

**PEACH CREEK ENVIRONMENTAL PARK
SAN JACINTO COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2406**

TYPE I PERMIT APPLICATION

PARTS I, II, III AND IV

Prepared for

PC-II, LLC

Technically Complete Application

Prepared by

NEEL-SCHAFFER, INC.
13430 NW Freeway, Suite 650
Houston, TX 77040
713-783-7117

Texas Board of Professional Engineers
Firm Registration No. F-2697



David M. Ruhl
12/30/2021

In preparing this permit application, Neel-Schaffer, Inc., David Ruhl, P.E., and Gregory Taylor, P.G. utilized and relied on work independently performed by other professionals, documentation of which is set out in the following Parts I/II appendices: Appendix A (Metes & Bound Survey, separately signed and sealed by responsible R.P.L.S.), Appendix C (Cultural Resources Coordination letter and Intensive Cultural Resources Survey), Appendix G (Waters of the U.S. Delineation & Wetlands Determination and Identification), Appendix H (Biological Assessment), Appendix L (Traffic Impact Analysis, separately signed and sealed by responsible P.E.), and Appendix M (Geotechnical Engineering Report, separately signed and sealed by responsible P.E.). Neel-Schaffer, Inc., David Ruhl, P.E., and Gregory Taylor, P.G. make no representation or warranty, express or implied, with regard to the accuracy or completeness of any information provided or work performed by others.

**PEACH CREEK ENVIRONMENTAL PARK
SAN JACINTO COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2406**

TYPE I PERMIT APPLICATION

**VOLUME 2 OF 5
PARTS I/II/III/IV**

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PARTS I/II/III/IV PERMIT APPLICATION

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David M. Ruhl
11/30/2021

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Addendum to Volume 2, Part III of the Technically Complete Application

The following list of minor revisions to Volume 2, Part III of the original Technically Complete Application were done under the seal of Shawn Buell, P.E.

Attachment A:

Page A-1, Sections 1.1 & 1.2 – Permitted acreage revised to 595 acres and site access route revised.

Page A-2, Permit Condition Summary – Permitted acreage revised to 595 acres.

Page A-3, Section 1.4 – Site access route revised and TIS reference updated.

Attachment B:

Page B-1, Section 1 – Site access route revised.

Drawings B.2, B.3, B.5, B.8 & B.9 are revised as noted on the drawings.

Attachment C:

Page C-1, Section 1 – Permitted acreage revised to 595 acres and Phase II area renamed.

Attachment C1:

Page C1-B-4 – Permitted acreage revised to 595 acres.

Drawings C1.1, C1.2, C1.2A, C1.2B, C1.3, C1.4, C1.5, C1.6, C1.7 & C1.8 are revised as noted on the drawings.

Attachment C2:

Page C2-1, Section 1 – Phase II reference deleted.

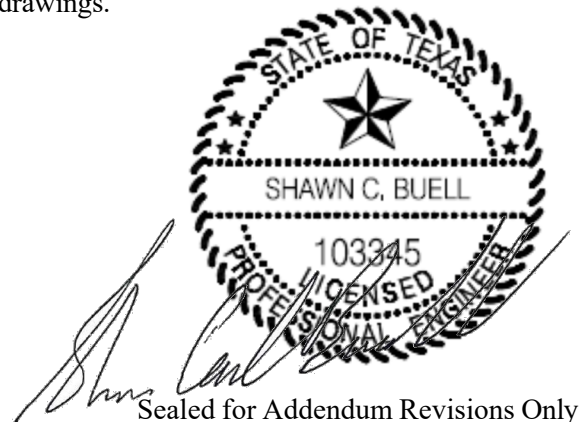
Drawings C2.1 and C2.3 are revised as noted on the drawings.

Attachment C3:

Drawings C3.1, C3.2 and C3.3 are revised as noted on drawings.

Attachment C4:

Drawings C4.1, C4.2 and C4.3 are revised as noted on drawings.



Sealed for Addendum Revisions Only

8-31-2023

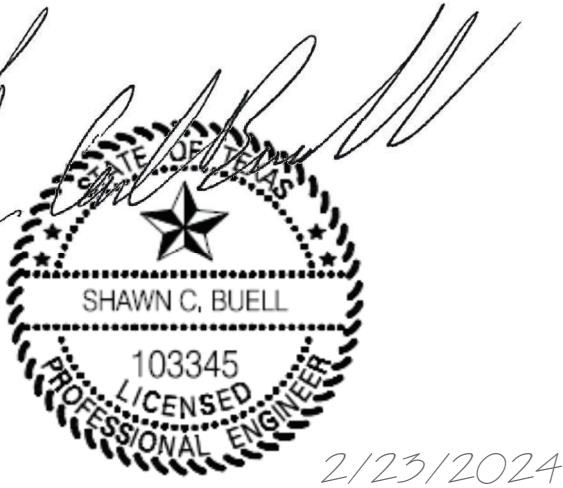
Technically Complete Application

Addendum 2 to Volume 2, Part III of the Technically Complete Application

The following list of minor revisions to Volume 2, Part III of the original Technically Complete Application were done under the seal of Shawn Buell, P.E.

Attachment C1:

Drawings C1.5, C1.6, C1.7 & C1.8 are revised to correct the southeast corner of the landfill boundary.



Sealed for Addendum 2 Revisions Only

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**PEACH CREEK ENVIRONMENTAL PARK
SAN JACINTO COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2406**

**TYPE I PERMIT APPLICATION
PART III – SITE DEVELOPMENT PLAN**

**ATTACHMENT A
PART III OVERVIEW**

Prepared for

PC-II, LLC

Rev. 4, October 11, 2021



Prepared by

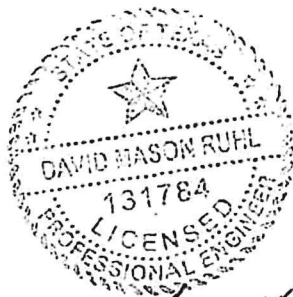
[Signature] 10/11/2021
NEEL-SCHAFER, INC.
13430 NW Freeway, Suite 650
Houston, TX 77040
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David Mason Ruhl
10-11-2021

Consistent with 30 TAC §330.63(a), this Part III overview narrative is included as Attachment A – Part III overview. Attachment A provides the criteria used in the design of this facility for safeguarding the health, welfare and physical property of the public and the environment. The Part III overview was prepared in consideration of the geology, soil conditions, drainage, land use, zoning, adequacy of access roads and highways, and other considerations specific to this facility.

1.1 Site Location and History

PC-II, LLC (PC-II) intends to permit and operate a new municipal solid waste facility in San Jacinto County, Texas. Peach Creek Environmental Park (PCEP) includes a proposed Type I municipal solid waste disposal facility. The site entrance will be located approximately 6.0 miles northwest of the intersection of US 59 and Business SH 105. The access route is via FM 1725 and Fostoria Tram Road to the facility access road. The proposed facility is intended to provide waste disposal for residences, businesses and institutions in San Jacinto and nearby counties. The facility is designed to protect the health and safety of the people in the region.

PCEP will include approximately 595 acres (the site) owned by PC-II, LLC. The overall property consists of generally flat terrain with pine timber land. The waste disposal area, to be located in the eastern portion of the site (Phase I), has a landfill footprint of approximately 115 acres. PCEP is in the San Jacinto River drainage basin. Jayhawker Creek traverses the property north to south and west of the Phase I area. Jayhawker Creek drains into Peach Creek which eventually drains into Caney Creek prior to discharging into Lake Houston approximately 17 miles south of the site. Surface water from the western portion of the site drains into Blue Branch which turns into Gum Branch prior to also discharging into Peach Creek.

1.2 Facility Description

The proposed PCEP site will encompass approximately 595 acres. The landfill facility will be accessed from Fostoria Tram Road via an access road. A gatehouse and scales will be provided at the entrance to the perimeter road. Additional facilities will include a maintenance area, citizen's convenience center, reusable materials staging area, large item storage area, used/scrap tire storage area, wood waste processing area, leachate storage facility, and truck wheel wash.

The landfill footprint will cover approximately 115 acres and is intended to provide about 21.4 years of site life. The landfill method will be below-grade fill with 3H:1V liner sidewall slopes and aerial fill with 4H:1V final cover side slopes, with a maximum 6 percent final cover top slope. The drainage system is designed to meet TCEQ and EPA requirements for run-on and runoff. The landfill liner, leachate collection, final cover, gas monitoring, and groundwater monitoring systems are designed to meet TCEQ requirements.

