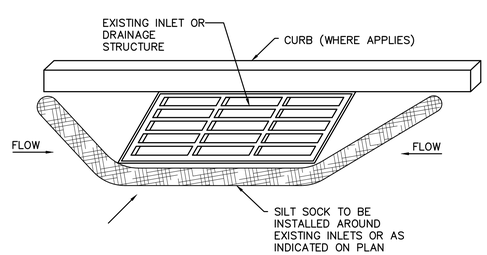



DETAIL "A"

DETAIL "B"

DUMPSTER AND RECYCLING AREA DETAILS
SCALE: NTS

PROJECT SIGN DETAILS
SCALE: NTS




INLET PROTECTIO (SILT SOCK ON INLET) DETAIL
SCALE: NTS

CES PLAN NOTES

1. THE CONTRACTOR SHALL PROTECT ALL CATCH BASINS, SWALES AND CHANNELS NEAR THE PROJECT AREA THAT COULD BE POTENTIALLY IMPACTED, PRIOR TO START ANY EXCAVATION. ALL MEASURES CAN BE REMOVED WHEN THE LOCAL CONSTRUCTION BE COMPLETED.
2. CONTRACTOR SHALL INSTALL EROSION CONTROL MEASURES IN THE PROJECT AREAS THAT COULD BE POTENTIALLY IMPACTED PRIOR TO START ANY CONSTRUCTION ACTIVITIES IN THAT AREA. THE CONTRACTOR COULD REMOVE THE CONTROL MEASURES WHEN THE AREA IS FULLY STABILIZED AS DETERMINED BY THE CES PLAN INSPECTOR.
3. CONTRACTOR SHALL INSPECT SEDIMENT BARRIERS AFTER EACH RAIN EVENT.REPAIRS SHALL BE DONE AS SOON AS POSSIBLE.SEDIMENT SHALL BE REMOVED FROM THE BARRIERS WHEN THEY REACH HALF THE HEIGHT OF THE BARRIER.
4. THE CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF THE STABILIZED CONSTRUCTION ENTRANCE AS DETAILED ON THIS PLAN.
5. THE CONTRACTOR SHALL MAINTAIN A WATER TANK TRUCK TO SPRAY IT AROUND THE WORKING AREAS WHEN NEEDED OR WHEN THE PROJECT INSPECTOR REQUIRES IT. A WATER HOSE WILL BE INSTALLED NEAR STABILIZED CONSTRUCTION ENTRANCE TO WASH THE CONSTRUCTION VEHICLES WHEELS.
6. THE CONTRACTOR SHALL STRICTLY FOLLOW THE GUIDELINES STATED AT THE CES PLAN APPROVED BY THE ENVIRONMENTAL QUALITY BOARD.
7. THE CONTRACTOR SHALL DISPOSE ALL WASTE MATERIALS AT AN APPROVED LANDFILL.
8. THE CONTRACTOR SHALL RESTORE PAVED AREAS AND RE–SEED GRASS AREAS AS SOON AS POSSIBLE OR AS INSTRUCTED BY THE PROJECT INSPECTOR.
9. ANY MODIFICATION PROPOSAL TO THE CES PLAN SHALL BE CONSULTED WITH THE DESIGNER IN ORDER TO AMEND THE APPROVED PLAN.
10. A SIGN SHALL BE INSTALLED AT EACH PROJECT ENTRANCE AS PER CONSOLIDATED GENERAL PERMIT CONDITION NUMBER 2.
11. CONTRACTOR CAN CHOOSE TO INSTALL DIFFERENT METHODS TO ACHIEVE THE REQUIRED PERFORMANCE.

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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

EROSION AND SEDIMENTATION CONTROL DETAILS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: AS SHOWN
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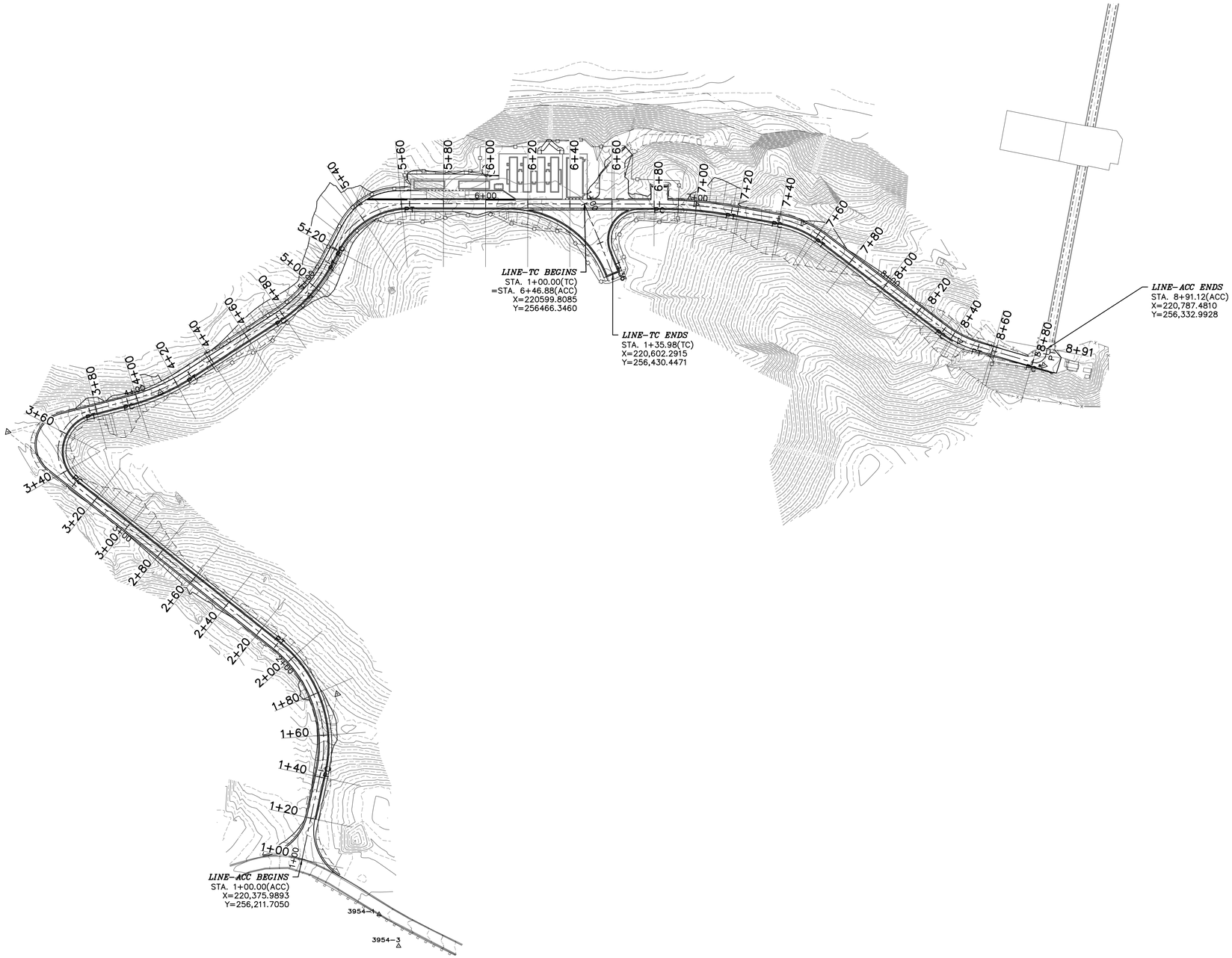


## ACCESS ROAD CROSS SECTION KEY MAP

SCALE: 1:1,000

NOTES:

1. FOR REFERENCE OF CROSS SECTIONS LOCATION.
2. REFER TO DWGS. 040-C-32 TO 040-C-38 FOR CROSS SECTIONS.

10 0 20 50

SCALE: 1:1,000

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| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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DESIGNED BY MVM
CHECKED BY LMR
APPR. BY GN

BR&A LLC

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B7 Tabonuco Street, Suite 1504
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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

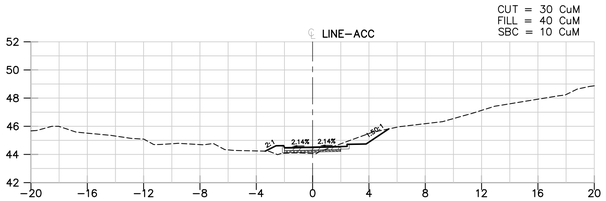
ACCESS ROAD CROSS SECTION KEY MAP

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:1,000

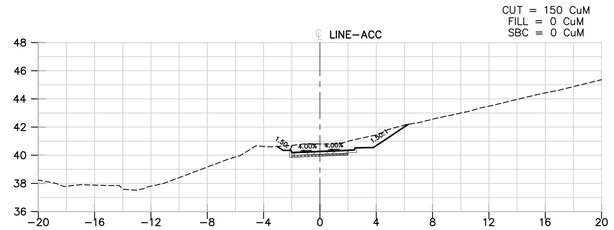
SHEET NO. 55 OF 145
DWG. NO. 040-C-32

040-c-32.dwg 2/20/2024 9:47:14 AM



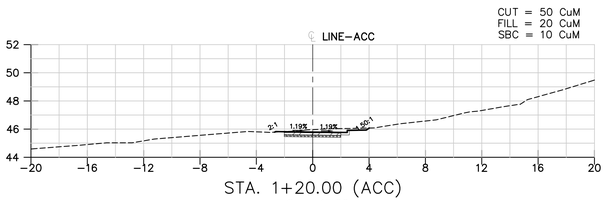

STA. 1+40.00 (ACC)

E.G. = 44.06
P.G. = 44.52
CUT = 2 SqM
FILL = 1 SqM
SBC = 1 SqM



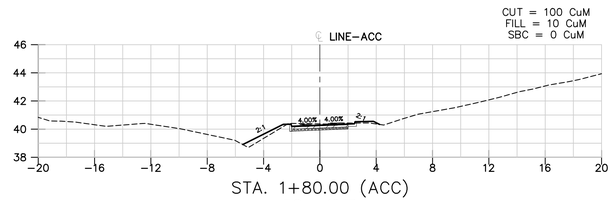

STA. 2+00.00 (ACC)

E.G. = 40.80
P.G. = 40.28
CUT = 7 SqM
FILL = 0 SqM
SBC = 0 SqM



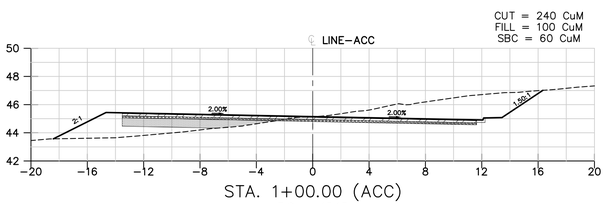

STA. 1+20.00 (ACC)

E.G. = 45.96
P.G. = 45.79
CUT = 3 SqM
FILL = 1 SqM
SBC = 0 SqM



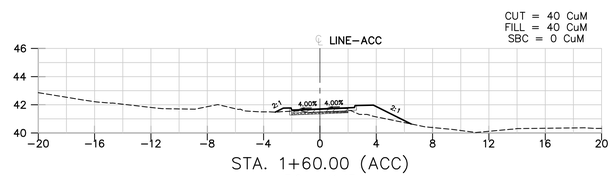

STA. 1+80.00 (ACC)

E.G. = 40.37
P.G. = 40.28
CUT = 3 SqM
FILL = 1 SqM
SBC = 0 SqM




STA. 1+00.00 (ACC)

E.G. = 45.15
P.G. = 45.15
CUT = 21 SqM
FILL = 9 SqM
SBC = 6 SqM




STA. 1+60.00 (ACC)

E.G. = 41.47
P.G. = 41.70
CUT = 1 SqM
FILL = 3 SqM
SBC = 0 SqM

2 0 5 10 15m

SCALE: 1:200

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BR&A LLC PROJECT MANAGEMENT • ENGINEERING • CONSULTING

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

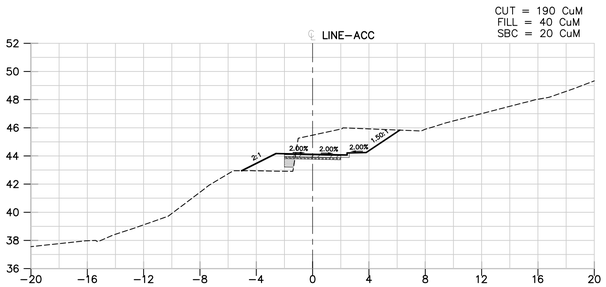
ACCESS ROAD - CROSS SECTIONS I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

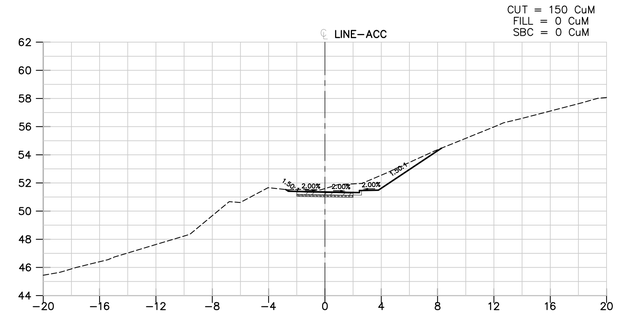
SHEET NO. 56 OF 145
DWG. NO. 040-C-33

2/20/2024 9:47:21 AM
040-C-33 to 39.dwg



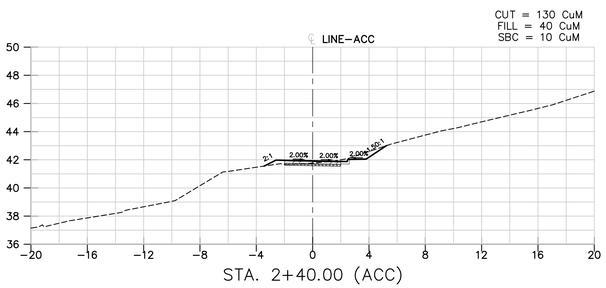

STA. 2+60.00 (ACC)

E.G. = 45.48
P.G. = 44.12
CUT = 11 SqM
FILL = 3 SqM
SBC = 1 SqM



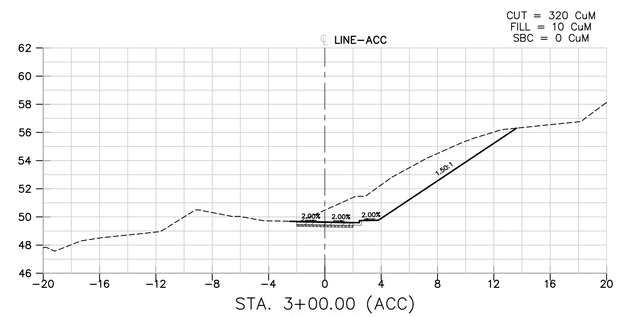

STA. 3+20.00 (ACC)

E.G. = 51.60
P.G. = 51.36
CUT = 7 SqM
FILL = 0 SqM
SBC = 0 SqM



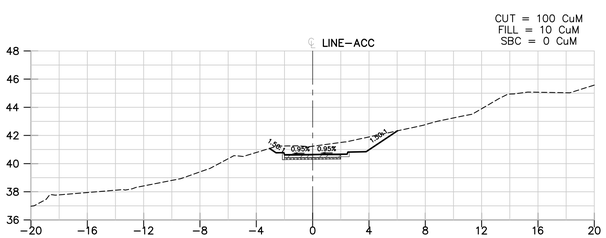

STA. 2+40.00 (ACC)

E.G. = 41.77
P.G. = 41.92
CUT = 2 SqM
FILL = 1 SqM
SBC = 0 SqM



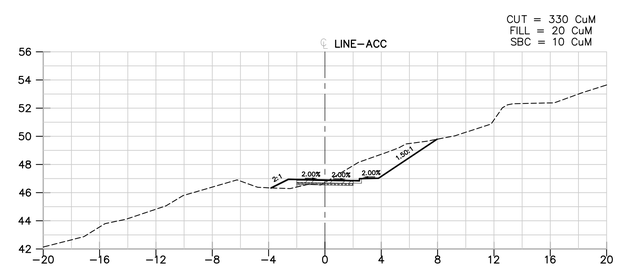

STA. 3+00.00 (ACC)

E.G. = 50.48
P.G. = 49.64
CUT = 25 SqM
FILL = 1 SqM
SBC = 0 SqM




STA. 2+20.00 (ACC)

E.G. = 41.23
P.G. = 40.65
CUT = 8 SqM
FILL = 0 SqM
SBC = 0 SqM




STA. 2+80.00 (ACC)

E.G. = 46.72
P.G. = 46.89
CUT = 8 SqM
FILL = 1 SqM
SBC = 1 SqM

2 0 5 10 15m

SCALE: 1:200

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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

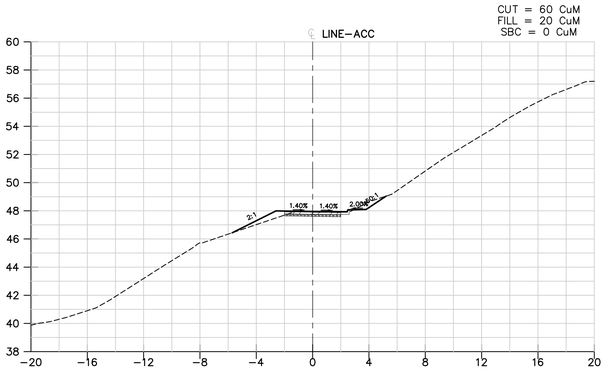
ACCESS ROAD - CROSS SECTIONS II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

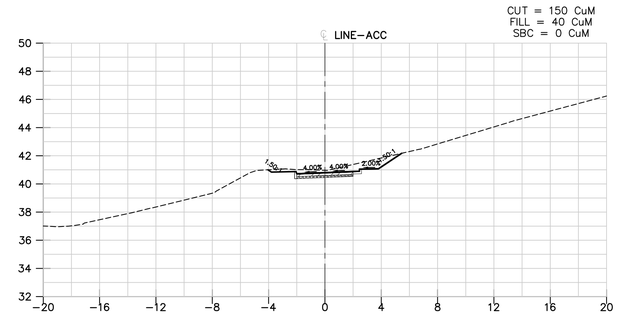
SHEET NO. 57 OF 145
DWG. NO. 040-C-34

2/20/2024 9:47:25 AM
040-C-33 to 39.dwg



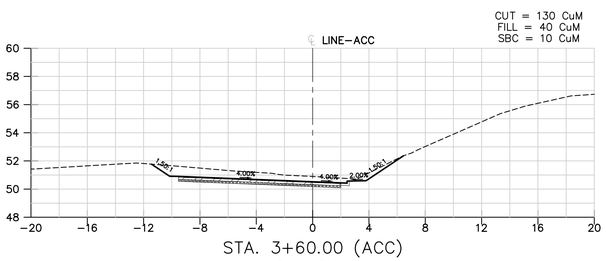

STA. 3+80.00 (ACC)

E.G. = 47.92
P.G. = 47.96
CUT = 2 SqM
FILL = 1 SqM
SBC = 0 SqM



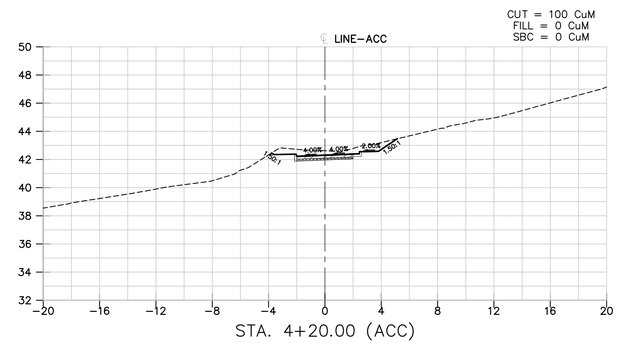

STA. 4+40.00 (ACC)

E.G. = 40.97
P.G. = 40.80
CUT = 5 SqM
FILL = 0 SqM
SBC = 0 SqM



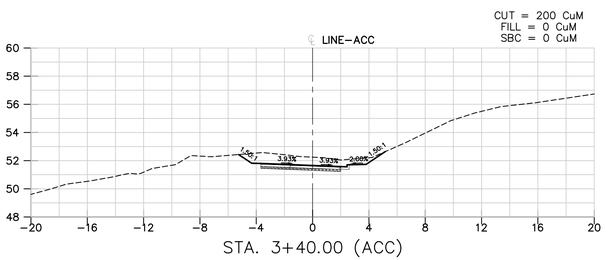

STA. 3+60.00 (ACC)

E.G. = 50.90
P.G. = 50.52
CUT = 12 SqM
FILL = 0 SqM
SBC = 0 SqM



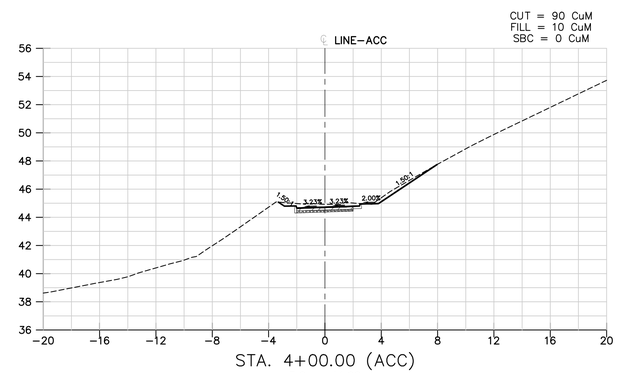

STA. 4+20.00 (ACC)

E.G. = 42.62
P.G. = 42.31
CUT = 5 SqM
FILL = 0 SqM
SBC = 0 SqM




STA. 3+40.00 (ACC)

E.G. = 52.25
P.G. = 51.66
CUT = 8 SqM
FILL = 0 SqM
SBC = 0 SqM




STA. 4+00.00 (ACC)

E.G. = 44.92
P.G. = 44.72
CUT = 4 SqM
FILL = 1 SqM
SBC = 0 SqM

2 0 5 10 15m

SCALE: 1:200

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| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
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Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

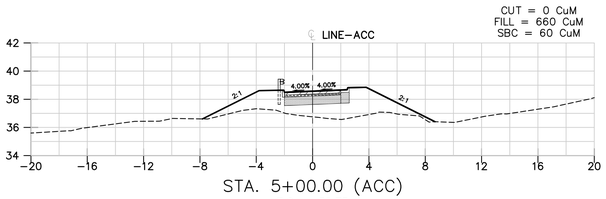
ACCESS ROAD - CROSS SECTIONS III

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

SHEET NO. 58 OF 145
DWG. NO. 040-C-35

2/20/2024 9:47:30 AM
040-C-33 to 39.dwg

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E.G. = 36.75
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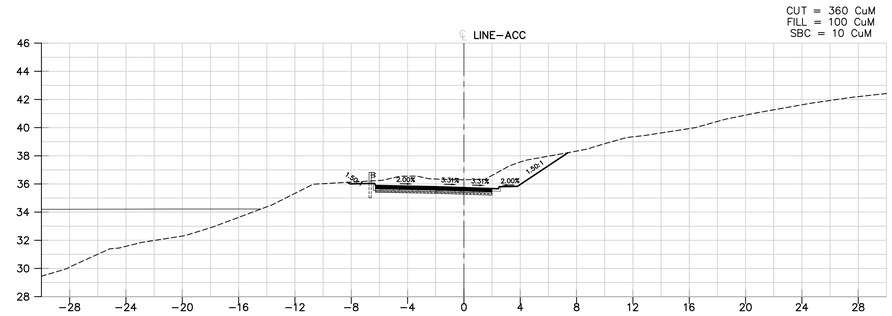
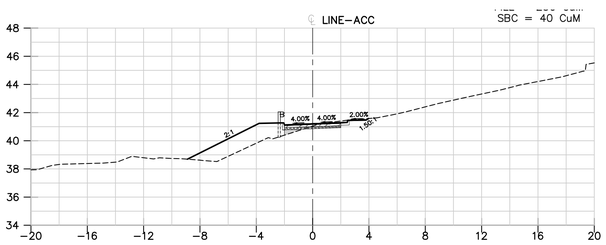
CUT = 0 SqM
FILL = 16 SqM
SBC = 3 SqM




STA. 5+60.00 (ACC)
E.G. = 36.30
P.G. = 35.74
CUT = 15 SqM
FILL = 0 SqM
SBC = 0 SqM




STA. 4+80.00 (ACC)
E.G. = 41.04
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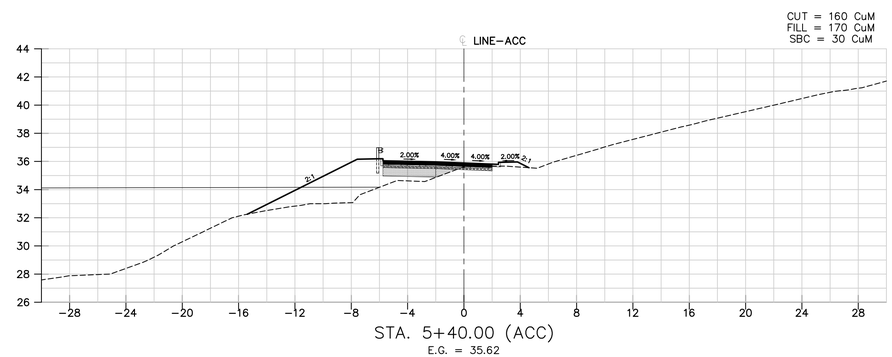
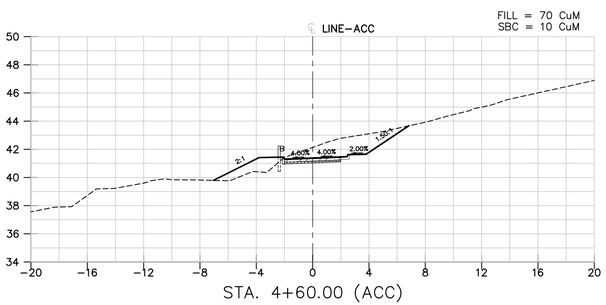
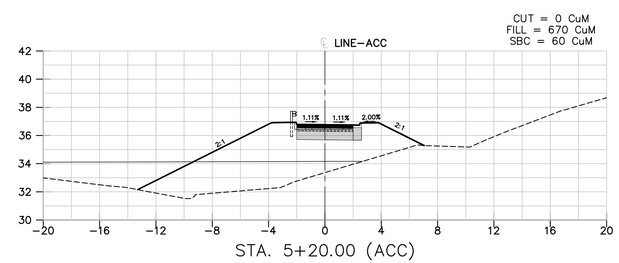
CUT = 2 SqM
FILL = 7 SqM
SBC = 1 SqM




STA. 5+40.00 (ACC)
E.G. = 35.62
P.G. = 35.89
CUT = 1 SqM
FILL = 17 SqM
SBC = 3 SqM




STA. 4+60.00 (ACC)
E.G. = 42.13
P.G. = 41.38
CUT = 10 SqM
FILL = 4 SqM
SBC = 0 SqM




STA. 5+20.00 (ACC)
E.G. = 33.36
P.G. = 36.76
CUT = 0 SqM
FILL = 50 SqM
SBC = 3 SqM

2 0 5 10 15m
SCALE: 1:200

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| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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00968-3028

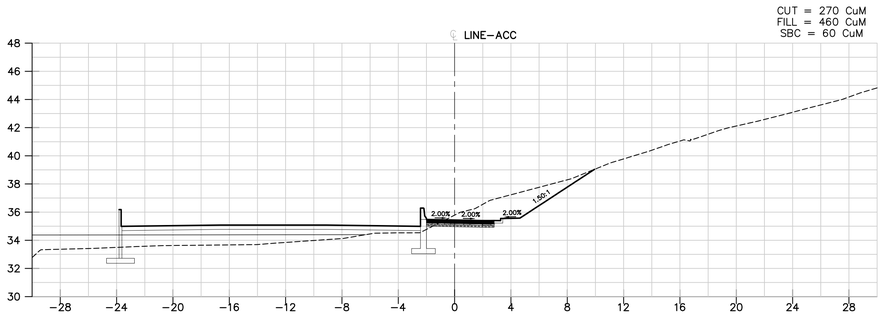
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - CROSS SECTIONS IV

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200
SHEET NO. 59 OF 145
DWG. NO. 040-C-36

2/20/2024 9:47:34 AM
040-c-33 to 39.dwg

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E.G. = 35.79
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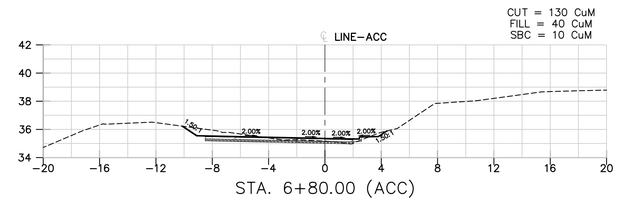
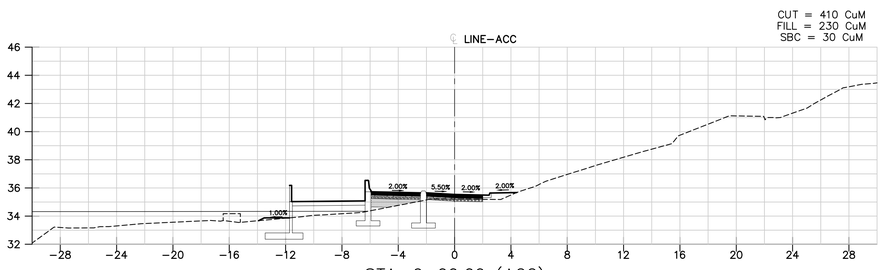
CUT = 22 SqM
FILL = 18 SqM
SBC = 1 SqM




STA. 6+80.00 (ACC)
E.G. = 35.16
P.G. = 35.36
CUT = 5 SqM
FILL = 1 SqM
SBC = 1 SqM




STA. 6+00.00 (ACC)
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CUT = 19 SqM
FILL = 5 SqM
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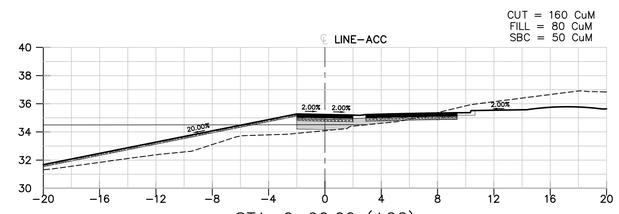


STA. 6+60.00 (ACC)
E.G. = 34.09
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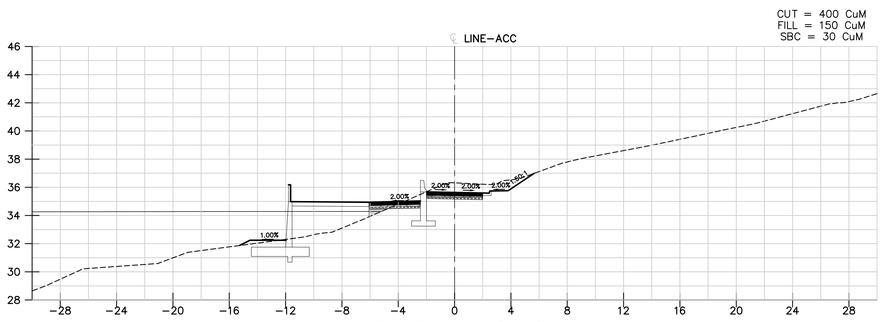
CUT = 11 SqM
FILL = 7 SqM
SBC = 4 SqM

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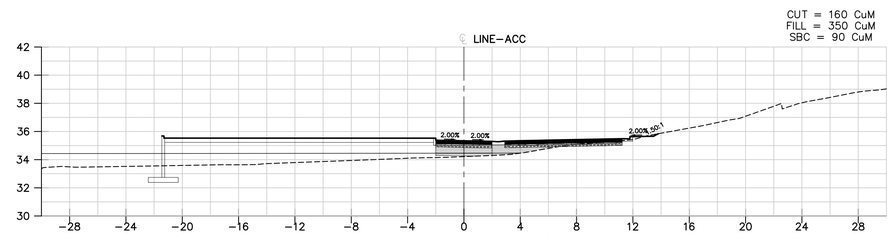
CUT = 21 SqM
FILL = 10 SqM
SBC = 1 SqM




STA. 6+40.00 (ACC)
E.G. = 34.22
P.G. = 35.34
CUT = 5 SqM
FILL = 28 SqM
SBC = 5 SqM

2 0 5 10 15m
SCALE: 1:200

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| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
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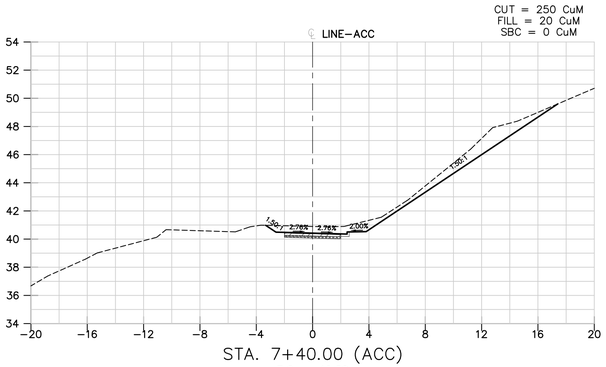
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - CROSS SECTIONS V

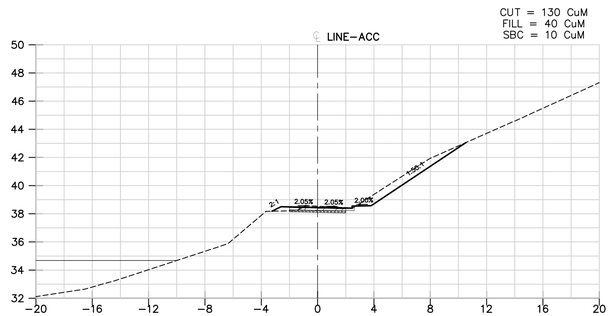
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200
SHEET NO. 60 OF 145
DWG. NO. 040-C-37

2/20/2024 9:47:38 AM
040-c-33 to 39.dwg




STA. 7+40.00 (ACC)
E.G. = 40.89
P.G. = 40.42
CUT = 14 SqM
FILL = 0 SqM
SBC = 0 SqM




STA. 7+20.00 (ACC)
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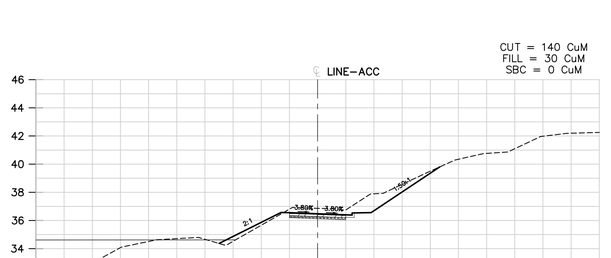
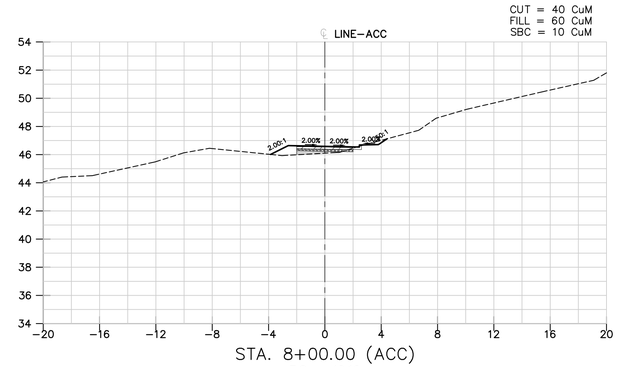
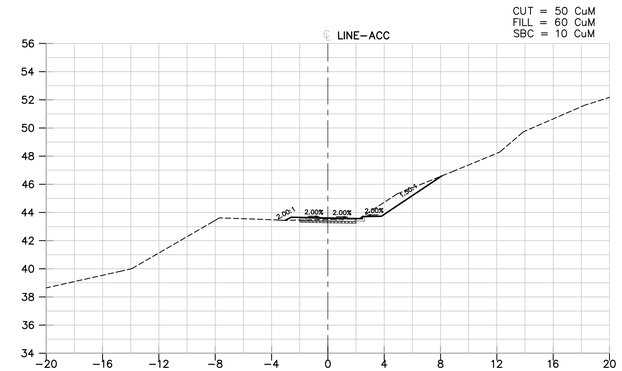
P.G. = 38.45
CUT = 6 SqM
FILL = 1 SqM
SBC = 0 SqM



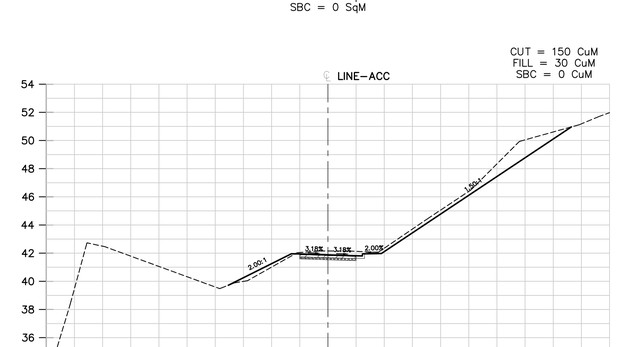

STA. 7+00.00 (ACC)
E.G. = 36.86
P.G. = 36.48
CUT = 8 SqM
FILL = 2 SqM
SBC = 0 SqM




STA. 8+00.00 (ACC)
E.G. = 46.10
P.G. = 46.59
CUT = 1 SqM
FILL = 5 SqM
SBC = 1 SqM




STA. 7+80.00 (ACC)
E.G. = 43.50
P.G. = 43.61
CUT = 4 SqM
FILL = 1 SqM
SBC = 0 SqM




STA. 7+60.00 (ACC)
E.G. = 42.15
P.G. = 41.88
CUT = 11 SqM
FILL = 2 SqM
SBC = 0 SqM

2 0 5 10 15m
SCALE: 1:200

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

DRAWN BY AM
DESIGNED BY MVM
CHECKED BY LMR
APPR. BY GN

BR&A LLC

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

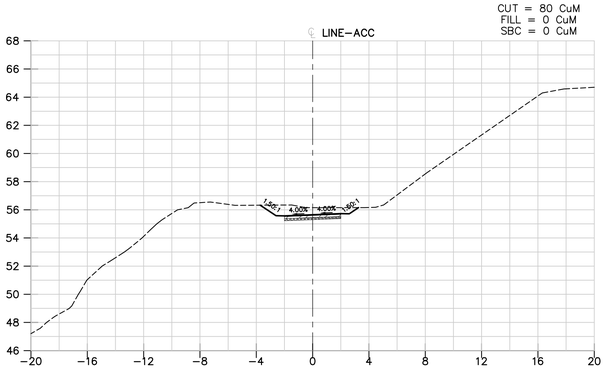
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

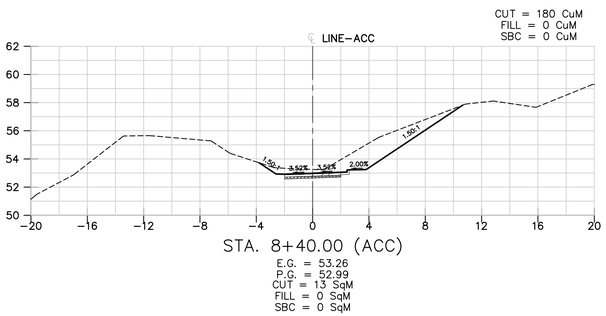
ACCESS ROAD - CROSS SECTIONS VI

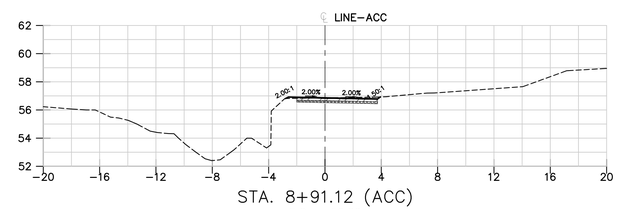
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

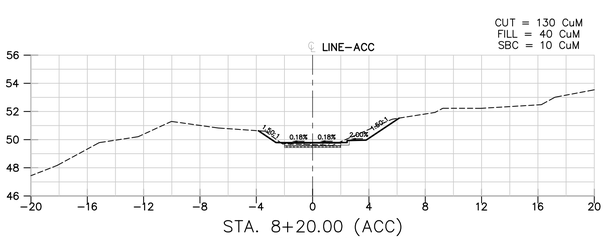
C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200
SHEET NO. 61 OF 145
DWG. NO. 040-C-38

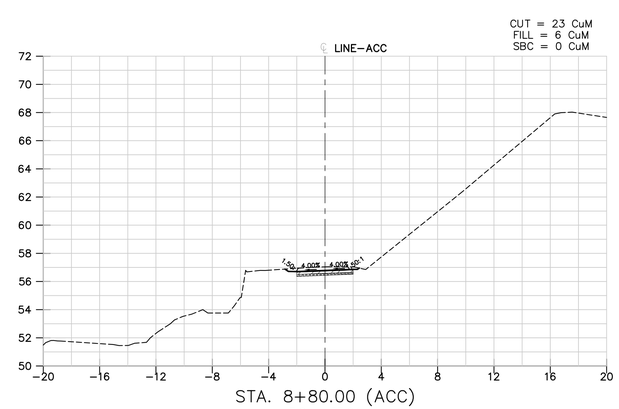
040-C-33 to 39.dwg
2/20/2024 9:47:43 AM




2 0 5 10 15m

SCALE: 1:200

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| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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BR&A LLC PROJECT MANAGEMENT • ENGINEERING • CIVIL

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87 Tabonuco Street, Suite 1504
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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

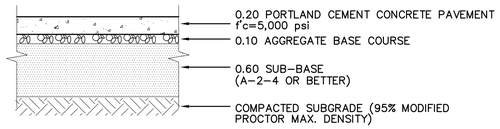
ACCESS ROAD - CROSS SECTIONS VII

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

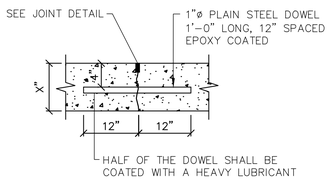
C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:200

SHEET NO. 62 OF 145
DWG. NO. 040-C-39

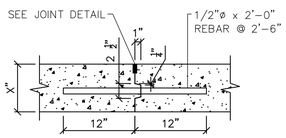
2/20/2024 9:47:47 AM
040-C-33 to 39.dwg




## CONCRETE PAVEMENT DETAIL
SCALE: NTS

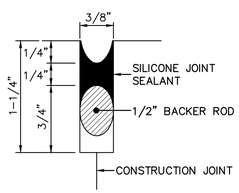



TRANSVERSE CONTRACTION JOINT

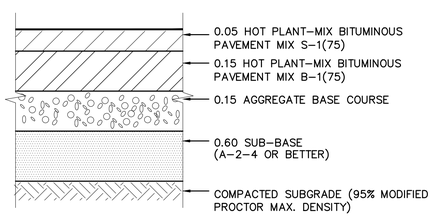



LONGITUDINAL CONTRACTION JOINT

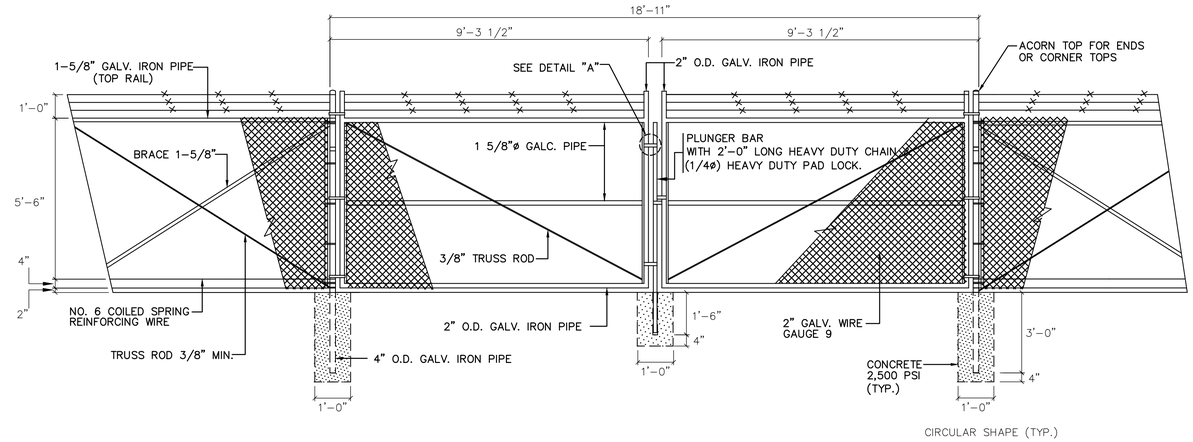
## CONCRETE PAVEMENT JOINT DETAILS
SCALE: NTS



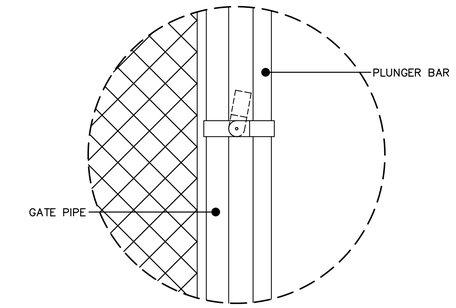

## JOINT DETAIL
SCALE: NTS



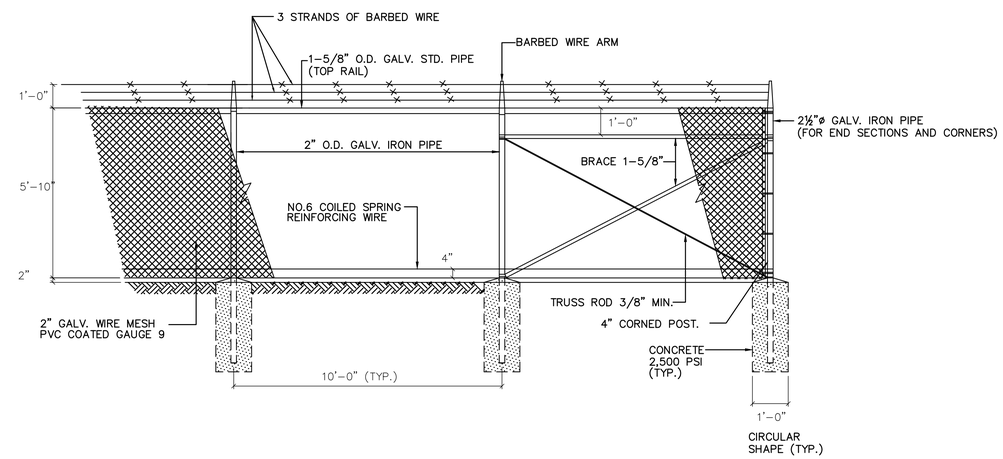

## ASPHALT PAVEMENT FOR ROADWAY DETAIL
SCALE: NTS

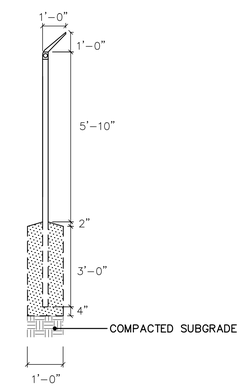



## CHAIN LINK DOUBLE SWING GATE DETAIL
SCALE: NTS

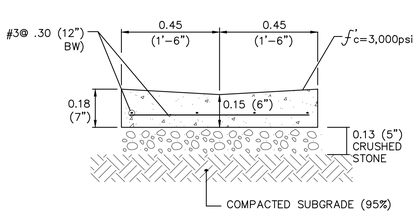



## DETAIL "A"

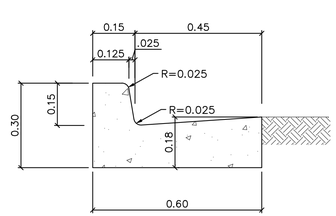


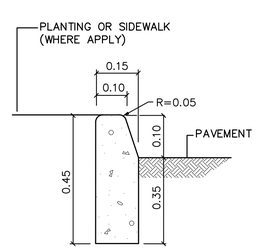

## CHAIN LINK FENCE DETAIL
SCALE: NTS




## CONCRETE GUTTER DETAIL
SCALE: NTS




## TYPICAL CURB AND GUTTER DETAIL
SCALE: NTS




## CONCRETE CURB DETAIL
SCALE: NTS

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| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

DRAWN BY: AM
DESIGNED BY: MVM
CHECKED BY: LMR
APPR. BY: GN

BR&A LLC

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

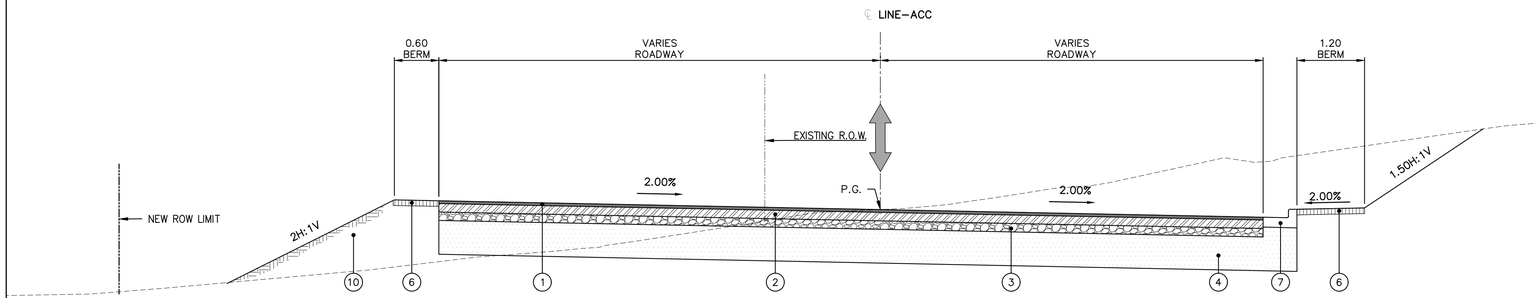
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

SECTIONS AND DETAILS I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: AS SHOWN
SHEET NO. 63 OF 145
DWG. NO. 040-C-40

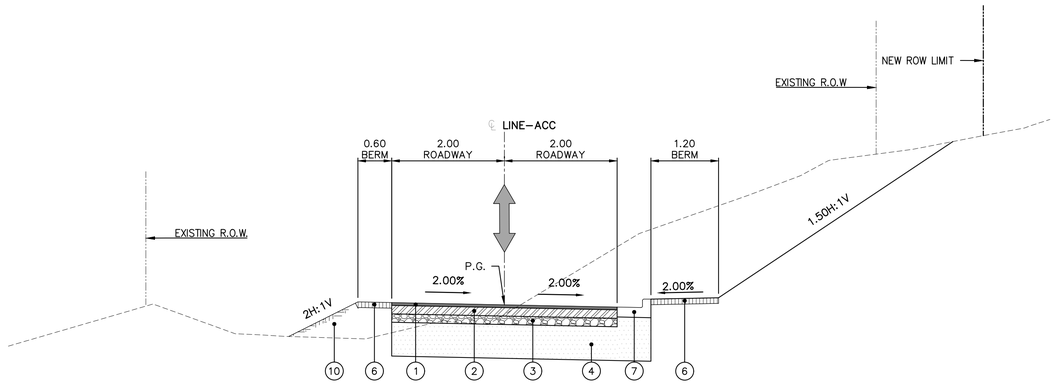
2/22/2024 9:47:55 AM
040-C-40 to 42.dwg




(STA. 1+05 (ACC) SHOWN)

## SECTION A 040–C–07

SCALE: 1:50




(STA. 2+80 (ACC) SHOWN)

## SECTION B 040–C–08

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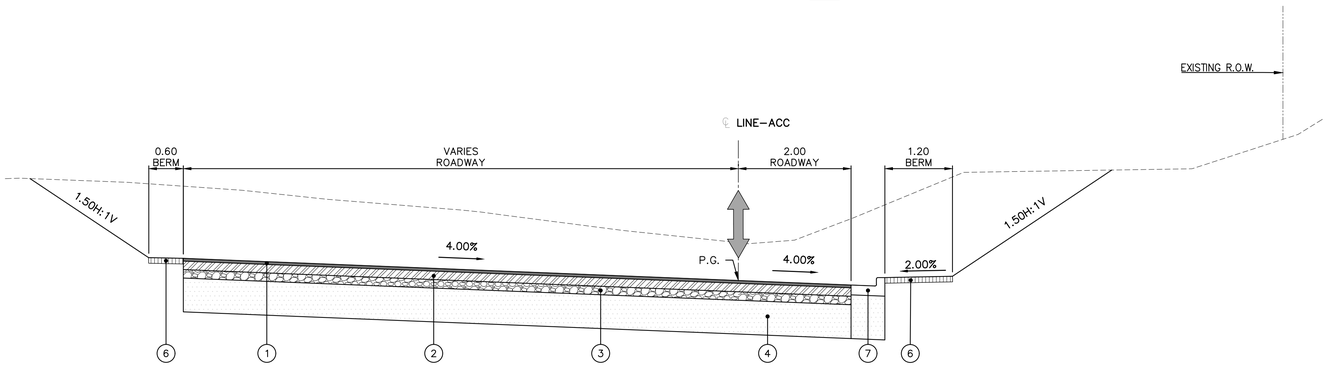
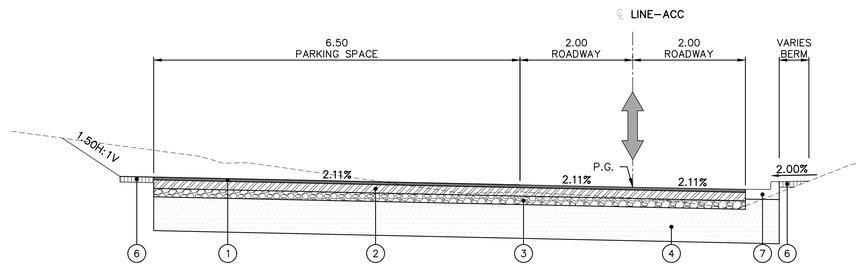



(STA. 3+50 (ACC) SHOWN)

## SECTION C 040–C–09

SCALE: 1:50




(STA. 6+80 (ACC) SHOWN)

## SECTION F 040–C–11

SCALE: 1:50

LEGEND:

| | | |
|---|---|---|
| 1 | 0.05m | HOT PLANT MIX BITUMINOUS PAVEMENT S (75) (12) (SPEC. 401) |
| 2 | 0.15m | HOT PLANT MIX BITUMINOUS PAVEMENT B (75) (34) (SPEC. 401) |
| 3 | 0.15m | AGGREGATE BASE COURSE, CLASS "A" (SPEC. 304) |
| 4 | 0.60m | SUBBASE (SPEC. 301) |
| 5 | 0.25m | PORTLAND CEMENT CONCRETE PAVEMENT (SPEC. 501) |
| 6 | | TURF ESTABLISHMENT (SEEDING WITH MULCH) & 0.10m TOP SOIL (SPEC. 627 & SPEC. 625) |
| 7 | | CONCRETE CURB & GUTTER, TYPE F (SPEC. 609) |
| 8 | | CONCRETE CURB, TYPE D (SPEC. 609) |
| 9 | | SHALLOW CONCRETE GUTTER (SPEC. 609) |
| 10 | | BORROW CLASS A (SPEC. 203) |
| 11 | | NEW W–BEAM SINGLE FACE GUARDRAIL (SPEC. 606) |

* CROSS SLOPE TO MATCH EXISTING

e FOR ROADWAY SUPERELEVATION

- HOT PLANT MIX BITUMINOUS PAVEMENT S (75) (12)
- PORTLAND CEMENT CONCRETE PAVEMENT
- HOT PLANT MIX BITUMINOUS PAVEMENT B (75) (34)
- AGGREGATE BASE COARSE
- STRUCTURE OR PAVEMENT TO BE DEMOLISHED
- BORROW CLASS A

NOTES:

1. SPECIFICATIONS FOR ROADWAY DESIGN WILL FOLLOW THE PUERTO RICO HIGHWAY AND TRANSPORTATION AUTHORITY STANDARD SPECIFICATIONS PER P.R.A.S.A. SPECIFICATIONS.
2. FOR GUARDRAIL DETAILS REFER TO PRHTA STANDARD DRAWINGS JUNE 2018 MASH REVISION.

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| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

| | |
|---|---|
| DRAWN BY | AM |
| DESIGNED BY | MVM |
| CHECKED BY | LMR |
| APPR. BY | GN |

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00968-3028

BR&A LLC

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

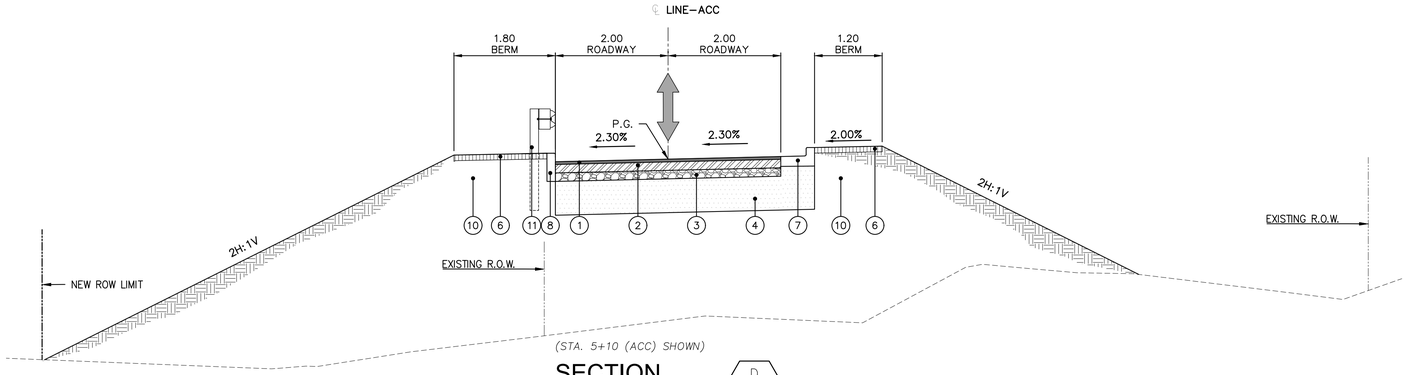
SECTIONS AND DETAILS II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

| | |
|---|---|
| C.I.P. No. | 1-70-9000 |
| PSWID | - |
| DATE: | SEPTEMBER / 2023 |
| SCALE: | AS SHOWN |
| SHEET NO. | 64 OF 145 |
| DWG. NO. | 040-C-41 |

2/20/2024 9:47:56 AM

040c-e41b-42.dwg




(STA. 5+10 (ACC) SHOWN)

## SECTION D 040–C–10

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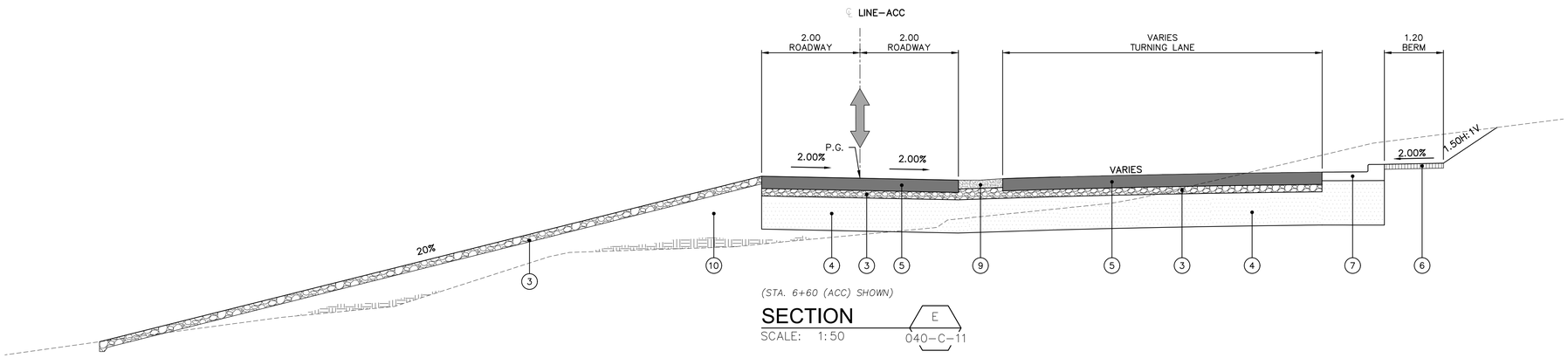


(STA. 6+60 (ACC) SHOWN)

## SECTION E 040–C–11

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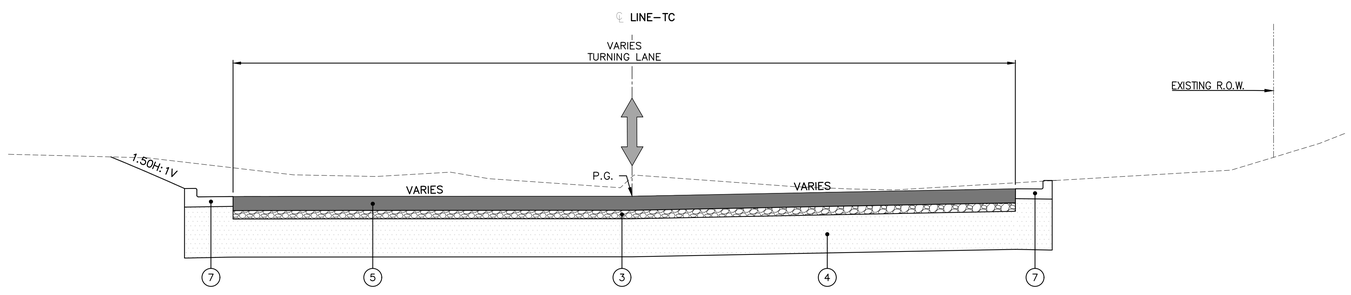


(STA. 1+15 (TC) SHOWN)

## SECTION G 040–C–11

SCALE: 1:50

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CHECKED BY LMR
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Guaynabo, PR
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

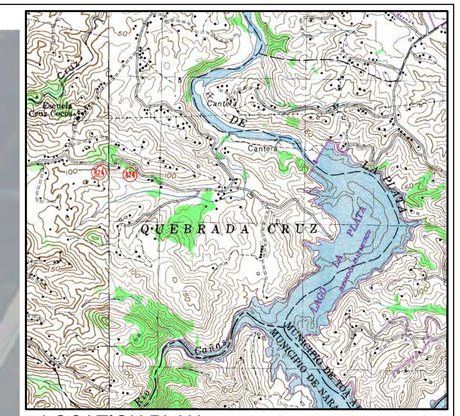
SECTIONS AND DETAILS III

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: AS SHOWN

SHEET NO. 65 OF 145
DWG. NO. 040-C-42

2/20/2024 9:47:57 AM
040C-40 to 42.dwg




## LOCATION PLAN

SCALE: 1:20,000

0 100 300 1,000m

SCALE: 1:20,000

## LEGEND

PROPERTY LIMIT

1 EXISTING R.O.W. PARCEL POINT

## NOTES:

1. HORIZONTAL PROJECTION REFERENCE TO NAD83(2011). VERTICAL DATUM TO PRVD2002 (AS SPECIFIED BY 2015-2017 USGS LIDAR.
2. PROPERTIES LIMITS WERE ESTABLISHED BASED ON INFORMATION OBTAINED FROM PUERTO RICO DIGITAL CADASTRE MANAGED BY THE MUNICIPAL REVENUE COLLECTION CENTER. (CRIM, BY ITS SPANISH ACRONYM).
3. PROPERTY 2774 LIMITS OBTAINED FROM THE "PLANO DE PARCELA A ADQ. DE GENOVEVA RIVERA Y EMELINA RIVERA" PLANS SIGNED ON 1969. THIS PROPERTY LIMIT LOCATION IS APPROXIMATE; THE SURVEYOR PROVIDED THE AREA BY ALIGNING THE PARCEL WITH THE DAM'S CENTER LINE AS ESTABLISHED ON THE ORIGINAL ACQUISITION PLANS. FURTHER INFORMATION IS REQUIRED TO CONFIRM THE TRUE BOUNDARIES OF THIS PARCEL. REFER TO TITLE RESEARCH STUDY PROVIDED BY SURVEYOR.

N

## EXISTING RIGHT OF WAY PLAN

SCALE: 1:800

0 5 15 30m

SCALE: 1:800

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| E | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| D | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| B | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

DRAWN BY AM
DESIGNED BY MVM
CHECKED BY LMR
APPR. BY GN

BR&A LLC PROJECT MANAGEMENT / ENGINEERING / CONSULTING

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

EXISTING RIGHT OF WAY PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:800

SHEET NO. 66 OF 145
DWG. NO. 040-C-43

2/22/2024 9:48:03 AM
040-C-43.dwg

| PARCEL NO. 102-01 (TO REMAIN) | | OWNER AUTORIDAD DE ACUEDUCTOS Y ALCANTARILLADOS | | |
|---|---|---|---|---|
| POINTS | BEARING | DISTANCE | NORTH COORDINATE | EAST COORDINATE |
| 1 TO 2 | N21°32'00"E | 49.530 | 256493.1962 | 220497.0951 |
| 2 TO 3 | S75°20'00"E | 20.110 | 256539.2692 | 220515.2747 |
| 3 TO 4 | S68°49'00"E | 25.080 | 256534.1775 | 220534.7295 |
| 4 TO 5 | S89°10'00"E | 70.790 | 256525.1147 | 220558.1148 |
| 5 TO 6 | S56°40'00"E | 40.270 | 256524.0852 | 220628.8973 |
| 6 TO 7 | S52°23'00"E | 58.760 | 256501.9564 | 220662.5424 |
| 7 TO 8 | S41°26'00"E | 36.770 | 256466.0908 | 220709.0869 |
| 8 TO 9 | S37°43'00"E | 45.770 | 256438.5233 | 220733.4194 |
| 9 TO 10 | S46°10'00"E | 55.890 | 256402.3172 | 220761.4195 |
| 10 TO 11 | S46°47'00"E | 28.380 | 256363.6098 | 220801.7362 |
| 11 TO 12 | S29°31'00"W | 192.380 | 256344.1764 | 220822.4186 |
| 12 TO 13 | N58°54'00"W | 29.290 | 256176.7649 | 220727.6375 |
| 13 TO 14 | N10°17'00"E | 111.190 | 256191.8942 | 220702.5574 |
| 14 TO 1 | N49°34'44"W | 295.956 | 256301.2981 | 220722.4066 |
| AREA= 40717.976 SqM = 10.360 Cdas. | | | | |

NOTES:

1. PARCEL SEGMENT TABLE ESTABLISHES LIMITS OF PROPERTY 2774 AS GRAPHICALLY PRESENTED BY THE SURVEYOR.

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| E | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| D | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| B | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| A | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

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BR&A LLC PROJECT MANAGEMENT • ENGINEERING • DESIGN

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Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

EXISTING RIGHT OF WAY
TABLE OF COORDINATES

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: AS SHOWN

SHEET NO. 67 OF 145
DWG. NO. 040-C-44

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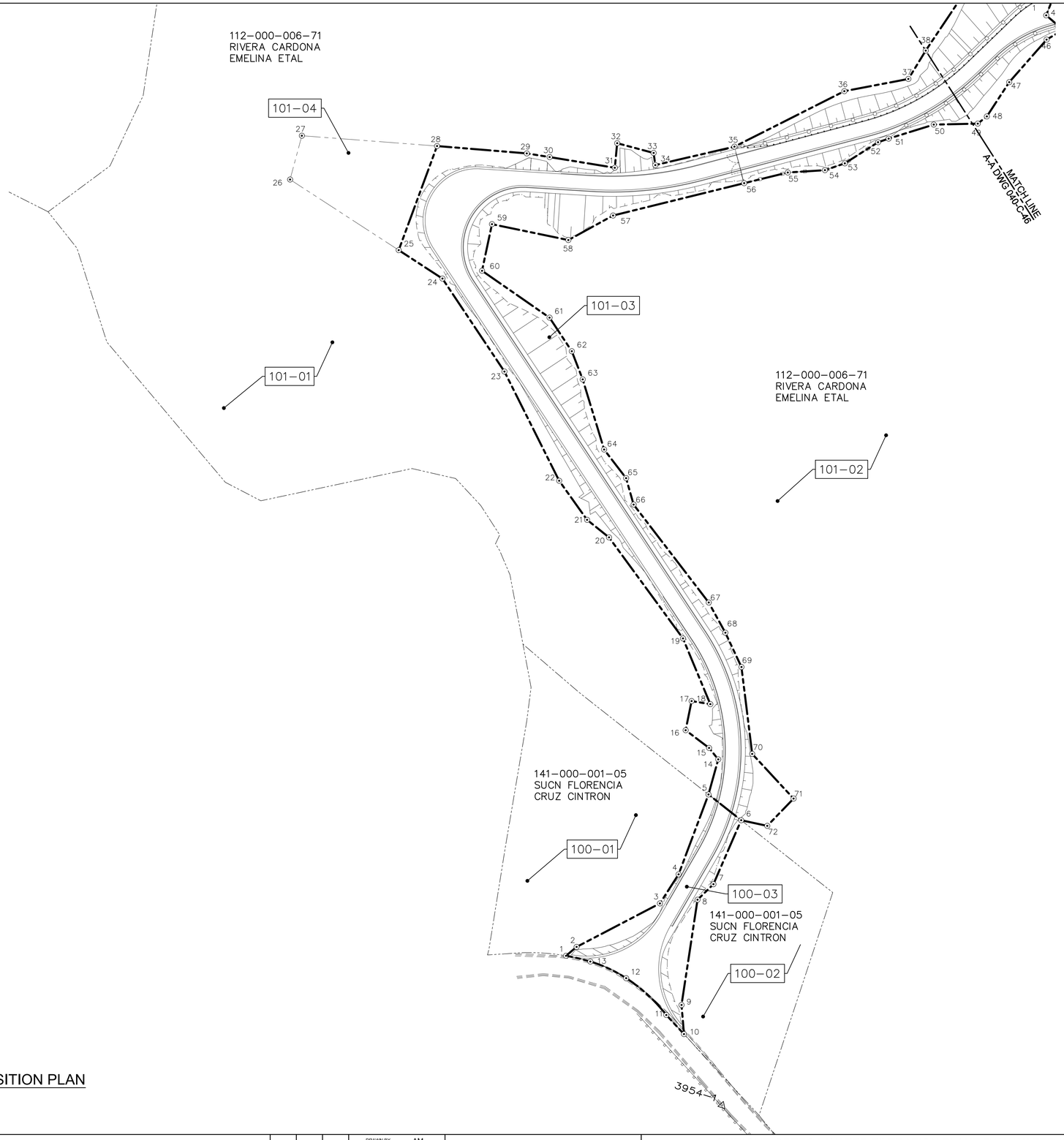


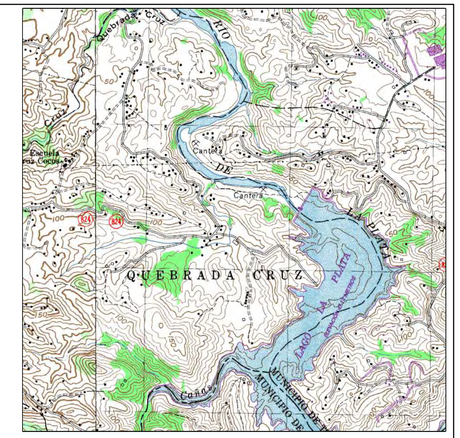


LOCATION PLAN
SCALE: 1:20,000

0 100 300 1,000m
SCALE: 1:20,000

LEGEND:

- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY LIMITS
- 14 NEW ROW MONUMENT
- 101-01 PARCEL NUMBER

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE EXPRESSED IN METERS, UNLESS OTHERWISE NOTED.
2. PROPERTY LIMITS TO BE ACQUIRED ADJACENT TO THE LIMITS OF PROPERTY 2774 ARE APPROXIMATE AND REQUIRE FURTHER INFORMATION TO CONFIRM THE TRUE LIMITS OF SAID PARCEL.
3. FOR LAND ACQUISITION TABLES, REFER TO DWG. 040-C-47 TO 48.

N

LAND ACQUISITION PLAN
SCALE: 1:600

0 2 5 10 20m
SCALE: 1:600

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| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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CHECKED BY LMR
APPR. BY GN

BR&A LLC

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

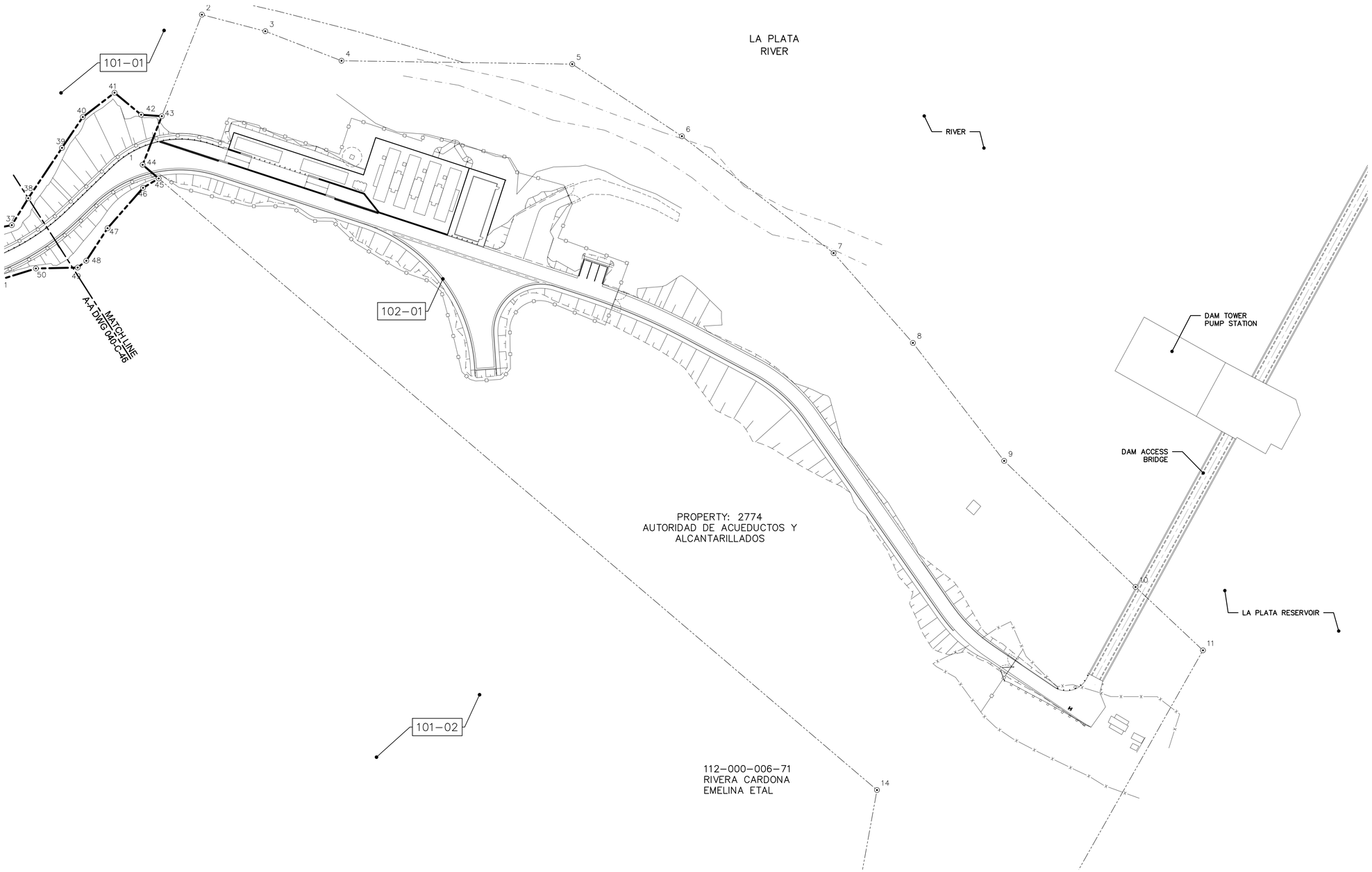
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

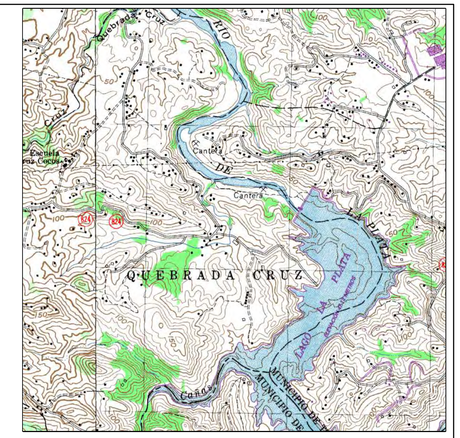
LAND ACQUISITION PLAN I
(FROM STA.1+00.00 TO STA.5+00.00)(ACC)

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:600
SHEET NO. 68 OF 145
DWG. NO. 040-C-45

040-c-45-6.dwg 2/20/2024 9:48:17 AM




## LOCATION PLAN

SCALE: 1:20,000

0 100 300 1,000m

SCALE: 1:20,000

## LAND ACQUISITION PLAN

SCALE: 1:600

0 2 5 10 20m

SCALE: 1:600

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| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

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DESIGNED BY MVM
CHECKED BY LMR
APPR. BY GN

BR&A LLC

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

LAND ACQUISITION PLAN II
(FROM STA.5+00.00 TO STA.9+91.12)(ACC)

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:600

SHEET NO. 69 OF 145
DWG. NO. 040-C-46

2/20/2024 9:46:19 AM
040-C-45-5.Dwg

| PARCEL NO. | | | OWNER | | |
|---|---|---|---|---|---|
| 100-03 (TO BE AQUIRED) | | | SUCN FLORENCIA CRUZ CINTRON | | |
| POINTS | BEARING | DISTANCE | NORTH COORDINATE | EAST COORDINATE | DESCRIPTION |
| 1 TO 2 | N49°59'13"E | 4.008 | 256219.1706 | 220357.2205 | NEW R.O.W. MONUMENT |
| 2 TO 3 | N62°25'18"E | 27.389 | 256221.7477 | 220360.2904 | NEW R.O.W. MONUMENT |
| 3 TO 4 | N32°45'06"E | 10.075 | 256234.4279 | 220384.5677 | NEW R.O.W. MONUMENT |
| 4 TO 5 | N20°30'17"E | 24.847 | 256242.9015 | 220390.0184 | NEW R.O.W. MONUMENT |
| 5 TO 6 | S51°43'43"E | 12.121 | 256266.1743 | 220398.7219 | NEW R.O.W. MONUMENT |
| 6 TO 7 | S23°25'45"W | 20.310 | 256258.6665 | 220408.2382 | NEW R.O.W. MONUMENT |
| 7 TO 8 | S45°41'10"W | 6.481 | 256240.0312 | 220400.1627 | NEW R.O.W. MONUMENT |
| 8 TO 9 | S08°38'29"W | 31.021 | 256235.5036 | 220395.5253 | NEW R.O.W. MONUMENT |
| 9 TO 10 | S04°49'45"E | 8.523 | 256204.8352 | 220390.8644 | NEW R.O.W. MONUMENT |
| 10 TO 11 | N42°44'31"W | 7.579 | 256196.3422 | 220391.5820 | NEW R.O.W. MONUMENT |
| 11 TO 12 | N47°30'07"W | 15.952 | 256201.9081 | 256201.91 | NEW R.O.W. MONUMENT |
| 12 TO 13 | N65°02'07"W | 11.551 | 256212.6318 | 256212.63 | NEW R.O.W. MONUMENT |
| 13 TO 1 | N76°38'44"W | 7.280 | 256217.4901 | 256217.49 | NEW R.O.W. MONUMENT |
| AREA= 978.419 = 0.2489 Cdas. | | | | | |

| PARCEL NO. | | | OWNER | | |
|---|---|---|---|---|---|
| 101-03 (TO BE AQUIRED) | | | EMELINA ETAL RIVERA CARDONA | | |
| POINTS | BEARING | DISTANCE | NORTH COORDINATE | EAST COORDINATE | DESCRIPTION |
| 5 TO 14 | N15°29'50"E | 10.611 | 256266.1743 | 220398.7219 | NEW R.O.W. MONUMENT |
| 14 TO 15 | N38°41'26"W | 4.273 | 256276.3991 | 220401.5570 | NEW R.O.W. MONUMENT |
| 15 TO 16 | N52°53'28"W | 8.561 | 256279.7345 | 220398.8856 | NEW R.O.W. MONUMENT |
| 16 TO 17 | N11°36'20"E | 8.669 | 256284.8998 | 220392.0581 | NEW R.O.W. MONUMENT |
| 17 TO 18 | S80°38'20"E | 5.525 | 256293.3913 | 220393.8020 | NEW R.O.W. MONUMENT |
| 18 TO 19 | N22°34'50"W | 20.731 | 256292.4926 | 220399.2538 | NEW R.O.W. MONUMENT |
| 19 TO 20 | N36°12'02"W | 36.496 | 256311.6348 | 220391.2933 | NEW R.O.W. MONUMENT |
| 20 TO 21 | N51°17'07"W | 8.183 | 256341.0854 | 220369.7383 | NEW R.O.W. MONUMENT |
| 21 TO 22 | N35°31'57"W | 13.987 | 256346.2033 | 220363.3534 | NEW R.O.W. MONUMENT |
| 22 TO 23 | N26°36'52"W | 35.590 | 256357.5860 | 220355.2245 | NEW R.O.W. MONUMENT |
| 23 TO 24 | N33°41'57"W | 32.558 | 256389.4046 | 220339.2809 | NEW R.O.W. MONUMENT |
| 24 TO 25 | N56°57'40"W | 15.195 | 256416.4919 | 220321.2165 | NEW R.O.W. MONUMENT |
| 25 TO 28 | N20°12'22"E | 32.332 | 256424.7761 | 220308.4790 | NEW R.O.W. MONUMENT |
| 28 TO 29 | S85°18'18"E | 26.228 | 256455.1187 | 220319.6466 | NEW R.O.W. MONUMENT |
| 29 TO 30 | S80°52'57"E | 6.742 | 256452.9719 | 220345.7861 | NEW R.O.W. MONUMENT |
| 30 TO 31 | S80°40'36"E | 19.246 | 256451.9035 | 220352.4431 | NEW R.O.W. MONUMENT |
| 31 TO 32 | N05°28'43"E | 7.192 | 256448.7855 | 220371.4349 | NEW R.O.W. MONUMENT |
| 32 TO 33 | S74°58'28"E | 10.987 | 256455.9446 | 220372.1216 | NEW R.O.W. MONUMENT |
| 33 TO 34 | S07°54'22"E | 3.560 | 256453.0962 | 220382.7331 | NEW R.O.W. MONUMENT |
| 34 TO 35 | N76°54'23"E | 23.675 | 256449.5696 | 220383.2228 | NEW R.O.W. MONUMENT |
| AREA= 6995.912 = 1.7799 Cdas. | | | | | |

| PARCEL NO. | | | OWNER | | |
|---|---|---|---|---|---|
| 101-03 (TO BE AQUIRED) | | | EMELINA ETAL RIVERA CARDONA | | |
| POINTS | BEARING | DISTANCE | NORTH COORDINATE | EAST COORDINATE | DESCRIPTION |
| 35 TO 36 | N63°11'39"E | 35.866 | 256454.9330 | 220406.2825 | NEW R.O.W. MONUMENT |
| 36 TO 37 | N79°13'05"E | 18.992 | 256471.1075 | 220438.2946 | NEW R.O.W. MONUMENT |
| 37 TO 38 | N31°27'16"E | 9.684 | 256474.6603 | 220456.9513 | NEW R.O.W. MONUMENT |
| 38 TO 39 | N33°47'26"E | 18.610 | 256482.9209 | 220462.0043 | NEW R.O.W. MONUMENT |
| 39 TO 40 | N34°01'48"E | 11.411 | 256498.3874 | 220472.3545 | NEW R.O.W. MONUMENT |
| 40 TO 41 | N52°31'14"E | 12.268 | 256507.8442 | 220478.7404 | NEW R.O.W. MONUMENT |
| 41 TO 42 | S50°21'26"E | 10.592 | 256515.3090 | 220488.4759 | NEW R.O.W. MONUMENT |
| 42 TO 43 | S85°58'35"E | 6.361 | 256508.5514 | 220496.6321 | NEW R.O.W. MONUMENT |
| 43 TO 44 | S21°32'00"W | 16.027 | 256508.1050 | 220502.9779 | NEW R.O.W. MONUMENT |
| 44 TO 45 | S49°34'44"E | 6.469 | 256493.1962 | 220497.0951 | NEW R.O.W. MONUMENT |
| 45 TO 46 | S59°01'06"W | 5.606 | 256489.0017 | 220502.0200 | NEW R.O.W. MONUMENT |
| 46 TO 47 | S41°17'13"W | 16.493 | 256486.1161 | 220497.2140 | NEW R.O.W. MONUMENT |
| 47 TO 48 | S33°09'04"W | 11.927 | 256473.7232 | 220486.3316 | NEW R.O.W. MONUMENT |
| 48 TO 49 | S51°45'02"W | 3.377 | 256463.7374 | 220479.8092 | NEW R.O.W. MONUMENT |
| 49 TO 50 | S88°43'28"W | 12.815 | 256461.6470 | 220477.1575 | NEW R.O.W. MONUMENT |
| 50 TO 51 | S72°44'28"W | 13.772 | 256461.3617 | 220464.3452 | NEW R.O.W. MONUMENT |
| 51 TO 52 | S71°08'14"W | 3.259 | 256457.2756 | 220451.1929 | NEW R.O.W. MONUMENT |
| 52 TO 53 | S57°32'03"W | 11.464 | 256456.2219 | 220448.1089 | NEW R.O.W. MONUMENT |
| 53 TO 54 | S71°07'22"W | 6.119 | 256450.0680 | 220438.4365 | NEW R.O.W. MONUMENT |
| 54 TO 55 | S86°22'22"W | 10.856 | 256448.0883 | 220432.6467 | NEW R.O.W. MONUMENT |
| AREA= 6995.912 = 1.7799 Cdas. | | | | | |

| PARCEL NO. | | | OWNER | | |
|---|---|---|---|---|---|
| 101-03 (TO BE AQUIRED) | | | EMELINA ETAL RIVERA CARDONA | | |
| POINTS | BEARING | DISTANCE | NORTH COORDINATE | EAST COORDINATE | DESCRIPTION |
| 55 TO 56 | S76°15'03"W | 13.074 | 256447.4015 | 220421.8124 | NEW R.O.W. MONUMENT |
| 56 TO 57 | S76°08'26"W | 39.338 | 256444.2941 | 220409.1129 | NEW R.O.W. MONUMENT |
| 57 TO 58 | S61°14'40"W | 14.860 | 256434.8711 | 220370.9205 | NEW R.O.W. MONUMENT |
| 58 TO 59 | N78°15'21"W | 22.718 | 256427.7222 | 220357.8928 | NEW R.O.W. MONUMENT |
| 59 TO 60 | S12°04'22"W | 13.876 | 256432.3462 | 220335.6506 | NEW R.O.W. MONUMENT |
| 60 TO 61 | S55°12'36"E | 23.945 | 256418.7767 | 220332.7483 | NEW R.O.W. MONUMENT |
| 61 TO 62 | S33°33'05"E | 11.749 | 256405.1144 | 220352.4133 | NEW R.O.W. MONUMENT |
| 62 TO 63 | S21°09'11"E | 8.796 | 256395.3228 | 220358.9068 | NEW R.O.W. MONUMENT |
| 63 TO 64 | S16°57'35"E | 21.360 | 256387.1195 | 220362.0810 | NEW R.O.W. MONUMENT |
| 64 TO 65 | S37°30'42"E | 10.520 | 256366.6889 | 220368.3115 | NEW R.O.W. MONUMENT |
| 65 TO 66 | S15°50'28"E | 8.001 | 256358.3439 | 220374.7175 | NEW R.O.W. MONUMENT |
| 66 TO 67 | S37°29'08"E | 35.972 | 256350.6471 | 220376.9015 | NEW R.O.W. MONUMENT |
| 67 TO 68 | S28°50'43"E | 10.044 | 256322.1032 | 220398.7924 | NEW R.O.W. MONUMENT |
| 68 TO 69 | S25°08'05"E | 11.035 | 256313.3056 | 220403.6380 | NEW R.O.W. MONUMENT |
| 69 TO 70 | S07°02'34"E | 25.520 | 256303.3159 | 220408.3249 | NEW R.O.W. MONUMENT |
| 70 TO 71 | S42°48'56"E | 17.735 | 256277.9889 | 220411.4539 | NEW R.O.W. MONUMENT |
| 71 TO 72 | S43°57'19"W | 11.046 | 256264.9793 | 220423.5074 | NEW R.O.W. MONUMENT |
| 72 TO 6 | N77°50'10"W | 7.777 | 256257.0278 | 220415.8407 | NEW R.O.W. MONUMENT |
| 6 TO 5 | N51°43'43"W | 12.121 | 256258.6665 | 220408.2382 | NEW R.O.W. MONUMENT |
| AREA= 6995.912 = 1.7799 Cdas. | | | | | |

## LAND ACQUISITION TABLES

SCALE: 1:600

0 2 5 10 20m

SCALE: 1:600

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| C | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| A | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |

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BR&A LLC PROJECT MANAGEMENT • ENGINEERING • CONSULTANT

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

LAND ACQUISITION TABLES I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:600

SHEET NO. 70 OF 145
DWG. NO. 040-C-47

2/20/2024 9:48:31 AM
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| RIGHT OF WAY SUMMARY TABLE (REMNANT) | | | | |
|---|---|---|---|---|
| PARCEL No. | PROPERTY TAX No. | OWNER | SqM. | Cdas. |
| 100-01 | 141-000-001-05 | SUCN FLORENCIA CRUZ CINTRON | 3338.359 | 0.849 |
| 100-02 | 141-000-001-05 | SUCN FLORENCIA CRUZ CINTRON | 2180.083 | 0.555 |
| 101-01 | 112-000-009-71 | EMELINA ETAL RIVERA CARDONA | 37363.772 | 9.506 |
| 101-02 | 112-000-009-71 | EMELINA ETAL RIVERA CARDONA | 105861.543 | 26.934 |
| 102-01 | PROPERTY 2774 | AUTORIDAD DE ACUEDUCTOS Y ALCANTARILLADOS | 40717.976 | 10.360 |

| RIGHT OF WAY SUMMARY TABLE (TO BE AQUIRED) | | | | |
|---|---|---|---|---|
| PARCEL No. | PROPERTY TAX No. | OWNER | SqM. | Cdas. |
| 100-03 | 141-000-001-05 | SUCN FLORENCIA CRUZ CINTRON | 978.419 | 0.249 |
| 101-03 | 112-000-009-71 | EMELINA ETAL RIVERA CARDONA | 6995.912 | 1.780 |

| RIGHT OF WAY SUMMARY TABLE (CONSTRUCTION EASEMENT) | | | | |
|---|---|---|---|---|
| PARCEL No. | PROPERTY TAX No. | OWNER | SqM. | Cdas. |
| 101-04 | 112-000-009-71 | EMELINA ETAL RIVERA CARDONA | 851.65 | 2.33 |

| PARCEL NO. | | | | OWNER | |
|---|---|---|---|---|---|
| 101-04 (CONSTRUCTION EASMENT) | | | | EMELINA ETAL RIVERA CARDONA | |
| POINTS | BEARING | DISTANCE | NORTH COORDINATE | EAST COORDINATE | DESCRIPTION |
| 25 TO 28 | N20°12'22"E | 32.332 | 256424.7761 | 220308.4790 | NEW R.O.W. MONUMENT |
| 25 TO 26 | N56°57'40"W | 37.756 | 256424.7761 | 220308.4790 | NEW R.O.W. MONUMENT |
| 26 TO 27 | N15°02'16"E | 13.216 | 256445.3612 | 220276.8279 | NEW R.O.W. MONUMENT |
| 27 TO 28 | S85°38'12"E | 39.504 | 256458.1242 | 220280.2568 | NEW R.O.W. MONUMENT |
| AREA= 851.651 = 0.2167 Cdas. | | | | | |

## LAND ACQUISITION TABLES

SCALE: 1:600

0 2 5 10 20m

SCALE: 1:600

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|---|---|---|---|---|---|
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| B | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| A | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |

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APPR. BY GN

BR&A LLC

Stantec

B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

LAND ACQUISITION TABLES II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:600

SHEET NO. 71 OF 145
DWG. NO. 040-C-48

2/20/2024 9:46:22 AM
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GENERAL NOTES:

1. NO WORK OTHER THAN MOBILIZATION, TRAFFIC CONTROL AND PROJECT OFFICE, SHALL BE PERFORMED UNTIL THE PROGRESS SCHEDULE IS APPROVED BY THE ENGINEER.

2. ALL TEMPORARY CONTROL DEVICES SHALL COMPLY WITH THE SUPPLEMENTAL SPECIFICATION NUMBER 638-"MAINTENANCE AND PROTECTION OF TRAFFIC" OF THE STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION, 2005 EDITION, AND WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES "MUTCD" 2009 (LATEST REVISED).

3. EQUIPMENT, MATERIALS AND OTHER DEVICES USED FOR CONSTRUCTION SHALL BE REMOVED FROM THE ROADWAY AFTER WORK HOURS AND SHALL BE STAGED A MINIMUM OF 10 METERS FROM THE TRAVEL WAY.

4. THE DRUM SPACING SHALL BE 2.50METERS. AN ALTERNATIVE FOR DRUMS IN NARROW STREET SEGMENTS, CONTRACTOR CAN USE ORANGE CONES, 28-IN HEIGHT MINIMUM AS PER MUTCD 2009, SECTION 6F-64.

5. ANY ALTERATION TO THE SCHEDULE THAT MAY IMPROVE TRAFFIC OPERATIONS WITHIN THE CONSTRUCTION AREA, IN ACCORDANCE WITH THE CURRENT MUTCD (2009) AND WITH NO ADDITIONAL COST TO THE AUTHORITY, SHALL BE SUBMITTED TO THE ENGINEER AT LEAST TWENTY ONE(21) CALENDAR DAYS IN ADVANCE TO THE PROPOSED DATE OF IMPLEMENTATION FOR REVIEW. IF THE PROPOSED ALTERATION IS APPROVED IT SHALL BE IMPLEMENTED AS DIRECTED BY THE ENGINEER.

6. THE CONTRACTOR CAN PERFORM, WITH THE APPROVAL OF THE ENGINEER, SEVERAL SIMULTANEOUS ACTIVITIES WITHIN A STAGE, AND AS PERMITTED BY THE CONTRACT PROPOSAL QUANTITIES ON THE TRAFFIC CONTROL ITEMS.

7. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER THE INSTALLATION OF TEMPORARY TRAFFIC CONTROL DEVICES FOR EACH PHASE AT LEAST FOURTEEN (14) CALENDAR DAYS IN ADVANCE FOR THE RELEASE OF PUBLIC NOTICE. THE CONTRACTOR SHALL NOT COMMENCE ANY OF THE CONSTRUCTION PHASES WITHOUT A PUBLIC NOTICE IS ISSUED OR WITHOUT DIRECT CONSENT FROM THE ENGINEER.

8. THE CONSTRUCTION SIGNS INSTALLATION SHOULD BE IN ACCORDANCE TO THE TEMPORARY TRAFFIC SIGNS MOUNTING DETAILS, SHEET NO. MPT-23 OF THE PRHTA STANDARD DRAWING REV. JUNE 2012.

9. THE CONTRACTOR SHALL FURNISH TEMPORARY TRAFFIC CONTROL DEVICES THAT MEET THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT (NCHRP) 350 CRITERIA FOR THE APPLICABLE CRASH WORTHINESS STANDARD.

10. ALL TRAFFIC CONTROL SIGNS DETERMINED BY THE ENGINEER TO BE UNNECESSARY FOR THE APPLICABLE CONSTRUCTION OPERATION SHALL BE IMMEDIATELY COVERED IN ITS ENTIRETY WITH NON ABRASIVE MATERIAL AND SHALL BE INSPECTED DURING DAY AND NIGHT TIME TO ENSURE THAT THE SIGN IS NOT READABLE. THIS WORK IS A SUBSIDIARY OBLIGATION OF THE CONTRACT UNDER EXISTING PAY ITEMS.

11. DURING THE CONSTRUCTION OPERATIONS, THE CONTRATOR SHALL TAKE ALL THE NECESSARY PRECAUTIONS AND MEASURES TO AVOID FALLING DEBRIS, TOOLS, EQUIPMENT OR ANY OTHER MATERIALS INTERFERE OR IMPACT THE MOTORING PUBLIC IN THE ROADWAY. ALL THE MATERIALS, LABOR EQUIPMENT, AND WORK NECESSARY FOR IMPLEMENTING THIS REQUIREMENT IS SUBSIDIARY OBLIGATION OF THE CONTRACT UNDER EXISTING PAY ITEMS.

12. THE CONTRACTOR SHALL MAINTAIN ACCESS AT ALL TIMES TO ADJACENT PROPERTIES DURING CONSTRUCTION. THIS WORK WILL REQUIRE COORDINATION WITH BUSINESSES AND PRIVATE OWNERS. ALL THE MATERIALS, LABOR, EQUIPMENT, AND WORK NECESSARY FOR IMPLEMENTING THIS REQUIREMENT IS SUBSIDIARY OBLIGATION OF THE CONTRACT UNDER EXISTING PAY ITEMS.

13. NO EXCAVATION AND/OR PAVEMENT DROP-OFF SHALL REMAIN OPEN WITHIN THE TRAVELED WAY WHEN THE CONTRACTOR OR ITS PERSONNEL IS NOT WORKING AND PHYSICALLY PRESENT AT THE WORK SITE.

14. IN CASE THAT THE WORKS AFFECTED THE EXISTING LUMINARY THE CONRACTOR SHALL PROVIDE ADEQUATE ILLUMINATION IN THE AFFECTED AREA BUT THE GLARE OF THE SAME NO AFFECT THE VISIBILITY OF THE DRIVERS.

15. THE CONTRACTOR SHALL RETURN ALL AREAS DISTURBED BY TEMPORARY DETOURS TO THEIR ORIGINAL STATE.

15. RELOCATE ALL UTILITIES PRIOR TO THE PERFORMANCE OF ANY CONSTRUCTION PHASE. THIS ACTIVITY SHALL BE CLOSELY COORDINATED WITH THE CORRESPONDING UTILITY AGENCIES AND DTOP REGIONAL OFFICE SO AS TO PERMIT THE CONSTRUCTION AS SCHEDULED.

16. ALL TRENCH EXCAVATIONS MUST BE BACKFILLED THE SAME DAY BY THE END OF THE WORKSHIFT. IF NOT, THE TRENCH SHALL BE COVERED WITH A SUITABLE STEEL PLATE.

17. ALL TRAFFIC CONTROL DEVICES SHALL BE CLEANED, REPAINTED, REFLECTORIZED OR REPLACED AS NECESSARY TO PROVIDE ADEQUATE VISIBILITY AND LEGIBILITY AT ALL TIMES.

18. THE PUERTO RICO HIGHWAY AND TRANSPORTATION AUTHORITY IT DOES RESERVES THE RIGHT TO STOP THE WORKS AT ANY TIME IF THE CONTRACTOR DO NOT COMPLY WITH THE MAINTENANCE OF TRAFFIC AND THE SAFETY REGULATIONS.

CONSTRUCTION SCHEDULE

THE FOLLOWING CONSTRUCTION SCHEDULE AND SPECIAL INSTRUCTIONS SHALL BE FOLLOWED, IN ORDER TO MAINTAIN TRAFFIC FLOW WITH "THE LEAST POSSIBLE INTERFERENCE FROM CONSTRUCTION OPERATIONS".

TYPICAL APPLICATIONS ARE SUBMITTED FOR THE TEMPORARY TRAFFIC CONTROL ACTIVITIES FOR A VARIETY OF SITUATIONS COMMONLY ENCOUNTERED. IT IS REQUIRED FROM THE ENGINEER TO ADJUST THESE GUIDELINES TO FIELD CONDITIONS.

SPECIFIC SITUATIONS NOT COVERED BY THESE APPLICATIONS SHALL BE BROUGHT UP TO THE ENGINEER FOR APPROPIATE DIRECTION AND CLARIFICATION 10 DAYS BEFORE THE BEGINNING OF THE CONSTRUCTION WORK IN THAT AREA.

CONSTRUCTION:

1. IMPLEMENT THE WORK ZONE TEMPORARY TRAFFIC CONTROL IN ACCORDANCE WITH THE MAINTENANCE OF TRAFFIC INDICATED ON THE PLANS

2. THE DETAILS SHOWN SHALL BE USED IN BOTH DIRECTIONS.

TRAFFIC:

1. THE TRAFFIC WILL BE FLOWING AS INDICATED ON THE MAINTENANCE OF TRAFFIC USED FOR THE CONSTRUCTION AREA.

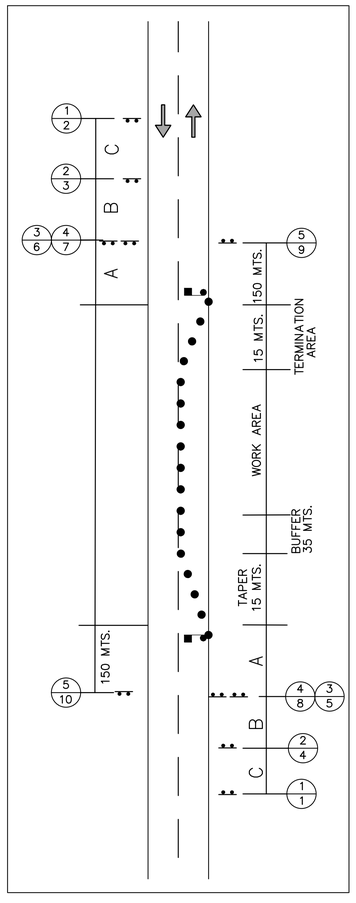
2. ALL WORK TO BE PERFORMED SHALL BE COORDINATED WITH THE TRAFFIC ENGINEERING OFFICE PERSONNEL.

3. NO WORK SHALL BE ALLOWED DURING PEAK HOURS. THE PEAK HOURS ARE DEFINED AS 7:00 AM - 8:00 AM AND 3:00 PM - 5:00 PM FROM MONDAY TO THURSDAY AND 7:00 AM - 8:00 AM AND 3:00 PM - 7:00 PM ON FRIDAYS.

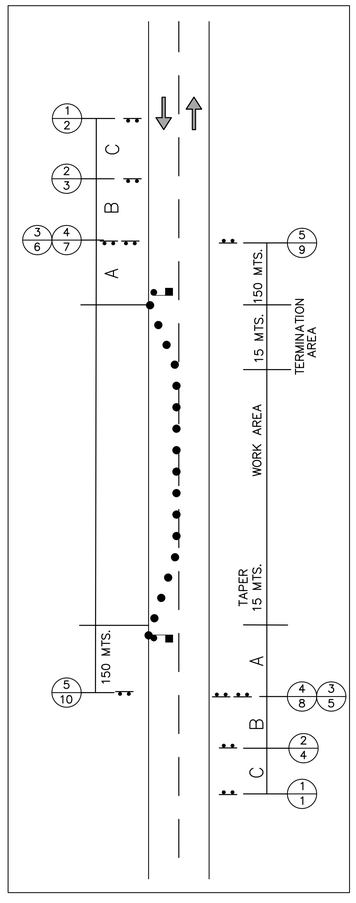
4. ALL ACTIVITIES PROPOSED FOR THE PROJECT THAT AFFECT THE NORMAL FLOW OF TRAFFIC, SHALL BE COORDINATED WITH ALL PROJECTS THAT ARE WITHIN A COVERAGE RADIUS OF TWO MILES OF THE WAY SO THAT THEY DO NOT AFFECT EACH OTHER.

5. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER THE ACCESS POINTS FOR CONSTRUCTION VEHICLES. INSTALL SIGN W8-6 (TRUCK CROSSING - 36" X 36") TO ALERT ROAD USERS OF LOCATIONS WHERE UNEXPECTED TRAVEL BY CONSTRUCTION VEHICLES MIGHT OCCUR.

TYPICAL APPLICATION I
RIGHT LANE CLOSURE




TYPICAL APPLICATION II
LEFT LANE CLOSURE




LEGEND:

- TRAFFIC SIGN LOCATION
- CODE NUMBER
- LOCATION NUMBER
- PLASTIC DRUMS
- AREA UNDER CONSTRUCTION
- TRAFFIC FLOW
- FLAGGER

NOTES:

1. MAINTENANCE OF TRAFFIC APPLICATIONS SHALL COMPLY WITH MUTCD 2009 MANUAL.
2. REFER TO DWG. 040-C-50 FOR CONSTRUCTION SIGNS TABLE.

DISTANCE BETWEEN SIGNS

| ROAD | A | B | C |
|---|---|---|---|
| MUNICIPAL ROADS | 100FT (30m) | 100FT (30m) | 100FT (30m) |

DISTANCE FOR TEMPORARY TRAFFIC CONTROL ZONE (mts)

| SPEED LIMIT | TAPER | BUFFER | TERMINATION AREA |
|---|---|---|---|
| 25MPH | 50FT (15m) | 115FT (35m) | 50FT (15m) |

**PRELIMINARY NOT FOR CONSTRUCTION**

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| C | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| A | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |

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BR&A LLC PROJECT MANAGEMENT • ENGINEERING • CIVIL ENV.

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - MAINTENANCE OF TRAFFIC GENERAL
NOTES & TYPICAL APPLICATIONS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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CONSTRUCTION SIGNS:

| CODE No. | LOCATION No. | SIGN CODE | L E G E N D | SIZE OF SIGN PANELS | STRUCTURE TYPE | REFERENCE MANUAL | TOTAL ITEM |
|---|---|---|---|---|---|---|---|
| 1 | 1,2 | W21-4 | | 30" X 30" | N/A | SEE D.T.P.W. MANUAL 2020 | 2 |
| 2 | 3,4 | W20-4 | | 36" X 36" | N/A | SEE D.T.P.W. MANUAL 2020 | 2 |
| 3 | 5,6 | W8-6a(PR) | | 36" X 36" | N/A | SEE D.T.P.W. MANUAL 2020 | 2 |
| 4 | 7,8 | W20-7A | | 30" X 30" | N/A | SEE D.T.P.W. MANUAL 2020 | 2 |
| 5 | 9,10 | G20-2 | | 40" X 16" | N/A | SEE D.T.P.W. MANUAL 2020 | 2 |

NOTES:

1. FOR MAINTENANCE OF TRAFFIC NOTES & LEGEND REFER TO DWG. 040-C-49
2. MAINTENANCE OF TRAFFIC APPLICATIONS MUST COMPLY WITH MUTCD 2009 MANUAL.
3. SIGNS MUST COMPLY WITH DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS' "MANUAL DE ROTULACION PARA LAS VIAS PUBLICA DE PUERTO RICO" 2020 & MUTCD 2009 MANUAL.

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|---|---|---|---|---|---|
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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - MAINTENANCE OF TRAFFIC
CONSTRUCTION SIGN TABLE

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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## GENERAL NOTES:

1. THESE GENERAL NOTES SUPPLEMENT THE PROJECT SPECIFICATIONS. REFER TO THE PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. IN CASE OF CONFLICT THE MOST STRINGENT SHALL TAKE PRECEDENCE.
2. SPECIFICATIONS NOTED ON THESE DRAWINGS SHALL BE OF THE LATEST REVISION.
3. STRUCTURAL DRAWINGS ARE INTENDED TO BE USED WITH ARCHITECTURAL, ELECTRICAL AND MECHANICAL DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR COORDINATING SUCH REQUIREMENTS INTO THEIR SHOP DRAWINGS AND WORK.
4. NO OPENINGS, OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS, SHALL BE MADE IN ANY STRUCTURAL MEMBER WITHOUT THE WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.
5. NO CHANGE IN SIZE OR DIMENSION OF STRUCTURAL MEMBERSHIP SHALL BE MADE WITHOUT THE WRITTEN APPROVAL OF THE ARCHITECT/ENGINEER.
6. OPENINGS 1'–4" AND LESS ON A SIDE ARE GENERALLY NOT SHOWN ON THE STRUCTURAL DRAWINGS. REFER TO ARCHITECTURAL AND MECHANICAL DRAWINGS FOR SUCH OPENINGS.
7. THE CONTRACTOR IS RESPONSIBLE FOR LIMITING THE AMOUNT OF CONSTRUCTION LOAD IMPOSED UPON STRUCTURAL FRAMING. CONSTRUCTION LOADS SHALL NOT EXCEED THE DESIGN CAPACITY OF THE FRAMING AT THE TIME THE LOADS ARE IMPOSED.
8. HORIZONTAL MOVEMENT OF ANY HEAVY EQUIPMENT OVER STRUCTURAL FLOORS OR ROOF AND ITS TEMPORARY AND/OR DEFINITE LOCATIONS MUST BE PREVIOUSLY APPROVED BY THE ENGINEER SO AS NOT TO OVERLOAD THE STRUCTURE OR IN ANY OTHER WAY IMPAIR THE STRUCTURE. SAME PRECAUTION SHALL BE TAKEN FOR THE PILING OF CONSTRUCTIONS MATERIALS.
9. THE STRUCTURE IS DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL TEMPORARY BRACING AND/OR SUPPORT THAT MAY BE REQUIRED AS THE RESULT OF THE CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES. OBSERVATION VISITS TO THE SITE BY THE STRUCTURAL ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.
10. ALL STRUCTURES HAVE BEEN DESIGNED ACCORDING TO FINAL BEHAVIOR AND CONDITIONS. HOWEVER, DURING ERECTION OF SAME, CERTAIN CONDITIONS CAN ARISE FOR WHICH THE BEHAVIOR OR THE STRUCTURE HAS NOT BEEN CONTEMPLATED. THEREFORE, THE CONTRACTOR SHOULD PROVIDE AT ALL TIME ADEQUATE SHORING AND RESTORING UNTIL THE DESIGN CONDITIONS HAVE BEEN MET. IF THERE IS ANY DOUBT DURING ANY PHASE OF THE CONSTRUCTION, PLEASE CONSULT AND/OR NOTIFY THE STRUCTURAL ENGINEER.
11. DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALES SHOWN ON DRAWINGS. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN ON STRUCTURAL DRAWINGS.
12. NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.
13. CONTRACTOR'S CONSTRUCTION AND/OR ERECTION SEQUENCES SHALL RECOGNIZE AND CONSIDER THE EFFECTS OF THERMAL MOVEMENTS OF STRUCTURAL ELEMENTS DURING THE CONSTRUCTION PERIOD.
14. THE CONTRACTOR SHALL INFORM THE ARCHITECT/ENGINEER IN WRITING OF ANY DEVIATION FROM THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL NOT BE RELIEVED OF THE RESPONSIBILITY OF SUCH DEVIATION BY THE PROFESSIONAL OF RECORD REVIEW OF SHOP DRAWINGS, PRODUCT DATA, ETC., UNLESS THE CONTRACTOR HAS SPECIFICALLY INFORMED THE PROFESSIONAL OF RECORD OF SUCH DEVIATION AT THE TIME OF SUBMISSION, AND THE PROFESSIONAL OF RECORD HAS GIVEN WRITTEN APPROVAL TO THE SPECIFIC DEVIATION.
15. WHERE "OWNER" IS MENTIONED IN PLANS IT IS TO BE UNDERSTOOD EITHER OWNER OR HIS AUTHORIZED REPRESENTATIVE.
16. CONTRACTOR SHALL SUBMIT FOR OWNERS APPROVAL LOCATION AND DETAILS OF CONSTRUCTION JOINTS IN SLABS AND BEAMS, AND IN ANY OTHER STRUCTURAL MEMBERS.
17. CONTRACTOR MUST VERIFY ALL DIMENSIONS ON STRUCTURAL PLANS AGAINST THE DIMENSIONS ON ARCHITECTURAL PLANS BEFORE LAYING OUT THE WORK.
18. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING FIELD CONDITIONS PRIOR TO STARTING CONSTRUCTION. IF ANY DISCREPANCY ARISES IN THE STRUCTURAL AND ARCHITECTURAL PLANS. THE ARCHITECTS AND ENGINEERS SHALL BE NOTIFIED IMMEDIATELY.
19. CONTRACTOR MUST PROVIDE, SET AND VERIFY DIMENSIONS AND LOCATION OF ALL ANCHORS, INSERTS BOLTS, SLEEVES, CONDUITS, ETC., SHOWN OR NOTED IN ARCHITECTURAL AND/OR MECHANICAL AND PLUMBING PLANS BEFORE THE CONCRETE IS POURED.
20. PROVISIONS FOR DETAILS NOT SPECIFICALLY DRAWN SHALL BE MADE BY THE CONTRACTOR IN ACCORDANCE WITH THE LATEST VERSION OF THE BUILDING CODE AND/OR AISC SPECIFICATIONS AND CLARIFIED WITH THE STRUCTURAL ENGINEER.
21. ALL DETAILS, SECTIONS AND NOTES SHOWN ON DRAWINGS ARE INTENDED TO BY TYPICAL AND SHALL APPLY TO SIMILAR SITUATIONS ELSEWHERE UNLESS NOTED OTHERWISE.
22. IN CASE OF DOUBT IN THE INTERPRETATION OF ANY ASPECT OF THESE STRUCTURAL DRAWINGS AND/OR SPECIFICATIONS, THE STRUCTURAL ENGINEER SHALL BE CONSULTED.
23. NOTIFY THE STRUCTURAL ENGINEER IN ADVANCE OF CONDITIONS NOT SHOWN OR OMITTED ON THE DRAWINGS.

## REFERENCES:

DESIGN, FABRICATION & CONSTRUCTION WORK SHALL COMPLY WITH THE REQUIREMENTS AND PROVISIONS OF THE FOLLOWING CODES AND SPECIFICATIONS THEIR COMMENTARIES AND THE STANDARDS REFERENCED THEREIN.

ALL CONSTRUCTION WORK SHALL COMPLY WITH THE REQUIREMENTS AND PROVISIONS OF THE FOLLOWING:
1. AMERICAN CONCRETE INSTITUTE 318–14 (ACI)
2. INTERNATIONAL BUILDING CODE (IBC) 2018.
3. PUERTO RICO BUILDING CODE 2018.
4. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
5. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
6. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
7. AMERICAN WELDING SOCIETY (AWS)
8. MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES – ASCE/SEI 7–2016

## DESIGN LOADS:

1. EQUIPMENT FOUNDATION SLAB:
   - A. GENERAL MECHANICAL FLOOR = 60 PSF
   - B. MECHANICAL EQUIPMENT FLOOR = 125 PSF
   - C. BOD EQUIPMENT WEIGHT :
     - a. 2500KVA GENERATOR EMPTY = 76,000 LBF
     - b. 2500KVA GENERATOR OPERATIONAL = 135,300 LBF
     - c. 40,000 GALLONS DIESEL TANK EMPTY = 54,330 LBF
     - d. 40,000 GALLONS DIESEL TANK OPERATIONAL = 338,330 LBF
2. RETAINING WALLS
   - A. SOIL :
     - a. SOIL DENSITY – $\gamma'$= 130 PCF
     - b. INTERNAL FRICTION ANGLE – $\phi$= 32°
     - c. COEFFICIENT OF EARTH ACTIVE PRESSURE (RANKINE) – Ka = 0.31
   - B. SURCHARGE TANK AREA:
     - a. DEAD LOAD = 546 PSF
     - b. LIVE LOAD = 1465 PSF
   - C. SURCHARGE GENERATORS AREA:
     - a. DEAD LOAD = 355 PSF
     - b. LIVE LOAD = 176 PSF
   - D. SURCHARGE VEHICLES:
     - a. DEAD LOAD = 100 PSF
     - b. LIVE LOAD = 250 PSF
   - E. WIND PRESSURE ON WALL = 120 PSF
   - F. SEISMIC PRESSURE ON WALL (MONONOBE–OKABE) :
     - a. Kh = 0.4*$S_{DS}$ = 0.29
     - b. Kv = 0.2
3. WIND DESIGN FOR EQUIPMENT & GENERATORS AREA:
   - A. WIND RISK CATEGORY IV
   - B. DESIGN BASIC WIND SPEED = 172 MPH.
   - C. ASD DESIGN WIND SPEED = 133.2 MPH
   - D. DESIGN CRITERIA : OTHER STRUCTURES (MECHANICAL EQUIPMENT)
   - E. EXPOSURE C
   - F. TANKS DESIGN WEIGHT = DEAD WEIGHT + 25% DIESEL
   - G. GENERATORS DESIGN WEIGHT = EMPTY DEAD WEIGHT
   - H. PIPE SUPPORTS = FULL PIPE WEIGHT
   - I. CONDUIT SUPPORTS = CONDUITS + POWER CABLES WEIGHT
4. SEISMIC DESIGN FOR EQUIPMENT & GENERATORS AREA:
   - A. RISK CATEGORY IV
   - B. SEISMIC DESIGN CATEGORY (D)
   - C. SITE CLASS (D)
   - D. IMPORTANCE FACTOR = 1.5
   - E. DESIGN CRITERIA : SEISMIC DESIGN FOR NONSTRUCTURAL COMPONENTS & NONBUILDING STRUCTURES
   - F. $S_S$ = 0.983
   - G. $S_1$ = 0.378
   - H. Fa = 1.107
   - I. Fv = 1.922
   - J. $S_{DS}$ = 0.726
   - K. $S_{D1}$ = 0.485
   - L. TANKS DESIGN WEIGHT = OPERATIONAL
   - M. GENERATORS DESIGN WEIGHT = OPERATIONAL
   - N. PIPE SUPPORTS = FULL PIPE WEIGHT
   - O. CONDUIT SUPPORTS = CONDUITS + POWER CABLES WEIGHT
5. ROOF LIVE LOAD FOR ELECTRICAL BUILDING = 30 PSF
6. WIND DESIGN FOR ELECTRICAL BUILDING:
   - A. WIND RISK CATEGORY IV
   - B. DESIGN BASIC WIND SPEED = 172 MPH.
   - C. ASD DESIGN WIND SPEED = 133.2 MPH
   - D. DESIGN CRITERIA : MAIN FORCE RESISTING SYSTEM
   - E. EXPOSURE C
7. SEISMIC DESIGN FOR ELECTRICAL BUILDING:
   - F. RISK CATEGORY IV
   - G. SEISMIC DESIGN CATEGORY (D)
   - H. SITE CLASS (D)
   - I. IMPORTANCE FACTOR = 1.5
   - J. DESIGN CRITERIA : SPECIAL REINFORCED CONCRETE SHEAR WALLS
   - K. $S_S$ = 0.983
   - L. $S_1$ = 0.378
   - M. Fa = 1.107
   - N. Fv = 1.922
   - O. $S_{DS}$ = 0.726
   - P. $S_{D1}$ = 0.485
   - Q. R = 5.0
   - R. Cs = 0.354
8. SOIL BEARING VALUES (ALLOWABLE):
   - A. SPREAD FOOTING = 3,000 PSF
   - B. TRANSIENT LOADING = 3,900 PSF

## CAST IN PLACE REINFORCED CONCRETE:

1. CONTRACTOR SHALL SUBMIT AND RECEIVE APPROVAL FROM THE ENGINEER, PRIOR TO INSTALLATION ALL REINFORCING STEEL SHOP DRAWINGS.
2. CONCRETE ITEMS AND REINFORCEMENT SHALL BE ERECTED IN STRICT ACCORDANCE WITH OWNER APPROVED SHOP AND ERECTION DRAWINGS FOLLOWING THE DETAILS SHOWN ON PLANS.
3. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PRODUCE CORRECTLY ALIGNED CONCRETE CONSIDERING AMONG OTHER THINGS, THE ELASTIC DEFORMATION OF THE STRUCTURAL MEMBERS.
4. AT HORIZONTAL JOINTS IN WALLS AND COLUMNS, THE LOWER SURFACE SHALL BE THROUGHLY CLEARED AND ALL WEAR OR LOOSE CONCRETE REMOVED FROM THERE BEFORE POURING THE UPPER CONCRETE(SEE SPECS. FOR ADDITIONAL REQUIREMENTS). NO JOINT SHALL BE COVERED WITH PLASTER OR OTHERWISE WITHOUT A VISUAL EXAMINATION AND APPROVAL BY THE INSPECTOR.
5. NO DEFECTIVE CONCRETE SHALL BE CORRECTED OR COVERED WITH MORTAR, PLASTER ETC. WITHOUT THE INSPECTORS' APPROVAL.
6. SLUMP OF CONCRETE SHALL NOT EXCEED 4" UNLESS A HIGHRANGE WATER–REDUCING ADMIXTURE IS USED. THE SLUMP OF CONCRETE PRIOR TO ADDITION OF A HIGH RANGE WATER– REDUCING ADMIXTURE SHALL NOT EXCEED 4". THE SLUMP OF CONCRETE CONTAINING A HIGH RANGE WATER–REDUCING ADMIXTURE SHALL NOT EXCEED 10".
7. CONCRETE SHALL BE NON–AIR ENTRAINED. AIR CONTENT SHALL BE BETWEEN 0 AND 3.5 PERCENT.
8. THE NOMINAL MAXIMUM AGGREGATE SIZE SHALL BE OF 3/4".
9. CONTRACTOR SHALL SUBMIT CONCRETE MIX DESIGNS FOR REVIEW WELL IN ADVANCE OF CONCRETE PLACEMENT. CONCRETE MIX DESIGN SHALL INCLUDE ALL STRENGTH DATA NECESSARY TO SHOW COMPLIANCE WITH THE PROJECT SPECIFICATIONS FOR EITHER THE TRIAL BATCH OR FIELD EXPERIENCE METHOD AND SHALL BE CERTIFIED BY A REGISTERED LICENSED ENGINEER. PHYSICAL TESTS RESULTS FOR COARSE AND FINE AGGREGATES SHALL ALSO BE SUBMITTED CERTIFIED BY A REGISTERED ENGINEER.
10. MINIMUM CONCRETE COVER, UNLESS NOTED OTHERWISE:

| | |
|---|---|
| UNFORMED SURFACE IN CONTACT WITH THE GROUND | 3 IN. |
| FORMED SURFACES EXPOSED TO EARTH OR WEATHER: | |
| #6 BARS AND LARGER | 2 IN. |
| #5 BARS AND SMALLER | 1–1/2 IN. |
| FORMED SURFACES NOT EXPOSED TO EARTH OR WEATHER: | |
| BEAMS, GIRDERS, AND COLUMNS | 1–1/2 IN. |
| SLABS, WALLS AND JOISTS: | |
| #11 BARS AND SMALLER | 3/4 IN. |
| #14 AND #18 BARS | 1–1/2 IN |

11. ALL REINFORCING SHALL BE DETAILED, FABRICATED AND PLACED, IN ACCORDANCE WITH ACI DETAILING MANUAL (MNL–66) AND "THE MANUAL OF STANDARD PRACTICE FOR REINFORCED CONCRETE CONSTRUCTION" BY THE CRSI.
12. ALL REINFORCING SHALL BE SUPPORTED IN FORMS USING STEEL CHAIRS, SPACED WITH NECESSARY ACCESSORIES AND SHALL BE SECURELY WIRED TOGETHER, IN ACCORDANCE WITH CRSI "MANUAL OF STANDARD PRACTICE".
13. LAP SPLICES SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE, UNLESS NOTED OTHERWISE, WHERE CLASSES ARE NOT CALLED OUT ON DRAWINGS, USE 8 1 CLASS "B" SPLICE.

### SPLICES TABLE (GRADE 60)

| BAR SIZE | f'c (psi) | TENSION: TOP BARS SPLICE CLASS A | TENSION: TOP BARS SPLICE CLASS B | TENSION: OTHER BARS SPLICE CLASS A | TENSION: OTHER BARS SPLICE CLASS B | COMPRESSION SPLICE |
|---|---|---|---|---|---|---|
| #3 | 3,000 | 22" | 28" | 17" | 22" | 12" |
| | 4,000 | 19" | 25" | 15" | 19" | 12" |
| | 5,000 | 17" | 22" | 13" | 17" | 12" |
| #4 | 3,000 | 29" | 38" | 22" | 29" | 15" |
| | 4,000 | 25" | 33" | 19" | 25" | 15" |
| | 5,000 | 23" | 29" | 17" | 23" | 15" |
| #5 | 3,000 | 36" | 47" | 28" | 36" | 19" |
| | 4,000 | 31" | 41" | 24" | 31" | 19" |
| | 5,000 | 28" | 36" | 22" | 28" | 19" |
| #6 | 3,000 | 43" | 56" | 33" | 43" | 23" |
| | 4,000 | 37" | 49" | 29" | 37" | 23" |
| | 5,000 | 34" | 44" | 26" | 34" | 23" |
| #7 | 3,000 | 63" | 81" | 48" | 63" | 27" |
| | 4,000 | 54" | 71" | 42" | 54" | 27" |
| | 5,000 | 49" | 63" | 38" | 49" | 27" |

14. COMPRESSION DOWEL EMBEDMENT: 22 BAR DIAMETERS LAP WELDED WIRE FABRIC ONE SPACING OF CROSS WIRES PLUS 2".
15. BASE PLATES, ANCHOR BOLTS, SUPPORT ANGLES, ETC., BELOW GRADE SHALL BE COVERED WITH A MINIMUM OF 3" OF CONCRETE.
16. CONCRETE WORK SHALL BE SUBJECT TO QUALITY ASSURANCE TESTING AND INSPECTIONS. SEE QUALITY ASSURANCE GENERAL NOTES AND PROJECT SPECIFICATIONS.
17. ALL SYMBOLS AND STRESSES AS WELL AS CONCRETE WORK SHALL CONFORM TO THE STANDARD OF THE LATEST VERSION OF THE ACI BUILDING CODE.
18. ALL SLAB AND CORRESPONDING BEAMS, CURBS, OR APRONS SHALL BE POURED MONOLITHICALLY.
19. ALL REINFORCING, SLEEVES, CONDUITS, INSERTS AND BOLTS SHALL BE WELL SECURED AND IN PLACE BEFORE CONCRETE IS POURED.
20. ALL OPENINGS IN CONCRETE WALLS SHALL BE REINFORCED AROUND WITH 2 #5 BARS PLACED AT 2 INCHES FROM THE FACE AND EXTENDING 24 INCHES BEYOND CORNERS, UNLESS OTHERWISE SPECIFIED IN PLANS.
21. TEMPERATURE REINFORCEMENT SHALL BE PROVIDED IN ALL ONE WAY SLAB NORMAL TO THE PRINCIPAL REINFORCEMENT IN ACCORDANCE THE LATEST VERSION OF THE ACI BUILDING CODE.
22. TEMPERATURE REINFORCEMENT SHALL BE AS FOLLOWS: (UNLESS NOTED OTHERWISE)
    - T = 4" #4 @ 12"
    - T = 5" #4 @ 12"
    - T = 6" #4 @ 10"
    - T = 7" #4 @ 8"
    - T = 8" #4 @ 12" E.F.
23. FOR CONSTRUCTION JOINTS IN STRUCTURAL MEMBERS A VERTICAL BULKHEAD AND KEY JOINT MUST BE PROVIDED.
24. SLAB ON GROUND, AS INDICATED ON DRAWINGS.
25. FOR CONCRETE FORMWORK, SURFACE FINISHING, BEVELED CORNERS AND DRIPS, SEE ARCHITECTURAL PLANS WHEN OTHERWISE NOT SHOWN IN STRUCTURAL DRAWINGS.
26. PLACEMENT OF CONCRETE SHALL CONFORM TO ACI STANDARD 304 AND PROJECT SPECIFICATIONS.
27. PROVIDE DOWELS IN PEDESTAL AND/OR WALL FOOTINGS EQUAL IN GRADE, SPACING, SIZE AND NUMBER TO VERTICAL REINFORCEMENT, EXTENDING A TENSION SPLICE LENGTH INTO THE PEDESTAL AND/OR WALL AND 40 BAR DIAMETER INTO FOOTING. (THE LATERAL EMBEDMENT SHALL BE EXTENDED AS NECESSARY TO PROVIDE A MINIMUM HORIZONTAL LEG RESTING ON FOOTING REINFORCEMENT EQUAL TO THE CORRESPONDING "G" LENGTH FOR THE BAR SIZE.)
28. CONCRETE SHALL NOT BE DROPPED THROUGH REINFORCING STEEL SO AS TO CAUSE SEGREGATION OF AGGREGATES IN SUCH CASES, HOOPERS OR VERTICAL CHUTES OR TRUNKS SHALL BE USED. THE FREE UNCONFINED FALL OF CONCRETE SHALL NOT EXCEED THE ABOVE REQUIREMENTS.
29. THE SIZE OF NAILS AND SIMILAR FASTENERS DRIVEN INTO CONCRETE SHALL BE SUCH, AS NOT TO CRACK OR IMPAIR IT. NEVERTHELESS, IF THE CONCRETE IS DAMAGED, IT SHALL BE PROPERLY REPAIRED AFTER REMOVING THE DAMAGED PORTION AND SUITABLE JOINT SURFACE ARE PROVIDED.
30. ALL CAST IN PLACE REINFORCED CONCRETE STRUCTURAL MEMBERS SHALL BE PROPERLY CURED IN ACCORDANCE WITH THE LATEST VERSION OF THE ACI CODE.
31. ALL LAPPING, BENDING AND PLACING OF REINFORCEMENT SHALL BE DONE IN ACCORDANCE WITH THE LATEST VERSION OF THE ACI BUILDING CODE.
32. ALL REINFORCING BAR BENDS SHALL BE MADE COLD.
33. ALL NEGATIVE REINFORCEMENT (TOP REINF.) AND POSITIVE REINFORCEMENT (BOTTOM REINF.) IN SLABS AND BEAMS SHALL BE EXTENDED BEYOND THE CENTER LINE OF THE END SUPPORTS IN ACCORDANCE WITH THE LATEST VERSION OF THE ACI BUILDING CODE, UNLESS OTHERWISE SPECIFIED.
34. WELDING OF REINFORCEMENT SHALL BE WITH LOW HYDROGEN ELECTRODES IN CONFORMANCE WITH "REINFORCING STEEL WELDING CODE" AND "RECOMMENDED PRACTICES FOR WELDING REINFORCING STEEL" BOTH BY THE AWS (AWS D12.1. & AWS D1.4 RESPECTIVELY).
35. ALL FORMWORK FOR FLEXURAL MEMBERS SHALL BE BUILT WITH A CAMBER CORRESPONDING TO ITS WON DEFORMATION PLUS THE STRUCTURE DEAD LOAD DEFORMATIONS. IN DETERMINING THE AMOUNT OF CAMBER, THE CONTRACTOR SHALL HAVE THE ASSISTANCE OF THE DESIGNER WHERE SO REQUESTED.
36. NO JOINT, OPENING, SLOT OR GROOVE OTHER THAN THAT SHOWN ON DRAWINGS SHALL BE PERMITTED WITHOUT PREVIOUS APPROVAL BY THE ENGINEER. ALL CONSTRUCTION JOINT SURFACES SHALL BE CLEANED AND ROUGHENED IMMEDIATELY BEFORE CONCRETING AND TREATED AS INSTRUCTED IN THE "ACI MANUAL OF CONCRETE PRACTICE".
37. CONDUIT OF PIPE SIZE (O.D.) SHALL NOT EXCEED 30 PERCENT OF TOTAL SLAB THICKNESS AND SHALL BE PLACED BETWEEN THE TOP & BOTTOM REINFORCEMENT, UNLESS SPECIFICALLY DETAILED OTHERWISE. CONCENTRATIONS OF CONDUITS OR PIPES SHALL BE AVOIDED EXCEPT WHERE DETAILED OPENINGS ARE PROVIDED.
38. WATER–CEMENT RATIO REQUIREMENTS FOR DIFFERENT COMPRESSIVE STRENGTHS OF CONCRETE.

| COMPRESSIVE STRENGTH AT 28 DAYS, psi | WATER–CEMENT RATIO BY WEIGHT: AIR ENTRAINED CONCRETE | WATER–CEMENT RATIO BY WEIGHT: NON–AIR ENTRAINED CONCRETE |
|---|---|---|
| 6,000 | 0.41 | --- |
| 5,000 | 0.48 | 0.40 |
| 4,500 | 0.50 | 0.42 |
| 4,000 | 0.55 | 0.45 |
| 3,500 | 0.58 | 0.50 |
| 3,000 | 0.62 | 0.56 |

39. PROVIDE SLEEVES FOR PLUMBING AND ELECTRICAL OPENINGS IN CONCRETE BEFORE PLACING. DO NOT CUT ANY REINFORCEMENT BAR WHICH MAY CONFLICT. CORING IN CONCRETE IS NOT PERMITTED UNLESS NOTED OTHERWISE.

## STRUCTURAL STEEL:

ALL STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES AND THE AISC SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS. EXCEPT AS MODIFIED IN THESE NOTES AND THE PROJECT SPECIFICATIONS AND/OR DRAWINGS.

1. THE STEEL STRUCTURE IS A PARTIAL–SELF–SUPPORTING STEEL FRAME AND IS DEPENDENT UPON DIAPHRAGM ACTION OF THE METAL ROOF DECK AND ATTACHMENT TO THE MASONRY WALLS FOR STABILITY AND FOR RESISTANCE TO WIND AND SEISMIC FORCES. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY SUPPORTS REQUIRED FOR STABILITY AND FOR RESISTANCE TO WIND AND SEISMIC FORCES UNTIL THESE ELEMENTS ARE COMPLETE AND ARE CAPABLE OF PROVIDING THIS SUPPORT.
2. THE FABRICATOR IS RESPONSIBLE FOR THE SHOP DRAWINGS OF ALL CONNECTONS. CONNECTIONS SHOWN ON THE STRUCTURAL DRAWINGS ARE SCHEMATIC AND ARE ONLY INTENDED TO SHOW THE RELATIONSHIP OF MEMBERS CONNECTED. CONNECTION DETAILS INDECATED ON THE DRAWINGS SHALL BE INCORPORATED INTO FABRICATOR'S CONNECTION DESIGN. ALL SHOP DRAWINGS SHALL BE SIGNED AND SEALED BY THE FABRICATOR'S ENGINEER WITH THE ENGINEER'S SEAL. ENGINEER'S SEAL MAY BE QUALIFIED "FOR DETAILING OF CONNECTIONS ONLY"
3. SPLICING OF STEEL MEMBERS, UNLESS SHOWN ON THE DRAWINGS, IS PROHIBITED WITHOUT WRITTEN APPROVAL OF THE ARCHITECT/ENGINEER.
4. UNLESS NOTED OTHERWISE, BEAMS SHALL BEAR 8" MINIMUM ON CONCRETE OR MASONRY. UNLESS NOTED OTHERWISE, ANCHOR BEAMS TO MASONRY WITH TWO (2) 3/4" DIAMETER ANCHOR BOLTS WITH 4" HOOK AND 1'–4" EMBEDMENT.
5. STRUCTURAL STEEL WORK SHALL BE SUBJECT TO QUALITY ASSURANCE TESTING & INSPECTIONS. SEE QUALITY ASSURANCE GENERAL NOTES AND PROJECT SPECIFICATION. AISC, ASTM & AWS SPECIFICATIONS WILL GOVERN ALL STRUCTURAL STEEL WORKS.
6. DESIGN & CONSTRUCTION SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION STANDARD PRACTICE.
7. STRUCTURAL STEEL WELDING SHALL BE PERFORMED BY A CERTIFIED WELDER AND IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY, AWS, REQUIREMENTS.
8. ALL INSPECTION AND TESTING OF WELDING SHALL BE DONE IN ACCORDANCE TO SECTION CHAPTER 6 OF THE LATEST EDITION OF THE AWS D1.1 STRUCTURAL WELDING CODE.
9. ALL CONNECTIONS SHALL BE BEARING TYPE UNLESS OTHERWISE SPECIFIED ON PLANS.
10. SHOP DRAWINGS FOR ALL STRUCTURAL STEEL FABRICATION AND ERECTION SHALL BE SUBMITTED TO THE DESIGNER FOR APPROVAL WELL IN ADVANCE OF CONSTRUCTION.
11. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON–CONFORMING MATERIAL OR CONDITIONS SHALL BE REPORTED TO THE ENGINEER FOR REVIEW AND APPROVAL OR REJECTION, PRIOR TO REMEDIAL OR CORRECTIVE ACTION TO BE IMPLEMENTED.

## EARTHWORK RECOMMENDATIONS:

ALL NEW FILL TO BE PLACED AT THE SITE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE FOLLOWING GENERAL RECOMMENDATIONS:

1. PRIOR TO COMMENCING CONSTRUCTION, THE SITE SHALL BE CLEARED AND GRUBBED OF ANY VEGETATION COVER, STRUCTURAL DEBRIS, EXISTING NON–ENGINEERED FILL, GARBAGE, AND SURFACE TOPSOIL THAT MAY EXIST AT THE GROUND SURFACE. IN AREAS WITHIN WHICH SITE GRADING WILL REQUIRE FILL PLACEMENT. THE EXPOSED NATURAL SOIL SURFACES SHALL THEN BE PROOF ROLLED WITH SEVERAL PASSES OF A HEAVY VIBRATORY ROLLER TO DETECT ANY SOFT SOIL SPOT THAT MAY HAVE TO BE REMOVED AND TO DENSIFY ANY SURFACE SOIL THAT MAY HAVE BEEN DISTURBED DURING THE CLEARING AND GRUBBING AND/OR CUT OPERATIONS. ANY TOPSOIL ENCOUNTERED MAY BE STOCKPILED FOR LATER USE DURING SITE LANDSCAPING.
2. ALL FILL MATERIAL SHALL CONSIST OF A NON–EXPANSIVE A–2–4 SOIL OR BETTER IN ACCORDANCE WITH THE AASHTO (AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS) SOIL CLASSIFICATION SYSTEM.
3. THE FILL SHALL BE PLACED AS AN ENGINEERED COMPACTED FILL IN 9–INCH–THICK LAYERS AND EACH LAYER WILL BE COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AS OBTAINED IN THE MODIFIED PROCTOR TEST (ASTM D–1557).
4. ALTHOUGH NOT EXPECTED, ANY SPRINGS ENCOUNTERED DURING SITE GRADING OR OTHER CONSTRUCTION ACTIVITIES SHALL BE PROVIDED WITH ADEQUATE DRAINAGE OUTLETS (FRENCH DRAINS OR OTHER APPROPRIATE MEASURES) TO PREVENT THE BUILDUP OF EXCESS PORE PRESSURES IN THE SOIL. UNDER NO CIRCUMSTANCE SHOULD A SPRING AREA BE COVERED WITH SOIL OR PAVED OVER WITHOUT PREVIOUSLY CONSTRUCTING A DRAINAGE OUTLET.
5. THE PROJECT SHOULD BE PROVIDED WITH ADEQUATE SURFACE DRAINAGE MEASURES TO COLLECT AND CONDUCT RUNOFF TO THE PROJECT STORM WATER SYSTEM. UNDER NO CIRCUMSTANCE SHOULD WATER BE ALLOWED TO ACCUMULATE ANYWHERE WITHIN THE PROJECT.
6. THE PLACEMENT AND COMPACTION OF STRUCTURAL FILL AND BACKFILL BEHIND ANY RETAINING WALLS (IF PRESENT) SHALL BE INSPECTED AND TESTED BY A SOIL TECHNICIAN UNDER THE DIRECTION OF THE PROJECT'S GEOTECHNICAL ENGINEER. SOIL DENSITY TESTS SHALL BE TAKEN WITH A NUCLEAR DENSITY GAUGE (ASTM D6938) TO ASCERTAIN THAT EACH LAYER IS COMPACTED TO THE REQUIRED COMPACTION LEVEL GIVEN IN POINT #3 ABOVE.

## STRUCTURAL TESTS, SPECIAL INSPECTIONS AND STRUCTURAL OBSERVATION:

1. PROVIDE SPECIAL INSPECTION ACCORDING TO PROJECT SPECIFICATIONS AND REFERENCED BUILDING CODE BY AN APPROVED INDEPENDENT TESTING AGENCY, HIRED BY OWNER OR OWNER'S REPRESENTATIVE AND INDEPENDENT FROM GENERAL CONTRACTOR.
2. SEE SPECIFICATIONS FOR TESTING/SPECIAL INSPECTION REQUIREMENTS.
   - A. COORDINATE TESTING AND INSPECTIONS AND NOTIFY ARCHITECT/ENGINEER AND SPECIAL INSPECTOR OF WORK READY FOR INSPECTION.
   - B. PROVIDE ACCESS TO AND MEANS FOR PROPER INSPECTION OF SUCH WORK.
   - C. FAILURE TO NOTIFY SPECIAL INSPECTOR MAY RESULT IN CONTRACTOR HAVING TO REMOVE WORK FOR PURPOSE OF INSPECTION AT CONTRACTOR'S EXPENSE.
   - D. PREMATURE NOTIFICATION FOR INSPECTIONS WILL RESULT IN AN ADDITIONAL INSPECTION WITH ALL EXPENSES AND FEES PAID BY CONTRACTOR.
3. SPECIAL INSPECTOR REQUIREMENTS:
   - A. A QUALIFIED PERSON, EMPLOYED BY APPROVED INDEPENDENT TESTING AGENCY WITH DEMONSTRATED COMPETENCE FOR INSPECTION OF PARTICULAR TYPE OF CONSTRUCTION RELEVANT TO PROJECT.
   - B. PROVIDE WRITTEN DOCUMENTATION INDICATING TRAINING, COMPETENCE AND RELEVANT EXPERIENCE OF SELECTED SPECIAL INSPECTOR TO SATISFACTION OF BUILDING OFFICIAL AND ARCHITECT/ENGINEER.
   - C. PROVIDE SPECIAL INSPECTIONS FOR MATERIALS, INSTALLATION, FABRICATION, ERECTION OR PLACEMENT OF COMPONENTS AND CONNECTIONS FOR COMPLIANCE WITH PROJECT DOCUMENTS AND REFERENCED STANDARDS.
   - D. VERIFY DESIGNATED WORK HAS BEEN PERFORMED IN COMPLIANCE WITH PROJECT DOCUMENTS AND REFERENCE STANDARDS. INSPECTOR MAY NOT ALTER, MODIFY OR WAIVE ANY REQUIREMENTS OF PROJECT DOCUMENTS.
   - E. PROVIDE SPECIAL INSPECTION OF FABRICATORS ACCORDING TO PROJECT DOCUMENTS AND REFERENCED BUILDING CODE UNLESS FABRICATOR IS REGISTERED AND APPROVED TO PERFORM WORK WITHOUT SPECIAL INSPECTION.
   - F. BRING NONCOMPLIANT ITEMS TO IMMEDIATE ATTENTION OF GENERAL CONTRACTOR AND ARCHITECT/ENGINEER.
   - G. SUBMIT A WEEKLY FIELD REPORT ADDRESSING OUTSTANDING DISCREPANCIES TO OWNER, BUILDING OFFICIAL, GENERAL CONTRACTOR AND ARCHITECT/ENGINEER UNTIL CORRECTIONS HAVE BEEN COMPLETED.
   - H. WHERE SPECIAL INSPECTION REQUIREMENTS DUPLICATE REQUIREMENTS OF OTHER SPECIFIED TESTING, MORE STRINGENT IS REQUIRED.
   - I. SUBMIT A CERTIFICATE OF COMPLIANCE FROM APPROVED, INDEPENDENT TESTING AGENCY, SIGNED BY SPECIAL INSPECTOR, TO OWNER, BUILDING OFFICIAL, ARCHITECT/ENGINEER AND GENERAL CONTRACTOR STATING WORK REQUIRING SPECIAL INSPECTION WAS, TO BEST OF INSPECTOR'S KNOWLEDGE, PERFORMED IN CONFORMANCE WITH PROJECT DOCUMENTS AND PROVISIONS OF APPLICABLE BUILDING CODE.
4. PROVIDE SPECIAL INSPECTIONS DURING CONSTRUCTION FOR FOLLOWING:

| TYPES OF WORK | CODE SECTION | QUALIFICATIONS AND FREQUENCY |
|---|---|---|
| CONCRETE CONSTRUCTION | 1704.4 | SEE PROJECT SPECIFICATIONS |
| STRUCTURAL STEEL | 1704.3 | SEE PROJECT SPECIFICATIONS |
| INSPECTION OF FABRICATIONS | 1704.2 | SEE PROJECT SPECIFICATIONS |
| MASONRY CONST. SPECIFICATIONS | 1704.5/1708.1 | SEE PROJECT SPECIFICATIONS |

5. SEE STRUCTURAL TESTS AND INSPECTIONS IN PROJECT SPECIFICATIONS FOR SPECIAL SEISMIC QUALITY ASSURANCE PLANS.
6. STRUCTURAL OBSERVATION IS AN OCCASIONAL, VISUAL OBSERVATION OF STRUCTURAL SYSTEM BY A ARCHITECT/ENGINEER FOR SOLE PURPOSE OF DETERMINING IF WORK IS PROCEEDING IN GENERAL ACCORDANCE WITH CONSTRUCTION DOCUMENTS AND IS NOT INTENDED TO BE A COMPREHENSIVE REVIEW OF QUALITY AND/OR QUANTITY OF WORK.

## FOUNDATIONS:

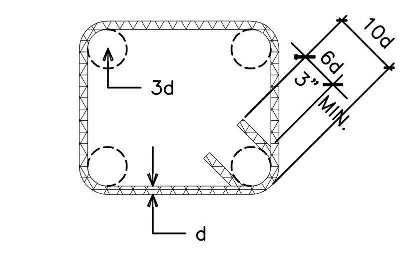
1. FOUNDATIONS HAS BEEN DESIGNED FOR A BEARING CAPACITY OF 3000 PSF BASED ON THE STUDY PERFORMED BY GEOCIM PROJECT NO. 5900. CONTRACTOR IS REPONSIBLE TO OBTAIN A COPY OF THE REPORT AND FOLLOW ALL THE CONSTRUCTIONS GUIDELINES FOR THE PROJECT IN IT.
2. THE PLATFORM AREA FOR THE GENERATORS MAY BE FOUNDED ENTIRELY ON EXISTING IN–SITU GROUND OR IN A PAD OF UNIFORM THICKNESS OF COMPACTED EARTHFILL. PLACING A STRUCTURE SO THAT IT BEARS ON BOTH CUT AND FILLED GROUND PRESENTS A POTENTIAL FOR THE DEVELOPMENT OF DIFFERENTIAL SETTLEMENT WITHIN THE STRUCTURE AND THEREFORE IS NOT ALLOWED.
3. THE COMPACTED FILL MUST BE CAREFULLY PLACED AND COMPACTED TO MEET THE COMPACTION SPECIFICATIONS, UNDER ENGINEERING TECHNICIAN'S INSPECTION.
4. PRIOR TO CONCRETE PLACEMENT, THE FOUNDATION BEARING SURFACES FOR THE FOOTINGS SHALL BE CLEANED AND ANY SOIL DISTURBED DURING THE FOOTING EXCAVATION OPERATIONS (OR ANYTIME THEREAFTER) SHALL BE REMOVED TO PROVIDE AN UNDISTURBED BEARING SURFACE.
5. FOOTINGS MAY BE POURED INTO AN EARTH–FORMED TRENCH IF SOIL CONDITIONS PERMIT.
6. FOUNDATION WALLS THAT RETAIN EARTH SHALL BE BRACED AGAINST BACKFILLING PRESSURES UNTIL FLOOR SLABS AT TOP AND BOTTOM ARE IN PLACE.
7. WHERE FOUNDATION WALLS ARE TO HAVE EARTH PLACED ON EACH SIDE, PLACE FILL SIMULTANEOUSLY SO AS TO MAINTAIN A COMMON ELEVATION ON EACH SIDE OF THE WALL.
8. FOUNDATION WORK SHALL BE SUBJECT TO QUALITY ASSURANCE TESTING AND INSPECTION, AS PER TECHNICAL SPECIFICATIONS AND SUBSOIL REPORT FOR THE PROJECT.
9. ALL FILL MATERIAL SHALL CONSIST OF A NON–EXPANSIVE A–2–4 SOIL OR BETTER IN ACCORDANCE WITH THE AASHTO (AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS) SOIL CLASSIFICATION SYSTEM.
10. ALL EXCAVATIONS AND BACKFILLS SHALL BE INSPECTED FOR COMPLIANCE WITH THE SUBSOIL REPORT RECOMMENDATIONS.

## MATERIALS:

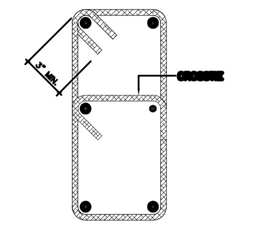
1. ALL CONCRETE SHALL DEVELOP A MINIMUM 28 DAYS COMPRESSIVE STRENGTH AS FOLLOWS:
   - A. FOOTINGS 3,000 PSI
   - B. SLAB ON GRADE 4,000 PSI
   - C. STRUCTURAL SLAB 4,000 PSI
   - D. BEAMS 4,000 PSI
   - E. COLUMNS 4,000 PSI
   - F. WALLS 4,000 PSI
   - G. STEM WALL 4,000 & 5,000 PSI
2. PORTLAND CEMENT SHALL CONFORM TO ASTM C–150, TYPE II.
3. WELDED WIRE FABRIC REINFORCEMENT SHALL CONFORM TO ASTM A1064.
4. ALL REINFORCING BARS SHALL BE HIGH TENSILE DEFORMED MEETING ASTM A–615 GRADE 60, UNLESS NOTED OTHERWISE ON SPECS AND/OR DRAWINGS.
5. STEEL SHALL CONFORM TO THE FOLLOWING GRADES:
   - A) W STEEL SHAPES ASTM A–992 GR.50
   - B) PLATES & CONNECTIONS ASTM A–36
   - C) STRUCTURAL TUBE (FY=46 KSI) ASTM A–500
   - D) STEEL PIPE (FY=35 KSI) ASTM A–53
   - E) ANCHOR BOLTS ASTM F1554 GR.36
   - F) UNFINISHED BOLTS ASTM A307
   - G) BOLTS, NUTS AND WASHERS ASTM F3125 (A325)
   - H) WELDING ELECTRODES (CLASS E7018XX) AWS A5.1,

## ABBREVIATIONS:

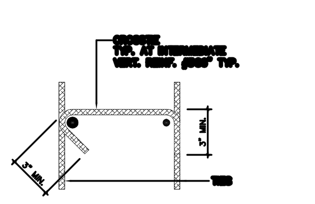
ARCH – ARCHITECT(URAL)
BO – BOTTOM OF...
BOS – BOTTOM OF STEEL ELEVATION
BB – BOND BEAM
BOT – BOTTOM
BRG –BEARING
B.I. – BOTTOM REINFORCEMENT OUTER LAYER
B.O. – BOTTOM REINFORCEMENT INNER LAYER
CJ – CONTROL JOINT
CL – CENTERLINE
CLR – CLEAR
COL – COLUMN
CONC – CONCRETE
CONT – CONTINUOUS
CONST – CONSTRUCTION
C.J. = CONTROL JOINT
I.J. = ISOLATION JOINT
C.S.C.J. = CONTROL SAW CUT JOINT
DBA – DEFORMED BAR ANCHOR
DIA – DIAMETER
DIAG – DIAGONAL
EA – EACH
EF – EACH FACE
EJ – EXPANSION JOINT
EL – ELEVATION
EQ – EQUAL
EW – EACH WAY
EXP – EXPANSION
EXT – EXTERIOR
FF – FINISHED FLOOR
FDTN – FOUNDATION
FTG – FOOTING
HORIZ – HORIZONTAL
INT – INTERIOR
JT –JOINT
LLB – LONG LEG BACK TO BACK
LLH – LONG LEG HORIZONTAL
LLV – LONG LEG VERTICAL
MAT'L– MATERIAL
MAX – MAXIMUM
MBM – METAL BUILDING MANUFACTURER
MCJ – MASONRY CONTROL JOINT
MECH – MECHANICAL
MFR – MANUFACTURER
MIN – MINIMUM
NF – NEAR FACE
NTS – NOT TO SCALE
OC – ON CENTER
OPH – OPPOSITE HAND
PL – PLATE
REINF – REINFORCEMENT
REG'D – REQUIRED
SIM – SIMILAR
STD – STANDARD
THRU –THROUGH
T&B – TOP AND BOTTOM
T.I. – TOP REINFORCEMENT INNER LAYER
T.O. – TOP REINFORCEMENT OUTER LAYER
TO–TOP OF...
TOP – TOP OF PEDESTAL ELEVATION
TOJ – TOP OF JOIST ELEVATION
TOS – TOP OF STEEL ELEVATION
THK – THICK
TYP – TYPICAL
UNO – UNLESS NOTED OTHERWISE
VERT – VERTICAL
W/ – WITH
WP – WORKING POINT




STIRRUPS HOOKS DET.
SCALE: N.T.S.




TIES & STIRRUPS TYP. HOOK DETAIL
SCALE: N.T.S.




CROSSTIE DETAIL
SCALE: N.T.S.

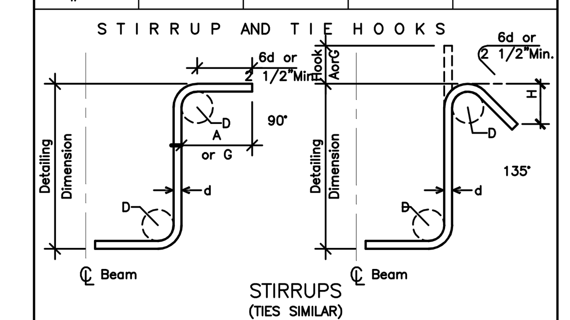
### Tension Development Length (ld), (inches)
(Minimum Straight Embedment length) for bars spaced less than 6" in, c.c.

| Bar Size | f'c=3,000 psi Top Bars | f'c=3,000 psi Other Bars | f'c=3,500 psi Top Bars | f'c=3,500 psi Other Bars | f'c=4,000 psi Top Bars | f'c=4,000 psi Other Bars | f'c=5,000 psi Top Bars | f'c=5,000 psi Other Bars | f'c=6,000 psi Top Bars | f'c=6,000 psi Other Bars |
|---|---|---|---|---|---|---|---|---|---|---|
| #3 | 13 | 12 | 13 | 12 | 13 | 12 | 13 | 12 | 13 | 12 |
| #4 | 17 | 12 | 17 | 12 | 17 | 12 | 17 | 12 | 17 | 12 |
| #5 | 21 | 15 | 21 | 15 | 21 | 15 | 21 | 15 | 21 | 15 |
| #6 | 27 | 19 | 25 | 18 | 25 | 18 | 25 | 18 | 25 | 18 |
| #7 | 37 | 26 | 33 | 24 | 32 | 23 | 29 | 21 | 29 | 21 |
| #8 | 48 | 35 | 43 | 31 | 42 | 30 | 38 | 27 | 34 | 25 |
| #9 | 61 | 44 | 55 | 39 | 53 | 38 | 48 | 34 | 43 | 31 |
| #10 | 78 | 56 | 70 | 50 | 67 | 48 | 60 | 43 | 55 | 39 |
| #11 | 96 | 68 | 86 | 61 | 83 | 59 | 74 | 53 | 68 | 48 |
| #14 | 130 | 93 | 117 | 83 | 113 | 81 | 101 | 72 | 92 | 66 |
| #18 | 169 | 120 | 151 | 108 | 146 | 104 | 131 | 93 | 119 | 85 |

### ASTM STANDARD REINFORCING BARS

| BAR SIZE DESIGNATION | WEIGHT POUNDS PER FOOT | NOMINAL DIMENSIONS–ROUND SECTIONS: DIAMETER INCHES | CROSS SECTIONAL AREA SQ. INCHES | PERIMETER INCHES |
|---|---|---|---|---|
| #3 | .376 | .375 | .11 | 1.178 |
| #4 | .668 | .500 | .20 | 1.571 |
| #5 | 1.043 | .625 | .31 | 1.963 |
| #6 | 1.502 | .750 | .44 | 2.356 |
| #7 | 2.044 | .875 | .60 | 2.749 |
| #8 | 2.670 | 1.000 | .79 | 3.142 |
| #9 | 3.400 | 1.128 | 1.00 | 3.544 |
| #10 | 4.303 | 1.270 | 1.27 | 3.990 |
| #11 | 5.313 | 1.410 | 1.56 | 4.430 |
| #14 | 7.65 | 1.693 | 2.25 | 5.32 |
| #18 | 13.60 | 2.257 | 4.00 | 7.09 |

STIRRUP AND TIE HOOKS

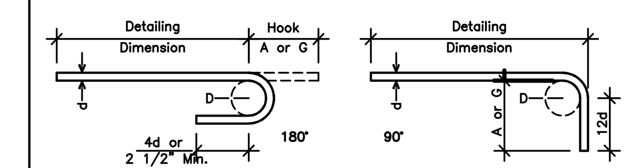



STIRRUPS
(TIES SIMILAR)

RECOMMENDED STIRRUP AND TIE HOOK DIMENSIONS

| Bar Size | D (in) | 90 HOOK: Hook A or G | 135 HOOK: Hook A or G | 135 HOOK: Approx. H |
|---|---|---|---|---|
| #3 | 1½" | 4 | 4 | 2½" |
| #4 | 2" | 4½ | 4½ | 3" |
| #5 | 2½" | 6 | 5½ | 3¾" |

### ACI STANDARD HOOKS




SIZES OF 180–DEG. HOOKS
All Grades
D=6d for #3 through #8
D=8d for #9 #10 and #11
D=10d for #14 and #18

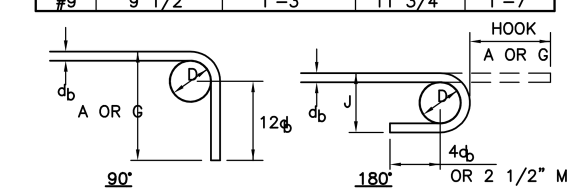
SIZES OF 90–DEG. HOOKS
All Grades
D=6d for #3 through #8
D=8d for #9 #10 and #11
D=10d for #14 and #18

RECOMMENDED END HOOK DIMENSIONS

| Bar Size | 180 HOOKS All Grades: A or G | 180 HOOKS All Grades: J | 90 HOOKS All Grades: A or G |
|---|---|---|---|
| #3 | 5 | 3 | 6 |
| #4 | 6 | 4 | 8 |
| #5 | 7 | 5 | 10 |
| #6 | 8 | 6 | 1–0 |
| #7* | 10 | 7 | 1–2 |
| #8* | 11 | 8 | 1–4 |
| #9* | 1–3 | 11 ¼ | 1–7 |
| #10* | 1–5 | 1–0¾ | 1–10 |
| #11* | 1–7 | 1–2¼ | 2–0 |
| #14 | 2–2 | 1–8½ | 2–7 |
| #18 | 2–11 | 2–3 | 3–5 |

### END HOOKS FOR ALL GRADES

| BAR SIZE | FINISHED BEND DIAMETER "D", IN. | 180° HOOKS: A OR G | 180° HOOKS: J | 90° HOOKS: A OR G |
|---|---|---|---|---|
| #3 | 2 1/4" | 5" | 3" | 6" |
| #4 | 3" | 6" | 4" | 8" |
| #5 | 3 3/4" | 7" | 5" | 10" |
| #6 | 4 1/2" | 8" | 6" | 1'–0" |
| #7 | 5 1/4" | 10" | 7" | 1'–2" |
| #8 | 6" | 11" | 8" | 1'–4" |
| #9 | 9 1/2" | 1'–3" | 11 3/4" | 1'–7" |

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| C | 11/20/2023 | 90% DESIGN | ELLR | CK | GN |
| B | 09/29/2023 | 60% DESIGN | ELLR | CK | GN |
| A | 07/26/2023 | 30% DESIGN | ELLR | CK | GN |

| | |
|---|---|
| DRAWN BY | ELLR |
| DESIGNED BY | ELLR |
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| APPR. BY | GN |

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

**LEGEND, GENERAL NOTES AND ABBREVIATIONS**

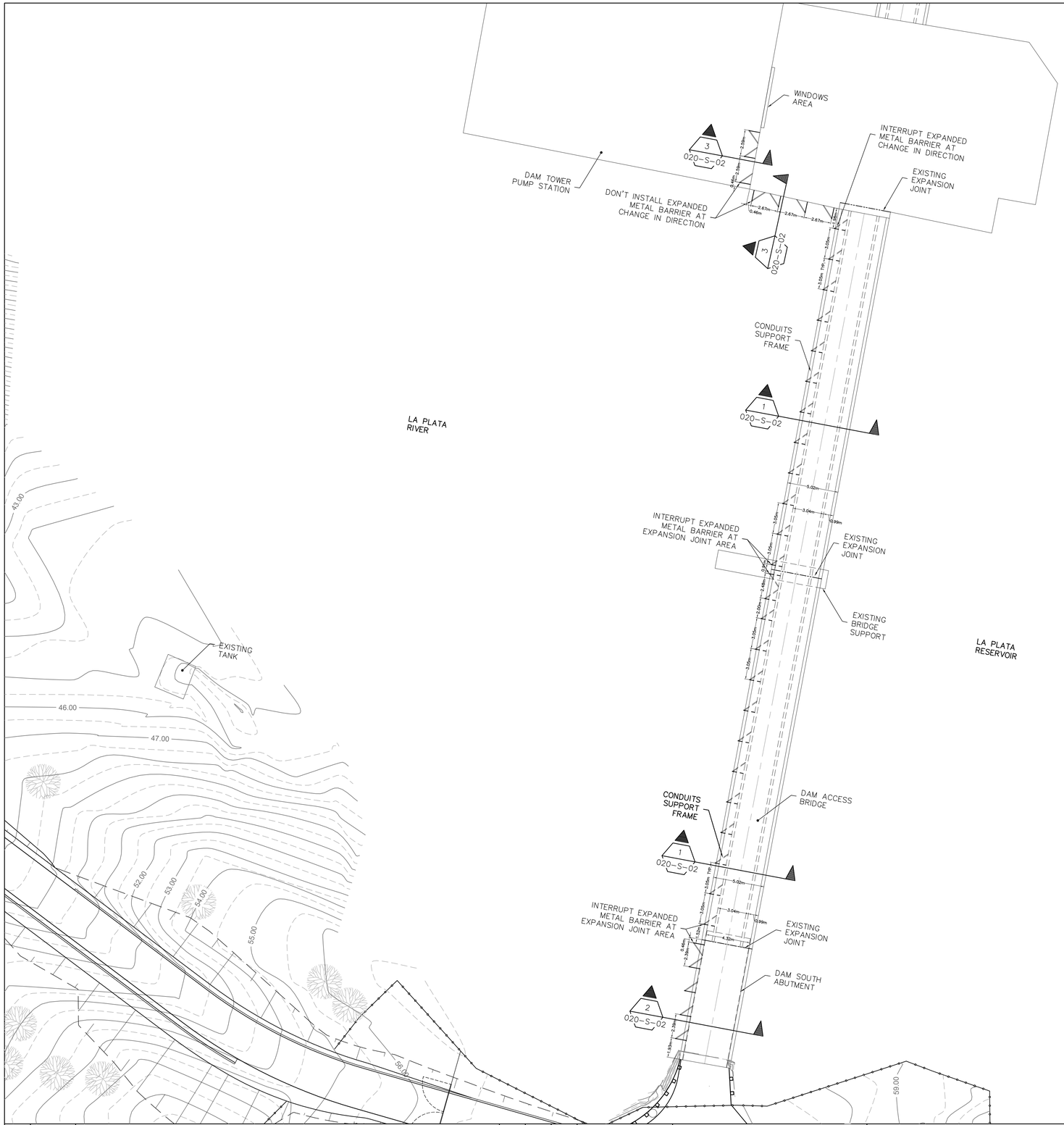
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE:

SHEET NO. 74 OF 145
DWG. NO. 000-S-01

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

2024.02.09 8:59:56 AM
000-s-01.dwg




N

## DAM BRIDGE - SITE PLAN

SCALE: 1:200

NOTE:

1. FOR LEGEND AND NOTES, REFER TO DWG. 000-S-01.
2. REFER TO CIVIL DRAWINGS FOR SITE GEOMETRY AND GRADING.

2 0 5 10 15m

SCALE: 1:200

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|---|---|---|---|---|---|
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| C | 11/20/2023 | 90% DESIGN | ELLR | CK | GN |
| B | 09/29/2023 | 60% DESIGN | ELLR | CK | GN |
| A | 07/26/2023 | 30% DESIGN | ELLR | CK | GN |

| | |
|---|---|
| DRAWN BY | ELLR |
| DESIGNED BY | ELLR |
| CHECKED BY | CK |
| APPR. BY | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

**DAM BRIDGE - SITE PLAN**

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: 1:200

SHEET NO: 75 OF 145
DWG. NO. **020-S-01**

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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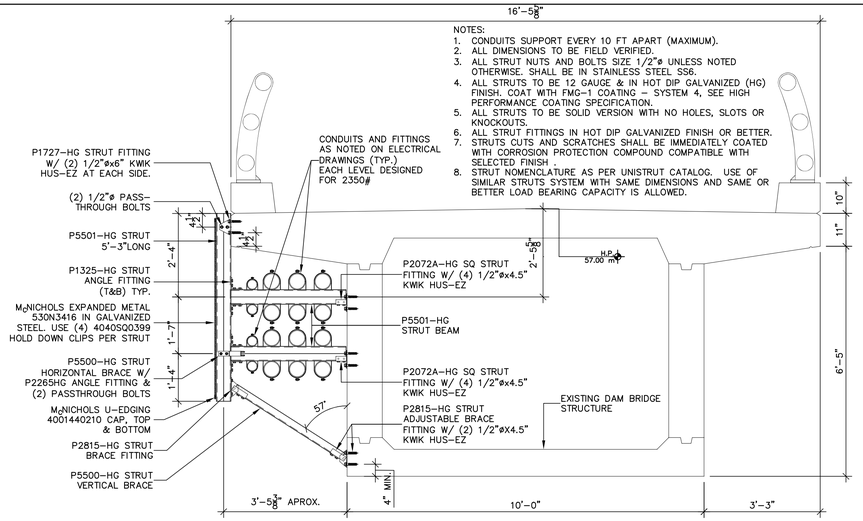
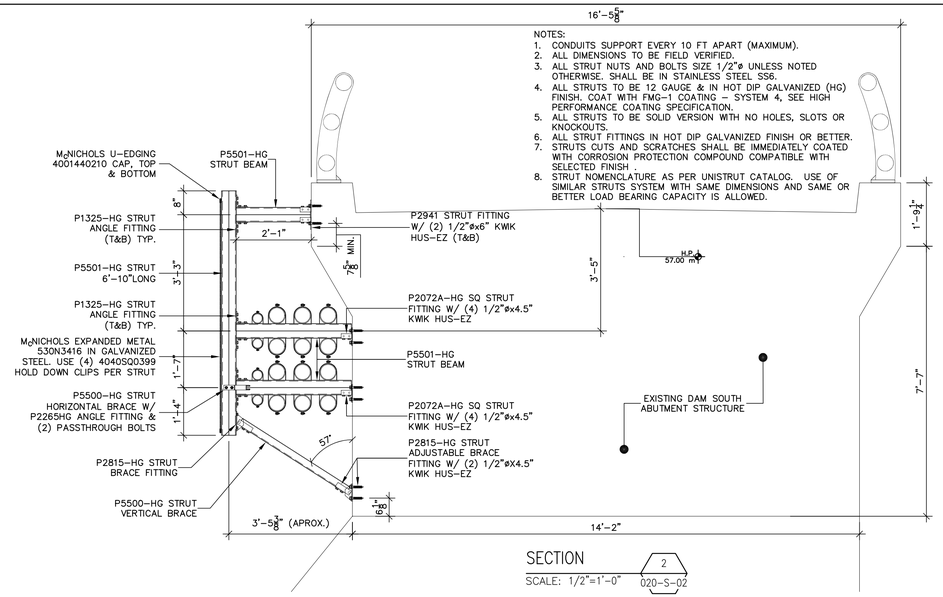



NOTES:
1. CONDUITS SUPPORT EVERY 10 FT APART (MAXIMUM).
2. ALL DIMENSIONS TO BE FIELD VERIFIED.
3. ALL STRUT NUTS AND BOLTS SIZE 1/2"ø UNLESS NOTED OTHERWISE. SHALL BE IN STAINLESS STEEL SS6.
4. ALL STRUTS TO BE 12 GAUGE & IN HOT DIP GALVANIZED (HG) FINISH. COAT WITH FMG-1 COATING – SYSTEM 4, SEE HIGH PERFORMANCE COATING SPECIFICATION.
5. ALL STRUTS TO BE SOLID VERSION WITH NO HOLES, SLOTS OR KNOCKOUTS.
6. ALL STRUT FITTINGS IN HOT DIP GALVANIZED FINISH OR BETTER.
7. STRUTS CUTS AND SCRATCHES SHALL BE IMMEDIATELY COATED WITH CORROSION PROTECTION COMPOUND COMPATIBLE WITH SELECTED FINISH .
8. STRUT NOMENCLATURE AS PER UNISTRUT CATALOG. USE OF SIMILAR STRUTS SYSTEM WITH SAME DIMENSIONS AND SAME OR BETTER LOAD BEARING CAPACITY IS ALLOWED.

