

MARCH 20, 2024



MUNICIPALITY OF TOA ALTA FEBRUARY 2024
MONTHLY REPORT
Civ. No. 3:21-01087-DRD



NIVIA I. AYALA, PE
TERRATEK ENGINEERING GROUP, PSC
P.O. Box 367445 San Juan, PR 00936

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I. DISTRIBUTION LIST

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II. REPORT ORGANIZATION

As part of the USA-MTA Civ. No. 3:21-01087-DRD Stipulation and Preliminary Injunction Order, MTA shall prepare and submit monthly reports regarding the performance of its obligations under this Order until completion of the requirements of Paragraphs 3 through 10 of this Order. Each report shall cover the period ending on the last day of each month. Each report must be sent to DOJ, EPA, and DNER on or before the 15th day of the month following the reporting period. Each monthly report shall include:

- i. description of compliance with each requirement of this Order;
- ii. the volume, acreage, and location of the Intermediate Cover that was applied;
- iii. the volume and disposition of leachate and leachate-contaminated stormwater collected;
- iv. results of any sampling analysis performed; and
- v. Notification of any noncompliance with this Order, including a statement describing the noncompliance and its underlying causes, proposed measures, and an implementation schedule to correct the noncompliance.

The monthly report is divided into four sections.

Section 1 summarizes the order requirements and the compliance status for each requirement. *Please note that Task IDs are not related to the Order assigned paragraphs.*

Section 2 will include detailed information or supporting documentation regarding the compliance status of each requirement needing a comprehensive description or status details.

Section 3 is a list of weekly inspections performed, and

Section 4 is the projection of next month's activities.

Section 5 includes all the attachments to the report.

III. Section 1: SUMMARY

Municipality of Toa Alta Civ. No. 3:21-01087-DRD		
Reporting Period:	February 01 to February 29, 2024	
Reporting Number:	17	
Reporting Official:	Nivia Ayala, PE/TerraTek	
Reporting Date:	03/20/2024	
Description of Compliance with Each Requirement of the Order		
ID	Requirement	Compliance Status
2	Access	In-Compliance
3	Daily Cover	In Compliance
4	Cessation of Waste Disposal	In-Compliance
5	Posting of Signs	In Compliance
6	Intermediate Cover	In-Compliance Intermediate Cover activities for the initial 5.4 cuerdas were completed on February 27, 2024. A total of started on August 29, 2023, with the areas identified by the surveyor. A total of 8264 cubic meters had been applied as intermediate cover at the facility. A new intermediate cover phase will cover approx. 4.5 acres and it is schedule to start during this quarter.
7	Maintenance of Cover	In-Compliance
8	Slope Stability	In compliance with agreed short-term controls, safety barrier fencing, and H&S program.
9	Leachate Management	
9a	Leachate Management Plan	A formal Leachate Management Plan was submitted with the Preliminary Closure Plan on October 31, 2023.
9b	Management of Leachate Collected from Landfill	Still waiting for the permit renewal approval.

10	Stormwater Management	
10a	Short Term Controls	In- Compliance
10 b	Survey of Leachate Seeps	In-Compliance
10c	Stormwater Management Plan	In-Compliance
10d	Discharges of Stormwater Not from Pond	N/A
10e	Discharge/Disposal of Pond Liquid	N/A
Additional Requirements		
The volume, acreage, and location of the Intermediate Cover that was applied.		During the month of February 2024, approximately 2550 cubic meters of intermediate cover were applied to 0.75 acres and to the cover's maintenance task.
The volume and disposition of leachate-contaminated stormwater collected.		None
Results Of Any Sampling Analysis Performed		None
Notification Of Noncompliance		None

IV. SECTION 2: DETAIL INFORMATION OR SUPPORTING DOCUMENTATION OF EACH REQUIREMENT IN NEED OF COMPREHENSIVE DESCRIPTION OR STATUS DETAILS

A. COMPLETED REQUIREMENTS

Access:

Access is granted to the United States and the Commonwealth of Puerto Rico and their employees, representatives, and contractors to conduct the necessary inspections and studies, including reviewing the applicable record to evaluate existing conditions, following the agreed terms in the Stipulation.

Daily Cover:

Daily Cover at the facility was completed on April 30, 2022. Daily Cover covered all areas of exposed waste.



Cessation of Waste Disposal:

The cessation of waste disposal at the facility was completed by March 30, 2022. However, as agreed in the Stipulation, the temporary storage of construction and demolition (C&D) waste, bulk household waste (durable goods such as mattresses, furniture, and appliances), or yard waste (vegetation waste generated by land maintenance) for final disposal at a different landfill is active and been performed daily.



Posting of Signs:

A sign size of four feet by five feet was installed at the landfill entrance. See the attached pictures.



Safety Barrier Fencing

Completed on April 28, 2023.

B. Supporting documentation of each requirement in need of comprehensive description or status details

1. ID 6: Intermediate Cover

The following is a chronological order of the Municipality performed steps to negotiate and acquire the funds to perform this task:

Rural Development:

1. On May 18, 2020, the Municipality submitted a Notice of Intent to Rural Development requesting the award of funds under the Disaster Mitigation Assistance Grant for the Landfill.
2. On September 4, 2020, the Municipality amended its request to include the landfill closure, post-closure activities, and expansion.
3. On August 16, 2021, the Municipality received a Rural Development email confirming all the documents for the appropriate Disaster Mitigation Assistance Grant for the Landfill were completed.
4. On August 22, 2022, the Municipality held a Public Hearing about the requested grant funds.
5. USDA Rural Grant Program, MTA submitted a final Environmental Assessment to Quiles, Danna - RD, San Juan, PR <danna.quiles@usda.gov>; Cabrera, Jose - RD, San Juan, PR <Jose.Cabrera@usda.gov>; Davila, Sandimary - RD, San Juan, PR <Sandimary.Davila@usda.gov>; Gonzalez, Melvin - RD, SAN JUAN, PR <Melvin.Gonzalez@usda.gov>. The document was submitted on September 30, 2022.
6. As of today, the Rural Development process is still ongoing but has not yet been completed.
7. The Municipality of Toa Alta, in its continued effort to receive assistance for obtaining the funds required for the landfill closure, received a letter from the Department of Housing informing the designation of the Community Development Block Grant - Mitigation Program (CDBG-MIT) funds for strategic, transformative, and high-impact projects that will strengthen the island's resilience to future natural disasters by improving critical infrastructure. As part of this

analysis, the Toa Alta Solid Waste Management Project was selected as a Strategic Project that will be receiving funds from this program to implement the landfill closure activities. Based on this designation, the Municipality of Toa Alta has commenced the meetings with the Department of Housing in order to complete all the required documentation required for the final issuance of the award. The Municipality will continue working with the Department of Housing to complete the required processes in order to receive the grant funds for this important project.

8. Additional meetings and information requests have been occurring between the MTA and PRDOH to complete the award issuance of CDBG-MIT funds.

Department of Natural and Environmental Resources (DNER)

1. A letter dated January 26, 2023, was directed to the MTA Mayor approving \$1.3M for planning and design of the closure activities. No disbursement has been received at this moment.
2. The Municipality designated \$3 Million of their ARPA funds to commence the execution of the required Intermediate Cover tasks.
3. The \$1.3M was reimbursed for planning and design in February 2023.
4. The MTA commenced in January 2023 an RFQ process for a Landfill Contractor to implement the Intermediate. Unfortunately, no contractor submitted a proposal for the RFQ.
5. Thus, a new formal drawing was developed to identify the specific project specifications to issue an RFP purpose that would allow more flexibility for contractors to participate. The MTA prepared a new RFP that was published in May 2023.
6. The MTA had two contractors participate in the RFP process, and it is evaluating the proposals to issue the final determination that would allow the commencement of the work during August 2023.
7. The RFP was awarded to LC Group on August 16, 2023.
8. The Intermediate Cover activities started on August 29, 2023.
9. A meeting with DNER Technical Personnel was held on February 29, 2024, regarding formal comments regarding the Preliminary Closure Report submitted on October 31, 2023. After the DNER evaluation the following are the discussed comments:
 1. Verify Closure Turf Stability Safety Factor calculated for the North Slope (2.4:1?)

2. Verify the results of the static and seismic Safety Factors.
3. Revise and include HELP Assumptions and used factors.
4. Revise Help Calculation results *227 ft³ or 2.267x10³ ft³
5. Clarify if the Stormwater Pond capacity calculation was performed using the existing water level or on an empty pond.
6. Verify profile A-A' used on Drawing 8.

A revised Preliminary Closure Plan will be submitted by April 15, 2024.

1a. ID 6: Intermediate Cover

The initial phase of intermediate cover started on August 29, 2023 and ended on February 23, 2024, covering 5.24 acres. A total of 8264 cubic meters had been applied as intermediate cover at the facility. A new intermediate cover phase will cover approx. 4.5 acres and it is schedule to start during this quarter.

C. EPA REVISIONS, REQUESTS AND VIRTUAL MEETINGS

- On February 22, 2024, a 2-hour discussion of the EPA HELP Model as it pertains to the Toa Alta Landfill was organized by Mr. Carl Plossl. The first hour was a general presentation of the suitability and use of the HELP Model in estimating leachate generation, stormwater flows, and other water flows in and out of Puerto Rico's landfills. The second hour was focused on aspects of the Toa Alta Landfill.
- On February 23, 2024, a discussion was held at the request from Mr. Carl Plossl, regarding the Stormwater Management Plan submitted in July 2023. An extensive list of comments was discussed. A revised Plan was submitted by MTA on February 26, 2024.
- On February 27, 2024 a kmz file containing the second phase intermediate cover information was submitted to Mr. Carl Plossl.
- We want to note our appreciation to Mr. Plossl for preparing and Updated ET Cover Design Elements for the Toa Alta Landfill Intermediate Cover received on January 23, 2024.

V. SECTION 3: WEEKLY INSPECTIONS PERFORMED DURING THE REPORTING PERIOD

Inspections were performed by TerraTek Engineering Group personnel on the following days:

February 2, 2024

February 9, 2024

and February 16, 2024



VI. SECTION 4: PROJECTION OF NEXT MONTH'S ACTIVITIES

March 1, 2024

Weekly Inspection

March 8, 2024

Weekly Inspection

March 15, 2024

Weekly Inspection

March 22, 2024

Weekly Inspection

Follow-up PRASA regarding Discharge Permit Application.

Submit the project status report to the OGP (Puerto Rico's Office of Management and Budget).

Follow up the next phase of intermediate cover RFP process.

These dates are subject to change.

VII. Section 4: Attachments

Attachment 1: Weekly Inspections

ATTACHMENT 1

Christian Villalta Calderón

cristhianvillalta@gmail.com

Submission Date Feb 2, 2024 1:50 PM

Nombre de la persona que hace la inspeccion Christian Villalta Calderón

Email cristhianvillalta@gmail.com

Fecha Feb 2, 2024

Hora 01:40 PM

Condicion del Clima **Nublado**

Esta la entrada limpia y libre de basura? Si

Foto Entrada



Hay Personal en la caseta de seguridad? **SI**

Cuantos camiones han llegado en el dia? **6**

Fecha de la ultima verificacion del sistema de manejo de lixiviados Celda Sur? **Feb 2, 2024**

Horas de operacion de la planta electrica **8**

Datos de eventos de lluvia **No hay datos registrados de lluvia. No se cuenta con el pluviometro de medición de precipitación.**

Estan las areas verdes limpias y se ha realizado mantenimiento? **SI**

Incluir Foto



Estan los diques limpios y sus valvulas cerradas con candado? **SI**

Condicion de Cubierta Talud Norte **Excelentes condiciones**

Incluir foto



Take Photo



Condicion Operacion Recibo
de Escombros

Necesita Limpieza

Tomar foto



Equipos Operando

Una retroexcavadora y una pala.

Condicion de medidas de control de erosion y sedimentacion

Buena

Se pueden notar brotes de lixiviado?

NO

Condicion de los caminos internos

Excelentes condiciones

Condicion de areas de desvio de materiales

Area completamente limpia.

Signature

Fotos Adicionales



Christian Villalta Calderón

cristhianvillalta@gmail.com

Submission Date Feb 9, 2024 2:13 PM

Nombre de la persona que hace la inspeccion Christian Villalta Calderón

Email cristhianvillalta@gmail.com

Fecha Feb 9, 2024

Hora 02:03 PM

Condicion del Clima **Soleado**

Esta la entrada limpia y libre de basura? Si

Foto Entrada



Hay Personal en la caseta de seguridad? **SI**

Cuantos camiones han llegado en el dia? **6**

Fecha de la ultima verificacion del sistema de manejo de lixiviados Celda Sur? **Feb 9, 2024**

Horas de operacion de la planta electrica **8**

Datos de eventos de lluvia **No hay datos de lluvia registrados. No se cuenta con instrumento de medicion.**

Estan las areas verdes limpias y se ha realizado mantenimiento? **SI**

Incluir Foto



Estan los diques limpios y sus valvulas cerradas con candado? **SI**

Condicion de Cubierta Talud Norte **Excelentes condiciones.**

Incluir foto



Take Photo



Condicion Operacion Recibo
de Escombros

Necesita Limpieza

Tomar foto



Equipos Operando

Una retroexcavadora y un bulldozer.

Condicion de medidas de control de erosion y sedimentacion

Buena

Se pueden notar brotes de lixiviado?

SI

Añadir fotos deal area de brotes visibles



Añadir fotos deal area de brotes visibles



Condicion de los caminos internos

Excelentes condiciones

Condicion de areas de desvio de materiales

Area completamente limpia.

Signature

A handwritten signature in blue ink, appearing to be 'K. J. ...', written in a cursive style.

Fotos Adicionales



Christian Villalta Calderón

cristhianvillalta@gmail.com

Submission Date Feb 16, 2024 3:21 PM

Nombre de la persona que hace la inspeccion Christian Villalta Calderón

Email cristhianvillalta@gmail.com

Fecha Feb 16, 2024

Hora 03:14 PM

Condicion del Clima **Nublado**

Esta la entrada limpia y libre de basura? Si

Foto Entrada



Hay Personal en la caseta de seguridad? **SI**

Cuantos camiones han llegado en el dia? **8**

Fecha de la ultima verificacion del sistema de manejo de lixiviados Celda Sur? **Feb 16, 2024**

Horas de operacion de la planta electrica **8**

Datos de eventos de lluvia **No hay datos registrados. No se cuenta con pluviometro.**

Estan las areas verdes limpias y se ha realizado mantenimiento? **SI**

Incluir Foto



Estan los diques limpios y sus valvulas cerradas con candado? **SI**

Condicion de Cubierta Talud Norte **Excelentes condiciones**

Incluir foto



Take Photo



Take Photo



Condicion Operacion Recibo de Escombros

Necesita Limpieza

Tomar foto



Equipos Operando

Ninguno al momento de la inspección.

Condicion de medidas de control de erosion y sedimentacion

Buena

Tomar foto solo si faltan medidas o necesitan mantenimiento



Se pueden notar brotes de lixiviado?

SI

Añadir fotos deal area de brotes visibles



Condicion de los caminos
internos

Excelentes condiciones

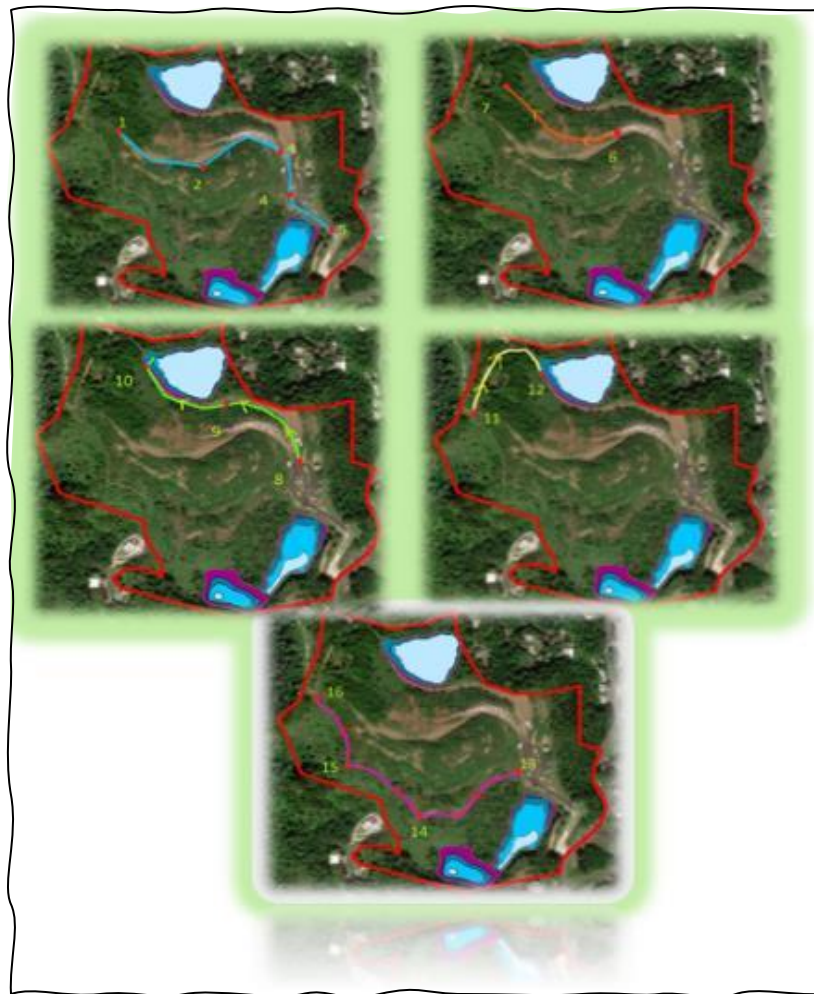
Condicion de areas de desvio
de materiales

Area completamente limpia.