The proposed landfill will have a capacity of approximately 16.3 million cubic yards of waste and daily/intermediate cover, or approximately 9,780,000 million tons of waste.

The landfill will receive an estimated 371,800 tons of waste (approximately 1,300 tons per day) in the initial year following construction of the facility. The waste acceptance rate will vary for the life of the facility depending on market conditions. The maximum rate of waste disposal is expected to be approximately 598,017 tons per year (approximately 2,091 tons per day). The facility is expected to receive waste five and one-half (5.5) days per week.

The following table provides a summary of the current proposed permit conditions:

PERMIT CONDITION SUMMARY

Description	Proposed Condition
Permitted Area (site)	595 acres
Landfill Limits (Phase I)	115 Acres
Total Permitted Capacity	16.3 million cubic yards
Total Projected Site Life	21.4 years
Maximum Elevation of Final Cover (msl)	385.4 feet

The major classifications of solid waste to be accepted for disposal at PCEP are included in Part II, Section 2.2 and include municipal solid waste, commercial solid waste, yard waste, nonhazardous industrial waste (Class 2 and Class 3), construction-demolition waste and certain special wastes identified below. Special wastes accepted at the facility per §330.171(c) include regulated asbestos-containing materials (RACM), nonregulated asbestos-containing materials (non-RACM), and empty containers. Empty containers may include RCRA-empty containers and empty containers used for pesticides, herbicides, fungicides, or rodenticides which prior to disposal have been triple-rinsed prior to receipt, rendered unusable prior to or upon receipt at the landfill and covered by the end of the same working day they are received. In addition, other special wastes may be accepted based on a waste-specific approval as authorized by §330.171(b) and the facility. The waste classifications are defined in §330.3.

PCEP is proposed to include units for storage and processing of waste and reuse/recyclable materials including a large item storage area, leachate storage facility, reusable materials staging area, citizen's convenience center, used/scrap tire storage area and wood waste processing area. Materials accepted for storage or reuse, or recycling include construction and demolition wastes, white goods, inert materials, asphalt pavement or asphaltic concrete, used or scrap tires, brush, and yard waste. Some of these areas will move as the landfill is developed to conveniently store, process and/or reuse these materials. In addition, municipal solid waste may be temporarily stored at the citizen's convenience center. All waste storage units and activities will be located at least 125 feet from the permit boundary and outside the required Type I landfill buffer as required by TCEQ (See Att. B Drawings).

PCEP will not accept Class 1 industrial waste other than RACM, untreated medical waste, sewage, dead animals and/or slaughterhouse waste, drugs, contaminated foods or contaminated beverages other than those contained in normal household waste, pesticide containers unless they have been properly triple-rinsed in accordance with TCEQ regulations, soil contaminated by petroleum hydrocarbons in excess greater than 1,500 milligrams per kilogram total petroleum hydrocarbons or contaminated by constituents of concern that exceed the concentrations listed in Table 1 of §335.521(a)(1), waste from commercial or industrial wastewater treatment plants, air pollution control facilities, and tanks, drums, or containers used for shipping or storing any material that has been listed as a hazardous constituent in 40 Code of Federal Regulations (CFR) Part 261, Appendix VIII but has not been listed as a commercial chemical product in 40 CFR §261.33(e) or (f), waste from oil, gas, and geothermal activities subject to regulation by the Railroad Commission of Texas, municipal and water supply treatment plant or other types of sewage treatment plant sludges, grease trap waste, grit trap waste, liquid waste from municipal sources, hazardous waste from conditionally exempt small quantity generators, or out-of-state wastes.

Consistent with §330.15, the facility will not accept for disposal lead acid storage batteries, used motor vehicle oil, used oil filters, whole used or scrap tires, refrigerators, freezers, air conditioners or other items containing chlorinated fluorocarbons (CFCs), bulk or noncontainerized liquid waste from non-household sources, regulated hazardous waste, polychlorinated biphenyls (PCB) waste, radioactive materials, or other wastes prohibited by TCEQ regulations.

1.3 Land Use and Zoning

Land Use is discussed in Part II, Section 7. The PCEP is not located within the limits of any city and is not within the extraterritorial jurisdiction of any city. The facility does not require zoning or other approval from any local government, nor does it require a special use permit.

1.4 Adequacy of Access Roads and Highways

A transportation study was prepared by Brian Jahn, P.E., to provide information related to access roads and vehicular traffic with respect to the facility. The transportation study is included in Part II, Appendix L, along with correspondence regarding coordination with TxDOT. Access will be provided to PCEP via Business SH 105, FM 1725 and Fostoria Tram Road to the facility access drive. There are no known weight restrictions on roads in the proximity of the facility other than the maximum legal weight limit of 80,000 pounds. Refer to Part II, Appendix L, Transportation Study, for a full traffic analysis and a TxDOT coordination letter request.

According to the study by Brian Jahn, P.E., there are no existing or planned restrictions on the main access roadways within one mile of the site that would preclude safe and efficient operations for landfill vehicles and other traffic and roadway analysis.

Consistent with 30 TAC §330.63(b), the general facility design information is included in Attachment B – General Facility Design. This application includes narrative and drawings that provide the required general facility design information, a discussion of facility access control as required by §330.63(b)(1), a generalized process design and working plan of the facility that describes waste movement as required by §330.63(b)(2), a description of how solid waste processing facilities will facilitate proper cleaning as required by §330.63(b)(3), a description of how all liquids resulting from the operation of solid waste processing facilities will be disposed of in a manner that will not cause surface water or groundwater pollution as required by §330.63(b)(4), and a general discussion of how the facility is designed to protect endangered and threatened species as required by §330.63(b)(5).

3 FACILITY SURFACE WATER DRAINAGE DESIGN

30 TAC §330.63(c)

Consistent with 30 TAC §330.63(c), the facility surface water drainage design information is included in Attachment C – Facility Surface Water Drainage Report. Attachment C includes narrative discussion, drawings, and calculations that demonstrate how the facility is designed to meet the drainage and flood control requirements of §330.63(c) and §§330.303, 330.305, and 330.307. The surface water drainage design report includes analyses of the existing conditions, post development conditions, and design of the surface water management system including final cover drainage facilities, perimeter drainage channels, and detention and sedimentation ponds; it also includes an erosion and sediment control plan for all phases of landfill development. The facility surface water drainage report demonstrates that existing drainage patterns will not be adversely altered. In addition, it includes information regarding the 100-year floodplain and a demonstration that the proposed landfill footprint and proposed storage and processing units are not located within the 100-year floodplain.

Consistent with 30 TAC §330.63(d), the waste management unit design information is included in Attachment D – Waste Management Unit Design. Attachment D includes a narrative, drawings, and calculations that demonstrate how the facility is designed to meet §330.63(d)(1) for storage units and §330.63(d)(4) for landfill units.

The storage units located within the facility boundary will include a large item storage area, reusable materials staging area, citizen's convenience area, used/scrap tire storage area, wood waste processing area, leachate storage facility, and truck wheel wash. Attachment B – General Facility Design provides details on these storage units. Attachment B also includes a narrative and drawings that demonstrate how the facility is designed to meet §330.63(b) and §330.63(d)(1) for general facility design and waste management unit design.

The landfill unit has been designed to meet the requirements of §330.63(d)(4), §330.331(a)(2) and §330.331(b) for a composite liner and the requirements of §330.333 for a leachate collection system. The landfill unit design includes provisions for all-weather operations, proposed landfill method, elevation of deepest excavation, maximum elevation of waste and final cover, waste disposal rate and operating life of the landfill, landfill unit cross sections, and construction and design details of the landfill unit. In addition, Attachment D includes the geotechnical design report for the facility, the liner quality control plan, the leachate and contaminated water management plan, and the final cover quality control plan.

Consistent with 30 TAC §330.63(e), the geology and soil information are included in Attachment E – Geology Report. Attachment E includes a narrative discussion, evaluations, and figures that provide the information required by §330.63(e). The geology report includes descriptions of the regional geology and hydrogeology, geologic process, regional aquifers, subsurface investigations, geotechnical properties of subsurface soils, and fault and seismic conditions. The geology report includes the evaluation and demonstrations which confirm that the geology and soil conditions are suitable for operations as a municipal solid waste disposal facility.