SECTION 1
SCALE: 1/2"=1'-0" 020-S-02




NOTES:
1. CONDUITS SUPPORT EVERY 10 FT APART (MAXIMUM).
2. ALL DIMENSIONS TO BE FIELD VERIFIED.
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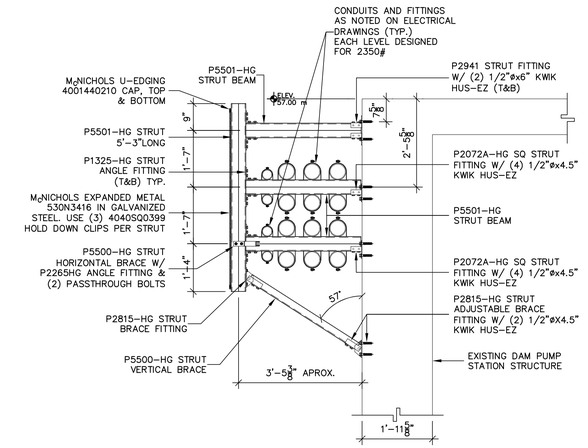
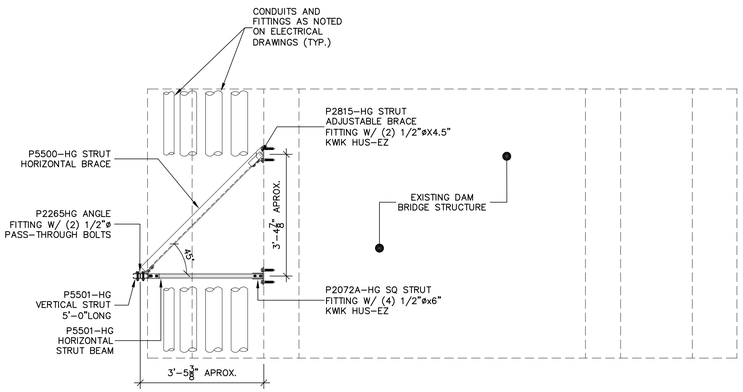
7. STRUTS CUTS AND SCRATCHES SHALL BE IMMEDIATELY COATED WITH CORROSION PROTECTION COMPOUND COMPATIBLE WITH SELECTED FINISH .
8. STRUT NOMENCLATURE AS PER UNISTRUT CATALOG. USE OF SIMILAR STRUTS SYSTEM WITH SAME DIMENSIONS AND SAME OR BETTER LOAD BEARING CAPACITY IS ALLOWED.

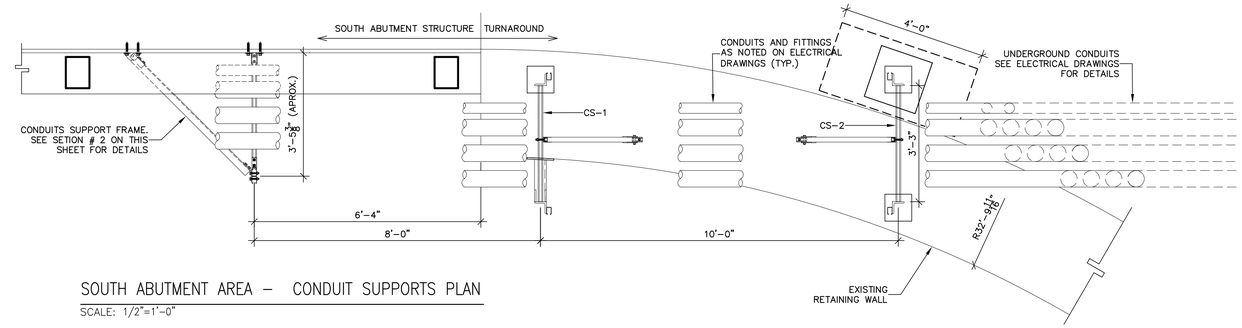
SECTION 2
SCALE: 1/2"=1'-0" 020-S-02



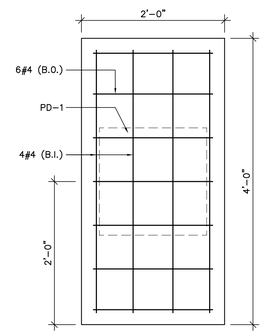

SECTION 3
SCALE: 1/2"=1'-0" 020-S-02



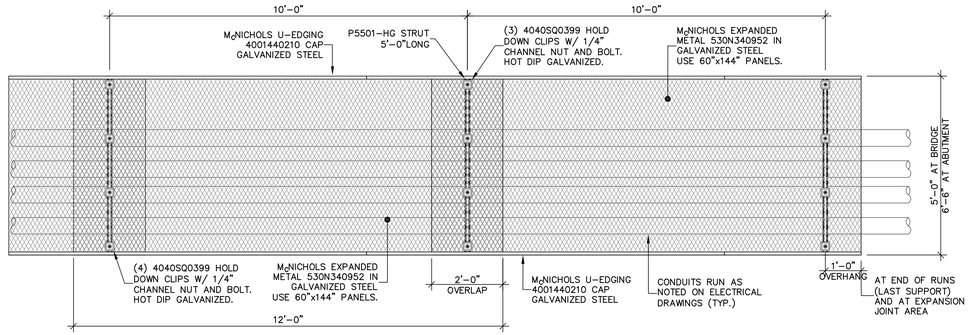

TOP VIEW
SCALE: 1/2"=1'-0" 020-S-02



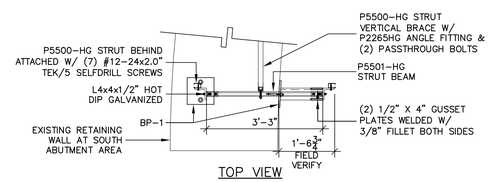

SOUTH ABUTMENT AREA – CONDUIT SUPPORTS PLAN
SCALE: 1/2"=1'-0"



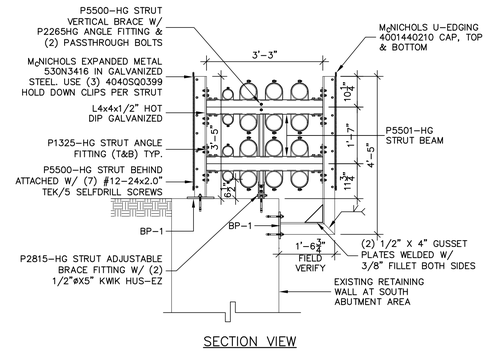

FOOTING F-1 DETAIL
SCALE: 1"=1'-0"




EXPANDED METAL PROTECTIVE BARRIER DETAIL
SCALE: 1/2"=1'-0"

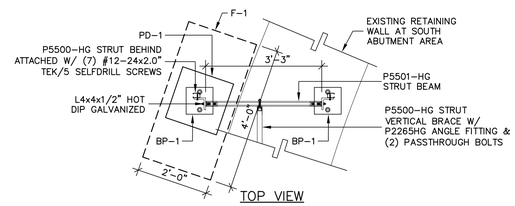



TOP VIEW

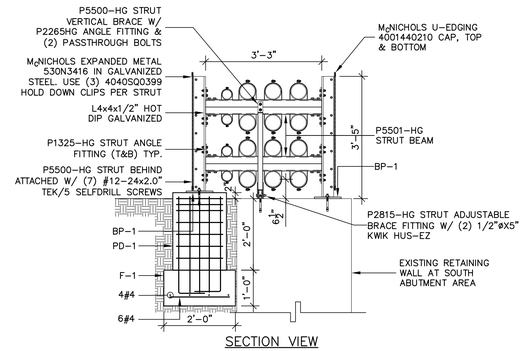



SECTION VIEW

CONDUIT SUPPORT CS-1
SCALE: 1/2"=1'-0"

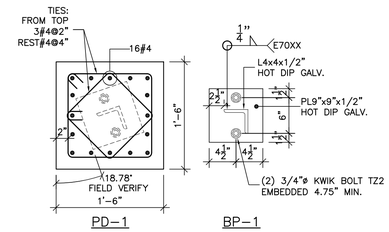



TOP VIEW




SECTION VIEW

CONDUIT SUPPORT CS-2
SCALE: 1/2"=1'-0"




PEDESTAL PD-1 AND BASE PLATE BP-1 DETAILS
SCALE: 1"=1'-0"

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|---|---|---|---|---|---|
| E | 02/13/2024 | 100% DESIGN | ELLR | | GN |
| D | 01/29/2024 | 100% DESIGN | ELLR | CK | GN |
| C | 11/20/2023 | 90% DESIGN | ELLR | CK | GN |
| B | 09/29/2023 | 60% DESIGN | ELLR | CK | GN |
| A | 07/26/2023 | 30% DESIGN | ELLR | CK | GN |

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CHECKED BY CK
APPR. BY GN

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

**DAM BRIDGE - DETAILS I**

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: AS SHOWN
SHEET NO. 76 OF 145
DWG. NO. 020-S-02
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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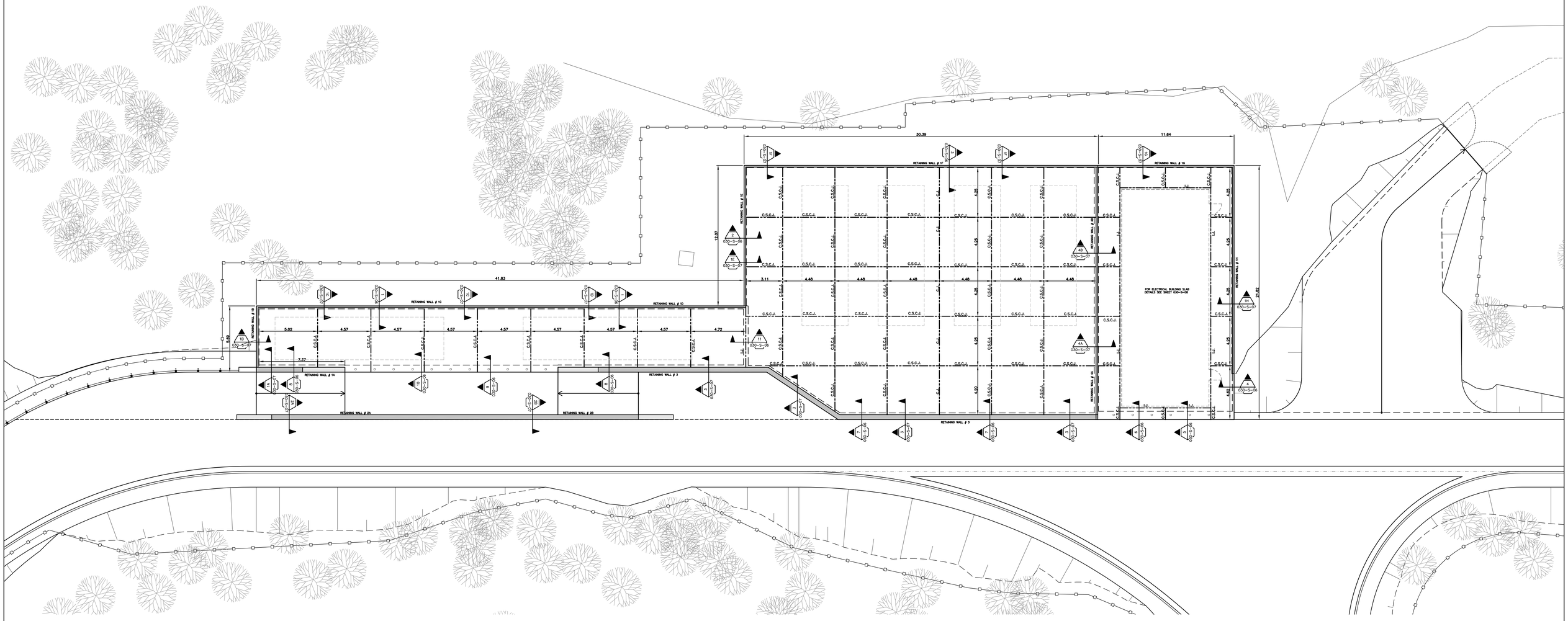


## GENERATOR AREA SITE PLAN

SCALE: 1:150

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE EXPRESSED IN METERS, UNLESS OTHERWISE NOTED.
2. REFER TO CIVIL DRAWINGS FOR SITE GEOMETRY AND GRADING.
3. DEFINITIONS:
   A. C.J. = CONTROL JOINT
   B. I.J. = ISOLATION JOINT
   C. C.S.C.J. = CONTROL SAW CUT JOINT

1 0 1 2 3 4 5

SCALE: 1:150

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| B | 09/29/2023 | 60% DESIGN | ELLR | CK | GN |
| A | 07/26/2023 | 30% DESIGN | ELLR | CK | GN |

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| DESIGNED BY | ELLR |
| CHECKED BY | CK |
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

**GENERATORS AREA - SITE PLAN**

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: 1:150

SHEET NO. 77 OF 145
DWG. NO. 030-S-01

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET ADJUST SCALES ACCORDINGLY
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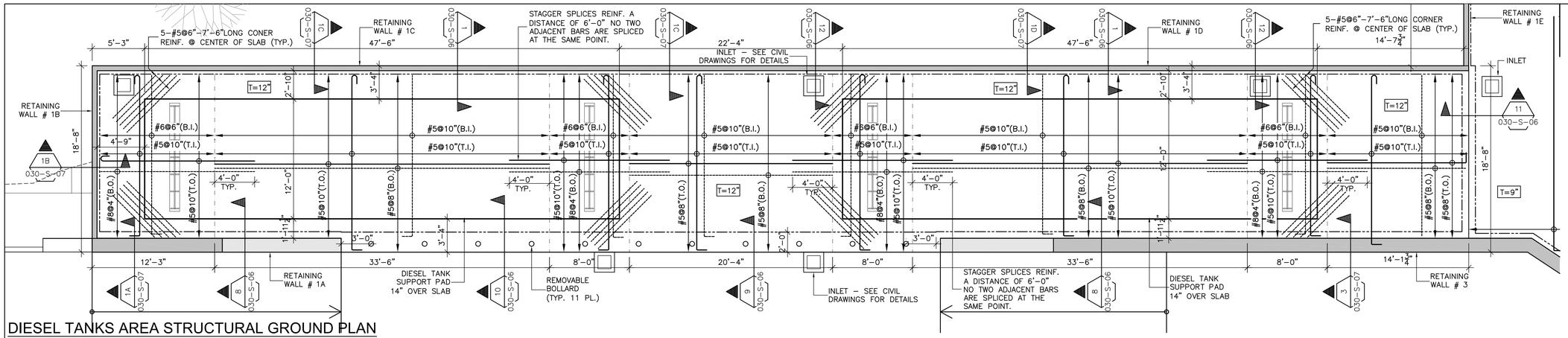
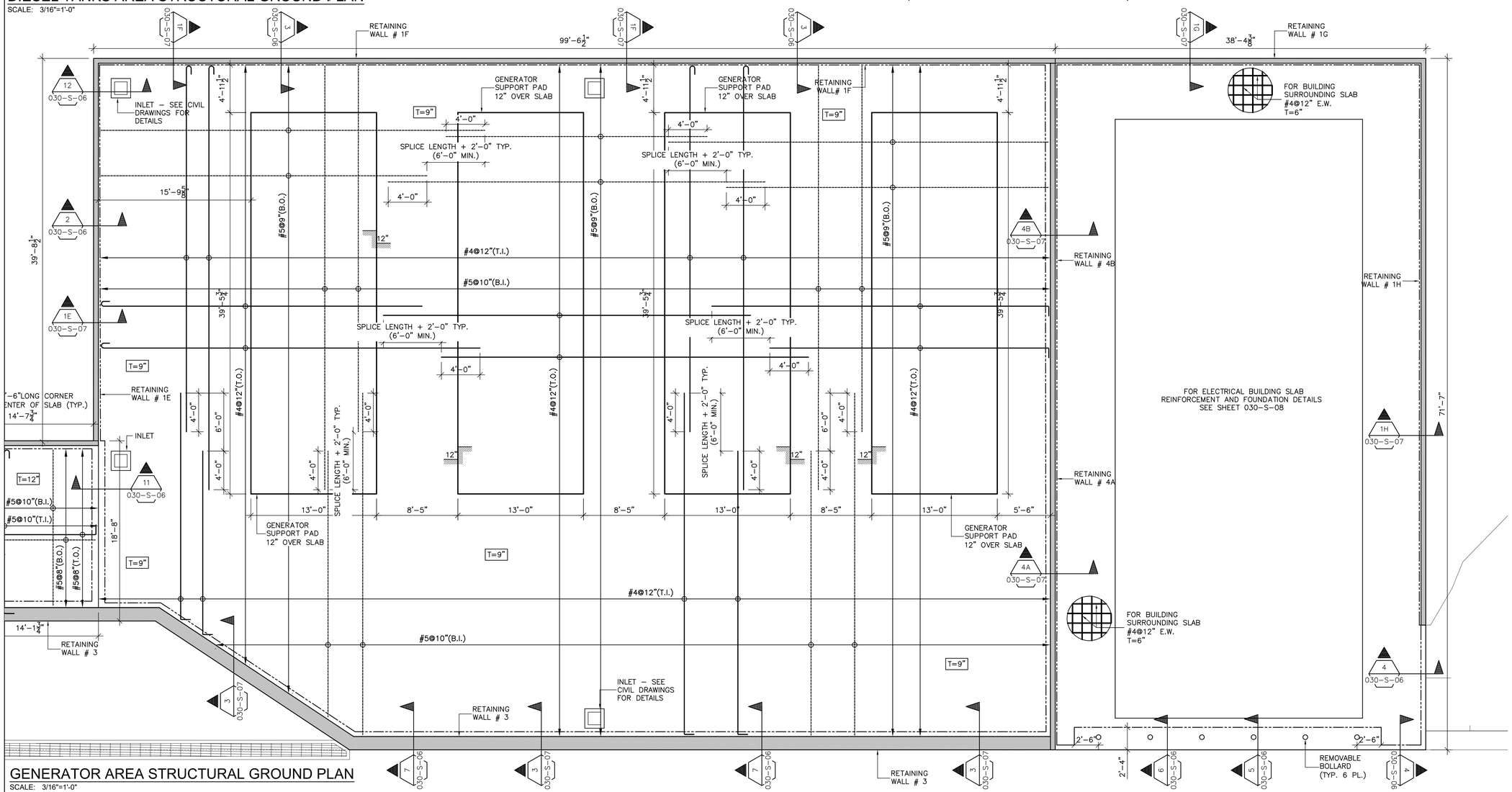



## DIESEL TANKS AREA STRUCTURAL GROUND PLAN

SCALE: 3/16"=1'-0"




## GENERATOR AREA STRUCTURAL GROUND PLAN

SCALE: 3/16"=1'-0"

## NOTES:

1. ALL MARKED DIMENSIONS ARE EXPRESSED IN FEET AND INCHES.
2. STATION NUMBERING IS EXPRESSED IN METER TO MATCH CIVIL DRAWINGS.
3. REFER TO CIVIL DRAWINGS FOR SITE GEOMETRY AND GRADING.
4. DEFINITIONS:
   A. B.O. – BOTTOM REINFORCEMENT OUTER LAYER
   B. B.I. – BOTTOM REINFORCEMENT INNER LAYER
   C. T.I. – TOP REINFORCEMENT INNER LAYER
   D. T.O. – TOP REINFORCEMENT OUTER LAYER
5. STAGGER SPLICES OF TOP AND BOTTOM REINFORCEMENT. NO TWO ADJACENT BARS ARE TO BE SPLICED AT THE SAME POINT.

## LEGEND:

RETAINING WALL

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| C | 01/29/2024 | 100% DESIGN | ELLR | CK | GN |
| B | 11/20/2023 | 90% DESIGN | ELLR | CK | GN |
| A | 09/29/2023 | 60% DESIGN | ELLR | CK | GN |

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DESIGNED BY ELLR
CHECKED BY CK
APPR. BY GN

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

**GENERATORS AREA - PLAN I**

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: 3/16" = 1'-0"

SHEET NO. 78 OF 145
DWG. NO. **030-S-02**

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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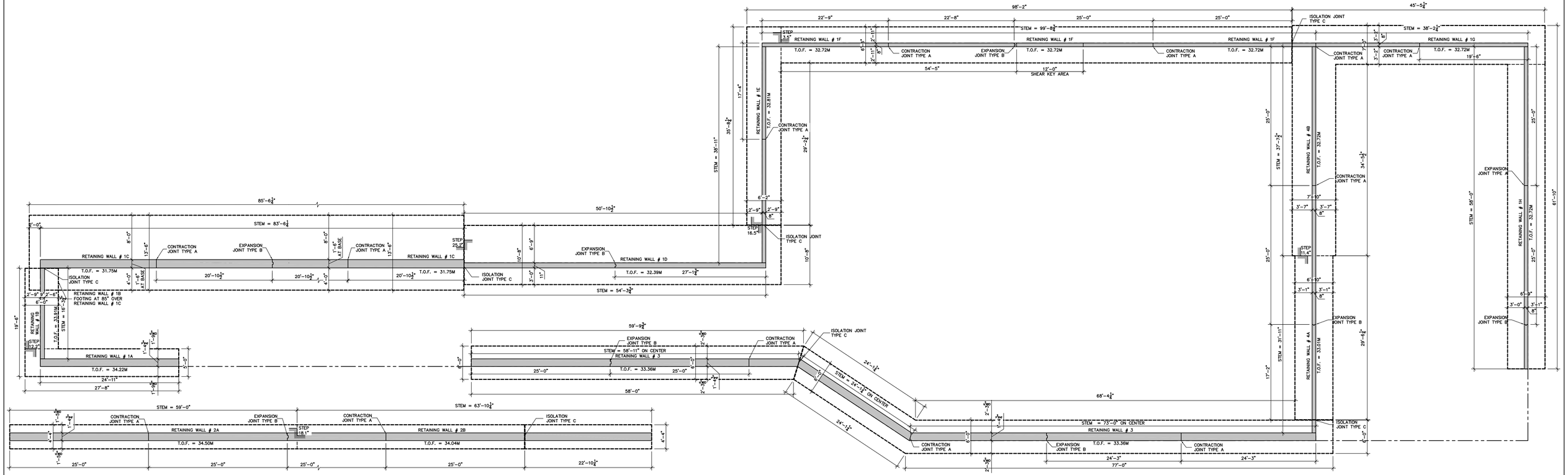


## GENERATOR AREA RETAINING WALLS FOOTING LAYOUT PLAN

SCALE: 1/8"=1'-0"

### NOTES:

1. ALL DIMENSIONS ARE EXPRESSED IN FEET AND INCHES, EXCEPT FOR STATION NUMBERING AND TOP OF FOOTING ELEVATIONS THAT ARE EXPRESSED IN METER TO MATCH CIVIL DRAWINGS.
2. REFER TO CIVIL DRAWINGS FOR SITE GEOMETRY AND GRADING.
3. REFER TO CIVIL DRAWING SHEET 030-C-03 FOR STATIONING AND COORDINATES.

### LEGEND:

RETAINING WALL

**PRELIMINARY NOT FOR CONSTRUCTION**

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
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| A | 01/29/2024 | 100% DESIGN | ELLR | CK | GN |

| | |
|---|---|
| DRAWN BY | ELLR |
| DESIGNED BY | ELLR |
| CHECKED BY | CK |
| APPR. BY | GN |

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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

**GENERATORS AREA - PLAN II**

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: 1/8" = 1'-0"

SHEET NO. 79 OF 145
DWG. NO. **030-S-03**

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

2024.02.12 4:12:31 PM
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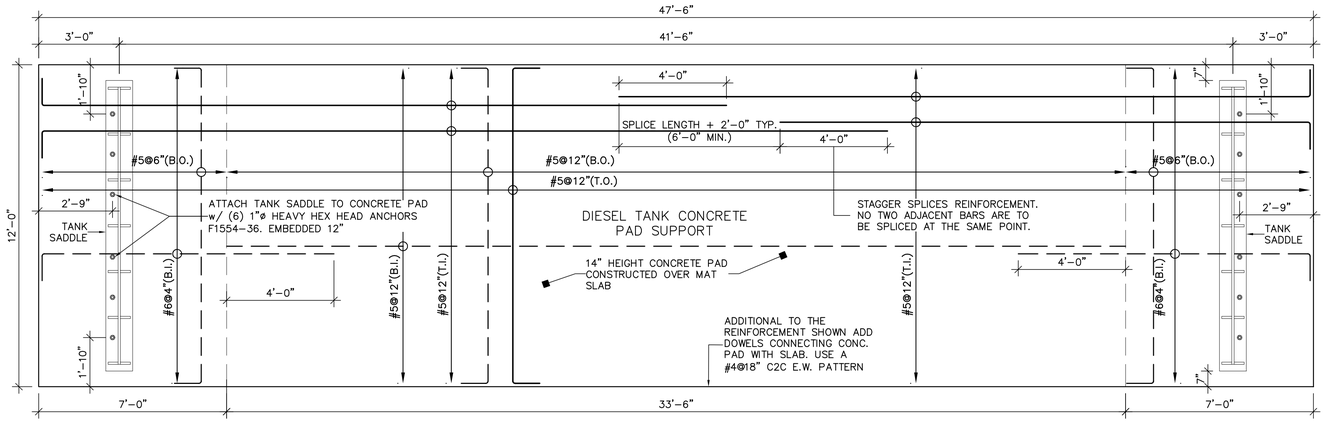
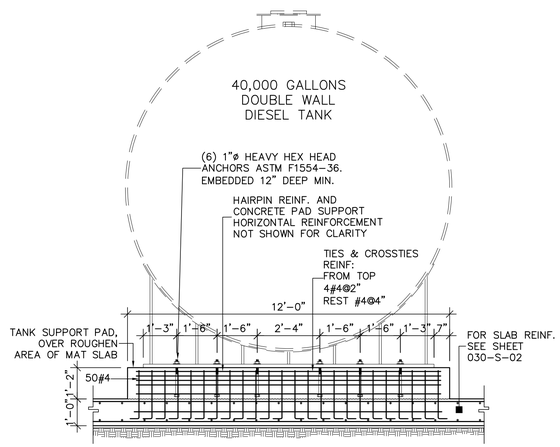


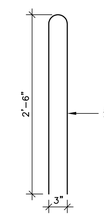

## TANK SADDLE CONCRETE PAD SUPPORT PLAN

SCALE :3/8"=1'-0"



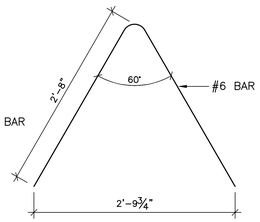

## TANK SADDLE CONCRETE PAD SUPPORT SECTION

SCALE :3/8"=1'-0"



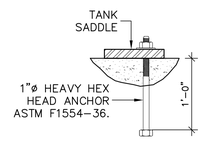

## HAIRPIN DETAIL

SCALE :1"=1'-0"



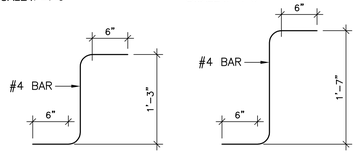

## HAIRPIN DETAIL

SCALE :1"=1'-0"




## ANCHOR DETAIL

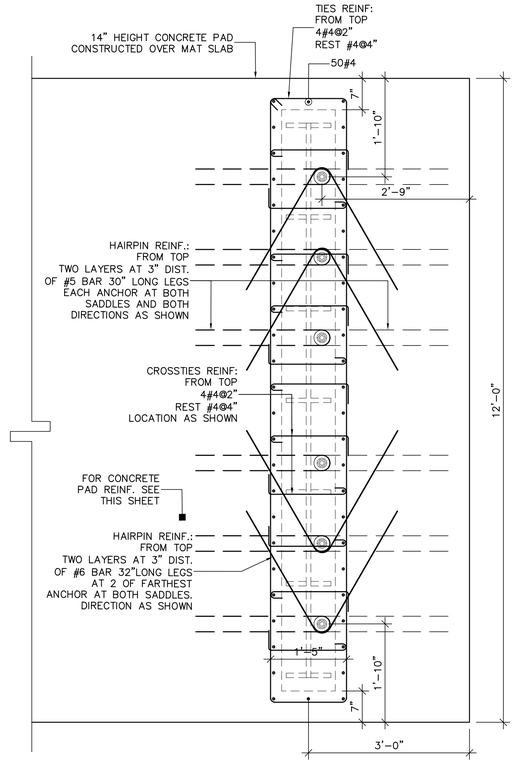
SCALE :1"=1'-0"




GENERATOR PAD TANK PAD

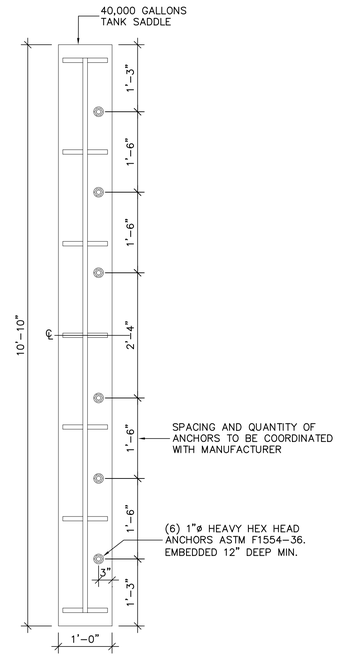
## DOWEL DETAIL FOR CONNECTING PAD TO SLAB

SCALE :1"=1'-0"



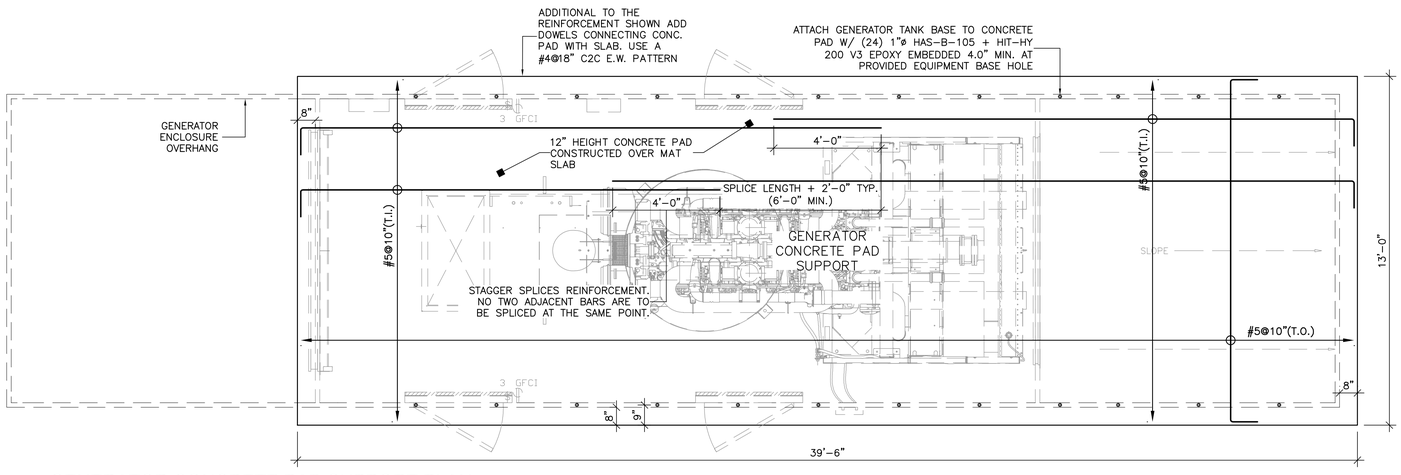

## SADDLE AREA CONCRETE PAD ADDITIONAL REINFORCEMENT

SCALE :3/4"=1'-0"



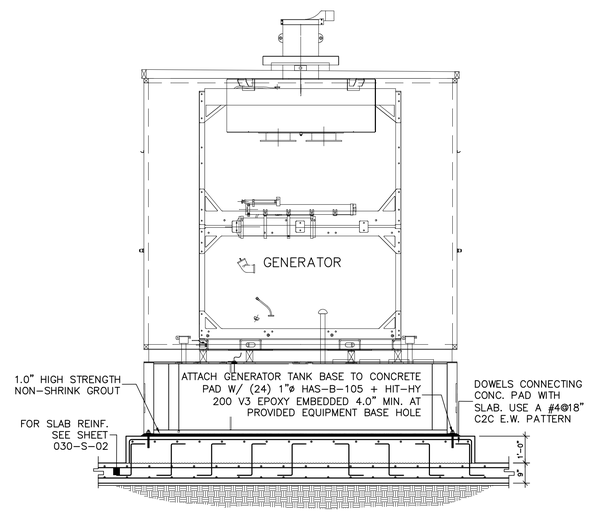

## SADDLE DETAIL

SCALE :3/4"=1'-0"




## GENERATOR CONCRETE PAD SUPPORT PLAN

SCALE :3/8"=1'-0"




## GENERATOR ANCHOR LAYOUT - SHORT SIDE SECTION

SCALE :3/8"=1'-0"

### NOTES:

1. PROVIDED DESIGN FOR THE DIESEL TANKS AND GENERATORS SUPPORT PAD AND ANCHORS IS BASE ON BOD EQUIPMENT. SEE MECHANICAL AND ELECTRICAL DRAWINGS/DOCUMENTS FOR MORE INFORMATION OF BOD EQUIPMENT.
2. GENERATORS SUPPORT PAD SIZE DEPENDS ON GENERATOR BRAND TO BE SELECTED DURING PROCUREMENT PROCESS. CONTRACTOR IS RESPONSIBLE TO ADJUST PROVIDED DIMENSIONS TO MATCH SELECTED EQUIPMENT.
3. ANCHORS LOCATION AND QUANTITY FOR GENERATOR BASE DEPENDS ON GENERATOR BRAND TO BE SELECTED DURING PROCUREMENT PROCESS. CONTRACTOR IS RESPONSIBLE TO VERIFY DESIGN AND COORDINATE LOCATION AND NUMBER OF ANCHORS WITH SELECTED EQUIPMENT.
4. DIESEL TANK CONCRETE BASE AND ANCHOR WHERE DESIGNED FOR A RESULTING SEISMIC LATERAL FORCE OF 147.34 KIPS. CONTRACTOR SHALL CONFIRM WITH MANUFACTURER THE DESIGN OF THE TANK AND TANK SADDLES TO RESIST SEISMIC LOAD.
5. DIESEL TANK ANCHORS LOCATION AND SIZE OF HOLES TO BE COORDINATED WITH TANK MANUFACTURER.
6. STAGGER SPLICES OF TOP AND BOTTOM REINFORCEMENT. NO TWO ADJACENT BARS ARE TO BE SPLICED AT THE SAME POINT.

**PRELIMINARY NOT FOR CONSTRUCTION**

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 02/13/2024 | 100% DESIGN | ELLR | | GN |
| C | 01/29/2024 | 100% DESIGN | ELLR | CK | GN |
| B | 11/20/2023 | 90% DESIGN | ELLR | CK | GN |
| A | 09/29/2023 | 60% DESIGN | ELLR | CK | GN |

DRAWN BY ELLR
DESIGNED BY ELLR
CHECKED BY CK
APPR. BY GN

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

**GENERATORS AREA - SECTION I**

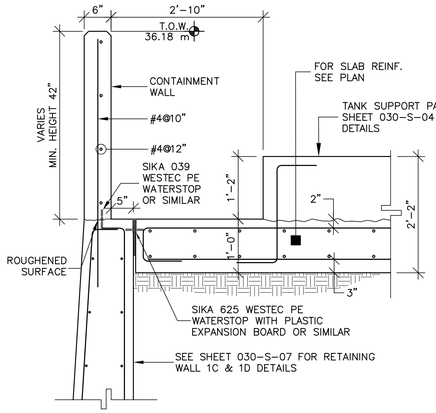
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: AS SHOWN

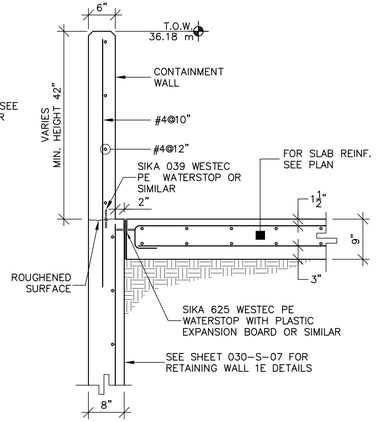
SHEET NO. 80 OF 145
DWG. NO. **030-S-04**

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 5 CM

2024.03.12 6:11:47 PM
030-S-04.dwg




SECTION 1
SCALE: 3/4"=1-'0" 030-S-06




SECTION 2
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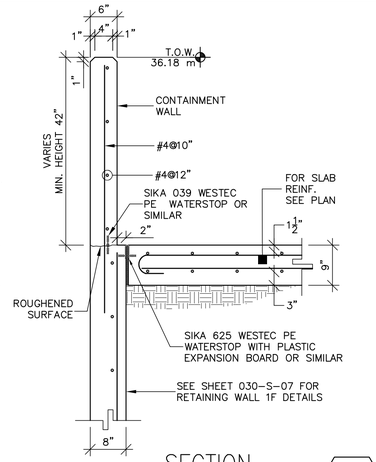
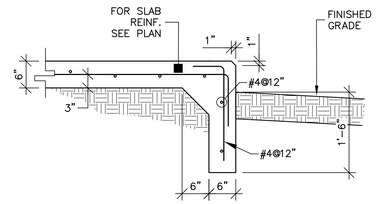
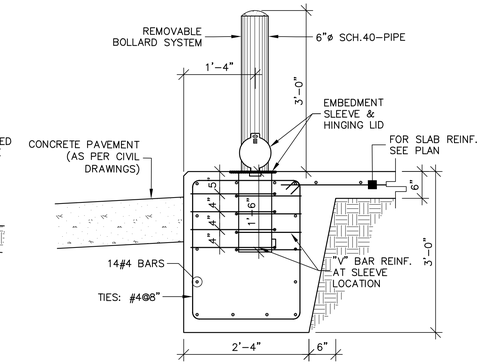


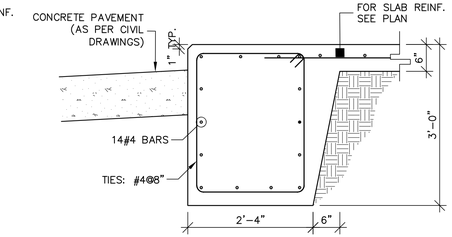

SECTION 3
SCALE: 3/4"=1-'0" 030-S-06



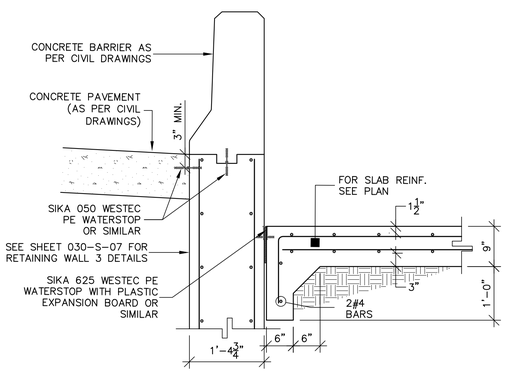

SECTION 4
SCALE: 3/4"=1-'0" 030-S-06




SECTION 5
SCALE: 3/4"=1-'0" 030-S-06




SECTION 6
SCALE: 3/4"=1-'0" 030-S-06




SECTION 7
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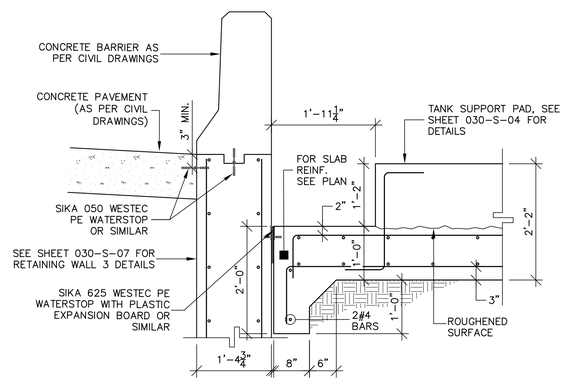


SECTION 8
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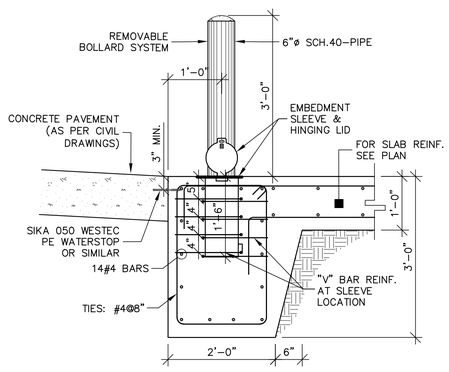


SECTION 9
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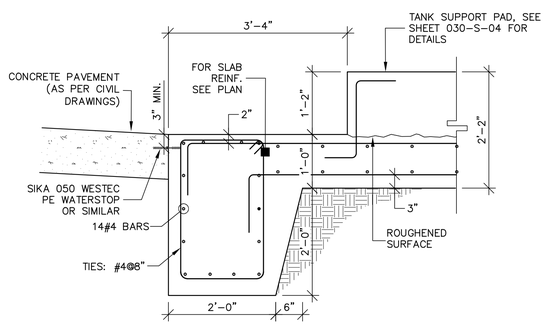


SECTION 10
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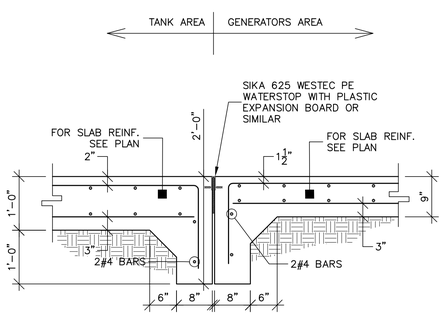
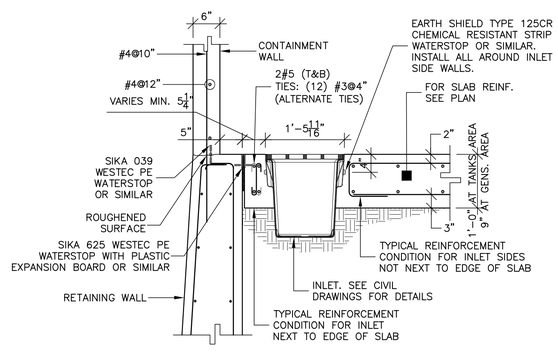
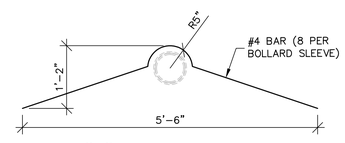


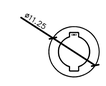

SECTION 11
SCALE: 3/4"=1-'0" 030-S-06



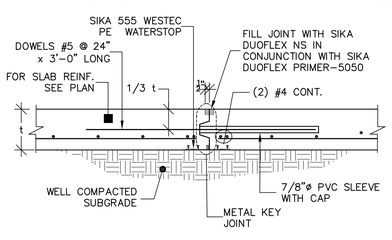

SECTION 12
SCALE: 3/4"=1-'0" 030-S-06



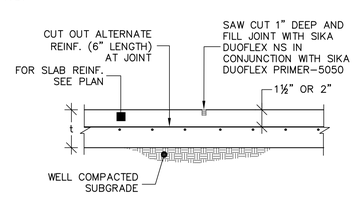

"V" BAR DETAIL
SCALE: N.T.S.




SLEEVE & HINGING LID DETAIL
SCALE: N.T.S.

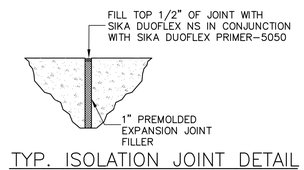



CONSTRUCTION JOINT DETAIL
SCALE: N.T.S.




NOTE :
JOINT SHALL BE SAWEN AS SOON AS THE CONCRETE IS HARD ENOUGH NOT TO BE TORN OR DAMAGED BY THE BLADE BUT BEFORE RANDOM CRACKS CAN FORM IN THE CONCRETE SLAB.

CONTROL SAW CUT JOINT FOR SLAB
SCALE: N.T.S.




TYP. ISOLATION JOINT DETAIL
SCALE: N.T.S.

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| E | 02/13/2024 | 100% DESIGN | ELLR | | GN |
| D | 01/29/2024 | 100% DESIGN | ELLR | CK | GN |
| C | 11/20/2023 | 90% DESIGN | ELLR | CK | GN |
| B | 09/29/2023 | 60% DESIGN | ELLR | CK | GN |
| A | 07/26/2023 | 30% DESIGN | ELLR | CK | GN |

| | |
|---|---|
| DRAWN BY | ELLR |
| DESIGNED BY | ELLR |
| CHECKED BY | CK |
| APPR. BY | GN |

Stantec
87 Taborucco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

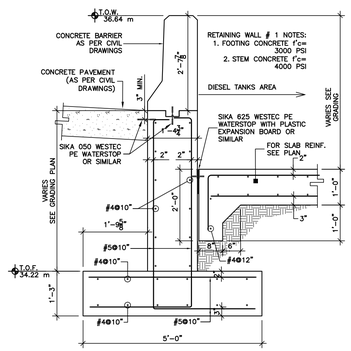
**GENERATORS AREA - DETAILS I**

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: 3/4"=1'-0"

SHEET NO. 81 OF 145
DWG. NO. **030-S-06**
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

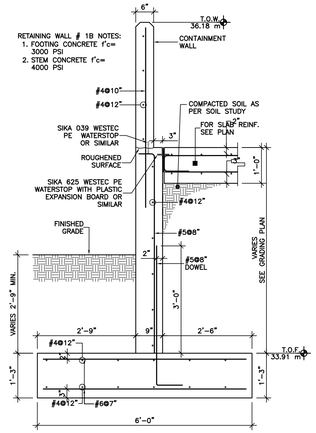
2024.02.12 4:11:28 PM
030-S-06.dwg




RETAINING WALL # 1A
STEM 24'-11" LONG

SECTION 1A
SCALE: 1/2"=1'-0" 030-S-07

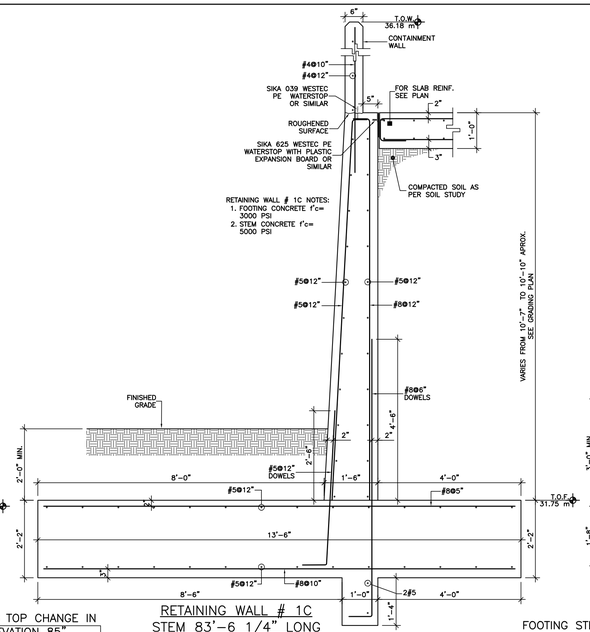
FOOTING STEP 12.2"




RETAINING WALL # 1B
STEM 16'-3 3/4" LONG

SECTION 1B
SCALE: 1/2"=1'-0" 030-S-07

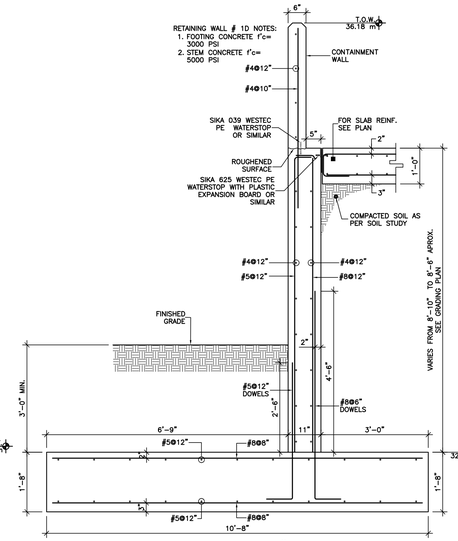
FOOTING TOP CHANGE IN ELEVATION 85"




RETAINING WALL # 1C
STEM 83'-6 1/4" LONG

SECTION 1C
SCALE: 1/2"=1'-0" 030-S-07

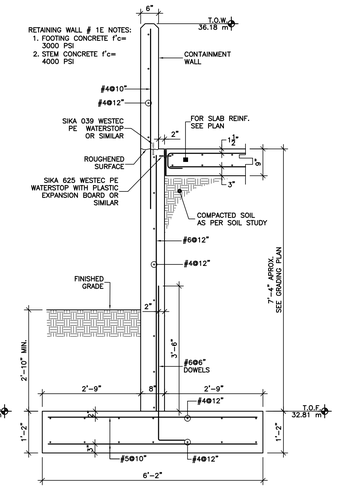
FOOTING STEP 25.2"
ISOLATION JOINT




RETAINING WALL # 1D
STEM 54'-3 3/4" LONG

SECTION 1D
SCALE: 1/2"=1'-0" 030-S-07

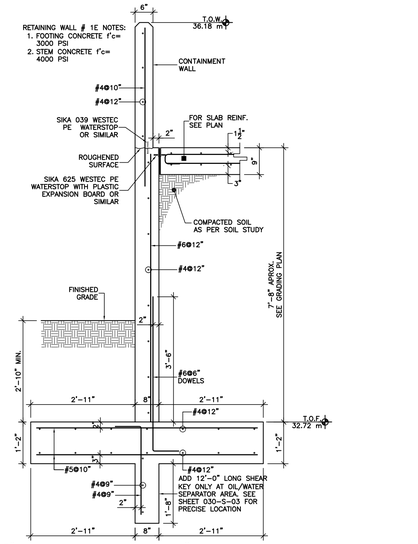
FOOTING STEP 16.5"
ISOLATION JOINT




RETAINING WALL # 1E
STEM 38'-11" LONG

SECTION 1E
SCALE: 1/2"=1'-0" 030-S-07

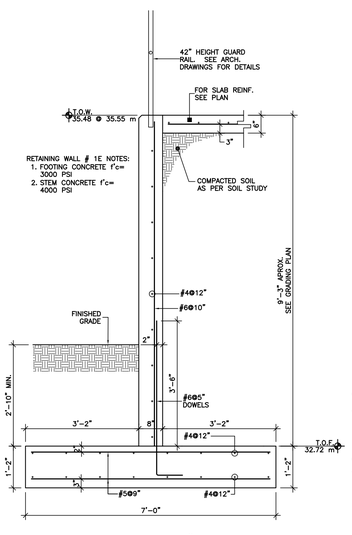
FOOTING STEP 3.5"




RETAINING WALL # 1F
STEM 99'-8 3/4" LONG

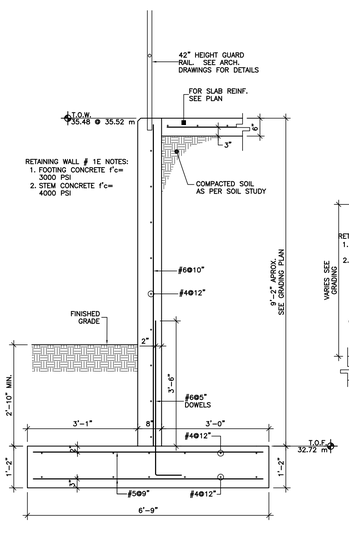
SECTION 1F
SCALE: 1/2"=1'-0" 030-S-07

FOOTING STEP NONE
ISOLATION JOINT



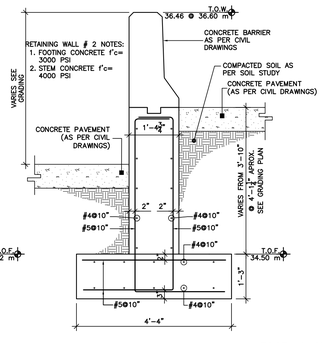

RETAINING WALL # 1G
STEM 32'-2 1/4" LONG

SECTION 1G
SCALE: 1/2"=1'-0" 030-S-07




RETAINING WALL # 1H
STEM 58'-0" LONG

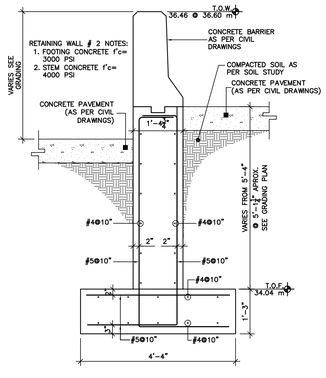
SECTION 1H
SCALE: 1/2"=1'-0" 030-S-07




RETAINING WALL # 2A
STEM 59'-0" LONG

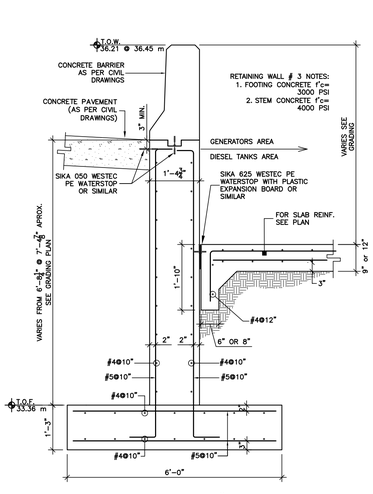
SECTION 2A
SCALE: 1/2"=1'-0" 030-S-07

FOOTING STEP 18.1"



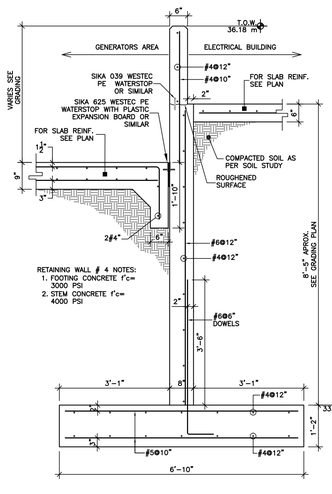

RETAINING WALL # 2B
STEM 63'-10 1/4" LONG

SECTION 2B
SCALE: 1/2"=1'-0" 030-S-07




RETAINING WALL # 3
STEM 156'-0 1/4" LONG

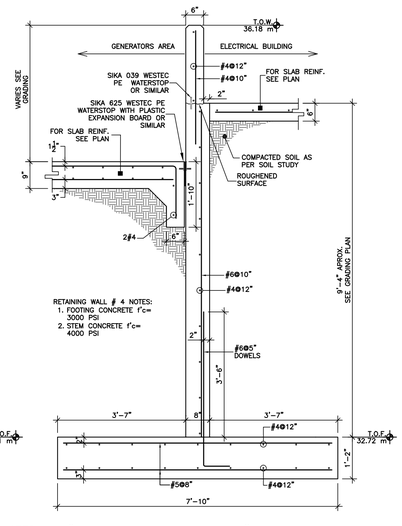
SECTION 3
SCALE: 1/2"=1'-0" 030-S-07




RETAINING WALL # 4A
STEM 31'-11" LONG

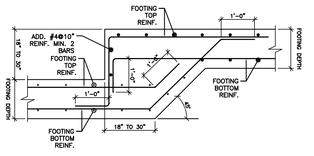
SECTION 4A
SCALE: 1/2"=1'-0" 030-S-07

FOOTING STEP 11.4"



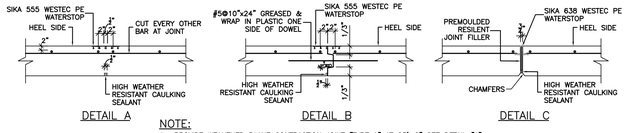

RETAINING WALL # 4B
STEM 37'-7 1/2" LONG

SECTION 4B
SCALE: 1/2"=1'-0" 030-S-07




STEP ON WALL FOOTING DETAIL

SCALE: N.T.S.




DETAIL A DETAIL B DETAIL C

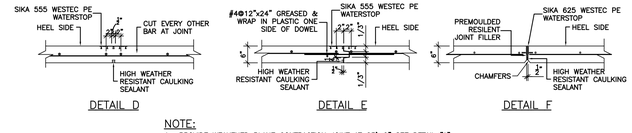
NOTE:
1- PROVIDE WEAKENED PLANE CONTRACTION JOINT "TYPE A" AT 25'-0" SEE DETAIL "A"
2- PROVIDE EXPANSION JOINT "TYPE B" AT NO MORE THAN 50'-0" SEE DETAIL "B"
3- PROVIDE EXPANSION/ISOLATION JOINT "TYPE C" AT NO MORE THAN 100'-0" SEE DETAIL "C"

RETAINING WALL JOINTS DETAILS

SCALE: N.T.S.

CONC. BARRIER TO STEM WALL KEY DETAIL

SCALE: N.T.S.




DETAIL D DETAIL E DETAIL F

NOTE:
1- PROVIDE WEAKENED PLANE CONTRACTION JOINT AT 25'-0" SEE DETAIL "A"
2- PROVIDE EXPANSION JOINT AT NO MORE THAN 50'-0" SEE DETAIL "B"
3- PROVIDE EXPANSION/ISOLATION JOINT AT NO MORE THAN 100'-0" SEE DETAIL "F"

CONTAINMENT WALL JOINTS DETAILS

SCALE: N.T.S.

NOTES:

1. ALL MARKED DIMENSIONS ARE EXPRESSED IN FEET AND INCHES EXCEPT FOR T.O.F. AND STATIONS NUMBERING.
2. TOP OF FOOTING (T.O.F.) ELEVATIONS AND STATION NUMBERING IS EXPRESSED IN METER TO MATCH CIVIL DRAWINGS.
3. REFER TO CIVIL DRAWINGS FOR SITE GEOMETRY AND GRADING.
4. REFER TO CIVIL DRAWING SHEET 030-C-03 FOR STATIONING AND COORDINATES.

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| C | 02/13/2024 | 100% DESIGN | ELLR | | GN |
| B | 01/29/2024 | 100% DESIGN | ELLR | CK | GN |
| A | 11/20/2023 | 90% DESIGN | ELLR | CK | GN |

| | |
|---|---|
| DRAWN BY | ELLR |
| DESIGNED BY | ELLR |
| CHECKED BY | CK |
| APPR. BY | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

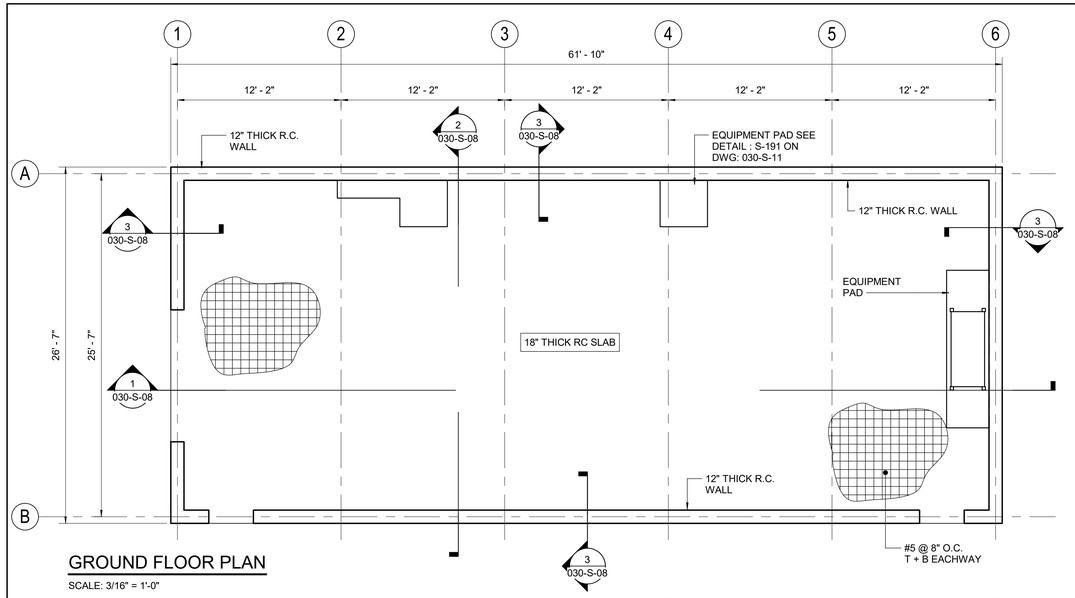
**GENERATORS AREA - DETAILS II**

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: 1/2"=1'-0"

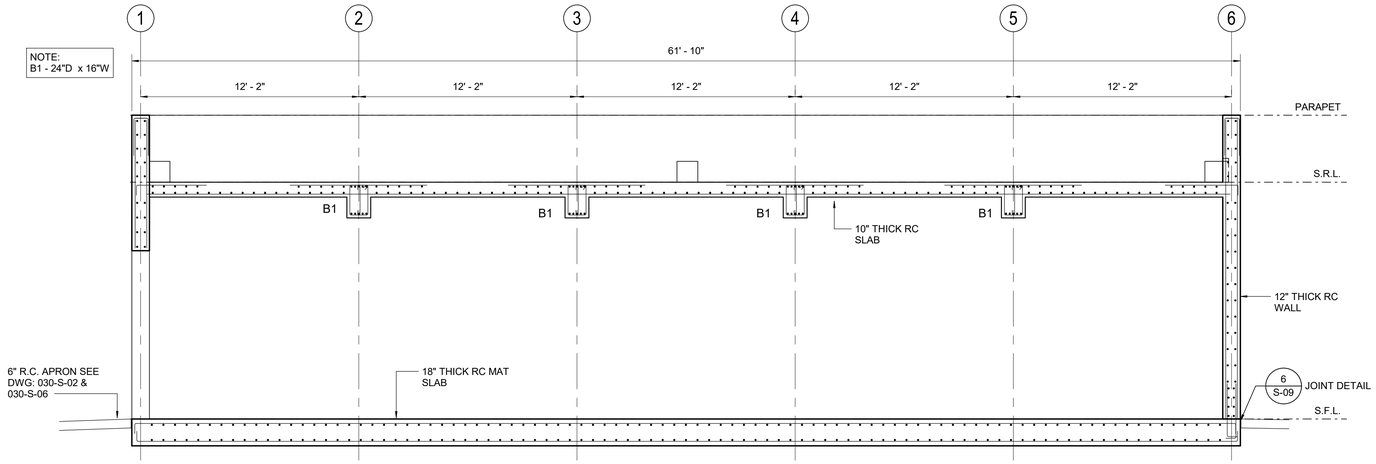
SHEET NO. 82 OF 145
DWG. NO. **030-S-07**
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET ADJUST SCALES ACCORDINGLY
0 2 CM

2024.02.12 4:11:07 PM
030-S-07.dwg



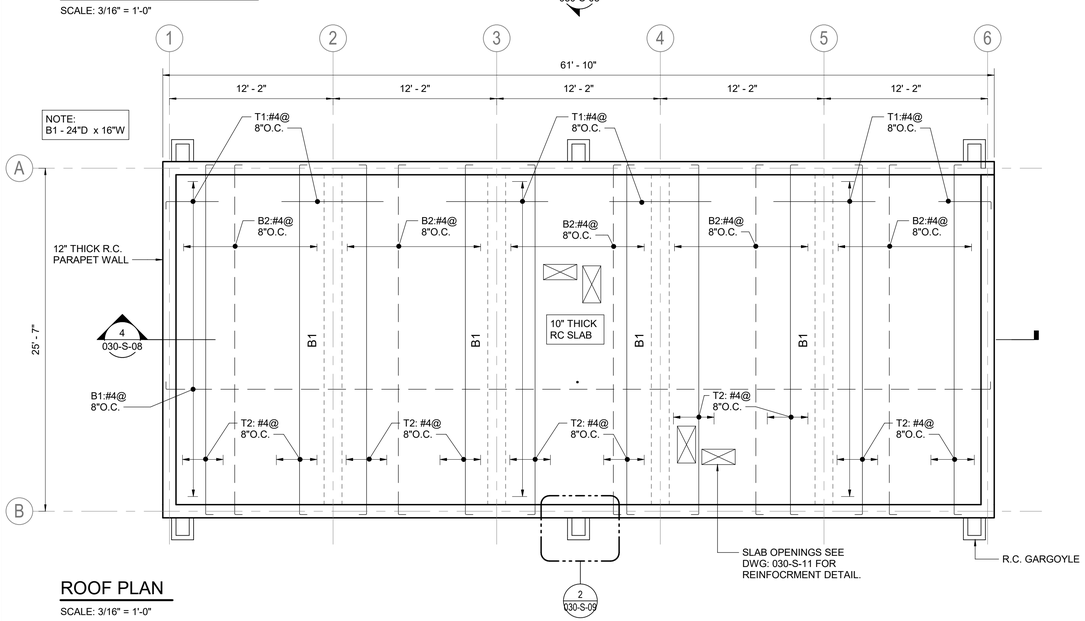

## GROUND FLOOR PLAN

SCALE: 3/16" = 1'-0"



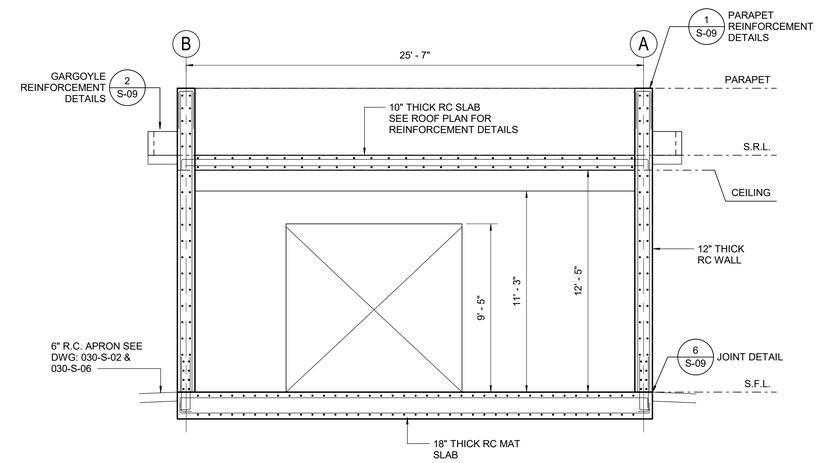

## 1 030-S-08 SECTION

SCALE: 1/4" = 1'-0"



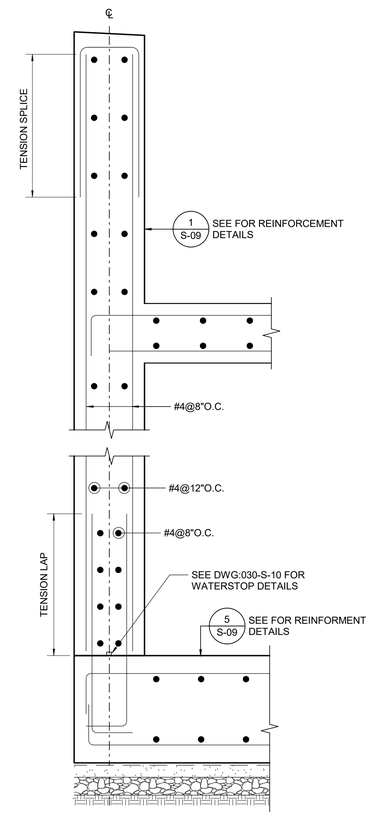

## ROOF PLAN

SCALE: 3/16" = 1'-0"



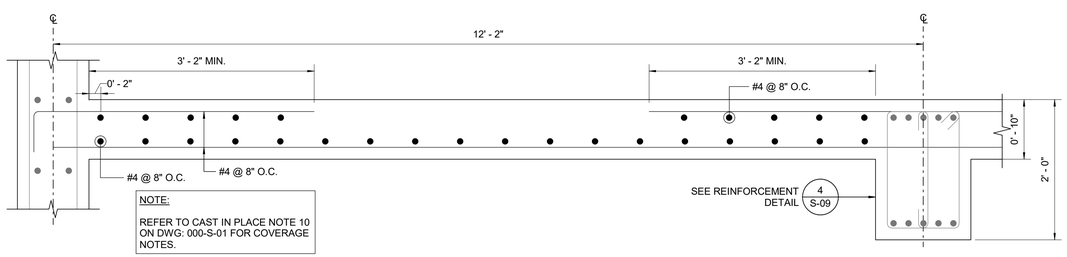

## 2 030-S-08 SECTION

SCALE: 1/4" = 1'-0"




## 3 030-S-08 WALL DETAIL

SCALE: 1" = 1'-0"




NOTE:

REFER TO CAST IN PLACE NOTE 10 ON DWG: 000-S-01 FOR COVERAGE NOTES.

## 4 030-S-08 ROOF SLAB DETAIL

SCALE: 1" = 1'-0"

Permit/Seal

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| B | 11/20/2023 | 90% DESIGN | SB | RB | GN |
| A | 09/26/2023 | 60% DESIGN | SB | RB | GN |

| | |
|---|---|
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| DESIGNED BY | PA |
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATOR
TOA ALTA, PUERTO RICO

GENERATORS AREA - ELECTRICAL BUILDING PLANS, SECTIONS AND DETAILS

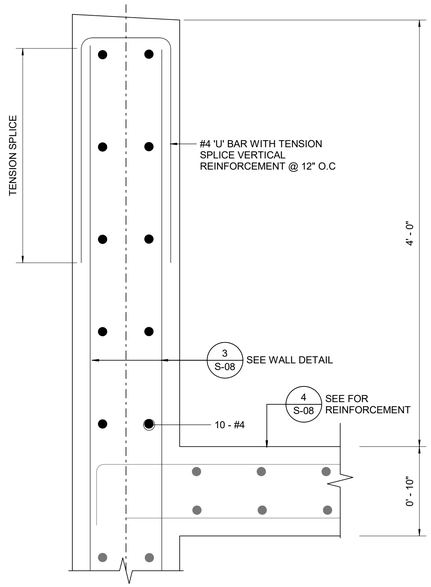
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No: 1-70-9000
PSWID: -
DATE: NOVEMBER/ 2023
SCALE: As indicated

SHEET NO. 83 OF 145
DWG. NO. 030-S-08

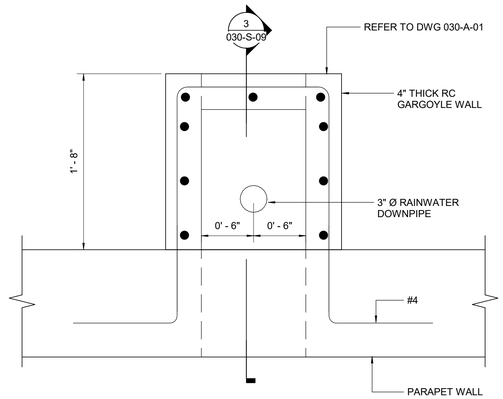
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

ORIGINAL SHEET - ARCH D



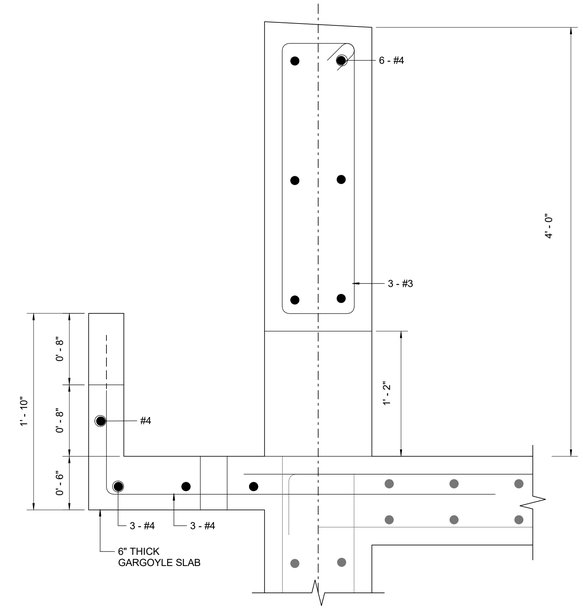

1 030-S-09 PARAPET DETAIL

SCALE: 1 1/2" = 1'-0"



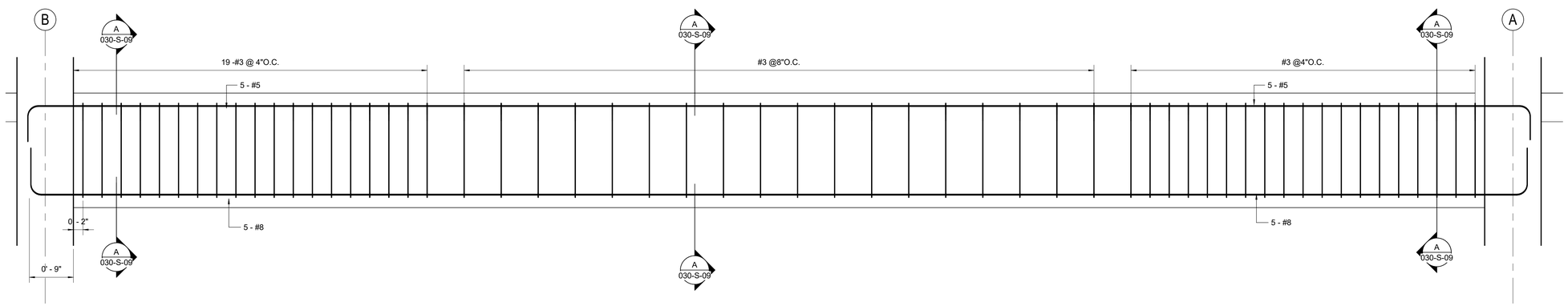

2 030-S-09 GARGOYLE DETAIL

SCALE: 1 1/2" = 1'-0"



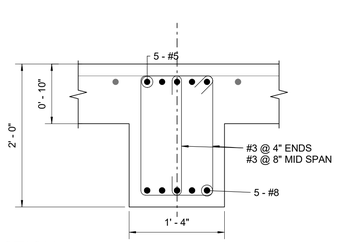

3 030-S-09 GARGOYLE SECTION

SCALE: 1 1/2" = 1'-0"



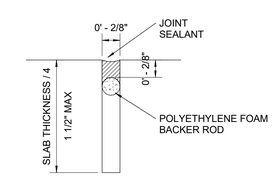

4 030-S-09 BEAM DETAIL AND ELEVATION (B1)

SCALE: 1" = 1'-0"

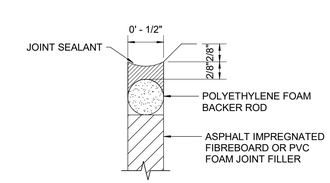



SECTION A

SCALE: 1" = 1'-0"




SAWCUT JOINT SEALANT




ISOLATION JOINT SEALANT

7 030-S-09 SEALANT AND REGLET

SCALE: 12" = 1'-0"

Permit/Seal

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| A | 09/26/2023 | 60% DESIGN | SB | RB | GN |

| | |
|---|---|
| DRAWN BY | SB |
| DESIGNED BY | PA |
| CHECKED BY | RB |
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATOR
TOA ALTA, PUERTO RICO

GENERATORS AREA - ELECTRICAL BUILDING - DETAILS

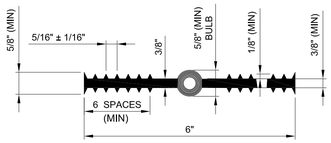
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: NOVEMBER/ 2023
SCALE: As indicated

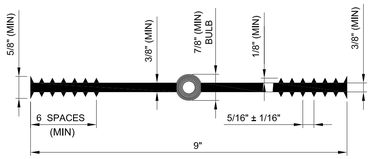
SHEET NO. 84 OF 145
DWG. NO. 030-S-09

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

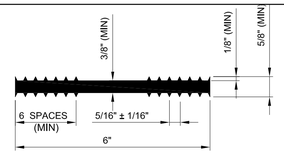
ORIGINAL SHEET - ARCH D



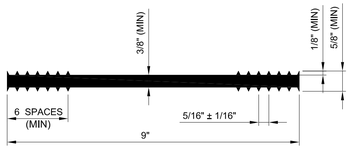

S-103 6" CENTER-BULB WATERSTOP
REV 010119



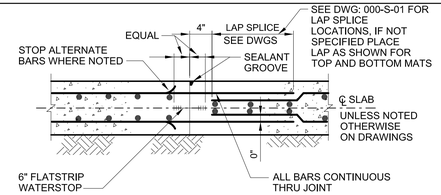

S-104 9" CENTER-BULB WATERSTOP
REV 010119




S-105 6" FLATSTRIP WATERSTOP
REV 010119




S-106 9" FLATSTRIP WATERSTOP
REV 010119

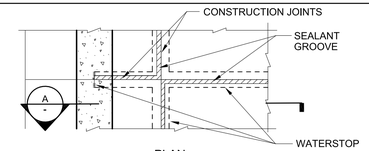



DOUBLE MAT REINF

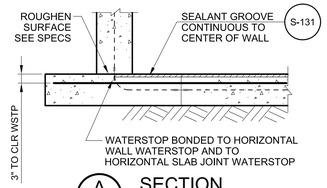
S-114 WITH WATERSTOP AND SEALANT GROOVE
REV 010119

S-115 NO WATERSTOP OR SEALANT GROOVE
REV 010119

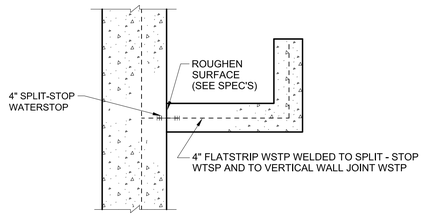
SLAB-ON-GRADE CONSTRUCTION JOINTS




PLAN




A SECTION

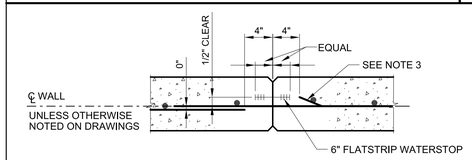



LAUNDER JOINT

NOTES:

1. SEALANT GROOVE SHALL BE CONTINUED UNDER WALL AND SEALANT SHALL BOND WITH WALL WATERSTOP IN ALL CASES WHERE SUCH WATERSTOP OCCURS.
2. SEALANT UNDER WALL SHALL BE IN PLACE AND FULLY CURED PRIOR TO PLACEMENT OF CONCRETE FOR WALL.
3. CONSTRUCTION JOINTS PASSING THROUGH VARIOUS MEMBERS OF A WATER RETAINING STRUCTURE SHALL BE SEALED WITH WATERSTOPS BONDED TOGETHER, SO AS TO PROVIDE A CONTINUOUS WATERTIGHT JOINT.

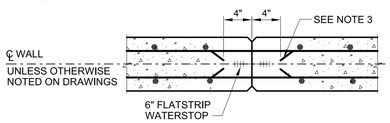
S-118 CONSTRUCTION JOINT WALL TO SLAB
REV 010119




SINGLE CURTAIN REINF

S-121 WITH WATERSTOP
REV 010119

S-122 NO WATERSTOP
REV 010119




DOUBLE CURTAIN REINF

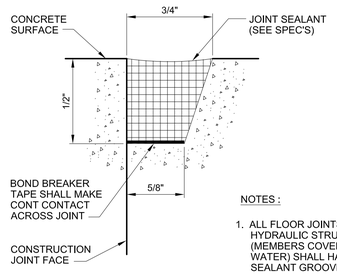
S-123 WITH WATERSTOP
REV 010119

S-124 NO WATERSTOP
REV 010119

NOTES:

1. WHERE WATERSTOP IS REQUIRED IN SINGLE CURTAIN WALL REINFORCEMENT, PLACE WATERSTOP ON WATER SIDE OF WALL.
2. UNLESS OTHERWISE NOTED 3/4" CHAMFERS SHALL BE OMITTED IN SURFACES TO RECEIVE ARCHITECTURAL TREATMENT.
3. UNLESS SPECIFICALLY NOTED OTHERWISE #5 AND LARGER BARS SHALL BE CONTINUOUS THRU JOINT. #4 AND SMALLER BARS SHALL STOP ALTERNATE BARS AT JOINT.
4. STAGGER SPLICES UNLESS NOTED OTHERWISE.

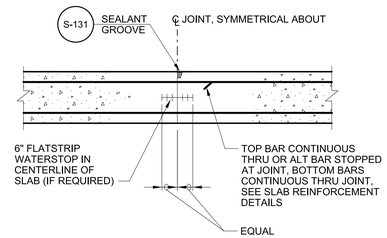
VERTICAL WALL CONSTRUCTION JOINT



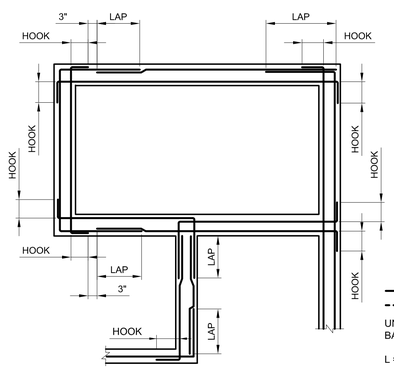

NOTES :

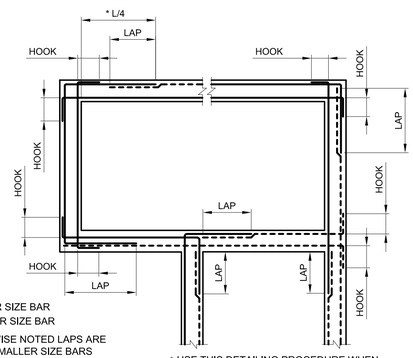
1. ALL FLOOR JOINTS OF HYDRAULIC STRUCTURES (MEMBERS COVERED WITH WATER) SHALL HAVE A SEALANT GROOVE
2. SANDBLASTING REQUIRED PRIOR TO APPLICATION OF PRIMER

S-131 SEALANT GROOVE
REV 010119




S-137 SUSPENDED SLAB CONSTRUCTION JOINT
REV 010119



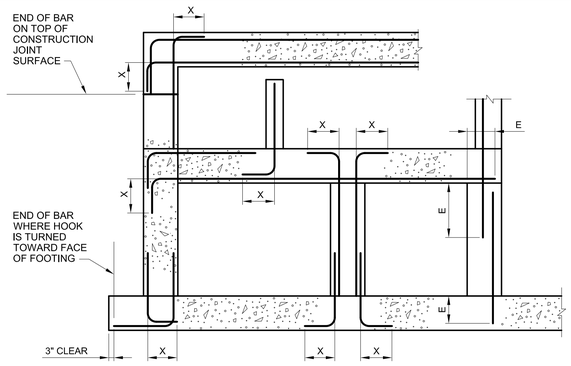

LARGER SIZE BAR
SMALLER SIZE BAR

UNLESS OTHERWISE NOTED LAPS ARE BASED ON THE SMALLER SIZE BARS

L = CLEAR SPAN

* USE THIS DETAILING PROCEDURE WHEN LARGER OR CLOSER SPACED BARS ARE CALLED OUT FOR CORNERS

S-141 HORIZONTAL REINFORCEMENT AT WALL INTERSECTIONS
REV 010119




SECTION

| LENGTH ( * ) | | | |
|---|---|---|---|
| BAR SIZE | HOOK X | LAP SPLICE | EMBEDMENT E |
| #3 | 6" | 16" (21") | 12" (16") |
| #4 | 8" | 16" (21") | 12" (16") |
| #5 | 10" | 20" (26") | 15" (20") |
| #6 | 12" | 28" (37") | 22" (28") |
| #7 | 14" | 48" (62") | 37" (48") |
| #8 | 16" | 62" (81") | 48" (62") |
| #9 | 19" | 79" (102") | 61" (79") |
| #10 | 22" | 100" (130") | 77" (100") |
| #11 | 24" | 123" (160") | 95" (123") |

* USE LENGTH IN PARENTHESIS FOR WALL HORIZONTAL REBARS AND SLAB BARS WITH 12" OR MORE OF FRESH CONCRETE UNDERNEATH

NOTES:

1. USE LAP LENGTHS AS DETERMINED FROM THESE TABLES UNLESS SHOWN OTHERWISE.
2. THE TABLES SHOWN ARE FOR f'c=4000psi, fy=60,000psi, 1.5" MIN CONCRETE COVER AND 3" MIN BAR SPACING.
3. MULTIPLY THE LAP AND E SHOWN IN THESE TABLES BY 1.5 FOR EPOXY COATED REINFORCING.
4. WHEN BARS OF DIFFERENT SIZES ARE LAP SPLICED, LAP LENGTH SHALL BE THE LARGER OF: EMBEDMENT LENGTH OF LARGER BAR OR LAP LENGTH OF SMALLER BAR
5. USE REINFORCING BAR COUPLERS FOR SPLICES OF #11 AND LARGER BARS UNLESS DRAWINGS INDICATE LAP SPLICES SHOWN IN TABLE ARE ACCEPTABLE.
6. ALL DOWEL BARS SHALL EXTEND AN EMBEDMENT LENGTH E INTO ANOTHER MEMBER OR ACROSS A CONSTRUCTION JOINT UNLESS SHOWN TO SPLICE WITH OTHER BARS OR TO EXTEND TO THE FAR FACE OF THE MEMBER AND END WITH A STANDARD HOOK.

S-143 STANDARD 90° BAR HOOKS, EMBEDMENT LENGTHS AND LAP LENGTHS
REV 010119

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| B | 01/10/2024 | 90% DESIGN | SB | RB | GN |
| A | 11/20/2023 | 60% DESIGN | AB | RB | GN |

DRAWN BY SB
DESIGNED BY PA
CHECKED BY RB
APPR. BY CK

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B7 Tabonuco Street, Suite 1504
Guaynabo, PR
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTAS, PUERTO RICO

GENERATORS AREA - ELECTRICAL BUILDING - STANDARD DETAILS - I

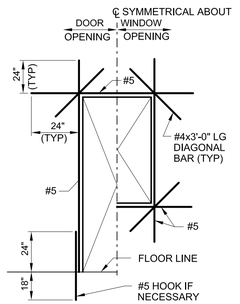
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 2-9-913
PSWID -
DATE: MAY / 2023
SCALE: NO SCALE

SHEET NO. 85 OF 145
DWG. NO. 030-S-10

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

ORIGINAL SHEET - ARCH D



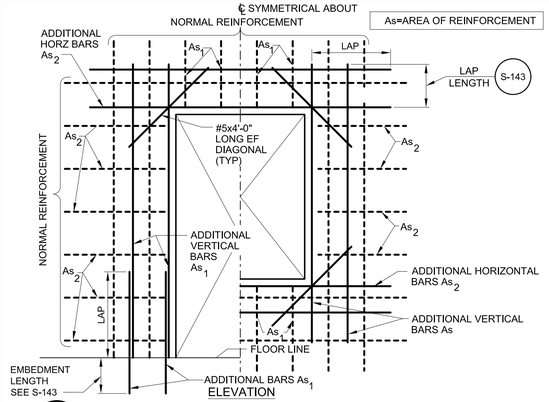

ELEVATION

NOTES:

1. CUT NORMAL REINFORCING AT OPENING.
2. FOR WALLS WITH TWO LAYERS OF REINFORCING PROVIDE 1 BAR EACH FACE.
3. FOR WALLS WITH ONE LAYER OF REINFORCING PROVIDE 1 BAR ON WALL CENTERLINE.
4. BAR LENGTHS FOR GRADE 60.
5. THIS DETAIL APPLIES TO ABOVE GRADE OPENING AND WHEN SPECIFICALLY REFERENCED. REFER TO DETAIL S-148 FOR BELOW GRADE OPENING.

## S-147 REINFORCEMENT AROUND RECTANGULAR WALL OPENING

REV 010119



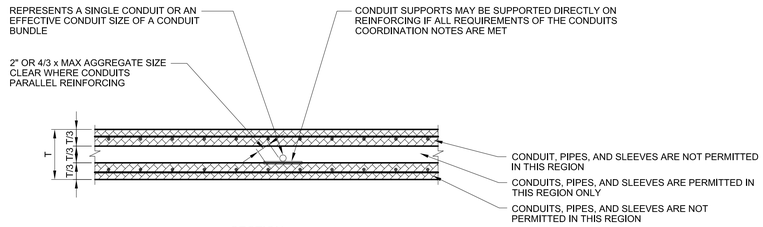

ELEVATION

NOTES:

1. CUT NORMAL REINFORCEMENT AT OPENING: $As_1$ AND $As_2$ = 1/2 AREA OF CUT BARS TO BE ADDED ON EACH SIDE OF OPENING.
2. DIAGONAL AND ADDITIONAL BARS $As_1$ AND $As_2$ TO BE PLACED:
   A) AT CENTERLINE OF WALLS OR SLABS WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
   B) AT EACH FACE OF WALLS OR SLABS WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED.
3. INCREASE SIZE OF ADDITIONAL BARS AS NEEDED TO FIT WITHIN A DISTANCE OF 2 X WALL / SLAB THICKNESS FROM OPENING. PROVIDE 2" MIN CLEAR BETWEEN BARS.
4. THIS DETAIL TO BE USED ONLY WHEN NO OTHER DETAIL IS INDICATED ON THE DRAWINGS.
5. WHERE A SLAB OR INTERSECTING WALL CONNECTS WITHIN ONE WALL THICKNESS OF THE OPENINGS, ADDITIONAL BARS ON THAT SIDE MAY BE OMITTED.
6. THIS DETAIL APPLIES TO BELOW GRADE OPENINGS AND WHEN SPECIFICALLY REFERENCED. REFER TO DETAIL S-147 FOR ABOVE GRADE OPENINGS.

## S-148 ADDITIONAL REINFORCEMENT AROUND RECTANGULAR OPENING

REV 010119

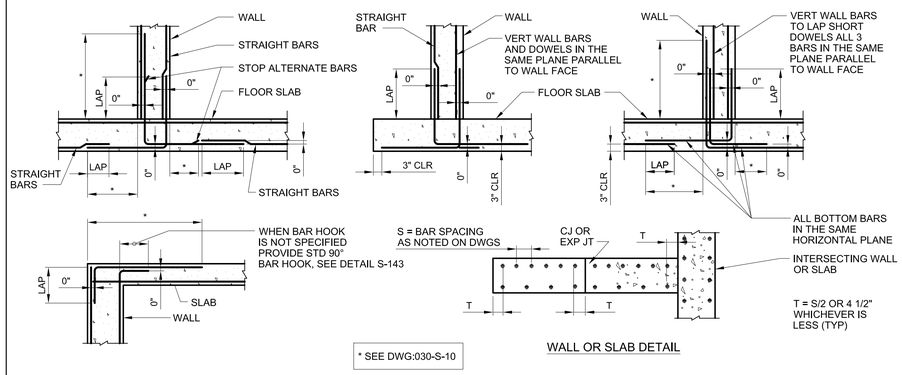



SECTION

NOTES:

1. THIS DETAIL APPLIES FOR ALL REINFORCED CONCRETE SLABS, WALLS AND BEAMS, UNLESS NOTED OTHERWISE.
2. CONDUITS, PIPING, OR OTHER NON-STRUCTURAL ITEMS ARE PROHIBITED FROM BEING LOCATED IN REINFORCED CONCRETE AS SHOWN.

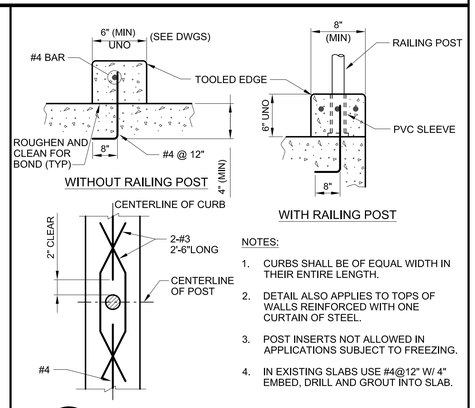
## EMBEDMENTS NOT PERPENDICULAR TO THE PLANE OF THE REINFORCED CONCRETE




WALL OR SLAB DETAIL

## S-149 STANDARD FOR REINFORCING BAR DETAILING

REV 010119

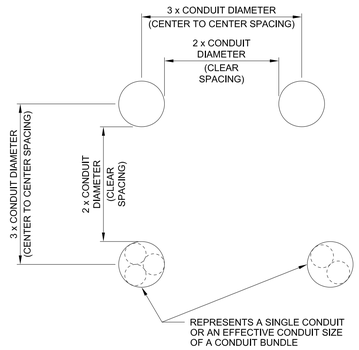



NOTES:

1. CURBS SHALL BE OF EQUAL WIDTH IN THEIR ENTIRE LENGTH.
2. DETAIL ALSO APPLIES TO TOPS OF WALLS REINFORCED WITH ONE CURTAIN OF STEEL.
3. POST INSERTS NOT ALLOWED IN APPLICATIONS SUBJECT TO FREEZING.
4. IN EXISTING SLABS USE #4@12" W/ 4" EMBED, DRILL AND GROUT INTO SLAB.

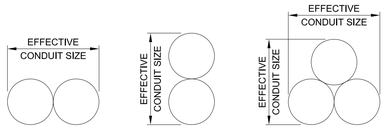
## S-180 CONCRETE CURB

REV 010119



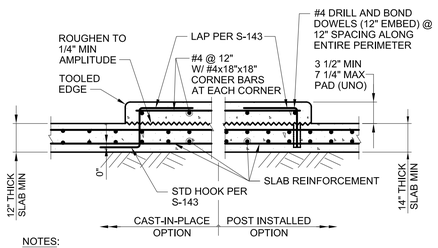

SECTION

## CONDUIT SPACING REQUIREMENTS




SMALL CONDUITS MAY BE BUNDLED AS SHOWN, PROVIDED THE MAXIMUM EFFECTIVE CONDUIT SIZE DOES NOT EXCEED ONE THIRD THE CONCRETE SECTION THICKNESS

## CONDUIT BUNDLE REQUIREMENTS

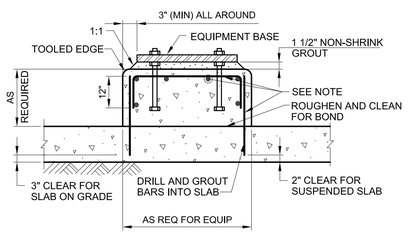



NOTES:

1. WHERE SLAB THICKNESS IS LESS THAN REQUIRED FOR POST-INSTALLED ANCHOR EMBEDMENT, USE CAST-IN-PLACE OPTION.
2. LOCATE AND AVOID ALL REINFORCEMENT PRIOR TO DRILLING INTO CONCRETE.
3. THIS DETAIL APPLIES TO REINFORCEMENT WITH fy = 60KSI AND CONCRETE WITH A COMPRESSIVE STRENGTH f'c = 4000 PSI AT 28 DAYS.
4. THE DETAIL APPLIES WHERE EQUIPMENT PADS OR HOUSEKEEPING PADS ARE CALLED OUT ON THE CONSTRUCTION DOCUMENTS.

## S-191 EQUIPMENT PAD

REV 021219

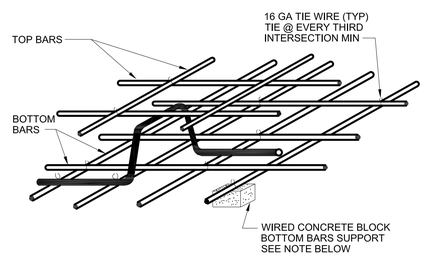



NOTE:

#5@12" OR AS REQUIRED TO DEVELOP ANCHOR BOLTS

## S-192 EQUIPMENT BASE

REV 010119

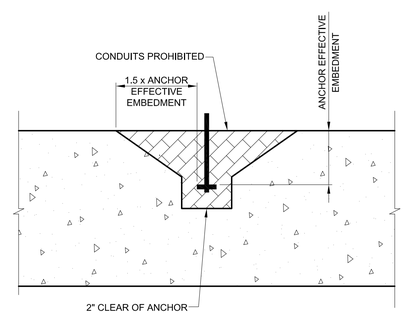



NOTE:

METAL BAR SUPPORTS, IF USED IN SLABS NOT ON GROUND, SHALL NOT MAKE CONTACT WITH FORMS

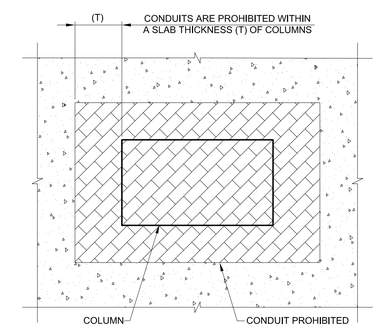
## S-204 REINFORCEMENT SUPPORT

REV 010119




SECTION

## ANCHOR ROD AND CONDUIT SPACING REQUIREMENTS




PLAN

## CONDUIT TO COLUMN CLEARANCE REQUIREMENTS

## S-182 EMBEDMENT REQUIREMENTS

REV 022020

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| C | 02/13/2024 | 100% DESIGN | SB | RB | GN |
| B | 01/10/2024 | 90% DESIGN | SB | RB | GN |
| A | 11/20/2023 | 60% DESIGN | AB | RB | GN |

DRAWN BY SB
DESIGNED BY CK
CHECKED BY BZ
APPR. BY GN

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTAS, PUERTO RICO

GENERATORS AREA - ELECTRICAL BUILDING - STANDARD DETAILS - II

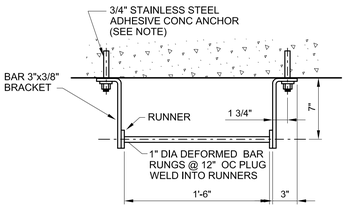
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 2-9-913
PSWID -
DATE: MAY / 2023
SCALE: NO SCALE

SHEET NO. 86 OF 145
DWG. NO. 030-S-11

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

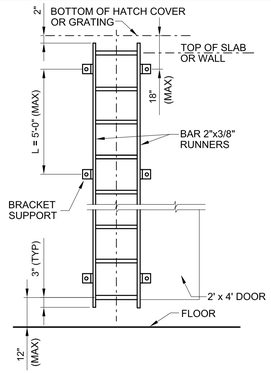
ORIGINAL SHEET - ARCH D




PLAN

NOTES:

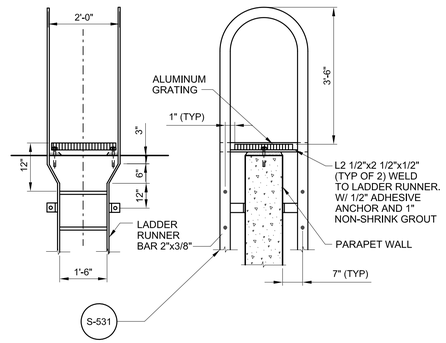
1. LADDERS SHALL BE STEEL UNLESS INDICATED OTHERWISE.
2. ANCHORS AND FASTENERS SHALL BE STAINLESS STEEL, EXCEPT FASTENERS FOR GALVANIZED STEEL LADDERS SHALL BE GALVANIZED STEEL.
3. LADDERS SHALL BE OSHA AND ANSI APPROVED.
4. LADDER TO HAVE SOLID LOCKABLE SECURITY DOOR (2No. 4FT x 2 FT WIDE) TOTAL HEIGHT 8FT.




STANDARD LADDER WITH RUNNER SUPPORTS AT 5'-0" OC MAX

S-531 FIXED LADDER

REV 010119




S-536 LADDER OVER PARAPET WALL

REV 010119

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DRAWN BY SB
DESIGNED BY CK
CHECKED BY BZ
APPR. BY GN

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTAS, PUERTO RICO

GENERATORS AREA - ELECTRICAL BUILDING - STANDARD DETAILS - III

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 2-9-913
PSWID -
DATE: MAY / 2023
SCALE: NO SCALE

SHEET NO. 87 OF 145
DWG. NO. 030-S-12

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

ORIGINAL SHEET - ARCH D

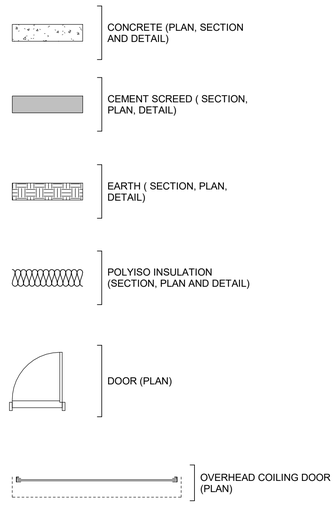
## GENERAL SHEET NOTES

1. ALL TEMPORARY CONSTRUCTION DOORS SHALL ALLOW FOR EMERGENCY EGRESS AT ALL TIMES THAT BUILDING IS OCCUPIED.
2. CONTRACTOR SHALL REFER TO DETAILS NOTED ON FLOOR PLAN WALL LOCATIONS. VERIFY DIMENSIONS NOTED ON PLAN WITH DETAIL NOTED. IF CONFLICT IS FOUND NOTIFY THE ENGINEER IMMEDIATELY
3. DIMENSIONS ARE IMPERIAL UNLESS OTHERWISE INDICATED.
4. INFILL ANY PENETRATIONS LEFT BY THE INSTALLATION OF MECHANICAL EQUIPMENT.
5. ALL CONCRETE SURFACES SHALL HAVE A SMOOTH FINISH.
6. REFER TO PROJECT SPECIFICATIONS FOR GENERAL CONTRACT REQUIREMENTS, MATERIALS, WORKMANSHIP AND SHOP DRAWINGS.
7. ALL DIMENSIONS SHOWN ON THE ARCHITECTURAL DRAWINGS SHALL BE FIELD COORDINATED BY THE CONTRACTOR WITH ALL OTHER DISCIPLINE DRAWINGS, AND ANY INCONSISTENCIES REPORTED TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
8. CONTRACTOR SHALL VERIFY ALL PROPOSED DIMENSIONS AND ELEVATIONS IN THE FIELD, CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD. NOTIFY THE ARCHITECT IMMEDIATELY AND BEFORE PROCEEDING WITH THE RELEVANT ASPECT OF THE WORK OF ANY LAYOUT CONDITION THAT IS NOT CONSISTENT WITH THE DRAWINGS OR THAT WILL IMPAIR LAYOUTS OR ATTACHMENTS OF FINISHES.
9. DO NOT SCALE DRAWINGS. USE INDICATED OR CALCULATED DIMENSIONS AND ELEVATIONS IN THE FIELD, NOTIFY THE ARCHITECT IMMEDIATELY AND BEFORE PROCEEDING WITH RELEVANT ASPECT OF THE WORK OF ANY LAYOUT CONDITIONS TAHT ARE NOT CONSISTENT WITH, OR MISSING FROM, THE DRAWINGS OR THAT WILL IMPAIR LAYOUT.
10. DIMENSIONING FORMAT FOR THE ARCHITECTURAL DRAWINGS IS: DIMENSIONS FOR PRECAST OR PREFABRICATED ELEMENTS ARE TO THE FACE OF THE ELEMENT UNLESS OTHERWISE NOTED, DIMENSIONS FOR MANSONRY ARE NOMINAL UNLESS OTHERWISE INDICATED, CRITICAL CLEAR DIMENSIONS , FINISH OPENING DIMENSIONS REQUIRED ARE INDICATED, CRITICAL CLEAR DIMENSIONS, FINISH OPENING DIMENSIONS REQUIRED ARE INIDICATED AND ARE TO FINISH FACE OF ELEMENT, GC SHALL VALIDATE ALL DIMENSIONS ON SITE.
11. REFER TO STRUCTURAL DRAWINGS WHEN APPLICABLE FOR DIMENSIONS AND LAYOUT OF STRUCTURAL CONCRETE.
12. SEE STRUCTURAL DRAWINGS FOR ALL CONCRETE REINFORCEMENT AND ALL OTHER REQUIREMENTS FOR LOAD CARRYING MEMBERS, STRUCTURAL DRAWINGS SHALL GOVERN FOR LOAD CARRYING MEMBERS.
13. REFER ALSO TO STRUCTURAL, PLUMBING, FIRE PROTECTION, MECHANICAL AND ELECTRICAL DRAWINGS AND APPROVED SHOP DRAWINGS FOR LOCATION AND DIMENSIONS OF CHASES, INSERTS, OPENING, SLEEVES, DEPRESSIONS AND ATTACHMENT REQUIREMENTS.
14. REFER TO STRUCTURAL DRAWINGS FOR ANY APPLICABLE PENETRATIONS OF STRUCTURAL ELEMENTS REFER ALSO TO CIVIL, INSTRUMENTATION & CONTROL., MECHANICAL AND ELECTRICAL DRAWINGS FOR SLEEVE, PENETRATIONS AND EMBEDMENT REQUIRED FOR THESE SYSTREMS, THE CONTRACTOR IS TO COORDINATE ALL EMBEDMENT AND PENETRATIONS .
15. PROVIDE ALL ACCESS PANELS AS REQUIRED BY APPLICABLE CODES AND AS REQUIRED FOR MECHANICAL EQUIPMENT FOR INFRASTRUCTURE. WHETHER OR NOT SHOWN ON DRAWINGS ALL ACCESS PANELS SHALL BE FLUSH WITH ADJACENT FINISH SURFACES.
16. COORDINATE PLACEMENT OF ALL CEILING ELEMENTS WITH MECHANICAL, ELECTRICAL AND INSTALLER.
17. WHERE SPECIFIC DIMENSIONS, DETAILS OR DESIGN INTENT CANNOT BE DETERMINED CONSULT THE ARCHITECT BEFORE PROCEEDING WITH WORK.
18. DETAILED DRAWINGS AND LARGER SCALE DRAWINGS TAKE PRECEDENCE OVER SMALL SCALE DRAWINGS.
19. ALL PENETRATIONS THROUGH RATED WALLS OR FLOORS SHALL BE PROTECTED AND /OR SEALED WITH MATERIAL OF THE SAME FIRE RATING AS THE PENETRATED WALLS OR FLOORS.
20. HANDRAILS AND GRAPHIC BANDS, HORIZONTAL CONCRETE JOINTS, CEILING AND DUCT ENCLOSURES SHALL RUN PARALLEL TO THE FLOOR, ALL VERTICAL JOINTS AND RUSTICATION IN THE TILE CLADDING, CONCRETE AND C.M.U SHALL BE TRUE VERTICAL.
21. PROVIDE ISOLATION BETWEEN DISSIMILAR METALS (TYPICAL).
22. ALL STEEL ITEMS SHALL BE GALV. DOUBLE DIP (U.N.O.).
23. ALL WOOD ITEMS SHALL BE FIRE RETARDANT TREATED (FLAME SPREAD:25 OR LESS PER A.S.T.M. E-84).
24. ANCHORS INDICATED BY MFR IDENTIFICATION ARE TO ESTABLISH ANCHOR TYPE, MATERIAL AND LOAD CAPACITY.
25. SHIM MEMBERS AT CONCRETE SURFACES AS REQUIRED.
26. ALL EXPOSED AREAS SUBJECT TO FOOT TRAFFIC SHALL BE SLIP RESISTANT, COEFFICIENT OF FRICTION O.6 MIN. WET & DRY (ASTM C-1028) OR AS PER DESIGN CRITERIA.
27. C.M.U. OPENINGS AND WALLS MUST BE LAID PLUM AND TRUE.
28. CONTRACTOR REFER TO IMPROVEMENTS NOTES (PROPOSED) FOR SCOPE RESPONSIBLITY.
29. CONTRACTOR SHALL LEGALLY DISPOSE ANY DEBRIS GENERATED ON SITE DURING CONSTRUCTION WORKS.
30. COORDINATE WITH MANAGEMENT REGARDING SCHEDULING OF CUTTING/ CORING OF SLAB, SHOOTING OF TRACK AND OTHER NOISY CONSTRUCTION ACTIVITIES
31. PRIOR TO ORDERING LOCKS SETS, COORDINATE CORE TYPE WITH OWNER'S REPRESENTATIVE.
32. CONTRACTOR SHALL CONFINE HIS EQUIPMENT, DELIVERY AND STORAGE OF MATERIALS, AND THE OPERATION OF HIS WORKMEN TO LIMIT DEFINED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL NOT UNREASONABLY ENCUMBER THE PREMISES TO THE INCONVENIENCE OF THE OWNERS PERSONAL AND OPERATION.

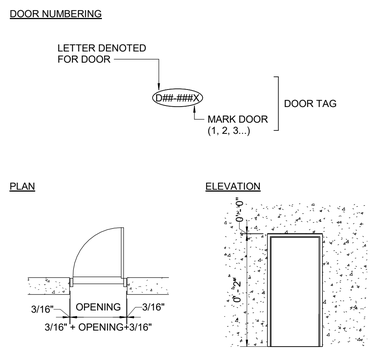
## GENERAL SHEET NOTES

33. CONTRACTOR IS RESPONSIBLE FOR STORAGE OF MATERIALS DURING CONSTRUCTION IN A MANNER THAT PREVENT LIVE LOADS FROM EXCEEDING THOSE ALLOWED IN ANY BUILDING STRUCTURAL DESIGN.
34. CONTRACTOR SHALL PROTECT AREA AND NEW OR EXISTING MATERIALS AND FINISHES FROM DAMAGE WHICH MAY OCCUR FROM CONSTRUCTION, DEMOLITION, DUST, WATER, ETC AND SHALL PROVIDE AND MAINTAIN TEMPORARY BARRICADES, CLOSURE WALLS, ETC. AS REQUIRED TO PROTECT THE PUBLIC DURING THE PERIODS OF CONSTRUCTION OF THE OWNER. DAMAGE TO NEW AND EXISTING MATERIAL. FINISHED, STRUCTURES, AND EQUIPMENT SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE OWNER/OWNER'S REPRESENTATIVE AT EXPENSE OF THE CONTRACTOR.
35. ALL WORK SHALL BE DONE IN THE FINEST QUALITY, WORKMANSHIP MANNER IN ACCORDANCE WITH THE INDUSTRY STANDARD FOR CONSTRUCTION, FABRICATION, AND INSTALLATION FOR EACH TRADE, UNLESS OTHERWISE NOTED. USE ONLY NEW HIGHEST QUALITY MATERIALS CONSISTENT WITH SPECIFICATIONS INDICATED, WORK SHALL INCLUDE ALL LABOR ASSEMBLIES AND FINISH WORK WITH ALL PARTS AND MATERIALS NECESSARY TO MAKE INSTALLATION REGARDLESS IF SHOWN ON DRAWINGS OR NOT.
36. WORK SHALL INCLUDE ALL LABOR ASSEMBLIES AND FINISH WORK WITH ALL PARTS AND MATERIALS IN PLACE AND PROPERLY WORKING REGARDLESS IF SHOWN ON DRAWING OR NOT.
37. CONTRACTOR SHALL MAINTAIN ON SITE, ONE RECORD COPY OF THE DRAWINGS, SPECIFICATIONS, ADDENDA, CHANGE ORDERS, AND OTHER MODIFICATIONS TO THE CONTRACT DOCUMENTS. ALL MODIFICATIONS ARE TO BE MAKE ON THE RECORD COPY TO ENSURE ALL TRADES ARE AWARE OF ALL CHANGES MADE DURING CONSTRUCTION.
38. WHEN CONSTRUCTION IS NEARING COMPLETION, CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE IN WRITING. THE REPRESENTATIVE WILL SCHEDULE A WALKTHROUGH TO INSPECT THE PROJECT AREA AND WILL PREPARE A FINAL PUNCH LISTOUTLINING INCOMPLETE OR UNACCEPTABLE FINISHES OF THE PROJECT. THE PROJECT WILL NOT BE CONSIDERED COMPLETE UNTIL ALL ITEMS ON THE PUNCH LIST HAVE BEEN RESOLVED AND ALL PROJECT CLOSE OUT DOCUMENTATION HAS BEEN DELIVERED TO THE OWNERS IN THE REQUESTED TIME.
39. TWO HOUR FIRE RATING TO ALL WALLS AND DOORS.
40. ROOF SLAB SHALL HAVE A R20ci ( ci - CONTINUOUS INSULATION ) VALUE.

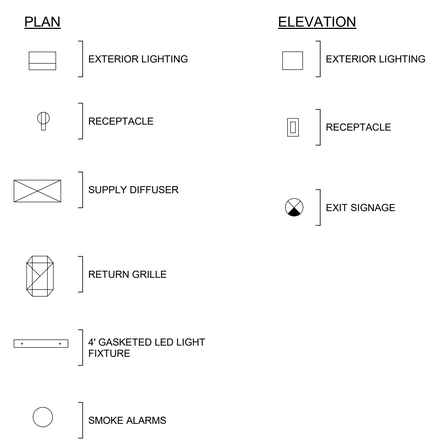
## ARCHITECTURAL SYMBOLS




## OPENINGS




## REFLECTED CEILING LEGEND




Permit/Seal

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| D | 02/13/2024 | 100% DESIGN | SB | RB | FC |
| C | 11/20/2023 | 90% DESIGN | SB | RB | FC |
| B | 09/26/2023 | 60% DESIGN | SB | RB | FC |
| A | 07/20/2023 | 30% DESIGN | SB | RB | FC |

DRAWN BY SB
DESIGNED BY PA
CHECKED BY RB
APPR. BY FC

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTAS, PUERTO RICO

GENERATORS AREA - ELECTRICAL BUILDING - SYMBOLS, LEGENDS AND NOTES

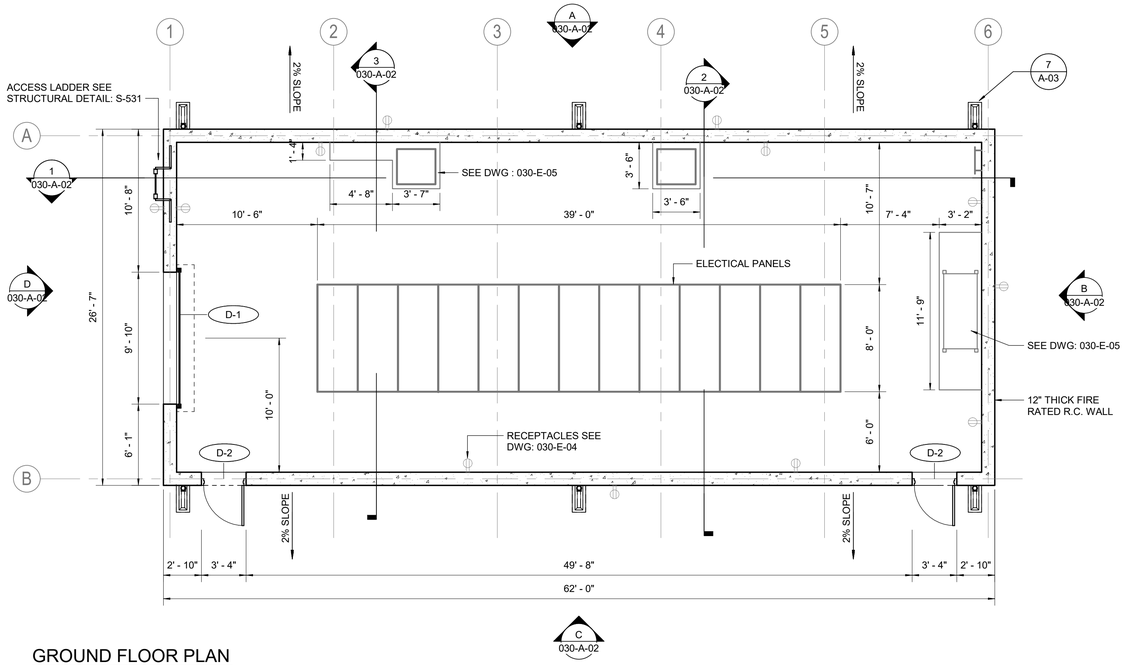
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: NOVEMBER / 2023
SCALE:

SHEET NO. 88 OF *
DWG. NO. **000-A-01**

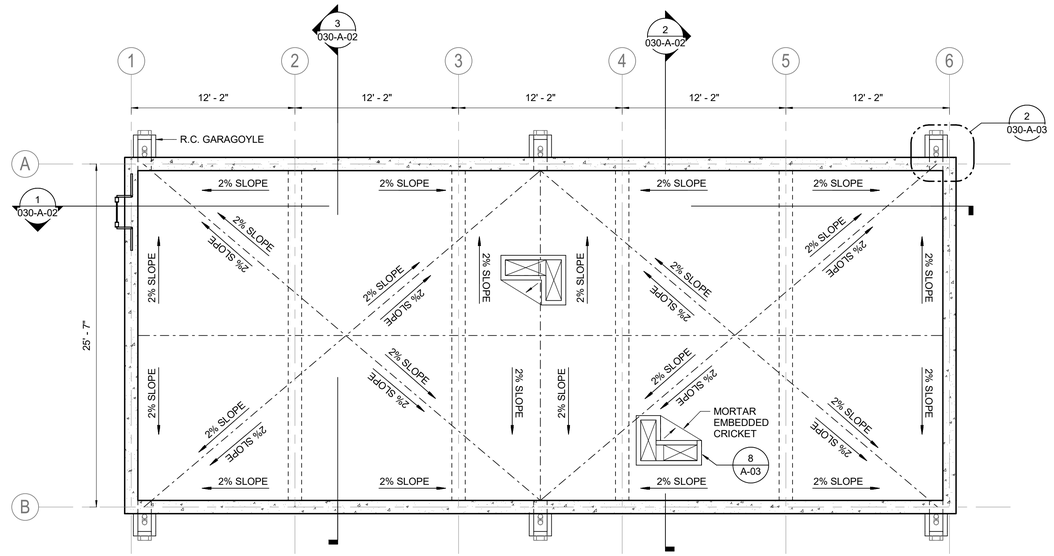
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

ORIGINAL SHEET - ARCH D



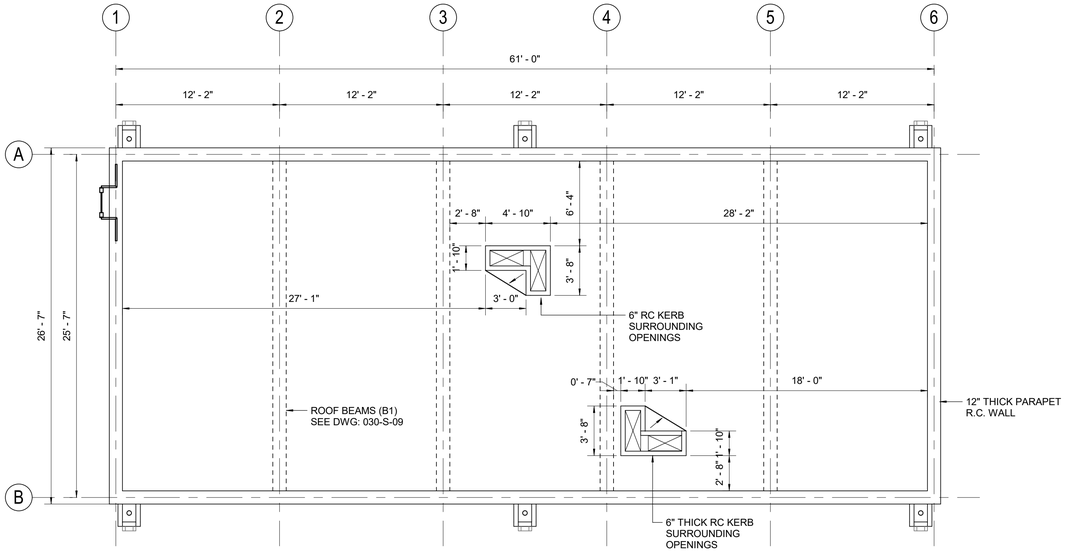

## GROUND FLOOR PLAN

SCALE: 3/16" = 1'-0"



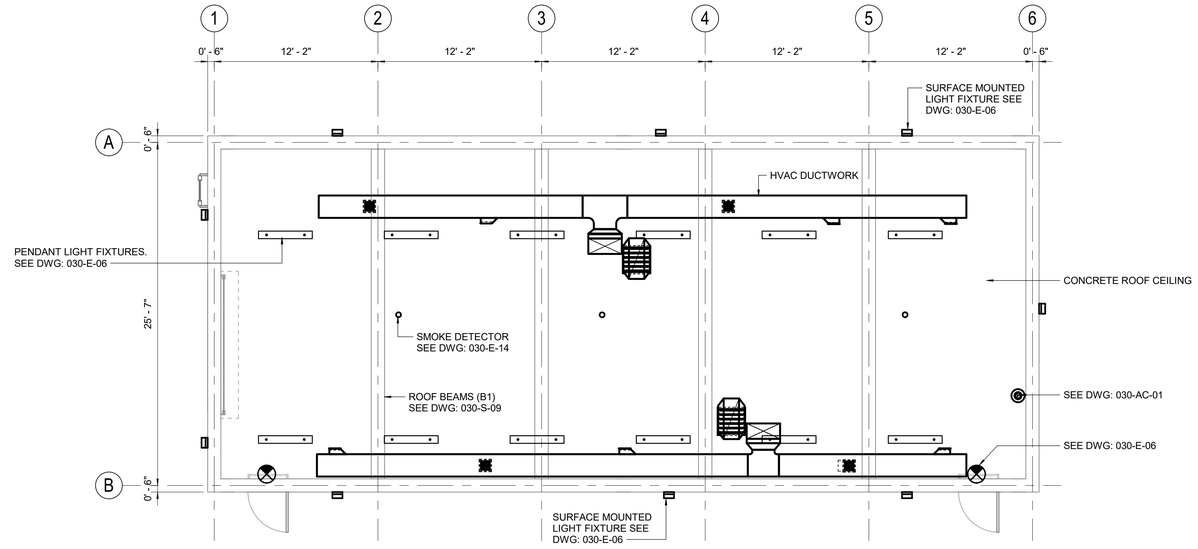

## ROOF PLAN A

SCALE: 3/16" = 1'-0"




## ROOF PLAN B - EQUIPMENT LAYOUT

SCALE: 3/16" = 1'-0"




## REFLECTED CEILING PLAN

SCALE: 3/16" = 1'-0"

Permit/Seal

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| A | 07/20/2023 | 30% DESIGN | SB | RB | FC |

| | |
|---|---|
| DRAWN BY | SB |
| DESIGNED BY | PA |
| CHECKED BY | RB |
| APPR. BY | FC |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTAS, PUERTO RICO

GENERATORS AREA - ELECTRICAL BUILDING - ARCHITECTURAL PLANS

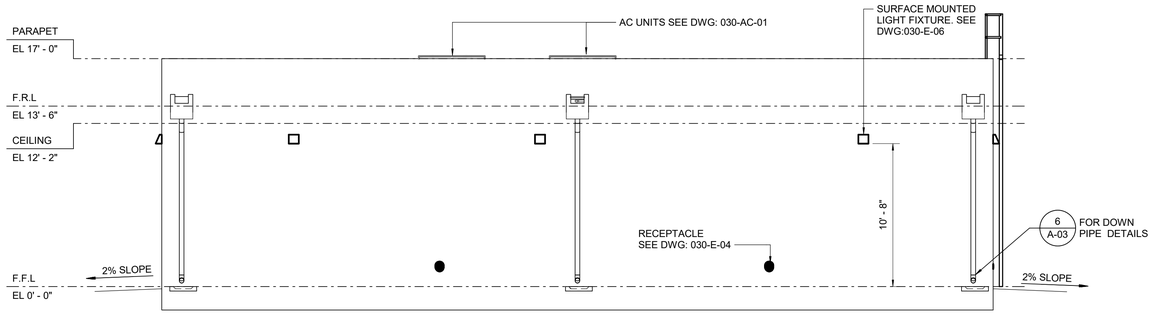
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No: 1-70-9000
PSWID: -
DATE: NOVEMBER / 2023
SCALE: 3/16" = 1'-0"

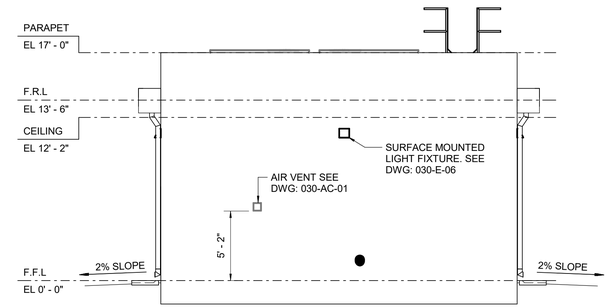
SHEET NO. 89 OF *
DWG. NO. 030-A-01

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY

ORIGINAL SHEET - ARCH D




A 030-A-02 ELEVATION
SCALE: 3/16" = 1'-0"




B 030-A-02 ELEVATION
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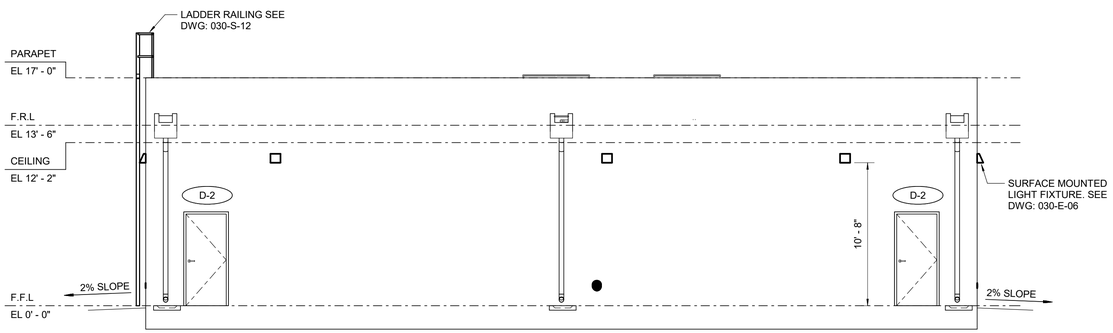
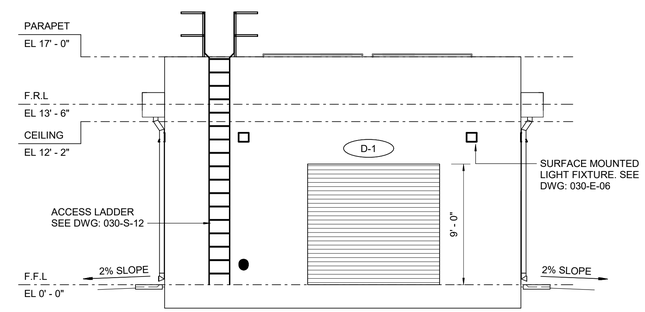



C 030-A-02 ELEVATION
SCALE: 3/16" = 1'-0"




D 030-A-02 ELEVATION
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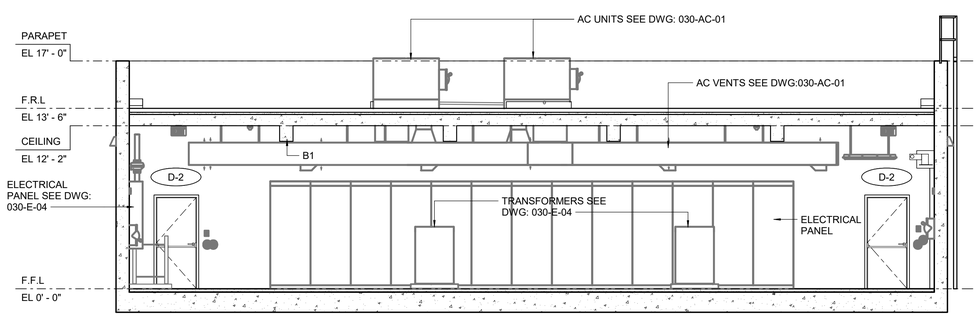


1 030-A-02 SECTION
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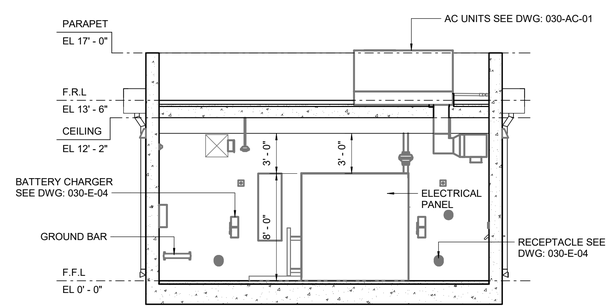


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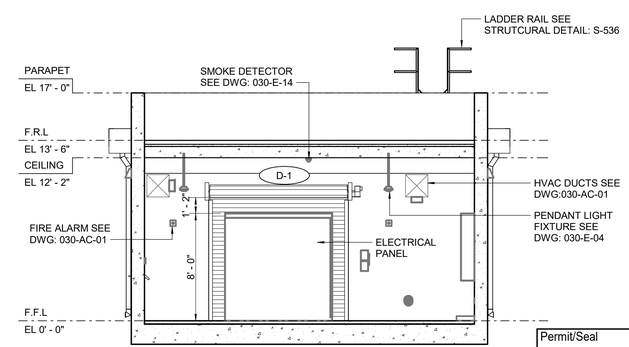


3 030-A-02 SECTION
SCALE: 3/16" = 1'-0"

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TOA ALTAS, PUERTO RICO

GENERATORS AREA - ELECTRICAL BUILDING - ARCHITECTURAL ELEVATIONS AND SECTIONS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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DATE: NOVEMBER / 2023
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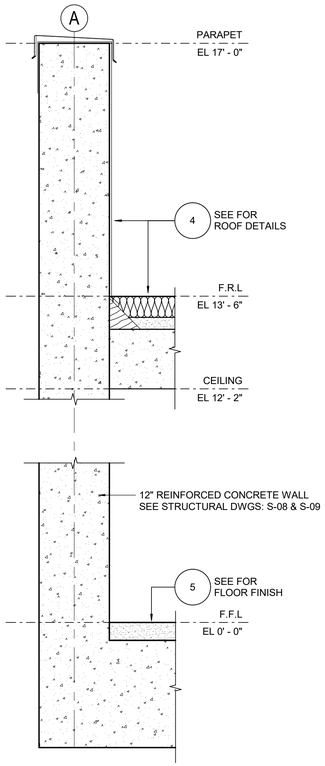
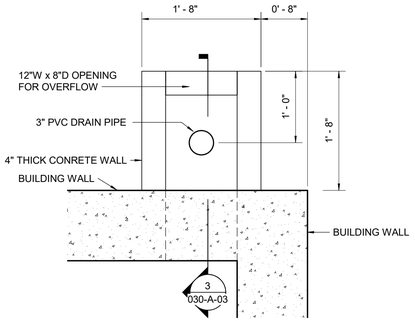
SHEET NO. 90 OF *
DWG. NO. 030-A-02

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

ORIGINAL SHEET - ARCH D




1 030-A-03 WALL DETAIL
SCALE: 1" = 1'-0"




2 030-A-03 GARAGOYLE DETAIL
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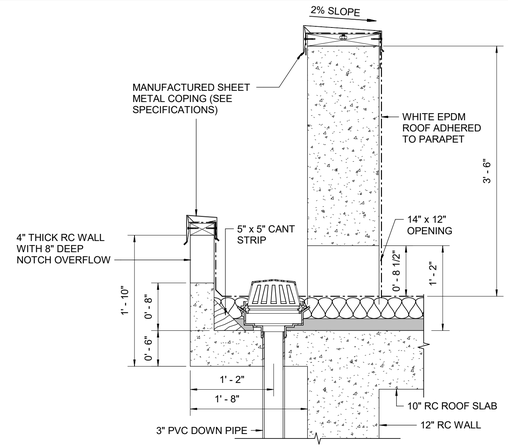


3 030-A-03 SECTION
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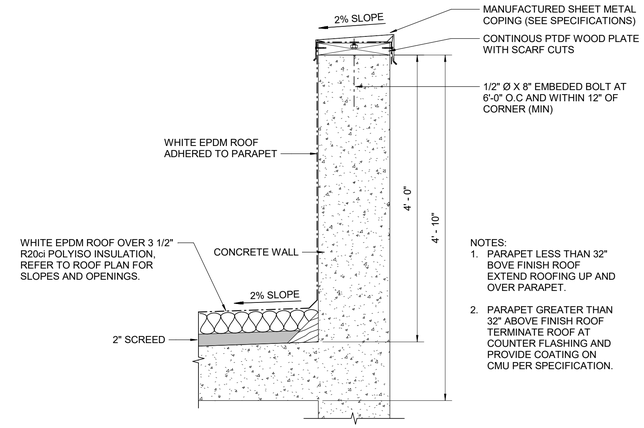
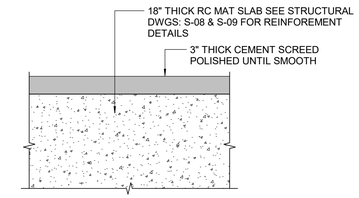
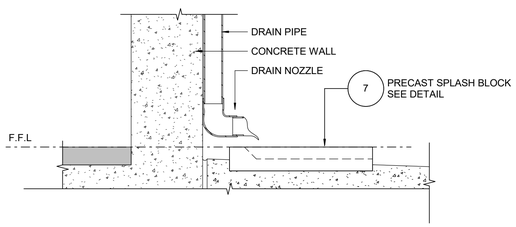



NOTES:
1. PARAPET LESS THAN 32" BOVE FINISH ROOF EXTEND ROOFING UP AND OVER PARAPET.
2. PARAPET GREATER THAN 32" ABOVE FINISH ROOF TERMINATE ROOF AT COUNTER FLASHING AND PROVIDE COATING ON CMU PER SPECIFICATION.

4 030-A-03 PARAPET DETAIL
SCALE: 1" = 1'-0"




5 030-A-03 SLAB FINISH
SCALE: 1" = 1'-0"




6 030-A-03 ROOF DRAIN NOZZLE DETAIL
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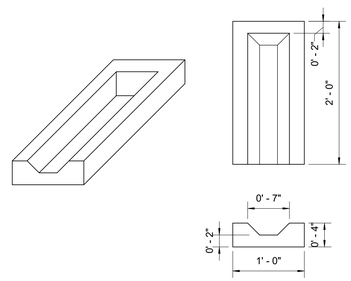


7 030-A-03 PRECAST SPLASH BLOCK
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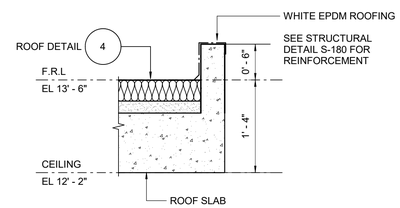
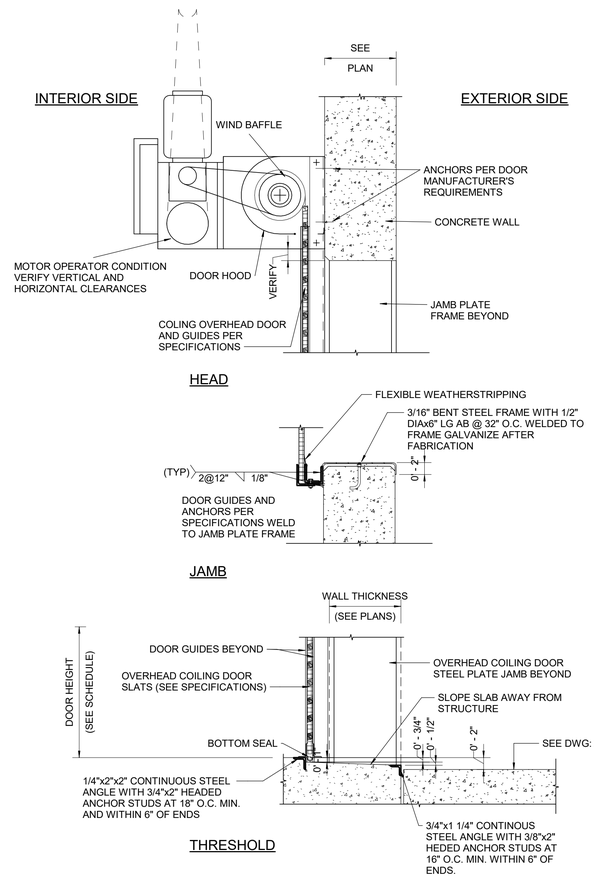
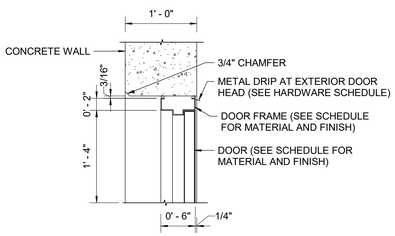


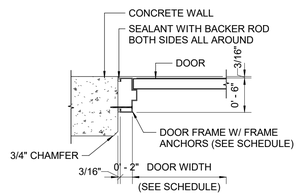

8 030-A-03 HVAC SUPPORT KERB
SCALE: 1" = 1'-0"



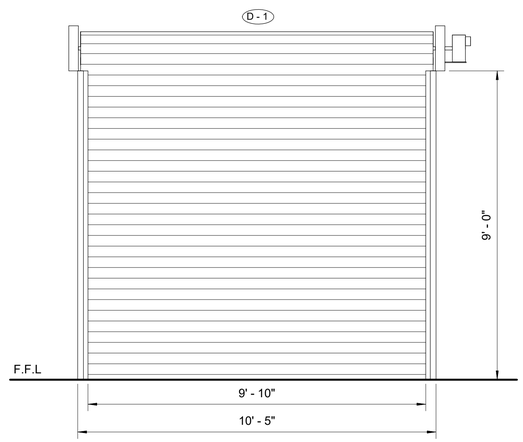

12 030-A-03 COILING DOOR DETAILS
SCALE: 1" = 1'-0"

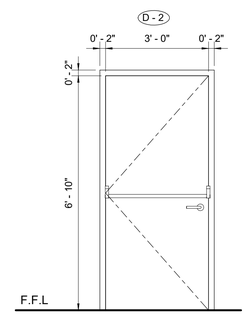


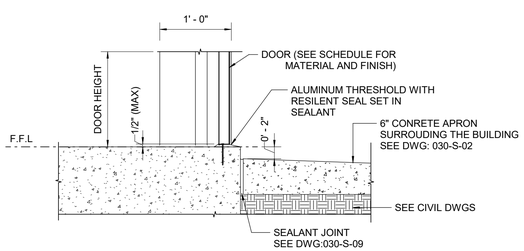

9 030-A-03 DOOR HEAD DETAIL
SCALE: 1" = 1'-0"




10 030-A-03 DOOR JAMB DETAIL
SCALE: 1" = 1'-0"




11 030-A-03 DOOR THRESHOLD DETAIL
SCALE: 1" = 1'-0"

SCHEDULE OF DOORS

| TYPE MARK | TYPE | QUANTITY | STRUCTURAL OPENING | | DOOR SIZE | | THICKNESS | GAUGE | | LOUVERS | FIRE RATING | MATERIAL | | HARDWARE | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WIDTH | HEIGHT | WIDTH | HEIGHT | | DOOR | FRAME | | | DOOR | FRAME | | |
| D-1 | ROLL-UP OVERHEAD COILING DOOR | 1 | 9' - 10" | 9' - 0" | 10' - 5" | 9' - 0" | - | 20 | 20 | N/A | CLASS B | HOLLOW METAL | GALAVANIZED STEEL | JAMB MOUNTED ROLLER SHUTTER DOOR WITH STUD ANCHORS, WEATHER TIGHT DOOR, WITH ACCESS CONTROLLED MOTORIZED OPERATION, MANUAL OVERIDE CHAIN, ALARM SYSTEM AND FULL KEYED LOCKING SYSTEM OVERHEAD COILING DOOR TO COME WITH FUSE LINK, IN CASE OF FIRE, DOOR WILL SELF-CLOSE | HARDWARE SET TO BE SUPPLIED BY MANUFACTURER, TO BE CONNECTED TO FIRE ALARM SYSTEM TO CLOSE ON FIRE ALARM GOING OFF, OVERHEAD DOOR SIZES, CONNECTION DETAILS, AND OVER HEAD MAIN DOOR TO BE CONFIRMED BY MANUFACTURER, DOOR TO BE HURRICANE RATED , REFER TO TECHNICAL SPECIFICATIONS AND PAINTED WHITE |
| D-2 | SINGLE DOOR | 2 | 3' - 4" | 7' - 0" | 3' - 0" | 6' - 10" | 0' - 1 3/4" | 20 | 20 | N/A | CLASS B | HOLLOW METAL | GALAVANIZED STEEL | SINGLE PANIC BOLT, 'FIRE DOOR KEEP SHUT' SIGN, OVERHEAD DOOR CLOSER, LEVER HANDLES INCLUDING PAIR OF CYLINDER ESCUTCHEONS, CYLINDER CASE AND SASH LOCK, PROFILE CYLINDER AND THUMB TURN, PANIC BAR, ALARM SYSTEM AND HINGES | TO BE PAINTED WHITE AND HURRICANE RATED , REFER TO TECHNICAL SPECIFICATIONS |

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TOA ALTAS, PUERTO RICO

GENERATORS AREA - ELECTRICAL BUILDING - DETAILS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

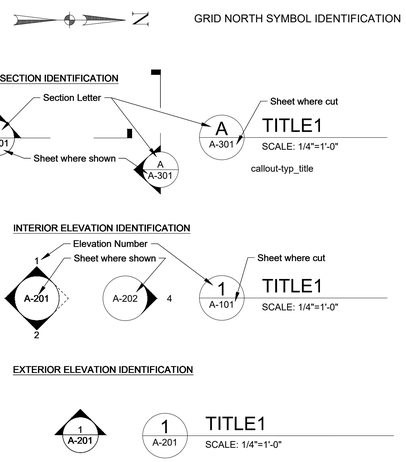
C.I.P. No. 1-70-9000
PSWID -
DATE: NOVEMBER / 2023
SCALE: As indicated

SHEET NO. 91 OF 145
DWG. NO. 030-A-03

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

ORIGINAL SHEET - ARCH D

## SYMBOL




## ABBREVIATIONS

| | |
|---|---|
| AVE. | AVERAGE |
| AF.WL | AVERAGE FLOW WATER LEVEL |
| ALUM. | ALUMINUM |
| ALK | ALKALINITY |
| ASV | ANTI-SYPHON VALVE |
| B.E. | BOTTOM ELEVATION |
| BLDG. | BUILDING |
| BWW | BACKWASH WASTE |
| BW | BACK WASH |
| COORD. | COORDINATE |
| CHL-R | CHLORINE RESIDUAL ANALYZER |
| CHL-R | CHLORINE RESIDUAL |
| CL2 | CHLORINE APPLICATION |
| DEPT. | DEPARTMENT |
| DI. | DUCTILE IRON |
| DIA. | DIAMETER |
| DIP. | DUCTILE IRON PIPE |
| D.O.H. | DEPARTMENT OF HEALTH |
| DPT | DIFFERENTIAL PRESSURE TRANSMITTER |
| DTPW | DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS |
| DWGS. | DRAWINGS |
| (E) | EXISTING |
| EA. | EACH |
| EC | ELECTRICAL CONDUCTIVITY METER |
| EFF | EFFLUENT |
| ELEV. | ELEVATION |
| EMERG. | EMERGENCY |
| EPA. | ENVIRONMENTAL PROTECTION AGENCY |
| DNER. | RESOURCES DEPARTMENT OF NATURAL AND EVIRONMENTAL |
| F.E. | FINAL ELEVATION |
| FEMA | FEDERAL EMERGENCY MANAGEMENT AGENCY |
| F.F.E. | FINAL FLOOR ELEVATION |
| FOR | FUEL OIL RETURN / RELIEF |
| FOS | FUEL OIL SUPPLY / SUCTION |
| FIN. | FINISH |
| FTW | FILTER TO WASTE |
| FT. | FEET |
| FM | ULTRASONIC FLOW METER |
| GALV. | GALVANIZED |
| G.P.M | GALLONS PER MINUTE |
| HP. | HORSEPOWER |
| INF | INFLUENT |
| LS | LEVEL SENSOR |
| RAS | RETURN ACTIVATED SLUDGE |
| WAS | WASTE ACTIVATED SLUDGE |
| HT. | HEIGHT |
| HZ. | HERTZ |
| IN. | INCHES |
| I.E. | INVERT ELEVATION |
| IR. | INTERNAL RECYCLE |
| KV.A. | KILOVOLTS AMPERES |
| KV. | KILOVOLTS |
| KW. | KILOWATTS |
| M | METERS |
| MAX. | MAXIMUM |
| MECH. | MECHANIC |
| MGD. | MILLION GALLONS PER DAY |
| MH. | MANHOLE |
| MIN. | MINIMUM |
| N.T.S. | NOT TO SCALE |
| OHWLM. | ORDINARY HIGH WATER LEVEL MARK |
| PH | PH METER |
| PFWL. | PEAK FLOW WATER LEVEL |
| PRASA. | PUERTO RICO AQUEDUCT AND SEWER AUTHORITY |
| PREPA. | PUERTO RICO ENERGY AND POWER AUTHORITY |
| PRV | PRESSURE RELIEF VALVE |
| R.L. | ROOF ELEVATION |
| SBS | SLUDGE BLANKET SENSOR |
| SCM | STREAMING CURRENT MONITOR |
| T.E. | TOP ELEVATION |
| TEMP | TEMPERATURE |
| TU | TURBIDITY |
| TYP. | TYPICAL |
| V. | VOLTS |
| W.L. | WATER LEVEL |

## LEGEND:

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DESIGNED BY DK
CHECKED BY GO
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LEGEND, GENERAL NOTES, AND ABBREVIATIONS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 92 OF 145
DWG. NO. 000-P-01

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

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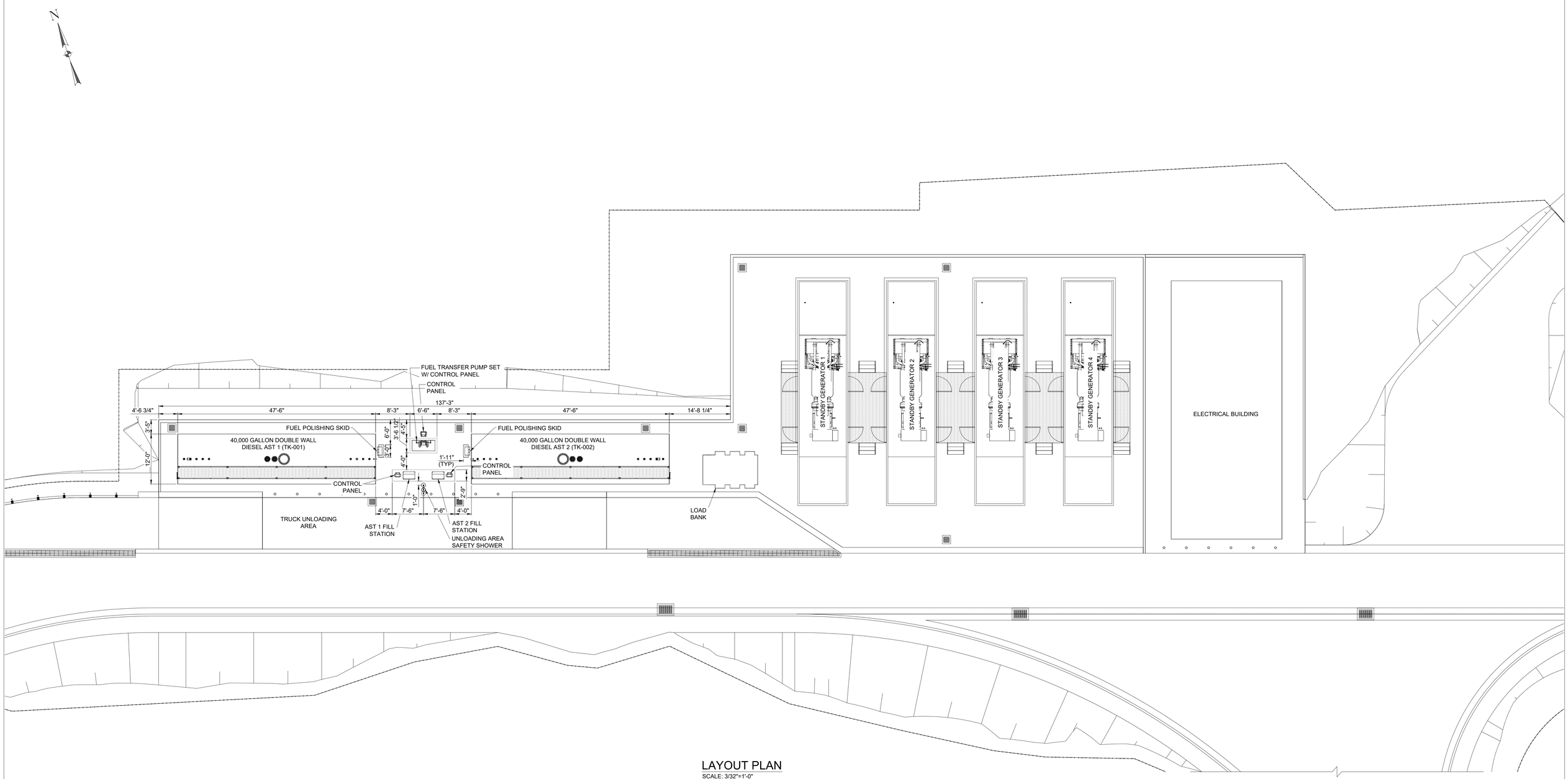


LAYOUT PLAN
SCALE: 3/32"=1'-0"

GENERAL SITE NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE EXPRESSED IN FEET AND INCHES, UNLESS OTHERWISE NOTED.
2. CONTRACTOR TO ISSUE SUBMITTALS FOR LONG LEAD EQUIPMENT (DEFINED AS HAVING OVER 3 MONTHS FROM PLACEMENT OF A PURCHASE ORDER TO ON-SITE DELIVERY) WITHIN ONE MONTH OF NOTICE TO PROCEED.

0 4' 8' 16'

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Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - EQUIPMENT ARRANGEMENT PLAN

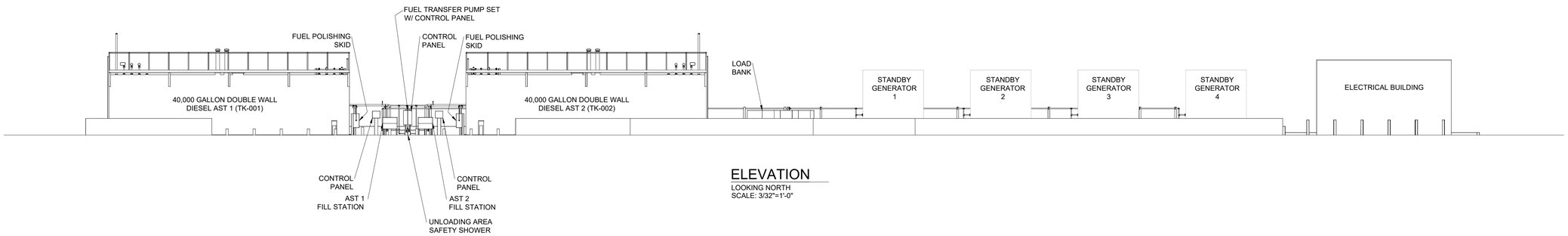
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: AS NOTED

SHEET NO. 93 OF 145
DWG. NO. 030-P-01

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

2024.01.26 8:19:35 AM




## ELEVATION

LOOKING NORTH
SCALE: 3/32"=1'-0"

GENERAL SITE NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE EXPRESSED IN FEET AND INCHES, UNLESS OTHERWISE NOTED.

0 4' 8' 16'

**PRELIMINARY NOT FOR CONSTRUCTION**

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 01/29/2024 | 100% DESIGN | DK | GO | GN |
| C | 11/20/2023 | 90% DESIGN | DK | CK | GN |
| B | 09/29/2023 | 60% DESIGN | DK | GO | GN |
| A | 07/26/2023 | 30% DESIGN | DK | GO | GN |

| | |
|---|---|
| DRAWN BY | DK |
| DESIGNED BY | DK |
| CHECKED BY | GO |
| APPR. BY | GN |

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Guaynabo, PR
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - EQUIPMENT ARRANGEMENT ELEVATION

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: AS NOTED

SHEET NO. 94 OF 145
DWG. NO. 030-P-02

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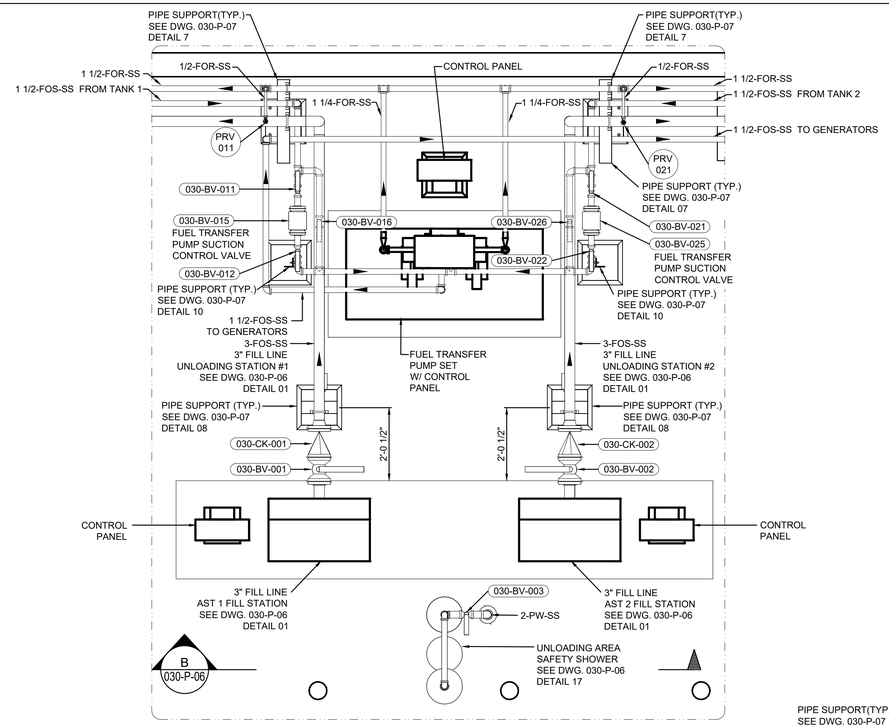
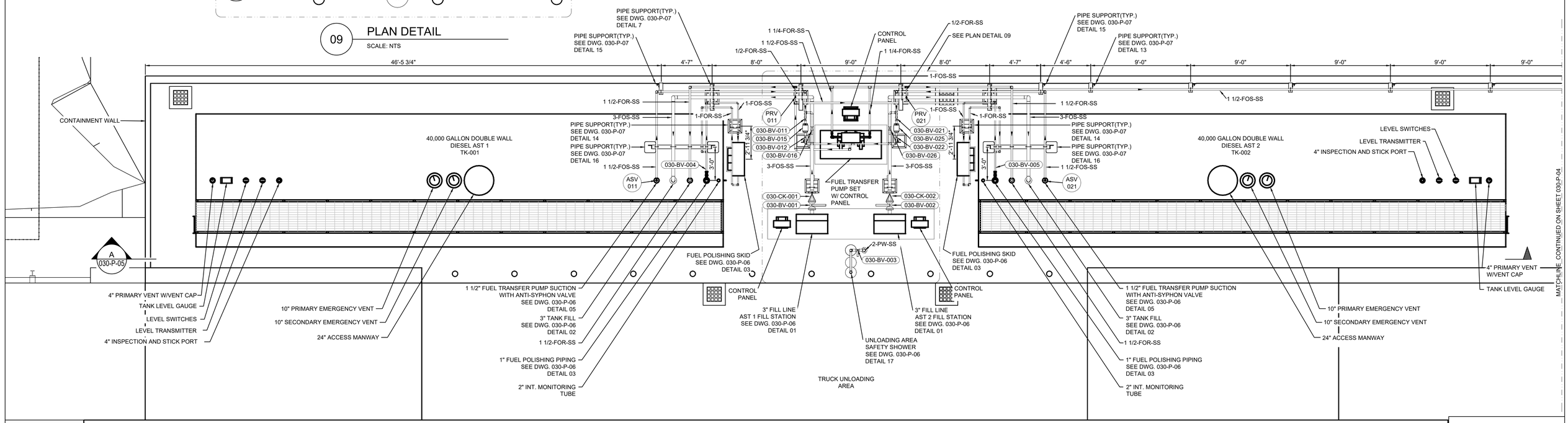
0 2 CM

2024-01-26 8:25:11 AM




09 PLAN DETAIL

SCALE: NTS




## PLAN VIEW

SCALE: 1/4"=1'-0"

## GENERAL SITE NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE EXPRESSED IN FEET AND INCHES, UNLESS OTHERWISE NOTED.

0 2' 4' 8'

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|---|---|---|---|---|---|
| C | 01/29/2024 | 100% DESIGN | DK | GO | GN |
| B | 11/20/2023 | 90% DESIGN | DK | CK | GN |
| A | 09/29/2023 | 60% DESIGN | DK | GO | GN |

| | |
|---|---|
| DRAWN BY | DK |
| DESIGNED BY | DK |
| CHECKED BY | GO |
| APPR. BY | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - PIPING PLAN I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: AS NOTED

SHEET NO. 95 OF 145
DWG. NO. 030-P-03

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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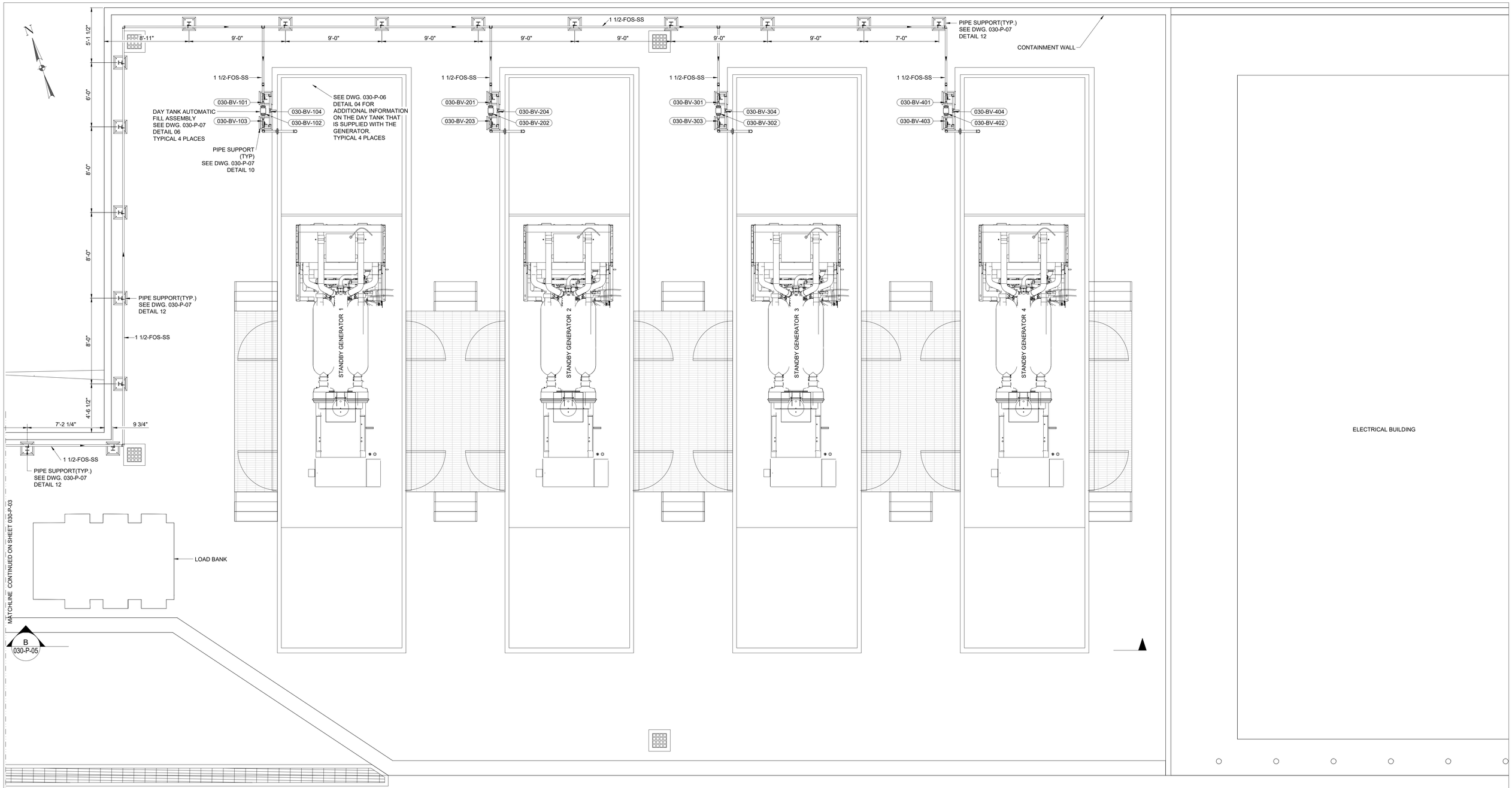


## PLAN VIEW

SCALE: 1/4"=1'-0"

## GENERAL SITE NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE EXPRESSED IN FEET AND INCHES, UNLESS OTHERWISE NOTED.

0 2' 4' 8'

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|---|---|---|---|---|---|
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| B | 11/20/2023 | 90% DESIGN | DK | CK | GN |
| A | 09/29/2023 | 60% DESIGN | DK | GO | GN |

| | |
|---|---|
| DRAWN BY | DK |
| DESIGNED BY | DK |
| CHECKED BY | GO |
| APPR. BY | GN |

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00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - PIPING PLAN II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: AS NOTED

SHEET NO. 96 OF 145
DWG. NO. 030-P-04

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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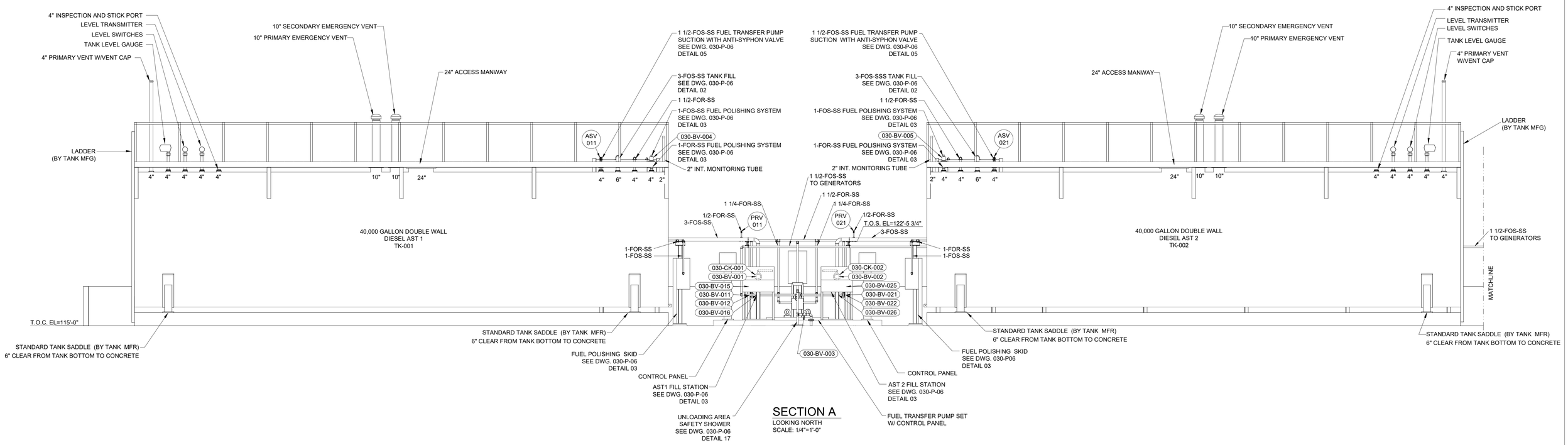
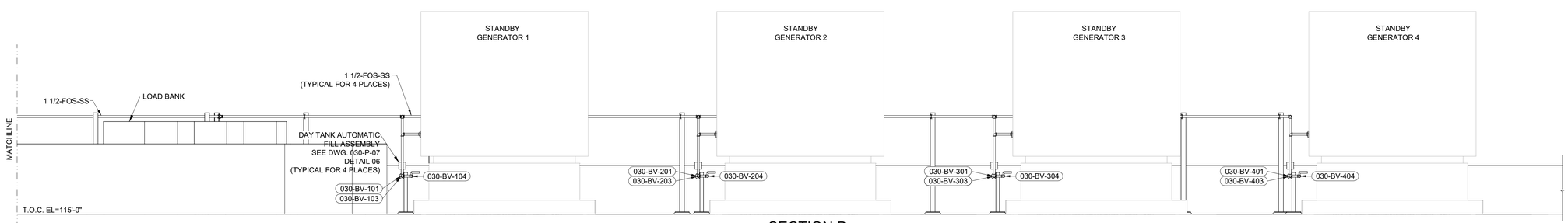



SECTION A
LOOKING NORTH
SCALE: 1/4"=1'-0"




SECTION B
LOOKING NORTH
SCALE: 1/4"=1'-0"

## GENERAL SITE NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE EXPRESSED IN FEET AND INCHES, UNLESS OTHERWISE NOTED.

0 2' 4' 8'

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| B | 11/20/2023 | 90% DESIGN | DK | CK | GN |
| A | 09/29/2023 | 60% DESIGN | DK | GO | GN |

| | |
|---|---|
| DRAWN BY | DK |
| DESIGNED BY | DK |
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| APPR. BY | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - PIPING SECTIONS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: AS NOTED

SHEET NO. 97 OF 145
DWG. NO. 030-P-05

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

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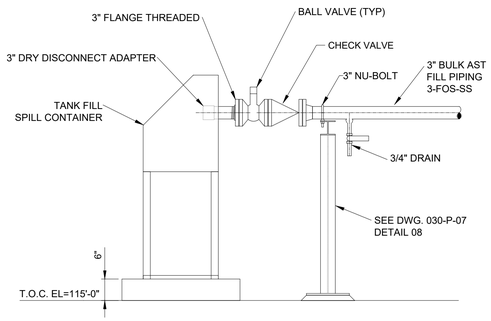
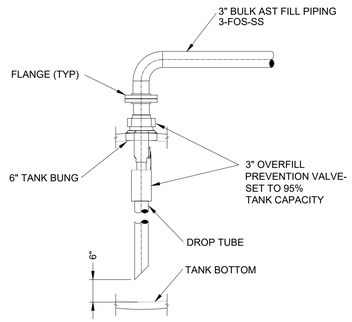
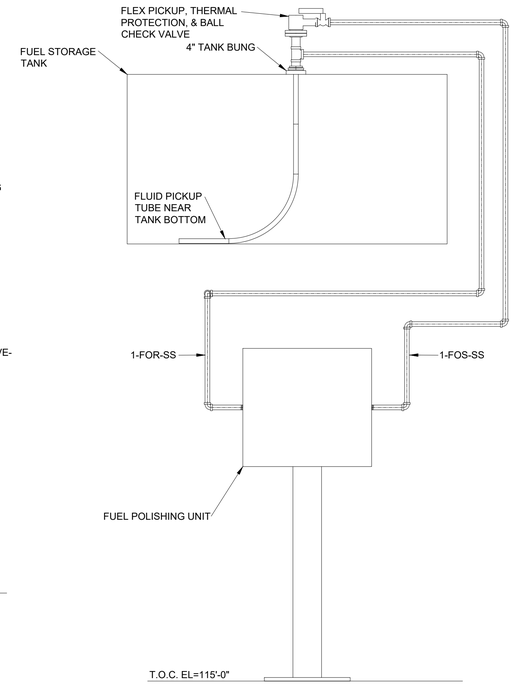


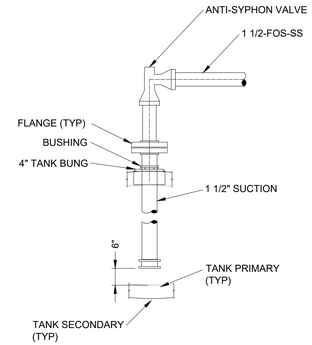

01 BULK AST FILL PIPING
SCALE: NTS



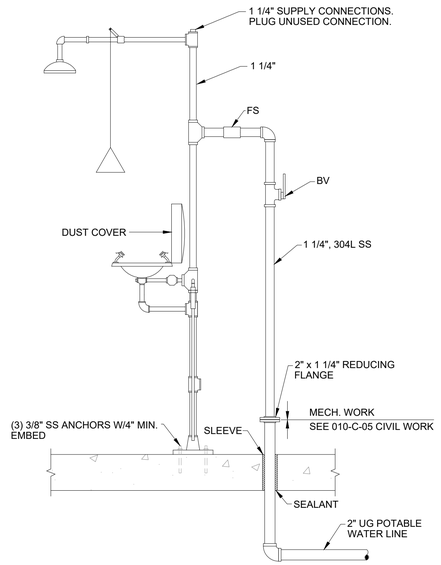

02 BULK AST FILL PIPING
SCALE: NTS



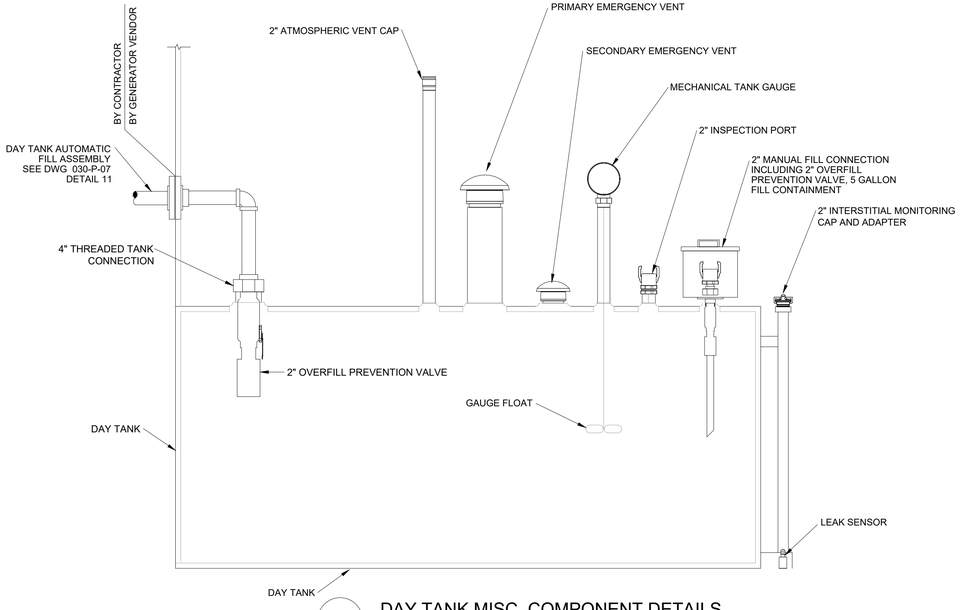

03 FUEL MAINTENANCE SYSTEM
SCALE: NTS




05 TRANSFER PUMP SET SUCTION PIPING
SCALE: NTS

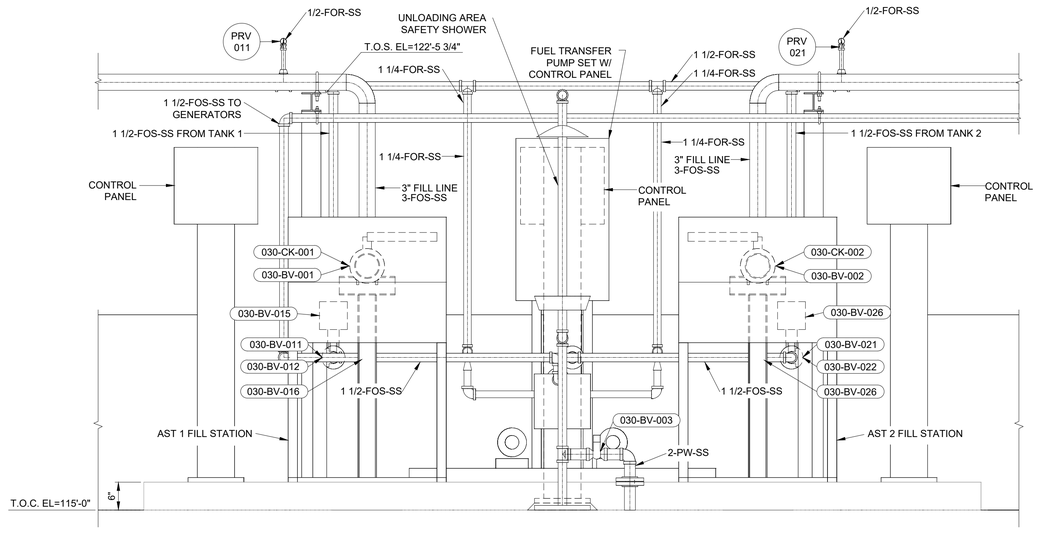



17 UNLOADING AREA SAFETY SHOWER/ EYEWASH STATION
SCALE: NTS




04 DAY TANK MISC. COMPONENT DETAILS
(TYPICAL FOR 4 LOCATIONS)
SCALE: NTS

NOTES:
1. LEVEL CONTROL DEVICES NOT SHOWN.
2. FUEL MAINTENANCE UNIT NOT SHOWN.
3. ALL ITEMS ARE SUPPLIED WITH THE GENERATOR.