Signature



TOA ALTA MUNICIPAL LANDFILL STORMWATER MANAGEMENT PLAN



Prepared by:
Nivia I. Ayala, PE / TerraTek Engineering Group, PSC
July 2023

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Attachments:

- Attachment 1 Project Drawings
- Attachment 2 DOJ Stipulation Agreement

1. Introduction

The Project Site is located at State Road PR-165, Km. 8.2, within the Contorno Ward of the Toa Alta Municipality in Puerto Rico. A Site Location Map is provided in Figure 1. The approximate coordinates of the Project Site are: 18°22'17.84"N; 66°15'53.17"W.

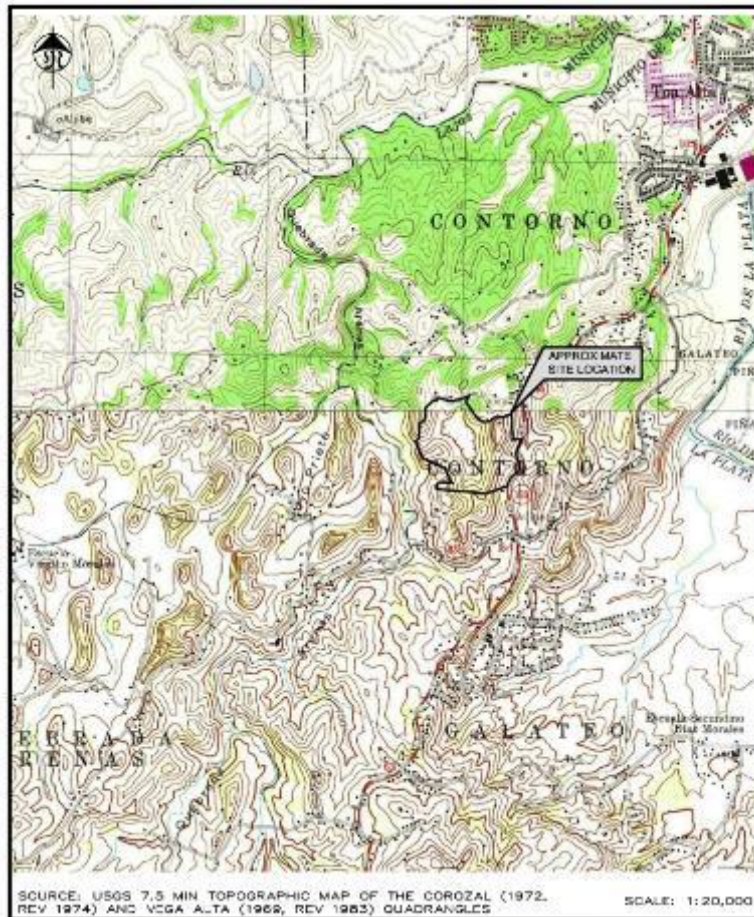


Figure 1 USGS Topographic Map

On August 8, 2022, as part of the USA-MTA Civ. No. 3:21-01087-DRD Stipulation and Preliminary Injunction Order, the United States, on behalf of the U.S. Environmental Protection Agency and the Municipality of Toa Alta ("M.T.A.") signed the Stipulation and Preliminary Injunction Order which required on Section 10 (c):

"Stormwater Management Plan. M.T.A. shall, by January 1, 2023, submit for approval under Paragraph 11 a proposed Stormwater Management Plan. The plan must describe engineered controls and procedures that are designed to minimize infiltration of stormwater into the waste mass, minimize

contact between stormwater runoff and leachate (to minimize the quantity of leachate-contaminated stormwater) and provide for irrigation sufficient to support and sustain existing flora in, around, and downstream from the Landfill. The plan must include: (1) measures (e.g., berms, chutes, channels, velocity dissipators) to rapidly convey stormwater from the Landfill surface to appropriate management areas (e.g., detention ponds and Discharge Points); (2) measures to significantly reduce the contamination of stormwater with leachate including measures to address the leachate seeps identified in the report described in Paragraph 10.b; (3) controls to minimize erosion of soils on the landfill surface; (4) measures to minimize the infiltration of leachate and stormwater contaminated with leachate from the North Pond and South Pond into the groundwater; (5) measures, including the applications of larvicides, to control mosquitoes in standing water; (6) measures, including periodic sampling and analysis consistent with the parameters in Appendix C, to ensure that all discharges of stormwater into the environment do not exceed the Appendix C pollutant criteria; and (7) proposed locations for sampling. The plan shall include a schedule, with milestones, for completion of construction and commencement of operation of the stormwater measures within one and a half years after approval of the Stormwater Management Plan." A copy of the Stipulation and Preliminary Injunction Order signed by parties is included as Attachment 2.

2. Requirements

The Stormwater Management Plan must include:

- (1) measures (e.g., berms, chutes, channels, velocity dissipators) to rapidly convey stormwater from the Landfill surface to appropriate management areas (e.g., detention ponds and Discharge Points);
- (2) measures to significantly reduce the contamination of stormwater with leachate, including measures to address the leachate seeps identified in the report described in Paragraph 10.b;
- (3) controls to minimize erosion of soils on the landfill surface;
- (4) measures to minimize the infiltration of leachate and stormwater contaminated with leachate from the North Pond and South Pond into the groundwater;
- (5) measures, including the applications of larvicides, to control mosquitoes in standing water;
- (6) measures, including periodic sampling and analysis consistent with the parameters in Appendix C, to ensure that all discharges of stormwater into the environment do not exceed the Appendix C pollutant criteria; and
- (7) proposed locations for sampling.

3. Methodology

We understand that the Stormwater Management Plan required in the Stipulation Order is not necessarily the same plan needed to be incorporated into the Final Closure Plan.

The proper pathway for a successful Landfill Final Closure Plan supports the reason for the above statement:

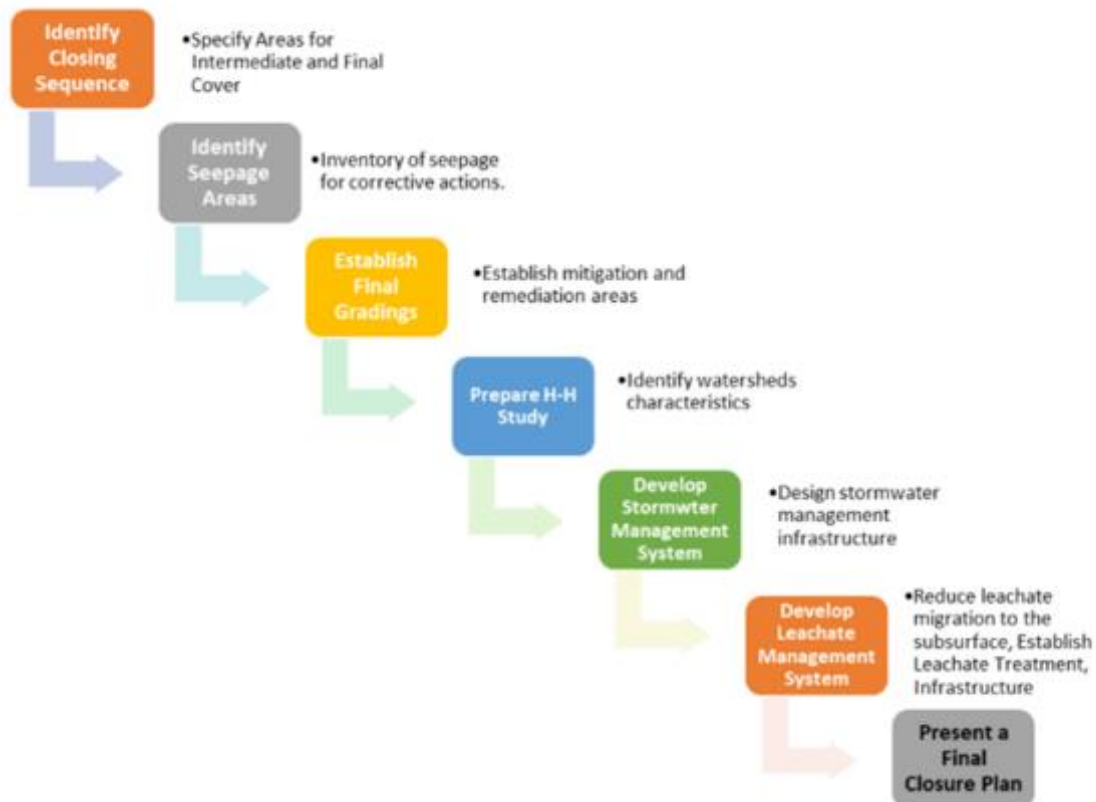


Figure 2 Final Closure Plan Pathway

As stated in the Stipulation and Preliminary Injunction Order, "The plan must describe engineered controls and procedures that are designed to minimize infiltration of stormwater into the waste mass, minimize contact between stormwater runoff and leachate (to minimize the quantity of leachate-contaminated stormwater) and provide for irrigation sufficient to support and sustain existing flora in, around, and downstream from the Landfill."

During this time, we have presented several options to improve existing site conditions for leachate seepage, and stormwater controls. All those options await comments and/or recommendations from E.P.A. to organize the next steps in the process that would allow in the near future the implementation of those plans and controls.

However, we are submitting this Stormwater Management Plan, as we know that the final approval of the Closure Plan may require extensive review from DNER and E.P.A. This Stormwater Management Plan provides engineered controls and procedures to minimize the infiltration into the cover material and the waste.

This SWMP should contemplate the following:

- A run-on (stormwater coming from the surrounding areas) control system to prevent flow onto the Landfill during peak discharge from a 25-year storm; and
- A runoff (stormwater from the landfill surface) control system from the Landfill to collect and control at least the water volume resulting from a 24-hour, 25-year storm.

Once precipitation is presented at the Landfill, it can take various routes:

1. Interception
2. Infiltrate the ground and be extracted by plant transpiration.
3. Infiltrate into the cover material and the waste and eventually converts to leachate.
4. Becomes surface runoff water.

To minimize the amount of leachate generated by the infiltration of precipitation, the surface water must be carried out promptly. This SWMP focuses primarily on Option 1 (Interception).

The proposed design approach tracks stormwater as it hits the Landfill, working downstream to discharge at perimeter ditches or into stormwater detention ponds. The steps are summarized as follows:

- Lay out the system and calculate stormwater runoff,
- Size diversion channels and berms,
- Select channel lining,
- Design downslope conveyances (slope drains, inlets, and conduits), and
- Adjust the layout as necessary.

The method used to estimate stormwater runoff is the Department of Agriculture Soil Conservation Service (S.C.S.) Curve Number Method. This method of runoff calculation yields a total runoff volume and a peak discharge. First, the drainage area is measured, then a curve number is calculated. Those curve numbers depend on soil type and hydrologic group. Afterward, runoff depth and volume are determined for a specific design storm, after which the time of concentration is calculated.

4. Task Completed

The following is a description of tasks already completed:

(1) Measures (e.g., berms, chutes, channels, velocity dissipators) to rapidly convey stormwater from the Landfill surface to appropriate management areas (e.g., detention ponds and Discharge Points).

Since August 2021, we have presented a "Stormwater Short Term Controls" prepared for the actual topographic conditions of the Site. Please see the following representation:

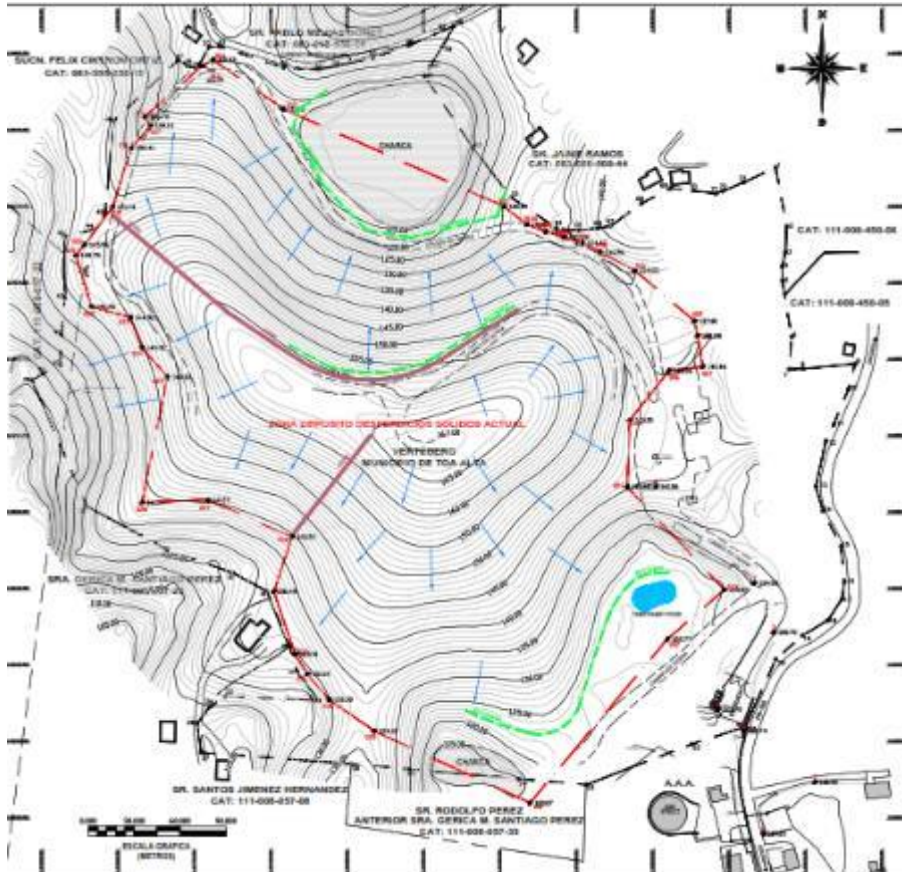


Figure 3 Stormwater Flow

As you can see from this drawing, the stormwater flow from the complete Site was analyzed and reported with control measurements to divert, deter, and channel the stormwater flow to specific control structures (i.e., berms, channels, vegetation, temporary pond, etc.).

At this time, all stormwater flow generated is conveyed to a control measure. Nonetheless, additional improvements are necessary to avoid stormwater contact with leachate seepages.

(2) Measures to significantly reduce the contamination of stormwater with leachate, including measures to address the leachate seeps identified in the report described in Paragraph 10.b; February monthly report included the final Leachate Seepage Inventory Report. As expected, all visually identifiable leachate seepages were found at the toe of the site slopes, terraces, and interior pathways (marked on this drawing as small red flags).

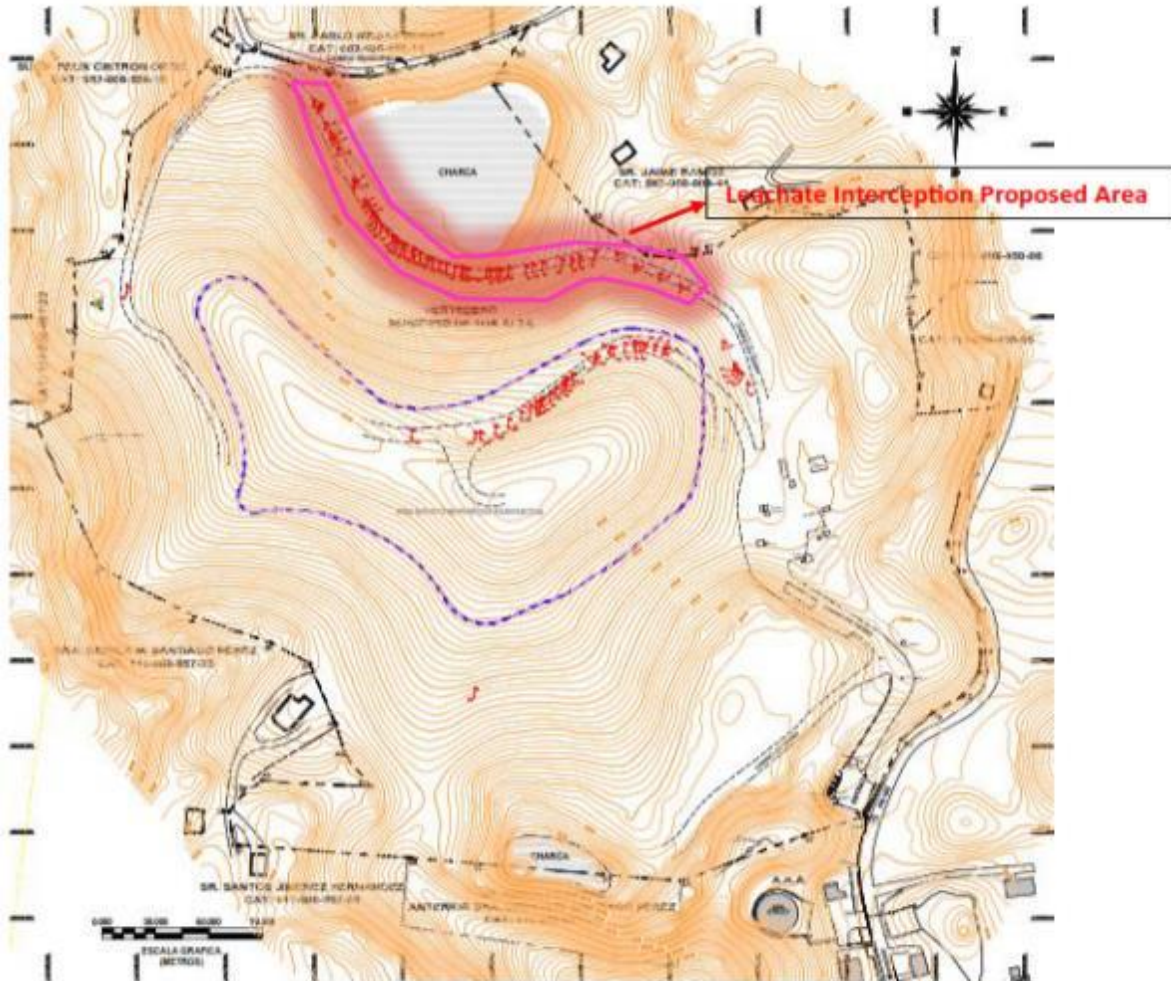


Figure 4 Leachate Seepage Inventory

In the above graphic, the area depicted in Magenta is the proposed area for installing a Leachate Interception System. As we can infer from the seepage locations, the Leachate Management Plan to be part of the Final Closure Design should include Leachate interception Systems along the Site to collect leachate and provide for safe and environmentally responsible treatment and disposition.

