

**Memorandum For: Ms. Rachael Thompson, Executive Director
Glynn Environmental Coalition
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Brunswick, GA 31525**

**From: Frank Anastasi, P.G., Community Technical Advisor
(PA PG-2605; WY PG-2001; NC LG-2459)**

Date: April 29, 2021 *Frank Anastasi*

**Subject: Review of Preliminary (50%) Remedial Design Report
Terry Creek OU-1 Outfall Ditch
Terry Creek Dredge Spoil Areas/Hercules Outfall Site**

Introduction

In March 2021, Geosyntec Consultants (GC) submitted to the U.S. Environmental Protection Agency (EPA) the *Preliminary (50%) Remedial Design Report* (PDR) for Operable Unit One (OU1) of the Terry Creek Site, including drawings and appendices with the Pre-design Investigation Report, Long-term Monitoring Plan, Quality Assurance Plan, Health and Safety Plan, and Field Sampling Plan.

The document was submitted on behalf of Hercules LLC, the responsible party for the site, in accordance with the Interim Record of Decision (IROD) issued under the November 17, 2019 Consent Decree Statement of Work for OU1. The PDR describes the design elements that are being prepared for implementation of the corrective measures at the Site. Additional details will be integrated with the preliminary plans as the design is finalized, in consultation with EPA and the Georgia Environmental Protection Division (EPD).

The PDR appears to include all elements typically required for remedial actions at Superfund Sites, and the specific requirements of the Consent Decree. It contains all criteria and bases for the remedial design, and presents the project approach, permit requirements, plans for minimizing environmental impacts, and how institutional controls will be implemented, and a schedule for completion of the project. The preliminary cost estimate cited in the PRD report is approximately \$3.96 million.

The PRD also contains supporting draft design drawings and technical specifications, and plans such as Operations and Maintenance, Long-term Monitoring, Sediment Transport and Disposal plans; drawings for current site conditions, ditch realignment, construction of structures, stormwater and sedimentation control; and specifications for earthwork, concrete, rip-rap, and other materials to be used to construct the remedy

The schedule indicates the next step towards full design will be the Pre-Final (95%) Design, scheduled to be provided to EPA and EPD on August 13, 2021. An approved Final (100%) Design