Consistent with 30 TAC §330.63(f), the groundwater sampling and analysis plan is included in Attachment F – Groundwater Monitoring Plan. Attachment F includes a narrative discussion, evaluations, and figures that provide the information required by §330.63(f) and §§330.401 through 330.421. The groundwater monitoring plan includes, among other things, the point of compliance, contaminant pathway analysis, groundwater monitoring program, detection monitoring program, and groundwater sampling and analysis plan.

Consistent with 30 TAC §330.63(g), the landfill gas management plan is included as Attachment G – Landfill Gas Management Plan. Attachment G includes narrative, evaluations, and drawings that provide the information required by §330.63(g) and §330.371. The landfill gas management plan includes the requirements for landfill gas monitoring at the landfill perimeter and in PCEP enclosed structures, a landfill gas control system, and procedures to be implemented in the event that concentrations of methane in excess of the regulatory limits are measured at the facility boundary or in PCEP enclosed structures.

Consistent with 30 TAC §330.63(h), the closure plan is included as Attachment H – Closure Plan. Attachment H includes narrative, evaluations, and maps and drawings that provide the information required by §330.63(h), §330.457, §330.459, and §330.461. The closure plan includes the procedures to be taken for closure of the facility and following final acceptance of waste and certification of final closure. The closure plan describes the final cover system, closure procedures, and a closure schedule.

Consistent with 30 TAC §330.63(i), the postclosure plan is included as Attachment I – Postclosure Plan. Attachment I include a narrative discussion that provides the information required by §330.63(i), §330.463 and §330.465. The postclosure plan includes the procedures to be taken for postclosure care maintenance of the facility following closure including postclosure care certification. The postclosure plan describes the postclosure care activities, persons responsible for conducting postclosure care activities, and postclosure land use.

Consistent with 30 TAC §330.63(j), the cost estimates for closure and postclosure care are included as Attachment J – Cost Estimates for Closure and Postclosure Care. Attachment J includes a narrative discussion, evaluations, calculations, and drawings that provide the information required by §330.63(j). The detailed cost estimate for closure care meets the requirements of §330.503. The detailed cost estimate for postclosure care meets the requirements of §330.507. This plan also provides procedures to adjust the cost estimates during the life of the facility and describes the evidence of financial assurance, as required.

**PEACH CREEK ENVIRONMENTAL PARK
SAN JACINTO COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2406**

TYPE I PERMIT APPLICATION

PART III – FACILITY INVESTIGATION AND DESIGN

**ATTACHMENT B
GENERAL FACILITY DESIGN**

Prepared for

PC-II, LLC

Rev. 4, August 13, 2021



NEEL-SCHAFER, INC.
13430 NW Freeway, Suite 650
Houston, TX 77040
713-783-7117

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APPENDIX B1 – DRAWINGS

Drawing B.1 – Waste Management Flow Chart

Drawing B.2 – General Permit Boundary Plan

Drawing B.3 – Waste Processing and Storage Units Plan

Drawing B.4 – Truck Wheel Wash

Drawing B.5 – Citizen's Convenience Center

Drawing B.6 – Reusable Materials Staging Area

Drawing B.7 – Leachate Storage Facility

Drawing B.8 – Large Item Storage Area

Drawing B.9 – Gate House and Scales Plan



Access to PCEP will be controlled by a perimeter fence located around the Phase I area and a locking gate at the site entrance. The fence and gate will prevent the entry of livestock, protect the public from exposure to potential health and safety hazards, discourage unauthorized public access to the disposal operations, and discourage unauthorized entry or uncontrolled disposal of solid waste or prohibited materials. Perimeter fencing consisting of barbed wire, woven wire, wooden fencing, plastic fencing, pipe fencing, or other suitable material will be provided.

A gate constructed of suitable fencing materials will be located on the entrance road. The gate will be locked when the landfill is not accepting waste. The perimeter fence and gate will be inspected monthly, and maintenance will be performed, as necessary. Should a breach be detected during inspection or at any other time, efforts will be made to make repairs within 24 hours of detection. Should repairs require more than 24 hours, temporary repairs will be performed and the TCEQ regional office will be notified when permanent repairs will be completed. The TCEQ regional office will be notified of the breach within 24 hours of detection unless permanent repairs are made within eight hours of detection.

Access to PCEP is provided from Fostoria Tram Road and is limited to the access road through the gatehouse area. Access control to the facility is provided by the perimeter fencing and gated site entrance. Entrance to the landfill is monitored by the gate attendant during site operating hours. Beyond waste acceptance hours, the gate to the site will be locked.

Entry to the active portion of the site will be restricted to designated personnel, approved waste haulers, properly identified persons whose entry is authorized by site management, and regulatory personnel. Visitors may be allowed on the active area only when accompanied by a site representative. Signs will be located along the entrance road directing traffic to the gatehouse. The gate attendant will restrict site access to authorized vehicles only and direct those vehicles appropriately.

Waste hauling vehicles will be directed to appropriate fill areas by signs located along the landfill perimeter road and access road. These vehicles will deposit their loads and depart the site. Private, commercial, or public solid waste vehicles will not be allowed access to any areas other than the active portion of the landfill. Site personnel will provide traffic directions as necessary to facilitate safe movement of vehicles. Within the site, signs will be placed along the landfill perimeter road and access road at a frequency adequate for users to determine the disposal area locations and which roads are to be used. Roads not being used for access to disposal areas will be blocked or otherwise marked as no entry.

The major classifications of solid waste to be accepted for disposal at PCEP include municipal solid waste, commercial solid waste, yard waste, nonhazardous industrial waste (Class 2 and Class 3), construction-demolition waste and certain special wastes identified below. Special wastes accepted at the facility authorized by §330.171(c) include regulated asbestos-containing materials (RACM), nonregulated asbestos containing materials (non-RACM), and empty containers. In addition, other special wastes may be accepted based on a waste-specific approval as authorized by §330.171(b) and the facility.

Waste disposal facilities include the municipal solid waste disposal area and RACM disposal area. Waste and/or reuse/recyclable processing and storage units include the large item storage area, reusable materials staging area, citizen's convenience center, used/scrap tire storage area, wood waste processing area, leachate storage facility, and truck wheel wash. Appendix B1 includes schematic drawings and details that depict disposal, waste and/or reuse/recyclables processing, and reuse/recyclable storage activities that are part of the PCEP.

Drawing B.1 is a flow diagram that provides the storage, processing, and disposal sequences for the various wastes accepted. Drawing B.2 is a schematic drawing of the permit boundary and the Phase I area which depicts the various phases of collection, processing, and disposal for the types of wastes accepted at the facility. Drawing B.3 depicts the location of processing and/or storage units that are located within Phase I. Schematic details of the processing and/or storage units are depicted on Drawings B.4, B.5, B.6, B.7 and B.8. The details include generalized construction details of slab and subsurface component for each processing and storage unit.

Waste enters the facility via the site entrance road. The gate attendant observes the incoming waste at the gatehouse, conducts waste screening and weighing, and documents the incoming waste. The gate attendant is familiar with the rules and regulations governing the various types of waste that can or cannot be accepted into this facility and will direct the waste hauler to the appropriate waste disposal, storage, or processing area. Gatehouse personnel will also have the authority to reject prohibited wastes and have the rejected waste removed by the waste hauler or transporter immediately upon discovery.

Trained personnel will observe waste unloading at the active working face and large item storage area and will have the authority and responsibility to reject loads that contain prohibited wastes. Working face personnel will also have the authority to have prohibited waste removed by the waste hauler or transporter immediately upon discovery.

Waste Disposal

The proposed landfill liner, leachate collection, and final cover systems will meet all applicable requirements of TCEQ regulations and guidelines. Provisions addressing design and construction are addressed in the liner quality control plan, the leachate and contaminated water management plan, and the final cover quality control plan.

The waste disposal area will be excavated with side slopes no steeper than 3H:1V. The liner system will be constructed following excavation of a new waste disposal area. The proposed liner system for the facility is generally described below with layers listed from top to bottom. In addition, a 12-inch compacted clay bridge (95% Standard Proctor) underlain by an 8 oz. nonwoven geotextile will be constructed over any granular material (Sand or gravel in Stratum II) which will require grading, shaping, and bridging to establish adequate subgrade elevations for documenting, on a grid system, the thickness and installation of

the 2-ft compacted clay liner. All geotechnical and geological investigations, testing and reporting were performed by Raba Kistner on behalf of PC-II. Stability analysis was also performed by Raba Kistner and is included in Att D-5.