SECTION B
LOOKING NORTH
SCALE: NTS

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| C | 01/29/2024 | 100% DESIGN | DK | GO | GN |
| B | 11/20/2023 | 90% DESIGN | DK | CK | GN |
| A | 09/29/2023 | 60% DESIGN | DK | GO | GN |

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|---|---|
| DRAWN BY | DK |
| DESIGNED BY | DK |
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - PIPING DETAILS I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 98 OF 145
DWG. NO. 030-P-06

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

2024.02.12 7:27:40 AM
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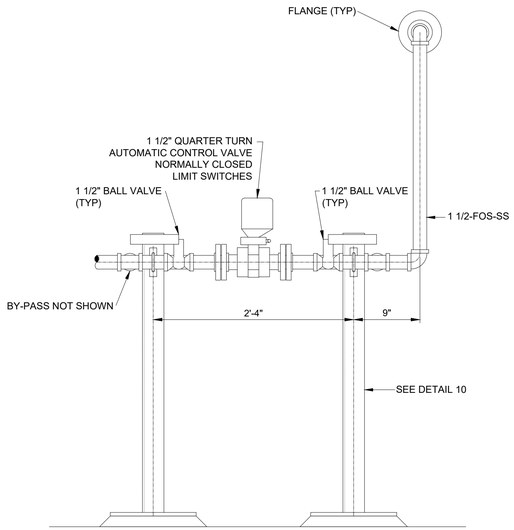
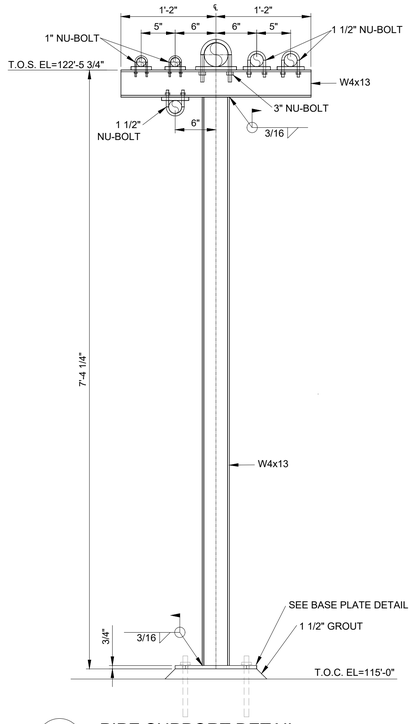
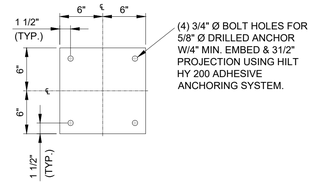


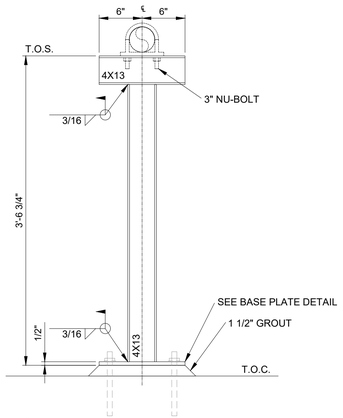

06 DAY TANK AUTOMATIC FILL ASSEMBLY DETAIL
LOOKING EAST
SCALE: NTS



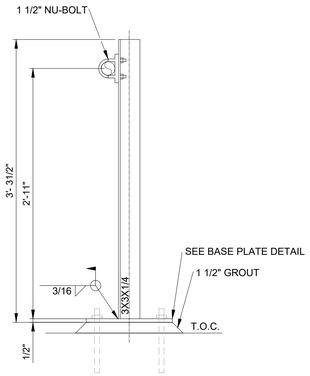

07 PIPE SUPPORT DETAIL
LOOKING WEST
SCALE: NTS



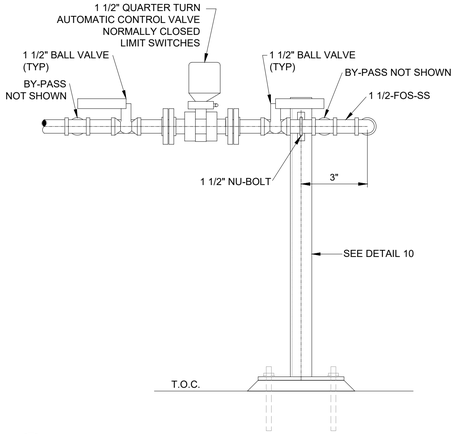

BASE PLATE DETAIL
SCALE: NTS



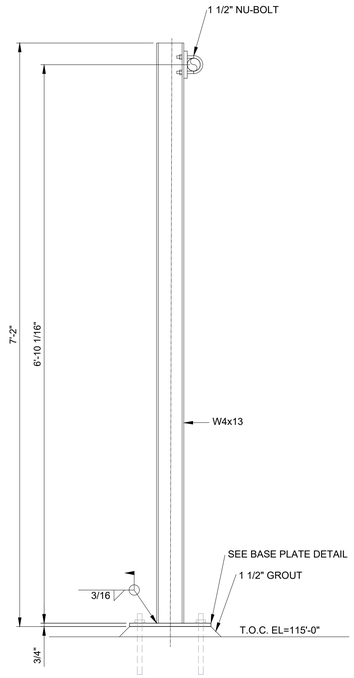

08 PIPE SUPPORT DETAIL
LOOKING NORTH
SCALE: NTS



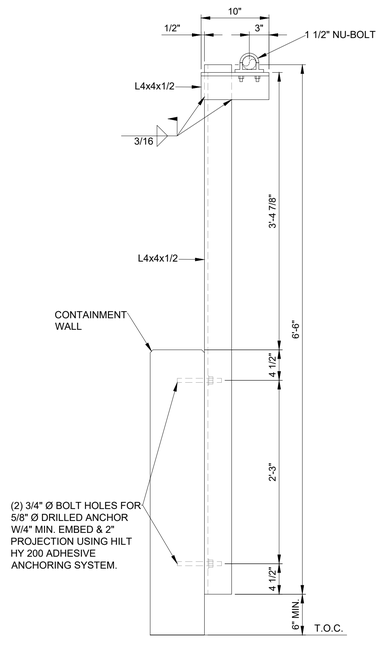

10 PIPE SUPPORT DETAIL
LOOKING NORTH
SCALE: NTS




11 TRANSFER PUMP VALVE ASSEMBLY
SCALE: NTS




12 PIPE SUPPORT DETAIL
ORIENTATION VARIES
SCALE: NTS




13 PIPE SUPPORT DETAIL
LOOKING EAST
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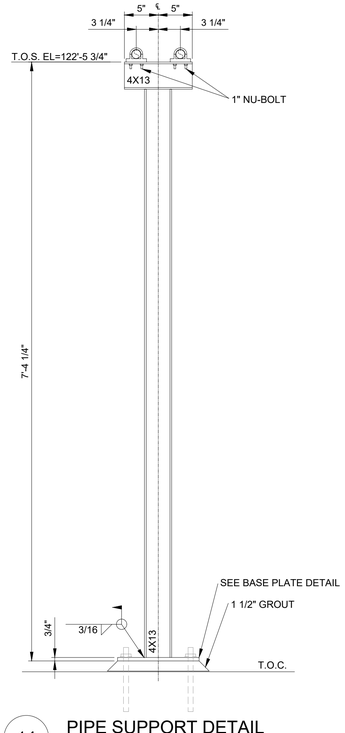
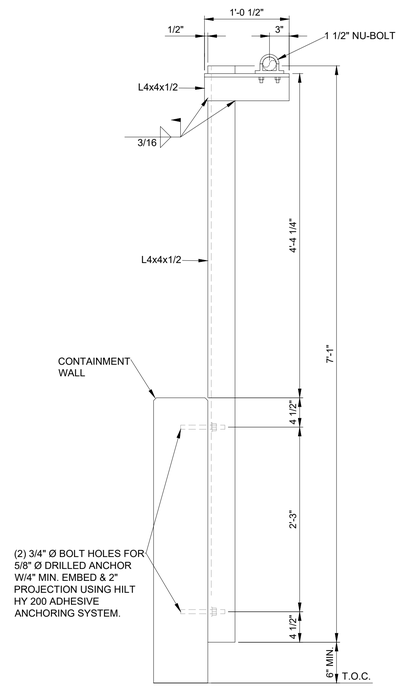
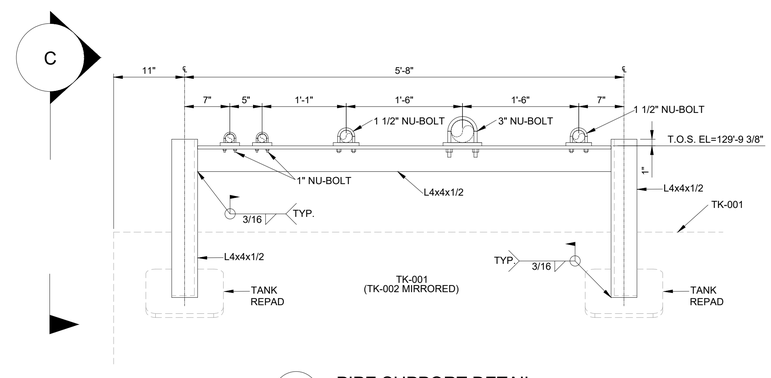


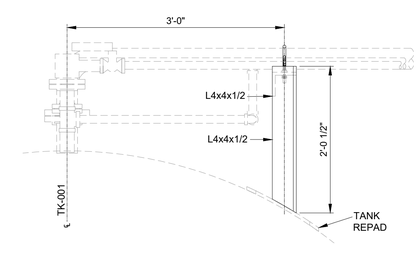

14 PIPE SUPPORT DETAIL
LOOKING NORTH
SCALE: NTS




15 PIPE SUPPORT DETAIL
LOOKING EAST
SCALE: NTS




16 PIPE SUPPORT DETAIL
LOOKING SOUTH
DETAIL MIRRORED FOR TK-002
SCALE: NTS




SECTION C
LOOKING WEST
DETAIL MIRRORED FOR TK-002
SCALE: NTS

## MATERIAL OF CONSTRUCTION NOTES:

1. ALL PIPING SHALL BE 304 STAINLESS STEEL UNLESS OTHERWISE NOTED.
2. ALL FITTINGS AND VALVES SHALL BE 304 STAINLESS STEEL.
3. PIPE 2 INCHES AND UNDER SHALL BE SCHEDULE 80.
4. PIPE LARGER THAN 2 INCHES SHALL BE SCHEDULE 40.
5. CONNECTIONS 2 INCHES AND UNDER SHALL BE SOCKET WELDED EXCEPT WHERE EQUIPMENT AND VALVES HAVE THREADED CONNECTION.
6. CONNECTIONS OVER 2 INCHES SHALL BE BUTT WELDED EXCEPT WHERE FLANGES ARE SHOWN.

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| B | 11/20/2023 | 90% DESIGN | DK | CK | GN |
| A | 09/29/2023 | 60% DESIGN | DK | GO | GN |

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DESIGNED BY DK
CHECKED BY GO
APPR. BY GN

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Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - PIPING DETAILS II

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 99 OF 145
DWG. NO. 030-P-07

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

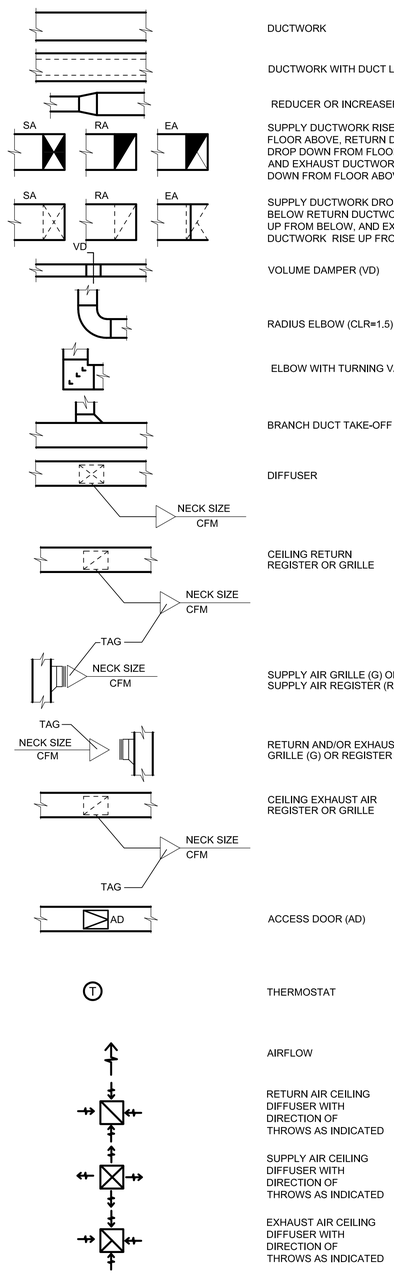
2024-01-26 8:51:44 AM
884300030-002_030-p-07.dwg

# ABBREVIATIONS

| | |
|---|---|
| **A** | |
| AC | AIR CONDITIONING UNIT |
| AFF | ABOVE FINISHED FLOOR |
| ALT | ALTITUDE |
| AHU | AIR HANDLING UNIT |
| ARCH | ARCHITECT(URAL) |
| AUTO | AUTOMATIC |
| AUX | AUXILIARY |
| ATC | AUTOMATIC TEMP CONTROL |
| **B** | |
| B | BOILER |
| B/ | BOTTOM OF |
| BHP | BRAKE HORSE POWER |
| BTU | BRITISH THERMAL UNIT |
| BLDG | BUILDING |
| **C** | |
| CDR | CONDENSER WATER RETURN |
| CDS | CONDENSER WATER SUPPLY |
| CFM | CUBIC FEET PER MINUTE |
| CH | CHILLER |
| CT | COOLING TOWER |
| CU | CONDENSING UNIT |
| CWR | CHILLED WATER RETURN |
| CWS | CHILLED WATER SUPPLY |
| CA | COMBUSTION AIR |
| CC | COOLING COIL |
| COP | COEFFICIENT OF PERFORMANCE |
| CLR | CENTERLINE RADIUS |
| CD | CONDENSATE DRAIN |
| **D** | |
| DB | DRY BULB TEMPERATURE |
| DIA | DIAMETER |
| DISCH | DISCHARGE |
| DL | DOOR LOUVER |
| DWG | DRAWING |
| **E** | |
| EA | EXHAUST AIR |
| EAT | ENTERING AIR TEMPERATURE |
| EER | ENERGY EFFICIENCY RATIO |
| EF | EXHAUST FAN |
| EL | ELEVATION |
| ESP | EXTERNAL STATIC PRESSURE |
| EUH | ELECTRIC UNIT HEATER |
| EAT | ENTERING AIR TEMPERATURE |
| EFF | EFFICIENCY |
| ELEC | ELECTRIC(AL) |
| EMS | ENERGY MANAGEMENT SYSTEM |
| EWT | ENTERING WATER TEMPERATURE |
| EXISTING | EXIST (E) |
| **F** | |
| FCU | FAN COIL UNIT |
| FD | FIRE DAMPER |
| FRP | FIBER-REINFORCED PLASTIC |
| °F | DEGREE FAHRENHEIT |
| FCV | FLOW CONTROL VALVE |
| FD | FLOOR DRAIN |
| FL | FLOOR |
| FLA | FULL LOAD AMPS |
| FP | FIRE PROTECTION |
| FPM | FEET PER MINUTE |
| FT | FEET OR FOOT |
| **G** | |
| GAL | GALLON |
| GND | GROUND |
| GPM | GALLONS PER MINUTE |
| **H** | |
| H | HUMIDISTAT |
| HB | HOSE BIBB |
| HP | HORSEPOWER |
| HPU | HEAT PUMP UNIT |
| HWR | HOT WATER RETURN |
| HWS | HOT WATER SUPPLY |
| HZ | HERTZ |
| **I** | |
| IH | INTAKE HOOD |
| IN | INCH |
| INV | INVERT |
| **K** | |
| KW | KILOWATT |
| **L** | |
| LV | LOUVER |
| LAT | LEAVING AIR TEMP |
| LBS | POUNDS |
| LAT | LEAVING AIR TEMPERATURE |
| LWT | LEAVING WATER TEMPERATURE |

| | |
|---|---|
| **M** | |
| MD | MOTORIZED DAMPER |
| MAU | MAKE-UP AIR HANDLING UNIT |
| MBH | THOUSAND BTU PER HOUR |
| MCA | MINIMUM CIRCUIT AMPACITY |
| MTD | MOUNTED |
| MCC | MAXIMUM MAX MOTOR CONTROL |
| CENTER | |
| MFR | MANUFACTURE(ER)(ED) |
| MISC | MISCELLANEOUS |
| MPD | MEDIUM PRESSURE GAS |
| **N** | |
| NC | NORMALLY CLOSED |
| NO | NORMALLY OPEN |
| NTS | NOT TO SCALE |
| N/A | NOT APPLICABLE |
| NEG | NEGATIVE |
| NPSH | NET POSITIVE SUCTION HEAD |
| **O** | |
| OA | OUTSIDE AIR |
| OAT | OUTSIDE AIR TEMPERATURE |
| OBD | OPPOSED BLADE DAMPER |
| OD | OUTDOOR AMBIENT TEMPERATURE |
| OD | AMB OUTSIDE DIAMETER |
| **P** | |
| P | PUMP |
| PW | POTABLE WATER |
| PD | PRESSURE DROP |
| PH | PHASE |
| POC | POINT OF CONNECTION |
| PPM | PARTS PER MILLION |
| PRES | PRESSURE |
| PRF | PREFILTER |
| PRV | PRESSURE REDUCING VALVE |
| PSIG | POUNDS PER SQUARE INCH GAGE |
| PVC | POLY-VINYL CHLORIDE |
| **Q** | |
| QTY | QUANTITY |
| **R** | |
| RA | RETURN AIR |
| RF | RETURN FAN |
| RPM | REVOLUTIONS PER MINUTE |
| REF | REFERENCE |
| RH | RELATIVE HUMIDITY (PERCENT) |
| RLA | RATED LOAD AMPS |
| RPBP | REDUCE. PRESSURE BACKFLOW PREVENTOR |
| **S** | |
| SA | SUPPLY AIR |
| SD | SMOKE DETECTOR |
| SEER | SEASONAL ENERGY EFFICIENCY RATIO |
| SEN | SENSIBLE HEAT |
| SF | SUPPLY FAN |
| SS | STAINLESS STEEL |
| SCFM | STANDARD CFM |
| SOV | SHUT OFF VALVE |
| SP | STATIC PRESSURE |
| SQFT | SQUARE FEET (OR FOOT) |
| STD | STANDARD |
| **T** | |
| T | THERMOSTAT |
| TA | TRANSFER AIR |
| TBD | TO BE DETERMINED |
| TYP | TYPICAL |
| **U** | |
| UG | UNDERGROUND |
| UTR | UP THROUGH ROOF |
| **V** | |
| VD | VOLUME DAMPER |
| V-PH-C | VOLTS-PHASE-CYCLE |
| V | VOLT(AGE) |
| VB | VACUUM BREAKER |
| VEL | VELOCITY |
| VTR | VENT THROUGH ROOF |
| **W** | |
| WB | WET BULB |
| WG | WATER GAUGE |
| WH | WATER HEATER |
| W/ | WITH |
| W/O | WITHOUT |
| WC | WATER COLUMN |
| WT | WEIGHT |

# LEGEND




DUCTWORK

DUCTWORK WITH DUCT LINING

REDUCER OR INCREASER

SUPPLY DUCTWORK RISE UP TO FLOOR ABOVE, RETURN DUCTWORK DROP DOWN FROM FLOOR ABOVE, AND EXHAUST DUCTWORK DROP DOWN FROM FLOOR ABOVE

SUPPLY DUCTWORK DROP DOWN TO BELOW RETURN DUCTWORK RISE UP FROM BELOW, AND EXHAUST DUCTWORK RISE UP FROM BELOW

VOLUME DAMPER (VD)

RADIUS ELBOW (CLR=1.5)

ELBOW WITH TURNING VANES

BRANCH DUCT TAKE-OFF

DIFFUSER

CEILING RETURN REGISTER OR GRILLE

SUPPLY AIR GRILLE (G) OR SUPPLY AIR REGISTER (R)

RETURN AND/OR EXHAUST AIR GRILLE (G) OR REGISTER (R)

CEILING EXHAUST AIR REGISTER OR GRILLE

ACCESS DOOR (AD)

THERMOSTAT

AIRFLOW

RETURN AIR CEILING DIFFUSER WITH DIRECTION OF THROWS AS INDICATED

SUPPLY AIR CEILING DIFFUSER WITH DIRECTION OF THROWS AS INDICATED

EXHAUST AIR CEILING DIFFUSER WITH DIRECTION OF THROWS AS INDICATED

# GENERAL HVAC NOTES

1. SCOPE OF WORK
   - 1.1. THE HVAC CONTRACTOR IS RESPONSIBLE FOR ALL WORK, MATERIALS, AND LABOR TO SATISFY A COMPLETE WORKING SYSTEM WHETHER SPECIFIED OR IMPLIED.
   - 1.2. ALL WORK IS TO BE PERFORMED IN STRICT COMPLIANCE WITH THE 2018 PUERTO RICO MECHANICAL CODE, ALL LOCAL CODES AND ALL OTHER REGULATIONS GOVERNING THE WORK OF THIS NATURE.
   - 1.3. BEFORE SUBMITTING ANY PROPOSAL, THE HVAC CONTRACTOR SHALL EXAMINE THE PROPOSED SITE AND SHALL DETERMINE THE CONDITIONS THAT MAY AFFECT THE WORK. NO ALLOWANCE SHALL BE MADE BECAUSE THE HVAC CONTRACTOR FAILS TO MAKE SUCH EXAMINATIONS.
   - 1.4. ALL EQUIPMENT AND MATERIALS SHALL BE AS SPECIFIED OR "APPROVED EQUAL" BY THE ENGINEER.THE EQUIPMENT SPECIFIED ON THE DRAWINGS HAVE BEEN SELECTED AS THE BASIS OF DESIGN. THE USE OF REVIEWED OR SPECIFIED EQUALS SHALL BE COORDINATED BY THE CONTRACTOR AS TO SPACE REQUIREMENTS, EQUIPMENT DIMENSIONS AND PERFORMANCE. ANY ADDITIONAL COSTS EITHER DIRECTLY OR INDIRECTLY CAUSED BY EQUALS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR
   - 1.5. DRAWINGS ARE DIAGRAMMATIC AND SHOW THE GENERAL DESIGN INTENT, ARRANGEMENT AND EXTENT OF SYSTEMS. DO NOT SCALE DRAWINGS NOR USE AS SHOP DRAWINGS. THE HVAC CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSIONS OF THE EQUIPMENT AND ENSURE THAT IT WILL FIT IN THE AVAILABLE SPACE. WHERE ALTERNATE ROUTING, OFFSETS AND TRANSITIONS ARE REQUIRED FOR FIELD COORDINATION OF ALL TRADES, THIS CONTRACTOR SHALL MAKE CHANGES WITHOUT ADDITIONAL COSTS.
2. SHOP DRAWINGS
   - 2.1. THE HVAC DESIGN DRAWINGS DEFINE THE GENERAL LAYOUT, CONFIGURATION, ROUTING, SIZE, AND THE GENERAL INTENT OF THE DESIGN AND ARE NOT FABRICATION DRAWINGS. CONTRACTOR'S SHALL BE RESPONSIBILITY TO DEVELOP THE SHOP DRAWINGS REQUIRED FOR THE CONSTRUCTION OF THE HVAC SYSTEM.
   - 2.2. SUBMIT DETAILED FABRICATION DRAWINGS WITH LAYOUTS AND ALL NECESSARY DIMENSIONS AND DETAILS ON EQUIPMENT, AND DUCTWORK. SHOW ALL FITTINGS AND SUPPORTS NECESSARY TO ACCOMMODATE THE EQUIPMENT PROVIDED IN A COMPLETE AND FUNCTIONAL SYSTEM. SHOW MAIN AND BRANCH RUNS, FITTINGS, OFFSETS, TAKEOFFS, ACCESSORIES, SUPPORTS, ANCHORAGE, POINT LOADS AND SEISMIC RESTRAINTS, AND DIMENSIONS OF SUB-ASSEMBLIES TO BE SHIPPED.
   - 2.3. THE DUCTWORK DIMENSIONS PROVIDED ON THE DESIGN DRAWINGS REPRESENT A FREE AREA AND THEY ARE CLEAR INSIDE DIMENSIONS. THE CONTRACTOR SHALL BE RESPONSIBLE TO ACCOUNT FOR THE LOSS OF FREE AREA DUE ACOUSTICAL LINING, OR ANY INTERNAL OBSTRUCTIONS, AND OVERSIZE THE DUCTWORK TO PROVIDE THE SAME FREE AREA AS THE ONE SHOWN ON THE DESIGN DRAWINGS.
3. DUCTWORK FABRICATION
   - 3.1. ALL DUCTWORK AND ALL DUCTWORK ACCESSORIES, INCLUDING VOLUME DAMPERS AND TURNING VANES SHALL BE MADE OF ALUMINUM.
   - 3.2. DUCTWORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA STANDARDS. ALL DUCTWORK SHALL BE OF THE LOW VELOCITY TYPE, UNLESS SPECIFIED OTHERWISE.
   - 3.3. THE HVAC CONTRACTOR SHALL PROVIDE AND INSTALL APPROVED FIRE DAMPERS AND PANELS IN ALL DUCTWORK THAT PENETRATES A HORIZONTAL OR VERTICAL FIRE PARTITION. UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
   - 3.4. ALL BRANCH DUCTS SHALL HAVE VOLUME DAMPERS.
   - 3.5. WHERE FLOW EXCEEDS 150 CFM, THE CONTRACTOR SHALL USE SMOOTH RADIUS ELBOWS OR TURNING VANES.
   - 3.6. ALL DUCT JOINTS SHALL BE SEALED IN ACCORDANCE WITH SMACNA STANDARDS AND ACCEPTED GOOD PRACTICE.
   - 3.7. ALL DUCT DIMENSIONS ARE NET INSIDE VALUES. DIMENSIONS MAY BE CHANGED PROVIDED THAT THE NET FREE AREA IS MAINTAINED.
   - 3.8. ALL DUCTS TO BE 22 GAUGE OR HIGHER.
   - 3.9. SEAMS
     - 3.9.1 PROVIDE DOUBLE-LOCKED SEAMS.
     - 3.9.2 PROVIDE RECTANGULAR DUCTS WITH LONGER THAN A 12-INCH DIMENSION FULL-PERIMETER STANDING SEAMS NOT LESS THAN ONE INCH HIGH.
     - 3.9.3 PROVIDE REINFORCEMENTS AT INTERVALS NOT GREATER THAN 30 INCHES ALONG THE DUCT.
     - 3.9.4 NO "S" SEAMS WILL BE ACCEPTED.
   - 3.10. BALANCING DAMPERS
     - 3.10.1 PROVIDE BUTTERFLY OR MULTI-BLADE DAMPERS AS INDICATED AND REQUIRED IN ORDER TO BALANCE THE AIR QUANTITIES TO THEIR INDICATED VALUES.
     - 3.10.2 PROVIDE A LOCKING QUADRANT ON EACH MANUAL DAMPER, WITH EASY ACCESS FOR OPERATION.
   - 3.11. TURNING VANES
     - 3.11.1 SQUARE-TURN ELBOWS SHALL BE FITTED WITH SHOP-FABRICATED DOUBLE-BLADE TURNING VANES MOUNTED INSIDE THE RAILS.
     - 3.11.2 CONSTRUCTION SHALL BE OF THE SAME MATERIAL AS THE DUCTWORK AND SHALL BE RIGID ENOUGH TO PREVENT VIBRATION AT HIGH AIR FLOW.
4. HVAC CONTROLS
   - 4.1. THE HVAC CONTRACTOR SHALL SUPPLY AND INSTALL ALL CONTROL WIRING AND THERMOSTATS AS REQUIRED.
5. ELECTRICAL
   - 5.1. THE HVAC CONTRACTOR SHALL COORDINATE WITH THE ELECTRICAL CONTRACTOR FOR LOCATION OF POWER WIRING TO EACH HVAC UNIT.
6. DUCTWORK INSTALLATION
   - 6.1. ALL DUCTWORK AND PIPE SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN A NEAT AND WORKMANLIKE MANNER. THE USE OF WIRE OR METAL STRAPS TO SUPPORT PIPES WILL NOT BE PERMITTED. SPACING OF PIPE SUPPORTS SHALL NOT EXCEED 8 FEET FOR ALL PIPING. PLASTIC PIPING SHALL BE SUPPORTED EVERY 4 FEET.
   - 6.2. FLANGES
     - 6.2.1. TIGHTEN FLANGE BOLTS SUFFICIENTLY TO SLIGHTLY COMPRESS THE GASKET AND MAKE A SEAL, BUT NOT SO TIGHTLY AS TO DISTORT THE FLANGES.
     - 6.2.2. PROVIDE A FLAT WASHER UNDER EACH NUT AND BOLT HEAD.
   - 6.3. DAMPERS
     - 6.3.1. POSITION THE DAMPERS TO FIT INTO THE CONNECTING DUCTWORK AT THE INDICATED LOCATIONS.
     - 6.3.2. INSTALL AXLES IN THE HORIZONTAL POSITION UNLESS OTHERWISE NECESSARY FOR PROPER OPERATION OF THE DAMPER.
7. MISCELLANEOUS
   - 7.1. WIND RESISTANCE: EXTERIOR MECHANICAL EQUIPMENT SHALL BE ANCHORED/TIED DOWN TO STRUCTURE OR CONCRETE PADS TO RESIST THE WIND PRESSURES DETERMINED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE, AND LOCAL REQUIREMENTS.
   - 7.2. SEISMIC RESISTANCE: MECHANICAL SYSTEM SUPPORTS SHALL BE DESIGNED AND INSTALLED FOR THE SEISMIC FORCES IN ACCORDANCE WITH 2018 PUERTO RICO MECHANICAL CODE. RESTRAINTS SHALL BE DESIGN FOR THE PROJECT'S LOCATION'S SEISMIC DESIGN CATEGORY AND SEISMIC RISK CATEGORY.
   - 7.3. ALL EXTERIOR OPENINGS SHALL BE PROPERLY CAULKED AND SEALED TO PREVENT INFILTRATION OF OUTSIDE AIR INTO THE CONDITIONED SPACE.
   - 7.4. COORDINATE THE INSTALLATION OF ALL ROOF FLASHING AT ROOF PENETRATIONS.
   - 7.5. THE HVAC CONTRACTOR SHALL VERIFY ALL FIGURES, CONDITIONS, AND DIMENSIONS AT THE JOB SITE.
8. TESTING AND BALANCING
   - 8.1. THE HVAC SYSTEMS SHALL BE TESTED AND BALANCED BY AN INDEPENDENT CONTRACTOR. ALL AIRFLOWS SHALL BE BALANCED WITHIN 10% OF THE DESIGN VALUES.
9. GUARANTEE
   - 9.1. MATERIALS, EQUIPMENT, AND INSTALLATION SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE. DEFECTS THAT APPEAR DURING THAT PERIOD SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
   - 9.2. COMPRESSOR SHALL COME WITH MANUFACTURER'S STANDARD 5-YEAR WARRANTY.

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| C | 01/29/2024 | 100% DESIGN | RK | GN | GN |
| B | 11/20/2023 | 90% DESIGN | RK | GN | GN |
| A | 09/29/2023 | 60% DESIGN | RK | GN | GN |

| | |
|---|---|
| DRAWN BY | RK |
| DESIGNED BY | JC |
| CHECKED BY | GN |
| APPR. BY | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

HVAC GENERAL NOTES

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO: 100 OF 145
DWG. NO. 00-AC-01

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

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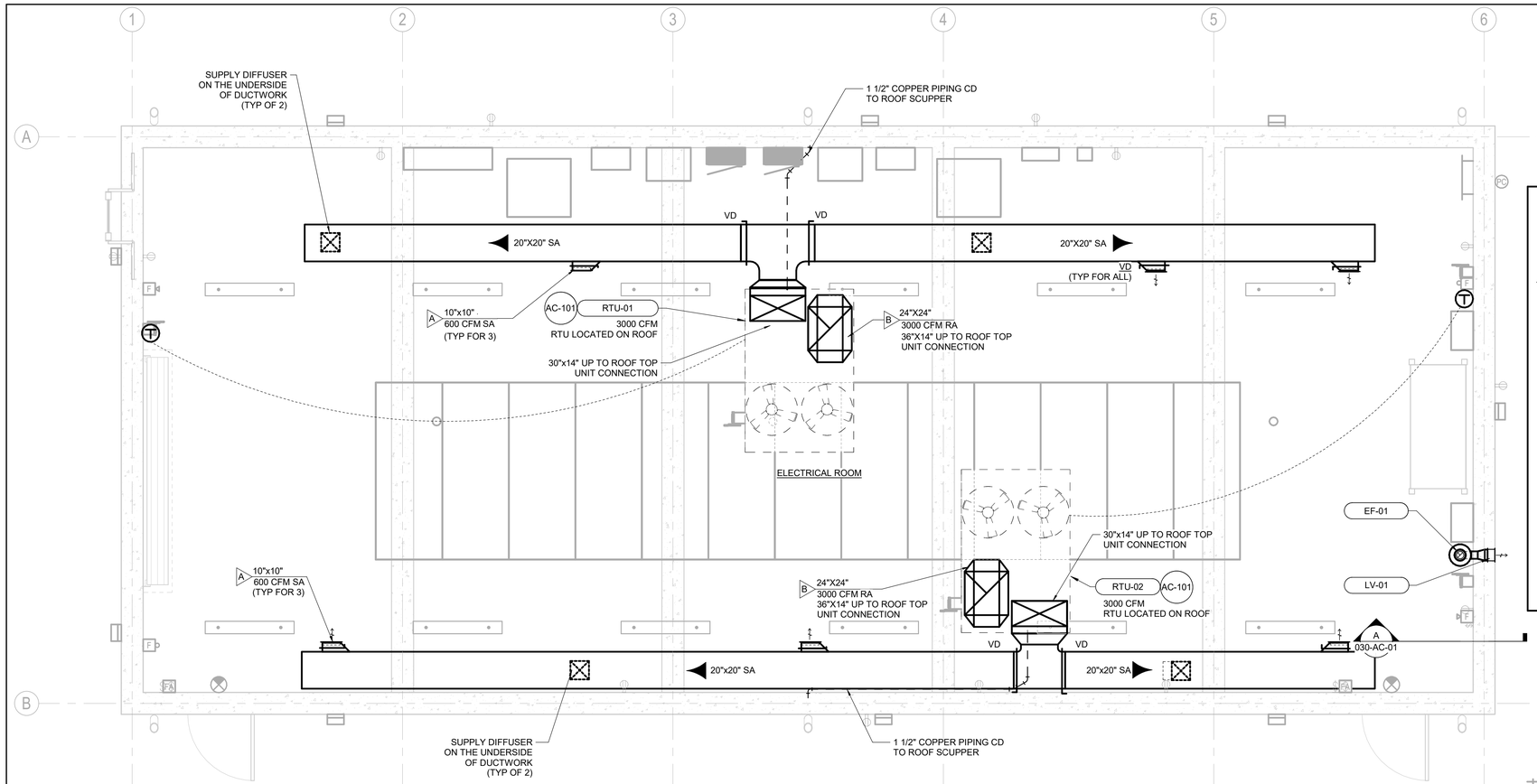



## HVAC PLAN

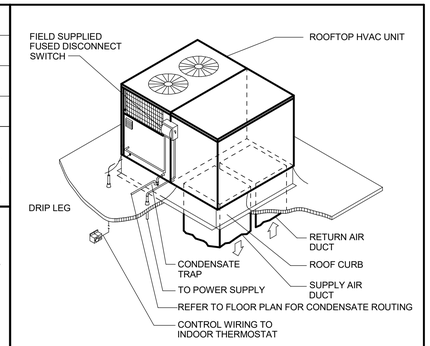
SCALE: 1 : 35

## DUCTWORK INSULATION AND LINER

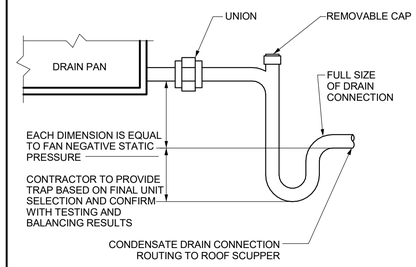
| LOCATION | REQUIREMENT | REMARKS |
|---|---|---|
| SUPPLY AIR DUCTWORK | INSULATE | - |
| RETURN AIR DUCTWORK | INSULATE | - |

NOTES:

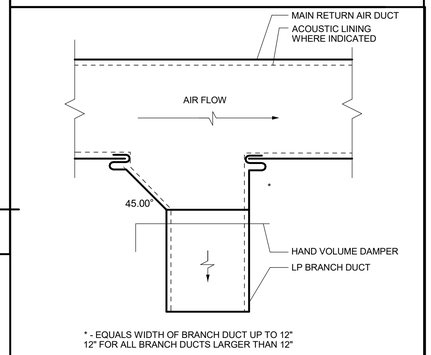
1. REFER TO SPECIFICATION FOR THICKNESS. MINIMUM R-VALUES SHALL MEET CURRENT IECC AND LOCAL REQUIREMENTS.
2. FREE INSIDE DUCTWORK DIMENSION SHALL BE MAINTAINED ON LINED DUCTWORK



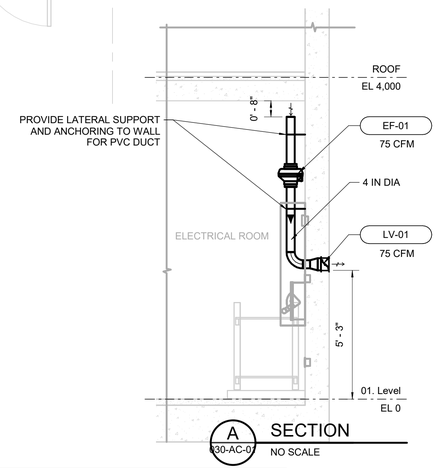

AC-101 ROOFTOP HVAC UNIT
REV 010119



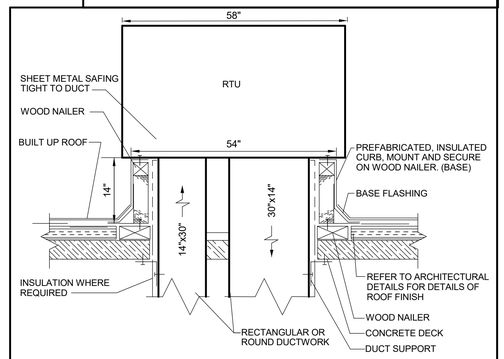

AC-114 CONDENSATE DRAIN DETAIL
REV 010119




AC-405 TYPICAL SUPPLY AIR BRANCH
(DUCT TAKE-OFF)
REV 010119




A 030-AC-01 SECTION
NO SCALE




AC-409 DUCT PENETRATION
(THROUGH ROOF)
REV 010119

## ROOF TOP UNIT SYSTEM SCHEDULE

| TAG NO | SERVICE | LOCATION | CAPACITY (BTU/HR) COOL | CAPACITY (BTU/HR) HEAT | SUPPLY AIR (CFM) | REFRIG. PIPING (IN.) LIQUID | REFRIG. PIPING (IN.) SUCTION | ELECTRICAL V/PH/C | ELECTRICAL MCA | ELECTRICAL MOP | COMPRESSOR MOTORS NO. | COMPRESSOR MOTORS RLA | COMPRESSOR MOTORS LRA | MANUFACTURER & MODEL | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RTU-01 | ELECTRICAL BLDG. | ELECTRICAL BLDG. ROOF | 90,000 | N/A | 3,000 | 3/4" | 1/2" | 208-230/3/60 | 36 | 45 | 2 | 11.6/10.4 | 123/73 | ECC090A / TRANE | 1 |
| RTU-02 | ELECTRICAL BLDG. | ELECTRICAL BLDG. ROOF | 90,000 | N/A | 3,000 | 3/4" | 1/2" | 208-230/3/60 | 36 | 45 | 2 | 11.6/10.4 | 123/73 | ECC090A / TRANE | 1 |

OPTIONS AND ACCESSORIES:

1. CONTRACTOR TO COORDINATE SELECTION OF ROOF CURB BASED ON ROOF TOP UNIT MANUFACTURER AND MODEL TO SECURE UNIT TO CURB AND ROOF BASED ON SITE SEISMIC DESIGN CONDITIONS AND WIND LOAD OF 172 MPH (CATEGORY IV)

## AIR OUTLET SHCEDULE

| TAG NO | SERVICE | MATERIAL | AIR OUTLET COLOR | FRAME | MANUFACTURER & MODEL | OPTIONS AND ACCESSORIES |
|---|---|---|---|---|---|---|
| A | SUPPLY AIR GRILLE | ALUMINUM | WHITE | RECTANGULAR SURFACE MOUNTED | TITUS 300FL | 1 |
| B | EXHAUST AIR GRILLE | ALUMINUM | WHITE | RECTANGULAR SURFACE MOUNTED | TITUS 350FL | 1 |

OPTIONS AND ACCESSORIES:

1. ALUMINUM OPPOSED BLADE VOLUME GRILLES

## FAN SHCEDULE

| TAG NO | SERVICE | LOCATION | TYPE | AIR FLOW (CFM) | ESP (IN. WC) | FAN RPM | MOTOR BHP | MOTOR HP | MOTOR FEI | MOTOR RPM | MOTOR VFD | MOTOR V/PH/CY | MOTOR ENCL | MOTOR FLA(A) | RADIATED SOUND Lwa | RADIATED SOUND dBA | MANUFACTURER & MODEL | ESTIMATED WEIGHT (POUNDS) | OPTIONS & ACCESSORIES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EF-01 | BATTERY EXHAUST AIR | ELECTRICAL BLDG. | CENTRIFUGAL INLINE | 75 | 0.2 | 3000 | - | - | N/A | 3000 | NO | 115/1/60 | IP44 | 0.17 | - | - | FANTECH FR100 | 5 | 1, 2, 3, 4 |

OPTIONS AND ACCESSORIES:

1. GRAVITY BACKDRAFT DAMPER (FRP)
2. WC 15 SPEED CONTROL
3. HS 4W EXHAUST AIR LOUVER
4. HYDROGEN CONCENTRATION EXHAUST FAN

## LOUVER SHCEDULE

| TAG NO | SERVICE | LOCATION | WIDTH (INCHES) | HEIGHT (INCHES) | AIR FLOW (CFM) | FREE AREA (SQFT) | FREE AREA VELOCITY (FPM) | MANUFACTURER/ MODEL |
|---|---|---|---|---|---|---|---|---|
| LV-01 | EXHAUST AIR | ELECTRICAL BLDG. | 6 | 6 | 75 | 0.125 | 600 | FANTECH/HS4W |

| NO | DATE | REVISION | BY | CK | APPR |
|---|---|---|---|---|---|
| C | 01/29/2024 | 100% DESIGN | RK | GN | GN |
| B | 11/20/2023 | 90% DESIGN | RK | GN | GN |
| A | 09/29/2023 | 60% DESIGN | RK | GN | GN |

ORIGINAL SHEET - ARCH D

| | |
|---|---|
| DRAWN BY | RK |
| DESIGNED BY | JC |
| CHECKED BY | GN |
| APPR. BY | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

HVAC PLAN, DETAILS, AND SCHEDULES

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSW/ID -
DATE: JANUARY / 2024
SCALE: As indicated

SHEET NO. 101 OF 145
DWG. NO. 030-AC-01
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALE ACCORDINGLY

Permit/Seal

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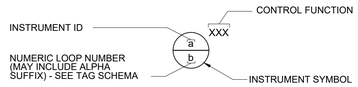
# INSTRUMENTATION CALL - OUT

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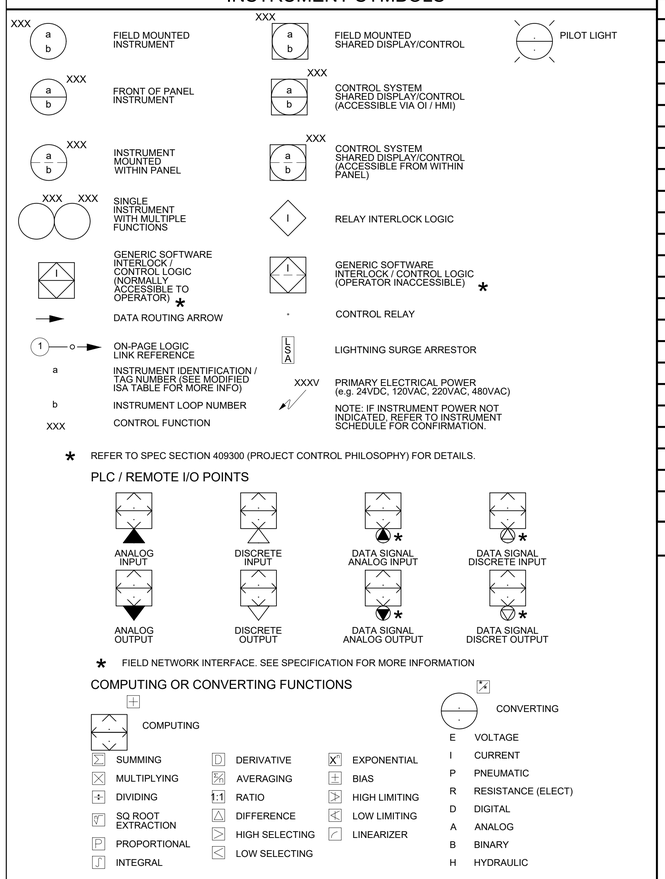



* REFER TO SPEC SECTION 409300 (PROJECT CONTROL PHILOSOPHY) FOR DETAILS.

## PLC / REMOTE I/O POINTS




* FIELD NETWORK INTERFACE. SEE SPECIFICATION FOR MORE INFORMATION

## COMPUTING OR CONVERTING FUNCTIONS




## CONTROL FUNCTION DESIGNATIONS

| | | | |
|---|---|---|---|
| AHC | AUTO / HOLD / CLOSE | OLH | OFF / LOW / HIGH |
| AM | AUTO / MANUAL | O/O | ON / OFF |
| AS | AIR SUPPLY | O/R | OVERRIDE |
| BEAR | BEARING | OOR | OUT OF RANGE |
| CLSD | CLOSED | OSC | OPEN / STOP / CLOSE |
| CV | CONTROL VARIABLE | PID | PROPORTIONAL / INTEGRAL / DERIVATIVE |
| DEV | DEVIATION | POT | POTENTIOMETER |
| E-STOP | EMERGENCY STOP | PV | PROCESS VARIABLE |
| ETM | ELAPSED TIME METER | RDY | READY |
| FOR | FORWARD /OFF /REVERSE | R/L | RAISE / LOWER |
| HML | HIGH / MID / LOW | RSL | RAISE / STOP / LOWER |
| HOA | HAND / OFF / AUTO | RST | RESET |
| HOR | HAND / OFF / REMOTE | RTD | RESISTANCE TEMPERATURE DETECTOR |
| LEAK | MOISTURE INTRUSION | SD | SHUTDOWN |
| LOR | LOCAL / OFF / REMOTE | SEL | SELECT |
| L/R | LOCAL / REMOTE | SP | SET POINT |
| LSR | LOCAL / STOP / REMOTE | S/R | START / RESET |
| MOA | MANUAL / OFF / AUTO | S/S | START / STOP |
| MN | MAINTENANCE / NORMAL | STR | START |
| O/C | OPEN / CLOSE | STP | STOP |
| OCA | OPEN / CLOSE / AUTO | TMR | TIMER |
| OL | OVERLOAD | WIND | WINDING |

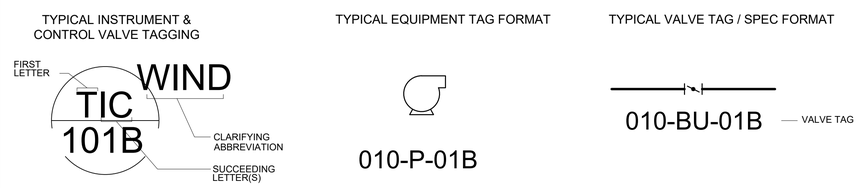
NOTE:

1. REFER TO DRAWING 000-I-02 FOR ANALYTICAL INSTRUMENT DESIGNATIONS.

# ISA TABLE (MODIFIED)

| | FIRST LETTER | | SUCCEEDING LETTER(S) | | |
|---|---|---|---|---|---|
| | MEASURED OR INITIATING VARIABLE | MODIFIER | READOUT OR PASSIVE FUNCTION | OUTPUT FUNCTION | MODIFIER |
| A | ANALYSIS | | ALARM | | |
| B | BURNER, COMBUSTION | | | | |
| C | CONDUCTIVITY | | | CONTROL | CLOSED |
| D | DENSITY | DIFFERENTIAL | | | |
| E | VOLTAGE | | SENSOR (PRIMARY ELEMENT) | | |
| F | FLOW RATE | RATIO (FRACTION) | | | FORWARD |
| G | | | GAUGE, GLASS, VIEWING DEVICE | | |
| H | HAND | | | | HIGH |
| I | CURRENT (ELECTRICAL) | | INDICATE | | |
| J | POWER | SCAN | | | |
| K | TIME, TIME SCHEDULE | TIME RATE OF CHANGE | | CONTROL STATION | |
| L | LEVEL | | LIGHT | | LOW |
| M | MOISTURE | MOMENTARY | | | MIDDLE, INTERMEDIATE |
| N | TORQUE | | ISOLATE | ISOLATOR | |
| O | | | ORIFICE, RESTRICTION | | OPEN |
| P | PRESSURE, VACUUM | | POINT (TEST) CONNECTION | | |
| Q | QUANTITY | INTEGRATE, TOTALIZE | | | |
| R | RADIATION | | RECORD | | REVERSE |
| S | SPEED, FREQUENCY | SAFETY | | SWITCH | |
| T | TEMPERATURE | | | TRANSMIT | |
| U | MULTIVARIABLE | | MULTIFUNCTION | MULTIFUNCTION | MULTIFUNCTION |
| V | VIBRATION, MECHANICAL ANALYSIS | | | VALVE, DAMPER, LOUVER | |
| W | WEIGHT, FORCE | | WELL | | |
| X | INTRUSION | X AXIS | | | |
| Y | EVENT, STATE, OR PRESENCE | Y AXIS | | COMPUTE, CONVERT | |
| Z | POSITION, DIMENSION | Z AXIS | | DRIVER, ACTUATOR, FINAL CONTROL ELEMENT | |

# TAG SCHEMA




### TYPICAL INSTRUMENT & CONTROL VALVE TAGGING

010-TIC-01B – – – – – INSTRUMENT SCHEDULE (FULL TAG)
010 – – – – – – – PROCESS AREA
TIC – – – – – INSTRUMENT / VALVE ID
01 – – TAG NUMBER
B – – SUFFIX

NOTE: REFER TO GENERAL SHEET GI-4 FOR STANDARD VALVE CALLOUTS.

### TYPICAL EQUIPMENT TAG FORMAT

010-P-01B – – – – EQUIPMENT SCHEDULE (FULL TAG)
010 – – – – PROCESS AREA
P – – – – – EQUIPMENT ID
01 – – – – TAG NUMBER
B – – SUFFIX

NOTE: REFER TO GENERAL SHEET GI-4 FOR STANDARD EQUIPMENT CALLOUTS.

### TYPICAL MANUAL VALVE TAG FORMAT

010-BU-01B – – – – – MANUAL VALVE SCHEDULE (FULL TAG)
010 – – – – – – – PROCESS AREA
BU – – – – – – VALVE TYPE
01 – – – – – TAG NUMBER
B – – – SUFFIX

NOTE: REFER TO GENERAL SHEET GI-4 FOR STANDARD VALVE CALLOUTS.

### SHEET NUMBER TAG FORMAT

180-I-01-A – – – – – – SHEET SCHEDULE (FULL TAG)
180-I-01 – – – – – P&ID BORDER (PARTIAL TAG)
180 – – – – – – PROCESS AREA
I – – – – – – DISCIPLINE CODE
01 – – – – SHEET NUMBER
A – – – REVISION

### TYPICAL PIPE LINE TAG FORMAT

12-RW-CS08 – – – – PIPE LINE SCHEDULE (FULL TAG)
12 – – – – – – – – – NOMINAL PIPE DIAMETER
RW – – – – – – – – FLUID CODE
CS08 – – – – PIPE SPEC

### VALVE SPECIFICATION TAG FORMAT

120-BU-41 – – – – – SPECIFICATION NUMBER
120 – – – – – – VALVE SIZE
BU – – – – – VALVE TYPE
41 – – – VALVE NUMBER

### EQUIPMENT SKID TAG FORMAT

6640-X-017 – – – SKID TAG
6640 – – – – – – PLANT ID
X – – – – – – SKID
017 – – – SKID NUMBER

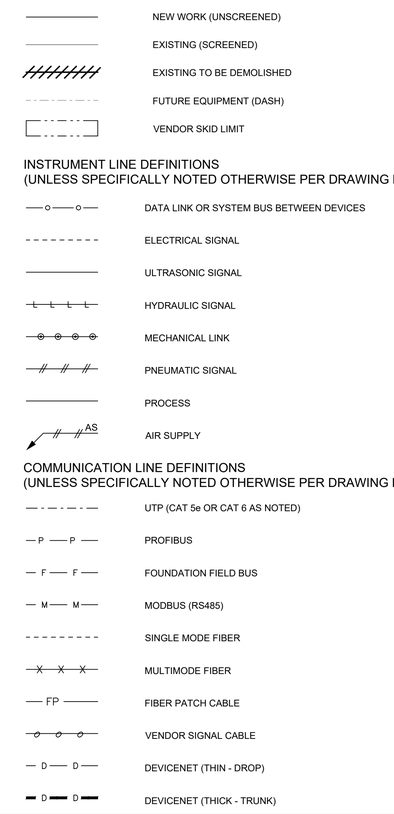
### TIE-IN POINT TAG FORMAT

6640-TP-0123 – – SPECIFICATION NUMBER
6640 – – – – PLANT ID
TP – – – – TIE-IN POINT
0123 – – TAG NUMBER

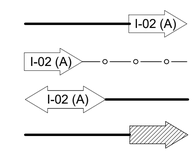
# GENERAL INSTRUMENTATION NOTES

1. THE SYMBOLS AND NOMENCLATURE SHEETS ARE REPRESENTATIVE OF A GENERAL STANDARD. THEREFORE, IT SHOULD BE UNDERSTOOD THAT NOT ALL INFORMATION PRESENTED WILL BE RELEVANT TO THIS PROJECT.
2. ADDITIONAL INSTRUMENTATION AND CONTROL SYMBOLS MAY BE USED AS REQUIRED. SYMBOLS AND NOMENCLATURE WILL BE EITHER BASED ON ISA STANDARD 5.1-INSTRUMENTATION SYMBOLS AND IDENTIFICATION OR DEFINED ELSEWHERE IN THE P&ID SET.
3. SEE ELECTRICAL AND PROJECT GENERAL SHEETS FOR ADDITIONAL SYMBOLS AND ABBREVIATIONS.
4. TO CAPTURE THE COMPLETE PROCESS CONTROL INTENT, THE P&IDS MUST TO BE REVIEWED IN CONJUNCTION WITH THE PROJECT CONTROL PHILOSOPHY (SPEC SECTION 406196), THE PROJECT I/O AND INSTRUMENT SCHEDULES AND OTHER SECTIONS REFERENCED HEREIN.
5. ALL INSTRUMENT TAGS ARE PRESUMED TO HAVE THE PREFIX "030".

# INSTRUMENTATION LINE SYMBOLOGY




# SIGNAL AND PROCESS OFF-PAGE CONNECTORS




NOTE: REFER TO INSTRUMENTATION LINE SYMBOLOGY FOR PROCESS AND LOGIC LINESTYLE DEFINITION.

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| E | 01/29/2024 | 100% DESIGN | AA | SK | GN |
| D | 11/20/2023 | 90% DESIGN | AA | DH | GN |
| C | 09/29/2023 | 60% DESIGN | AA | DH | GN |
| B | 07/26/2023 | 30% DESIGN | SK | CL | GN |
| A | 06/06/2023 | 15% DESIGN | ZC | SK | GN |

DRAWN BY DS
DESIGNED BY AA
CHECKED BY SK
APPR. BY GN

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

SYMBOLS AND NOMENCLATURE I

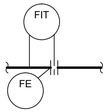
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE:

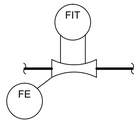
SHEET NO. 102 OF 145
DWG. NO. 000-I-01
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

2024.02.12 3:48:43 PM
89842000000-01.dwg

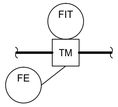
## FLOW INSTRUMENTS



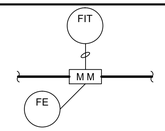

ORIFICE PLATE WITH VENA CONTRACTA, RADIUS, OR PIPE TAPS CONNECTED TO DIFFERENTIAL-PRESSURE -TYPE FLOW TRANSMITTER



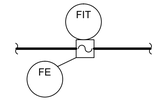

VENTURI TUBE WITH (DIFFERENTIAL PRESSURE) FLOW TRANSMITTER



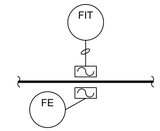

THERMAL MASS FLOW METER



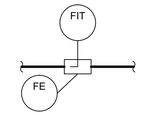

MAGNETIC FLOWMETER WITH REMOTE FLOW TRANSMITTER



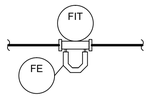

SONIC FLOWMETER DOPPLER OR TRANSIT TIME



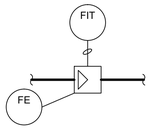

SONIC FLOWMETER CLAMP ON TYPE



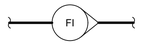

SINGLE PORT PITOT TUBE OR PITOT-VENTURI TUBE



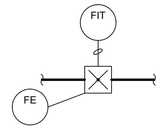

CORIOLIS FLOWMETER



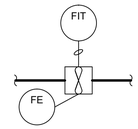

VORTEX FLOW METER



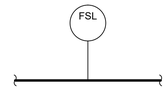

VARIABLE AREA FLOW INDICATOR (ROTAMETER)



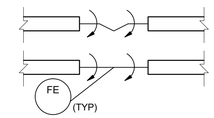

PADDLE WHEEL FLOW METER




TURBINE OR PROPELLER TYPE FLOW METER

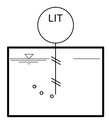



FLOW DETECTION SWITCH THERMAL TYPE

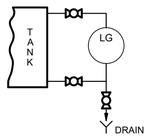



WEIR

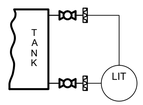
## LEVEL INSTRUMENTS



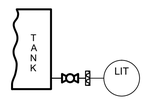

LEVEL TRANSMITTER BUBBLER TYPE



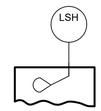

GAUGE GLASS (EXTERNALLY CONNECTED)




LEVEL TRANSMITTER, SEALED DIFFERENTIAL PRESSURE TYPE (MOUNTED ON TANK)

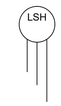



LEVEL TRANSMITTER PRESSURE ACTUATED

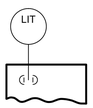



LEVEL DETECTION SWITCH FLOAT ACTUATED TYPE

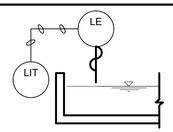
LEVEL DETECTION SWITCH VIBRATING FORK TYPE



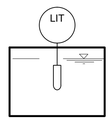

LEVEL DETECTION SWITCH CONDUCTANCE TYPE



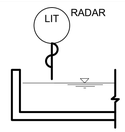

LEVEL TRANSMITTER CAPACITANCE OR DIELECTRIC OR RF ADMITTANCE TYPE



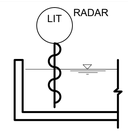

LEVEL TRANSMITTER NON-CONTACTING ULTRASONIC TYPE REMOTE MOUNTED



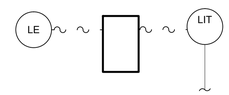

LEVEL TRANSMITTER HYDROSTATIC TYPE



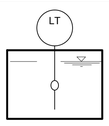

LEVEL TRANSMITTER NON-CONTACTING RADAR TYPE




LEVEL TRANSMITTER GUIDED WAVE RADAR TYPE

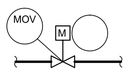



LEVEL TRANSMITTER RADIOACTIVE OR SONIC TYPE WITH INTEGRAL SENSOR

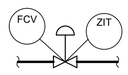



LEVEL TRANSMITTER MAGNETOSTRICTIVE

## POSITION INSTRUMENTS

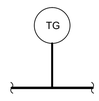



LIMIT SWITCH ON MOTORIZED VALVE INDICATING CLOSED POSITION

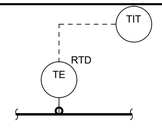



VALVE POSITION TRANSMITTER ON PNEUMATIC ACTUATED VALVE

## TEMPERATURE INSTRUMENTS

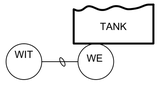



BIMETALLIC TYPE THERMOMETER, GLASS THERMOMETER, OR OTHER LOCAL UNCLASSIFIED TEMPERATURE INDICATOR

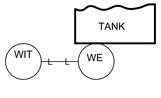



THERMOCOUPLE, RESISTANCE BULB (RTD) OR THERMISTOR (TH) TEMPERATURE TRANSMITTER WITH THERMOWELL

## WEIGHT INSTRUMENTS

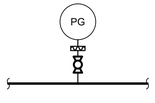



STRAIN GAUGE CONNECTED TO SEPARATE WEIGHT TRANSMITTER (TAG STRAIN GAUGE WE)

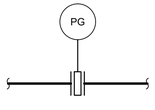



HYDRAULIC ACTUATED WEIGHT TRANSMITTER

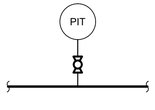
## PRESSURE OR VACUUM INSTRUMENTS



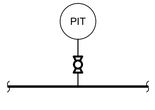

PRESSURE GAUGE WITH DIAPHRAGM SEAL




PRESSURE GAUGE WITH LIQUID FILLED ANNULAR SEAL SYSTEM

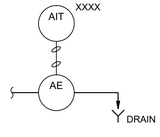



PRESSURE INDICATING TRANSMITTER




PRESSURE INDICATOR DIRECT - CONNECTED

## ANALYTICAL INSTRUMENTS




FLOW THROUGH ANALYZING ELEMENT WITH REMOTE TRANSMITTER

| | |
|---|---|
| ALK | ALKALINITY |
| $CL_2$ | CHLORINE CONCENTRATION |
| COMB | COMBUSTIBLE GAS |
| COND | CONDUCTIVITY |
| COD | CHEMICAL OXYGEN DEMAND |
| DO | DISSOLVED OXYGEN |
| HC | HYDROCARBON |
| $H_2O_2$ | HYDROGEN PEROXIDE |
| $H_2S$ | HYDROGEN SULFIDE |
| LEL | LOWER EXPLOSIVE LIMIT |
| $NO_3$ / $NO_2$ | NITRATE / NITRITE |
| $NH_3$ / $NH_4$ | AMMONIA / AMMONIUM |
| $O_2$ | OXYGEN CONCENTRATION |
| $O_3$ | OZONE |
| ORP | OXIDATION - REDUCTION POTENTIAL |
| PC | PARTICLE COUNTER |
| pH | HYDROGEN ION CONCENTRATION |
| SCU | STREAMING CURRENT UNIT |
| SO | SULFUR DIOXIDE |
| $TH^2$ | TOTAL HARDNESS |
| TKN | TOTAL KJELDAHL NITROGEN |
| TN | TOTAL NITROGEN |
| TOC | TOTAL ORGANIC CARBON |
| TURB | TURBIDITY |
| TSS | TOTAL SUSPENDED SOLIDS |
| UVI | ULTRA VIOLET INTENSITY |
| UVT | ULTRA VIOLET TRANSMITTANCE |

NOTE : IN THE CASE WHERE MULTIPLE SENSORS ARE TIED TO A SINGLE TRANSMITTER OR IN THE CASE OF GAS DETECTION, THE ANALYTIC CALLOUT WILL BE ASSIGNED TO THE SENSOR.

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Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

SYMBOLS AND NOMENCLATURE II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE
SHEET NO. 103 OF 145
DWG. NO. 000-I-02
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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## VALVES

| | |
|---|---|
| 3WV | 3 WAY MULTI-PORT VALVE |
| 4WV | 4 WAY MULTI-PORT VALVE |
| VRV | AIR VACUUM, AIR RELEASE, OR COMBINATION AIR VACUUM AND AIR RELEASE ASSEMBLY |
| AV | ANGLE VALVE |
| BPV | BACK-PRESSURE VALVE |
| BFPV | BACKFLOW PREVENTER VALVE |
| BV | BALL VALVE |
| BU | BUTTERFLY VALVE |
| CK | CHECK VALVE |
| CNV | CONE VALVE |
| DV | DIAPHRAGM VALVE |
| FCV | FLOW CONTROL VALVE |
| FLV | FLOAT VALVE |
| FS | FLOW SWITCH |
| FV | FLAP VALVE |
| GV | GATE VALVE |
| GLV | GLOBE VALVE |
| HBV | HOSE BIBB VALVE |
| NV | NEEDLE VALVE |
| PIV | PINCH VALVE |
| PV | PLUG VALVE |
| PCV | PRESSURE REGULATING VALVE |
| PRV | PRESSURE RELIEF VALVE |
| SLV | SLEEVE VALVE |
| TV | TELESCOPING VALVE |

## VALVE AND GATE ACTUATORS

| | |
|---|---|
| | DIAPHRAGM ACTUATOR |
| | E/H = ELECTROHYDRAULIC<br>P = PNEUMATIC<br>S = SOLENOID |
| | MOTOR ACTUATOR |
| | MOTOR ACTUATOR WITH HAND CONTROL |
| | PISTON ACTUATOR |
| | WEIGHT BALANCED ACTUATOR |

## GATES

| | |
|---|---|
| SG | SLIDE GATE OR SLUICE GATE |
| WG | WEIR GATE |

## HVAC

| |
|---|
| AIR CONDITIONING UNIT |
| DUCT AIR FILTER |
| AIR HANDLING UNIT |
| NON-MOTORIZED DAMPER |
| MOTORIZED DAMPER |
| DEHUMIDIFIER |
| DUCT SMOKE DETECTOR |
| EVAPORATIVE COOLER |
| HEATER |
| HVAC BOILER |
| HVAC FAN |
| VENT FAN |
| HVAC LOUVER |
| THERMOSTAT |
| STEAM GENERATOR |
| UNIT HEATER |
| WATER HEATER |
| AFTER COOLER |
| SUPPLY / EXHAUST FAN |
| ROLLER FILTER |

## PUMPS & COMPRESSORS

| |
|---|
| HORIZONTAL CENTRIFUGAL PUMP |
| GENERIC PUMP |
| CHEMICAL METERING PUMP |
| DRUM PUMP |
| ROTARY GEAR PUMP |
| SPLIT-CASE PUMP |
| HOSE / PERISTALTIC PUMP |
| ROTARY LOBE PUMP |
| SUBMERSIBLE SUMP PUMP |
| VERTICAL TURBINE PUMP |
| VERTICAL CENTRIFUGAL PUMP |
| VERTICAL SUMP PUMP |
| RECIPROCATING COMPRESSOR |
| ROTARY SCREW COMPRESSOR |

## PIPING ACCESSORIES

| |
|---|
| ANNULAR SEAL |
| ATMOSPHERIC VENT |
| BLIND FLANGE |
| CAP - BREATHER |
| CAP - SCREW / THREADED |
| CAP - WELDED |
| CAP - QUICK DISCONNECT |
| CHLORINE INJECTOR OR CHEMICAL EDUCTOR |
| DIAPHRAGM SEAL |
| DRAIN |
| EXPANSION CHAMBER WITH RUPTURE DISK |
| EDUCTOR |
| FLANGED |
| FLEXIBLE CONNECTION - BELLOWS TYPE |
| FLAME ARRESTOR |
| FLOOR CLEANOUT |
| FILTER |
| HUB DRAIN |
| HYDROCYCLONIC SEPARATOR |
| INLINE MIXER |
| PIPE MATERIAL CHANGE |
| PULSATION DAMPENER |
| REDUCER - CONCENTRIC |
| REDUCER - ECCENTRIC |
| REMOVABLE SPOOL PIECE |
| UNION |
| RUPTURE DISK |
| STRAINER - BASKET TYPE |
| STRAINER - DUPLEX BASKET TYPE |
| STRAINER - WYE TYPE |
| SLOPE |
| TRAP |
| WALL CLEANOUT |
| TIE-IN POINT |

## BLOWERS

| |
|---|
| CENTRIFUGAL BLOWER |
| POSITIVE DISPLACEMENT BLOWER |

## MISCELLANEOUS

| |
|---|
| BRIDGE CRANE |
| CALIBRATION COLUMN |
| CONTAINER SCALE |
| CARTRIDGE FILTER |
| DEMISTOR |
| FIRE HYDRANT |
| GAS BOTTLE |
| HEAT EXCHANGER - PLATE TYPE |
| HEAT EXCHANGER - STRAIGHT TYPE |
| HEAT EXCHANGER - U TUBE |
| HEATER |
| HORN |
| PANEL-MOUNTED HORN |
| BEACON |
| MISCELLANEOUS EQUIPMENT |
| MIXER |
| MOTOR SYMBOL |
| HORIZONTAL PRESSURE VESSEL |
| VERTICAL PRESSURE VESSEL |
| RADIO ANTENNA |
| REFRIGERATOR DRYER |
| SAMPLE COOLER |
| AUTO-BACKWASHING STRAINER |
| TANK WITH CONE SHAPED ROOF |
| TANK WITH DOME ROOF |
| TANK WITH FLOATING COVER |
| TANK, VESSEL, OR BIN |
| TEMPERING TANK |
| TOTE TANK |
| WATER LEVEL |
| GENERATOR |

## MISCELLANEOUS

| |
|---|
| DIESEL ENGINE |
| BAR SCREEN |
| FINE SCREEN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

SYMBOLS AND NOMENCLATURE III

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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SHEET NO: 104 OF 145
DWG. NO. 000-I-03

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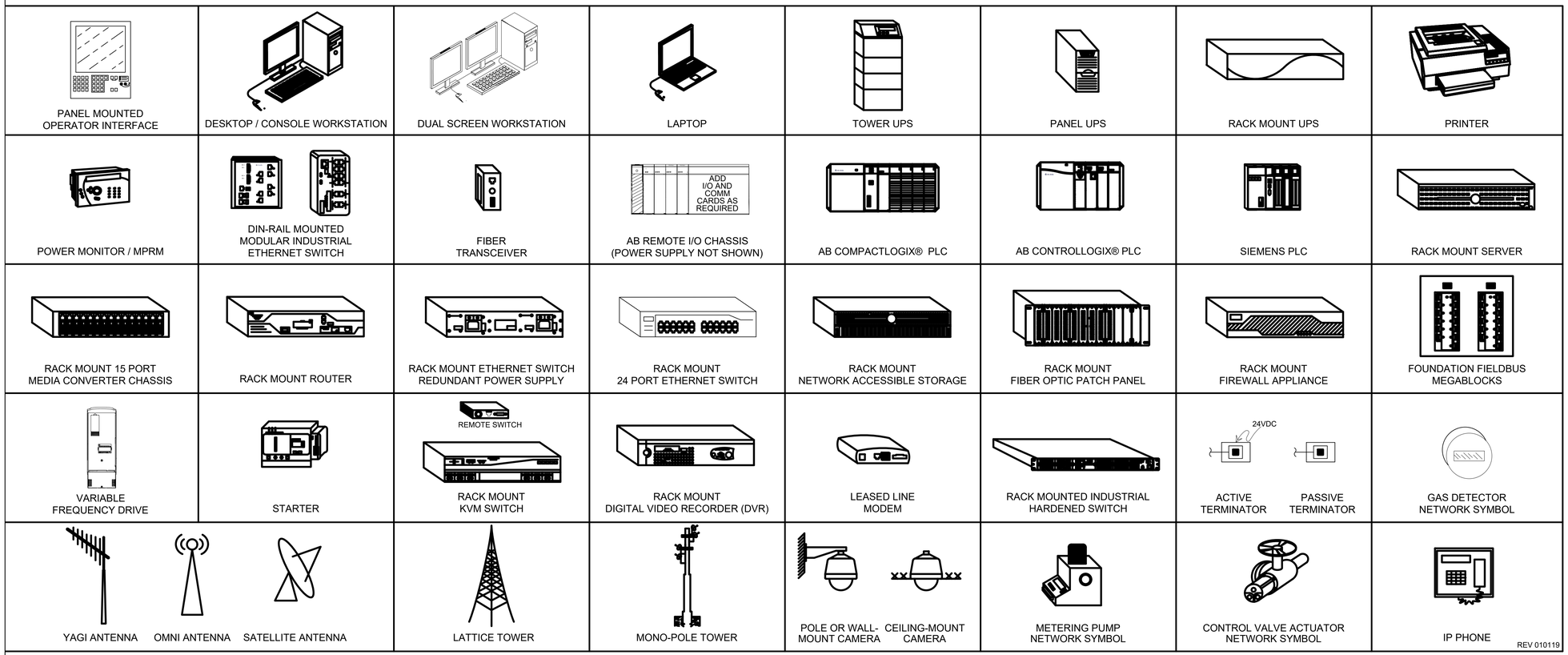
# NETWORK AND CONTROL COMPONENTS SYMBOL LIBRARY

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

SYMBOLS AND NOMENCLATURE IV

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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DWG. NO. 000-I-04

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## PROCESS ABBREVIATIONS

| | |
|---|---|
| AERATION | A |
| ALUMINUM SULFATE (LIQUID ALUM) | ALS |
| AMMONIUM HYDROXIDE (AQUEOUS AMMONIA) | AMH |
| AUTOMATIC SPRINKLER RISER | ASR |
| BLEND | B |
| BALLASTED FLOCCULATION POLYMER | BFP |
| BALLASTED FLOCCULATION SOLIDS | BFS |
| BLENDED PRODUCT | BP |
| CONDENSATE | C |
| CALCIUM HYDROXIDE (HYDRATED LIME) | CAH |
| CALCIUM OXIDE (QUICK LIME) | CAO |
| CHANNEL AGITATION WATER | CAW |
| MEMBRANE CLEANING CONCENTRATE RETURN | CCR |
| CHEMICAL DRAIN | CD |
| CONDENSER WATER RETURN | CDR |
| CONDENSER WATER SUPPLY | CDS |
| CHILLED WATER RETURN | CHR |
| CHILLED WATER SUPPLY | CHS |
| CORROSION INHIBITOR | CI |
| CHLORINE (GAS OR LIQUID) | CL |
| CHLORINE SOLUTION | CLS |
| CHLORINE GAS UNDER VACUUM | CLV |
| CENTRATE | CN |
| CONDENSATE DRAIN | CND |
| CHEMICAL CONTAINMENT | CP |
| MEMBRANE CLEANING PERMEATE RETURN | CPR |
| CIRCULATED SLUDGE | CSL |
| CITRIC ACID | CTA |
| CALCIUM THIOSULFATE | CTH |
| CHLORINATOR VENT AND DETECTION | CV |
| CHEMICAL DRAIN VENT | CVT |
| COAGULATED WATER | CW |
| COOLING WATER RETURN | CWR |
| COOLING WATER SUPPLY | CWS |
| DEFOAMING CHEMICAL | DC |
| DOMESTIC COLD WATER | DCW |
| DIESEL FUEL OIL | DFO |
| DEMINERALIZED WATER | DMW |
| DECANT | DN |
| DRAIN | DR |
| DIGESTED SLUDGE | DSL |
| DOMESTIC HOT WATER RETURN | DWR |
| DOMESTIC HOT WATER SUPPLY | DWS |
| ENGINE EXHAUST | EE |
| ENGINE COOLING WATER RETURN | EWR |
| ENGINE COOLING WATER SUPPLY | EWS |
| FOUL AIR | FA |
| FILTER AIR WASH | FAW |
| FILTER BACKWASH | FBW |
| FINAL EFFLUENT | FE |
| FERRIC CHLORIDE | FEC |
| FERRIC SULFATE | FES |
| FILTER INFLUENT | FI |
| FILTERED WATER | FLW |
| FORCE MAIN | FM |
| FUEL OIL RETURN | FOR |
| FUEL OIL SUPPLY | FOS |
| FIRE PROTECTION | FP |
| FROTH | FR |
| FROTH SPRAY | FS |
| FILTER SURFACE WASHWATER | FSW |
| FILTER TO WASTE | FTW |
| FINISHED WATER | FW |
| FILTER WASTE WASHWATER | FWW |
| GRIT | G |
| GRANULAR ACTIVATED CARBON | GAC |
| GASEOUS OXYGEN | GOX |
| HYDROCHLORIC ACID | HCA |
| HYDROGEN PEROXIDE | HDP |
| HYDROFLUOSILICIC ACID | HFA |
| HEATING WATER RETURN | HWR |
| HEATING WATER SUPPLY | HWS |
| INSTRUMENT AIR | IA |
| INTERMEDIATE EFFLUENT | IE |
| LANDFILL GAS | LFG |
| LUBE OIL | LO |
| LIQUID OXYGEN | LOX |
| LIQUEFIED PETROLEUM GAS | LPG |
| LIME SLURRY | LS |
| LANDSCAPING SPRINKLER SYSTEM | LSP |
| MEMBRANE CONCENTRATE | MC |
| MEMBRANE CLEANING RETURN | MCR |
| MEMBRANE CLEANING SUPPLY | MCS |
| MEMBRANE CLEANING WASTE | MCW |
| MECHANICAL DEWATERING POLYMER | MDP |
| MEMBRANE FEED | MF |
| METHANE GAS | MG |
| MIXED LIQUOR | ML |
| MIXED LIQUOR RECYCLE | MLR |
| MEMBRANE PERMEATE | MP |
| MURIATIC ACID | MRA |
| NATURAL GAS | NG |
| NON-LEADED GASOLINE | NLG |
| OVERFLOW | OF |
| OFFGAS | OG |
| OXIDATION TOWER EFFLUENT | OTE |
| OZONE | OZG |
| OZONATED WATER | OZW |
| PLANT AIR | PA |
| POWDERED ACTIVATED CARBON | PAC |
| POLYALUMINUM CHLORIDE | PACL |
| PLANT DRAIN | PDR |
| PRIMARY EFFLUENT | PE |
| PLANT INFLUENT | PI |
| PLANT EFFLUENT | PLE |
| PLANT OVERFLOW | PO |
| ANIONIC POLYMER | POA |
| CATIONIC POLYMER | POC |
| FILTER AID POLYMER | POF |
| NONIONIC POLYMER | PON |
| THICKENER POLYMER | POT |
| PRESSURIZED RECYCLE | PRR |
| PRESSATE | PRS |
| POTASSIUM PERMANGANATE | PTP |
| POTABLE WATER | PW |
| RETURN ACTIVATED SLUDGE | RAS |
| RECLAIMED WATER | REW |
| REFRIGERANT LIQUID | RFL |
| REFRIGERANT SUCTION | RFS |
| REFRIGERANT SUCTION | RSL |
| RETURN SECONDARY SLUDGE | RSS |
| RAW WATER | RW |
| RAINWATER LEADER | RWL |
| RAINWATER LEADER OVERFLOW | RWO |
| SCUM | S |
| SAMPLE | SAM |
| SUBNATANT | SBN |
| SUBNATANT OVERFLOW | SBO |
| SCAVENGER SYSTEM DISCHARGE | SCV |
| SANITARY DRAIN | SD |
| SODIUM BISULFITE | SDB |
| SODIUM HYDROXIDE (CAUSTIC SODA) | SDH |
| STORM DRAIN | SDR |
| SANITARY DRAIN VENT | SDV |

## PROCESS ABBREVIATIONS

| | |
|---|---|
| SECONDARY EFFLUENT | SE |
| SLUDGE FILTRATE | SF |
| SULFURIC ACID | SFA |
| SLUDGE GAS | SG |
| SODIUM HYPOCHLORITE | SHC |
| SCALE INHIBITOR | SI |
| SLUDGE | SL |
| SUPERNATANT | SN |
| SAND SLURRY | SND |
| SULFUR DIOXIDE (GAS OR LIQUID) | SO |
| SULFUR DIOXIDE SOLUTION | SOS |
| SULFUR DIOXIDE GAS UNDER VACUUM | SOV |
| SPARE CHEMICAL | SP |
| SUMP PUMP DISCHARGE | SPD |
| SANITARY SEWER | SS |
| SODIUM SILICOFLUORIDE | SSF |
| STEAM | STM |
| STRUCTURE UNDERDRAIN | SU |
| STRUCTURE UNDERDRAIN COLLECTOR | SUC |
| SETTLED WATER | SW |
| SCRUBBER WATER RETURN | SWR |
| TRICKLING FILTER EFFLUENT | TFE |
| TRICKLING FILTER INFLUENT | TFI |
| TRICKLING FILTER RECYCLE | TFR |
| THICKENED SLUDGE | TSL |
| TREATED WATER | TW |
| UNDERDRAIN | UD |
| UTILITY WATER (NON-POTABLE WATER) | UW |
| VACUUM | V |
| VENT | VT |
| WASTE ACTIVATED SLUDGE | WAS |
| WASTE LUBE OIL | WLO |
| WASTE SECONDARY SLUDGE | WSS |
| WASH WATER | WW |

## EQUIPMENT ABBREVIATIONS

| | |
|---|---|
| AIR HANDLING UNIT | AHU |
| AIR RELEASE VALVE | ARV |
| BACK FLOW PREVENTER | BFP |
| BACK PRESSURE SUSTAINING VALVE | BPV |
| BAR SCREEN | BS |
| BEACON | BCN |
| BLENDING UNIT | BLU |
| BLOWER | BL |
| BULK STORAGE TANK | BTK |
| CARTRIDGE FILTER | CF |
| CHECK VALVE | CV |
| CLEAN IN PLACE | CIP |
| CONVEYOR | CN |
| DAY TANK | DTK |
| DEGASIFIER | DG |
| EXHAUST FAN | EF |
| FILTER (GENERAL) | F |
| HEATER | HTR |
| HIGH SERVICE PUMP | HSP |
| LOUVER | LOU |
| MECHANICAL EQUIPMENT (GENERAL) | ME |
| MIXER | MX |
| MOTOR OPERATOR VALVE | MOV |
| PNEUMATIC OPERATOR VALVE | POV |
| PRESSURE REDUCING VALVE | PRV |
| PRESSURE SAFETY VALVE | PSV |
| PUMP (GENERAL) | PU |
| RUPTURE DISK | RD |
| SAMPLE PUMP | SP |
| SAND SEPARATOR | SS |
| SLIDE GATE | SG |
| SOLENOID OPERATOR VALVE | SOV |
| SUBMERSIBLE PUMP | SU |
| TANK | TK |
| TRANSFER PUMP | TP |
| VALVE (MANUAL) | V |

## AREA NUMBERING

- GENERAL SHEETS:
  - GENERAL SYMBOLS AND NOMENCLATURE SHEETS 000-I-01 THRU 000-I-05
  - CONTROL / COMMUNICATION NETWORK LAYOUT SHEET 001-I-01
  - CONTROL PANEL DETAILS AND ELEVATIONS SHEET TBD
  - INSTRUMENT INSTALLATION DETAILS SHEET TBD
  - SAMPLE WIRING DIAGRAMS SHEET TBD
- WFP AREA NUMBERING:
  - AREA 030: GENERATOR AREA

## PIPE

| | |
|---|---|
| REINFORCED CONCRETE | RC |
| CAST IRON | CI |
| DUCTILE IRON | DI |
| VITRIFIED CLAY | VC |
| POLYVINYL CHLORIDE | PVC |
| CHLORINATED POLYVINYL CHLORIDE | CPVC |
| POLYETHYLENE | PE |
| COPPER | CU |
| STAINLESS STEEL | SS |
| PERFLUOROALKOXY | PFA |
| POLYPROPYLENE | PP |

## VALVE ABBREVIATIONS

| | |
|---|---|
| GATE VALVE | GV |
| BALL VALVE | BV |
| BUTTERFLY VALVE | BU |
| CHECK VALVE | CK |
| DIAPHRAGM VALVE | DI |
| GLOBE VALVE | GL |
| NEEDLE VALVE | NE |
| PLUG VALVE | PV |
| FLOAT VALVE | FV |

## CONTROL EQUIPMENT ABBREVIATIONS

| | |
|---|---|
| ATMOSPHERE | ATM |
| AUTO TRANSFER CONTROLLER | ATC |
| CONTACT TIME | CT |
| CONTROL PANEL | CP |
| DISTRIBUTED CONTROL SYSTEM | DCS |
| DIRECT ONLINE STARTER | DOL |
| EMERGENCY SHUTDOWN | ES |
| FAIL CLOSED | FC |
| FIBER OPTIC CABLE | FOC |
| FIBER OPTIC PATCH PANEL | FOPP |
| FIBER OPTIC TRANSCEIVER | FOT |
| FULL VOLTAGE NON-REVERSING STARTER | FVNR |
| HAND OFF AUTO | HOA |
| HAND OFF AUTO REMOTE | HOAR |
| HUMAN MACHINE INTERFACE | HMI |
| LOCKED CLOSED | LC |
| LOCAL CONTROL PANEL | LCP |
| LOCAL CONTROL STATION | LCS |
| LOCKED OPEN | LO |
| LIGHTNING SURGE ARRESTOR | LSA |
| MOTOR CONTROL CENTER | MCC |
| MAIN CONTROL PANEL | MCP |
| MULTIMODE FIBER | MMF |
| MOTOR STARTER | MS |
| MOTOR | MTR |
| NOT APPLICABLE | N/A |
| NORMALLY CLOSED | NC |
| NOT IN CONTRACT | NIC |
| NORMALLY OPEN | NO |
| OPEN CLOSE AUTO | OCA |
| OPERATOR INTERFACE | OI |
| OPERATOR INTERFACE TERMINAL | OIT |
| PERSONAL COMPUTER | PC |
| PROGRAMMABLE LOGIC CONTROLLER | PLC |
| PLANT CONTROL NETWORK | PCN |
| POWER DISTRIBUTION UNIT | PDU |
| REMOTE I/O | RIO |
| REDUCED VOLTAGE SOLID-STATE STARTER | RVSS |
| REMOTE TERMINAL UNIT | RTU |
| START/STOP | S/S |
| SINGLE MODE FIBER | SMF |
| SOLID STATE METER | SSM |
| SHIELDED TWISTED PAIR | STP |
| THERMOCOUPLE | TC |
| UNINTERRUPTABLE POWER SUPPLY | UPS |
| UNSHIELDED TWISTED PAIR | UTP |
| VENDOR CONTROL PANEL | VCP |
| VARIABLE FREQUENCY DRIVE | VFD |
| VARIABLE SPEED DRIVE | VSD |

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| C | 09/29/2023 | 60% DESIGN | CL | SK | GN |
| B | 07/26/2023 | 30% DESIGN | ZC | SK | GN |
| A | 06/06/2023 | 15% DESIGN | ZC | SK | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

SYMBOLS AND NOMENCLATURE V

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 106 OF 145
DWG. NO. 000-I-05

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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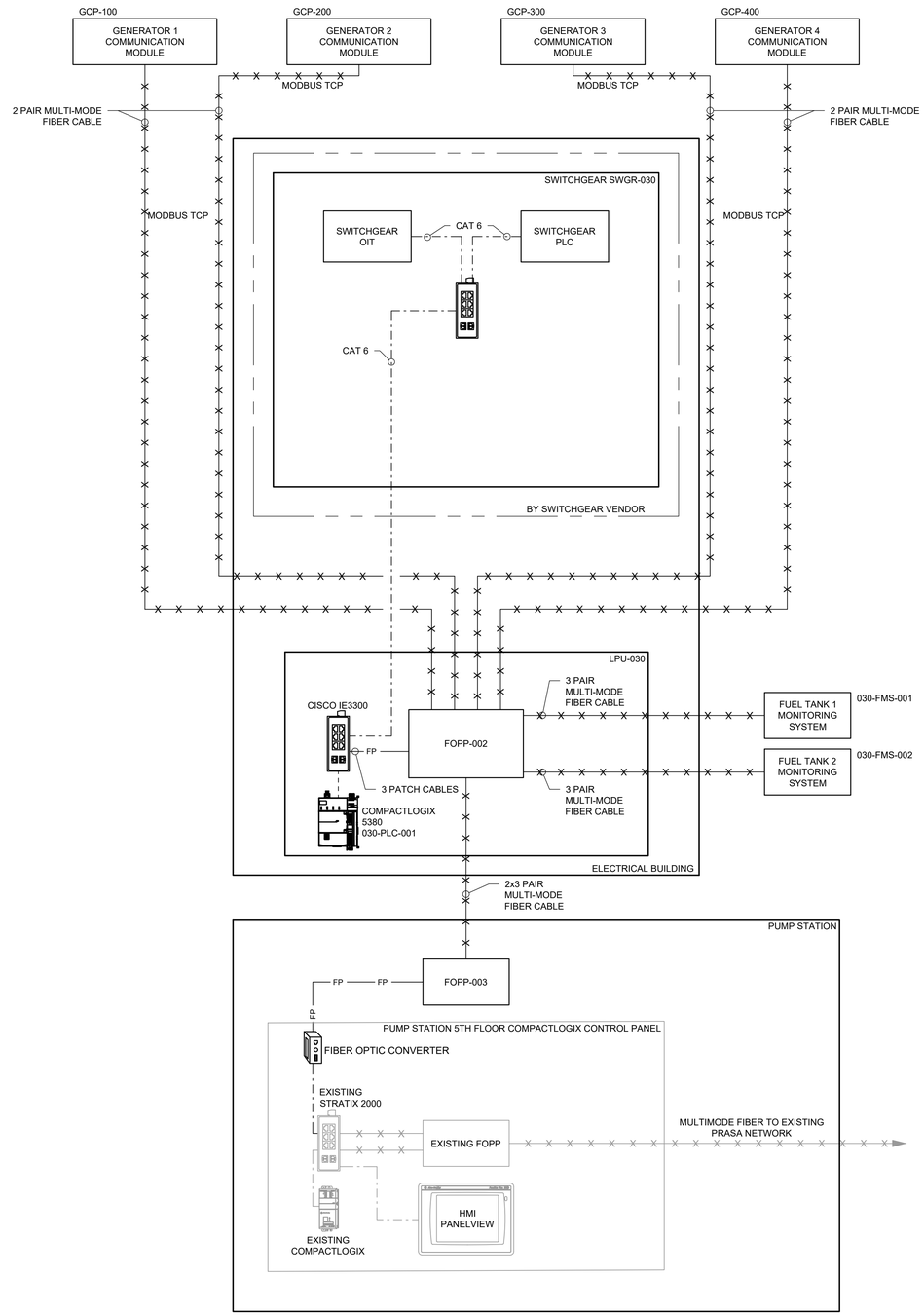
## GENERAL SHEET NOTES

1. THE NETWORK ARCHITECTURE DRAWING SHOWS THE GENERAL ARRANGEMENT OF THE NETWORK, NETWORK CONNECTED HARDWARE, AND NETWORK CABLING. THE CONTRACTOR IS RESPONSIBLE FOR COMPLETING DETAILED NETWORK DESIGN AND INTEGRATION OF VENDOR SYSTEMS INTO THE PLANT NETWORK, INCLUDING BUT NOT LIMITED TO NETWORK PROTOCOLS, QUANTITIES, HARDWARE, AND CABLE ROUTING.
2. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER FOR THE REPLACEMENT OF THE STRATIX 2000 SWITCH.

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - CONTROL SYSTEM ARCHITECTURE

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE:
SHEET NO. 107 OF 145
DWG. NO. 001-I-01
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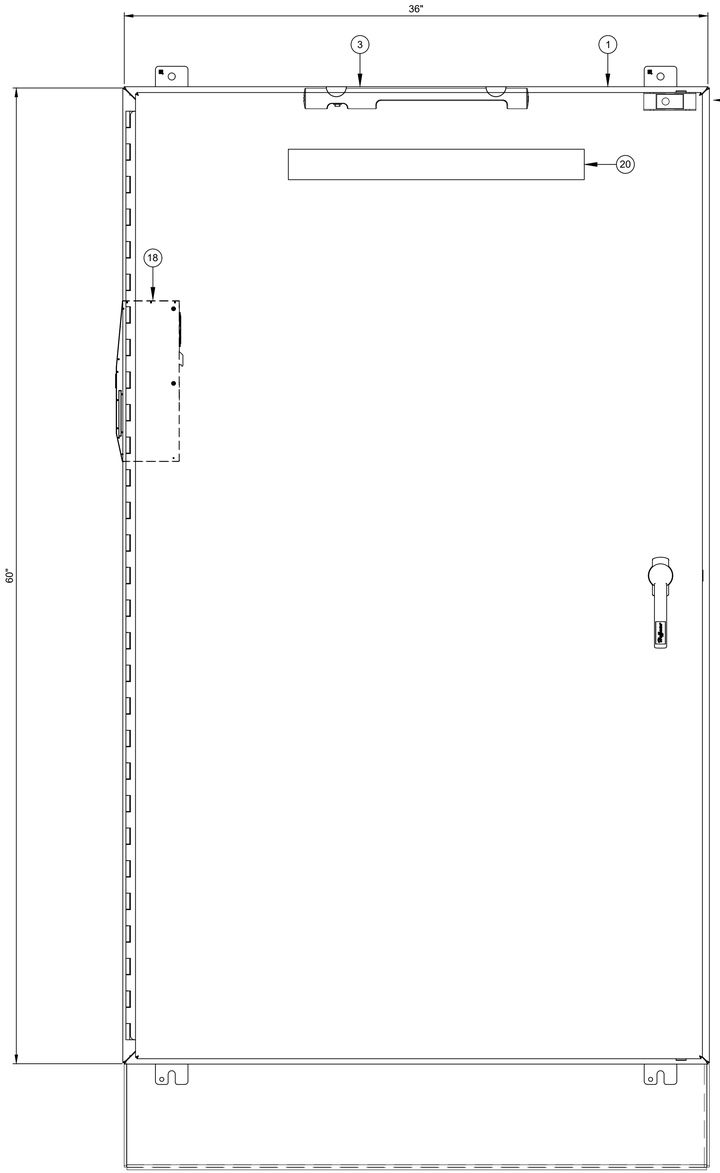


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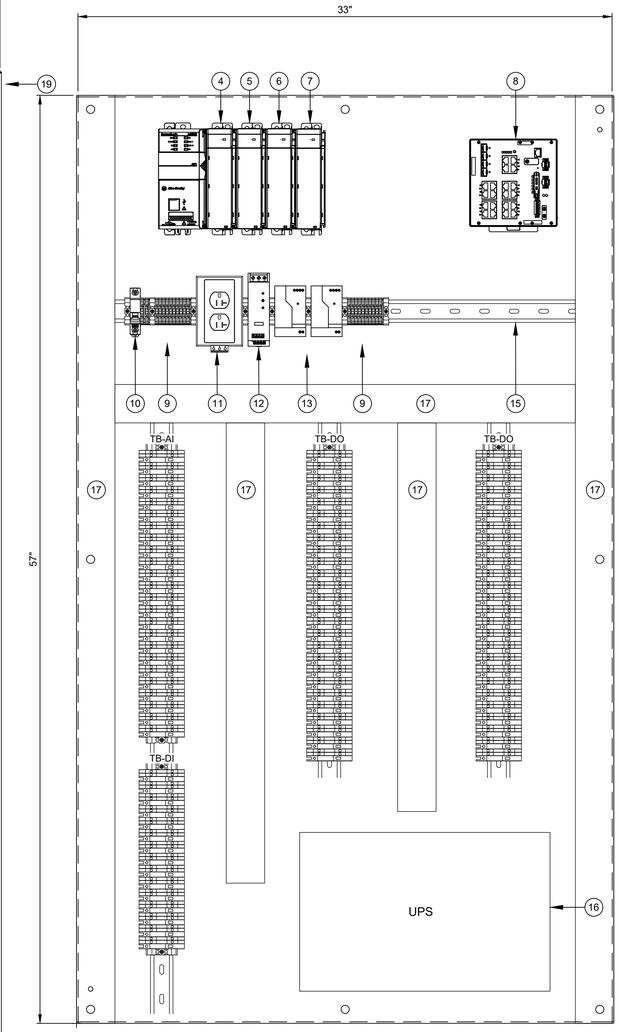


GENERAL ARRANGEMENT
SCALE : NTS

## GENERAL SHEET NOTES

1. THE BOTTOM 12" OF THE PANEL SHALL BE FREE OF ALL DEVICES, INCLUDING TERMINAL STRIPS, TO PROVIDE EASE OF INSTALLATION AND TESTING.
2. CONTRACTOR SHALL SUPPLY THE TYPE AND QUANTITY OF PLC MODULES AND ANCILLARY HARDWARE, AS REQUIRED, INCLUDING FUTURE SCADA GROWTH PROVISIONS AS SPECIFIED.
3. CONTRACTOR SHALL SUPPLY THE PLC CHASSIS QUANTITY AND SIZES TO ACCOMMODATE THE REQUIRED QUANTITY OF PLC MODULES, AS REQUIRED, INCLUDING FUTURE SCADA GROWTH PROVISIONS AS SPECIFIED.
4. PANEL SHALL BE IN ACCORDANCE WITH NEC ARTICLE 409/UL508A.
5. PROVIDED COMPONENTS SHALL BE AS SPECIFIED UNDER DIVISION 40 SPECIFICATIONS.
6. CONTRACTOR SHALL PROVIDE THE SCADA GROWTH PROVISIONS (FUTURE EXPANSION, INSTALLED SPARE I/O, AND SPARE SPACE ALLOCATION) AS DEFINED IN SPECIFICATION 40 95 10.
7. PROVIDE CIRCUIT BREAKER PROTECTED BRANCH CIRCUITS AS REQUIRED BY THE QUANTITY OF I/O MODULES PLUS FUTURE SCADA GROWTH PROVISIONS. PROVIDE FUSE AND BREAKER LEGEND PLATE MOUNTED ON INSIDE OF ENCLOSURE DOOR WITH FUSE/BREAKER ID OR NUMBER, CURRENT RATING, AND LOAD(S) SERVED.
8. THE PLC PANEL LAYOUT DRAWING SHOWS THE GENERAL ARRANGEMENT OF THE HARDWARE. THE CONTRACTOR IS RESPONSIBLE FOR THE DETAILED PANEL DESIGN, INCLUDING PANEL SIZING AND THE QUANTITY AND TYPE OF HARDWARE SHOWN IN THE BILL OF MATERIALS.
9. FOR ALL PANELS CONTAINING WIRING NOT DE-ENERGIZED BY THE PANEL MAIN DISCONNECTING MEANS OR CIRCUIT BREAKER, PROVIDE A WARNING NAMEPLATE ON THE FRONT OF THE PANEL STATING "WARNING: YELLOW WIRING NOT DE-ENERGIZED BY PANEL DISCONNECTING MEANS". THE NAMEPLATE SHALL BE YELLOW WITH BLACK 1/4" HIGH LETTER ENGRAVINGS AND SHALL BE ATTACHED TO THE PANEL FACE WITH TAPE 3M#5952.

## BILL OF MATERIAL

| ITEM | QTY. | DESCRIPTION |
|---|---|---|
| 1 | 1 | HOFFMAN NEMA 4X FREE STAND SINGLE DOOR ACCESS 60"X36"X18" ENCLOSURE<br>CAT. NO.: 603618SSFSN4 |
| 2 | 1 | HOFFMAN BACK PANEL, STEEL, 57"X36"<br>CAT. NO.: A60P36 |
| 3 | 1 | HOFFMAN ENCLOSURE, ACCESSORY, LIGHT, LED, 120VAC<br>CAT. NO.: LEDA1S35 |
| 4 | 1 | ALLEN BRADLEY COMPACT LOGIX 5380 CONTROLLER<br>CAT. NO.:5069-L306ER |
| 5 | 3 | ALLEN BRADLEY 16 INPUTS DIGITAL MODULE, 24VDC<br>CAT. NO.: 5069-IB16F |
| 6 | 1 | ALLEN BRADLEY 16 OUTPUTS DIGITAL MODULE, 24VDC<br>CAT. NO.: 5069-OB16F |
| 7 | 1 | ALLEN BRADLEY 8 INPUTS ANALOG MODULE, 24VDC<br>CAT. NO.: 5069-IF8 |
| 8 | 1 | CISCO ETHERNET SWITCH<br>CAT. NO.: IE3300 |
| 9 | AS REQ'D | FUSE BLOCKS, END BARRIER, END ANCHOR/RETAINER<br>CAT. NO.: |
| 10 | AS REQ'D | MAIN CIRCUIT BREAKER-1-POLE<br>CAT. NO.: |
| 11 | 1 | SIMPLEX RECEPTACLE<br>CAT. NO.: |
| 12 | 2 | 24VDC POWER SUPPLY<br>CAT. NO.: |
| 13 | 2 | 24VDC REDUNDANCY MODULE<br>CAT. NO.: |
| 14 | AS REQ'D | FUSED BLOCKS, END BARRIER, SNAP-IN MARKER CARDS, END ANCHOR/RETAINER<br>CAT. NO.: |
| 15 | AS REQ'D | STANDARD DIN RAIL MOUNTING CHANNEL<br>CAT. NO.: |
| 16 | 1 | HOFFMAN PANEL HEATER<br>CAT. NO.: DAH1001A |
| 17 | AS REQ'D | WIREWAY AND COVER<br>CAT. NO.: |
| 18 | 2 | SPECTRACOOL INDOOR AC G28, 6000BTU 115V, BRUSHED, SS304<br>CAT. NO.: |
| 19 | 2 | REMOTE DOOR SWITCH<br>CAT. NO.: ALFSWD |
| 20 | 1 | PHENOLIC TAG. BACK LETTERS ON WHITE BACKGROUND. TEXT SHALL BE: 7.5"<br>CAT. NO.: |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

PLC GENERAL ARRANGEMENT DRAWING

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE:

SHEET NO. 108 OF 145
DWG. NO. 001-I-02
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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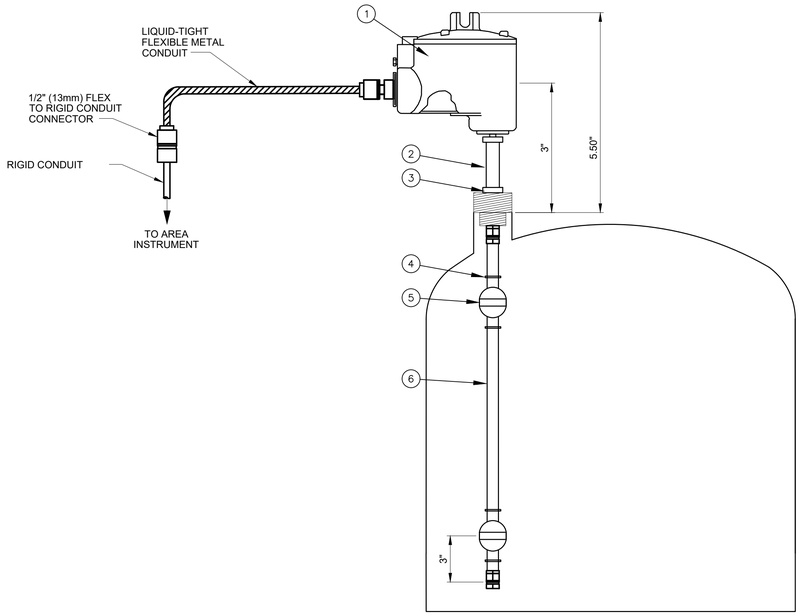


GENERAL NOTES:

1. POTENTIALLY WETTED MATERIALS SHALL BE CHEMICALLY INERT TO THE PROCESS.
2. REFER TO P&ID'S AND DATA SHEET FOR PROCESS PIPING AND MATERIAL.
3. REFER TO DIVISION 26 SPECIFICATIONS FOR FLEX AND RIGID CONDUIT MATERIAL AND USAGE LIMITATIONS.

GENERAL NOTES:

A. ENSURE POWER HAS BEEN SHUT OFF BEFORE EXPOSING TERMINATION BOARD BELOW DISPLAY.

| ITEM | QTY | DESCRIPTION | SUPPLY | MATERIAL/RATING (WATER) | MATERIAL/RATING (CHEMICAL) |
|---|---|---|---|---|---|
| 1 | 1 | FLOAT SWITCH HOUSING WITH 1/2" NPT CONDUIT FITTING NEMA 4 RATED. | MANF | 316SS | 316SS |
| 2 | 1 | NIPPLE | MANF | | |
| 3 | 1 | 2" 0R 1-1/2" NPT BUSHING | MANF | CAST IRON | CAST IRON |
| 4 | 4 | RETAINER CLIPS | MANF | 316SS | 316SS |
| 5 | 1 | 1.62"(MAX DIAMETER) FLOAT | MANF | BUNA-N | 316SS |
| 6 | 1 | SHAFT (SS MAX LENGTH - 192"; BRASS MAX LENGTH - 144") | MANF | BRASS | 316SS |

I-154 LIQUID LEVEL FLOAT SWITCH

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

INSTRUMENT INSTALLATION DETAILS I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: SK
SHEET NO. 109 OF 145
DWG. NO. 002-I-01
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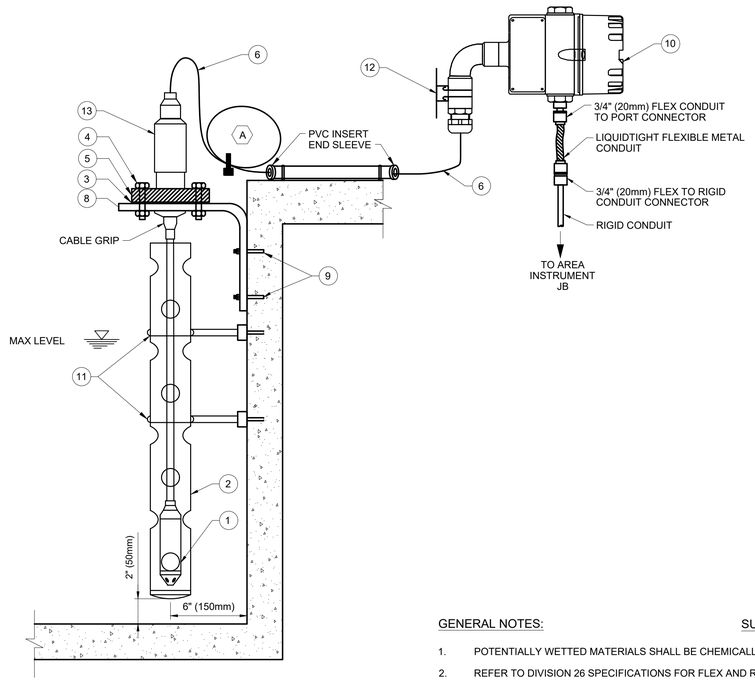
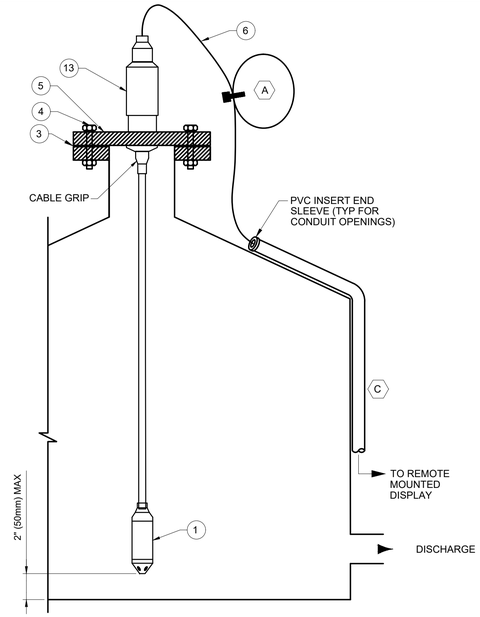



SUBMERSIBLE LEVEL SENSOR - BRACKET MOUNT



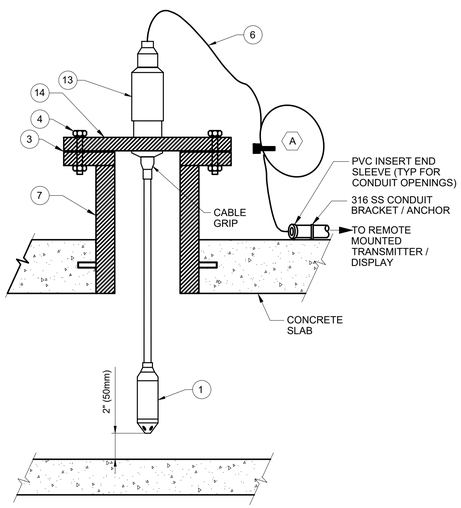

SUBMERSIBLE LEVEL SENSOR - TANK TOP MOUNT

GENERAL NOTES:

1. POTENTIALLY WETTED MATERIALS SHALL BE CHEMICALLY INERT TO THE PROCESS.
2. REFER TO DIVISION 26 SPECIFICATIONS FOR FLEX AND RIGID CONDUIT MATERIAL AND USAGE LIMITATIONS.
3. SENSOR CABLE SPLICE OF ANY KIND SHALL NOT BE ACCEPTABLE.
4. CONTRACTOR SHALL VERIFY SUITABILITY OF STILLING WELL PERFORATION DENSITY AND SIZING WITH LEVEL SENSOR MANUFACTURER PRIOR TO FINAL ENGINEER APPROVAL FOR INSTALLATION.
5. REFER TO TANK MECHANICAL DATA SHEETS OR DETAILS FOR TANK NOZZLE SIZE AND SPACING. INSTRUMENT INSTALLATION IN THE TANK MANWAY IS NOT PERMITTED.
6. USE PVC COATED SS TIE-WRAPS TO NEATLY COIL AND SECURE ANY EXCESS SENSOR CABLING AS SHOWN.

KEYNOTES:

A. MAINTENANCE LOOP SHALL INCLUDE 3FT (1 M) LENGTH OF CABLE SECURED WITH PVC-COATED SS TIE WRAPS, BEND RADIUS NO LESS THAN 8" (200mm).
B. PROVIDE MOUNTING BRACKET SUPPORT FOR EVERY 3FT (1M) OF PIPE LENGTH.
C. SECURE CONDUIT TO TANK SIDE USING PROJECT APPROVED MEANS PER TANK TYPE.
D. MANUFACTURER FURNISHED ANGLE BRACKET (WITH MOUNTING HARDWARE) SHALL BE SIZED AND TAPPED TO SUPPORT WALL-MOUNT INSTALLATION. REFER TO INSTRUMENT SELECTION OR DATA SHEET FOR MEASURING DEPTH REQUIREMENT.



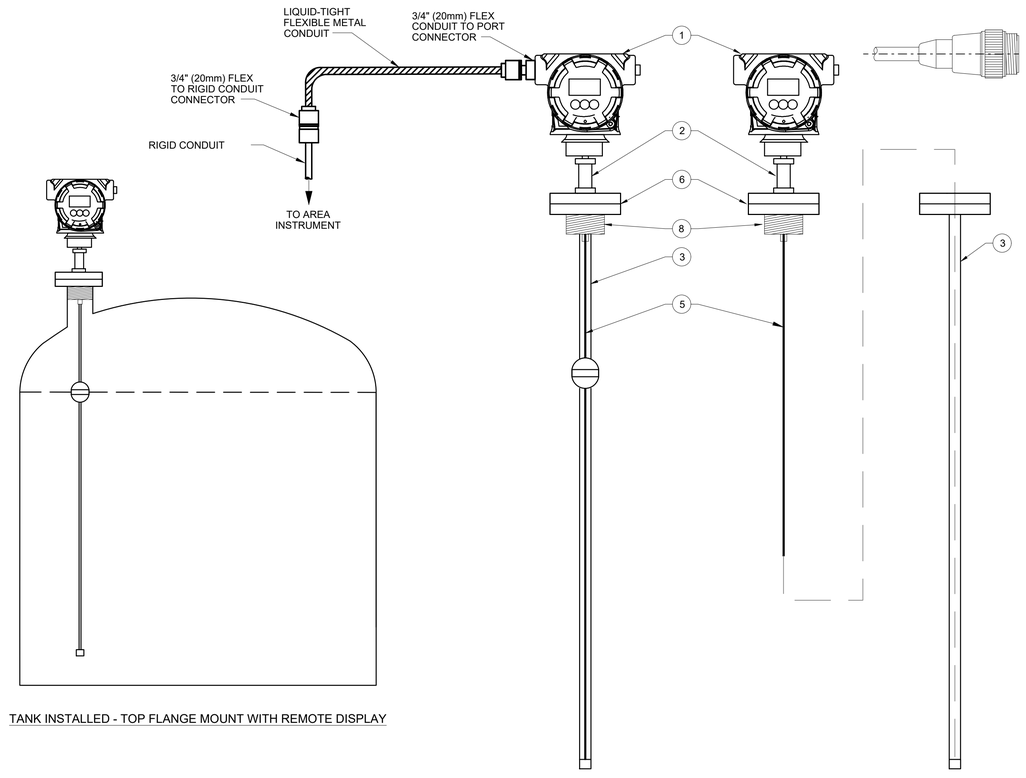

SUBMERSIBLE LEVEL SENSOR - SLAB MOUNT

BILL OF MATERIALS

| ITEM | QTY | DESCRIPTION | SUPPLY | MATERIAL/RATING (WATER) | MATERIAL/RATING (CHEMICAL) |
|---|---|---|---|---|---|
| 1 | 1 | SUBMERSIBLE PRESSURE SENSOR | MANF | PER VENDOR | N/A |
| 2 | 1 | PERFORATED 2"(DN50) SCH 80 PVC PIPE STILLING WELL | CONT | PVC | PVC |
| 3 | 1 | GASKET | CONT | VITON | VITON |
| 4 | AR | FLANGED BOLTS | MANF | 304 SS | 316 SS |
| 5 | 1 | 4" (DN100) DIA FLANGE PLATE (TAPPED FOR INSTRUMENT FITTING) | MANF | 304 SS | 316 SS OR PVC |
| 6 | AR | INTEGRAL UV-RESISTANT SENSOR SIGNAL CABLE | MANF | PER VENDOR | PER VENDOR |
| 7 | 1 | 6" (150mm) DIA SCH 80 FLANGED PIPE SLEEVE WITH SEEP RING | CONT | 304 SS | 316 SS OR PVC |
| 8 | 1 | WALL-MOUNT ANGLE BRACKET TAPPED FOR PROBE FITTING (D) | MANF | 316 SS | 316 SS |
| 9 | AR | ANCHOR BOLTS AND MOUNTING HARDWARE | MANF | 316 SS | 316 SS |
| 10 | 1 | LEVEL TRANSMITTER / DISPLAY | MANF | EPOXY COATED ALUMINUM | EPOXY COATED ALUMINUM |
| 11 | AR | U-BOLTS AND MOUNTING BRACKET HARDWARE (B) | CONT | 316 SS | 316 SS |
| 12 | AR | P1000 (1 5/8") (40mm) UNISTRUT AND MOUNTING STRAP | CONT | 304 SS | 304 SS |
| 13 | 1 | HOUSING ADAPTER | MANF | 316 SS | 316 SS |
| 14 | 1 | 6" (DN150) DIA FLANGE PLATE (TAPPED FOR INSTRUMENT FITTING) | MANF | 316 SS | 316 SS OR PVC |

## I-204 SUBMERSIBLE (HYDROSTATIC) LEVEL SENSOR

REV 010119




TANK INSTALLED - TOP FLANGE MOUNT WITH REMOTE DISPLAY

GENERAL NOTES:

1. POTENTIALLY WETTED MATERIALS SHALL BE CHEMICALLY INERT TO THE PROCESS.
2. REFER TO P&IDS AND DATA SHEET FOR PROCESS PIPING AND MATERIAL.
3. REFER TO DIVISION 26 SPECIFICATIONS FOR FLEX AND RIGID CONDUIT MATERIAL AND USAGE LIMITATIONS.

KEYNOTES:

A. ENSURE POWER HAS BEEN SHUT OFF BEFORE EXPOSING TERMINATION BOARD BELOW DISPLAY.

BILL OF MATERIALS

| ITEM | QTY | DESCRIPTION | SUPPLY | MATERIAL/RATING (WATER) | MATERIAL/RATING (CHEMICAL) (F) |
|---|---|---|---|---|---|
| 1 | 1 | TRANSMITTER HEAD (A) | MANF | POWDER-COATED ALUMINUM | 316 SS |
| 2 | 1 | SENSOR PICKUP | MANF | 316 SS | 316 SS |
| 3 | 1 | EXTERNAL FLOAT | MANF | 316 SS | HASTELLOY/TITANIUM/CPVC |
| 4 | 1 | ISOLATION WELL | MANF | 316 SS | HASTELLOY OR CPVC |
| 5 | 1 | INTERNAL WAVEGUIDE | MANF | 316 SS | 316SS |
| 6 | 1 | ISOLATION WELL FLANGE | MANF | 316 SS/CARBON STEEL | HASTELLOY/CARBON STEEL |
| 7 | AR | MOUNTING HARDWARE | CONT | 316 SS/CARBON STEEL | HASTELLOY/CARBON STEEL |
| 8 | 1 | 1/2" NPT | MANF | 316 SS | 316 SS |

## I-207 MAGNETORESTRICTIVE LEVEL TRANSMITTER

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

INSTRUMENT INSTALLATION DETAILS II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWD -
DATE: JANUARY / 2024
SCALE:

SHEET NO. 110 OF 145
DWG. NO. 002-I-02

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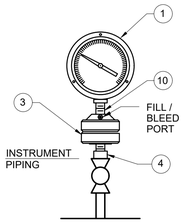
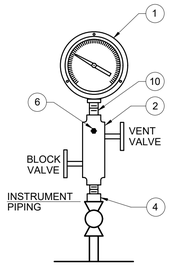
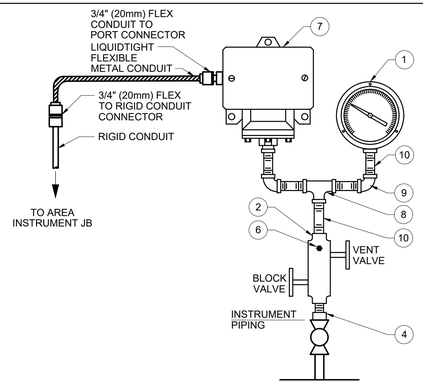


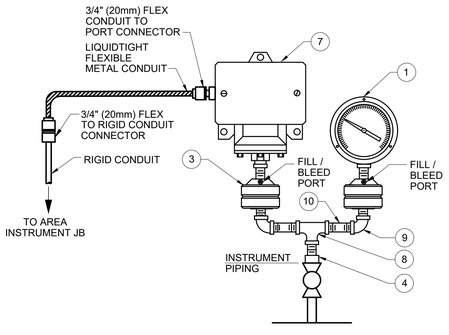

PRESSURE GAUGE OR SWITCH WITH DIAPHRAGM SEAL



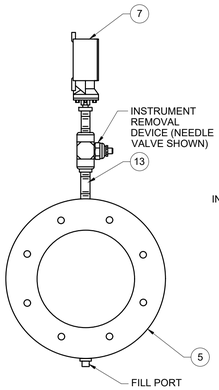

PRESSURE GAUGE OR SWITCH



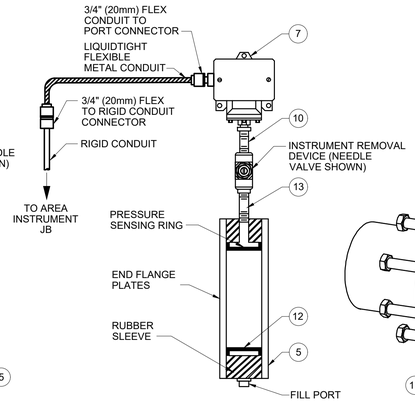

PRESSURE GAUGE AND SWITCH




PRESSURE GAUGE AND SWITCH WITH DIAPHRAGM SEALS

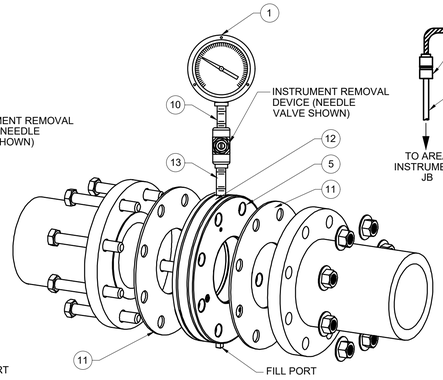



FRONT-VIEW



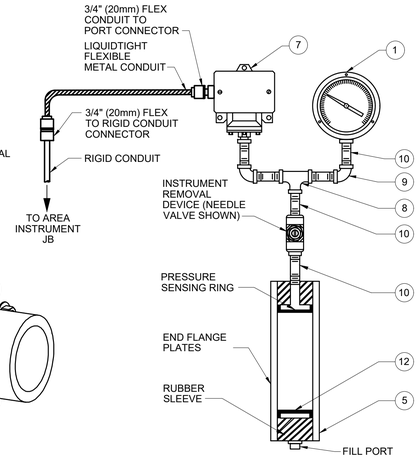

CROSS-SECTION SIDE-VIEW

PRESSURE SWITCH WITH ANNULAR SEAL




CROSS-SECTION EXPLODED-VIEW

PRESSURE GAUGE WITH ANNULAR SEAL




CROSS-SECTION SIDE-VIEW

PRESSURE GAUGE AND SWITCH WITH ANNULAR SEAL

BILL OF MATERIALS

| ITEM | QTY | DESCRIPTION | SUPPLY | MATERIAL/ RATING (WATER / AIR) | MATERIAL/ RATING (CHEMICAL) |
|---|---|---|---|---|---|
| 1 | 1 | LIQUID-FILLED PRESSURE GAUGE | MANF | PHENOLIC ENCASED | PHENOLIC ENCASED |
| 2 | 1 | 1/2" (15mm) 2 VALVE MANIFOLD WITH INTEGRAL BLEED | MANF | 316 SS | 316 SS OR PVC |
| 3 | AR | ISOLATION DIAPHRAGM SEAL; SILICONE OIL FILL FLUID (A) | MANF | 316 SS | HASTELLOY C OR PVC |
| 4 | 1 | HEX REDUCING BUSHING 1"x1/2" (25mmx15mm) | CONT | 316 SS | 316 SS OR PVC |
| 5 | 2 | END FLANGES (CLASS TO SUIT PIPING) | MANF | EPOXY COATED CARBON STEEL | 316 SS OR PVC |
| 6 | 1 | 1/4" NPT VENT PIPE PLUG (B) | MANF | 316 SS | 316 SS OR PVC |
| 7 | 1 | PRESSURE SWITCH | MANF | 316 SS | 316 SS OR PVC |
| 8 | 1 | TEE 1/2" (15mm) | CONT | 316 SS | 316 SS OR PVC |
| 9 | 2 | ELBOW 1/2" (15mm) | CONT | 316 SS | 316 SS OR PVC |
| 10 | AR | 1/2" MALE TO MALE NIPPLE | CONT | 316 SS | 316 SS OR PVC |
| 11 | 2 | GASKETS | CONT | VITON | VITON |
| 12 | 1 | ANNULAR SEAL; SILICONE OIL FILL FLUID (A) | MANF | TEFLON COATED BUNA-N | PTFE OR TEFLON COATED VITON |
| 13 | 1 | INSTRUMENT REMOVAL DEVICE AND 1/2" STEM | MANF | 316 SS | 316 SS OR PVC |

GENERAL NOTES:

1. POTENTIALLY WETTED MATERIALS SHALL BE CHEMICALLY INERT TO THE PROCESS.
2. REFER TO P&IDS AND DATA SHEETS FOR PROCESS PIPING SIZE AND MATERIAL.
3. PIPING SIDE ISOLATION VALVES FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.
4. REFER TO DIVISION 26 SPECIFICATIONS FOR FLEX AND RIGID CONDUIT MATERIAL AND USAGE LIMITATIONS.
5. NOT ALL TYPES OF PRESSURE GAUGES ARE INSTALLED. REFER TO P&IDs FOR THE TYPE OF PRESSURE GAUGES USED.

KEYNOTES:

A. FOR AMBIENT TEMPERATURE APPLICATIONS LOWER THAN -10 degC, ETHYLENE GLYCOL FILL FLUID REQUIRED IN LIEU OF STANDARD SILICONE OIL.

B. FURNISH 1/4" (8mm) OD MALE CONNECTOR AND 1/4" OD (1.5mm WALL THICKNESS) 316SS DOWN TURNED DRAIN TUBING FOR FIELD INSTALLATION. ENSURE VENT / DRAIN IS DIRECTED TO SAFE LOCATION.

I-301 PRESSURE GAUGE / SWITCH

REV 010119

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| B | 01/29/2024 | 100% DESIGN | AA | SK | |
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

INSTRUMENT INSTALLATION DETAILS III

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE:

SHEET NO. 111 OF 145
DWG. NO. 002-I-03
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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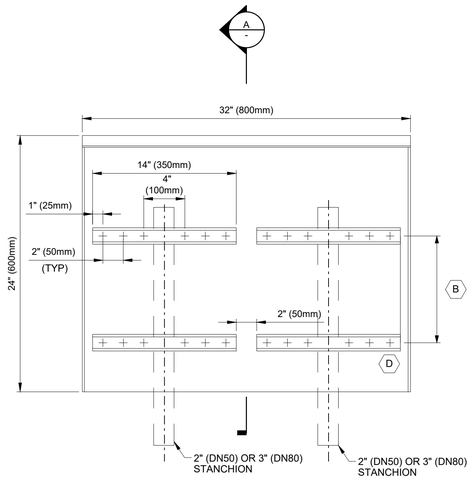
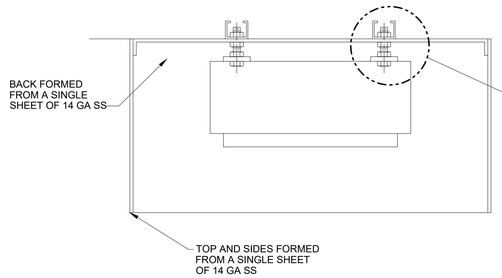
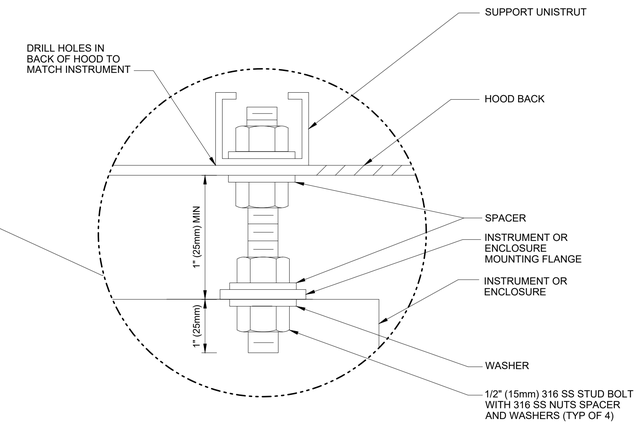
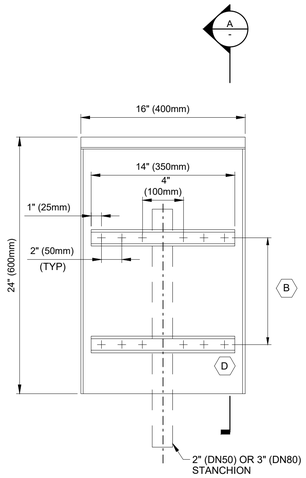



TYPE 32" (800mm) FRONT VIEW

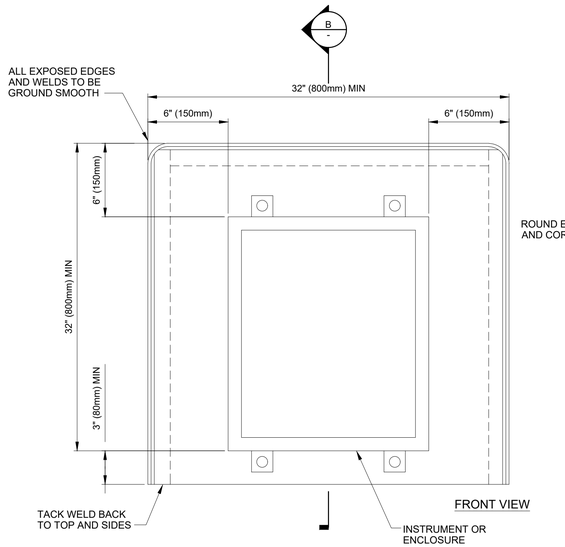



TOP VIEW WITH MOUNTED ELEMENT



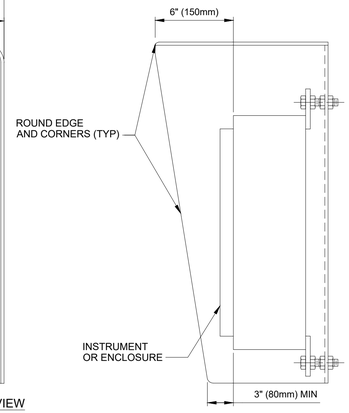




TYPE 16" (400mm) FRONT VIEW

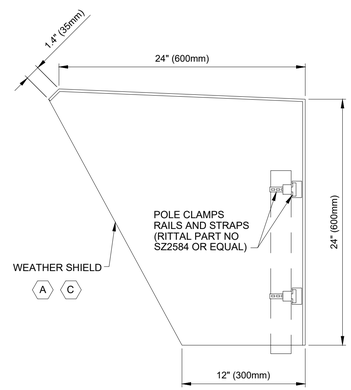



FRONT VIEW

FRONT VIEW WITH MOUNTED ELEMENT




B - SECTION




A - SECTION

GENERAL NOTES:

1. REFER TO INSTRUMENT STAND INSTALLATION DETAIL I-701 FOR STANCHION SUPPORT DETAILS.
2. CROSS RAILS TO HAVE MOUNTING HOLES DRILLED AS DETAILED.

KEYNOTES:

A. 304 STAINLESS STEEL.
B. WEATHER SHIELD MOUNTING HOLES ARE TO BE DRILLED ON SITE TO SUIT JUNCTION BOX POSITION, HOLES TO BE SMOOTH AND DEBURRED.
C. WEATHER SHIELD OPEN AT FRONT AND BOTTOM.
D. WEATHER SHIELD ATTACHED TO CROSS RAILS WITH 1/4" (6mm) DIA BY 3/4" (20mm) LONG 316SS BOLTS, 1/4" (6mm) DIA NUTS AND WASHERS.

I-702 INSTRUMENT WEATHER SHIELD

REV 010119

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

INSTRUMENT INSTALLATION DETAILS IV

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE:

SHEET NO. 112 OF 145
DWG. NO. 002-I-04

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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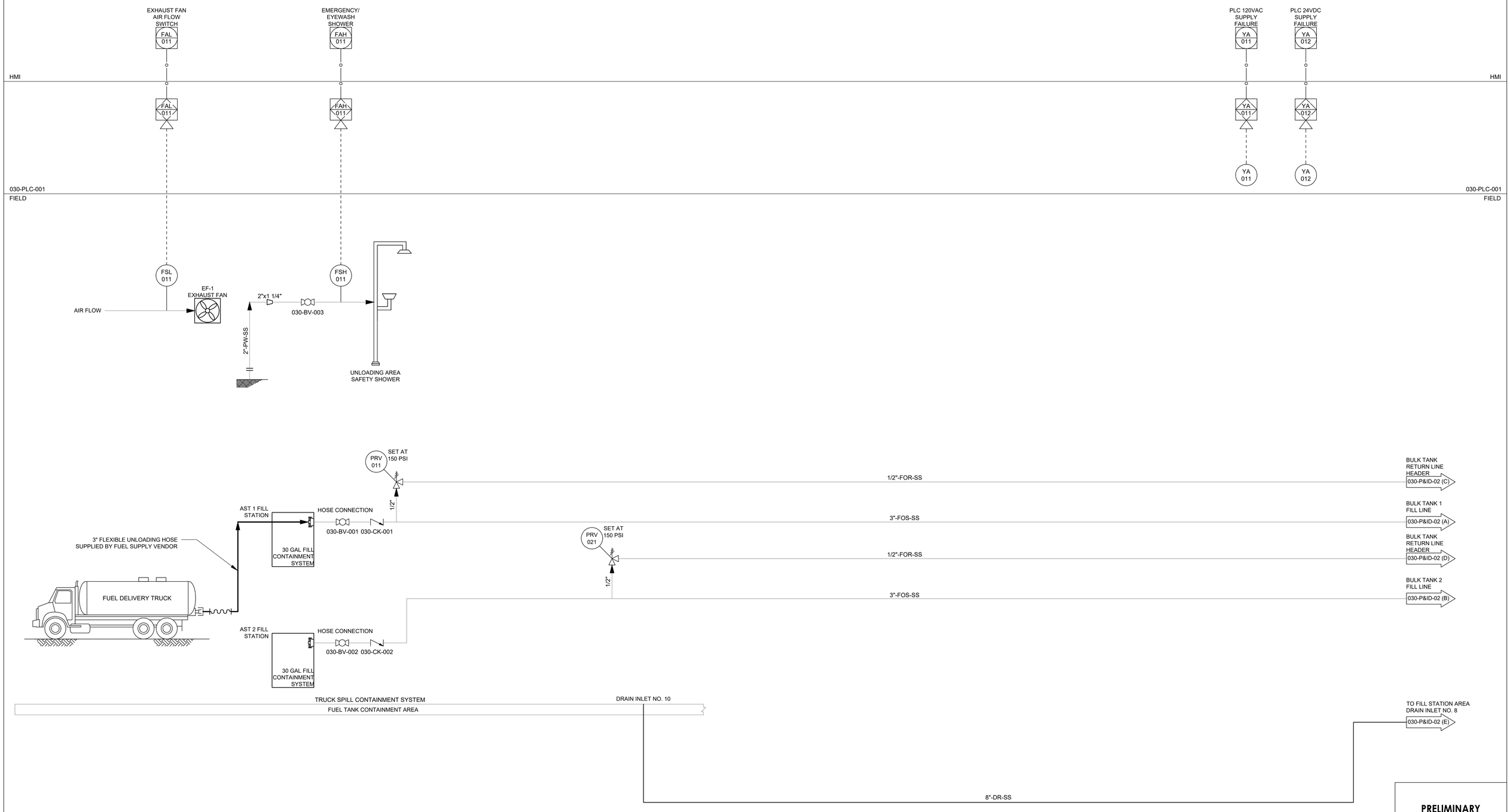


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| C | 09/29/2023 | 60% DESIGN | CL | SK | GN |
| B | 07/26/2023 | 30% DESIGN | ZC | SK | GN |
| A | 06/06/2023 | 15% DESIGN | ZC | SK | GN |

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

DIESEL FUEL SYSTEM P&ID - I

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GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
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SHEET NO. 113 OF 145
DWG. NO. 030-P&ID-01

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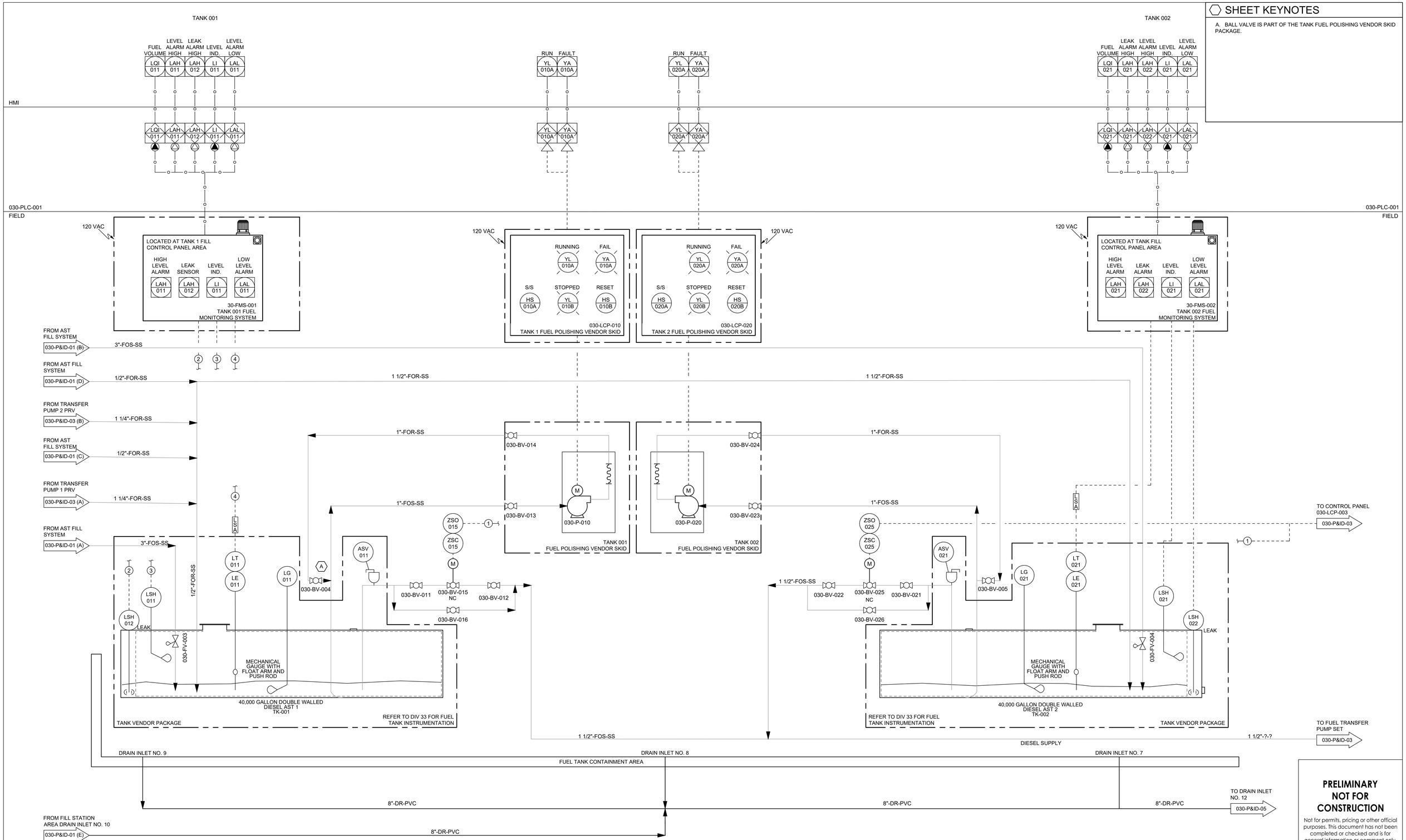


## SHEET KEYNOTES

A. BALL VALVE IS PART OF THE TANK FUEL POLISHING VENDOR SKID PACKAGE.

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TOA ALTA, PUERTO RICO

DIESEL FUEL SYSTEM P&ID - II

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C.I.P. No. 1-70-9000
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DATE: JANUARY / 2024
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SHEET NO. 114 OF 145
DWG. NO. 030-P&ID-02

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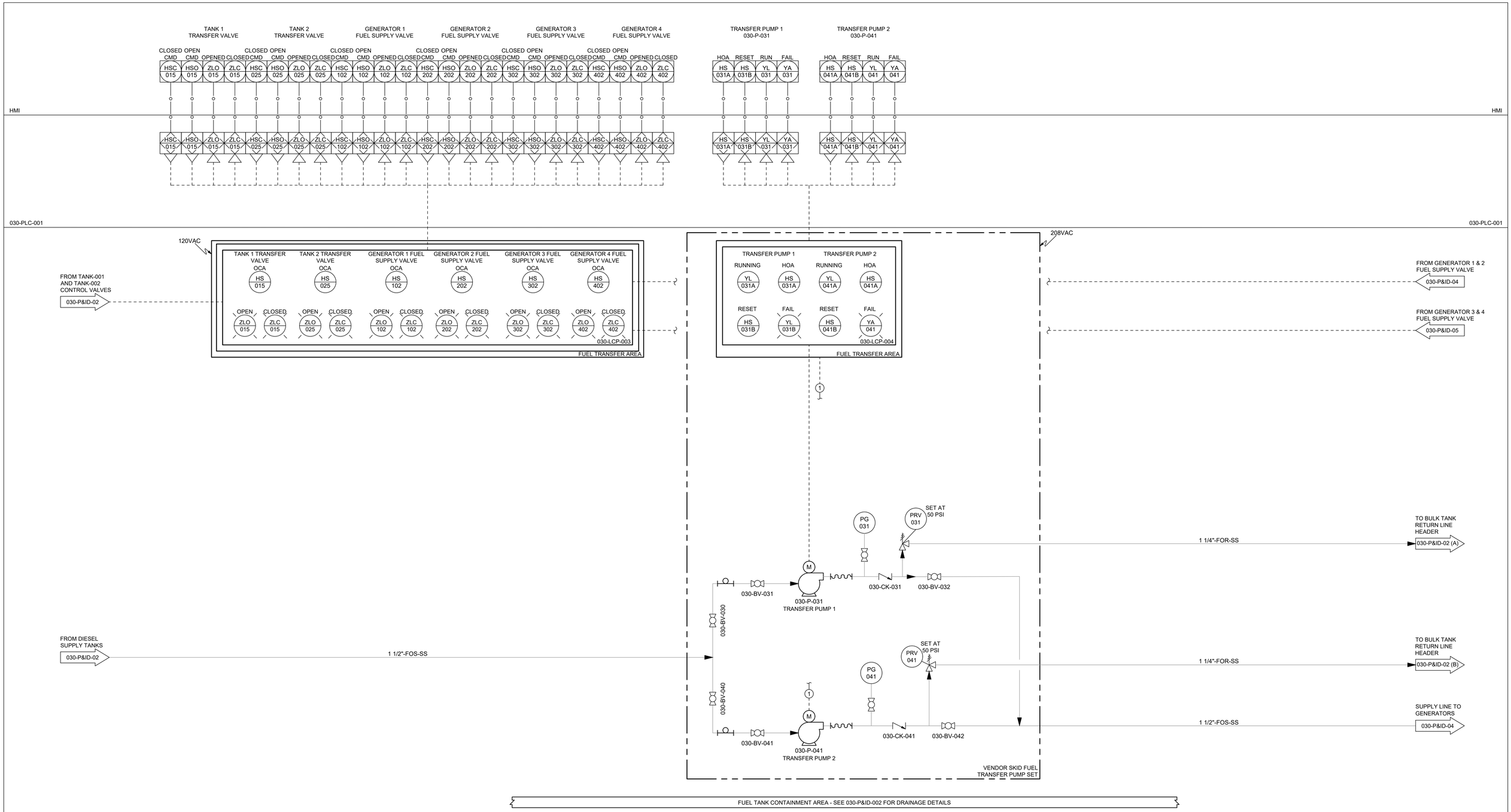


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TOA ALTA, PUERTO RICO

DIESEL FUEL SYSTEM P&ID - III

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PSWID -
DATE: JANUARY / 2024
SCALE:

SHEET NO. 115 OF 145
DWG. NO. 030-P&ID-03

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0 2 CM

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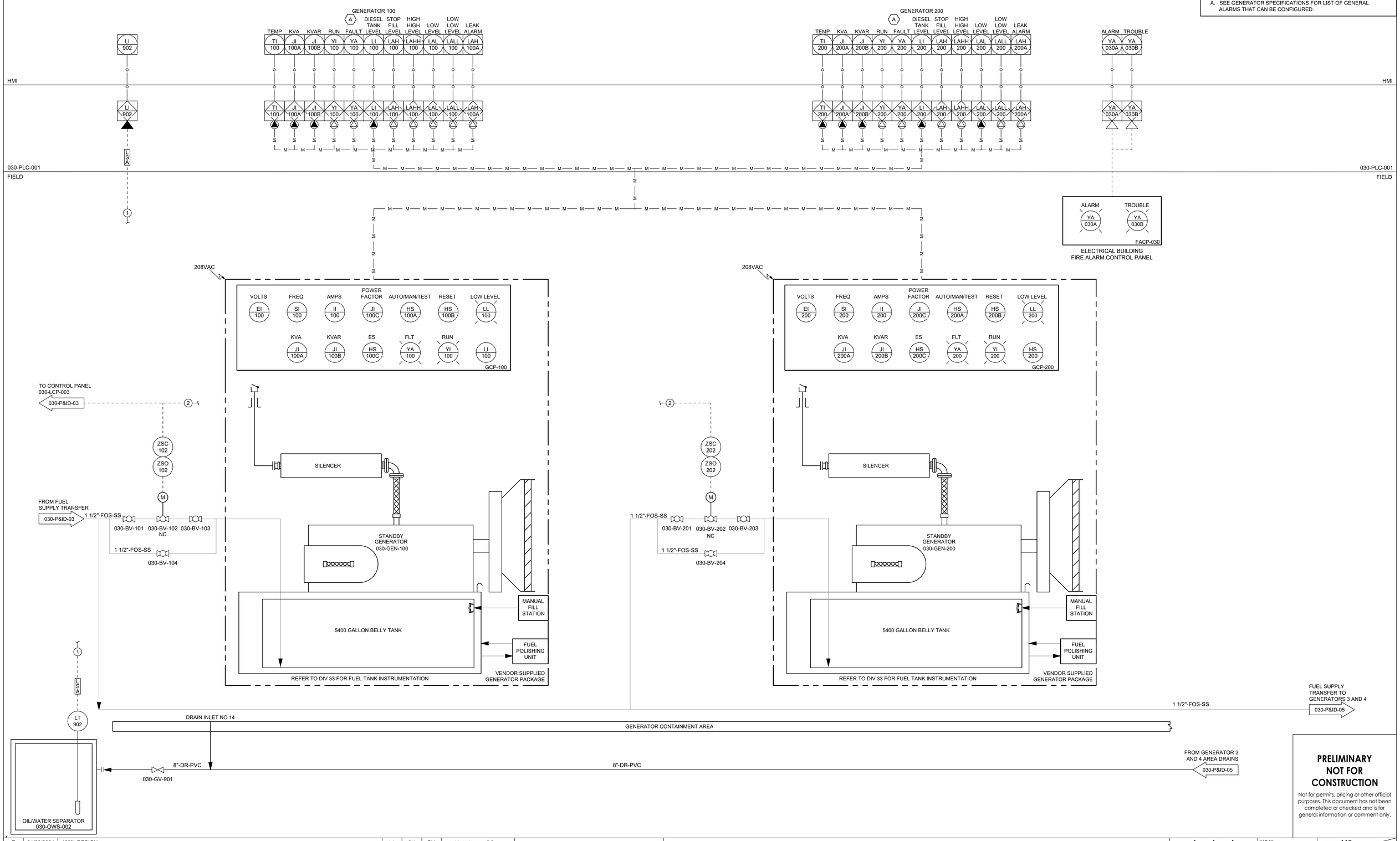
## SHEET KEYNOTES

A. SEE GENERATOR SPECIFICATIONS FOR LIST OF GENERAL ALARMS THAT CAN BE CONFIGURED.

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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS P&ID I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No: 1-70-9000
PSWID: -
DATE: JANUARY / 2024
SCALE:

SHEET NO. 116 OF 145
DWG. NO. 030-P&ID-04

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

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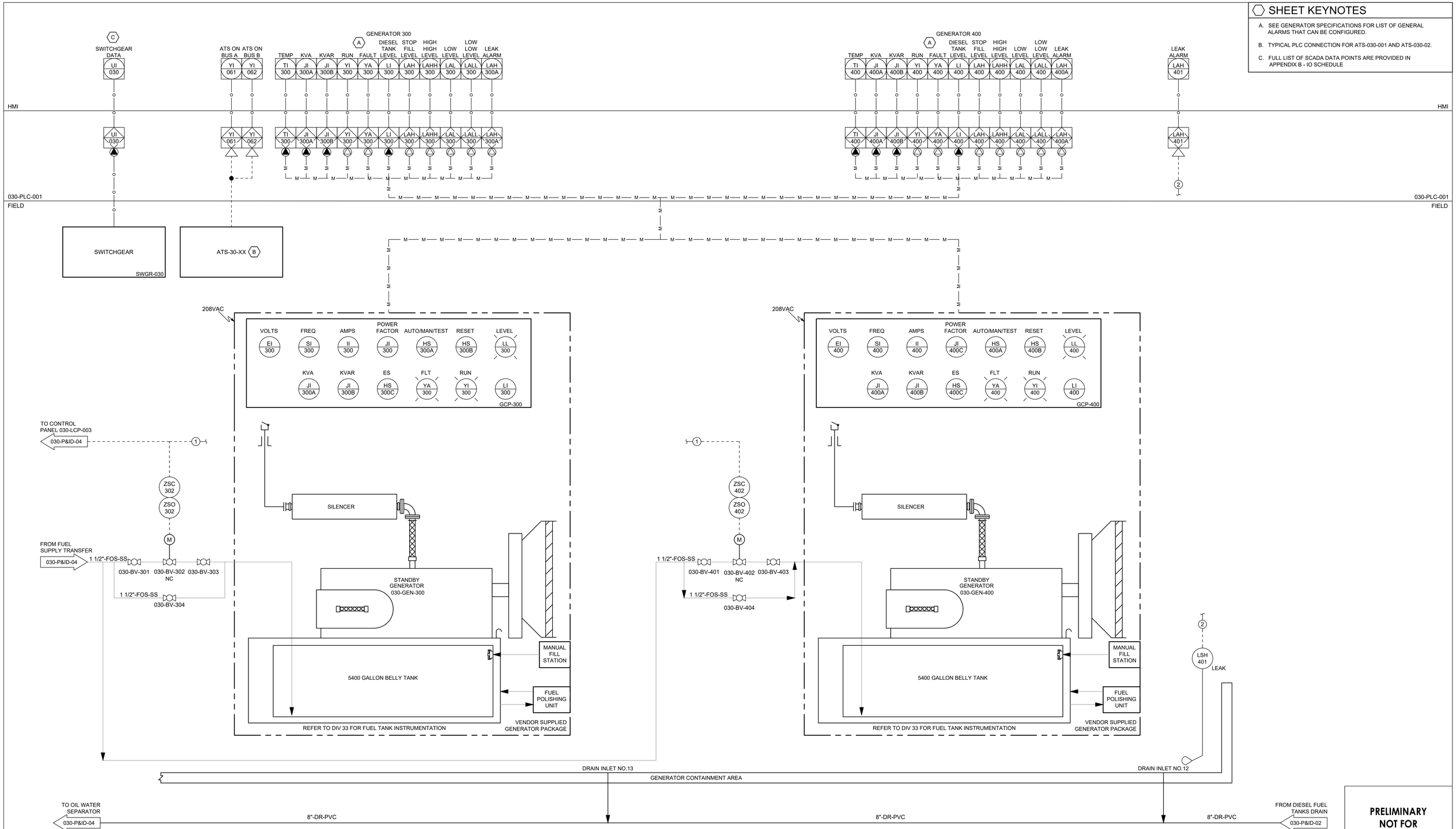
## SHEET KEYNOTES

A. SEE GENERATOR SPECIFICATIONS FOR LIST OF GENERAL ALARMS THAT CAN BE CONFIGURED.

B. TYPICAL PLC CONNECTION FOR ATS-030-001 AND ATS-030-02.

C. FULL LIST OF SCADA DATA POINTS ARE PROVIDED IN APPENDIX B - IO SCHEDULE

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| B | 07/26/2023 | 30% DESIGN | ZC | SK | GN |
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS P&ID II

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SCALE:

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DWG. NO. 030-P&ID-05

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0 2 CM

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# SINGLE LINE DIAGRAM SYMBOLOGY

MEDIUM VOLTAGE VACUUM DRAWOUT STARTER

52 — MEDIUM VOLTAGE DRAWOUT BREAKER

THERMAL MAGNETIC CIRCUIT BREAKER
X = LOCATION
100AF — TRIP (AMPS)
20AT — FRAME (AMPS)

MCP CIRCUIT BREAKER
X = LOCATION
7A — CONTINUOUS AMPS
MCP — TRIP SETTING BASED ON MOTOR HORSEPOWER

LOW VOLTAGE DRAWOUT CIRCUIT BREAKER
800AF / 400AT
(L-S-I-G)
L LONG TIME
S SHORT TIME
I INSTANTANEOUS
G GROUND FAULT

COMBINATION NEMA RATED STARTER WITH MCP DISCONNECT AND CONTROL POWER TRANSFORMER
X, 40 / MCP, *
ROMAN NUMERAL = NEMA SIZE
X = LOCATION
* = STARTER TYPE
(BLANK) FULL VOLTAGE NON-REVERSING
FVR FULL VOLTAGE REVERSING
2S2W TWO SPEED TWO WINDING
2S1W TWO SPEED ONE WINDING

X / VFD — VARIABLE FREQUENCY DRIVE
X = AMPERE RATING

X / RVSS — REDUCED VOLTAGE SOLID STATE STARTER
X = AMPERE RATING

X / Y — PACKAGED EQUIPMENT
X = EQUIPMENT SIZE
Y = TYPE (KW, KVA, OR HP AS INDICATED)

K — KEY INTERLOCK

GENERATOR
RATINGS AS INDICATED

TRANSFER SWITCH (MANUAL OR AUTOMATIC)
RATINGS AS INDICATED

AS — AMMETER SWITCH

VS — VOLTMETER SWITCH

X — METERING DEVICE
X = METER TYPE
WHM WATT HOUR METER
WM WATT METER
AM ANMETER
VM VOLTMETER
PFM POWER FACTOR METER

480/120 (3) — POTENTIAL TRANSFORMER
RATIO AND NUMBER OF PT'S AS INDICATED

100/5 (3) — CURRENT TRANSFORMER
RATIO AND NUMBER OF CT'S AS INDICATED

GROUND FAULT CURRENT TRANSFORMER
RATIO AS INDICATED

5A — FUSE
SIZE AS INDICATED

X * — MOTOR
X = HORSEPOWER
* = FULL LOAD AMPS

DELTA-WYE TRANSFORMER WITH
SECONDARY KVA SIZE AND VOLTAGE
RATIO AS INDICATED

X AMPS
Y SECONDS
51G
DELTA-WYE TRANSFORMER
WITH RESISTANCE GROUNDED
SECONDARY AND GROUND
FAULT RELAYING
X - GROUNDING RESISTOR AMPS
Y - GROUNDING RESISTOR SECONDS

FUSED CONTROL POWER TRANSFORMER

MOV — ELECTRICAL MOTOR OPERATED VALVE, WITH
INTEGRAL REVERSING STARTER

30A — DISCONNECT SWITCH
SIZE AS INDICATED

30A / 30A — FUSED DISCONNECT SWITCH
SIZE AS INDICATED

CAPACITOR

SPD — SURGE PROTECTIVE DEVICE

SSM — SOLID STATE METERING DEVICE

FPR — FEEDER PROTECTION RELAY

GPR — GENERATOR PROTECTION RELAY

CDR — CURRENT DIFFERENTIAL RELAY

SSMP — SOLID STATE MOTOR PROTECTIVE DEVICE

LIGHTNING ARRESTOR AND SURGE CAPACITOR

* (#) — ANSI RELAY DEVICE
(#) = QUANTITY
* = ANSI DEVICE

| | |
|---|---|
| 25 | SYNCHRONISM CHECK RELAY |
| 27 | UNDERVOLTAGE |
| 27/47 | UNDERVOLTAGE, PHASE SEQUENCE, UNBALANCED VOLTAGE |
| 32 | DIRECTIONAL POWER RELAY |
| 41 | FIELD CONTACTOR |
| 43 | SELECTOR SWITCH |
| 49 | HIGH OIL TEMPERATURE |
| 50/51 | INSTANTANEOUS AND TIME OVERCURRENT |
| 50/51N | INSTANTANEOUS AND TIME RESIDUALLY CONNECTED GROUND OVERCURRENT |
| 51G | GROUND FAULT |
| 55 | POWER FACTOR RELAY |
| 59 | OVERVOLTAGE RELAY |
| 60 | VOLTAGE BALANCE |
| 62 | TIME DELAY |
| 63 | SUDDEN PRESSURE |
| 67 | AC DIRECTIONAL CURRENT RELAY |
| 71L | LOW OIL LEVEL |
| 81 | FREQUENCY RELAY |
| 81O/U | OVER/UNDER FREQUENCY |
| 83 | CONTROL POWER TRANSFORMER |
| 86 | LOCKOUT |
| 87TL | TRANSFORMER DIFFERENTIAL |
| 87M | MOTOR DIFFERENTIAL |

# SCHEMATIC DIAGRAM SYMBOLOGY

L O R — THREE - POSITION SELECTOR SWITCH

L R — TWO - POSITION SELECTOR SWITCH

THREE - POSITION SPRING RETURN-TO-CENTER
MOMENTARY CONTACT SWITCH

SINGLE POLE TOGGLE SWITCH

VACUUM OR PRESSURE SWITCH
CLOSE ON RISING PRESSURE

VACUUM OR PRESSURE SWITCH
OPEN ON RISING PRESSURE

FLOAT LEVEL SWITCH
CLOSE ON RISING LEVEL

FLOAT LEVEL SWITCH
OPEN ON RISING LEVEL

NORMALLY OPEN

NORMALLY CLOSED

NORMALLY OPEN HELD CLOSED

NORMALLY CLOSED HELD OPEN

MAINTAINED POSITION

TEMPERATURE SWITCH
CLOSE ON RISING TEMPERATURE

TEMPERATURE SWITCH
OPEN ON RISING TEMPERATURE

FLOW SWITCH
CLOSE ON INCREASING FLOW

FLOW SWITCH
OPEN ON INCREASING FLOW

TORQUE SWITCH
OPEN ON INCREASING TORQUE

1 — LOCATION SYMBOL
LEGEND SHOWN ON SCHEMATIC DRAWINGS
ALL DEVICES ARE LOCATED IN THE MCC
UNLESS INDICATED OTHERWISE

DI — DIGITAL INPUT TO PLC/RTU/DCS

DIGITAL OUTPUT FROM PLC/RTU/DCS
NORMALLY OPEN

DIGITAL OUTPUT FROM PLC/RTU/DCS
NORMALLY CLOSED

AI — ANALOG INPUT TO PLC/RTU/DCS
4-20 mA (UNLESS INDICATED OTHERWISE)

AO — ANALOG OUTPUT FROM PLC/RTU/DCS
4-20 mA (UNLESS INDICATED OTHERWISE)

SV — SOLENOID VALVE

SOLENOID VALVE

E-STOP PUSHBUTTON

BIMETALLIC OVERLOAD RELAY

X — CONTROL RELAY OR COIL
X = DEVICE
CR CONTROL RELAY
TD TIME DELAY RELAY
(TIMING RANGE AS INDICATED)
M MOTOR STARTER
PC PHOTOCELL

NORMALLY OPEN CONTACT

NORMALLY CLOSED CONTACT

XXXX — NORMALLY OPEN CONTACT LINE REFERENCE

XXXX — NORMALLY CLOSED CONTACT LINE REFERENCE

TIMED CONTACTS
CONTACT ACTION IS DELAYED AFTER COIL IS:

ENERGIZED

TD1 — NORMALLY OPEN WITH TIME DELAY CLOSING

TD1 — NORMALLY CLOSED WITH TIME DELAY OPENING

DE-ENERGIZED

TD1 — NORMALLY OPEN WITH INSTANT CLOSING AND
TIME DELAY OPENING

TD1 — NORMALLY CLOSED WITH INSTANT OPENING AND
TIME DELAY CLOSING

START — NORMALLY OPEN PUSHBUTTON

STOP — NORMALLY CLOSED PUSHBUTTON

OFF ON — NO/NC MAINTAINED PUSHBUTTON

X — PILOT LIGHT
X = LENS COLOR
R RED
G GREEN
A AMBER
W WHITE

X — PILOT LIGHT (PUSH-TO-TEST)
X = LENS COLOR (SEE ABOVE)

HORN

ETM — ELAPSED TIME METER

HEATER

GROUND CONNECTION

CROSSING OF CONDUCTORS - NOT CONNECTED

CROSSING OF CONDUCTORS - CONNECTED

FUSE

VOLTAGE SURGE SUPPRESSOR


Document No.: 4375.016 Version: 3

CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION

FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE
Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

LUMA ENDOSO / ENDORSEMENT
Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

ENDOSADO POR / ENDORSED BY
Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:39:38 -04'00'


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| NO | DATE | REVISION | BY | CK. | APPR. |
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| D | 01/29/2024 | 100% DESIGN | JL | GN | GN |
| C | 11/20/2023 | 90% DESIGN | JL | GN | GN |
| B | 09/29/2023 | 60% DESIGN | JL | GN | GN |
| A | 07/26/2023 | 30% DESIGN | JL | GN | GN |

| | |
|---|---|
| DRAWN BY | FL |
| DESIGNED BY | JL |
| CHECKED BY | DR |
| APPR. BY | GN |

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

SYMBOLS LEGEND - I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE
SHEET NO. 118 OF 145
DWG. NO. 000-E-01
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

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# PLAN SYMBOLOGY

## RECEPTACLES

X-#
120V DUPLEX RECEPTACLE, NEMA CONFIGURATION
5-20R (WALL MOUNT)
X = PANELBOARD DESIGNATION
# = CIRCUIT DESIGNATION
* = TYPE
WP WEATHERPROOF
XP EXPLOSION PROOF
GFCI GROUND FAULT CIRCUIT INTERRUPTER

120V DUPLEX RECEPTACLE, NEMA CONFIGURATION
5-20R (FLOOR MOUNT)

X
SINGLE SPECIAL PURPOSE RECEPTACLE, 240V 1 PHASE
X = AMPERAGE

X
WELDING RECEPTACLE
X = AMPERAGE

X
SPECIAL PURPOSE RECEPTACLE, 480 VAC
X = AMPERAGE

TELEPHONE OUTLET - FLOOR TYPE

TELEPHONE OUTLET - WALL TYPE

COMPUTER/DATA OUTLET - FLOOR TYPE

COMPUTER/DATA OUTLET - WALL TYPE

## CONDUIT AND RACEWAY SYMBOLOGY

EXPOSED OR CONCEALED CONDUIT

CONDUIT RUN (UNDERGROUND OR IN CONCRETE)

CONDUIT RUN (CHANGE IN ELEVATION)

CONDUIT TURNING UP

CONDUIT TURNING DOWN

CONDUITS GROUPED TOGETHER BUT
SHOWN AS A SINGLE LINE FOR CLARITY

CONDUIT FROM FLOOR ABOVE TO FLOOR BELOW

CONDUIT CAPPED, OR SEALED

HOMERUN TO EQUIPMENT INDICATED
(3/4 " CONDUIT, 2 #12, 1 #12 GND
UNLESS INDICATED OTHERWISE)

X
RACEWAY BOX
X = BOX TYPE
MH MANHOLE
HH HANDHOLE
PB PULLBOX
PPB POWER PULLBOX
FPB FIBER PULLBOX

J
JUNCTION BOX OR FITTING

P
PULL BOX OR FITTING

## MISCELLANEOUS ELECTRICAL SYMBOLOGY

POWER PANEL

DISCONNECT SWITCH

M
MOTOR

TS
THERMOSTAT

SH
SPACE HEATER, MOTOR

VS
VIBRATION SWITCH

RT
RESISTANCE TEMPERATURE DETECTOR

HORN

COMBINATION STARTER

$ M
MANUAL MOTOR STARTER

## FIRE PROTECTION SYMBOLOGY

F
FIRE ALARM HORN WITH STROBE

A F
FIRE ALARM LOUDSPEAKER WITH AMPLIFIER

FA
FIRE ALARM PULL STATION

F
FIRE ALARM STROBE

F
FIRE ALARM BELL WITH STROBE

FS
FIRE SUPPRESSION SWITCH

ER
END-OF-LINE TERMINATOR

*
DETECTOR
X = TYPE
SD SMOKE DETECTOR
HD HEAT DETECTOR
CD COMBINATION DETECTOR

## SECURITY & COMM SYSTEMS SYMBOLOGY

I *
INTERCOM SPEAKER
* = TYPE (REFER TO SPECIFICATIONS)

I *
INTERCOM SPEAKER WITH STROBE LIGHT
* = TYPE (REFER TO SPECIFICATIONS)

I
INTERCOM WALL JACK

HS I
INTERCOM HANDSET - WALL MOUNTED

VC *
VIDEO CAMERA
* = TYPE
F FIXED
PTZ PAN-TILT-ZOOM

*
SECURITY ACCESS DEVICE
* = TYPE
CR CARD READER
KS KEY SWITCH
PS DIGITAL KEYPAD

## LIGHTING SYMBOLOGY

A
X-#a
PENDANT OR CEILING MOUNT LUMINAIRE
A = LUMINAIRE TYPE
X = LIGHTING PANEL DESIGNATION
# = CIRCUIT NUMBER
a = SWITCH DESIGNATION

PENDANT OR CEILING MOUNT LUMINAIRE - UNSWITCHED
(NIGHT LIGHT)

WALL MOUNTED LUMINAIRE

POLE, BRACKET, ARM, AND STREETLIGHT

LINEAR LUMINAIRE

LINEAR LUMINAIRE - UNSWITCHED

EMERGENCY LUMINAIRE
BATTERY BACKUP

EXIT LIGHT, ARROW INDICATE DIRECTION
OF EXIT, SHADING INDICATES FACE
BATTERY BACKUP

A
*
LUMINAIRE CALLOUT
A = LUMINAIRE TYPE
* = APPROXIMATE MOUNTING HEIGHT AFF
CLG = CEILING MOUNT
(SEE LUMINAIRE SCHEDULE FOR MORE DETAILS)

$ X-#a
*
LIGHT SWITCH
X = LIGHTING PANEL DESIGNATION
# = CIRCUIT DESIGNATION
a = SWITCH DESIGNATION
* = TYPE
3 3-WAY
4 4-WAY
D DIMMER
M MANUAL MOTOR STARTER

LIGHTING PANEL

## GROUNDING SYMBOLOGY

GROUND ROD AND GROUND WELL

GROUND ROD (19mm X 3000mm)

GROUND CONNECTION - BOLTED TYPE

GROUND CONNECTION - EXOTHERMIC TYPE

BARE COPPER GROUND TO GROUND WIRE IN SLAB, OR
UNDERGROUND GROUND GRID, SIZE AS NOTED

EARTH GROUNDING

Document No.: 42YLP8 Version: 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar estos planos de construcción ante LUMA Energy como operador y administrador del Sistema de Transmisión y Distribución de la AEE. / I certify that I am a licensed and registered engineer, surveyor or architect in compliance with Law 173 of 1988, as amended, and I am authorized by the design of the project to submit these construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico que las disposiciones de la Ley Núm. 170 de 15 de junio de 1987, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, sentidas que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. / LUMA Energy y el Manual de Prácticas Profesionales de Certificación de Ingeniería de Puerto Rico. Por lo tanto, de acuerdo con la Ley Núm. 170 de 15 de junio de 1987, Proyecto Certificación Ad / I certify that I prepared the electric design for this project in accordance with the codes, Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**ENDOSO / ENDORSEMENT**

LUMA

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago

Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:41:09 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación suministrada por el diseñador en cumplimiento con la Ley Núm. 170 del 15 de julio de 1987, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification provided by the designer in compliance with Law 170 of July 15, 1987, as amended.
2. LUMA no asume responsabilidad activa el diseño certificado. El endoso por parte de la LUMA no relieva al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no relieva al constructor ni al inspector de obra pro-rata de cumplir con las especificaciones de los planos sellados. LUMA no asume responsabilidad sobre los permisos de construcción, permisos ambientales, permisos de agua y de otras agencias de gobierno, ni como viajes laterales y ordenes, cuyidas en exceso de cien dólares. / LUMA does not assume responsibility over the certified design. LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from the Puerto Rico Electric Power Authority (PREPA) and the Puerto Rico Planning Board and Permits Management Office.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediante notificación previa a LUMA, el endoso mencionado su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese término, el diseñador tiene que volver a presentar el diseño eléctrico para que LUMA considere endosarlo de acuerdo con la Ley Núm. 170 y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TOU de 2007. / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the mentioned endorsement will last until the completion of the same. If electrical work is not certified during that period, this endorsement will lapse its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TOU of 2007).