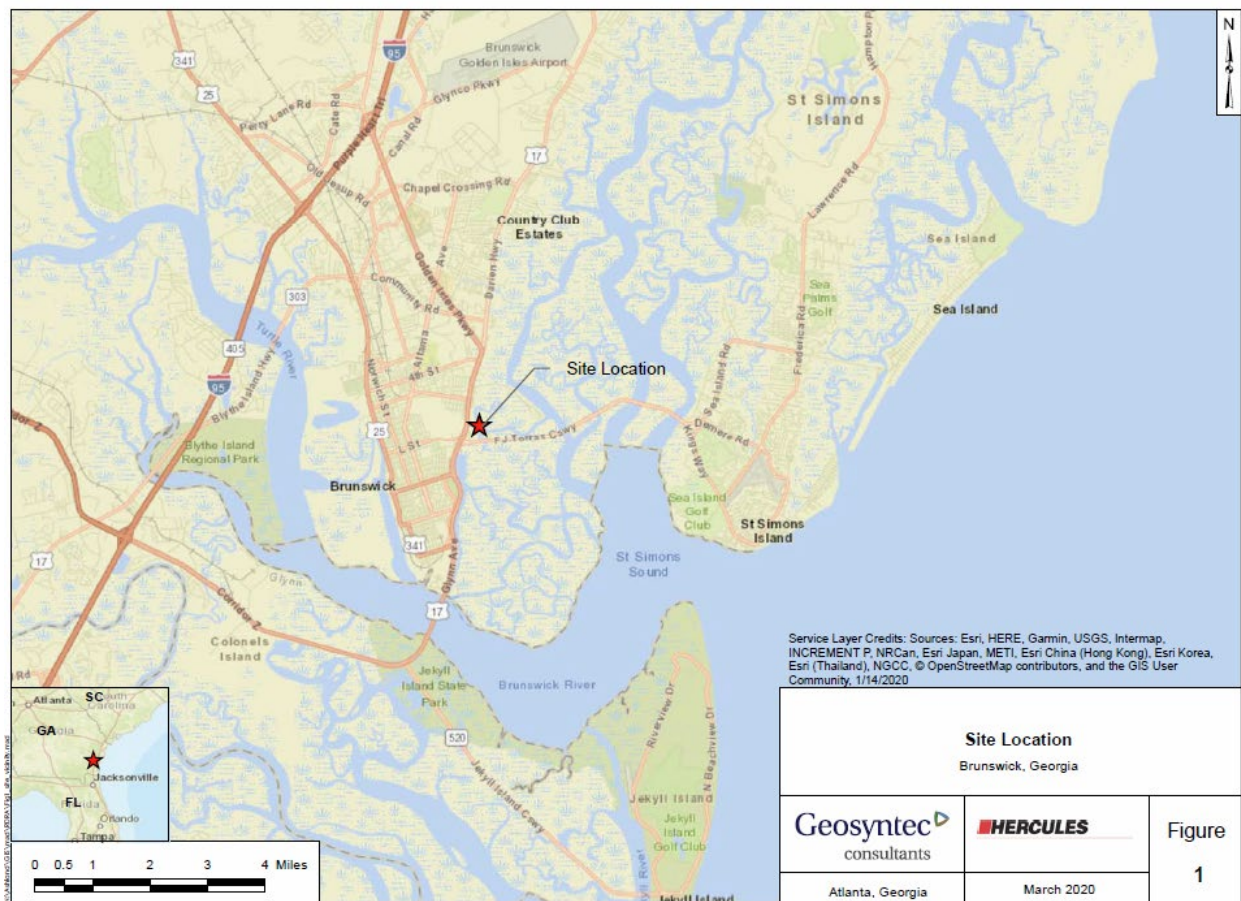
should be completed on October 27, 2021. Remedial construction should begin around April 25, 2022 and be completed around December 21, 2022.

Background

The site is located east of the city of Brunswick in Glynn County, Georgia, north of the Torras Causeway and east of U.S. Highway 17. The ditch discharges into Dupre Creek, near its confluence with Terry Creek and the North River (site location shown on following page).

Flow to the ditch originates at the former Hercules pesticide plant, which lies west of highway 17. The plant is currently owned by Pinova, which discharges non-contact cooling water and stormwater runoff into the ditch. Stormwater runoff from adjacent residential properties flows into the ditch as well. The ditch was a discharge point for untreated wastewater containing toxaphene from the former Hercules plant until 1972, when Hercules began treating its wastewater.

Terry Creek OU-1 Hercules Outfall Ditch Location (Source: Geosyntec Field Sampling Plan Fig. 1)



The Remedial Action

EPA selected a remedy for toxaphene-contaminated sediment at the outfall ditch (site features shown of following page). As explained in IROD, the remedial actions will include the following elements:

- Re-routing the existing stormwater ditch into a newly constructed concrete-lined ditch;
- Excavation and offsite disposal of sediment near Glynn Avenue to construct the new ditch;
- Removal of the weir;
- Placement of geo-textile fabric over existing sediment in the current outfall ditch;
- Backfilling the currently existing outfall ditch with compacted clean soil over fabric;
- Armoring the backfill slope of the currently existing outfall ditch;
- Seeding and stabilization of disturbed areas;
- Implementation of institutional controls such as an environmental covenant prescribing land use and activity restrictions to prevent unauthorized disturbance of the soil cover and other remedy components;
- Periodic inspections, maintenance, and sediment removal in the newly constructed ditch; and
- Development and implementation of a long-term monitoring plan to ensure the effectiveness of the OU1 interim remedy.