COMPOSITE LINER SYSTEM (TOP TO BOTTOM)
24-inch Soil Protective Cover
Drainage Geocomposite LCS Layer (270-mil)
HDPE Textured Geomembrane Liner (60-mil)
24-inch Compacted Clay Liner ($\leq 1 \times 10^{-7}$ cm/sec)

Information regarding materials and construction quality assurance are included in Attachment D7 – Liner Quality Control Plan. Liner system details are included in Attachment D3 – Construction Design Details.

The leachate collection system (LCS) has been designed with a geocomposite drainage layer, leachate collection trench, and leachate collection sumps to remove leachate from the landfill. The LCS layout and details are shown in Part III, Attachment D3 – Construction Design Details. Design of the LCS is discussed in Part III, Attachment D6 – Leachate and Contaminated Water Management Plan. Information regarding materials and construction quality assurance are included in Part III, Attachment D7 – Liner Quality Control Plan.

The proposed landfill development method for the site is a combination of the area-excavation fill followed by aerial fill to the proposed landfill completion height. Landfill development will generally follow the sequence of development as shown on Drawing B.2, which will be in the order the cells are numbered.

Waste accepted for disposal will be directed to the active working face. Waste will be unloaded within the active working face, spread in layers, and thoroughly compacted. Daily cover of waste will be applied to control disease vectors, windblown waste, odors, fires, scavenging, and to promote runoff from the fill area. Daily cover consisting of a minimum of six inches of soil will be placed over wastes at the end of each working day for odor control.

The aerial fill side slopes will not be steeper than 4H:1V, and the aerial fill top slope will be approximately six percent. A composite final cover will be constructed over the entire landfill. As shown in Part III, Attachment D3 – Construction Design Details, the final cover is generally described below with layers from top to bottom.

COMPOSITE FINAL COVER SYSTEM (TOP TO BOTTOM)
24-inch Erosion Control Layer
Drainage Geocomposite Layer – Sideslope Only (200-mil)
Cushion Geotextile Layer – Topslope Only (8 oz/sy)
LLDPE Textured Geomembrane Cover (40-mil)
18-inch Infiltration Layer ($\leq 1 \times 10^{-5}$ cm/sec)

Final cover placement will generally follow the sequence of development as shown on Drawing B.2 and will be ongoing as the site is developed. Cells will be closed according to the closure plan provided in Part III, Attachment H – Closure Plan

RACM

Regulated asbestos-containing material (RACM) will be accepted at PCEP as defined in 40 Code of Federal Regulations Part 61 in accordance with 30 TAC §330.171(c)(3). PCEP, by inclusion of the requirements of §330.171(c)(3) in the Site Operating Plan, is providing written notification to the executive director of the intent of the facility to accept RACM. The landfill, in accordance with §330.171(c)(3)(A), dedicates all the Subtitle D landfill units as potentially receiving RACM. On days when RACM is accepted, a RACM unloading, and disposal area will be provided separate from the active waste disposal area. Control will be used to confine the RACM area to a size consistent with the rate of incoming RACM while allowing for safe and efficient operation. After unloading, RACM waste will be covered with a minimum of three feet of other solid waste or one foot of earthen material. Daily cover consisting of a minimum of six inches of soil will be placed over RACM wastes at the end of each working day. The procedures for recordkeeping, acceptance, and disposal of RACM at the facility are further addressed in Part IV – Site Operating Plan.

Large Item Storage Area

A storage area for large items, white goods and scrap/used tires will be provided at the location next to the perimeter road on Drawing B.3 and B.8. All large item storage areas will be located at least 125-ft from the permit boundary and outside the required 125 ft buffer required by TCEQ. An additional location may also be provided for temporary storage near the active working face. Large items and white goods include ovens, dishwashers, freezers, air conditioners, scrap metal and other large items. Typically, large items and white goods are received in source-separated loads. Should large items or white goods be received in mixed loads, they will be removed from the active face and staged on the ground near the active working face, or citizen's convenience center. The large items and white goods are unloaded and then transferred into steel roll-off containers for storing until transport to an off-site recycler. The roll-off containers will be covered with tarps to prevent rainfall from accumulating inside the containers and to prevent generation of contaminated water. The elimination of contaminated water within the roll-off containers will limit the potential for generating odors within the area. Large items will not be stored more than 180 days. Large items that are not recycled will be disposed of at the working face. Large items will be stored in roll-offs covered with tarps when not in use or in enclosed container boxes. Surface water runoff will be diverted around the large item storage area.

Reusable Materials Staging Area

Inert materials such as brick, concrete, etc., and non-inert materials such as asphalt may be stockpiled for use on facility access roads and staging areas or for erosion control in drainage structures. Asphalt will not be used for erosion control in drainage structures. The reusable materials staging area will be located within the waste disposal footprint and will be relocated periodically as the active working face moves. The size of the stockpiles may vary depending on the amount of materials received at any given time. Typical details for the reusable materials staging area are provide on Drawing B.6 and a typical location is shown on Drawing B.3. Since the brick and concrete materials are inert, run-on and runoff from rainfall will not be controlled. Odor control measures will not be used for these materials. Since asphalt is not an inert material, it will be managed similar to the reuse area inside the active cell over the lined landfill with stormwater runoff and runoff control berms. which will prevent runoff of contaminated water, discharge of waste, or the creation of nuisance conditions. Any contaminated water within the bermed area will be removed and disposed of in the leachate storage tanks as needed. These inert and non-inert materials will continuously be reused for site operations with no time limit proposed for storage of these materials.

Citizen's Convenience Center

A citizen's convenience center for waste drop-off will be located near the site entrance facilities, as shown on Drawings B.3 and B.5. General construction details of the Citizen's Convenience Center are provided on Drawing B.5. Large roll-off containers, as well as smaller containers for recycled goods, will be provided for citizen's use and will be located at least 125-ft from the permit boundary and outside the required 125-ft buffer required by TCEQ. Containers with waste will be emptied at the active working face at the end of each day to minimize odors and accumulation of contaminated water. Containers that are empty will be covered with a tarp at the end of the day to prevent rainfall from accumulating inside the containers and to prevent generation of contaminated waters. Recycle containers will periodically be transported to an appropriate recycling facility. Large items and white goods may be stored at the citizen's convenience center in steel roll-off containers and will be periodically transported to an appropriate recycling facility.

Used/Scrap Tire Storage Area

The PCEP will not intentionally or knowingly accept whole used or scrap tires for disposal unless processed prior to disposal in a manner acceptable to the executive director. Scrap tires will be accepted from the public or from community clean-up efforts and stored in containers or trailers prior to shipment offsite. The used/scrap tire storage area will be located within the large item storage area. The used/scrap tire storage area will be located at least 125-ft from the permit boundary and outside the required 125 ft buffer required by TCEQ. Scrap tires identified during landfill operations and generated through maintenance will be accumulated on site by placing them in containers or trailers prior to shipment offsite. The total quantity of tires will not exceed 500 scrap tires (or weight equivalent tire pieces) on the ground, or 2,000 scrap tires in containers. Tire containers and an area designated for scrap tires will be kept within the large item storage area or near the active working face. Manifests will be used for shipment of scrap tires offsite. A registration for the used/scrap tire storage is not required. However, operational standards required by the TCEQ for used/scrap tires are discussed in Part IV- SOP.

Wood Waste Processing Area

The wood waste processing area will be located within the landfill footprint and will process incoming yard trimmings, clean wood materials and vegetative materials, including trees and brush, into wood chips and mulch. The wood chips and mulch will only be used on-site and will be stored in the processing area for a maximum time of 60 days. The wood chips and mulch will be stored in small piles and will be managed to prevent fire, safety, or health hazards in accordance with 30 TAC §330.209(a). The wood waste processing area will not be larger than approximately 125 feet by 100 feet and a typical location is shown on Drawing B.3 and other plan view drawings.