(3) Controls to minimize erosion of soils on the landfill surface;

The following is the latest aerial picture from Google Earth of the Site as of January 2023:



Figure 5 Aerial View

From this picture, you can see that as the result of successful stormwater control measurements and suitable controlled operation, there is no evidence of sediment or erosion leaving the property boundaries or being dragged through areas within the Site. Nevertheless, additional control measurements will be needed at specific outfalls from the southeast side of the property.

5. Drainage Areas

The hydrologic and hydraulic study performed by the MTA was limited to the area covered by the landfill area and immediate surrounding areas, which are the higher elevation terrain in the area. This evaluation did not include a hydrologic/hydraulic evaluation of drainage areas not draining into the landfill area, including any creek or sinkhole area on which the landfill area may discharge.

Drainage Areas (DA) were delineated using the USGS Corozal and Vega Alta topographic maps, the project site topographic map prepared by engineer Hector Tirado Rodriguez, P.E., R.P.A, L.I.C. 12,215, dated September 14, 2022, the 2018 USGS Lidar D.E.M.: Post Hurricane Maria - Puerto Rico, the USGS Hydrologic Unit Maps, and field observations.



Figure 6 Project Area

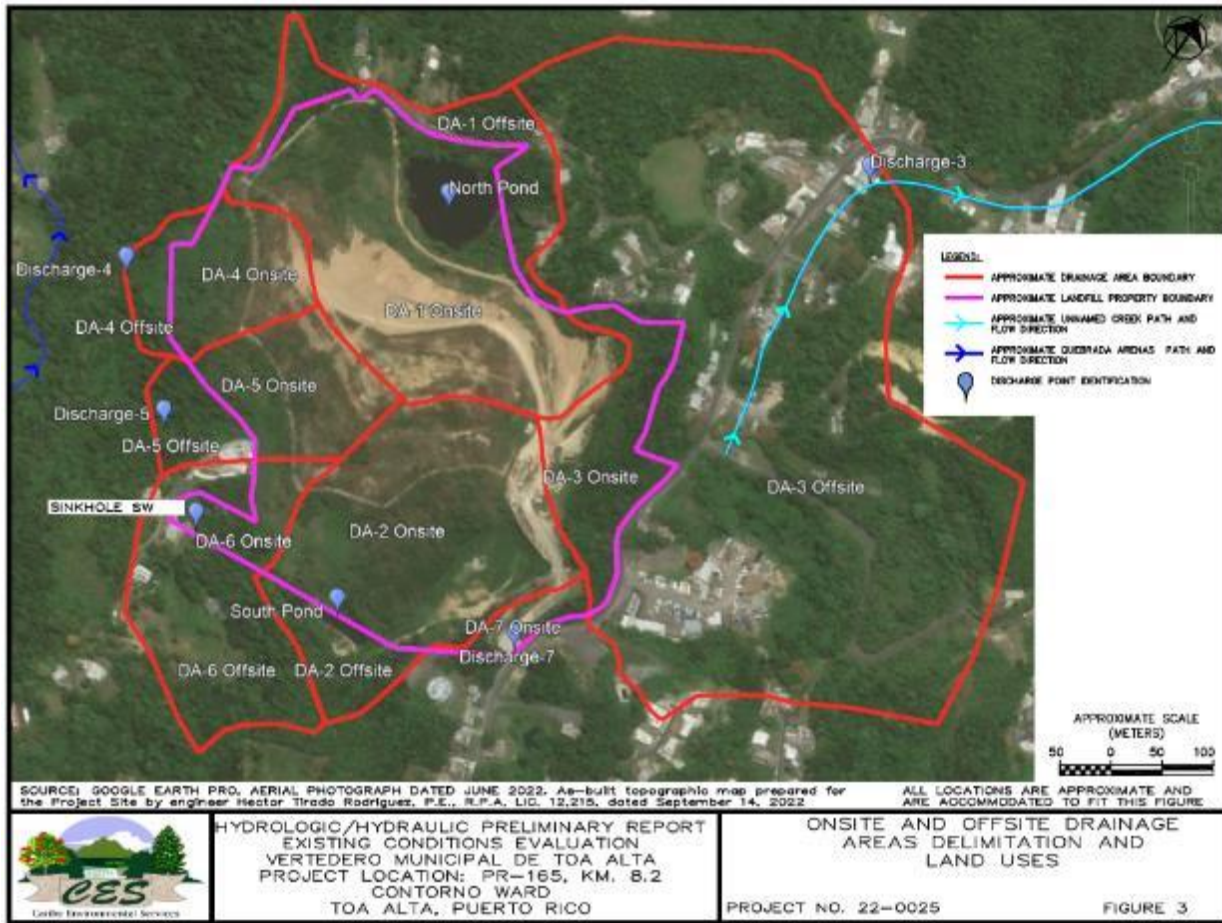
As part of the study, the Drainage Areas included: seven areas draining from the project site and six offsite drainage areas, which drain into the same drainage point as the onsite drainage areas. For purposes of this study, the drainage areas were identified as follows:

- DA-1 Onsite
 - DA-1 Offsite
 - DA-2 Onsite
 - DA-2 Offsite
 - DA-3 Onsite
 - DA-3 Offsite
 - DA-4 Onsite
 - DA-4 Offsite
 - DA-5 Onsite
 - DA-5 Offsite
 - DA-6 Onsite
 - DA-6 Offsite
 - DA-7 Onsite
- DA-1 Onsite; consists mostly of bare ground surface, the north pond, and slight vegetation and shrubs located in the landfill area's northern portion. This drainage area drains into the North Pond.

- DA-1 Offsite; consists mainly of shrubs vegetation and some impervious areas associated with the local access road and scarce rural residential developments located north of the landfill area. This drainage area drains into the North Pond.
- DA-2 Onsite; consists mostly of bare ground surface, the south pond, slight vegetation and shrubs, and impervious areas associated with the landfill access road and office structures located at the southern and eastern portions of the landfill area. This drainage area drains into the South Pond.
- DA-2 Offsite; consists mostly of shrubs vegetation and a south pond located to the south of the landfill area. This drainage area drains into the South Pond.
- DA-3 Onsite; consists mostly of bare ground surface, shrubs vegetation, and impervious areas associated with the landfill access road and office structures located at the eastern portion of the landfill area. This drainage area drains into the unnamed creek located to the northeast of the project site
- DA-3 Offsite; consists primarily of shrubs and heavy vegetation and some impervious areas associated with the road, rural residential developments, and the municipal public works facility located east of the landfill area. This drainage area drains into the unnamed creek northeast of the project site.
- DA-4 Onsite; consists mostly of bare ground surface and medium vegetation and shrubs located at the western portion of the landfill area. This drainage area drains into the Quebrada Arenas, situated west of the project site.
- DA-4 Offsite; consists mainly of shrubs vegetation located west of the landfill area. This drainage area drains into the Quebrada Arenas, situated west of the project site.
- DA-5 Onsite; consists mostly of bare ground surface and slight vegetation and shrubs vegetation located at the southwestern portion of the landfill area. This drainage area drains into the Quebrada Arenas, situated west of the project site.
- DA-5 Offsite; consists mostly of vegetation shrubs and residential property located southwest of the landfill area. This drainage area drains into the Quebrada Arenas, situated west of the project site.
- DA-6 Onsite; consists mostly of bare ground surface, a sinkhole ponding area at the southwest portion, and slight vegetation and shrubs in the landfill area's south part. This drainage area drains into the Southwest Pond.
- DA-6 Offsite; consists mostly of medium and shrubs vegetation and some impervious areas associated with the local access road and scarce rural residential developments located south of

the landfill area. This drainage area drains into the sinkhole ponding area at the southwest portion.

- DA-7 Onsite; consists mainly of impervious areas associated with the landfill access road and shrub vegetation located at the southeastern portion of the landfill area. This drainage area drains out the Landfill's main entrance road.



1

Figure 7 Drainage Areas

We have divided the Landfill Area using the onsite drainage areas delimitation for this Stormwater Management Plan.

The drainage areas used for the preparation of this plan are:

- | | |
|-------------|-------------|
| DA-1 Onsite | DA-3 Onsite |
| DA-2 Onsite | DA-4 Onsite |

¹ Prepared by Caribbean Environmental Services

DA-5 Onsite

DA-7 Onsite

DA-6 Onsite

Drainage Area distribution is as follows:

Drainage Area ID	Estimated Area	Estimated percentage
DA-1 Onsite	15.80 acres	35%
DA-2 Onsite	12.50 acres	28%
DA-3 Onsite	4.92 acres	11%
DA-4 Onsite	3.89 acres	8.6%
DA-5 Onsite	4.60 acres	10.2%
DA-6 Onsite	1.94 acres	4.5%
DA-7 Onsite	1.1 acres	2.7%

Table 1 Drainage area distribution

6. Physiographical Information

According to the information obtained from the Topographic Map of the Corozal (2018) and Vega Alta (2018) Quadrangles, the topography of the study area at the onsite areas consists mainly of moderate to steep sloping terrain. The topography of the study area at the offsite areas consists primarily of moderate sloping terrain with some relatively flat areas. According to the as-built topographic map prepared for the Project Site by engineer Hector Tirado Rodriguez, P.E., R.P.A, L.I.C. 12,215, dated September 14, 2022, the Project Site elevation varies from approximately 170 meters PRVD02 at the central portion of the landfill area, to about 110 PRVD02 at the pond areas located at the northern and southern part of the Project Site. According to the information obtained from the USGS Topographic Maps, the offsite areas' elevations vary from about 175 m M.S.L. along the southeastern portion where hills are located to a lower elevation of about 100 m M.S.L. along the PR-165 road to the northeast of the project site.

According to the USGS Geologic Map of the Vega Alta and Corozal Quadrangles, the shallow geology of the landfill area before landfill operations consists of Rio Indio Limestone Member (Tcr) and Quebrada Arenas Limestone Member (Tcq). The Tcr geologic unit is characteristically dark yellowish orange in contrast to the pale-orange tints of adjacent limestone units. The member consists of earthy, generally thick-bedded limestone that in this area commonly contains no quartz sand; an exception is near Toa Alta, where the upper part is a very fragmental yellowish-orange limestone that contains scattered quartz grains and many pelecypods. The member includes lenses of soft marly clay rich in large *Lepidocyclus* at several places. The Rio Indio Limestone Member is about 100 meters thick in the valley of the Rio Cibuco.

Still, in the eastern half of the quadrangle, the member thins rapidly to a total thickness of only 65 meters near Toa Alta.

The following is a representation of the Hydrologic Soil Groups present at the facility:

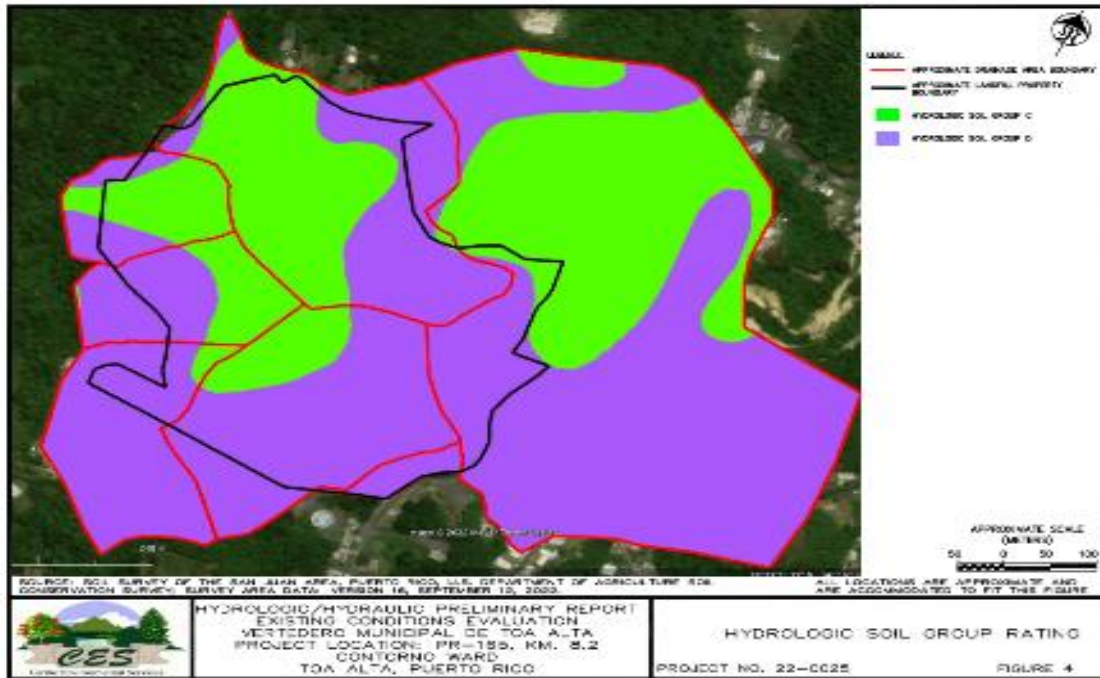
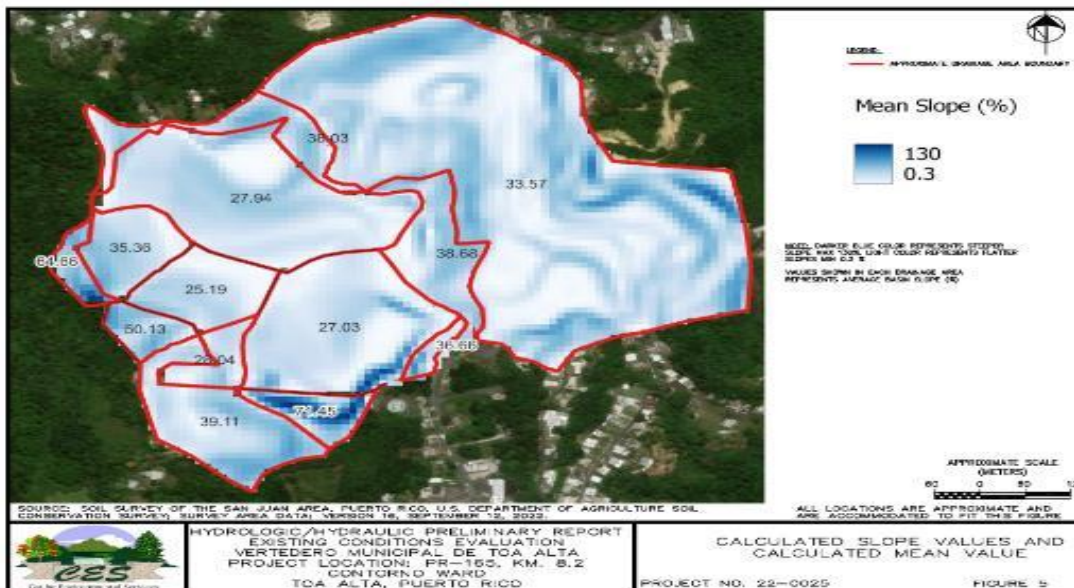


Figure 8 Hydrologic Soil Group Rating²

Additionally, the mean value of the slopes at the facility was calculated and depicted in the following drawing:



² Prepared by Caribbean Environmental Services

Figure 9 Calculated Slope Values³

7. Historical, Flow, Rainfall Data & Temporal Distribution

Estimates of flood flow having given recurrence intervals or probabilities of exceedance are needed to design hydraulic structures and floodplain management. As indicated in the 2016 Hydrologic Hydraulic Guidelines prepared by the Puerto Rico Planning Board and the Department of Natural and Environmental Resources (DNER), a flow frequency analysis is the preferred method to estimate a peak flow exceedance if gauge data are available and adequate. The United States Geological Survey (USGS) has collected flow data from many rivers and streams for the past 50 years in Puerto Rico.

A review of the USGS Caribbean Water Science Center's available historic online database (https://waterdata.usgs.gov/pr/nwis/current/?type=flow&group_key=basin_cd) was conducted to verify if recorded flow data had been collected along the unnamed creek and the Arenas Creek. However, no flow data was available for the area of study included in this report.

This table shows that the 100-year recurrence event ranges from a rainfall depth of 3.34 inches in 1 hour to a rainfall depth of 13.9 inches in 24 hours. In addition, as shown in Table 2, the 25-year recurrence event ranges from a rainfall depth of 3.00 inches in 1 hour to a rainfall depth of 10.5 inches in 24 hours.

Storm Duration	Rainfall Depth (inches)
	100 YR Frequency
24 hr	13.9
12 hr	10.7
6 hr	7.83
1 hr	3.34

Storm Duration	Rainfall Depth (inches)
	25 YR Frequency
24 hr	10.5
12 hr	8.31
6 hr	6.41
1 hr	3.00

**Source: NOAA Atlas 14, 2006, Volume 3, Version 4 Gridded Precipitation Frequency Estimates for Puerto Rico and the U.S. Virgin Islands, Updated March 21, 2008

Table 2 Rainfall Data 100 and 25 years

³ Prepared by Caribbean Environmental Services

8. Stormwater Drainage System

A total of 5 main stormwater channels are proposed⁴:

- Channel Trap West
- Channel Trap North Down
- Channel Trap Mid
- Channel Trap Up
- Channel Trap South Up

Channel Trap North UP

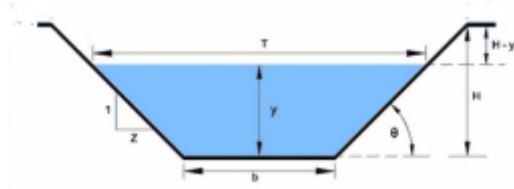


Channel ID	Length (ft)	Slope S (%)	BASE b (ft)	z	Angle (°)	Flow depth (ft)	TOP WIDTH T (ft)	Flow Q (cfs)	Velocity (ft/s)	Froude Number
1-2	578.6	2.84	1	0.6	60	1.7	3.04	32	9.81	1.32
2-3	585.0	6.32	1	0.6	60	1.35	2.62	32	13.1	4.85
3-4	275.2	10.24	1	0.6	60	1.20	2.44	32	15.8	5.14
4-5	327.3	16.0	1	0.6	60	1.1	2.32	32	19.0	5.38

Table 3 Channel Trap North UP

Trapezoidal Channel Details:

⁴ Channels are located on existing internal roads and terrace benches. Flow goes along with topography.