Terry Creek Site Features (Source: Geosyntec PDR Fig. 2)



Findings of the Pre-Design Investigation at the Outfall Ditch Area

The PRD report includes the Pre-Design Investigation (PDI) Report (Appendix A). The PDI was completed at the Outfall Ditch and surrounding area by the end of October 2020. It included the following tasks:

- Environmental survey of wetlands and creeks;
- Update of site topography and bathymetry;
- Characterization of contaminated sediments to be removed for proper disposal; and
- Determine ground water management needs (quantity and quality) due to construction dewatering.

The features of the Outfall Ditch and surrounding property are shown in the following illustration from the PDI report. The northern boundary of the site is bounded by a developed area and an undeveloped forested area. The eastern boundary of the site is bounded by Dupree and Terry Creeks. The southern boundary of the site is bounded by tidally influenced salt marsh and Warde Street. The western boundary of the site is bounded by Highway 17.

Hercules Outfall Ditch Features (Source: Geosyntec PDI Report Fig. 2)



Wetland and Creeks Survey

Wetlands and other waters of the U.S. are protected by Section 404 of the Clean Water Act. The federal definition of wetlands is those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" at [40 Code of Federal Regulations (CFR) §230.3(t)]. The survey identified wetlands and waters occurring within the project area to incorporate the jurisdictional boundaries of these features into the Site base map.

Identified wetland boundaries were flagged with high visibility flagging and identified with alphanumeric designations. The boundaries of these features were surveyed as part of the topographic survey. Photographs from the survey are presented in PDI report Appendix B.

Four waterbodies, eight wetlands, and the ditch were identified, as summarized in the table from the PDI report reproduced below (more details on this are presented in PDI Report section 3.1.1).

Potentially Jurisdictional Wetlands and Waters Identified within the Site

Potentially Jurisdictional Waterbody	Cowardin Class	Length/Area (linear feet/acre)
Waterbody Feature 1	E1UBL _x ¹	465 LF / 0.92 ac
Waterbody Feature 2	E1UBL ²	396 LF / 1.61 ac
Waterbody Feature 3	E1UBL ²	1,000 LF*
Waterbody Feature 4	E1UBL ²	670 LF*
Wetland 1	E2EM1P ³	0.53 ac
Wetland 2	E2EM1P ³	0.05 ac
Wetland 3	E2EM1P ³	0.61 ac
Wetland 4	E2EM1P ³	1.33 ac
Wetland 5	PEM1E ⁴	0.05 ac
Wetland 6	PEM1E ⁴	0.07 ac
Wetland 7	PEM1E ⁴	0.04 ac
Wetland 8	PEM1E ⁴	0.06 ac
Stormwater Ditch 1	n/a	105 LF

¹ Estuarine subtidal unconsolidated bottom subtidal (excavated)

² Estuarine subtidal unconsolidated bottom subtidal

³ Estuarine intertidal emergent persistent irregularly flooded

⁴ Palustrine freshwater emergent persistent seasonally flooded/saturated

* Length calculated along survey area boundary

The information on each waterbody and wetland will be used to design the elements of the remedial action that could impact them. The locations of these features are shown on the PDI report Figure 8, which is reproduced below.



Threatened/Endangered Species Survey

Potential presence of protected species was researched in the U.S. Fish and Wildlife Service on-line resources and other publicly available records including the Georgia Department of Natural Resources (GDNR). The habitat requirements for any species identified were evaluated and compared to the habitat characteristics present at the Site. Geosyntec did not perform a species-specific survey and only evaluated the potential presence and absence of protected species and their habitat.

Fourteen federal and/or state protected species and 23 migratory birds were identified as potentially occurring in the project vicinity, with the details provided in PDI report section 3.1.2 and in Appendix D (Table 2 briefly describes known habitat for each of these species). No species-specific surveys were conducted, however. Worth noting is that no clearing is anticipated as part of the remedial action, so no long-term impacts to migratory birds are anticipated.