Leachate Storage Facility

Primary leachate storage will be provided by the leachate sumps, which will be located within each landfill cell. Leachate will be pumped from the sumps directly into transport trucks and transported offsite or through a dual contained leachate force main to the leachate storage facility, as shown on Drawings B.7. Landfill gas condensate will not be introduced back into the landfill but pumped via condensate pump stations and piping directly to the leachate tanks. The leachate storage facility will be located along the perimeter road just north of the landfill to allow access for transport trucks. As shown on Drawings B.2 and B.3, the leachate tanks will be located at least 125-ft from the permit boundary and outside the 125-ft buffer required by TCEQ. General construction details of the leachate storage facility are provided on

Drawing B.7. The storage facility will consist of up to two 250,000-gallon storage tanks within a secondary containment structure, which will be installed separately based on leachate generation. The secondary containment structure will provide containment, with 12 inches of freeboard, for volume from one leachate storage tank and precipitation from the 25-year, 24-hour storm event or 110 percent of the volume from one leachate storage tank. Secondary containment volume calculations are provided in Attachment D6, Section 2.3 – Leachate Storage and Appendix D6-D.

Truck Wheel Wash

The truck wheel wash will be located near the scale house, as shown on Drawing B.3. As shown on Drawing B.4, the wheel wash is a drive-through structure with a series of metal grates and water nozzles. As vehicles drive across the grates, the nozzles spray the undercarriage and sides with water, and the mud drops through the grates into a settling basin. The accumulated mud will be periodically removed from a settling basin and placed on the active working face of the landfill. The periodic removal of mud and contaminated water will provide odor control for the truck wheel wash. The water removed from the system will be treated as contaminated water in accordance with Attachment D6 – Leachate and Contaminated Water Plan.

The processing and/or storage units will be maintained and operated to manage run-on and runoff during the peak discharge from the 25-year, 24-hour storm event to prevent the off-site discharge of waste and recycled material, including, but not limited to, stored materials. Surface water in and around each processing and/or storage unit will be controlled to minimize surface water running onto, into, and off the processing and/or storage area. As discussed above, all contaminated water will be managed in a controlled manner to protect and prevent the contamination of groundwater. Should the discharge of contaminated water become necessary, the facility will obtain specific written authorization from the TCEQ prior to discharge. The landfill and its processing and/or storage units will be operated consistent with §330.15(h)(1)-(4) regarding discharge of solid wastes or pollutants into waters of the United States or Texas.

3 SANITATION

30 TAC §330.63(b)(3)

The solid waste processing and/or reuse/recyclable storage units include the large item storage area, reusable materials staging area, citizen's convenience center, used/scrap tire storage area, wood waste processing area, leachate storage facility, and truck wheel wash. Reusable materials and their uses will be limited to those specified under §330.3(151)(B). Each of the solid waste processing facilities has been designed to facilitate proper cleaning. Refer to Section 2 – Waste Movement for a discussion of each of the solid waste processing facilities. Operational requirements for each facility are described in Part IV – Site Operating Plan, including a discussion of surface water controls, cleaning facilities, and contaminated water.

Large Item Storage Area

Large items and white goods received are transferred into steel roll-off containers for storage. Each steel roll-off container is tarped to prevent rainfall from accumulating inside the containers. Containers will be cleaned by removing loose material for disposal at the working face and washing down the containers with water. Wash water will be treated as contaminated water and disposed of in accordance with Part III, Attachment D6, Section 3.

Reusable Materials Staging Area

Inert and non-inert materials will be stockpiled and reused for site operations. Surface water run-on and runoff controls are not required for inert materials such as brick and concrete but will be required for non-inert materials such as asphalt. Stockpiles of non-inert materials will be located over lined waste disposal areas. Runoff of contaminated water will be prevented by diversion and containment berms as shown on Drawing B.6. Any contaminated water that is collected will be disposed of in accordance with Part III, Attachment D6, Section 3.

Citizen's Convenience Center

The citizen's convenience center will receive municipal solid waste from the public. Any waste received will be loaded into steel roll-off containers. Each container is tarped to prevent rainfall from accumulating inside the containers. Waste in the containers will be disposed of at the working face. Containers will be cleaned as needed by washing down the containers with water. The citizen's convenience center is constructed of reinforced concrete. Should waste materials spill onto the concrete surface, the materials will be picked up and disposed of at the working face. The concrete surfaces will be cleaned as needed by washing down with water. Wash water from the steel roll-off containers or concrete surfaces will be treated as contaminated water and disposed of in accordance with Part III, Attachment D6, Section 3.

Used/Scrap Tire Storage Area

When used/scrap tires are unintentionally received at PCEP, they are transferred into containers for storage. Used/Scrap tires will be stored in enclosed containers located at the Large Item Storage Area or in a designated pile located on a concrete pad with curb. After used/scrap tires are shipped offsite, containers, and as necessary, the concrete pad will be cleaned by sweeping and removing loose material for disposal at the working face. If water is used for washing out the containers or pile area, wash water will be treated as contaminated water and disposed of in accordance with Part III, Attachment D6, Section 3.

Wood Waste Processing Area

Wood wastes received will be chipped and stockpiled only to be used for site operations. The area will consist of small piles managed to prevent litter and control fire, health hazards, and safety in accordance with §330.209(a). There are no water run-on and runoff control, or additional sanitation controls required.

Leachate Storage Facility

The leachate storage facility consists of two steel storage tanks in a reinforced concrete containment structure. Leachate storage and disposal will be in accordance with Part III, Attachment D6, Section 2.3 and 2.4. The secondary containment concrete structure will be periodically cleaned by removing loose materials from the concrete surface and disposing of materials at the working face. The concrete surfaces will be cleaned as needed by washing down with water. Wash water will be treated as contaminated water and disposed of in accordance with Part III, Attachment D6, Section 3.

Truck Wheel Wash

The truck wheel wash is constructed of metal and reinforced concrete. Accumulated mud will be periodically removed from the settling basin for disposal at the working face. The concrete surfaces will be periodically cleaned by washing down with water. Wash water will be considered contaminated water and disposed of in accordance with Part III, Attachment D6, Section 3.

The processing and/or storage units will be maintained and operated to manage run-on and runoff during the peak discharge from the 25-year, 24-hour storm event to prevent the off-site discharge of waste and recycled material, including, but not limited to, stored materials. Surface water in and around each processing and/or storage unit will be controlled to minimize surface water running onto, into, and off the processing and/or storage area. As discussed above, all contaminated water will be managed in a controlled manner to protect and prevent the contamination of groundwater. There will be no discharge of contaminated water into Jayhawker Creek, or elsewhere without specific written authorization from the TCEQ prior to discharge in strict accordance with 330.207(e). The landfill and its processing and/or storage units will be operated consistent with §330.15(h)(1)-(4) regarding discharge of solid wastes or pollutants into waters of the United States or Texas.

The design of the landfill itself and the surface water management system for the facility will prevent the discharge of solid waste, pollutants, dredged or fill material and nonpoint source pollution that would violate any of the provisions referenced in 30 TAC §330.15(h). The facility has been designed to keep contaminated surface water (water that may have contacted waste at the landfill) separated from uncontaminated stormwater runoff. Contaminated water will be collected and managed in accordance with Attachment D-6 Leachate and Contaminated Water Plan and any other relevant portions of the permit application. Per the 12-15-2020 jurisdictional determination letter from the US Army Corps of Engineers (included in Parts I/II, Appendix IIB), The PCEP will not require any Section 404 permit from the Corps. Prior to construction activities, a Notice of Intent (NOI) under the stormwater permitting requirements of TCEQ's rules will be filed qualifying the facility to construct pursuant to a general stormwater discharge permit for construction (2018 Construction General Permit (CGP) TXR150000) for sites over 5 acres. Prior to commencing operations, a Notice of Intent (NOI) under the stormwater permitting requirements of TCEQ's rules will be filed qualifying the facility to operate pursuant to a general stormwater discharge permit (Permit No. 050000) for industrial activity.

Refer to Section 2 – Waste Movement for a discussion of the solid waste processing and/or storage units and Part IV – Site Operating Plan for a discussion of operational requirements. Refer to Part III, Attachment D6 – Leachate and Contaminated Water Plan for a discussion of contaminated water management.