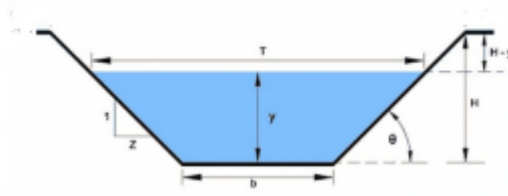
Channel North MID



Channel ID	Length (ft)	Slope S (%)	BASE b (ft)	z	Angle (°)	Flow depth (ft)	TOP WIDTH T (ft)	Flow Q (cfs)	Velocity (ft/s)	Froude Number
6-7	941.0	6.85	1	0.6	60	1.2	2.44	25	12.96	2.08

Table 4 Channel North MID

Trapezoidal Channel Details:



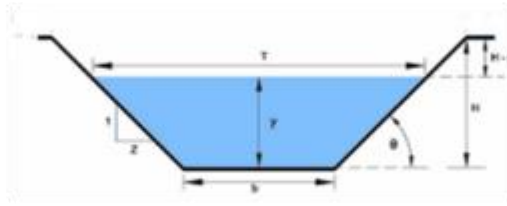
Channel North Down



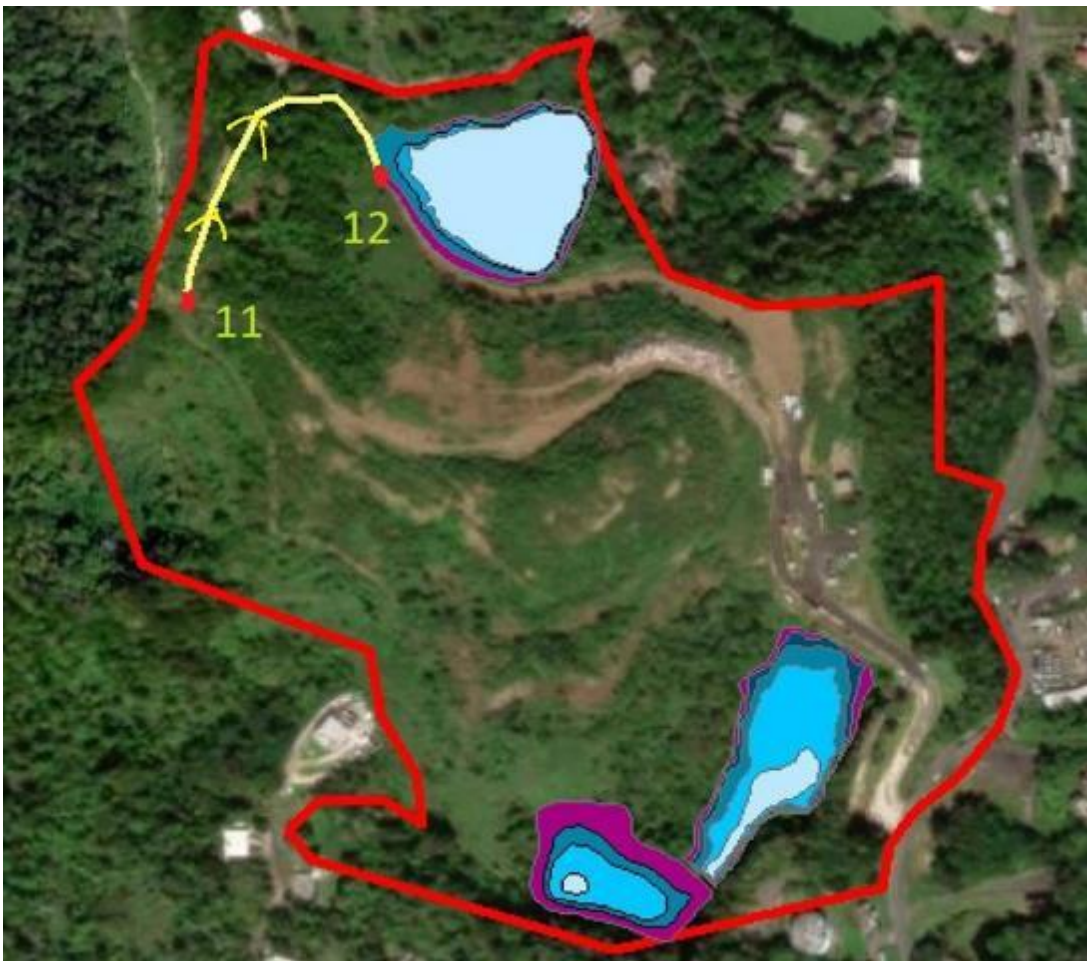
Channel ID	Length (ft)	Slope S (%)	BASE b (ft)	z	Angle (°)	Flow depth (ft)	Top Width T (ft)	Flow Q (cfs)	Velocity (ft/s)	Froude Number
8-9	596.4	9.90	1	0.6	60	1.55	2.86	52.5	17.53	2.48
9-10	560.9	3.94	1	0.6	60	2.00	3.40	52.5	12.48	6.54

Table 5 Channel North Down

Trapezoidal Channel Details:



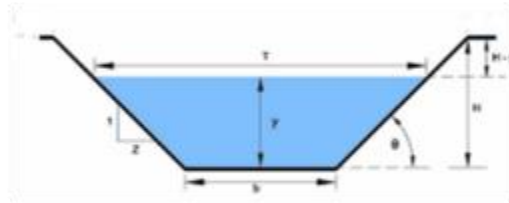
Channel Trap West



Channel ID	Length (ft)	Slope S (%)	BASE b (ft)	z	Angle (°)	Flow depth (ft)	Top Width T (ft)	Flow Q (cfs)	Velocity (ft/s)	Froude Number
11-12	740.9	18.30	1	0.6	60	1.00	2.20	20	11.9	2.10

Table 6 Channel Trap West

Trapezoidal Channel Details:



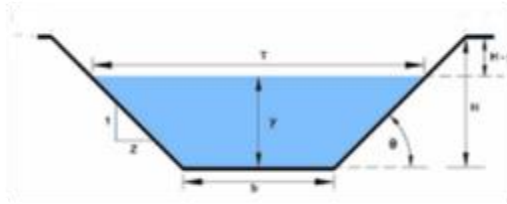
Channel Trap South Up



Channel ID	Length (ft)	Slope S (%)	BASE b (ft)	z	Angle (°)	Flow depth (ft)	Top Width T (ft)	Flow Q (cfs)	Velocity (ft/s)	Froude Number
13-14	709.9	5	1	0.6	60	1.10	2.32	18.0	10.6	1,79
14-15	554.6	5	1	0.6	60	1.35	2.62	28.0	11.7	4.28
15-16	580.1	5	1	0.6	60	1.60	2.92	39.0	12.6	5.43

Table 7 Channel Trap South Up

Trapezoidal Channel Details:



All channels have a minimum of 6 inches of freeboard.

All channels cover by erosion control mat (n de Manning igual a 0.020)

Energy dissipators every 300 feet using rip raps or rock vanes (Class I).

Table 5.1. Minimum and Maximum Allowable Particle Size in Inches.

Nominal Riprap Class by Median Particle Diameter		d ₁₅		d ₅₀		d ₈₅		d ₁₀₀
Class	Size	Min	Max	Min	Max	Min	Max	Max
I	6 in	3.7	5.2	5.7	6.9	7.8	9.2	12.0
II	9 in	5.5	7.8	8.5	10.5	11.5	14.0	18.0
III	12 in	7.3	10.5	11.5	14.0	15.5	18.5	24.0
IV	15 in	9.2	13.0	14.5	17.5	19.5	23.0	30.0
V	18 in	11.0	15.5	17.0	20.5	23.5	27.5	36.0
VI	21 in	13.0	18.5	20.0	24.0	27.5	32.5	42.0
VII	24 in	14.5	21.0	23.0	27.5	31.0	37.0	48.0
VIII	30 in	18.5	26.0	28.5	34.5	39.0	46.0	60.0
IX	36 in	22.0	31.5	34.0	41.5	47.0	55.5	72.0
X	42 in	25.5	36.5	40.0	48.5	54.5	64.5	84.0

Note: Particle size d corresponds to the intermediate ("B") axis of the particle.

Table 8 Rip Rap Specifications⁵

9. Temporary Retention Pond

The size of the temporary retention pond⁶ was calculated based on the Hydrologic Results Volume (ACRE-FT) for the 25-year recurrence period for the existing conditions (8.9ACRE-FT):

⁵ HEC 23 Table 4.1 page 77

⁶ The final size of the retention pond will be defined on-site, as we keep on adding stormwater interception channels to the system.

**Summary of Hydrologic Results Volume (ACRE-FT)
25 Year Recurrence Period - Existing Conditions**

Drainage Area Identification	25YR Volume (acre-ft)							
	24HR 4 th Ql-90%	24HR 1 st Ql-10%	12HR 4 th Ql-90%	12HR 1 st Ql-10%	6HR 4 th Ql-90%	6HR 1 st Ql-10%	1HR 4 th Ql-90%	1HR 1 st Ql-10%
DA-1 Offsite	2.6	2.6	1.9	1.9	1.3	1.3	0.4	0.4
DA-1 Onsite	11.7	11.7	8.9	8.9	6.5	6.5	2.3	2.3
DA-2 Offsite	1.6	1.6	1.2	1.2	0.9	0.9	0.3	0.3
DA-2 Onsite	8.9	8.9	6.7	6.7	4.8	4.8	1.6	1.6
DA-3 Offsite	34.2	34.2	25.4	25.4	18.0	18.0	5.6	5.6
DA-3 Onsite	3.4	3.4	2.5	2.5	1.8	1.8	0.5	0.5
DA-4 Offsite	0.9	0.9	0.6	0.6	0.4	0.4	0.1	0.1
DA-4 Onsite	2.6	2.6	1.9	1.9	1.4	1.4	0.4	0.4
DA-5 Offsite	1.4	1.4	1.0	1.0	0.7	0.7	0.3	0.3
DA-5 Onsite	2.8	2.8	2.1	2.1	1.4	1.4	0.4	0.4
DA-6 Offsite	5.0	5.0	3.7	3.7	2.7	2.7	0.8	0.8
DA-6 Onsite	1.5	1.5	1.1	1.1	0.8	0.8	0.3	0.3
DA-7 Onsite	0.8	0.8	0.6	0.6	0.4	0.4	0.1	0.1
North Pond Peak Storage	14.3	14.3	10.8	10.8	7.8	7.8	2.7	2.7
South Pond Peak Storage	10.6	10.6	7.9	7.9	5.7	5.7	1.9	1.9
Sinkhole SW Peak Storage	6.5	6.5	4.9	4.9	3.5	3.5	1.1	1.1

**Bold Red Font = Peak Volume
Onsite Drainage Area**

Table 9 Hydrologic Result Volume⁷

Channel	AREA (m2)	Volume (m3)	Volume (ft3)	Volume (acre-ft)
A1-120M	0		0	0.0
A2-121M	1146.24	573.12	20236.87	0.5
A3-122M	4545.17	3418.825	120718.7	2.8
A4-123M	6000.66	8691.74	306905.3	7.0
A5-124M	7038.19	15211.17	537106.2	12.3
A6-125M	7922.86	22691.69	801243.6	18.4

Table 10 Hydrologic Results Volume (ACRE-FT) for the 25-year recurrence for proposed channels

Traveling Points	Length (ft)	Time (min)
1-2	578.6	0.98
2-3	585	0.74
3-4	275.2	0.29
4-5	327.3	0.29
6-7	941	1.21
8-9	596.4	0.57
9-10	560.9	0.75
11-12	740.9	1.04
13-14	709.9	1.11
14-15	554.6	0.79

⁷ Provided by Caribbean Environmental Services H-H Report

15-16	580.1	0.76
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Table 11 Travelling Points timing.

Channel Travelling	Discharge Time based on peak discharge (min)
Channel Trap North UP	2.30 min
Channel North Mid	1.21 min
Channel North Down	1.32 min
Channel Trap West	1.04 min
Channel Trap South Up	2.67 min

Table 12 Discharge Time

10. Erosion Control Mat

All channels will be covered with erosion control mats. We recommend the Curlex erosion control blankets designed to provide extended protection for grass seed and topsoil from wind and water erosion for approximately 36+ months while simultaneously promoting ideal growing conditions on steep, long slopes and/or in channel applications.

Erosion control blanket shall have the following material characteristics:

Width	4.0 ft (1.2 m)	8.0 ft (2.4 m)	16.0 ft (4.9 m)
Length	112.5 ft (34.29 m)	112.5 ft (34.29 m)	112.5 ft (34.29 m)
Area	50.0 yd ² (41.8 m ²)	100.0 yd ² (83.6 m ²)	200.0 yd ² (167.2 m ²)
Weight^b	36.5 lb (16.6 kg)	73.0 lb (33.1 kg)	146.0 lb (66.2 kg)
Fiber Count	≈7,000 per yd ² (≈8,400 per m ²)	≈7,000 per yd ² (≈8,400 per m ²)	≈7,000 per yd ² (≈8,400 per m ²)
Fiber Length (80% min.)	≥6.0 in (≥15.2 cm)	≥6.0 in (≥15.2 cm)	≥6.0 in (≥15.2 cm)
Mass per Unit Area (± 10%)	0.73 lb/yd ² (0.40 kg/m ²)	0.73 lb/yd ² (0.40 kg/m ²)	0.73 lb/yd ² (0.40 kg/m ²)
Net Openings	1.0 in x 2.0 in (25.4 mm x 50.8 mm)	1.0 in x 2.0 in (25.4 mm x 50.8 mm)	1.0 in x 2.0 in (25.4 mm x 50.8 mm)

Table 13 Erosion Control Blankets Specifications

11. Vector Control

Applications of larvicides to control mosquitoes in standing water are conducted monthly, per the Disease Vector Control Plan implementation for The Toa Alta Municipal Landfill.

The following is a list of preventive maintenance procedures practiced at this facility for the stormwater management system:

Sedimentation Ponds:

These areas are inspected monthly and cleaned by removing the accumulated floating debris when the surrounding vegetation is mowed.

A licensed and authorized Puerto Rico Pest Control company was contracted to inspect and fumigate the landfill facilities.

Ditches, Swales, and Channels:

When necessary, catch basins, ditches, swales and channels are inspected weekly, cleaned of accumulated debris, and any observed standing/stagnant water is eliminated. When applicable, catch basins, ditches, swales, and channels were periodically mowed and cleaned.

12. Stormwater contamination and Infiltration of Leachate

The following are measures to be taken to minimize leachate contamination of the stormwater:

- Limit run-on/run-in
- A perimeter leachate interception system will be installed at the toe of the North Slope.
- Grade control to promote runoff
 - Create and maintain a gradient with the surface grades of the intermediate cover. The recommendation is to work with a minimum of a 2 percent slope on the top deck to promote runoff of incident precipitation. The runoff should be directed to down chutes on the sideslopes to limit concentrated water flow on unprotected sideslopes, which generally results in deep erosion rills that require repair.
- Landfill roads will be graded to promote runoff, including grading roads with a crown profile to direct water to roadside swales and other stormwater management features.
- Vegetative cover maintenance
 - Vegetative cover on the landfill's interim or final cover will provide additional uptake of moisture from the cover soils through evapotranspiration, and more importantly keep the soil on the slopes from eroding.