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 02/13/2024 | 100% DESIGN | JL | DR | GN |
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DRAWN BY FL
DESIGNED BY JL
CHECKED BY DR
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ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

SYMBOLS LEGEND - II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 119 OF 145
DWG. NO. 000-E-02

BAR IS TWO CM ON ORIGINAL DWG. IF NOT THIS OM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

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## ELECTRICAL ABBREVIATIONS

| | |
|---|---|
| A | AMPERE, AUTOMATIC |
| AC | ALTERNATING CURRENT |
| AF | CIRCUIT BREAKER FRAME SIZE |
| AM | AMMETER |
| ANN | ANNUNCIATOR |
| AS | ADJUSTABLE SPEED |
| AT | CIRCUIT BREAKER AMPERE TRIP SETTING |
| ATS | AUTOMATIC TRANSFER SWITCH |
| AUTO | AUTOMATIC |
| AWG | AMERICAN WIRE GAUGE |
| BATT | BATTERY |
| BC | BARE COPPER |
| BKR | BREAKER |
| C | CONDUIT, CLOSED |
| CAP | CAPACITOR |
| CB | CIRCUIT BREAKER |
| CDR | CURRENT DIFFERENTIAL RELAY |
| CKT | CIRCUIT |
| CLF | CURRENT LIMITING FUSE |
| COM | COMMON |
| COMM | COMMUNICATIONS |
| COMP | COMPARTMENT |
| CP | CONTROL PANEL |
| CPT | CONTROL POWER TRANSFORMER |
| CR | CONTROL RELAY, CARD READER |
| CT | CURRENT TRANSFORMER |
| DCS | DISTRIBUTED CONTROL SYSTEM |
| DISC | DISCONNECT |
| DISTR | DISTRIBUTION |
| DPDT | DOUBLE POLE DOUBLE THROW |
| DPST | DOUBLE POLE SINGLE THROW |
| E | EMERGENCY |
| EMT | ELECTRICAL METALLIC TUBING |
| ENCL | ENCLOSURE |
| EO | ELECTRICALLY OPERATED CLOSING SPRING CHARGER |
| ETM | ELAPSED TIME METER |
| F | FREQUENCY, FUSE, FIXED |
| FDR | FEEDER |
| FLA | FULL LOAD AMPS |
| FLOUR | FLUORESCENT |
| FM | FREQUENCY METER |
| FO | FIBER OPTIC |
| FOC | FIBER OPTIC CONDUIT |
| FPB | FIBER PULLBOX |
| FRP | FEEDER PROTECTION RELAY |
| FVR | FULL VOLTAGE REVERSING |
| FVNR | FULL VOLTAGE NON-REVERSING |
| GEN | GENERATOR |
| GFCI | GROUND FAULT CIRCUIT INTERRUPTER |
| GND | GROUND |
| GPR | GENERATOR PROTECTION RELAY |
| GRD | GROUND |
| H | HAND |
| HD | HEAT DETECTOR |
| HH | HAND HOLE |
| HID | HIGH INTENSITY DISCHARGE |
| HOA | HAND-OFF-AUTOMATIC |
| HPS | HIGH PRESSURE SODIUM |
| HS | HAND SWITCH |
| HZ | HERTZ |
| IMC | INTERMEDIATE METALLIC CONDUIT |
| INCAND | INCANDESCENT |
| IND | INDICATION |
| INST | INSTANTANEOUS |
| I/O | INPUT/OUTPUT |
| Isc | SHORT CIRCUIT CURRENT, AMPS |
| ISO | ISOLATION |
| J | JUNCTION BOX |
| JB | JUNCTION BOX |
| KA | KILO AMPERES |
| KAIC | KILO AMP INTERRUPTING CURRENT |
| KCMIL | KILO CIRCULAR MILS |
| KVA | KILOVOLT AMPERE |
| L | LOCAL |
| LCP | LOCAL CONTROL PANEL |
| LCS | LOCAL CONTROL STATION |
| LOC | LOCAL |
| LOR | LOCAL-OFF-REMOTE |
| LOS | LOCKOUT STOP PUSHBUTTON |
| LP | LIGHTING PANEL |
| LRA | LOCKED ROTOR AMPS |
| LS | LEVEL SWITCH; LONG TIME, SHORT TIME |
| LSI | LONG TIME, SHORT TIME, INSTANTANEOUS |
| LSIG | LONG TIME, SHORT TIME, INSTANTANEOUS, GROUND FAULT |
| LTG | LIGHTING |
| LTS | LIGHTS |
| M | MOTOR CONTACTOR COIL |
| mA | MILLIAMPERE |
| MCB | MAIN CIRCUIT BREAKER; MOLDED CASE CIRCUIT BREAKER |
| MCOV | MAXIMUM CONTINUOUS OVERCURRENT VOLTAGE |
| MCP | MOTOR CIRCUIT PROTECTOR |
| MCS | MOLDED CASE SWITCH |
| MLO | MAIN LUGS ONLY |
| MH | MANHOLE |
| MO | MANUALLY OPERATED CLOSING SPRING CHARGER |
| MOV | MOTOR OPERATED VALVE |
| MS | MANUAL MOTOR STARTER |
| MTS | MANUAL TRANSFER SWITCH |
| NC | NORMALLY CLOSED |
| NEUT | NEUTRAL |
| NO | NORMALLY OPEN |
| NP | NAMEPLATE |
| O | OPEN, OFF |
| OL | OVERLOAD |
| PA | PUBLIC ADDRESS |
| PB | PUSHBUTTON, PULLBOX |
| PC | PHOTOCELL |
| PCM | PROCESS CONTROL MODULE |
| PF | POWER FACTOR |
| PFM | POWER FACTOR METER |
| PH | PHASE |
| PL | PILOT LIGHT |
| PNLBD | PANELBOARD |
| PP | POWER PANELBOARD |
| PPB | POWER PULLBOX |
| POS | POSITION |
| POT | POTENTIOMETER |
| PRI | PRIMARY |
| PT | POTENTIAL TRANSFORMER |
| PTS | PAN-TILT-ZOOM |
| PWR | POWER |
| R | REMOTE |
| RECPT | RECEPTACLE |
| RGS | RIGID GALVANIZED STEEL |
| RMS | ROOT MEAN SQUARE |
| RTU | REMOTE TERMINAL UNIT |
| RVSS | REDUCED VOLTAGE SOLID STATE |
| SEL SW | SELECTOR SWITCH |
| SEQ | SEQUENCE |
| SHLD | SHIELDED |
| SIG | SIGNAL |
| SP | SPARE |
| SP HTR | SPACE HEATER |
| SPDT | SINGLE POLE DOUBLE THROW |
| SPST | SINGLE POLE SINGLE THROW |
| SSM | SOLID STATE METER |
| SSMP | SOLID STATE MOTOR PROTECTOR |
| ST, SH | SHUNT TRIP |
| STR | STARTER |
| SSTU | SOLID STATE TRIP UNIT |
| SW | SWITCH |
| SWBD | SWITCHBOARD |
| SWGR | SWITCHGEAR |
| TACH | TACHOMETER |
| TB | TERMINAL BOX |
| TJB | TERMINAL JUNCTION BOX |
| TERM | TERMINAL |
| TM | REPEAT CYCLE TIMER |
| TD | TIME DELAY RELAY |
| TS | TEMPERATURE SWITCH |
| TYP | TYPICAL |
| U/G | UNDERGROUND |
| UPS | UNINTERRUPTIBLE POWER SUPPLY |
| V | VOLTAGE, VOLTS |
| VA | VOLT AMPERE |
| VAR | VOLT AMPERE REACTIVE |
| VFD | VARIABLE FREQUENCY DRIVE |
| VFM | VOLTMETER |
| VP | VAPOR PROOF |
| W | WATTS, WIRE |
| WM | WATT METER |
| WP | WEATHERPROOF |
| XFMR | TRANSFORMER |
| XMTR | TRANSMITTER |
| XP | EXPLOSION PROOF |

## GENERAL ELECTRICAL NOTES

1. ALL RACEWAYS AND EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE CURRENTLY ADOPTED EDITION OF THE PUERTO RICO ELECTRICAL CODE AND APPLICABLE LOCAL CODES.
2. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF TERMINAL BOXES AND CONDUIT ENTRANCES OF ALL EQUIPMENT AGAINST APPROVED SHOP DRAWINGS BEFORE STUBBING UP CONDUITS.
3. CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONFLICTS WITH EQUIPMENT OR STRUCTURAL CONDITIONS. EXPOSED CONDUIT SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO BEAMS AND WALLS.
4. CONDUIT STUB-UPS SHALL NOT BE MORE THAN 6 INCHES FROM THE CENTERLINE OF TERMINAL BOXES.
5. IN THE EVENT OF INTERFERENCE BETWEEN ELECTRICAL EQUIPMENT SHOWN ON THE DRAWINGS AND OTHER EQUIPMENT, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING AND THE ENGINEER SHALL APPROVE PROPOSED CHANGES BEFORE THEY ARE MADE.
6. ALL SURFACE MOUNTED PANELS AND PANELBOARDS ON THE INTERIOR OF EXTERIOR WALLS ABOVE GRADE OR IN OTHER LOCATIONS CONSIDERED DAMP OR WET SHALL BE MOUNTED SO AS TO MAINTAIN A 6mm (MINIMUM) AIR SPACE BETWEEN THE ENCLOSURE AND THE WALL.
7. LOCATION OF PULLBOXES ARE APPROXIMATE. THE CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH MECHANICAL PIPING AND SHALL BE 150mm (MINIMUM) AWAY FROM MECHANICAL PIPING FLOW LINES.
8. ONLY MAJOR PULLBOXES ARE SHOWN. THE CONTRACTOR SHALL PROVIDE ADDITIONAL PULLBOXES WHERE REQUIRED TO MAKE A WORKABLE INSTALLATION.
9. THE WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE DETAILS WHETHER OR NOT THEY ARE REFERENCED ON THE DRAWINGS.
10. ALL CONDUIT RUNS CROSSING EXPANSION JOINTS SHALL HAVE EXPANSION OR EXPANSION AND DEFLECTION TYPE FITTINGS. FOR LOCATIONS OF EXPANSION JOINTS, REFER TO THE STRUCTURAL DWGS.
11. LUMINAIRES SHALL BE MOUNTED ACCORDING TO THE MOUNTING HEIGHT GIVEN ON THE DRAWINGS, WITH THE DISTANCE BEING MEASURED FROM THE BOTTOM OF THE LUMINAIRE TO THE FINISHED FLOOR. THE APPROPRIATE MOUNTING BRACKETS AND HARDWARE SHALL BE SUPPLIED.
12. ALL PANELBOARDS SHALL BE MOUNTED SO THAT THE DISTANCE FROM THE CENTERLINE OF THE TOP CIRCUIT BREAKER OPERATING HANDLE IN THE UPPERMOST POSITION TO THE FINISHED FLOOR SHALL NOT EXCEED 2000mm.
13. THE WIRING DIAGRAMS, QUANTITY AND SIZE OF WIRES AND CONDUIT REPRESENT A SUGGESTED ARRANGEMENT BASED UPON SELECTED STANDARD COMPONENTS OF ELECTRICAL EQUIPMENT. MODIFICATIONS ACCEPTABLE TO THE ENGINEER MAY BE MADE BY THE CONTRACTOR TO ACCOMMODATE EQUIPMENT ACTUALLY PURCHASED. THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS.
14. CONNECTIONS BETWEEN RIGID CONDUIT AND MOTOR TERMINAL BOXES OR SIMILAR EQUIPMENT SUBJECT TO VIBRATION SHALL BE FLEXIBLE LIQUID-TIGHT CONDUIT.
15. CONDUITS SHALL BE TERMINATED SO AS TO PERMIT NEAT CONNECTION TO MOTORS AND OTHER EQUIPMENT.
16. CONDUITS FOR FUTURE EQUIPMENT OR EXTENSIONS SHALL BE TERMINATED AS SHOWN IN DETAIL OR AS SPECIFIED.
17. MCC AND SWITCHGEAR COMPARTMENT DESIGNATIONS SHALL BE AS FOLLOWS:

    BLANK/SPACE: CONTAINS NECESSARY BUS AND HARDWARE FOR FUTURE ADDITION OF BREAKERS OR STARTERS.

    SPARE: CONTAINS A COMPLETE INSTALLED BREAKER OR STARTER AVAILABLE FOR FUTURE USE.
18. ALL MOTOR STARTER CONTROL POWER TRANSFORMERS SHALL BE SIZED TO PROVIDE SUFFICIENT VOLT-AMPERE CAPACITY FOR OPERATING ALL LOCAL AND REMOTE ELECTRICAL DEVICES ASSOCIATED WITH CONTROL OF THE MOTOR IN ADDITION TO THE STARTER COIL.
19. MOTOR CONTROL CENTERS AND ALL FREE STANDING PANELS SHALL BE SET ON CONCRETE HOUSEKEEPING PADS WITH LEVELING CHANNELS EMBEDDED IN THE PAD.
20. ALL RECEPTACLES IN OUTDOOR AND ANTICIPATED WET AREAS SHALL BE GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLES WITH WEATHERPROOF COVERS.
21. ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING THE PROJECT TO VERIFY THE SCOPE OF WORK WITH FIELD CONDITIONS. PARTICULAR ATTENTION SHOULD BE GIVEN TO NEW CONDUIT RUNS IN EXISTING BUILDINGS.
22. EQUIPMENT LOCKOUTS SHALL BE IN STRICT ACCORDANCE WITH OWNER'S REQUIREMENTS.
23. FOR LIGHTING AND RECEPTACLE SYSTEMS, ONLY CIRCUIT NUMBERS ARE SHOWN. CONTRACTOR SHALL PROVIDE ALL NECESSARY CONDUITS, WIRES, FITTINGS, JUNCTION BOXES AND ALL NECESSARY COMPONENTS SHOWN OR NOT SHOWN ON THE DRAWINGS, TO MAKE THE ELECTRICAL INSTALLATION COMPLETE AND OPERATIONAL. ALL CONDUIT RUNS SHALL BE CONCEALED UNLESS INDICATED OTHERWISE. CIRCUIT LOADING SHALL BE AS INDICATED IN THE PANEL SCHEDULES. ALL LIGHTING AND RECEPTACLE CIRCUITS SHALL INCLUDE GROUND WIRE.
24. HVAC TEMPERATURE CONTROL WIRING SHALL BE THE RESPONSIBILITY OF THE TEMPERATURE CONTROLS SUBCONTRACTOR UNDER DIVISION 15/23, AND IS NOT SHOWN ON THE ELECTRICAL DRAWINGS. 120, 208, AND 480 VOLT POWER WIRING SHALL BE PROVIDED AS INDICATED AND AS A PART OF THE ELECTRICAL DIVISION 16/26 WORK.
25. CONTRACTOR SHALL ISSUE SUBMITTALS FOR LONG LEAD-TIME EQUIPMENT (DEFINED AS HAVING OVER 3 MONTHS FROM PLACEMENT OF A PURCHASE ORDER TO ONSITE DELIVERY) WITHIN ONE MONTH OF NOTICE TO PROCEED.

Document No.: 4375.016 Version: 3

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el dueño del proyecto a presentar estos planos de construcción ante LUMA Energy como operador y administrador del Sistema de Transmisión y Distribución de la AEE. / I certify that I am a licensed and registered engineer, surveyor, or architect (in compliance with Act 173 of 1988, as amended) and authorized by the project or land owner to submit these construction plans to LUMA Energy as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. En armonía con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, certifico que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos, LUMA Energy y el Manual de Práctica Profesional del CIAPR. / In compliance with Act No.135 of June 15, 1967, as amended known as the "Construction Plans or Projects Certification Act", I certify that I prepared the electric design for this project in accordance with the codes. Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CIAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

LUMA **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:48:22 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification presented by the designer in compliance with Act 135 of July 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no releva al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al constructor ni al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. / LUMA does not assume responsibility over the certified design. LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from: National Electric Code, National Electric Safety Code; constructions standards, norms, and regulations from LUMA and other government agencies as well as federal and state laws ruling by the time construction begins.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediando notificación previa a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese periodo, este endoso perderá su vigencia. Este endoso no es para constituir servidumbre ni para completar proceso de Cesión, Traspaso y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (7282 de 2007 / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will still be valid until work's completion. In case there is no certified electrical work during the period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (7282 of 2007).

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 05/21/2024 | 100% DESIGN | JL | GN | GN |
| C | 11/20/2023 | 90% DESIGN | JL | GN | GN |
| B | 09/29/2023 | 60% DESIGN | JL | GN | GN |
| A | 07/26/2023 | 30% DESIGN | JL | DR | GN |

| | |
|---|---|
| DRAWN BY | FL |
| DESIGNED BY | JL |
| CHECKED BY | DR |
| APPR. BY | GN |

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERAL NOTES AND ABBREVIATIONS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 120 OF 145
DWG. NO. **000-E-03**

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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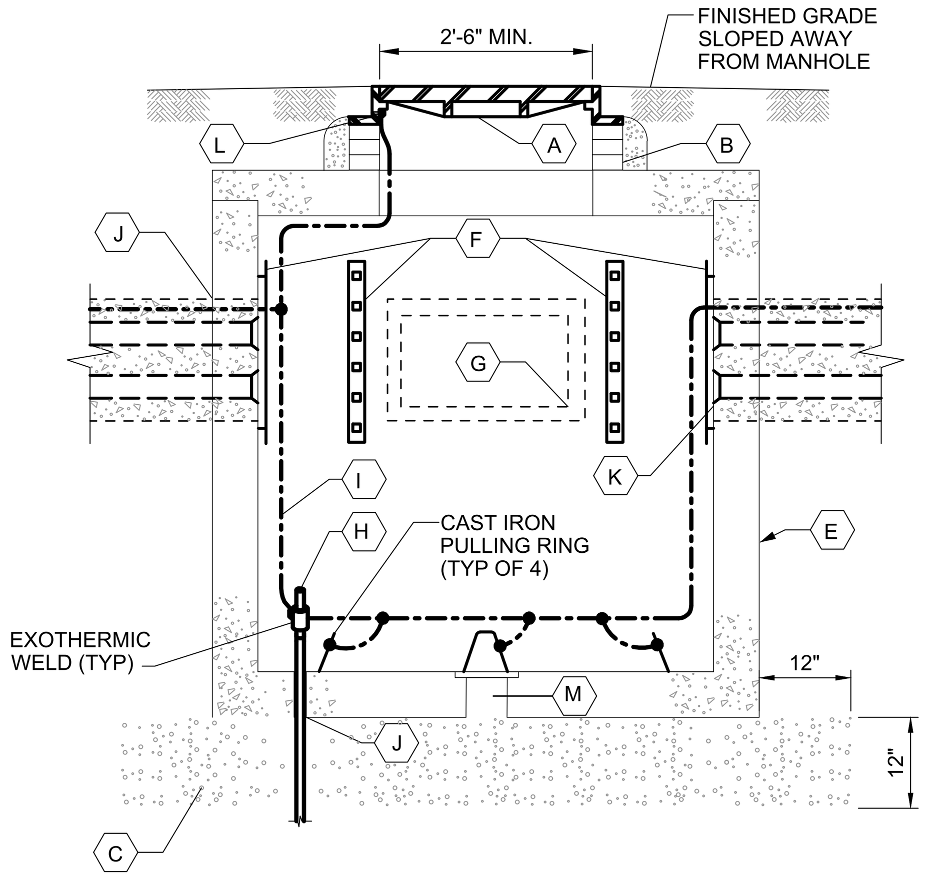
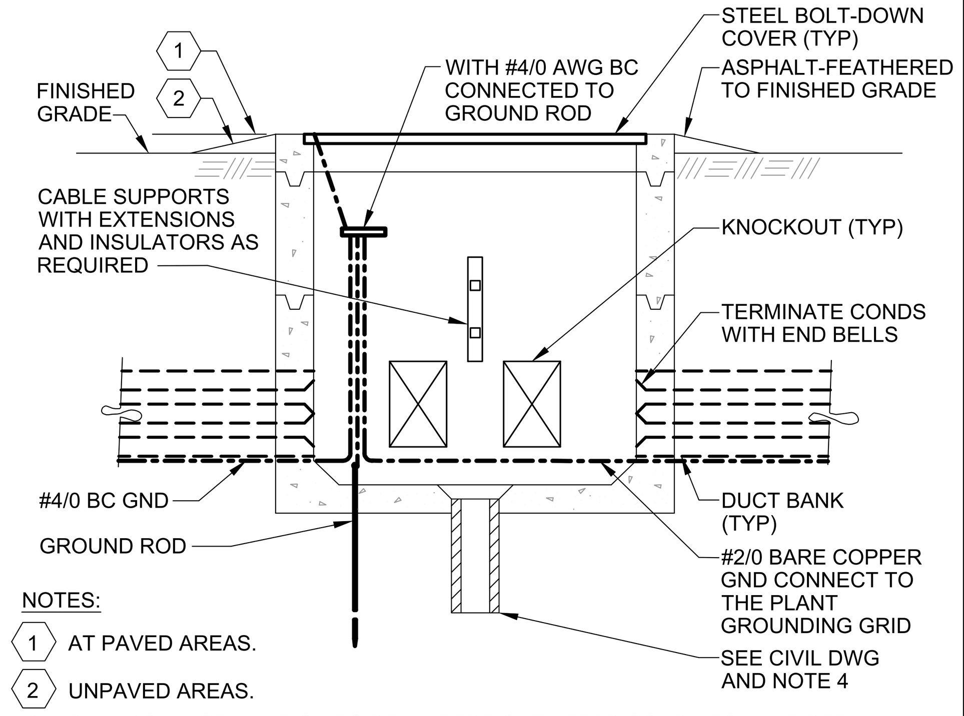



KEYNOTES:

- (A) HEAVY DUTY TRAFFIC RATED CAST IRON COVER, SEE UNDERGROUND RACEWAY SPECIFICATION FOR DETAILS.
- (B) GRADING RINGS AS REQUIRED, GROUTED WITH WATERPROOF GROUT.
- (C) COMPACTED GRANULATED FILL, 3/4" MAXIMUM DIAMETER.
- (D) 3" DEEP SUMP WITH 18" SQUARE C.I. FRAME AND GRATE.
- (E) PRE-CAST CONCRETE (4000 PSI @ 28 DAYS) ELECTRIC MANHOLE. 6'x6'x7' H INSIDE DIMENSIONS FOR LOW VOLTAGE MANHOLES AND 10'x10'x7' H INSIDE DIMENSIONS FOR HIGH VOLTAGE MANHOLES, UNLESS OTHERWISE NOTED.
- (F) HEAVY DUTY NON METALLIC STANCHIONS WITH HEAVY DUTY NON-METALLIC CABLE RACKS AS MANUFACTURED BY UNDERGROUND DEVICES OR APPROVED EQUAL.
- (G) CONCRETE KNOCKOUT WINDOW, SIZE AND LOCATION AS REQUIRED.
- (H) 3/4" X 10'-0" COPPER CLAD GROUND ROD. SEAL OPENING WITH WATERPROOF GROUT.
- (I) #4/0 BARE COPPER CONTINUOUS GROUND.
- (J) SEAL ALL OPENINGS WITH WATERPROOF GROUT, DAMP PROOF MANHOLE PER CAST IN PLACE CONCRETE SPECIFICATION.
- (K) PVC DUCT BELL-END FOR PVC CONDUITS. FOR METAL CONDUITS, PROVIDE SEALING BUSHINGS WITH GROUND LUG FOR BONDING TO MANHOLE GROUNDING NETWORK AS REQUIRED. SEALING BUSHING, O-Z ELECTRICAL MFG. CO. TYPE "CSBG".
- (L) CAST IRON FRAME 1/2" DIA HOLE DRILLED AND TAPPED FOR GROUNDING LUG INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
- (M) 8" MINIMUM DRAIN WITH GRATE.

## E-101 PRE-CAST MANHOLE

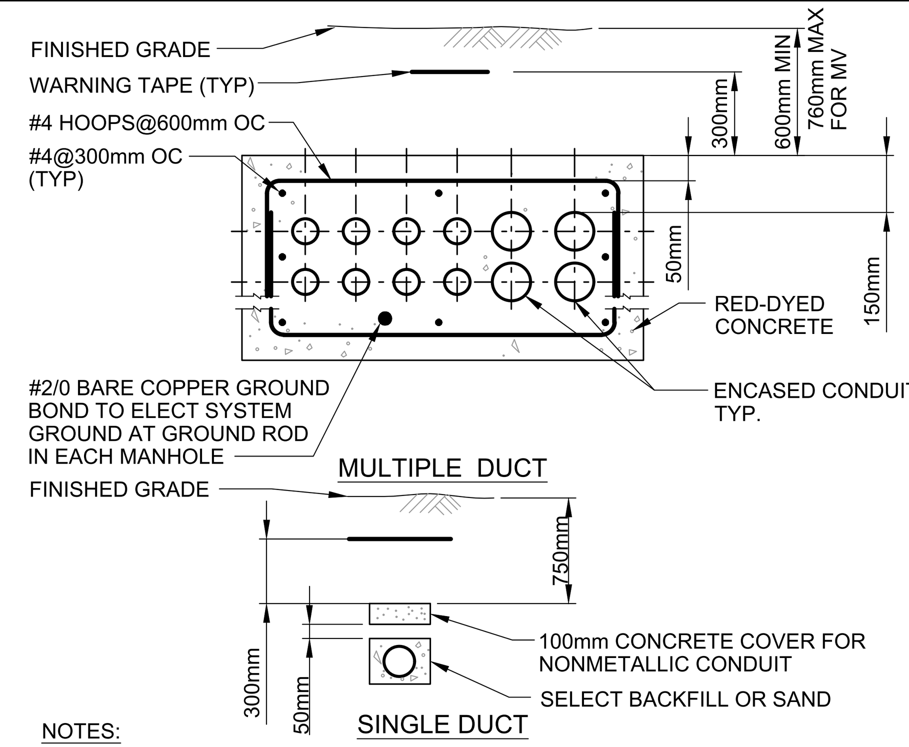



NOTES:

1. AT PAVED AREAS.
2. UNPAVED AREAS.
3. PULL BOX INSTALLATION TO BE WATERTIGHT AFTER CONDUITS HAVE BEEN INSTALLED BY USING DUCT SEALING.
4. FOR MANHOLE/PULL BOX NOT SHOWN WITH DRAINAGE PIPING ON CIVIL DRAWINGS, PROVIDE A MINIMUM 100mm DIAMETER PVC PIPE TO A 77mm x 77mm x 77mm DRAIN ROCK PIT.

## E-102 TYPICAL PRECAST PULLBOX

REV 010119

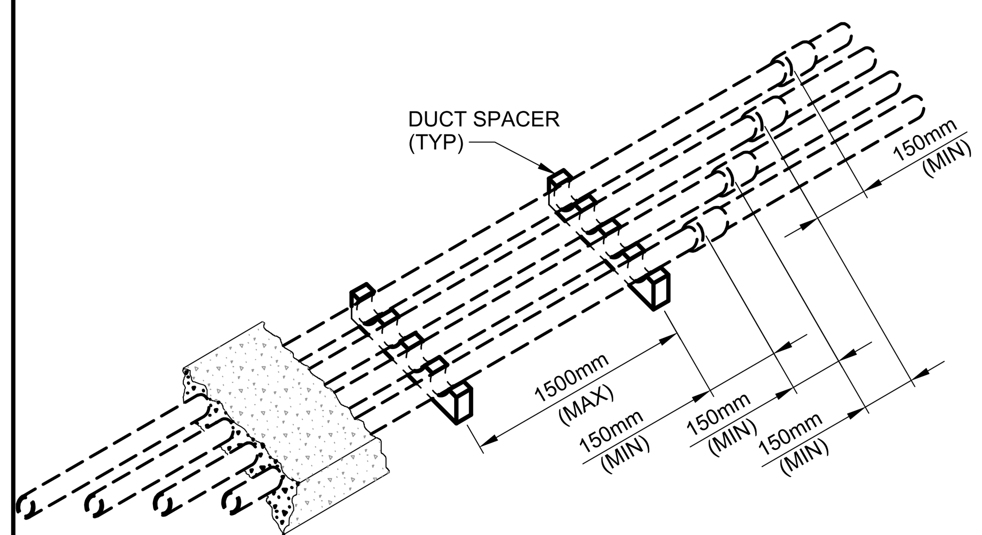



NOTES:

1. AT INTERSECTIONS WITH STRUCTURES HOOK #4'S INTO THE FOOTING OR WALL (TYP).
2. SEE DUCT BANK SECTIONS AND DETAILS FOR NUMBER AND ARRANGEMENT OF DUCTS.

## E-103 TYPICAL DUCTBANK

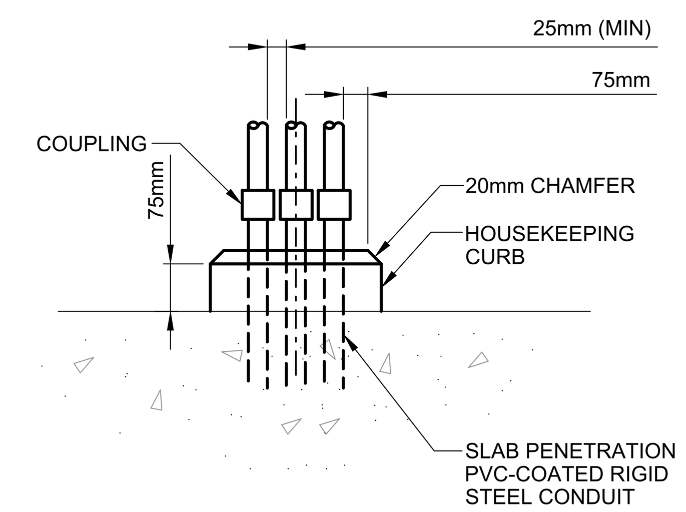
REV 010119




## E-108 TYPICAL DUCTBANK

JOINT/SUPPORT SPACING

REV 010119



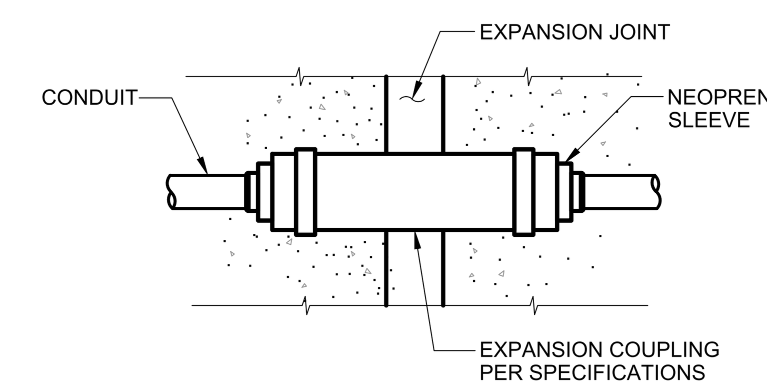

NOTE:

HOUSEKEEPING CURB REQUIRED AT ALL LOCATIONS FOR SINGLE AND MULTIPLE RISERS.

## E-203 CONCRETE HOUSEKEEPING CURB

NON-HAZARDOUS LOCATIONS

REV 010119

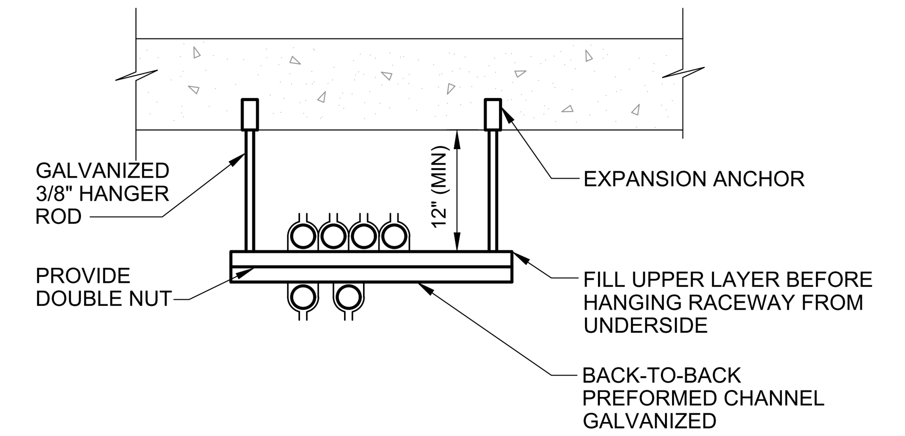



NOTE:

PROVIDE EXTERNAL BONDING JUMPER WITH METALLIC CONDUIT AND WHEN COUPLING HAS NO INTERNAL JUMPER.

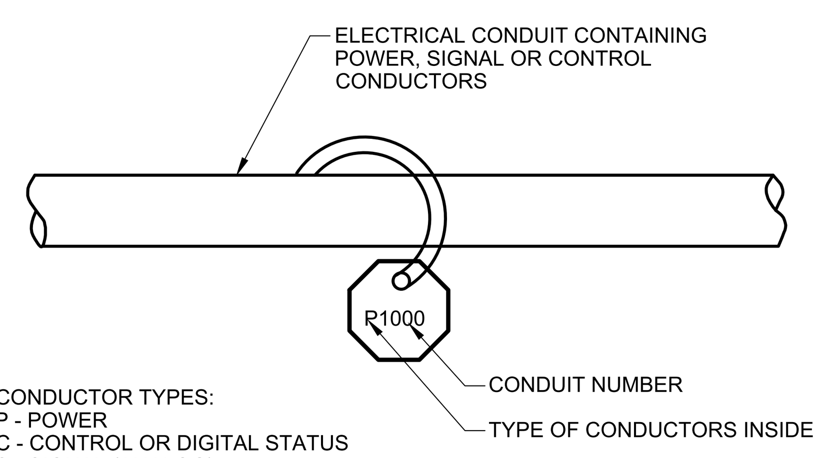
## E-204 EXPANSION COUPLING

REV 010119




## E-207 CONDUIT TRAPEZE

REV 010119




CONDUCTOR TYPES:
P - POWER
C - CONTROL OR DIGITAL STATUS
S - SIGNAL (ANALOG)

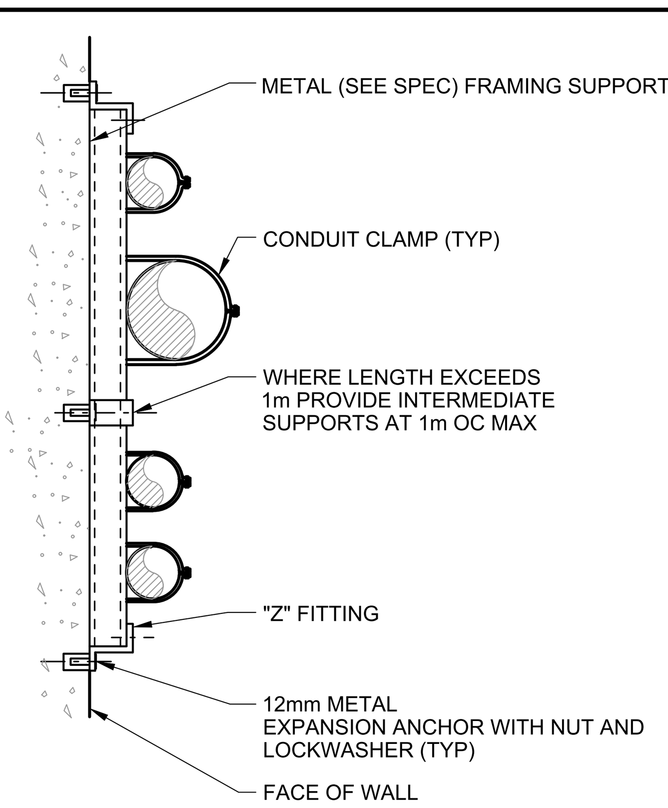
CONDUIT NUMBERS ARE LISTED ON THE CONDUIT / CABLE SCHEDULE

NOTE:

1. CONDUIT TAGS SHALL BE AFFIXED TO CONDUITS:
   A. AFTER ALL WORKING DRAWINGS ARE APPROVED AND ALL FIELD MODIFICATIONS HAVE BEEN MADE.
   B. BEFORE FINAL ACCEPTANCE TESTING HAS STARED.

## E-210 CONDUIT IDENTIFICATION TAG

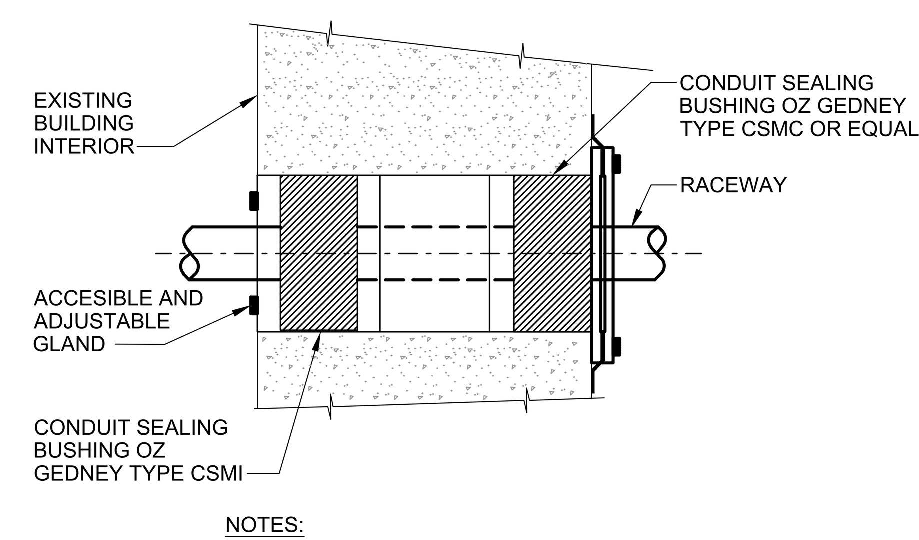
REV 010119




## E-212 CONDUIT SUPPORT

FLUSH MOUNT

REV 010119



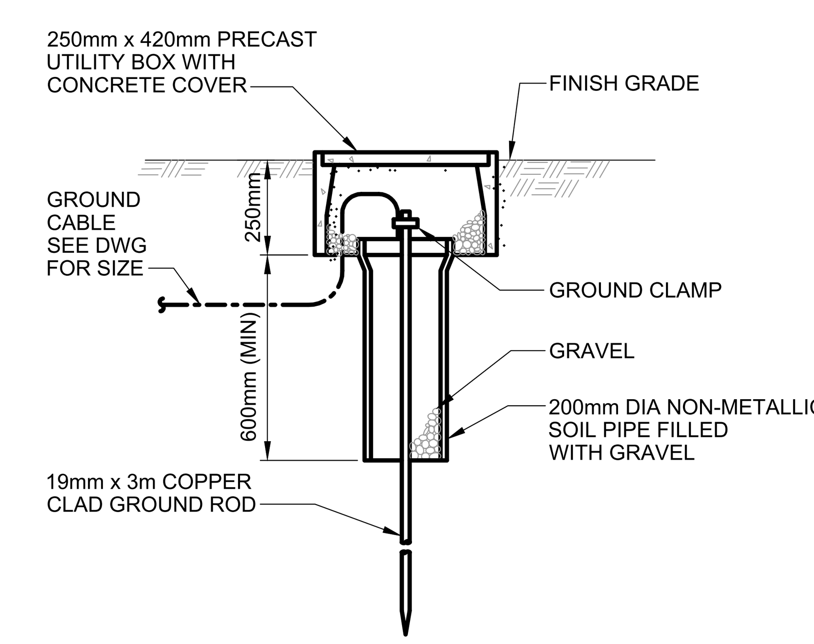

NOTES:

APPLICABLE TO NON-FIRE RATED WALLS.

## E-214 WATERTIGHT CONDUIT SEAL

ABOVE GRADE EXTERIOR WALLS

REV 010119




## E-303 GROUND ROD AND WELL

REV 010119

Document No.: 4375.016 Version: 3

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el dueño del proyecto a presentar estos planos de construcción ante LUMA Energy como operador y administrador del Sistema de Transmisión y Distribución de la AEE. / I certify that I am a licensed and registered engineer, surveyor, or architect (in compliance with Act 173 of 1988, as amended) and authorized by the project or land owner to submit these construction plans to LUMA Energy as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. En armonía con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, certifico que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos, LUMA Energy y el Manual de Práctica Profesional del CIAPR. / In compliance with Act No.135 of June 15, 1967, as amended known as the "Construction Plans or Projects Certification Act", I certify that I prepared the electric design for this project in accordance with the codes. Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CIAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

LUMA

**ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago — Digitally signed by Rafael Meléndez Santiago Date: 2024.06.06 14:48:44 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification presented by the designer in compliance with Act 135 of July 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no releva al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al constructor ni al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. / LUMA does not assume responsibility over the certified design. LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from: National Electric Code, National Electric Safety Code; constructions standards, norms, and regulations from LUMA and other government agencies as well as federal and state laws ruling by the time construction begins.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediando notificación previa a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese periodo, este endoso perderá su vigencia. Este endoso no es para constituir servidumbre ni para completar proceso de Cesión, Traspaso y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (7282 de 2007 / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will still be valid until work's completion. In case there is no certified electrical work during this period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment. Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (7282 of 2007).

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| C | 02/13/2024 | 100% DESIGN | JL | DR | GN |
| B | 11/20/2023 | 90% DESIGN | JL | DR | GN |
| A | 09/29/2023 | 60% DESIGN | JL | GN | GN |

DRAWN BY FL
DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ELECTRICAL DETAILS - I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE
SHEET NO. 121 OF 145
DWG. NO. 000-E-04
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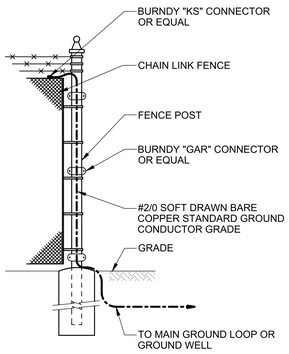
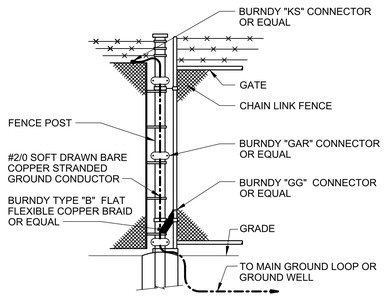


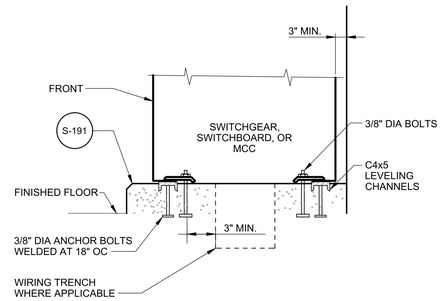

## E-316 FENCE GROUNDING

REV 010119




## E-317 GATE-TO-FENCE GROUNDING

REV 010119

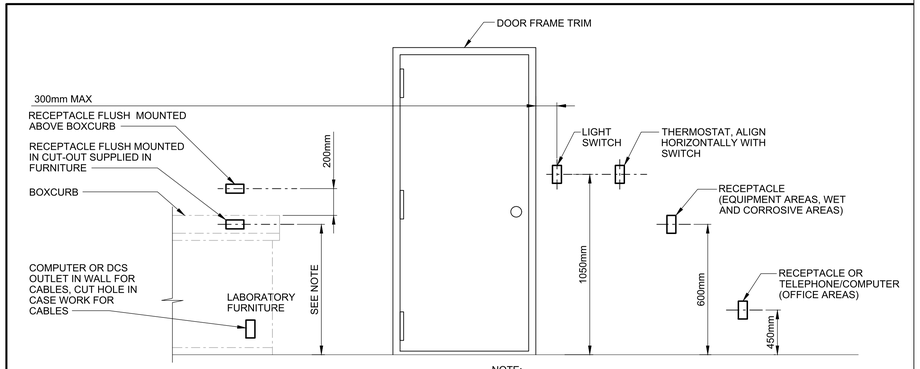



NOTE:

INSTALL LEVELING CHANNELS IN FLOOR, WHERE HOUSEKEEPING PAD IS NOT PROVIDED.

## E-400 EQUIPMENT LEVELING CHANNELS

REV 010119

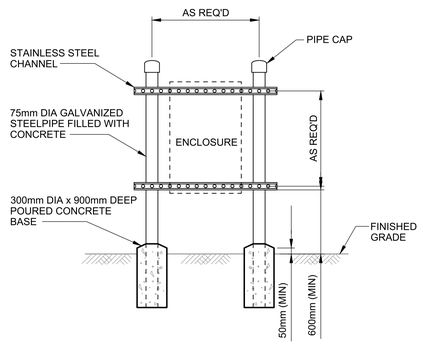



NOTE:

CONTRACTOR SHALL DETERMINE OUTLET BOX MOUNTING HEIGHT TO SUIT LABORATORY EQUIPMENT FURNISHED FOR INSTALLATION

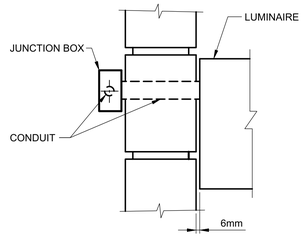
## E-450 OUTLET BOX MOUNTING

REV 010119




## E-420 ENCLOSURE MOUNTING STAND

REV 010119



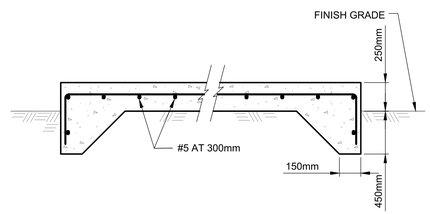

NOTES:

1. PROVIDE GASKET BETWEEN LUMINAIRE AND CONDUIT.
2. INSTALLATION SHALL BE WATERTIGHT.
3. APPLICABLE FOR EXPOSED CONDUIT RUNS

## E-605 WALL MOUNT LUMINAIRE

EXTERIOR WALL

REV 010119

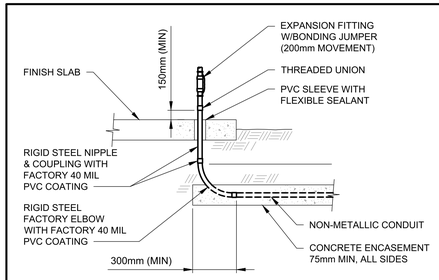



NOTES:

1. OVERALL PAD DIMENSIONS SHALL BE DETERMINED FROM ELECTRICAL DRAWING AND ADJUSTED AS REQ'D TO SUIT EQUIPMENT FURNISHED.
2. COORDINATE WITH STRUCTURAL DRAWINGS.

## E-617 ELECTRICAL EQUIPMENT PAD

REV 010119



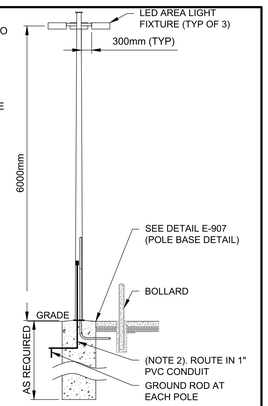

NOTES:

1. TO ALLOW FOR DIFFERENTIAL SETTLING ALL CONDUITS ROUTED FROM BELOW GRADE THROUGH CONCRETE SLABS SHALL BE INSTALLED IN ACCORDANCE WITH THIS DETAIL. CAST-IN-PLACE CONDUIT PENETRATIONS NOT ACCEPTED.
2. ANY CONDUIT SUPPORT APPLIED UNDERNEATH THE EXPANSION FITTING SHALL ALLOW FREE MOVEMENT OF THE CONDUIT RELATIVE TO THE SLAB.

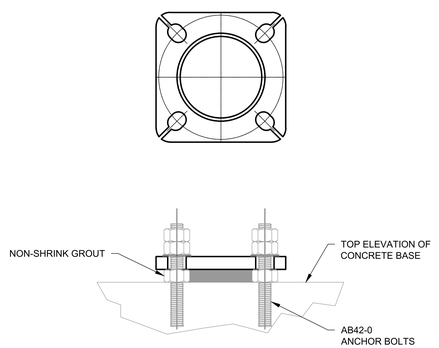
## E-902 RISER THROUGH CONCRETE SLAB

GENERAL NOTES:

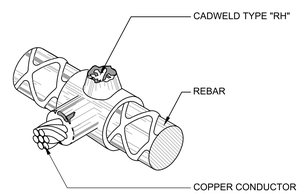
1. PROVIDE LIGHTNING TERMINALS TO POLES.
2. PROVIDE CLASS 1 LP Cu. CABLE FROM LIGHTNING TERMINAL TO GROUND ROD.
3. RUN POWER WIRING LOOSE INSIDE THE POLE.




## E-906 AREA LIGHTING POLE ELEVATION



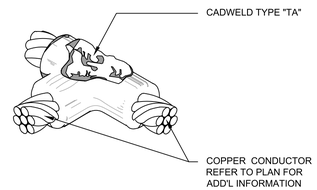

## E-907 POLE BASE DETAIL




NOTE:

CADWELD TYPE LISTED FOR REFERENCE ONLY AND DOES NOT PRECLUDE ANY OTHER MANUFACTURERS. THERMOWELD IS AN APPROVED MANUFACTURER.

## E-914 GROUNDING AT REBAR CONNECTION




NOTE:

CADWELD TYPE LISTED FOR REFERENCE ONLY AND DOES NOT PRECLUDE ANY OTHER MANUFACTURERS. THERMOWELD IS AN APPROVED MANUFACTURER.

## E-915 GROUNDING AT TEE CONNECTION

Document No.: 457824E Version: 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1968, según enmendada, y que he preparado o he sido autorizado por el proponente de proyecto o su representante autorizado, incluyendo pero sin limitarse al administrador del Sistema de Transmisión y Distribución de la AEE, lo certifico (I certify that I am a licensed and registered engineer, surveyor, or architect (in compliance with Act 173 of 1968, as amended) and authorized by the project or land owner to endorse these construction plans, including, but not limited to, LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority).
2. En armonía con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planes de Construcción y de Ejecución de Mejoras Públicas y Privadas para Garantizar el Pago de Salarios Mínimos, Beneficios Marginales y seguros según establecidos por la ASTE, la Junta de Planificación, y la Oficina de Gerencia de Permisos, LUMA Energy, y el Manual de Práctica Profesional del CAPR, y en cumplimiento con Act No.135 of June 15, 1967, as amended known as the "Construction Plans or Certificate of Construction and Execution of Public and Private Improvements to Guarantee the Payment of Minimum Wages, Marginal Benefits and Guarantees as established by the ASTE, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE:5131(28)
Date: 2024.05.20 14:38:03 -04'00'

**ENDOSO / ENDORSEMENT**

LUMA

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:49:07 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación someteda por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de junio de 1967, según enmendada. LUMA endosa los electric design shown in these construction plans based on the certification presented by the designer in compliance with Act 135 of July 15, 1967, as amended.
2. LUMA no se responsabiliza por el diseño eléctrico certificado por el diseñador. Este endoso no exime al diseñador profesional que asume el certificar estos planos. Este endoso no relieva al constructor ni al propietario de obra privada de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA. Tampoco relieva al constructor de su responsabilidad de cumplir con los requisitos de seguridad. LUMA no asume ninguna responsabilidad over the certified design. LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with applicable dispositions from National Electric Code, National Electric Safety Code, applicable materials, norms, and regulations from LUMA as well as from the requirements of the National Electric Safety Code. Nor does it relieve the builder of its responsibility.
3. El presente endoso tiene vigencia de un (1) año. De mostrar los diseño eléctrico dentro de este término, mediando notificación prior a a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese periodo, este endoso perderá su vigencia. Este endoso no es para construir ser ocupado o para completar procesos de Centro. Tampoco es para obtener el Permiso de Uso. Este endoso no sustituye el requisito de inspecciones de Oficina de Permisos de la Autoridad de Energía Eléctrica (TOA) de 2007. This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will still be valid until work's completion. In case there is no certified electrical work during this period, this endorsement will be void. This endorsement is not for construction, occupancy or completion of Center processes nor for the Use and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TOA) of 2007.

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| C | 02/13/2024 | 100% DESIGN | JL | GN | GN |
| B | 11/20/2023 | 90% DESIGN | JL | GN | GN |
| A | 09/29/2023 | 60% DESIGN | JL | GN | GN |

| | |
|---|---|
| DRAWN BY | FL |
| DESIGNED BY | JL |
| CHECKED BY | DR |
| APPR. BY | GN |

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ELECTRICAL DETAILS - II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 122 OF 145
DWG. NO. 000-E-05

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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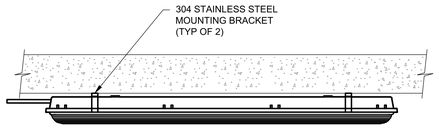
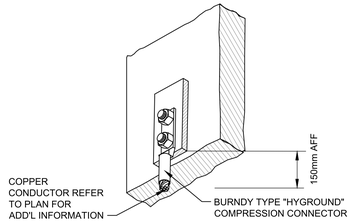


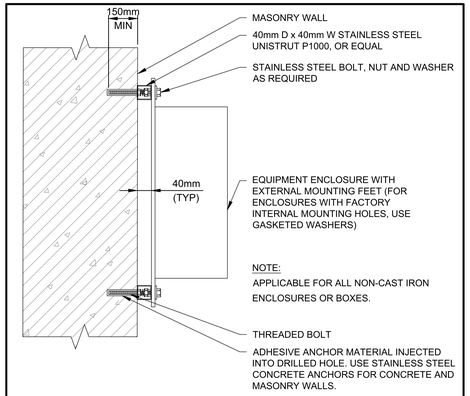

NOTES:
1. DETAIL TYPICAL FOR CEILING OR WALL MOUNT.
2. PROVIDE CONDUIT FITTINGS AS REQUIRED.

## E-909 SURFACE MOUNTED LINEAR FIXTURE



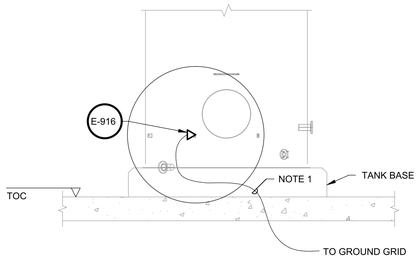

NOTE:
BURNDY TYPE LISTED FOR REFERENCE ONLY AND DOES NOT PRECLUDE ANY OTHER MANUFACTURERS.

## E-916 GROUNDING AT STEEL PLATE CONNECTION




NOTE:
APPLICABLE FOR ALL NON-CAST IRON ENCLOSURES OR BOXES.

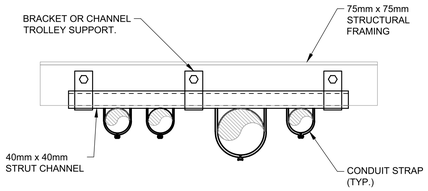
## E-923 ENCLOSURE MOUNTING



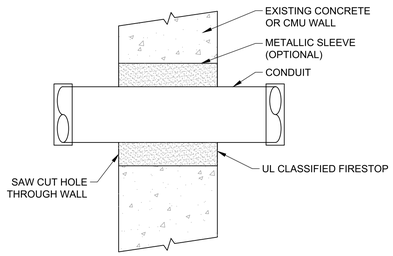

NOTES:

#2/0 BARE STRANDED COPPER BONDING CONDUCTOR WITH EXOTHERMIC OR IRREVERSIBLE COMPRESSION CONNECTION TO MAIN GROUND CONDUCTOR. EXTEND CONDUCTOR UP THROUGH EQUIPMENT BASE AND TERMINATE WITH GROUND PLATE USING BOLTED CONNECTION.

## E-925 TANK GROUNDING

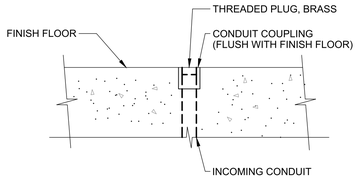



## E-928 CONDUIT SUPPORT




NOTES:
1. ALL CONDUIT RUNS SHALL BE SUPPORTED IN ACCORDANCE WITH THE LATEST NEC CODE.
2. FIRESTOP SYSTEM SHALL BE TESTED FOR THROUGH PENETRATION APPLICATIONS UP TO 4 HOURS IN ACCORDANCE WITH UL 1479, OR AS REQUIRED PER WALL FIRE RATING.

## E-938 CONDUIT PENETRATION THRU WALL ABOVE GRADE




## E-938 CONDUIT TERMINATION FOR FUTURE EQUIPMENT

Document No.: 427LPR Version: 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar estos planos de construcción ante LUMA Energy como operador y administrador del Sistema de Transmisión y Distribución de la ADE. / I certify that I am a licensed and registered engineer, surveyor or architect in compliance with Law 173 of 1988, as amended, and I am authorized by the design of the project to submit these construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico que las disposiciones de la Ley Núm. 170 de 15 de julio de 1987, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, sentidas que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la ARE, la Junta de Planificación y la Oficina de Gerencia de Permisos. / LUMA Energy y el Manual de Prácticas Profesionales de Certificación de Planos de la CAPR. / I certify that I prepared the electric design for this project in accordance with the Projects Certification Act. / I certify that I prepared the electric design for this project in accordance with the codes, Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**ENDOSO / ENDORSEMENT**

LUMA

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago

Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:49:31 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación suministrada por el diseñador en cumplimiento con la Ley Núm. 170 del 15 de julio de 1987, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification provided by the designer in compliance with Law 170 of July 15, 1987, as amended.
2. LUMA no asume responsabilidad activa el diseño certificado. El endoso por parte de la LUMA no relevo al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no relevo al constructor ni al inspector de obra pro-rata de cumplir con las especificaciones de los planos certificados. LUMA no asume responsabilidad sobre el diseño certificado. / LUMA does not assume responsibility over the certified design. LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediante notificación previa a LUMA, el endoso mencionado su vigencia habrá la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese término, el endoso perderá su validez. Este endorsamiento no constituye un servidumbre o Transferencia y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TQG de 2007 / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the mentioned endorsement will have its validity. If electrical work is not certified within this period, the endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TQG of 2007).

**PRELIMINARY NOT FOR CONSTRUCTION**

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| DRAWN BY | JL |
| DESIGNED BY | JL |
| CHECKED BY | DR |
| APPR. BY | GN |

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B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ELECTRICAL DETAILS - III

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 123 OF 145
DWG. NO. 000-E-06

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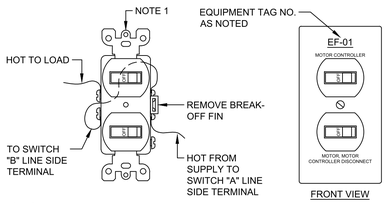
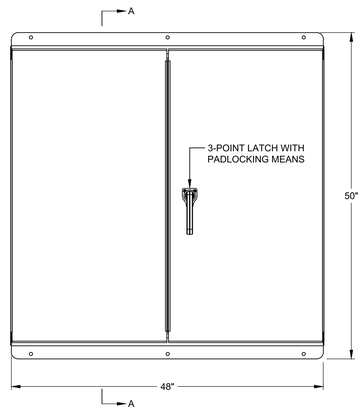


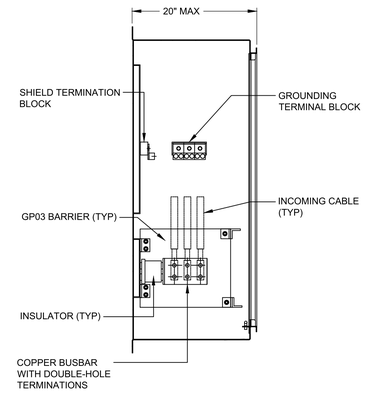

NOTES:

1. 15 AMP 120/277V COMMERCIAL GRADE DUPLEX AC SNAP SWITCH. HANDLES SHALL CLEARLY INDICATE SWITCH POSITION.
2. WIRE BOTH SWITCHES IN SERIES WITH THE MOTOR CONTROLLER DISCONNECT UPSTREAM OF THE MOTOR CONTROLLER. GROUNDED CONDUCTORS AND EQUIPMENT GROUNDING CONDUCTORS NOT SHOWN FOR CLARITY.
3. DEVICE PLATE SHALL BE STAINLESS STEEL, ENGRAVED WITH BLACK TEXT AS SHOWN. TEXT STYLE SHALL BE ARIAL. TEXT HEIGHT FOR THE EQUIPMENT TAG NUMBER SHALL BE 3/16". TEXT HEIGHT FOR REMAINING TEXT SHALL BE 1/8".
4. SURFACE MOUNTED. DRY INTERIOR APPLICATIONS ONLY, FOR STATIONARY MOTORS, 2HP OR LESS AND 300V OR LESS.

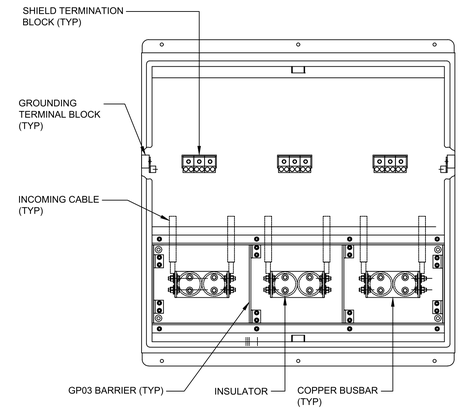
## 1 1-PHASE COMBINATION MOTOR CONTROLLER AND DISCONNECT




FRONT VIEW




SECTION A-A

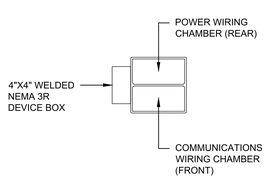



FRONT VIEW WITH DOORS REMOVED

NOTES:

1. TERMINATION BOX SHALL BE ASSEMBLED BY A UL CERTIFIED SHOP AND SHALL BEAR THE APPROPRIATE UL LABEL.
2. THIS DETAIL ILLUSTRATES THE BASIC REQUIREMENTS FOR THE ENCLOSURE. FINAL DESIGN SHALL BE THE RESPONSIBILITY OF THE MANUFACTURER. ENGINEER WILL CONSIDER VENDOR PREFERENCES.
3. DESIGN THE TERMINATION BOX TO ACCEPT 750KCM, 15KV 100% XLP SHIELDED COPPER CABLE WITH PVC OUTER JACKET FOR UNGROUNDED CONDUCTORS AND #4/0 AWG COPPER GROUND CONDUCTORS WITH XHHW INSULATION. OPERATING VOLTAGE SHALL BE 4160V. CONTINUOUS CURRENT RATING SHALL BE 1200A, MINIMUM. FAULT CURRENT RATING SHALL BE 50KA, MINIMUM. PROVIDE THE MANUFACTURER WITH ALL ADDITIONAL RELEVANT INFORMATION.
4. ENCLOSURE SHALL BE NEMA 3R, STAINLESS STEEL, SIZED BY CONTRACTOR, SUITABLE FOR WALL-MOUNT APPLICATION. ALL MOUNTING HARDWARE SHALL BE STAINLESS STEEL. FURNISH WITH TWO BREATHER/DRAIN FITTINGS.
5. FURNISH WITH INFRARED INSPECTION WINDOW(S) TO ALLOW THERMOGRAPHIC SURVEY WITH CABINET DOOR CLOSED.
6. PROVIDE SUFFICIENT TERMINALS TO ACCOMMODATE THE REQUIRED NUMBER OF PARALLEL CONDUCTORS IN EACH PHASE.
7. PROVIDE MEANS TO BOND CONDUCTOR SHIELDING.
8. APPLY NAMEPLATE ON EACH BOX INDICATING ITS TAG NUMBER AND ITS SOURCE OF POWER.
9. APPLY ALL REQUIRED WARNING LABELS, PER PUERTO RICO ELECTRICAL CODE REQUIREMENTS. APPLY WARNING LABEL WITH THE FOLLOWING TEXT. "DO NOT OPEN ENCLOSURE WHILE ENERGIZED!"
10. APPLY ARC FLASH HAZARD LABEL BASED ON RESULTS FROM THE ARC FLASH HAZARD ANALYSIS.
11. ENCLOSURE DEPTH SHALL NOT EXCEED 20"
12. BUSBARS SHALL BE TIN-PLATED COPPER.
13. PROVIDE SUFFICIENT TERMINALS TO TERMINATE ALL INCOMING GROUND CONDUCTORS.
14. CABLE ENTRY SHALL BE TOP ONLY.
15. PROVIDE EXTERNAL GROUNDING LUG, SIZED TO ACCEPT #4/0 COPPER GROUNDING CONDUCTOR.
16. PROVIDE ROXTEC CABLE TRANSIT SYSTEM TO ACCOMMODATE CABLE ENTRY INTO THE ENCLOSURE

## 2 TYPICAL MEDIUM VOLTAGE TERMINATION BOX

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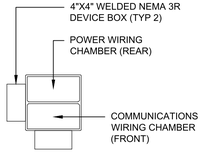


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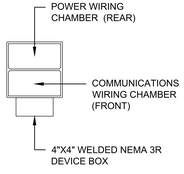


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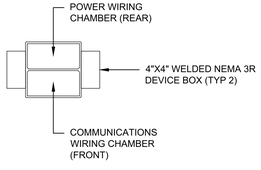


TYPE 4

1. PROVIDE MEANS TO ALLOW TRANSITION OF LUMINAIRE LEADS FROM THE LUMINAIRE MOUNTED AT THE FRONT OF THE POLE TO THE POWER CHAMBER IN THE REAR.
2. FURNISH DEVICE BOXES WITH BLANK, GASKETED COVERS. PROVIDE MEANS TO ROUTE COMMUNICATIONS WIRING FROM COMMUNICATIONS CHAMBER INTO EACH DEVICE BOX. DEVICE BOX SHALL REMAIN SEGREGATED FROM POWER CHAMBER.
3. CENTERLINE OF DEVICE BOXES SHALL BE 12'-0" ABOVE POLE BASE PLATE

## 3 DUAL CHAMBER LIGHT POLE DETAIL

Document No.: 4375.616 Version: 0

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1965, según enmendada, y estoy autorizado por el dueño del proyecto a presentar estos planos de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor or architect in compliance with Act 173 of 1965, as amended, and authorized by the project or land owner to submit these construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. En armonía con las disposiciones de la Ley Núm. 135 de 15 de julio de 1967, según enmendada, conocida como Ley de Certificación de Planos de Construcción y Mejoras Permanentes, el diseño de la instalación eléctrica de este proyecto cumple con el Código Eléctrico Nacional, reglamento aprobado por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Práctica Profesional de GWRI. / In compliance with Act No.135 of June 15, 1967, as amended known as the "Construction Plans or Permanent Improvements Certification Act", the design of the electrical installation of this project complies with the National Electric Code, regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the GWRI Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:49:56 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación someteda por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification presented by the designer in compliance with Act 135 of July 15, 1967, as amended.
2. El diseñador profesional que firma estos planos de construcción certifica que el diseño de la instalación eléctrica de responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al contratista o al inspector de obra privado de cumplir con las disposiciones de Código Eléctrico Nacional, Código Eléctrico de Seguridad, codigos, patrones, normas y reglamentos vigentes de LUMA. Este endoso no libera al diseñador profesional de su responsabilidad profesional. / The professional designer signing these plans assumes responsibility over the certified design. LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with applicable requirements of the National Electric Code, Electrical Safety Code, codes, patrons, standards and regulations from LUMA and other government agencies as well as federal and state laws ruling by the time construction begins.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediante notificación prior a la LUMA, el endoso tendrá vigencia hasta que se complete la instalación eléctrica. Si no se inician las obras eléctricas dentro de este periodo, este endoso perderá su vigencia. Este endoso no es para conceder servidumbre o para completar procesos de Cesión, Traspaso y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica de Puerto Rico (7262 of 2007). / This endorsement is valid for a period of one (1) year. If the electrical work is started within this period, mediante notificación la LUMA, the endorsement will still be valid until work is completed. In case there is no certified electrical work during this period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (7262 of 2007).

**PRELIMINARY NOT FOR CONSTRUCTION**

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| DRAWN BY | JL |
| DESIGNED BY | JL |
| CHECKED BY | DR |
| APPR. BY | GN |

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ELECTRICAL DETAILS - IV

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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SHEET NO. 124 OF 145
DWG. NO. 000-E-07

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 1 2 CM

2024.05.20 1:20:33 PM
8814320006-07.dwg

## LUMINAIRE SCHEDULE

| TAG | MOUNTING | LAMP | COLOR TEMP. | NOMINAL LUMENS | VOLTAGE | WATTS | DESCRIPTION | MANUFACTURER OR EQUAL | MODEL | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| A1 | SUSPENDED | LED | 4000K | 8000 | 120-277 | 50.5 | LINEAR, GASKETED FIXTURE WITH WHITE FIBERGLASS HOUSING, LOW PROFILE ACRYLIC FROSTED LENS, MEDIUM DISTRIBUTION, UL LISTED FOR WET LOCATIONS. | LITHONIA | FEM L48 8000LM LPAFL MD MVOLT 40K 80CRI | |
| A1E | SUSPENDED | LED | 4000K | 8000 | 120-277 | 50.5 | LINEAR, GASKETED FIXTURE WITH WHITE FIBERGLASS HOUSING, LOW PROFILE ACRYLIC FROSTED LENS, MEDIUM DISTRIBUTION, UL LISTED FOR WET LOCATIONS, 10 WATT CONSTANT POWER EMERGENCY BATTERY WITH SELF DIAGNOSTICS. | LITHONIA | FEM L48 8000LM LPAFL MD MVOLT 40K 80CRI E10WMCP | |
| S1 | POLE | LED | 3500 | 14200 | 120-277 | 170 | AREA LIGHTING LUMINAIRE WITH CAST ALUMINUM HOUSING, TYPE III OPTICS WITH BACKLIGHT CONTROL, CRI OF 80, UL LISTED FOR WET LOCATIONS, EQUIPPED WITH MOTION SENSOR. FURNISH WITH 6-INCH SQUARE STRAIGHT ALUMINUM POLE WITH DUAL CHAMBERS, MATCHING COLOR. | LITHONIA | DSX0-LED-P7-35K-80CRI-BLC3-PIR | NORMAL POWER OUTPUT SHALL BE 50%, AND RISE TO 100% WHEN MOTION IS DETECTED. REFER TO POLE SCHEDULE FOR ADDITIONAL LIGHT-POLE REQUIREMENTS. |
| S2 | POLE | LED | 3500 | 14600 | 120-277 | 170 | AREA LIGHTING LUMINAIRE WITH CAST ALUMINUM HOUSING, TYPE IV OPTICS WITH BACKLIGHT CONTROL, CRI OF 80, UL LISTED FOR WET LOCATIONS, EQUIPPED WITH MOTION SENSOR. FURNISH WITH 6-INCH SQUARE STRAIGHT ALUMINUM POLE WITH DUAL CHAMBERS, MATCHING COLOR. | LITHONIA | DSX0-LED-P7-35K-80CRI-BLC4-PIR | NORMAL POWER OUTPUT SHALL BE 50%, AND RISE TO 100% WHEN MOTION IS DETECTED. REFER TO POLE SCHEDULE FOR ADDITIONAL LIGHT-POLE REQUIREMENTS. |
| W1 | SURFACE | LED | 3500k | 2000 | 120-277 | 15 | ARCHITECTURAL WALL SCONCE WITH ONE-PIECE DIE CAST, GASKETED ALUMINUM HOUSING, DARK BRONZE FINISH, FORWARD THROW OPTICS, ZERO UPLIGHT, UL LISTED FOR WET LOCATIONS. | LITHONIA | WDGE1 P2 35K 80CRI VF MVOLT DMG DDBXD | |
| W1E | SURFACE | LED | 3500k | 2000 | 120-277 | 15 | ARCHITECTURAL WALL SCONCE WITH ONE-PIECE DIE CAST, GASKETED ALUMINUM HOUSING, DARK BRONZE FINISH, FORWARD THROW OPTICS, ZERO UPLIGHT, UL LISTED FOR WET LOCATIONS, INTEGRAL EMERGENCY BATTERY. | LITHONIA | WDGE1 P2 35K 80CRI VF MVOLT DMG E4WH DDBXD | |
| X1 | SURFACE | LED | - | - | 120 | 1 | SINGLE-FACED EXIT SIGN WITH WHITE THERMOPLASTIC HOUSING, RED LETTERING, TEST SWITCH, STATUS INDICATION, AND 90 MINUTE EMERGENCY BATTERY BACKUP. | LITHONIA | EXRG EL M6 | |

## LIGHT POLE SCHEDULE

| TAG NO. | FIXTURE TAG | FIXTURE HEIGHT ABOVE BASE PLATE | DUAL CHAMBER | HANDHOLE HEIGHT | REMARKS |
|---|---|---|---|---|---|
| P-1 | S1 | 20'-0" | N/A | 30" | REFER T STRUCTURAL PLANS FOR RETAINING WALL POLE BASE DETAILS |
| P-2 | S2 | 20'-0" | TYPE 2 | 30" | REFER T STRUCTURAL PLANS FOR RETAINING WALL POLE BASE DETAILS |
| P-3 | S1 | 20'-0" | TYPE 4 | 30" | REFER T STRUCTURAL PLANS FOR RETAINING WALL POLE BASE DETAILS |
| P-4 | S1 | 20'-0" | TYPE 3 | 30" | REFER T STRUCTURAL PLANS FOR RETAINING WALL POLE BASE DETAILS |
| P-5 | N/A | N/A | N/A | 30" | 4" SQUARE STRAIGHT ALUMINUM CAMERA POLE. NO FIXTURE ATTACHED. FURNISH WITH 4"X4" WELDED NEMA 3R DEVICE BOX, CENTERLINE 12" ABOVE GRADE |
| P-6 | S1 | 20'-0" | TYPE 1 | 30" | PROVIDE STEEL REINFORCED CONCRETE POLE BASE |
| P-7 | S2 | 20'-0" | N/A | 30" | PROVIDE STEEL REINFORCED CONCRETE POLE BASE |

## PRECAST CONCRETE BOX SCHEDULE

| TAG NO. | SERVICE | INTERIOR DIMENSIONS | MANHOLE DIA. | REMARKS |
|---|---|---|---|---|
| MH-01 | SECURITY | 4'X4'X6'-7" | 30" | |
| MH-02 | SECURITY | 4'X4'X6'-7" | 30" | |
| MH-11 | POWER | 8'X8'X6'-7" | 30" | |
| MH-12 | FIBER | 4'X4'X6'-7" | 30" | |
| MH-21 | POWER | 8'X8'X6'7" | 30" | |
| MH-22 | FIBER | 4'X4'X6'-7" | 30" | |
| MH-31 | POWER | 8'X8'X6'7" | 30" | FURNISH WITH OFFSET MANHOLE COVER AS SHOWN ON PLAN |
| MH-32 | FIBER | 4'X4'X6'-7" | 30" | |

Document No.: 4374,R6 Version: 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar estos planos de construcción ante LUMA Energy como operador y administrador del Sistema de Transmisión y Distribución de la AEE. / I certify that I am a licensed and registered engineer, surveyor or architect in compliance with Law 173 of 1988, as amended, and I am authorized by the design of the project to submit these construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico que las disposiciones de la Ley Núm. 170 de 10 de junio de 1987, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, aplicables que preceden el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. / LUMA Energy y el Manual de Prácticas Profesionales de Certificación de Planos de la CAPR. / I certify that the provisions of Law Number 170 of June 10, 1987, as amended, Plans or Projects Certification Act, applicable to the electric design for this project in accordance with the codes, Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**ENDOSO / ENDORSEMENT**

LUMA

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago

Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:50:20 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación suministrada por el diseñador en cumplimiento con la Ley Núm. 170 del 10 de julio de 1987, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification provided by the designer in compliance with Law 170 of July 10, 1987, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no relева al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no relева al constructor ni al inspector de obra pro-uso de cumplir con las especificaciones de los planos certificados. / LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standard stipulations from National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.
3. El presente endoso tiene vigencia de un (1) año. De instar las obras eléctricas dentro de este término, mediante notificación previa a LUMA, el endoso mencionado su vigencia habrá la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese término, el diseñador tiene que volver a presentar el diseño eléctrico para su evaluación y endoso de LUMA para su Revisión y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TDU de 2007. / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the mentioned endorsement will have its validity extended until the completion of the mentioned works. In the event that the period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TDU of 2007).

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| B | 02/13/2024 | 100% DESIGN | JL | GN | GN |
| A | 11/20/2023 | 90% DESIGN | JL | GN | GN |

DRAWN BY FL
DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

MISCELLANEOUS SCHEDULES

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 125 OF 145
DWG. NO. 000-E-08

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

2024.02.12 2:48:14 PM

| LOW VOLTAGE POWER CIRCUIT SCHEDULE | | | | | |
|---|---|---|---|---|---|
| EQUIPMENT GROUNDS NEC 250 Table 122 | | 100% GROUNDS NEC 250-122(A) | | SERVICE GROUNDS NEC 250 Table 66 | |
| 2 Wire + Ground | | | | | |
| [20E2] | 3/4"C-2#12,#12G | [20M2] | 3/4"C-2#12,#12G | NA | NA |
| [30E2] | 3/4"C-2#10,#10G | [30M2] | 3/4"C-2#10,#10G | NA | NA |
| [40E2] | 3/4"C-2#8,#10G | [40M2] | 3/4"C-2#8,#8G | [40S2] | 3/4"C-2#8,#8G |
| [50E2] | 1"C-2#6,#10G | [50M2] | 1"C-2#8,#8G | [50S2] | 3/4"C-2#8,#8G |
| [60E2] | 1"C-2#6,#10G | [60M2] | 1"C-2#6,#6G | [60S2] | 3/4"C-2#6,#8G |
| [70E2] | 1"C-2#4,#8G | [70M2] | 1"C-2#4,#4G | [70S2] | 3/4"C-2#4,#8G |
| [80E2] | 1"C-2#4,#8G | [80M2] | 1"C-2#4,#4G | [80S2] | 3/4"C-2#4,#8G |
| [90E2] | 1"C-2#3,#8G | [90M2] | 1"C-2#3,#3G | [90S2] | 1"C-2#3,#8G |
| [100E2] | 1"C-2#2,#8G | [100M2] | 1"C-2#2,#3G | [100S2] | 1"C-2#3,#8G |
| [110E2] | 1"C-2#1,#6G | [110M2] | 1"C-2#1,#2G | [110S2] | 1"C-2#2,#8G |
| [125E2] | 1-1/2"C-2#1/0,#6G | [125M2] | 1-1/2"C-2#1/0,#1G | [125S2] | 1-1/2"C-2#1/0,#6G |
| [150E2] | 1-1/2"C-2#1/0,#6G | [150M2] | 1-1/2"C-2#1/0,#1/0G | [150S2] | 1-1/2"C-2#1/0,#6G |
| [200E2] | 1-1/2"C-2#3/0,#6G | [200M2] | 1-1/2"C-2#3/0,#3/0G | [200S2] | 1-1/2"C-2#3/0,#4G |
| [225E2] | 2"C-2#4/0,#4G | [225M2] | 2"C-2#4/0,#4/0G | [225S2] | 1-1/2"-2#4/0,#2G |
| 3 Wire + Ground | | | | | |
| [20E3] | 3/4"C-3#12,#12G | [20M3] | 3/4"C-3#12,#12G | NA | NA |
| [30E3] | 3/4"C-3#10,#10G | [30M3] | 3/4"C-3#10,#10G | NA | NA |
| [40E3] | 3/4"C-3#8,#10G | [40M3] | 3/4"C-3#8,#8G | [40S3] | 3/4"C-3#8,#8G |
| [50E3] | 3/4"C-3#8,#10G | [50M3] | 3/4"C-3#8,#8G | [50S3] | 3/4"C-3#8,#8G |
| [60E3] | 3/4"C-3#6,#10G | [60M3] | 3/4"C-3#6,#6G | [60S3] | 3/4"C-3#6,#8G |
| [70E3] | 1"C-3#4,#8G | [70M3] | 1"C-3#4,#4G | [70S3] | 1"C-3#4,#8G |
| [80E3] | 1"C-3#4,#8G | [80M3] | 1"C-3#4,#4G | [80S3] | 1"C-3#4,#8G |
| [90E3] | 1-1/2"C-3#3,#8G | [90M3] | 1-1/2"C-3#3,#3G | [90S3] | 1"C-3#3,#8G |
| [100E3] | 1-1/2"C-3#2,#8G | [100M3] | 1-1/2"C-3#2,#2G | [100S3] | 1"C-3#2,#8G |
| [110E3] | 1-1/2"C-3#1,#6G | [110M3] | 1-1/2"C-3#1,#1G | [110S3] | 1-1/2"C-3#1,#6G |
| [125E3] | 1-1/2"C-3#1/0,#6G | [125M3] | 1-1/2"C-3#1/0,#1/0G | [125S3] | 1-1/2"C-3#1/0,#6G |
| [150E3] | 1-1/2"C-3#1/0,#6G | [150M3] | 1-1/2"C-3#1/0,#1/0G | [150S3] | 1-1/2"C-3#1/0,#6G |
| [175E3] | 2"C-3#2/0,#6G | [175M3] | 2"C-3#2/0,#2/0G | [175S3] | 2"C-3#2/0,#6G |
| [200E3] | 2"C-3#3/0,#6G | [200M3] | 2"C-3#3/0,#3/0G | [200S3] | 2"C-3#3/0,#4G |
| [225E3] | 2"C-3#4/0,#4G | [225M3] | 2"C-3#4/0,#4/0G | [225S3] | 2"C-3#4/0,#2G |
| [250E3] | 3"C-3#300,#4G | [250M3] | 3"C-3#300,#300G | [250S3] | 3"C-3#300,#2G |
| [300E3] | 3"C-3#350,#4G | [300M3] | 3"C-3#350,#350G | [300S3] | 3"C-3#350,#2G |
| [350E3] | 3"C-3#500,#3G | [350M3] | 3"C-3#500,#500G | [350S3] | 3"C-3#500,#1/0G |
| [400E3] | 3"C-3#500,#3G | [400M3] | 3"C-3#500,#500G | [400S3] | 3"C-3#500,#1/0G |
| [500E3] | (2)3"C-3#250,#2G | [500M3] | (2)3"C-3#250,#250G | [500S3] | (2)3"C-3#250,#1/0G |
| [600E3] | (2)3"C-3#350,#1G | [600M3] | (2)3"C-3#350,#350G | [600S3] | (2)3"C-3#350,#2/0G |
| [700E3] | (2)3"C-3#500,#1/0G | [700M3] | (2)3"C-3#500,#500G | [700S3] | (2)3"C-3#500,#2/0G |
| [800E3] | (2)3"C-3#500,#1/0G | [800M3] | (2)3"C-3#500,#500G | [800S3] | (2)3"C-3#500,#2/0G |
| [1000E3] | (3)3"C-3#350,#2/0G | [1000M3] | (3)3"C-3#500,#500G | [1000S3] | (3)3"C-3#500,#3/0G |
| [1200E3] | (3)4"C-3#600,#3/0G | [1200M3] | (3)4"C-3#600,#600G | [1200S3] | (3)4"C-3#600,#3/0G |
| [1600E3] | (4)4"C-3#600,#4/0G | [1600M3] | (4)4"C-3#600,#600G | [1600S3] | (4)4"C-3#600,#3/0G |
| [2000E3] | (5)4"C-3#600,#250G | [2000M3] | (5)4"C-3#600,#600G | [2000S3] | (5)4"C-3#600,#3/0G |
| [2500E3] | (6)4"C-3#600,#350G | [2500M3] | (6)4"C-3#600,#600G | [2500S3] | (6)4"C-3#600,#3/0G |
| [3000E3] | (8)4"C-3#600,#400G | [3000M3] | (8)4"C-3#600,#600G | [3000S3] | (8)4"C-3#600,#3/0G |
| [4000E3] | (10)4"C-3#600,#500G | [4000M3] | (10)4"C-3#600,#600G | [4000S3] | (10)4"C-3#600,#3/0G |
| 4 Wire + Ground | | | | MULTI-WIRE 20 AMP | |
| [20E4] | 3/4"C-4#12,#12G | [20M4] | 3/4"C-4#12,#12G | [20E5] | 3/4"C-5#12,1#12G |
| [30E4] | 3/4"C-4#10,#10G | [30M4] | 3/4"C-4#10,#10G | [20E6] | 3/4"C-6#12,1#12G |
| [40E4] | 3/4"C-4#8,#10G | [40M4] | 3/4"C-4#8,#8G | [20E7] | 3/4"C-7#12,1#12G |
| [50E4] | 3/4"C-4#8,#10G | [50M4] | 3/4"C-4#8,#8G | [20E8] | 3/4"C-8#12,1#12G |
| [60E4] | 1"C-4#6,#8G | [60M4] | 1"C-4#6,#6G | [20E9] | 3/4"C-9#12,1#12G |
| [70E4] | 1-1/2"C-4#4,#8G | [70M4] | 1-1/2"C-4#4,#4G | [20E10] | 1"C-10#10,1#10G |
| [80E4] | 1-1/2"C-4#4,#8G | [80M4] | 1-1/2"C-4#4,#4G | [20E11] | 1"C-11#10,1#10G |
| [90E4] | 1-1/2"C-4#3,#8G | [90M4] | 1-1/2"C-4#3,#3G | [20E12] | 1"C-12#10,1#10G |
| [100E4] | 1-1/2"C-4#2,#8G | [100M4] | 1-1/2"C-4#2,#2G | [20E13] | 1"C-13#10,1#10G |
| [110S4] | 1-1/2"C-4#1,#6G | [110M3] | 1-1/2"C-4#1,#1G | [20E14] | 1"C-14#10,1#10G |
| [125E4] | 2"C-4#1/0,#6G | [125M4] | 2"C-4#1/0,#1/0G | [20E15] | 1"C-15#10,1#10G |
| [150E4] | 2"C-4#1/0,#6G | [150M4] | 2"C-4#1/0,#1/0G | [20E16] | 1-1/4"C-16#10,1#10G |
| [175E4] | 2"C-4#2/0, #6G | [175M4] | 2"C-4#2/0,#2/0G | [20E17] | 1-1/4"C-17#10,1#10G |
| [200E4] | 2"C-4#3/0,#6G | [200M4] | 2"C-4#3/0,#3/0G | [20E18] | 1-1/4"C-18#10,1#10G |
| [225E4] | 3"C-4#4/0,#4G | [225M4] | 3"C-4#4/0,#4/0G | [20E19] | 1-1/4"C-19#10,1#10G |
| [250E4] | 3"C-4#300,#4G | [250M4] | 3"C-4#300,#300G | [20E20] | 1-1/4"C-20#10,1#10G |
| [300E4] | 3"C-4#350,#4G | [300M4] | 3"C-4#350,#350G | THE MULTIWIRE CONFIGURATIONS SHOWN HERE SHALL NOT BE USED FOR RECEPTACLE CIRCUITS OR OTHER CORD-AND-PLUG-CONNECTED PORTABLE LOADS. NEC-240.4(B) | |
| [350E4] | 4"C-4#500,#3G | [350M4] | 4"C-4#500,#500G | | |
| [400E4] | (2)4"C-4#500,#3G | [400M4] | (2)4"C-4#500,#500G | | |
| [500E4] | (2)4"C-4#250,#2G | [500M4] | (2)4"C-4#250,#250G | | |
| [600E4] | (2)3"C-4#350,#1G | [600M4] | (2)3"C-4#350,#350G | | |
| [700E4] | (2)4"C-4#500,#1/0G | [700M4] | (2)4"C-4#500,#500G | | |
| [800E4] | (2)4"C-4#500,#1/0G | [800M4] | (2)4"C-4#500,#500G | | |
| [1000E4] | (3)3"C-4#350,#2/0G | [1000M4] | (3)3"C-4#350,#350G | | |
| [1200E4] | (3)4"C-4#600,#3/0G | [1200M4] | (3)4"C-4#600,#600G | | |
| [1600E4] | (4)4"C-4#600,#4/0G | [1600M4] | (4)4"C-4#600,#600G | | |
| [2000E4] | (5)4"C-4#600,#250G | [2000M4] | (5)4"C-4#600,#600G | | |
| [2500E4] | (6)4"C-4#600,#350G | [2500M4] | (6)4"C-4#600,#600G | | |
| [3000E4] | (8)4"C-4#600,#400G | [3000M4] | (8)4"C-4#600,#600G | | |
| [4000E4] | (10)4"C-4#600,#500G | [4000M4] | (10)4"C-4#600,#600G | | |

| CUSTOM CIRCUITS | |
|---|---|
| [MSC] | 1"C - MFR. SUPPLIED CABLE |
| [MC1] | 3/4"C-2#12, 2#14, #12G |
| [MC2] | 3/4"C-2#12, 4#14, #12G |
| [MC3] | 1"C-5#12, 2#14, #12G |
| [MC4] | 1-1/2"C-10#12, 4#14, 2#12G |
| [MC5] | 1"C-4#12, 8#14, #12G |
| [MC6] | 3/4"C-2#12, 4#14, #12G |

1) MSC DIAMETER VARIES. COORDINATE WITH MANUFACTURER AND UPSIZE CONDUIT AS NEEDED TO ACCOMMODATE.

2) MINIMUM CONDUIT SIZE FOR ENCASED OR BURIED CONDUITS SHALL BE 1". UPSIZE 3/4" CONDUITS FOR SUCH APPLICATIONS

| EMPTY CONDUIT SCHEDULE | |
|---|---|
| [CE07] | 3/4"C - EMPTY W/PULL STRING |
| [CE10] | 1"C - EMPTY W/PULL STRING |
| [CE15] | 1-1/2"C - EMPTY W/PULL STRING |
| [CE20] | 2"C - EMPTY W/PULL STRING |
| [CE25] | 2-1/2"C - EMPTY W/PULL STRING |
| [CE30] | 3"C - EMPTY W/PULL STRING |
| [CE40] | 4"C - EMPTY W/PULL STRING |
| [CE50] | 5"C - EMPTY W/PULL STRING |

| INSTRUMENTATION & CONTROLS CIRCUIT SCHEDULE | | | |
|---|---|---|---|
| ANALOG CABLE CIRCUITS | | CONTROL WIRE CIRCUITS | |
| [A1] | 3/4"C - 1 #16 TSP | [C2] | 3/4"C - 2 #14, #14G |
| [A2] | 1"C - 2 #16 TSP | [C3] | 3/4"C - 3 #14, #14G |
| [A3] | 1"C - 3 #16 TSP | [C4] | 3/4"C - 4 #14, #14G |
| [A4] | 1"C - 4 #16 TSP | [C5] | 3/4"C - 5 #14, #14G |
| [A5] | 1-1/2"C - 5 #16 TSP | [C6] | 3/4"C - 6 #14, #14G |
| [A6] | 1-1/2"C - 6 #16 TSP | [C7] | 3/4"C - 7 #14, #14G |
| [A7] | 1-1/2"C - 7 #16 TSP | [C8] | 3/4"C - 8 #14, #14G |
| [A8] | 1-1/2"C - 8 #16 TSP | [C9] | 3/4"C - 9 #14, #14G |
| [A9] | 1-1/2"C - 9 #16 TSP | [C10] | 3/4"C - 10 #14, #14G |
| [A10] | 2"C - 10 #16 TSP | [C11] | 1"C - 11 #14, #14G |
| [A11] | 2"C - 11 #16 TSP | [C12] | 1"C - 12 #14, #14G |
| [A12] | 2"C - 12 #16 TSP | [C13] | 1"C - 13 #14, #14G |
| [A13] | 2"C - 13 #16 TSP | [C14] | 1"C - 14 #14, #14G |
| [A14] | 2"C - 14 #16 TSP | [C15] | 1"C - 15 #14, #14G |
| [A15] | 3"C - 15 #16 TSP | [C16] | 1"C - 16 #14, #14G |
| [A16] | 3"C - 16 #16 TSP | [C17] | 1"C - 17 #14, #14G |
| [A17] | 3"C - 17 #16 TSP | [C18] | 1"C - 18 #14, #14G |
| [A18] | 3"C - 18 #16 TSP | [C19] | 1"C - 19 #14, #14G |
| [A19] | 3"C - 19 #16 TSP | [C20] | 1"C - 20 #14, #14G |
| [A20] | 3"C - 20 #16 TSP | [C21] | 1-1/2"C - 21 #14, #14G |
| COMMUNICATIONS CIRCUITS | | [C22] | 1-1/2"C - 22 #14, #14G |
| [CAT6-1] | 3/4"C, 1 CAT 6 CABLE | [C23] | 1-1/2"C - 23 #14, #14G |
| [CAT6-2] | 1"C, 2 CAT 6 CABLES | [C24] | 1-1/2"C - 24 #14, #14G |
| [CAT6-3] | 1"C, 3 CAT 6 CABLES | [C25] | 1-1/2"C - 25 #14, #14G |
| [CAT6-4] | 1-1/2"C, 4 CAT 6 CABLES | [C26] | 1-1/2"C - 26 #14, #14G |
| [CAT5-5] | 1-1/2"C, 5 CAT 6 CABLES | [C27] | 1-1/2"C - 27 #14, #14G |
| [F1-1] | 1"C, 1 F/O CABLE | [C28] | 1-1/2"C - 28 #14, #14G |
| [F2-X;Y;Z] | 2"C, X F/O CABLES | [C29] | 1-1/2"C - 29 #14, #14G |
| [F3-X;Y;Z] | 3"C, X F/O CABLES | [C30] | 1-1/2"C - 30 #14, #14G |
| [F4-X;Y;Z] | 4"C, X F/O CABLES | [C31] | 1-1/2"C - 31 #14, #14G |
| [F5-X;Y;Z] | 5"C, X F/O CABLES | [C32] | 1-1/2"C - 32 #14, #14G |
| CONTROL CABLE CIRCUITS | | [C33] | 1-1/2"C - 33 #14, #14G |
| [CC5] | 3/4"C - 5/C #14 | [C34] | 1-1/2"C - 34 #14, #14G |
| [CC7] | 3/4"C - 7/C #14 | [C35] | 1-1/2"C - 35 #14, #14G |
| [CC9] | 1"C - 9/C #14 | [C36] | 1-1/2"C - 36 #14, #14G |
| [CC12] | 1"C - 12/C #14 | [C37] | 1-1/2"C - 37 #14, #14G |
| [CC19] | 1-1/2"C - 19/C #14 | [C38] | 1-1/2"C - 38 #14, #14G |
| [CC25] | 1-1/2"C - 25/C #14 | [C39] | 1-1/2"C - 39 #14, #14G |
| [CC30] | 2"C - 30/C #14 | [C40] | 1-1/2"C - 40 #14, #14G |
| [CC37] | 2"C - 37/C #15 | EMPTY CONDUIT | |
| OTHER CIRCUITS | | [CE-1] | 3/4"C WITH PULL STRING |
| [MSC] | 1"C - MFR. SUPPLIED CABLE | [CE-2] | 1"C WITH PULL STRING |
| | | [CE-3] | 1-1/2"C WITH PULL STRING |
| | | [CE-4] | 2"C WITH PULL STRING |
| | | [CE-5] | 3"C WITH PULL STRING |
| | | [CE-6] | 3"C WITH PULL STRING |
| | | [CE-7] | 4"C WITH PULL STRING |
| | | [CE-8] | 5"C WITH PULL STRING |

1) MSC DIAMETER VARIES. COORDINATE WITH MANUFACTURER AND UPSIZE CONDUIT AS NEEDED TO ACCOMMODATE.

2) THE LETTER "X" INDICATES THE NUMBER OF CABLES TO BE INSTALLED IN THE RACEWAY, "Y" INDICATES THE NUMBER OF STRANDS PER CABLE, Z INDICATES THE NUMBER OF CELLS IN FABRIC INNERDUCT.

3) FIBER OPTIC CABLE SHALL BE PULLED BY ELECTRICAL CONTRACTOR, BUT PROVIDED BY OTHERS.

# YARD CIRCUIT SCHEDULE

| CKT NO. | CONDUIT | WIRE | FROM | TO | REFERENCE | REMARKS |
|---|---|---|---|---|---|---|
| YC01 | 5" | 3-750KCM (15KV), #4/0 GND | MV TERMINAL JUNCTION BOX | SWITCHGEAR UTILITY BREAKER A | | |
| YC02 | 5" | 3-750KCM (15KV), #4/0 GND | MV TERMINAL JUNCTION BOX | SWITCHGEAR UTILITY BREAKER A | | |
| YC03 | 5" | 3-750KCM (15KV), #4/0 GND | MV TERMINAL JUNCTION BOX | SWITCHGEAR UTILITY BREAKER A | | |
| YC04 | 5" | 3-750KCM (15KV), #4/0 GND | SWITCHGEAR FEEDER BREAKER (MV MCC NO. 1) | MV TERMINAL JUNCTION BOX | | |
| YC05 | 5" | 3-750KCM (15KV), #4/0 GND | SWITCHGEAR FEEDER BREAKER (MV MCC NO. 1) | MV TERMINAL JUNCTION BOX | | |
| YC06 | 5" | 3-750KCM (15KV), #4/0 GND | SWITCHGEAR FEEDER BREAKER (MV MCC NO. 1) | MV TERMINAL JUNCTION BOX | | |
| YC07 | 5" | 3-750KCM (15KV), #4/0 GND | MV TERMINAL JUNCTION BOX | SWITCHGEAR UTILITY BREAKER B | | |
| YC08 | 5" | 3-750KCM (15KV), #4/0 GND | MV TERMINAL JUNCTION BOX | SWITCHGEAR UTILITY BREAKER B | | |
| YC09 | 5" | 3-750KCM (15KV), #4/0 GND | MV TERMINAL JUNCTION BOX | SWITCHGEAR UTILITY BREAKER B | | |
| YC10 | 5" | 3-750KCM (15KV), #4/0 GND | SWITCHGEAR FEEDER BREAKER (MV MCC NO. 2) | MV TERMINAL JUNCTION BOX | | |
| YC11 | 5" | 3-750KCM (15KV), #4/0 GND | SWITCHGEAR FEEDER BREAKER (MV MCC NO. 2) | MV TERMINAL JUNCTION BOX | | |
| YC12 | 5" | 3-750KCM (15KV), #4/0 GND | SWITCHGEAR FEEDER BREAKER (MV MCC NO. 2) | MV TERMINAL JUNCTION BOX | | |
| YC13 | 3" | FIBER OPTIC CABLE | LPU-030 | FOPP-003 (PUMP STATION 5TH FLOOR) | | |
| YC14 | 5" | 3-750KCM (15KV), #1 GND | 030-GEN-100 | 030-GEN-100 SWITCHGEAR CONTROL SECTION | | |
| YC15 | 1" | 10#10, #10 GND | 030-GEN-100 | 030-GEN-100 SWITCHGEAR CONTROL SECTION | | CURRENT XFMRS. UTILIZE PVC COATED STEEL CONDUIT |
| YC16 | 5" | 3-750KCM (15KV), #1 GND | 030-GEN-200 | 030-GEN-200 SWITCHGEAR CONTROL SECTION | | |
| YC17 | 1" | 10#10, #10 GND | 030-GEN-200 | 030-GEN-200 SWITCHGEAR CONTROL SECTION | | CURRENT XFMRS. UTILIZE PVC COATED STEEL CONDUIT |
| YC18 | 5" | 3-750KCM (15KV), #1 GND | 030-GEN-300 | 030-GEN-300 SWITCHGEAR CONTROL SECTION | | |
| YC19 | 1" | 10#10, #10 GND | 030-GEN-300 | 030-GEN-300 SWITCHGEAR CONTROL SECTION | | CURRENT XFMRS. UTILIZE PVC COATED STEEL CONDUIT |
| YC20 | 5" | 3-750KCM (15KV), #1 GND | 030-GEN-400 | 030-GEN-400 SWITCHGEAR CONTROL SECTION | | |
| YC21 | 1" | 10#10, #10 GND | 030-GEN-400 | 030-GEN-400 SWITCHGEAR CONTROL SECTION | | CURRENT XFMRS. UTILIZE PVC COATED STEEL CONDUIT |
| YC22 | 2-1/2" | 1#2 (15KV), #8 GND | NGR-030-1 | 030-GEN-100 | | |
| YC23 | 2-1/2" | 1#2 (15KV), #8 GND | NGR-030-2 | 030-GEN-200 | | |
| YC24 | 2-1/2" | 1#2 (15KV), #8 GND | NGR-030-3 | 030-GEN-300 | | |
| YC25 | 2-1/2" | 1#2 (15KV), #8 GND | NGR-030-4 | 030-GEN-400 | | |
| YC26 | 1" | FIBER OPTIC CABLE | SWGR-030 MASTER CONTROL SECTION | 030-GEN-100 | | |
| YC27 | 1" | FIBER OPTIC CABLE | SWGR-030 MASTER CONTROL SECTION | 030-GEN-200 | | |
| YC28 | 1" | FIBER OPTIC CABLE | SWGR-030 MASTER CONTROL SECTION | 030-GEN-300 | | |
| YC29 | 1" | FIBER OPTIC CABLE | SWGR-030 MASTER CONTROL SECTION | 030-GEN-400 | | |
| YC30 | 1" | FIBER OPTIC CABLE | LPU-030 | 030-FMS-001 | | |
| YC31 | 1" | FIBER OPTIC CABLE | LPU-030 | 030-FMS-002 | | |
| YC32 | 1-1/2" | 50#14, #1 GND | 030-GEN-100 SWITCHGEAR CONTROL SECTION | 030-GEN-100 | | CONTROLS, ALARMS, STATUS |
| YC33 | 1-1/2" | (8)TWISTED SHIELDED PAIRS | 030-GEN-100 SWITCHGEAR CONTROL SECTION | 030-GEN-100 | | UTILIZE PVC-COATED STEEL CONDUIT |
| YC34 | 1-1/2" | 3#2, #8 GND | 030-DP-1 | 030-GEN-100 | | |
| YC35 | 1-1/2" | 50#14, #1 GND | 030-GEN-200 SWITCHGEAR CONTROL SECTION | 030-GEN-200 | | CONTROLS, ALARMS, STATUS |
| YC36 | 1-1/2" | (8)TWISTED SHIELDED PAIRS | 030-GEN-200 SWITCHGEAR CONTROL SECTION | 030-GEN-200 | | UTILIZE PVC-COATED STEEL CONDUIT |
| YC37 | 1-1/2" | 3#2, #8 GND | 030-DP-1 | 030-GEN-200 | | |
| YC38 | 1-1/2" | 50#14, #1 GND | 030-GEN-300 SWITCHGEAR CONTROL SECTION | 030-GEN-300 | | CONTROLS, ALARMS, STATUS |
| YC39 | 1-1/2" | (8)TWISTED SHIELDED PAIRS | 030-GEN-300 SWITCHGEAR CONTROL SECTION | 030-GEN-300 | | UTILIZE PVC-COATED STEEL CONDUIT |
| YC40 | 1-1/2" | 3#2, #8 GND | 030-DP-2 | 030-GEN-300 | | |
| YC41 | 1-1/2" | 50#14, #1 GND | 030-GEN-400 SWITCHGEAR CONTROL SECTION | 030-GEN-400 | | CONTROLS, ALARMS, STATUS |
| YC42 | 1-1/2" | (8)TWISTED SHIELDED PAIRS | 030-GEN-400 SWITCHGEAR CONTROL SECTION | 030-GEN-400 | | UTILIZE PVC-COATED STEEL CONDUIT |
| YC43 | 1-1/2" | 3#2, #8 GND | 030-DP-2 | 030-GEN-400 | | |
| YC44 | 1" | 2#12, #12 GND | 030-DP-1 | 030-FMS-001 | | |
| YC45 | 1" | 2#12, #12 GND | 030-DP-2 | 030-FMS-002 | | |
| YC46 | 1" | 2#14, #14 GND | 030-FS-011 (EYEWASH STATION) | LPU-030 | | |
| YC47 | 1" | 2#12, #12 GND | 030-FS-011 (EYEWASH STATION) | 030-DP-2 | | |
| YC48 | 1" | 6#14, #14 GND | 030-LCP-001 | LPU-030 | | |
| YC49 | 1" | 2#12, #12 GND | 030-LCP-001 | 030-DP-1 | | |
| YC50 | 1" | 6#14, #14 GND | 030-LCP-002 | LPU-030 | | |
| YC51 | 1" | 2#12, #12 GND | 030-LCP-002 | 030-DP-2 | | |
| YC52 | 2" | 40#14, #14 GND | 030-LCP-003 | LPU-030 | | |
| YC53 | 1" | 2#12, #12 GND | 030-LCP-003 | 030-DP-2 | | |
| YC54 | 1-1/2" | 20#14, #14 GND | 030-LCP-004 | LPU-030 | | |
| YC55 | 1" | 3#12, #12 GND | 030-LCP-004 | 030-DP-2 | | |
| YC56 | 1" | 2#14, #14 GND | 030-LSH-401 | LPU-030 | | |
| YC57 | 1" | (1) TWISTED SHIELDED PAIR | 030-LT-902 | LPU-030 | | |
| YC58 | 5" | 3-#250KCM (15KV), #4 GND | LBK-030 | SWGR-030 | | |
| YC59 | 3" | FIBER OPTIC CABLE | LPU-030 | FOPP-003 (PUMP STATION 5TH FLOOR) | | |
| YC60 | 5" | EMPTY W/PULL STRING | SWITCHGEAR UTILITY BREAKER A | MH-41 | | SPARE POWER CABLE CONDUIT |
| YC61 | 5" | EMPTY W/PULL STRING | SWITCHGEAR UTILITY BREAKER A | MH-41 | | SPARE POWER CABLE CONDUIT |
| YC62 | 5" | EMPTY W/PULL STRING | SWITCHGEAR UTILITY BREAKER A | MH-41 | | SPARE POWER CABLE CONDUIT |
| YC63 | 5" | EMPTY W/PULL STRING | SWITCHGEAR UTILITY BREAKER B | MH-41 | | SPARE POWER CABLE CONDUIT |
| YC64 | 5" | EMPTY W/PULL STRING | SWITCHGEAR UTILITY BREAKER B | MH-41 | | SPARE POWER CABLE CONDUIT |
| YC65 | 5" | EMPTY W/PULL STRING | SWITCHGEAR UTILITY BREAKER B | MH-41 | | SPARE POWER CABLE CONDUIT |
| YC66 | 1" | EMPTY W/PULL STRING | VIDEO SURVEILLANCE CABINET | LIGHT POLE P-2 | | EMPTY CONDUIT FOR FUTURE CAMERA COMMUNICATIONS |
| YC67 | 1" | 2#10, #10 GND | LC-030 | LIGHT POLE P-2 | | |
| YC68 | 1" | EMPTY W/PULL STRING | VIDEO SURVEILLANCE CABINET | LIGHT POLE P-1 | | EMPTY CONDUIT FOR FUTURE CAMERA COMMUNICATIONS |
| YC69 | 1" | EMPTY W/PULL STRING | VIDEO SURVEILLANCE CABINET | LIGHT POLE P-5 | | EMPTY CONDUIT FOR FUTURE CAMERA COMMUNICATIONS |
| YC70 | 1" | EMPTY W/PULL STRING | VIDEO SURVEILLANCE CABINET | GATE EQUIPMENT INTERFACE CABINET | | EMPTY CONDUIT FOR FUTURE CAMERA AND INTERCOM FIBER |
| YC71 | 1" | 2#12, #12 GND | DP-030-2 | GATE EQUIPMENT INTERFACE CABINET | | |
| YC72 | 1" | 2#10, #10 GND | LC-030 | LIGHT POLE P-6 | | |
| YC73 | 1" | 2#12, #12 GND | LC-030 | LIGHT POLE P-7 | | |
| YC74 | 1" | EMPTY W/PULL STRING | DP-030-2 | GATE EQUIPMENT INTERFACE CABINET | | SPARE POWER CABLE CONDUIT |
| YC75 | 4" | 4#600, #3/0 GND | MANUAL XFER SWITCH AT EXISTING GENSETS | TJB-20-3 | | REFER TO 010-E-01 FOR MORE INFORMATION |
| YC76 | 4" | 4#600, #3/0 GND | MANUAL XFER SWITCH AT EXISTING GENSETS | TJB-20-3 | | REFER TO 010-E-01 FOR MORE INFORMATION |
| YC77 | 1" | FIBER OPTIC CABLE | SWGR-030 MASTER CONTROL SECTION | LBK-030 | | |
| YC78 | 1" | FIBER OPTIC CABLE | LCP-LBK-1 | LBK-030 | | |
| YC79 | 1-1/2" | 3#4, 2#10, #8 GND | 030-DP-1 | LBK-030 | | BLOWER POWER, CONTROL POWER |
| YC80 | 2" | (10) TWISTED SHIELDED PAIRS | LCP-LBK-1 | LBK-030 | | UTILIZE PVC-COATED STEEL CONDUIT |
| YC81 | 2" | 60#14, #14G | LCP-LBK-1 | LBK-030 | | |

Document No.: 4375.016 Version: 3

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el dueño del proyecto a presentar estos planos de construcción ante LUMA Energy como operador y administrador del Sistema de Transmisión y Distribución de la AEE. / I certify that I am a licensed and registered engineer, surveyor, or architect (in compliance with Act 173 of 1988, as amended) and authorized by the project or land owner to submit these construction plans to LUMA Energy as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. En armonía con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, certifico que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos, LUMA Energy y el Manual de Práctica Profesional del CIAPR. / In compliance with Act No.135 of June 15, 1967, as amended known as the "Construction Plans or Projects Certification Act", I certify that I prepared the electric design for this project in accordance with the codes. Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CIAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

LUMA **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:50:50 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification presented by the designer in compliance with Act 135 of July 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no releva al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al constructor ni al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. / LUMA does not assume responsibility over the certified design. LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from: National Electric Code, National Electric Safety Code; constructions standards, norms, and regulations from LUMA and other government agencies as well as federal and state laws ruling by the time construction begins.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediando notificación previa a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese periodo, este endoso perderá su vigencia. Este endoso no es para constituir servidumbre ni para completar proceso de Cesión, Traspaso y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (7282 de 2007 / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will still be valid until work's completion. In case there is no certified electrical work during this period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment. Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (7282 of 2007).

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| B | 05/21/2024 | 100% DESIGN | JL | GN | GN |
| A | 11/20/2023 | 90% DESIGN | JL | GN | GN |

DRAWN BY FL
DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

WIRE AND CONDUIT SCHEDULES

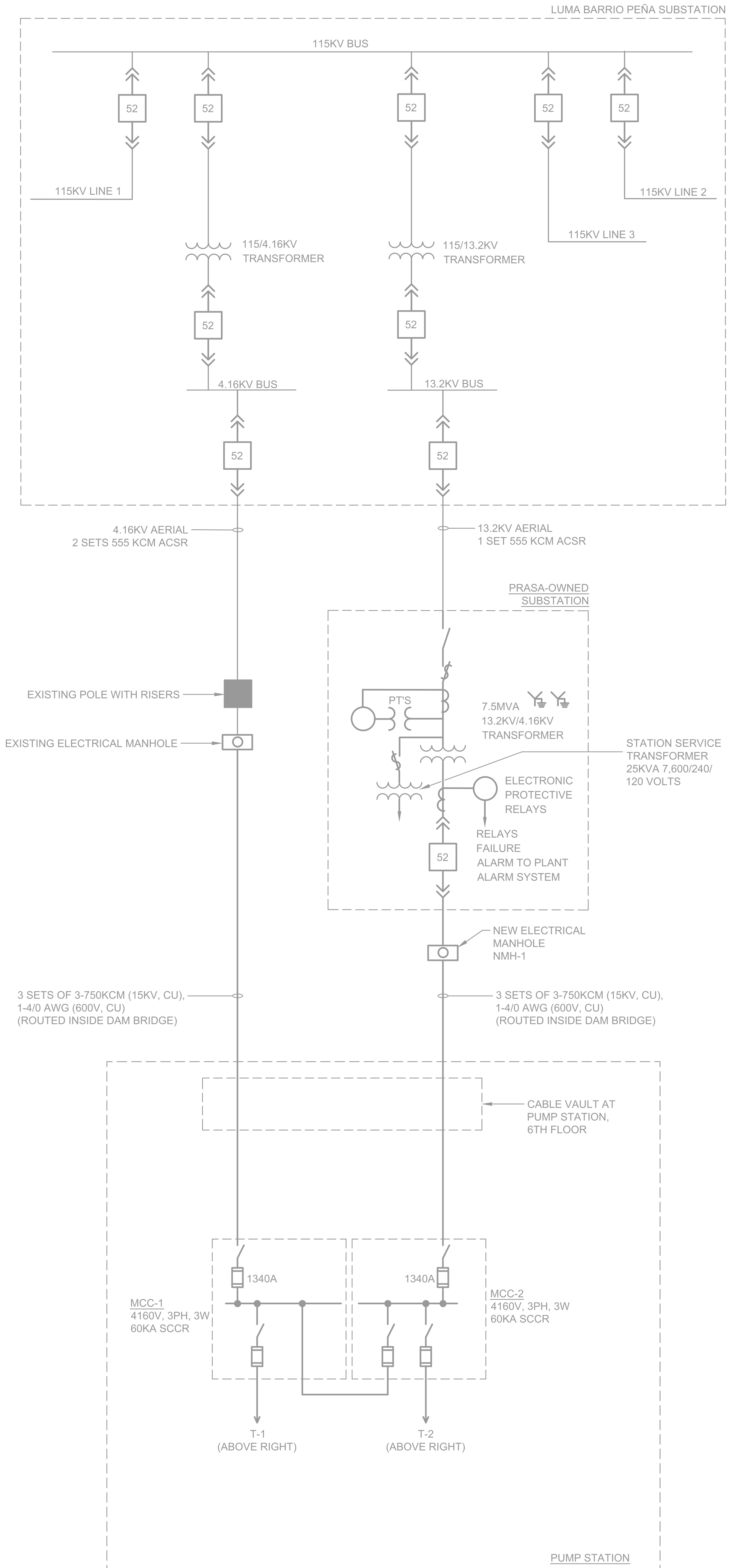
Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 126 OF 145
DWG. NO. 000-E-09

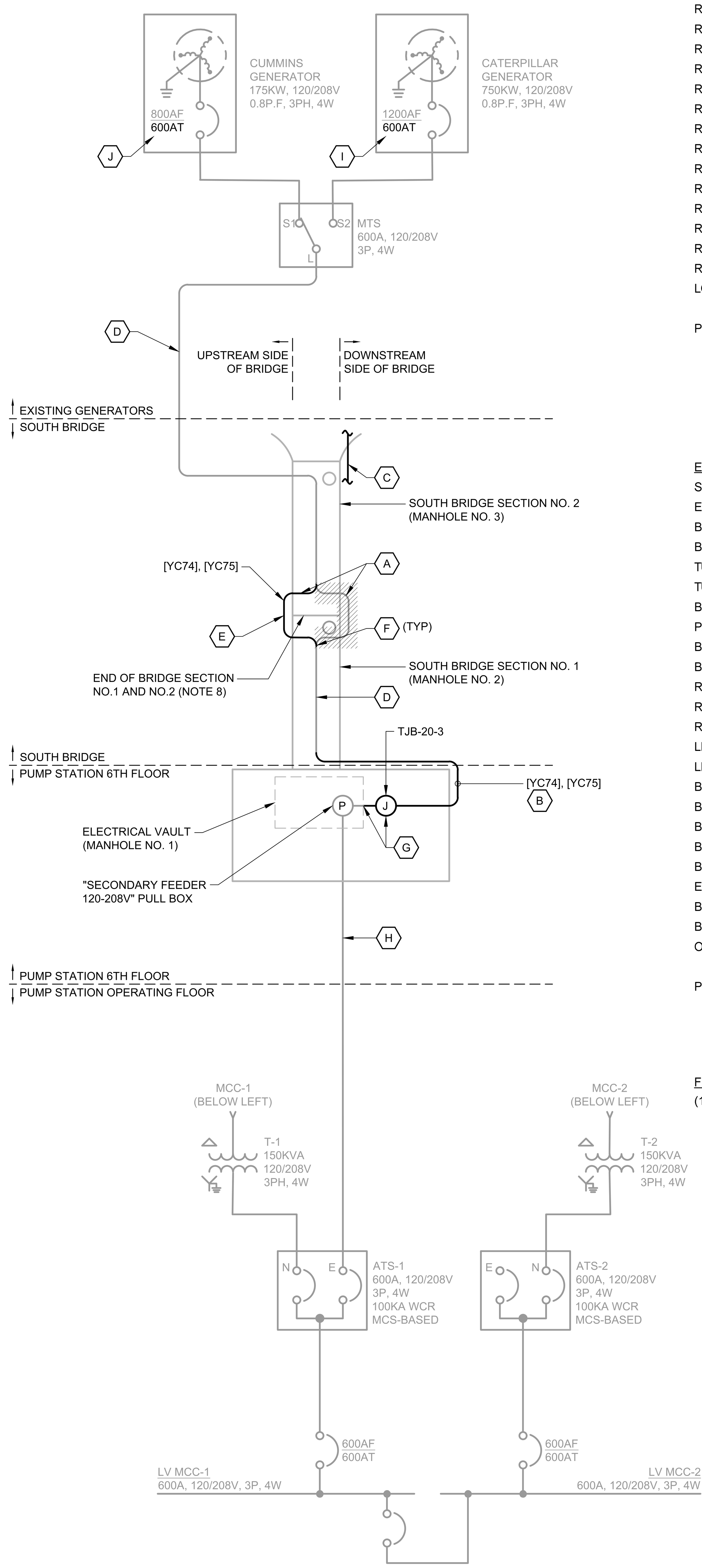
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

2024.05.21 7:52:16 AM




## EXISTING ONE LINE DIAGRAM - MEDIUM VOLTAGE DISTRIBUTION

SCALE: NONE




## EXISTING ONE LINE DIAGRAM - LOW VOLTAGE DISTRIBUTION

SCALE: NONE

## LOAD CALCULATION - MEDIUM VOLTAGE MCC'S

| EQUIPMENT | LOAD (KVA) CONN. | DEMAND |
|---|---|---|
| RAW WATER PUMP NO. 1 (650 HP) | 648.5 | 0.0 |
| RAW WATER PUMP NO. 2 (650 HP) | 648.5 | 0.0 |
| RAW WATER PUMP NO. 3 (1350 HP) | 1037.6 | 1037.6 |
| RAW WATER PUMP NO. 4 (1350 HP) | 1037.6 | 1037.6 |
| RAW WATER PUMP NO. 5 (1350 HP) | 1037.6 | 1037.6 |
| RAW WATER PUMP NO. 6 (1350 HP) | 1055.0 | 1055.0 |
| RAW WATER PUMP NO. 7 (1350 HP) | 1055.0 | 1055.0 |
| RAW WATER PUMP NO. 1 EXCITER | 4.9 | 0.0 |
| RAW WATER PUMP NO. 2 EXCITER | 4.9 | 0.0 |
| RAW WATER PUMP NO. 3 EXCITER | 6.8 | 6.8 |
| RAW WATER PUMP NO. 4 EXCITER | 6.8 | 6.8 |
| RAW WATER PUMP NO. 5 EXCITER | 6.8 | 6.8 |
| RAW WATER PUMP NO. 6 EXCITER | 13.0 | 13.0 |
| RAW WATER PUMP NO. 7 EXCITER | 13.0 | 13.0 |
| LOW VOLTAGE MCC'S | 262.1 | 128.8 |
| SUBTOTAL: | 6838.1 | 5398.0 |
| PLUS 25% LARGEST MOTOR | | 263.8 |
| CALCULATED LOAD (KVA): | | 5661.8 |
| CALCULATED LOAD (AMPERES@4160V, 3-PH): | | 785.8 |

## LOAD CALCULATION - LOW VOLAGE MCC'S

| EQUIPMENT | LOAD (KVA) CONN. | DEMAND |
|---|---|---|
| SEWAGE EJECTOR | 3.8 | 3.8 |
| ELEVATOR | 16.6 | 16.6 |
| BUILDING SUMP PUMP | 11.1 | 11.1 |
| BUTTERFLY VALVE (DRAINAGE TUNNEL) | 16.6 | 16.6 |
| TUNNEL PUMP NO. 1 | 31.7 | 31.7 |
| TUNNEL PUMP NO. 2 | 31.7 | 0.0 |
| BUTTERFLY VALVE (EMERGENCY DRAIN) | 16.6 | 16.6 |
| PANEL PP-1 | 46.2 | 37.0 |
| BUTTERFLY VALVE SUCTION PUMP NO. 1 | 3.8 | 3.8 |
| BUTTERFLY VALVE SUCTION PUMP NO. 2 | 3.8 | 3.8 |
| ROOF VENTILATOR NO. 1 | 2.4 | 2.4 |
| ROOF VENTILATOR NO. 2 | 2.4 | 2.4 |
| ROOF VENTILATOR NO. 3 | 2.4 | 2.4 |
| LIGHTING PANEL LP-1 | 21.1 | 16.9 |
| LIGHTING PANEL LP-2 | 25.6 | 20.5 |
| BUTTERFLY VALVE SUCTION PUMP NO. 3 | 3.8 | 3.8 |
| BUTTERFLY VALVE SUCTION PUMP NO. 4 | 3.8 | 3.8 |
| BUTTERFLY VALVE SUCTION PUMP NO. 5 | 3.8 | 3.8 |
| BUTTERFLY VALVE SUCTION PUMP NO. 6 | 3.8 | 3.8 |
| BUTTERFLY VALVE SUCTION PIPE DRAIN PUMP | 3.8 | 3.8 |
| EXISTING COMPRESSOR | 1.7 | 1.7 |
| BATTERY CHARGER NO. 1 | 0.2 | 0.2 |
| BATTERY CHARGER NO. 2 | 0.2 | 0.2 |
| OVERHEAD CRANE | 5.0 | 0.0 |
| SUBTOTAL: | 262.1 | 206.8 |
| PLUS 25% LARGEST MOTOR | | 7.9 |
| TOTAL (KVA): | | 214.7 |
| CALCULATED LOAD (0.6 DEMAND FACTOR APPLIED) (1) | | 128.8 |
| CALCULATED LOAD (AMPERES@208V, 3-PH): | | 357.6 |

FOOTNOTES

(1) DEMAND FACTOR APPLIED PER PUERTO RICO ELECTRICAL CODE ARTICLE 430.26.

Document No.: 4375.016 Version: 3

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el dueño del proyecto a presentar estos planos de construcción ante LUMA Energy como operador y administrador del Sistema de Transmisión y Distribución de la AEE. / I certify that I am a licensed and registered engineer, surveyor, or architect (in compliance with Act 173 of 1988, as amended) and authorized by the project or land owner to submit these construction plans to LUMA Energy as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. En armonía con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, certifico que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos, LUMA Energy y el Manual de Práctica Profesional del CIAPR. / In compliance with Act No.135 of June 15, 1967, as amended known as the "Construction Plans or Projects Certification Act", I certify that I prepared the electric design for this project in accordance with the codes, Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CIAPR Professional Practice Manual.

FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE

Digitally signed by Gaston Nogales PE (5/31/28) Date: 2024.05.20 14:38:03 -04'00'

LUMA — ENDOSO / ENDORSEMENT

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators

Número de Proyecto / Project Number: LUMA 24-7-044

Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

ENDOSADO POR / ENDORSED BY

Rafael Meléndez Santiago — Digitally signed by Rafael Meléndez Santiago Date: 2024.06.06 14:51:26 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification presented by the designer in compliance with Act 135 of July 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no releva al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al constructor ni al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. / LUMA does not assume responsibility over the certified design. LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from: National Electric Code, National Electric Safety Code; constructions standards, norms, and regulations from LUMA and other government agencies as well as federal and state laws ruling by the time construction begins.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediando notificación previa a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese periodo, este endoso perderá su vigencia. Este endoso no es para constituir servidumbre ni para completar proceso de Cesión, Traspaso y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (7282 de 2007 / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will still be valid until work's completion. In case there is no certified electrical work during this period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (7282 of 2007).

## GENERAL SHEET NOTES

1. EXISTING ONE LINE DIAGRAM SHOWN IS BASED ON EXISTING DRAWINGS, STAFF INTERVIEWS AND FIELD INVESTIGATIONS WITH LIMITED ACCESS. CONTRACTOR SHALL FULLY REVIEW EXISTING CONDITIONS AND NOTIFY THE ENGINEER OF ANY DEVIATIONS BETWEEN THE CONTRACT DOCUMENTS AND ACTUAL CONDITIONS.
2. SUBMIT THE CONTRACTOR'S SEQUENCE OF CONSTRUCTION FOR REVIEW NO LESS THAN 6 WEEKS AFTER CONTRACT AWARD. THE CONTRACTOR SHALL ULTIMATELY BE RESPONSIBLE FOR SEQUENCING THE CONSTRUCTION IN A MANNER THAT MINIMIZES DISRUPTION TO THE RAW WATER PUMPING PROCESS AND MINIMIZES THE LENGTH OF TIME WHEN ONLY ONE 4160V FEEDER IS SUPPLYING THE EXISTING PUMP STATION.
3. ELECTRICAL SYSTEMS ANALYSES DEMONSTRATE THAT HIGHER MOTOR STARTING CAPACITY BETWEEN THE TWO 4160V FEEDERS IS AVAILABLE FROM THE FEEDER SUPPLIED BY PRASA'S SUBSTATION (UTILITY FEEDER B). TO MAXIMIZE MOTOR STARTING CAPACITY WHEN ONLY ONE 4160V FEEDER IS SUPPLYING THE PUMP STATION, FEEDER A SHALL BE TAKEN OUT OF SERVICE AND EXTENDED FIRST. FIELD VERIFY AND PROVIDE CONFIRMATION TO THE ENGINEER THAT FEEDER B IS SUPPLIED FROM PRASA'S SUBSTATION. IF THE EXISTING ARRANGEMENT DIFFERS NOTIFY THE ENGINEER - FEEDER B WILL BE EXTENDED FIRST.
4. SCHEDULE ALL REQUIRED SHUTDOWNS WITH THE OWNER. NO SHUTDOWNS SHALL BE INITIATED WITHOUT WRITTEN APPROVAL FROM THE OWNER. WHERE REQUIRED, COORDINATE SHUTDOWNS WITH THE SERVING UTILITY, LUMA.
5. PROVIDE TEMPORARY POWER FOR THE NEW CONSTRUCTION SITE AS REQUIRED INCLUDING POWER SUPPLY TO THE CONTRACTOR'S STAGING AREA, SUPPLY FOR ELECTRICALLY-POWERED CONSTRUCTION MACHINERY, AND IF REQUIRED, TEMPORARY BUILDING POWER.
6. DO NOT CUT INTO EXISTING CONDUCTORS SUPPLYING THE PUMP STATION UNTIL THE NEW ELECTRICAL BUILDING, SWITCHGEAR, LOW VOLTAGE DISTRIBUTION EQUIPMENT, LIGHTING, CONTROL EQUIPMENT, GENERATORS, FUEL SYSTEM PIPING AND EQUIPMENT, AND AIR CONDITIONING SYSTEMS HAVE BEEN INSTALLED AND WIRED. ALL ELECTRICALLY-POWERED EQUIPMENT AT THE NEW GENERATION FACILITY SHALL BE READY FOR ENERGIZING PRIOR TO EXTENDING EXISTING 4160V FEEDERS TO THE NEW SITE.
7. REFER TO MAIN SWITCHGEAR ONE LINE DIAGRAM FOR PROPOSED FACILITY LOAD CALCULATION.
8. SOUTH BRIDGE COMPRISES OF TWO HOLLOW STRUCTURAL PIECES USED AS ELECTRICAL MANHOLES (MANHOLE NO. 2 AND NO. 3), THROUGH WHICH EXISTING CONDUITS ARE ROUTED. THE END OF EACH SECTION IS SOLID CONCRETE, AND EXISTING CONDUITS ARE ROUTED AROUND THE END OF THE SECTIONS THROUGH THE SIDE OF THE BRIDGE AS ILLUSTRATED.

## SHEET KEYNOTES

A. REMOVE EXISTING CONDUITS ON DOWNSTREAM SIDE OF DAM BRIDGE TO CLEAR PATH FOR NEW CONDUIT SYSTEM INCOMING FROM NEW ELECTRICAL BUILDING, AND REROUTE ON THE UPSTREAM SIDE OF THE DAM BRIDGE AS SHOWN. REPAIR ANY REMAINING OPENINGS.

B. REMOVE AND REPLACE EXISTING CONDUITS ROUTED ALONG EXTERIOR OF PUMP STATION. REROUTE THE NEW CONDUITS AS REQUIRED TO CLEAR PATH FOR NEW CONDUIT SYSTEM INCOMING FROM NEW ELECTRICAL BUILDING. REFER TO DRAWING 020-E-02 FOR MORE INFORMATION.

C. CONDUITS FROM NEW ELECTRICAL BUILDING TO BE ROUTED TO PUMP STATION ALONG THE DOWNSTREAM SIDE OF THE DAM BRIDGE.

D. REUSE THIS SECTION OF EXISTING CABLE AND RACEWAY SYSTEM FOR ROUTING NEW CONDUCTORS.

E. ROUTE EXISTING CONDUCTORS THROUGH NEW CONDUITS.

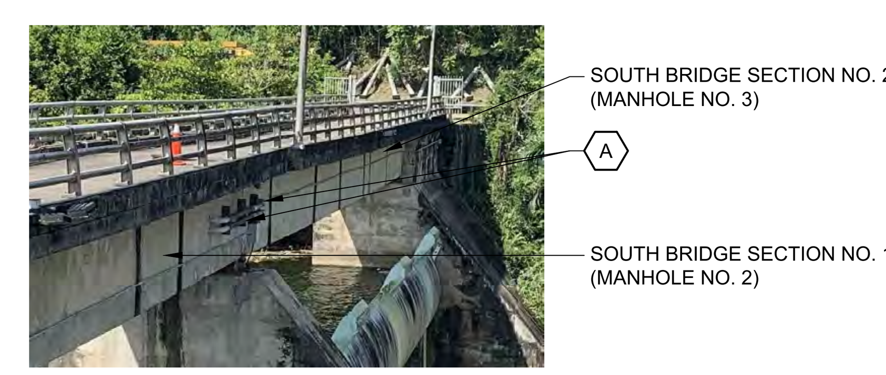
F. CONNECT NEW CONDUIT TO EXISTING CONDUIT. UTILIZE 3" CONDUITS.

G. INTERCEPT EXISTING CONDUITS ON PUMP STATION 6TH FLOOR WITH NEW TERMINAL JUNCTION BOX TJB-20-3. EXTEND EXISTING CONDUIT FROM "SECONDARY FEEDER 120-208V" PULL BOX TO THIS JUNCTION BOX.

H. FURNISH AND INSTALL NEW [4#400, #1/0 GND] CONDUCTORS FROM TJB-20-3 TO ATS-1. UTILIZE EXISTING CONDUITS AND CABLE TRAY.

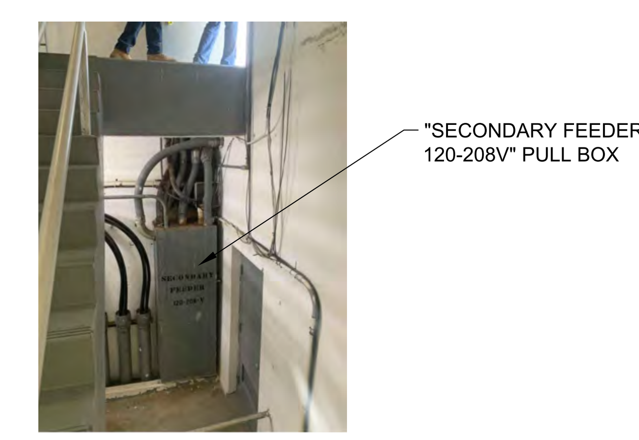
I. EXISTING CATERPILLAR GENERATOR MAIN CIRCUIT BREAKER IS MERLIN GERIN CK 1200N WITH STR 25DP TRIP UNIT. REPLACE 1000A RATING PLUG WITH 600A RATING PLUG. SET LONG TIME CURRENT SETTING TO 1 AND INSTANTANEOUS PICKUP TO 10.

J. ADJUST EXISTING CUMMINS GENERATOR MAIN CIRCUIT BREAKER TRIP SETTING TO 600A.



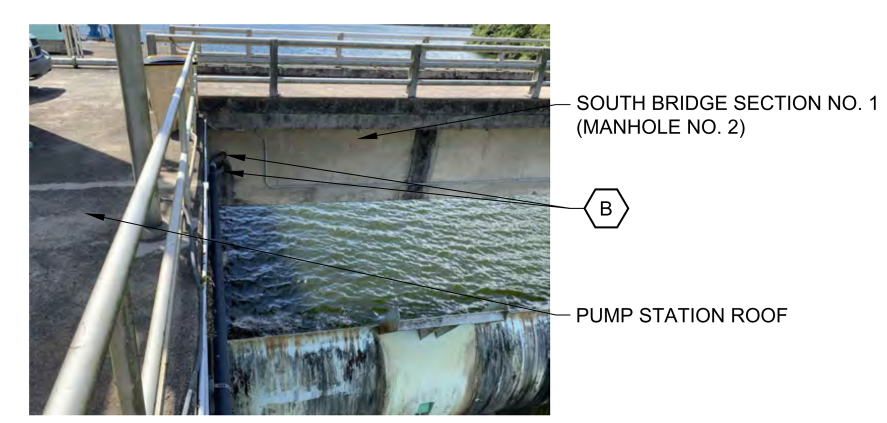

## PHOTO 1: CONDUITS ON DOWNSTREAM SIDE OF BRIDGE

SCALE: NONE




## PHOTO 3: SECONDARY FEEDER PULLBOX

SCALE: NONE




## PHOTO 2: CONDUITS ROUTED ON STATION EXTERIOR

SCALE: NONE

## PHOTO 4: EXISTING GENERATORS

SCALE: NONE

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Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| B | 05/21/2024 | 100% DESIGN | JL | DR | GN |
| A | 11/20/2023 | 90% DESIGN | JL | DR | GN |

DRAWN BY NE
DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

EXISTING ONE-LINE DIAGRAM

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 127 OF 145
DWG. NO. 010-E-01

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
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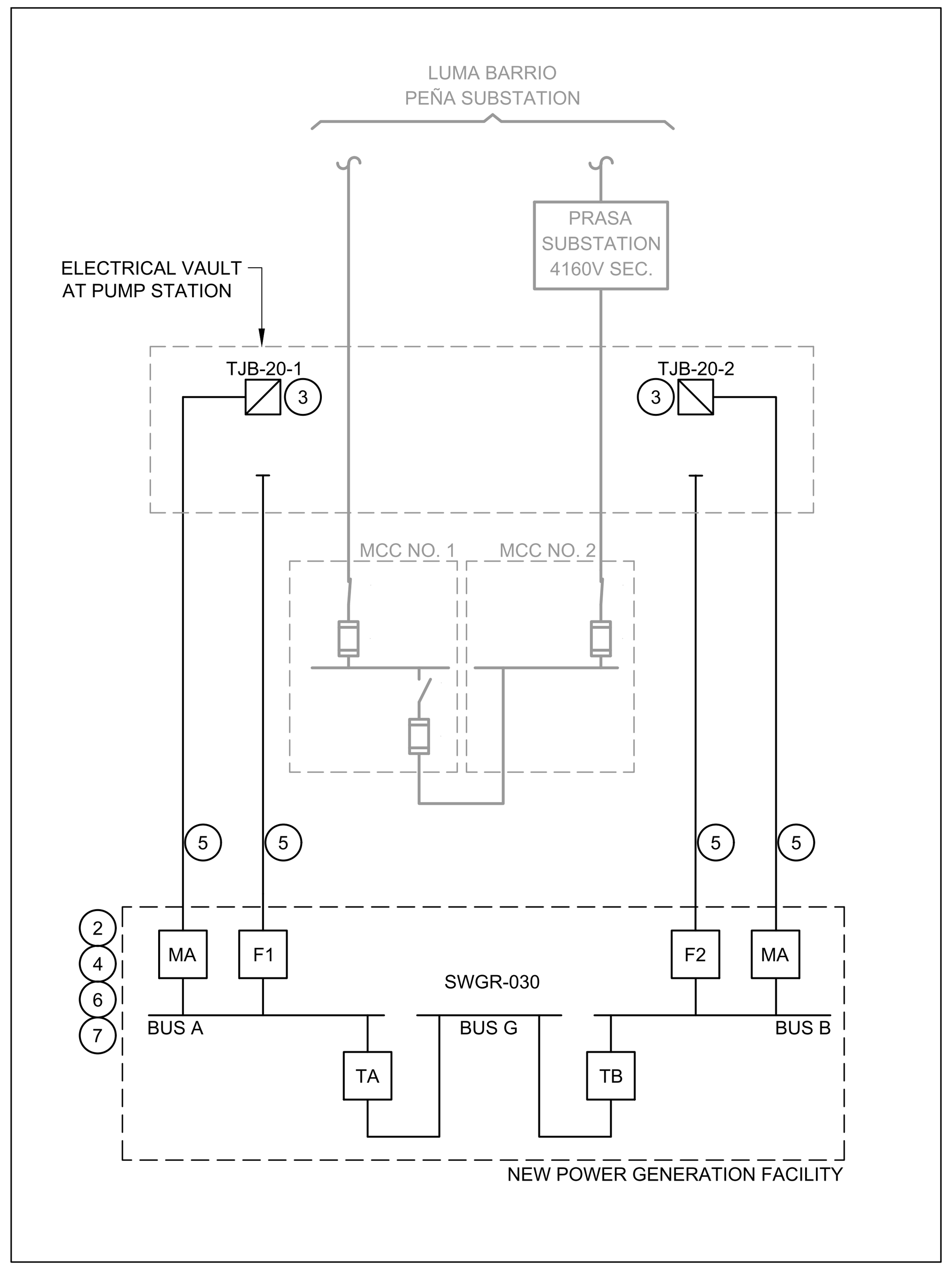
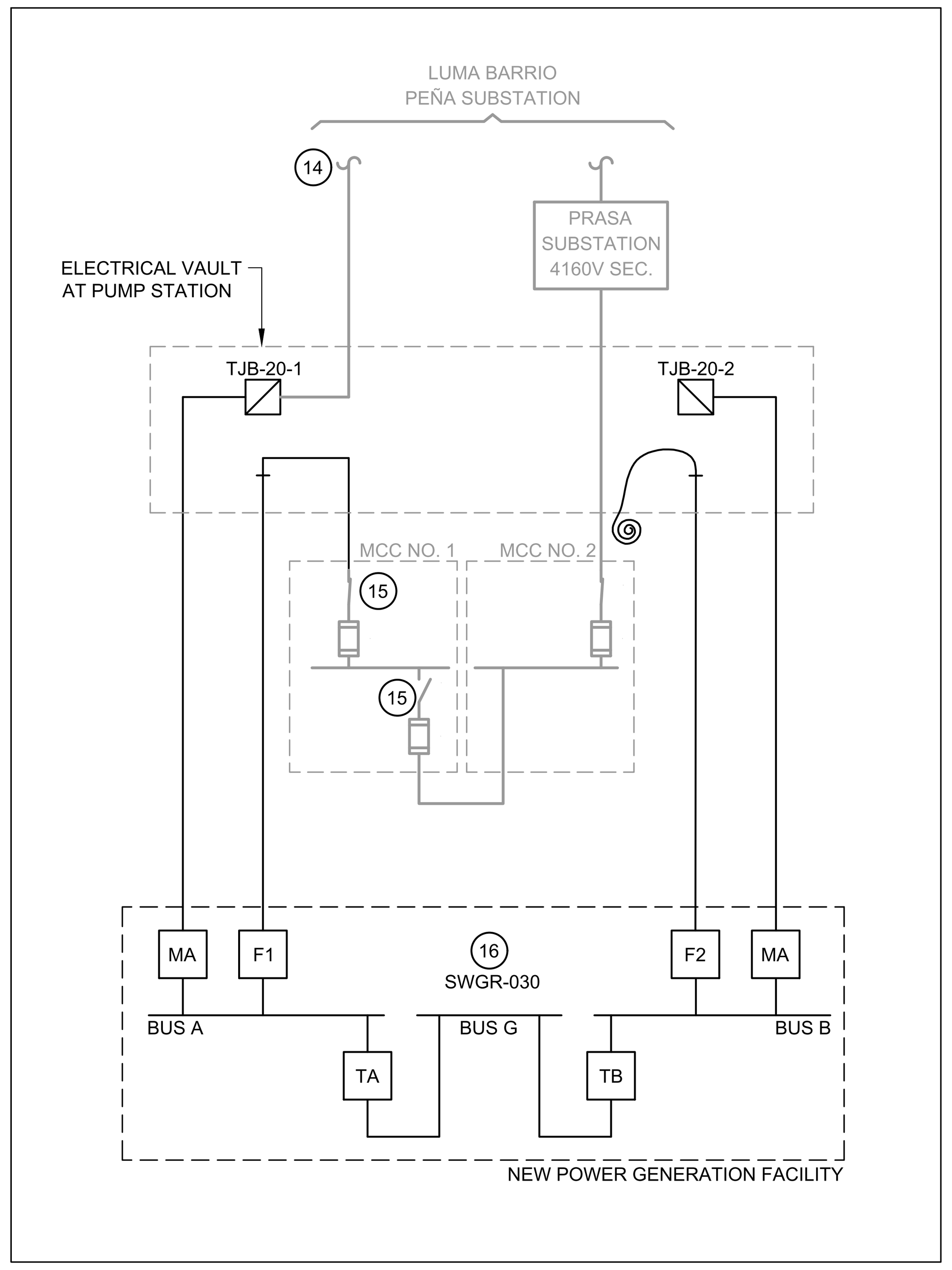
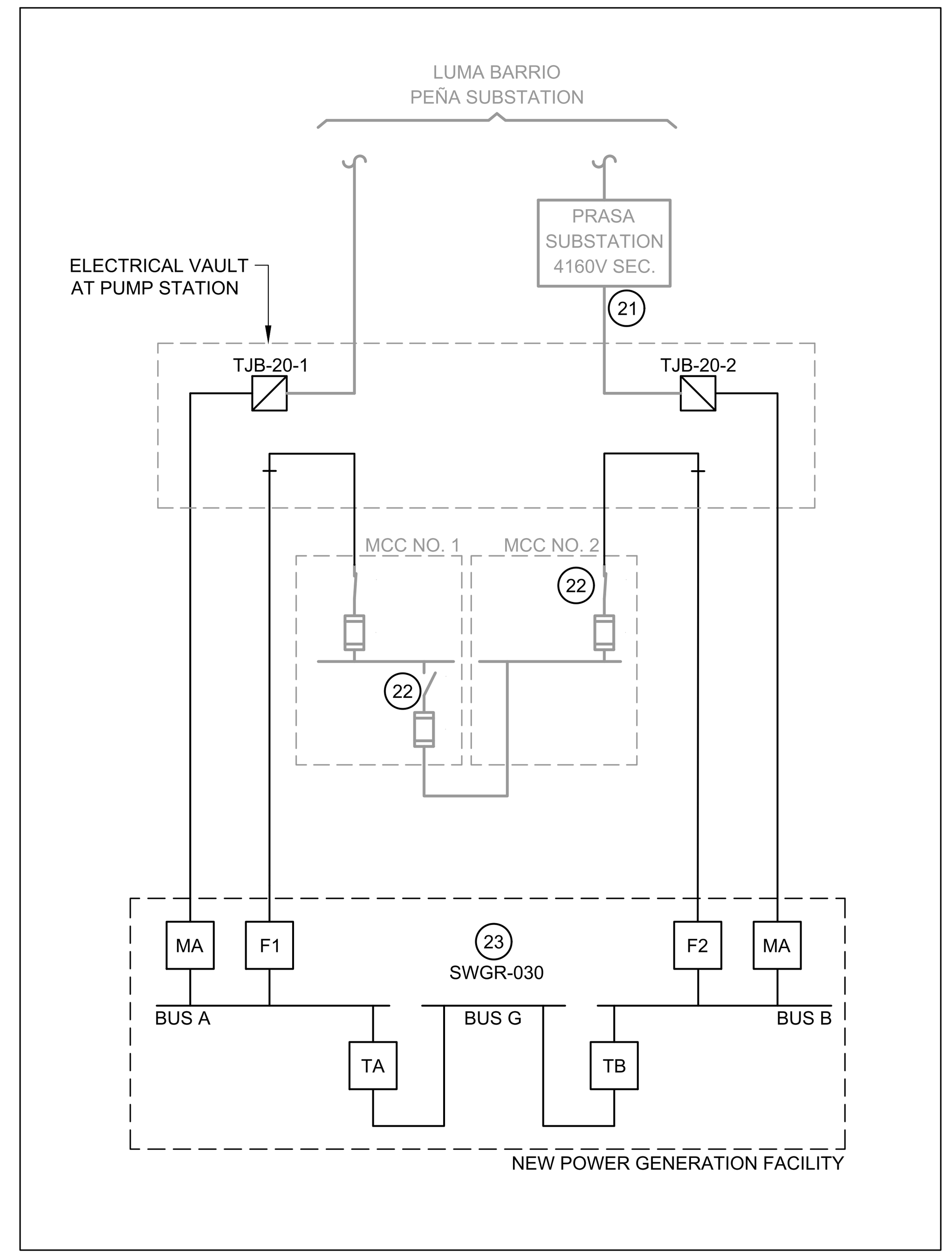



## SEQUENCE PROGRESSION - GROUP 3




## SEQUENCE PROGRESSION - GROUP 5

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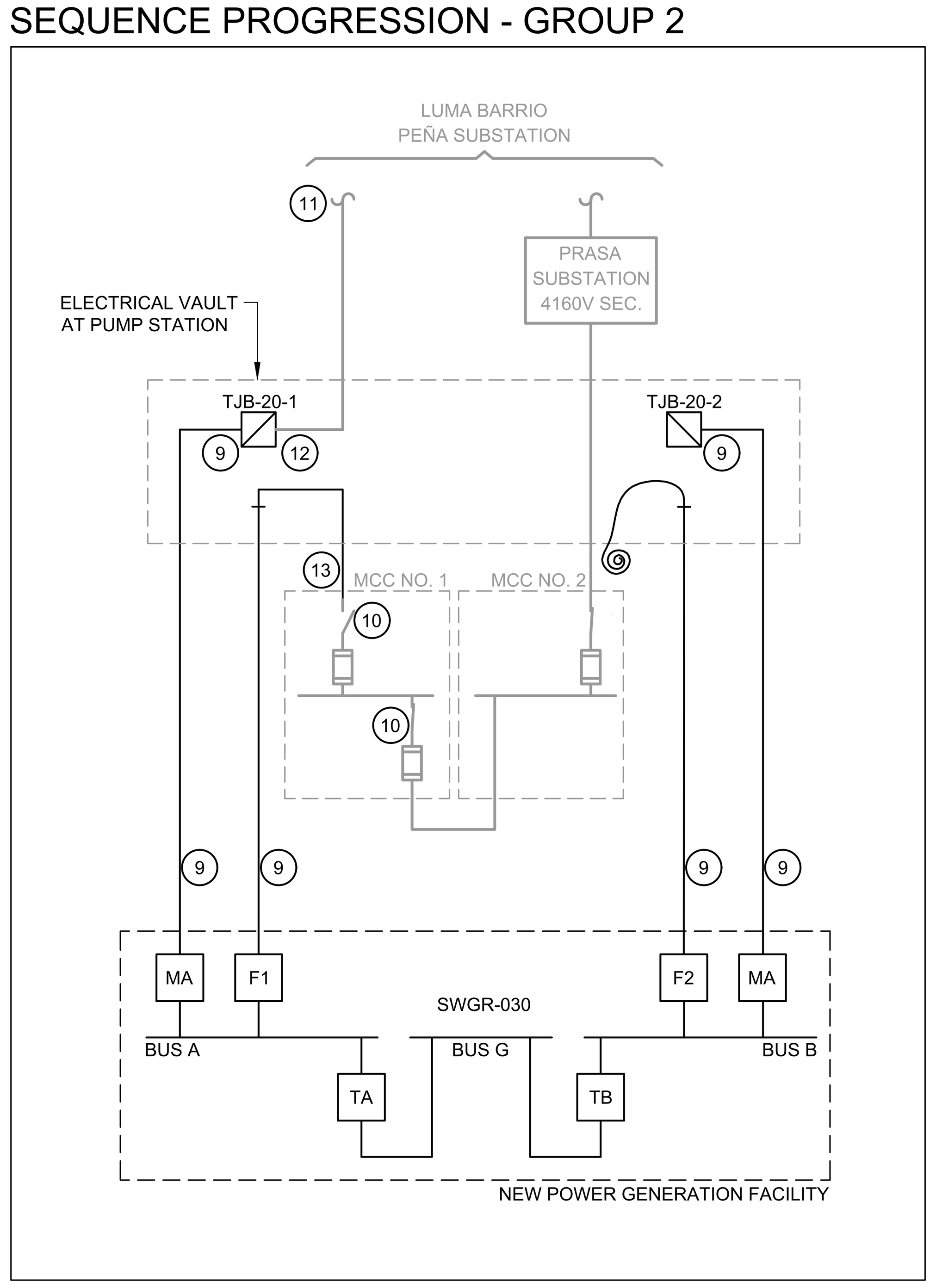


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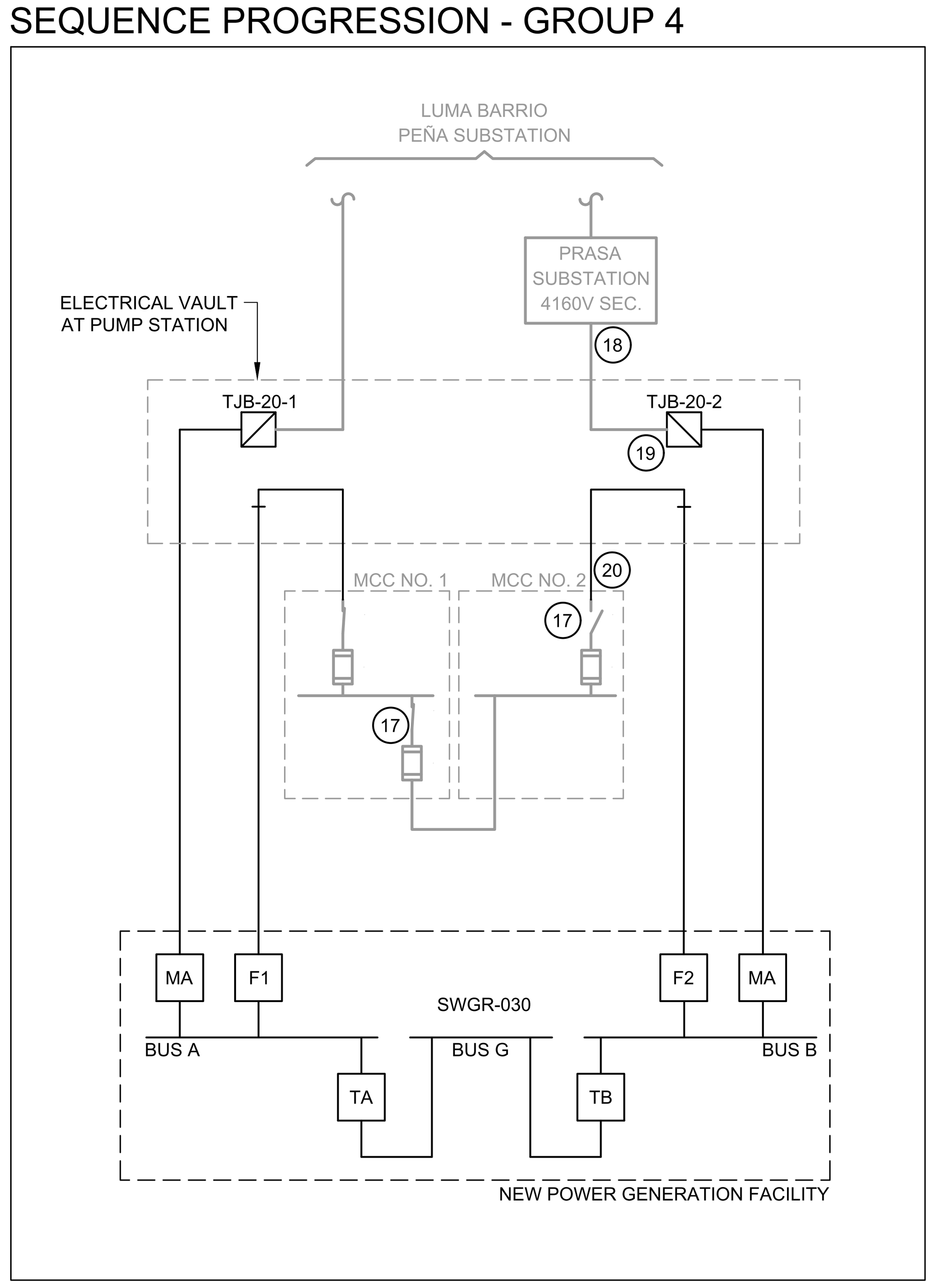


Document No.: 4375.016 Version: 3

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el dueño del proyecto a presentar estos planos de construcción ante LUMA Energy como operador y administrador del Sistema de Transmisión y Distribución de la AEE. / I certify that I am a licensed and registered engineer, surveyor, or architect (in compliance with Act 173 of 1988, as amended) and authorized by the project or land owner to submit these construction plans to LUMA Energy as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. En armonía con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, certifico que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos, LUMA Energy y el Manual de Práctica Profesional del CIAPR. / In compliance with Act No.135 of June 15, 1967, as amended known as the "Construction Plans or Projects Certification Act", I certify that I prepared the electric design for this project in accordance with the codes, Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CIAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**LUMA** **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:51:54 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification presented by the designer in compliance with Act 135 of July 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no releva al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al constructor ni al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. / LUMA does not assume responsibility over the certified design. LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from: National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and other government agencies as well as federal and state laws ruling by the time construction begins.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediando notificación previa a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese periodo, este endoso perderá su vigencia. Este endoso no es para constituir servidumbre ni para completar proceso de Cesión, Traspaso y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (7282 de 2007 / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will still be valid until work's completion. In case there is no certified electrical work during this period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (7282 of 2007).

## ◯ SEQUENCE OF CONSTRUCTION

THE SPECIFIED CONSTRUCTION SEQUENCE SHALL BE CONSIDERED A SUGGESTED SEQUENCE. IN ADDITION, THE CONSTRUCTION SEQUENCE SHALL NOT BE CONSIDERED ALL-ENCOMPASSING AND IS GENERALLY LIMITED TO THE ELECTRICAL WORK REQUIRED FOR ENERGIZING THE NEW ELECTRICAL BUILDING. REFER TO ILLUSTRATIONS FOR CLARIFICATION.

PRIOR TO EXTENDING EXISTING 4160V FEEDERS TO THE POWER GENERATION FACILITY, THE CONTRACTOR SHALL:

1. REROUTE EXISTING GENERATOR CONDUITS ROUTED ON DOWNSTREAM SIDE OF THE SOUTH DAM BRIDGE AND ALONG THE PUMP STATION EXTERIOR WALL TO CLEAR PATH FOR NEW CONDUITS. REFER TO DRAWING 010-E-01 FOR MORE INFORMATION.
2. PROVIDE TEMPORARY UTILITY POWER TO THE NEW CONSTRUCTION SITE.
3. INSTALL MEDIUM VOLTAGE TERMINATION BOXES IN ELECTRICAL VAULT ON PUMP STATION 6TH FLOOR.
4. ROUGH-IN CONDUIT AT NEW POWER GENERATION FACILITY.
5. INSTALL RACEWAY SYSTEM BETWEEN EXISTING PUMP STATION AND NEW ELECTRICAL BUILDING.
6. CONSTRUCT NEW ELECTRICAL BUILDING.
7. INSTALL ELECTRICALLY-POWERED EQUIPMENT INCLUDING SWITCHGEAR, LOW VOLTAGE DISTRIBUTION EQUIPMENT, INTERIOR LIGHTING, CONTROL AND COMMUNICATIONS EQUIPMENT, GENERATORS, FUEL SYSTEM PIPING AND EQUIPMENT, AND AIR CONDITIONING SYSTEMS AT THE NEW POWER GENERATION FACILITY. INSTALL AND TERMINATE ALL WIRING.
8. INSTALL AND TERMINATE FIBER OPTIC CABLING BETWEEN EXISTING PUMP STATION AND THE NEW POWER GENERATION FACILITY.

AFTER COMPLETING THE WORK SPECIFIED ABOVE, THE CONTRACTOR SHALL EXTEND THE EXISTING 4160V FEEDERS FROM THE EXISTING PUMP STATION TO THE NEW ELECTRICAL BUILDING AS FOLLOWS:

9. INSTALL MEDIUM VOLTAGE CABLES BETWEEN SWITCHGEAR PUMP STATION. TERMINATE AT MEDIUM VOLTAGE TERMINATION BOXES.
10. OPEN MEDIUM VOLTAGE MCC-1 MAIN SWITCH AND CLOSE TIE SWITCH TO SUPPLY PUMP STATION FROM FEEDER B IN THE INTERIM.
11. DE-ENERGIZE EXISTING FEEDER A.
12. CUT AND TERMINATE FEEDER A AT TERMINATION BOX TJB-20-1 TO COMPLETE SUPPLY CIRCUIT TO NEW SWITCHGEAR.
13. TERMINATE NEW CABLE, INCOMING FROM SWITCHGEAR FEEDER BREAKER F1, AT MEDIUM VOLTAGE MCC-1 TO COMPLETE SUPPLY CIRCUIT FROM SWITCHGEAR TO MEDIUM VOLTAGE MCC-1.
14. RE-ENERGIZE FEEDER A TO SUPPLY NEW GENERATION FACILITY.
15. OPEN MEDIUM VOLTAGE MCC TIE SWITCH AND CLOSE MEDIUM VOLTAGE MCC-1 MAIN SWITCH TO SUPPLY MEDIUM VOLTAGE MCC-1.
16. TEST AND COMMISSION ALL SYSTEMS AT POWER GENERATION STATION INCLUDING GENERATORS, FUEL OIL STORAGE AND TRANSFER SYSTEM, CONTROL SYSTEMS, COMMUNICATIONS SYSTEMS, LIGHTING SYSTEM, AND POWER DISTRIBUTION SYSTEM. TO THE GREATEST EXTEND POSSIBLE, WHILE UTILITY FEEDER B IS UNAVAILABLE, THE SWITCHGEAR SHALL BE TESTED AND COMMISSIONED. ANY TESTS, SUCH AS SOURCE TRANSFER TESTING, THAT WILL INTERRUPT SUPPLY TO THE PUMP STATION SHALL REQUIRE WRITTEN APPROVAL FROM THE OWNER PRIOR TO COMMENCING.
17. OPEN MEDIUM VOLTAGE MCC-2 MAIN SWITCH AND CLOSE TIE SWITCH TO SUPPLY PUMP STATION FROM FEEDER A IN THE INTERIM.
18. DE-ENERGIZE FEEDER B.
19. CUT AND TERMINATE FEEDER B AT TERMINATION BOX TJB-20-2 TO COMPLETE SUPPLY CIRCUIT TO NEW SWITCHGEAR.
20. TERMINATE NEW CABLE, INCOMING FROM SWITCHGEAR FEEDER BREAKER F2, AT MEDIUM VOLTAGE MCC-2 TO COMPLETE SUPPLY CIRCUIT FROM SWITCHGEAR TO MEDIUM VOLTAGE MCC-2.
21. RE-ENERGIZE FEEDER B TO SUPPLY NEW SWITCHGEAR BUS B.
22. OPEN MEDIUM VOLTAGE MCC TIE SWITCH AND CLOSE MEDIUM VOLTAGE MCC-2 MAIN SWITCH.
23. COMPLETE TESTING AND COMMISSIONING OF SWITCHGEAR INCLUDING SOURCE TRANSFER CONTROL.

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| B | 02/13/2024 | 100% DESIGN | JL | DR | GN |
| A | 11/20/2023 | 90% DESIGN | JL | DR | GN |

| | |
|---|---|
| DRAWN BY | NE |
| DESIGNED BY | JL |
| CHECKED BY | DR |
| APPR. BY | GN |

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

SEQUENCE OF CONSTRUCTION

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

| | |
|---|---|
| C.I.P. No. | 1-70-9000 |
| PSWID | - |
| DATE: | JANUARY / 2024 |
| SCALE: | NO SCALE |
| SHEET NO. | 128 OF 145 |
| DWG. NO. | 010-E-02 |

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## GENERAL SHEET NOTES

1. PLANS FOR EXISTING FACILITIES HAVE BEEN DEVELOPED USING RECORD DRAWINGS AND FIELD INVESTIGATIONS, AND MAY NOT REPRESENT ACTUAL CONDITIONS. FIELD VERIFY EXISTING CONDITIONS PRIOR TO PLACING BID.
2. EVALUATE PROPOSED CONDUIT ROUTING FOR EXISTING OBSTRUCTIONS AND INCLUDE THE COST TO REMOVE, RELOCATE AND REWIRE THEM IN THE BID. COORDINATE THIS WORK WITH THE OWNER.
3. FURNISH AND INSTALL ADDITIONAL CABLE RACKS IN THE ELECTRICAL VAULT AS REQURED TO SUPPORT THE INSTALLATION. CABLE RACKS SHALL BE NON-METALLIC.

## SHEET KEYNOTES

A. NEW WALL-MOUNTED MEDIUM VOLTAGE TERMINATION BOX. ARRANGE BOXES AS REQUIRED TO SUIT THE INSTALLATION.

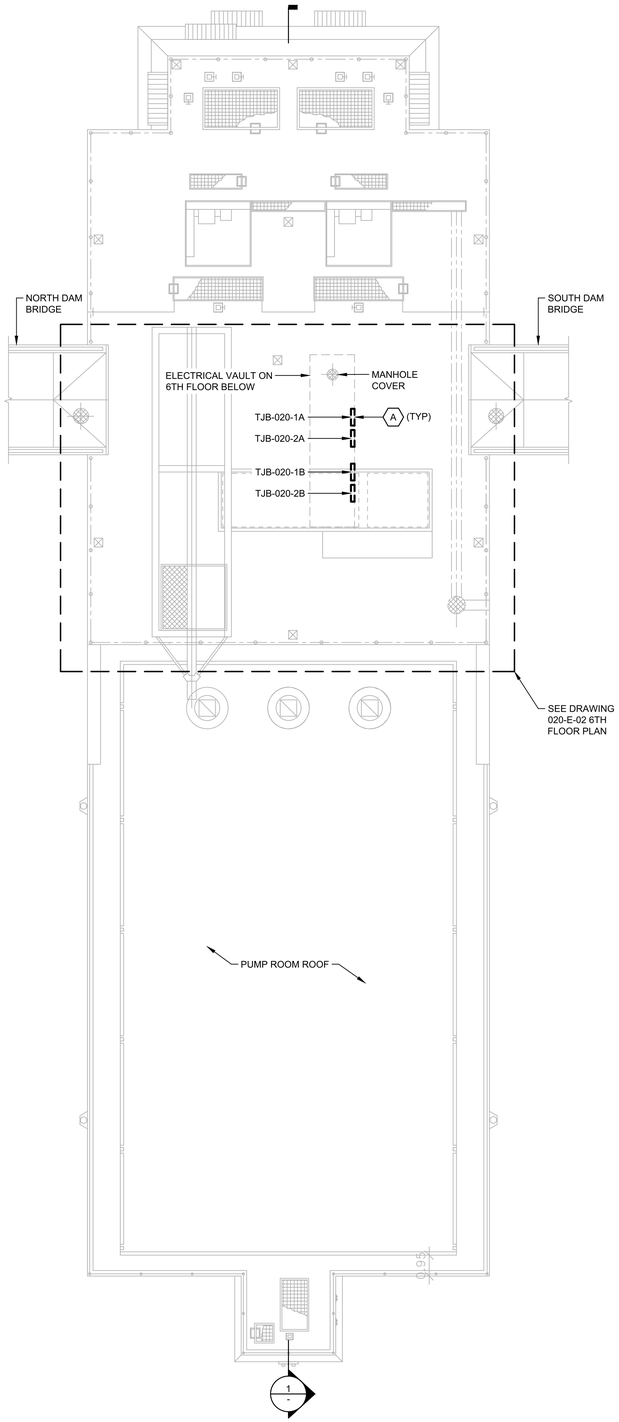
B. CUT EXISTING 4160V SUPPLY CONDUCTORS INCOMING FROM NORTH BRIDGE, AND TERMINATE AT NEW MEDIUM VOLTAGE TERMINATION BOXES.

C. EXISTING CONDUITS ROUTING 4160V SUPPLY CONDUCTORS TO PUMP ROOM MEDIUM VOLTAGE MOTOR CONTROL CENTERS.

D. TJB-20-3. FIELD-DETERMINE A SUITABLE LOCATION.

E. "SECONDARY FEEDER 120-208V" PULL BOX. EXTEND EXISTING CONDUITS TO TJB-20-3, AS SHOWN.

F. MEDIUM VOLTAGE CABLES TO MEDIUM VOLTAGE MCC'S. PROVIDE ALL HARDWARE REQUIRED TO SUPPORT TRANSITION FROM OVERHEAD RUN TO EXISTING CONDUITS.




ROOF PLAN - EXISTING

SCALE: 3/32" = 1'-0"

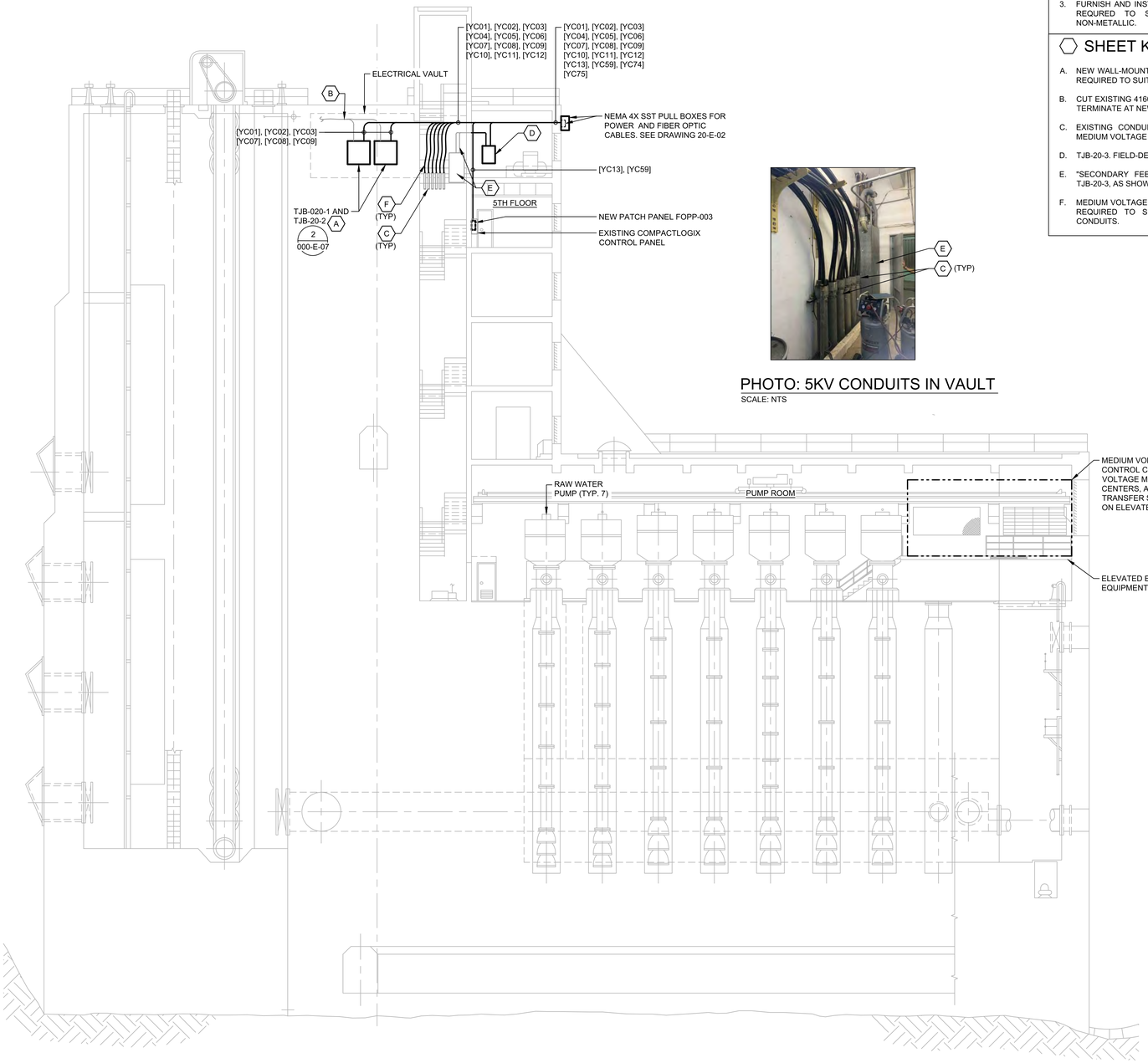






PHOTO: 5KV CONDUITS IN VAULT

SCALE: NTS

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SECTION

SCALE: 3/32" = 1'-0"

Document No.: 47CFR-PE Version: 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar sellos planos de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor, or architect in compliance with Law 173 of 1988, as amended, and I am authorized by the design of the project to present construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico que las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, aplicables que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patronas, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. I LUMA Energy y el Manual de Prácticas Profesionales de CAPR. I certify that I prepared the electric design for this project in accordance with the Law 135 of June 15, 1967, as amended, Project Certification Act. I certify that I prepared the electric design for this project in accordance with the codes, Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5131/28)
Date: 2024.05.20 14:38:03 -04'00'

**ENDOSO / ENDORSEMENT**

LUMA

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA-24-7-044
Carga / Load: (KVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago

Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:52:33 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification submitted by the designer in compliance with Law Núm. 135 of July 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no relea al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no relevia al constructor ni al inspector de obra privado de cumplir con las especificaciones de los planos sellados. LUMA no asume responsabilidad por el diseño de otras agencias de gobierno, municipios y de otras agencias de gobierno, así como otras reales hereadas y arrendadas. / LUMA does not assume responsibility over the certified design. LUMA's endorsement does not relieve the designer from the professional responsibility assumed when certifying these plans. This endorsement does not relieve the contractor nor the private work inspector from complying with the standing dispositions from: National Electric Code, National Electric Safety Code, construction standards, norms, and regulations from LUMA and other government agencies as well as federal and state laws noting by the time construction begins.
3. Este endoso es válido por un (1) año. El mismo es válido para el diseño eléctrico que se haya completado antes de notificación prior a a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese periodo, este endoso perderá su vigencia. Este endoso no es para construir ser colocribre o para completar proceso de Cliéntes, Traspaso de Responsabilidad (TOR) o Cliente Ilumina Proyecto (CIP) que se encuentren en el proceso de Autoridad de Acueductos y Alcantarillados de Energía Eléctrica (CEA) de 2007. / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will still be valid until work's completion. In case there is no certified electrical work during this period, this endorsement will cease its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Acceptance process of the Assignment, Transfer, or Work Ilumina Project (CIP) clients, or that is in the process of the Puerto Rico Electric Power Authority (CEA) of 2007.