Headwaters, Inc. conducted a biological assessment of the site to determine the potential for state or federally listed threatened or endangered species to occur on the landfill site and the potential impacts to such species and any critical habitat areas resulting from the landfill or its operation. The assessment included a record search and a site reconnaissance by a qualified biologist. The biological assessment is in Part II, Appendix IHH. Coordination communication with the Texas Parks and Wildlife Department (TPWD) and the U. S. Fish and Wildlife Service (USFWS) is provided in Part II, Appendix IIB. A Protection and Management Plan, which includes measures for the protection of endangered and threatened species, is in Part II Appendix IV-C.

This project is being permitted by TCEQ pursuant to a Texas state permitting program and does not have a federal nexus, as a result, the federal Endangered Species Act section 7 consultation process does not apply to the project. USFWS (10/23/19 email) noted that, if section 7 were applicable, a determination of effects on federally-listed species would be required only for the red-cockaded woodpecker because the other three such species "only need to be considered for wind projects" and that, in a situation like this where the biological assessment included a "No Effects" determination regarding the red-cockaded woodpecker, conservation measures are not needed. However, inclusion of the additional species in the biological assessment and the inclusion of conservation measures in the Revised Species Protection and Management Plan makes the biological assessment and the revised species protection and management plan overly conservative, with consideration of species and conservation measures that go beyond federal requirements.

Other comments and recommendations from TPWD (10/21/19 letter) have been addressed by adding to and/or revising the application as follows:

- TPWD Gen'l Rec. #1 and #2: Addressed by adding new Site Operating Plan section 8.30, "Erosion Control".
- TPWD Gen'l Rec. #3: Addressed by adding provisions to the Erosion and Sediment Control Plan in Part III, Attachment C3, and a new Part IV, Section 8.30, Erosion Control.
- TPWD Gen'l Rec. #4: Addressed by adding a new paragraph at the end of SOP section 8.1.2 regarding the posting of speed limit signs.
- TPWD Gen'l Rec. #5: Addressed by adding a new paragraph at the end of SOP section 8.1.1 regarding facility lighting.
- TPWD Recommendation re Federal Law: Migratory Bird Treaty Act: Addressed by adding new SOP section 8.31, "Vegetation Clearing".
- TPWD Recommendations re Federal Law Endangered Species Act: Addressed in the Species Protection Plan in Part IV, Appendix IVC.
- TPWD Recommendations re State Law State Listed Species: Addressed in the Species Protection Plan in Part IV, Appendix IVC.

- TPWD Recommendations re Species of Concern: Addressed in the Species Protection Plan in Part IV, Appendix IVC.

Development of the facility shall be conducted to minimize potential impacts to endangered or threatened species. The facility and the operation of the facility will not result in the destruction or adverse modification of the critical habitat of endangered or threatened species, or cause or contribute to the taking of any endangered or threatened species.

Additional recommendations in TPWD's 1/25/2021 letter have been addressed by including in Part IV, Section 31 provisions prohibiting construction activities near active raptor nests during raptor nesting season, by incorporating into Part IV, Section 32 provisions to limit impacts to water resources by establishing and maintaining a minimum 50-foot buffer along the stream channels on the site, by prohibiting the use of at-grade stream crossings for access roads, by following BMPs in the application's erosion and sediment control plan during construction and operations, and by locating equipment staging areas in disturbed areas outside of riparian corridors.

USFWS's comment regarding federal take permits has been addressed by adding language regarding such permits to the Species Protection Plan in Part IV, Appendix IVC.

PEACH CREEK ENVIRONMENTAL PARK

APPENDIX B1

DRAWINGS

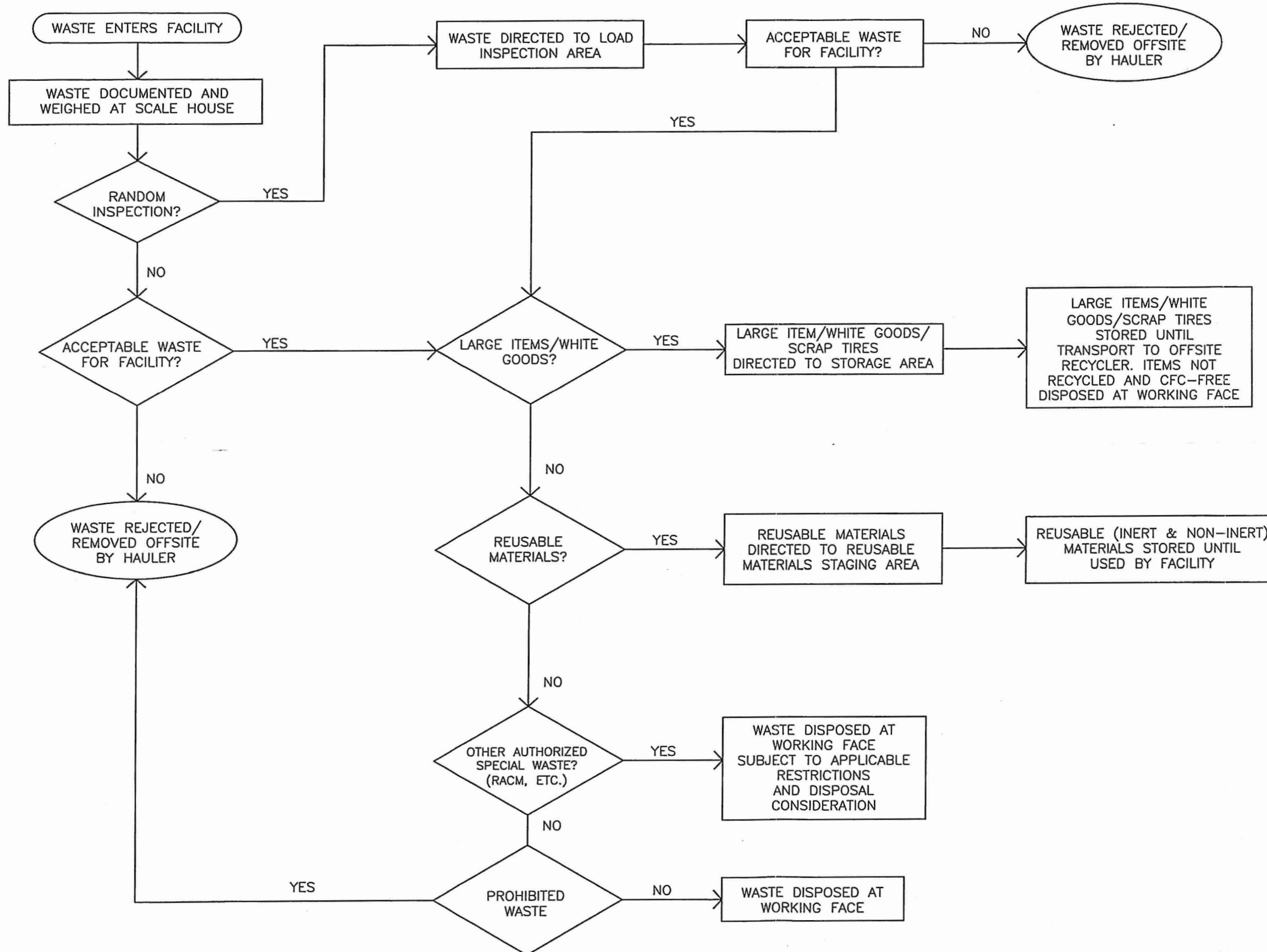
Rev. 1, December 11, 2020


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APPENDIX B1 – DRAWINGS

- B.1 Waste Management Flow Chart
- B.2 General Permit Boundary Plan
- B.3 Waste Processing and Storage Units Plan
- B.4 Truck Wheel Wash
- B.5 Citizen's Convenience Center
- B.6 Reusable Materials Staging Area
- B.7 Leachate Storage Facility
- B.8 Large Item Storage Area
- B.9 Gate House and Scales Plan