13. Sampling and Analysis

Two sampling points are proposed:

1. Sampling point temporary retention pond.
2. Sampling point North Pond.



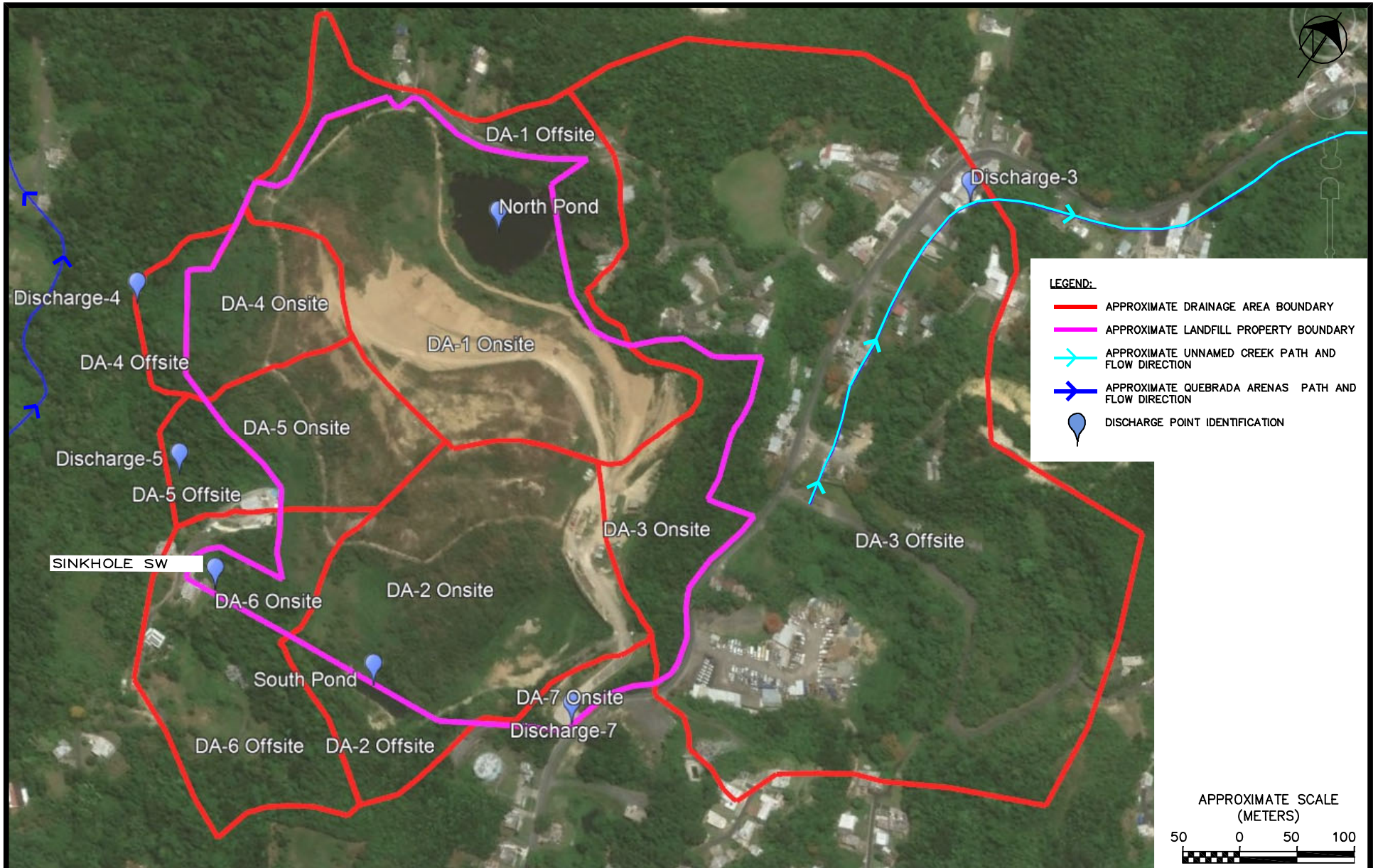
Figure 10 Sampling Point Locations

14. Schedule

The following presents the suggested schedule to complete the project within 18 months after approval of the Stormwater Management Plan.

Task	Start Date	Completion Date
RFP Process	Approval of the SWMP	75 days
Temporary Retention Pond Construction	Project Awarded	90 days
Sampling Points Construction	After Temporary Pond Construction Ends	60 days
Channel Trap North Up	Temporary Pond Construction Ends	60 days
Channel North Down	After Channel Trap North Up Ends	60 days
Channel North MID	After Channel North MID Ends	45 days
Channel Trap West	After Channel North MID	45 days
Channel Trap South UP	After Channel Trap West	60 days
Time projected		495 days/ 16.5 months
Contingency		45days/ 1.5 months

Table 14 Project Schedule



SOURCE: GOOGLE EARTH PRO, AERIAL PHOTOGRAPH DATED JUNE 2022. As-built topographic map prepared for the Project Site by engineer Hector Tirado Rodriguez, P.E., R.P.A., LIC. 12,215, dated September 14, 2022

ALL LOCATIONS ARE APPROXIMATE AND ARE ACCOMMODATED TO FIT THIS FIGURE

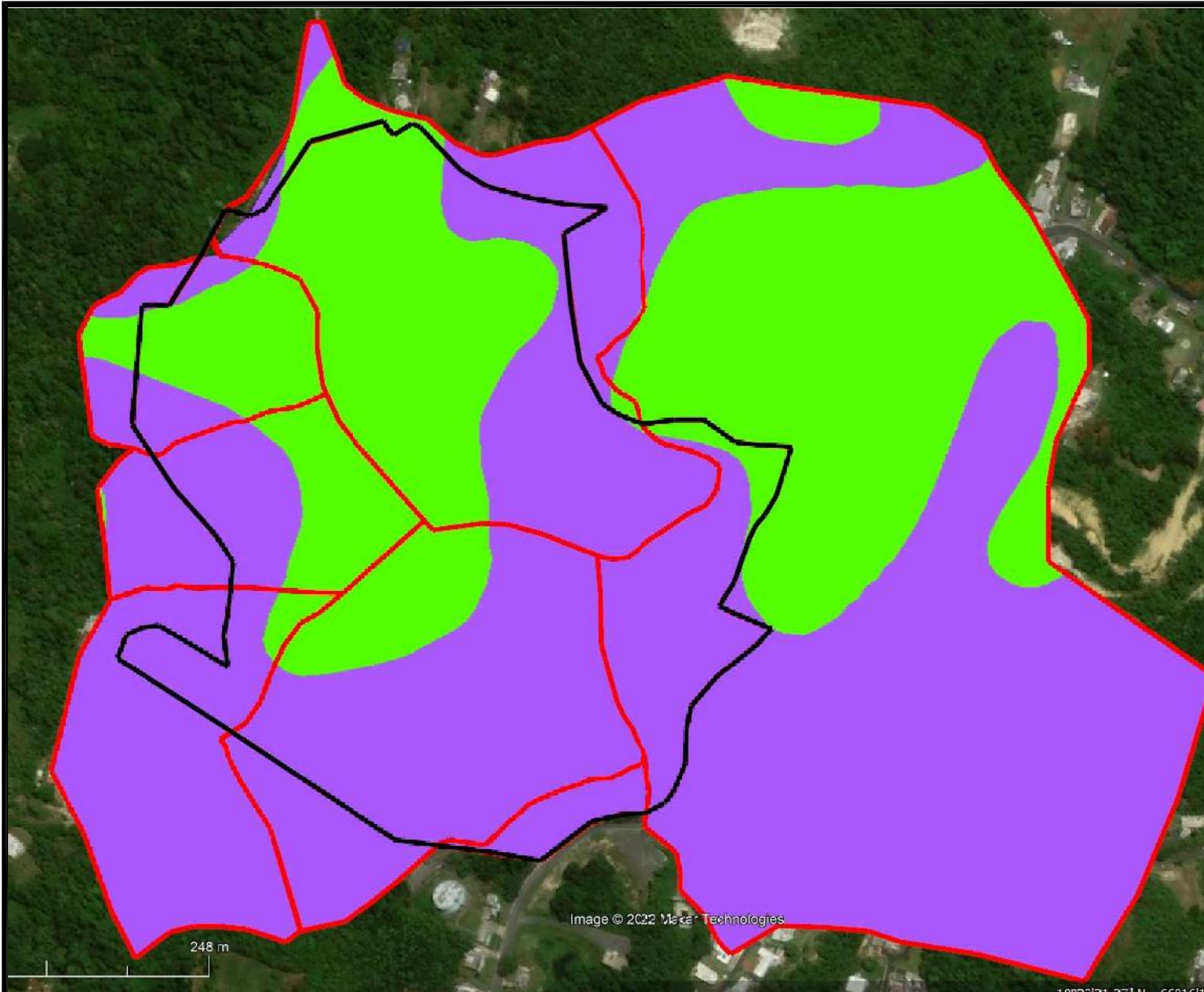


HYDROLOGIC/HYDRAULIC PRELIMINARY REPORT
EXISTING CONDITIONS EVALUATION
VERTEDERO MUNICIPAL DE TOA ALTA
PROJECT LOCATION: PR-165, KM. 8.2
CONTORNO WARD
TOA ALTA, PUERTO RICO





ONSITE AND OFFSITE DRAINAGE
AREAS DELIMITATION AND
LAND USES

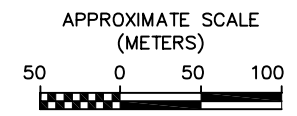
PROJECT NO. 22-0025

FIGURE 3



LEGEND:

-  APPROXIMATE DRAINAGE AREA BOUNDARY
-  APPROXIMATE LANDFILL PROPERTY BOUNDARY
-  HYDROLOGIC SOIL GROUP C
-  HYDROLOGIC SOIL GROUP D



SOURCE: SOIL SURVEY OF THE SAN JUAN AREA, PUERTO RICO, U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SURVEY; SURVEY AREA DATA: VERSION 16, SEPTEMBER 12, 2022.

ALL LOCATIONS ARE APPROXIMATE AND ARE ACCOMMODATED TO FIT THIS FIGURE

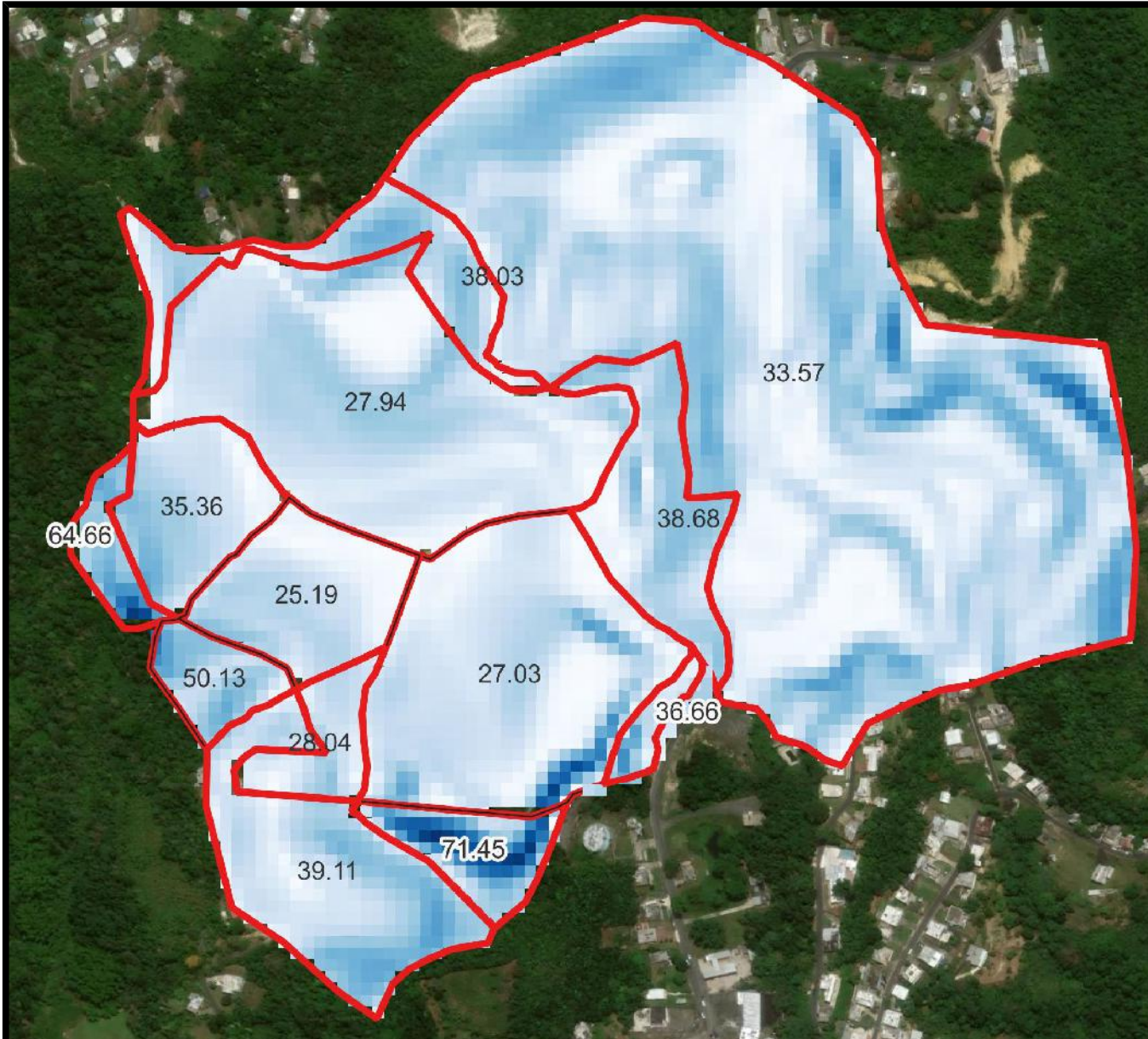


HYDROLOGIC/HYDRAULIC PRELIMINARY REPORT
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 CONTORNO WARD
 TOA ALTA, PUERTO RICO

HYDROLOGIC SOIL GROUP RATING

PROJECT NO. 22-0025

FIGURE 4



LEGEND:

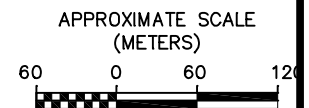
 APPROXIMATE DRAINAGE AREA BOUNDARY

Mean Slope (%)



NOTE: DARKER BLUE COLOR REPRESENTS STEEPER SLOPE MAX 130%. LIGHT COLOR REPRESENTS FLATTER SLOPES MIN 0.3 %

VALUES SHOWN IN EACH DRAINAGE AREA REPRESENTS AVERAGE BASIN SLOPE (%)



SOURCE: SOIL SURVEY OF THE SAN JUAN AREA, PUERTO RICO, U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SURVEY; SURVEY AREA DATA: VERSION 16, SEPTEMBER 12, 2022.

ALL LOCATIONS ARE APPROXIMATE AND ARE ACCOMMODATED TO FIT THIS FIGURE



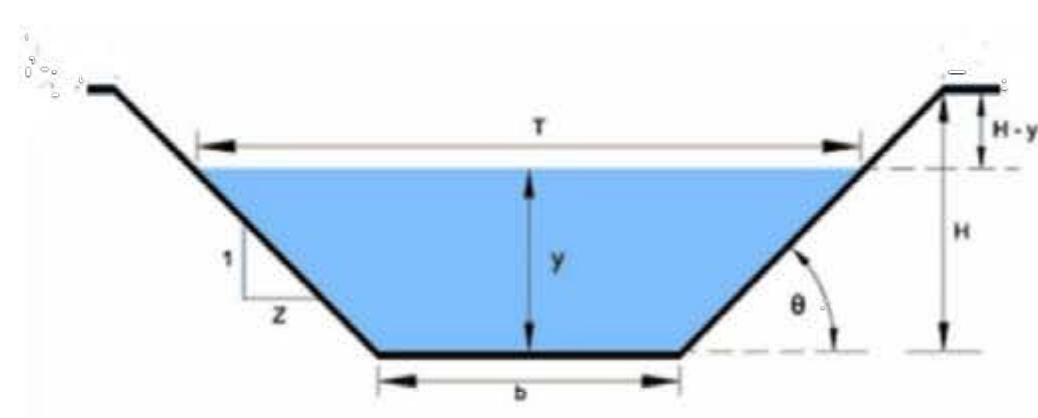
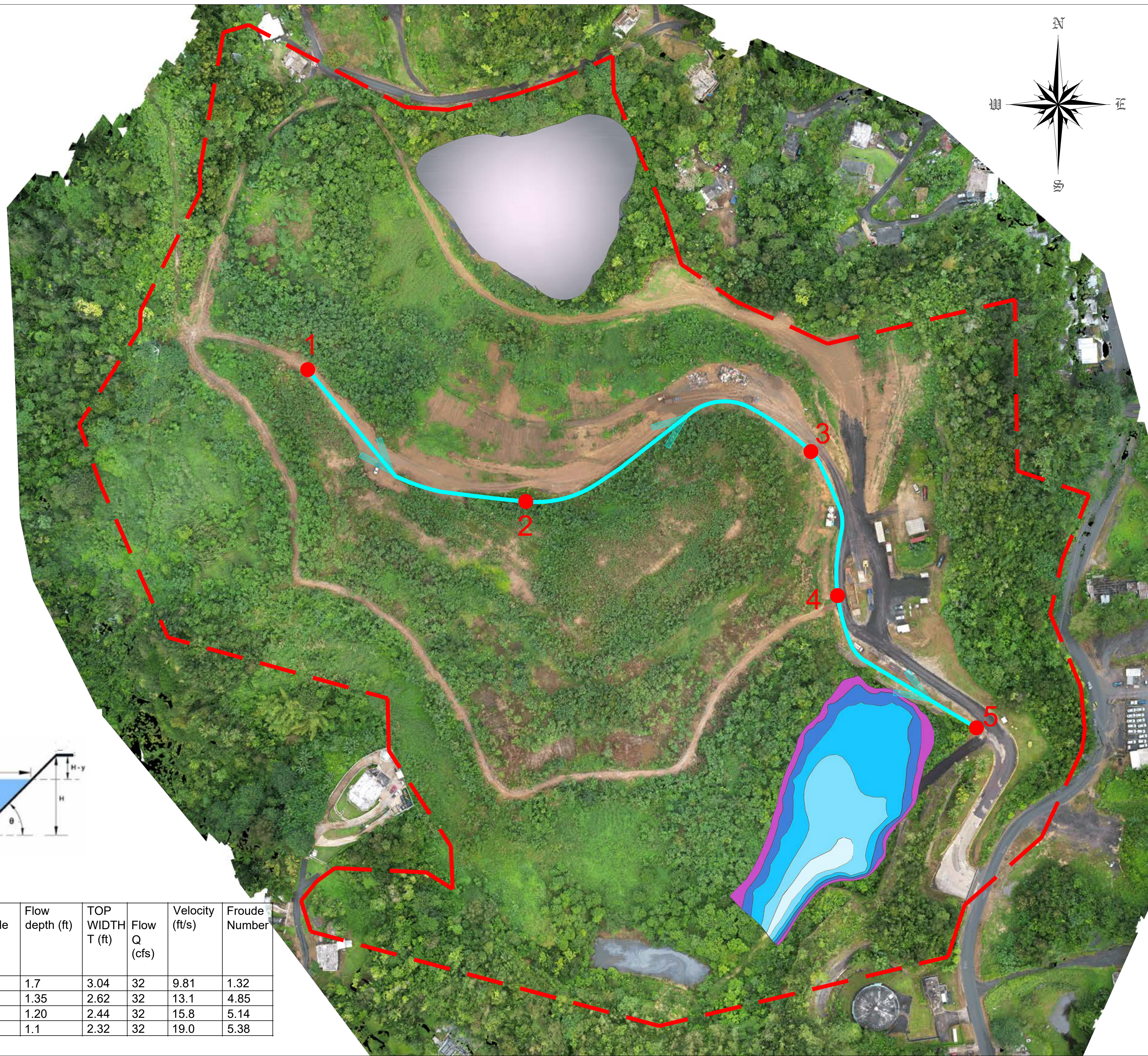
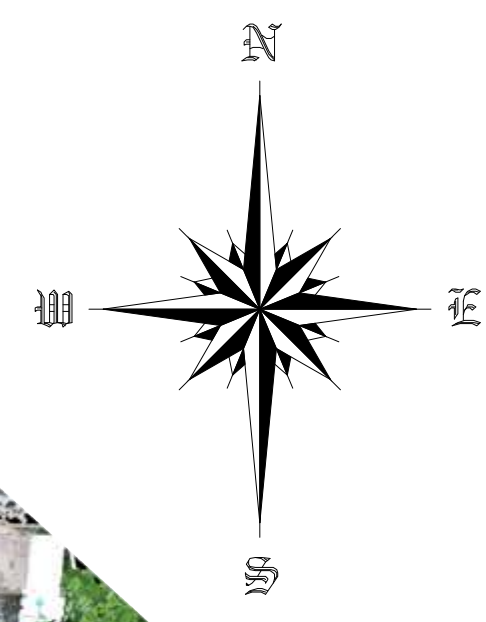
HYDROLOGIC/HYDRAULIC PRELIMINARY REPORT
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 CONTORNO WARD
 TOA ALTA, PUERTO RICO