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO. | DATE | REVISION | BY | CK. | APPR. |
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| A | 02/13/2024 | 100% DESIGN | JL | DR | GN |

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| DESIGNED BY | JL |
| CHECKED BY | DR |
| APPR. BY | GN |

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

PUMP STATION ROOF PLAN AND SECTION

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 129 OF 145
DWG. NO. 020-E-01

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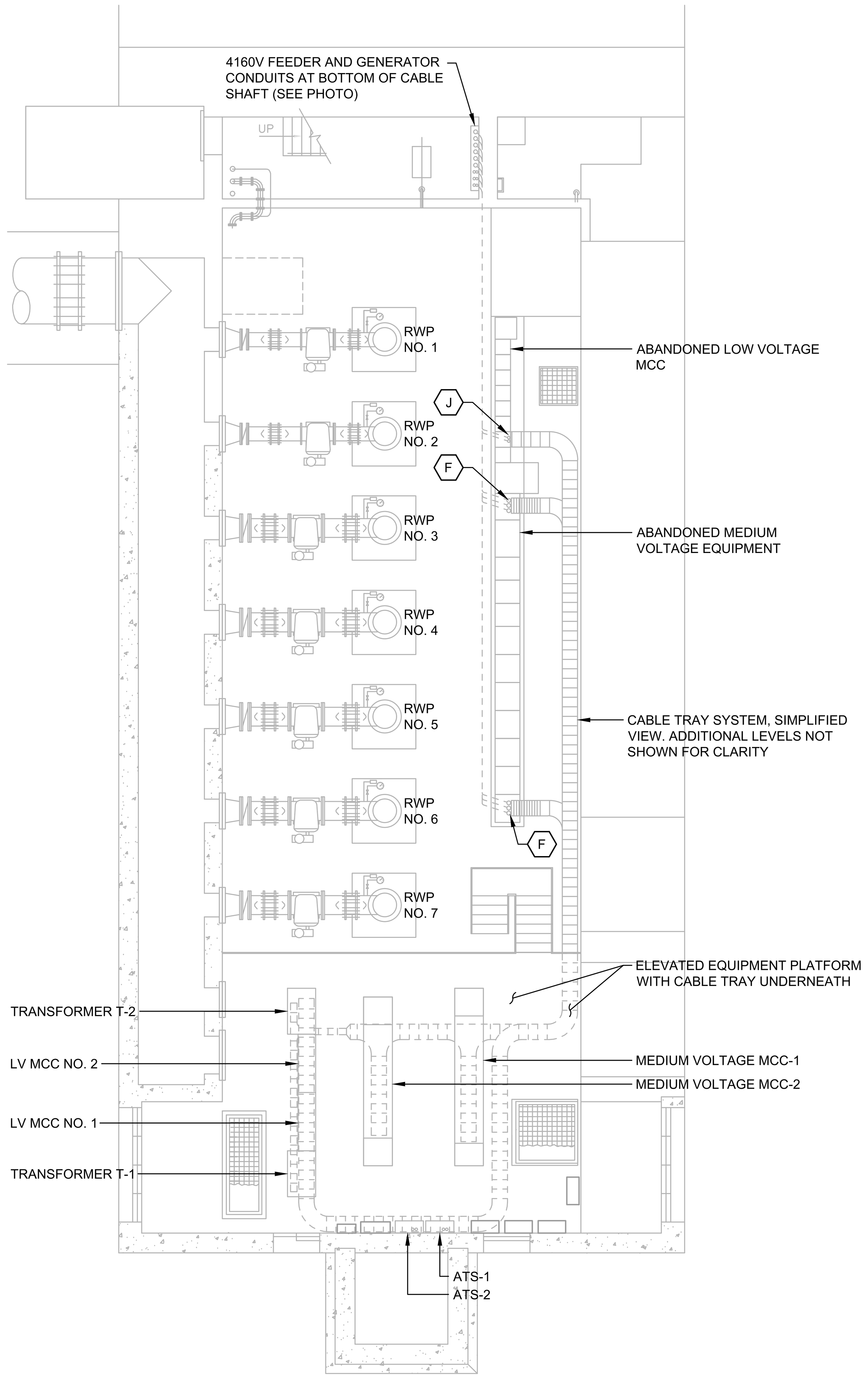


## PUMP ROOM PLAN

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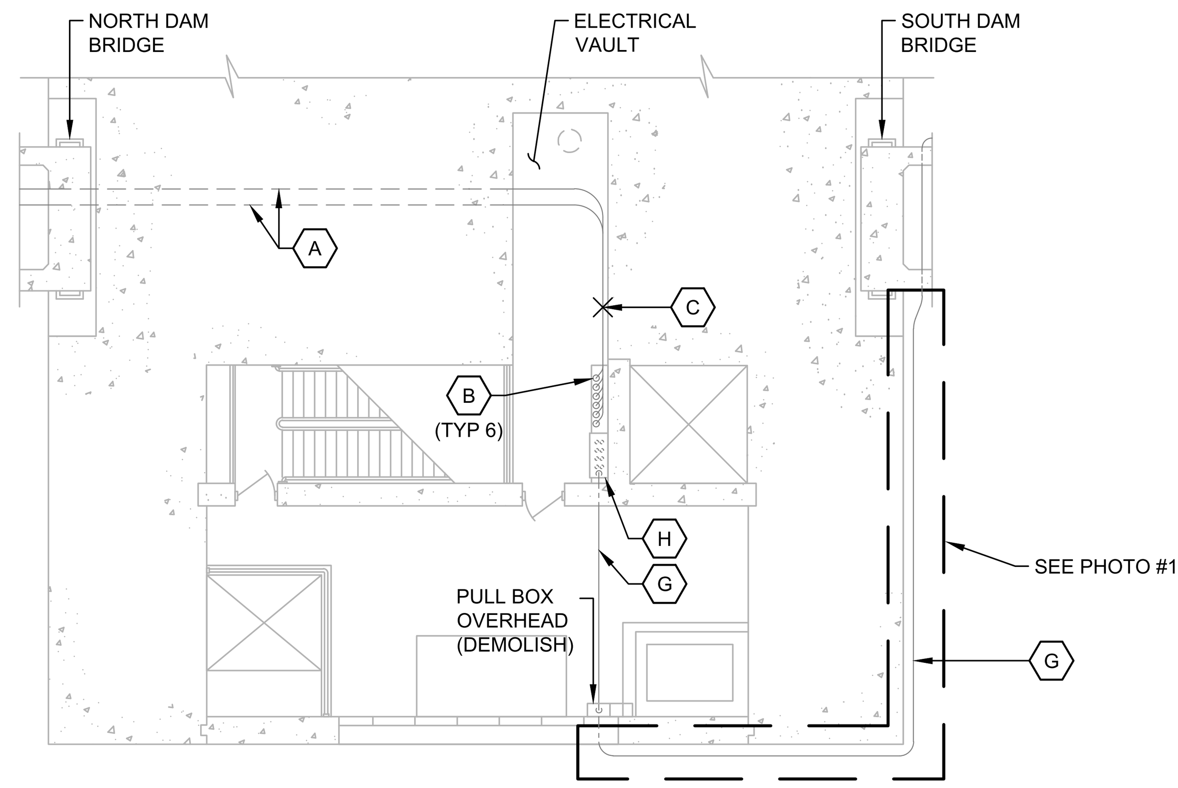


## 6TH FLOOR PLAN - EXISTING

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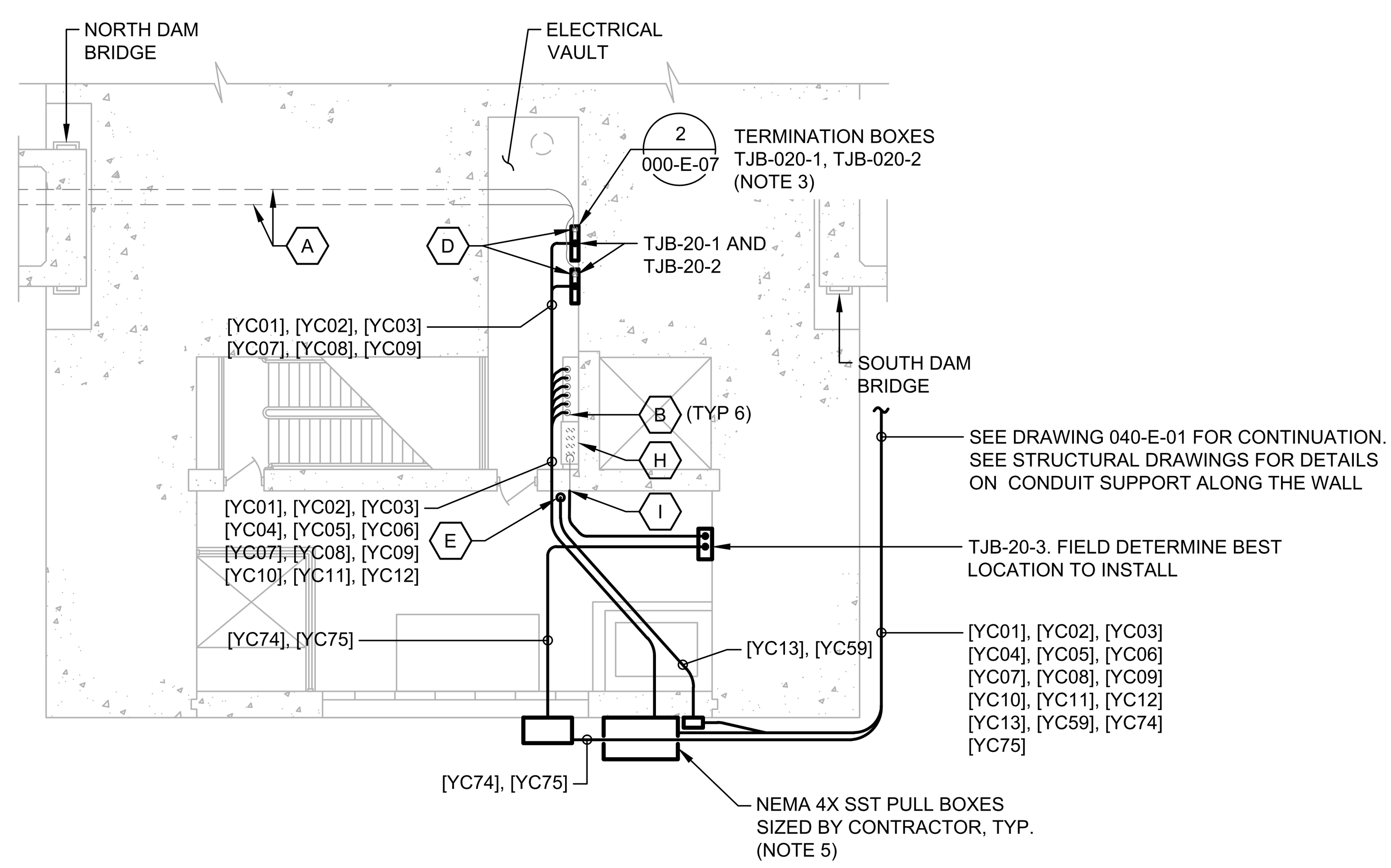


## 6TH FLOOR PLAN - MODIFIED

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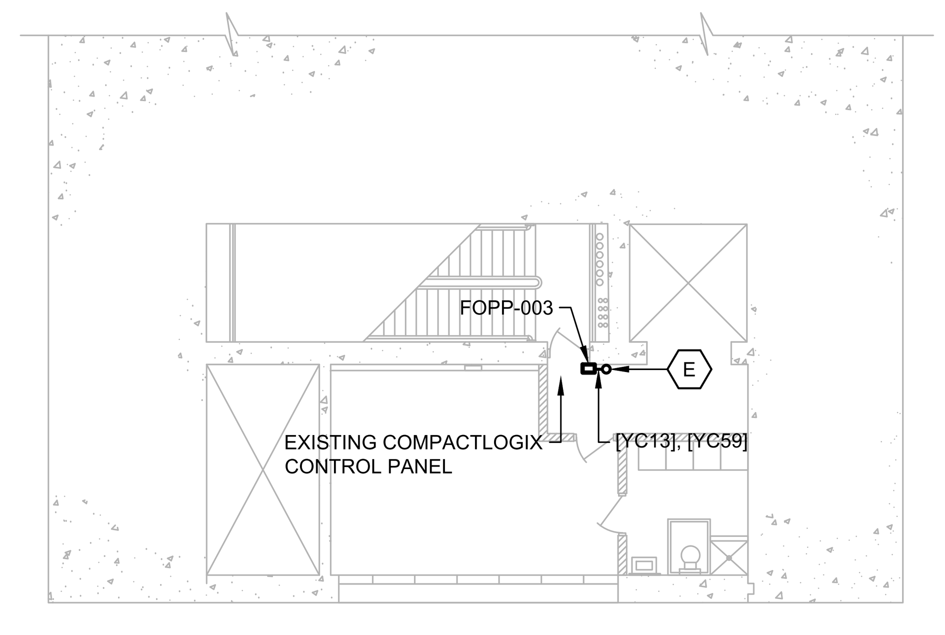



## 5TH FLOOR PLAN

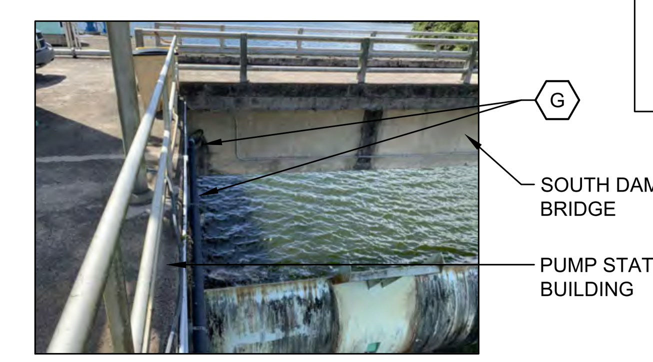
SCALE: 3/32" = 1'-0"

## GENERAL SHEET NOTES

1. PLANS FOR EXISTING FACILITIES HAVE BEEN DEVELOPED USING RECORD DRAWINGS AND FIELD INVESTIGATIONS, AND MAY NOT REPRESENT ACTUAL CONDITIONS. FIELD VERIFY EXISTING CONDITIONS PRIOR TO PLACING BID.
2. EVALUATE PROPOSED CONDUIT ROUTING FOR EXISTING OBSTRUCTIONS AND INCLUDE THE COST TO REMOVE, RELOCATE AND REWIRE THEM IN THE BID. COORDINATE THIS WORK WITH THE OWNER.
3. ARRANGE TERMINAL BOXES TO SUIT EXISTING CONDITIONS.
4. REFER TO SEQUENCE OF CONSTRUCTION FOR MORE INFORMATION.
5. REFER TO EXISTING ONE-LINE DIAGRAM ON DRAWING 010-E-01 FOR MORE INFORMATION.
6. PROVIDE SEPARATE PULL BOXES FOR FIBER AND POWER AS SHOWN.

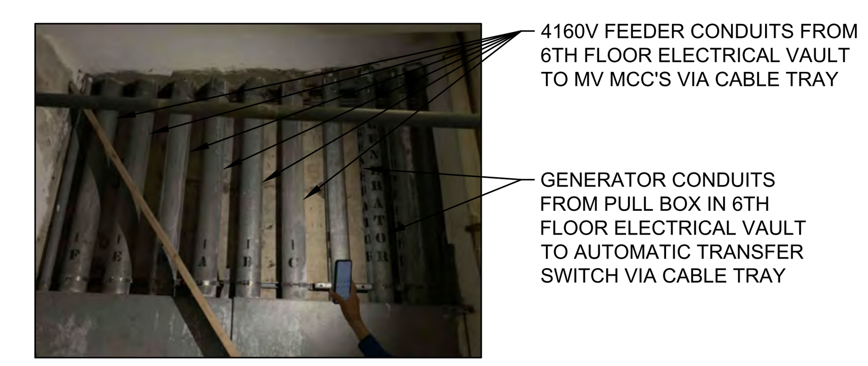
## SHEET KEYNOTES

A. EXISTING INCOMING 4160V SUPPLY CONDUCTORS.
B. EXISTING CONDUITS AT TOP OF CABLE SHAFT ROUTING 4160V SUPPLY CONDUCTORS TO PUMP ROOM MEDIUM VOLTAGE MOTOR CONTROL CENTERS ON OPERATING FLOOR.
C. CUT EXISTING CONDUCTORS FOR TERMINATION AT NEW MEDIUM VOLTAGE TERMINAL BOXES. DICARD REMAINING LENGTH OF CABLES FROM THE VAULT TO THE MEDIUM VOLTAGE MCC'S.
D. TERMINATE INCOMING SECTION OF EXISTING 4160V CONDUCTORS AT NEW MEDIUM VOLTAGE TERMINAL BOXES.
E. ROUTE FIBER CONDUITS VERTICALLY FROM SIXTH FLOOR TO NEW PATCH PANEL FOPP-003 FIFTH FLOOR. FIELD COORDINATE BEST LOCATION TO INSTALL.
F. EXISTING 4160V CABLES TRANSITION FROM CONDUIT TO CABLE TRAY AT THIS LOCATION.
G. EXISTING GENERATOR CONDUITS TO BE REMOVED AND REROUTED AS REQUIRED TO ACCOMMODATE CONDUIT RUN FROM NEW ELECTRICAL BUILDING ALONG SIDE OF PUMP STATION BUILDING.
H. "SECONDARY FEEDER 120-208V" PULL BOX (SEE PHOTO #3).
I. EXTEND EXISTING CONDUITS FROM "SECONDARY FEEDER 120-208V" PULL BOX TO TO NEW TJB-20-3.
J. EXISTING GENERATOR CABLES TRANSITION FROM CONDUIT TO CABLE TRAY AT THIS LOCATION



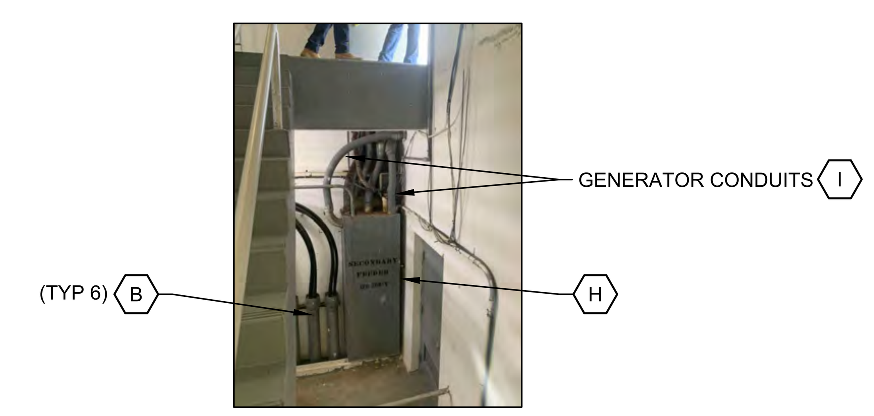

## PHOTO 1: EXISTING GENERATOR CONDUITS

SCALE: NOT TO SCALE




## PHOTO #2: BOTTOM OF CABLE SHAFT

SCALE: NOT TO SCALE




## PHOTO 3: SECONDARY FEEDER PULL BOX

SCALE: NOT TO SCALE

Document No.: 4375.016 Version: 3

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el dueño del proyecto a presentar estos planos de construcción ante LUMA Energy como operador y administrador del Sistema de Transmisión y Distribución de la AEE. / I certify that I am a licensed and registered engineer, surveyor, or architect (in compliance with Act 173 of 1988, as amended) and authorized by the project or land owner to submit these construction plans to LUMA Energy as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. En armonía con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, certifico que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos, LUMA Energy y el Manual de Práctica Profesional del CIAPR. / In compliance with Act No.135 of June 15, 1967, as amended known as the "Construction Plans or Projects Certification Act", I certify that I prepared the electric design for this project in accordance with the codes, Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CIAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

LUMA **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:53:08 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification presented by the designer in compliance with Act 135 of July 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no releva al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al constructor ni al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. / LUMA does not assume responsibility over the certified design. LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from: National Electric Code, National Electric Safety Code; constructions standards, norms, and regulations from LUMA and other government agencies as well as federal and state laws ruling by the time construction begins.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediando notificación previa a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese periodo, este endoso perderá su vigencia. Este endoso no es para constituir servidumbre ni para completar proceso de Cesión, Traspaso y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (7282 de 2007 / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will still be valid until work's completion. In case there is no certified electrical work during this period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (7282 of 2007).

**PRELIMINARY NOT FOR CONSTRUCTION**

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| DESIGNED BY | JL |
| CHECKED BY | DR |
| APPR. BY | GN |

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

PUMP STATION INTERIOR PLANS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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| DWG. NO. | 020-E-02 |

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Document No. 4476,R4 Version 1

## CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar sobre planos de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor, or architect in compliance with Law 173 of 1988, as amended, and I am authorized by the design of the project to present construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Cumplo con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, sellos que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, policiras, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Prácticas Profesionales del CAPR. I comply with the provisions of Law Nº 135 of June 15, 1967, as amended, known as the "Certificate of Plans and Projects Certificate Act". I certify that I prepared the electric design for this project in accordance with the codes, standards, rules and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (S/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**LUMA** **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

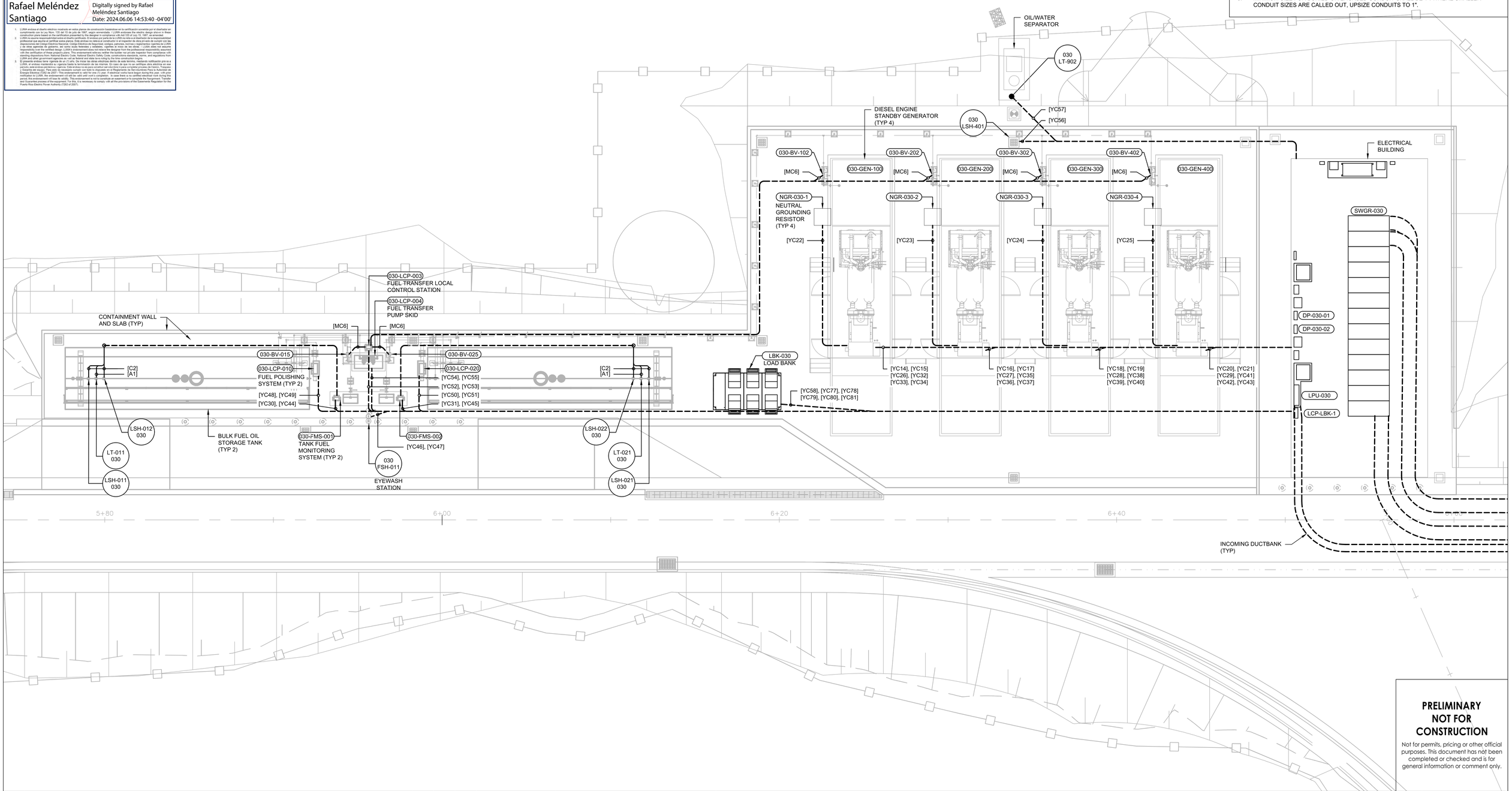
Rafael Meléndez Santiago

Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:53:40 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción haciéndose en la certificación sometida por el diseñador(a) en cumplimiento con la Ley Núm. 135 del 15 de junio de 1967, según enmendada. I LUMA endorses the electric design shown in these construction plans as certified by the designer(s) in compliance with Law Nº 135 of June 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de LUMA no exime a el diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al contratista o al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, policiras, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. I LUMA does not assume responsibility for the certified design. The endorsement by LUMA does not release the designer from professional responsibility with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and other government agencies, as well as federal and state laws, effective at the beginning of the works.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de esta termino, mediando notificación pre-ya a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese tiempo, el endoso perderá su validez. Este endoso no constituye un gravamen sobre servidumbres. Para esto es necesario cumplir con el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TJS2 de 2007. This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will remain valid until the completion of the same. If electrical work is not certified during that period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TJS2 of 2007).

## GENERAL SHEET NOTES

1. FINAL GENERATOR DIMENSIONS ARE SUBJECT TO CHANGE, COMPARED TO THE CONTRACT DOCUMENTS. GENERATOR CONCRETE PAD LOCATIONS AND DIMENSIONS, AND CONDUIT STUB UP LOCATIONS SHALL NOT BE FINALIZED UNTIL GENERATOR SHOP DRAWINGS HAVE BEEN ACCEPTED.
2. GENERATOR STAIRCASES AND PLATFORMS SHALL BE DESIGNED AND FURNISHED BY THE GENERATOR MANUFACTURER.
3. CONDUIT ROUTING SHOWN ARE DIAGRAMMATIC AND SHALL NOT BE CONSIDERED FINAL. FIELD-COORDINATE FINAL ROUTING WITH INSTALLATION REQUIREMENTS AND CONSTRAINTS.
4. ALL CONDUIT TRANSITIONS THROUGH CONTAINMENT SLAB SHALL BE THROUGH THE ASSOCIATED EQUIPMENT HOUSEKEEPING PAD. PENETRATIONS DIRECTLY INTO THE CONTAINMENT SLAB ARE STRICTLY FORBIDDEN.
5. MINIMUM SIZE FOR BURIED OR ENCASED CONDUIT SHALL BE 1". WHERE SMALLER CONDUIT SIZES ARE CALLED OUT, UPSIZE CONDUITS TO 1".




**PRELIMINARY NOT FOR CONSTRUCTION**

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| NO | DATE | REVISION | BY | CK. | APPR. |
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| B | 11/20/2023 | 90% DESIGN | JL | DR | GN |
| A | 09/29/2023 | 60% DESIGN | JL | DR | GN |

DRAWN BY JL
DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - SITE POWER PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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DATE: JANUARY / 2024
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SHEET NO. 131 OF 145
DWG. NO. 030-E-01

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**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar sellos planos de construcción sello LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor, or architect in compliance with Law 173 of 1988, as amended, and I am authorized by the design of the project to present construction plans by LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, sellos que preparé el diseño eléctrico de este proyecto en conformidad con los codigos, polizenas, normas y reglamentos aprobados por la AEE. la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Procesos Certificados del CAPR. I certify that I prepared the electric design for this project in accordance with the codes, specifications, standards, and Process Certificados del. I certify that I prepared the electric design for this project in accordance with the codes, specifications, standards, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (S/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**LUMA** **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago

Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:54:14 -04'00'

1. LUMA endosa el diseño eléctrico reseñado en estos planos de construcción basándose en la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. I. LUMA endorses the electric design shown in these construction plans based on the certification submitted by the designer in compliance with Law 173 of 1988, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no libra al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al contratista o al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, codigos, polizenas, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. I. LUMA does not assume responsibility for the certified design. The endorsement by LUMA does not release the designer from the professional responsibility assumed with the certification of these property plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from: National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and government agencies, as well as federal and state laws, effective at the beginning of the construction.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediando notificación pre-ya a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese término de tiempo, el endoso quedará nulo y sin efecto y se tendrá que someter nuevamente para endoso. Ley Para la Autoridad de Energía Eléctrica (TØ2 de 2007 - Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TØ2 de 2007 - This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will remain valid until the completion of the same. If electrical work is not certified within this period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to consider the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TØ02 of 2007).

## GENERAL SHEET NOTES

1. UNLESS OTHERWISE NOTED, ALL GROUNDING CONNECTIONS SHOWN SHALL BE BARE, SOLID COPPER WIRE, SIZE AS INDICATED. PROVIDE MINIMUM 1" SCHEDULE 40 PVC SLEEVE FOR TRANSITION TO BELOW GRADE THROUGH CONCRETE SLAB. SEAL SLEEVE WITH WEATHERPROOF FLEXIBLE SEALANT.
2. INSTALL GROUND TEST WELL FLUSH WITH FINISHED CONCRETE SURFACE.
3. WHERE REQUIRED BY THE APPROVED EQUIPMENT SHOP DRAWINGS, PROVIDE ADDITIONAL GROUNDING AS REQUIRED.
4. ALL CONNECTIONS TO GROUNDING LOOP SHALL BE EXOTHERMIC UNLESS OTHERWISE NOTED.

## SHEET KEYNOTES

A. #4/0 AWG BARE, STRANDED, TINNED COPPER GROUNDING LOOP BURIED 30" BELOW GRADE, WITH EXOTHERMIC CONNECTIONS TO GROUND RODS.

B. #6 AWG BONDING CONNECTION.

C. #2/0 AWG EXOTHERMIC BONDING CONNECTION TO LOWER REBAR GRID IN BUILDING FOOTER.

D. #2/0 AWG BONDING CONNECTION.

E. #6 AWG BONDING CONNECTION TO GENERATOR STAIRCASE. PROVIDE BONDING JUMPER AT ALL ELECTRICAL DISCONTINUITIES IN THE STAIRCASE AND PLATFORM ASSEMBLY TO ENSURE A FULLY GROUNDED STRUCTURE.

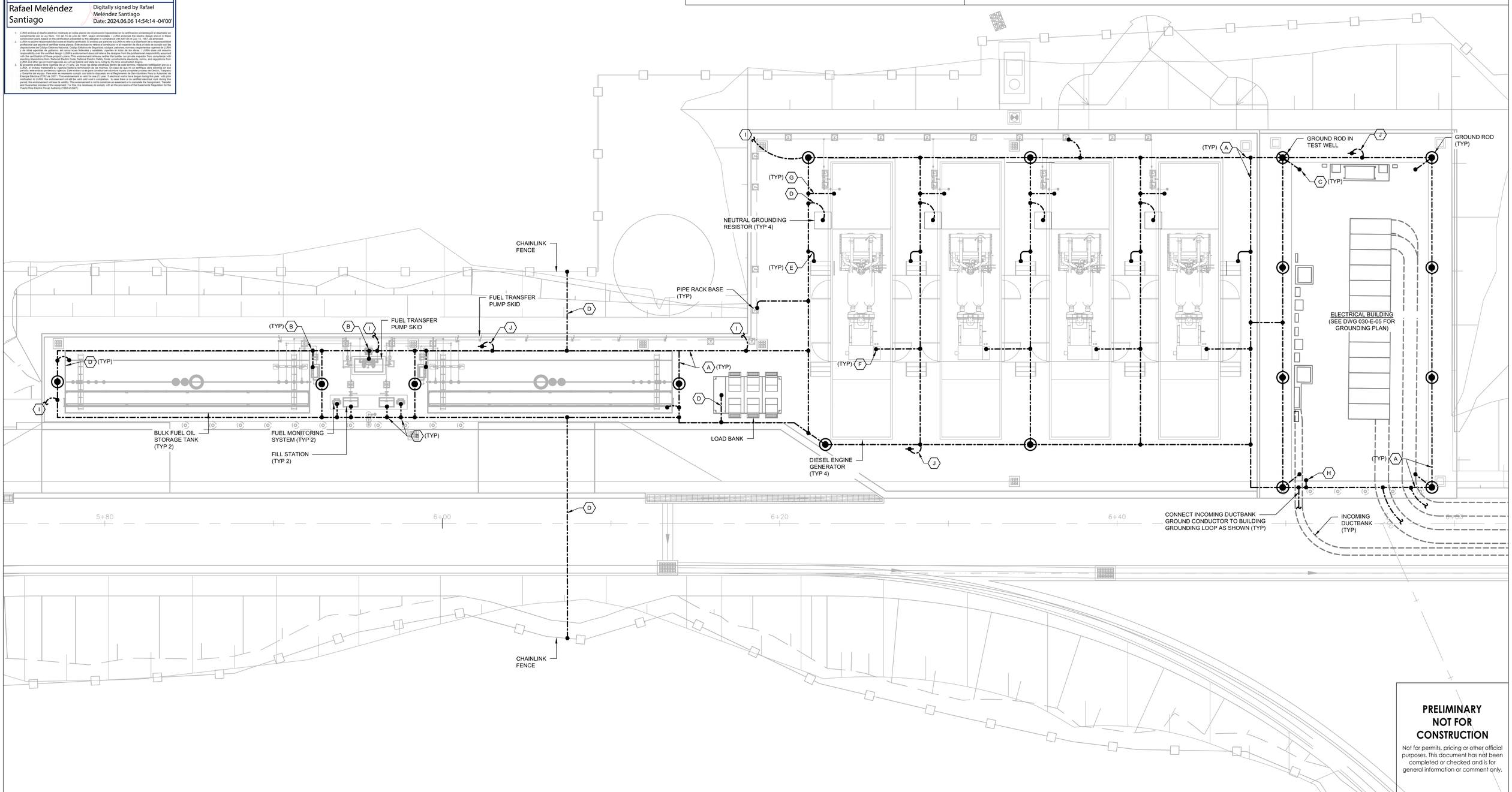
F. #2/0 AWG BONDING CONNECTION TO GENERATOR GROUNDING LUG.

G. #2/0 AWG BONDING CONNECTION TO GENERATOR SUB-BASE FUEL STORAGE TANK.

H. #6 AWG BONDING CONNECTION TO LADDER.

I. #6 AWG BONDING CONNECTION TO LIGHT POLE. REFER TO GENERATORS AREA - LIGHTING AND VIDEO SURVEILLANCE PLAN FOR MORE INFORMATION.

J. #2/0 AWG BONDING CONNECTION TO LOWER REBAR GRID IN CONTAINMENT BASIN SLAB.




**PRELIMINARY NOT FOR CONSTRUCTION**

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| C | 05/21/2024 | 100% DESIGN | JL | DR | GN |
| B | 11/20/2023 | 90% DESIGN | JL | DR | GN |
| A | 09/29/2023 | 60% DESIGN | JL | DR | GN |

DRAWN BY JL
DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - SITE GROUNDING PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: 1:100

SHEET NO. 132 OF 145
DWG. NO. 030-E-02

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Document No. 407824 Version 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar sobre planos de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. [ certify that I am a licensed and registered engineer, surveyor, or architect in compliance with Law 173 of 1988, as amended, and authorized by the design of the project to present construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, sellos que preparé el diseño eléctrico de este proyecto en conformidad con los codigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Prácticas Profesionales de PREPA. [certify that I prepared the electric design of this project in accordance with the codes, standards, rules and Projects Certificates Act. [ certify that I prepared the electric design of this project in accordance with the codes, standards, rules and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (S/31/28)
Date: 2024.05.20 14:38:03 -04'00'

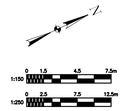
**LUMA** **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:54:50 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador(a) en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. [ LUMA endorses the electric design shown in these construction plans based on the certification submitted by the designer(s) in compliance with Law 173 of 1988, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de LUMA no niega ni desvirtúa la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al contratista o al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, codigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. [ LUMA does not assume responsibility for the certified design. The endorsement by LUMA does not negate nor detract from the professional responsibility with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and other government agencies, as well as federal and state laws, effective at the beginning of the works.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de esta termino, mediando notificación pre-ya a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese término de tiempo, el endoso perderá su vigencia y el diseñador(a) tendrá que someter nuevamente los planos para su endoso. [ Servitude or Guarantee Equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TB2 de 2007. [ This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will remain valid until the end of the work. If electrical work is not certified within this time period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to consider the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TB2 of 2007).




## GENERAL SHEET NOTES

1. DRAWINGS ARE DIAGRAMMATIC IN NATURE AND DO NOT SHOW EVERY CONNECTION, JUNCTION BOX, WIRE, CONDUIT ETC. THE EXACT LOCATION AND ARRANGEMENT OF ALL PARTS SHALL BE DETERMINED AS THE WORK PROGRESSES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A COMPLETE AND FUNCTIONAL ELECTRICAL SYSTEM.
2. LIGHTING CIRCUITS ORIGINATE FROM PANEL DP-030-01, CIRCUITS 8-10, AND ARE SWITCHED BY LIGHTING CONTACTOR LC-030.
3. REFER TO SECTION 26 32 13 FOR GENERATOR EXTERIOR LIGHTING REQUIREMENTS.
4. REFER TO LIGHT FIXTURE SCHEDULE AND LIGHT POLE SCHEDULE FOR ADDITIONAL INFORMATION.
5. AT DUAL CHAMBER LIGHT POLES, STUB CONDUIT FOR POWER INTO THE POWER CHAMBER AND EMPTY CONDUIT FOR COMMUNICATIONS INTO THE COMMUNICATIONS CHAMBER.
6. VIDEO SURVEILLANCE CAMERAS, INTERCOM SYSTEM AND VIDEO SURVEILLANCE SYSTEM NETWORK CABINET SHALL BE FURNISHED AND INSTALLED BY OTHERS. PROVIDE EMPTY CONDUIT AND DEVICE BOXES ARE REQUIRED TO FACILITATE THIS.
7. REFER TO STRUCTURAL DRAWINGS FOR POLE P1 THRU P4 POLE BASE DETAILS.
8. BOND LIGHT POLE P1 THRU P4 TO GROUNDING ELECTRODE USING #6 AWG BARE SOLID COPPER WIRE AND EXOTHERMIC CONNECTION. REFER TO GROUNDING PLAN FOR GROUNDING ELECTRODE. ROUTE IN 1" PVC CONDUIT

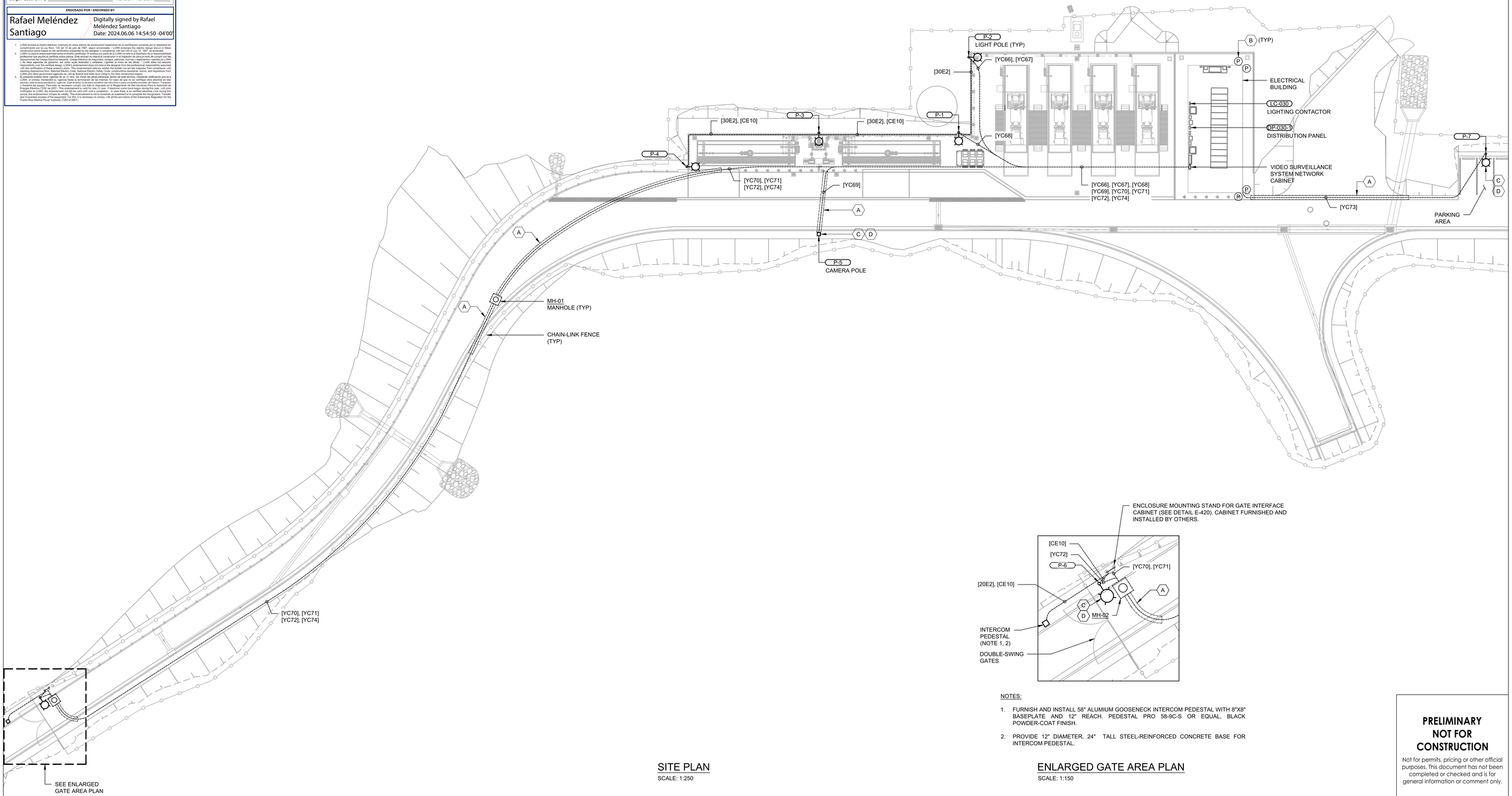
## SHEET KEYNOTES

A. ALL CONDUIT RUNS UNDER ROADWAY AND TRAFFIC AREAS NORMALLY TRAVERSED BY TRUCKS SHALL BE CONCRETE ENCASED.

B. 4"X4" NEMA 3R FLUSH-MOUNTED GASKETED DEVICE BOX WITH BLANK COVER. MOUNTING HEIGHT SHALL BE 10'-0" ABOVE FINISH GRADE.

C. PROVIDE ADEQUATELY SIZED STEEL-REINFORCED CONCRETE POLE BASE. INCLUDE IN REQUIRED CALCULATIONS, PER SECTION 26 50 00-1.03-B-6.

D. FURNISH AND INSTALL GROUND ROD ADJACENT TO POLE. BOND POLE WITH GROUND ROD USING #6 AWG BARE SOLID COPPER WIRE.




SITE PLAN
SCALE: 1:250




NOTES:

1. FURNISH AND INSTALL 58" ALUMIUM GOOSENECK INTERCOM PEDESTAL WITH 8"X8" BASEPLATE AND 12" REACH. PEDESTAL PRO 58-9C-S OR EQUAL, BLACK POWDER-COAT FINISH.
2. PROVIDE 12" DIAMETER, 24" TALL STEEL-REINFORCED CONCRETE BASE FOR INTERCOM PEDESTAL.

ENLARGED GATE AREA PLAN
SCALE: 1:150

**PRELIMINARY NOT FOR CONSTRUCTION**

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| B | 11/20/2023 | 90% DESIGN | JL | DR | GN |
| A | 09/29/2023 | 60% DESIGN | JL | DR | GN |

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DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - LIGHTING AND VIDEO SURVEILLANCE PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: 1:150

SHEET NO. 133 OF 145
DWG. NO. 030-E-03

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Revision No. 05/25/21 Version 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar sobre planos de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor, or architect in compliance with Law 173 of 1988, as amended, and authorized by the design of the project to present construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico que con las disposiciones de la Ley Núm. 170 de 15 de junio de 1987, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, certifico que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, palizmas, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Certificación de Diseño y Garantía del equipo. Para esto se necesario cumplir con lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TØ32 de 2007. I certify that I prepared the electric design for this project in accordance with the codes, palizmas, standards, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (S/31/28)
Date: 2024.05.20 14:38:03 -04'00'

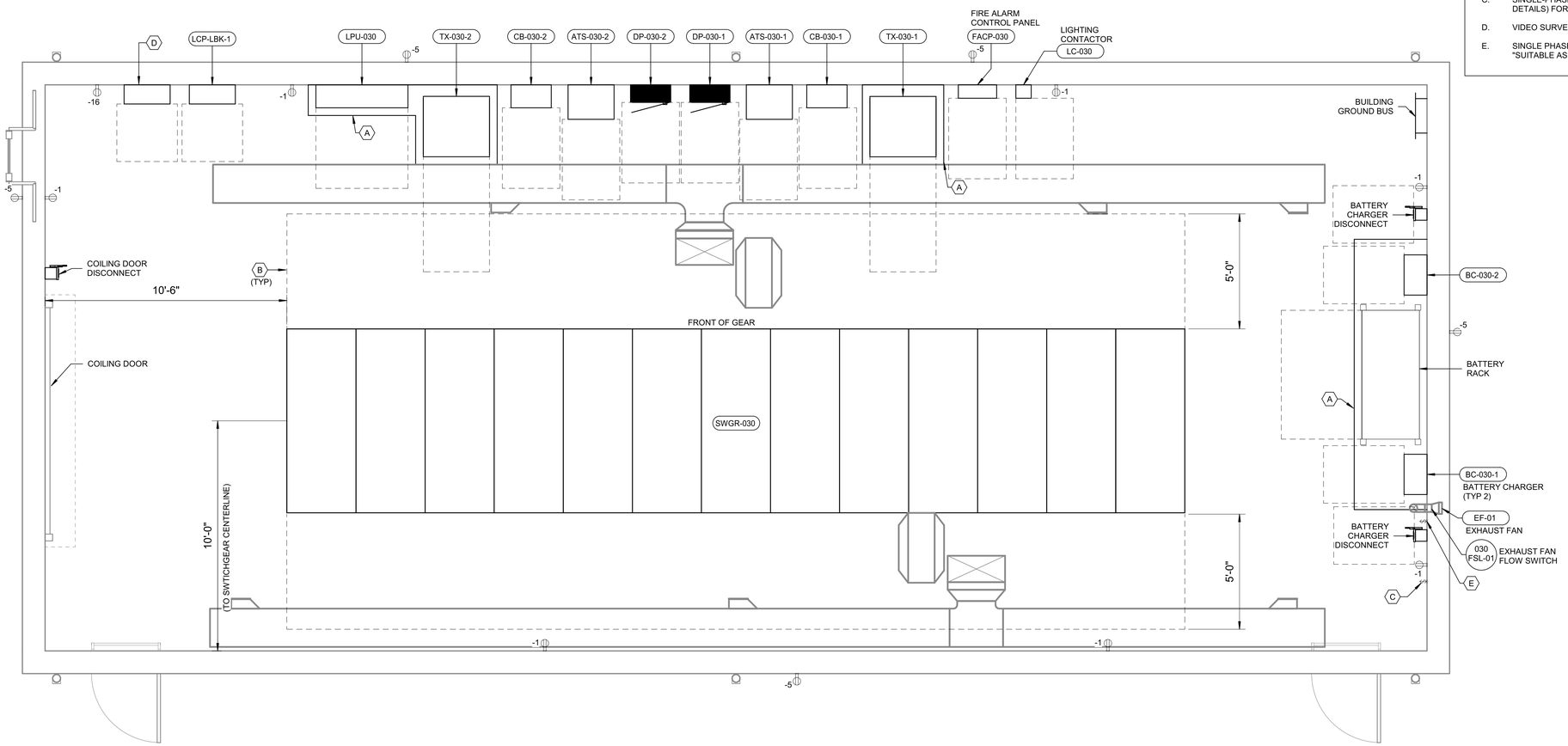
**LUMA** **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:55:20 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción fundadamente en la certificación sometida por el diseñador(a) en cumplimiento con la Ley Núm. 170 del 15 de junio de 1987, según enmendada. I LUMA endorses the electric design shown in these construction plans based on the certification submitted by the designer in compliance with Law 170 of June 15, 1987, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso no parte de la LUMA no sirve ni es diversión de la responsabilidad profesional que asume el certificar estos planos. Este endoso no releva al constructor ni al ingeniero de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, codigos, palizmas, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. I LUMA does not assume responsibility for the certified design. The endorsement by LUMA does not relieve the contractor nor the private engineer of complying with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and other government agencies, as well as federal and state laws, effective at the beginning of the works.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de esta termino, mediando notificación pre-ya a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese termino de tiempo, el endoso perderá su vigencia y tendrá que someterse nuevamente para evaluación y endoso. Para esto es necesario cumplir con lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TØ32 de 2007. This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will remain valid until the completion of the mentioned works. In case electrical work is not certified in that period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to consider the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TØ32 of 2007).




## ELECTRICAL BUILDING EQUIPMENT

SCALE: 3/8" = 1'-0"

## GENERAL SHEET NOTES

1. ALL RECEPTACLES ARE SUPPLIED FROM PANEL 030-DP-01. CIRCUIT NUMBERS ARE SHOWN ADJACENT TO EACH RECEPTACLE.
2. PROVIDE NEMA 3R WHILE-IN-USE EXTRA DUTY CAST ALUMINUM COVERS FOR ALL OUTDOOR RECEPTACLES. PROVIDE GFCI PROTECTION.
3. PROVIDE POWER CIRCUITS FOR LIGHTS AND RECEPTACLE INSTALLED IN SWITCHGEAR, PER SECTION 26 13 13-2.03-B. REFER TO PANEL SCHEDULES.
4. FURNISH AND INSTALL SWITCHGEAR LEVELING CHANNELS, PER STANDARD DETAIL E-400.

## SHEET KEYNOTES

A. 4" HIGH CONCRETE HOUSE-KEEPING PAD. EXTEND 4" BEYOND PERIMETER OF THE EQUIPMENT.

B. WORKING SPACE REQUIREMENT. 60" DEEP FOR MAIN SWITCHGEAR AND STEP DOWN TRANSFORMERS, AND 42" DEEP FOR ALL OTHER (LOW VOLTAGE) EQUIPMENT.

C. SINGLE-PHASE COMBINATION MOTOR CONTROLLER AND DISCONNECT (SEE DETAILS) FOR EXHAUST FAN EF-1.

D. VIDEO SURVEILLANCE SYSTEM CABINET. FURNISHED AND INSTALLED BY OTHERS.

E. SINGLE PHASE MANUAL MOTOR STARTER FOR EXHAUST FAN. SHALL BE MARKED "SUITABLE AS MOTOR DISCONNECT".

Permit/Seal

**PRELIMINARY NOT FOR CONSTRUCTION**

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| D | 05/21/2024 | 100% DESIGN | JL | DR | GN |
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| B | 09/23/2023 | 60% DESIGN | JL | DR | GN |
| A | 07/26/2023 | 30% DESIGN | JL | DR | GN |

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DESIGNED BY JL
CHECKED BY JL
APPR. BY GN

Stantec

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ELECTRICAL BUILDING - POWER PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: As indicated

SHEET NO. 134 OF 145
DWG. NO. 030-E-04

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Document No. 434,543 Version 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar estos planos de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor, or architect in compliance with Law 173 of 1988, as amended, and I am authorized by the design of the project to submit these construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Cumplo con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, certifico que preparé el diseño eléctrico de este proyecto en conformidad con los codigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Procesos Certificados del CAPR. Certifico que he preparado el diseño de este proyecto de acuerdo con la Ley Núm. 135 de 1967, la Junta de Procesos Certificados del CAPR. I certify that I prepared the electric design for this project in accordance with the Law Number 135 of 1967, Certificated Process and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (S/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**LUMA** **ENDOSO / ENDORSEMENT**

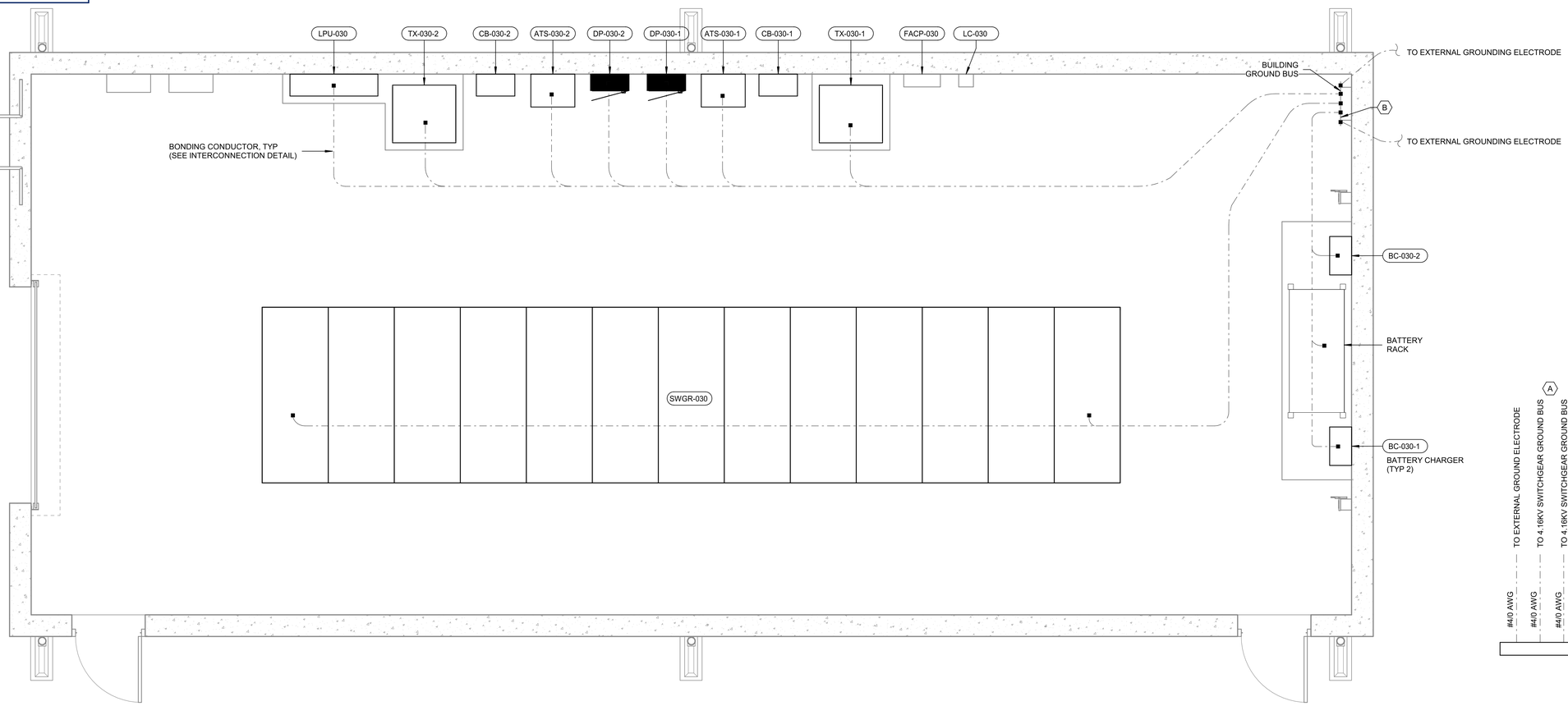
Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

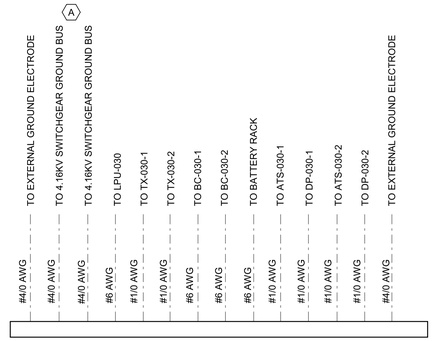
Rafael Meléndez Santiago

Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 14:59:56 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. I LUMA endorses the electric design shown in these construction plans based on the certification submitted by the designer in compliance with Law 135 of 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no exime a el diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al contratista o al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, codigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. I LUMA does not assume responsibility for the certified design. The endorsement by LUMA does not release the designer from professional responsibility with the certification of these property plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and other government agencies, as well as federal and state laws, effective at the beginning of the works.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediando notificación pre-op a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese término, el endoso perderá su validez. Este endoso no constituye un gravamen o servidumbre. Para lo anterior, se requiere el proceso de ¿Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TB2 de 2007. / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will remain valid until the completion of the work. If electrical work is not certified within that period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TB2 of 2007).




ELECTRICAL BUILDING GROUNDING
SCALE: 3/8" = 1'-0"




BUILDING GROUND BUS INTERCONNECTION DETAIL

## GENERAL SHEET NOTES

1. PROVIDE GROUNDING AND BONDING AS SHOWN AND AS REQUIRED BY THE PUERTO RICO ELECTRICAL CODE. PROVIDE 1"C SCHEDULE 40 PVC CONDUIT MINIMUM FOR ALL GROUND CONNECTIONS TO GROUNDING BUS, INCLUDING CONNECTIONS TO THE PERIMETER GROUNDING RING. UPSIZE WHERE REQUIRED TO ACCOMMODATE LARGER CONDUCTORS.
2. REFER TO GENERATORS AREA GROUNDING PLAN FOR DETAILS ON THE BUILDING GROUNDING ELECTRODE.

## SHEET KEYNOTES

A. GROUND BOTH ENDS OF SWITCHGEAR GROUND BUS AS SHOWN.

B. EQUIPMENT CONNECTIONS TO THE GROUND BUS SHALL BE STRANDED COPPER WIRE WITH GREEN INSULATION. GROUND BUS CONNECTION TO THE EXTERNAL GROUNDING ELECTRODE SHALL BE BARE, STRANDED, COPPER.

Permit/Seal

**PRELIMINARY NOT FOR CONSTRUCTION**

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| A | 09/23/2023 | 60% DESIGN | JL | DR | GN |

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CHECKED BY DR
APPR. BY GN

Stantec

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ELECTRICAL BUILDING - GROUNDING PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: As indicated

SHEET NO. 135 OF 145
DWG. NO. 030-E-05

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ORIGINAL SHEET - ARCH D

Document No. 434,543 Version 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar sobre planos de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor or architect in compliance with Law 173 of 1988, as amended, and authorized by the design of the project to present construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos a Proyectos, certifico que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Prácticas Profesionales de CAPR. Certifico que he leído y estoy de acuerdo con la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos a Proyectos. Certifico que preparé el diseño eléctrico de este proyecto de conformidad con los códigos, estándares y regulaciones aprobados por LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (S/31/28)
Date: 2024.05.20 14:38:03 -04'00'

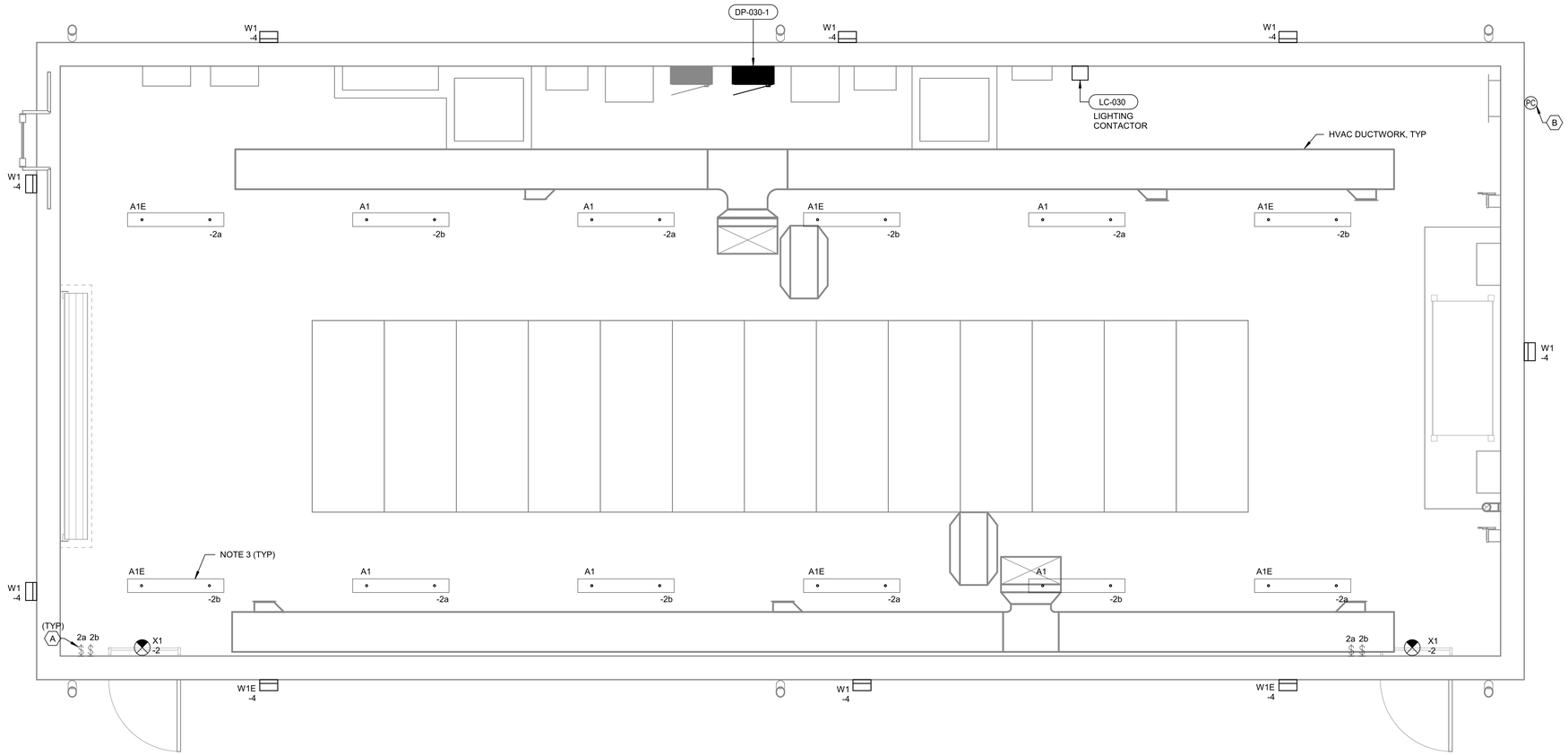
**LUMA** **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

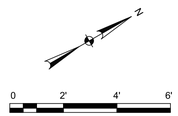
**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 15:00:28 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification submitted by the designer in compliance with Law 135 of July 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de LUMA no sirve ni al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al constructor ni al ingeniero de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. / LUMA does not assume responsibility for the certified design. The endorsement by LUMA does not relieve the designer nor the private engineer from compliance with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and other government agencies, as well as federal and state laws, effective at the beginning of the works.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediando notificación pre-op a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese término, el endoso perderá su vigencia y será necesario someter un nuevo diseño eléctrico para evaluación y endoso de LUMA Energy ¿Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TB2 de 2007 / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will remain valid until the completion of the works. In the event that work is not certified in that period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to consider the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TB2 of 2007).




ELECTRICAL BUILDING LIGHTING
SCALE: 3/8" = 1'-0"




## GENERAL SHEET NOTES

1. MOUNTING HEIGHT FOR TYPE A1 AND A1E LUMINAIRES SHALL BE 10'-0" ABOVE FINISH FLOOR. MOUNTING HEIGHT FOR BUILDING EXTERIOR FIXTURES SHALL BE 11'-0" ABOVE FINISH GRADE
2. INSTALL EXIT LIGHTS WITH BOTTOM OF LUMINAIRE 6" ABOVE THE TOP OF THE DOOR FRAME.
3. WIRE EMERGENCY LUMINAIRES (TYPE A1E) TO BE NON-MAINTAINED, WHERE THEY ARE SWITCHED ALONG WITH THE NORMAL LIGHTING, BUT SHALL AUTOMATICALLY ILLUMINATE UPON LOSS OF POWER TO THE NORMAL LIGHTING CIRCUIT.
4. ALL LIGHTING CIRCUITS SHALL ORIGINATE FORM PANEL DP-030-1. CIRCUIT ASSIGNMENTS ARE SHOWN NEXT TO EACH LUMINAIRE.

## SHEET KEYNOTES

A. THREE-WAY SWITCH.
B. PHOTOCELL. MOUNTING HEIGHT SHALL BE 10'-0" ABOVE FINISH GRADE.

Permit/Seal

**PRELIMINARY NOT FOR CONSTRUCTION**

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Stantec

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ELECTRICAL BUILDING - LIGHTING PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: As indicated

SHEET NO. 136 OF 145
DWG. NO. 030-E-06

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ORIGINAL SHEET - ARCH D

Revision No. 04/24 Version 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar sobre planos de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor, or architect in compliance with Law 173 of 1988, as amended, and am authorized by the design of the project to present construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico con las disposiciones de la Ley Núm. 170 de 15 de junio de 1987, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, certifico que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Prácticas Profesionales del CAPR. I certify that in accordance with Law 170 of June 15, 1987, as amended, known as the Certification of Plans or Projects Certificate Act, I certify that I prepared the electric design for this project in accordance with the codes, standards, rules and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (S/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**ENDOSO / ENDORSEMENT**

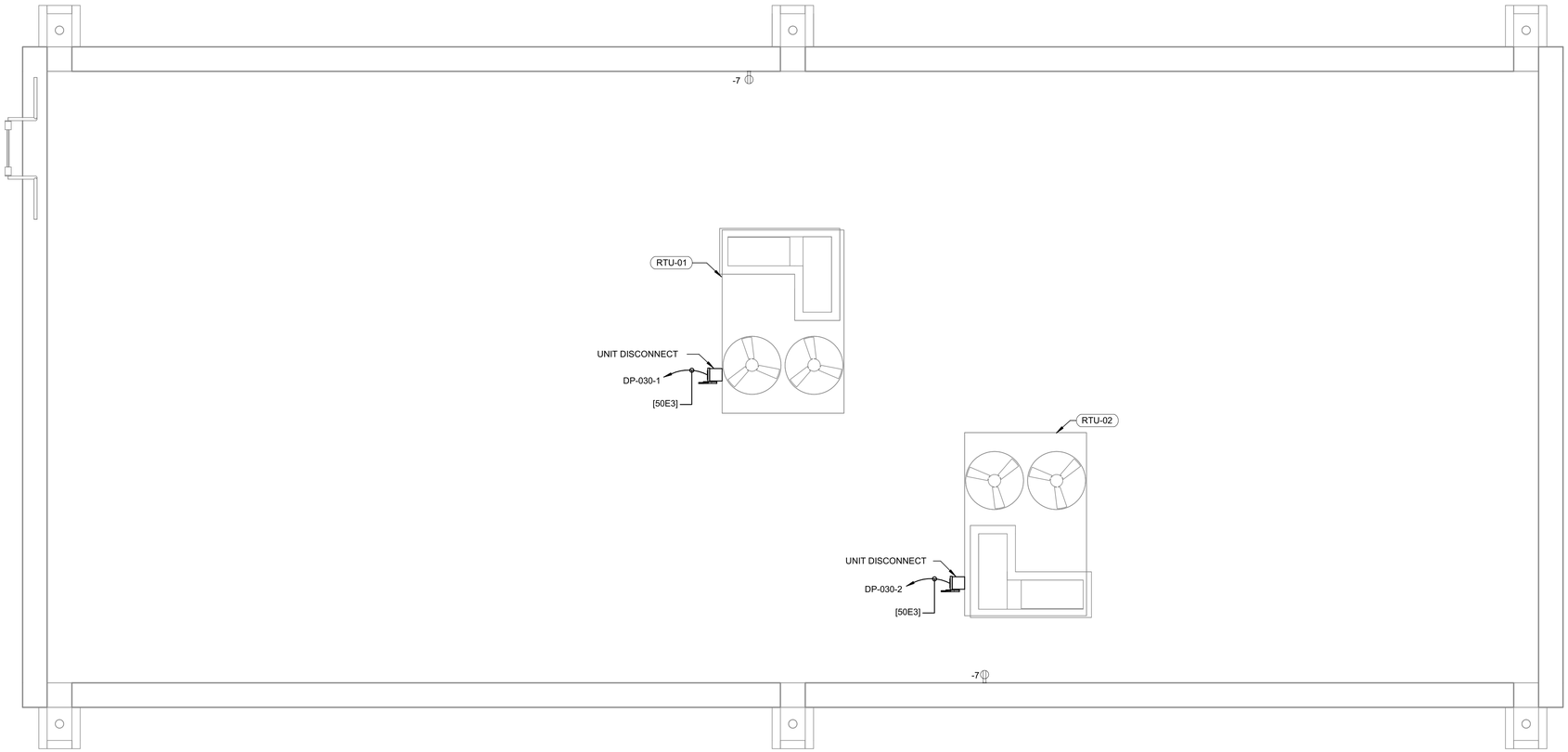
Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago

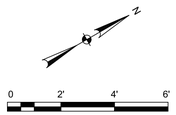
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 15:01:02 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción fundamos en la certificación someterlas por el diseñador en cumplimiento con la Ley Núm. 170 del 15 de julio de 1987, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification submitted by the designer in compliance with Law 170 of July 15, 1987, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no exime al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al constructor ni al ingeniero de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. / LUMA does not assume responsibility for the certified design. The endorsement by LUMA does not exempt the designer from the professional responsibility with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from: National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and other government agencies, as well as federal and state laws, effective at the beginning of the works.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de esta término, mediando notificación pre-op a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese término de tiempo, el endoso quedará nulo y sin efecto y el diseñador tendrá que someter nuevamente el diseño para Endoso y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TJS2 de 2007. / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will remain valid until the completion of the work. In the event that work is not certified in that period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to consider the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TJS2 of 2007).




## ROOF PLAN

SCALE: 3/8" = 1'-0"




## GENERAL SHEET NOTES

1. ALL RECEPTACLES ARE SUPPLIED FROM PANEL 030-DP-01. CIRCUIT NUMBERS ARE SHOWN ADJACENT TO EACH RECEPTACLE.
2. PROVIDE NEMA 3R WHILE-IN-USE EXTRA DUTY CAST ALUMINUM COVERS FOR ALL OUTDOOR RECEPTACLES. PROVIDE GFCI PROTECTION.
3. DISCONNECT SWITCHES SHALL BE 60A, 3P, HEAVY DUTY WITH STAINLESS STEEL NEMA 3R ENCLOSURES.

Permit/Seal

**PRELIMINARY NOT FOR CONSTRUCTION**

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Stantec

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ELECTRICAL BUILDING - ROOF PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
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SHEET NO. 137 OF 145
DWG. NO. 030-E-07

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Revision No. 04/24 Version 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar sobre planos de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor or architect in compliance with Law 173 of 1988, as amended, and I am authorized by the design of the project to present construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico que las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, sentidas por preparar el diseño eléctrico de este proyecto en conformidad con los codigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Procesos Certificados del Garantía de equipo. I certify that I prepared the electric design of this project in accordance with the provisions of Law Number 135 of June 15, 1967, as amended, commonly known as the Certificate of Plans or Projects Certificates Act. I certify that I prepared the electric design of this project in accordance with the codes, standards, rules and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (S/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**LUMA** **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago

Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 15:01:35 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification submitted by the designer in compliance with Law 135 of July 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso no parte de la LUMA no sobre el diseñador ni la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al contratista ni al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, codigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. / LUMA does not assume responsibility for the certified design. The endorsement does not depart LUMA nor the designer nor the professional responsibility it assumes with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and other government agencies, as well as federal and state laws, effective at the beginning of the works.
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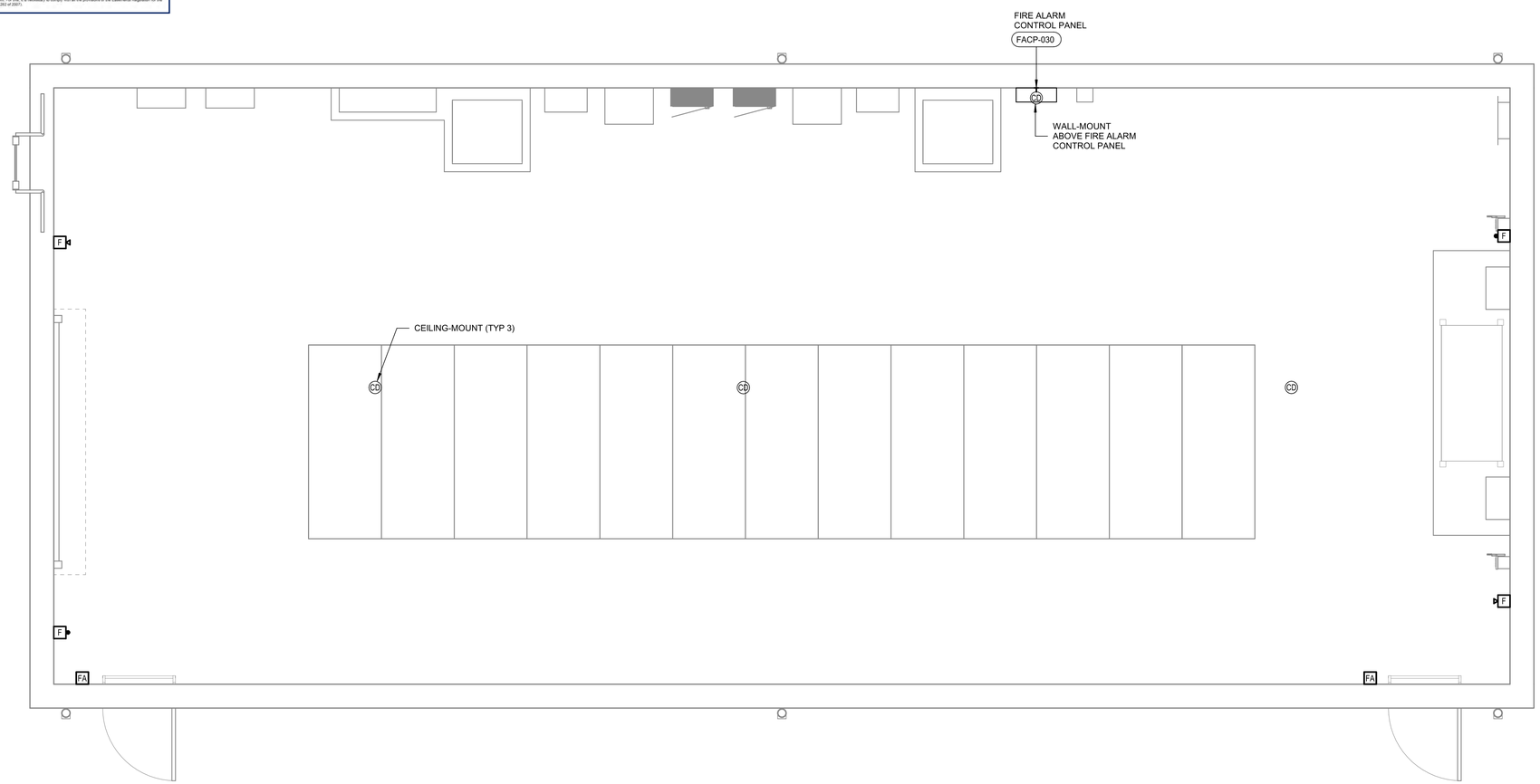
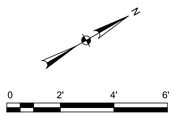


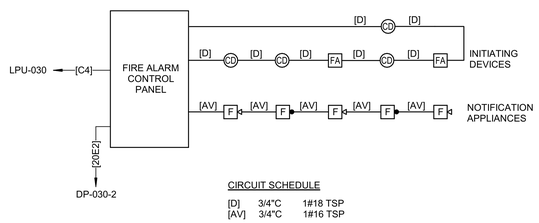

## ELECTRICAL BUILDING FIRE ALARM PLAN

SCALE: 3/8" = 1'-0"




## GENERAL SHEET NOTES

1. REMOTE MONITORING SHALL BE PERFORMED BY PLANT STAFF ON SITE AT THE RAW WATER PUMP STATION. THIS FACILITY IS MANNED 24 HOURS A DAY.
2. TROUBLE AND ALARM NOTIFICATIONS SHALL BE TRANSMITTED VIA INTERFACE WITH LPU-030.
3. FIRE ALARM SYSTEM SHOWN IS FOR PERFORMANCE SPECIFICATION. CONTRACTOR SHALL EMPLOY THE SERVICES OF A QUALIFIED FIRE ALARM INSTALLER TO PREPARE SIGNED AND SEALED SHOP DRAWINGS AND TO INSTALL A COMPLETE AND FULLY OPERABLE FIRE ALARM SYSTEM THAT MEETS THE REQUIREMENTS OF THE CURRENTLY ADOPTED VERSION OF THE PUERTO RICO FIRE ALARM CODE. CENTRAL STATION MONITORING SHALL NOT BE PROVIDED UNDER THIS SCOPE.




CIRCUIT SCHEDULE

| | | |
|---|---|---|
| [D] | 3/4"C | 1#18 TSP |
| [AV] | 3/4"C | 1#16 TSP |

NOTES:

1. SIMPLIFIED FIRE ALARM RISER IS SHOWN. INSTALLED DEVICE QUANTITIES AND TYPE MAY DIFFER, PENDING FINAL DESIGN FROM FIRE ALARM SYSTEM INSTALLER

## SIMPLIFIED FIRE ALARM RISER

Permit/Seal

**PRELIMINARY NOT FOR CONSTRUCTION**

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DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ELECTRICAL BUILDING - FIRE ALARM PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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DATE: SEPTEMBER / 2023
SCALE: As indicated

SHEET NO. 138 OF 145
DWG. NO. 030-E-08

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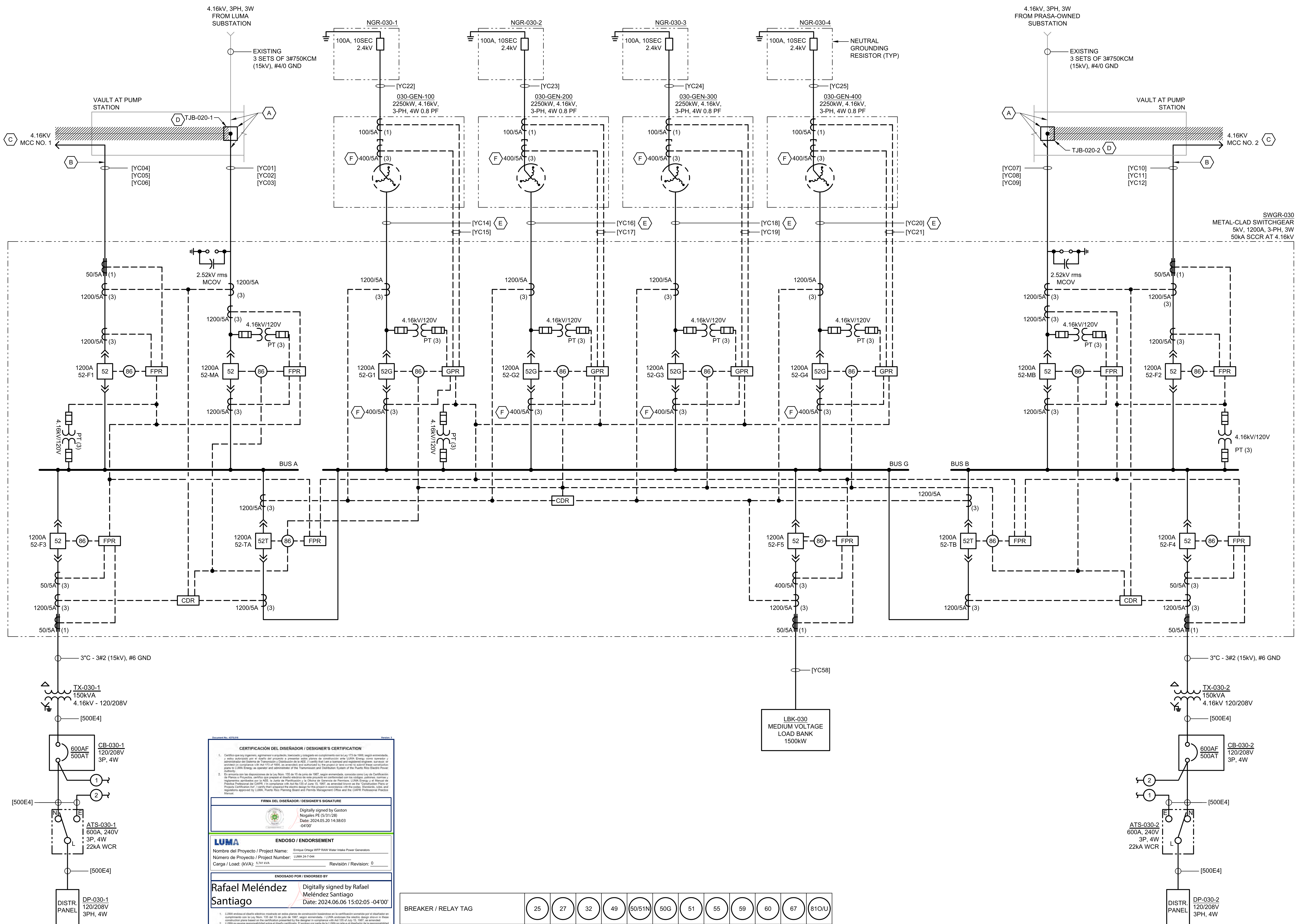
ORIGINAL SHEET - ARCH D




## GENERAL SHEET NOTES

1. POWER GENERATION SYSTEM SHALL BE DESIGNED TO OPERATE AS A STANDBY POWER SUPPLY SYSTEM WITH N+1 REDUNDANCY, WHERE THREE OF THE GENERATORS SHALL BE ON DUTY, AND THE FOURTH SHALL BE A BACKUP UNIT.
2. PARALLELING OF UTILITY AND STANDBY SOURCES SHALL NOT BE ALLOWED, EXCEPT AS REQUIRED FOR CLOSED TRANSITION SOURCE TRANSFER FROM STANDBY TO UTILITY. SOURCE TRANSFER FROM UTILITY TO STANDBY SUPPLY SHALL BE OPEN TRANSITION. REFER TO SECTION 26 13 13 - MEDIUM VOLTAGE METAL-CLAD PARALLELING SWITCHGEAR FOR SEQUENCE OF OPERATION.
3. CLOSED TRANSITION SOURCE TRANSFER SHALL NOT BE ALLOWED WHEN MORE THAN THREE GENERATORS ARE OPERATING IN PARALLEL.
4. SOURCE TRANSFER SHALL BE SEQUENCED TO PREVENT PARALLELING OF THE TWO UTILITY SOURCES (WHERE BOTH TIE CIRCUIT BREAKERS AND BOTH MAIN CIRCUIT BREAKERS ARE CLOSED SIMULTANEOUSLY).
5. GENERATOR RATINGS SHOWN ARE PRIME RATINGS. STANDBY RATING IS 2500KW.
6. CONTROL POWER FOR THE SWITCHGEAR SHALL BE SOURCED FROM STATION BATTERY SYSTEM.
7. MAXIMUM DIAMETER FOR MEDIUM VOLTAGE 750KCM CABLE SHALL NOT EXCEED 1.78 INCHES, TYP.
8. SINGLE LINE DIAGRAM DOES NOT ILLUSTRATE ALL DEVICES TO BE FURNISHED WITH THE GEAR, INCLUDING ANALOG METERING DEVICES, GENERATOR PARALLELING DEVICES, PROGRAMMABLE LOGIC CONTROLLERS, ETC. REFER TO SPECIFICATION SECTION 26 13 13 - MEDIUM VOLTAGE METAL-CLAD PARALLELING SWITCHGEAR, FOR ADDITIONAL REQUIREMENTS.
9. REFER TO THE RISER DIAGRAMS FOR ADDITIONAL SWITCHGEAR WIRING REQUIREMENTS.

## SHEET KEYNOTES

A. CUT EXISTING MCC FEEDER AT EXISTING ELECTRICAL VAULT ON PUMP STATION 6TH FLOOR . TERMINATE EXISTING FEEDER WIRES AT NEW TERMINAL BOX. PROVIDE NEW FEEDER WIRES TO NEW SWITCHGEAR MAIN CIRCUIT BREAKER AS SHOWN.
B. ROUTE NEW FEEDERS FROM NEW SWITCHGEAR FEEDER CIRCUIT BREAKER TO EXISTING MEDIUM VOLTAGE MCC AS SHOWN. REFER TO 020-E-01 FOR TERMINAL BOX DETAILS.
C. REFER TO LOAD CALCULATION FOR LOADS SUPPLIED BY MEDIUM VOLTAGE MOTOR CONTROL CENTERS.
D. NEW MV TERMINAL BOX. REFER TO 020-E-01 FOR TERMINAL BOX DETAILS.
E. MAXIMUM DIAMETER FOR MEDIUM VOLTAGE 750KCM CABLE SHALL NOT EXCEED 1.78 INCHES, TYP.
F. CURRENT TRANSFORMERS UTILIZED FOR GENERATOR DIFFERENTIAL CURRENT PROTECTION SHALL BE IDENTICAL. SWITCHGEAR MANUFACTURER SHALL PROVIDE THE CURRENT TRANSFORMERS TO THE GENERATOR MANUFACTURER FOR INSTALLATION AT THE GENERATOR.

## FAULT CURRENT SUMMARY

THE FAULT CURRENTS LISTED ARE MAXIMUM ASYMMETRICAL FAULT CURRENTS, WHICH OCCUR A 1/2 CYCLE AFTER THE SHORT CIRCUIT CONDITION ARISES.

1. AVAILABLE FAULT CURRENT AT GENERATOR PARALLELING BUS (BUS G), AS PRODUCED BY THREE GENERATORS OPERATING IN PARALLEL WITH NO FAULT CURRENT CONTRIBUTION FROM THE UTILITY (BOTH TIE CIRCUIT BREAKERS ARE OPEN), ARE LISTED BELOW.

   3-PHASE: 13,064 AMPS
   LINE-TO-LINE: 11,420 AMPS
   LINE-TO-LINE-TO-GROUND: 16,436 AMPS
   SINGLE LINE-TO-GROUND: 14,807 AMPS

2. MAXIMUM FAULT CURRENT DURING CLOSED TRANSITION SOURCE TRANSFER OPERATIONS ARE LISTED BELOW.

   SOURCE TRANSFER TO BUS A

   3-PHASE: 25,919 AMPS
   LINE-TO-LINE: 22,966 AMPS
   LINE-TO-LINE-TO-GROUND: 30,266 AMPS
   SINGLE LINE-TO-GROUND: 27,548 AMPS

   SOURCE TRANSFER TO BUS B

   3-PHASE: 25,371 AMPS
   LINE-TO-LINE: 22,438 AMPS
   LINE-TO-LINE-TO-GROUND: 29,975 AMPS
   SINGLE LINE-TO-GROUND: 27,514 AMPS

   BUS G (OCCURS DURING SOURCE TRANSFER TO BUS A)

   3-PHASE: 25,923 AMPS
   LINE-TO-LINE: 22,961 AMPS
   LINE-TO-LINE-TO-GROUND: 30,366 AMPS
   SINGLE LINE-TO-GROUND: 27,628 AMPS

## LOAD CALCULATION - MAIN SWITCHGEAR

| EQUIPMENT | LOAD (KVA) CONN. | DEMAND |
|---|---|---|
| MEDIUM VOLTAGE MCC'S | 6838.1 | 5398.0 |
| DP-030-01 | 70.0 | 52.5 |
| DP-030-02 | 55.2 | 41.4 |
| SUBTOTAL: | 6963.3 | 5491.9 |
| PLUS 25% LARGEST MOTOR (RAW WATER PUMP) | | 263.8 |
| CALCULATED LOAD (KVA): | | 5755.7 |
| CALCULATED LOAD (AMPERES@4160V, 3-PH): | | 798.8 |

Document No.: 4375.016 Version: 3

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

LUMA **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 15:02:05 -04'00'

| BREAKER / RELAY TAG | 25 | 27 | 32 | 49 | 50/51N | 50G | 51 | 55 | 59 | 60 | 67 | 81O/U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 52-MA / 52-MB | X | X | X | | X | X | X | X | X | X | X | X |
| 52-F1 / 52-F2 / 52-F3 / 52-F4 / 52-F5 | | | | | X | X | X | | | | | |
| 52-G1 / 52-G2 / 52-G3 / 52-G4 | X | X | X | X | X | X | X | | X | | | X |
| 52-TA / 52-TB | X | | | | | | | | | | | |

**PRELIMINARY NOT FOR CONSTRUCTION**

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 05/21/2024 | 100% DESIGN | JL | JL | GN |
| C | 11/20/2023 | 90% DESIGN | JL | JL | GN |
| B | 09/29/2023 | 60% DESIGN | JL | JL | GN |
| A | 07/26/2023 | 30% DESIGN | JL | DR | GN |

DRAWN BY FL
DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

MAIN SWITCHGEAR - ONE LINE DIAGRAM

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 139 OF 145
DWG. NO. 030-E-09

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY

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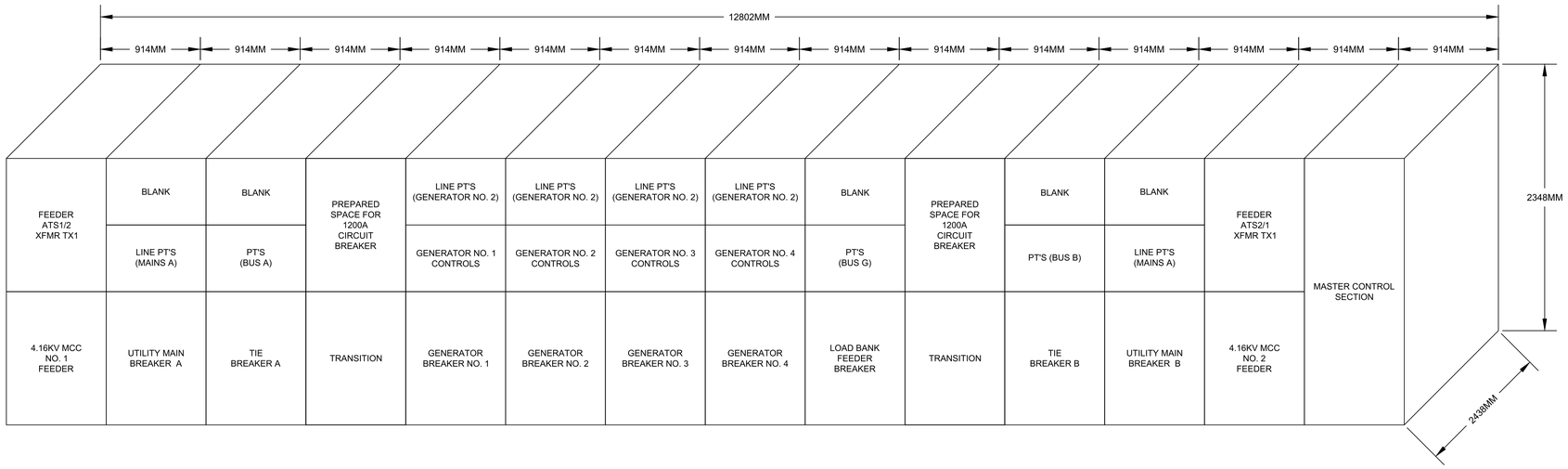


## SWITCHGEAR FRONT ELEVATION

SCALE: NO SCALE

Document No.: 42TLF6 Version: 0

### CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar sobre planos de construcción ante LUMA Energy como operador y administrador del Sistema de Transmisión y Distribución de la AEE. / I certify that I am a licensed and registered engineer, surveyor, or architect in compliance with Act No 173 of June 19, 1988, as amended, and I am authorized by the design of the project to present plans to LUMA Energy as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico que, en cumplimiento con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, certifico que preparé el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Práctica Profesional del CoPR. / In compliance with Act No 135 of June 15, 1967, as amended (known as the "Construction Plans or Projects Certification Act"), I certify that I prepared the electric design for this project in accordance with the codes, Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CoPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

### ENDOSO / ENDORSEMENT

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5.741 kVA
Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago

Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 15:02:36 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación suministrada por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification presented by the designer in compliance with Act 135 of July 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de la LUMA no relieva al diseñador de la responsabilidad de cumplir con los códigos, patrones, normas y reglamentos vigentes de la Autoridad de Energía Eléctrica de Puerto Rico y de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, del sector privado y reguladas, vigentes al inicio de las obras. / LUMA does not assume responsibility for the certified design. The endorsement by LUMA does not relieve the designer of the responsibility to comply with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and other government agencies, private sector and regulated, effective at the beginning of the construction.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediante notificación por escrito a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en este término, el diseñador tiene que volver a someter el diseño eléctrico para endoso y certificación de Servitudes Para la Autoridad de Energía Eléctrica (Servitudes Para Servicio Eléctrico). Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TOU de 2007. / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will remain valid until the completion of the work. In the event that electrical work is not certified in this period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TOU of 2007).

**PRELIMINARY NOT FOR CONSTRUCTION**

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| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
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| C | 11/20/2023 | 90% DESIGN | JL | DR | GN |
| B | 09/29/2023 | 60% DESIGN | JL | DR | GN |
| A | 07/26/2023 | 30% DESIGN | JL | DR | GN |

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DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

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B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

MAIN SWITCHGEAR - FRONT ELEVATION

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 140 OF 145
DWG. NO. 030-E-10

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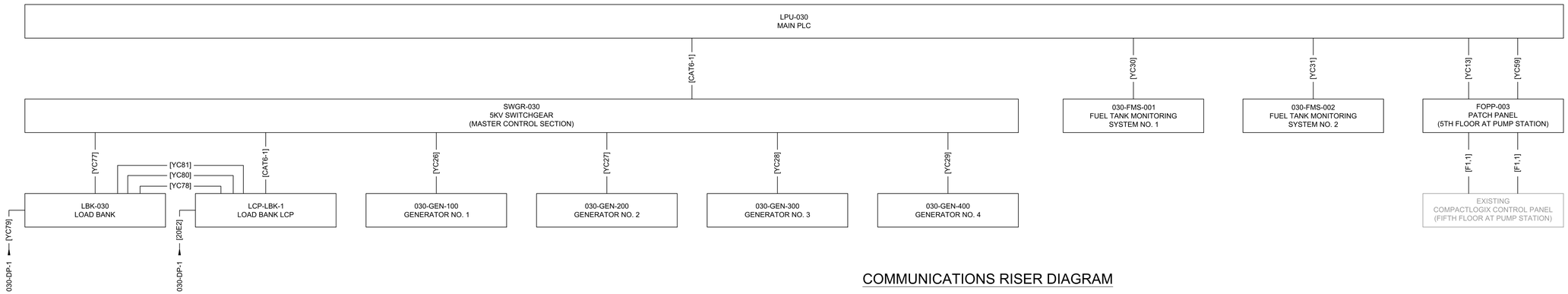
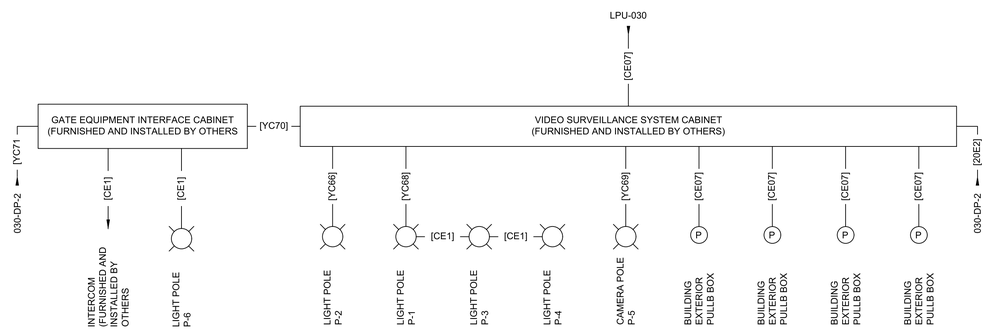
## GENERAL SHEET NOTES

1. ONLY COMMUNICATIONS INTERCONNECTIONS ARE SHOWN ON THIS DRAWING REFER TO GENERATORS AREA - RISER DIAGRAMS - II FOR ANALOG AND DISCRETE SIGNAL WIRING REQUIREMENTS.




## COMMUNICATIONS RISER DIAGRAM




## VIDEO SURVEILLANCE AND INTERCOM RISER DIAGRAM

Document No.: 42YLP8 Version: 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el dueño del proyecto a presentar estos planos de construcción ante LUMA Energy (como operador y administrador de Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor or architect in compliance with Law 173 of 1988, as amended, and I am authorized by the owner of the project to submit these construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico que las disposiciones de la Ley Núm. 170 de 15 de julio de 1987, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, aplicables que preceden el diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy, el Manual de Permisos de Servidumbres Para la Autoridad de Energía Eléctrica (ZQU de 2007) y el Manual de Permisos de Gerencia de Proyecto Certification Act. I certify that I prepared the electric design for this project in accordance with the codes, Standards, rules, and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**ENDOSO / ENDORSEMENT**

LUMA

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago

Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 15:03:05 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación suministrada por el diseñador en cumplimiento con la Ley Núm. 170 del 15 de julio de 1987, según enmendada. / LUMA endorses the electric design shown in these construction plans based on the certification provided by the designer in compliance with Law 173 of 1988, as amended.
2. LUMA no asume responsabilidad activa el diseño certificado. El endoso por parte de la LUMA no relieva al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no relieva al constructor ni al inspector de obra pro-rata de cumplir con las especificaciones de los planos aprobados. / LUMA does not assume responsibility over the certified design. The endorsement by LUMA does not relieve the designer of the professional responsibility assumed with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from: National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA, Puerto Rico Electric Power Authority, Puerto Rico Planning Board and Permits Management Office.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediante notificación previa a LUMA, el endoso mencionado su vigencia habrá la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese término, el endoso quedará nulo y el diseñador tendrá que someter nuevamente los planos para su evaluación y endoso. Ver Manual de Permisos y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (ZQU de 2007 / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the mentioned endorsement will be valid until the completion of said electrical works. If electrical work is not certified in this period, this endorsement will lapse its validity. This endorsement is not to constitute an easement or to complete the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (ZQU of 2007).

**PRELIMINARY NOT FOR CONSTRUCTION**

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| NO | DATE | REVISION | BY | CK. | APPR. |
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| A | 11/20/2023 | 90% DESIGN | JL | DR | GN |

| | |
|---|---|
| DRAWN BY | FL |
| DESIGNED BY | JL |
| CHECKED BY | DR |
| APPR. BY | GN |

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - RISER DIAGRAMS - I

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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DATE: JANUARY / 2024
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SHEET NO. 141 OF 145
DWG. NO. 030-E-11

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Document No. 407824 Version 1

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y actúo autorizado por el dueño del proyecto a presentar este plano de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor or architect in compliance with Law 173 of 1988, as amended, and I am authorized by the owner of the project to submit this construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Cumplo con las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, sellos que preparé al diseño eléctrico de este proyecto en conformidad con los códigos, patrones, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Procesos Certificados de Diseño de LUMA Energy (Rev. 2 de 2021). I certify that I prepared the electric design of this project in accordance with the provisions of the Certificate of Plans or Projects Certificate Act. I certify that I prepared the electric design of this project in accordance with the codes, patterns, standards and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (S/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**LUMA** **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

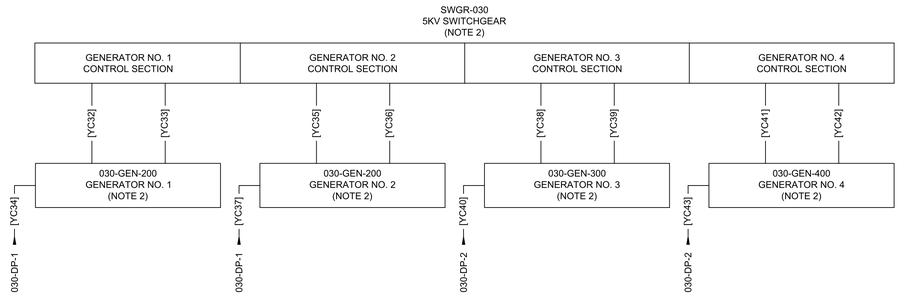
**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 15:03:42 -04'00'

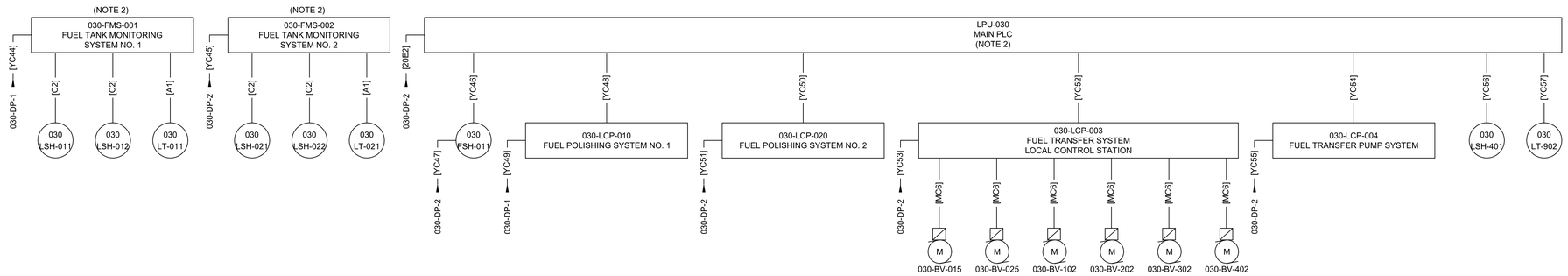
1. LUMA excluye el diseño eléctrico mostrado en estos planos de construcción hasta tanto se la certificación sometida por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de junio de 1967, según enmendada. / LUMA endorses the electric design shown in these construction plans until such time as the certification submitted by the designer in compliance with Law 135 of June 15, 1967, as amended.
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de LUMA no exime a el diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al contratista o al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. / LUMA does not assume responsibility for the certified design. The endorsement by LUMA does not relieve the designer of professional responsibility associated with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from: National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and other government agencies, as well as federal and state laws, effective at the beginning of the works.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediando notificación pre-op a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese término de tiempo, el endoso perderá su vigencia y el diseñador tendrá que someter nuevamente el diseño para su endoso. / Warranty of Equipment. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TJ52 de 2007. / This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will remain valid until the completion of the mentioned works. In case electrical work is not done in this period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to consider the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TJ52 of 2007).

# GENERAL SHEET NOTES

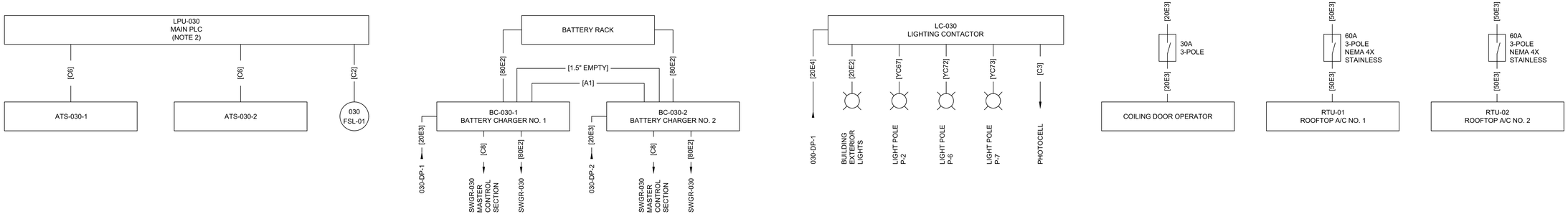
1. REFER TO PANEL SCHEDULES AND YARD CIRCUIT SCHEDULE FOR POWER SUPPLY REQUIREMENTS.
2. REFER TO GENERATORS AREA - RISER DIAGRAMS I FOR COMMUNICATIONS REQUIREMENTS.




## GENERATION SYSTEM RISER DIAGRAM




## FUEL SYSTEM RISER DIAGRAM




## ELECTRICAL BUILDING EQUIPMENT RISER DIAGRAM

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| B | 02/13/2024 | 100% DESIGN | JL | DR | GN |
| A | 11/20/2023 | 90% DESIGN | JL | DR | GN |

DRAWN BY FL
DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - RISER DIAGRAMS - II

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 142 OF 145
DWG. NO. 030-E-12

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

2024.02.12 2:31:40 PM

# PANEL SCHEDULE: DP-030-1

BUS AMPS: 500A | SERVICE VOLTS: 120/208V | MAINS: BRKR | TRIP: 600A | PHASE: 3 | WIRE: 4 | BUS: COPPER | ENCLOSURE: NEMA 1 | SCCR: 65KA | LOCATION: ELECTRICAL ROOM | MOUNTING: SURFACE

| NOTES | CKT NO. | DESCRIPTION | BREAKER AMPS | BREAKER POLES | WIRE & CONDUIT | PHASE A | | PHASE B | | PHASE C | | WIRE & CONDUIT | BREAKER POLES | BREAKER AMPS | DESCRIPTION | CKT NO. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | RECEPTACLES, INTERIOR | 20 | 1 | 3/4"C-2#12,#12G | 1,080 | 673 | | | | | 3/4"C-2#12,#12G | 1 | 20 | LIGHTS, INTERIOR | 2 | |
| | 3 | SPACE | 20 | 1 | | | | | 150 | | | | 1 | 15 | LIGHTS, BUILDING EXTERIOR | 4 | |
| | 5 | RECEPTACLES, EXTERIOR | 20 | 1 | 3/4"C-2#12,#12G | | | | | 900 | 20 | | 1 | 15 | LTG CONTACTOR CNTRL PWR | 6 | |
| | 7 | RECEPTACLES, ROOF | 20 | 1 | 3/4"C-2#12,#12G | 360 | 548 | | | | | | 2 | 15 | LIGHTS, SITE | 8 | |
| | 9 | EXHAUST FAN | 20 | 1 | 3/4"C-2#12,#12G | | | 20 | 548 | | | | | | | 10 | |
| | 11 | FUEL MONITORING SYSTEM 1 | 20 | 1 | | | | | | 200 | 6,016 | | 3 | 70 | LOAD BANK BLOWERS | 12 | |
| | 13 | FUEL POLISHING SYSTEM 1 | 20 | 1 | | 1,400 | 6,016 | | | | | | | | | 14 | 2 |
| | 15 | LOAD BANK CONTROL PANEL | 20 | 1 | | | | 500 | 6,016 | | | | | | | 16 | |
| | 17 | SPARE | 20 | 1 | | | | | | | 500 | | 1 | 20 | LOAD BANK CONTROL PWR | 18 | |
| | 19 | SPARE | 20 | 1 | | | 4,045 | | | | | | 3 | 45 | RTU-02 | 20 | |
| | 21 | SPARE | 20 | 1 | | | | | 4,045 | | | | | | | 22 | |
| | 23 | GENERATOR 1 LOADCENTER | 100 | 2 | | | | | | 6,870 | 4,045 | | | | | 24 | |
| | 25 | | | | | 6,870 | 1,801 | | | | | | 3 | 20 | BATT. CHARGER, BC-030-1 | 26 | |
| | 27 | GENERATOR 2 LOADCENTER | 100 | 2 | | | | 6,870 | 1,801 | | | | | | | 28 | |
| | 29 | | | | | | | | | 6,870 | 1,801 | | | | | 30 | |
| | 31 | SPARE | 20 | 1 | | | | | | | | | 1 | 20 | SPARE | 32 | |
| | 33 | SPARE | 20 | 1 | | | | | | | | | 1 | 20 | SPARE | 34 | |
| | 35 | SPARE | 20 | 1 | | | | | | | | | 1 | 20 | SPARE | 36 | |
| | 37 | SPARE | 20 | 1 | | | | | | | | | 1 | 20 | SPARE | 38 | |
| | 39 | SPARE | 20 | 1 | | | | | | | | | 1 | 20 | SPARE | 40 | |
| | 41 | SPARE | 20 | 1 | | | | | | | | | 1 | 20 | SPARE | 42 | |

| | PHASE A | PHASE B | PHASE C |
|---|---|---|---|
| SUBTOTAL: | 22,793 | 19,950 | 27,222 |
| SUB-FEED LUGS: | N/A | N/A | N/A |
| TOTAL: | 22,793 | 19,950 | 27,222 |
| CONNECTED (AMPS): | 189.9 | 166.3 | 226.9 |

NOTES:
1. FURNISH WITH INTEGRAL SPD. 160KA SURGE CAPACITY, MINIMUM.
2. COORDINATE MINIMUM CIRCUIT BREAKER RATING WITH APPROVED LOAD BANK SHOP DRAWINGS.

# PANEL SCHEDULE: DP-030-2

BUS AMPS: 500A | SERVICE VOLTS: 120/208V | MAINS: BRKR | TRIP: 600A | PHASE: 3 | WIRE: 4 | BUS: COPPER | ENCLOSURE: NEMA 1 | SCCR: 65KA | LOCATION: ELECTRICAL ROOM | MOUNTING: SURFACE

| NOTES | CKT NO. | DESCRIPTION | BREAKER AMPS | BREAKER POLES | WIRE & CONDUIT | PHASE A | | PHASE B | | PHASE C | | WIRE & CONDUIT | BREAKER POLES | BREAKER AMPS | DESCRIPTION | CKT NO. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | FIRE ALARM CONTROL PANEL | 20 | 1 | | 100 | 876 | | | | | | 3 | 20 | FUEL XFER PUMP SYSTEM | 2 | |
| | 3 | LPU-030 | 20 | 1 | | | | 500 | 876 | | | | | | | 4 | |
| | 5 | SPARE | 20 | 1 | | | | | | | 876 | | | | | 6 | |
| | 7 | EYEWASH STATION | 20 | 1 | | 20 | 250 | | | | | 3/4"C-2#12,#12G | 1 | 20 | LIGHTS, SWITCHGEAR | 8 | |
| | 9 | FUEL POLISHING SYSTEM 2 | 20 | 1 | | | | 1,400 | 1,260 | | | 3/4"C-2#12,#12G | 1 | 20 | RECEPTACLES, SWITCHGEAR | 10 | |
| | 11 | FUEL MONITORING SYSTEM 2 | 20 | 1 | | | | | | 200 | 1,080 | 3/4"C-2#12,#12G | 1 | 20 | RECEPTACLES, SWITCHGEAR | 12 | |
| | 13 | FUEL XFER CNTRL STATION | 20 | 1 | | 100 | 300 | | | | | | 1 | 20 | GATE INTERFACE CABINET | 14 | |
| | 15 | COILING DOOR | 20 | 3 | | | | 552 | 300 | | | | 1 | 20 | SURVEILLANCE CABINET | 16 | |
| | 17 | | | | | | | | | 552 | | | 1 | 20 | SPARE | 18 | |
| | 19 | | | | | 552 | 4,045 | | | | | 1"C-3#6,#10G | 3 | 45 | RTU-01 | 20 | |
| | 21 | GENERATOR 3 LOADCENTER | 100 | 2 | | | | 6,870 | 4,045 | | | | | | | 22 | |
| | 23 | | | | | | | | | 6,870 | 4,045 | | | | | 24 | |
| | 25 | GENERATOR 4 LOADCENTER | 100 | 2 | | 6,870 | 1,801 | | | | | | 3 | 20 | BATT. CHARGER, BC-030-2 | 26 | |
| | 27 | | | | | | | 6,870 | 1,801 | | | | | | | 28 | |
| | 29 | SPARE | 20 | 1 | | | | | | | 1,801 | | | | | 30 | |
| | 31 | SPARE | 20 | 1 | | | 400 | | | | | | 1 | 20 | VIDEO SURVEILLANCE CAB. | 32 | |
| | 33 | SPARE | 20 | 1 | | | | | | | | | 1 | 20 | SPARE | 34 | |
| | 35 | SPARE | 20 | 1 | | | | | | | | | 1 | 20 | SPARE | 36 | |
| | 37 | SPARE | 20 | 1 | | | | | | | | | 1 | 20 | SPARE | 38 | |
| | 39 | SPARE | 20 | 1 | | | | | | | | | 1 | 20 | SPARE | 40 | |
| | 41 | SPARE | 20 | 1 | | | | | | | | | 1 | 20 | SPARE | 42 | |

| | PHASE A | PHASE B | PHASE C |
|---|---|---|---|
| SUBTOTAL: | 15,314 | 24,474 | 15,424 |
| SUB-FEED LUGS: | N/A | N/A | N/A |
| TOTAL: | 15,314 | 24,474 | 15,424 |
| CONNECTED (AMPS): | 127.6 | 204.0 | 128.5 |

NOTES:
1. FURNISH WITH INTEGRAL SPD. 160KA SURGE CAPACITY, MINIMUM.


Document No.: 4375.016 Version: 3

CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION

FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE

Digitally signed by Gaston Nogales PE (5/31/28) Date: 2024.05.20 14:38:03 -04'00'

LUMA ENDOSO / ENDORSEMENT

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators

Número de Proyecto / Project Number: LUMA 24-7-044

Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

ENDOSADO POR / ENDORSED BY

Rafael Meléndez Santiago — Digitally signed by Rafael Meléndez Santiago Date: 2024.06.06 15:04:13 -04'00'

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.


| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| B | 05/21/2024 | 100% DESIGN | JL | DR | GN |
| A | 11/20/2023 | 90% DESIGN | JL | DR | GN |

DRAWN BY FL | DESIGNED BY JL | CHECKED BY DR | APPR. BY GN

Stantec — B7 Tabonuco Street, Suite 1504, Guaynabo, PR 00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - PANEL SCHEDULES

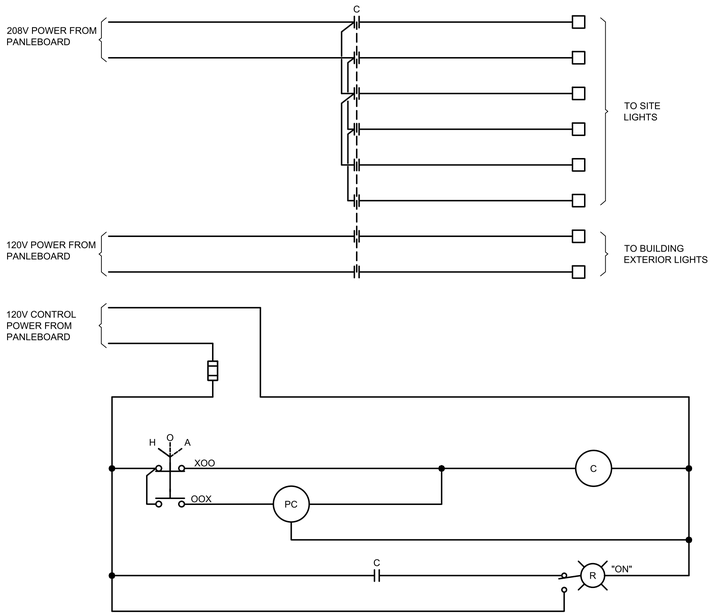
Autoridad de Acueductos y Alcantarillados — GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000 | PSWID - | DATE: JANUARY / 2024 | SCALE: NO SCALE

SHEET NO. 143 OF 145

DWG. NO. 030-E-13

BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 — 2 CM




NOTES:

1. FURNISH WITH 20A, ELECTRICALLY-HELD, 8-POLE LIGHITNG CONTACTOR.

## LIGHTING CONTACTOR ELEMENTARY CONTROL SCHEMATIC

Document No.: 4375-PR Version: 0

**CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION**

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1995, según enmendada, y estoy autorizado por el dueño del proyecto a preparar estos planos de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. I certify that I am a licensed and registered engineer, surveyor or architect in compliance with Act 173 of 1995, as amended, and authorized by the project or lead owner to submit these construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. En armonía con las disposiciones de la Ley Núm. 135 de 15 de julio de 1967, según enmendada, conocida como Ley de Certificación de Planos de Construcción Sometidos a Agencias Gubernamentales, certifico que he preparado estos planos de construcción de acuerdo a reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Práctica Profesional del CIAPR. I in compliance with Act No.135 of June 15, 1967, as amended known as the "Construction Plans or Specifications Certification Act for Submittal to Government Agencies", certify that these construction plans are according to the regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CIAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (5/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 0.74 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago

Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 15:04:45 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación someteda por el diseñador en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. LUMA endosa the electric design shown in these construction plans based on the certification presented by the designer in compliance with Act 135 of July 15, 1967, as amended.
2. LUMA no asume responsabilidad por el diseño original certificado por el diseñador. Este endoso no asume responsabilidad profesional que asuma el certificar estos planos. Este endoso no relieva al constructor o al inspector de obra privada de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, patrones, normas y reglamentos vigentes de LUMA y otras agencias gubernamentales. LUMA no asume responsabilidad por el diseño original certificado por el diseñador. Por la responsabilidad over the certified design, LUMA's endorsement does not relieve the designer from the professional responsibility assumed with the certification of these projects plans. This endorsement relieves neither the builder nor private inspector from compliance with the provisions of the National Electric Code, Electrical Safety Code, codes, patrons, norms and regulations from LUMA and other government agencies as well as federal and state laws ruling by the time construction begins.
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de este término, mediando notificación prior a la AEE, el endoso quedará en vigencia hasta que termine la construcción. Si no se inician las obras eléctricas dentro de este término de tiempo, este endoso perderá su vigencia. Este endoso no es para conceder servidumbre o para completar procesos de Cesión, Traspaso y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica de Puerto Rico (7262 of 2007). Este endoso no es válido hasta que se haya completado el proceso de cesión y notificado la LUMA, this endorsement not valid be valid until cost is completed. In case there is no certified electrical work during this period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to complete the Assignment. Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (7262 of 2007).

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| B | 02/13/2024 | 100% DESIGN | JL | DR | GN |
| A | 11/20/2023 | 90% DESIGN | JL | DR | GN |

DRAWN BY FL
DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR.
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - ELEMENTARY CONTROL SCHEMATICS

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: NO SCALE

SHEET NO. 144 OF 145
DWG. NO. 030-E-14
BAR IS TWO CM ON ORIGINAL DWG. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2 CM

2024.02.12 2:52:07 PM

Document No. 407824 Version 1

## CERTIFICACIÓN DEL DISEÑADOR / DESIGNER'S CERTIFICATION

1. Certifico que soy ingeniero, agrimensor o arquitecto, licenciado y colegiado en cumplimiento con la Ley 173 de 1988, según enmendada, y estoy autorizado por el diseño del proyecto a presentar sobre planos de construcción ante LUMA Energy, como operador y administrador del Sistema de Transmisión y Distribución de la AEE. (I certify that I am a licensed and registered engineer, surveyor, or architect in compliance with Law 173 of 1988, as amended, and I am authorized to present the design of the project on construction plans to LUMA Energy, as operator and administrator of the Transmission and Distribution System of the Puerto Rico Electric Power Authority.
2. Certifico que las disposiciones de la Ley Núm. 135 de 15 de junio de 1967, según enmendada, conocida como Ley de Certificación de Planos o Proyectos, sólo fue empleó al diseño eléctrico de este proyecto en conformidad con los códigos, palismas, normas y reglamentos aprobados por la AEE, la Junta de Planificación y la Oficina de Gerencia de Permisos. LUMA Energy y el Manual de Certificaciones Profesionales de Prácticas de Medición de PREPA. (I certify that I prepared the electric design for this project in accordance with the Law 135 of June 15, 1967, as amended, known as the Certification of Plans or Projects Certification Act. I certify that I prepared the electric design for this project in accordance with the codes, palismas, standards, rules and regulations approved by LUMA, Puerto Rico Planning Board and Permits Management Office and the CAPR Professional Practice Manual.

**FIRMA DEL DISEÑADOR / DESIGNER'S SIGNATURE**

Digitally signed by Gaston Nogales PE (S/31/28)
Date: 2024.05.20 14:38:03 -04'00'

**LUMA** **ENDOSO / ENDORSEMENT**

Nombre del Proyecto / Project Name: Enrique Ortega WFP RAW Water Intake Power Generators
Número de Proyecto / Project Number: LUMA 24-7-044
Carga / Load: (kVA): 5,741 kVA Revisión / Revision: 0

**ENDOSADO POR / ENDORSED BY**

Rafael Meléndez Santiago
Digitally signed by Rafael Meléndez Santiago
Date: 2024.06.06 15:05:25 -04'00'

1. LUMA endosa el diseño eléctrico mostrado en estos planos de construcción basándose en la certificación sometida por el diseñador(a) en cumplimiento con la Ley Núm. 135 del 15 de julio de 1967, según enmendada. (LUMA endorses the electric design shown in these construction plans based on the certification submitted by the designer in compliance with Law 135 of June 15, 1967, as amended.)
2. LUMA no asume responsabilidad sobre el diseño certificado. El endoso por parte de LUMA no niega ni al diseñador de la responsabilidad profesional que asume al certificar estos planos. Este endoso no releva al contratista ni al inspector de obra privado de cumplir con las disposiciones del Código Eléctrico Nacional, Código Eléctrico de Seguridad, códigos, palismas, normas y reglamentos vigentes de LUMA y de otras agencias de gobierno, así como leyes federales y estatales, vigentes al inicio de las obras. (LUMA does not assume responsibility for the certified design. The endorsement by LUMA does not negate nor does it relieve the designer of professional responsibility with the certification of these project's plans. This endorsement relieves neither the builder nor private inspector from compliance with standing dispositions from National Electric Code, National Electric Safety Code, constructions standards, norms, and regulations from LUMA and other government agencies, as well as federal and state laws, effective at the beginning of the works.)
3. El presente endoso tiene vigencia de un (1) año. De iniciar las obras eléctricas dentro de esta término, mediando notificación pre-ya a LUMA, el endoso mantendrá su vigencia hasta la terminación de las mismas. En caso de que no se certifique obra eléctrica en ese término de tiempo, el diseño deberá ser revisado por el diseñador(a) para cumplir con cualquier cambio en los códigos, palismas, normas y Garantía del equipo. Para esto es necesario cumplir con todo lo dispuesto en el Reglamento de Servidumbres Para la Autoridad de Energía Eléctrica (TJSE de 2007. This endorsement is valid for one (1) year. If electrical works have begun during this year, with prior notification to LUMA, the endorsement will remain valid until the completion of the same. In case electrical work is not certified in that period, this endorsement will lose its validity. This endorsement is not to constitute an easement or to consolate the Assignment, Transfer and Guarantee process of the equipment. For this, it is necessary to comply with all the provisions of the Easements Regulation for the Puerto Rico Electric Power Authority (TJSE of 2007).

## GENERAL SHEET NOTES

1. PROVIDE ALL WORK IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
2. DRAWINGS ARE DIAGRAMMATIC IN NATURE. THE EXACT LOCATION AND ARRANGEMENT OF ALL EQUIPMENT SHALL BE DETERMINED AS THE WORK PROGRESSES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A COMPLETE AND FUNCTIONAL ELECTRICAL SYSTEM.
3. REFER TO STRUCTURAL DRAWINGS FOR CONDUIT INSTALLATION REQUIREMENTS ON THE BRIDGE AND PUMP STATION BUILDING.
4. REFER TO SECTION 40 95 10 FOR FIBER OPTIC CABLE PULLING REQUIREMENTS. CABLES FURNISHED AND TERMINATED BY DIVISION 40, BUT PULLED BY THE ELECTRICAL CONTRACTOR. PRIOR TO ACCEPTING THE CABLE REEL THE REEL, THE CABLE SHALL BE TESTED ON THE REEL.
5. SPLICES IN POWER OR FIBER OPTIC CABLES NOT ACCEPTED.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING CABLE PULL CALCULATIONS PRIOR TO INSTALLATION OF THE RACEWAY SYSTEM. SUBMIT CALCULATIONS PROVING THAT THE FORCES EXERTED ON THE CABLES DURING THE PULLING OPERATION WILL NOT EXCEED THE LIMITS OF THE CABLE AS ESTABLISHED BY THE MANUFACTURER. FURNISH AND INSTALL ADDITIONAL PULL BOXES AND MANHOLES AS REQUIRED TO FACILITATE THE PULLAND TO ENSURE THE TOTAL ANGLE OF THE BENDS IN EACH RUN DOES NOT EXCEED 360 DEGREES. CONTRACTOR MAY ADJUST LOCATION OF PULL BOXES TO SUIT FIELD CONDITIONS OR INSTALLATION REQUIREMENTS.
7. APPLY RIGID GALVANIZED STEEL EXPANSION FITTINGS ON RIGID AT ALL EXPANSION JOINTS ON THE BRIDGE AND BETWEEN THE BRIDGE AND THE PUMP STATION BUILDING. REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.
8. AS PART OF THE WORK, RELOCATE AND RECONNECT ANY EXISTING EQUIPMENT AND APPURTENANCES THAT OBSTRUCT THE RACEWAY PATH AS REQUIRED TO FACILITATE THE INSTALLATION. COORDINATE THIS EFFORT WITH THE OWNER.
9. DUE TO LIMITED ROADWAY WIDTH, THE POTABLE WATER PIPELINE RUNNING FROM THE DAM BRIDGE TO THE ELECTRICAL BUILDING MUST BE ROUTED OVER THE FIBER MANHOLE. COORDINATE INSTALLATION DEPTH/NECK HEIGHT OF THE FIBER MANHOLES WITH POTABLE WATER PIPE AS REQUIRED TO ACCOMMODATE.

## SHEET KEY NOTES

A. REFER TO STRUCTURAL DRAWINGS FOR CONDUIT TRANSITION FROM BURIED TO EXPOSED, AND FOR CONDUIT SUPPORT DETAILS ALONG THE BRIDGE AND RAW WATER PUMP STATION EXTERIOR.

B. APPLY RAYFLATE DUCT SEALS ON ALL CONDUITS ENTERING MANHOLE ON THIS SIDE.

C. REMOVE SECTION OF EXISTING GENERATOR CONDUIT RUN ROUTED ALONG THE DOWNSTREAM SIDE OF THE BRIDGE, AND REROUTE ON THE UPSTREAM SIDE OF THE BRIDGE AS SHOWN TO ACCOMMODATE CONDUIT RUN FROM NEW ELECTRICAL BUILDING. REFER TO DRAWING 010-E-01 FOR MORE INFORMATION.

D. EXISTING GENERATOR CONDUITS ROUTED INSIDE BRIDGE.

E. CONDUIT TRANSITION FROM BRIDGE INTERIOR TO EXPOSED.

F. TIE NEW GENERATOR CONDUITS INTO EXISTING CONDUIT.

G. FURNISH AND INSTALL EXPANDED METAL PROTECTIVE BARRIER AROUND CONDUITS INSTALLED UPSTREAM OF THE DAM BRIDGE. CONSTRUCT THE FRAME OF P5501-HG GALVANIZED STEEL STRUT BEAM. EXPANDED METAL SHALL BE MCNICHOLS 530N3416 IN GALVANIZED STEEL ATTACHED USING 4040SQ0399 HOLD DOWN CLIPS. APPLY MCNICHOLS U-EDGING GALVNAIZED STEEL CAP (4001440210) ALL AROUND. INSTALL EXPANDED METAL ON ALL EXPOSED SIDES. SPACING FOR VERTICAL SUPPORTS SHALL NOT EXCEED 5 FEET. SEE TRUCTURAL DETAILS FOR MORE INFORMATION. UTILIZE 1/2" DIA.X4.5" ANCHORS (KWIK HUS-EZ).

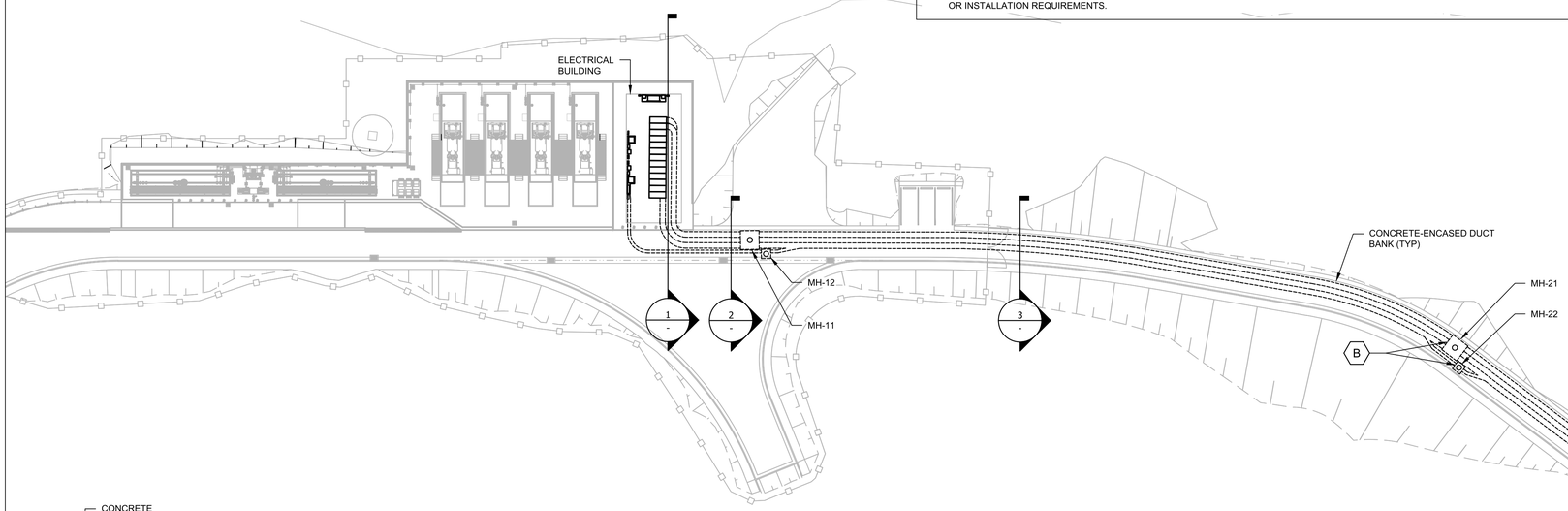
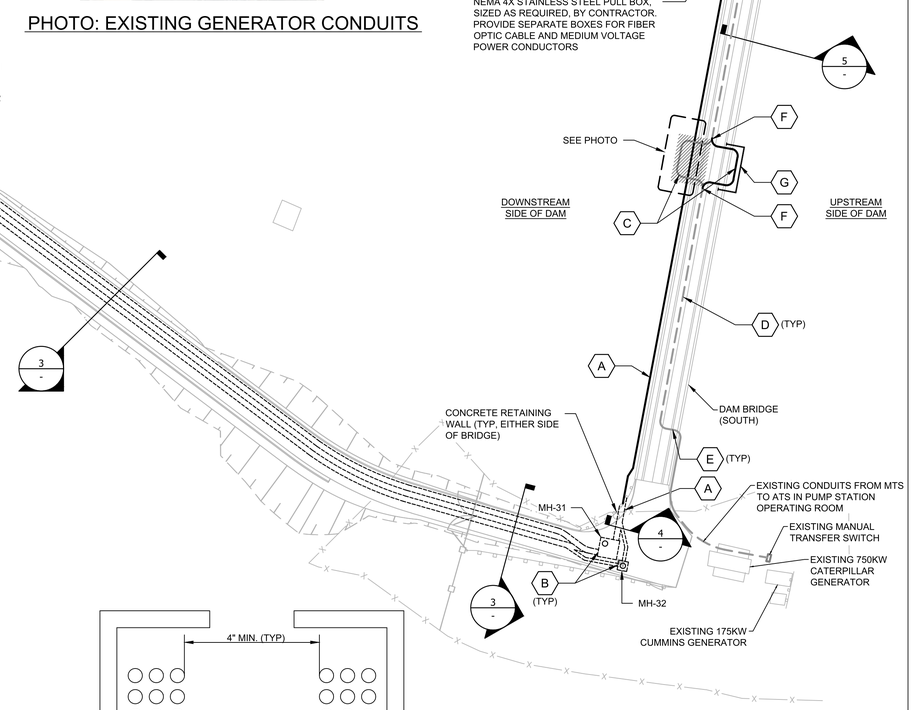
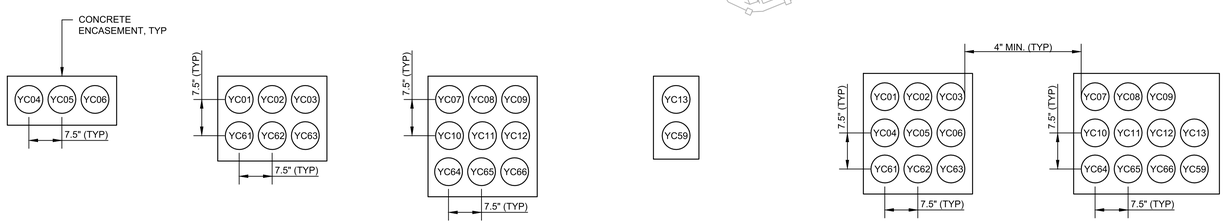


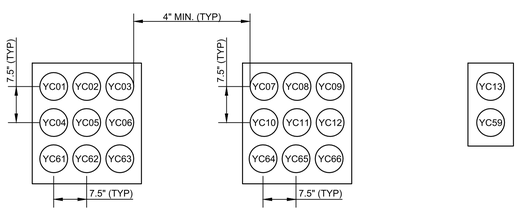
PHOTO: EXISTING GENERATOR CONDUITS




1 DUCTBANK SECTION

3 DUCTBANK SECTION

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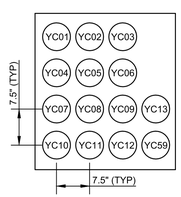


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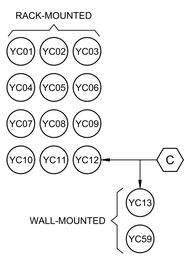


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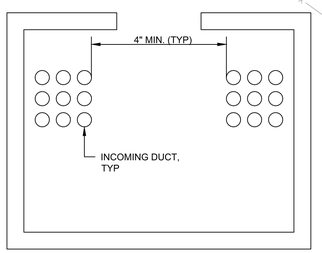


MV MANHOLE DUCT ENTRY DETAIL

APPLIES TO MH-11 AND MH-21 ONLY

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| C | 02/13/2024 | 100% DESIGN | JL | DR | GN |
| B | 11/20/2023 | 90% DESIGN | JL | DR | GN |
| A | 09/29/2023 | 60% DESIGN | JL | DR | GN |

DRAWN BY FL
DESIGNED BY JL
CHECKED BY DR
APPR. BY GN

Stantec
B7 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD - SITE PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: JANUARY / 2024
SCALE: 1:400

SHEET NO. 145 OF 145
DWG. NO. 040-E-01

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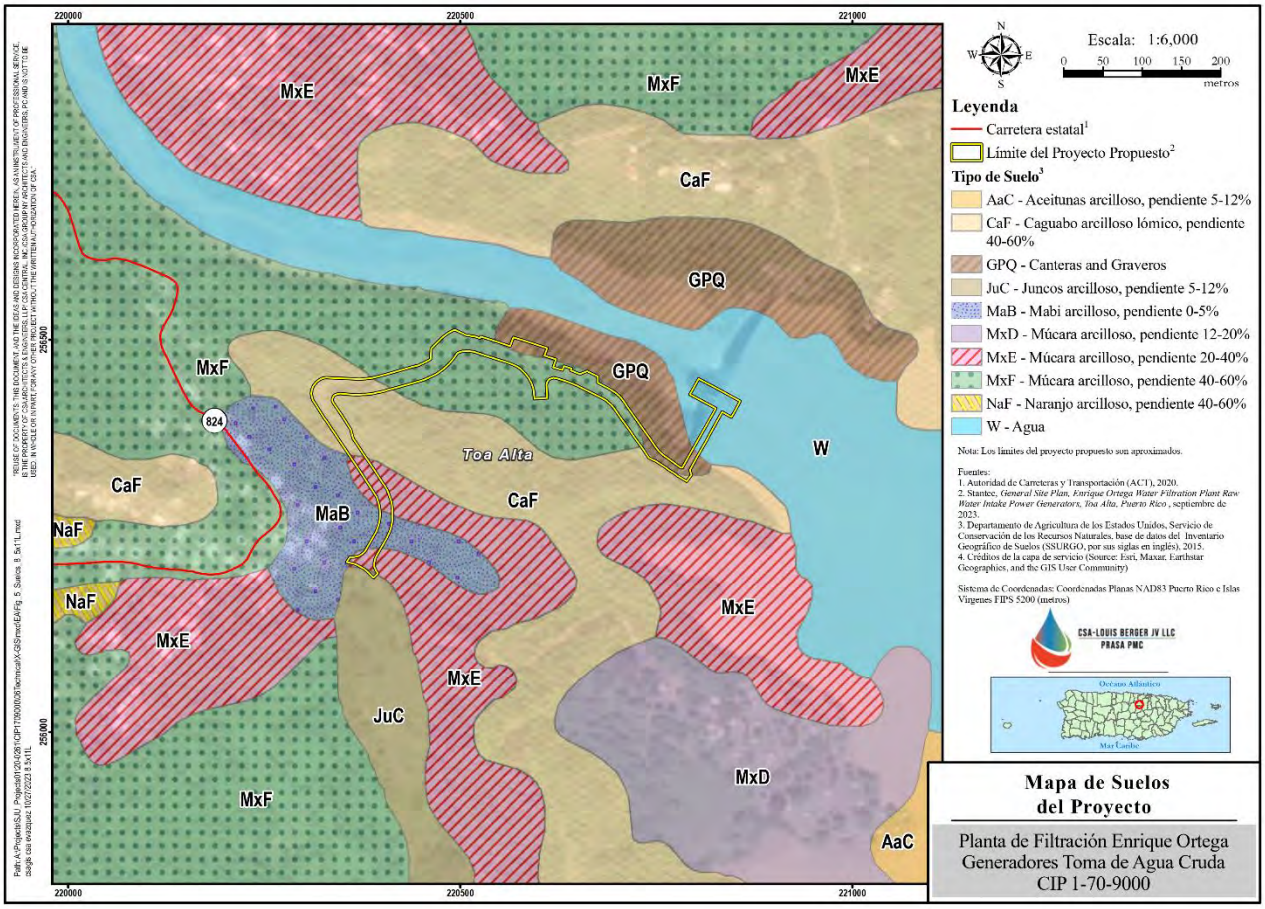
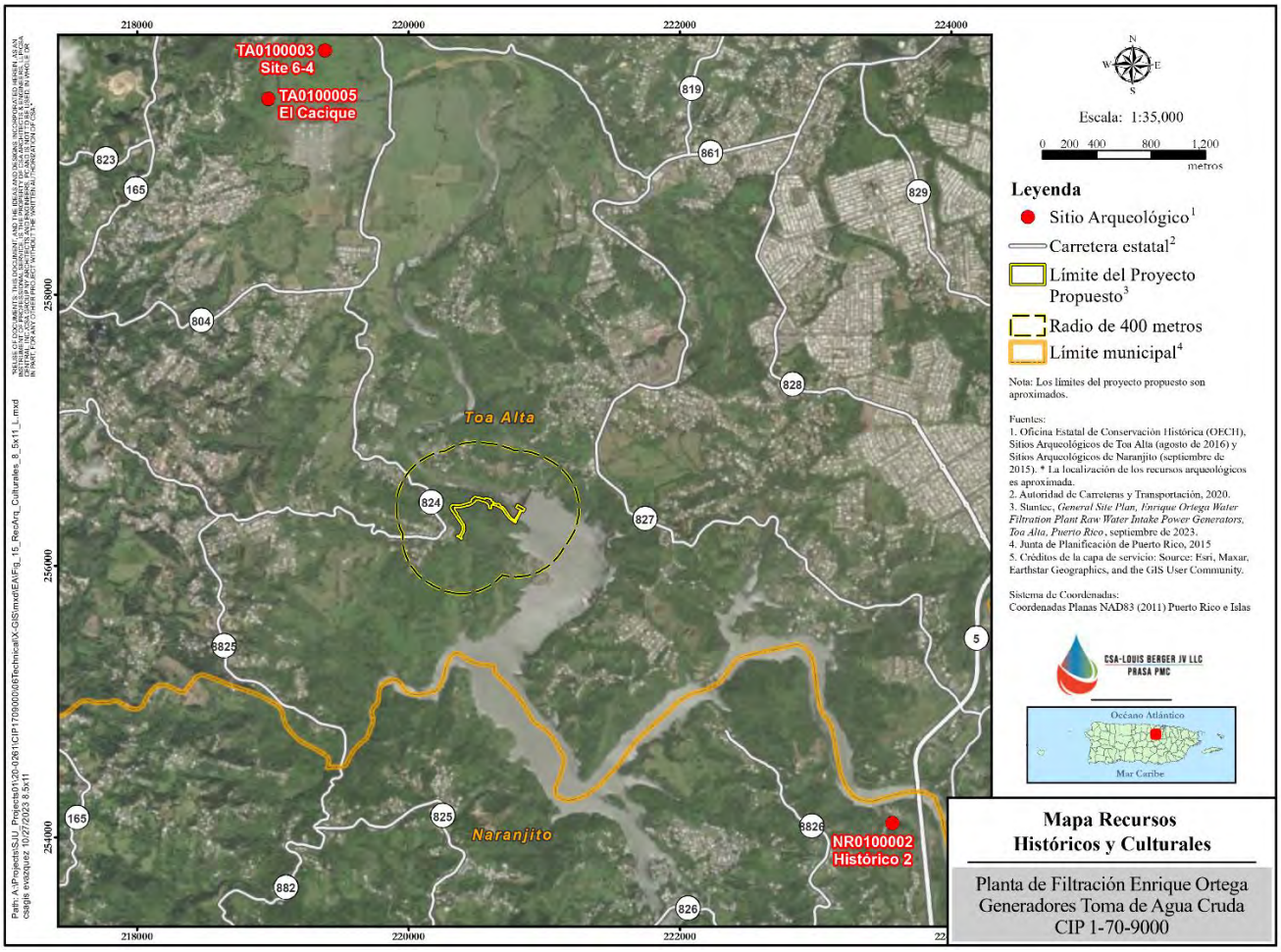
## Project (Parcel) Location – Soils Map (Only if Archaeology Review is Required)

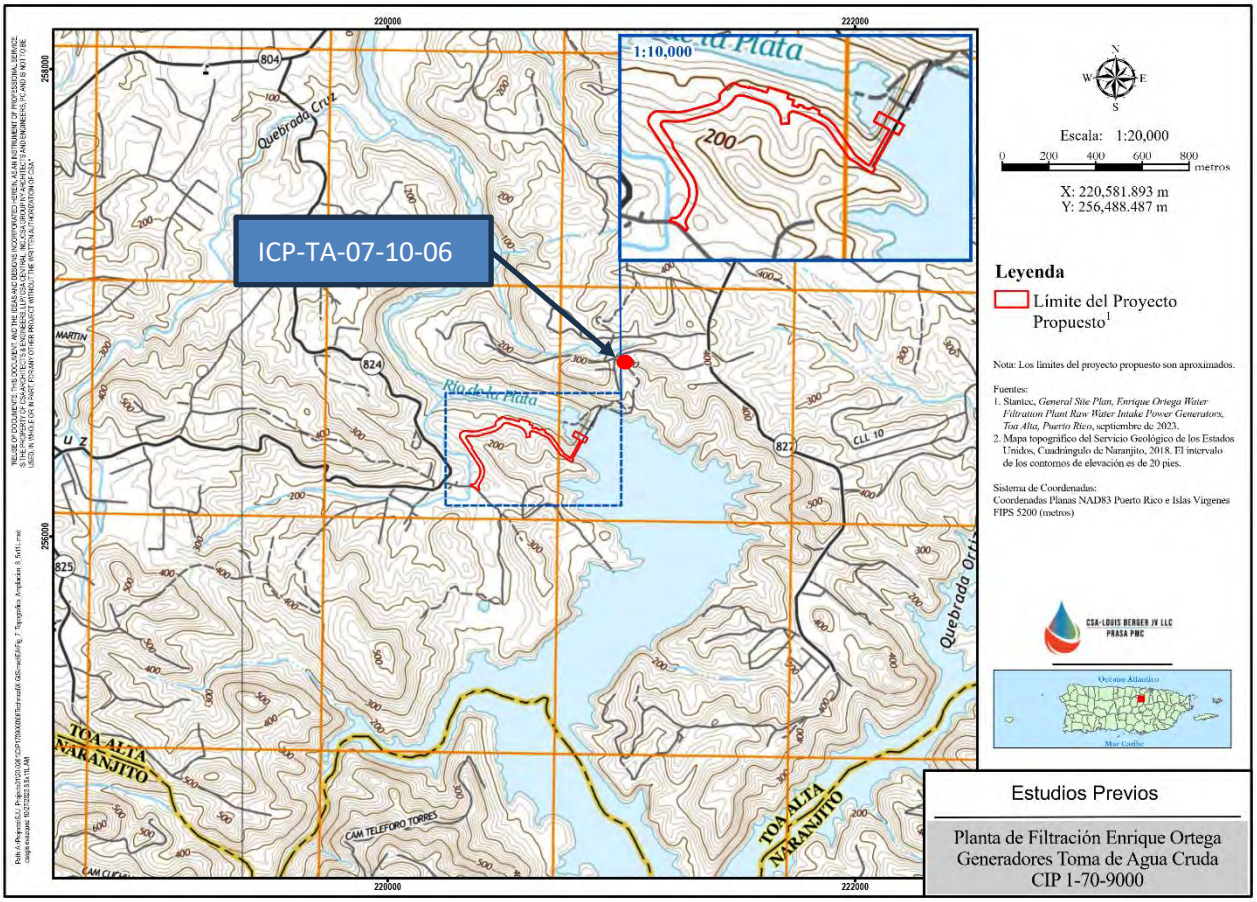


| CDBG-MIT PROGRAM<br>Hazard Mitigation Grant Program (HMGP-MIT)<br>Section 106 NHPA Effect Determination Form | GOVERNMENT OF PUERTO RICO<br>DEPARTMENT OF HOUSING |
|---|---|
| Subrecipient: PRASA | |
| Project Name: PR-HMGP-4339-0019 Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators Phase I | |

## Project (Parcel) Location with Previously Recorded Cultural Resources - Aerial Map



## Project (Parcel) Location with Previous Investigations
## USGS Topographic Map



## Photograph Key

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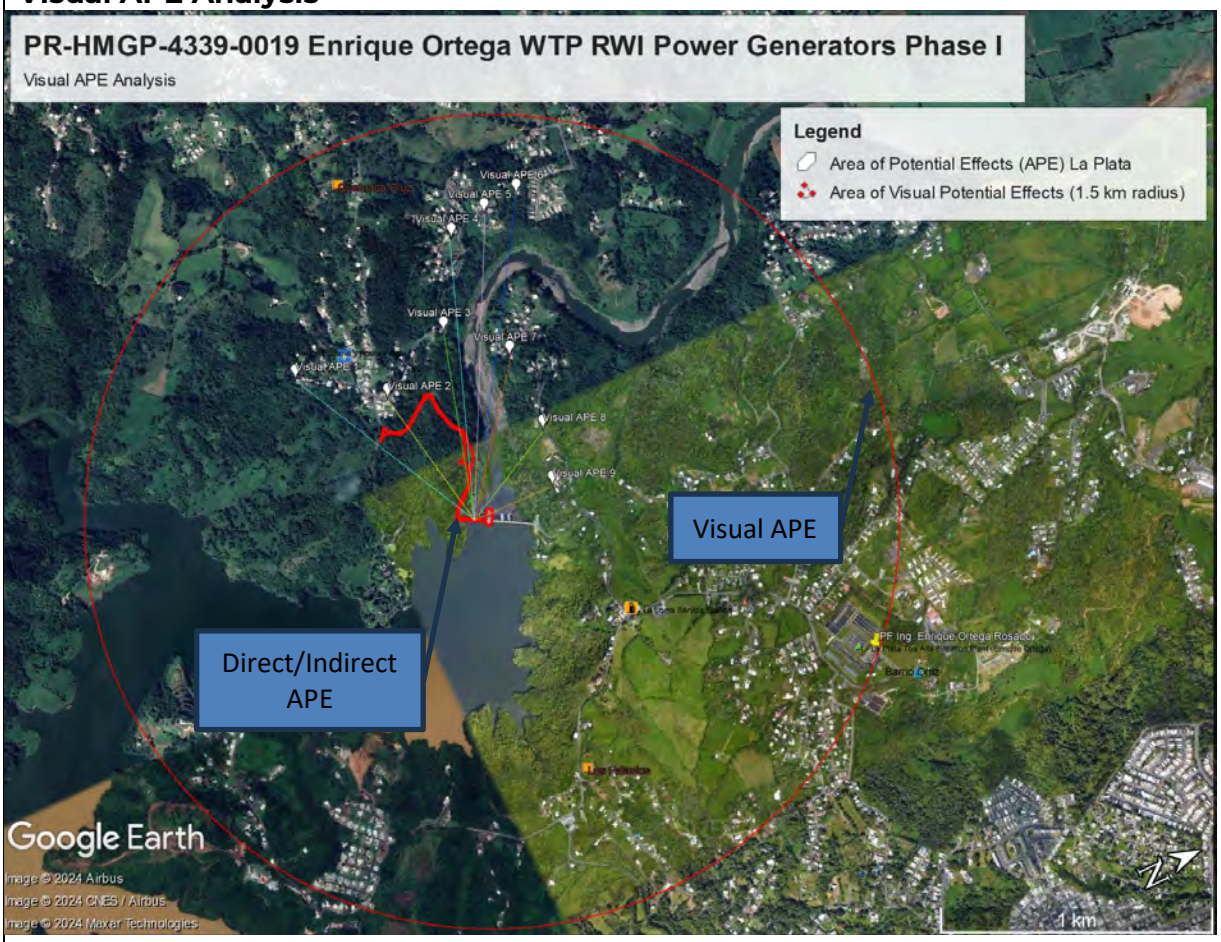
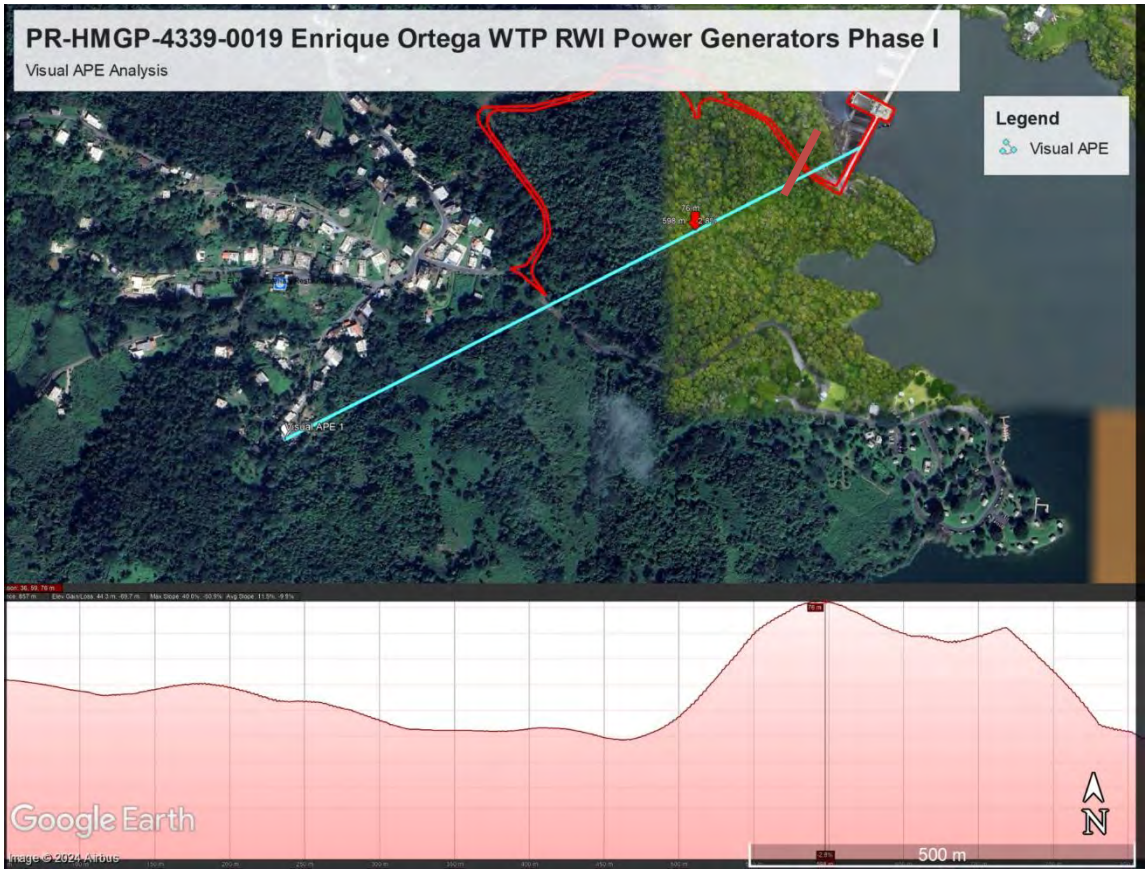



| | |
|---|---|
| **Photo #:1** | **Description (include direction):** |
| **Date:** | **Visual APE north-west orientation** |
| **11/20/2024** | **Source: Google Earth** |

## Photograph Key

### Visual APE 1

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## Photograph Key

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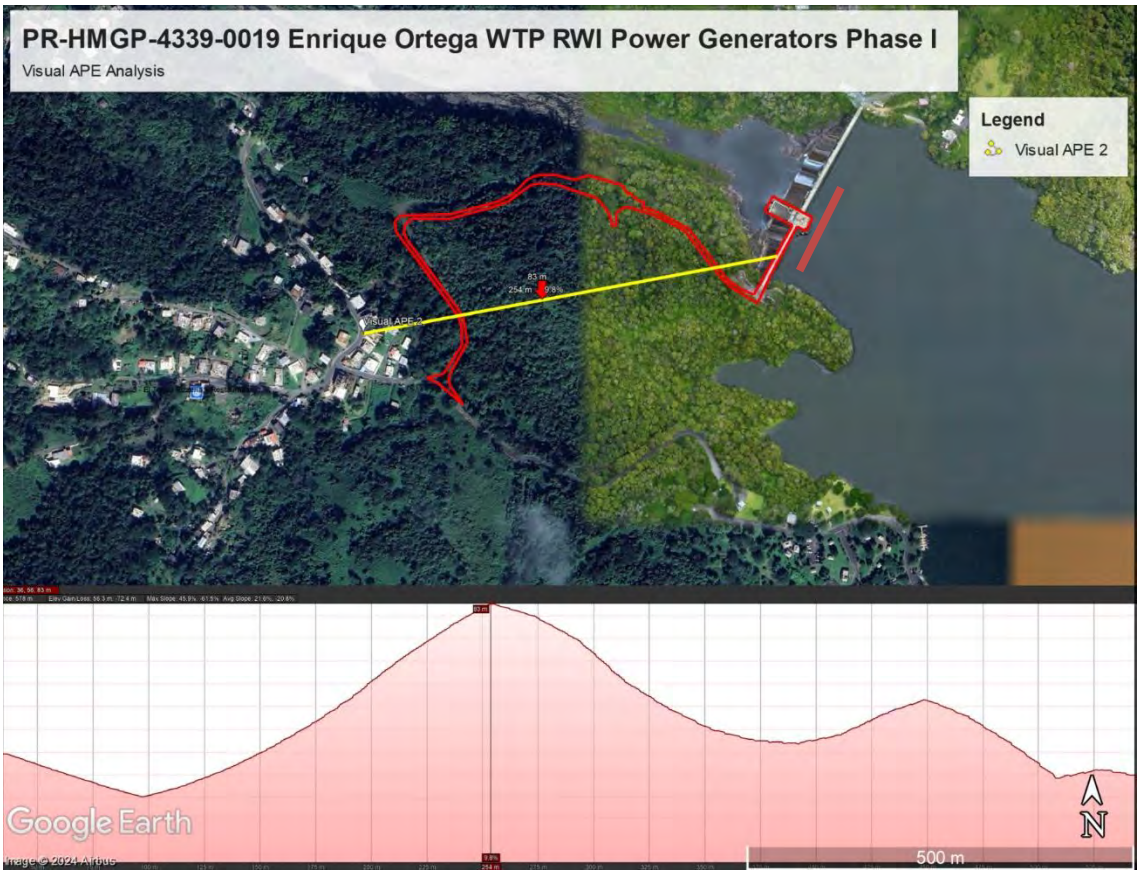


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## Photograph Key

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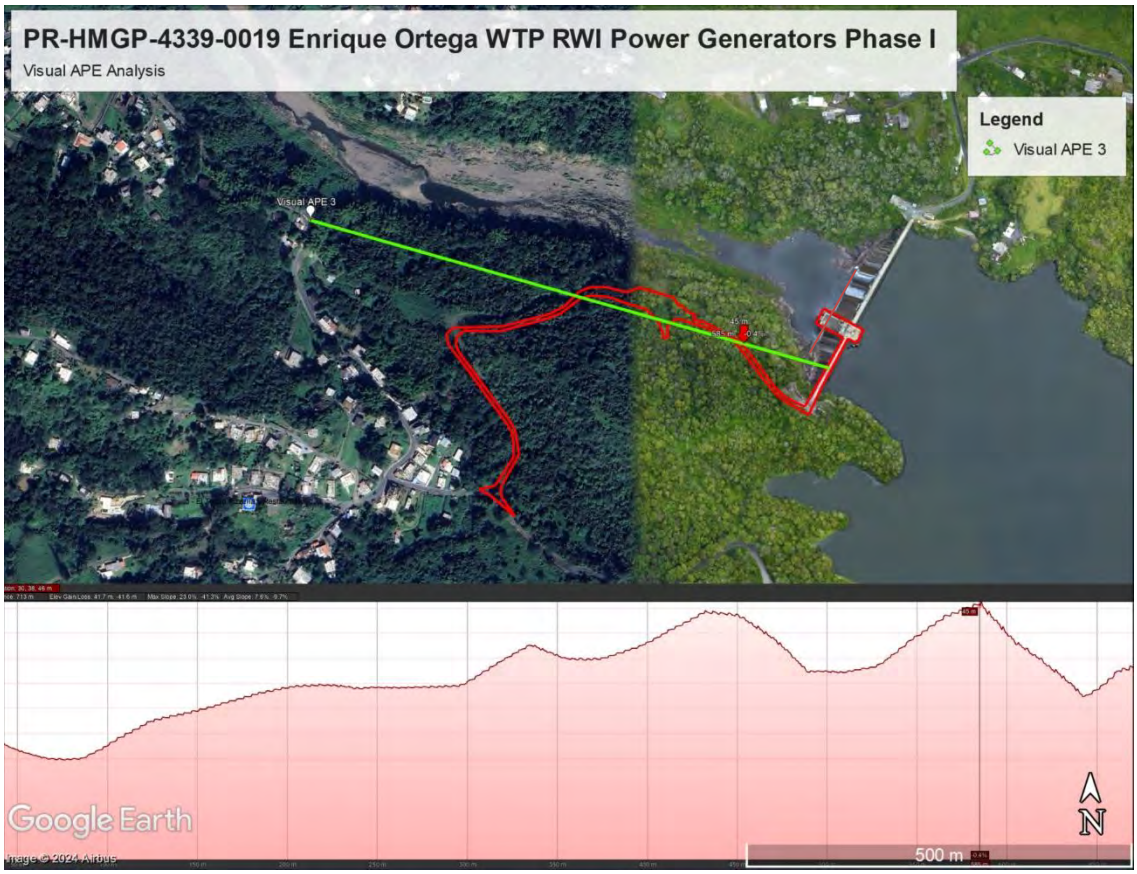


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## Photograph Key

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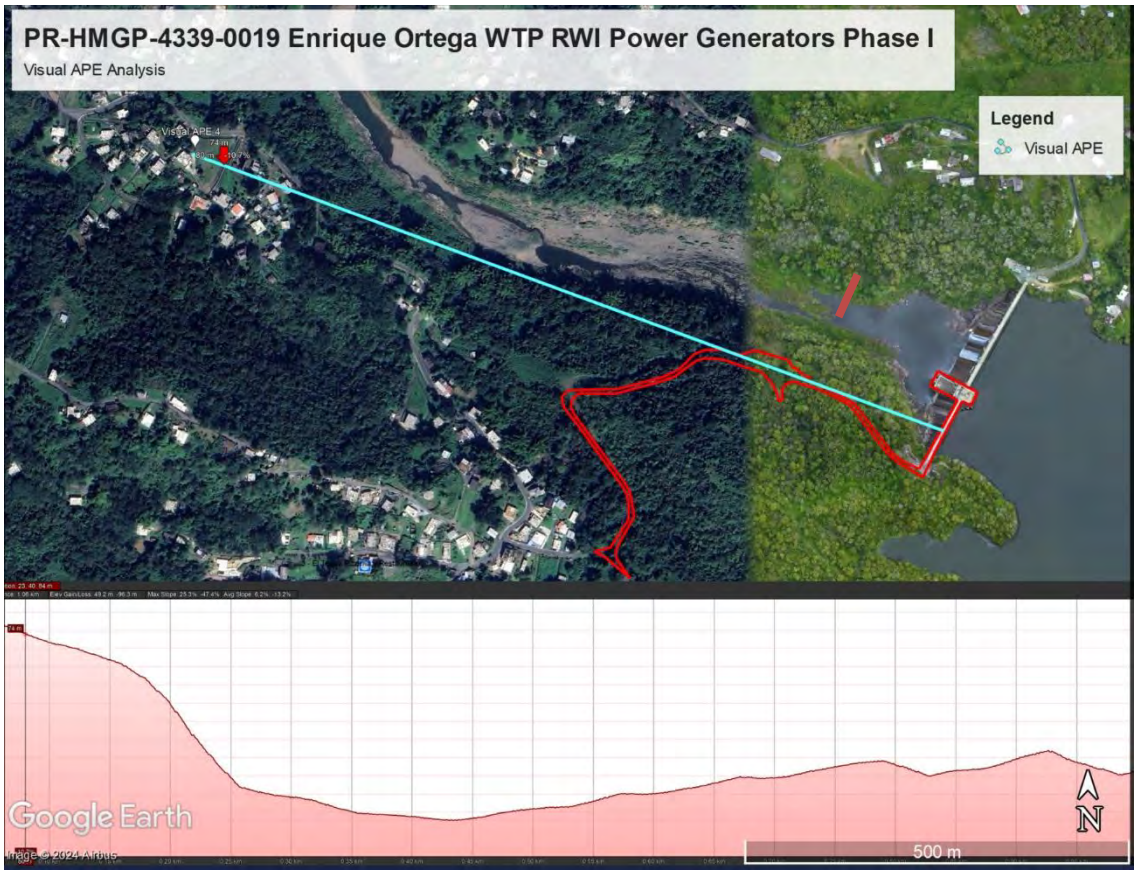


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## Photograph Key

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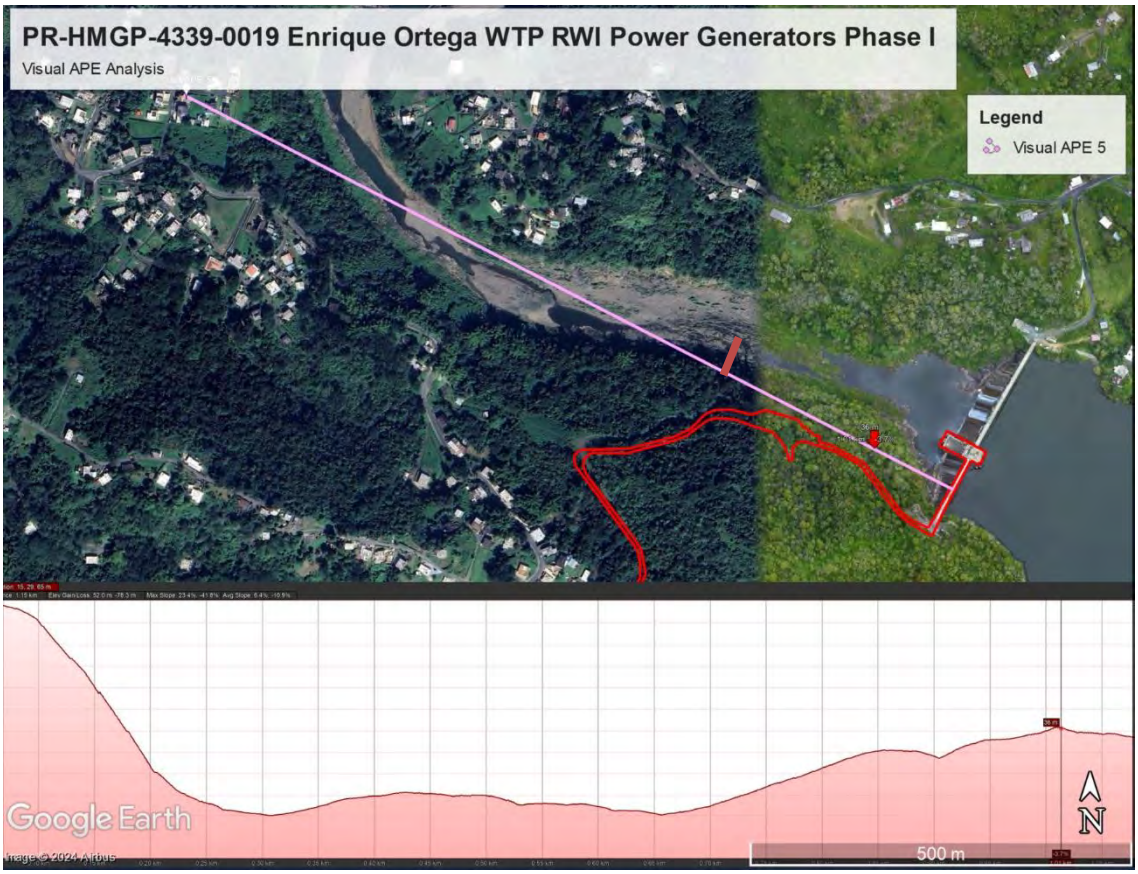