Superfund actions are exempted by law from the requirement to obtain Federal, State or local permits related to any activities conducted completely on-site. Based on the results of the environmental survey, meetings will be set regulatory agencies to review the conceptual design and solicit input on specific permitting requirements. The USFWS and GADNR were consulted and input received was used to refine the list of permit requirements and incorporated into the 50% Remedial Design Report. Draft permit applications may be submitted prior to the 95% RD such that substantive permit requirements are addressed prior to the RA.

Topographic Survey

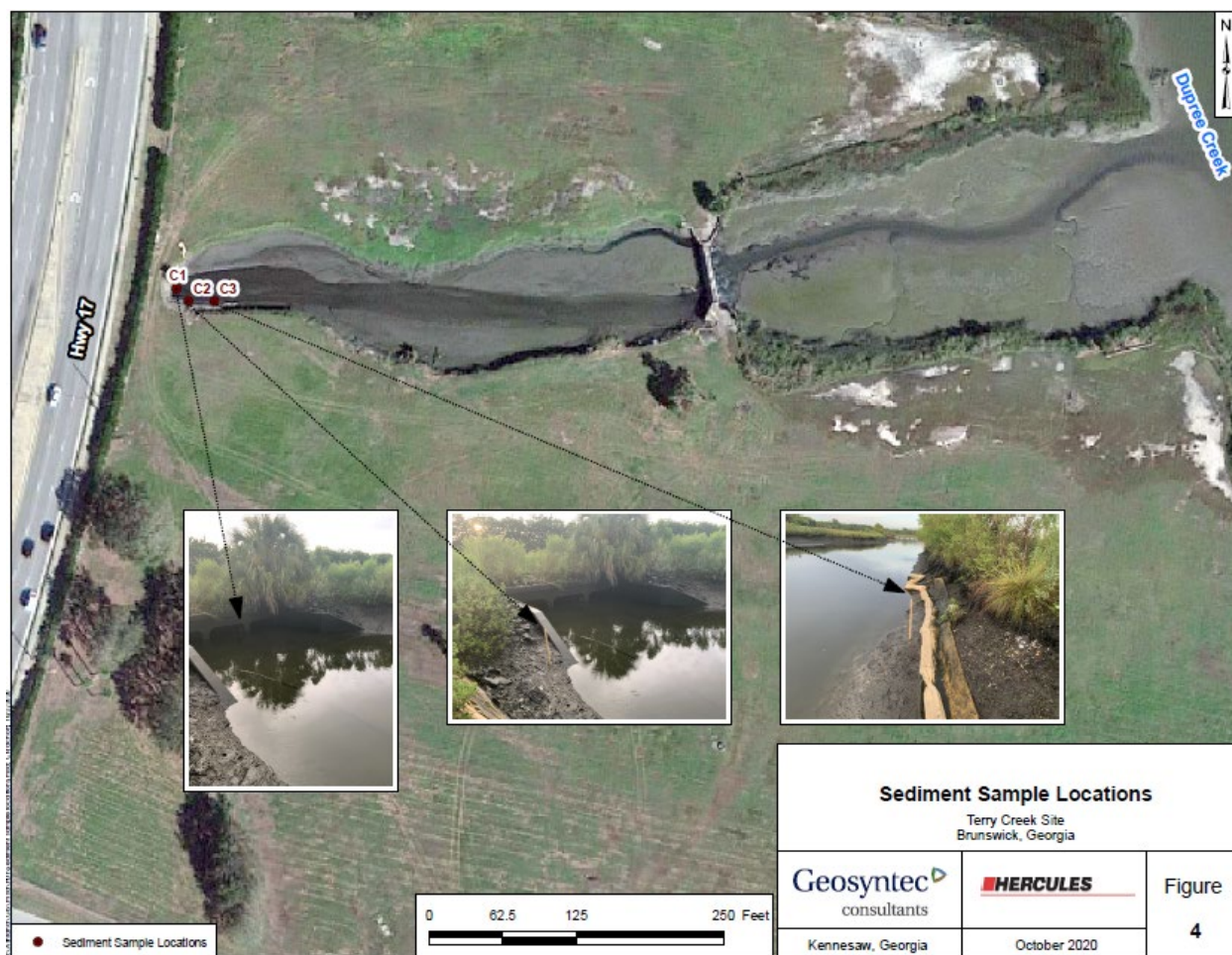
The topographic survey was conducted in October 2020 collecting data at 50-ft station intervals, with ground elevations at intervals of approximately 25 ft or less, to define terrain features (e.g., roads, ditches). The result was a drawing with contours at 1-ft intervals and supporting ground elevations. Additionally, a hydrographic survey was performed at 50- ft cross-sections intervals bank to bank inside the Outfall Ditch. Additional cross-sections were collected at the Outfall Ditch intersection and south perpendicular to Dupree Creek to the confluence with Terry Creek.