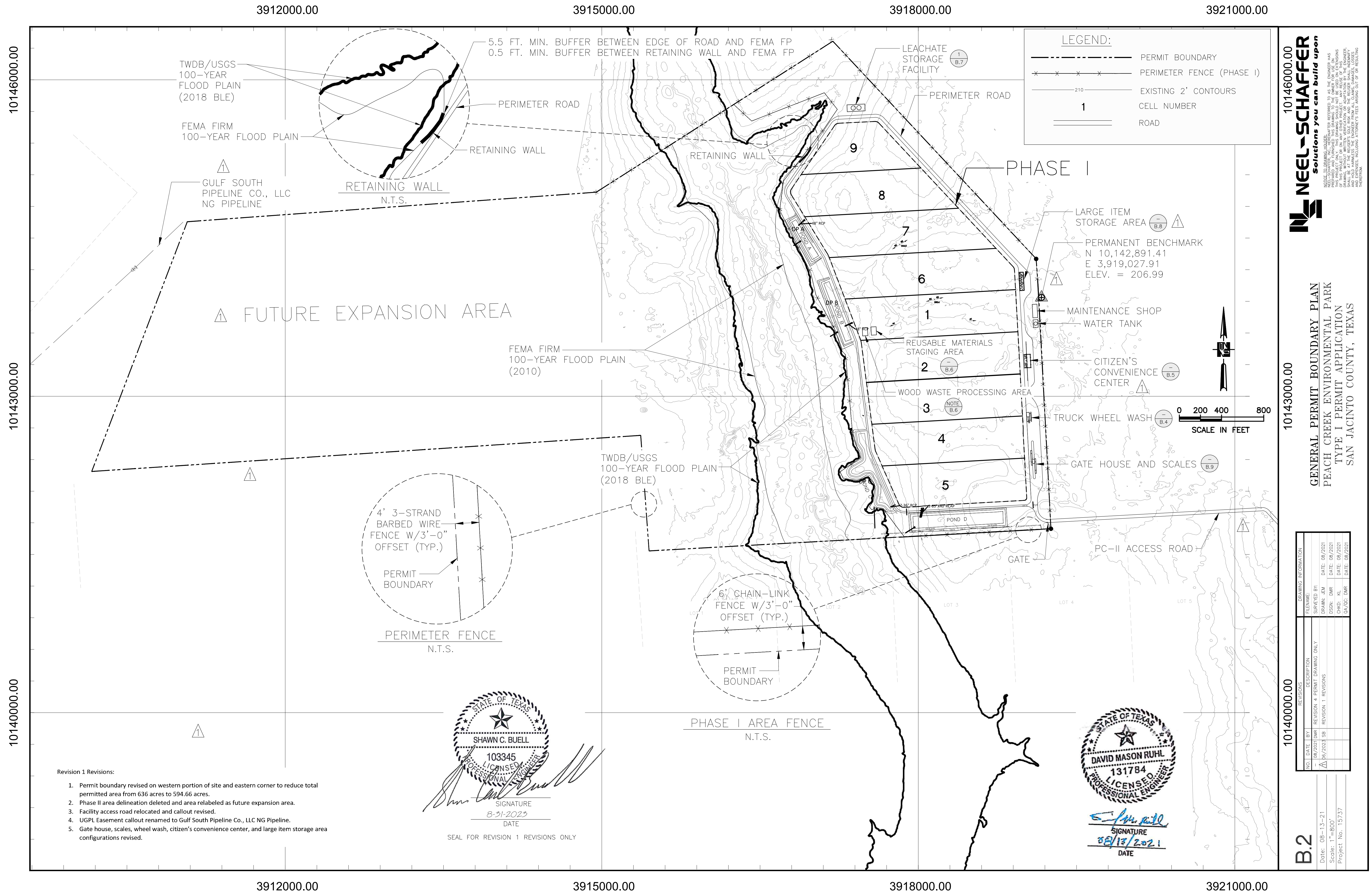

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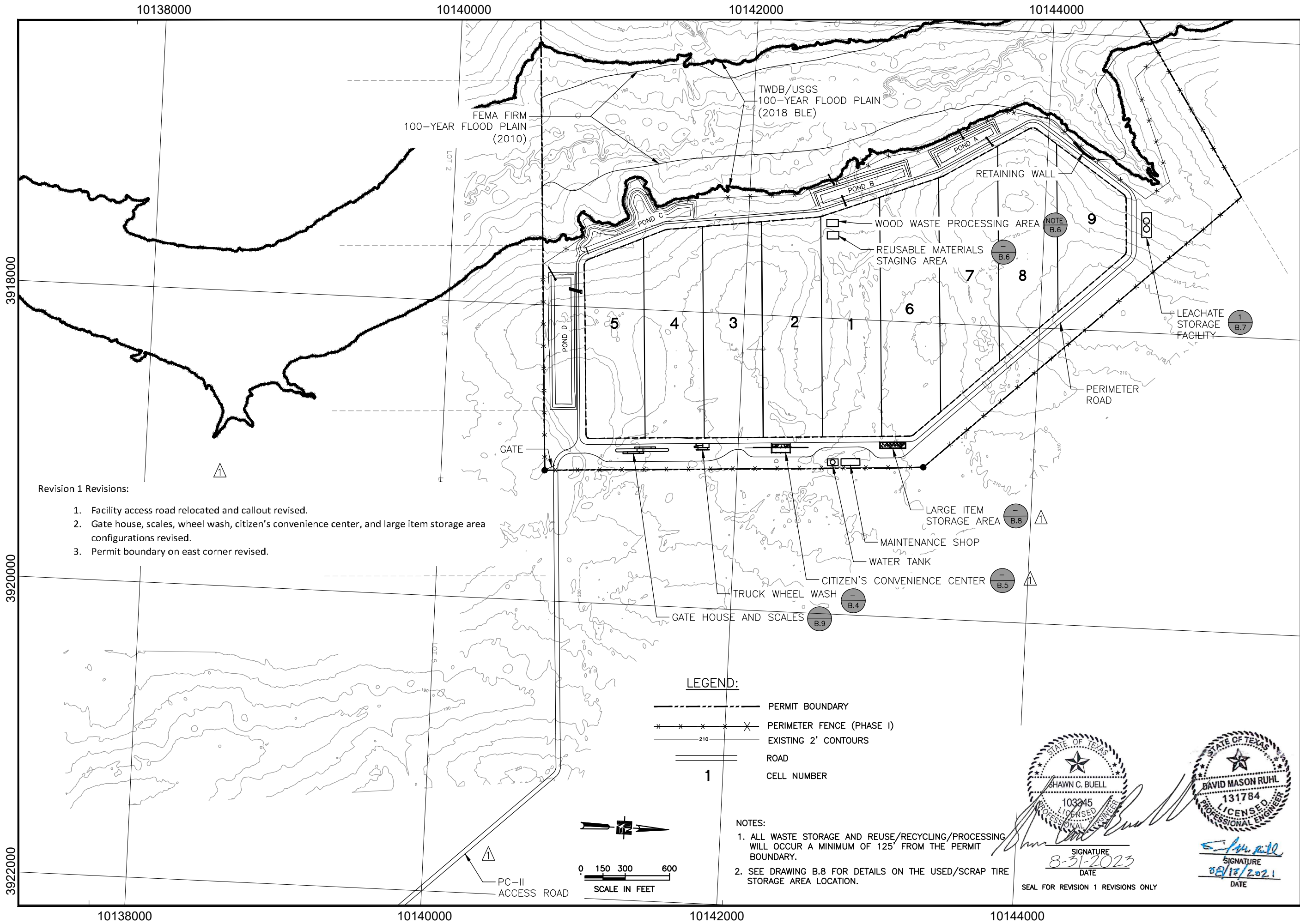
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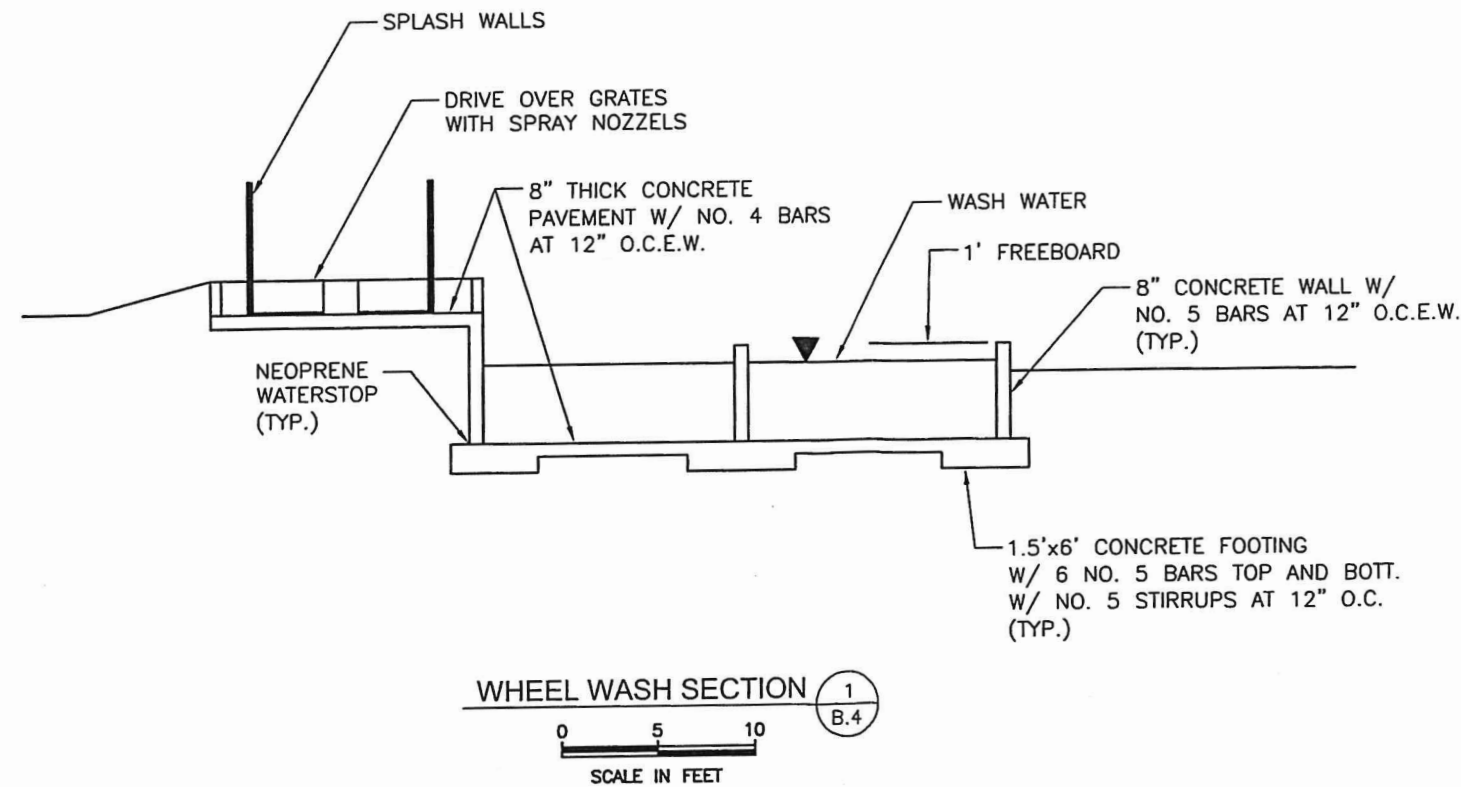
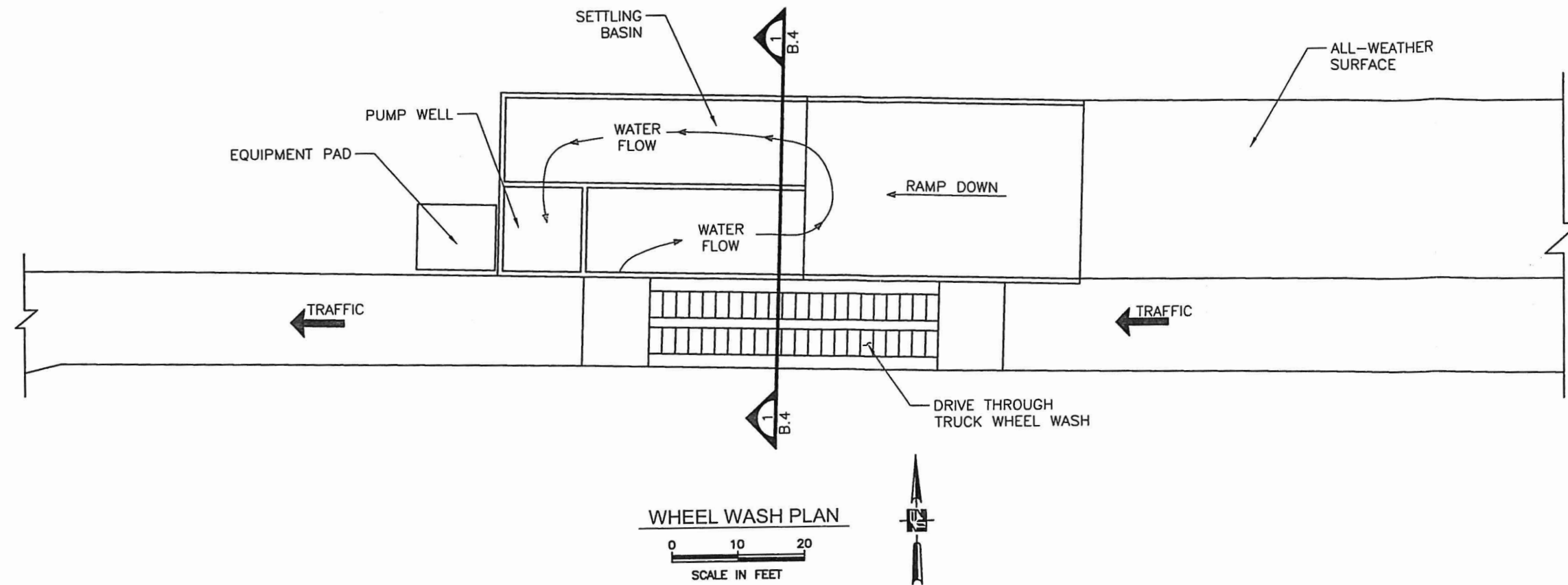