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## Photograph Key

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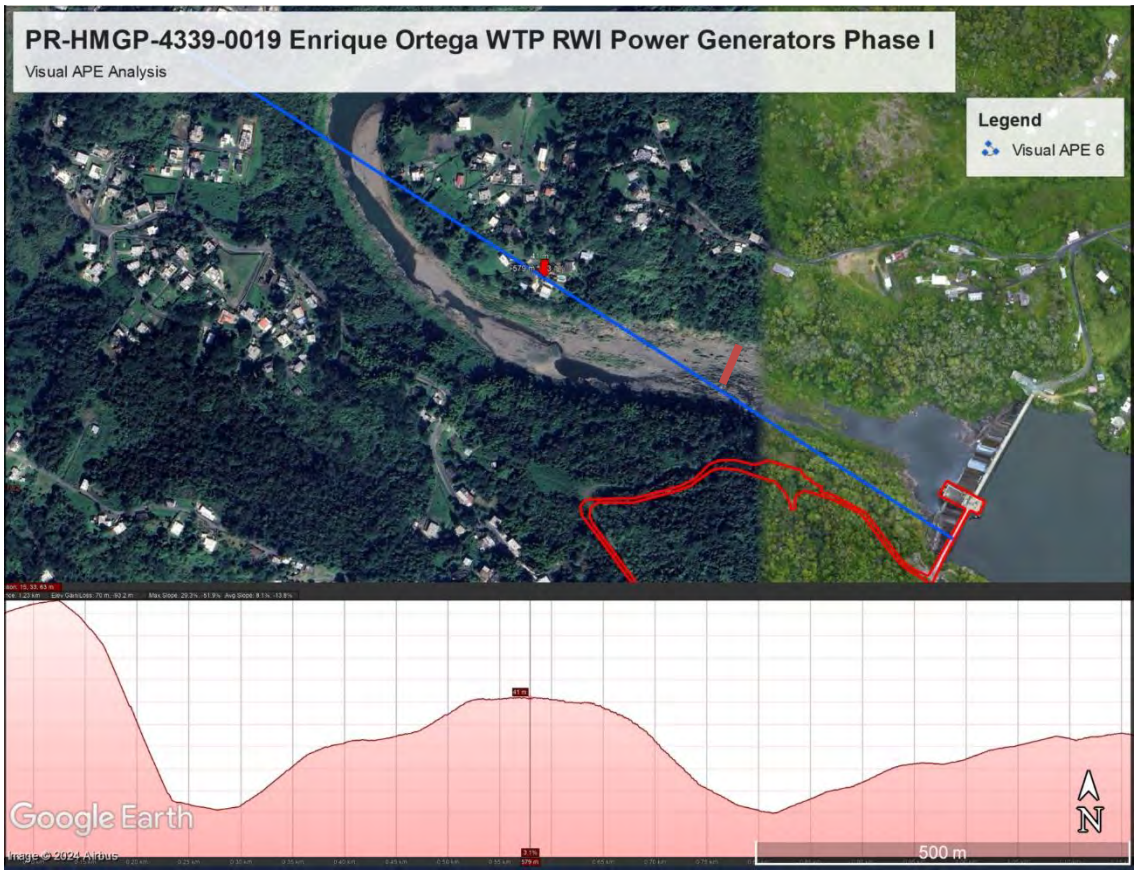


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## Photograph Key

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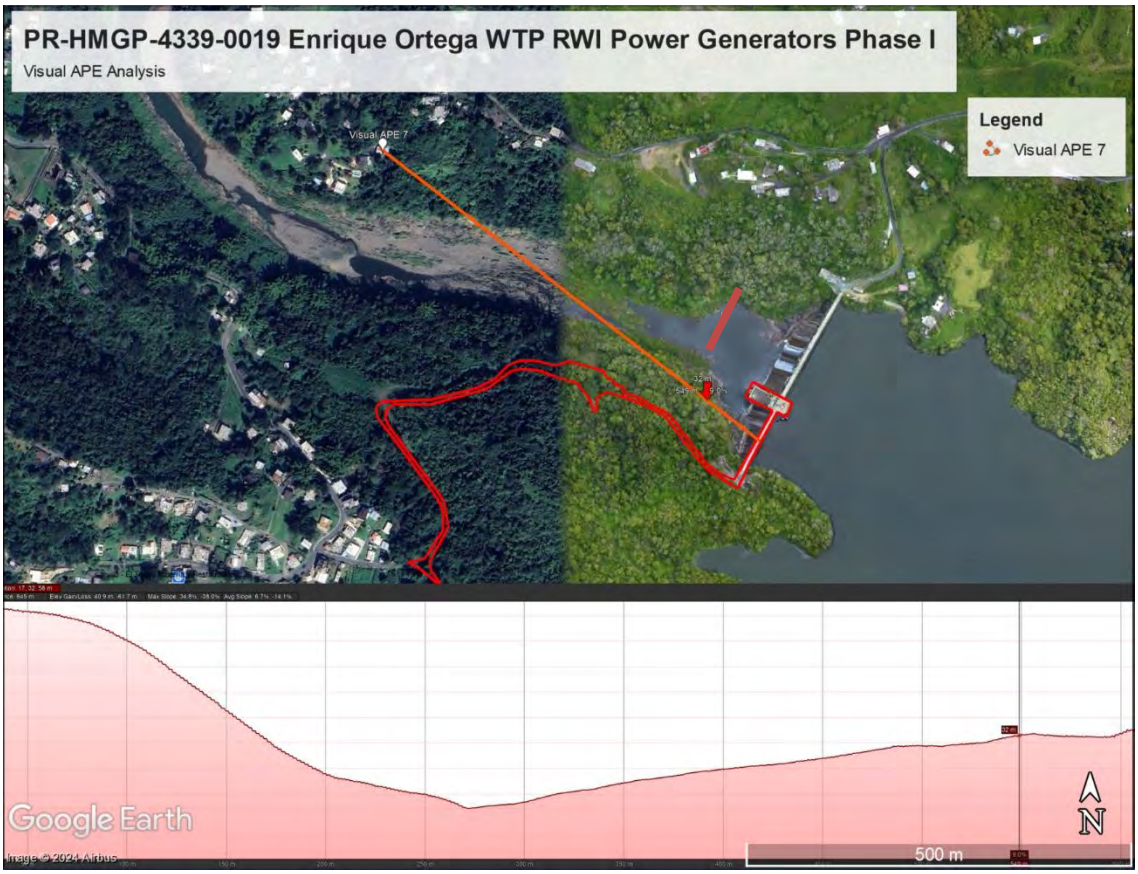


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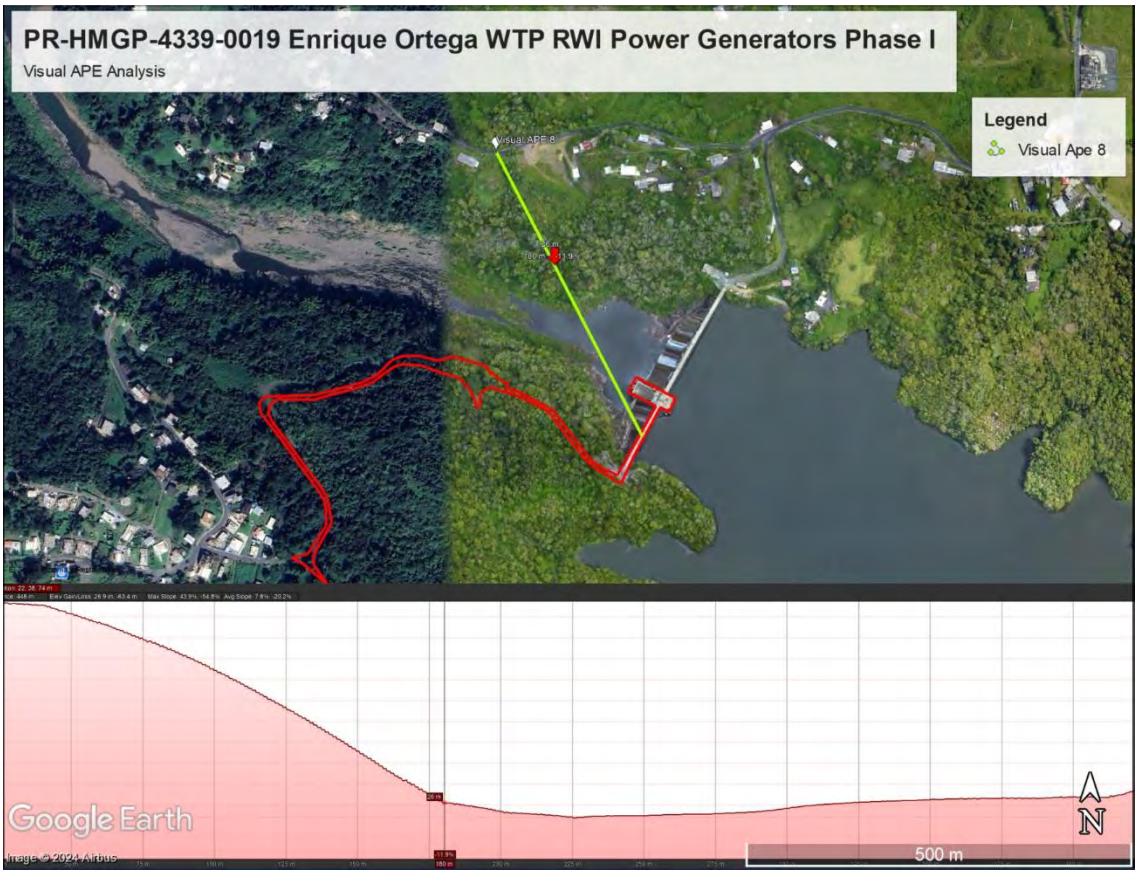
## Photograph Key

### Visual APE 8

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## Photograph Key

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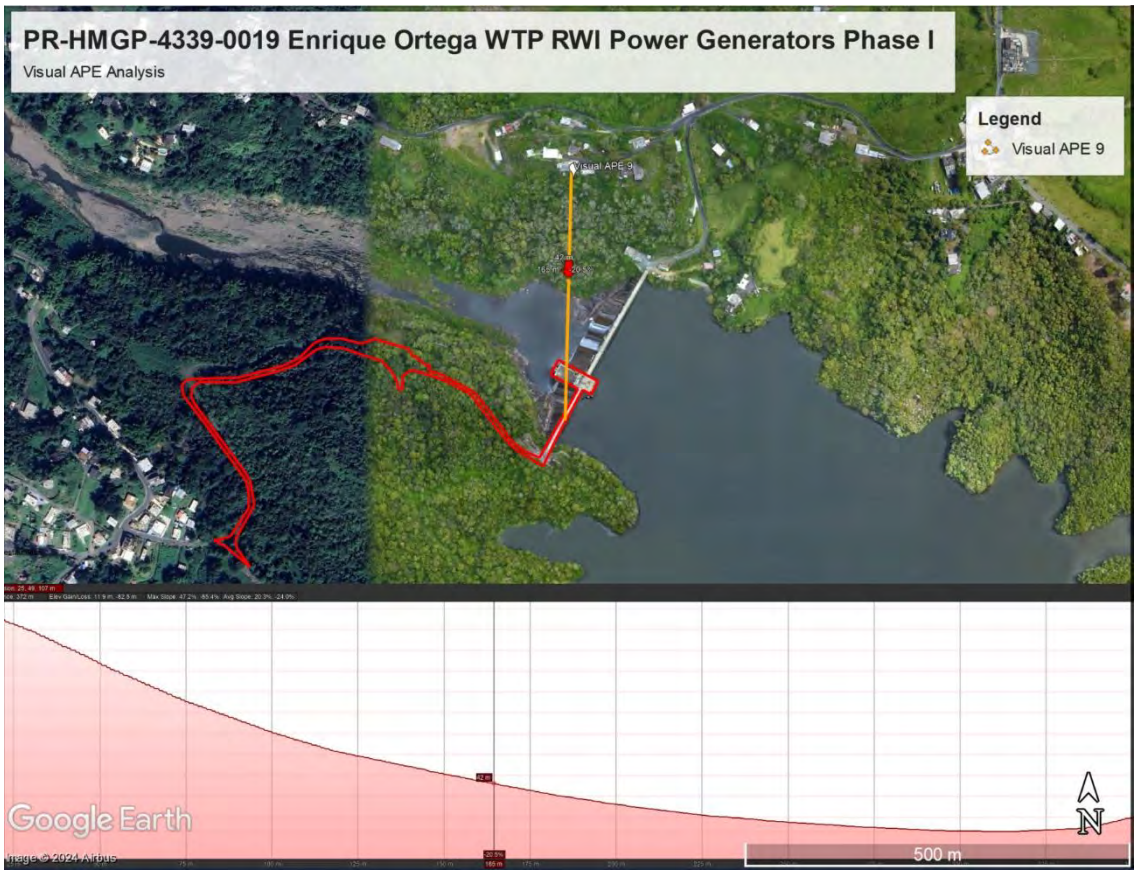


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|---|---|
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## Photograph Key

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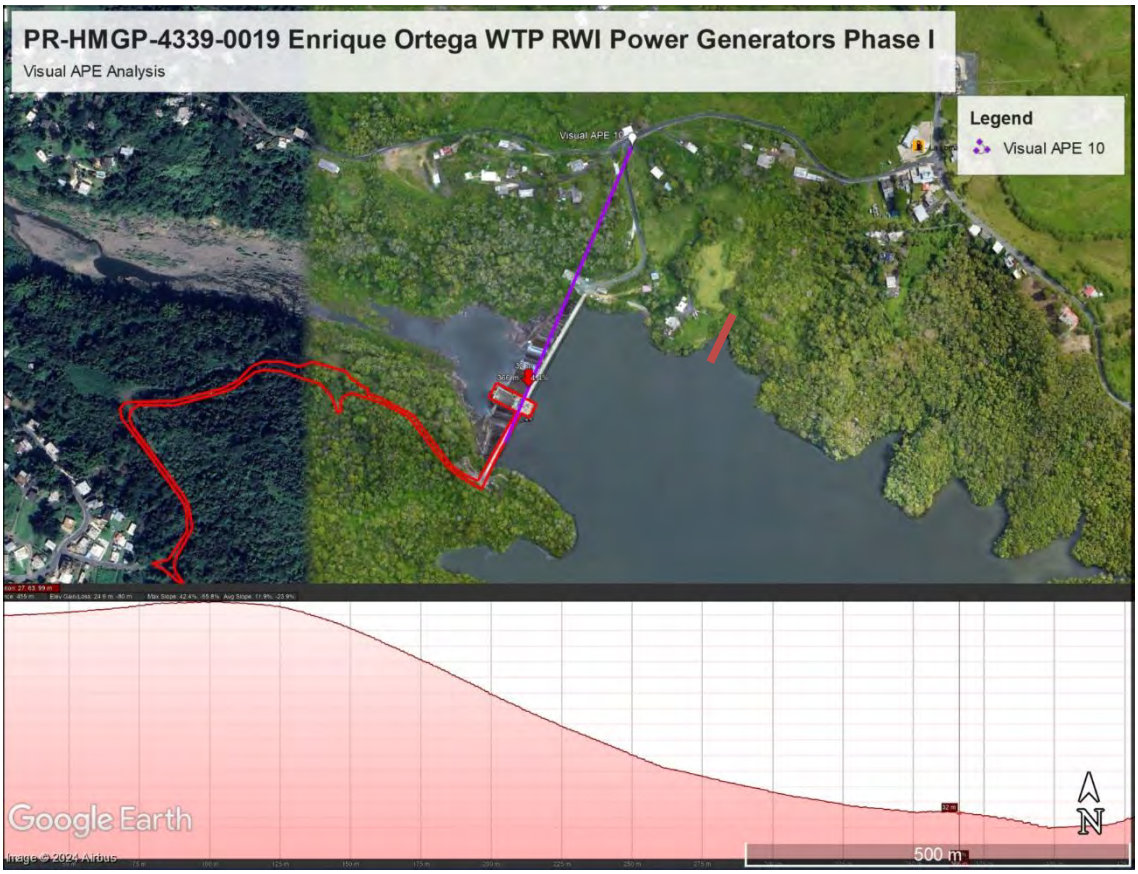


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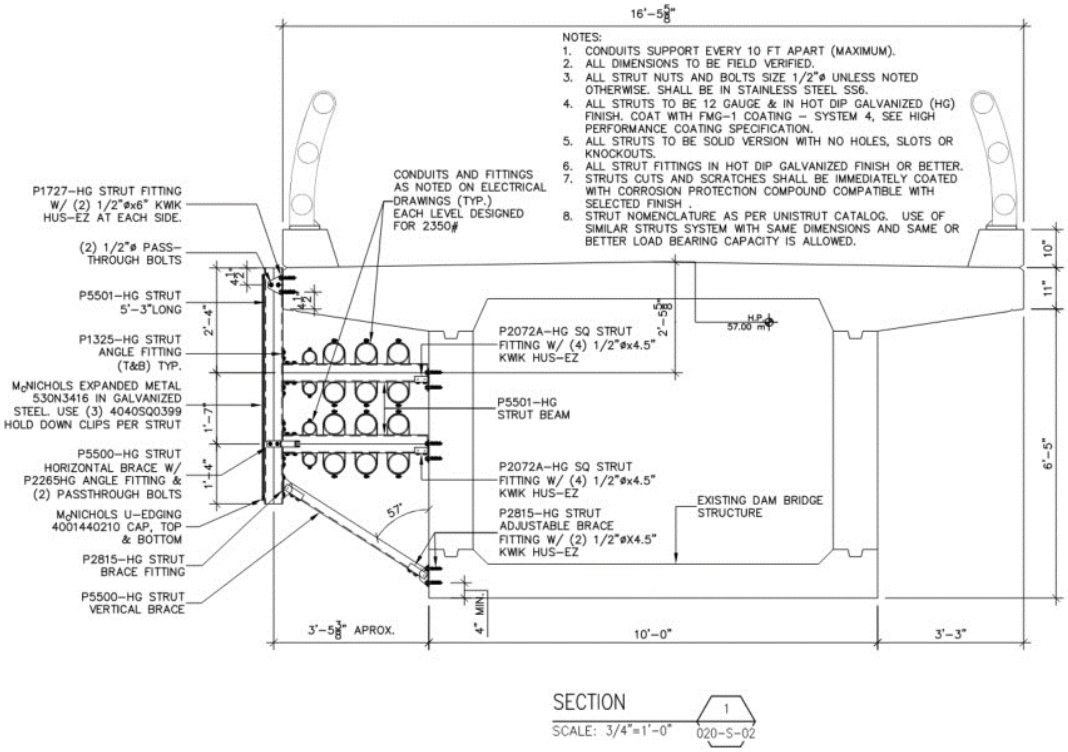


*Figure 1: Proposed conduit routing*

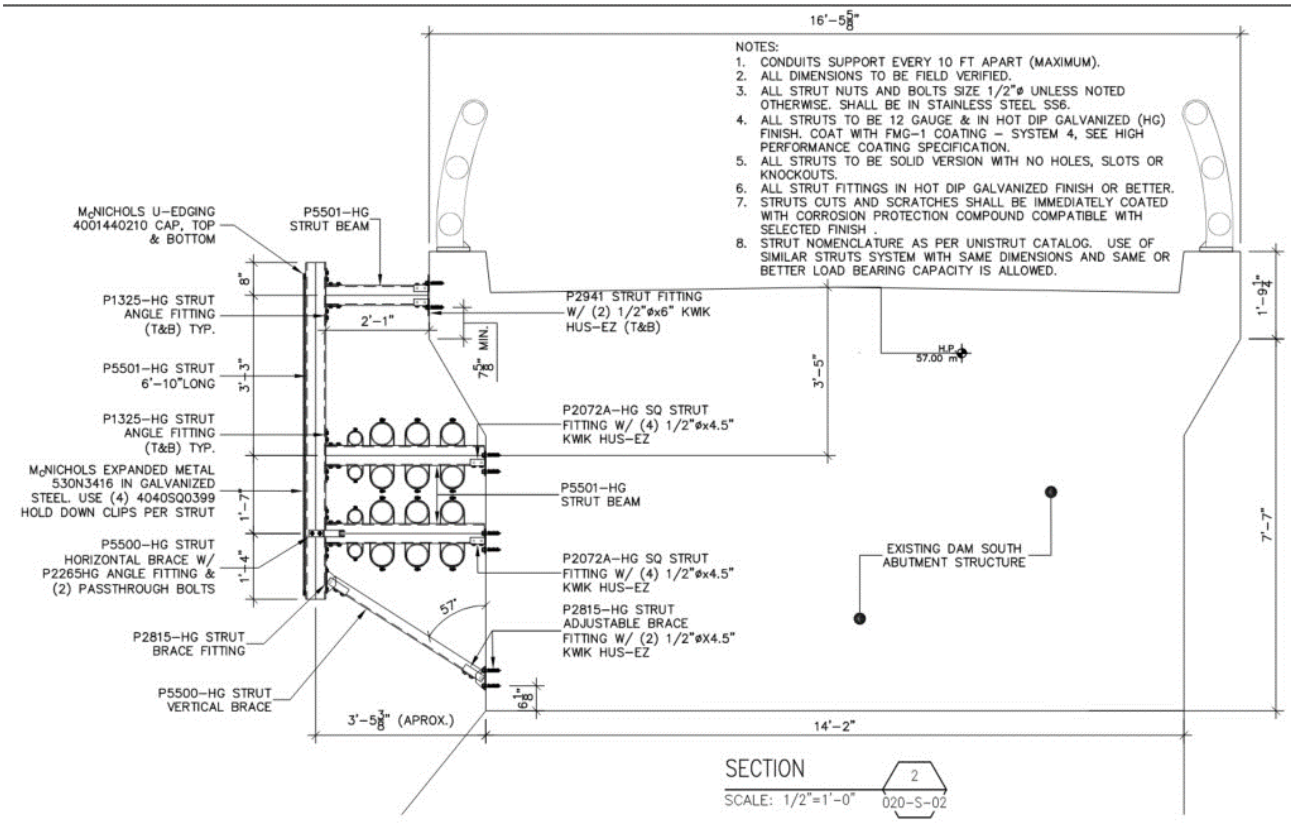


*Figure 2: Electrical Conduit Routing- structural review*

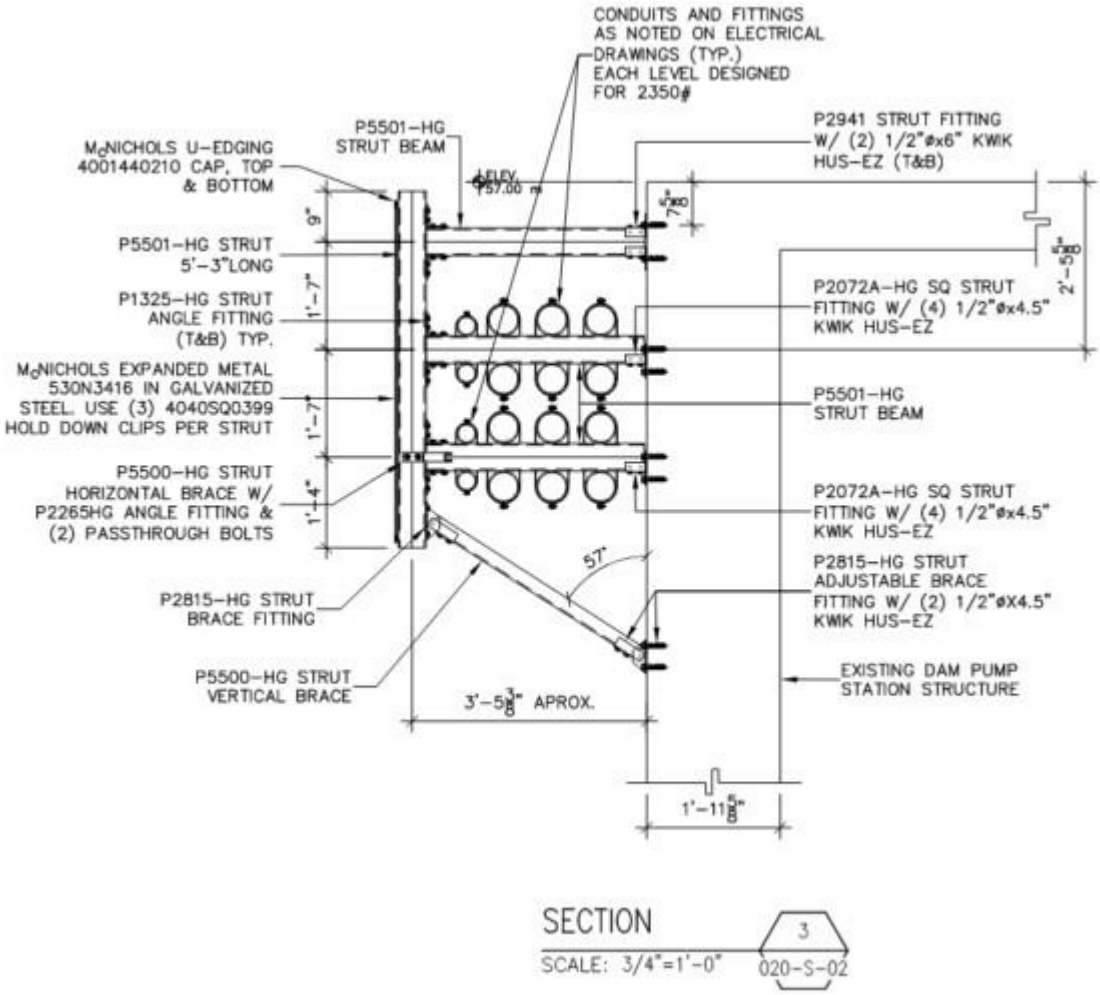


*Figure 3 Electrical conduits and fittings as noted on electrical drawings*

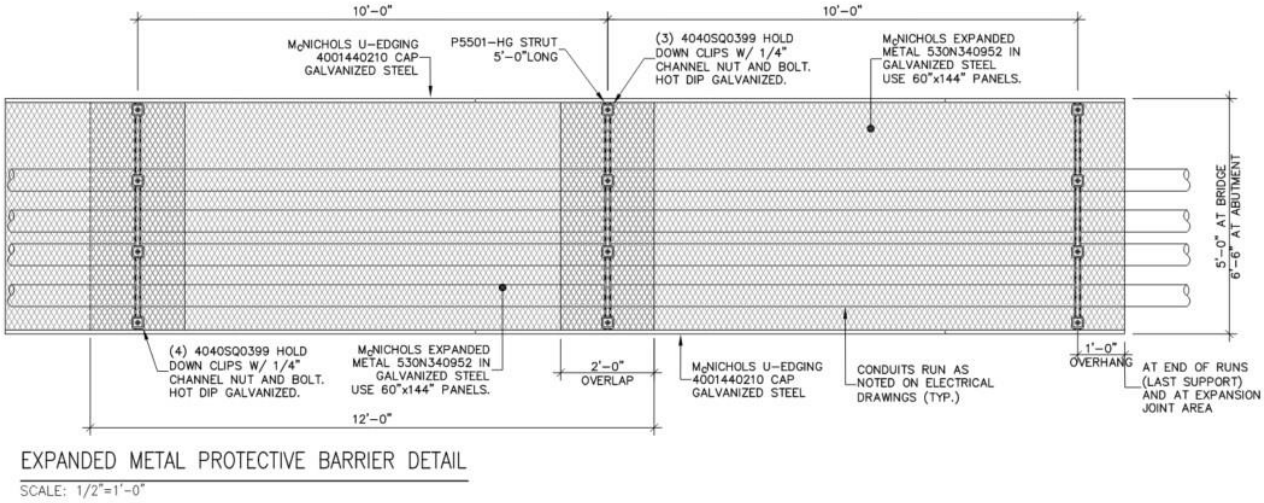


*Figure 4: Expanded Metal protective barrier detail*

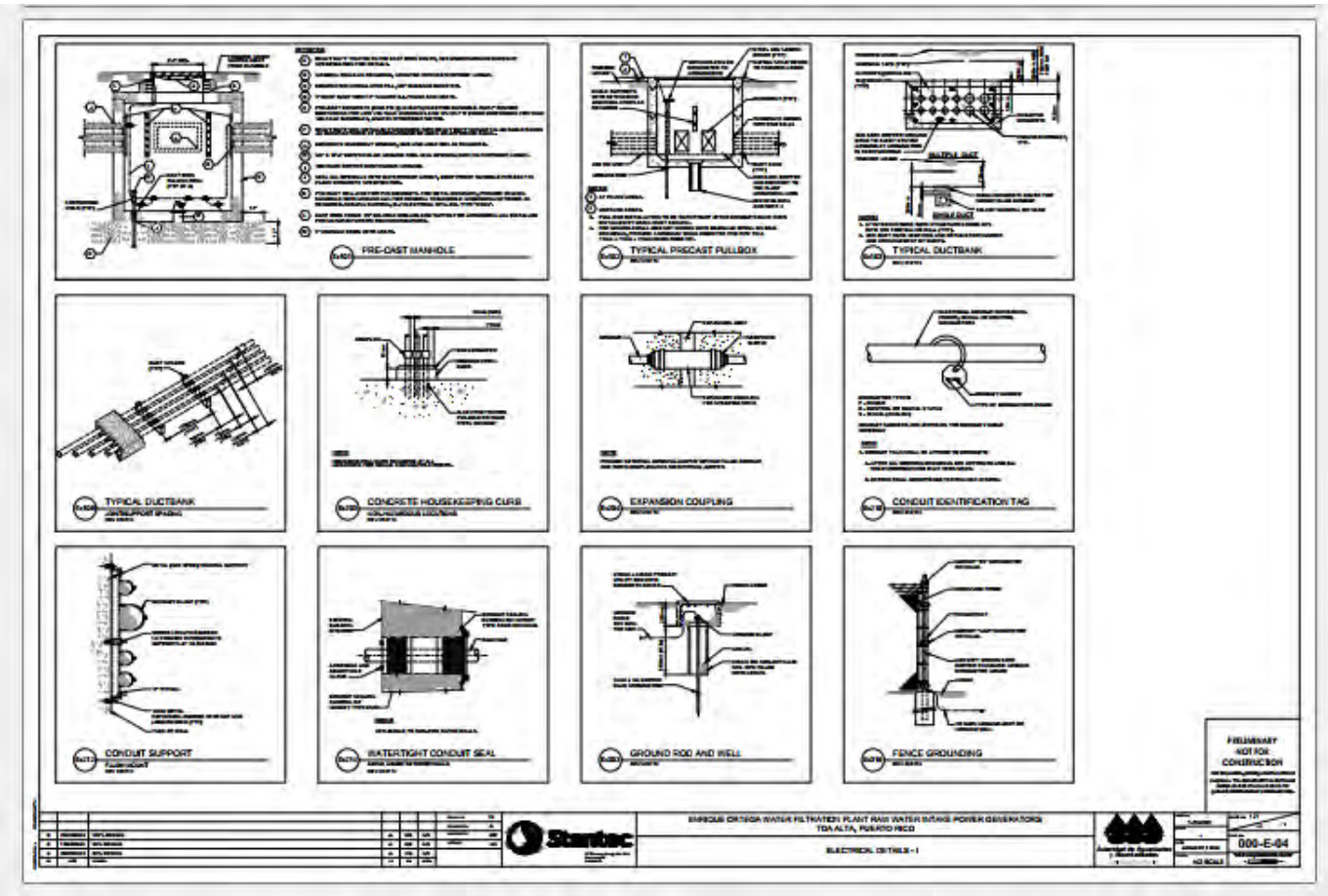


*Figure 5:Electrical Detail (conduit installation)*

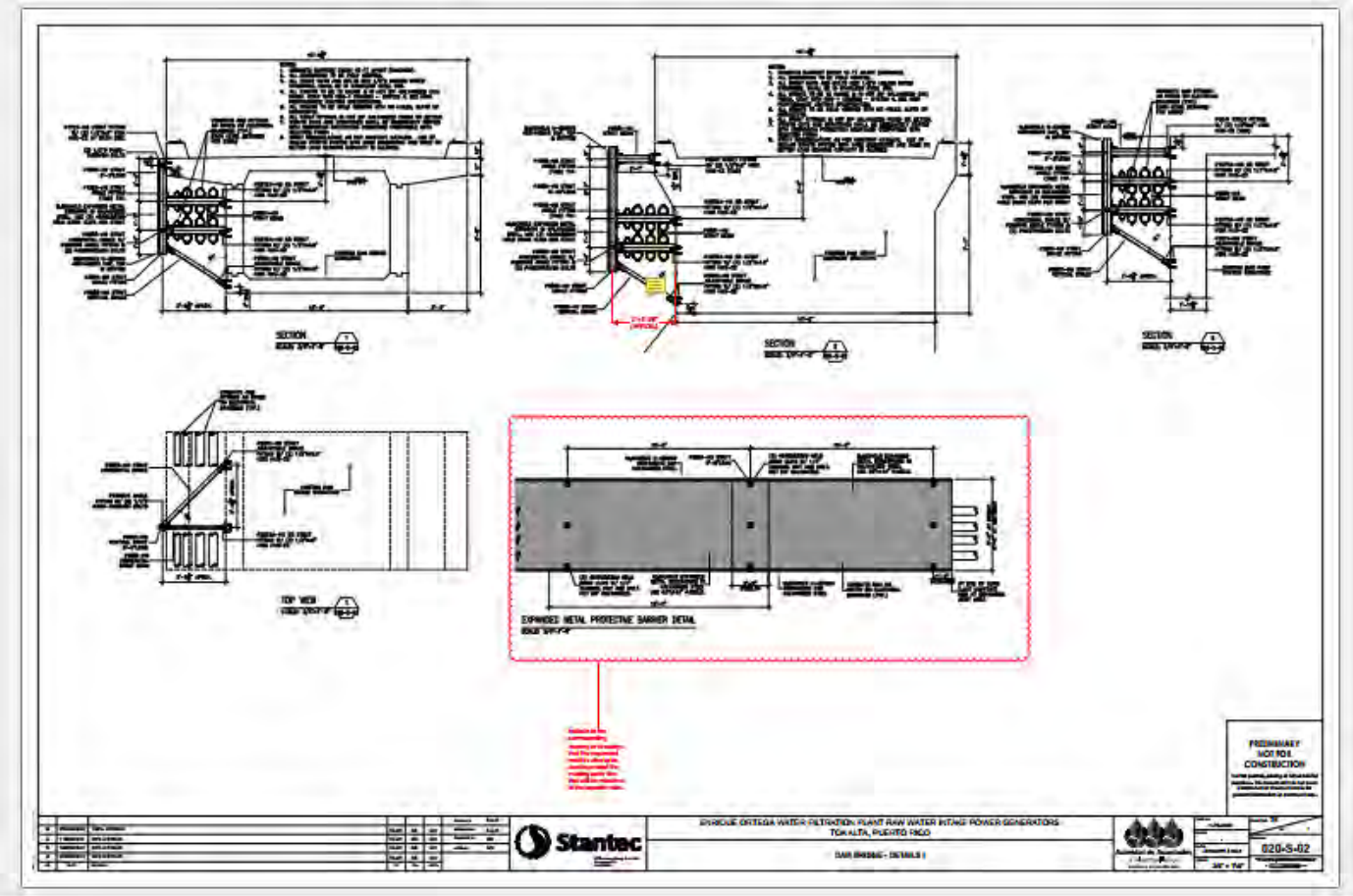


*Figure 6: Dam Bridge Detail (conduits and protective barrier)*

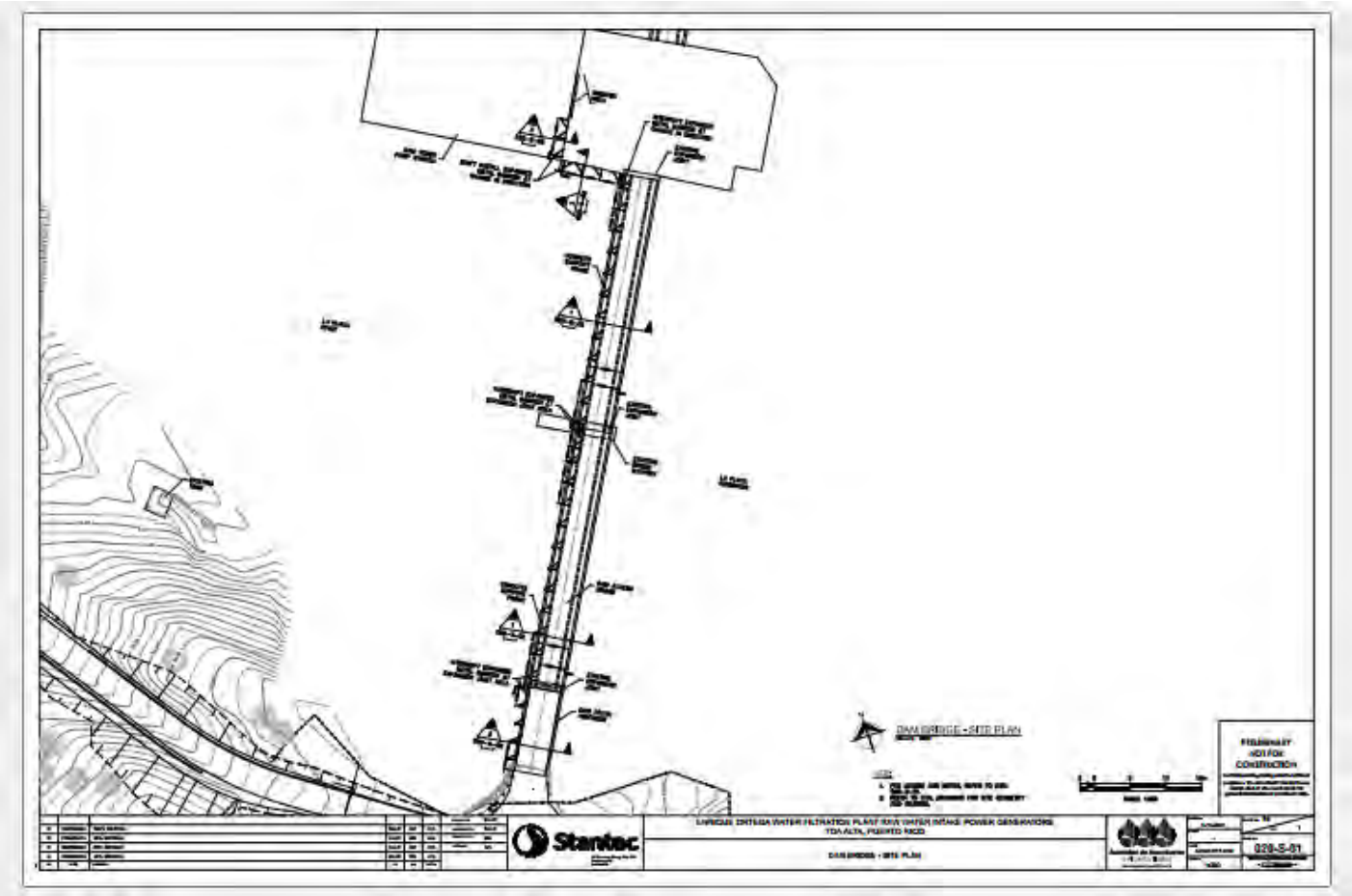


*Figure 7: Dam Bridge Site Plan (conduit installation)*

# APPENDIX G GEOTECHNICAL INVESTIGATION REPORT

LUIS O. GARCIA & ASSOCIATES
GEOTECHNICAL ENGINEERING CONSULTANTS

# REPORT ON GEOTECHNICAL INVESTIGATION AND FOUNDATION RECOMMENDATIONS FOR LA PLATA DAM EMERGENCY GENERATORS TOA ALTA, PUERTO RICO

**SEPTEMBER 15, 2023**

**GEO CIM PROJECT NO. 5900**

AMELIA DISTRIBUTION CENTER, EMMA STREET NO. 26A, GUAYNABO, PR 00968-8007
TEL. (787) 792-2626 FAX (787) 782-5990
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LUIS O. GARCIA & ASSOCIATES
GEOTECHNICAL ENGINEERING CONSULTANTS

**Partners**
Luis Oscar García, MSCE, CE
Carlos García Echevarría, MSCE

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6.0 CLOSURE ....7

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Email: asoto@geocim.com

## FIGURES

**FIGURE 1 - SITE LOCATION (GOOGLE EARTH IMAGE)**

**FIGURE 2 – PROJECT SITE TOPOGRAPHIC PLAN and BORING LOCATIONS**

**FIGURE 3 – PROJECT SITE LAYOUT and BORING LOCATION PLAN**

**FIGURE 4 - GENERAL GEOLOGY OF THE PROJECT SITE AREA**

## APPENDICES

**APPENDIX A - BORING LOGS AND SOIL CLASSIFICATION TEST RESULTS**

**APPENDIX B – DRILLING AND LABORATORY SOIL TEST PROCEDURES**

GeoCim LUIS O. GARCIA & ASSOCIATES
GEOTECHNICAL ENGINEERING CONSULTANTS

**Partners**
Luis Oscar García, MSCE, CE
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**SEPTEMBER 15, 2023**

**GEO CIM PROJECT NO. 5900**

## 1.0 INTRODUCTION

This report presents the results of a geotechnical investigation performed for the proposed four (4) Generators of 2,500 Kv capacity to be installed at La Plata Dam, Toa Alta, PR. See Figure 1- Site Location in Google Earth image).

The study was conducted in accordance with the subconsultant agreement entered with Stantec Consulting Puerto Rico, LLP on June 7, 2023. The objective of the investigation was to evaluate subsurface conditions at the site to provide geotechnical recommendations for the design and construction of the foundations for the proposed emergency generators and related facilities (switch gear and electrical building, and 2 - 32,000 gallons fuel tanks), and the access road from Camino Recreativo La Plata, off PR-824. Eng. Gastón Nogales of Stantec has provided us the site plans for the project.

## 2.0 PROJECT DESCRIPTION AND SETTING

The project site is located on the southwest end of the La Plata Dam. The 4 - 2,500 KV generators are proposed to be installed on a relatively level platform alongside the existing dirt road that will be conditioned (asphalt paved) to provide access to the new facilities. This access road ends at the south end of the La Plata Dam. Figure 2 shows the site location in more detail, in an existing conditions and topographic survey map prepared by Javier Bidot & Associates. Figure

3 shows the overlay of the proposed generators and other facilities over a Google Earth image which also shows the boring locations. The access to the project site is from the Camino Recreativo La Plata, which is off PR-824 further west.

A visit was made to the project site on May 18, 2023 with members of the Stantec Design team, coordinated by Eng. Gastón Nogales.

The 10 boring locations that are part of the original scope of the study are shown in Figures 2 and 3. The boring locations were staked out in the field by a surveying crew of Javier Bidot & Associates. A table of the coordinates and ground elevations of the boring locations are presented in Table 1.

The access road runs over the existing topography, which contains hilly terrain and is thickly wooded. The ground surface elevations along the access road fluctuate between 32 to 45 meters.

## 3.0 GEOTECHNICAL INVESTIGATION

The geotechnical investigation consisted of drilling initially 10 borings to depths varying from 10 ft to 30 ft below ground surface (B-1 to B-10). Two additional borings were made to the pad where the generators are to be installed, to provide better coverage of the area (B-11 and B-12).

The borings were drilled with two drill rigs, one a CME-45 drill rig and the other a CME-55 drill rig, both using the "Hollow Stem Auger-Dry Sample" method of drilling. Soil samples were collected at 2.5-foot depth intervals beginning at the ground surface to a depth of 10 feet, and at 5-foot depth intervals thereafter from 10 to 30 ft depth. The samples were collected during the performance of the Standard Penetration Test (SPT) using a standard 1.5-foot-long split-spoon sampler driven into the ground ahead of the advancing auger with an automatic SPT hammer. The number of blows required to drive the sampler into the soil was recorded in the field. The N-value is the number of blows required for the penetration of the last 12 inches of the sampler, and this value is related to the consistency of cohesive soils and the relative density of granular soils through correlations with a large body of data that has been developed over many years.

The collected samples were placed in tightly closed plastic bottles and transported to the Geo Cim Geotechnical Testing Laboratory in Guaynabo for unconfined compression testing (of

cohesive samples using a spring tester and/or pocket penetrometer), natural moisture content determinations, and visual/manual soil descriptions following standard laboratory procedures. Geo Cim, Inc., performed the field and laboratory work. Several soil classification tests are in progress; the results will be incorporated in the report when completed. The results of the field operations, laboratory testing, and detailed descriptions of the soils encountered at each boring are documented in the boring logs included in Appendix A. Appendix B contains a detailed description of drilling, sampling, and testing procedures.

## 4.0 SUBSOIL CONDITIONS

Figure 4 shows the portion of the 1968 *Geologic Map of the Naranjito Quadrangle, Puerto Rico,* by M. H. Pease, published by the U.S. Geological Survey (USGS) in 1968, where the site is located. The map, in which different rock and soil units are distinguished by coloring and letter symbols, shows the site is underlain by unit Kcn, which the USGS describes as the Cancel Breccia of Upper Cretaceous age.

Orientation of the strata near the site are not indicated, however, there are a few faults shown in the vicinity, including the Quebrada Cruz Fault south of the site.

The subsurface profile encountered by the 12 exploratory borings drilled at the site consists initially of silty to clayey sand and sandy silt to sandy clay in a medium stiff to very stiff consistency for the first 5 to 10 ft below ground surface. The profile then changes gradually to a weathered rock formation in which may of the borings were stopped before the target 20 ft depth, at depths ranging from 7 to 15 ft when the auger and sampler encountered refusal to further penetration. An examination of the boring logs shows the variable nature of the upper deposits, but which are generally in a firm to very firm consistency before reaching the weathered bedrock.

The area where the generators are proposed to be installed was initially covered by boring B-7, which encountered clayey sand, with gravel rock fragments, to about 10 ft depth in a relatively medium stiff to loose and medium dense condition, and then rock fragments were encountered and the boring was stopped at 15 ft depth due to refusal. The N-values in the upper part of the profile varied from 11 to 5 blows per foot. For this reason, we recommended two additional borings to better cover the area where the proposed generators will be installed. Borings B-11 and B-12 were drilled as shown in the Figure 3 boring location plan. These showed the silty sand in a firmer

denser condition, to 30 ft depth in B-11 and in B-12 a sandy clay, very stiff, to 7 ft depth where the weathered rock was detected at 7 ft depth, but it was possible to continue sampling to 19 ft depth until hard refusal.

In boring B-9, (for the fuel tanks) the clayey to silty sand resulted in N-values varying from 13 to 7 blows per foot, except for a higher N-value of 22 bpf at 15 ft depth. The weathered rock was detected at 24 ft depth.

Other borings along the entrance road (B-1 to B-6) and B-10 at the northeast end closest to the dam showed very good subsoil conditions from the ground surface to the end of the borings.

Ground water was not encountered in any of the borings.

## 5.0 CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

Overall, the subsoil conditions encountered in this geotechnical exploration indicate that the underlying in-situ soils, consisting of superficial sandy silt to silty and clayey sand soils and varying into weathered rock, will provide adequate bearing support for the shallow spread footings or mat foundations for the proposed generator plants, and related auxiliary structures such as the 80 ft x 20 ft switch gear and electrical building (B-8) and the two 32,000 gallon fuel storage tanks (B-9).

### 5.1 EARTHWORK RECOMMENDATIONS

The project grading plans are not yet available, but we assume the roadway final grades will be closely following the existing roadway path. Likewise, the area where the generators are to be installed will likely be graded up only a few feet from the existing grades. So, overall, there may be some cut and fill required for the final grade elevations. We request to be provided the grading plans when available to establish more detailed recommendations that may be necessary.

All new fill to be placed for the roadway of the generators area at the site shall be constructed in accordance with the following general recommendations:

1. Prior to commencing construction, the site shall be cleared and grubbed of any vegetation cover, structural debris, existing non-engineered fill, garbage, and surface topsoil that may exist at the ground surface. In areas within which site grading will require fill placement, the

exposed natural soil surfaces shall then be proof rolled with several passes of a heavy vibratory roller to detect any soft soil spot that may have to be removed and to densify any surface soil that may have been disturbed during the clearing and grubbing and/or cut operations. Any topsoil encountered may be stockpiled for later use during site landscaping.

2. All fill material shall consist of a non-expansive A-2-4 soil or better in accordance with the AASHTO (American Association of State Highway and Transportation Officials) Soil Classification system.
3. The fill shall be placed as an engineered compacted fill in 9-inch-thick layers and each layer will be compacted to a minimum of 95% of the Maximum Dry Density as obtained in the Modified Proctor Test (ASTM D-1557).
4. Although not expected, any springs encountered during site grading or other construction activities shall be provided with adequate drainage outlets (French drains or other appropriate measures) to prevent the buildup of excess pore pressures in the soil. Under no circumstance should a spring area be covered with soil or paved over without previously constructing a drainage outlet.
5. The project should be provided with adequate surface drainage measures to collect and conduct runoff to the project storm water system. Under no circumstance should water be allowed to accumulate anywhere within the project.
6. The placement and compaction of structural fill and backfill behind any retaining walls (if present) shall be inspected and tested by a soil technician under the direction of the project's geotechnical engineer. Soil density tests shall be taken with a nuclear density gauge (ASTM D6938) to ascertain that each layer is compacted to the required compaction level given in Point #3 above.
7. For the preliminary design of a flexible asphaltic pavement along the entrance road we recommend to use a CBR value of 10 for the subgrade soils, as a starting point to establish the thickness of the pavement. As a minimum, we recommend that the parking pavement consist of 8 inches of a well graded crushed stone aggregate base course and 2 inches of asphaltic pavement wearing course. The final thickness, however, shall be established from the Subgrade CBR value of 10 or values measured in the Lab and the design wheel loads. In addition, the pavement shall be well graded such that surface runoff is quickly disposed away from the pavement surface into

a properly designed and built storm sewer system. The full design of the pavement is beyond the scope of work for this study.

### 5.2 FOUNDATION RECOMMENDATIONS

1. The platform area for the generators may be founded entirely on existing in-situ ground or in a pad of uniform thickness of compacted earthfill. Placing a structure so that it bears on both cut and filled ground presents a potential for the development of differential settlement within the structure due to differences in the elastic and strength properties of the compacted fill and the natural in-situ soil and/or rock materials. In addition, there is a potential for under compaction of the fill in the zone of transition from cut to fill. Therefore, the compacted fill must be carefully placed and compacted to meet the compaction specifications, under engineering technician's inspection.
2. The spread footing foundations for the generator pads may consist of independent or continuous spread footings bearing on engineered compacted fill or the in-situ weathered rock at a minimum depth of 2 feet below final grade. An allowable bearing pressure, $q_{all}$, of $q_{all}$ = 3,000 pounds per square foot (psf) may be used to proportion the footings if it will be bearing in compacted fill. This allowable bearing pressure may be increased by 30% percent for short duration and transient loading such as wind and earthquake loads. The allowable bearing pressure could be higher, if necessary, if the footings are cast into the insitu weathered rock, to be discussed with the structural engineer where it is needed, and areas of different bearing pressures can be indicated. An allowable bearing pressure of 4,000 psf may be used to proportion footings if cast into in situ weathered rock.
3. Prior to concrete placement, the foundation bearing surfaces for the footings shall be cleaned and any soil disturbed during the footing excavation operations (or anytime thereafter) shall be removed to provide an undisturbed bearing surface. We further recommend that foundation excavation and construction be scheduled such that the casting of the footings may be completed within a brief period of time after their excavation to minimize disturbance of the foundation bearing soil/rock or fill due to construction operations and/or weather conditions.
4. We recommend that the Project Owner retain the services of a Geotechnical Engineer. All

aspects of site grading and foundation preparation and casting shall take place under the inspection of a soil technician working under the supervision of the Geotechnical Engineer, with particular care given to the site preparation for fill placement and compaction operations. The technician shall have and operate equipment to test for the moisture and density of the fill material.

## 6.0 CLOSURE

The above stated conclusions and recommendations are based on geologic and engineering analysis and evaluation of a limited number of soil samples obtained from widely spaced subsurface explorations and observations of existing surface conditions at the site. Although the evaluation approaches used in this study are consistent with those used in ordinary geotechnical engineering studies, unexpected conditions may be encountered during construction. The nature and extent of variations between the explored locations may not become evident until site grading activities are underway or completed. We further recommend that Geo Cim be retained to observe geologic/geotechnical conditions during earthwork construction to help confirm that our assumptions and recommendations are valid, to verify general compliance with design concepts and recommendations, and to assist in the development of design changes should subsurface conditions differ from those anticipated at this time.

If any changes are planned in the nature, design, or location of the proposed development, the conclusions and recommendations presented in this report must be reviewed and modified in writing as applicable to the proposed changes. Geo Cim is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analysis presented herein by others without the express written authorization of Geo Cim, Inc. PSC.

We request to be kept informed on the progress of the design of this project and to be consulted if there are any questions as to the intent and general purpose of our recommendations. Likewise, we request to be informed of any changes in the scope of this project that may require a revision of these recommendations or need for additional recommendations.

Respectfully submitted,

GEO CIM – LUIS O. GARCIA & ASSOCIATES

LUIS O. GARCIA
INGENIERO LICENCIADO
LIC. 5534
PUERTO RICO

Luis O. García, PE, MSCE
Principal

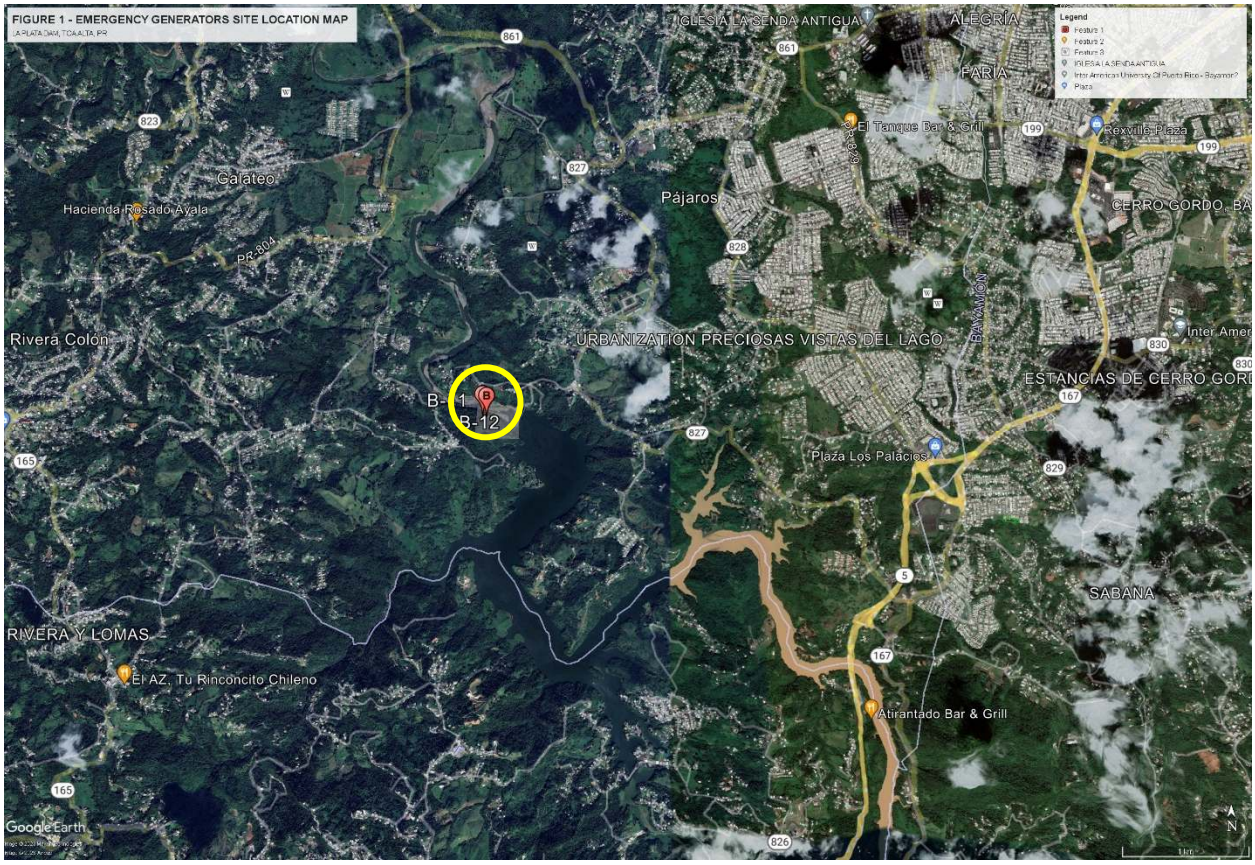
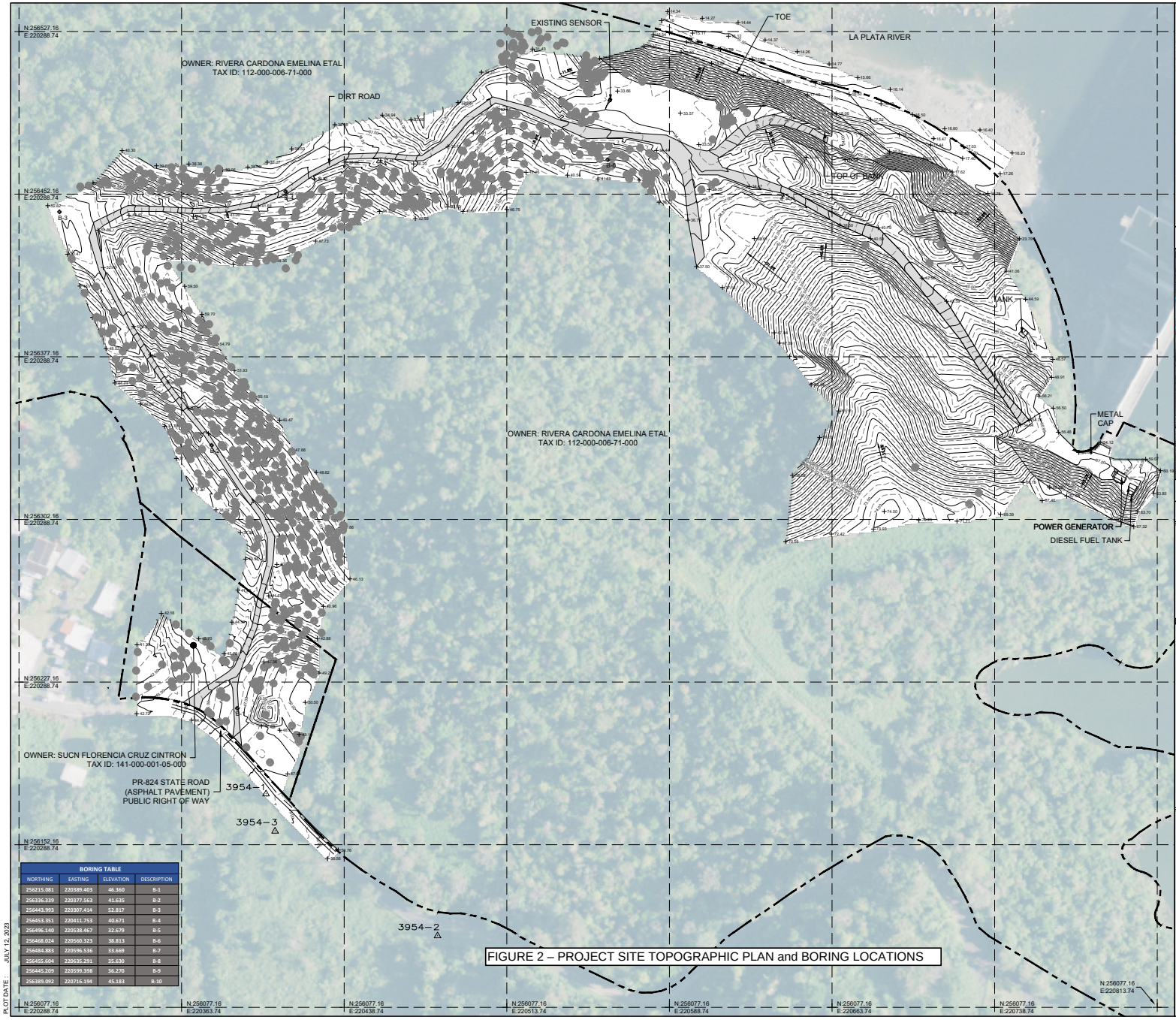
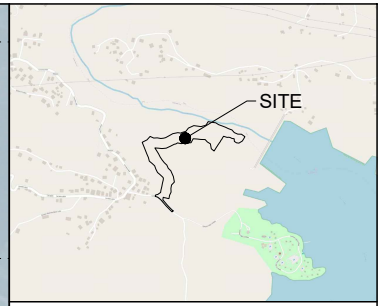



**Figure 1 – Emergency Generators Site Location Map**

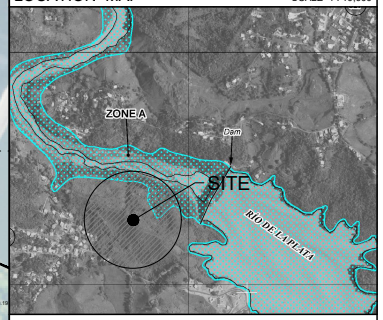



| BORING TABLE | | | |
|---|---|---|---|
| NORTHING | EASTING | ELEVATION | DESCRIPTION |
| 256215.081 | 220389.403 | 46.360 | B-1 |
| 256336.339 | 220377.563 | 41.635 | B-2 |
| 256443.993 | 220307.414 | 52.817 | B-3 |
| 256453.351 | 220411.753 | 40.671 | B-4 |
| 256496.140 | 220538.467 | 32.679 | B-5 |
| 256468.024 | 220560.323 | 38.813 | B-6 |
| 256484.883 | 220596.536 | 33.669 | B-7 |
| 256455.604 | 220635.291 | 35.630 | B-8 |
| 256445.209 | 220599.398 | 36.270 | B-9 |
| 256389.092 | 220716.194 | 45.183 | B-10 |

FIGURE 2 – PROJECT SITE TOPOGRAPHIC PLAN and BORING LOCATIONS




LOCATION MAP SCALE 1 : 10,000




FLOOD MAP SCALE 1 : 10,000

LEGEND:

CONTROL STATION
PROPERTY POINT
SANITARY SEWER MANHOLE
STORM SEWER MANHOLE
ELECTRIC UTILITY MANHOLE
TELEPHONE MANHOLE
WATER MANHOLE
HEAD WALL
CATCH BASINS
WATER METER
WATER VALVE
CONCRETE LIGHT POLE
CONCRETE POWER POLE
CONCRETE POWER & TELEPHONE POLE
UTILITY POLE
GUY POLE
WOODEN POWER/ TELEPHONE POLE
TELEPHONE POLE
WOODEN POWER POLE
WOODEN LIGHT POLE
NOT IN USE POLE
CAMERA POLE
METAL LIGHT POLE
METAL POWER POLE
ELECTRIC BOX
TWO SIDE METAL LIGHT POLE
STREET LIGHT POLE
TWO SIDE METAL LIGHT POLE
KM ID
SANITARY CLEAN OUT
FIRE HYDRANT
CURB INLET
PUBLIC TELEPHONE BOOTH
STREET LIGHT BOX
HANDICAP RAMP
SIGN
GUY CABLE
EXISTING TREE (3.0' DIAMETER BREAST HEIGHT)
EXISTING BUSH
EXISTING PALM TREE
VERTICAL PIPE
BOLLARD
GATE
IRON POST
CONCRETE MONUMENT
BITT
FIRE WATER NOZZLE
CONCRETE GUTTER
SANITARY SEWER LINE
STORM SEWER LINE
WATER LINE
TELEPHONE LINE
POWER LINE
CHAIN LINK FENCE
BARBED WIRE FENCE
UNDERGROUND POWER LINE
UNDERGROUND TELEPHONE LINE
GUARDRAIL
SPOT ELEVATIONS
EXISTING STRUCTURES
CONCRETE SLAB
METAL CAP
PAVEMENT PATCH
CONTOUR 1 METER INTERVAL
CONTOUR 0.5 METER INTERVAL
MONITORING WELL
BORING

GENERAL NOTES:

1. ALL DISTANCES ARE EXPRESSED IN METERS, UNLESS OTHERWISE NOTED.
2. FIELDWORK PERFORMED THRU MAY 29 THRU JULY 12, 2023.
3. HORIZONTAL CONTROLS ARE REFERRED TO NAD 83 (2011) EPOCH 2010.00.
4. VERTICAL DATUM IS REFERRED TO PRVD02.
5. PLEASE REFER TO SURVEY JEB-3954.
6. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULT OF THE SURVEY MADE ON THE DATE INDICATED AND CAN BE ONLY CONSIDERED AS AN INDICATION OF THE GENERAL CONDITIONS EXISTING AT THAT TIME.
7. CONTRACTOR SHALL VERIFY FIELD CONDITIONS AND MEASUREMENTS AND ADVISE ARCHITECT OR OWNER OF ANY DIFFERENCES.
8. PLANIMETRIC MAPPING ENHANCED WITH RECORD AERIAL MAPPING, SHOWN FOR REFERENCE PURPOSES. ONLY INFORMATION COLLECTED ON GROUND SHALL BE USED FOR ENGINEERING DESIGN.
9. UNDERGROUND UTILITIES ARE BASED ON ABOVE GROUND EVIDENCE. THIS DRAWING NEITHER DEPICTS NOR INTEND TO DEPICT ALL UNDERGROUND UTILITIES. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES PRIOR TO ANY WORK.

GRAPHIC SCALE

16 8 0 16 32 48

SCALE 1 : 800

SURVEY CONTROLS

| STA | COORDINATES | | ELEVATION | DESCRIPTION |
|---|---|---|---|---|
| | NORTHING | EASTING | | |
| 3954-1 | 256,175.561 | 220,402.661 | 48.372 | NAIL AND WASHER |
| 3954-2 | 256,110.141 | 220,481.776 | 58.476 | NAIL AND WASHER |
| 3954-3 | 256,158.377 | 220,406.840 | 51.151 | NAIL AND WASHER |

N
W E
S

| SYM. | REVISION | BY: | DATE: |
|---|---|---|---|
| | | | |

THE MATERIAL SHOWN HEREON IS PROPERTY OF JAVIER E. BIDOT ASSOCIATES, PSC AND SHALL NOT BE REPRODUCED IN WHOLE OR IN PART WITHOUT PERMISSION OF JAVIER E. BIDOT ASSOCIATES, PSC

JAVIER E. BIDOT ASSOCIATES, PSC
Land Surveyors & Geomatics
Apartado 1000 Toa Alta, PR 00954-1000
Phone: (787) 740-5456 Fax: (787) 740-6215
www.jebpsc.com

# EXISTING CONDITIONS SURVEY & TOPOGRAPHIC SURVEY

FOR PRASA EMERGENCY GENERATORS PROJECT

LOCATED LA PLATA DAM

MUNICIPALITY OF TOA ALTA, PUERTO RICO

| | |
|---|---|
| LAST DAY OF FIELD SURVEY | JULY 12, 2023 |
| DRAWN BY: | J.CAINS |
| CHECKED BY: | C. LEBRON |
| SCALE: | 1: 800 |

CERTIFY CORRECT

I, JAVIER E. BIDOT CRUZ, HEREBY CERTIFY THAT THIS PLAN IS AN EXACT AND TRUE GRAPHIC REPRESENTATION OF THE EXISTING CONDITIONS

JAVIER E. BIDOT CRUZ
LAND SURVEYOR LIC.NO. 12972

DRAWING TITLE:
EXISTING CONDITIONS & TOPOGRAPHIC SURVEY

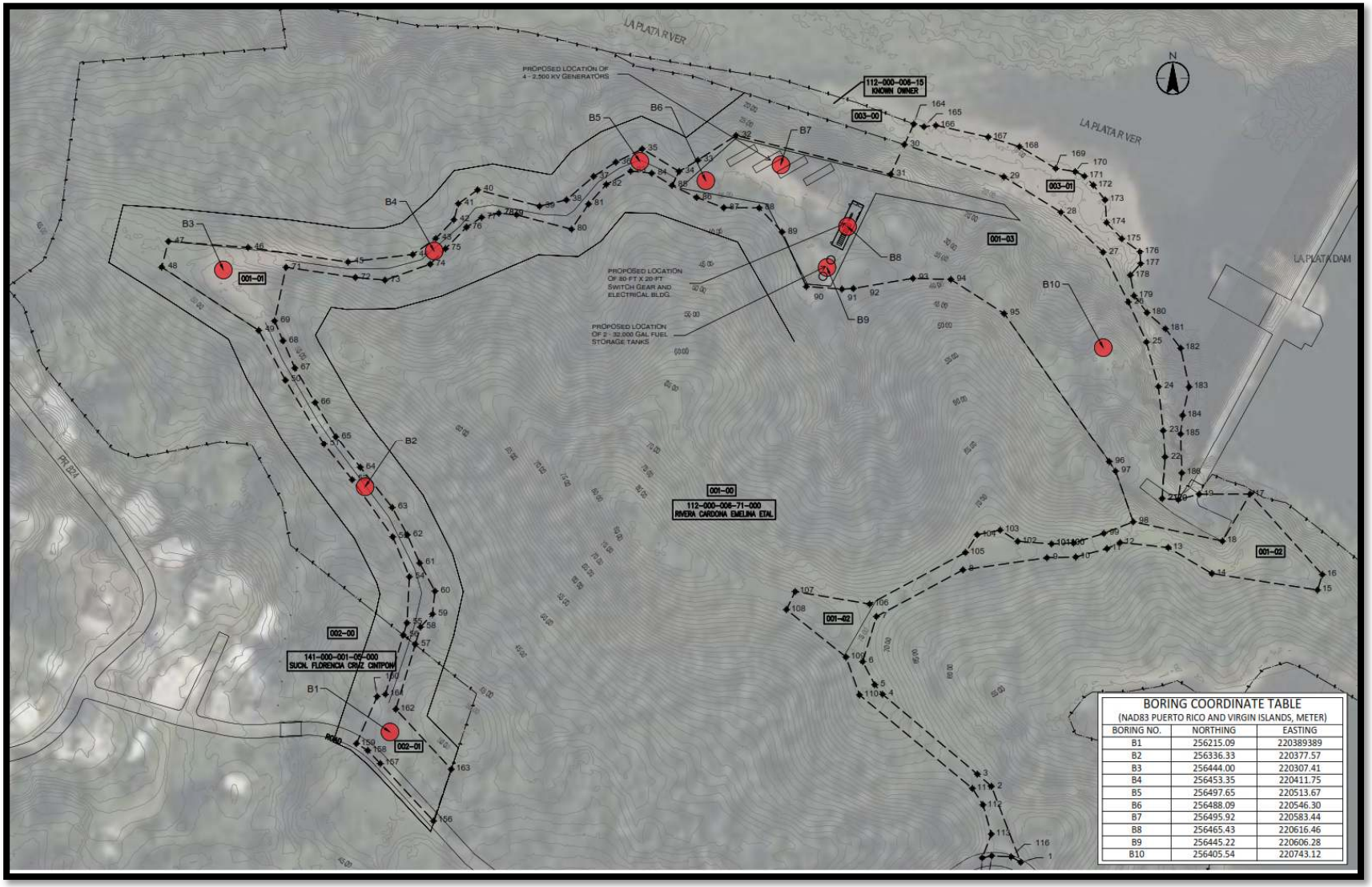
| DATE: | DWG. NO. | SHEET NO. |
|---|---|---|
| JULY 12, 2023 | VF-1 | 1 / 1 |
| PROJECT: JEB-3954 | | |

PAPER SIZE: 24x36

PLOT DATE: JULY 12, 2023

PLOT SCALE: 1:1

FILE NAME: 3954-EC




BORING COORDINATE TABLE
(NAD83 PUERTO RICO AND VIRGIN ISLANDS, METER)

| BORING NO. | NORTHING | EASTING |
|---|---|---|
| B1 | 256215.09 | 220389389 |
| B2 | 256336.33 | 220377.57 |
| B3 | 256444.00 | 220307.41 |
| B4 | 256453.35 | 220411.75 |
| B5 | 256497.65 | 220513.67 |
| B6 | 256488.09 | 220546.30 |
| B7 | 256495.92 | 220583.44 |
| B8 | 256465.43 | 220616.46 |
| B9 | 256445.22 | 220606.28 |
| B10 | 256405.54 | 220743.12 |

Figure 3 – Site Layout Plan and Boring Locations

GEOCIM, INC. PSC

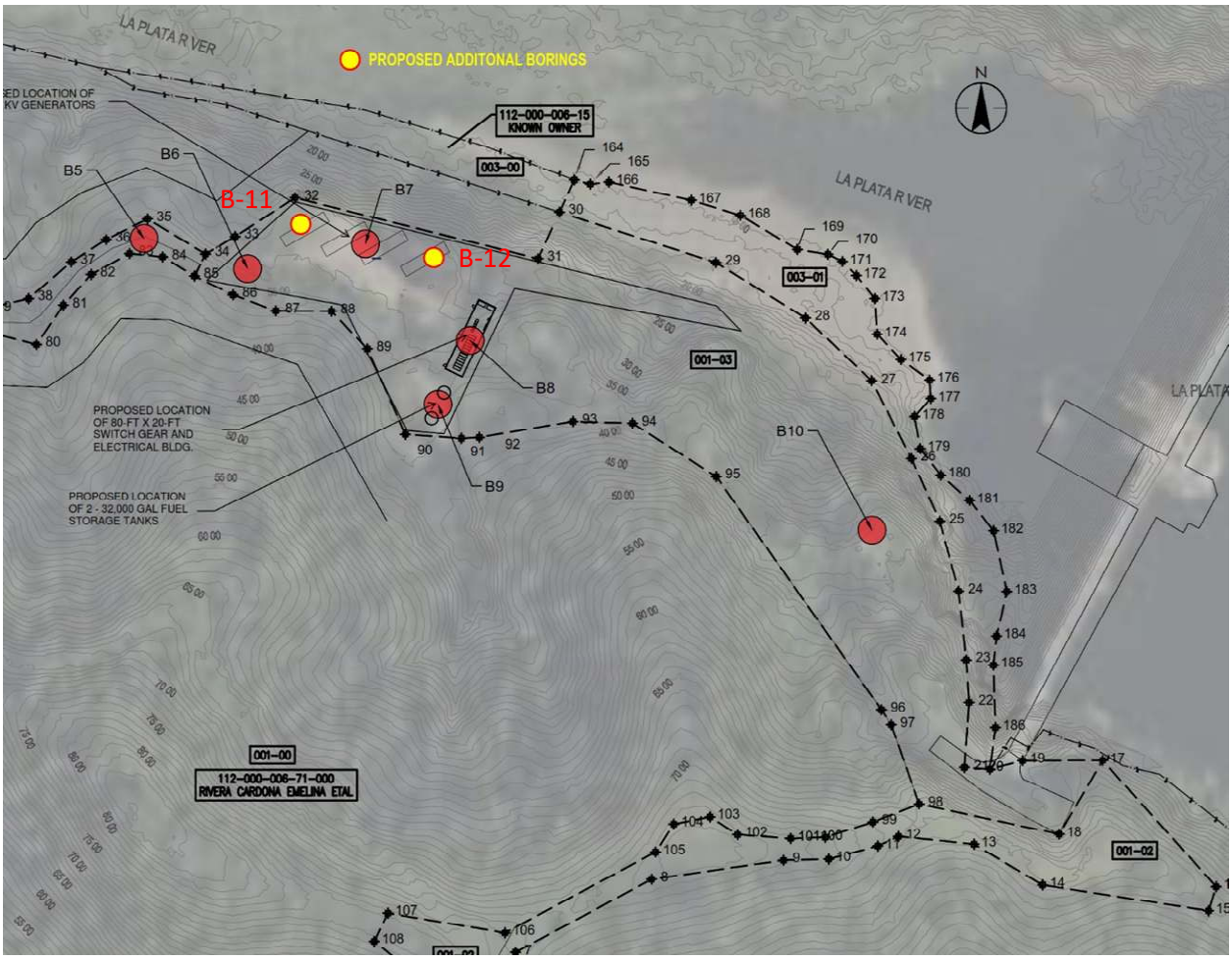



Figure 3a -Site Layout Plan and Boring Locations

**ADDITIONAL 2 BORING**

**B-11**

**LAT 18.343680°; LONG -66.238695°**

**B-12**

**LAT 18.343560° ; LONG -66.238383°**

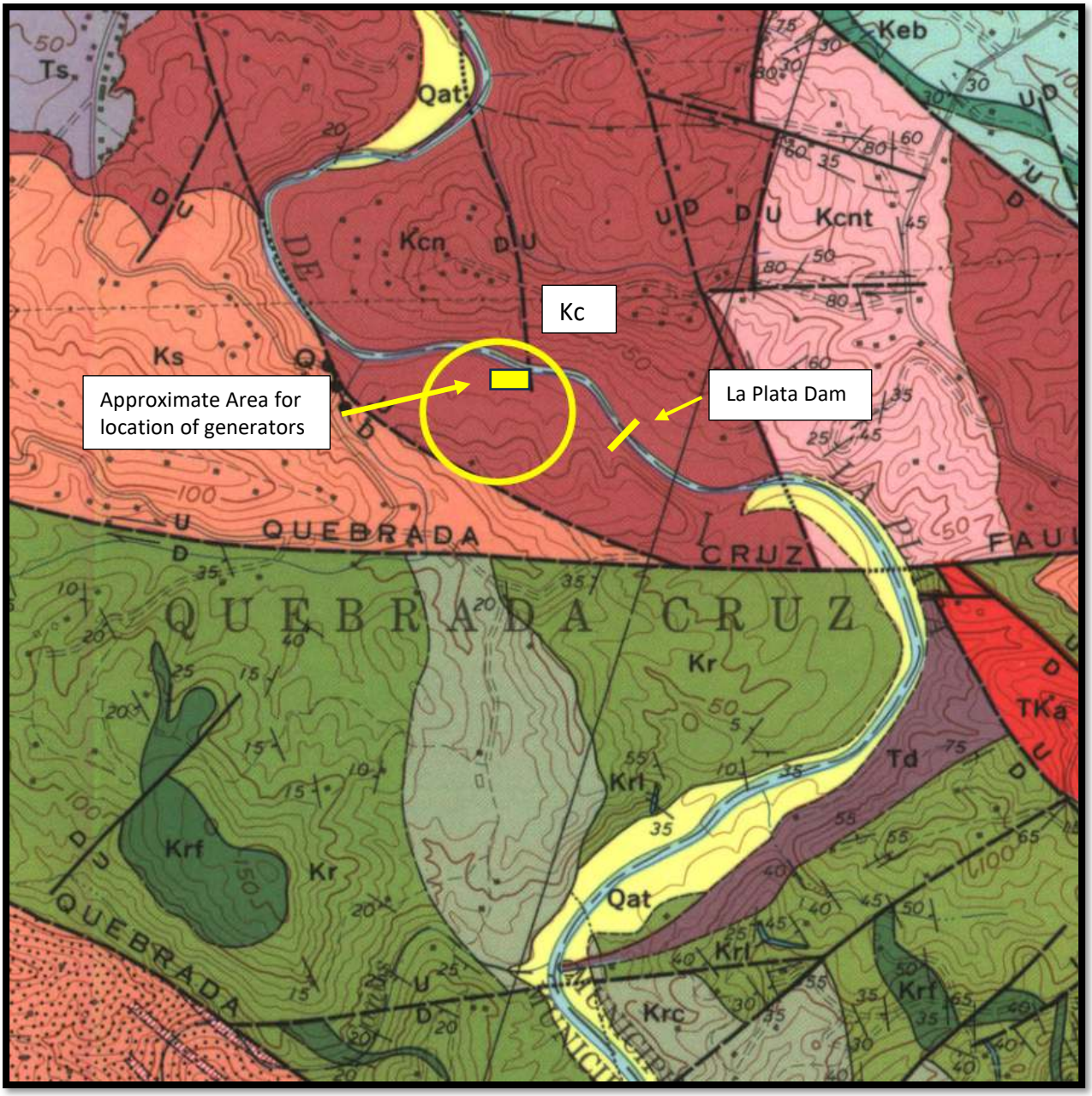



**Figure 4: Portion of the Naranjito geologic quadrangle map published by the USGS (by M. H. Pease, Jr., 1968) that shows the general geology of the area of the proposed location for the generators. The various map units are identified by different colors and letter symbols. The project site is underlain by unit Kcn which is described as Cancel Breccia of Upper Cretaceous age. North is up. The contour interval is 10 meters.**

# APPENDIX A

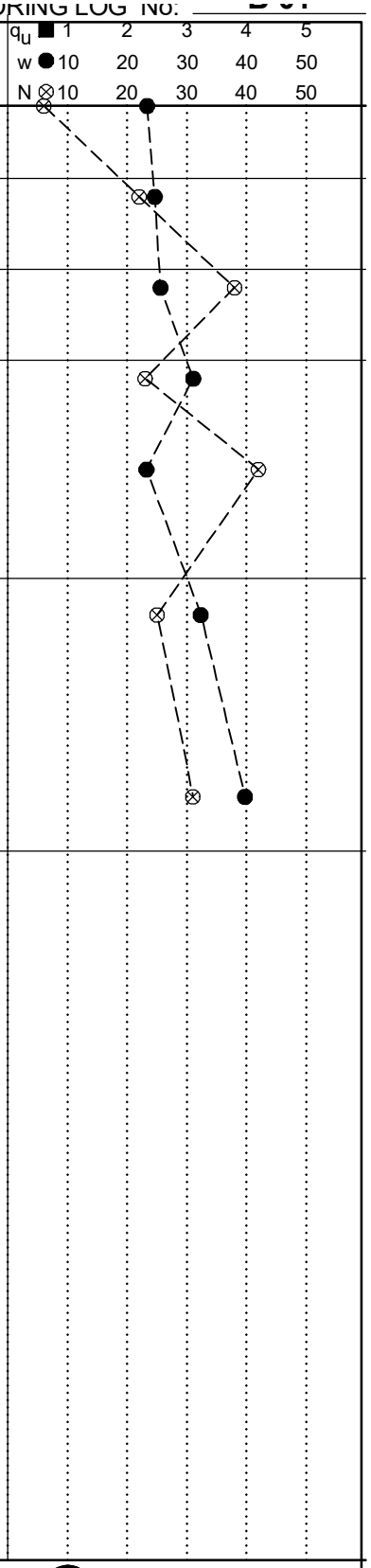
## BORING LOGS

## AND

## SOIL CLASSIFICATION TEST RESULTS

BORING LOG No. B-01

| DEPTH M FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | 4-2-4 | 6 | (3.0) | 23.3 | | | | Sandy Clay, yellowish brown, trace roots, trace gravel size pockets fragments, medium stiff. Pen. 2.5 |
| | | 5-10-12 | 22 | | 24.6 | | | | Sandy Silt, yellowish brown black veins, black oxidation stains, trace clay pockets, hard. Pen. 3.0 |
| 5 | | 16-16-22 | 38 | | 25.6 | | | | Sandy Silt, yellowish brown, oxidation strains, trace fine sand pockets, very stiff. |
| | | 6-9-14 | 23 | | 31.1 | | | | Sandy silt, yellowish brown black oxidation stains, trace fine sand pockets, very stiff. |
| 10 | | 12-17-25 | 42 | | 23.2 | | | | -same as above, saprolitic structure veins, hard. |
| 15 | | 9-11-14 | 25 | | 32.3 | | | | Sandy Silt, pale yellowish black veins, black oxidation stains, very stiff. 4.5+ |
| 20 | | 14-15-16 | 31 | | 39.7 | | | | -same as above, Pen. 3.75 |
| | | | | | | | | | END OF BORING B-01 AT 20.5 FEET DEPTH. |




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 7-19-23 | COMPLETED 7-19-23 | |
| ELEVATION TOP OF HOLE | 152.10 ft.46.360 M | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | N 256,215.1 E 220,389.4 | | |
| NAME OF DRILLER J. NIEVES | DRILLING RIG CME-45 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

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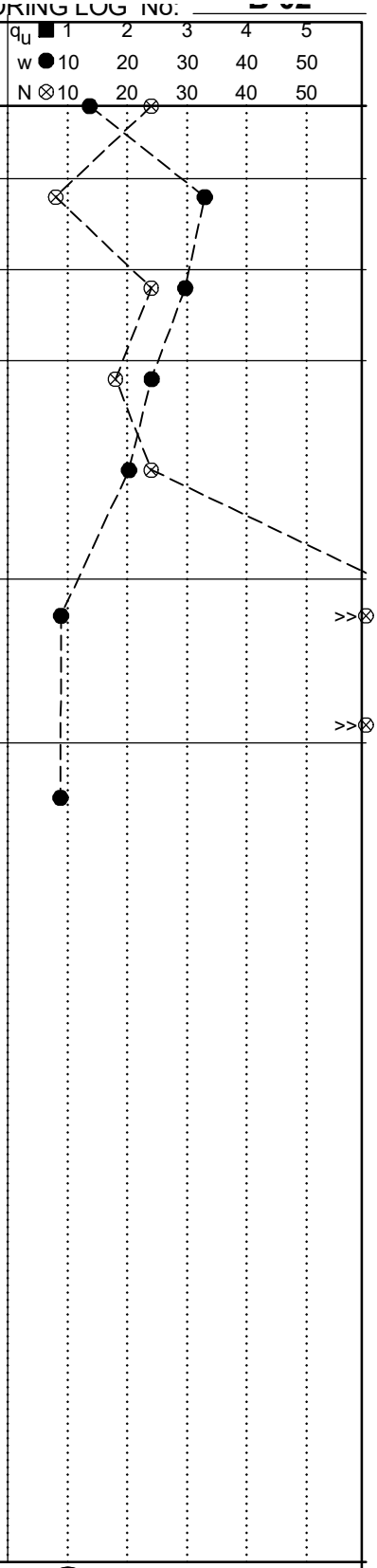
GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-01 |

BORING LOG No. B-02

| DEPTH M | DEPTH FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 13-15-9 | 24 | | 13.7 | | | | Silty Sand with gravel size rock fragments, brown, angular to subangular, medium dense. |
| | | | 2-3-5 | 8 | | 33.0 | | | | Sandy Silt, yellowish brown, trace gravel size rock fragments, medium stiff. |
| | 5 | | 3-10-14 | 24 | | 29.7 | | | | Sandy Clay, yellowish brown, pale yellowish brown, angular rock fragments, very stiff. |
| | | | 6-8-10 | 18 | | 24.1 | | | | Sandy Silt, pale yellowish brown, pale gray pockets, trace gravel size rock fragments, very stiff. |
| | 10 | | 8-10-14 | 24 | | 20.3 | | | | -as above, very stiff. |
| | 15 | | 30-45-30 | 75 | | 8.9 | | | | Weathered Rock sampled as gravel size angular to subangular rock fragments on silty sand matrix, very dense. |
| | | | 50/4" | 100 | | | | | | -same as above, weathered rock. |
| | | | | | | 8.8 | | | | END OF BORING B-02 AT 17.33 FEET DEPTH. |




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 7-20-23 | COMPLETED 7-20-23 | |
| ELEVATION TOP OF HOLE | 136.60 ft.41.635 M | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | N 256,336.3 E 220,377.6 | | |
| NAME OF DRILLER J. NIEVES | DRILLING RIG CME-45 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

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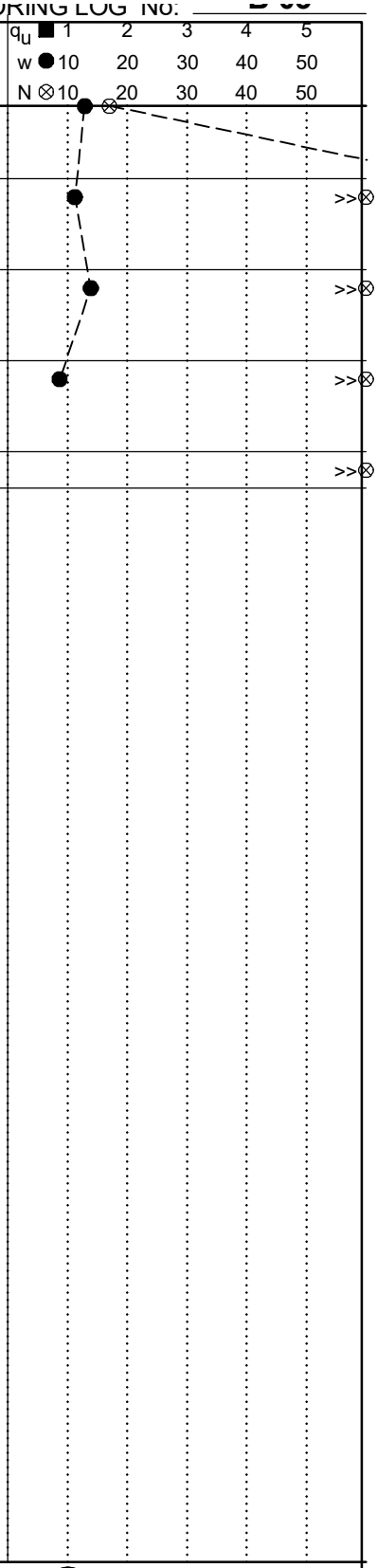
**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-02 |

BORING LOG No. B-03

| DEPTH M | DEPTH FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 5-13-17 | 17 | | 12.9 | | | | Silty Sand, yellowish brown, fine to medium grained, some sandy silt pockets, medium dense. |
| | | | 24-40-50 | 90 | | 11.2 | | | | Silty Sand with gravel size angular to subangular rock fragments, yellow brown, very dense. |
| 5 | | | 29-50-35/1" | 100 | | 13.9 | | | | Weathered rock sampled as gravel size angular to subangular rock fragments on silty sand matrix, Very dense. |
| | | | 50/5" | 100 | | 8.6 | | | | Silty Sand with gravel size rock fragments, pale yellow brown, angular to subangular, very dense. |
| 10 | | | 50/1" | 100 | | | | | | No Recover possible, Rock or hard formation could not drill deeper. |
| | | | | | | | | | | END OF BORING B-03 AT 10.08 FEET DEPTH. |




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED | COMPLETED | |
| ELEVATION TOP OF HOLE | 173.28 ft.52.817 M | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | N 256,444.0 E 220,307.4 | | |
| NAME OF DRILLER | DRILLING RIG | DRILL METHOD / SAMPLER | |
| J. NIEVES | CME-55 | / | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

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GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

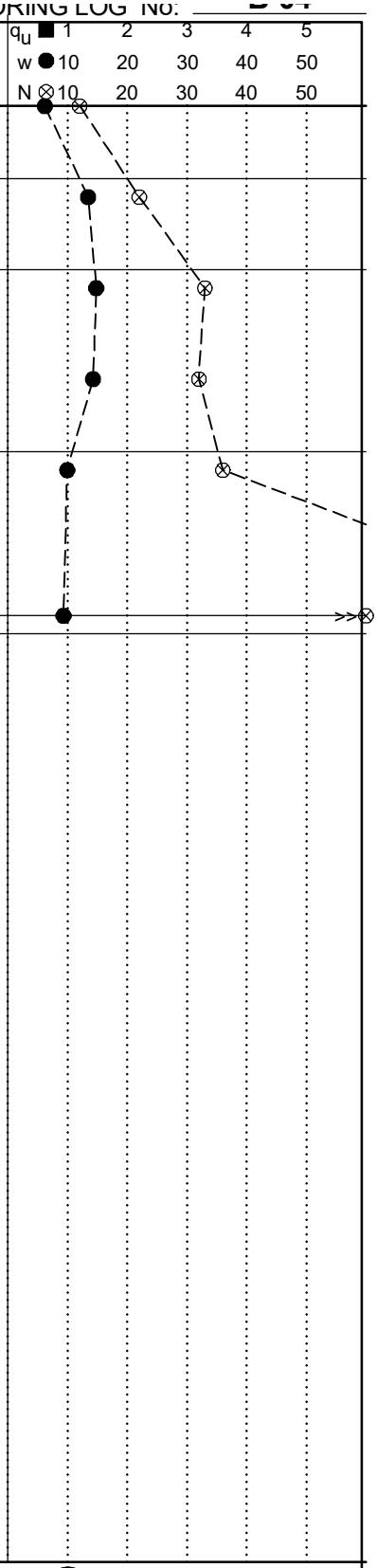
**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-03 |

BORING LOG No. B-04

| DEPTH M FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | 13-7-5 | 12 | | 6.2 | | | | Silty Sand, yellowish brown, fine to medium grained little gravel size angular to subangular rock fragments, medium dense. |
| | | 6-7-15 | 22 | | 13.4 | | | | Sandy Silt, yellowish brown, some gravel size rock fragments, stiff. |
| 5 | | 9-11-22 | 33 | | 14.8 | | | | Sandy Silt, yellowish brown black veins, _____ oxidation stains, trace fine sand pockets, hard. Pen. 3.0 |
| | | 15-15-17 | 32 | | 14.2 | | | | -same as above. |
| 10 | | 16-24-12 | 36 | | 9.9 | | | | Sandy Silt, yellowish brown, pale yellowish brown, trace silty sand pockets, black veins, oxidation stains, hard. |
| | | 35/1" | 100 | | 9.3 | | | | Weathered rock sampled as gravel size rock fragments. |

END OF BORING B-04 AT 14.08 FEET DEPTH.




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 7-20-23 | COMPLETED 7-20-23 | |
| ELEVATION TOP OF HOLE | 133.44 ft.40.671 M | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | N 256,453.4 E 220,411.8 | | |
| NAME OF DRILLER J. NIEVES | DRILLING RIG CME-45 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

GeoCim

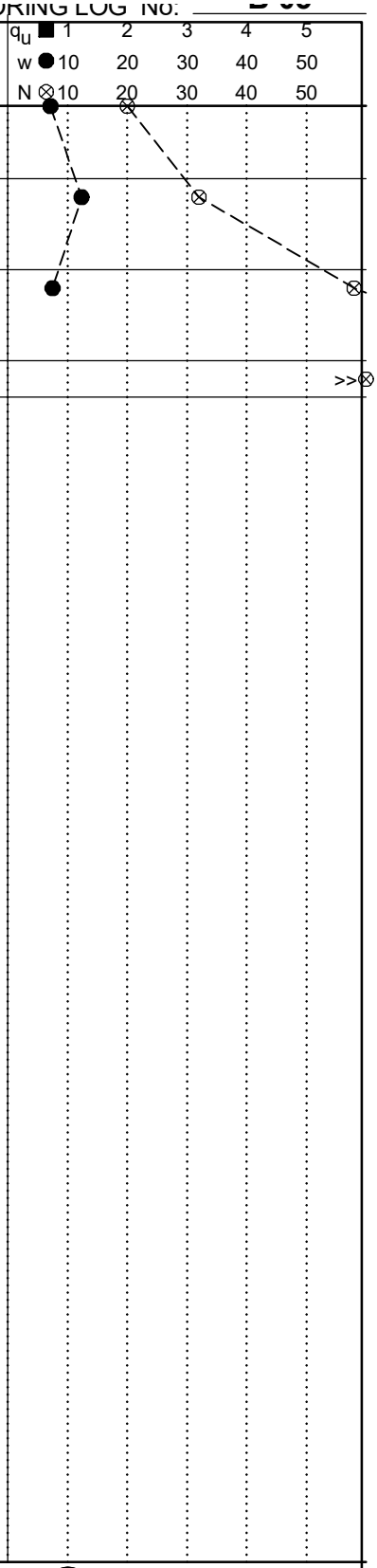
GEOTECNIA Y CIMIENTOS
GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-04 |

BORING LOG No. B-05

| DEPTH M | DEPTH FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 8-10-10 | 20 | | 7.1 | | | | Gravelly Sand, brown, medium to coarse grained angular to subangular, medium dense. |
| | | | 6-14-18 | 32 | | 12.3 | | | | Silty Sand, fine to medium grained, with gravel size rock fragments, brown, dense. |
| | 5 | | 10-19-39 | 58 | | 7.5 | | | | Silty Sand, reddish brown, with gravel size rock fragments, very dense. |
| | | | 50/1" | 100 | | | | | | Weathered Rock sampled as gravel size rock fragments, very dense. Could not drill deeper. |
| | 10 | | | | | | | | | END OF BORING B-05 AT 7.58 FEET DEPTH. |




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 7-20-23 | COMPLETED 7-20-23 | |
| ELEVATION TOP OF HOLE | 107.21 ft.32.679 M | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | N 256,496.1 E 220,538.5 | | |
| NAME OF DRILLER J. NIEVES | DRILLING RIG CME-45 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

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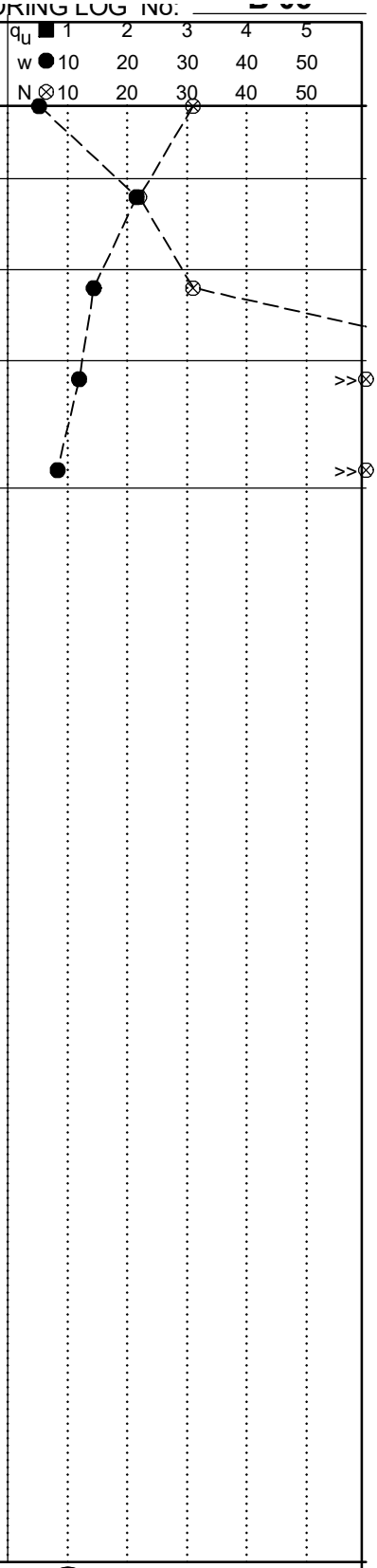
GEOTECNIA Y CIMIENTOS
GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-05 |

BORING LOG No. B-06

| DEPTH M | DEPTH FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 11-15-16 | 31 | | 5.2 | | | | Gravelly Sand, dark grayish brown, medium grained angular _____, dense. |
| | | | 7-9-13 | 22 | | 21.5 | | | | Sandy Clay, dark brown, _____ fine grained sand pockets, very stiff. |
| | 5 | | 12-14-17 | 31 | | 14.4 | | | | Silty Sand, purple brown, fine to medium grained trace sandy silt, dense. |
| | | | 50/6" | 100 | | 11.9 | | | | Weathered Rock sampled as gravel size rock fragments with sand, very dense. |
| | 10 | | 50/5" | 100 | | 8.3 | | | | -same as above, very dense. |
| | | | | | | | | | | END OF BORING B-06 AT 10.42 FEET DEPTH. |




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 7-20-23 | COMPLETED 7-20-23 | |
| ELEVATION TOP OF HOLE | 127.34 ft.38.813 M | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | N 256,468.0 E 220,560.3 | | |
| NAME OF DRILLER Carlos Calderón | DRILLING RIG CME-55 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

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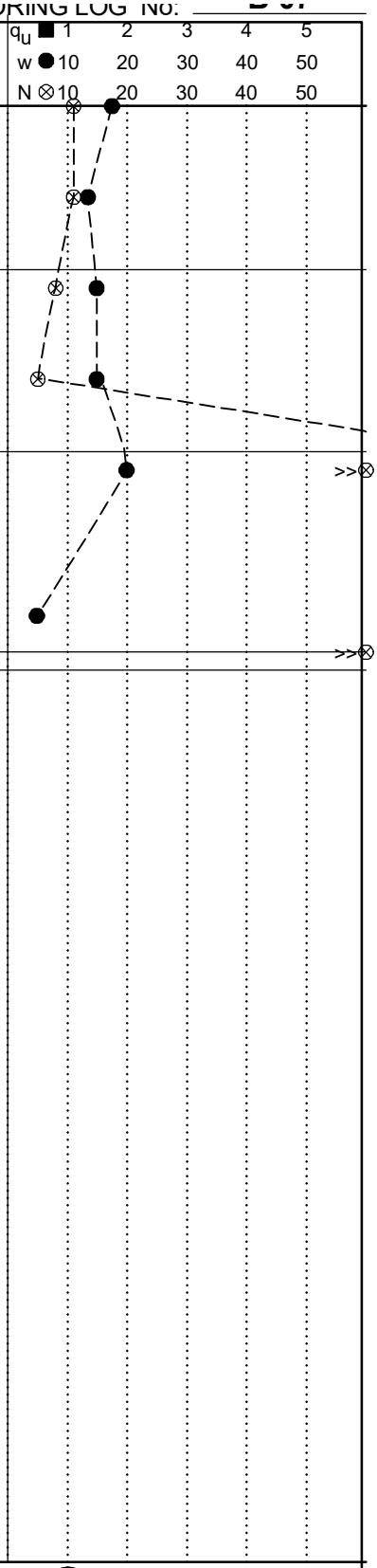
GEOTECNIA Y CIMIENTOS
GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-06 |

BORING LOG No. B-07

| DEPTH M | DEPTH FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2-4-7 | 11 | | 17.4 | | | | Clayey Sand, dark brown, some gravel size rock fragments, angular to subangular, medium dense. |
| | | | 7-6-5 | 11 | | 13.4 | | | | -same as above, some oxidation stains, medium dense. |
| 5 | | | 7-5-3 | 8 | | 14.9 | | | | Clayey Sand, dark brown with gravel size rock fragments, oxidation stains, brown. |
| | | | 2-3-2 | 5 | | 14.9 | | | | -same as above, _____ . |
| 10 | | | 3-50/5" | 100 | (2.0) | 19.9 | | | | Top: Sandy silt, purple brown, trace silty sand pockets; Bottom: rock fragments. |
| | | | | | | 4.8 | | | | |
| 15 | | | 50/2" | 100 | | | | | | Weathered Rock sampled as gravel size rock fragments, purple brown, very dense. |
| | | | | | | | | | | END OF BORING B-07 AT 15.17 FEET DEPTH. |




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 7-20-23 | COMPLETED 7-20-23 | |
| ELEVATION TOP OF HOLE | 110.46 ft.33.669 M | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | N 256,484.9 E 220,596.5 | | |
| NAME OF DRILLER Carlos Calderón | DRILLING RIG CME-55 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

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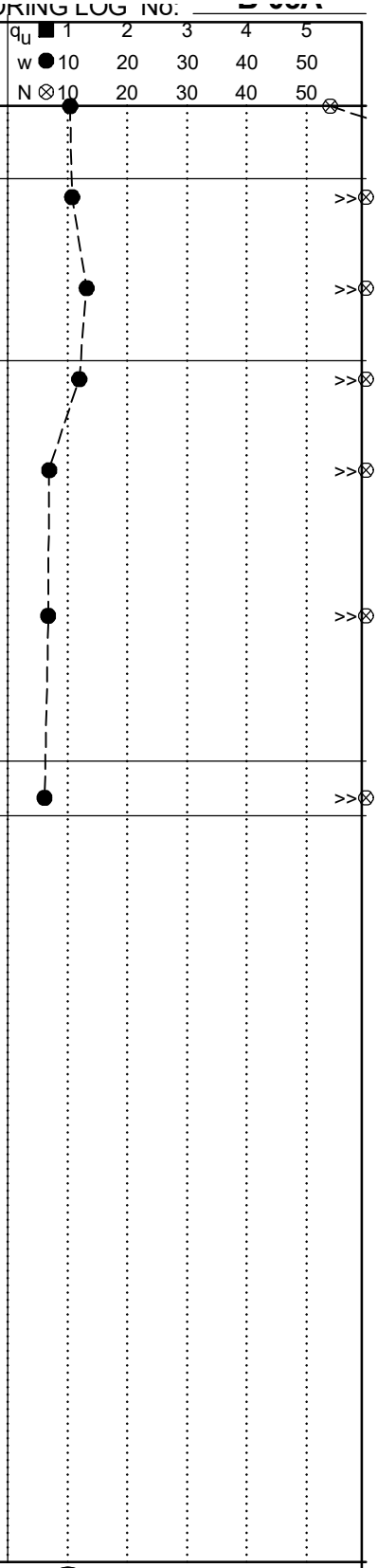
GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-07 |

BORING LOG No. B-08A

| DEPTH M | DEPTH FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 16-22-32 | 54 | | 10.4 | | | | Silty Sand, dark yellowish brown, fine to medium grained, trace rock fragments, very dense. |
| | | | 40-50/4" | 100 | | 10.7 | | | | Silty Sand, dark yellowish brown, fine to medium grained, trace rock fragments, angular, very dense. |
| | 5 | | 16-33-43 | 76 | | 13.2 | | | | -same as above, very dense. |
| | | | 42-50/5" | 100 | | 11.9 | | | | Weathered Rock sampled as gravel size angular to subangular rock fragments on s silty sand matrix, saprolitic status, veins black, oxidation stains, very dense. |
| | 10 | | 50/5" | 100 | | 6.9 | | | | -same as above. |
| | 15 | | 50/4" | 100 | | 6.7 | | | | -same as above. |
| | 20 | | 50/6" | 100 | | 6.1 | | | | Weathered Rock sampled as gravel size angular to subangular rock fragments, dark yellow brown, very dense. |
| | | | | | | | | | | END OF BORING B-08A AT 19.5 FEET DEPTH. |




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 7-19-23 | COMPLETED 7-19-23 | |
| ELEVATION TOP OF HOLE | 116.90 ft.35.630 M | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | N 256,455.6 E 220,635.3 | | |
| NAME OF DRILLER Carlos Calderón | DRILLING RIG CME-55 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

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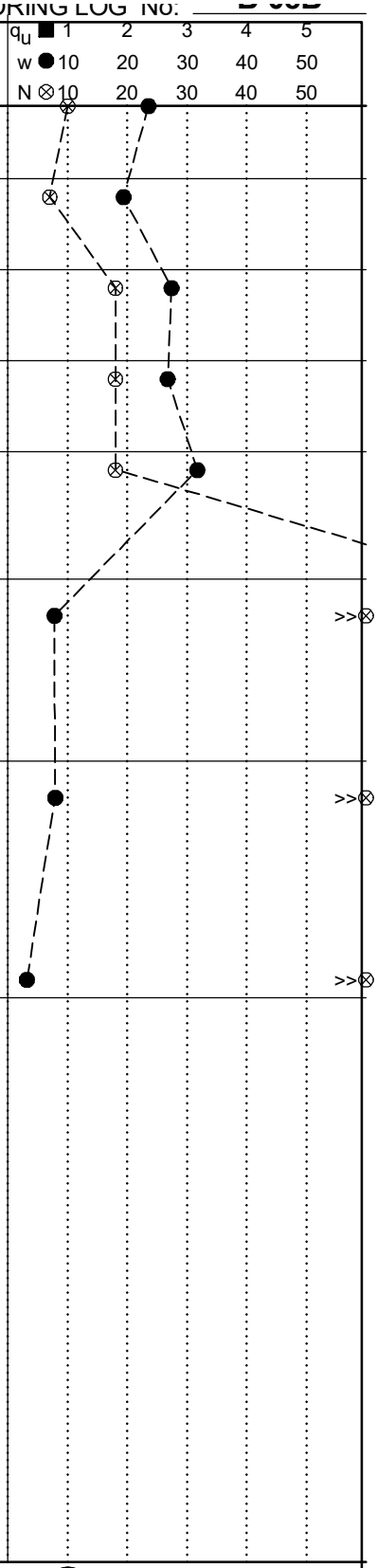
GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-08A |

BORING LOG No. B-08B

| DEPTH M FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | 3-3-7 | 10 | | 23.5 | | | | Sandy Silt, dark brown, trace fine silty sand pockets, stiff. Pen. 3.0 |
| | | 3-3-4 | 7 | | 19.4 | | | | Silty Sand, dark brown, fine grained, some sandy silt pockets, loose. |
| 5 | | 4-7-11 | 18 | | 27.4 | | | | Sandy Clay, dark brown, trace sand pockets, very stiff. Pen. 3.0 |
| | | 4-9-9 | 18 | | 26.8 | | | | Silty Sand, dark brown _____, dark yellow _____, with sandy silt pockets, black veins, medium dense. |
| 10 | | 3-7-11 | 18 | 3.56 | 31.7 | | | | clay, dark brown, dark yellowish brown, very stoff. Pen. 4.0 |
| 15 | | 50/3" | 100 | | 7.8 | | | | Weathered Rock sampled as gravel size angular to subangular rock fragments, grayish brown, very dense. |
| 20 | | 50/3" | 100 | | 7.9 | | | | Weathered Rock sampled as gravel size angular to subangular rock fragments on a silty sand matrix, very dense, dark yellow brown. |
| 25 | | 50/6" | 100 | | 3.2 | | | | -same as above, weathered rock. END OF BORING B-08B AT 24.5 FEET DEPTH. |




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 7-19-23 | COMPLETED 7-19-23 | |
| ELEVATION TOP OF HOLE | ft. | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | | | |
| NAME OF DRILLER Carlos Calderón | DRILLING RIG CME-55 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

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GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

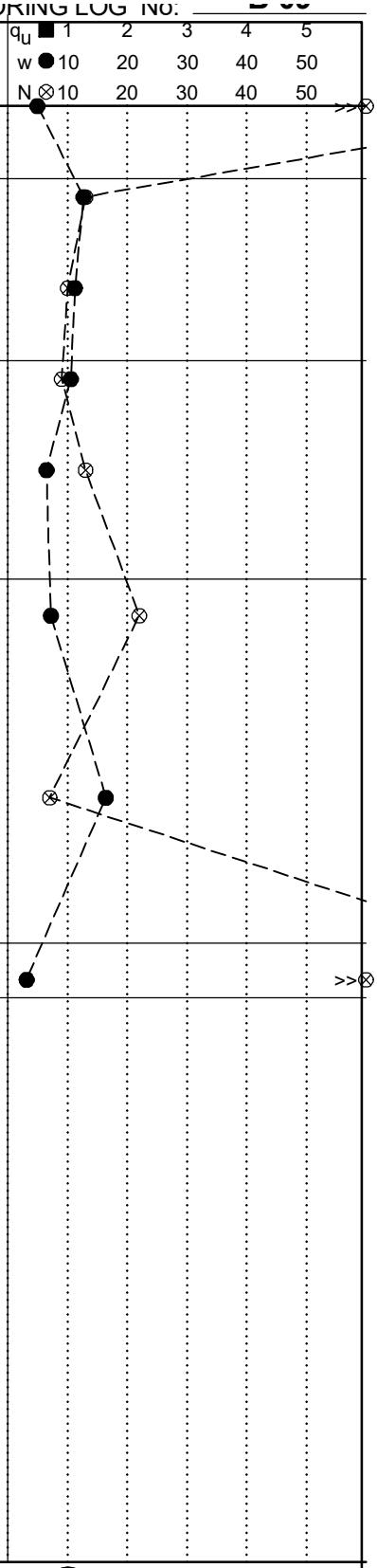
**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-08B |

BORING LOG No. B-09

| DEPTH M | DEPTH FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 16-50/6" | 100 | | 4.9 | | | | Gravel size angular to subangular rock fragments with silty sand, very dense, brown. |
| | | | 6-6-7 | 13 | | 12.7 | | | | Clayey Sand, very dark grayish brown, some gravel size rock fragments, medium dense. |
| 5 | | | 3-4-6 | 10 | | 11.2 | | | | -same as above. |
| | | | 3-4-5 | 9 | | 10.5 | | | | Silty Sand, dark grayish brown, medium to dense grained with gravel size rock fragments, loose. |
| 10 | | | 5-6-7 | 13 | | 6.4 | | | | -same as above, medium dense. |
| 15 | | | 16-16-6 | 22 | | 7.2 | | | | Silty Sand, grayish brown, medium to coarse grained with gravel size rock fragments, medium dense. |
| 20 | | | 4-5-2 | 7 | | 16.4 | | | | -same as above, loose. |
| | | | 50/2" | 100 | | 3.1 | | | | Weathered rock sampled as gravel size angular to subangular rock fragments, very dense. |

END OF BORING B-09 AT 24.17 FEET DEPTH.




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 7-20-23 | COMPLETED 7-20-23 | |
| ELEVATION TOP OF HOLE | 119.00 ft.36.270 M | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | N 256,445.2 E 220,599.4 | | |
| NAME OF DRILLER Carlos Calderón | DRILLING RIG CME-55 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

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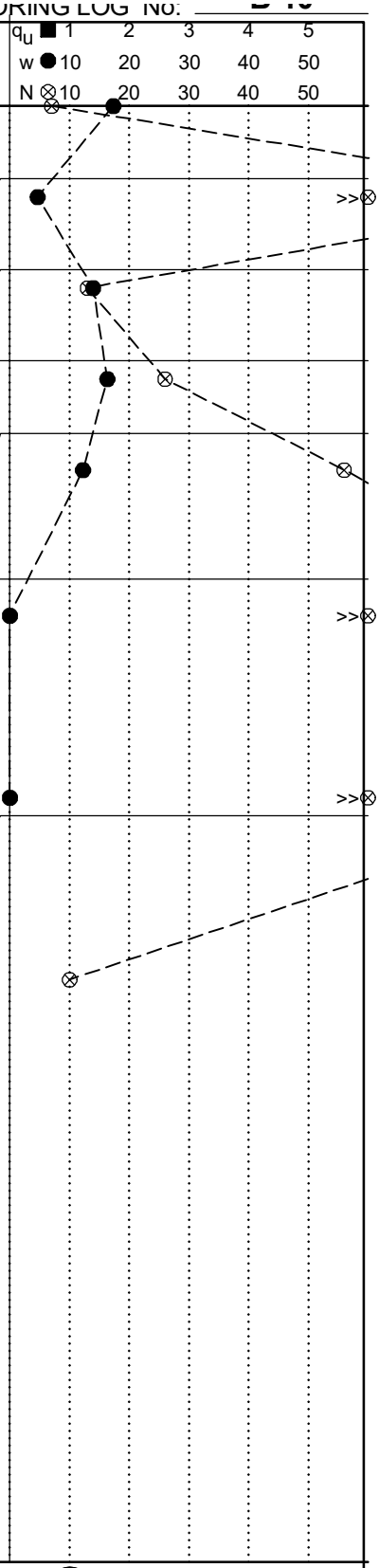
GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-09 |

BORING LOG No. B-10

| DEPTH M | DEPTH FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3-3-4 | 7 | | 17.3 | | | | Gravel size rock fragments on a clayey sand matrix, angular, dark yellowish brown, loose. |
| | | | 50/6" | 100 | | 4.6 | | | | Gravel size angular to subangular rock fragments, grayish brown, very dense. |
| 5 | | | 6-6-7 | 13 | | 13.9 | | | | Sandy Silt, pale brown, trace fine silty sand pockets, stiff. |
| | | | 10-13-13 | 26 | | 16.3 | | | | Silty Sand, very fine grained pale yellowish brown, trace sandy silt pockets, medium dense. |
| 10 | | | 11-21-35 | 56 | | 12.2 | | | | silty Sand, pale yellowish brown, fine to medium grain, trace rock fragments, angular, very dense. |
| 15 | | | 50/6" | 100 | | 0.0 | | | | Weathered Rock sampled as gravel size angular to subangular on a silty sand matrix. |
| 20 | | | 50/2" | 100 | | 0.0 | | | | -same as above. |
| | | | | | | | | | | END OF BORING B-10 AT 19.17 FEET DEPTH. |
| 25 | | | 50/2 | 10 | | | | | | |




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 7-19-23 | COMPLETED 7-19-23 | |
| ELEVATION TOP OF HOLE | 148.24 ft.45.183 M | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | N 256,389.1 E 220,716.2 | | |
| NAME OF DRILLER Carlos Calderón | DRILLING RIG CME-55 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

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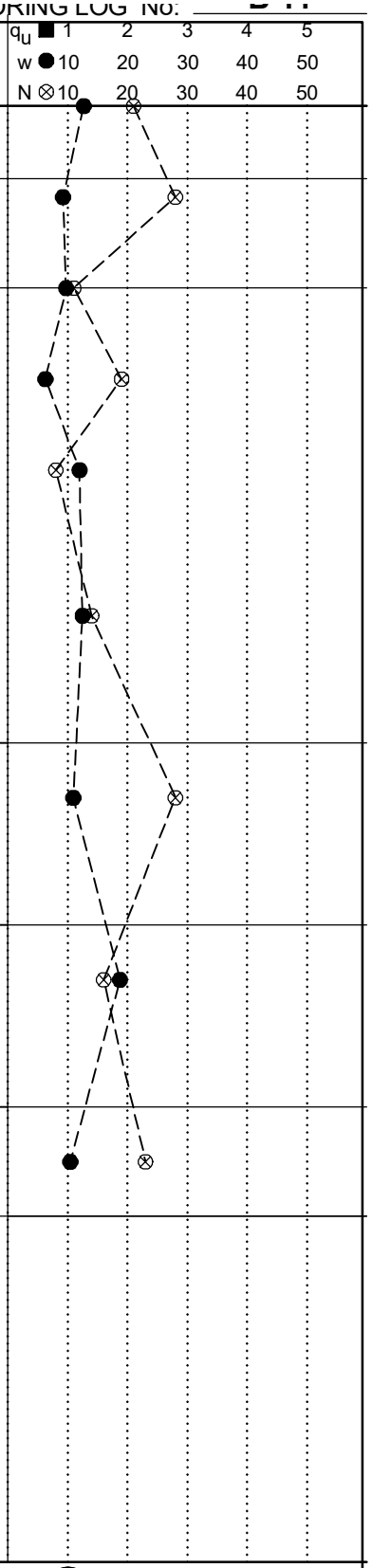
GEOTECNIA Y CIMIENTOS
GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-10 |

BORING LOG No. B-11

| DEPTH M FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | 3-11-10 | 21 | | 12.7 | | | | Topsoil: Dark brown, trace roots, brown, clayey sand, dark brown medium grained medium tan. |
| | | 10-15-13 | 28 | | 9.2 | | | | Top Sandy Silt, grayish brown, bottom, silty sand, grayish brown, fine to medium grained trace gravel site rock fragments, fill from site. |
| 5 | | 6-5-6 | 11 | | 9.7 | | | | Silty Sand, dark brown, ocassionally gravelly angular to subangular rock fragments, medium dense. |
| | | 25-13-6 | 19 | | 6.3 | | | | Silty Sand, grayish brown fine to medium grained; little gravel size angular rock fragments, medium dense. |
| 10 | | 5-3-5 | 8 | | 12.0 | | | | Clayey Sand, dark grayish brown, medium grained little gravel size angular rock fragments, loose. |
| 15 | | 4-7-7 | 14 | | 12.5 | | | | -same as above clayey sand, medium dense. |
| 20 | | 8-9-19 | 28 | | 10.9 | | | | Silty Sand, dark grayish brown, fine to red grained some gravel size rock fragments, angular medium dense. |
| 25 | | 7-8-8 | 16 | | 18.7 | | | | Sandy Silt, yellowish brown trace fine sand pocket, saprolitic, very stiff. |
| 30 | | 8-8-15 | 23 | | 10.4 | | | | Sandy Silt, clay yellowish brown, little silty sand, fine grained trace gravel size rock fragments. |
| | | | | | | | | | END OF BORING NO. B-11 AT 30.5 FEET DEPTH. |




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 8-7-23 | COMPLETED 8-7-23 | |
| ELEVATION TOP OF HOLE | ft. | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | | | |
| NAME OF DRILLER Carlos Calderón | DRILLING RIG CME-55 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

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GEOTECNIA Y CIMIENTOS
GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

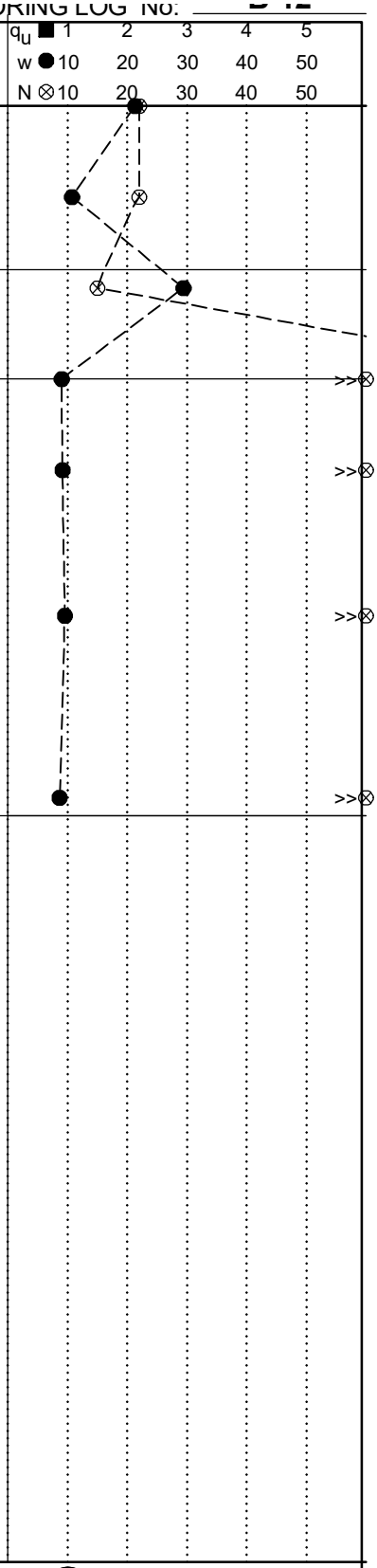
**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-11 |

BORING LOG No. B-12

| DEPTH M FT | SAMPLE NO. | BLOWS ON SAMPLER | N | $q_u$ | $w_n$ | LL | PI | Symbol | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| | | 5-13-9 | 22 | | 21.3 | | | | Sandy Clay, dark brown dark yellowish brown, some silty sand pockets very stiff. |
| | | 11-13-9 | 22 | | 10.7 | | | | Sandy Silt, dark brown, trace gravel size angular rock fragments, very stiff. |
| 5 | | 5-5-10 | 15 | | 29.4 | | | | Clay, dark yellowish brown, sandy clay pockets, very stiff. Pen 4.5+ |
| | | 21-50/6" | 100 | | 9.0 | | | | Sandy Silt, yellowish brown black mottled, oxidation stains, trace fine gravel size rock fragments hard. |
| 10 | | 50/6" | 100 | | 9.1 | | | | Weathered rock, silty sand, fine grained, with gravel size angular to subangular rock fragments, yellowish brown hard. |
| 15 | | 50/6" | 100 | | 9.5 | | | | Weathered rock sampled as: Silty Sand with gravel size angular to subangular rock fragments, very dense. |
| | | 50/4" | 100 | | 8.6 | | | | -same as above very dense. |

END OF BORING NO. B-12 AT 19.33 FEET DEPTH.




| | | | |
|---|---|---|---|
| DATE HOLE | STARTED 8-7-23 | COMPLETED 8-7-23 | |
| ELEVATION TOP OF HOLE | ft. | | |
| ELEVATION GROUND WATER | ft. | | |
| LOCATION (Coordinates or Station) | | | |
| NAME OF DRILLER Carlos Calderón | DRILLING RIG CME-55 | DRILL METHOD / SAMPLER SPT-A/ | |

| | | | |
|---|---|---|---|
| $w_n$ | WATER CONTENT IN % | $q_u$ | ( ) PENETROMETER, TSF |
| N | BLOWS FROM S. P. T. (ASTM D-1586) | LL | LIQUID LIMIT IN % |
| $q_u$ | UNCONFIED COMPRESSIVE STRENGTH, TSF | PL | PLASTIC LIMIT IN % |
| ▼ | WATER TABLE OR PHREATIC LEVEL | PI | PLASTICITY INDEX IN % |

GeoCim
GEOTECNIA Y CIMIENTOS
GEOTECHNICAL TESTING SERVICES
AMELIA IND PARK, EMMA ST. 26A, GUAYNABO, PR 00968

**RIO LA PLATA DAM EMERGENCY GENERATORS, TOA ALTA , PR**

| APPROVED | PROJECT No. 5900 | BORING No. |
|---|---|---|
| | 1 OF 1 SHEETS | B-12 |

# APPENDIX B

## DRILLING AND LABORATORY SOIL TEST PROCEDURES

## Appendix B

## DRILLING AND LABORATORY SOIL TEST PROCEDURES

### I. DRILLING METHODS

A. Hollow Stem Auger Boring - Dry Sample method (ASTM-D-1452)

In the auger method, borings are advanced by turning a hydraulic powered auger into the ground in 5 feet increments or less. As the auger penetrates the cuttings rise to the surface on the spirals. The depth from which the material comes, however, cannot be accurately determined. Therefore, soil samples are not taken from the spiral augers. With the use of a hollow stem auger, a sampling apparatus may be inserted in the hollow stem to the bottom of the auger, eliminating the need for casings. The sampling procedures are described in the following paragraphs. Geo Cim, Inc. normally uses CME (Central Mining Equipment) drilling rigs which are trailer mounted and pulled with a 4x4-wheel drive F-350 or equivalent truck. The drilling rigs are either CME-45 or CME-55 models.

B. Wash Boring - Dry Sample Method

For inaccessible locations, a portable drilling unit is used which consists of a tripod mounted motorized cathead which is used to drive casings and sampling rods to conduct this method of drilling. Borings are advanced into the ground by the wash-boring-dry sample method. The borings are normally cased through most of this length by the drop of either a 350 or 140 lbs. hammer from a height of 30 inches. The casing diameter is 2-1/2 inches. The number of blows for every foot of penetration the casing advanced is recorded and is reported in the boring logs. When driving of the casing becomes too difficult due to the hardness of the soils encountered, and the hole does not cave-in, the boring may be advances without casing by continuous washing out of the soils with the drill rods. The color and nature of the soil washed out (gravel, sand, silt, or clay) is examined and recorded to determine the extent of each soil strata. This is complemented with the sampling operations which are regularly done every five feet.

C. Core Borings (ASTM-D-2113)

Core Borings are used when necessary to penetrate rock and obtain a continuous rock sample. The sample is obtained by means of a core barrel which is attached to the drill rods. At the end of the core barrel is a special bit studded with industrial diamonds which cuts into the rock. The drill rod, and hence the core barrel and diamond bit are rotated as downward pressure is applied. As the bit cuts into the rock, the rock core is free to move into the inner core barrel head, which is suspended on a swivel and therefore does not follow the motion of the outer core barrel with its bit. Cooling water or bentonite slurry is circulated through the drill rod and the core barrel. Penetration depends on the length of the core barrel and the quality of the rock (amount of joints or fractures). Rock discontinuities such as joints and fractures affect the length of penetration in

each core run. The runs are longer as the rock quality increases. As the core barrel is withdrawn, the core lifter, located inside the diamond bit, wedges itself around the bottom of the rock core and thus permits it to be pulled free from the underlying rock. The two most common core sizes are NWM which produces a core of 2.15 inches diameter and HWM which produces a core 3.00 inches in diameter.

## II. SAMPLING IN SOILS

### A. Standard Penetration Test (ASTM-D-1586)

The standard penetration tests are made with a split-spoon sampler 2.0 inches/O.D. diameter, 1,375 inches I.D. diameter, 18 inches long. The sampler is driven into the ground by the drop of a 140 pounds hammer from a height of 30 inches. The number of blows from the three consecutive six inches of penetration of the sampler is recorded and the number of blows for the last foot of penetration is reported as the N-value. The samples are stored and sealed in glass jars for future classification tests in the laboratory.

The standard penetration test has been correlated with the consistency of fine-grained soils and with the angle of internal friction or the relative density of sands. Such correlations can be used for preliminary estimates and to aid in the stratigraphic classification of the soil strata at a given site.

In the case of fine-grained soils, the correlations of the SPT with the undrained shear strength of medium and stiff silts and clays of low sensitivity have been found to be good; however, in the case of the soft silts and clays the SPT gives poor estimates of the undrained shear strength. Testing in undisturbed samples and vane shear tests are recommended in such cases.

### B. Undisturbed Sampling

Undisturbed Samples are obtained using thin wall brass or zinc coated steel shelby tubes 2" to 3"O.D. by 24" to 30" long. The sampler is forced to penetrate the soil by static force or downward pressure and is pulled out also using static pull. The samplers are sealed in the field and shipped to the laboratory where the samples are extruded at the time of testing by pushing in the same direction that the sample penetrated the sampler. Particular care is taken in packing and handling these samples to avoid disturbance.

## III. LABORATORY TESTING

### A. Atterberg Limits (ASTM-D-2166)

The Atterberg limits and related indices are very commonly used in soil mechanics works for soil identification and classification purposes. They are also used in connection with some semi-empirical methods of design for preliminary estimates.

B. Unconfined Compression Test (ASTM-D-2166)

The best quality samples recovered in the split-spoon sampler are subjected to unconfined compression to failure. These samples cannot be regarded as "undisturbed," and the strengths obtained are lower than the "true" in-situ value because of disturbances and sensitivity of the soil. Furthermore, increased brittleness of friability of the soil structure results in strength values lower than the in-situ undrained strength. Therefore, the unconfined strength values measured in the split-spoon samples are used only as an index property for classification and identification purposes. When more accurate values of strength are needed, undisturbed samples from thin-wall Shelby tubes are used.

C. Natural Moisture Content (ASTM-D-2216)

The natural moisture content is the water content of the soil in-situ. The soil sample is obtained from the SPT sampler or Shelby tubes. Approximately 40 gms. of soil are weighed and then placed in an oven for 24 hours at a temperature of 105□ - 110□C. The natural moisture content, "Wn" is obtained from the difference between the weights in the natural state and after oven drying, divided by the dry weight of the sample, and expressed in percentage.

IV. SOIL DESCRIPTION (ASTM-D-2488)

The description of the soils includes the type (gravel, sand, silt, clay, organic), consistency (if a fine grained soil), size and roundness (if a coarse grained soil), color, and some other special characteristic which can aid in the identification and classification of the soil such as presence of rubbish, organic matter, shells and fossils, stratification and structure, cementation, mineral composition, relict structures, stains and others.

To aid in the preparation of these descriptions some simple tests are made such as those recommended by the Unified Soil Classification system for field classification (dilatancy, dry strength, shine, toughness). To approximate the consistency of fine-grained soils (soft, medium, stiff, hard), a simple test is performed with the hand: a hard, fine-grained soil is difficult to indent with the thumbnail, stiff soils are readily indented with the thumb, medium soils can be penetrated by moderate thumb pressure and soft soils are easily penetrated with the thumb.

The description of coarse-grained soils (sands and gravel) includes size (fine, medium coarse) and roundness (angular, sub-angular, sub-rounded, rounded, and well-rounded).

The relative amount of coarse fractions in fine grained soils is estimated by placing a representative sample or some 50 gms. in a graduated cylinder filled with water. The mix is shaken and allowed to settle. Particles of a size larger than fine sand are visible to the naked eye while silt and clays are not. In this manner, estimates of the relative amounts of the coarse fraction are made and reported as:

| | | |
|---|---|---|
| Trace | 1 | 10% |
| Little | 10 | 20% |
| Some | 20 | 35% |
| Sandy, gravelly, silty, or clayey | 35 | 50% |

The relative density of sands has been correlated with the results of the Standard Penetration Test, as follows:

For Granular Soils

| N-Blows/ft. | **Relative Density** |
|---|---|
| 0 – 4 | Very loose |
| 4 – 10 | Loose |
| 10 – 30 | Medium |
| 30 – 50 | Dense |
| over 50 | Very dense |

These are very approximate correlations which vary with, among other factors, overburden pressure (Gibbs and Holtz, 1957, and Peck and Bazaraa, 1967). These correlations are meaningless in soils with a significant amount of gravel or cobbles.

The relative amounts of the fine-grained soils are estimated based on the reaction of the soils to the dilatancy, shine, dry strength, and toughness tests, with adjective indicating the less active fraction i.e., a sandy clay behaves more like a clay than a sand.

The consistency of cohesive soils has also been correlated to the results of the Standard Penetration Test, as shown below. The correlation, however, is affected by the clay structure and factors such as sensitivity.

For Cohesive Soils

| Unconfined Compressive Strength (T.S.F.) | N-Blows/Ft. | **Consistency** |
|---|---|---|
| Less than 0.25 | Less than 2 | Very soft |
| 0.25 – 0.50 | 2 – 4 | Soft |
| 0.50 – 1.00 | 4 – 8 | Medium |
| 1.00 – 2.00 | 8 – 15 | Stiff |
| 2.00 – 4.00 | 15 – 30 | Very stiff |
| More than 4.00 | More than 30 | Hard |

Once the soil samples have been tested, they are stored for three months after the date of our final report, and then destroyed, unless required in writing by the client to store them for a longer period.

# APPENDIX H 8-STEP DECISION MAKING PROCESS

# EO11988/EO11990 Eight-Step Decision Making Process

**Puerto Rico Aqueduct and Sewer Authority (PRASA): Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico**

**Executive Order 13690 – Federal Flood Risk Management Standard**
**Executive Order 11988 – Floodplain Management**
**Executive Order 11990 – Protection of Wetlands**

**Eight-Step Decision Making Process**

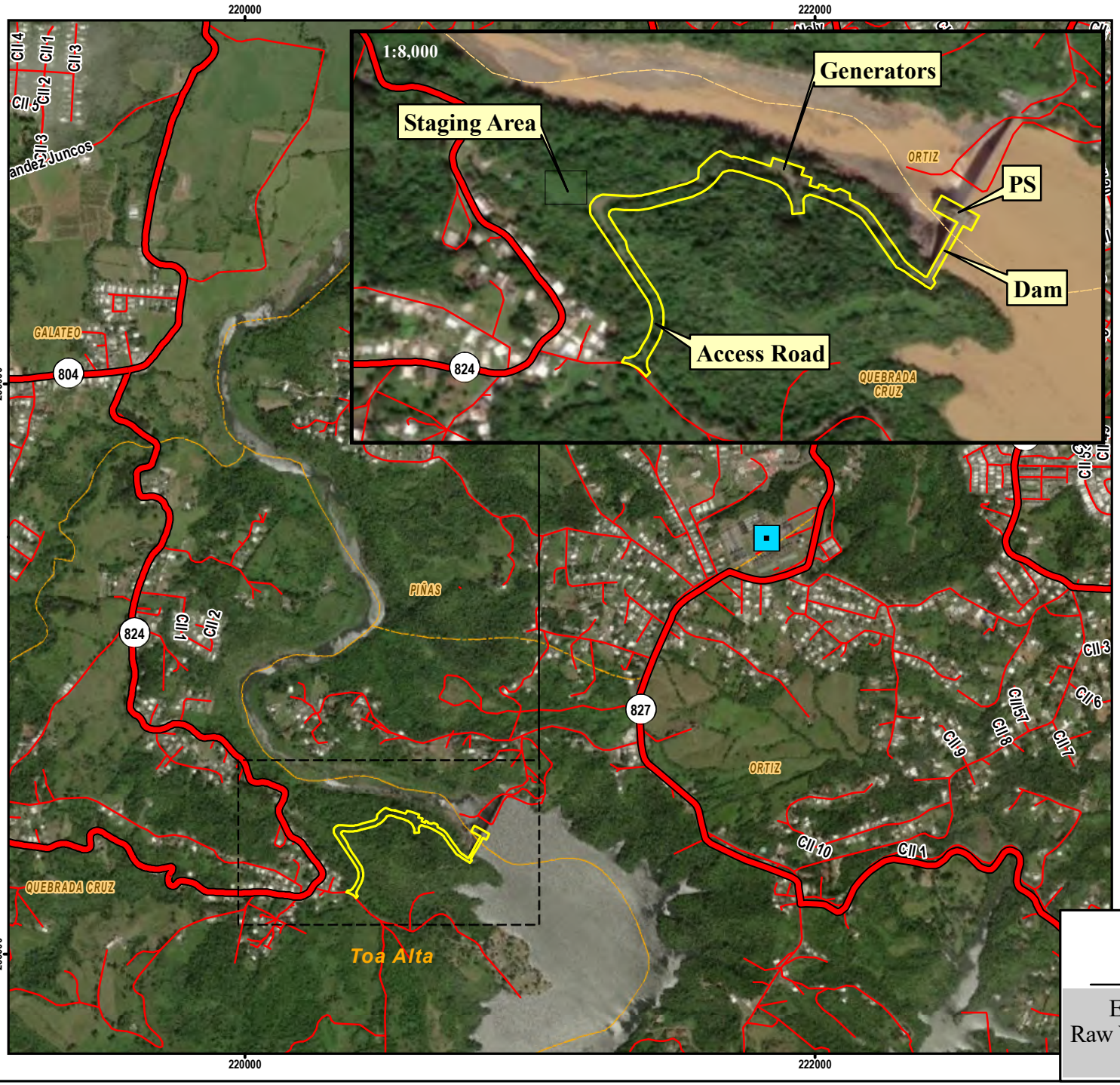
## Introduction

The Puerto Rico Department of Housing (PRDOH), proposes the project Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators located at road PR-827, km 5.6, Ortiz Ward in Toa Alta, Puerto Rico. The activity is funded under the Community Development Block Grant – Mitigation (CDBG-MIT), Hazard Mitigation Grant Program, Grant number B-18-DP-72-0002. The type of assistance is a combination of FEMA (HMGP) and HUD CDBG-DR "Gap Funding."

The Represa del Lago La Plata (circa 1974) is located on road PR-827, km 5.6 in the Ortiz Ward, within the Municipality of Toa Alta, Puerto Rico. The proposed project area is located west of Represa del Lago La Plata (Coordinates: 18.343583°N, -66.238678°W), in the Quebrada Cruz Ward, Toa Alta. Heading from the Toa Alta city center, the construction vehicles could use the Road PR-861, then Road PR-824 until km 5.0 to access the Camino Recreativo La Plata to enter the access road to the project site. The project area occupies approximately 6,051 $m^2$, which is divided into the following project components: access road, including truck turning path, generators, and diesel tank platforms. (**Figure 1** Site Location)

The project geographic location, Lago La Plata and Represa del Lago La Plata, is southwest of San Juan, approximately 28 kilometers from the Luis Muñoz Marín International Airport in Carolina; approximately 14 kilometers south from the north coast in Dorado; approximately 5 kilometers south from downtown Toa Alta. The project area surroundings are the mountains of Toa Alta at elevations between 16 m and 110 m. (**Figure 2** Geographic Location).

The project as presented requires (a) land acquisition, (b) demolition or modification of existing components, and (c) new construction of an emergency power generators facility, including access roads that have been identified within floodplain areas. For these reasons, Executive Order 11988- Floodplain Management, amended by Executive Order 13690 and/or Executive Order 11990- Wetlands Protection evaluation, applies. This project is considered a critical action, therefore requires an 8-step analysis of the direct and indirect impacts associated with the construction, occupancy, and modification of the floodplain and wetland.




N
W E
S

Scale 1:20,000

0 250 500 Meters

X: 220,581.893 m
Y: 256,488.487 m

**Legend**

- Enrique Ortega WTP[1]
- Project Boundary[2]
- State Road[3]
- Municipal Road[4]
- Ward Limit[5]

Note: Project boundary is approximate.

Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, septiembre de 2023.
3. Puerto Rico Highways and Transportation Authority (ACT, in Spanish), 2020.
4. U.S. Department of Commerce, U.S. Census Bureau, Geography Division, 2010, TIGER/Line 2010 Census, Census Tract national-based.
5. Puerto Rico Planning Board, 2015.
6. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Figure 1: Site Location

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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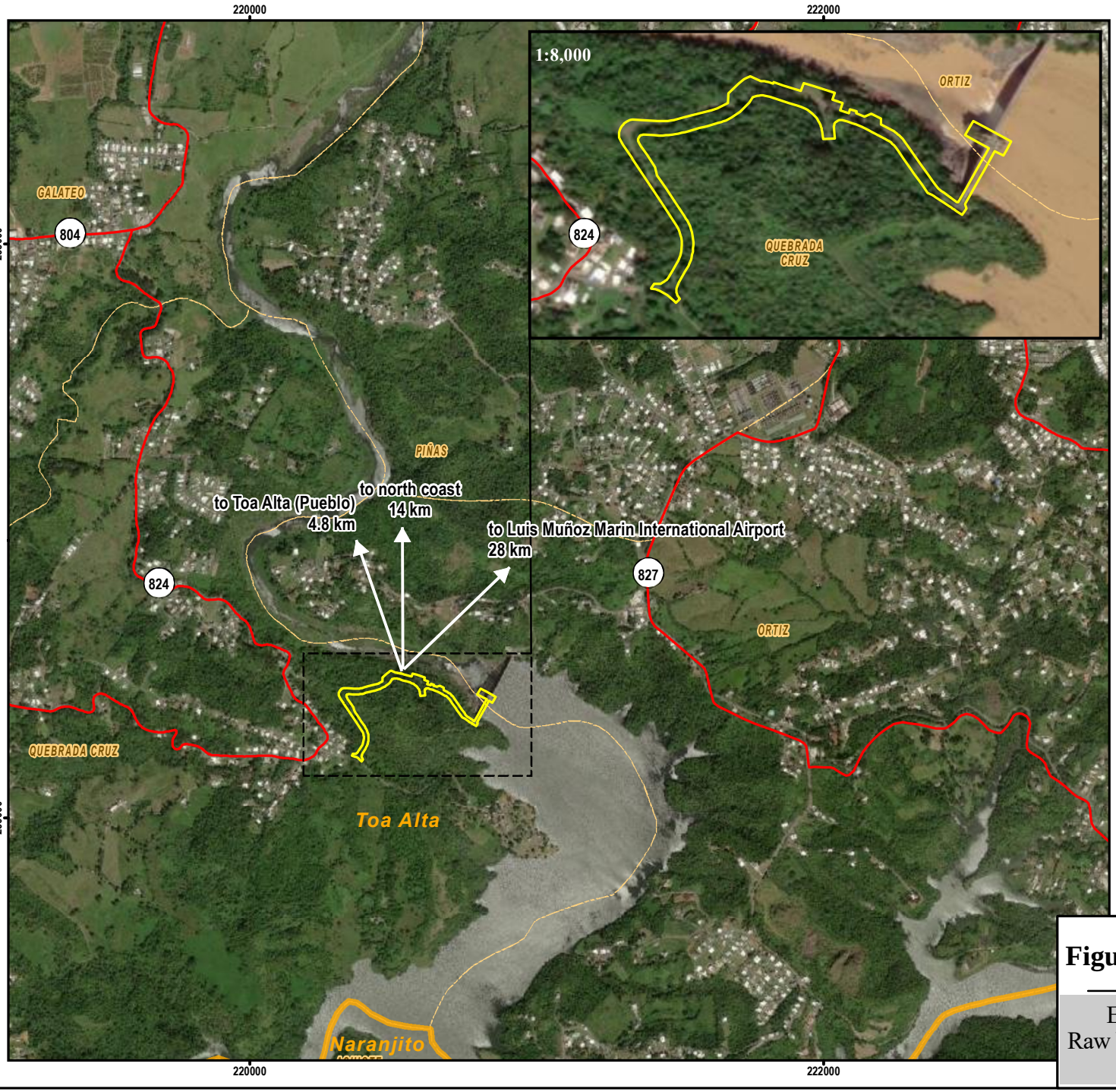


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Scale 1:20,000

0 250 500 Meters

X: 220,581.893 m
Y: 256,488.487 m

**Legend**

- Project Boundary[1]
- State Road[2]
- Ward Limit[3]
- Municipal Boundary[3]

Note: Project boundary is approximate.

Sources:
1. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, septiembre de 2023.
2. Puerto Rico Highways and Transportation Authority (ACT, in Spanish), 2020.
3. Puerto Rico Planning Board, 2015.
4. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Figure 2: Geographic Location

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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csagis csa evazquez 4/26/2024 8.5x11L

**Regulatory Background Requirements**

HUD's regulations in 24 CFR Part 55, outlines HUD's procedures for complying with EO 11988, Floodplain Management, Executive Order 11990, Protection of Wetlands, and Executive Order 13690, Federal Flood Risk Management Standard (FFRMS). Part 55 applies to all HUD actions that could be harmed or cause harm if located in floodplains or wetlands. Covered actions include the proposed acquisition, construction, demolition, improvement, disposition, financing, and use of properties located in floodplains or wetlands for which approval is required either from HUD, under any HUD program. Part 55 does not prohibit approval of actions in a floodplain or wetlands but provides a consistent method for implementing HUD interpretation of the EO in the projects approval decision-making processes to comply with EO 11988, EO 11990, and EO13690 and avoid unnecessary impacts.

The ***Executive Order 13690*** – ***Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*** (2015) establishes a Federal Flood Risk Management Standard (FFRMS) so that agencies take actions to enhance the nation's resilience to current and future flooding.

The ***Executive Order 11988 – Floodplain Management*** (1977) requires agencies to take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values of floodplains. The Federal Emergency Management Agency (FEMA) designates floodplains as geographic zones subject to varying levels of flood risk. Each zone reflects the severity or type of potential flooding in the area. The FEMA Map Service Center provides this information in the form of FEMA Flood Insurance Rate Maps (FIRMs) and Flood Hazard Boundary Map - Advisory Base Flood Elevations (ABFE).

The ***Executive Order 14030*** – ***Climate-Related Financial Risk*** (2021) reinstates EO 13690 (revoked in 2017) and clarifies that the FFPMS and the guidelines for floodplain management under EO 11988 remain in effect.

The ***Executive Order 11990*** – ***Protection of Wetlands*** requires Federal activities to avoid construction or management practices that would adversely affect wetlands unless that agency finds that there is no practicable alternative, and the proposed action includes all practicable measures to minimize harm to the wetlands. Wetlands are identified on the National Wetlands Inventory (NWI) or else consult directly with the Department of Interior-Fish and Wildlife Service (FWS). HUD or grantees may also consult with the USDA/NRCS National Soils Survey or the U.S. Army Corp of Engineers (USACE).

On March 24, 2024 the Housing and Urban Development Department (HUD) published the proposed rule - *Floodplain Management and Protection of Wetlands; Minimum Property Standards for Flood Hazard Exposure; Building to the Federal Flood Risk Management Standard.* This final rule became in effect a regulatory requirement on June 24, 2024. The Final Rule was published in the 89 FR 30850 on April 23rd, 2024. The effective date of the final rule was May 23rd, 2024 and compliance with this rule was required no later than June 24th, 2024. This 8 Step decision making process has been performed to comply with FFRMS new final rule. The Final Rule defines a new floodplain of concern from the 1-percent-annual-chance-floodplain to the FFRMS floodplain, designated based on projected future flood risk, to ensure that HUD projects are designed with a more complete picture of a proposed project site's flood risk over time. This final rule expands the floodplain to a higher vertical elevation and corresponding horizontal floodplain area (FFRMS floodplain) that addresses current and future flood risk due to future changes. Implementing the FFRMS, the Federal agencies were to select among the following three approaches for establishing the flood elevation and hazard area in siting, design, and construction.

The Federal Emergency Management Agency (FEMA) uses the Flood Insurance Rate Maps (FIRM) to identify the floodplains for the National Flood Insurance Program (NFIP). The Puerto Rico Planning Board (PRPB) is the local agency that coordinates the NFIP in Puerto Rico. Actions within the FFRMS floodplain , are evaluated by using the 8-Step Process.

As the administrator of the NFIP, FEMA created the Advisory Base Flood Elevation (ABFE). The ABFE information serves as a guide to understand current flood hazard conditions and higher elevations that communities should build to reduce impacts of similar storm events in the future. Following Hurricane María, FEMA re-evaluated and re-mapped the floodplain based on highwater marks from the disaster and prepared the ABFE. The PRPB issued a resolution (JP-ABFE- 01 and ABFE-02) in 2018 requiring the use of the ABFE maps for permitting processes.

**EO 13690** established three approaches for determining the FFRMS flood elevation: **Climate-Informed Science Approach (CISA), 0.2-Percent-Annual-Chance (500-Year) Flood Approach (0.2PFA), Freeboard Value Approach (FVA)**. Under Part 55, HUD has adopted these approaches and established a preference for the Climate-Informed Science Approach (CISA) where it is available and actionable.

**Key Terminology**

**Climate-Informed Science Approach (CISA)** defines the FFRMS floodplain as the elevation and flood hazard area that result from using a CISA that uses the best-available, actionable, hydrologic, and hydraulic data. HUD permits the voluntary use of federal CISA data where available and actionable and permits the voluntary use of formally adopted local CISA data, as described in 24 CFR 55.7.

**0.2 Percent Annual Chance Floodplains (or 500-Year Floodplains)** are areas with at least a 0.2% chance of flood occurrence in any given year. HUD requires critical actions (e.g., hospitals, nursing homes, police stations, fire stations, and roadways providing sole egress from flood-prone areas) to comply with Part 55 when they are located in the 0.2 Percent-Annual-Chance floodplain. 500-Year floodplains are designated as a shaded Zone X.

**Freeboard Value Approach (FVA)** defines the FFRMS floodplain as the elevation and flood hazard area that result from adding 2 feet to the base flood elevation (BFE) for non-critical actions or adding three feet to the BFE for critical actions. This approach is used for noncritical actions if neither CISA data nor FEMA-mapped 0.2-percent-annual-chance floodplain data is available or actionable. For critical actions, the higher, 0.2PFA or FVA must be used.

**Base flood elevation (BFE)** is the computed elevation to which floodwater is anticipated to rise during the base flood (also known as the 1-percent-annual-chance or 100-year flood).

**1.0 Percent Annual Chance Floodplains (or 100-Year Floodplains)** means the area subject to inundation from a flood having a one percent or greater chance of being equaled or exceeded in any given year.

**Wetlands** means those areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, prairie potholes, wet meadows, river overflows, mud flats, vernal pools, and natural ponds.

**Non-Critical Actions** defined in EO 13690 not deemed critical.

**Critical Actions** defined in EO 13690 as any activity for which even a slight chance of flooding is too great. Examples of critical actions are siting structures such as (but not limited to):

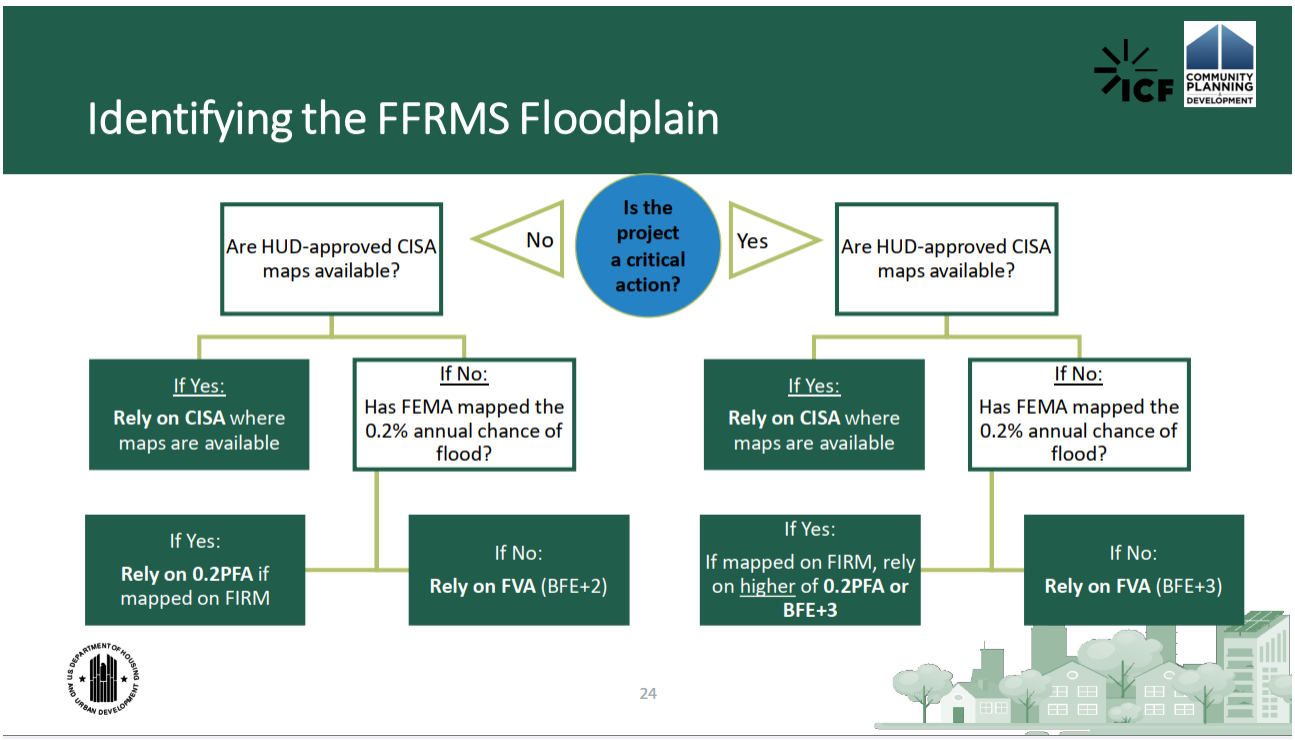
- Those which produce or store highly volatile, toxic, radioactive, or water-reactive materials.
- Those with occupants who may have limited mobility (e.g., hospitals, nursing homes, prisons, schools, animal care facilities).
- Research facilities of significant value to research communities.
- Emergency operations centers.
- Data centers that hold physical or electronic records without copies or backup.
- Utilities, critical equipment, system, networks, or functions that are essential or irreplaceable (e.g., water, power, communication, evacuation routes).
- Those that hold items of substantial cultural significance.
- Infrastructure that provides access to critical facilities or services.

**New construction** in the FFRMS floodplain must be elevated or floodproofed to the higher FFRMS floodplain elevation for protection.

## 24 CFR Part 55 Requirements and Analysis

HUD has prepared flow charts illustrating how to comply with Part 55 for non-critical actions and critical actions (see Figure 3 below).

Figure 3: **FFRMS Floodplain Flowchart**




### Step 1: Determine whether any of the exceptions at 55.12(c) apply.

Under 55.12(c), certain projects are exempt from Part 55. Exceptions for Part 55 were updated with the rule published April 23, 2024. The projects are not required to complete the 8-Step Process, and they may be able to proceed despite the presence of a floodway, or coastal high hazard area, or an onsite wetland.

Activities listed in 55.12(c) include restoration or preservation of floodplains, acquisition of floodplains property provided the site is used for flood control or open space but only if structures are cleared and improvements are specifically limited, minor amendments to previously approved actions with no additional adverse impact on or from a floodplain or wetland, receivership or foreclosure and related actions, policy-level actions not involving site-based work, issuance of non-project-based housing vouchers, sites where FEMA has issued a final Letter of Map Revision or final Letter of Map Amendment (LOMA), and actions that are Categorically Excluded Not Subject to 50.4 or 58.5.

**Step 2: Determine whether the project site contains a FFRMS floodplain or a wetland.**

Part 55 requirements define the approach by which HUD determines if an action is in the FFRMS floodplain and subject to the 8-step decision-making process. Part 55 defines the floodplain of concern as the FFRMS floodplain as determined by using one of three approaches:

1. Climate-Informed Science Approach (CISA)
2. 0.2-Percent-Annual-Chance (500-Year) Flood Approach (0.2 PFA)
3. Freeboard Value Approach (FVA)

For critical actions:

- When available and actionable CISA data exists and have been formally adopted by HUD, use CISA maps to verify the floodplain and elevation, provided federal data is equal to or greater than BFE and local CISA data must be equal to or greater than FVA (BFE+3):
- If CISA maps are not available, use 0.2PFA and utilize the **FEMA Map Service Center**. The FFRMS Floodplain is the higher of the 0.2 Percent Annual Chance floodplain or BFE+3:
- If 0.2PFA map is not available, use Freeboard Value Approach (FVA) approach adding 3 feet to the base flood elevation.

**Step 3: Determine if the 8-Step Process is required.**

***8-Step Process Determination***

Under section 55.13, certain actions must comply with Part 55 but are not required to complete the full 8-Step Process.

- Section 55.13 lists project types that must comply with the basic restrictions in Part 55 (i.e., the prohibitions on projects in floodways and critical actions in coastal high hazard areas) but which are not required to complete the 5- or 8- step decision-making processes. These include acquisition and refinance of existing single-family properties, minor improvements to single family properties, and leasing.
    - An additional exception includes special projects for the purpose of improving the energy or water efficiency of utilities or installing renewable energy that involve the repair, rehabilitation, modernization, weatherization, or improvement of existing structures or infrastructure that are not substantial improvements and that do not include the installation of equipment below the FFRMS floodplain elevation.
- Section 55.14 lists activities that must complete the modified 5-step process instead of the full 8-step decision-making process. These actions are not required to provide public notice or consider alternatives but must complete the other steps in the 8-step decision-making process. Types of actions that allow the modified 5-step process for compliance include:
    - disposition of properties,
    - purchase and refinance of existing multifamily housing or healthcare facilities,
    - minor improvements to multifamily housing and nonresidential structures.

- **If the project occurs in a 1-Percent-Annual-Chance floodplain (A Zone)**, an 8-Step Process is required unless it is inapplicable per 55.13 or the **5-Step Process** is applicable per 55.14.
- **If the project occurs in a 0.2-Percent-Annual-Chance floodplain (shaded X Zone)**, the 8-Step Process is required for critical actions unless it is inapplicable per 55.13 or the **5-Step Process** is applicable per 55.14.
- **If the project has a direct on-site impact to wetlands**, the project will require the completion of the 8-step decision-making process to address wetlands impacts and determine if there are no practicable alternatives to wetlands development.
- **If the project indirectly affects wetlands by modifying the flow of stormwater, releasing pollutants, or changing conditions that contribute to wetlands viability**, the significance of these impacts must be evaluated and minimized through best management practices. Mitigation measures to address off-site wetland impacts may be necessary to comply with other related laws and authorities such as the Endangered Species Act, or to reduce impacts to less than significant under the National Environmental Policy Act (NEPA), but the 8-Step decision-making process is not required. If the project site includes wetlands that will not be impacted by new construction, measures to preserve such wetlands from future impacts, including by obtaining a restrictive covenant, conservation easement, or other mechanism is strongly encouraged.
- **If the project indirectly affects off-site wetlands**, impacts must be minimized to the extent practicable, but the 8-Step decision-making process is not required. Mitigation measures to address off-site wetland impacts may be necessary to comply with other related laws and authorities such as the Endangered Species Act, or to reduce impacts to less than significant under NEPA.

***Proposed Project Area Location Description***

The Proposed Action consists of the construction and installation of an emergency power generators facility, which includes the installation of 4 generators, diesel storage tanks, an electrical/control room, and the associated components to allow the continuous operation of the Enrique Ortega WTP Raw Water Intake under grid power outages. It includes the construction of an asphalt access road over an existing dirt road with entrance from Camino Recreativo La Plata and Road PR-824.

The project area is adjacent to the La Plata reservoir Wildlife Refuge and Finca Vizcarrondo, however the site is not located within or is considered part of the natural reserve area. The Lago La Plata Wildlife Refuge is located east of the proposed area, this reservoir was built in 1973. This water reservoir is administered by the Puerto Rico Aqueduct and Sewer Authority (PRASA). The Río La Plata is located north of the proposed project area.

The project area where the generators are proposed to be installed has a slope ranging from 6.1 to 37.0%. No special soil conditions, foundation issues, settling, have been identified in areas within the Proposed Action as determined in the Geotechnical Investigation conducted by Geo Cim[1]. (See **Appendix 1**) The project area has an existing dirt road that has been proposed to be rehabilitated to provide access to the facility premises. The project area (access road, power generators site, staging area) was previously disturbed as part of a project to repair the scours found at the base of the Represa del Lago La Plata structure between 2021 and 2022. (**Figure 4** Proposed Site Historical Aereal Views)

Through the extension of the proposed site boundary, one (1) main vegetative association was classified as: Areas of previously impacted land (100%). The vegetation observed throughout these areas are fast-growing grasses and shrubs typical of previously disturbed areas. Outside the footprint that the Proposed Action would impact, particularly to the east of the property where the dam is located, there are scattered trees. Forest patches of secondary succession are observed outside the area that the action would impact, some of these bordering much of the extension of the dirt road.

The Proposed Action (generators, access road, staging area) would occupy an area of approximately 6,968 $m^2$ (1.72 acres). The Action would disturb an estimated area of 9,814 $m^2$ (2.42 acres). The existing access dirt road will be improved and paved from the Camino Recreativo La Plata Road to the access gate to the Represa del Lago La Plata. The dimensions of the access road to be improved are approximately 740 m long and 4 m wide with 1 m wide ditches on the sides to divert the runoff. The estimated area for the access way is 4,773 $m^2$ (1.18 acre). A 40 m x 20 m generator platform will serve as the base for four generators, with an additional area to accommodate two diesel fuel storage tanks and a switchgear. The estimated area for the generator pad is 1,278 $m^2$ (0.32 acre). From the access gate to the Represa La Plata Raw Water Pump Station conduits will be attached underneath the dam access bridge wall and along the pump station exterior wall with conduit supports for approximate 95 meters long. The staging area would be the same area used as part of a project to repair the scours found at the base of the Represa del Lago La Plata structure, approximately 917 $m^2$ (0.23 acre). The estimated area with vegetation to be affected is approximately 3,799 $m^2$.

[1] Geotechnical Investigation for La Plata Dam Emergency Generators, Toa Alta, Puerto Rico (Geo Cim, September 15, 2023)

The Proposed Action includes:

1. Installation of four emergency generators with a capacity of 2,500 kW each, two diesel storage tanks with a capacity of 40,000 gallons each, an electrical room, three parking areas, and a fuel dispensing area.
2. Construction of a concrete platform measuring approximately 20 meters x 40 meters for the installation of the generators, including other necessary infrastructure components required for equipment operation.
3. Paving the existing dirt road with approximate dimensions of 740 meters in length and 4 meters in width, with 1-meter-wide ditches at the edges to divert runoff.
4. Leveling the area where the generators are proposed to be installed to elevate them above the flood level.
5. Removal of the topsoil to improve the access road to comply with current codes for fuel deliveries to the Proposed Action.
6. Installation of an access gate at the entrance.
7. Installation of underground electrical lines that will run from the generators to the dam's pump building.
8. Installation of conduits attached to the dam's structure to connect to the existing electrical infrastructure, extending to the dam's intake tower.
9. Construction of a temporary preparation area for the placement of heavy machinery during the Proposed Action's construction phase.

**Project Need and Purpose**

PRDOH and FEMA, proposes the construction of an area to install backup power generators associated to the Enrique Ortega Water Filtration Plant Raw Water Intake. The emergency power generators facility will provide backup power to the Represa La Plata Raw Water Intake Pump Station, sump pump and security systems. The emergency power facility will also energize the Represa del Lago La Plata gate system engine, the office buildings, and exterior lighting during power blackouts or service interruptions. The Proposed Action will support the provision of potable water needed to support business, health and safety, and basic services required after atmospheric events or prolonged power outages. The Action is consistent with PRASA's goals of reducing the vulnerability of critical facilities to natural hazards and provide safe drinking water to a population of approximately 369,000 inhabitants of the Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño and Corozal municipalities.

The Project Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators proposes the construction of a new infrastructure to provide power to the Represa La Plata Raw Water Intake Pump Station, a critical system of the Enrique Ortega Water Treatment Plant, utilities that are essential for potable water supply. It is considered a **critical action;** the new construction and the access road expands the footprint of the ground disturbance. The Proposed Action is not exempt from Part 55.

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csagis evazquez 5/21/2024 8.5x11

**August 25, 2021**

**January 23, 2022**

**Figure 4: Proposed Site Historical Aerial Views**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

# Eight-Step Decision Making Process

***Step 1.* Determine if the proposal is located in the FFRMS floodplain or wetlands.**

The Puerto Rico Department of Housing (PRDOH) has conducted an evaluation as required by Executive Order 11988, as amended by Executive Order 13690 and/or Executive Order11990 , in accordance with HUD regulations at 24 CFR 55.20 Subpart C – Procedures for Making Determinations on Floodplain Management and Protection of Wetlands.

***FFRMS Floodplain Determination***

The Project Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators is a critical action that occurs in a 0.2 Percent Annual Chance floodplain; therefore the 8-Step Process is required to comply with 24 CFR Part 55 for FFRMS floodplains. Three of the five Proposed Action components are located within the Zone X according to the *Advisory Base Flood Elevations* (ABFE) map, prepared by the Federal Emergency Management Agency[2] (FEMA) (see Table 1). Part of the project's access road is within 100 feet of a Riverine Wetland, so the 8-Step Process is required to comply 24 CFR Part 55 for wetlands. The proposed action will not potentially adversely affect the floodplain or support floodplain development, but the proposed action will potentially be adversely affected by the floodplain. The project is not located in a coastal high hazard area.

EO 13690 establishes to use the **Climate-Informed Science Approach (CISA)** as the first approach to determine FFRMS floodplains. The Federal Flood Standard Support Tool Beta (v1.1.5) at https://floodstandard.climate.gov/tool/ made a note that CISA reports are only available for coastal areas. After HUD published the final rule, the PRDOH issued the FFRMS Policy Alert notifying its program participants that the CISA methodology hasn't been adopted so far as a tool to determine the FFRMS and that the 0.2PFA approach is the one to be used for determining the FFRMS elevation.

If CISA maps are not available, the second approach to determine FFRMS floodplains established by EO 13690 is **0.2PFA (0.2 Percent Annual Chance Floodplains or 500-Year Floodplains)** using the **FEMA Map Service Center**. The FFRMS Floodplain is the higher of the 0.2 Percent Annual Chance floodplain or BFE+3 for critical actions.

The parcel considered for the generator's platform was acquired by PRASA when the Represa del Lago La Plata was built, and no other uses have been proposed other than infrastructure/institutional uses. Using the Flood Insurance Rate Map, Firm Panel 72000C0705J, effective date November 18, 2009, the project components of a segment of the access road to the project platform, the diesel fuel tanks pad, the generators platform, the electrical room, and a segment of the access road after generators platform are within the Flood Zone A (1.0% Percent Annual Chance Floodplain). The project footprint within the Zone A has been calculated of approximately 6,153.37 $m^2$ (1.52 acres). The access road (from Station 0+00.00 to 4+80.00) and the temporary staging area are in Zone X. (**Figure 5** FEMA FIRM and **Figure 6** FEMA Advisory Data).

*Zone A*

The Preferred Alternative components within Zone A (moderate flood hazard) include a segment of the proposed access road (from Station 5+00.00 to 8+91.12), and the generators platform. The access road is currently a dirt road that has been proposed to be upgraded to support construction and maintenance of the emergency generators facility. The generator platform could cause localized interruptions to local drainage patterns, such as ponding in the areas adjacent to the new proposed facilities. To mitigate potential flood damage to adjacent areas, the generators platform construction will include a design of a stormwater management system to control runoff to and from site. The civil site drawings will comply with PR Planning Board Regulation 13, which address the control and management of runoff waters for newly developed areas.

[2] *FEMA, as the administrator of the National Flood Insurance Program (NFIP), has created Advisory Base Flood Elevations (ABFEs) for the commonwealth of Puerto Rico. The ABFE information can serve as a guide to understand current flood hazard conditions and higher elevations that communities should build to in order to reduce impacts of similar events in the future.*

*Zone X*

The Preferred Alternative access road (from Station 0+00.00 to 4+80.00) and the temporary staging area are in Zone X (minimal flood hazard). The access road may indirectly slightly affect the off-site riverine wetland that is within 100 feet west of the project limits. The project area was evaluated and does not show the biotic and hydrological characteristics of a wetland. There is a buffer strip between the existing dirt road and the riverine wetland. Considering whether stormwater runoff would flow into the offsite wetland, it is necessary to implement construction practices to protect the wetland. BMP measures would control the temporary and intermittent effects of the stormwater runoff to the offsite riverine wetland. The temporary staging area will be used during construction activities and will not result in changes to existing topographic levels, therefore no changes or impacts to Zone X have been identified.

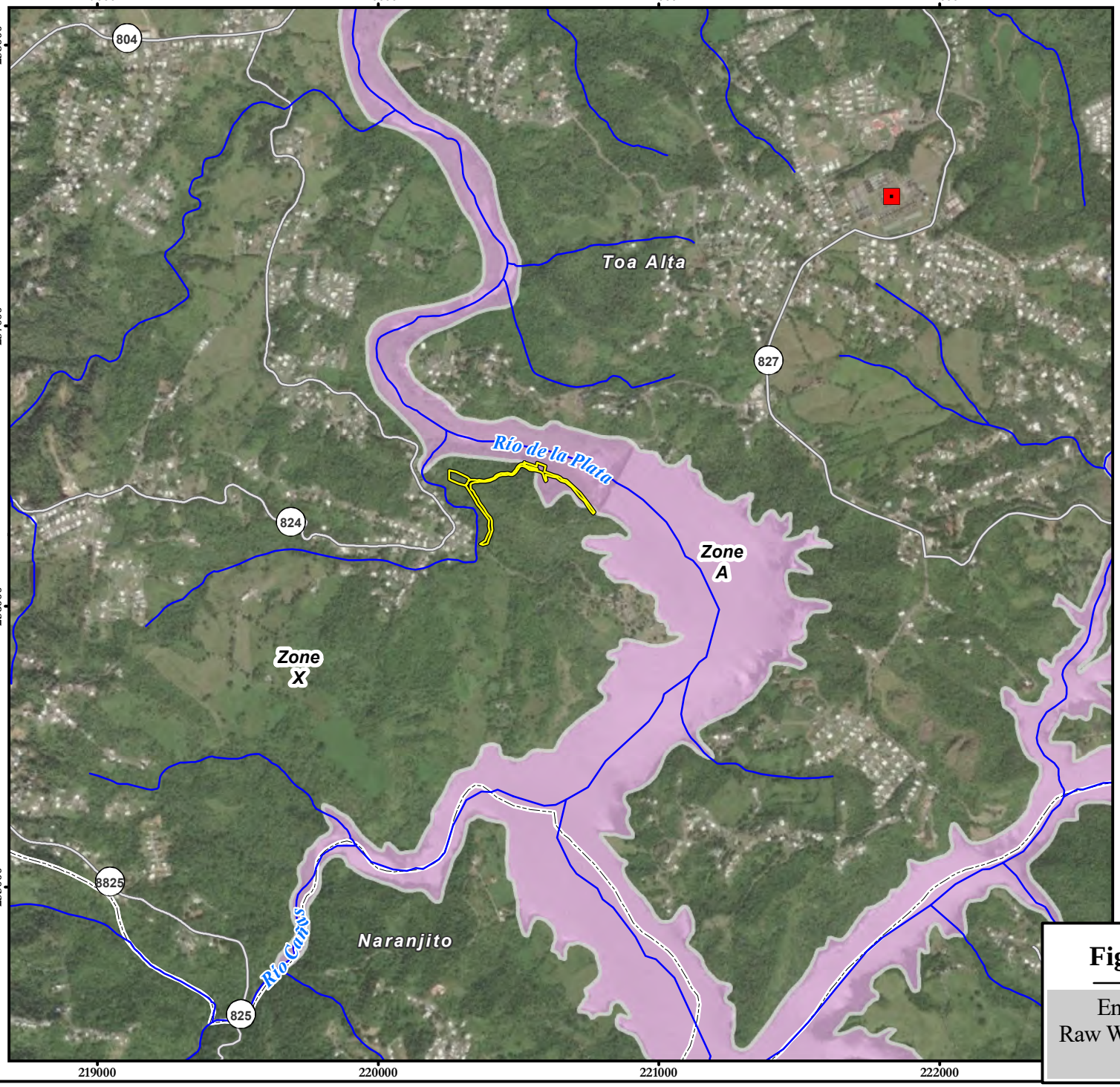
According to the Advisory Base Flood Elevation Maps[3], the Proposed Action components of the new emergency power facility are within the Flood Zone X (or ABFE 0.2% Chance), areas with a 0.2% annual chance of flooding, according to FEMA Advisory Base Flood Elevation Map, ABFE Panel 72000C0705J, effective date April 13, 2018. ABFE maps indicate that 0.2% Chance *floodplains* are designated as Zone X. The Proposed Action footprint within the Zone X has been calculated of approximately 7,043.49 $m^2$ (1.74 acres) (**Figure 6** FEMA Advisory Data). The Project Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators is in a FFRMS floodplain. **Figure 7** FEMA 1% & 0.2% Floodplains Boundary lines shows the project footprint over both zones, being the 0.2% Percent Annual Chance Floodplain what determines that the Proposed Action is within a FFRMS floodplain.