CALCULATED SLOPE VALUES AND
 CALCULATED MEAN VALUE

PROJECT NO. 22-0025

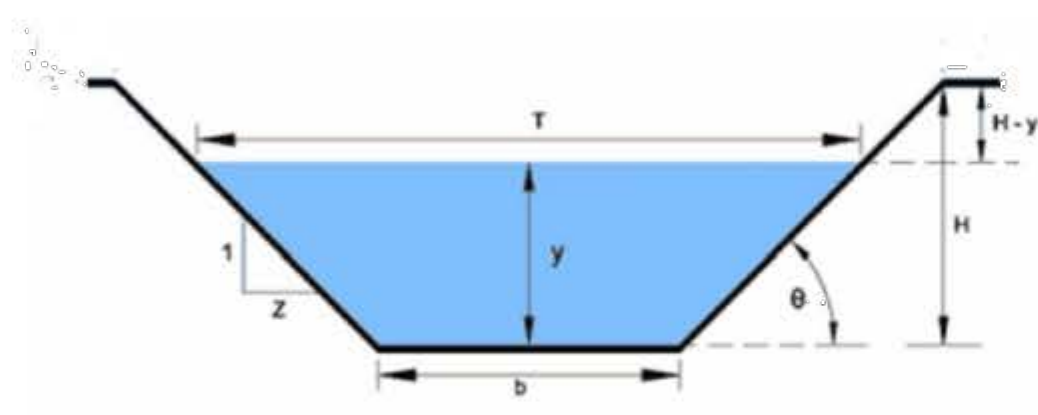
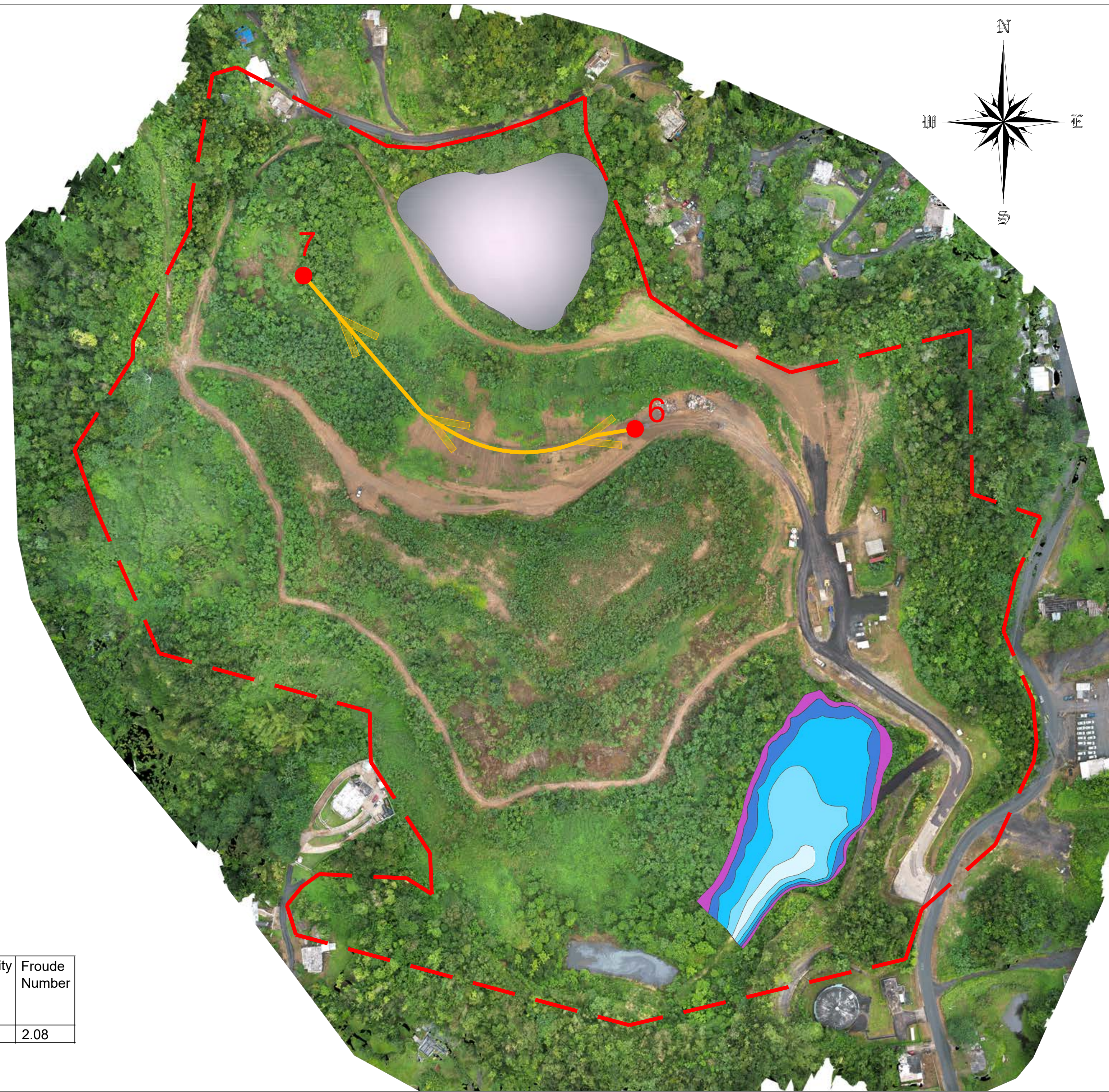
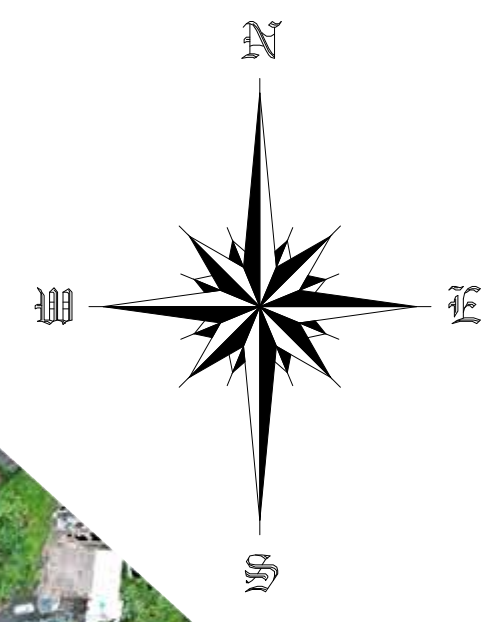
FIGURE 5

- Canal_Trapping_North_UP
- Canal+Trap_South_UP



Channel ID	Length (ft)	Slope S (%)	BASE b (ft)	z	Angle (°)	Flow depth (ft)	TOP WIDTH T (ft)	Flow Q (cfs)	Velocity (ft/s)	Froude Number
1-2	578.6	2.84	1	0.6	60	1.7	3.04	32	9.81	1.32
2-3	585.0	6.32	1	0.6	60	1.35	2.62	32	13.1	4.85
3-4	275.2	10.24	1	0.6	60	1.20	2.44	32	15.8	5.14
4-5	327.3	16.0	1	0.6	60	1.1	2.32	32	19.0	5.38

NORTH CHANNEL_MID



Channel ID	Length (ft)	Slope S (%)	BASE b (ft)	z	Angle (°)	Flow depth (ft)	TOP WIDTH T (ft)	Flow Q (cfs)	Velocity (ft/s)	Froude Number
6-7	941.0	6.85	1	0.6	60	1.2	2.44	25	12.96	2.08

SHEET NUMBER	2/4
DRAWING NUMBER	
SCALE:	
PROJECT:	TOA ALTA LANDFILL_CHANNEL SYSTEM.DWG
DATE:	JULY 28, 2023

TITLE:
 TOA ALTA LANDFILL CHANNEL SYSTEM
 LOCATED AT PR-165, KM 9.0, MAMEY WARD
 TOA ALTA, PUERTO RICO



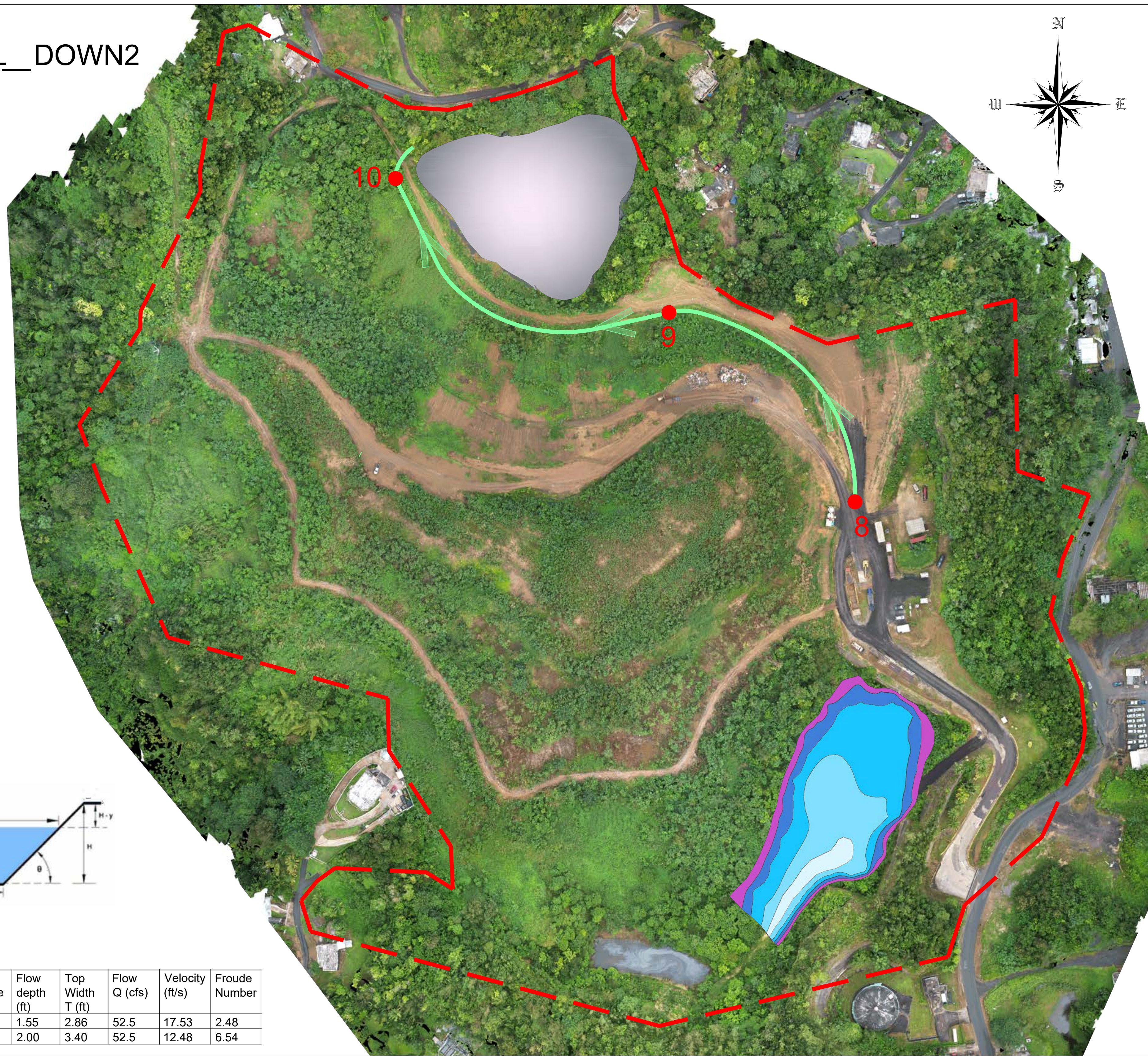
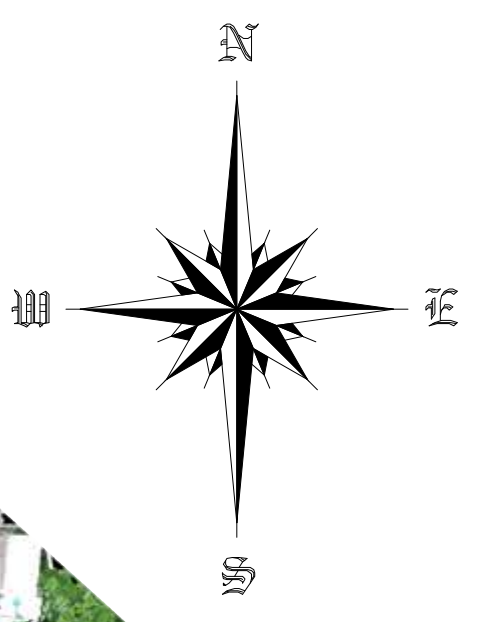
NIVIA I. AYALA, PE
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 P.O. Box 367445
 San Juan, PR 00936
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 nayala@terratekpr.com * www.terratekpr.com

NO.	REVISION	BY	DATE

DRAW BY: DAVID PASTRANA LIC: # 3949

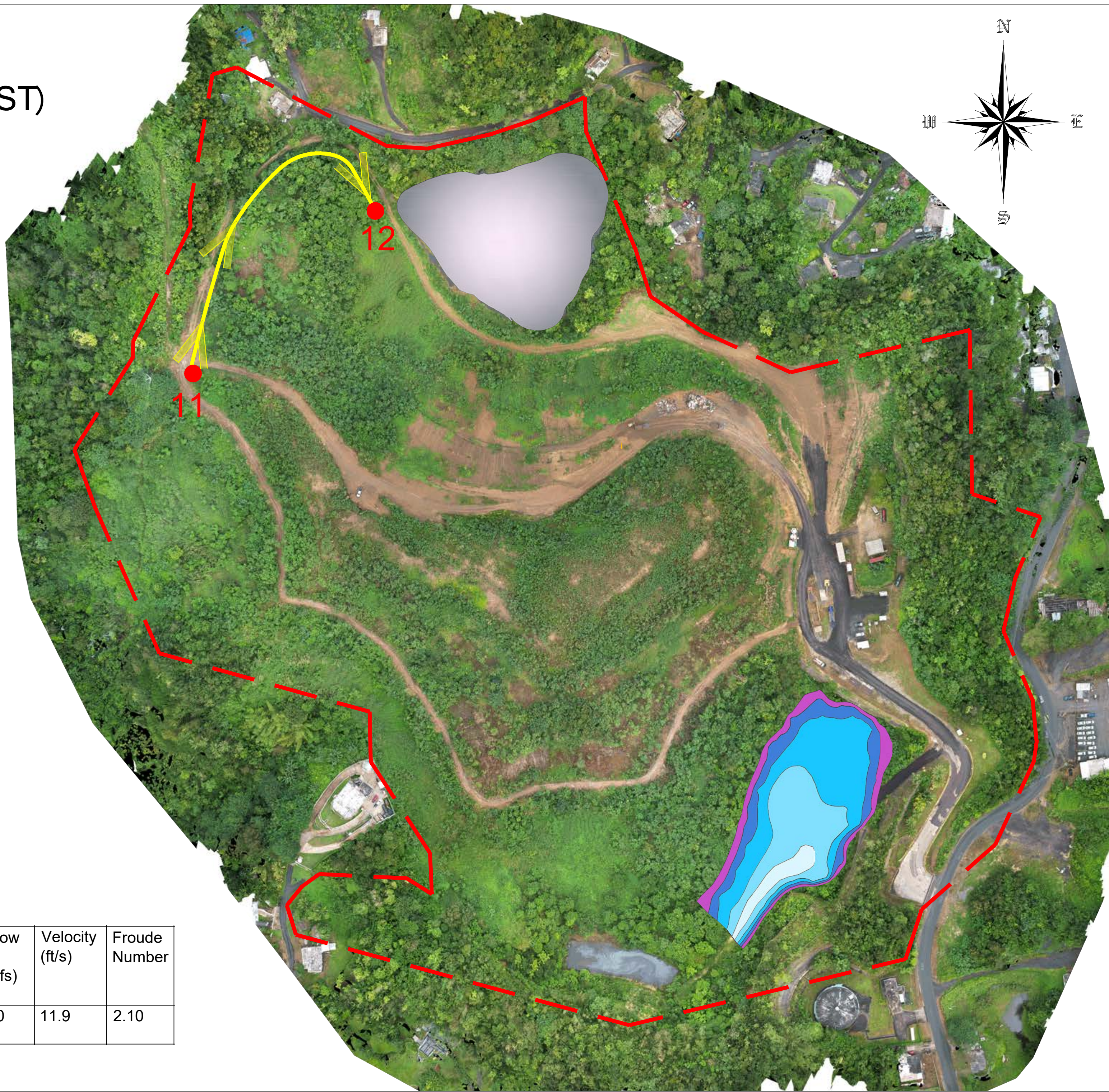
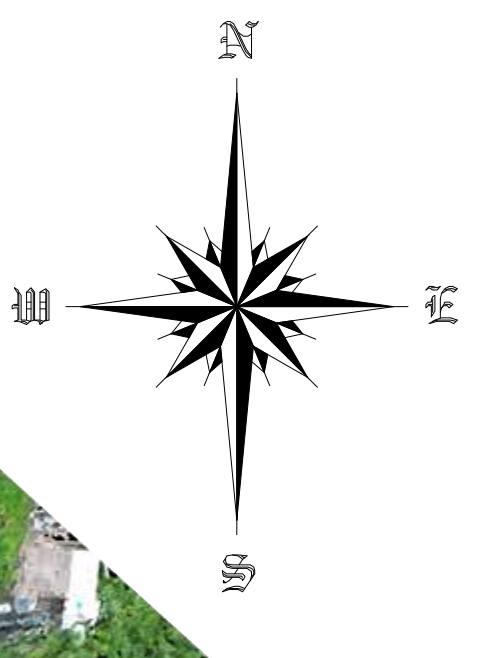
SEAL:
 CORRECT CERTIFY
 LIC. NUM.: 12,286
 DATE:

NORTH CHANNEL_DOWN2



Channel ID	Length (ft)	Slope S (%)	BASE b (ft)	z	Angle (°)	Flow depth (ft)	Top Width T (ft)	Flow Q (cfs)	Velocity (ft/s)	Froude Number
8-9	596.4	9.90	1	0.6	60	1.55	2.86	52.5	17.53	2.48
9-10	560.9	3.94	1	0.6	60	2.00	3.40	52.5	12.48	6.54

NORTH CHANNEL TRAP (WEST)



Channel ID	Length (ft)	Slope S (%)	BASE b (ft)	z	Angle (°)	Flow depth (ft)	Top Width T (ft)	Flow Q (cfs)	Velocity (ft/s)	Froude Number
CANAL 11-12	740.9	18.30	1	0.6	60	1.00	2.20	20	11.9	2.10

SHEET NUMBER	3/4
DRAWING NUMBER	
SCALE:	
TOA ALTA LANDFILL_CHANNEL SYSTEM.DWG	
PROJECT:	
DATE:	JULY 28, 2023

TITLE:
 TOA ALTA LANDFILL CHANNEL SYSTEM
 LOCATED AT PR-165, KM 9.0, MAMEY WARD
 TOA ALTA, PUERTO RICO



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NO.	REVISION	BY	DATE

DRAW BY: DAVID PASTRANA LIC: # 3949

SEAL:
 CORRECT CERTIFY
 LIC. NUM.: 12,286
 DATE:

**UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF PUERTO RICO**

UNITED STATES OF AMERICA,

Plaintiff,

v.

MUNICIPALITY OF TOA ALTA, PUERTO RICO,

Defendant.

Civ. No. 3:21-01087-DRD

STIPULATION AND PRELIMINARY INJUNCTION ORDER

WHEREAS, on February 25, 2021, the United States filed a complaint in this action alleging that certain conditions at the Toa Alta Municipal Solid Waste Landfill constitute an imminent and substantial endangerment to human health and the environment under Section 7003 of the Resource Conservation and Recovery Act (“RCRA”), 42 U.S.C. § 6973.

WHEREAS, on July 15, 2021, the United States filed a motion requesting a preliminary injunction and a memorandum of law in support thereof.

WHEREAS, on July 30, 2021, the Municipality of Toa Alta (“MTA”) filed a motion and memorandum of law in opposition to the United States’ request for a preliminary injunction.

WHEREAS, on August 25, 2021, the United States filed an amended motion requesting a preliminary injunction and a memorandum of law in support thereof.

WHEREAS, on January 12, 2022, the Court dismissed the United States’ motion and MTA’s opposition without prejudice to the United States refiling its motion and MTA refiling its opposition at a later time.

WHEREAS, MTA does not admit that conditions at the Landfill constitute an imminent and substantial endangerment to human health and the environment under Section 7003 of RCRA.

WHEREAS, the intent of the United States is that once a revised permanent closure plan has been submitted by MTA and approved by DNER, it will be the responsibility of DNER to oversee the implementation of the engineered works and other elements of the approved closure plan by MTA.

WHEREAS, the Parties recognize, and the Court by approving this Stipulation finds, that

this Stipulation has been negotiated by the Parties in good faith, that implementation of this Stipulation will avoid unnecessary litigation between the Parties, and that this Stipulation is fair, reasonable, in the public interest, and consistent with RCRA.

NOW, THEREFORE, it is hereby ORDERED as follows:

1. Definitions

- a. "Commonwealth" means the Commonwealth of Puerto Rico.
- b. "Daily Cover" means the application of earthen material over solid waste and the compacting of such earthen material to a thickness of at least six inches.
- c. "Discharge Point" or "Outfall" means the location where non-contaminated stormwater is conveyed and discharged from the Landfill into a receiving water of the United States, either directly or through a separate storm sewer system.
- d. "DNER" means the Department of Natural and Environmental Resources of Puerto Rico.
- e. "Order" means this Stipulation and Preliminary Injunction Order.
- f. The "Effective Date" of this Order is the date that the Court's approval of this Order is entered on the Court's docket. The Order has no effect until it is approved and entered by the Court.
- g. "Intermediate Cover" means the placing and compacting of earthen material to a compacted thickness of at least 12 inches over Daily Cover.
- h. The "Landfill" means the Toa Alta Municipal Solid Waste Landfill and areas with any ancillary operations and facilities related to the Landfill under MTA's control.
- i. "Leachate" means a liquid that has passed through or emerged from solid waste and contains soluble, suspended, or miscible materials removed from such waste.
- j. "North Slope Area" means the area of the Landfill shown in Appendix A.
- k. "NPDES Permit" means National Pollutant Discharge Elimination System program permit issued under Section 402 of the Clean Water Act, 33 U.S.C. § 1342, and its implementing regulations.
- l. "Paragraph" means a paragraph of this Order.
- m. "Southeast Cell" means the approximately 4.4-acre portion of the Landfill under which there is a liner.

2. **Access.** Effective immediately, MTA shall provide the United States and the Commonwealth of Puerto Rico, and their employees, representatives and contractors, with immediate, unimpeded access to the Landfill to conduct inspections, land surveys, monitoring and sampling (including installation of monitoring and sampling equipment, the taking of borings and installation of wells), and review of records to evaluate environmental conditions (*i.e.*, air, soil, groundwater, surface runoff including leachate) at or related to the Landfill and associated operations, compliance with federal and Commonwealth law, and compliance with this Order. The United States will provide MTA at least 30 days advance notice regarding any physical interventions, including but not limited to borings and well installations, including a summary of methods and protocols to be used during such activities. For purposes of the preceding sentence, “physical interventions:” (i) includes borings and well installations made with powered equipment; and (ii) does not include routine liquid sampling, soil grab sampling, soil samples obtained with a hand auger, and samples of liquids being pumped by MTA from the Southeast Cell and liquids from the ponds being pumped or stored. The MTA has the right to be present during any records review, sampling, borings, and well installations, and to take split samples. As such, if EPA requires MTA to commence operating equipment that is not already in operation, in order to take routine samples from the Outfalls where such equipment discharges into (e.g., the Southeast Cell leachate pump or any pump operating at the North and South Ponds), then EPA shall inform MTA no later than during the day prior to the sampling event to allow for MTA participation. If the MTA is not present when EPA conducts sampling, EPA will notify MTA that such sampling has taken place and provide MTA with split samples provided MTA makes timely and reasonable arrangements to receive such samples.

3. **Daily Cover.** MTA shall by April 30, 2022, ensure that all areas of exposed waste are covered by Daily Cover.

4. **Cessation of Waste Disposal.** Subject to Paragraph 17, MTA shall cease disposing of any waste at the Landfill by April 1, 2022. For purposes of the preceding sentence, the temporary storage of construction and demolition (C&D) waste, bulk household waste (durable goods such as mattresses, furniture and appliances), or yard waste (vegetation waste generated by land maintenance) in up to four roll-off containers at the Landfill prior to its shipment for final disposal at a different landfill does not constitute “disposal.”

5. **Posting of Signs.** Within 15 days after the deadline for cessation of waste disposal under Paragraph 4, MTA shall install and thereafter maintain a four-foot by five-foot sign at the Landfill entrances, including the main and northwest entrances, stating in large lettering: “ESTE VERTEDERO MUNICIPAL ESTÁ CERRADO. NINGUNA PERSONA PODRÁ DISPONER DE NINGÚN DESPERDICIO EN ESTE VERTEDERO. LA DISPOSICIÓN DE DESPERDICIOS SÓLIDOS PODRÁ OCURRIR EN EL FUTURO MEDIANTE AUTORIZACIÓN DEL TRIBUNAL O DEL DEPARTAMENTO DE RECURSOS NATURALES Y AMBIENTALES.” and “THIS MUNICIPAL LANDFILL FACILITY IS CLOSED. NO PERSON MAY DISPOSE OF ANY WASTE AT THIS LANDFILL. DISPOSALS MAY OCCUR IN THE FUTURE IF AUTHORIZED BY ORDER OF THE COURT OR BY THE DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES OF PUERTO RICO.” The sign must also set forth the address of EPA’s Toa Alta webpage, and points of contact for MTA, DNER, and the landfill operator. If MTA is authorized

to dispose of additional waste at the Landfill under one or more conditions described in a reservation under Paragraph 17, MTA may, after 15 days advance notice to EPA, make appropriate temporary modifications to the signs for the period in which additional waste placement is allowed.

6. Intermediate Cover.

a. MTA shall by October 1, 2022, commence to apply Intermediate Cover (including any necessary grading and regrading) at the Landfill. All installed Intermediate Cover must, through a combination of soil selection and compaction, be designed to achieve a saturated hydraulic conductivity no greater than 1.0×10^{-4} centimeters per second (cm/s). Except as provided in the next sentence, MTA shall apply Intermediate Cover at the rate of one acre per month period during the first year, and two acres per month thereafter until the entire Landfill has been covered. After DNER approves, or approves with modifications or conditions, any MTA revised permanent closure plan, and if the approved plan includes a schedule for completion of Intermediate Cover, that schedule shall control.

b. If MTA can demonstrate in a plan submitted for approval under Paragraph 11 that one or more areas of the Landfill already has sufficient soil cover and vegetation that, through a combination of thickness, low permeability and evapotranspiration, replicates or improves upon the expected stormwater infiltration rate of daily and intermediate cover, then MTA is not required to apply Intermediate Cover in such areas.

7. Maintenance of Cover. MTA shall monitor all Daily Cover and Intermediate Cover for integrity, including soil erosion, and for evidence of leachate seepage, at least once every two weeks, and within three days after each rainfall event that includes one inch or more of rainfall within a 24-hour period, but not more than once during any seven-day period. Following each monitoring event, MTA shall take corrective action within three days, to maintain a minimum of six inches of Daily Cover and a minimum of 12 inches of Intermediate Cover and to apply additional soil cover and implement other measures as needed to contain leachate seeps within the waste mass. MTA shall maintain on site for EPA inspection records of: (a) each rainfall event of one inch or more within a 24-hour period measured by a pluviometer at the Landfill; (b) each monitoring event; (c) all integrity or erosion problems observed; and (d) all corrective actions taken.

8. Slope Stability

a. **Short Term Controls.** MTA shall by May 1, 2022, complete construction of, and maintain, diversion works to prevent stormwater runoff on the top deck from entering the North Slope Area and erosion controls (*e.g.*, benches, berms, chutes, silt fences, velocity dissipation) for the diverted stormwater. The diversion works and erosion controls must be constructed in accordance with Appendix B and considering the existing stormwater runoff direction.

b. MTA shall by May 1, 2022, install safety barrier fencing and signage around the North Slope Area, and thereafter maintain such fencing and signage. The safety barrier and signage around the North Slope can be temporarily removed during any work to enhance slope stability.

c. MTA shall by May 1, 2022, update its health and safety program for the Landfill to include sufficient worker protective measures regarding work to be performed on all Landfill slopes and the North Pond and South Pond. The updated health and safety program must be certified by a responsible official of MTA authorized to provide such certifications. Thereafter, MTA shall take all reasonable steps to ensure that the health and safety program is implemented.

9. **Leachate Management**

a. **Leachate Management Plan.** MTA shall by October 1, 2022 submit for approval under Paragraph 11 a proposed Leachate Management Plan. The plan must describe engineered works and procedures that are designed to ensure at least a 90% reduction in releases of leachate from the unlined portion of the Landfill to the subsurface within two years after the Effective Date. The plan must include engineered works and procedures, as necessary, to minimize the infiltration of leachate to the North Pond and South Pond. The plan must include a schedule, with milestones, for completion of all engineered works within 12 months after plan approval. To determine leachate release reductions, MTA shall use EPA's Hydrologic Evaluation of Landfill Performance ("HELP") Model. The Plan must include documentation and justification of all assumptions used.

b. **Management of Leachate Collected from Landfill.** Commencing by October 1, 2022, all leachate and all other liquids that are subject to this Paragraph must be transported to a wastewater treatment plant lawfully permitted to receive the leachate and authorized to discharge under Section 402 of the Clean Water Act (*e.g.*, a Puerto Rico Aqueduct and Sewer Authority publicly-owned treatment works facility), or an on-site wastewater treatment process. No leachate or bulk liquids may be disposed of onto or into the waste mass at the Landfill, including a process known as "leachate recirculation." MTA's ability to comply with this paragraph 9.b depends on third parties, *i.e.*, haulers with capacity to haul and dispose of MTA's leachate and permitting authorities such as the Puerto Rico Aqueduct and Sewer Authority. MTA agrees to act in good faith to perform the necessary efforts to meet all applicable requirements and to obtain the necessary permits to comply with this paragraph.

10. **Stormwater Management**

a. **Short Term Controls.** MTA shall by May 1, 2022, commence: (a) to control mosquitoes (*e.g.* with larvicides) in standing water, and (b) to employ soil erosion control techniques such as sod, mulching and matting, temporary check dams, filter fences, berms, and straw bales.

b. **Survey of Leachate Seeps.** MTA shall by December 1, 2022, complete a physical survey to identify all leachate seeps that affect stormwater that flows off-site. MTA shall by January 1, 2023, submit the survey to EPA, including a report identifying which of the leachate seeps found has the potential to affect stormwater that flows off site.

c. **Stormwater Management Plan.** MTA shall by January 1, 2023, submit for approval under Paragraph 11 a proposed Stormwater Management Plan. The plan must describe engineered controls and procedures that are designed to minimize infiltration of stormwater into the waste mass, minimize contact between stormwater runoff and leachate (to minimize the quantity of leachate-contaminated stormwater) and provide for irrigation sufficient to support and sustain existing flora in, around, and downstream from the Landfill. The plan must include: (1) measures (*e.g.*, berms, chutes, channels, velocity dissipators) to rapidly convey stormwater from the Landfill surface to appropriate management areas (*e.g.*, detention ponds and Discharge Points); (2) measures to significantly reduce the contamination of stormwater with leachate including measures to address the leachate seeps identified in the report described in Paragraph 10.b; (3) controls to minimize erosion of soils on the landfill surface; (4) measures to minimize the infiltration of leachate and stormwater contaminated with leachate from the North Pond and South Pond into the groundwater; (5) measures, including the applications of larvicides, to control mosquitoes in standing water; (6) measures, including periodic sampling and analysis consistent with the parameters in Appendix C, to ensure that all discharges of stormwater into the environment do not exceed the Appendix C pollutant criteria; and (7) proposed locations for sampling. The plan shall include a schedule, with milestones, for completion of construction and commencement of operation of the stormwater measures within one and a half years after approval of the Stormwater Management Plan.

d. **Discharges of Stormwater Not from Ponds.** If during the first year after approval of the Stormwater Management Plan, any sampling result in accordance with Paragraph 10.c(6) shows an exceedance of any maximum level for a parameter in Table 1, MTA shall promptly implement additional measures to reduce contact of stormwater with leachate or the landfill mass. If during the second year after approval of the Stormwater Management Plan, the average of the latest and previous three quarterly sampling results shows an exceedance of any parameter in Table 1, MTA shall within 30 days submit a plan for approval under Paragraph 11 which describes additional measures to reduce contact of stormwater with leachate or the landfill mass. At any time after the Effective Date, MTA or its agents become aware, through incidental observations, cover inspections, or notification by EPA or by third parties, of visible leachate seeps, MTA shall promptly implement additional measures as necessary to prevent any offsite leachate discharge.

e. **Discharge/Disposal of Pond Liquid.** MTA shall prepare for review and approval by EPA a plan to characterize the liquid and sediment columns at the North Pond and South Pond, including activities for sampling and laboratory analysis of the liquid and sediment columns from each pond. MTA shall include in the plan a Quality Assurance Project Plan for monitoring and laboratory analysis of the liquid samples to determine the portions, if

any, of the liquid in each pond that is stormwater that has not mixed with leachate. If EPA agrees, in its sole discretion, that one or more portions of the liquid in each pond is stormwater that has not mixed with leachate, MTA may discharge the liquid in such portions to an existing separate storm sewer system or to a surface water in accordance with the applicable requirements of an NPDES permit issued to MTA. MTA has the responsibility to obtain coverage under the applicable NPDES Permit prior to any discharge into a separate storm sewer system and/or the NPDES permit if a direct discharge is proposed to a water of the United States. Any liquid in the ponds that has not been approved for discharge under an NPDES permit must be disposed of as leachate in accordance with Paragraph 9.b. If a direct stormwater discharge from the North Pond and/or the South Pond into a water of the United States is proposed, the MTA shall establish an underground pipeline(s) from the Landfill into the Discharge Point, which shall include flow velocity dissipation structures. MTA shall install and thereafter maintain a four-foot by five-foot sign at each Discharge Point, stating in large lettering: "PRECAUTION: PUNTO DE DESCARGA DE AGUAS DE ESCORRENTÍA PROVENIENTES DE LA CHARCA NORTE Y LA CHARCA SUR UBICADAS EN EL VERTEDERO MUNICIPAL DE TOA ALTA." and "CAUTION: DISCHARGE POINT OF STORMWATER FROM THE NORTH POND AND SOUTH POND LOCATED AT THE TOA ALTA MUNICIPAL LANDFILL."