The survey data will be used to for the detailed design of the new conveyance structure, to plan for placing the liner and the backfill within the Outfall Ditch, to figure quantities of fill needed for the Outfall Ditch, and to design specifications for the tie-in between the rerouted channel and the creek. Based on the survey, the triple box culvert contains approximately 300 cubic yards of sediment. In addition, the area downstream of the triple box culverts that will be used to tie-in the new concrete-lined ditch is approximately 300 square feet. The design subgrade in this area upon which the concrete-lined ditch and its subbase will be constructed is approximately elevation -5 ft (NAVD88). For the purposes of the RD, the corresponding volume of sediment anticipated to be removed and disposed offsite in the tie-in area is approximately 900 cubic yards.

Sediment Characterization

Sediments were sampled at three locations and analyzed to evaluate whether excavated materials should be managed as a hazardous waste or non-hazardous waste. One sample was collected in the center of the triple box culverts at the outlet end (east side of Highway 17), and two were collected at the outlet area of the triple box culvert, downstream of the apron. Additional samples will be collected from the ditch and the creeks when construction begins.

Photographs of the locations where sediment samples were collected appear in PDI report Figure 4, which is reproduced on the following page. The laboratory data indicate the sediment can be managed and disposed of as a nonhazardous waste and can be sent to a CERCLA-approved Subtitle D (non-hazardous waste landfill). The laboratory results are provided in PDI report Appendix E and in Table 3. This information will be used for the cost estimates and the Transportation and Off-Site Disposal Plan.



Aquifer Testing for Construction Dewatering

An aquifer pumping test was performed in August 2020. A pumping well and observation wells were installed, pumping tests were performed, and produced ground water was sampled and analyzed by a laboratory for contaminants so management of water produced during construction dewatering can be planned. Data was analyzed to estimate hydrogeological characteristics of the shallow soil at the site to use in design of the dewatering system needed to construct the re-routed channel.

Ground water was encountered at 4 ft to 5 ft bgs during well installation. A tidal fluctuation during the pumping tests ranged between 0.6 ft and 0.9 ft. The subsurface geology of the site encountered in drilling the wells was summarized as follows.

- Organic-rich soil with fine- to medium-grained sand from ground surface to approximately one foot below ground surface (bgs).
- Poorly-graded, fine-grained alluvial sand to approximately 8 ft bgs.
- Clayey sand from approximately 8 ft to at least 30 ft bgs. Based on laboratory sieve analysis of a soil sample (65-percent fine-grained sand and 35-percent silt and clay).

Aquifer parameters obtained by analyzing the testing data APT data were used to estimate the volume of water that will be discharged during excavation of the rerouting channel (the remediation contractor will be required to perform their own estimates/calculations for construction dewatering purposes). Assuming flow into a linear excavation trench of 200 ft long and 80 ft wide, the flow rate into the excavation is estimated to be about 5 gallons/minute or 7,200 gallons/day.