Activities located in the FFRMS floodplain area may include removal of earth's crust, cut and fill, leveling the area, foundations construction, raise the works for the generators pad, including the paved access road. (**Figure 8** General Site Plan Flood Limits Plan).

***Wetlands***

The Preferred Alternative site has been located out of areas identified as wetland according to USWFS National Wetlands Inventory (NWI). The Río de la Plata (R2UBH) is outside of 100 feet north of the project limits. The existing access dirt road will be improved and paved from the Camino Recreativo La Plata Road to the access gate of Represa del Lago La Plata. (**Figure 9** Wetlands Protection). A small unnamed creek, designated as a riverine wetland on the NWI map, is within the 100 feet buffer around the project and could be temporarily impacted by the proposed road improvements. The project area was evaluated and does not present the biotic and hydrological characteristics of a wetland. There is a buffer strip between the existing dirt road and the riverine wetland. The vegetation observed throughout these areas are fast-growing grasses and shrubs typical of previously disturbed areas. Forest patches of secondary succession are observed outside the area that the Proposed Action would impact, some of these bordering much of the extension of the road. Considering whether stormwater runoff would flow into the offsite wetland, it is necessary to implement erosion control best management practices (BMPs) to avoid sediment migration to nearby wetlands (**Figure 10** Riverine Wetland). BMPs can be classified as Erosion Prevention, Sediment Control, Runoff Control, among others. Examples of practices include the installation of geotextile material, fiber rolls, hay bales and silt fences.

[3] *Panel 72000C0705J, effective date April 13, 2018*

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Scale: 1:20,000

0 100 200 400 600 Meters

## Legend

- Enrique Ortega WTP[1]
- Hydrography[2]
- State Road[3]
- Project Boundary
- Municipal Limit[4]

**Flood hazard Zones[5]**

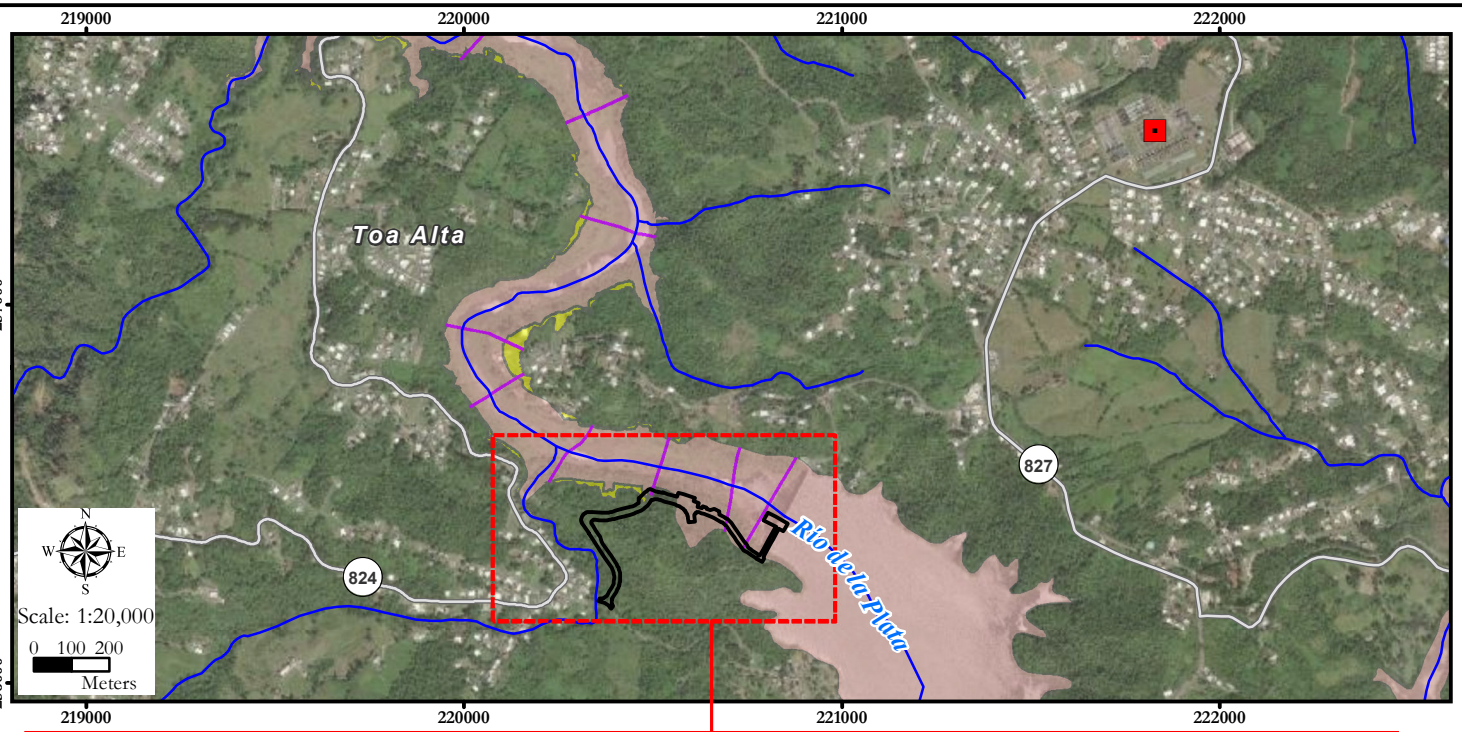
- Zone A: Areas with a 1% annual chance of flooding, detailed analyses have not been performed
- Zone X: Area of Minimal Flood Hazard

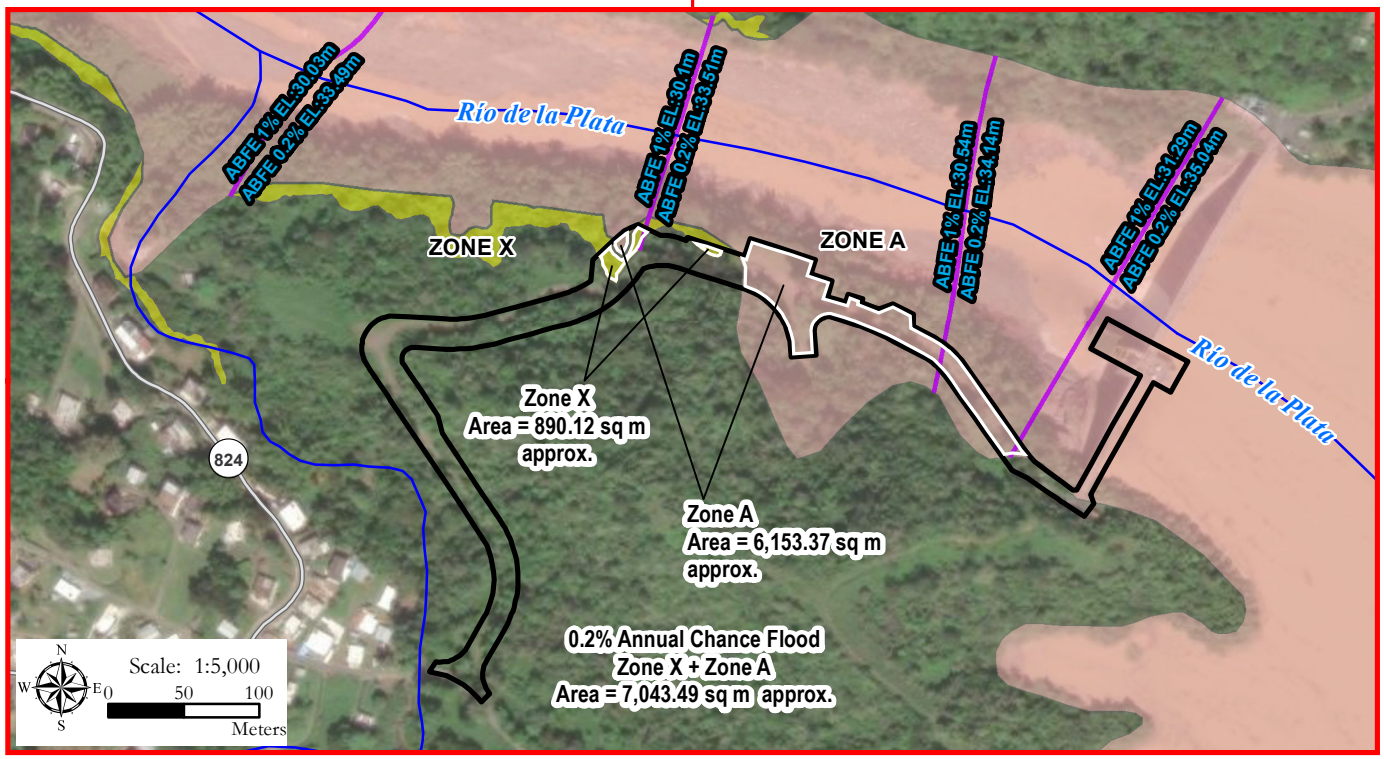
Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. USGS National Hydrography Dataset, 2020.
3. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
4. Puerto Rico Planning Board, 2015.
5. Federal Emergency Management Agency, Digital Flood Insurance Rate Map (DFIRM) database, Commonwealth of Puerto Rico and Municipalities, FIRMette/NFHLREST_FIRMette (MapServer). Panel: 72000C0705J (eff. 11/18/2009).
6. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Figure 5: Flood Insurance

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000




## Legend

- Enrique Ortega WTP[1]
- Hydrography[2]
- State Road[3]
- Project Boundary[4]
- Municipal Limit[5]

**FEMA Advisory Data**

- A - Areas subject to inundation by the 1% Annual Chance Flood event associated with rivers, lakes, and lagoons, among others.
- X - 0.2% Annual Chance Flood
- Advisory Base Flood Elevation (ABFE)

Note: Project boundary is approximate.

Sources:
1. Puerto Rico Aqueduct and Sewer Authority (PRASA), 2015.
2. USGS National Hydrography Dataset, 2020.
3. Puerto Rico Highways and Transportation Authority (ACT, in Spanish), 2020.
4. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
5. Puerto Rico Planning Board, 2015.
6. Federal Emergency Management Agency (FEMA), Advisory Maps: Puerto Rico Advisory Data and Products Post-Hurricanes Irma and Maria (Spatial Dataset, March 1, 2018); Panel Number 72000C0705J (effective date: April 13, 2018; geodata revision date: May 12, 2018; map date (pdf): May 25, 2018).
7. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

# Figure 6: FEMA Advisory Data

Enrique Ortega Water Treat Plant Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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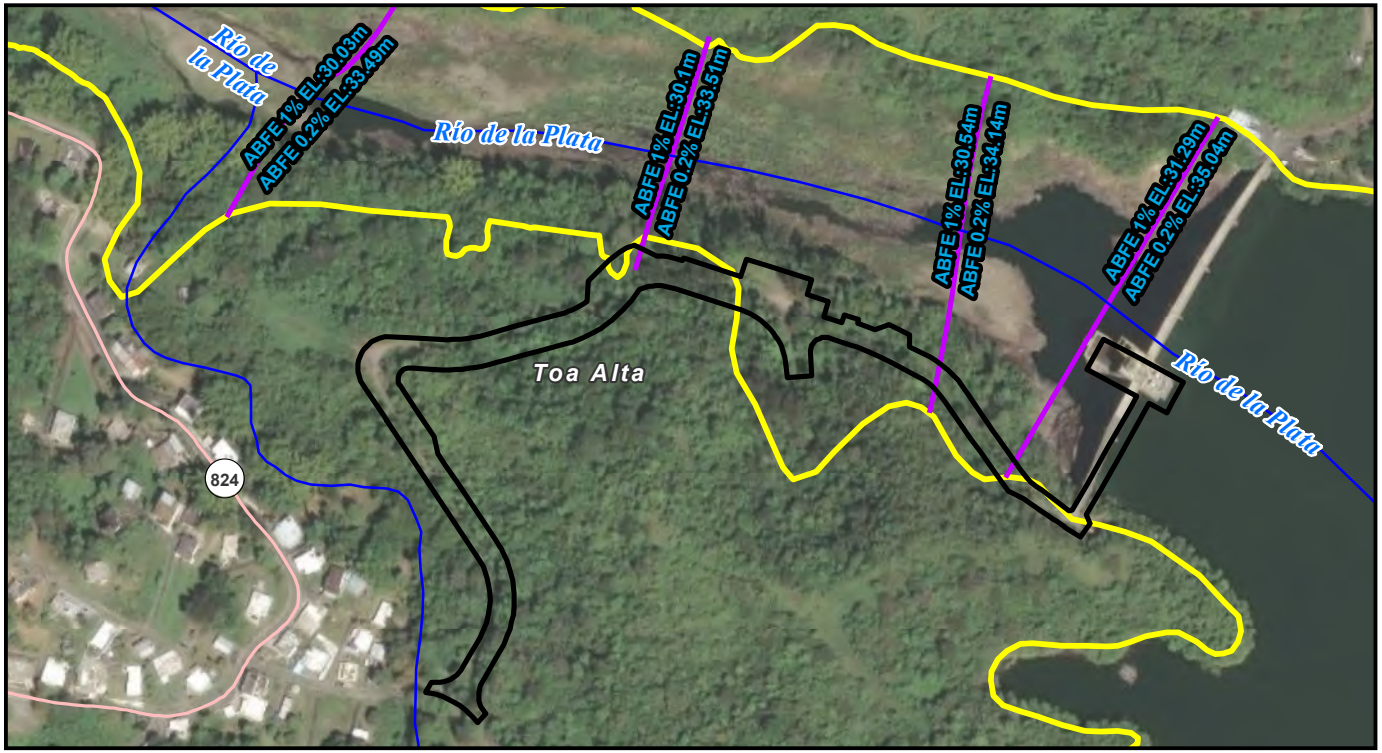


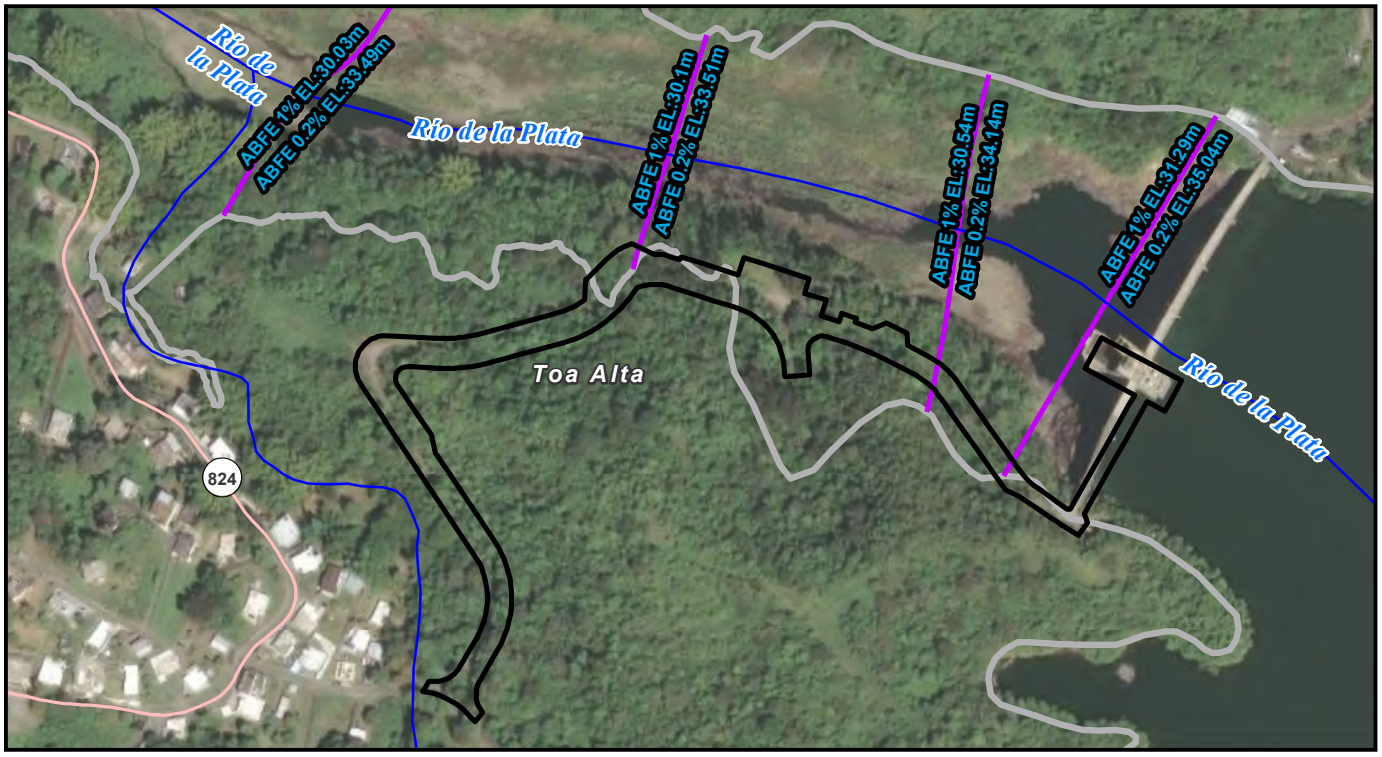


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Meters

## Legend

- Hydrography[1]
- State Road[2]
- Municipal Limit[3]
- Project Boundary
- Advisory Base Flood Elevation (ABFE)[4]
- 1% Annual Chance Floodplain Boundary[4]
- 0.2% Annual Chance Floodplain Boundary[4]

Note: Project boundary is approximate.

Sources:
1. USGS National Hydrography Dataset, 2020.
2. Puerto Rico Highways and Transportation Authority (ACT in Spanish), 2020.
3. Puerto Rico Planning Board, 2015.
4. Federal Emergency Management Agency (FEMA), Advisory Maps: Puerto Rico Advisory Data and Products Post-Hurricanes Irma and Maria (Spatial Dataset, March 1, 2018); Panel Number 72000C0705J (effective date: April 13, 2018; geodata revision date: May 12, 2018; map date (pdf): May 25, 2018).
5. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

**Figure 7: FEMA 1% & 0.2% Floodplains Boundary Lines**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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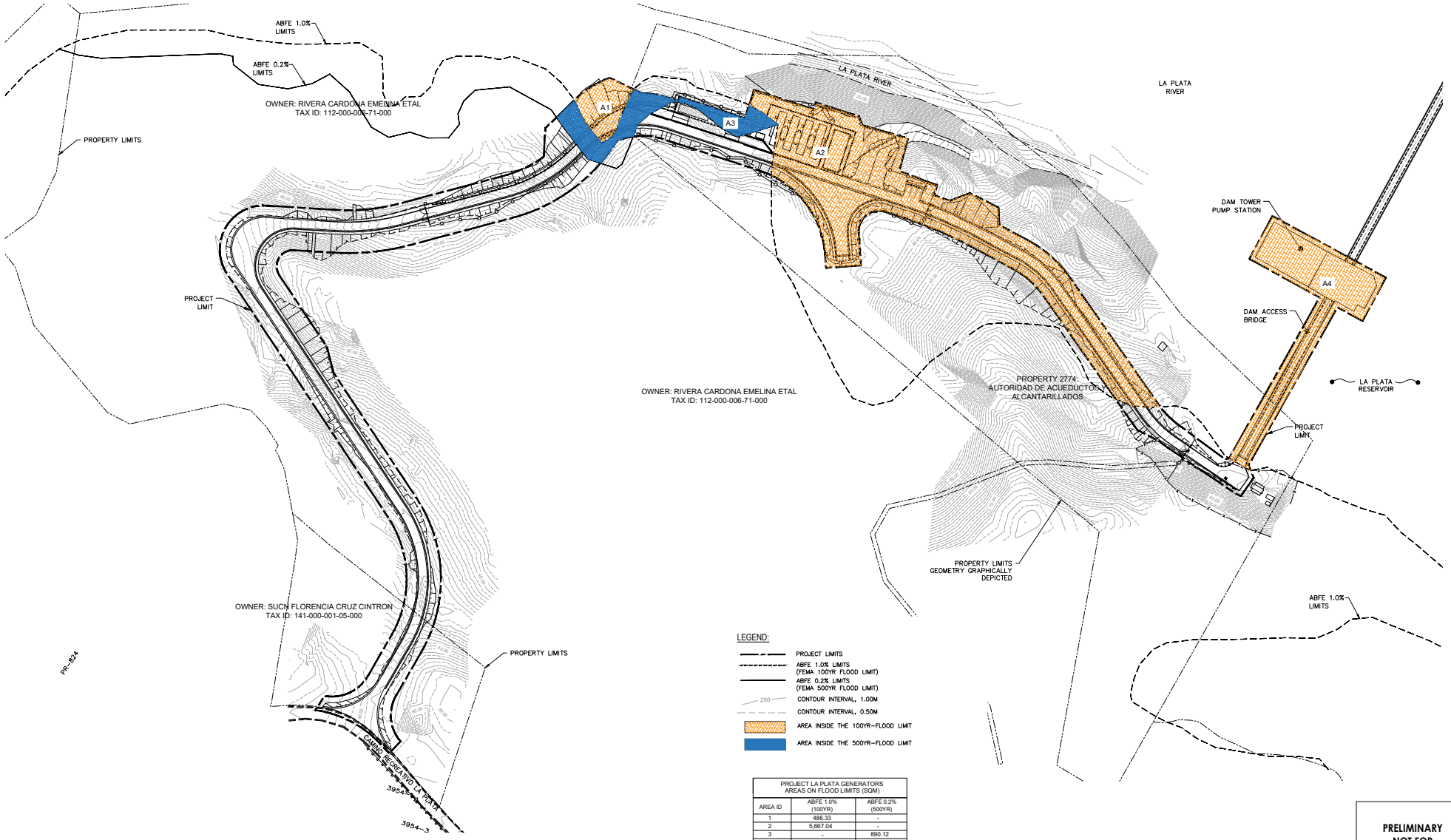


| PROJECT LA PLATA GENERATORS AREAS ON FLOOD LIMITS (SQM) | | |
|---|---|---|
| AREA ID | ABFE 1.0% (100YR) | ABFE 0.2% (500YR) |
| 1 | 486.33 | - |
| 2 | 5,667.04 | - |
| 3 | - | 890.12 |
| 4 | 2,214.71 | - |
| TOTAL | 8,368.08 | 890.12 |

## GENERAL SITE PLAN-FLOOD LIMITS PLAN

SCALE: 1:800

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| F | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| E | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| D | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| C | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |
| B | 07/26/2023 | 30% DESIGN | MVM | LMR | GN |

DRAWN BY: AM
DESIGNED BY: MVM
CHECKED BY: LMR
APPR. BY: GN

BR&A LLC

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERAL SITE PLAN
FLOOD LIMITS PLAN

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

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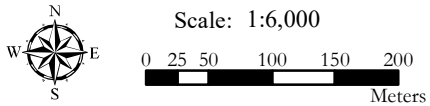


## Legend

- State Road[1]
- Hydrography[2]
- Project Boundary

**NWI Wetlands[3]**

- Lake
- Riverine

Sources:
1. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
2. USGS National Hydrography Dataset, 2022.
3. U. S. Fish and Wildlife Service, National Wetlands Inventory, October 2020.
4. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011)
Puerto Rico and Virgin Islands FIPS 5200 (Meters)

**Figure 9: Wetlands Protection**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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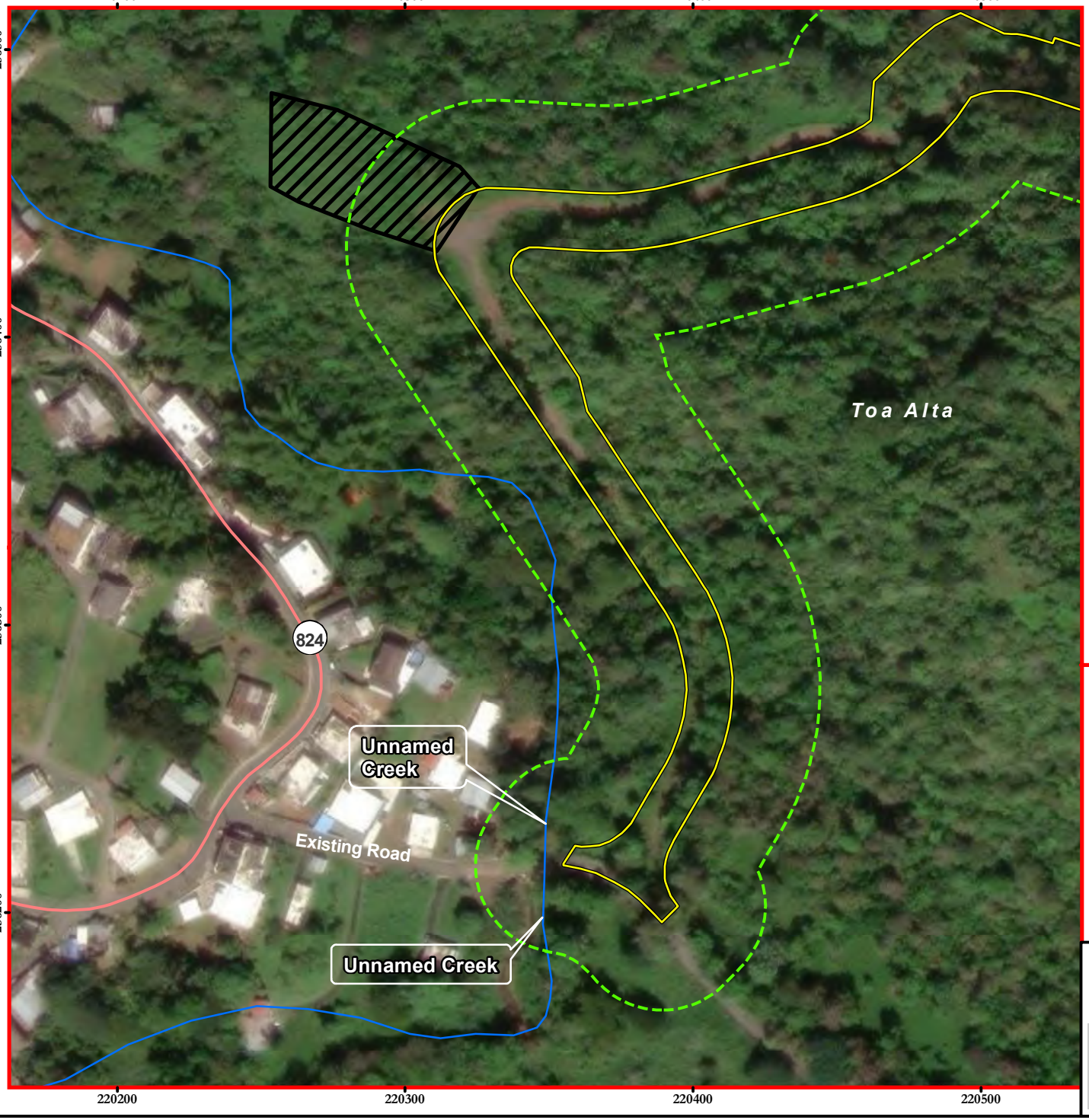


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0 25 50 100 150 200
Feet

## Legend

- State Road[1]
- Hydrography[2]
- Project Boundary[3]
- Staging Area
- 100-ft radius from the Project boundary

Note: Project boundary is approximate.

Sources:
1. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
2. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
3. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

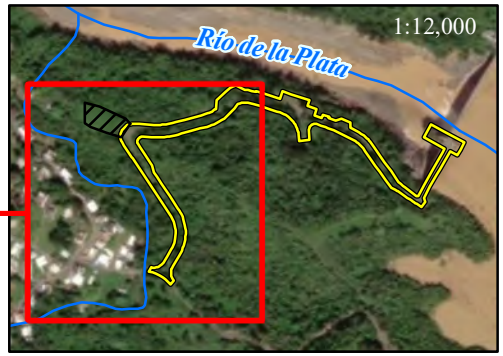

**Figure 10: Riverine Wetland**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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***Summary***

The proposed project Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators is located in a FFRMS floodplain. The FEMA ABFE Map locates the project areas within the Flood Zone X, with a 0.2% annual chance of flooding, and within the Flood Zone A. (**Figure 7** FEMA 1% & 0.2% Floodplains Boundary lines).

**Table 1**. Proposed Action Components Locations and their designations in the FFRMS floodplain and on wetlands

| Project Component | Coordinates | ABFE Designation and Elevation | Wetlands Designation* |
|---|---|---|---|
| Generators Platform | Lat: 18.343744°N, Lon: -66.239149°W<br>Lat: 18.343461°N, Lon: -66.238415°W | ABFE Zone A<br>(Range 34.21 m to 34.44 m) | None Present |
| Access Road | Start: Lat: 18.341115°N, Lon: -66.240564°W<br>End: Lat: 18.343480°N, Lon: -66.239592°W | None Present | Within 100 feet of a Riverine Wetland |
| | Start: Lon: 18.343480°N, Lon: -66.239592°W<br>End: Lat: 18.342206°N, Lon: -66.236669°W | ABFE Zone X<br>(Range 34.12 m to 35.00 m) | None Present |
| Temporary Staging Area | Lat: 18.343262°N, Lon: -66.241716°W<br>Lat: 18.343276°N, Lon: -66.241043°W | None Present | None Present |
| Conductors Alignment | Start: Lat X: 18.342133°N, Lon: -66.236677°W<br>End: Lat: 18.342206°N, Lon: -66.236669°W | ABFE Zone X<br>(Range 34.50 m to 35.00 m) | None Present |

**Wetland designations are based on select field surveys or on USFWS National Wetland Inventory Maps where surveys have not yet been conducted. The entire project area has not been delineated, and a U.S. Army Corps of Engineers jurisdictional determination is not yet available.*
*Color designations: Red = Areas in ABFE; Purple = Areas in Wetland*

Using the approach **0.2PFA (0.2 Percent Annual Chance Floodplain or 500-Year Floodplain)** to determine FFRMS floodplain, for critical actions, new construction shall be over the ABFE 0.2% annual chance elevation or an additional 3 feet above the Base flood elevation (BFE) (1-percent-annual-chance or 100-year flood) or BFE+3, whichever is greater.

The project design elevation parameters are shown in **Figure 11 -** Access Road Cross Section-, and **Figure 12 -** Generators Area Site Plan, and the cross-sections included (refer to **Appendix 2**). Each cross-section defines a station to evaluate the compliance with new FFRMS regulations. Table 2 lists the project stations that are in the FFRMS floodplain. Starting with station 5+00.00, the ABFE 0.2% elevation is 34.12 meters. The proposed grading elevation of the access road is 38.58 meters. For station 5+00.00, the grading elevation is 4.46 meters over 0.2PFA or 0.2PFA +14.63 feet. Station 6+00 (B) has a BFE (1.0%) elevation of 30.69 meters. The BFE+3 elevation is 31.58 meters. The ABFE 0.2% elevation is 34.27 meters, higher than the BFE+3. Being the proposed project Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators a critical action, the higher elevation standard to comply is 0.2PFA. Station 6+00 (B) finish floor elevation is 35.54 meters, 0.2PFA +1.21 meters or 0.2PFA +3.97 feet. Please refer to **Table 2** Federal Flood Risk Management Standard (FFRMS) Floodplain Determination for details for cross-sections evaluated.

**Figure 13 –** Elevation Contours demonstrates the steeped slope from the basin of Río La Plata to the project site. The project site is approximately 15 meters higher in elevation than the basin of Río La Plata in an approximate distance of 60 meters.

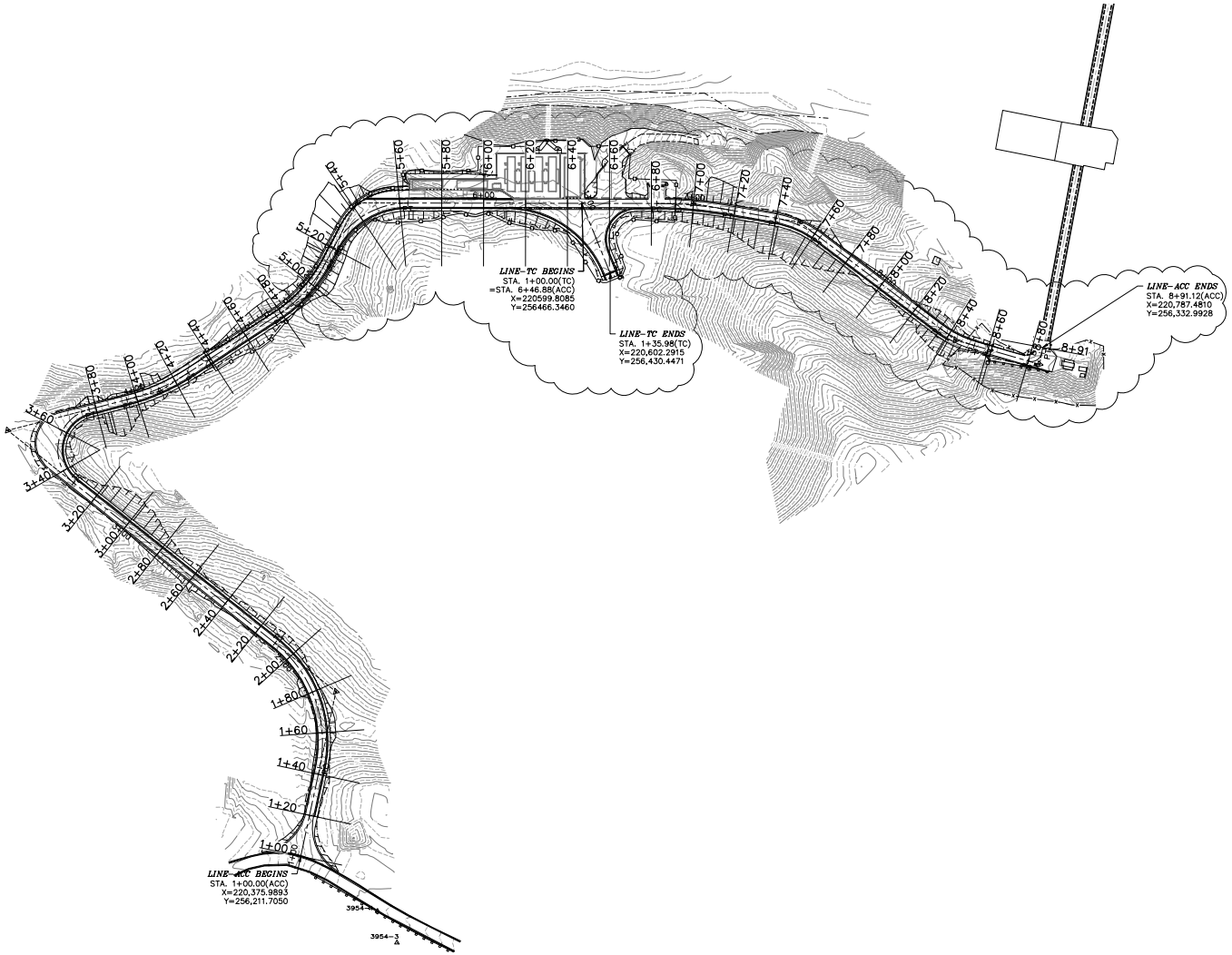
The proposed grading or final floor elevations for the project components within the FFRMS floodplain are higher than the ABFE 0.2% Annual Chance Floodplain elevations by more than 2 feet (0.61 m), complying with the Federal Flood Risk Management Standards for 0.2PFA.

The access road within 100 feet of a Riverine Wetland will require implementing erosion control best management practices (BMPs: Erosion Prevention, Sediment Control, Runoff Control among others) to avoid sediment migration to nearby wetlands.

**Table 2**. Federal Flood Risk Management Standard (FFRMS) Floodplain Determination

| Station | BFE (1.0%) (m) | BFE+3 ft (0.9144 m) | 0.2PFA (m) | Proposed Grading Elevation (m) | Compliance Elevation Difference | |
|---|---|---|---|---|---|---|
| | | | | | (m) | (ft) |
| 4+60.00 | NA | NA | | 41.38 | | |
| 4+80.00 | NA | NA | | 41.20 | | |
| 5+00.00 | NA | NA | 34.12 | 38.58 | 4.46 | 14.63 |
| 5+20.00 | NA | NA | 34.12 | 36.76 | 2.64 | 8.66 |
| 5+40.00 | NA | NA | 34.14 | 35.89 | 1.75 | 5.74 |
| 5+60.00 | NA | NA | 34.21 | 35.74 | 1.53 | 5.02 |
| 5+80 (A) | 30.67 | 31.58 | 34.29 | 35.64 | 1.35 | 4.43 |
| 6+00 (B) | 30.69 | 31.60 | 34.32 | 35.54 | 1.22 | 4.00 |
| 6+20 (C) | 30.74 | 31.65 | 34.38 | 35.44 | 1.06 | 3.48 |
| 6+40 (D) | 30.82 | 31.73 | 34.47 | 35.34 | 0.87 | 2.85 |
| 6+60.00 | NA | NA | 34.50 | 35.24 | 0.74 | 2.43 |
| 6+80.00 | NA | NA | 34.56 | 35.36 | 0.80 | 2.62 |
| 7+00.00 | NA | NA | 34.62 | 36.48 | 1.86 | 6.10 |
| 7+20.00 | NA | NA | 34.68 | 38.45 | 3.77 | 12.37 |
| 7+40.00 | 30.54 | 31.45 | 34.74 | 40.42 | 5.68 | 18.64 |
| 7+60.00 | NA | NA | 34.81 | 41.88 | 7.07 | 23.20 |
| 7+80.00 | NA | NA | 34.87 | 43.61 | 8.74 | 28.67 |
| 8+00.00 | NA | NA | 34.92 | 46.59 | 11.67 | 38.29 |
| 8+20.00 | NA | NA | 35.00 | 49.79 | 14.79 | 48.52 |
| 8+40.00 | 31.29 | 32.20 | 35.00 | 52.99 | 17.99 | 59.02 |
| 8+60.00 | NA | NA | 35.00 | 55.65 | 20.65 | 67.75 |
| 8+80.00 | NA | NA | 35.00 | 56.78 | 21.78 | 71.46 |
| 8+91.12 | NA | NA | 35.00 | 56.86 | 21.86 | 71.72 |

NA – Not available




## ACCESS ROAD CROSS SECTION KEY MAP

SCALE: 1:1,000

NOTES:

1. FOR REFERENCE OF CROSS SECTIONS LOCATION.
2. REFER TO DWGS. 040-C-32 TO 040-C-38 FOR CROSS SECTIONS.

10 0 20 50

SCALE: 1:1,000

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Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

DRAWN BY AM
DESIGNED BY MVM
CHECKED BY LMR
APPR. BY GN

BR&A LLC
ARCHITECTURE | ENGINEERING | PLANNING

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD CROSS SECTION KEY MAP

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
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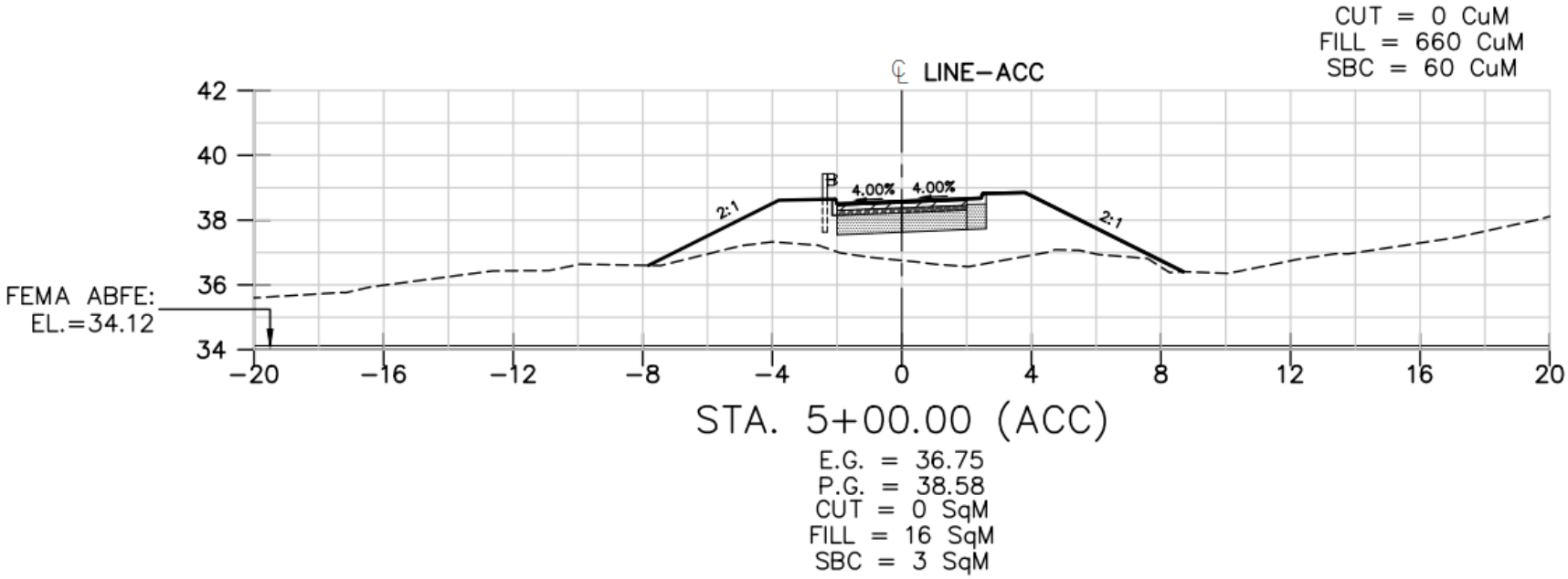
CUT = 0 CuM
FILL = 660 CuM
SBC = 60 CuM
℄ LINE–ACC
42
40
38
36
34
FEMA ABFE:
EL.=34.12
2:1
4.00%
4.00%
2:1
–20
–16
–12
–8
–4
0
4
8
12
16
20
STA. 5+00.00 (ACC)
E.G. = 36.75
P.G. = 38.58
CUT = 0 SqM
FILL = 16 SqM
SBC = 3 SqM

Figure 12: Generators Area Site Plan

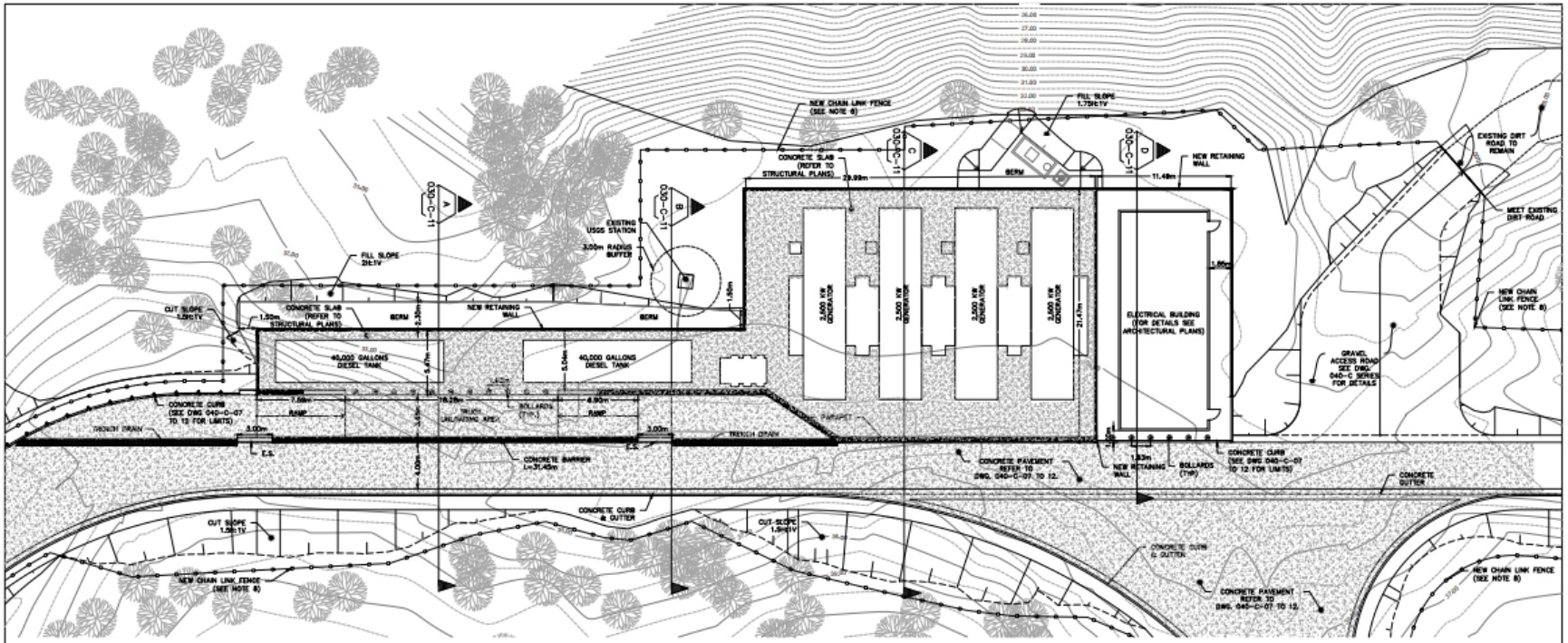


**Table 1: Federal Flood Risk Management Standard (FFRMS) Floodplain Determination**

| | Freeboard Value Approach (FVA) | | 0.2 PFA | | | |
|---|---|---|---|---|---|---|
| Section | 100 yr ABFE (m) = BFE | BFE +3' (0.9144m) | 500 yr ABFE (m) | Finished Floor Elev. (m) | Compliance Elevation Difference (m) | Elevation Difference (ft) |
| A | 30.67 | 31.58 | 34.29 | 34.98 | 0.69 | 2.26 |
| B | 30.69 | 31.60 | 34.32 | 35.03 | 0.71 | 2.33 |
| C | 30.74 | 31.65 | 34.38 | 34.99 | 0.61 | 2.00 |
| D | 30.82 | 31.73 | 34.47 | 35.40 | 0.93 | 3.05 |

Chosen Method

For this particular project, no CISA maps have been made. Therefore, the 0.2PFA value was chosen since it reflects the highest elevation value when compared to the Freeboard Value Approach as shown on Table 1. Finally, FFEs for the four (4) shown sections comply with FFRMS.

SITE PLAN
SCALE: 1:150

GENERAL SITE NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS REFER TO DWG. 000-C-01.
2. FOR SECTIONS REFER TO DWG. 03-C-13.
3. REFER TO DWG. 030-C-06 FOR STORM SEWER PLAN.
4. REFER TO MECHANICAL PLANS FOR DIESEL TANK, GENERATOR EQUIPMENT AND DETAILS.
5. REFER TO ELECTRICAL PLANS FOR ELECTRICAL BUILDING DETAILS.
6. REFER TO VERTEX DATA AND COORDINATES TABLES ON DWG. 030-C-03.
7. REFER TO DWG. 030-C-04 FOR PROPOSED GRADING PLAN AND RETAINING WALL TOP OF WALL ELEVATIONS.
8. FOR CHAIN LINK FENCE EXTENTS SEE DWG. 040-C-07 TO 12.

SCALE: 1:150

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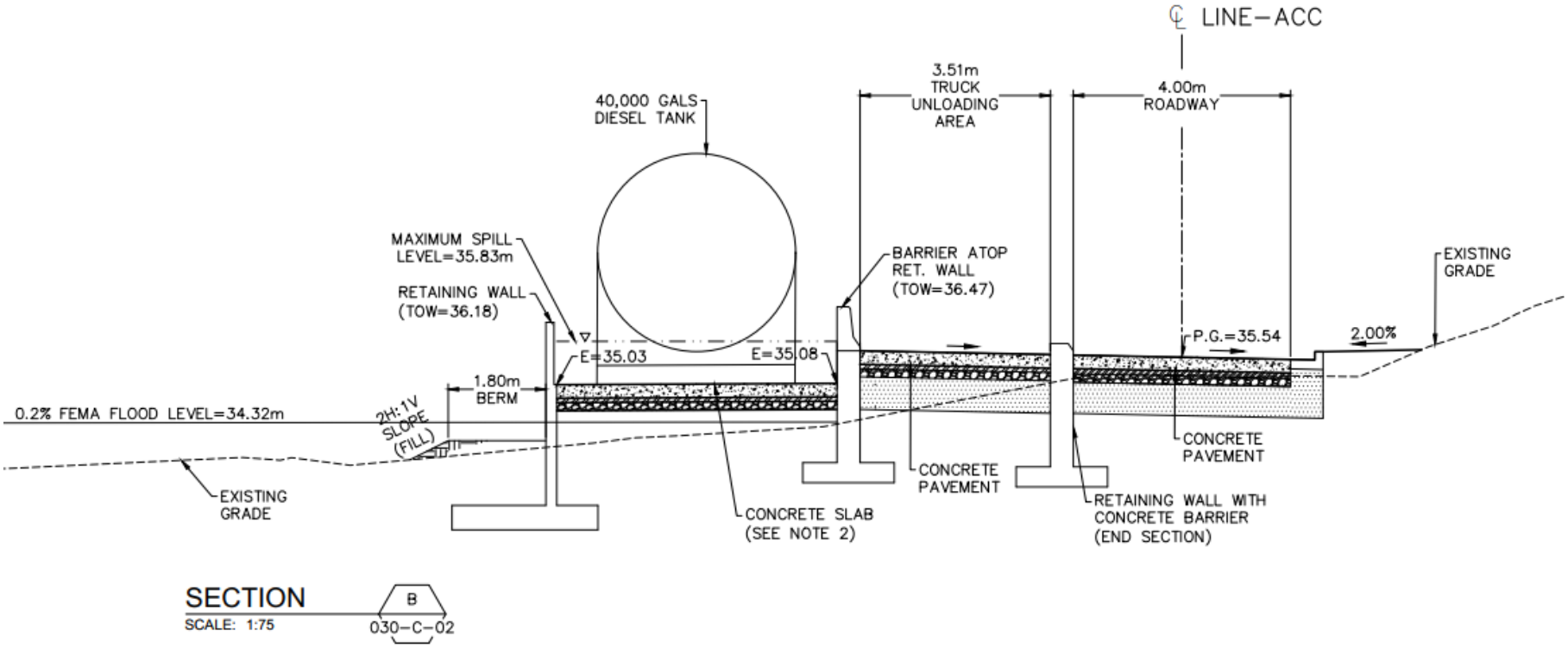
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

GENERATORS AREA - SITE PLAN

Autoridad de Acueductos y Alcantarillados

SEPTEMBER / 2023
1:150
030-C-02


℄ LINE–ACC
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TRUCK
UNLOADING
AREA
4.00m
ROADWAY
40,000 GALS
DIESEL TANK
MAXIMUM SPILL
LEVEL=35.83m
RETAINING WALL
(TOW=36.18)
BARRIER ATOP
RET. WALL
(TOW=36.47)
EXISTING
GRADE
P.G.=35.54
2.00%
E=35.03
E=35.08
1.80m
BERM
0.2% FEMA FLOOD LEVEL=34.32m
2H:1V
SLOPE
(FILL)
CONCRETE
PAVEMENT
CONCRETE
PAVEMENT
EXISTING
GRADE
CONCRETE SLAB
(SEE NOTE 2)
RETAINING WALL WITH
CONCRETE BARRIER
(END SECTION)
SECTION
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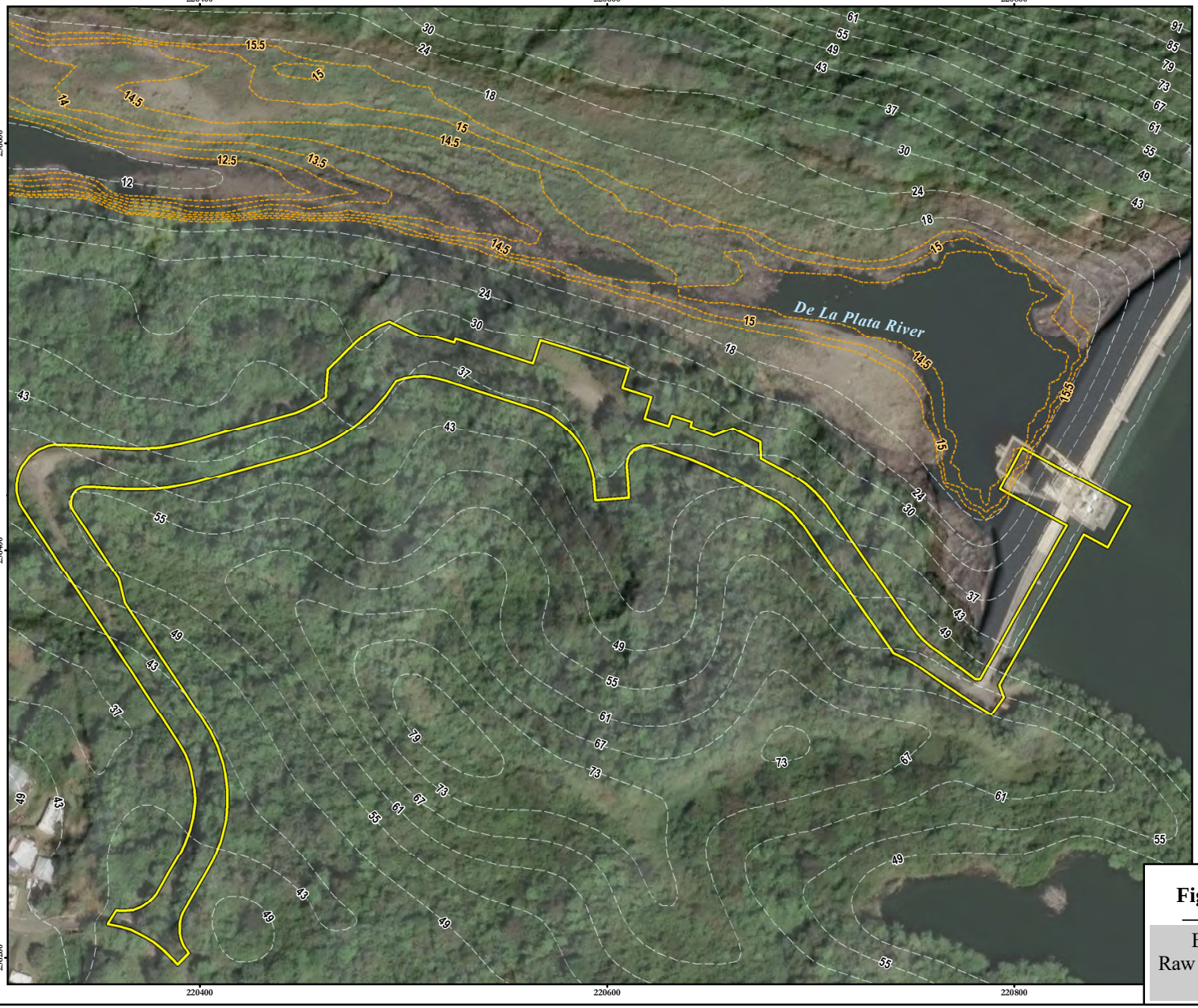
B
030–C–02




Scale: 1:1,900

0 12.5 25 50 75 100

Meters

## Legend

- Contour Line (elevation in meters)[1]
- Contour Line (elevation in meters)[2]
- Project Boundary[3]

Note: Project boundary is approximate.

Sources:
1. Elevation contours derived from the National Elevation Dataset, U.S. Geological Survey, National Geospatial Program, USGS NED 1/3 arc-second Contours for Puerto Rico C, Puerto Rico 20181106 1 X 1 degree FileGDB 10.1, vector digital data, 20181106.
2. Elevation contours derived from U.S. Geological Survey, USGS 1/3 arc-second n19w067 1 x 1 degree TIFF, raster digital data, 20200506.
3. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
3. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community USGS National Map 3D Elevation Program (3DEP). August 27, 2024.

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

CSAGROUP EST • 1956

**Figure 13: Elevation Contours**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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csagis evazquez 10/2/2024 11 x17

***Step 2.*** **Early public notice (Preliminary Notice).**

***FFRMS Floodplain***

The Puerto Rico Department of Housing (PRDOH) has determined that the following Proposed Action under the Community Development Block Grant – Mitigation (CDBG-MIT), Hazard Mitigation Grant Program, Grant number B-18-DP-72-0002, is in the 100-Year floodplain. (At the time of publishing the early public notice the current FFRMS was not in force) PRDOH notified the public and interested agencies of the proposal to consider an action in the floodplain. An Early Notice and Public Review of a proposed activity was published in Primera Hora newspaper on October 10, 2023, to: All Interested Parties, Groups & Individuals. (See **Appendix 3**).

The purpose for this notice was to obtain comments from public who may be affected by activities in floodplains and those who have an interest in the protection of the natural environment should be given an opportunity to express their concerns and provide information about these areas. Commenters were encouraged to offer alternative sites outside of the floodplains, alternative methods to serve the same project purpose, and methods to minimize and mitigate impacts.

*PRDOH received no responses on or before October 26, 2023.*

***Wetlands***

The Puerto Rico Department of Housing (PRDOH) has determined that the Proposed Action, under the Community Development Block Grant – Mitigation (CDBG-MIT), Hazard Mitigation Grant Program, Grant number B-18-DP-72-0002, is located next to an unnamed creek, designated as a riverine wetland with R2UBH classification under the National Wetlands Inventory. The creek is a tributary of the Río La Plata within the Quebrada Cruz ward.. PRDOH requested comments to identify and evaluate practicable alternatives to locating the action and the potential impacts on the wetland from the Proposed Action. An Early Notice and Public Review of a proposed activity was published in Primera Hora newspaper on August 2, 2024, to: All Interested Parties, Groups & Individuals. (See **Appendix 3**).

The purpose for this notice was to obtain comments from public that may be affected by activities in wetlands and those who have an interest in the protection of the natural environment should be given an opportunity to express their concerns and provide information about these areas. Commenters were encouraged to offer alternative sites outside of the wetlands, alternative methods to serve the same project purpose, and methods to minimize and mitigate impacts.

*PRDOH received no responses on or before August 17, 2024.*

***Step 3.* Identify and evaluate practicable alternatives to locating the Proposed Action in the FFRMS floodplain or wetland.**

The Enrique Ortega WTP Emergency Backup Generators project site selection criteria are:

(a) The Proposed Action is considered functionally dependent on the floodplain due to Enrique Ortega WTP pump station location
(b) The project must be relatively close to the Represa del Lago La Plata to facilitate operation during/after atmospheric events and power outages.
(c) Site must allow project components construction and installation while reducing the environmental impacts and costs associated to construction and land acquisition.

PRDOH considered several alternative sites:

- Proposed Action (Preferred Alternative, discussed in Step 1)
- Alternative #1 – No action
- Alternative #2 – Construction of a Backup Power Facility, west to Represa del Lago La Plata facilities.
- Alternative #3 – Construction of a Backup Power Facility, next to Represa del Lago La Plata facilities.
- Alternative #4 – Site Located Next to Represa del Lago La Plata Existing Electrical Facilities
- Alternative #5a, 5b and 5c – Sites Located Adjacent to PREPA's Piñas Electrical Substation
- Alternative #6 – Site Located Northwest to Represa del Lago La Plata

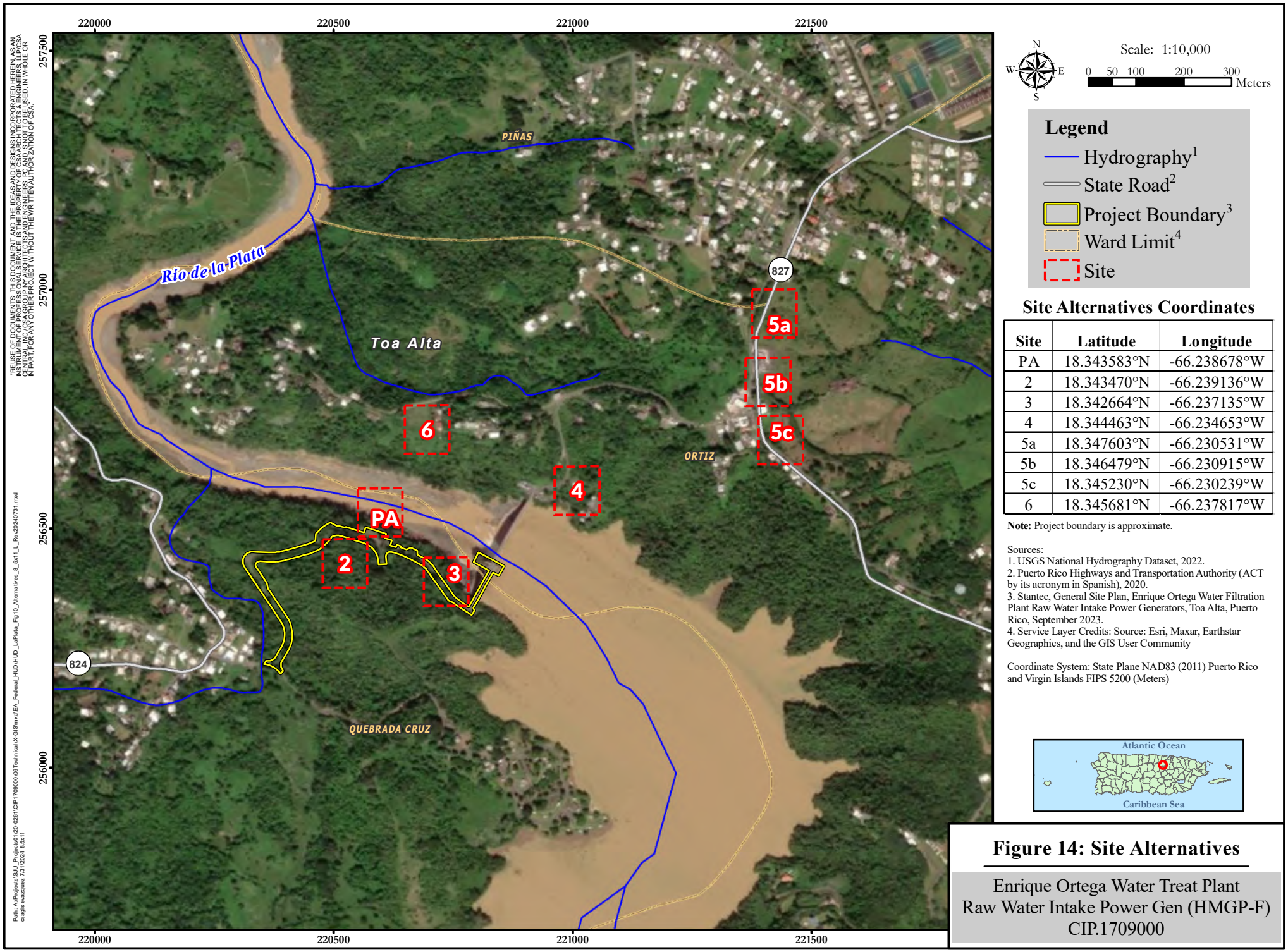
The Figure 14 shows the alternative sites evaluated

A. No Action Alternative

**Alternative #1:** Under the "No-action" alternative the La Plata Dam Raw Water Pump Station will remain "as is" under current limited conditions. The La Plata Dam has three emergency generators with a capacity of 750 kW, 250 kW and 50 kW. The emergency generators capacities only allow the operation of dam gates and other critical safety components, leaving the Raw Water Pump Station without power when grid system fails. Without the installation of the emergency generators and its components, the Enrique Ortega WTP will remain inoperative during power outages or after the passage of atmospheric events. This implies that more than 369,000 habitants, within the Metropolitan area, especially residents from the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño, and Corozal will not receive potable water services during extreme weather emergencies such as hurricanes or other events like power blackouts or service interruptions.

The No Action alternative would not address the project purpose to provide backup power to La Plata Dam Raw Water Pump Station during grid power outages, therefore the continuous operation of the Enrique Ortega WTP will cease due to a shortage of raw water, resulting in the interruption of potable water service to several municipalities. Lack of potable water carries serious consequences like illness and loss of quality of life, among others. The No Action Alternative does not satisfy the Purpose and Need of the Proposed Action as discussed above.

The No Action alternative would have no impact anticipated on the riverine wetland or the floodplain.




## Site Alternatives Coordinates

| Site | Latitude | Longitude |
|---|---|---|
| PA | 18.343583°N | -66.238678°W |
| 2 | 18.343470°N | -66.239136°W |
| 3 | 18.342664°N | -66.237135°W |
| 4 | 18.344463°N | -66.234653°W |
| 5a | 18.347603°N | -66.230531°W |
| 5b | 18.346479°N | -66.230915°W |
| 5c | 18.345230°N | -66.230239°W |
| 6 | 18.345681°N | -66.237817°W |

**Note:** Project boundary is approximate.

Sources:
1. USGS National Hydrography Dataset, 2022.
2. Puerto Rico Highways and Transportation Authority (ACT by its acronym in Spanish), 2020.
3. Stantec, General Site Plan, Enrique Ortega Water Filtration Plant Raw Water Intake Power Generators, Toa Alta, Puerto Rico, September 2023.
4. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Coordinate System: State Plane NAD83 (2011) Puerto Rico and Virgin Islands FIPS 5200 (Meters)

**Figure 14: Site Alternatives**

Enrique Ortega Water Treat Plant
Raw Water Intake Power Gen (HMGP-F)
CIP.1709000

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csagis evazquez 7/31/2024 8.5x11

B. Locate the project Within the FFRMS Floodplain (2 Alternatives)

**Preferred Alternative:** See Step 1 for Alternative in-depth analysis and discussion. The proposed project Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators is located in a FFRMS floodplain. The FEMA ABFE Map locates the project areas within the Flood Zone X, with a 0.2% annual chance of flooding, and within the Flood Zone A

Using the approach **0.2PFA (0.2 Percent Annual Chance Floodplain or 500-Year Floodplain)** to determine FFRMS floodplain, for critical actions, new construction shall be over the ABFE 0.2% annual chance elevation or an additional 3 feet above the Base flood elevation (BFE) (1-percent-annual-chance or 100-year flood) or BFE+3, whichever is greater.

The proposed grading or final floor elevations for the project components within the FFRMS floodplain are higher than the ABFE 0.2% Annual Chance Floodplain elevations by more than 2 feet (0.61 m), complying with the Federal Flood Risk Management Standards for 0.2PFA. Proposed Action would result in direct, long-term, minor adverse impact to FFRMS floodplain as result of site preparation with implementation of proposed BMPs.

The access road within 100 feet of a Riverine Wetland will require implementing erosion control best management practices (BMPs: Erosion Prevention, Sediment Control, Runoff Control among others) to avoid sediment migration to nearby wetlands. Proposed Action may have a direct, temporary, minor adverse impact to riverine wetland during road construction activities.

**Alternative #3:** Construction of a Backup Power Facility, west to existing Represa del Lago La Plata facilities (coordinates: 18.342664°N, -66.237135°W), approximately 200 meters from the Represa La Plata pump control building. The Alternative 3 area shows limited space, which makes it very difficult for equipment and truck maneuvering. Alternative 3 would also require a containment wall on the side facing the dam structure and affects a heavily forested area . (**Figure 14** - Location of Evaluated Alternatives). The Alternative 3 area has an existing dirt road to be rehabilitated to provide access to the facility premises with entrance from Camino Recreativo La Plata and Road PR-824.

The Alternative 3 location shows a variable topography with no visible runoff conveying areas. The alternative site is located within the FFRMS floodplain zone. It has the closest distance to the Represa del Lago La Plata site after the base site. It is necessary to bury underground electrical conduits from the alternative site up to the dam structure, and then continue exposed conduits from where the dam structure starts to the dam intake tower to intercept the existing electrical infrastructure.

PRASA owns the 10.24-acre lot which contains the Alternative 3 site. Additional land acquisition (1,800 square meters) activities should occur to provide the Alternative with a maneuvering area for large trucks and maintenance vehicles. Land acquisition cost is approximately $93,600.

Reviewing Figure 14 Location of Evaluated Alternatives, and **Figure 7** FEMA 1% & 0.2% Floodplains Boundary lines found the location of Alternative 3 over both zones, being the 0.2% Percent Annual Chance Floodplain what determines that the project is within a FFRMS floodplain. Being the alternative a critical action, to comply with FFRMS alternative elevations, must be higher than the 0.2 Percent Annual Chance floodplain. Alternative 3 would result in direct, long-term, minor adverse impact to FFRMS floodplain as result of site preparation with implementation of proposed BMPs.

The approximate earth disturbance activities would cover an area of 8,250 square meters (2.04 acres), and an estimated volume of 9,500 cubic meters of cut and 3,500 cubic meters of fill will be required with an approximate cost of $1,370,000. The installation of conduits for power wire and fiber optic cable would be approximately 25 meters long and 95 meters attached to the dam access bridge wall and along the pump station exterior wall with conduit supports. The site is downstream of the Represa del Lago La Plata but still remarkably close to the Río La Plata. In case of an accidental spill, diesel fuel would not jeopardize Enrique Ortega WTP operation but would impact the Río La Plata which would be approximately 270 meters southwest of the diesel tanks. The design would incorporate engineering controls like double-walled tanks, an extra dike for additional containment, an oil trap, and spill/overflow monitoring system, to reduce the chance of an oil spill but, assuming a failure in one of the tanks, up to 40,000 gallons of diesel fuel could end up in the river. Aquatic life

as well as vegetation would be impacted by such an event. Remediation and mitigation costs would exceed $750,000. Further site analysis shows that due to limited space it is very difficult to accommodate the proposed equipment and provide space for heavy equipment and truck maneuvering in a two-story structure. It would also require a containment wall on the side facing the dam structure and affects an area covered by trees. Alternatively, the site could be expanded through extensive earthwork. The cost associated with this or with the two-story structure would be significant when compared to other discarded alternatives, including the PA. The cost does not include the cost to mitigate the tree cutting authorization. Assuming the number of affected trees is twice the Preferred Action, the estimated number of affected trees is 692 trees. The cost of mitigating the action with Monetary Compensation implies an amount of $207,600.

The access road with entrance from Camino Recreativo La Plata and Road PR-824 is within 100 feet from a small unnamed creek, designated as a riverine wetland. Alternative 3 would have a direct, temporary, minor adverse impact to riverine wetland during road construction activities.

The alternative area was evaluated and does not present the biotic and hydrological characteristics of a wetland. There is a buffer strip between the existing dirt road and the riverine wetland. The vegetation observed throughout these areas are fast-growing grasses and shrubs typical of previously disturbed areas. Forest patches of secondary succession are observed outside the area that the alternative would impact, some of these bordering much of the extension of the road. The access road within 100 feet of a Riverine Wetland will require implementing erosion control best management practices (BMPs: Erosion Prevention, Sediment Control, Runoff Control among others) to avoid sediment migration to nearby wetlands.

C. Locate the project Out of the FFRMS Floodplain (4 Alternatives)

**Alternative #2:** Construction of a Backup Power Facility, west to Represa del Lago La Plata facilities. The alternative site is located outside the FFRMS flood elevation, approximately 50 meters shifted southwest of the Preferred Alternative (coordinates: 18.343470°N, -66.239136°W), towards the existing slope at the south side of the road. The proposed grading or levels for the generators and equipment would be above the ABFE level and outside the FFRMS floodplain as per FEMA maps. (**Figure 14** – Location of Evaluated Alternatives). The Alternative 2 includes upgrading an existing dirt road to provide permanent access to the facility premises with entrance from the Camino Recreativo La Plata and Road PR-824.

The Alternative 2 would occupy a total of 6,051 $m^2$ (1.50 acres) of land divided into the areas for access road, road extension for truck turning path, and the generators and diesel tanks platform. Although final staging areas to support construction activities were not included, an estimated area of 917 $m^2$ (0.23 acre) would be required to be used as staging area.

The Alternative 2 location has a steep slope with mature trees and diverse vegetation, that will require major leveling, including clear and grubbing activities. The required earthwork to accommodate the site to develop the Alternative 2 results in an increase in the project cost, when compared to the Preferred and other discarded alternatives. The earthwork would require 103 cubic yards of cut, 17,717 cubic yards of rock excavation, and 3,078 cubic yards of fill. The estimated cost for this action is approximately $2,190,000. This estimate does not include the cost to mitigate the tree cutting authorization. Assuming the number of affected trees is 3 times the Preferred Action, the estimated amount of affected tress is 1,038 trees. The estimated cost to mitigate the action with Monetary Compensation implies an amount of $311,400.

The access road with entrance from Camino Recreativo La Plata and Road PR-824 is within 100 feet from a small unnamed creek, designated as a riverine wetland. Alternative 3 would have a direct, temporary, minor adverse impact to the riverine wetland during road construction activities.

The Alternative 2 area was preliminarily evaluated and does not show the biotic and hydrological characteristics of a wetland. There is a buffer strip between the existing dirt road and the riverine wetland. The vegetation observed throughout the area are fast-growing grasses and shrubs typical of previously disturbed areas. Forest patches of secondary succession were observed adjacent to the proposed area. These forested areas might require removal, some of these are bordering segments along the existing dirt road extension. The access road within 100 feet of a Riverine Wetland will require to implement erosion control best management practices (BMPs: Erosion Prevention, Sediment Control, Runoff Control among others) to avoid sediment migration to nearby wetlands.

**Alternative #4:** Generators and equipment located northeast next to the electrical facilities of Represa del Lago La Plata (coordinates: 18.344463°N, -66.234653°W). (**Figure 14** – Location of Evaluated Alternatives) The Alternative 4 access roads are Road PR-827 and a municipal road to Represa del Lago La Plata.

Alternative 4 would require land acquisition of approximately 3,200 $m^2$ (0.79 acres) for the generators and diesel tanks area. The works would require the installation of an underground electrical line (110 meters trench). Portions of the alternative area are owned by PRASA while some portions may remain privately own. Land acquisition cost is approximately $166,400.

The site vegetation to be impacted consists mainly of grasses with some scattered trees. The land to be acquired has two structures that would be demolished to open space for the generator's pad: a concrete/wood house and a concrete house. Assuming the number of affected trees is 25 trees, the cost to mitigate the action with Monetary Compensation implies an amount of $7,500.00.

Further analysis of this Alternative 4 revealed that the generators pad location was on top of an existing 54" Ø Raw Water Pipeline, which limits future repair and maintenance activities. The existing 54"Ø raw water pipeline and its ROW resulted in a site rearrangement to avoid the construction of new project components on top of existing infrastructure. There is considerable earth movement to build the generator's concrete pad and access to vehicles for maintenance area (2,970 cubic meters of cut and 606 cubic meters of fill). Cost estimate for cut and fill is approximately $400,000. Retaining walls most likely will be required, to provide an area for fuel tank and maintenance vehicles maneuvering, if not the fuel dispatch truck would have to drive backwards from PR-827 to the Represa del Lago La Plata (approximately 660 meters) through a very narrow road. Working on the site could affect the integrity of the line and expose the pipeline to breakage and/or have a portion of it under the concrete pad for the generators. The cost estimate for the required retaining walls is approximately $2,141,000. The site is located upstream of the dam; any accidental fuel spill would jeopardize Enrique Ortega WTP operation for hours or days. The design would incorporate engineering controls like double-walled tanks, an extra dike for additional containment, an oil trap, and spill/overflow monitoring system, to reduce the chance of an oil spill but, assuming a failure in one of the tanks, up to 40,000 gallons of diesel fuel could end up in the reservoir. Aquatic life would be impacted by such an event and also the WFP operation, as mentioned previously. If the Enrique Ortega WFP ceases operation, PRASA loses $2,500,000 daily in revenues and more than 169,000 clients will not have drinking water service. Remediation and mitigation costs would exceed $7,50,000.

Alternative 4 area is not located within the FFRMS floodplain. No wetlands were identified within the Alternative 4 proposed area.

**Alternatives #5a-c:** Sites Located Adjacent to PREPA's Piñas Electrical Substation: Three sites (5a, 5b and 5c) adjacent to the Piñas Electrical Substation were evaluated (**Figure 14**- Location of Evaluated Alternatives). These locations were evaluated as potential sites to develop the Proposed Action, however, the distance to existing raw water intake pump station, the elevated electrical construction cost, and proximity to residential areas resulted on the dismissal when compared to other more favorable locations.

Alternatives 5a-c locations are not located within the FFRMS floodplain. No wetlands were identified within the Alternatives 5a-c proposed locations.

***Alternative #5a*:** Located on state road 827 (coordinates: 18.347603°N, -66.230531°W), north next to PREPA's Piñas Electrical Substation and approximately 900 meters from the Represa del Lago La Plata main access gate. The alternative 5a access road is Road PR-827.

The proposed location shows a variable topography with a nearby depression were stormwater runoff runs. Site area elevations vary from 129 meters down to 119 meters. It is adjacent to the main road and there are high voltage lines passing near Piñas Electrical Substation. The generators platform has to shift the required ROW away from the power lines 100 feet (30.5 meters) for regulatory requirements. It is considered installing the generators, fuel tanks and switchgear, and running underground electrical conduits from the site to a paralleling switchgear located at the dam site. This paralleling switchgear would be located at the base site but occupying a significantly less area; it might be possible that it could be located entirely on PRASA's property. The land that needs to be acquired is approximately 3,850 square meters. Earth movement has been estimated around 14,340 cubic meters. The alternative site would affect approximately 25 trees that must be removed. Site is less than 40 meters from the nearest residence boundary. Assuming the number of affected trees is 25 trees, the cost to mitigate the action with Monetary Compensation implies an amount of $7,500.00.

***Alternative #5b*:** Located on state road 827 (coordinates: 18.346479°N, -66.230915°W), south to PREPA's Piñas Electrical Substation and approximately 710 meters from the Represa del Lago La Plata main access gate. The alternative 5a access road is Road PR-827.

The proposed location shows a semi-flat topography with no visible runoff conveying areas. It is adjacent to the main road and the high voltages lines passing nearby do not affect the site development. This Alternative considers installing the generators, fuel tanks and switchgear, and running underground electrical conduits from the site to a paralleling switchgear located at the dam site. This paralleling switchgear would be located at the dam site. The alternative requires land acquisition of approximately 1,600 square meters for the new site and potentially 24 square meters to accommodate the paralleling switchgear near Represa del Lago La Plata. Earth movement has been estimated around 2,300 cubic meters. The alternative site would not affect any tree. Site is less than 40 meters from the nearest residence boundary. No impacts to forested areas or trees were identified as part of the proposed activities, therefore no mitigation costs are expected.

***Alternative #5c*:** Located on state road 827 (coordinates: 18.345230°N, -66.230239°W), southeast to PREPA's Piñas Electrical Substation and approximately 770 meters from the Represa del Lago La Plata main access gate. The alternative 5a access road is Road PR-827.

This Alternative location shows a variable topography with a depression where stormwater runoff runs in the middle. It is adjacent to the main road and there are no high voltage lines passing nearby. It was considered installing the generators, fuel tanks and switchgear, and running underground electrical conduits from the site to a paralleling switchgear located at the dam site. This paralleling switchgear would be located at the dam site. The land that needs to be acquired is approximately 2,160 square meters. Earth movement has been estimated around 5,640 cubic meters approximately. The alternative site would not affect any tree. Site is less than 20 meters from the nearest residence boundary. No impacts to forested areas or trees were identified as part of the proposed activities, therefore no mitigation costs are expected.

**Alternative #6:** Site Located Northwest of Represa del Lago La Plata, approximately 275 meters northwest from the Represa del Lago La Plata main access gate (coordinates: 18.345681°N, -66.237817°W) and approximately 580 meters from its main access gate. (**Figure 14** - Location of Evaluated Alternatives) The Alternative 6 access roads are Road PR-827 and a municipal road to Represa del Lago La Plata.

This site was discarded early in the evaluation because high voltage lines cross it right in the middle. PREPA's (LUMA) typical right of way for 115 KV lines is 100 ft (30.5 meters) to allow service and maintenance and to comply with safety requirements. When the right of way is projected, the available area for development is reduced considerably, limiting the equipment space. The concrete pad would have to be in a highly steep terrain. The available construction area after taking into consideration the required right of way would be approximately 673 square meters. This alternative site would not result in impacts to forested areas or trees. No impacts to forested areas or trees were identified as part of the proposed activities, therefore no mitigation costs are expected.

Alternative 6 area is not in FFRMS floodplain. No wetlands were identified within the Alternative 6 proposed location.

Alternative 6 was discarded early in the evaluation process. No analysis was done on costs associated to earthwork, land acquisition, construction cost estimates, flood insurance costs, potential property losses for Alternative 6.

***Step 4.*** **Identify and evaluate the potential direct and indirect impacts of proposed action associated with occupancy or modification of the FFRMS floodplain or wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the proposed action, including impacts related to future climate-related flood levels, sea level rise, and the related increased value of beneficial floodplain and wetland functions.**

As previously discussed, the **EO 13690** established three approaches for determining the Federal Flood Risk Management Standard (FFRMS) flood elevation:

- **Climate-Informed Science Approach (CISA),**
- **0.2-Percent-Annual-Chance (500-Year) Flood Approach (0.2PFA), and**
- **Freeboard Value Approach (FVA)**.

CISA reports are only available for coastal areas and the project location is out of the CISA studied areas, therefore the CISA approach is not feasible to be used to determine the FFRMS flood elevation for this project. The preferred approach is to use the **0.2PFA Flood Approach for critical actions,** the FFRMS floodplain elevation to be used will be the higher of the 0.2 Percent Annual Chance floodplain elevation or the BFE+3 (1.0%) elevation..

The Preferred Action components has been designed to comply with the 0.2 Percent Annual Chance Floodplain Elevation.

Locating the project at the preferred site selected will have minimum impacts to the floodplain because the structures will be elevated a minimum of 2.43 ft (0.74m) above the 0.2 PFA elevation and have a footprint designed to minimize these impacts. The design will also minimize potential damage to the property as a result of the flooding. PRASA as owner and operator of potable water systems includes flood insurance to infrastructure owned by the agency that is located within flood zones, therefore PRASA will provide flood insurance for the emergency generators platform in order to mitigate any effects of flooding.

In addition to concerns for life and property, PRASA, PRDOH and HUD considered the natural values of the floodplain. The natural resources of the floodplain include water, biological, and societal resources. The natural area selected to build the Proposed Action was previously disturbed between 2021 and 2022, as it was used as staging area to repair the scours found at the base of the Represa del Lago La Plata structure. This was preferred over other evaluated alternatives to minimize impacts to forested areas and reduce earthworks materials leveling/extraction and costs associated to these activities. The existing dirt road that provides access to the facility premises, and project area (access road, power generators site, staging area) contains vegetation typical of areas that have been previously disturbed (fast-growing grasses and shrubs).

The Fish and Wildlife Service concurred with PRASA's determination that the proposed project may affect, but is not likely to adversely affect the Puerto Rican boa with the implementation of conservation measures. With this determination the requirements of section 7 of the Endangered Species Act (Act) have been satisfied (see **Appendix 4**).

Societal resources were also considered during the design process. No residences were identified within a radius of approximately 300 meters from project center. The designs are meant to complement the natural features of the area and to offer an aesthetically pleasing structure. The site will not have an effect on agricultural lands and efforts have been made to minimize construction areas and preserve existing trees on the site. An easement will be made to allow PRASA access for maintenance and operation purposes. The PRASA will also allow the facilities to be accessible for archaeological, historic, environmental, biological, and other scientific studies should an individual or an organization express interest.

*Sea Level Rise Analysis*

The Proposed Action is located approximately 14 kilometers south from the north coast and at an average elevation of 30 meters over the sea level, therefore is not subject to impacts associated to sea level rise. The actions of the construction of the generator's platform rising 2.0 feet (0.61 m) above the 0.2PFA elevations and other project components would not have impacts related to future climate-related flood levels in the project site nor sea level rise in the north coast. The Proposed Action impacts maintain the functionality of the beneficial floodplain and wetland.

*Vegetation Management Analysis*

The Preferred Alternative would directly affect approximately 346 trees that must be removed to allow the construction of proposed project components. The Proposed Action will apply for a Tree Cutting Authorization Permit, following the provisions of Chapter 3.4, Single Incidental Operational Permit of the Joint Regulations (2023) which requires mitigation for each tree to be removed. (See **Appendix 5**).

None of the project components are located or would impact the nearby DNER Natural Protected and Priority Conservation Areas. The project is not a hazard to flora or fauna habitat. The Proposed Action will not result in impacts to land use classifications, which are predominantly associated to natural preservation.

*Cultural Resources Analysis*

The Preferred Alternative components have been located in areas with a low potential to impact archaeological resources. However, the installation of Proposed Action components (attaching power and fiber optic conduits underneath the dam access bridge wall and along the pump station exterior wall with conduit supports) for approximate 95 meters long would not impact the aesthetics, historic and cultural values of the Represa del Lago La Plata (circa 1974). A formal SHPO consultation process will occur as part of the agencies consultation process to comply with requirements of the National Historic Preservation Act, Section 106 Consultation.

*Traffic Associated to Construction*

The delivery of materials, equipment and heavy trucks would result in temporary, minor impacts to the traffic in the vicinity of Quebrada Cruz Ward and El Tocón Sector through State Roads PR-861, PR-824, and Camino Recreativo La Plata. The adverse impacts associated to the traffic increase could be mitigated by Implementing Best Management Practices, that would include measures such as traffic management techniques. Considering whether stormwater runoff would flow into the offsite wetland, it is necessary to implement construction BMPs to avoid or minimize the migration of sediments out of the project construction areas will be included as part of the Stormwater Pollution Prevention Plan (SWPPP). BMPs can be classified as Erosion Prevention, Sediment Control, Runoff Control, among others. Examples of practices include the installation of geotextile material, fiber rolls, hay bales and silt fences. Traffic control BMP's must also be implemented to reduce hazard and inconvenience to residents. The design drawings contain sheets detailing the maintenance of traffic (MOT). There would be construction signs, temporary traffic control zones, no works to be done during peak hours (7:00 to 8:00 am and 3:00 to 7:00 pm, Monday to Friday), temporary lane closures, off-site detours or use of alternate routes, no material or equipment left in the road area after work hours, and maintaining access at all times to properties, among other measures. Traffic control management during construction would be temporary.

*State Environmental Compliance Analysis*

The Puerto Rico Permit Management Office (OGPe, for its Spanish acronym) Division of Environmental Compliance evaluated the project Environmental Assessment (OGPe Project Number - *2024-575571-DEA-300221)* to adequately evaluate the potential environmental impacts associated to the Proposed Action construction/operation activities. The OGPe determined that impacts were evaluated and proposed mitigation activities are in compliance with the Environmental Public Policy Law of June 11, 2024, requirements. Local environmental compliance determination was issued by OGPe in June 11, 2024, including typical mitigation measures that are mandatory to reduce potential environmental impacts and minimize adverse effects, mainly associated to construction activities.

Among requirements and commitments included in the determination are:

- Prepare an Emergency Response Plan to properly manage and respond to spills for all tanks installed above ground, used for the storage of fuel(s), raw materials, or any chemical substance.
    - The Emergency Plan must be submitted to the DNER Water Quality Area reflecting the actions to be taken to avoid, control and remedy fuel or chemical substance spills, in accordance with Rule 1306.5 of Regulation No. 9079 of April 26, 2019, known as the "Puerto Rico Water Quality Standards Regulations."
- Take the necessary measures to prevent residues of organic and inorganic substances such as oils, fuels, or other chemical substances from being carried away by runoff and gaining access to bodies of water.
- All matters concerning the management of rainwater and control of runoff from the property will be taken into consideration.
- Take the necessary measures to control erosion and prevent sedimentation during the execution of the works.

A Spill Prevention Control and Countermeasures Plan (SPCCP) will be prepared for construction and operation activities.

The Proposed Action will result in minor, temporary adverse impacts to the floodplain, mainly associated with the construction process. By elevating the equipment and careful design of project components in and around the floodplain, the construction will have minimal effects on water resources and will not increase the risk of flood loss during normal weather or extreme atmospheric events. Moreover, the Proposed Action will not result in an increase base discharge or increase the flood hazard potential to other properties and structures. The action will not contribute to flood loss that will impact human health, safety, or welfare, and will not induce future growth and development of nearby areas, which will potentially adversely affect the floodplain. The action does not involve dredging activities, or the discharge of pollutants into the floodplain. The Proposed Action minor temporary impacts are mitigated by the long-term major beneficial impacts that the proposed project represents for the Enrique Cuevas potable water service area and the Municipalities served. The Proposed Action will result in an increase to the infrastructure resilience of the La Plata WTP and the PRASA potable water system.

The Proposed Action has no direct impact on wetlands according to USWFS National Wetlands Inventory (NWI). The unnamed creek, designated as a riverine wetland on the NWI map, is within the 100 feet buffer around the project and could be temporarily impacted by the proposed road improvements. There is a buffer strip between the existing dirt road and the riverine wetland. The project would implement erosion control best management practices (BMPs) to avoid sediment migration to nearby wetlands. Examples of practices include the installation of geotextile material, fiber rolls, hay bales and silt fences.

***Step 5. Where practicable, d*esign or modify the proposed action to minimize the potential adverse impacts to lives, property and from the FFRMS floodplain or wetland and to restore and preserve its natural and beneficial floodplain or wetland or wetland values.**

The proposed location for the emergency generators facility was determined mainly considering the need for a relatively leveled piece of land structurally sound to withhold an outstanding load, adjacent to the existing Enrique Ortega Pump Station. After considering the alternatives presented in Step 3, the Proposed Action is the one with the best potential. The Preferred Alternative location has been previously disturbed. The Proposed Action preserved other locations with more natural and forestry conditions from being developed. The Staging Area is proposed to be located in a previously disturbed area. The Proposed site location would affect approximately 346 trees, while the Mitigation Plan requires 1,038 trees to plant. To mitigate the action with Monetary Compensation implies an amount of $103,800.00.

The project impacts directly a FFRMS floodplain from the Río La Plata. The FFRMS regulatory requirement is 0.2PFA for new construction of critical actions. The project increased the elevation of the components more than 2 feet over 0.2PFA minimizing the impacts to the floodplain. The design elevation will be properly documented on an Elevation Certificate or a Floodproofing Certificate prior to starting construction activities. As part of the Proposed Action, cut and fill activities will be performed to guarantee project components elevation complies with ABFE 0.2% requirements. The modification of current ground elevation is considered minimal; therefore, no adverse effects have been identified to FFRMS floodplain or neighboring properties.

The selection of the existing dirt road to develop the project access road preserves natural ground from being developed. BMPs are necessary to avoid or minimize the migration of sediments out of the project construction areas to the nearby riverine wetland. BMPs can be classified as Erosion Prevention, Sediment Control, Runoff Control, among others. Examples of practices include the installation of geotextile material, fiber rolls, hay bales and silt fences to help preserve floodplains and wetlands.

The stormwater management system at the generator platform is designed to mitigate flood damage to the structures. The backup generators diesel tanks will be double-walled and would be installed inside a concrete dike as an extra measure to provide additional containment. The installation of oil/water separator tank at the outlet of the proposed storm sewer system to remove oil or grease from the runoff water prior to discharge into the ground or river. These measures help minimize equipment failure, prevent, or alleviate hazardous spills into the FFRMS floodplain and wetland values.

In terms of the actions to protect occupants, the Represa del Lago La Plata has already established an early warning system to notify residents living downstream of the reservoir when the gates are going to be opened. This protocol is in coordination with disaster management agencies from the government and the corresponding municipalities. This system would also serve to notify any occupants working in the generator's premises that the gates will be opened and that the water level in the river will rise. Also, personnel temporarily occupying the premises will be either PRASA employees or contractors hired by PRASA. PRASA personnel at the dam will alert or prevent anyone from going to the generator area if the conditions are not safe.

Upon project completion, actions will be implemented to restore staging area and other temporarily affected areas that were cleared during construction to their original natural state and preserve the natural and beneficial values.

The Office of Permits Management (OGPe for its Spanish acronym) and the Division of Evaluation of Environmental Compliance (DECA for its Spanish acronym) evaluated the project under permit 2024-575571-DEA-300221 included the recommendations to be implemented, among others, to help preserve benefits of floodplains and wetland areas: (**Appendix 6**).

- Apply through OGPe for the Single Incidental Operational Permit, in accordance with Rule 3.4.1 of Regulation No. 9473, effective June 16, 2023, known as the "Joint Regulation for the Evaluation and Issuance of Permits Related to Development, Land Use and Business Operations".
- All storage, handling, and disposal processes of non-hazardous solid waste to be generated during the different phases of the Proposed Action will be carried out in accordance with the provisions of the Regulation for the management of non-hazardous waste, Regulation No. 5717-1997.
- Take the necessary measures to control the area during construction to avoid exposing vehicles to collecting mud, dust, sticky substances or viscous material on the wheels or other parts of the vehicle, which in turn can be deposited in the streets or other public place and thus keep the public roads and surroundings of the project free of construction waste accumulation.
- Take the necessary measures to prevent waste from organic and inorganic substances such as oils, fuels, or other chemical substances from being carried by the runoff and gaining access to any body of water or the storm system.
- Objectionable odors that may affect the communal atmosphere must be controlled.
- You must stop all types of excavation, movement, and removal of the earth's crust, and notify the Archaeology and Ethnohistory Program within twenty-four (24) hours, in the event that, during the development of the project, any deposit, element, structure or vestige of an archaeological nature is discovered or impacted.

**Step 6. HUD or the responsible entity shall consider the totality of the previous steps and the criteria in this section to make a decision as to whether to approve, approve with modifications, or reject the proposed action. Adverse impacts to floodplains and wetlands must be avoided if there is a practicable alternative.**

The purpose of this step is to re-evaluate Steps 3 to 5 to minimize FFRMS floodplains and wetlands impacts. During Step 3, Proposed Action and six alternatives were evaluated with the goal of selecting the most qualified strategic location to fit the backup generators and related appurtenances to power the Represa del Lago La Plata.

Although the Preferred Alternative site is in a floodplain, the project has been designed to comply with flood elevation levels and minimize effects on floodplain values. Additionally, steps were taken to minimize risks to human life and property via already existing evacuation plans, construction methods, flood insurance, etc. The estimated annual cost of flood insurance is $437,365 and the costs of elevating the structure is $1,424,076. The increased elevation of the components more than 2 feet over 0.2PFA will save $* annually[4] on flood insurance compared to building at the BFE. This means the additional elevation cost will pay for itself in * years due to decreased mandatory flood insurance premiums. The PRASA will cover the floodproofing costs and flood insurance premiums for the life of the structure in accordance with the Flood Disaster Protection Act of 1973.

The Alternative 1 (No action) was rejected because it would not address the current need to provide backup power to Represa La Plata Raw Water Pump Station and guarantee the continuous operation of the Enrique Ortega WTP. If the raw water source is interrupted, the potable water service to several municipalities will be interrupted as well. Lack of potable water carries serious consequences to human health, business and service interruptions and loss of quality of life, during power outages or after the passage of severe atmospheric events.

The Alternative 2 location has a steep slope with mature trees and diverse vegetation, that will require major leveling, including clear and grubbing activities. The required earthwork to accommodate the site to develop this alternative results in an increase in project costs, when compared to the Preferred and other discarded alternatives. Site development is problematic due to access, storm-water runoff management and other operational concerns. The economic compensation to comply with tree mitigation requirements exceeds the cost of mitigation estimated for the preferred alternative, on which the existence of forested areas is minimal. The land acquisition values, forested areas mitigation costs, and other potential environmental impacts associated to heavy earthwork activities could result in an estimated cost of approximately $976,000 over the preferred alternative, making Alternative 2 not as practicable.

Alternative 3 site, located within the FFRMS floodplain zone, has reduced site acreage to guarantee construction and service vehicles maneuverability, additional land acquisition, increased costs associated to forested areas mitigation, as well as increased construction costs associated to site development (heavy earthworks activities) and constructability issues (a containment wall on the side facing the dam structure). The development of this alternative would cost $2,326,000 more, when compared to the Preferred Alternative.. Alternative 3 includes the construction of the access road from Camino Recreativo La Plata. The access road within 100 feet of a Riverine Wetland will require the implementation of erosion control best management practices (BMPs: Erosion Prevention, Sediment Control, Runoff Control among others) to avoid sediment migration to nearby wetlands.

The Alternative 4, which is located next to the Represa del Lago La Plata, was discarded mainly due to the existence of an underground 54" Ø Raw Water Pipeline that pass through the site, limiting future repair and maintenance activities. Construction or operation activities on top of the raw water pipeline could affect the integrity of the line and expose the pipeline to breakage and/or have a portion of it under the concrete pad for the generators. The site is located upstream of the dam, which increases the potential risk associated with reservoir water contamination if any accidental fuel spill occurs. The spill event would jeopardize the Enrique Ortega WTP operation for hours or days until the situation is controlled. The economic impact of a diesel fuel oil spill is hard to estimate since it depends on the spill volume, but it is almost certain that it will exceed hundreds of thousands of dollars.

[4] * HUD agreed with PRASA to determine values in a later stage

As part of the analysis of alternatives out of the floodplain the Alternatives 5a-c would require additional land acquisition and the underground electrical conduits from the sites to a paralleling switchgear located at the dam site would be approximately 710 to 900 meters long. The distance to existing raw water intake pump station, the elevated electrical construction cost, and proximity to residential areas resulted in the dismissal when compared to other more favorable locations. The costs associated to the infrastructure installation have been calculated approximately 6 to 8%, exceeding the cost of the Preferred alternative.

The Alternative 6 was discarded early in the evaluation process due to the passage of overhead 115 KV high voltage on top of the alternative site. No further analysis was performed to support this alternative selection.

Due to limited site availability, land acquisition costs, mitigation and construction costs, and other environmental concerns, as well as the requirement that the project should be constructed relatively close to the existing raw water pumps, the Preferred Alternative site is the only location that satisfies these needs and concerns to comply with federal and local regulation/requirements. The savings on elevation and flood insurance costs also do not offset the benefits of the continued operation of the Enrique Ortega Raw Water Pump Station during power outages or after prolonged no power periods associated to atmospheric events. The no action alternative is also impracticable because it will not satisfy the need to provide potable water services to Municipalities within the Enrique Ortega service area during outages and after the passage of atmospheric events.

After evaluating the six alternatives to Proposed Action in Step 3, the option which best accommodates the generators with its related appurtenances (diesel tanks, pump house, loading/unloading area, etc.) with the smallest number of cut and fill, and tree clearing, while maintaining structural stability is Proposed Action.

During Step 4, the impacts of the Proposed Action on the floodplains and/or wetlands were identified. The Proposed Action is located within:

- FFRMS floodplain

The Proposed Action is located within a 100 feet radius to a:

- Riverine Wetland

Because the Proposed Action involves placing diesel storage tanks above the floodplains, the following methods will be implemented as permanent best management practices (BMPs):

- Installation of oil/water separator tank at the outlet of the proposed storm sewer system to remove oil or grease from the runoff water prior to discharge into the ground or river.
- Proposed diesel storage tanks for the new generators are double containment, which provides protection to the tanks in case of damage or leakage.
- Secondary containment provision is required for areas and equipment with potential for a discharge. The area provided for the new tanks and generators was designed to provide a containment structure during a spill or leakage. The containment was designed to contain the tanks' storage capacity and sufficient freeboard to contain the precipitation from the 25yr-24hr storm event (as per EPA requirements for secondary containment).
- A Maintenance Plan for these facilities shall include cleaning the storm sewer structures from sediments, vegetation, or debris to avoid clogging the oil/water separator, especially after storm events or heavy rains. Also, the inspection of equipment and tanks to detect any leakage or damage.
- As required by the Clean Water Act, a Spill Prevention Control and Countermeasures Plan (SPCCP), will be created, submitted for approval, and implemented as part of the project.

Finally, the purpose of Step 5 is to design or modify the proposed action to minimize threats to life and property and preserve its natural and beneficial floodplain or wetland values. Because of this, the proposed site layout ground elevation in this area will be filled to 2 feet (0.61 m) above the FFRMS floodplain 0.2PFA elevation to comply with the ABFE minimum ground elevation levels to keep this area over the FFRMS floodplain. The ground elevation on this area has been previously modified as it was used as part of a project to repair the scours found at the base of the Represa del Lago La Plata structure between 2021 and 2022. As part of the Proposed Action, cut and fill activities will be performed to guarantee the elevation of the project's components complies with the FFRMS 0.2PFA requirements. The modification of current ground elevation is considered minimal; therefore, no adverse effects have been identified to the FFRMS floodplain or neighboring properties.

By rising more than 2.0 feet (0.61 m) above the 0.2PFA elevations, the Proposed Location will comply with FFRMS requirements for critical actions at a lower cost than the other alternatives.

The Project will have a positive impact on the municipalities in the metropolitan area that are supplied by the La Plata Reservoir, by maintaining a potable water service in operation in the event of an emergency. It is planned that the construction and installation activities will not interrupt the potable water service to the subscribers who are supplied by the La Plata Reservoir. The installation of the generators and the construction of the access road will last approximately 730 days. The construction of the Project would create approximately 381 direct, indirect, and induced jobs.

***Step 7.* Findings and public explanation (Final Notification).**

Puerto Rico Department of Housing (PRDOH) has conducted an evaluation as required by the Executive Order 11988, in accordance with HUD regulations at 24 CFR 55.20 Subpart C - Procedures for Making Determinations on Floodplain Management and Wetlands Protection. It is the Puerto Rico Department of Housing (PRDOH) determination that there is no practicable alternative for partially locating the proposed Project in the flood zone. The PRDOH has determined that the following Proposed Action under the Community Development Block Grant – Mitigation (CDBG-MIT), Hazard Mitigation Grant Program, Grant number B-18-DP-72-0002, is located in a Federal Flood Risk Management Standard (FFRMS) floodplain (500-Year floodplain) and next to a small unnamed creek, designated as a riverine wetland. This is due to: 1) the need to provide a reliable and resilient emergency power source adjacent to raw water pump station facilities to allow an efficient operation of the Enrique Ortega Water Pump Station during power outages and after extraordinary atmospheric events; 2) provide a safe potable water system to the Enrique Ortega service area composed of approximately 369,000 inhabitants; 3) the desire to not displace residents or business; 4) the need to construct an economically feasible project with the least environmental impacts; and 5) the ability to mitigate and minimize impacts on human health, public property, and floodplain values. PRDOH has reevaluated the alternatives to building in the FFRMS floodplain and has determined that it has no practicable alternative.

PRDOH notified the public and interested agencies of the proposal to consider an action in the FFRMS floodplain, near a riverine wetland and the potential impacts on the FFRMS floodplain and the wetland from the Proposed Action.

A Final Notice and Public Explanation of a proposed activity was published in Primera Hora newspaper on December 4, 2024 to : All Interested Parties, Groups & Individuals. (See **Appendix 7**.

The primary purposes for this notice were:

First, people who may be affected by activities in FFRMS floodplain and wetland and those who have an interest in the protection of the natural environment should be given an opportunity to express their concerns and provide information about these areas.

Second, an adequate public notice program can be an important public education tool. The dissemination of information and request for public comments about the FFRMS floodplain and wetland can facilitate and enhance Federal efforts to reduce the risks and impacts associated with the occupancy and modification of these special areas.

Third, as a matter of fairness, when the Federal government determines it will participate in actions taking place in FFRMS floodplain and wetland, it must inform those who may be put at greater or continued risk.

*PRDOH received no responses on or before December 12, 2024.*

An additional project specific public notice will be provided in the public comment period for the Environmental Assessment for this project.

***Step 8.*** **Implement the action.**

The approval of the project **Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators** is conditioned on review of implementation and post-implementation phases to ensure compliance with the requirement(s) stated in 44 CFR 9.11. The proposed project will be constructed in accordance with floodplain development requirements and other applicable laws, regulations, and executive orders.

The proposed grading elevations for the project components within the FFRMS floodplain are higher than the ABFE 0.2% Annual Chance Floodplain elevations by more than 2 feet (0.61 m), The project complies with the Federal Flood Risk Management Standards of 0.2PFA elevation.

The access road within 100 feet of a Riverine Wetland will require to implement erosion control best management practices (BMPs: Erosion Prevention, Sediment Control, Runoff Control among others) to avoid sediment migration to nearby wetlands.

The project is planned to be in the FFRMS floodplain, near a riverine wetland, and complies with the Federal Flood Risk Management Standards. This is the most practicable design to protect the structure and the access road from flooding considering the existing grade elevations. The access road for the Proposed Action is practicable considering the buffer strip between the existing dirt road and the riverine wetland, the vegetation observed throughout these areas, and the implementation of erosion control best management practices (BMPs) during construction

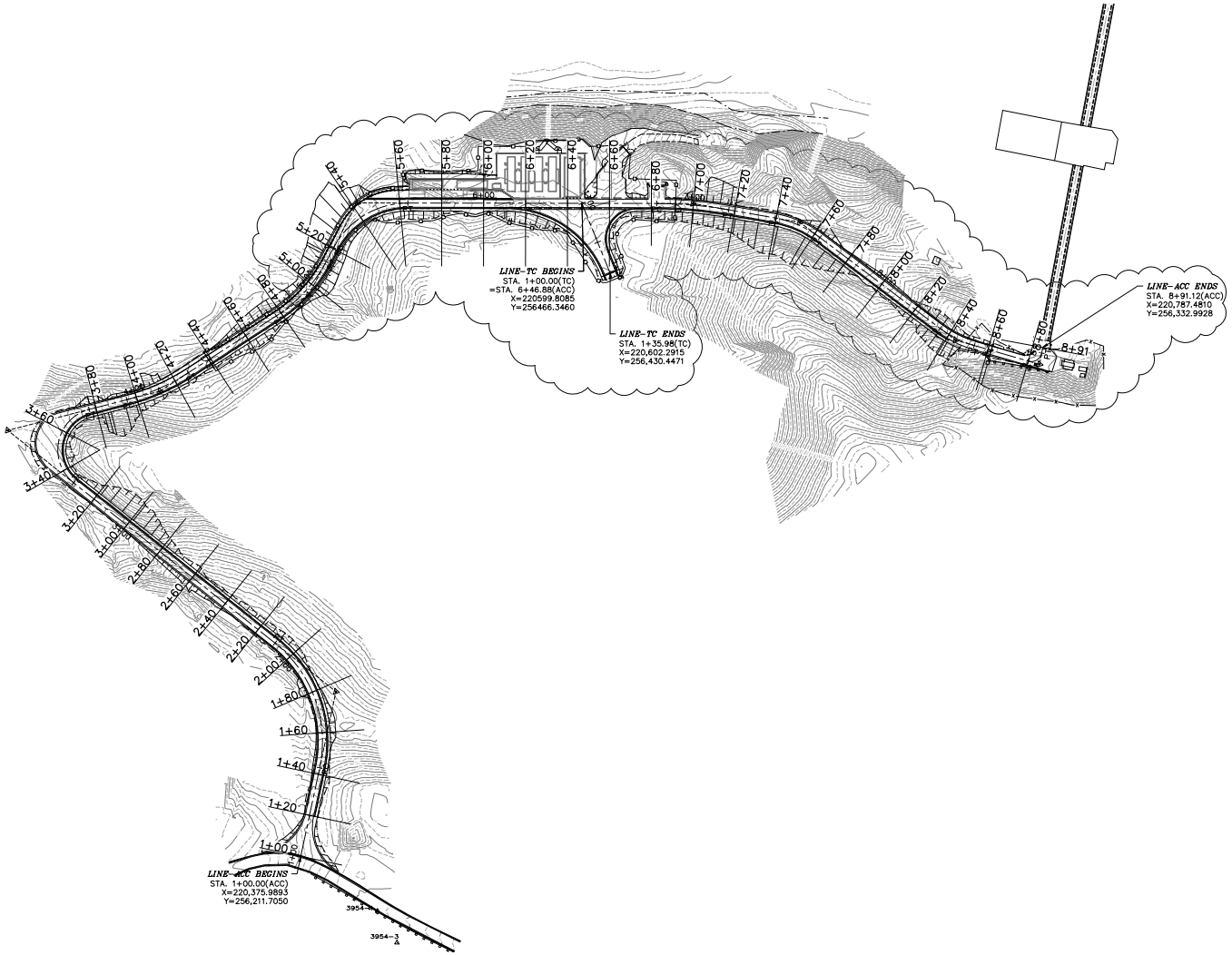
The PRDOH will assure that this plan, as modified and described above, is executed and necessary language will be included in all agreements with participating parties. PRASA will also take an active role in monitoring the construction process to ensure that neither unnecessary impacts occur, nor unnecessary risks are taken. The flood insurance requirement for the life of the property will be provided by PRASA as part of the current flood insurance program managed by the agency and will last for the useful life of the structure.

All coordination (emails, letters, documented phone calls) pertaining to these activities and compliance must be provided and maintained in the applicant's permanent files.

**Appendix 1.** Geotechnical Investigation for La Plata Dam Emergency Generators, Toa Alta, Puerto Rico (Geo Cim, September 15, 2023)

**PLEASE REFER TO APPENDIX G OF ENVIRONMENTAL ASSESSMENT**

**Appendix 2.** Site Drawings




## ACCESS ROAD CROSS SECTION KEY MAP

SCALE: 1:1,000

NOTES:

1. FOR REFERENCE OF CROSS SECTIONS LOCATION.
2. REFER TO DWGS. 040-C-32 TO 040-C-38 FOR CROSS SECTIONS.

10 0 20 50

SCALE: 1:1,000

**PRELIMINARY NOT FOR CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| NO | DATE | REVISION | BY | CK. | APPR. |
|---|---|---|---|---|---|
| D | 02/13/2024 | 100% DESIGN | MVM | LMR | GN |
| C | 01/29/2024 | 100% DESIGN | MVM | LMR | GN |
| B | 11/20/2023 | 90% DESIGN | MVM | LMR | GN |
| A | 09/29/2023 | 60% DESIGN | MVM | LMR | GN |

DRAWN BY AM
DESIGNED BY MVM
CHECKED BY LMR
APPR. BY GN

BR&A LLC
ARCHITECTURE | ENGINEERING | PLANNING

Stantec
87 Tabonuco Street, Suite 1504
Guaynabo, PR
00968-3028

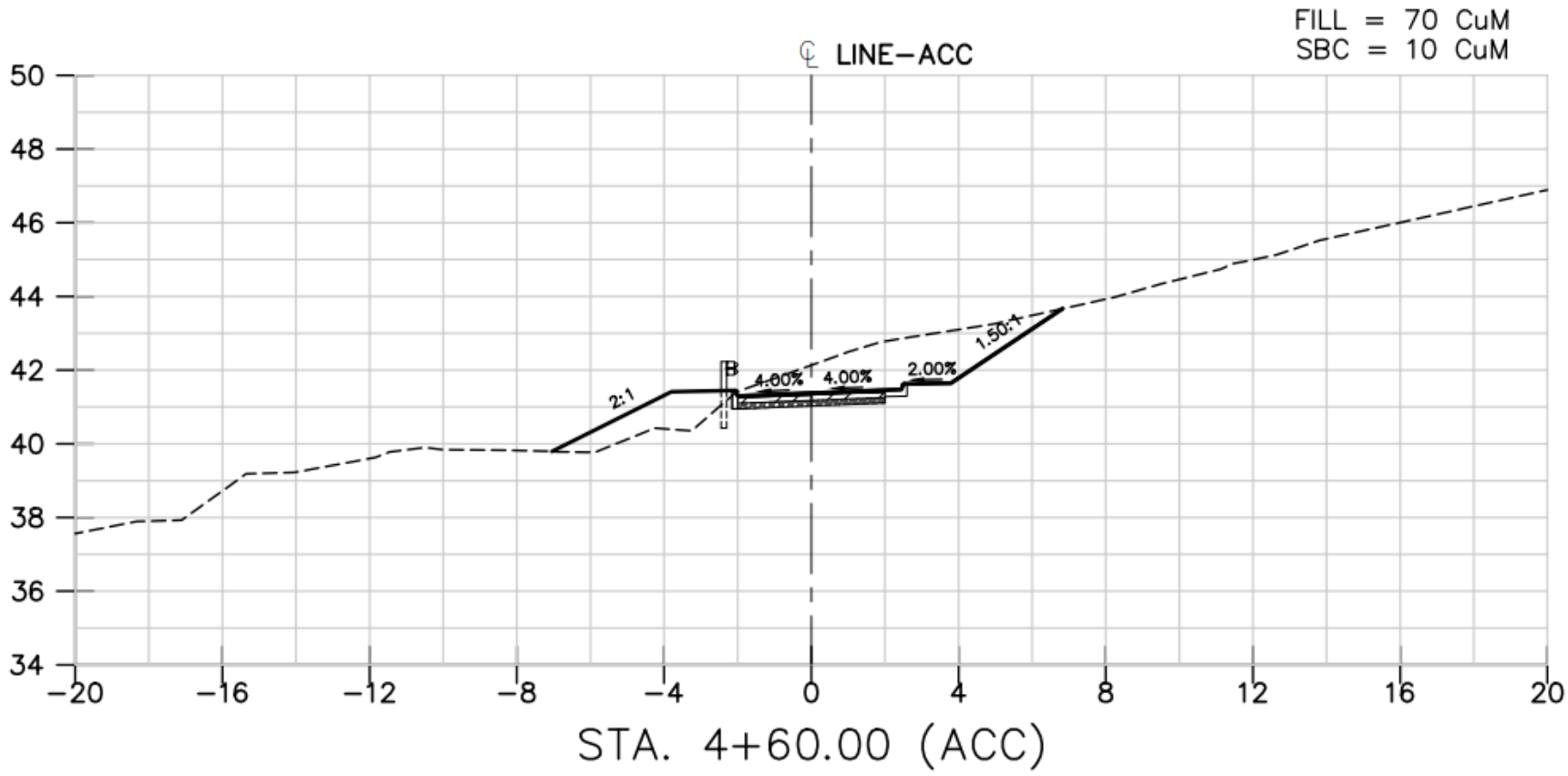
ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

ACCESS ROAD CROSS SECTION KEY MAP

Autoridad de Acueductos y Alcantarillados
GOBIERNO DE PUERTO RICO

C.I.P. No. 1-70-9000
PSWID -
DATE: SEPTEMBER / 2023
SCALE: 1:1,000
SHEET NO. 55 OF *
DWG. NO. 040-C-32

040-C-32.dwg




STA. 4+60.00 (ACC)

E.G. = 42.13
P.G. = 41.38
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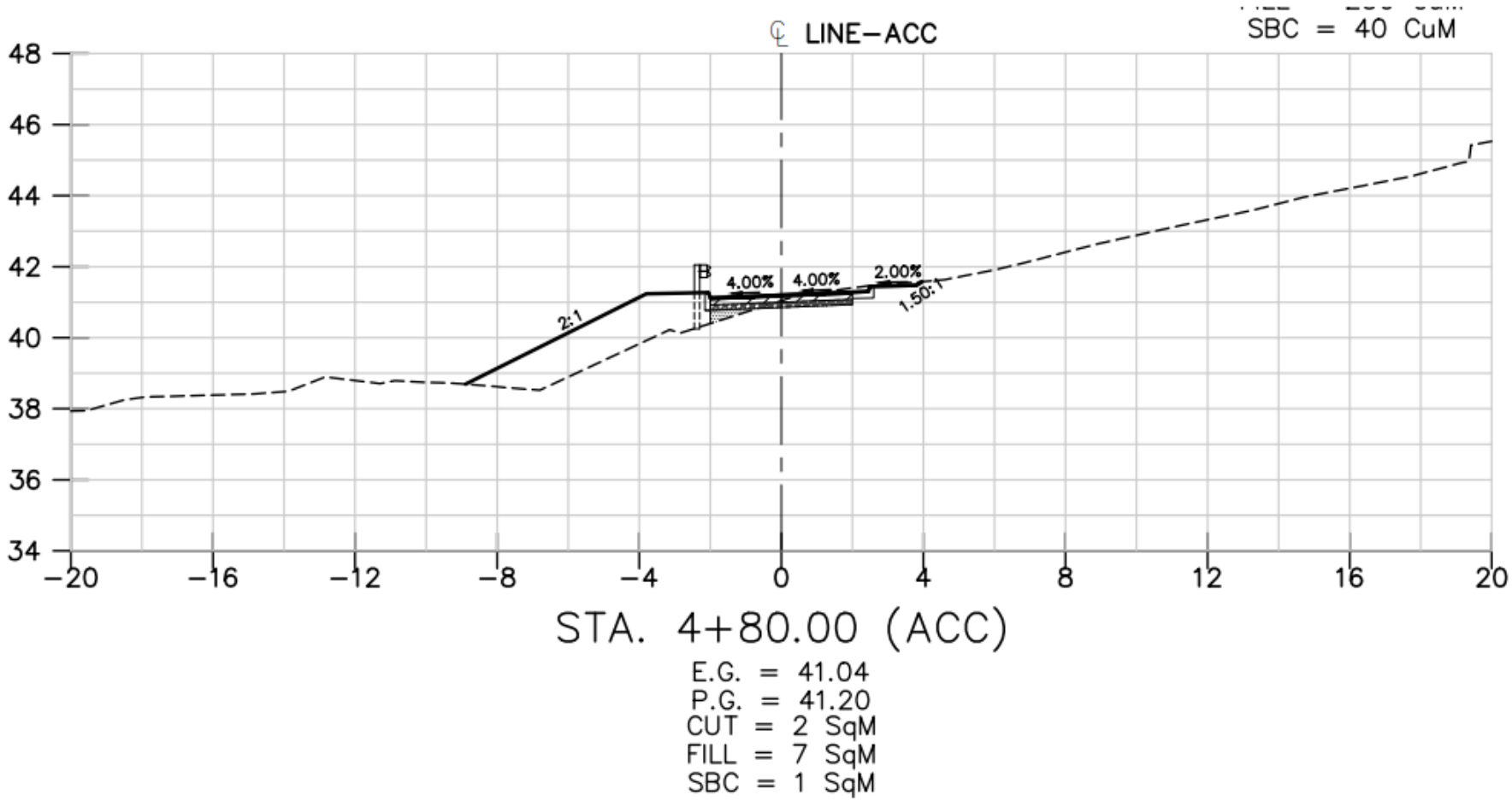
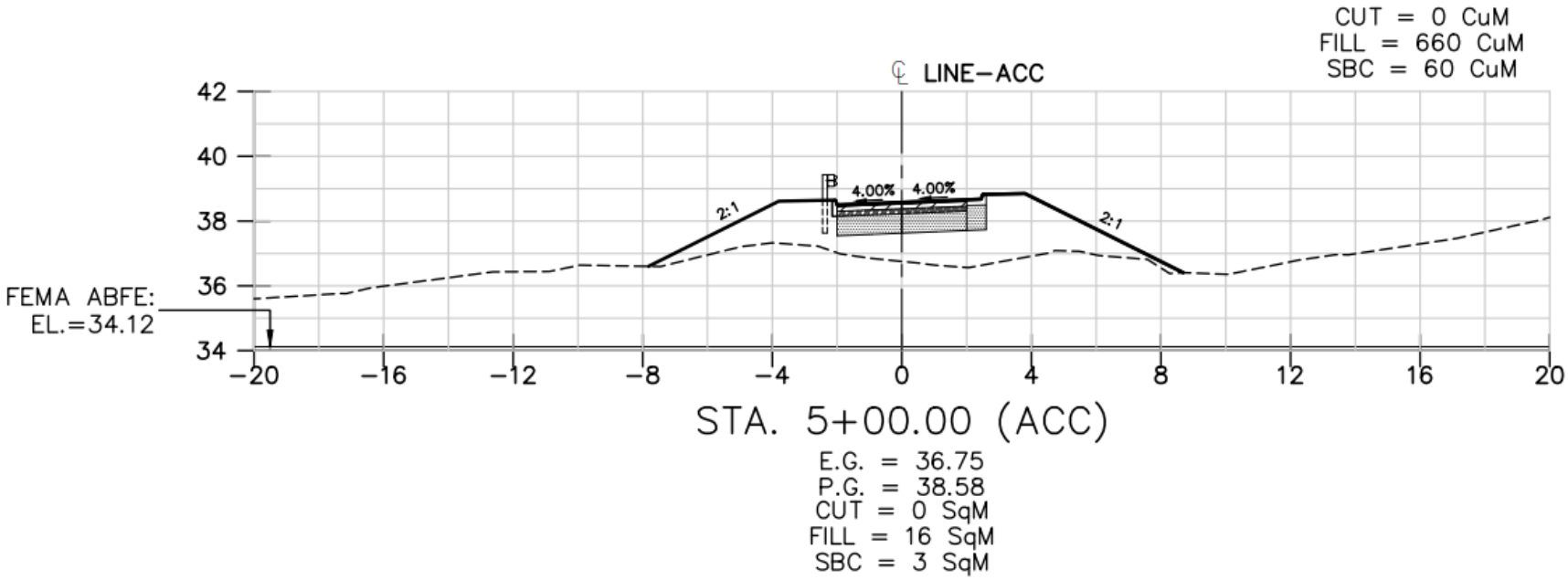
FILL = 4 SqM
SBC = 0 SqM


℄ LINE–ACC
SBC = 40 CuM
48
46
44
42
40
38
36
34
–20
–16
–12
–8
–4
0
4
8
12
16
20
B
4.00%
4.00%
2.00%
2:1
1.50:1
STA. 4+80.00 (ACC)
E.G. = 41.04
P.G. = 41.20
CUT = 2 SqM
FILL = 7 SqM
SBC = 1 SqM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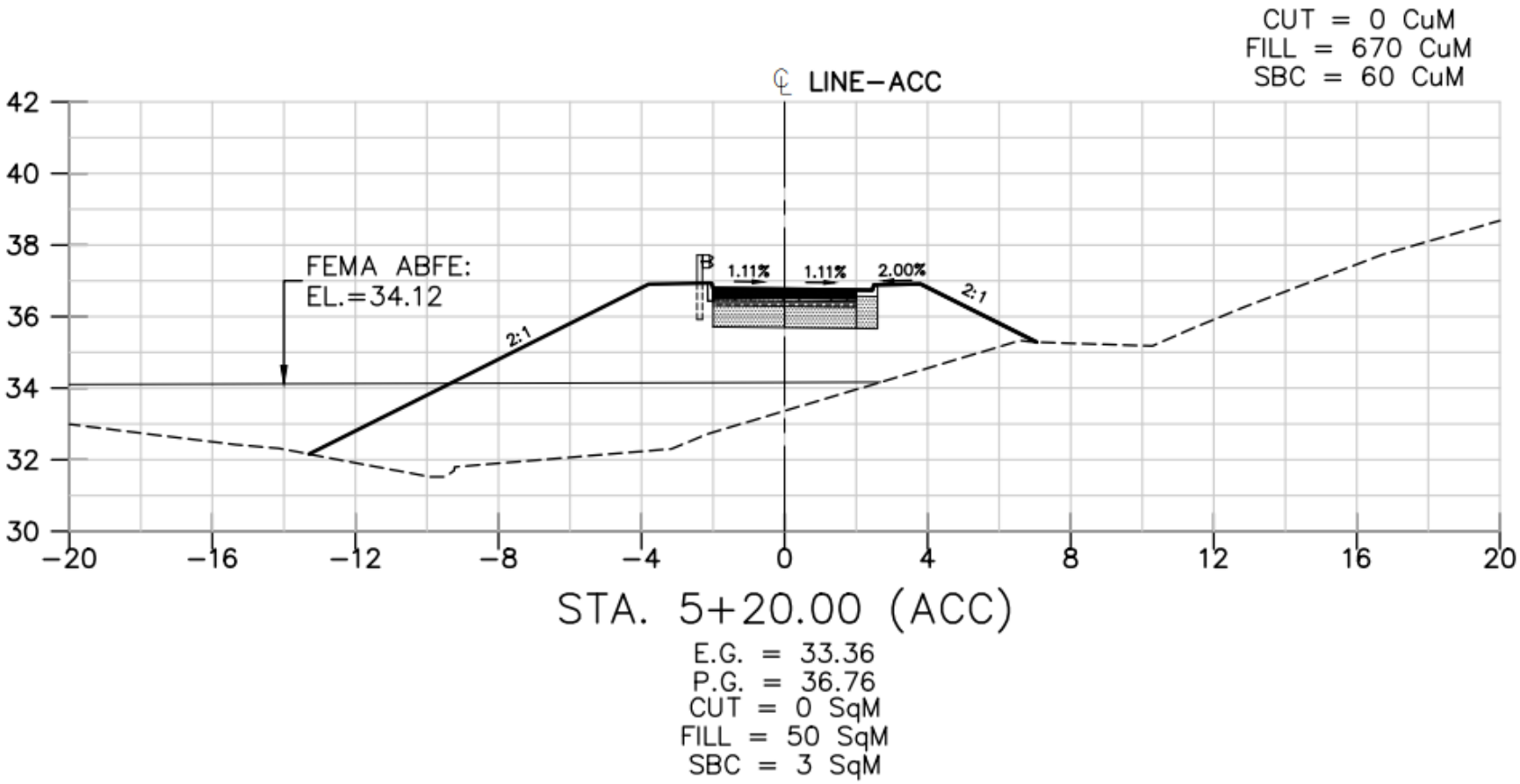
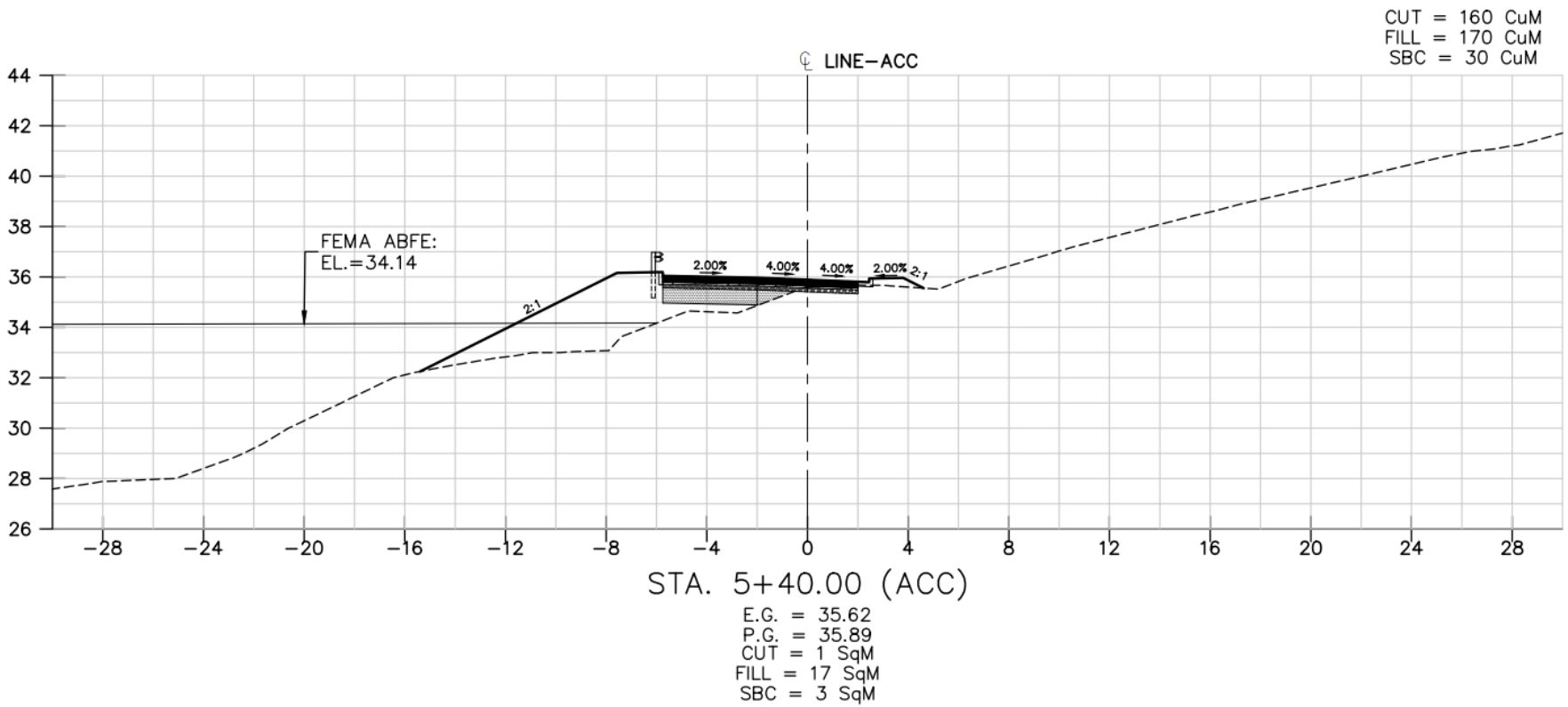
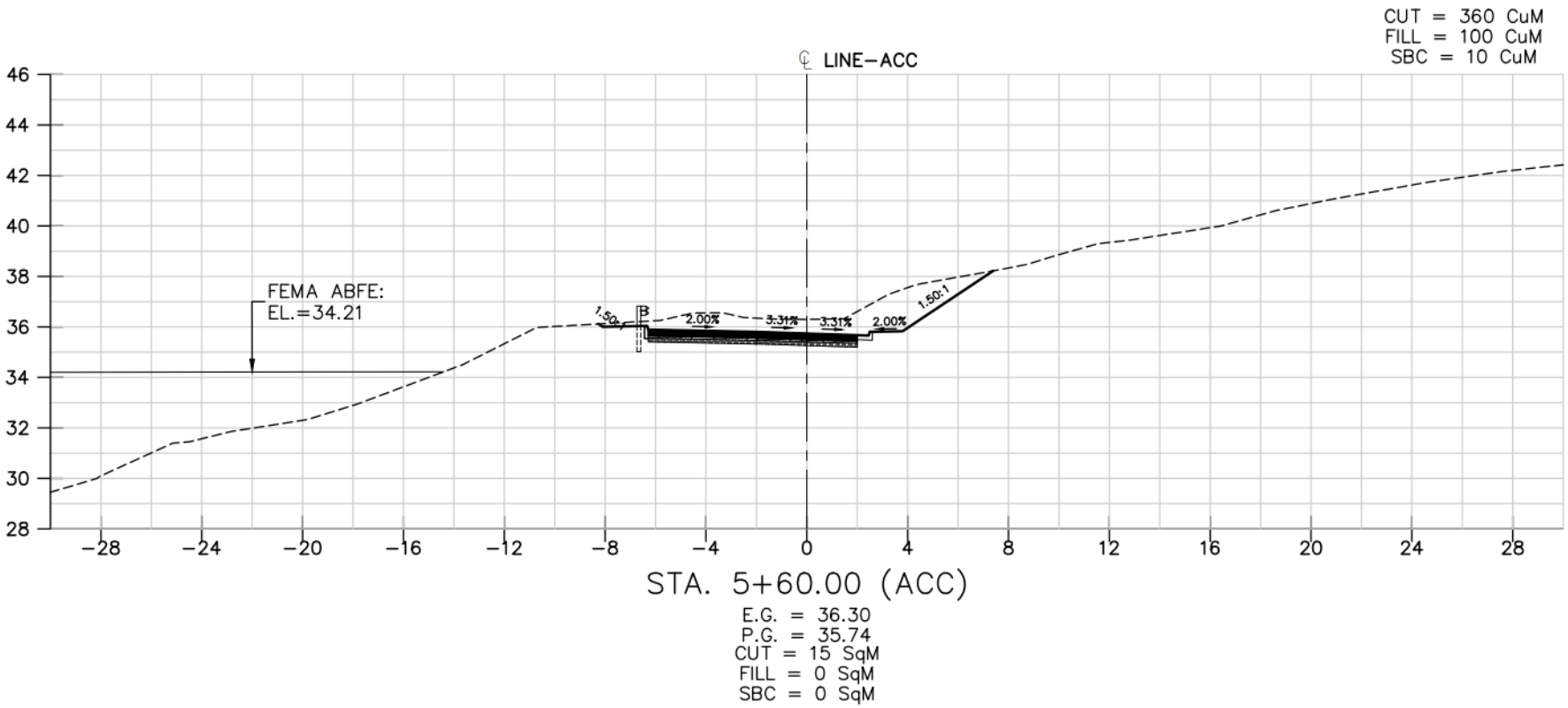
FILL = 660 CuM
SBC = 60 CuM
℄ LINE–ACC
42
40
38
36
34
FEMA ABFE:
EL.=34.12
2:1
4.00%
4.00%
2:1
–20
–16
–12
–8
–4
0
4
8
12
16
20
STA. 5+00.00 (ACC)
E.G. = 36.75
P.G. = 38.58
CUT = 0 SqM
FILL = 16 SqM
SBC = 3 SqM


CUT = 0 CuM
FILL = 670 CuM
SBC = 60 CuM
℄ LINE–ACC
FEMA ABFE:
EL.=34.12
1.11%
1.11%
2.00%
2:1
2:1
42
40
38
36
34
32
30
–20
–16
–12
–8
–4
0
4
8
12
16
20
STA. 5+20.00 (ACC)
E.G. = 33.36
P.G. = 36.76
CUT = 0 SqM
FILL = 50 SqM
SBC = 3 SqM


CUT = 160 CuM
FILL = 170 CuM
SBC = 30 CuM
℄ LINE–ACC
FEMA ABFE:
EL.=34.14
2:1
2.00%
4.00%
4.00%
2.00%
2:1
44
42
40
38
36
34
32
30
28
26
–28
–24
–20
–16
–12
–8
–4
0
4
8
12
16
20
24
28
STA. 5+40.00 (ACC)
E.G. = 35.62
P.G. = 35.89
CUT = 1 SqM
FILL = 17 SqM
SBC = 3 SqM


CUT = 360 CuM
FILL = 100 CuM
SBC = 10 CuM
℄ LINE–ACC
FEMA ABFE:
EL.=34.21
1.50:1
2.00%
3.31%
3.31%
2.00%
1.50:1
46
44
42
40
38
36
34
32
30
28
−28
−24
−20
−16
−12
−8
−4
0
4
8
12
16
20
24
28
STA. 5+60.00 (ACC)
E.G. = 36.30
P.G. = 35.74
CUT = 15 SqM
FILL = 0 SqM
SBC = 0 SqM

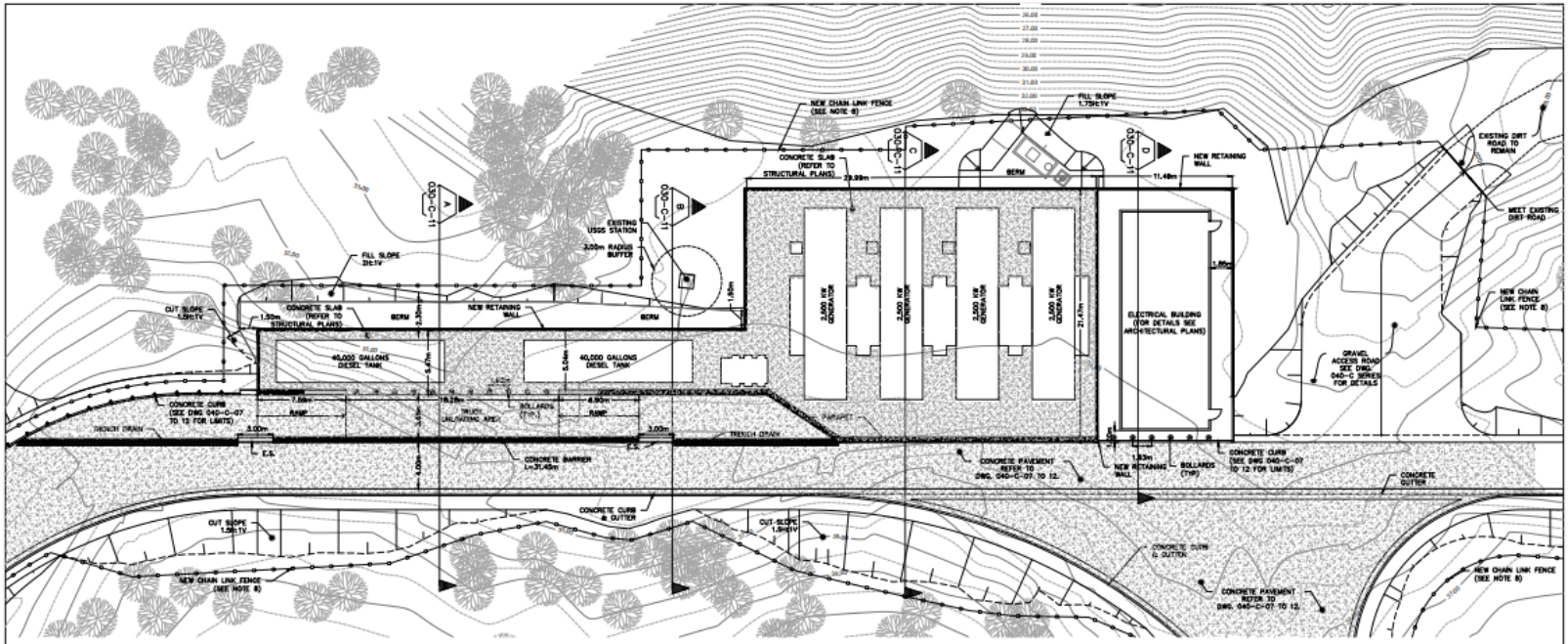



**Table 1: Federal Flood Risk Management Standard (FFRMS) Floodplain Determination**

| | Freeboard Value Approach (FVA) | | 0.2 PFA | | | |
|---|---|---|---|---|---|---|
| Section | 100 yr ABFE (m) = BFE | BFE +3' (0.9144m) | 500 yr ABFE (m) | Finished Floor Elev. (m) | Compliance Elevation Difference (m) | Elevation Difference (ft) |
| A | 30.67 | 31.58 | 34.29 | 34.98 | 0.69 | 2.26 |
| B | 30.69 | 31.60 | 34.32 | 35.03 | 0.71 | 2.33 |
| C | 30.74 | 31.65 | 34.38 | 34.99 | 0.61 | 2.00 |
| D | 30.82 | 31.73 | 34.47 | 35.40 | 0.93 | 3.05 |

Chosen Method

For this particular project, no CISA maps have been made. Therefore, the 0.2PFA value was chosen since it reflects the highest elevation value when compared to the Freeboard Value Approach as shown on Table 1. Finally, FFEs for the four (4) shown sections comply with FFRMS.

SITE PLAN
SCALE: 1:150

GENERAL SITE NOTES:

1. FOR LEGEND, NOTES AND ABBREVIATIONS REFER TO DWG. 000-C-01.
2. FOR SECTIONS REFER TO DWG. 03-C-13.
3. REFER TO DWG. 030-C-06 FOR STORM SEWER PLAN.
4. REFER TO MECHANICAL PLANS FOR DIESEL TANK, GENERATOR EQUIPMENT AND DETAILS.
5. REFER TO ELECTRICAL PLANS FOR ELECTRICAL BUILDING DETAILS.
6. REFER TO VERTEX DATA AND COORDINATES TABLES ON DWG. 030-C-03.
7. REFER TO DWG. 030-C-04 FOR PROPOSED GRADING PLAN AND RETAINING WALL TOP OF WALL ELEVATIONS.
8. FOR CHAIN LINK FENCE EXTENTS SEE DWG. 040-C-07 TO 12.

SCALE: 1:150

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| F | 02/13/2024 | 100% DESIGN | MVM | LMR | GN | | AM |
| E | 01/09/2024 | 100% DESIGN | MVM | LMR | GN | | MVM |
| D | 11/06/2023 | 90% DESIGN | MVM | LMR | GN | | LMR |
| C | 09/06/2023 | 90% DESIGN | MVM | LMR | GN | | GN |
| B | 07/06/2023 | 30% DESIGN | MVM | LMR | GN | | |
| NO | DATE | REVISION | BY | CK | APPR | | |

Stantec

ENRIQUE ORTEGA WATER FILTRATION PLANT RAW WATER INTAKE POWER GENERATORS
TOA ALTA, PUERTO RICO

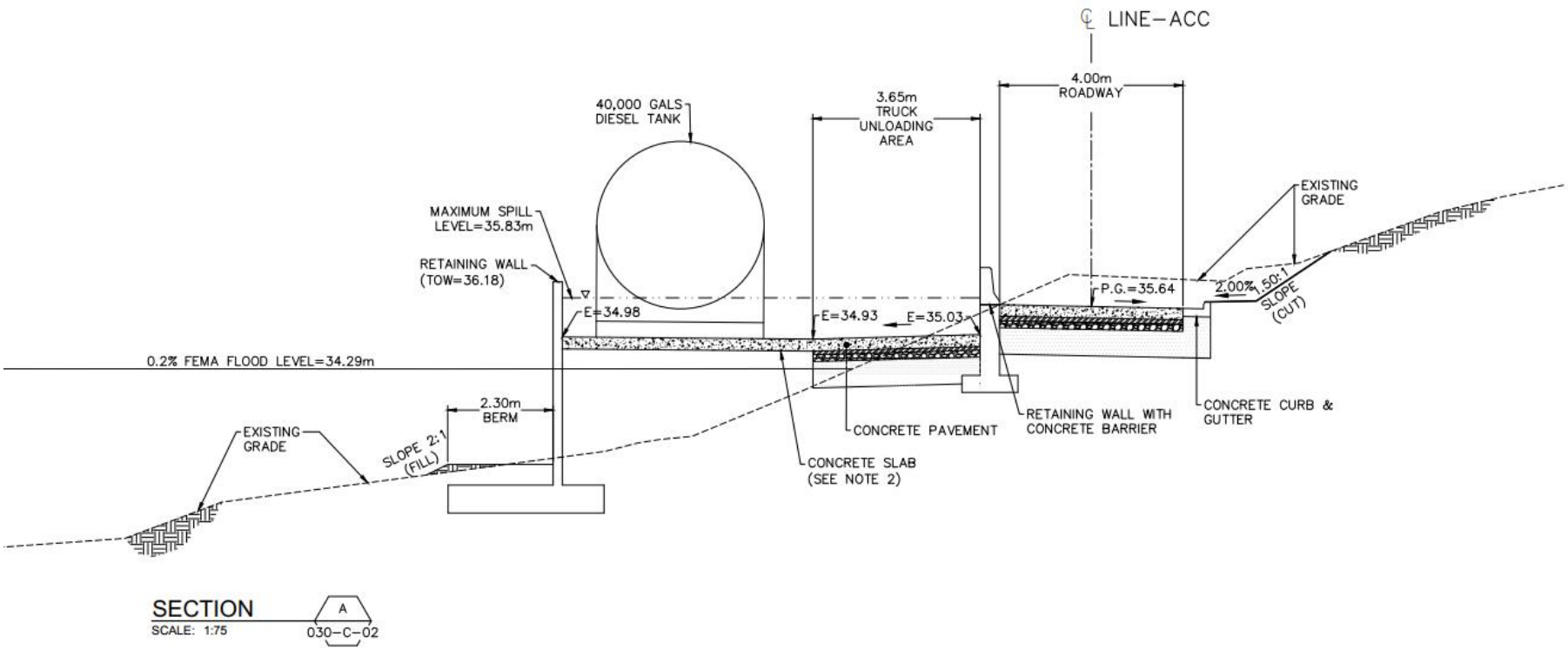
GENERATORS AREA - SITE PLAN

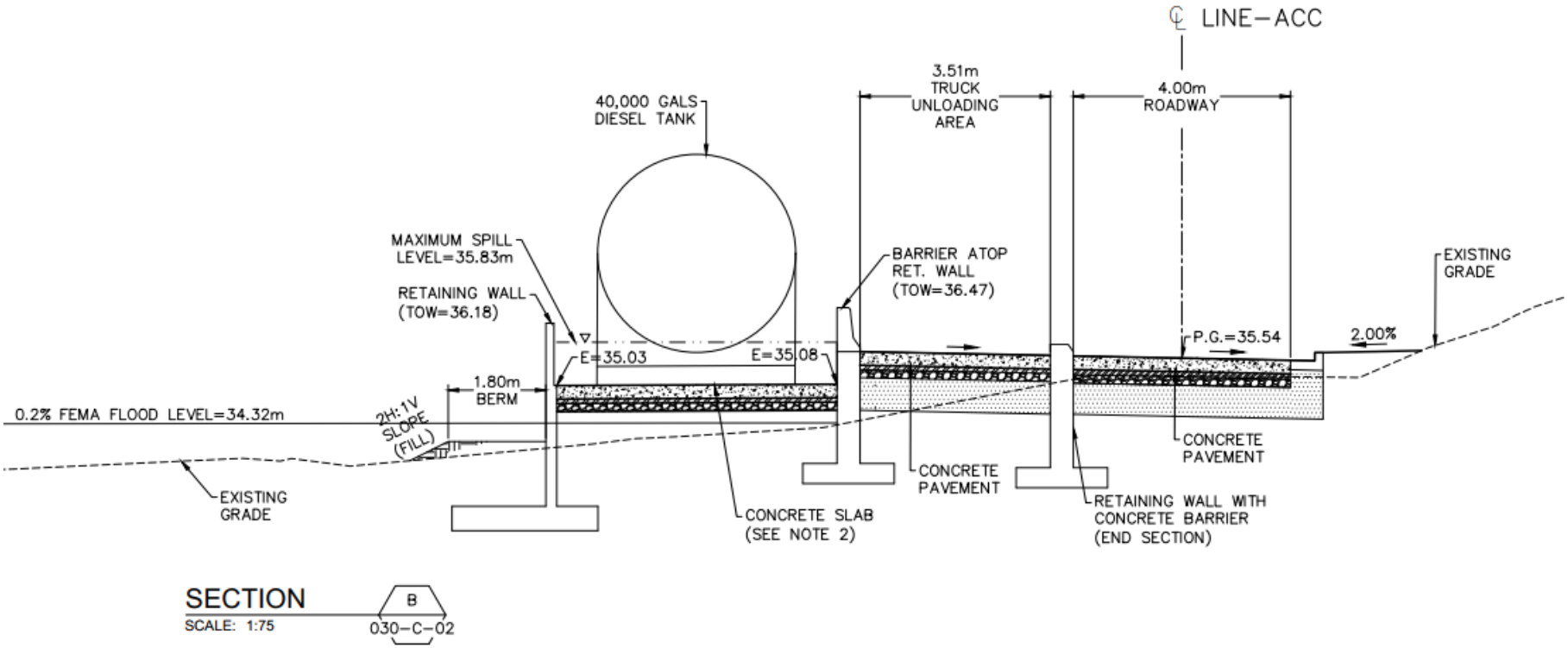
Autoridad de Acueductos y Alcantarillados
CONSORCIO DE PUERTO RICO

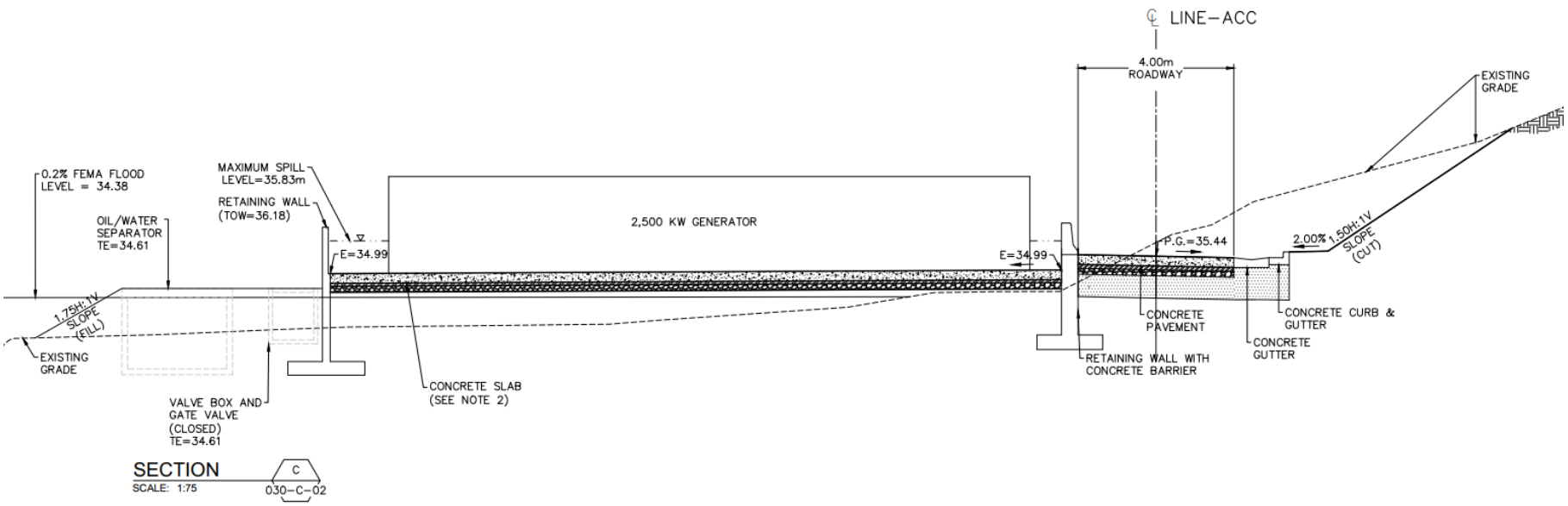
SCALE: 1:150

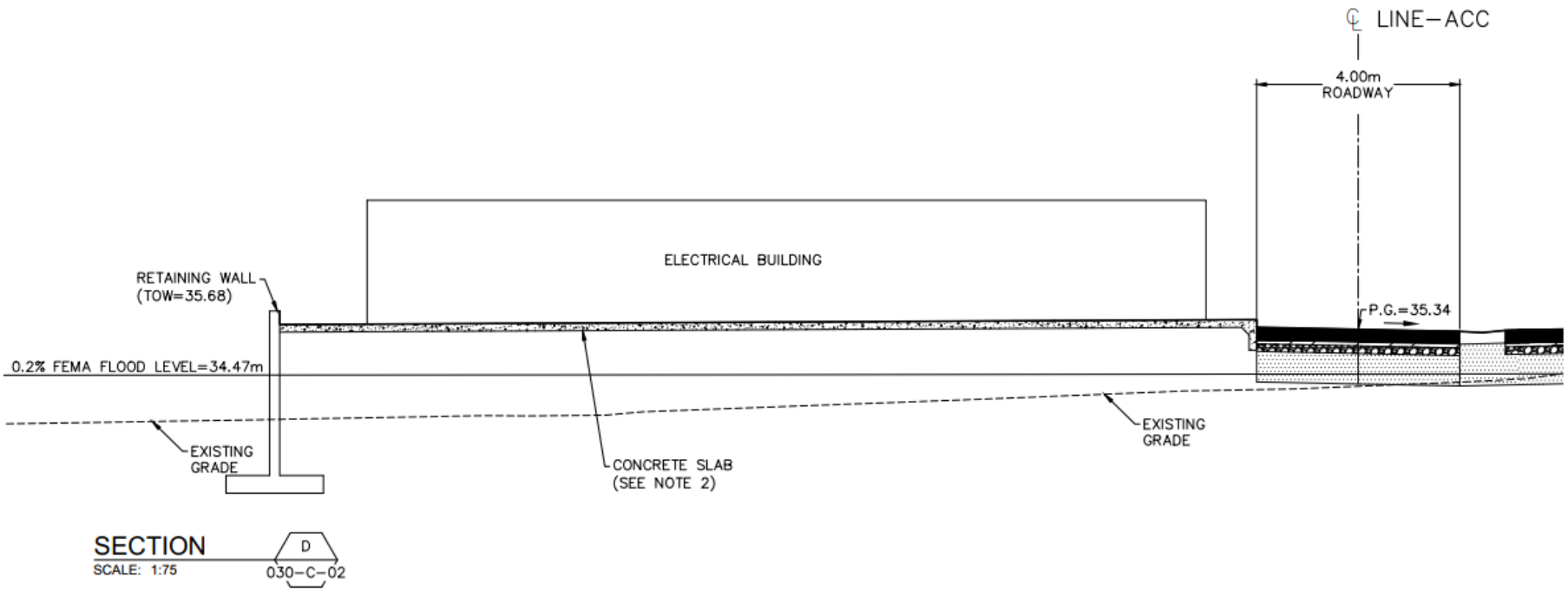
SHEET NO. 54

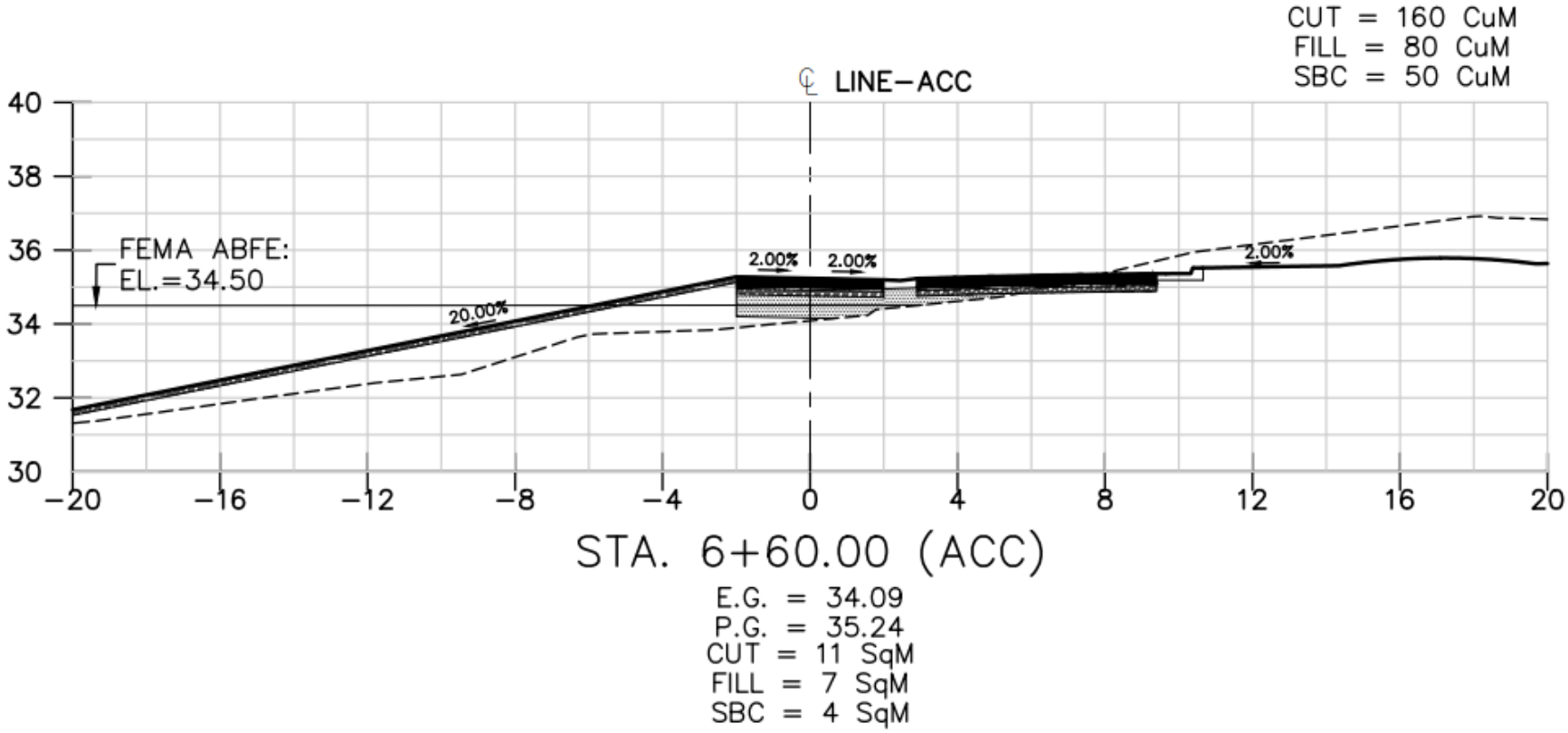
030-C-02

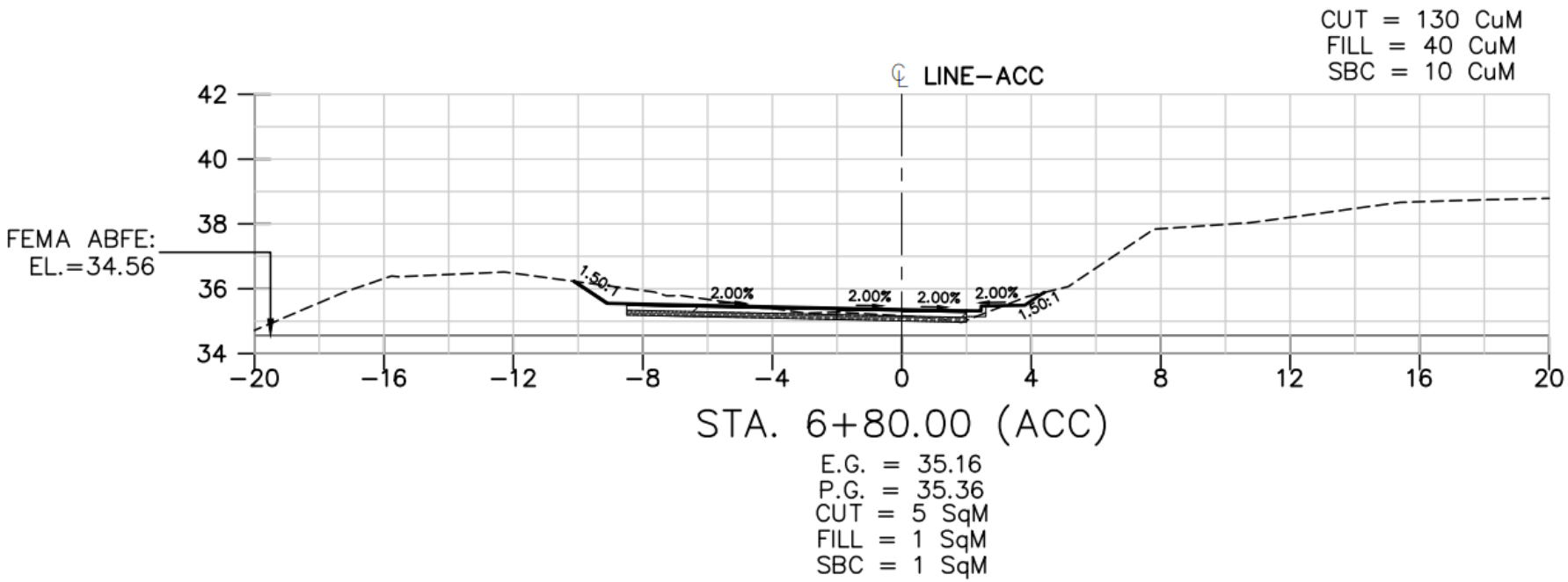

℄ LINE–ACC
4.00m
ROADWAY
3.65m
TRUCK
UNLOADING
AREA
40,000 GALS
DIESEL TANK
EXISTING
GRADE
MAXIMUM SPILL
LEVEL=35.83m
RETAINING WALL
(TOW=36.18)
P.G.=35.64
2.00%
.50:1
SLOPE
(CUT)
E=34.98
E=34.93
E=35.03
0.2% FEMA FLOOD LEVEL=34.29m
2.30m
BERM
EXISTING
GRADE
SLOPE 2:1
(FILL)
CONCRETE PAVEMENT
RETAINING WALL WITH
CONCRETE BARRIER
CONCRETE CURB &
GUTTER
CONCRETE SLAB
(SEE NOTE 2)
SECTION
SCALE: 1:75
A
030–C–02

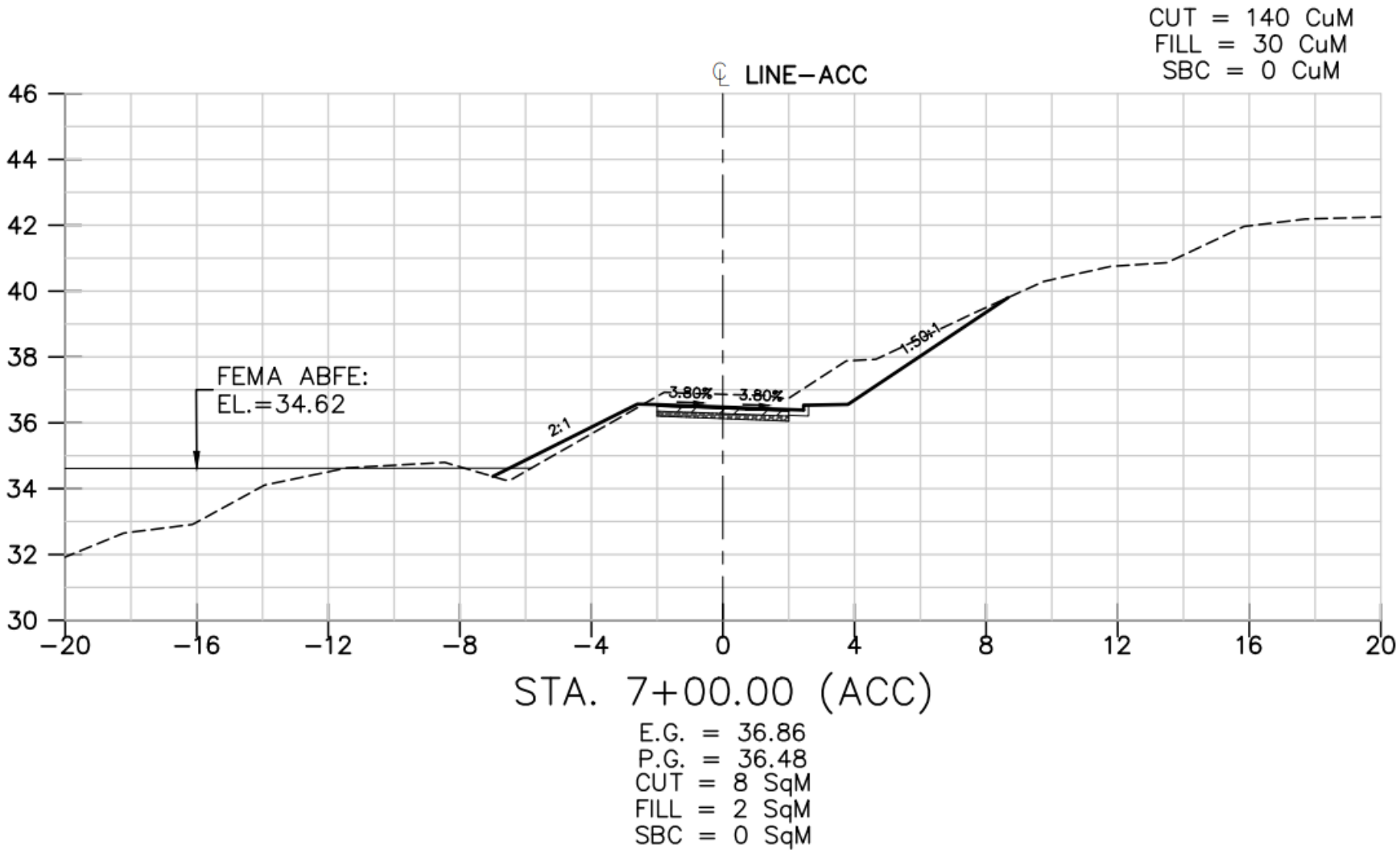

℄ LINE–ACC
3.51m
TRUCK
UNLOADING
AREA
4.00m
ROADWAY
40,000 GALS
DIESEL TANK
MAXIMUM SPILL
LEVEL=35.83m
RETAINING WALL
(TOW=36.18)
BARRIER ATOP
RET. WALL
(TOW=36.47)
EXISTING
GRADE
P.G.=35.54
2.00%
E=35.03
E=35.08
1.80m
BERM
0.2% FEMA FLOOD LEVEL=34.32m
2H:1V
SLOPE
(FILL)
CONCRETE
PAVEMENT
CONCRETE
PAVEMENT
EXISTING
GRADE
CONCRETE SLAB
(SEE NOTE 2)
RETAINING WALL WITH
CONCRETE BARRIER
(END SECTION)
SECTION
B
SCALE: 1:75
030–C–02


℄ LINE–ACC
4.00m
ROADWAY
EXISTING
GRADE
0.2% FEMA FLOOD
LEVEL = 34.38
MAXIMUM SPILL
LEVEL=35.83m
RETAINING WALL
(TOW=36.18)
OIL/WATER
SEPARATOR
TE=34.61
2,500 KW GENERATOR
E=34.99
E=34.99
P.G.=35.44
2.00%
1.50H:1V
SLOPE
(CUT)
1.75H:1V
SLOPE
(FILL)
EXISTING
GRADE
CONCRETE
PAVEMENT
CONCRETE CURB &
GUTTER
CONCRETE
GUTTER
RETAINING WALL WITH
CONCRETE BARRIER
CONCRETE SLAB
(SEE NOTE 2)
VALVE BOX AND
GATE VALVE
(CLOSED)
TE=34.61
SECTION
SCALE: 1:75
C
030–C–02


℄ LINE–ACC
4.00m
ROADWAY
ELECTRICAL BUILDING
RETAINING WALL
(TOW=35.68)
P.G.=35.34
0.2% FEMA FLOOD LEVEL=34.47m
EXISTING
GRADE
CONCRETE SLAB
(SEE NOTE 2)
EXISTING
GRADE
SECTION
SCALE: 1:75
D
030–C–02


CUT = 160 CuM
FILL = 80 CuM
SBC = 50 CuM
℄ LINE–ACC
FEMA ABFE:
EL.=34.50
20.00%
2.00%
2.00%
2.00%
40
38
36
34
32
30
–20
–16
–12
–8
–4
0
4
8
12
16
20
STA. 6+60.00 (ACC)
E.G. = 34.09
P.G. = 35.24
CUT = 11 SqM
FILL = 7 SqM
SBC = 4 SqM


CUT = 130 CuM
FILL = 40 CuM
SBC = 10 CuM
℄ LINE–ACC
FEMA ABFE:
EL.=34.56
42
40
38
36
34
–20
–16
–12
–8
–4
0
4
8
12
16
20
1.50:1
2.00%
2.00%
2.00%
2.00%
1.50:1
STA. 6+80.00 (ACC)
E.G. = 35.16
P.G. = 35.36
CUT = 5 SqM
FILL = 1 SqM
SBC = 1 SqM


CUT = 140 CuM
FILL = 30 CuM
SBC = 0 CuM
℄ LINE–ACC
46
44
42
40
38
36
34
32
30
FEMA ABFE:
EL.=34.62
2:1
3.80%
3.80%
1.50:1
–20
–16
–12
–8
–4
0
4
8
12
16
20
STA. 7+00.00 (ACC)
E.G. = 36.86
P.G. = 36.48
CUT = 8 SqM
FILL = 2 SqM
SBC = 0 SqM

**Appendix 3.** Primera Hora Newspaper Early Public Notices

## AVISO A TENEDORES DE CERTIFICADOS DE ACCIÓN DE CAPITAL CORPORATIVO DE CORPORACIÓN 900-902, REALTY.

La Corporación 900-902 Realty, con número de registro #161588, expedido por el Registro de Corporaciones del Departamento de Estado de Puerto Rico, NOTIFICA por medio de este AVISO a todo tenedor de certificado de acción de capital corporativo en la referida corporación, que dicha empresa ha iniciado un proceso de reorganización de documentos corporativos. Se les advierte a los poseedores de certificados de acción en la referida corporación que de no comunicarse con el abogado identificado en este AVISO podrían perder sus derechos como accionistas de la Corporación 900-902 Realty. Los poseedores de certificados de acción de la referida corporación quedan debidamente notificados por este medio y deberán comunicarse a Raúl González Toro Law Offices, LLC en el Banco Popular Center, Suite 1028, 208 Avenida Ponce de León, San Juan, PR 00918-1033, teléfono (787) 753-6090, dirección de correo electrónico **rgtlaw@ymail.com**, en los próximos TREINTA (30) días a partir de la publicación de este aviso para hacer valer sus derechos como accionista en la Corporación 900-902 Realty.

primerahora#acurbelo@v

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## aviso público

Aviso Preliminar y Revisión Pública de una Actividad Propuesta en un Valle Inundable de 100 Años

Generadores de Energía Toma de Aguas Crudas de la Planta de Filtración Enrique Ortega

Para: Todas las partes interesadas, grupos e individuos

Este aviso notifica que el Departamento de la Vivienda de Puerto Rico (Vivienda, en adelante) ha determinado que la siguiente acción propuesta bajo el Programa de Subvenciones de Mitigación de Riesgos, Subvención en Bloque para el Desarrollo Comunitario – Mitigación (CDBG-MIT), número de subvención B-18-DP-72-0002, se encuentra en un valle inundable de 100 años. Vivienda estará evaluando e identificando alternativas prácticas para realizar la acción propuesta y el impacto potencial en el valle inundable debido a la acción propuesta, según establecido por la Orden Ejecutiva 11988, de acuerdo con las regulaciones de HUD en 24 CFR 55.20 Subparte C - Procedimientos para tomar determinaciones sobre el manejo de llanuras aluviales y la protección de humedales. El proyecto propuesto, **Generadores de Energía Toma de Aguas Crudas de la Planta de Filtración Enrique Ortega**, se encuentra dentro de un municipio que sufrió daños debido a los huracanes Irma y María, y está localizado en la carretera PR-827, km 5.6, barrio Ortiz, Toa Alta, PR 00953. La actividad propuesta está situada en una zona de inundación A con cabida de 0.437 acres. El área del proyecto se encuentra en el mapa de tarifas de seguro contra inundaciones (FIRM, por sus siglas en inglés) (panel 72000C0705J, efectivo 13/04/2009), como se indica en el Centro de Servicios de Mapas de Inundaciones de FEMA en https://msc.fema.gov/portal/home.