11. **Approval of Plans.** MTA shall submit any plan whose approval is subject to this paragraph to EPA. After review of such plan, EPA shall: (a) approve the proposed plan; (b) request revisions to the proposed plan; or (c) disapprove the proposed plan. If EPA requires revisions, EPA will provide a reasonable deadline for the resubmission, and MTA shall submit the revised plan by the required deadline. If EPA approves the plan or revised plan, subject to Paragraph 12, MTA shall implement the work in accordance with the EPA-approved plan/revised plan and schedule. If, absent exigent circumstances, EPA does not approve the plan/revised plan within 90 days of proof of submittal, then either party may initiate dispute resolution by filing their proposed plan with the Court. The other party shall submit a response in accordance with local rules. MTA shall implement the work in accordance with the Court's resolution of the dispute. If any delay in approval or disapproval of a plan or any delay in Court resolution of a disputed plan will cause delays in completion of the requirements under a related, previously approved plan, MTA may submit a revised schedule for the related plan(s), which is subject to approval under this Paragraph. MTA must send DNER a copy of each approved plan within 15 days after EPA's approval of the plan.

12. If the schedules for construction and operation of the engineered works for leachate and stormwater management that are contained in the revised permanent closure plan approved by DNER differ from the schedules contained in the EPA-approved leachate management plan and stormwater management plan under Paragraphs 9 and 10 above, the schedules in the approved closure plan shall control.

13. **Good Engineering Practices.** MTA shall perform all work required by this Order in accordance with Good Engineering Practices under the direction and certification of a professional engineer experienced in landfill design and operation. Good Engineering Practices means proven and generally accepted engineering methods and procedures that provide for

appropriate, safe, cost-effective (*i.e.*, employing reasonable financial considerations consistent with the requirements of this Order), and well-documented solutions. Professional Engineer means an engineer either licensed by the Commonwealth or otherwise permitted to practice engineering in the Commonwealth. Any plan by MTA addressing grading or engineering works must be approved and certified by an engineer licensed by the Commonwealth of Puerto Rico. The Leachate Management Plan under Paragraph 9 must be prepared, certified, and stamped by a Professional Engineer experienced in using EPA's HELP model and in leachate management techniques. The Stormwater Plan under Paragraph 10 must be prepared, certified, and stamped by a Professional Engineer experienced in stormwater management system design and construction, after consultation with a professional hydrologist.

14. Reporting

a. MTA shall prepare and submit monthly reports regarding the performance of its obligations under this Order until completion of the requirements of Paragraphs 3 through 10 of this Order. Each report shall cover the period ending on the last day of each month. Each report must be sent to DOJ, EPA, and DNER on or before the 15th day of the month following the reporting period. Each monthly report shall include:

- i. description of compliance with each requirement of this Order;
- ii. the volume, acreage and location of the Intermediate Cover that was applied;
- iii. the volume and disposition of leachate and leachate-contaminated stormwater collected;
- iv. results of any sampling analysis performed; and
- v. notification of any noncompliance with this Order, including a statement describing the noncompliance and its underlying causes, and proposed measures and an implementation schedule to correct the noncompliance.

b. MTA shall correct any noncompliance with this Order that it detects or that it is notified of by the United States within 15 days after detection or notification, provided, however, that any failure to apply daily cover or to maintain short term slope stability controls must be corrected within one day. The United States may submit to the Court any Monthly Report that documents any noncompliance with this Order.

15. Community Involvement.

a. EPA and DNER may publish copies of the Leachate Management Plan, Stormwater Management Plan, and Reports submitted by MTA under Paragraphs 9, 10, and 14 on their respective websites.

b. If EPA or DNER schedules any public meeting or community meeting regarding the Landfill, MTA shall, upon request by EPA or DNER, ensure that a knowledgeable official attends the meeting, and is available to answer questions.

16. **Notices.** Whenever a plan, notice, report or other deliverable is required to be sent under this Order it shall be sent via email in PDF format as follows:

As to DOJ:	David Gordon Senior Counsel david.l.gordon@usdoj.gov
As to EPA:	Lee Spielmann Assistant Regional Counsel spielmann.lee@epa.gov
	Carl Plossl Environmental Engineer & Enforcement Officer plossl.carl@epa.gov
As DNER:	Nilda del Mar Sanchez DNER Counsel nildasanchez@drna.pr.gov
	María V. Rodriguez DNER (Land Pollution Area) mariavrodriguez@drna.pr.gov
As to MTA:	Carlos López Freytes CWL Legal Services, P.S.C. carlos@cwlllegal.com
	Diana Batlle-Barasorda Casillas Santiago Torres, LLC dbatlle@cstlawpr.com
	Jose L. Ramirez-Coll Antonelli Montalvo & Ramirez-Coll jramirez@amrclaw.com

17. **Reservations**

a. Nothing in this Order prevents MTA from filing applications for applicable permits and authorizations from the relevant federal government and Commonwealth agencies related to the Landfill.

b. Nothing in this Order prevents MTA from seeking approval from EPA of a change in the schedule for completion of Intermediate Cover or the engineered works for leachate management or stormwater management, after MTA submits a revised permanent closure plan to DNER and before the plan is approved by DNER, if the schedule change sought by MTA is consistent with the submitted closure plan.

c. Nothing in this Order affects any obligations by MTA to comply with obligations arising from the complaint filed by DNER on September 1, 2021, in case number 21 189-OA, as amended (“DNER Complaint”). This Order does not affect any right of MTA to assert in the DNER administrative proceeding that any relief sought in that proceeding is precluded by this Order and any authority of DNER to oppose any such assertions by MTA.

d. This Order does not affect any waste disposal at the Landfill that may be allowed or required as part of a revised permanent closure plan for the Landfill that is prepared in accordance with Commonwealth regulations and that is approved by DNER before any such disposal.


e. The United States reserves its claims of imminent and substantial endangerment regarding releases of leachate from the Southeast Cell and MTA reserves all defenses and claims, including but not limited to counterclaims and third-party claims, regarding such claims by the United States.

f. Nothing in this Stipulation and Order limits the United States from asserting in this action or in a separate action that any conditions at the Landfill present an imminent and substantial endangerment subject to Section 7003 of RCRA. Nothing in this Stipulation and Order limits any right of the MTA to assert in this action or in a separate action any defense, including but not limited to lack of jurisdiction, against any claim asserted under Section 7003 of RCRA by the United States.

**FOR THE UNITED STATES ON BEHALF OF THE U.S.
ENVIRONMENTAL PROTECTION AGENCY:**

TODD KIM
Assistant Attorney General
U.S. Department of Justice
Environment and Natural Resources Division

8/8/22
Dated



DAVID L. GORDON
Senior Counsel
U.S. Department of Justice
Environment and Natural Resources Division
Environmental Enforcement Section
Washington, D.C. 20044-7611

W. STEPHEN MULDROW
United States Attorney
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CARMEN MARQUEZ
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United States Attorney's Office
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OF COUNSEL:

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U.S. Environmental Protection Agency, Region 2
290 Broadway
New York, New York 10007-1866

U.S. v. Municipality of Toa Alta, 2:21-01087, Stipulation and Preliminary Injunction Order

FOR THE MUNICIPALITY OF TOA ALTA, PUERTO RICO:



Dated

CLEMENTE AGOSTO
Mayor
Municipality of Toa Alta, Puerto Rico

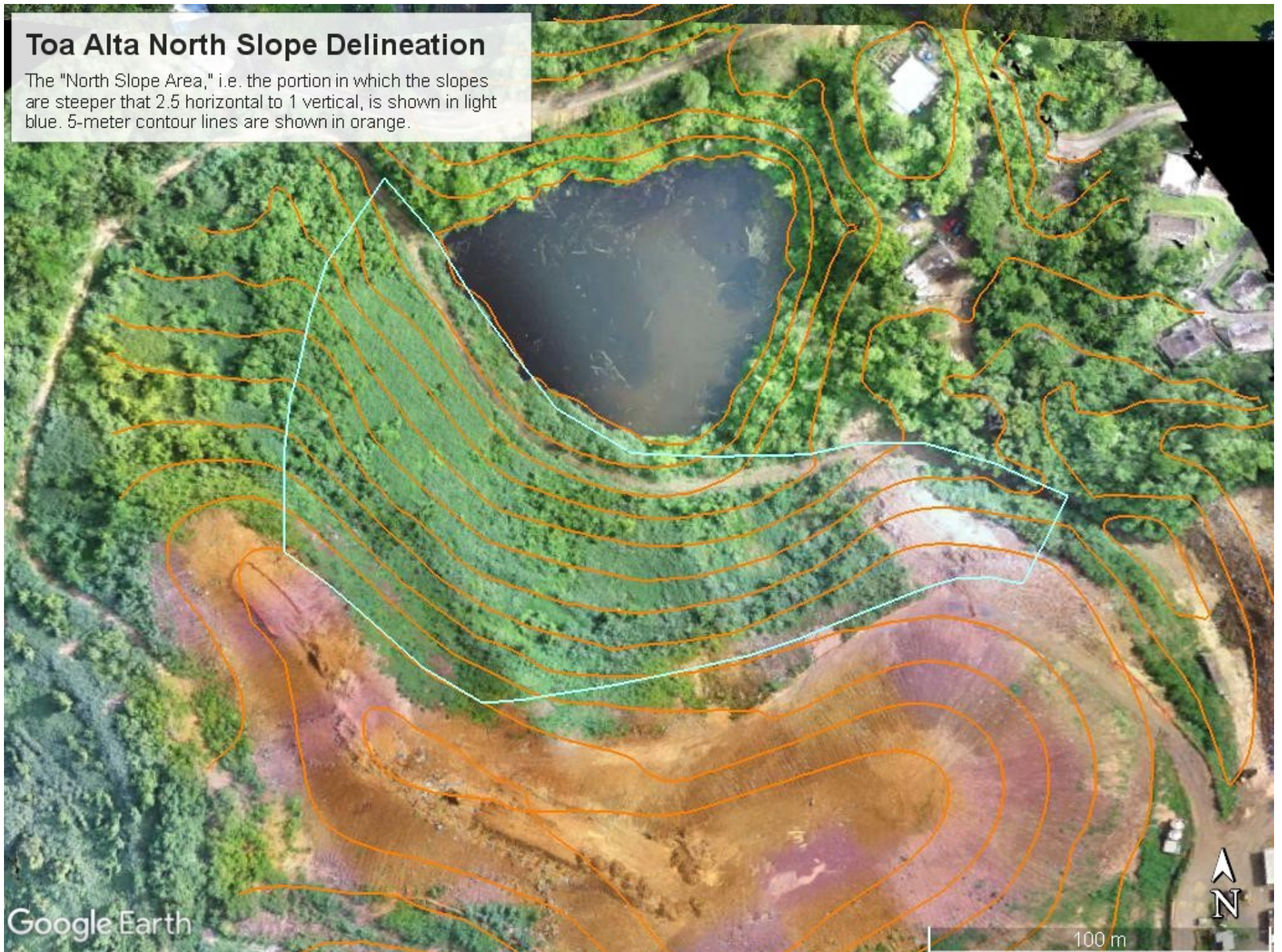
IT IS SO ORDERED:

Dated

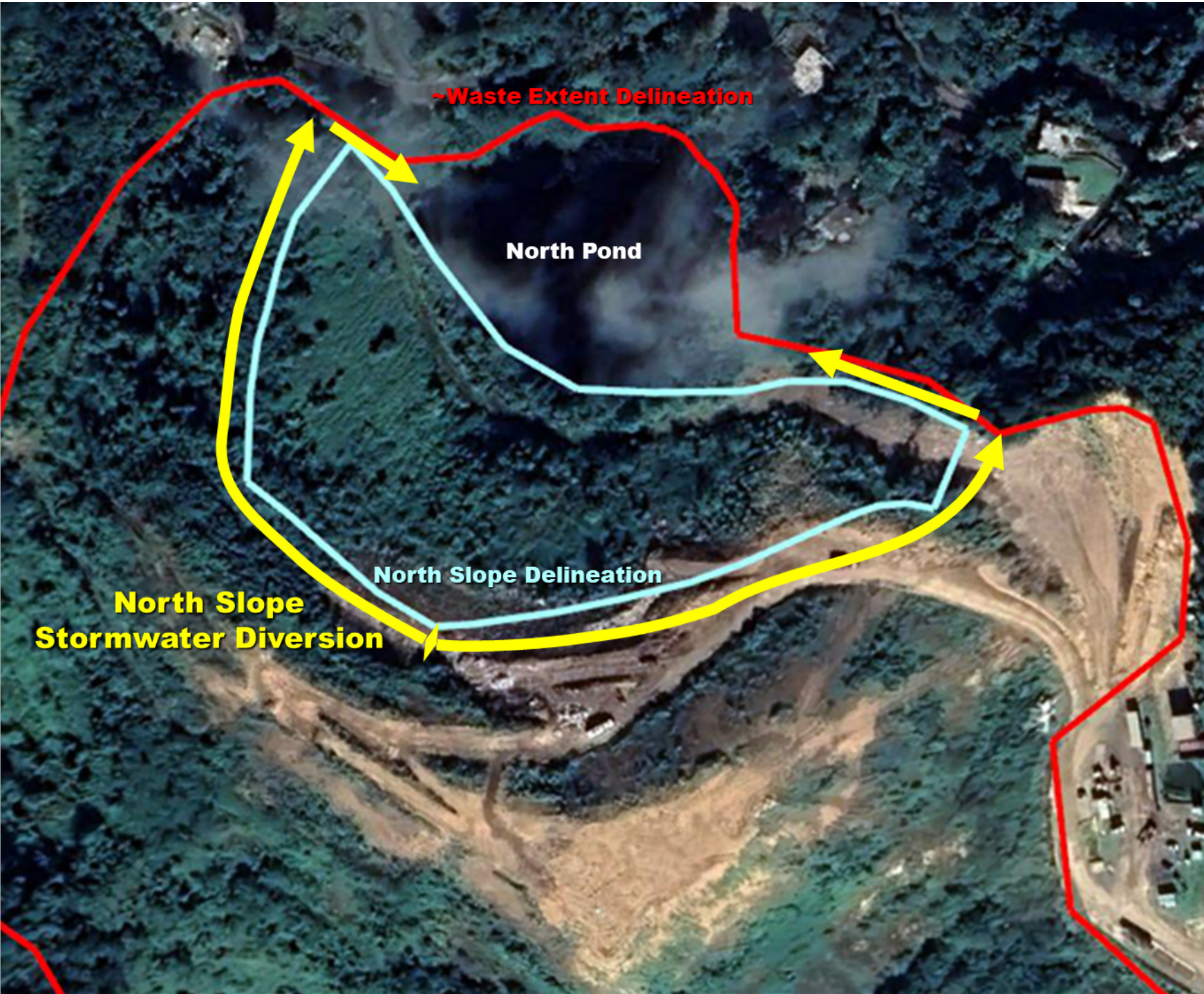
HON. DANIEL R. DOMINGUEZ
UNITED STATES DISTRICT JUDGE

Toa Alta North Slope Delineation

The "North Slope Area," i.e. the portion in which the slopes are steeper than 2.5 horizontal to 1 vertical, is shown in light blue. 5-meter contour lines are shown in orange.



APPENDIX B: SHORT TERM STORMWATER CONTROLS FOR NORTH SLOPE AREA



APPENDIX C Sampling Parameters

MTA shall commence quarterly sampling and laboratory analysis of the parameters in Table 1 within 30 days after EPA approval of the Stormwater Management Plan and continue sampling and laboratory analysis of these parameters for three years, provided however, that for any parameter in Table 1 where the analytical results are below the maximum level for four consecutive quarterly sampling events, MTA may choose to cease sampling for such parameter.

TABLE 1		
Pollutant Name	Maximum Level	Units
BOD ₅	37	mg/L
TSS	27	mg/L
Ammonia (as N)	4.9	mg/L
α-Terpineol	0.016	mg/L
Benzoic acid	0.071	mg/L
p-Cresol	0.014	mg/L
Phenol	0.015	mg/L
Zinc	0.11	mg/L
pH	6 - 9	mg/L
Enterococci	35	cfu/100-mL
Aniline	0.015	mg/L
Naphthalene	0.022	mg/L
Pyridine	0.025	mg/L
Arsenic	0.54	mg/L
Chromium	0.46	mg/L

Discharge Limits (mg/L = milligrams/liter, cfu/100mL = colony-forming units/100 milliliters)

All sample collection, preservation, and analysis for the discharge of pollutants shall be carried out in accordance with 40 C.F.R. Part 136. A licensed chemist authorized to practice the profession in the Commonwealth of Puerto Rico shall certify all chemical analyses. All bacteriological tests shall be certified by a microbiologist or licensed medical technologist authorized to practice the profession in the Commonwealth of Puerto Rico. If any of the sampling results show exceedances in certain parameters included in Table 1, the MTA shall be allowed to perform background testing and analysis to demonstrate whether the exceedances are related to the existing environmental condition in the area.