Soil and ground water generated from drilling wells and conducting the aquifer pumping tests in the PDI were analyzed to determine appropriate management procedures. For soil, no VOCs, SVOCs, organochlorine pesticides, PCBs, or metals were detected. The two 55-gallon drums of soil will be/was disposed as nonhazardous waste at Bradley County Landfill in McDonald, Tennessee. For ground water, no VOCs, SVOCs, organochlorine pesticides or PCBs were detected. Naturally occurring dissolved metals were detected in the groundwater samples. Based on the results, the approximately 5,000 gallons of ground water produced during the well installation and aquifer testing was transported to a treatment facility located at 305 South Main Street, Mauldin, South Carolina.

Preliminary (50%) Design Documents

The preliminary (50%) design documents and drawings drawings have been prepared based on applicable design criteria including the following:

- Maintaining a minimum hydraulic capacity within the re-routed channel that matches or exceeds that of the existing triple (3) 6-foot by 5-foot box culvert crossing at U.S. 17;
- Substantial compliance with applicable federal, state and local permitting requirements;
- Placement of clean soil fill for the final lifts of the OU1 outfall ditch backfill;
- Minimizing disturbance to the natural environment (including land) to the extent practicable; and
- Restoration of disturbed areas with permanent seeding.

The pre-final designs will incorporate Superfund Greener Cleanup principles in ways such as using native grasses, best management practices for dust control and dewatering, and disposing of wastes at facilities closer to the Site.