El proyecto propuesto consiste en la construcción de una plataforma de concreto donde se instalarán 4 generadores de energía y sus componentes y tanques de almacenamiento de diésel, y la construcción de un camino de acceso asfaltado sobre un camino de tierra existente. El propósito es reducir la vulnerabilidad de las instalaciones críticas ante amenazas naturales y abordar la continuidad del servicio y suministro de agua potable a la población. El actual generador de la represa solo suministra energía a las compuertas de la represa y sus instalaciones, dejando la Estación de Bombas de Aguas Crudas sin cobertura si el sistema eléctrico falla. En consecuencia, se detiene el suministro de agua a la PF Enrique Ortega. El tamaño del solar es de aproximadamente 2,744 metros cuadrados. El número de unidades son cuatro generadores con una capacidad de 2,500 kW y dos tanques de almacenamiento de diésel con una capacidad de 30,000 galones cada uno. El tamaño de la huella para la ubicación de los generadores de energía es de aproximadamente 1,278 metros cuadrados y para el camino de acceso es de 4,773 metros cuadrados. El valle inundable que posiblemente sea afectado es un área previamente impactada al haber sido utilizada como parte del proyecto para reparar las socavaciones encontradas en la base de la estructura de la represa La Plata entre 2021 y 2022, por lo que el predio posee una baja biodiversidad de especies, sin valores recreacionales, educativos, científicos, históricos ni culturales conocidos. El área del proyecto fue evaluada y no presenta las características bióticas e hidrológicas de humedal.

Este aviso tiene tres propósitos principales. En primer lugar, las personas que puedan verse afectadas por las actividades en valles inundables y aquellos que tengan interés en la protección del ambiente natural deben tener la oportunidad de expresar sus inquietudes y proveer información sobre estas áreas. Se exhorta a la comunidad a ofrecer ubicaciones alternas fuera de valles inundables, métodos alternos para cumplir el mismo propósito del proyecto y métodos para minimizar y mitigar los impactos. Segundo, un programa adecuado de avisos públicos puede ser una herramienta importante para la educación pública. La divulgación de información sobre valles inundables puede facilitar y mejorar los esfuerzos federales por reducir los riesgos e impactos asociados con la ocupación y alteración de estas zonas especiales. Tercero, como materia de justicia, cuando el gobierno federal determine participar en acciones ubicadas en valles inundables, debe informárselo a quienes puedan ser expuestos a un riesgo mayor o similar al presente.

Vivienda considerará todos los comentarios recibidos en o antes de 26 de octubre de 2023. Pueden enviar los comentarios de forma impresa a la siguiente dirección: Departamento de la Vivienda de Puerto Rico, edificio Juan C. Cordero Dávila, 606 avenida Barbosa, Río Piedras, PR 00918-8461, Atención: Santa D. Ramírez-Lebrón/Pedro de León-Rodríguez, Especialistas en Permisos y Cumplimiento Ambiental. Una descripción completa del proyecto está disponible al público para revisión de 8:30 a. m. a 4:00 p. m. en el Departamento de la Vivienda de Puerto Rico, edificio Juan C. Cordero Dávila, 606 avenida Barbosa, Río Piedras, PR 00918. El número para obtener información es (787) 274-2527, ext. 4320. Como alternativa, también pueden enviar los comentarios a Vivienda por medio electrónico a environmentcdbg@vivienda.pr.gov.

Fecha: 10 de octubre de 2023

Lcdo. William O. Rodríguez Rodríguez
Secretario del Departamento de la Vivienda

DEPARTAMENTO DE LA VIVIENDA

primerahora#acurbelo@vivienda.pr.gov

## public notice

Early Notice and Public Review of a Proposed Activity in the 100-year Floodplain

Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators

To: All Interested Parties, Groups, and Individuals

This is to give notice that the Puerto Rico Department of Housing (PRDOH) has determined that the following proposed action under the Community Development Block Grant – Mitigation (CDBG-MIT), Hazard Mitigation Grant Program, grant number B-18-DP-72-0002, is located on the 100-year floodplain. PRDOH will be identifying and evaluating practicable alternatives to locating the action and the potential impacts on the floodplain from the proposed action, as required by Executive Order 11988, in accordance with HUD regulations at 24 CFR 55.20 Subpart C Procedures for Making Determinations on Floodplain Management and Protection of Wetlands. The proposed project, **Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators**, is within a municipality with structures damaged by hurricanes Irma and María and is located on Road PR-827, km 5.6, Ortiz Ward, Toa Alta, PR 00953. The proposed activity is situated in flood zone A with dimensions of 0.437 acres. The floodplains in the project area can be found in the Flood Insurance Rate Map (FIRM) (panel 72000C0705J, effective 04/13/2018), as indicated on the FEMA Flood Map Service Center at https://msc.fema.gov/portal/home.

The proposed project consists of the construction of a concrete platform where 4 power generators and their components and diesel storage tanks will be installed, and the construction of a paved access road over an existing dirt road. The purpose is to reduce the vulnerability of critical facilities to natural hazards and address the continuity of service and supply of potable water to the population. The current generator of the dam generator only provides power to the dam gates and facilities, leaving the Raw Water Pump Station without coverage if the electrical system fails. Consequently, the water supply to Enrique Ortega WTP stops. The size of the area is approximately 2,744 square meters. The number of units is four generators with a capacity of 2,500 kW and two diesel storage tanks with a capacity of 30,000 gallons each. The size of the footprint for the location of the power generators is approximately 1,278 square meters and for the access road it is 4,773 square meters. The floodplain that may possibly be affected is an area previously impacted as it was used as part of the project to repair the scours found at the base of the La Plata Dam structure between 2021 and 2022. Therefore, the property has low biodiversity of species, without known recreational, educational, scientific, historical, nor cultural values. The lot was evaluated and does not present the biotic and hydrological characteristics of a wetland.

There are three primary purposes for this notice. First, people who may be affected by activities in floodplains and those who have an interest in the protection of the natural environment should be given an opportunity to express their concerns and provide information about these areas. Commenters are encouraged to offer alternative sites outside of the floodplains, alternative methods to serve the same project purpose, and methods to minimize and mitigate impacts. Second, an adequate public notice program can be an important public educational tool. The dissemination of information and request for public comment about floodplains can facilitate and enhance federal efforts to reduce the risks and impacts associated with the occupancy and modification of these special areas. Third, as a matter of fairness, when the federal government determines it will participate in actions taking place in floodplains, it must inform those who may be put at greater or continued risk.

PRDOH will consider all comments received on or before October 26, 2023. Written comments can be sent to the following address: Puerto Rico Department of Housing, 606 Barbosa Avenue, Juan C. Cordero Dávila Building, Río Piedras, PR 00918-8461, Attention: Santa D. Ramírez-Lebrón/Pedro de León-Rodríguez, Permits and Environmental Compliance Specialists. A complete description of the project is available to the public for review from 8:30 a. m. to 4:00 p. m. at the Puerto Rico Department of Housing, 606 Barbosa Avenue, Juan C. Cordero Dávila Building, Río Piedras, PR 00918. The number to get information is (787) 274-2527, ext. 4320. In the alternative, comments may also be sent to PRDOH by email at environmentcdbg@vivienda.pr.gov.

Date: October 10, 2023

William O. Rodríguez Rodríguez, Esq.
Secretary of the Department of Housing

DEPARTMENT OF HOUSING

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## aviso público

**Aviso Preliminar y Revisión Pública de una Actividad Propuesta en un humedal**

Generadores de Energía Toma de Aguas Crudas
de la Planta de Filtración Enrique Ortega

Para: Todas las partes interesadas, grupos e individuos

Este aviso notifica que el Departamento de la Vivienda de Puerto Rico (Vivienda, en adelante) ha determinado que la siguiente acción propuesta bajo el Programa de Subvenciones de Mitigación de Riesgos, Subvención en Bloque para el Desarrollo Comunitario – Mitigación (CDBG-MIT), número de subvención B-18-DP-72-0002, se encuentra adyacente a un humedal. Vivienda identificará y evaluará alternativas prácticas para realizar la acción propuesta dentro del humedal y los impactos potenciales en el humedal debido a la acción propuesta, según lo requerido por la Orden Ejecutiva 11990, de acuerdo con las regulaciones de HUD en 24 CFR 55.20 Subparte C - Procedimientos para tomar determinaciones sobre el manejo de llanuras aluviales y la protección de humedales. El proyecto propuesto, **Generadores de Energía Toma de Aguas Crudas de la Planta de Filtración Enrique Ortega (#4339-0019)**, propuesto por la Autoridad de Acueductos y Alcantarillados (PRASA, por sus siglas en inglés) como subrecipiente, se encuentra dentro de un municipio que sufrió daños debido a los huracanes Irma y María, y está localizado en la carretera PR-827 km 5.6, barrio Ortiz, Toa Alta, PR 00953; coordenadas 18.342664, -66.237135. El proyecto propuesto consiste en la construcción de una plataforma de hormigón donde se instalarán cuatro generadores de energía, sus componentes y tanques de almacenamiento de diésel, y la construcción de un camino de acceso asfaltado sobre un camino de tierra existente. El propósito es reducir la vulnerabilidad de las instalaciones críticas ante amenazas naturales y abordar la continuidad del servicio y suministro de agua potable a la población. El actual generador de la represa solo suministra energía a las compuertas de la represa y sus instalaciones, dejando la Estación de Bombas de Aguas Crudas sin cobertura si el sistema eléctrico falla. En consecuencia, se detiene el suministro de agua a la PF Enrique Ortega. El tamaño del solar es de aproximadamente 2,744 metros cuadrados. El número de unidades son cuatro generadores con una capacidad de 2,500 kW y dos tanques de almacenamiento de diésel con una capacidad de 30,000 galones cada uno. El tamaño de la huella para la localización de los generadores de energía es de aproximadamente 1,278 metros cuadrados y para el camino de acceso es de 4,773 metros cuadrados. El proyecto está parcialmente ubicado dentro de un valle inundable de 100 años en la que se publicó un Aviso Preliminar el 10 de octubre de 2023. Este aviso se publica en base a la proximidad del proyecto a un humedal ribereño (R2UBH), según el mapa del Inventario Nacional de Humedales (NWI, por sus siglas en inglés). Para evitar los impactos indirectos a este humedal, que puedan ser causados por el movimiento de tierra y remoción de vegetación, durante la construcción y al establecer las áreas de preparación, se implementarán las mejores prácticas posibles (BMP's, por sus siglas en inglés), tales como zonas de amortiguamiento naturales con un ancho mínimo de 50 pies medidos desde el borde del arroyo/humedal, instalación de mallas, pacas de heno, estanques de sedimentación, canales de desvío, protección de taludes y construcción de un estanque de retención permanente. Los humedales se encuentran a 44 pies y 50 pies al oeste en dos áreas en la parte sur del camino de acceso propuesto. La construcción y otras actividades se limitarán a la parte este de la alineación en estos lugares. Además, se sembrarán árboles para la protección del humedal con especies de beneficios para la vida silvestre.

Este aviso tiene tres propósitos principales. En primer lugar, las personas que puedan verse afectadas por las actividades en el humedal y aquellos que tengan interés en la protección del ambiente natural deben tener la oportunidad de expresar sus inquietudes y proveer información sobre estas áreas. Se exhorta a la comunidad a ofrecer ubicaciones alternas fuera del humedal, métodos alternos para cumplir el mismo propósito del proyecto y métodos para minimizar y mitigar los impactos en el humedal. Segundo, un programa adecuado de avisos públicos puede ser una herramienta importante para la educación pública. La divulgación de información sobre humedales puede facilitar y mejorar los esfuerzos federales para reducir los riesgos e impactos asociados con la ocupación y alteración de estas áreas especiales. Tercero, como materia de justicia, cuando el gobierno federal determine participar en acciones ubicadas en el humedal, debe informárselo a quienes puedan ser expuestos a un riesgo mayor o continuo.

Los comentarios escritos deben ser recibidos por Vivienda en la siguiente dirección antes 17 de agosto de 2024: Departamento de la Vivienda de Puerto Rico, edificio Juan C. Cordero Dávila, 606 avenida Barbosa, Río Piedras, PR 00918-8461, y (787)274-2527 ext. 4320, Atención: Juan Pérez. Una descripción completa del proyecto puede ser revisada de 8:30 a.m. a 4:00 p.m. en el Departamento de la Vivienda de Puerto Rico, edificio Juan C. Cordero Dávila, 606 avenida Barbosa, Río Piedras, PR 00918. Los comentarios también pueden enviarse por correo electrónico a environmentcdbg@vivienda.pr.gov.

Fecha: 2 de agosto de 2024

Lcdo. William O. Rodríguez Rodríguez
Secretario del Departamento de la Vivienda

Autorizado por la Oficina del Contralor
Electoral OCE-SA-2023-00076

## public notice

**Early Notice and Public Review of a Proposed Activity in a Wetland**

Enrique Ortega Water Treatment Plant Raw
Water Intake Power Generators

To: All Interested Parties, Groups & Individuals

This is to give notice that the Puerto Rico Department of Housing (PRDOH) has determined that the following proposed action under the Hazard Mitigation Grant Program, Community Development Block Grant – Mitigation (CDBG-MIT), Grant number B-18-DP-72-0002, is located adjacent to a wetland. PRDOH will be identifying and evaluating practicable alternatives to locating the action within the wetland and the potential impacts on the wetland from the proposed action, as required by Executive Order 11990, in accordance with HUD regulations at 24 CFR 55.20 Subpart C - Procedures for Making Determinations on Floodplain Management and Protection of Wetlands. The proposed project, **Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators (#4339-0019)**, proposed by Puerto Rico Aqueduct and Sewer Authority (PRASA) as subrecipient, is within a municipality with structures damaged by Hurricanes Irma and María, and it's located at PR-827 Road Km 5.6, Ortiz Ward, Toa Alta, PR 00953; coordinates 18.342664, -66.237135. The proposed project consists of the construction of a concrete platform where four power generators, their components and diesel storage tanks will be installed, and the construction of a paved access road over an existing dirt road. The purpose is to reduce the vulnerability of critical facilities to natural hazards and address the continuity of service and supply of potable water to the population. The current generator of the dam only provides power to the dam gates and facilities, leaving the Raw Water Pump Station without coverage if the electrical system fails. Consequently, the water supply to Enrique Ortega WTP stops. The size of the area is approximately 2,744 square meters. The number of units is four generators with a capacity of 2,500 kW and two diesel storage tanks with a capacity of 30,000 gallons each. The size of the footprint for the location of the power generators is approximately 1,278 square meters and for the access road is 4,773 square meters. The project is partially located within a 100-year floodplain in which an Early Notice was published on October 10, 2023. This notice is being published based on the project located in proximity to a riverine wetland (R2UBH) according to the National Wetlands Inventory (NWI) map. To prevent indirect impacts to the wetland that may be caused by earthmoving and vegetation removal, during construction, and establishing staging areas, best management practices (BMPs) will be implemented, such as natural buffer zones with a minimum width of 50 feet measured from the stream/wetland edge, installation of meshes, bales, sedimentation ponds, diversion channels, slope protection, and construction of a permanent retention pond. Wetlands are within 44 feet and 50 feet to the west at two areas at the southern portion of the proposed access road. Construction and other activities will be limited to the east portion of the alignment at these locations. Additionally, trees will be planted to protect the wetland with species beneficial to wildlife.

There are three primary purposes for this notice. First, people who may be affected by activities in the wetland and those who have an interest in the protection of the natural environment should be given an opportunity to express their concerns and provide information about these areas. Commenters are encouraged to offer alternative sites outside of the wetland, alternative methods to serve the same project purpose, and methods to minimize and mitigate impacts on the wetland. Second, an adequate public notice program can be an important public educational tool. The dissemination of information and request for public comment about wetlands can facilitate and enhance Federal efforts to reduce the risks and impacts associated with the occupancy and modification of these special areas. Third, as a matter of fairness, when the Federal government determines it will participate in actions taking place in the wetland, it must inform those who may be put at greater or continued risk.

Written comments must be received by PRDOH at the following address on or before August 17, 2024: Puerto Rico Department of Housing, 606 Barbosa Avenue, Juan C. Cordero Dávila Building, Río Piedras, PR 00918-8461, and (787)274-2527 ext. 4320, Attention: Juan Pérez. A full description of the project may also be reviewed from 8:30 am to 4:00 pm at the Puerto Rico Department of Housing, 606 Barbosa Avenue, Juan C. Cordero Dávila Building, Río Piedras, PR 00918. Comments may also be submitted via email at environmentcdbg@vivienda.pr.gov.

Date: August 2, 2024

William O. Rodríguez Rodríguez, Esq.
Secretary of the Department of Housing

Authorized by the Office of the Electoral
Comptroller OCE-SA-2023-00076

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## Andrea Curbelo-Marty

**From:** Kenneth M. Garcia-De Leon
**Sent:** Monday, October 30, 2023 9:33 AM
**To:** environmentcdbg
**Subject:** RE: Comentarios HMGP-Enrique Ortega

Saludos

Por correo postal no llegaron comentarios para mencionado proyecto.

Atentamente

**Kenneth M. García De León**
Oficial de Radicación de Informes de Operaciones
Oficina Recuperación de Desastres
kgarcia@vivienda.pr.gov|787.274.2527 Ext. 4013
Visit us: www.cdbg-dr.pr.gov
Write us: infocdbg@vivienda.pr.gov

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**From:** environmentcdbg <environmentcdbg@vivienda.pr.gov>
**Sent:** Monday, October 30, 2023 9:31 AM
**To:** Kenneth M. Garcia-De Leon <kgarcia@vivienda.pr.gov>
**Subject:** Comentarios HMGP-Enrique Ortega

Saludos Kenneth,

Con respecto a la publicación del Aviso Preliminar y Revisión Pública de una Actividad Propuesta en un valle inundable de 100 años (Paso 2) para el proyecto **Generadores de Energía Toma de Aguas Crudas de la Planta de Filtración Enrique Ortega** ¿habrá llegado algún comentario a través del correo postal? De ser así, por favor nos lo hace llegar.

October 30, 2023

To whom it may concern,

This letter is to validate that no comments were received in the Permits and Environmental Compliance Division e-mail: environmentcdbg@vivienda.pr.gov, for the project *Generadores de Energía Toma de Aguas Crudas de la Planta de Filtración Enrique Ortega*, as part of the CDBG-MIT Hazard Mitigation Grant Program. The Early Notice and Public Review of a Proposed Activity in the 100-Year Floodplain was published in the *Primera Hora* newspaper of Puerto Rico on October 10, 2023, with a comment period that concluded on October 26, 2023.

Cordially,

Permits and Environmental Compliance Division
CDBG-DR/MIT Program
environmentcdbg@vivienda.pr.gov | 787.274.2527 ext. 4320

| | |
|---|---|
| **From:** | Kenneth M. Garcia-De Leon |
| **To:** | environmentcdbg |
| **Subject:** | RE: Comentarios - Aviso Preliminar Enrique Ortega |
| **Date:** | Tuesday, August 20, 2024 10:42:20 AM |
| **Attachments:** | image002.png<br>image003.png |

---

Buenos días:

Por correo postal no llegaron comentarios para mencionado proyecto.

Cordialmente,

**Kenneth M. García De León**
Especialista en Control de Documentos / Operaciones
Oficina Recuperación de Desastres
kgarcia@vivienda.pr.gov|787.274.2527 Ext. 4013
Visitanos: recuperacion.pr.gov
Contactanos: infocdbg@vivienda.pr.gov

DEPARTAMENTO DE LA VIVIENDA

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**From:** environmentcdbg <environmentcdbg@vivienda.pr.gov>
**Sent:** Tuesday, August 20, 2024 9:19 AM
**To:** Kenneth M. Garcia-De Leon <kgarcia@vivienda.pr.gov>
**Subject:** Comentarios - Aviso Preliminar Enrique Ortega

Saludos Kenneth,

Con respecto a la publicación del Aviso Preliminar y Revisión Pública de una Actividad Propuesta en un humedal (Paso 2) para el proyecto ***Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators* (#4339-0019)**, ¿habrá llegado algún comentario a través del correo postal? De ser así, por favor nos lo hace llegar.

# Validation Letter

August 20, 2024

To whom it may concern,

This letter is to validate that no comments were received in the Permits and Environmental Compliance Division e-mail: environmentcdbg@vivienda.pr.gov, for the project **Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators (#4339-0019)**, as part of the CDBG-MIT Hazard Mitigation Grant Program. The Early Notice and Public Review of a Proposed Activity in a Wetland was published in the *Primera Hora* newspaper of Puerto Rico on August 2, 2024, with a comment period that concluded on August 17, 2024.

Cordially,

Permits and Environmental Compliance Division
Disaster Recovery Office
environmentcdbg@vivienda.pr.gov | 787.274.2527 ext. 4320

## Appendix 4. USFWS ESA Section 10 Concurrence Letter

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Caribbean Ecological Services Field Office
Bayamón | Mayagüez | Maricao | Rio Grande | St Croix
P.O. Box 491
Boquerón, Puerto Rico 00622


In Reply Refer to:
FWS/R4/CESFO/72135-Gen

Submitted Via Electronic Mail: jcperez@vivienda.pr.gov

Juan Carlos Pérez-Bofill, PE, MEng.
Director – Disaster Recovery CDBG-DR Program
Puerto Rico Department of Housing
P.O. Box 21365
San Juan, P.R 00928-1365

Re: PRDOH-4339-0019 Enrique Ortega Water Treatment Plant, Toa Alta, Puerto Rico

Dear Mr. Pérez-Bofill

Thank you for your letter dated November 10, 2023, requesting comments on the above referenced project. As per your request, our comments are provided under the Endangered Species Act (Act) (87 Stat. 884, as amended; 16 United States Code 1531 et seq.), and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

The Puerto Rico Department of Housing (PRDOH) on behalf of the Puerto Rico Aqueduct and Sewer Authority (PRASA-the Applicant) is proposing the installation of four (4) 2,500 KW generators to provide backup power to the Raw Water Intake Pump Station, sump pump, dam gate system engine, one of the office buildings, exterior lighting, and security systems of the La Plata Raw Water Intake located in Toa Alta, Puerto Rico. The proposed project location will be at PR-819, Bo. Mucarabones (18°23'18.7"N 66°13'40.0"W) in the municipality of Toa Alta, Puerto Rico.

Using the Information for Planning and Consultation (IPaC) system PRASA has determined that the proposed project lies within the range of Puerto Rican boa (*Epicrates inornatus* now known as *Chilabothrus inornatus*).

Based on the nature of the project, scope of work, information available, and analysis of the IPaC lists (Project code: 2023-0071470), PRASA has determined that the proposed project may affect, but is not likely to adversely affect the Puerto Rican boa. Conservation measures will be implemented prior to and during the construction to avoid or minimize impacts to this species.

We have reviewed the information provided in your letter and our files, and concur with your determination that the proposed project may affect, but is not likely to adversely affect the Puerto Rican boa with the implementation of the conservation measures. As per the conservation recommendations, please note that if a Puerto Rican boa is encountered during the project activities, it should not be captured. If a boa needs to be moved out of harm's way, the Puerto Rico Department of Natural and Environmental Resources (PRDNER) should be contacted for safe capture and relocation of the animal. If immediate relocation is not an option, project-related activities in the area where the boa is found must stop until it moves out of harm's way on its own.

In view of this, we believe that requirements of section 7 of the Endangered Species Act (Act) have been satisfied. However, obligations under section 7 of the Act must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner that was not previously considered; (2) this action is subsequently modified in a manner not previously considered in this assessment; or, (3) a new species is listed, or critical habitat determined that may be affected by the identified action.

Thank you for the opportunity to comment on this project. If you have any questions or require additional information, please contact us via email at caribbean_es@fws.gov or by phone at (786) 244-0081.

Sincerely yours,

Lourdes Mena
Acting Field Supervisor

drr

**Appendix 5**. Pre-consultation Request Mitigation Payment Through Monetary Compensation Authorization Cutting, Pruning, Transplanting and Planting of Trees

**PLEASE REFER TO APPENDIX B OF ENVIRONMENTAL ASSSESSMENT**

**Appendix 6**. Permit 2024-575571-DEA-300221

GOBIERNO DE PUERTO RICO
Departamento de Desarrollo Económico y Comercio
Oficina de Gerencia de Permisos

Número de Caso:
**2024-575571-DEA-300221**

# Determinación de Cumplimiento Ambiental para Evaluación Ambiental

**Generadores Toma de Agua Cruda Planta de Filtracion Enrique Ortega CIP 1-70-9000**

## Fecha de Expedición:

11/JUN/2024

## Datos de Determinación

### Presentado por

OGPE

### Número de Caso

2024-575571-DEA-300221

### Dirección Física

BO QUEBRADA CRUZ, CARR 824 KM 5.0, , Puerto Rico, 00954

### Casos de Referencia

2023-503258-REA-014414

### Número(s) de Catastro

112-000-006-71

## Acción Propuesta

La Acción Propuesta consiste en un proyecto: Público con Contratación Privada en el Distrito de Clasificación identificado a continuación. El mismo tiene los siguientes componentes:

### Calificación

**Distrito(s) de Calificación:**

CR-C

**Distrito en el Mapa de Inundabilidad:**

X (80.6%), A (19.4%)

**Tipo de Suelo:**

CaF (36.6%), MxF (26.7%), MxE (19.4%), CTR (8.3%), MaB (7.1%), MxD (1.9%)

### Cabida del proyecto (Área Total Según Escritura)

200302.09 metros cuadrados

### Servidumbres Existentes

Acueductos (AAA), Vía municipal de acceso (MUNICIPIO), Electricidad (AAE)

### Desperdicios Sólidos

Volumen en construcción: 304 yardas cúbicas

Tipo: NP

Volumen en operación: 2 yardas cúbicas

Tipo: NP

### Movimiento de Tierra

Volumen: 7674 metros cúbicos

Volumen de corte: 3151 metros cúbicos

Volumen de relleno: 4523 metros cúbicos

### Demolición

Conlleva demolición: No

Conlleva explosivos: No

### Instalación de Generadores de Electricidad

Conlleva generadores: Sí

Capacidad: 10000 kW

Tanque: 60000 galones

### Descripción

El Proyecto consiste en la instalación de cuatro generadores de 2,500 kW, la construcción de una plataforma en hormigón en donde se instalarán los generadores.

Estas acciones propuestas conllevan la adquisición de la servidumbre de paso y 2,744 metros cuadrados (m2) de terreno para el camino de acceso para que los vehículos asignados pueden maniobrar en el área de mantenimiento.

La obra propuesta incluye:

1. Instalación de cuatro (4) generadores con capacidad de 2,500kW cada uno, dos (2) tanques para almacenamiento de diésel con capacidad de 30,000 galones cada uno, un cuarto eléctrico, tres espacios para estacionamiento y un área para despacho de combustible.

2. Construcción de un dique en hormigón de 20 metros por 40 metros para la colocación de los generadores e infraestructuras mencionada en el punto anterior.

3. Construcción de camino asfaltado para acceso a la zona de aproximadamente 740 metros de largo y 4 metros de ancho con cunetas de 1 metro de ancho a los lados para el desvío de las escorrentías.

4. Remoción de corteza terrestre para ensanchar el camino asfaltado para un mejor viraje del camión que proveerá el diésel a los generadores.

5. Colocación de portón de acceso en la entrada.

6. Instalación de conductos soterrados para la instalación de nuevas líneas eléctricas y cablería de fibra óptica que conectarán los nuevos generadores con el edificio de bombas de la represa. Para esto se realizará un corte de 3,151 metros cúbicos (m3) y un relleno de 4,523 metros cúbicos (m3) .

7. Extensión de línea de agua soterrada desde un punto existente hasta la nueva área de generadores.

8. Instalación de nuevas líneas eléctricas por medio de conductos soterrados.

9. Instalación un nuevo sistema postes para el alumbrado del área del proyecto y los caminos de accesos.

El proyecto ocupará un área total de 6,051 metros cuadrados (m2) de terreno, la cual se divide en las siguientes áreas:

- Camino de acceso = 4,284 metros cuadrados (m2)
- Extensión de carretera para camino de giro de camiones = 489 metros cuadrados (m2)
- Área de generadores y tanques de almacenamiento de diésel = 1,278 metros cuadrados (m2).

El Proyecto no contempla el hincado de pozo, canalización, dragado o modificaciones a cuerpos de agua adyacentes.

# Determinación de Cumplimiento Ambiental para Evaluación Ambiental

**Impactos al Ambiente y Medidas de Mitigación**

Los siguientes impactos ambientales potenciales están asociados a las actividades de instalación y construcción del Proyecto: corte, movimiento y relleno de terreno, remoción de material vegetativo, nivelación del terreno, emisiones de polvo fugitivo, corte de árboles, movimiento de fauna, movimiento de equipo pesado, aumento de niveles de ruido. El impacto asociado a las actividades de movimiento de tierra durante la fase de construcción resultará en la remoción de un estimado de 150 árboles, los cuales ubican en el área de los generadores, taludes y el camino no asfaltado en tierra existente que va desde el comienzo de la carretera Camino Recreativo La Plata hasta el portón que lleva a la Represa La Plata.

Durante las actividades de construcción, se prevé un aumento en el tránsito de vehículos pesados por la carretera PR-824 y el Camino Recreativo La Plata. Esto podría resultar en impactos temporeros al tránsito en el barrio Quebrada Cruz y la entrada al Refugio de Vida Silvestre de La Plata y sus facilidades recreativas. Se establecerá un plan para identificar los horarios de movimiento de vehículos y equipo pesado fuera de las horas pico de entrada y salida en el refugio, límites de velocidad y otros parámetros asociados a la seguridad vial.

Los posibles impactos evaluados en este documento son de carácter temporero por lo que se implementarán medidas de mitigación en total cumplimiento con las leyes y reglamentos aplicables para el proceso de permisos de proyectos en su etapa de construcción. No se prevén impactos significativos a especies catalogadas como en peligro de extinción o amenazadas. Estas especies no fueron observadas dentro de los límites del área de estudio.
El proyecto no conllevará impactos ambientales significativos, la mayor parte de estos están asociados a la etapa de construcción y son de carácter temporero. Se prevé que los impactos socioeconómicos asociados a la instalación de los generadores resultarán en un impacto beneficioso a largo plazo para las comunidades y municipios que se suplen de agua del Embalse La Plata durante una emergencia.

El predio del proyecto cuenta con la Certificación de Categorización de Hábitat para Vida Silvestre del Departamento de Recursos Naturales y Ambientales, emitida el 8  de diciembre de 2023, donde se categoriza el predio como Habitat Natural con Alto Potencial de Convertirse en Habitat Esencial, Habitat de Alto Valor Ecologico o Habitat de Valor Ecologico (Categoria 5).

## Determinación

Luego de revisado y analizado el expediente administrativo y discutidos todos los méritos del documento ambiental, al amparo de los poderes y facultades que le confiere a esta Oficina de Gerencia de Permisos, (en adelante “OGPe”) la Ley Núm. 161 - 2009, según enmendada y el Reglamento para el Proceso de Evaluación Ambiental de la Junta de Calidad Ambiental ( en adelante “RPEA”), RESOLVEMOS:

## Determinación de Cumplimiento Ambiental para Evaluación Ambiental

- La Evaluación Ambiental (en adelante, "EA") sometida por la Agencia Proponente para la acción propuesta, cumple con todos los requisitos de la Ley sobre Política Pública Ambiental, Ley Número 416 - 2004, según enmendada, y con el RPEA. En dicho documento ambiental fueron adecuadamente considerados y analizados los impactos ambientales que conlleva la acción, por lo que se aprueba el mismo, dando así por terminado el proceso de evaluación ambiental.

- De conformidad con el RPEA, las medidas de mitigación contenidas en el documento ambiental serán obligatorias y constituirán las medidas mínimas a tomarse en consideración para proteger el ambiente. La Agencia Proponente requerirá a las agencias con jurisdicción que incluyan las medidas de mitigación como condición indispensable de sus permisos.
- La Agencia Proponente deberá procurar que al momento de llevarse a cabo el desarrollo del Proyecto, las recomendaciones emitidas por los Gerentes de Permisos de la OGPe sean adecuadamente observadas y consideradas. Asimismo, la Agencia Proponente será responsable de velar que la acción, de llevarse a cabo, se desarrolle acorde con la información suministrada en el documento ambiental presentado apercibiéndosele que, los permisos que administran las entidades gubernamentales en relación al cumplimiento de las mismas están supeditados a la información y datos contenidos en documento ambiental.

- Si luego de haberse dado cumplimiento con el Artículo 4 de la Ley Núm. 416, supra, surgieran variaciones sustanciales en la acción propuesta, según definida en el RPEA, la Agencia Proponente será responsable de evaluar dichos impactos mediante el documento ambiental que entienda correspondiente.

- Se le apercibe que esta determinación de cumplimiento ambiental no será revisable hasta tanto se emita una determinación final, cuyo componente sea la presente determinación.

### Recomendación y/o Comentarios del Director de la División de Cumplimiento Ambiental

1.Solicitar a través de la Oficina de Gerencia de Permisos (OGPe) el Permiso Único Incidental Operacional, a tenor con la Regla 3.4.1 del Reglamento Núm. 9473, vigencia 16 de junio de 2023, conocido como el "Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operación de Negocios".

2.Todo proceso de almacenaje, manejo y disposición de los desperdicios sólidos no peligrosos a ser generados durante las diferentes fases del proyecto propuesto, serán realizados en conformidad con lo estipulado bajo el Reglamento para el manejo de desperdicios no peligrosos, Reglamento Núm. 5717-1997.

3.Mantener los camiones de carga que se utilicen para transportar escombros y/o materiales de construcción cubiertos con toldos mientras estén en movimiento, para evitar la generación de polvo fugitivo.

4. Los camiones de acarreo de desperdicios deberán contar con el Permiso para Operar Servicios de Recolección o Transportación de Desperdicios Sólidos No Peligrosos (Permiso DS-1) emitido por el DRNA, para transportarlos hasta una instalación de disposición final o de reciclaje.

5.Tomar las medidas necesarias para controlar el área durante la construcción para evitar exponer a los vehículos a recoger lodo, polvo, sustancias pegajosas o material viscoso en las ruedas u otras partes del vehículo, los cuales a su vez

puedan ser depositados en las calles u otro sitio público y así mantener las vías públicas y alrededores del proyecto libres de acumulación de desechos de construcción.

6.Tomar las medidas necesarias para evitar que residuos de sustancias orgánicas e inorgánicas tales como: aceites, combustibles u otras sustancias químicas, puedan ser arrastradas por la escorrentía y ganen acceso a cualquier cuerpo de agua o al sistema pluvial.

7.De tener alguna descarga de escorrentía a cualquier cuerpo de agua durante la operación, deberá consultar a la Agencia Federal de Protección Ambiental para determinar si dichas descargas requieren un permiso “NPDES” de acuerdo al Código Federal de Reglamentación Número 40, Sección 122.26 (b) (14) (x).

8.Se deberá establecer un programa de reforestación utilizando especies nativas que además de ayudar a minimizar la erosión beneficien la vida silvestre. Esta medida es cónsona con la Ley para Fomentar la Siembra de Árboles Cuyas Frutas y/o Semillas Provean Alimento a Especies de Aves Silvestres de Puerto Rico (Ley Núm. 97 de 24 de junio de 1998), la cual establece lo siguiente: “En todo proyecto de reforestación en que se utilicen fondos públicos o privados, o en una combinación de estos, un 15% en las áreas rurales y un 10% en las áreas urbanas del total de árboles a ser sembrados, serán de especies cuyas frutas y/o semillas sirvan de alimento a las aves silvestres que residan temporal o permanentemente en ésta”.

9.Para operar generadores de electricidad con capacidad mayor de diez (10) caballos de fuerza y una operación no mayor de quinientas (500) horas al año, deberán obtener a través de la OGPe, el Permiso General que establece el Reglamento para el Trámite de los Permisos Generales, que incluye el Permiso de Fuente de Emisión.

10. Se deberán controlar los olores objetables que puedan afectar la atmósfera comuna

11.En relación con tanques sobre tierra que se utilicen para almacenar combustibles o sustancias químicas, se deberá presentar ante el Área de Calidad de Agua del DRNA, un Plan de Emergencia, reflejando las acciones a tomar para evitar, controlar y remediar derrames de combustibles o sustancias químicas, a tenor con la Regla 1306.5 del Reglamento Núm. 9079 del 26 de abril de 2019, conocido como el "Reglamento de Estándares de Calidad de Agua de Puerto Rico”.

12.Revisar el Plan de Emergencia de la facilidad de manera que se aseguren que este incluya todos los tanques instalados sobre tierra, utilizados para el almacenamiento de combustible(s), materias primas o cualquier sustancia química; y de ser requerido se deberá presentar el mismo ante el Área de Calidad de Agua del DRNA, reflejando las acciones a tomar para evitar, controlar y remediar derrames de combustible(s), materias primas o cualquier sustancia química, a tenor con la Regla 1306.5 del Reglamento Núm. 9079 del 26 de abril de 2019, conocido como el “Reglamento de Estándares de Calidad de Agua de Puerto Rico”.

13.Cumplir con las disposiciones del Reglamento de Planificación Núm. 13 (Reglamento sobre Áreas Especiales de Peligro a Inundación).

14.Relacionado al nivel de sonido máximo permitido, cumplir con el Reglamento Número 8019 del 9 de mayo de 2011, conocido como el Reglamento para el Control de la Contaminación por Ruido.

15.Cumplir con el Reglamento Núm. 8786 del 9 de agosto de 2016, conocido como el "Reglamento para el Control y la Prevención de la Contaminación Lumínica" en lo relacionado a fuentes emisoras de iluminación exterior y demás requisitos aplicables al proyecto que disponga dicho reglamento.

16.Deberá paralizar todo tipo de actividad de excavación, movimiento y remoción de corteza terrestre, y notificar en un plazo de veinticuatro (24) horas al Programa de Arqueología y Etnohistoria, en caso de que, durante el desarrollo del proyecto, se descubra o impacte algún depósito, elemento, estructura o vestigio de naturaleza arqueológica.

17.Tendrá que cumplir con todos los requerimientos y especificaciones emitidas por el Departamento de Recursos Naturales y Ambientales (DRNA) en la certificación de Categorización de Hábitats con fecha del 8 de diciembre de 2023.

18.Cumplir con los requerimientos de las agencias concernientes y con las recomendaciones (2023-503258-REA-014414) emitidas para el proyecto.

19.Las recomendaciones y requisitos presentados en esta comunicación no eximen de cualquier otro requerimiento o permiso de esta Oficina u otras agencias concernidas, que sean aplicables a la acción propuesta.

# Determinación de Cumplimiento Ambiental para Evaluación Ambiental

## Firma / Sellos

CERTIFICO: Que he notificado copia fiel y exacta de la presente determinación con sus anejos, bajo mi firma, a la Agencia Proponente.

**Fecha de Expedición:**
11/JUN/2024

Lcdo. Félix E. Rivera Torres
Secretario Auxiliar
Departamento de Desarrollo Económico y Comercio de Puerto Rico
Oficina de Gerencia de Permisos

**Appendix 7** Primera Hora Newspaper Final Public Notice

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# aviso público

**Aviso Final y Explicación Pública de una Actividad Propuesta en un valle inundable designado del Estándar Federal para el Manejo de Riesgo de Inundación y un humedal**

Generadores de Energía Toma de Aguas Crudas de la Planta de Filtración Enrique Ortega
4339-0019

Para: Todas las partes interesadas, grupos e individuos

Este aviso notifica que el Departamento de la Vivienda de Puerto Rico (Vivienda, en adelante) completó una evaluación según estipulado en la Orden Ejecutiva 11988, según enmendada por la Orden Ejecutiva 13690, y la Orden Ejecutiva 11990, de acuerdo con las regulaciones de HUD en 24 CFR 55.20 Subparte C - Procedimientos para tomar determinaciones sobre el manejo del valle inundable y la protección de humedales. La actividad está subvencionada con fondos del Programa de Subvenciones de Mitigación de Riesgos, Subvención en Bloque para el Desarrollo Comunitario – Mitigación (CDBG-MIT), número de subvención B-18-DP-72-0002. El proyecto propuesto, **Generadores de Energía Toma de Aguas Crudas de la Planta de Filtración Enrique Ortega (4339-0019)**, localizado en la carretera PR-827 km 5.6, barrio Ortiz, Toa Alta, PR 00953; coordenadas 18.342664, -66.237135, y está ubicado dentro de un valle inundable del Estándar Federal para el Manejo de Riesgo de Inundación (FFRMS, por sus siglas en inglés) y en las proximidades de un humedal. El proyecto propuesto consiste en la construcción de una plataforma de hormigón donde se instalarán cuatro generadores de energía, sus componentes y tanques de almacenamiento de diésel, y la construcción de un camino de acceso asfaltado sobre un camino de tierra existente. El propósito es reducir la vulnerabilidad de las instalaciones críticas ante amenazas naturales y abordar la continuidad del servicio y suministro de agua potable a la población. El actual generador de la represa solo suministra energía a las compuertas de la represa y sus instalaciones, dejando la estación de bombeo de aguas crudas sin cobertura si el sistema eléctrico falla. En consecuencia, se detiene el suministro de agua a la Planta de Filtración (PF) Enrique Ortega. El área del proyecto propuesto es de aproximadamente 6,051 metros cuadrados. El número de unidades son cuatro generadores con una capacidad de 2,500 kW y dos tanques de almacenamiento de diésel con una capacidad de 40,000 galones cada uno. El tamaño de la huella para la localización de los generadores de energía es de aproximadamente 1,278 metros cuadrados y para el camino de acceso es de 4,773 metros cuadrados. La extensión del valle inundable del FFRMS se determinó utilizando el enfoque de inundación del 0.2% de probabilidad anual (0.2PFA, por sus siglas en inglés) y extensión del humedal se determinó utilizando datos del Inventario Nacional de Humedales. El proyecto está parcialmente ubicado dentro de un valle inundable de 100 años. La proximidad del proyecto a un humedal ribereño (R2UBH) es de 44 pies y 50 pies al oeste en dos áreas en la parte sur del camino de acceso propuesto. La parte del valle inundable que está parcialmente afectada es un área previamente impactada al haber sido utilizada como parte de un proyecto para reparar las socavaciones encontradas en la base de la estructura de la Represa La Plata entre el 2021 y 2022. Por lo tanto, el predio posee una baja biodiversidad de especies, sin valores recreacionales, educativos, científicos, históricos y culturales conocidos. Para evitar los impactos indirectos a este humedal ribereño que puedan ser causados por el movimiento de tierra y remoción de vegetación durante la construcción y al establecer áreas de preparación, se debe implementar las mejores prácticas posibles (BMP's, por sus siglas en inglés), como la instalación de material geotextil, rollos de fibra, fardos de heno y vallas de cienos. Además, se sembrarán árboles para proteger el humedal con especies beneficiosas para la vida silvestre.

Vivienda consideró las siguientes alternativas y medidas de mitigación para minimizar los impactos adversos y restaurar y preservar las funciones naturales y beneficiosas, y los valores intrínsecos del valle inundable y el humedal existente: i) la Autoridad de Acueductos y Alcantarillados de Puerto Rico (AAA) se encuentra en la necesidad de proveer energía de respaldo a la estación de bombeo de aguas crudas de una de sus instalaciones de tratamiento de agua potable más grandes. La acción propuesta está relativamente cerca de la Represa La Plata para facilitar la operación durante y después de eventos atmosféricos y cortes de energía. La ubicación permitirá la construcción e instalación de los componentes del proyecto, mientras reduce los impactos ambientales y los costos asociados con la construcción y la adquisición de tierras. La parcela con la ubicación preferida es una propiedad de PRASA y se ha utilizado para usos de infraestructura/institucionales. El área seleccionada es esencialmente plana y ya ha sido impactada, lo que reduce la alteración ambiental. La ubicación preferida minimiza los impactos en las áreas forestadas, reduce la nivelación/extracción de materiales de movimiento de tierras y los costos asociados. La ubicación del proyecto proporciona un área que permita la de maniobra de camiones grandes y vehículos de mantenimiento. La construcción de un camino de acceso asfaltado sobre un camino de tierra existente con entrada desde el Camino Recreativo La Plata reduce el suelo expuesto a la erosión y protegerá el humedal ribereño cercano al camino de tierra. ii) En adición a la parcela de la acción propuesta, AAA analizó cinco ubicaciones alternas diferentes que fueron descartados. La ubicación alterna #2, la AAA intentó situar la ubicación alterna seleccionada fuera de la zona de inundación, hacia una pendiente existente en el lado sur de la carretera. El área identificada para instalar los nuevos generadores tiene una pendiente pronunciada con vegetación y árboles que requieren ser removidos. Esto requeriría una perturbación del suelo significativo, más remoción de árboles, lo que aumentaría considerablemente el costo del proyecto. La ubicación alterna #3 está localizada aproximadamente a 200 metros del edificio de control de bombas de la represa La Plata. El área presenta limitaciones de espacio, lo que dificulta mucho la maniobra de equipos y camiones. Esta alternativa también requeriría un muro de contención en el lado que da a la estructura de la represa y afecta una zona con gran densidad forestal. La ubicación alterna #4 está localizada junto a las instalaciones eléctricas de la represa La Plata y requeriría la adquisición de un terreno de aproximadamente 3,200 metros cuadrados para el área de los generadores y tanques de diésel. El terreno a adquirir tiene dos estructuras que serían demolidas para abrir espacio para la plataforma del generador. El área disponible en la ubicación de la represa es limitada. Inicialmente se consideró el único espacio disponible, pero no se pudo utilizar debido a la tubería de agua cruda soterrada. Las ubicaciones alternativas #5a-c son localizaciones adyacentes a la Subestación Eléctrica Piñas de la AEE en la carretera PR-827. Se evaluaron tres parcelas (5a, 5b y 5c) como ubicaciones potenciales para desarrollar la acción propuesta. Todas fueron descartados debido a la distancia a la estación de bombeo de toma de agua cruda existente, la proximidad a otros servicios públicos, el elevado costo de construcción eléctrica, la proximidad a áreas residenciales y la posibilidad de molestar a los vecinos con el ruido y las emisiones de los generadores de respaldo. La ubicación alterna #6 está localizada aproximadamente a 275 metros al noroeste de la represa La Plata, fue descartada al principio de la evaluación porque las líneas de alta tensión cruzan justo en el medio. El derecho de paso típico de la AEE (LUMA) para líneas de 115 kV es de 100 pies (30.5 metros) para permitir el servicio y mantenimiento y cumplir con los requisitos de seguridad. Cuando se proyecta el derecho de paso, el área disponible para el desarrollo se reduce considerablemente, lo que limita el espacio para el equipo. La losa de concreto tendría que estar en un terreno muy empinado. No tomar acción mantendrá la situación actual. Sin la instalación de los generadores de emergencia, una cantidad significativa de residentes del área Metropolitana no contará con servicios de agua potable durante emergencias climáticas extremas u otros eventos, como apagones. La falta de agua potable conlleva consecuencias graves, como enfermedades y pérdida de calidad de vida, entre otras. iii) La AAA ha tomado medidas de ingeniería de mitigación para eliminar el peligro de inundación en la ubicación seleccionada. El proyecto impacta directamente un valle inundable del FFRMS del Río La Plata. El requisito reglamentario del FFRMS es de 0.2PFA para la nueva construcción de acciones críticas. El proyecto aumentó la elevación de los componentes más de 2 pies por encima de 0.2PFA, minimizando los impactos en el valle inundable. Como parte de la acción propuesta, se realizarán actividades de corte y relleno para garantizar que la elevación de los componentes del proyecto cumpla con los requisitos del ABFE del 0.2%. La modificación de la elevación actual del terreno se considera mínima, por lo tanto, no se han identificado efectos adversos en el valle inundable del FFRMS ni en las propiedades vecinas. La selección del camino de tierra existente para desarrollar el camino de acceso al proyecto preserva el terreno natural de que se desarrolle. Las BMP son necesarias para evitar o minimizar la migración de sedimentos desde las áreas de construcción del proyecto hacia el humedal ribereño cercano. Las BMP se pueden clasificar como prevención de la erosión, control de sedimentos, control de escorrentía, entre otras. Algunos ejemplos de prácticas incluyen la instalación de material geotextil, rollos de fibra, fardos de heno y cercas de sedimentos que ayudan a preservar los valles inundables y los humedales. El sistema de gestión de aguas pluviales en la plataforma del generador está diseñado para mitigar los daños causados a las estructuras por las inundaciones. Los tanques diésel de los generadores de respaldo tendrán una pared doble y se instalarán dentro de un dique de hormigón como medida adicional para proporcionar contención adicional. La instalación de un tanque separador de aceite/agua en la salida del sistema de alcantarillado pluvial propuesto eliminaría el aceite o la grasa del agua de escorrentía antes de descargarla en el suelo o el río. Estas medidas ayudan a minimizar las fallas de los equipos, y prevenir o aliviar derrames peligrosos en el valle inundable y humedal. Una vez finalizado el proyecto, se implementarán acciones para restaurar el área de preparación y otras áreas afectadas temporalmente que se limpiaron durante la construcción a su estado natural original y preservar los valores naturales y beneficiosos. No existen impactos adversos en el sitio, ya que anteriormente se vio afectado por un proyecto de construcción. El sitio seleccionado no tiene valor recreativo, científico, educativo, histórico o cultural. Las aguas pluviales se desviarán de manera eficiente para minimizar la erosión.

Vivienda reevaluó las alternativas para construir en el valle inundable y a menos de 50 pies de un humedal ribereño, y determinó que no cuenta con alternativas prácticas al desarrollo del valle inundable y humedal. La documentación ambiental que documenta el cumplimiento con la Orden Ejecutiva 11988, según enmendada por la Orden Ejecutiva 13690 y la Orden Ejecutiva 11990, está disponible para inspección, revisión y reproducción del público, de ser solicitado, en el horario y lugar indicado en el último párrafo de este aviso, el cual trata sobre recibo de comentarios.

Este aviso tiene tres propósitos principales. Primero, las personas que pueden verse afectadas por actividades en el valle inundable y humedal, y aquellos que tengan interés en la protección del ambiente natural deben recibir la oportunidad de expresar sus inquietudes y proveer información sobre estas áreas. Segundo, un programa adecuado de avisos públicos puede ser una importante herramienta de educación pública. La divulgación de información y solicitud de comentarios sobre valles inundables y humedales puede facilitar y mejorar los esfuerzos federales para reducir los riesgos e impactos asociados con la ocupación y alteración de estas áreas especiales. Tercero, como materia de justicia, cuando el gobierno federal determine participar en acciones ubicadas en el valle inundable y humedal, debe informárselo a quienes puedan ser expuestos a un riesgo mayor o similar al presente.

Comentarios por escrito deben ser recibidos por Vivienda en la siguiente dirección en o antes de 12 de diciembre de 2024: Departamento de la Vivienda de Puerto Rico, edificio Juan C. Cordero Dávila, 606 avenida Barbosa, Río Piedras, PR 00918-8461, y (787)274-2527 ext. 4320, Atención: Juan Pérez. Una descripción completa del proyecto está disponible al público para revisión de 8:30 a.m. a 4:00 p.m. en el Departamento de la Vivienda de Puerto Rico, edificio Juan C. Cordero Dávila, 606 avenida Barbosa, Río Piedras, PR 00918. Los comentarios también pueden enviarse por correo electrónico a environmentcdbg@vivienda.pr.gov.

Fecha: 4 de diciembre de 2024

Lcdo. William O. Rodríguez Rodríguez
Secretario del Departamento de la Vivienda

Autorizado por la Oficina del Contralor
Electoral OCE-SA-2023-00076

# public notice

**Final Notice and Public Explanation of a Proposed Activity in a Federal Flood Risk Management Standard Designated Floodplain and Wetland**

Enrique Ortega Water Treatment Plant Raw Water
Intake Power Generators
4339-0019

To: All Interested Parties, Groups & Individuals

This is to give notice that the Puerto Rico Department of Housing (PRDOH) has conducted an evaluation as required by the Executive Order 11988, as amended by Executive Order 13690, and Executive Order 11990, in accordance with HUD regulations at 24 CFR 55.20 Subpart C - Procedures for Making Determinations on Floodplain Management and Wetlands Protection. The activity is funded under the Hazard Mitigation Grant Program, Community Development Block Grant – Mitigation (CDBG-MIT), Grant number B-18-DP-72-0002. The proposed project, **Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators (4339-0019)**, is located at PR-827 Road Km 5.6, Ortiz Ward, Toa Alta, PR 00953; coordinates 18.342664, -66.237135, and within the Federal Flood Risk Management Standard (FFRMS) floodplain and in close proximity of a wetland. The proposed project consists in the construction of a concrete platform where four power generators, their components, and diesel storage tanks will be installed, and the construction of a paved access road over an existing dirt road. The purpose is to reduce the vulnerability of critical facilities to natural hazards and address the continuity of service and supply of potable water to the population. The current generator of the dam only provides power to the dam gates and facilities, leaving the Raw Water Pump Station without coverage if the electrical system fails. Consequently, the water supply to the Enrique Ortega Water Treatment Plant (WTP) stops. The proposed project area is approximately 6,051 square meters. The number of units is four generators with a capacity of 2,500 kW and two diesel storage tanks with a capacity of 40,000 gallons each. The size of the footprint for the location of the power generators is approximately 1,278 square meters and for the access road is 4,773 square meters. The extent of the FFRMS floodplain was determined using the 0.2 Percent-Annual-Chance Flood Approach (0.2PFA) and the extent of the wetland was determined using data from the National Wetland Inventory. The project is partially located within a 100-year floodplain. The proximity of the project to a riverine wetland (R2UBH) is within 44 feet and 50 feet to the west at two areas at the southern portion of the proposed access. The portion of the floodplain that is partially affected is a previously impacted area as it was used as part of a project to repair the scours found at the base of the La Plata Dam structure between 2021 and 2022. Therefore, the property has a low biodiversity of species, without known recreational, educational, scientific, historical, and cultural values. To prevent indirect impacts to the riverine wetland that may be caused by earthmoving and vegetation removal during construction and the establishment of staging areas, best management practices (BMPs), like the installation of geotextile material, fiber rolls, hay bales and silt fences, will be implemented. Additionally, trees will be planted to protect the wetland with species beneficial to wildlife.

PRDOH has considered the following alternatives and mitigation measures to minimize adverse impacts and to restore and preserve natural and beneficial functions and intrinsic values of the existing floodplain and wetland: i) the Puerto Rico Aqueducts and Sewers Authority (PRASA) is in the need of providing backup power to the raw water pumping station of one of its largest drinking water treatment facilities. The proposed action is relatively close to the La Plata Dam to facilitate operation during/after atmospheric events and power outages. The site will allow the construction and installation of project components while reducing the environmental impacts and costs associated to construction and land acquisition. The preferred site parcel is property of PRASA which has been used for infrastructure/institutional uses. The selected area is essentially flat and has already been impacted, thus reducing environmental disruption. The preferred site minimizes impacts to forested areas, reduces earthworks materials leveling/extraction and the costs associated. The location of the project provides an area that allows maneuvering large trucks and maintenance vehicles. The construction of an asphalt access road over an existing dirt road with entrance from Camino Recreativo La Plata reduces the soil exposed to erosion and will protect the riverine wetland close to the dirt road. ii) In addition to the proposed action site, PRASA analyzed five different alternate sites which were discarded. Alternative site #2, PRASA tried to locate the alternate site selected outside the flood zone, towards an existing slope at the south side of the road. The area identified to install the new generators has a steep slope with vegetation and trees that would require removal. It would require significant ground disturbance and more tree removal, considerably increasing the project cost. Alternative site #3 is located approximately 200 meters from the La Plata Dam pump control building. The area shows limited space, which makes it very difficult for equipment and truck maneuvering. This alternative would also require a containment wall on the side facing the dam structure and affects a heavily forested area. Alternative site #4 is located next to the electrical facilities of La Plata Dam would require land acquisition of approximately 3,200 square meters for the generators and diesel tanks area. The land to be acquired has two structures that would be demolished to open space for the generator's pad. The available area at the dam site is limited. The only space available was originally considered, but could not be used because the raw water pipeline runs underneath. Alternative sites #5a-c are located adjacent to PREPA's Piñas Electrical Substation along State Road PR-827. The three sites (5a, 5b and 5c) were evaluated as potential sites to develop the proposed action. All were discarded due to the distance to existing raw water intake pump station, the proximity to other utilities, the elevated electrical construction cost, the proximity to residential areas and possibility of disrupting neighbors with the noise and emissions from the backup generators. Alternative site #6 is located approximately 275 meters northwest from the La Plata Dam, was discarded early in the evaluation because high voltage lines cross it right in the middle. PREPA's (LUMA) typical right of way for 115 kV lines is 100 feet (30.5 meters) to allow service and maintenance and to comply with safety requirements. When the right of way is projected, the available area for development is reduced considerably, limiting the equipment space. The concrete pad would have to be in a highly steep terrain. Taking no action will maintain the current situation. Without the installation of the emergency generators, a significant number of residents of the Metropolitan area will not have potable water services during extreme weather emergencies or other events, like power blackouts. Lack of potable water carries serious consequences like illness and loss of quality of life, among others. iii) PRASA has taken engineering mitigation measures to eliminate the flood hazard in the selected site. The project impacts directly a FFRMS floodplain from the La Plata River. The FFRMS regulatory requirement is 0.2PFA for new construction of critical actions. The project increased the elevation of the components more than 2 feet over 0.2PFA, minimizing the impacts to the floodplain. As part of the proposed action, cut and fill activities will be performed to guarantee project components elevation complies with ABFE 0.2% requirements. The modification of current ground elevation is considered minimal; therefore, no adverse effects have been identified to FFRMS floodplain or neighboring properties. The selection of the existing dirt road to develop the project access road preserves natural ground from being developed. BMPs are necessary to avoid or minimize the migration of sediments out of the project construction areas to the nearby riverine wetland. BMPs can be classified as Erosion Prevention, Sediment Control, Runoff Control among others. Examples of practices include the installation of geotextile material, fiber rolls, hay bales and silt fences help preserve floodplains and wetlands. The stormwater management system at the generator platform is designed to mitigate flood damage to the structures. The backup generators diesel tanks will be double-wall and would be installed inside a concrete dike as an extra measure to provide additional containment. The installation of an oil/water separator tank at the outlet of the proposed storm sewer system would remove oil or grease from the runoff water prior to discharge into the ground or river. These measures help minimize equipment failure, prevent or alleviate hazardous spills into the floodplain and wetland. Upon project completion, actions will be implemented to restore staging area and other temporarily affected areas that were cleared during construction to their original natural state and preserve natural and beneficial values. There are no adverse impacts to the site since it was previously affected by a construction project. The selected site has no recreational, scientific, educational, historic, or cultural value. Stormwater will be diverted efficiently to minimize erosion.

PRDOH has reevaluated the alternatives to building in the floodplain and within 50 feet of a riverine wetland and has determined that it has no practical alternatives to floodplain and wetland development. Environmental files that document compliance with Executive Order 11988, as amended by Executive Order 13690, and Executive Order 11990, are available for public inspection, review and copying upon request at the times and location delineated in the last paragraph of this notice for receipt of comments.

There are three primary purposes for this notice. First, people who may be affected by activities in the floodplain and wetland, and those who have an interest in the protection of the natural environment should be given an opportunity to express their concerns and provide information about these areas. Second, an adequate public notice program can be an important public education tool. The dissemination of information and request for public comments about floodplains and wetland can facilitate and enhance Federal efforts to reduce the risks and impacts associated with the occupancy and modification of these special areas. Third, as a matter of fairness, when the Federal government determines it will participate in actions taking place in the floodplain and wetland, it must inform those who may be put at greater or continued risk.

Written comments must be received by the PRDOH at the following address on or before December 12, 2024: Puerto Rico Department of Housing, 606 Barbosa Avenue, Juan C. Cordero Dávila Building, Río Piedras, PR 00918-8461, and (787)274-2527 ext. 4320, Attention: Juan Pérez. A full description of the project may also be reviewed from 8:30 am to 4:00 pm at the Puerto Rico Department of Housing, 606 Barbosa Avenue, Juan C. Cordero Dávila Building, Río Piedras, PR 00918. Comments may also be submitted via email at environmentcdbg@vivienda.pr.gov.

Date: December 4, 2024

William O. Rodríguez Rodríguez, Esq.
Secretary of the Department of Housing

Authorized by the Office of the Electoral Comptroller OCE-SA-2023-00076

NOTA ACLARATORIA

EN NUESTRO SHOPPER EFECTIVO DEL1 AL 14 DE DICIEMBRE DE 2024
EL SIGUIENTE ARTÍCULO NO ESTARÁ DISPONIBLE:

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3+ 2 PIEZAS VARIEDAD DE ESTILOS
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EN LOS SIGUIENTES ARTÍCULOS DEBIÓ DECIR C/U
EN PRECIO REGULAR Y ESPECIAL:

BRAZALETE CON RHINESTONES DORADA O DOS TONOS STAINLESS STEEL
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DISFRAZ DE SANTA PARA HOMBRE O MUJER ONE SIZE
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✓ Regístrate
✓ Crea tu lista (aquí colocarás tu límite de presupuesto)
✓ Añade todos los productos que necesitas

shop.pr shoppers 24/7

| | |
|---|---|
| **From:** | Kenneth M. Garcia-De Leon |
| **To:** | environmentcdbg |
| **Subject:** | RE: Comentarios - Aviso Final Enrique Ortega |
| **Date:** | Monday, December 16, 2024 9:31:28 AM |
| **Attachments:** | image002.png<br>image003.png |

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Buenos días:

Por correo postal no llegaron comentarios para mencionado proyecto.

Cordialmente,

**Kenneth M. García De León**
Especialista en Control de Documentos / Operaciones
Oficina Recuperación de Desastres
kgarcia@vivienda.pr.gov|787.274.2527 Ext. 4013
Visitanos: recuperacion.pr.gov
Contactanos: infocdbg@vivienda.pr.gov

DEPARTAMENTO DE LA VIVIENDA

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**From:** environmentcdbg <environmentcdbg@vivienda.pr.gov>
**Sent:** Monday, December 16, 2024 9:08 AM
**To:** Kenneth M. Garcia-De Leon <kgarcia@vivienda.pr.gov>
**Subject:** Comentarios - Aviso Final Enrique Ortega

Saludos Kenneth,

Con respecto a la publicación del Aviso Final y Explicación Pública de una Actividad Propuesta en un valle inundable designado del Estándar Federal para el Manejo de Riesgo de Inundación y un humedal (Paso 2) para el proyecto ***Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators* (4339-0019)**, ¿habrá llegado algún comentario a través del correo postal? De ser así, por favor

# Validation Letter

December 16, 2024

To whom it may concern,

This letter is to validate that no comments were received in the Permits and Environmental Compliance Division e-mail: environmentcdbg@vivienda.pr.gov, for the project **Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators (4339-0019)**, as part of the CDBG-MIT Hazard Mitigation Grant Program. The Final Notice and Public Review of a Proposed Activity in a Federal Flood Risk Management Standard Designated Floodplain and Wetland was published in the *Primera Hora* newspaper of Puerto Rico on December 4, 2024, with a comment period that concluded on December 12, 2024.

Cordially,

Permits and Environmental Compliance Division
Disaster Recovery Office
environmentcdbg@vivienda.pr.gov | 787.274.2527 ext. 4320

# APPENDIX I ENVIRONMENTAL SITE INSPECTION PHOTOGRAPHIC RECORD

# Generadores Toma Agua Cruda Planta Filtración Enrique Ortega CIP 1-70-9000

## INSPECCIÓN AMBIENTAL **REGISTRO FOTOGRÁFICO**

Carretera PR 827, km 5.6, interior
Barrio Ortíz
Toa Alta; PR 00954

Agosto 2023

Submitted to:
Oficina de Gerencia de Permisos (OGPe)
P.O. Box 41179
San Juan, PR 00940-1179

Submitted by:
CSA-Louis Berger JV LLC
1511 Ponce de León Ave., Suite 23
San Juan, PR 00909-1728
T: (939) 630.7147

# Leyenda

| Foto | Nombre |
|---|---|
| 1 | Vista aérea de la Represa La Plata |
| 2 | Puente de la Represa La Plata |
| 3 | Puente de la Represa La Plata |
| 4 | Estructura de la Represa La Plata |
| 5 | Estructura de la Represa La Plata |
| 6 | Estructura de la Represa La Plata |
| 7 | Estructura de la Represa La Plata |
| 8 | Placa conmemorativa 1974 |
| 9 | Ladera aguas abajo de la Represa La Plata |
| 10 | Camino de acceso desde el barrio Quebrada Cruz |
| 11 | Camino de acceso desde el barrio Quebrada Cruz |
| 12 | Camino de acceso desde el barrio Quebrada Cruz |
| 13 | Camino de acceso desde el barrio Quebrada Cruz |
| 14 | Camino de acceso desde el barrio Quebrada Cruz |
| 15 | Camino de acceso desde el barrio Quebrada Cruz |
| 16 | Camino de acceso desde el barrio Quebrada Cruz |
| 17 | Camino de acceso desde el barrio Quebrada Cruz |
| 18 | Camino de acceso desde el barrio Quebrada Cruz |
| 19 | Camino de acceso desde el barrio Quebrada Cruz |
| 20 | Camino de acceso desde el barrio Quebrada Cruz |
| 21 | Camino de acceso desde el barrio Quebrada Cruz |
| 22 | Camino de acceso desde el barrio Quebrada Cruz |
| 23 | Camino de acceso desde el barrio Quebrada Cruz |

Vista de aérea de la Represa La Plata

Foto 2 Puente de la Represa La Plata desde la Carretera PR-827, km 5.6, interior

Foto 3 Plataforma de la Represa La Plata

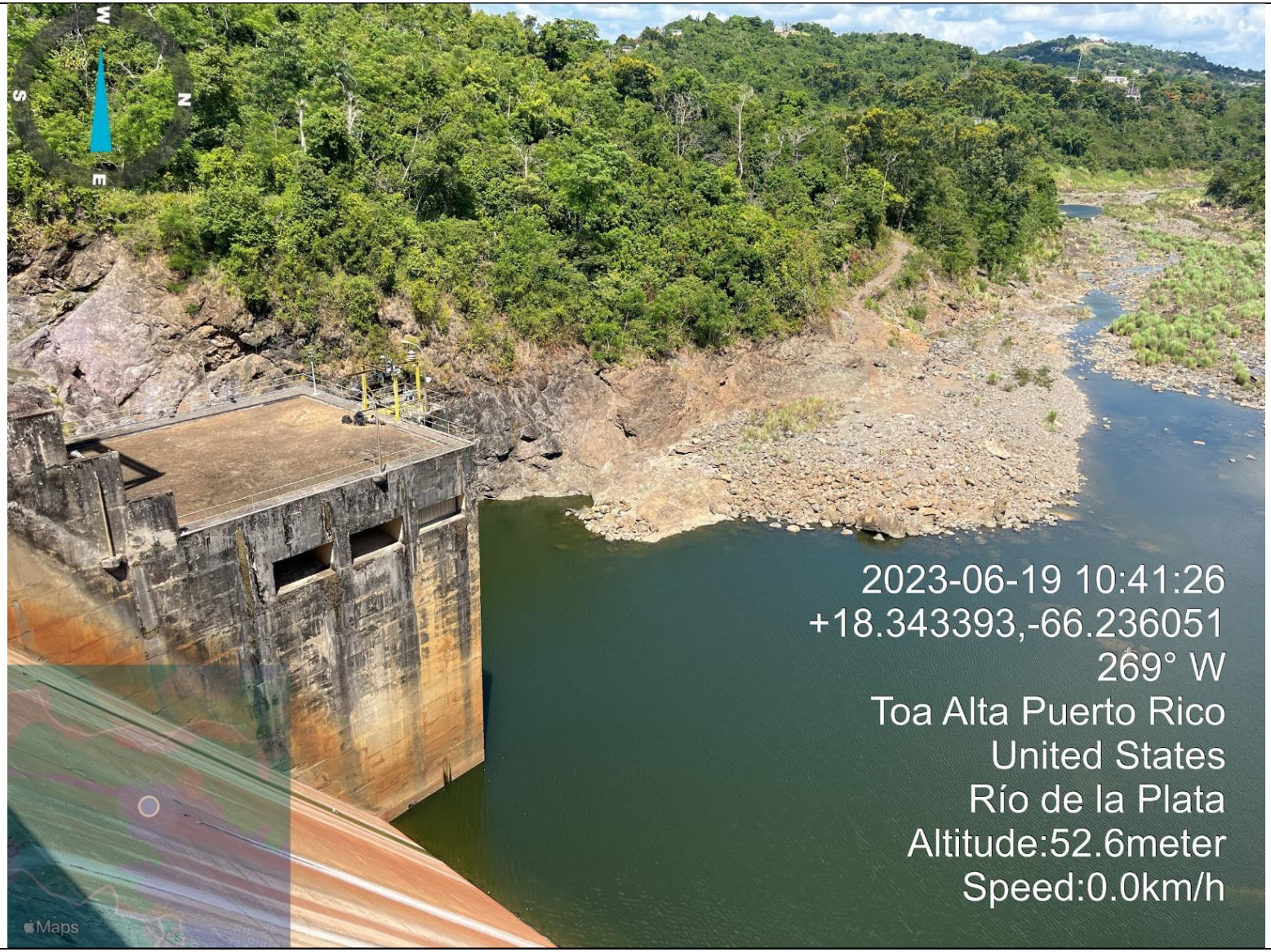


Foto 4 Estructura de la Represa La Plata

Foto 5 Estructura de la Represa La Plata

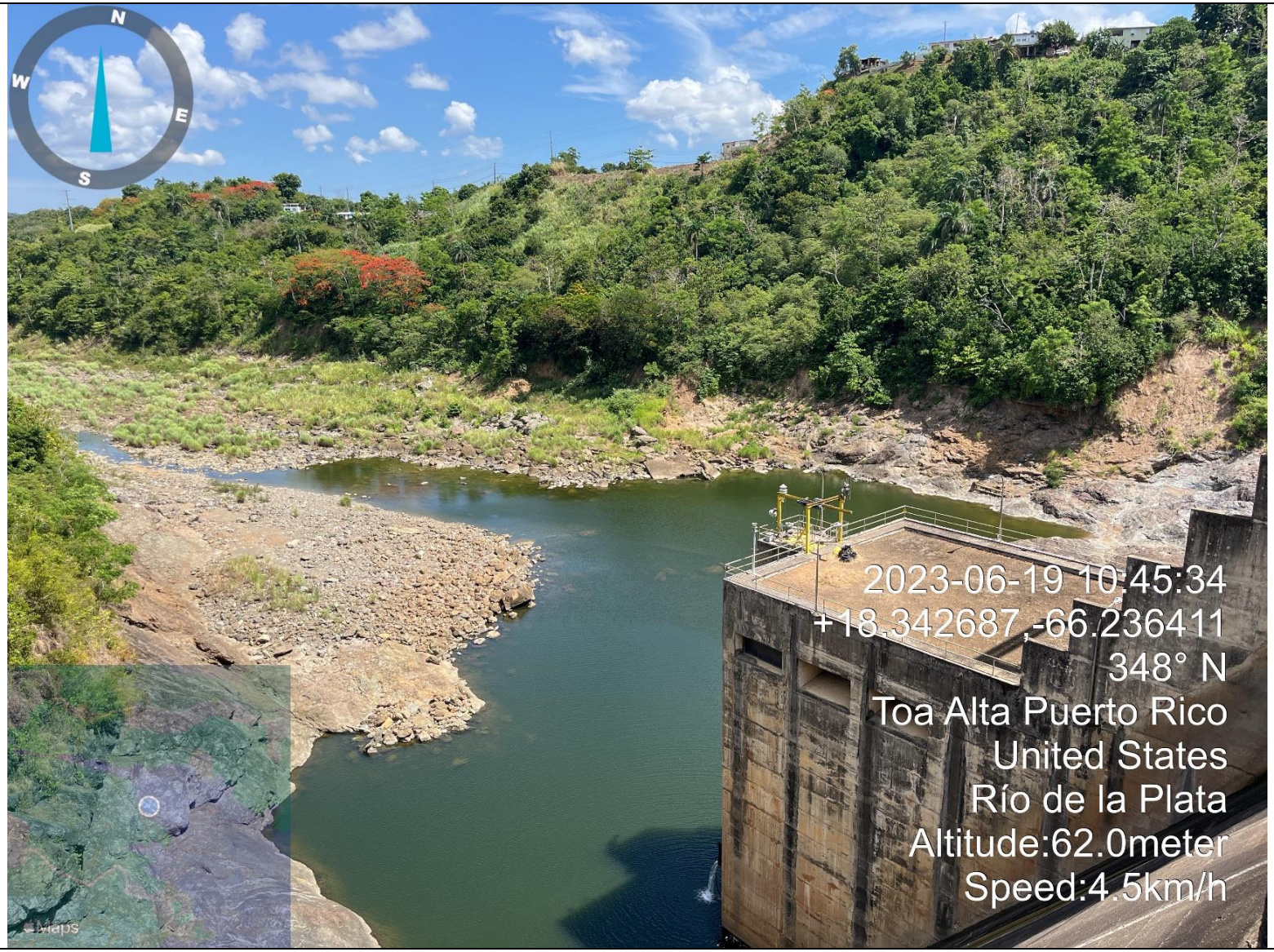


Foto 6 Estructura de la Represa La Plata

Foto 7 Estructura de la Represa La Plata

Foto 8 Placa conmemorativa 1974

Foto 9 Ladera aguas abajo de la Represa La Plata

Foto 10 Camino de acceso desde el barrio Quebrada Cruz

Foto 11 Camino de acceso desde el barrio Quebrada Cruz

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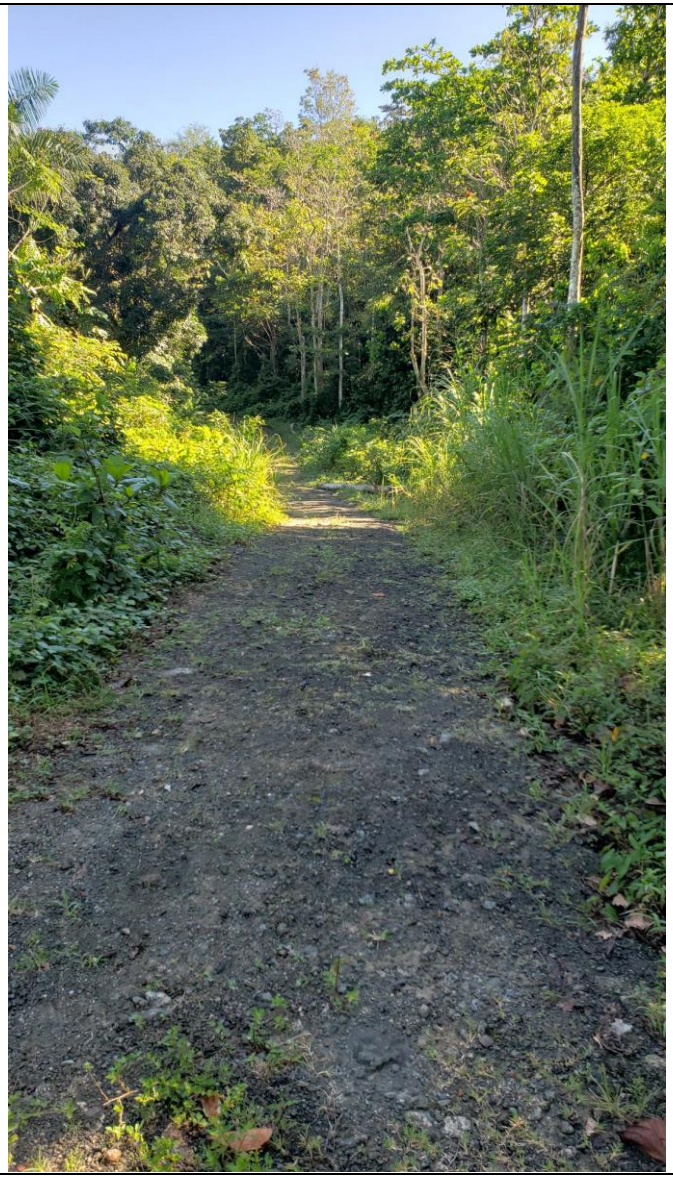
| |  |
| Foto 12 Camino de acceso desde el barrio Quebrada Cruz | Foto 13 Camino de acceso desde el barrio Quebrada Cruz |

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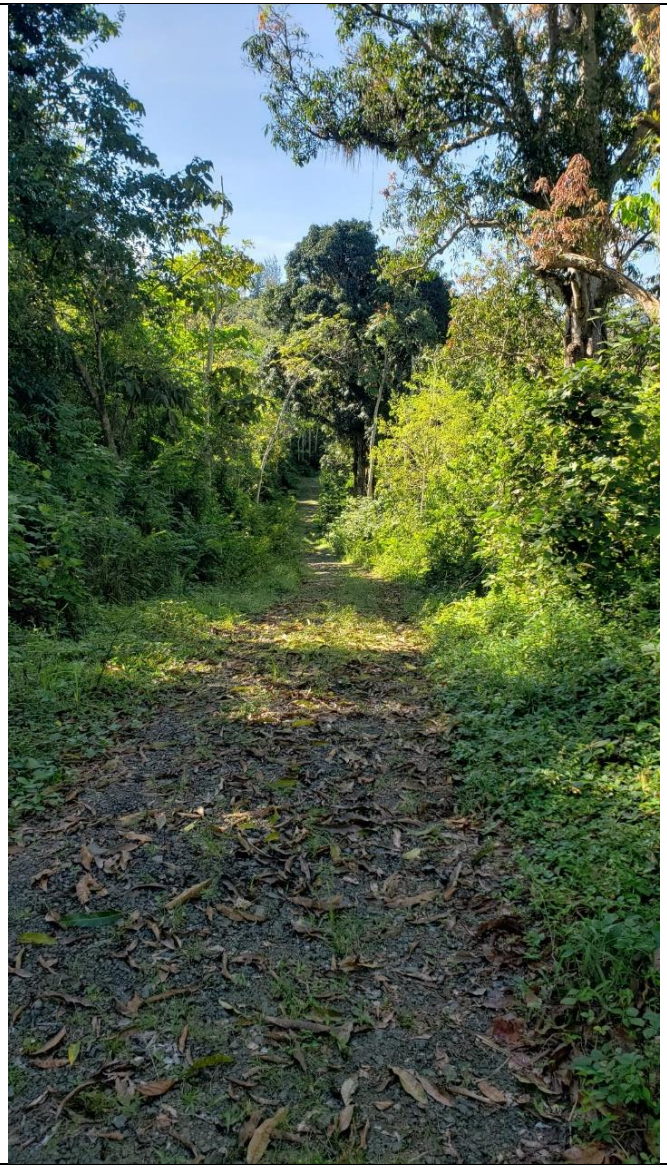
| |  |
| Foto 14 Camino de acceso desde el barrio Quebrada Cruz | Foto 15 Camino de acceso desde el barrio Quebrada Cruz |

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| Foto 16 Camino de acceso desde el barrio Quebrada Cruz | Foto 17 Camino de acceso desde el barrio Quebrada Cruz |

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| Foto 18 Camino de acceso desde el barrio Quebrada Cruz | Foto 19 Camino de acceso desde el barrio Quebrada Cruz |

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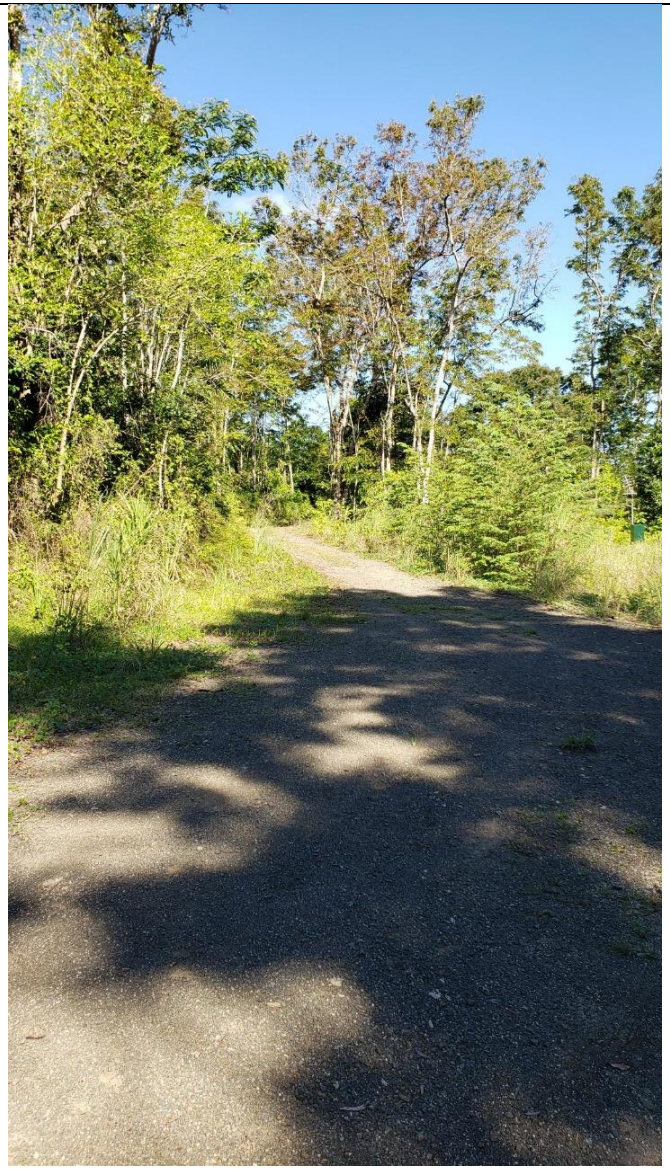
|  | |
| Foto 20 Camino de acceso desde el barrio Quebrada Cruz | Foto 21 Camino de acceso desde el barrio Quebrada Cruz |

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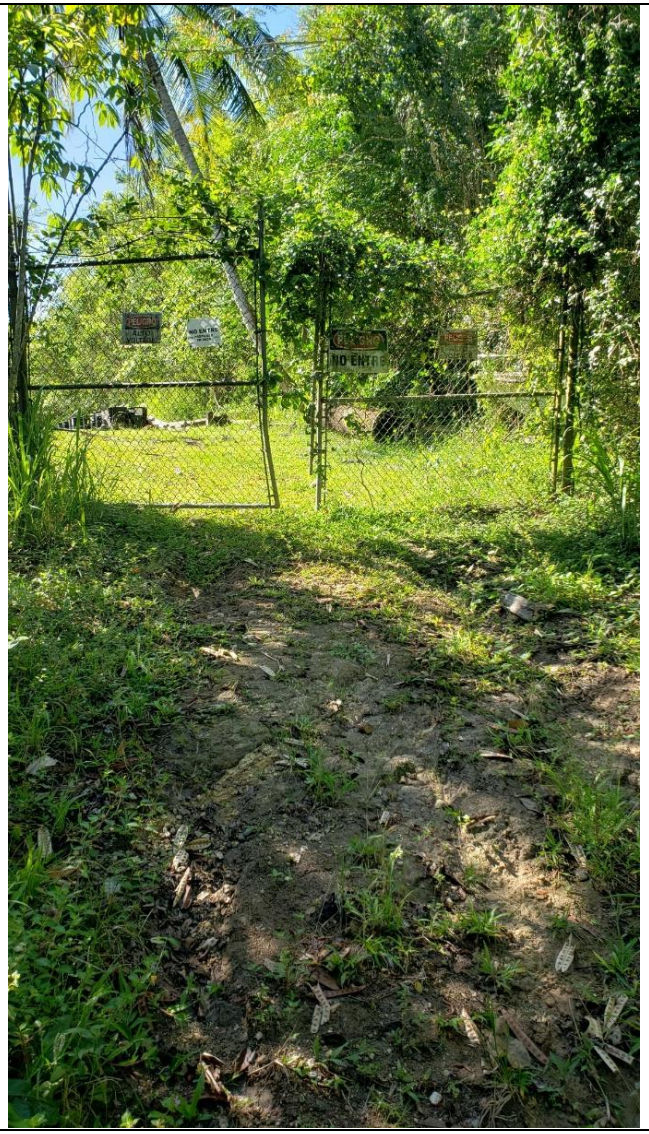
| |  |
| Foto 22 Camino de acceso desde el barrio Quebrada Cruz | Foto 23 Camino de acceso desde el barrio Quebrada Cruz |

# APPENDIX J USFWS CONSULTATION LETTER

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Caribbean Ecological Services Field Office
Bayamón | Mayagüez | Maricao | Rio Grande | St Croix
P.O. Box 491
Boquerón, Puerto Rico 00622


In Reply Refer to:
FWS/R4/CESFO/72135-Gen

Submitted Via Electronic Mail: jcperez@vivienda.pr.gov

Juan Carlos Pérez-Bofill, PE, MEng.
Director – Disaster Recovery CDBG-DR Program
Puerto Rico Department of Housing
P.O. Box 21365
San Juan, P.R 00928-1365

Re: PRDOH-4339-0019 Enrique Ortega Water Treatment Plant, Toa Alta, Puerto Rico

Dear Mr. Pérez-Bofill

Thank you for your letter dated November 10, 2023, requesting comments on the above referenced project. As per your request, our comments are provided under the Endangered Species Act (Act) (87 Stat. 884, as amended; 16 United States Code 1531 et seq.), and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

The Puerto Rico Department of Housing (PRDOH) on behalf of the Puerto Rico Aqueduct and Sewer Authority (PRASA-the Applicant) is proposing the installation of four (4) 2,500 KW generators to provide backup power to the Raw Water Intake Pump Station, sump pump, dam gate system engine, one of the office buildings, exterior lighting, and security systems of the La Plata Raw Water Intake located in Toa Alta, Puerto Rico. The proposed project location will be at PR-819, Bo. Mucarabones (18°23'18.7"N 66°13'40.0"W) in the municipality of Toa Alta, Puerto Rico.

Using the Information for Planning and Consultation (IPaC) system PRASA has determined that the proposed project lies within the range of Puerto Rican boa (*Epicrates inornatus* now known as *Chilabothrus inornatus*).

Based on the nature of the project, scope of work, information available, and analysis of the IPaC lists (Project code: 2023-0071470), PRASA has determined that the proposed project may affect, but is not likely to adversely affect the Puerto Rican boa. Conservation measures will be implemented prior to and during the construction to avoid or minimize impacts to this species.

We have reviewed the information provided in your letter and our files, and concur with your determination that the proposed project may affect, but is not likely to adversely affect the Puerto Rican boa with the implementation of the conservation measures. As per the conservation recommendations, please note that if a Puerto Rican boa is encountered during the project activities, it should not be captured. If a boa needs to be moved out of harm's way, the Puerto Rico Department of Natural and Environmental Resources (PRDNER) should be contacted for safe capture and relocation of the animal. If immediate relocation is not an option, project-related activities in the area where the boa is found must stop until it moves out of harm's way on its own.

In view of this, we believe that requirements of section 7 of the Endangered Species Act (Act) have been satisfied. However, obligations under section 7 of the Act must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner that was not previously considered; (2) this action is subsequently modified in a manner not previously considered in this assessment; or, (3) a new species is listed, or critical habitat determined that may be affected by the identified action.

Thank you for the opportunity to comment on this project. If you have any questions or require additional information, please contact us via email at caribbean_es@fws.gov or by phone at (786) 244-0081.

Sincerely yours,

Lourdes Mena
Acting Field Supervisor

drr

Puerto Rico Aqueduct and Sewer Authority

604 Avenida Barbosa
Edif. Sergio Cuevas Bustamante
Hato Rey, San Juan

October 5, 2023

Mr. Edwin E. Muñiz
Field Supervisor
United States Fish and Wildlife Service
Caribbean Ecological Services
Field Office
PO Box 491
Boquerón, Puerto Rico 00622

Via email: caribbean_es@fws.gov

**CONSULTATION LETTER FOR CONCURRENCE UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT (ESA) - Enrique Ortega Water Treatment Plant Raw Water Intake Emergency Power Generators**
**CIP 1-70-9000**

**Determination: May affect but is not likely to adversely affect the Puerto Rican boa (*Chilabothrus inornatus*)**

Dear Mr. Muñiz:

The Puerto Rico Aqueduct and Sewer Authority (PRASA), on behalf of the Puerto Rico Department of Housing (PRDOH), proposes the construction of an Emergency Power Generators Site to back up the Enrique Ortega Water Treatment Plant Raw Water Intake to provide the continuation of safe drinking water to a population of over 369,000 habitants located at the municipalities of Dorado, Guaynabo, Naranjito, Toa Alta, Toa Baja, Vega Alta, Bayamón, Cataño and Corozal. The project is consistent with PRASA's goals to reduce the vulnerability of critical facilities to natural hazards. One of the objectives towards the Puerto Rican community, especially municipalities in the metropolitan area (Toa Alta, Toa Baja, Naranjito, Corozal, Bayamón, Cataño and Guaynabo). This project is part of the PRASA Capital Improvements Program (CIP), which promotes public health and environmental protection, focusing on specific projects to provide a high-quality water service, while promoting water conservation and protecting of health and the environment.

The Proposed Action (PA) would be financed with federal funds from the Federal Emergency Management Agency (FEMA) and the Community Development Block Grant - Mitigation (CDBG-MIT) of the U.S. Department of Housing and Urban Development (HUD). The 24 CFR Part 58 contains HUD's regulations for implementing NEPA when the responsible entity assumes HUD's environmental review responsibilities under NEPA. The purpose of this communication is to present our findings on determining the absence or presence of endangered species under Section 7 and provide our determination on how the PA may affect any listed species that may be present in the action area, as well as request a Letter for Concurrence with the Determination.

## PROJECT DESCRIPTION

PRASA operates the Enrique Ortega Water Treatment Raw Water Intake which is located southwest of the La Plata Dam wall (Coordinates: 18° 20'36.90" N, -66° 14'19.24" W) on highway PR-824, km. 5.0 in the Camino Municipal Recreativo La Plata on Quebrada Cruz neighborhood of the Toa Alta municipality.

The Project consists of the installation of four emergency generators (2,500 kW/per unit with two double walls, contained diesel storage tanks with a capacity of 30,000 gallons each). To allow Project operation, the construction of a 20 m x 40 m concrete platform is required to install the generators and its components (**Appendix 1**. Proposed Conceptual Design for Project Components). These proposed actions entail the acquisition of an area with an approximate acreage of 2,744.56 $m^2$ to allow effective access and equipment maneuvering on site. These generators will provide backup power to the raw water intake pump station and the entire facility during power outages or service interruptions of the Puerto Rico Electric Power Authority (PREPA)/LUMA electrical grid.

The trench excavation volume will be 479.2$m^3$. The total volume of earth movement estimated for the project (including trench excavation) is approximately:

- Cut = 3,151.59$m^3$
- Fill=4,523.07$m^3$

The Project area has been estimated to occupy approximately 6,968 $m^2$, which is divided into the following areas (**Appendix 2.** Google Earth Aerial View; **Appendix 3.** Photographic Record La Plata Generators):

- Access road= 4,284 $m^2$
- Road extension for truck turning path = 489 $m^2$
- Generators and diesel tanks area = 1,278 $m^2$
- Suggested staging area for contractor = 917 $m^2$

## AREA EVALUATION

To determine the absence or presence of endangered species under Section 7, we searched public environmental databases and several stie visits were performed to confirm the data gathered.

The U.S Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) website was consulted to obtain an Official Species List identifying any threatened, endangered, proposed and candidate species, as well as proposed and designated critical habitats within the project area. According to IPaC, the listed species that may be present in the action area is one (1) reptile: *Chilabothrus inornatus* (listed yet as *Epicrates inornatus*). Although the species has a defined distribution range that covers the entire Island, no critical habitat has been designated. (**Appendix 4**. Official Species List, **Appendix 5**. General Project Design Guidelines).

During the months of June and July of 2023, field visits were carried out to perform a study of the Flora and Fauna in the proposed property. No Puerto Rican boas were observed, nor any other critical, threatened, or endangered species during the field visits.

The result of the field study showed that there is one (1) main vegetative association which was classified as: *Areas of previously impacted land* (area where the generators and their infrastructure would be placed). Outside the footprint that the proposed project would impact, forest patches of secondary succession are observed. According to the tree inventory carried out in the proposed area, a total of 150 trees would require cutting to accommodate the project components. The proposed project will not affect the three natural systems nearby identified. The construction of an asphalt access road will go over an actual dirt road. A total of eighty-five (85) plant species corresponding to thirty-eight (38) families were identified in the area. Regarding the fauna, a total of thirty-three (33) species were observed, with birds being the dominant group. (**Appendix 6**. Flora and Fauna Terrestrial Study).

Based on the data submitted by the US Fish and Wildlife Service National Wetland Inventory (NWI) and the field visit conducted, a potential wetland area was identified approximately xx meters (north/south/east/west) to property limits. The Rio La Plata runs north to Project site. The NWI has classified this water body as a *Permanently Flooded Unconsolidated Bottom Perennial Shallow Riparian System* (R2UBH). The La Plata Reservoir and an unnamed stream located northeast, and northwest of the project are classified as *Permanently Flooded Unconsolidated Bottom Perennial Riparian System* (R2UBH). (**Appendix 7.** USFWS National Wetlands Inventory).

There is the potential for temporary adverse effects or consequences associated to human development to the boa habitat. These impact effects include habitat lost and/ fragmentation by earth movement and deforestation caused by site preparation. As a result, direct adverse effects

caused by the proposed action might include isolation of the specie, harm, and mortality due to trampling with construction and vegetation clearing machinery, road kills, predation, and possible competition with other exotic species (i.e., Boa constrictor). The proponent and selected contractor will perform biological monitoring activities to identify the existence of Puerto Rican boas prior to clear and grubbing activities begin. Monitoring activities will minimize potential impacts to the specie, therefore allowing species migration and establishment to neighboring fields during construction activities. The construction activities are considered temporary and within a relatively small acreage with no presence of the specie., therefore the proposed determination associated to the proposed action is considered as might affect but not likely to adversely affect the Puerto Rican boa. The implementation of protective measures and best engineering practices (BMPs) will prevent, or minimize, potential adverse effects to flora and fauna species, that would remain within or adjacent to Project areas.

The properties proposed for the installation of the generators were previously disturbed by the use of this space as part of repair activities carried out on the La Plata Dam between 2021 and 2022. The main impact on the vegetation will be caused by the removal of vegetation for the installation of generators, diesel, concrete platform, among other infrastructure. Consequently, the most direct effects on wildlife will result from the removal, alteration, or fragmentation of existing habitats. However, although these impacts will be minimal for the low biodiversity of the area. No species of conservation concern or habitats of high ecological value are expected to be significantly affected.

The following recommendations included as part of the USFWS Puerto Rican boa Conservation Measures will be implemented as part of Project activities:

- Inform all project personnel about the potential presence of the PR boa in areas where the proposed work will be conducted. A pre-construction meeting will be conducted to inform all project personnel about the need to avoid harming the species as well as penalties for harassing or harming PR boas. An educational poster or sign with photo or illustration of the species will be displayed at the project site.
- Prior to any construction activity, including removal of vegetation and earth movements, the boundaries of the project and areas to be excluded and protected should be clearly marked in the project plan and in the field in order to avoid further habitat degradation into forested and conservation areas.
- Once areas are clearly marked, and prior to the use of heavy machinery and any construction activity (including removal of vegetation and earth movement), biologist or personnel with experience on this species should survey the areas to be cleared to verify the presence of any PR boa within the work area.
- The PR boa is considered more active at night. Thus, in order to maximize its detection, the species should be searched at nights prior to habitat disturbance.

- Once the area has been searched for PR boas, vegetation should first be cleared by hand to the maximum extent possible. Vegetation should be cut about one meter above ground prior to the use of heavy machinery for land clearing. Cutting vegetation by hand will allow boas present on site to move away on their own to adjacent available habitat. Any stone walls or naturally occurring rock piles must be carefully dismantled by hand as these are refuges for the snake. This will allow any boas present to vacate the site without injury.
- For all boa sightings (dead or alive), record the time and date of the sighting and the specific location where it was found. PR boa data should also include a photo of the animal (dead or alive), site GPS coordinates, the time and date, and comments on how the animal was detected and its behavior.
- If a PR boa is found within any of the working or construction areas, activities should stop at that area and information recorded (see #6). Do not capture the boa. If boas need to be moved out of harm's way, designated personnel shall immediately contact the Puerto Rico Department of Natural and Environmental Resources (PRDNER) Rangers for safe capture and relocation of the animal (PRDNER phone #s: ((787) 724-5700, (787) 230-5550, (787) 771-1124). If immediate relocation is not an option, project-related activities at this area must stop until the boa moves out of harm's way on its own. Activities at other work sites, where no boas have been found after surveying the area, may continue.
- If a PR boa is captured by the PRDNER, record the name of the PRDNER staff and information on where the PR boa will be taken. This information should be reported to the Service.
- Measures should be taken to avoid and minimize PR boa casualties by heavy machinery or motor vehicles being used on site. Any heavy machinery left on site (staging) or near potential PR boa habitat (within 50 meters of potential boa habitat), needs to be thoroughly inspected each morning before work starts to ensure that no boas have sheltered within engine compartments or other areas of the equipment. If PR boas are found within vehicles or equipment, do not capture the animal and let it move on its own or call PRDNER Rangers for safe capture and relocation of the animal (see #7). If not possible, the animal should be left alone until it leaves the vehicle on its own.
- PR boas may seek shelter in debris piles. Measures should be taken to avoid and minimize boa casualties associated with sheltering in debris piles as a result of project activities. Debris piles should be placed far away from forested areas. Prior to moving, disposing, or shredding, debris piles should be carefully inspected for the presence of boas. If debris piles will be left on site, we recommend they be placed in areas that will not be disturbed in the future.
- If a dead PR boa is found, immediately cease all work in that area and record the information accordingly (see #6). If the PR boa was accidentally? killed as part of the project actions, please include information on what conservation measures had been implemented and what actions that will be taken to avoid further killings. A dead boa report should be sent by email (see contacts below) to the Service within 48 hours of the event.
- Projects must comply with all state laws and regulations. Please contact the PRDNER for further guidance.

Specific mitigation measures would be coordinated as part of the environmental review process with your office as well as with the DNER and any other applicable federal/state agencies.

Based on the above analysis, we conclude that the Project Area, may affect but is not likely to adversely affect the Puerto Rican boa (*Chilabothrus inornatus*) and formal consultation is not deemed necessary. Therefore, PRASA, on behalf of Puerto Rico Department of Housing (PRDOH), respectfully requests, the concurrence of the USFWS with our determination.

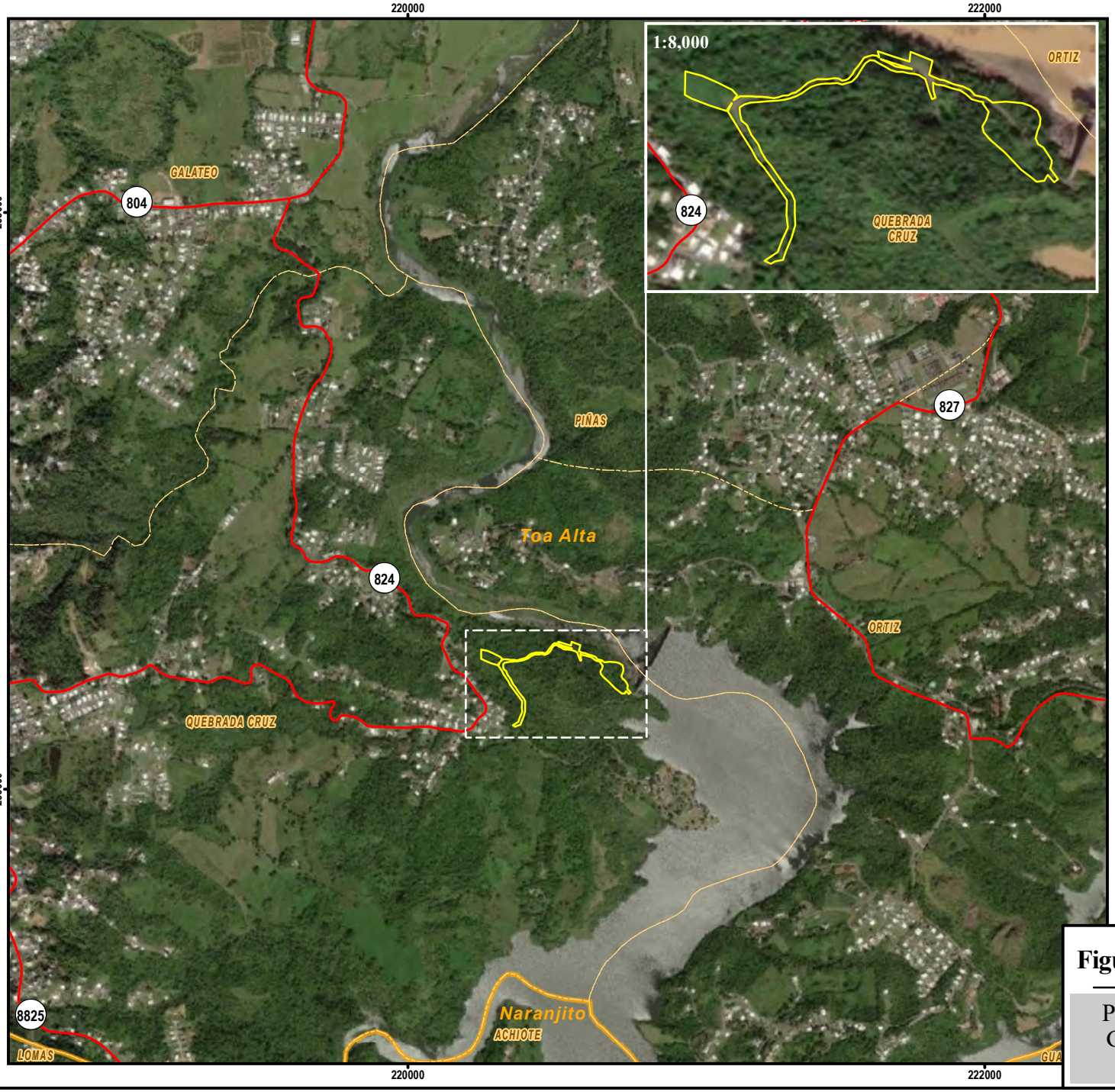
If you have any questions regarding our petition or need further clarification, please contact us at ann.ventura@acueductospr.com | 787-409-8542 or environmentcdbg@vivienda.pr.gov | 787.274.2527 ext. 4320.

Cordially,

Ann Ventura Payán, P.E.
Design Deputy Director
Puerto Rico Aqueduct and Sewer Authority (PRASA)

**Appendices (7):**

- Appendix 1. Proposed Conceptual Design for Project Components
- Appendix 2. Google Earth Aerial View
- Appendix 3. Photographic Record La Plata Generators
- Appendix 4. Official Species List, IPaC
- Appendix 5. General Project Design Guidelines
- Appendix 6. Study of Terrestrial Flora and Fauna
- Appendix 7. USFWS National Wetlands Inventory

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Escala: 1:20,000

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X: 220,581.893 m
Y: 256,488.487 m

## Leyenda

- Límite del Proyecto Propuesto*
- Carretera estatal[1]
- Límite de barrio[2]
- Límite municipal[3]

*Límite aproximado

Fuentes:
1. Autoridad de Carreteras y Transportación (ACT), 2020.
2. Junta de Planificación de Puerto Rico, 2015.
3. Créditos de la capa de servicio (Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community)

Sistema de Coordenadas:
Coordenadas Planas NAD83 Puerto Rico e Islas Vírgenes FIPS 5200 (metros)

CSA-LOUIS BERGER JV LLC
PRASA PMC

# Figura 1: Localización del Proyecto

Planta de Filtración Enrique Ortega
Generadores Toma de Agua Cruda
CIP 1-70-9000

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# Generadores Toma Agua Cruda Planta Filtración Enrique Ortega CIP 1-70-9000

## REGISTRO FOTOGRÁFICO

Carretera PR 827, km 5.6, interior
Barrio Ortíz
Toa Alta; PR 00954

Agosto 2023

Submitted to:
Oficina de Gerencia de Permisos (OGPe)
P.O. Box 41179
San Juan, PR 00940-1179

Submitted by:
CSA-Louis Berger JV LLC
1511 Ponce de León Ave., Suite 23
San Juan, PR 00909-1728
T: (939) 630.7147

# Leyenda

| Foto | Nombre |
|---|---|
| 1 | Vista aérea de la Represa La Plata |
| 2 | Puente de la Represa La Plata |
| 3 | Puente de la Represa La Plata |
| 4 | Estructura de la Represa La Plata |
| 5 | Estructura de la Represa La Plata |
| 6 | Estructura de la Represa La Plata |
| 7 | Estructura de la Represa La Plata |
| 8 | Placa conmemorativa 1974 |
| 9 | Ladera aguas abajo de la Represa La Plata |
| 10 | Camino de acceso desde el barrio Quebrada Cruz |
| 11 | Camino de acceso desde el barrio Quebrada Cruz |
| 12 | Camino de acceso desde el barrio Quebrada Cruz |
| 13 | Camino de acceso desde el barrio Quebrada Cruz |
| 14 | Camino de acceso desde el barrio Quebrada Cruz |
| 15 | Camino de acceso desde el barrio Quebrada Cruz |
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| 21 | Camino de acceso desde el barrio Quebrada Cruz |
| 22 | Camino de acceso desde el barrio Quebrada Cruz |
| 23 | Camino de acceso desde el barrio Quebrada Cruz |

Vista de aérea de la Represa La Plata

Foto 2 Puente de la Represa La Plata desde la Carretera PR-827, km 5.6, interior

Foto 3 Plataforma de la Represa La Plata

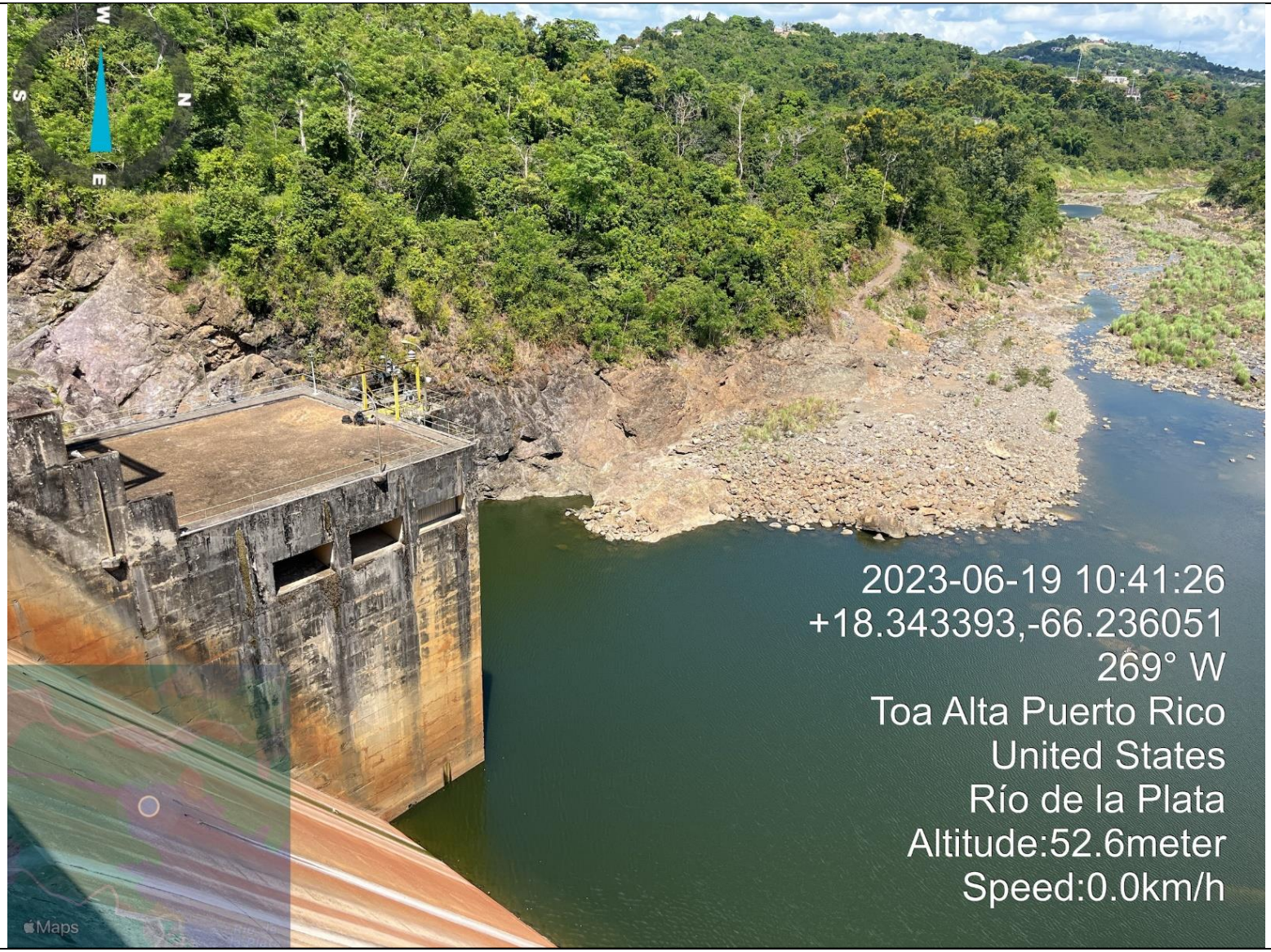


Foto 4 Estructura de la Represa La Plata

Foto 5 Estructura de la Represa La Plata

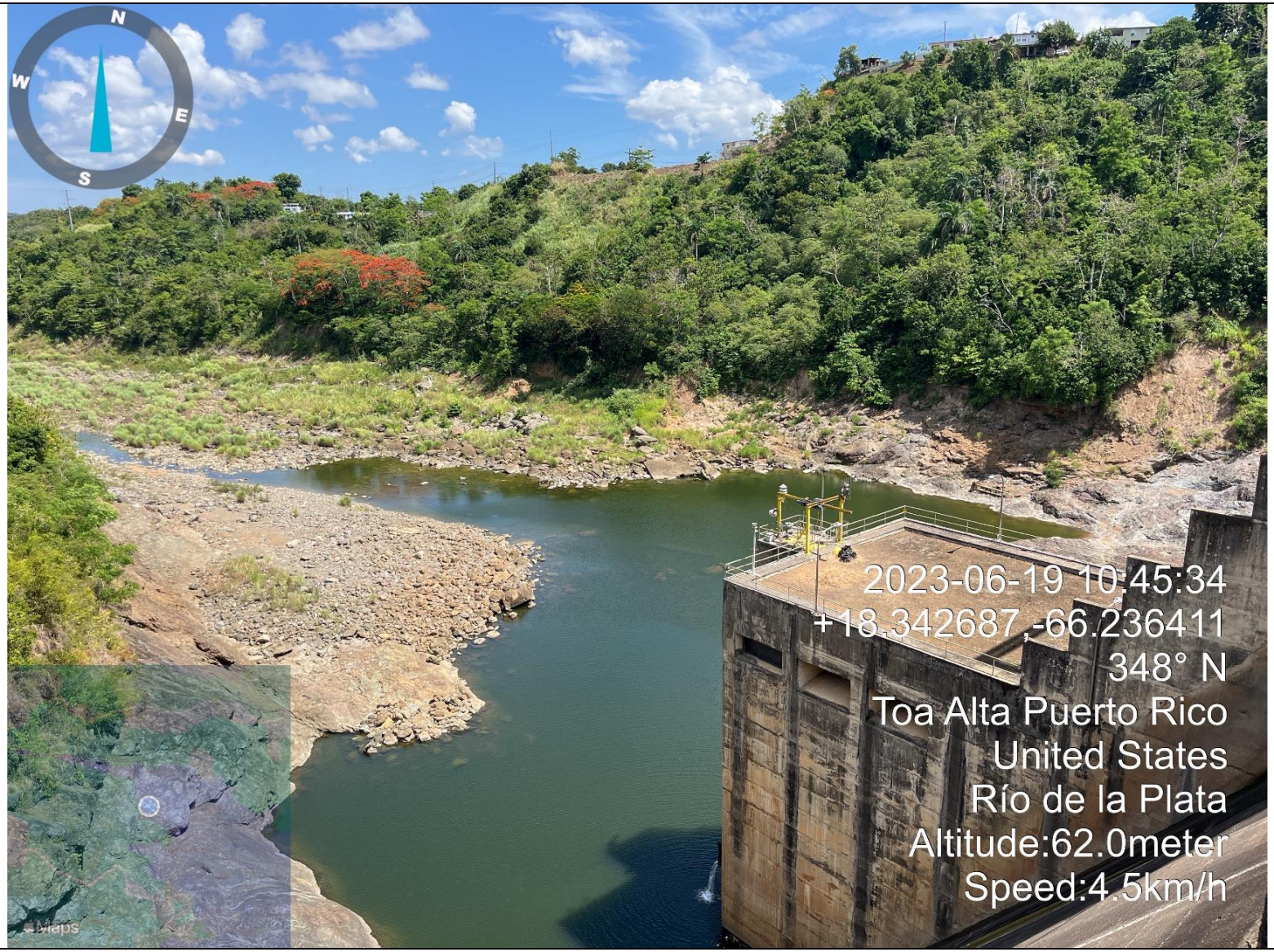


Foto 6 Estructura de la Represa La Plata

Foto 7 Estructura de la Represa La Plata

Foto 8 Placa conmemorativa 1974

Foto 9 Ladera aguas abajo de la Represa La Plata

Foto 10 Camino de acceso desde el barrio Quebrada Cruz

Foto 11 Camino de acceso desde el barrio Quebrada Cruz

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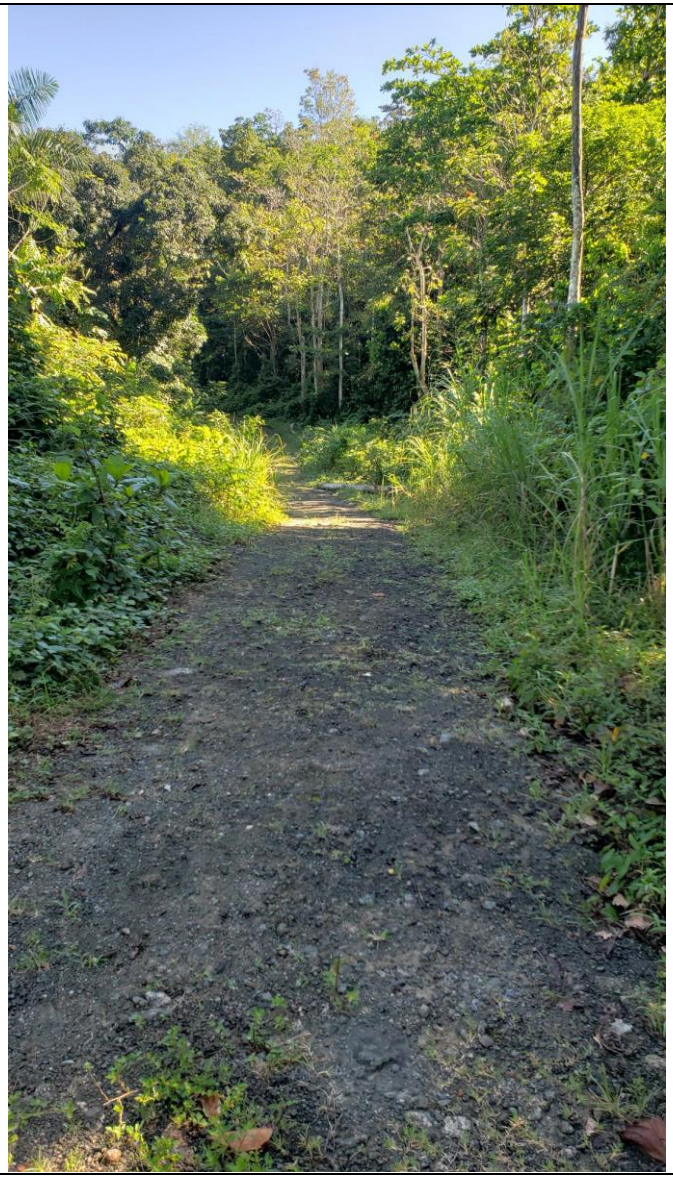
| |  |
| Foto 12 Camino de acceso desde el barrio Quebrada Cruz | Foto 13 Camino de acceso desde el barrio Quebrada Cruz |

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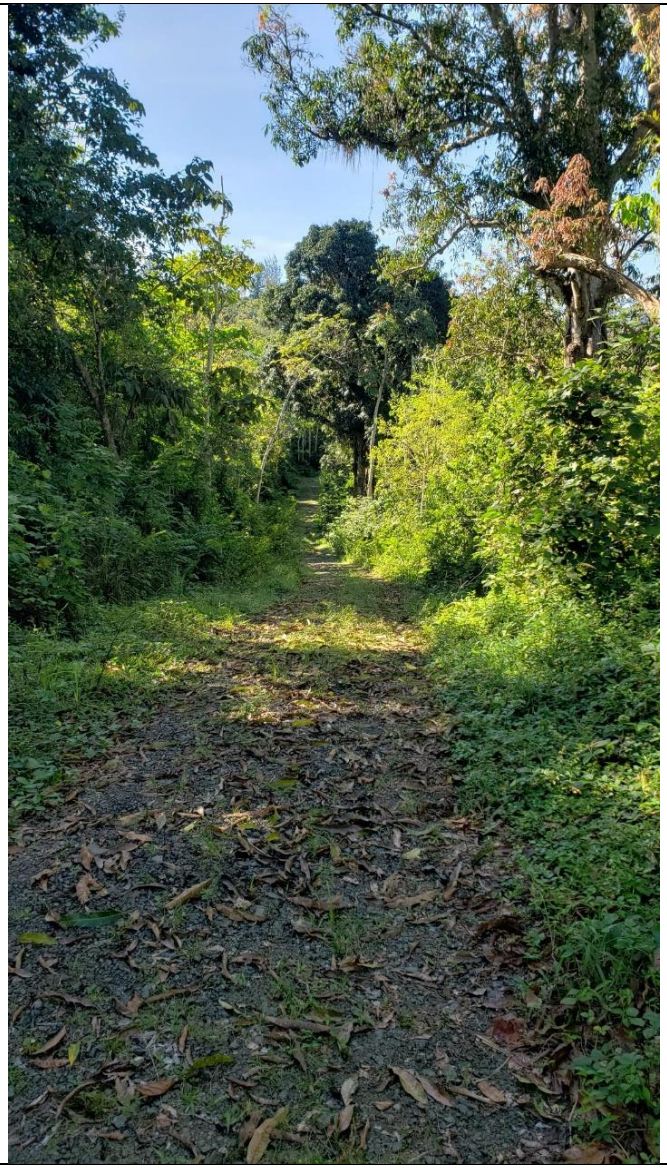
| |  |
| Foto 14 Camino de acceso desde el barrio Quebrada Cruz | Foto 15 Camino de acceso desde el barrio Quebrada Cruz |

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| Foto 16 Camino de acceso desde el barrio Quebrada Cruz | Foto 17 Camino de acceso desde el barrio Quebrada Cruz |

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| Foto 18 Camino de acceso desde el barrio Quebrada Cruz | Foto 19 Camino de acceso desde el barrio Quebrada Cruz |

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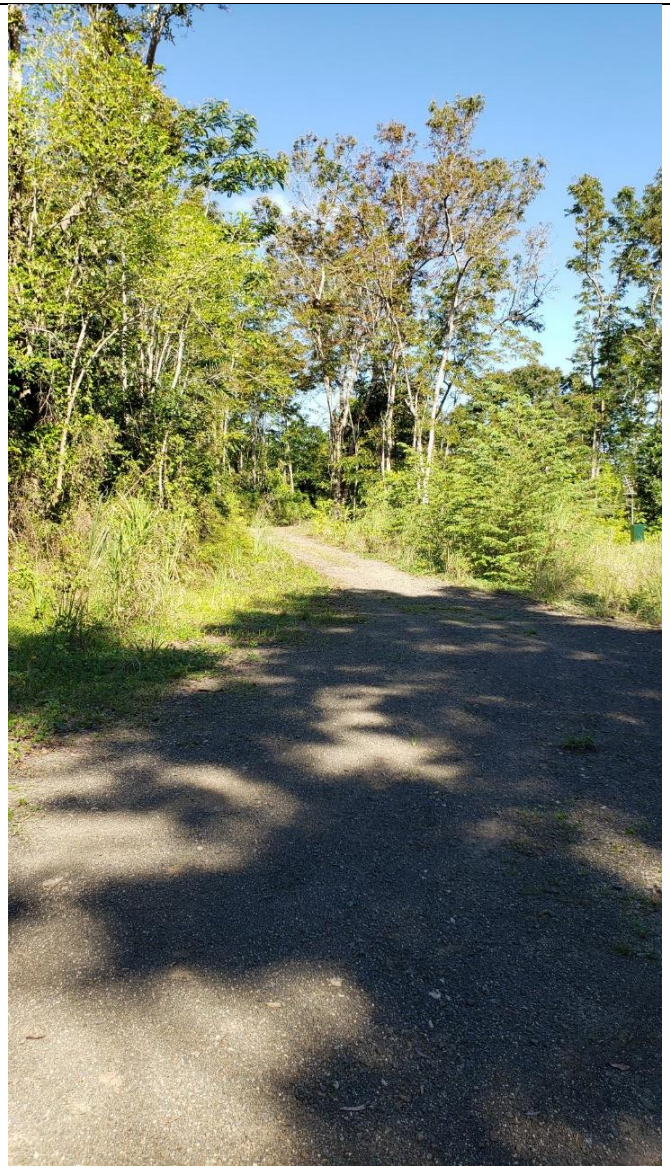
|  | |
| Foto 20 Camino de acceso desde el barrio Quebrada Cruz | Foto 21 Camino de acceso desde el barrio Quebrada Cruz |

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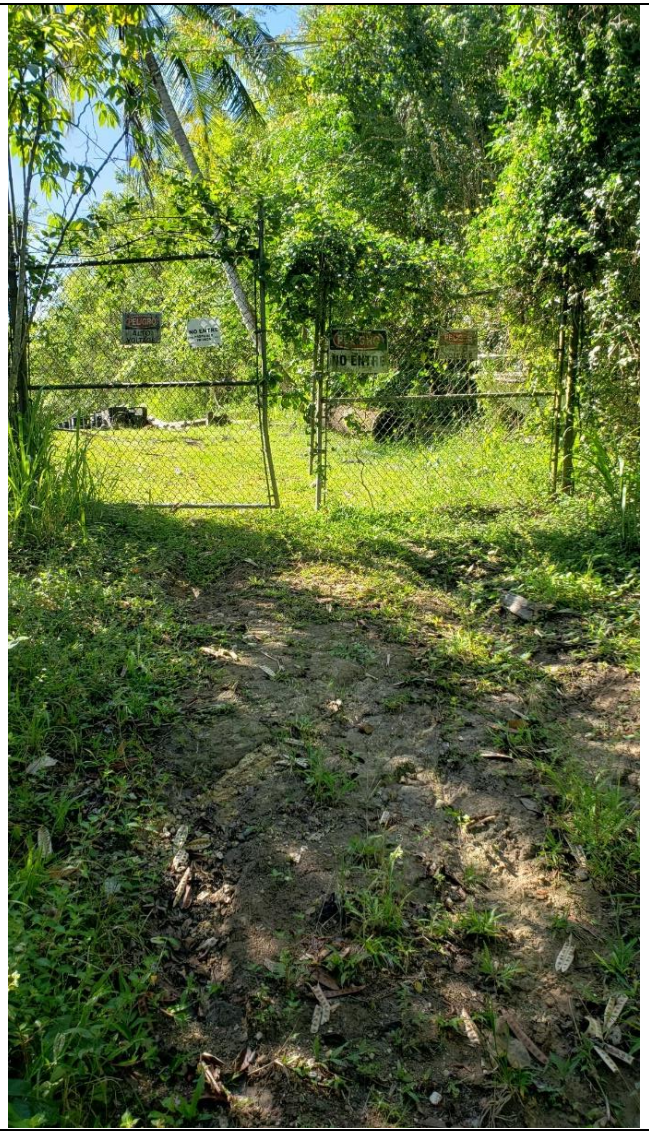
| |  |
| Foto 22 Camino de acceso desde el barrio Quebrada Cruz | Foto 23 Camino de acceso desde el barrio Quebrada Cruz |

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Caribbean Ecological Services Field Office
Post Office Box 491
Boqueron, PR 00622-0491
Phone: (787) 834-1600 Fax: (787) 851-7440
Email Address: CARIBBEAN_ES@FWS.GOV


In Reply Refer To: April 19, 2023
Project Code: 2023-0071470
Project Name: Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

***THE FOLLOWING SPECIES LIST IS NOT A SECTION 7 CONSULTATION. PLEASE CONTACT OUR OFFICE TO COMPLETE THE CONSULTATION PROCESS***

The purpose of the Endangered Species Act (Act) is to provide a means whereby threatened, and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect those species and/or their designated critical habitat.

Federal agencies are required to "request of the Secretary of Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action". The enclosed species list provides information to assist with the U.S. Fish and Wildlife Service (Service) consultation process under section 7 of the Act. However, **the enclosed species list does not complete the required consultation process.** The species list identifies threatened, endangered, proposed and candidate species, as well as proposed and designated critical habitats, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. A discussion between the Federal agency and the Service should include what types of listed species may occur in the proposed action area and what effect the proposed action may have on those species. This process initiates informal consultation.

Once a species list is obtained for the proposed project, an effect determination for endangered and threatened species should be made. The applicant could make an effect determination by using available keys on IPaC for specific species. For species with no determination keys, the applicant should request concurrence from the Service by sending a project package

to caribbean_es@fws.gov. To obtain guidance for completing this process and the minimum requirements for project packages, please visit:

https://www.fws.gov/southeast/pdf/letter/consultation-under-section-7-of-the-endangered-species-act-with-the-caribbean-ecological%20Services-field-office-template-letter.pdf

When a federal agency, after discussions with the Service, determines that the proposed action is not likely to adversely affect any listed species, or adversely modify any designated critical habitat, and the Service concurs, the informal consultation is complete, and the proposed project moves ahead. If the proposed action is suspected to affect a listed species or modify designated critical habitat, the Federal agency may then prepare a Biological Assessment (B.A.) to assist in its determination of the project's effects on species and their habitat. However, a B.A. is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a B.A. where the agency provides the Service with an evaluation on the likely effects of the action to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a B.A. are described at 50 CFR 402.12.

If a federal agency determines, based on its B.A. or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to further consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation process. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species.

This list is provided pursuant to Section 7 of the Endangered Species Act and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action". Please use this list to determine whether your project requires consultation and to make your effects determination. For more guidance, use the Guideline for Consultation under Section 7 of the Endangered Species Act with the Caribbean Ecological Services Field Office by clicking here.

This species list is provided by:

Caribbean Ecological Services Field Office
caribbean_es@fws.gov

Post Office Box 491
Boqueron, PR 00622-0491
(786) 244-0081

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

# OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Caribbean Ecological Services Field Office**
Post Office Box 491
Boqueron, PR 00622-0491
(787) 834-1600

# PROJECT SUMMARY

Project Code: 2023-0071470

Project Name: Enrique Ortega Water Treatment Plant Raw Water Intake Power Generators

Project Type: Dam - New Construction

Project Description: The project encompasses the installation of four (4) 2,500 KW generators to provide backup power to the Raw Water Intake Pump Station, sump pump, dam gate system engine, one of the office buildings, exterior lighting, and security systems of the La Plata Raw Water Intake located in Toa Alta, Puerto Rico. Three (3) of these generators will be used as primary emergency generator plus one (1) generator as a back-up in case of failure of any of the primary generators. These generators will provide electric power to the Raw Water Intake Pump Station and the entire facility during power blackouts or service interruptions from the Puerto Rico Electric Power Authority (PREPA) electrical grid.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@18.34186125,-66.23899244002445,14z

Counties: Toa Alta County, Puerto Rico

# ENDANGERED SPECIES ACT SPECIES

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## REPTILES

| NAME | STATUS |
|---|---|
| Puerto Rican Boa *Chilabothrus inornatus* | Endangered |

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/6628
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/ENN6KWAYVFAJ3BZZ4JEHZZUBVQ/documents/generated/6941.pdf

## CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

# USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

# MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

THERE ARE NO FWS MIGRATORY BIRDS OF CONCERN WITHIN THE VICINITY OF YOUR PROJECT AREA.

## MIGRATORY BIRDS FAQ

**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?**

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list

of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

**How do I know if a bird is breeding, wintering or migrating in my area?**
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

**What are the levels of concern for migratory birds?**
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

**Details about birds that are potentially affected by offshore projects**
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical

Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

**What if I have eagles on my list?**
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

**Proper Interpretation and Use of Your Migratory Bird Report**
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

# WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

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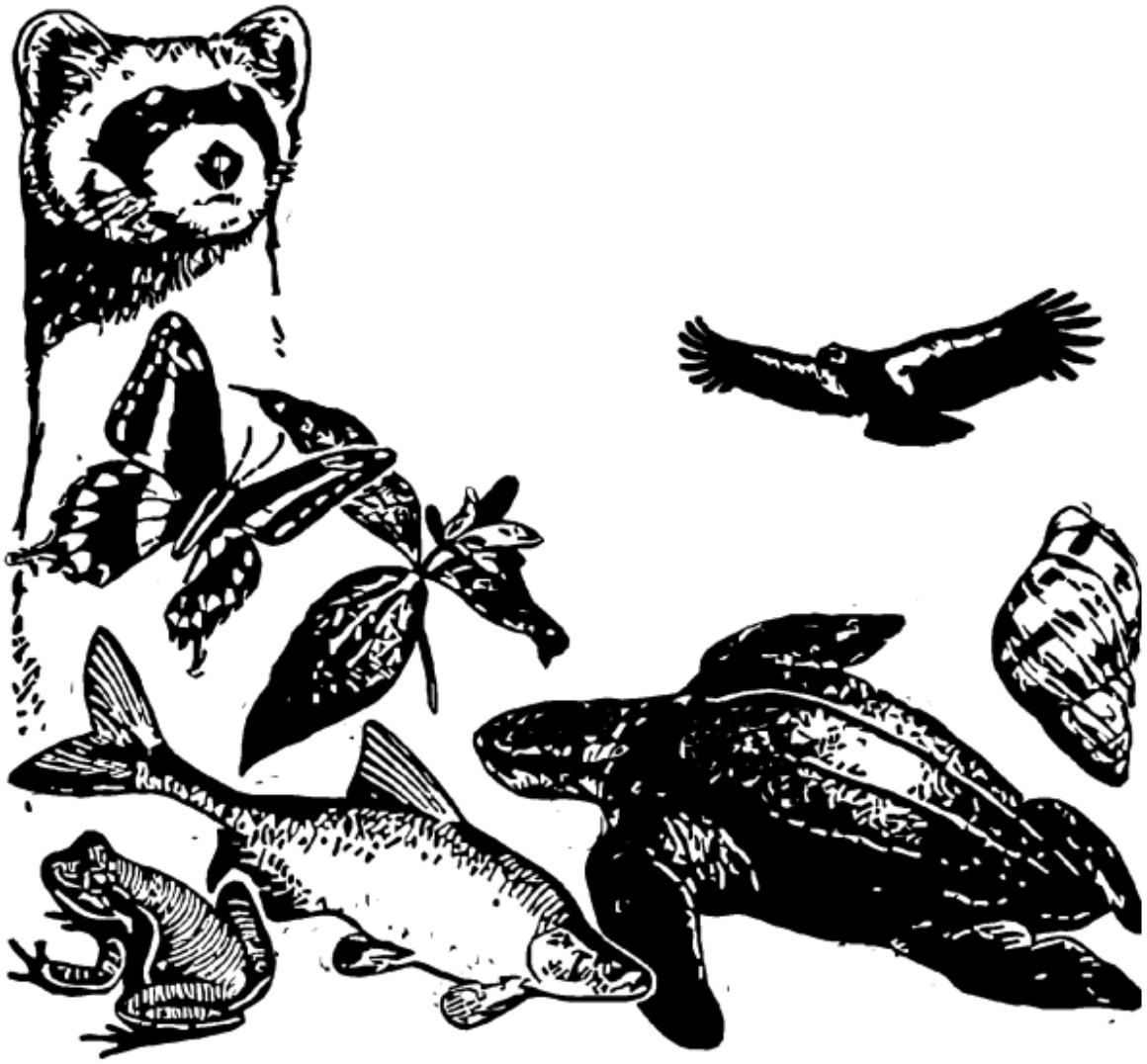
# IPAC USER CONTACT INFORMATION


| | |
|---|---|
| Agency: | CSA Gruop |
| Name: | Diana Ferro |
| Address: | 1511 Ponce de Leon Ave. |
| Address Line 2: | Suite 23 |
| City: | San Juan |
| State: | PR |
| Zip: | 00909 |
| Email | dferro@csagroup.com |
| Phone: | 7876416800 |

**U.S. Fish & Wildlife Service**

# *General Project Design Guidelines (1 Species)*

Generated May 06, 2022 01:21 PM UTC, IPaC v6.74.0-rc8



IPaC - Information for Planning and Consultation (https://ipac.ecosphere.fws.gov/): A project planning tool to help streamline the U.S. Fish and Wildlife Service environmental review process.

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Puerto Rican Boa - Caribbean Ecological Services Field Office . . . . . 2

# Species Document Availability

## Species with general design guidelines

Puerto Rican Boa *Epicrates inornatus*

# U.S. FISH AND WILDLIFE SERVICE
# CARIBBEAN ECOLOGICAL SERVICES FIELD OFFICE

**Conservation Measures for the Puerto Rican boa (*Chilabothrus inornatus*)**

Section 7 (a)(1) of the Endangered Species Act (ESA) charges Federal agencies to aid in the conservation of listed species, and section 7 (a)(2) requires the agencies, through consultation with the U.S. Fish and Wildlife Service (Service), to ensure their activities are not likely to jeopardize the continued existence of listed species or adversely modify designated critical habitats. Section 7 applies to the management of Federal lands as well as Federal actions that may affect listed species, such as Federal approval of private activities through the issuance of Federal funding, permits, licenses, or other actions. Any person that injures, captures, or kills a Puerto Rico boa is subject to penalties under the ESA. If Federal funds or permits are needed, the funding or permitting agency should initiate Section 7 consultation with the Service. To initiate a consultation under the Section 7 of the ESA, you must submit a project package with the established minimum requirements. These conservation measures should be incorporated into the project plans to minimize possible impacts to the species.

The endangered Puerto Rican (PR) boa (*Chilabothrus inornatus*, formerly *Epicrates inornatus*) is the largest endemic snake species that inhabits Puerto Rico. The PR boa is non-venomous and does not pose any life threatening danger to humans, but some individuals may try to bite if disturbed or during capture or handling. Its body color ranges from tan to dark brown with irregular diffuse marking on the dorsum, but some individuals lack marking and are uniformly dark. Juveniles may have a reddish color with more pronounced markings. In general, as they mature, their body color tends to darken.

Adult PR boa – *Chilabothrus inornatus*
Photo: Puerto Rico by JP Zegarra

**Last Revised: November 2020**

The Puerto Rican boa was federally listed in 1970. Currently, the species has an island-wide distribution and occurs in a wide variety of habitat types ranging from wet montane to subtropical dry forest, and can be found from mature forest to areas with different degrees of human disturbance like roadsides or houses, especially if near their habitat in rural areas. This boa is considered mostly nocturnal, remaining less active, concealed or basking under the sun during the day.

The Service has developed the following conservation measures with the purpose of assisting others to avoid or minimize adverse effects to the PR boa and its habitat. These recommendations may be incorporated into new project plans and under certain circumstances into existing projects. Depending on the project, additional conservation measures can be implemented besides the ones presented in this document.

Conservation Measures:

1. Inform all project personnel about the potential presence of the PR boa in areas where the proposed work will be conducted. A pre-construction meeting should be conducted to inform all project personnel about the need to avoid harming the species as well as penalties for harassing or harming PR boas. An educational poster or sign with photo or illustration of the species should be displayed at the project site.

2. Prior to any construction activity, including removal of vegetation and earth movements, the boundaries of the project and areas to be excluded and protected should be clearly marked in the project plan and in the field in order to avoid further habitat degradation into forested and conservation areas.

3. Once areas are clearly marked, and prior to the use of heavy machinery and any construction activity (including removal of vegetation and earth movement), a biologist or personnel with experience on this species should survey the areas to be cleared to verify the presence of any PR boa within the work area.

4. The PR boa is considered more active at night. Thus, in order to maximize its detection, the species should be searched at nights prior to habitat disturbance.

5. Once the area has been searched for PR boas, vegetation should first be cleared by hand to the maximum extent possible. Vegetation should be cut about one meter above ground prior to the use of heavy machinery for land clearing. Cutting vegetation by hand will allow boas present on site to move away on their own to adjacent available habitat. Any stone walls or naturally occurring rock piles must be carefully dismantled by hand as these are refuges for the snake. This will allow any boas present to vacate the site without injury.

6. For all boa sightings (dead or alive), record the time and date of the sighting and the specific location where it was found. PR boa data should also include a photo of the animal (dead or alive), site GPS coordinates, the time and date, and comments on how the animal was detected and its behavior.

**Last Revised: November 2020**

7. If a PR boa is found within any of the working or construction areas, activities should stop at that area and information recorded (see #6). **Do not capture the boa.** If boas need to be moved out of harm's way, designated personnel shall immediately contact the Puerto Rico Department of Natural and Environmental Resources (PRDNER) Rangers for safe capture and relocation of the animal (PRDNER phone #s: ((787) 724-5700, (787) 230-5550, (787) 771-1124). If immediate relocation is not an option, project-related activities at this area must stop until the boa moves out of harm's way on its own. Activities at other work sites, where no boas have been found after surveying the area, may continue.

8. If a PR boa is captured by the PRDNER, record the name of the PRDNER staff and information on where the PR boa will be taken. This information should be reported to the Service.

9. Measures should be taken to avoid and minimize PR boa casualties by heavy machinery or motor vehicles being used on site. Any heavy machinery left on site (staging) or near potential PR boa habitat (within 50 meters of potential boa habitat), needs to be thoroughly inspected each morning before work starts to ensure that no boas have sheltered within engine compartments or other areas of the equipment. If PR boas are found within vehicles or equipment, do not capture the animal and let it move on its own or call PRDNER Rangers for safe capture and relocation of the animal (see #7). If not possible, the animal should be left alone until it leaves the vehicle on its own.

10. PR boas may seek shelter in debris piles. Measures should be taken to avoid and minimize boa casualties associated with sheltering in debris piles as a result of project activities. Debris piles should be placed far away from forested areas. Prior to moving, disposing or shredding, debris piles should be carefully inspected for the presence of boas. If debris piles will be left on site, we recommend they be placed in areas that will not be disturbed in the future.

11. If a dead PR boa is found, immediately cease all work in that area and record the information accordingly (see #6). If the PR boa was accidentally? killed as part of the project actions, please include information on what conservation measures had been implemented and what actions that will be taken to avoid further killings. A dead boa report should be sent by email (see contacts below) to the Service within 48 hours of the event.

12. Projects must comply with all state laws and regulations. Please contact the PRDNER for further guidance.

If you have any questions regarding the above conservation measures, please contact the Service:

- Marelisa Rivera, Deputy Field Supervisor
  - Email: marelisa_rivera@fws.gov
  - Office phone (786) 244-0081 or mobile (305) 304-1814
- José Cruz-Burgos, Endangered Species Coordinator
  - Email: jose_cruz-burgos@fws.gov
  - Office phone (786) 244-0081 or mobile (305) 304-1386

**Last Revised: November 2020**

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Escala: 1:6,000

0 25 50 100 150 200
metros

## Leyenda

- Carretera estatal[1]
- Hidrografía[2]
- Límite del Proyecto Propuesto*

**Humedales[3]**

- Lago
- Ribereño

* Límite de propiedad es aproximado.

Fuentes:
1. Autoridad de Carreteras y Transportación, 2020.
2. Servicio Geológico de los Estados Unidos, Conjunto de Datos de Hidrografía Nacional (NHD, en inglés), 2020.
3. Servicio Nacional de Pesca y Vida Silvestre de lo Estados Unidos (USFWS, en inglés), Inventario Nacional de Humedales, 2020.
4. Créditos de la capa de servicio: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Sistema de Coordenadas: Coordenadas Planas NAD83 (2011) Puerto Rico e Islas Vírgenes FIPS 5200 (metros)

CSA-LOUIS BERGER JV LLC
PRASA PMC

USFWS National Wetlands Inventory

Planta de Filtración Enrique Ortega
Generadores Toma de Agua Cruda
CIP 1-70-9000

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# APPENDIX K US CENSUS BUREAU DP03 SELECTED ECONOMIC CHARACTERISTICS

# Selected Economic Characteristics

**Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.**

| Label | Toa Alta Municipio, Puerto Rico | |
|---|---|---|
| | Estimate | Percent |
| EMPLOYMENT STATUS | | |
| Population 16 years and over | 57,260 | 57,260 |
| In labor force | 31,589 | 55.2% |
| Civilian labor force | 31,331 | 54.7% |
| Employed | 29,749 | 52.0% |
| Unemployed | 1,582 | 2.8% |
| Armed Forces | 258 | 0.5% |
| Not in labor force | 25,671 | 44.8% |
| Civilian labor force | 31,331 | 31,331 |
| Unemployment Rate | (X) | 5.0% |
| Females 16 years and over | N | N |
| Own children of the householder under 6 years | N | N |
| Own children of the householder 6 to 17 years | N | N |
| COMMUTING TO WORK | | |
| OCCUPATION | | |
| INDUSTRY | | |
| Civilian employed population 16 years and over | 29,749 | 29,749 |
| Agriculture, forestry, fishing and hunting, and minin | 155 | 0.5% |
| Construction | 2,158 | 7.3% |
| Manufacturing | 992 | 3.3% |
| Wholesale trade | 1,763 | 5.9% |
| Retail trade | 4,307 | 14.5% |
| Transportation and warehousing, and utilities | 1,715 | 5.8% |
| Information | 775 | 2.6% |
| Finance and insurance, and real estate and rental a | 2,962 | 10.0% |
| Professional, scientific, and management, and admi | 2,999 | 10.1% |
| Educational services, and health care and social as | 5,818 | 19.6% |
| Arts, entertainment, and recreation, and accommoc | 2,629 | 8.8% |

# Selected Economic Characteristics

**Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.**

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| Finance and insurance, and real estate and rental a | 2,962 | 10.0% |
| Professional, scientific, and management, and admi | 2,999 | 10.1% |
| Educational services, and health care and social as | 5,818 | 19.6% |
| Arts, entertainment, and recreation, and accommoc | 2,629 | 8.8% |
| Other services, except public administration | 1,701 | 5.7% |
| Public administration | 1,775 | 6.0% |
| CLASS OF WORKER | | |
| INCOME AND BENEFITS (IN 2023 INFLATION-ADJUSTED | | |
| Total households | 24,486 | 24,486 |
| Less than $10,000 | 3,838 | 15.7% |
| $10,000 to $14,999 | 2,067 | 8.4% |
| $15,000 to $24,999 | 4,361 | 17.8% |
| $25,000 to $34,999 | 2,716 | 11.1% |
| $35,000 to $49,999 | 3,256 | 13.3% |
| $50,000 to $74,999 | 3,946 | 16.1% |
| $75,000 to $99,999 | 1,433 | 5.9% |

# Selected Economic Characteristics

**Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.**

| Label | Toa Alta Municipio, Puerto Rico | |
|---|---|---|
| | Estimate | Percent |
| EMPLOYMENT STATUS | | |
| COMMUTING TO WORK | | |
| OCCUPATION | | |
| INDUSTRY | | |
| CLASS OF WORKER | | |
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| $15,000 to $24,999 | 4,361 | 17.8% |
| $25,000 to $34,999 | 2,716 | 11.1% |
| $35,000 to $49,999 | 3,256 | 13.3% |
| $50,000 to $74,999 | 3,946 | 16.1% |
| $75,000 to $99,999 | 1,433 | 5.9% |
| $100,000 to $149,999 | 2,233 | 9.1% |
| $150,000 to $199,999 | 321 | 1.3% |
| $200,000 or more | 315 | 1.3% |
| Median household income (dollars) | 31,635 | (X) |
| Mean household income (dollars) | 49,998 | (X) |
| With earnings | 17,258 | 70.5% |
| With Social Security | 9,759 | 39.9% |
| With retirement income | 3,104 | 12.7% |
| With Supplemental Security Income | 0 | 0.0% |
| With cash public assistance income | 250 | 1.0% |
| With Food Stamp/SNAP benefits in the past 12 mon | 9,690 | 39.6% |
| Families | 18,089 | 18,089 |
| Per capita income (dollars) | 19,689 | (X) |
| Nonfamily households | 6,397 | 6,397 |

# Table Notes

## Selected Economic Characteristics

**Survey/Program:** American Community Survey

**Year:** 2023

**Estimates:** 1-Year

**Table ID:** DP03

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, the decennial census is the official source of population totals for April 1st of each decennial year. In between censuses, the Census Bureau's Population Estimates Program produces ar disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units and the group quarters population for states and counties.

Information about the American Community Survey (ACS) can be found on the ACS website. Supporting documentation including code lists, subject definitions, data accuracy, and statistical testing, and a full list of ACS tables and table shells (without estimates) can be found on the Technical Documentation section of the ACS website.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the
Methodology
section.

Source: U.S. Census Bureau, 2023 American Community Survey 1-Year Estimates

ACS data generally reflect the geographic boundaries of legal and statistical areas as of January 1 of the estimate year. For more information, see Geography Boundaries by Year.

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roug as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (f a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.

Users must consider potential differences in geographic boundaries, questionnaire content or coding, or other methodological issues when comparin ACS data from different years. Statistically significant differences shown in ACS Comparison Profiles, or in data users' own analysis, may be the result these differences and thus might not necessarily reflect changes to the social, economic, housing, or demographic characteristics being compared. F more information, see Comparing ACS Data.

Employment and unemployment estimates may vary from the official labor force data released by the Bureau of Labor Statistics because of differenc in survey design and data collection. For guidance on differences in employment and unemployment estimates from different sources go to Labor For Guidance.

Workers include members of the Armed Forces and civilians who were at work last week.

Industry titles and their 4-digit codes are based on the 2022 North American Industry Classification System. The Industry categories adhere to the guidelines issued in Clarification Memorandum No. 2, "NAICS Alternate Aggregation Structure for Use By U.S. Statistical Agencies," issued by the Offi of Management and Budget.

Occupation titles and their 4-digit codes are based on the 2018 Standard Occupational Classification.

The health insurance coverage category names were modified in 2010. See https://www.census.gov/topics/health/health-insurance/about/glossary.html#par_textimage_18 for a list of the insurance type definitions.

Beginning in 2017, selected variable categories were updated, including age-categories, income-to-poverty ratio (IPR) categories, and the age univer for certain employment and education variables. See user note entitled "Health Insurance Table Updates" for further details.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on 2020 Census data. A result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Explanation of Symbols:

-

The estimate could not be computed because there were an insufficient number of sample observations. For a ratio of medians estimate, one or both the median estimates falls in the lowest interval or highest interval of an open-ended distribution. For a 5-year median estimate, the margin of error associated with a median was larger than the median itself.

N

The estimate or margin of error cannot be displayed because there were an insufficient number of sample cases in the selected geographic area.

(X)

The estimate or margin of error is not applicable or not available.

median-

The median falls in the lowest interval of an open-ended distribution (for example "2,500-")

median+

The median falls in the highest interval of an open-ended distribution (for example "250,000+").

**

The margin of error could not be computed because there were an insufficient number of sample observations.

***

The margin of error could not be computed because the median falls in the lowest interval or highest interval of an open-ended distribution.

*****

A margin of error is not appropriate because the corresponding estimate is controlled to an independent population or housing estimate. Effectively, the corresponding estimate has no sampling error and the margin of error may be treated as zero.

# APPENDIX L ARCHAEOLOGICAL RECOMMENDATIONS

# Recomendaciones

Generadores Toma de Agua Cruda Planta de Filtracion Enrique Ortega CIP 1709000

## Datos de Localización

De acuerdo a la información suministrada se propone una actividad: Público con Contratación Privada en:

### Dirección Física

BO QUEBRADA CRUZ , CARRETERA PR -824, KM 5.0
Toa Alta Puerto Rico, 00916

### Número(s) de Catastro

112-000-006-71

### Dueño

Autoridad de Acueductos y Alcantarillados

### Certificado por

### Calificación

Distrito(s) de Calificación: CR-C

Distrito en el Mapa de Inundabilidad: X (80.6%), A (19.4%)

Tipo de Suelo: CaF (36.6%), MxF (26.7%), MxE (19.4%), CTR (8.3%), MaB (7.1%), MxD (1.9%)

### Cabida

Cabida según escritura: 200302.09 metros cuadrados

### Arqueología y Conservación Histórica

Comentario Final del PPHE y PAE del ICP: El Programa de Patrimonio Histórico Edificado y el Programa de Arqueología y Etnohistoria del ICP han evaluado los documentos del proyecto 2023-503258-SRA-073503 - Generadores toma de agua cruda planta de filtración Enrique Ortega CIP 1709000 - recibidos a través de la OGPe. La evaluación y determinación se realizó siguiendo las leyes y reglamentos establecidos para la protección del Patrimonio Histórico Edificado y el Patrimonio Arqueológico Terrestre. Las recomendaciones emitidas por ambos Programas son necesarias para la aprobación de este proyecto. La determinación de dicha evaluación y su eventual recomendación ha sido emitida mediante carta por parte de ambos programas. Ambos documentos fueron anejados al caso en las fechas 9/01/2023y 12/06/2023. Favor hacer referencia a estos documentos y tenerlos presentes en caso de visitas o inspecciones al proyecto durante todas sus etapas de desarrollo.

## Condiciones Especiales

NINGUNA

## Condiciones Generales

Esta recomendación es solamente aplicable a la situación de hechos y los datos según presentados y evaluados en el caso. La OGPe se reserva el derecho de reevaluar, variar o modificar el mismo en cualquier momento anterior a la emisión del permiso o la acción administrativa correspondiente por parte de la agencia solicitante o proponente cuando surja nueva información oficial específica estableciendo que el derecho aplicable o las condiciones ambientales en el predio han cambiado sustancialmente, o cuando la recomendación original se emitió bajo premisas falsas o fraudulentas.

Las vigencias de las diferentes agencias del proceso de recomendación serán las establecidas en los comunicados que estas emiten conforme a sus reglamentos.

## Recomendaciones

Generadores Toma de Agua Cruda Planta de Filtracion Enrique Ortega CIP 1709000

## Firma / Sellos

**Fecha de Expedición:**

06/DEC/2023

Lcdo. Félix E. Rivera Torres
Secretario Auxiliar
Departamento de Desarrollo Económico y Comercio de Puerto Rico
Oficina de Gerencia de Permisos

**Lcdo. Félix E. Rivera Torres**

**Secretario Auxiliar de la OGPe**

GOBIERNO DE PUERTO RICO
INSTITUTO DE CULTURA PUERTORRIQUEÑA
Programa de Arqueología y Etnohistoria
Directora | Arql. Anabel Arana Lanzas

6 de diciembre de 2023

***AUTORIZACIÓN***

Lcdo. Félix E. Rivera Torres
Secretario Auxiliar - Oficina de Gerencia de Permisos
Departamento de Desarrollo Económico y Comercio
PO Box 41118
San Juan, Puerto Rico 00940

Proyecto: Generadores Toma de Agua Cruda Planta de Filtración Enrique Ortega - CIP-1709000
PR-824, KM. 5.0 y el camino Recreativo La Plata, Barrio Quebrada Cruz, Toa Alta
OGPe: 2023-503258-SRA-073503 / Catastro: 112-000-006-71
ICP-PAE: TA-23-625

Estimado licenciado Rivera Torres:

El Programa de Arqueología y Etnohistoria (PAE) del Instituto de Cultura Puertorriqueña (ICP) evaluó los documentos relacionados al proyecto en referencia, recibidos a través de la Oficina de Gerencia de Permisos (OGPe). La evaluación realizada sugiere que, basado en los datos existentes al presente, las probabilidades de impactar un recurso arqueológico, según definido por la Ley 112 del 20 de julio de 1988, según enmendada, son mínimas. Por lo tanto, en lo concerniente a recursos culturales de naturaleza arqueológica, no tenemos objeción al proyecto según fue radicado y evaluado.

Le notificamos que el proponente queda sujeto a las responsabilidades y obligaciones que impone la Ley 112 del 20 de julio de 1988. Esta establece que, se deberá paralizar todo tipo de actividad de excavación, movimiento y remoción de corteza terrestre, y notificar en un plazo de veinticuatro (24) horas al PAE, en caso de que, durante el desarrollo del proyecto, se descubra o impacte algún depósito, elemento, estructura o vestigio de naturaleza arqueológica. Se le apercibe que el incumplimiento de estos requerimientos será objeto de sanciones administrativas según lo establecido en la citada ley.

**Esta autorización tiene vigencia de un (1) año.**

Atentamente,

Arql. Anabel Arana Lanzas
Directora
Programa de Arqueología y Etnohistoria

LJPR

30 DE AGOSTO DE 2023

Lcdo. Félix E. Rivera Torres
Secretario Auxiliar
**DEPARTAMENTO DE DESARROLLO ECONÓMICO Y COMERCIO**
Oficina de Gerencia de Permisos
PO Box 41179
San Juan, Puerto Rico 00940-1179

**NO OBJECIÓN**

| | |
|---|---|
| CASO OGPE: | 2023-503258-SRA-073503 |
| DESCRIPCIÓN: | GENERADORES TOMA DE AGUA CRUDA PLANTA DE FILTRACIÓN ENRIQUE ORTEGA CIP 1709000 |
| MUNICIPIO: | TOA ALTA |
| UBICACIÓN: | PR 827 KM 5.6, BARRIO ORTIZ |
| CATASTRO: | 112-000-006-71 |
| CALIFICACIÓN: | CR-C |
| PROPIETARIO: | AUTORIDAD DE ACUEDUCTOS ALCANTARILLADOS |
| PROPONENTE: | AUTORIDAD DE ACUEDUCTOS ALCANTARILLADOS |

El Instituto de Cultura Puertorriqueña (**ICP**), por medio de su Programa de Patrimonio Histórico Edificado (**ICP-PPHE**), ha examinado el proyecto de referencia para determinar si afecta Propiedades de Valor Histórico y Arquitectónico que estén protegidas, o sean elegibles a serlo, bajo las leyes y reglamentos que nuestra agencia tiene responsabilidad de administrar, como agencia primaria, endosante o recomendante. Estas leyes y reglamentos incluyen, entre otros:

1. La Ley 89 del 21 de junio de 1955 S.E., Ley Orgánica del Instituto de Cultura Puertorriqueña, en especial el inciso 4(a)(7), "Determinar que edificios o estructuras son de valor histórico o artístico en Puerto Rico. (…)" y el inciso 4(a)(8), "Asesorar a la Junta de Planificación en la reglamentación de construcción en aquellas zonas que determine como zonas de valor histórico. (…)".
2. La Ley 89 del 21 de junio de 1955 S.E., Ley Orgánica del Instituto de Cultura Puertorriqueña, en su inciso 4(b)(3) según enmendado por la ley 119 del 26 de septiembre de 2005, que permite "adoptar, enmendar o derogar, por conducto de su Junta de Directores, las reglas que gobiernen [el] funcionamiento y el descargo de los poderes" concedidos e impuestos al ICP por ley, y la imposición de multas administrativas y/u otras sanciones por su incumplimiento o violación.

    a. Reglamento de Procedimientos Administrativos del Programa de Patrimonio Histórico Edificado del Instituto de Cultura Puertorriqueña registrado en el Departamento de Estado como Reglamento Núm. 7746 con vigencia del 3 de abril de 2009.

3. Ley Núm. 161 de 1 de diciembre de 2009, S.E., Ley para la Reforma del Proceso de Permisos de Puerto Rico, Artículo 1.5, inciso 31, el Instituto de Cultura Puertorriqueña es identificado como una de las agencias gubernamentales concernidas y con injerencia sobre el proceso de evaluación de solicitudes para el desarrollo y uso de terrenos, consultas, permisos, licencias, certificaciones, autorizaciones o cualquier trámite para la operación de negocios en Puerto Rico. Esta Ley establece claramente el requerimiento de autorización escrita previa del ICP para toda intervención y operación en las propiedades incluidas en el Registro de Sitios y Zonas Históricas de Puerto Rico, plazas de recreo y centros fundacionales (ver Reglamento Conjunto).

   A. Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operaciones de Negocios (RC-2023); con vigencia de 16 de junio de 2023. Tomo X: Conservación de Recursos Históricos
   B. Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operaciones de Negocios (RC-2023); con vigencia de 16 de junio de 2023. Tomos II, III, IV, VI, VII, IX (ver anejo 1 con identificación de Reglas correspondientes).

4. La Ley Núm. 183 de 21 de agosto de 2000, S.E., Ley Orgánica de la Oficina Estatal de Conservación Histórica, Artículo 7(b) y Artículo 8 (b), establece implícitamente el requerimiento de la recomendación favorable previa del ICP en permisos para proyectos que cuenten con fondos, permisos o asistencia de alguna agencia federal para realizar intervenciones que puedan impactar propiedades localizadas en el territorio de Puerto Rico que hayan sido incluidas en el Registro Nacional de Lugares Históricos en Washington o sean elegibles al mismo.[1]
5. Ley Núm. 60 de 1 de julio de 2019, S.E., Código de Incentivos de Puerto Rico, Capítulo 7 Infraestructura y Energía Verde, Sección 2071.01, Inciso 1: Se provee para que un negocio establecido, o que será establecido, en Puerto Rico por una Persona, organizado o no bajo un nombre común, pueda solicitarle al Secretario del DDEC la Concesión de Incentivos cuando la Entidad se establece en Puerto Rico para dedicarse a una de las siguientes actividades elegibles: Realizar obras de mejoras, restauración o reconstrucción de edificios existentes, u obras de reestructuración o nueva construcción en solares baldíos en las Zonas Históricas de Puerto Rico, y los alquileres de tales edificios localizados en tales zonas una vez hayan sido mejorados, restaurados, reconstruidos, restructurados o construidos, según sea el caso. Se requiere la Recomendación del ICP.
6. La exigencia de endoso o comentario del **ICP** aplicable a propiedades designadas de valor histórico y arquitectónico por otros medios, tales como:
   a. Resolución de la Asamblea Legislativa.
   b. Monumentos Históricos designados por la Junta de Directores del **ICP.**
   c. Propiedades designadas por un plan de ordenamiento territorial de un Municipio Autónomo y que esté en vigor, o por el Plan de Uso de Terrenos de Puerto Rico.
   d. Ser declaradas históricas en un plan especial de zonificación.
   e. Otras propiedades referidas por cualquier componente del Sistema Unificado de Información/Single Business Portal (**SUI/SBP**), la Oficina de Permisos de un Municipio Autónomo con poder de otorgar permisos, la Junta de Planificación, el Programa de

[1] La OECH **asiste** a las agencias federales en el proceso de cumplimiento con el 54 USC 306108 (Sección 106 de la Ley de Preservación Histórica Nacional) y el 36 CFR Parte 800: Protección de Propiedades Históricas, pero esta consulta **no sustituye** los permisos ni las recomendaciones requeridos en Puerto Rico para intervenciones en propiedades históricas en virtud de la Ley 161-2009, según enmendada, Ley para la Reforma del Proceso de Permisos de Puerto Rico y la Ley 89-1955, según enmendada, Ley Orgánica del Instituto de Cultura Puertorriqueña.

Arqueología y Etnohistoria del **ICP**, u otra agencia o entidad de gobierno con poder reglamentario.

7. Petición a solicitud voluntaria de un propietario o derechohabiente de una propiedad.

De acuerdo a nuestros expedientes y la información provista:

1. El solar a impactar carece de patrimonio histórico construido y se localiza fuera del centro urbano tradicional del municipio de Toa Alta.
2. Se propone la construcción de una plataforma para la instalación de cuatro generadores, infraestructura en la estación de bombas y caminos de acceso.
3. El proyecto propuesto no afecta adversamente elementos del patrimonio histórico construido.

Por lo tanto, se emite una determinación de **NO OBJECIÓN AL PROYECTO PROPUESTO.**

Esta evaluación no incluye los elementos a evaluarse conforme a la Ley 112-1988, Ley para la Protección del Patrimonio Arqueológico Terrestre, lo cual debe hacerse mediante solicitud separada al Programa de Arqueología y Etnohistoria del **ICP**. Las evaluaciones de ambos programas son necesarias para concluir el proceso con esta agencia.

Este documento tiene vigencia de un (1) año a partir de su emisión.

Sin otro particular, quedo.

**Mildred González Valentín, BDA. MArq.**
Subdirectora
Programa Patrimonio Histórico Edificado

MGV/ejc

ANEJO 1

1. Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operaciones de Negocios (RC-2023); con vigencia de 16 de junio de 2023. Tomo X: Conservación de Recursos Históricos
    a. Capítulo 10.2 Conservación de Sitios Históricos, Zonas Históricas y Centros Fundacionales,
        1. Regla 10.2.2 Requerimiento Expedición de Permisos y Recomendaciones en Sitios y Zonas Históricas, Sección 10.2.2.3, Sección 10.2.2.4, Sección 10.2.2.3 y Sección 10.2.2.4
        2. Regla 10.2.5 Normas Generales de Intervención
        3. Regla 10.2.7 Intervención en Espacios Públicos y Estacionamientos donde ubican Sitios y Zonas Históricas
        4. Regla 10.2.8 Obras en las Plazas, Plazuelas, Plazas de Recreo y en las Propiedades Circundantes a éstas, en Zonas Históricas Designadas o en Proceso de Designación
        5. Regla 10.2.9 Estacionamiento en Sitios y Zonas Históricas
        6. Regla 10.2.10 Rótulos, Cortinas y Toldos en Sitios y Zonas Históricas
        7. Regla 10.2.11 Conservación del Patrimonio Inmueble, Sección 10.2.11.5 Requerimiento de Recomendaciones o Certificaciones
2. Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operaciones de Negocios (RC-2023); con vigencia de 16 de junio de 2023. Tomos II, III, IV, VI, VII, IX

    a. Regla 2.1.8, Sección 2.1.8.7, Inciso “b”: Todo proyecto público o privado que conlleve movimiento de terreno, excavación, extracción de corteza terrestre o construcción, reconstrucciones o canalizaciones deberá solicitar a la División o Unidad de Evaluación Ambiental (DECA) la recomendación del ICP sobre Arqueología y Conservación Histórica, ya sea a través de la OGPe, los Municipios Autónomos con Jerarquía 1 a la III o el Profesional Autorizado.

b. Regla 2.2.8, Inciso c-10: Consultas de Ubicación a proyectos de mejoras públicas municipales en propiedades y estructuras que ubiquen en los centros fundacionales, dentro de Zonas Históricas o designadas como sitio histórico deberán contar con la recomendación del ICP, previo comienzo de la obra.
c. Regla 2.3.1: El PA requerirá una Recomendación del ICP en todo aquel permiso único a otorgarse en las estructuras oficialmente designadas e incluidas en el Registro de Sitios y Zonas Históricas de la JP y en los centros fundacionales de los Municipios. Los permisos y determinaciones finales a un permiso de construcción y para la demolición, reparación, restauración o remodelación de una estructura con valor histórico requerirán de la recomendación del ICP.
d. Regla 3.2.1 Permisos de Construcción, Sección 3.2.1.2, inciso "l": El proyecto que se encuentre en una zona histórica, centros urbanos tradicionales y yacimientos arqueológicos, la OGPe, Los Municipios Autónomos con jerarquías de la I a la III o los PA, requerirán la recomendación escrita del ICP antes de autorizar cualquier permiso de construcción, conforme a la Regla 10.2.11 de Conservación del Patrimonio Inmueble, en el Tomo X de este Reglamento Conjunto.
e. Regla 3.2.2, inciso "b-6": Si el proyecto se encuentre en una zona histórica, centros urbanos tradicionales y yacimientos arqueológicos, la OGPe, los Municipios Autónomos con Jerarquía I a la III, o los PA, requerirán la recomendación escrita del ICP antes de autorizar la actividad de demolición. En caso de ser una propiedad histórica, estará conforme a lo establecido en este Reglamento Conjunto sobre Conservación de Sitios y Zonas Históricas, entiéndase Tomo X, o cualquier documento formal emitido por las Entidades Gubernamentales Concernidas cuando existe una situación de emergencia previamente decretada por el Gobierno de Puerto Rico o el Gobierno Federal.
f. Regla 3.2.4 Obras Exentas de Permisos de Construcción
    1. Sección 3.2.4.1 Actividades que no se consideran obras de Construcción, inciso "c": Cuando la actividad se vaya a realizar en Sitios y Zonas Históricas así declaradas por la JP, el ICP o la Asamblea Legislativa, o en otras áreas especiales donde así se establezca mediante Reglamento o resolución, deberá obtener la autorización correspondiente del ICP, mediante una solicitud de recomendación de arqueología y conservación histórica ('SRA").
    2. Sección 3.2.4.2 Obras de Carácter Menor Exentas, inciso "b": Cuando la obra exenta se vaya a realizar en Sitios y Zonas Históricas así declaradas por la JP, el ICP o la Asamblea Legislativa, o en otras áreas especiales donde así se establezca mediante Reglamento o resolución, deberá obtener la autorización correspondiente del ICP, mediante una solicitud de recomendación de arqueología y conservación histórica ('SRA").
g. Regla 3.5.9 Permiso Formal para la Extracción, Excavación, Remoción y Dragado de los Componentes de la Corteza Terrestre, Sección 3.5.9.4, inciso "u": Recomendación del ICP para el área donde se propone la extracción, cuando la misma haya sido predeterminada por ICP o la Asamblea Legislativa como zona de valor histórico o arqueológico.
h. Regla 3.7.1 Permiso Único, Sección 3.7.1.7, inciso "g": Se requerirá la recomendación del ICP en Sitios y Zonas históricas antes de expedir este tipo de permiso para actividades cuya duración exceda de treinta (30) días.
i. Regla 4.4.1.2 Licencias Traficantes al Detalle de Bebidas Alcohólicas, Sección 4.4.1.2, inciso "c": Recomendación del ICP en los casos en que la propiedad ubique en una zona histórica
j. Regla 6.1.27 Distrito S-H: Sitio Histórico, Sección 6.6.27.2 (ver Tabla 6.85 – Usos permitidos en Distrito S-H) y Sección 6.1.27.4 (ver Tabla 6.86 – Parámetros de Diseño Distrito S-H).
k. Regla 6.1.28 Distrito C-H: Conservación Histórica, Sección 6.1.28.2 (ver Tabla 6.87 – Usos permitidos en Distrito C-H) y Sección 6.1.28.4 (ver Tabla 6.88- Parámetros de Diseño Distrito C-H).
l. Regla 7.3.6 Centro Urbano (CU), Sección 7.3.6.1, Inciso "d": Toda intervención en los centros urbanos delimitados se hará en conformidad con el Plan de Ordenación Territorial, Plan de área del Centro Urbano Tradicional o Plan de Rehabilitación del Centro Urbano, cumpliendo con las disposiciones de la Regla 10.2.11 en el Tomo X de este Reglamento Conjunto.
m. Capítulo 9.1 Obras Eléctricas, Sección 9.1.2.2 inciso "k": Los permisos y autorizaciones en Sitios y Zonas Históricas, Plazas de recreo y bloques circundantes, entiéndase centros fundacionales de los pueblos requerirán de la recomendación del ICP.
n. Capítulo 9.6 Obras de Acueductos y Alcantarillados, Sección 9.6.2.2, Inciso "l": Los permisos y Autorizaciones en Sitios y Zonas Históricas, plazas de recreo y bloques circundantes, entiéndase centros fundacionales de los pueblos requerirán de la recomendación del ICP.
o. Capítulo 9.8 Sistemas Individuales de Disposición de Desperdicios Domésticos (SIDDD), Sección 9.8.3.1, inciso "d".
p. Capítulo 9.11 Proyectos de Construcción, Instalación y Ubicación de Torres e Instalaciones de Telecomunicaciones, Sección 9.11.6.3, inciso "e" Zonas Históricas y Centros Fundacionales.

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## APPENDIX M REFERENCES

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