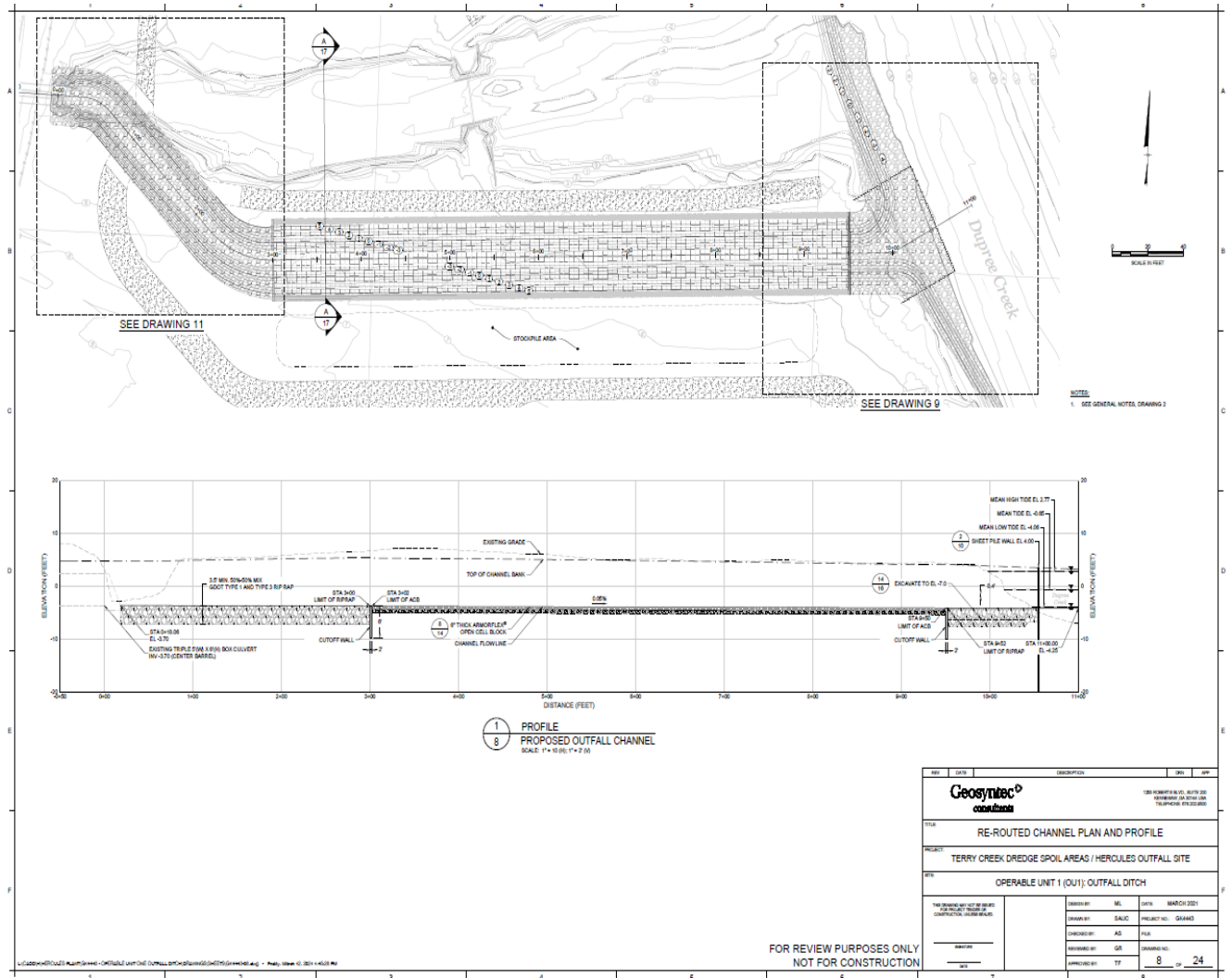
Preliminary Design Drawings

The preliminary design drawings appear in PDR report Appendix B. The 24 sheets of drawings include all design elements of the remedial action. The main items are listed below.

- Existing Site Conditions;
- Initial Site Controls, Demolition, E&SC and Construction Access;
- Site Development, Construction Phasing, and Construction Dewatering Plans;
- Re-Routed Channel Plan and Profile,, Tie-In with Dupree Creek, Sheet Pile Plan and Profile;
- Re-Routed Channel Tie-In with Triple Box Culvert and Outfall Ditch Grading Plan;
- Dupree Creek Bank Stabilization Plan and Sections;

- Multiple sheets of Construction Details and Sections;
- Erosion and Sediment Control Plans;
- Top of Subgrade Construction Control Points and Tables; and
- Final Grading Construction Control Points and Tables.

These drawings will be refined as work proceeds toward the Pre-Final (95%) Design. An example of a preliminary design drawing contained in the PDI report for construction of the re-routed drainage channel is reproduced below.



Preliminary Technical Specifications

Technical specifications are the minimum requirements and installation procedures for materials to be used to construct the remedial action. The preliminary technical specifications for each of the following items are contained in PDR report Appendix C.

- Surveying, Earthwork (excavation and fill), Topsoil Placement, Grading, and Seeding

- Aggregates, Geotextiles, Concrete, Articulating Concrete Block, Riprap, and Sheet Pile
- Well protection and abandonment

Preliminary Supporting Plans

The preliminary supporting plans contained in the PDR will be more fully developed during the next step of the design and for the Pre-Final (95%) Remedial Design. They include the following.

- Institutional Controls, Operation and Maintenance Plan – for inspection and maintenance following construction. The plan will define frequency and methods for inspection of the capped Outfall Ditch and new channel, and includes legal descriptions and survey maps of OU1. It will document the activities associated with implementing and ensuring the long-term stewardship of all institutional controls (ICs) and specify the entity responsible for conducting these activities.
- Transportation and Offsite Disposal Plan – for procedures to be followed in transporting the excavated sediments and as well as investigation derived waste (IDW) that are generated during the action. Sediments, after dewatering, will be disposed of in accordance with the CD and SOW and with the relevant provisions of applicable regulations. The plan will include components that account for characterizing the waste, the means of transport, loading procedures, spill control measures, and recordkeeping.
- Construction Quality Assurance Plan – to ensure that design requirements are satisfied for the different components of the remedy, and to present the principles and practices of CQA required during construction. Quality management involves both quality assurance and quality control activities performed to verify that construction activities are being performed in accordance with design drawings and meet technical specifications.
- Preliminary OU1 Long Term Monitoring Plan – The long term monitoring plan describes the investigations to be carried out prior to, during, and after construction of the action. Baseline data collected prior to construction will document the current distribution of contamination. By collecting data during and after construction of the OU1 remedy, assessments will be made to evaluate potential changes in the baseline conditions as a result of implementation of the OU1 remedial action.
- Field Sampling Plan – This plan describes the field operations, sampling protocols, and documentation for the sampling and analysis. Sampling requirements and standard operating procedures are specified.
- Quality Assurance Project Plan – Describes activities involved with the acquisition of environmental data from direct measurements activities (or other sources). The plan details roles and responsibilities of the project’s management and personnel, and defines sampling methodologies and QA/QC requirements for the analyses to be conducted, and contains 37 worksheets detailing field, laboratory and office procedures to verify data quality.

- Health and Safety Plan (“HASP”) -- developed to address protection of workers considering site-specific project conditions, work activities, emergency contacts and procedures, hazard evaluations, on-site safety responsibilities, work zones, personnel training, medical monitoring, air monitoring, personal protective clothing and equipment, and decontamination procedures. All employees of the remediation contractor and its subcontractors will be educated on and subject to this plan conforming with its requirements.

Permits and Approvals

Superfund response actions are exempted by law from the requirement to obtain Federal, State or local permits related to any activities conducted completely on-site.

As discussed in the RD/RA Plan and the Pre-Design Investigation Report, federal and state regulatory requirements are not strictly applied as permit approvals but typically as “permit equivalents”. Section 4 of the PDR explains the details of project staff’s consultations and interactions with federal and state agencies regarding meeting requirements for wetlands and species protections. Local permitting coordination will occur in the near future as the Pre-Final (95%) Design is prepared.

Engineering Cost Estimate

The engineering cost estimate was updated based on refinements made at the 50% design stage of the overall remedy design. A summary of the updated engineering cost estimate is provided in Table 5-1 (reproduced below). The cost estimate will be refined at the 95% design stage with contractor input and detailed backup.

	Item	Estimated Cost
1	Oversight & Other Third Party Services	\$196,600
2	Pre-Mobilization	\$44,151
3	Contractor's Project Management, Site Set-up, Admin.	\$248,860
4	Initial Site Preparation and Controls	\$444,829
5	Dewatering / By-Pass Pumping / Water Management	\$427,525
6	Earthwork - Excavation & Removal, Excluding S,T&D	\$523,575
7	Earthwork - Backfill & Compaction	\$390,019
8	Earthwork - Aggregates and Armoring	\$910,431
9	Systems Construction / De-Construction	\$224,152
10	Final Restoration, Stabilization, Protection	\$33,705
	SUBTOTAL	\$3,444,000
	Contingency, 15%	\$516,600
	TOTAL	\$3,960,600

Schedule

A preliminary schedule for the Remedial Design is included in the PRD report, which shows an extension of about four months compared to the previous estimated schedule presented in the Remedial Design Work Plan. The current schedule includes the following major milestones.

Pre-final (95%) Design	August 13, 2021
Final (100%) Design	October 27, 2021
Start of construction	April 25, 2022
Construction Completion	December 21, 2022

Next Steps

I will continue to be in contact with EPA to monitor progress on this effort as the remedial design is developed. I trust this memorandum provides GEC and the community with a good understanding of the status of design for the remedial action for the Hercules Outfall Ditch at this half-way point, and the projected schedule for completing the work. Feel free to contact me if you have any questions or desire any additional information.