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 Project No. 15737

WASTE MANAGEMENT FLOW CHART
 PEACH CREEK ENVIRONMENTAL PARK
 TYPE I PERMIT APPLICATION
 SAN JACINTO COUNTY, TEXAS

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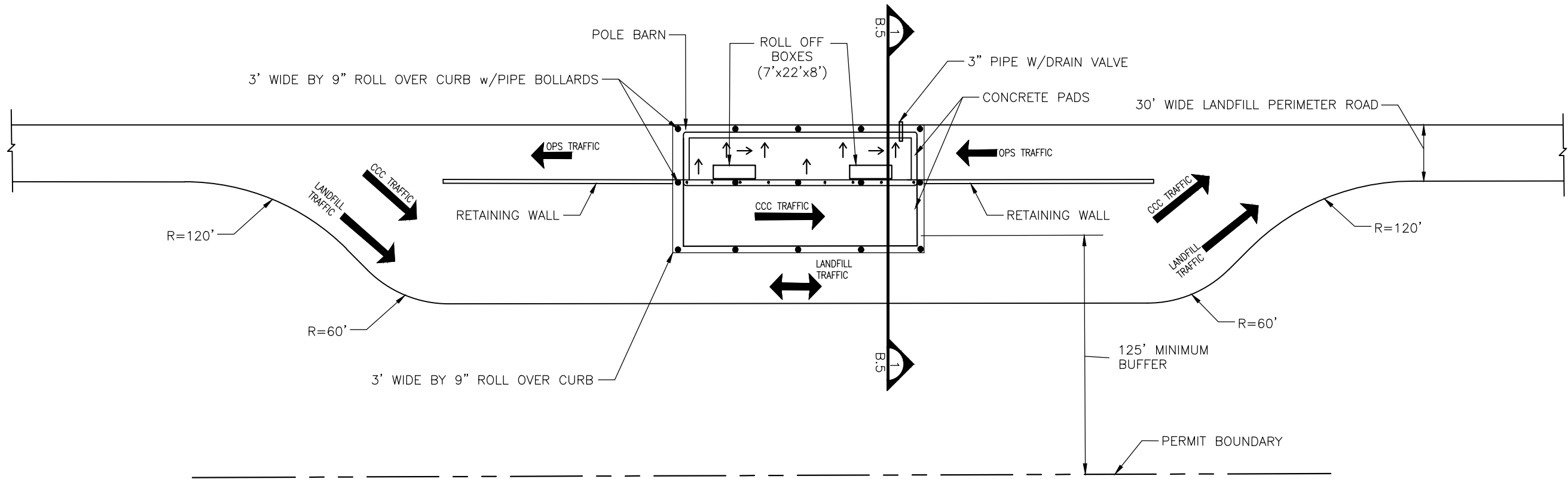


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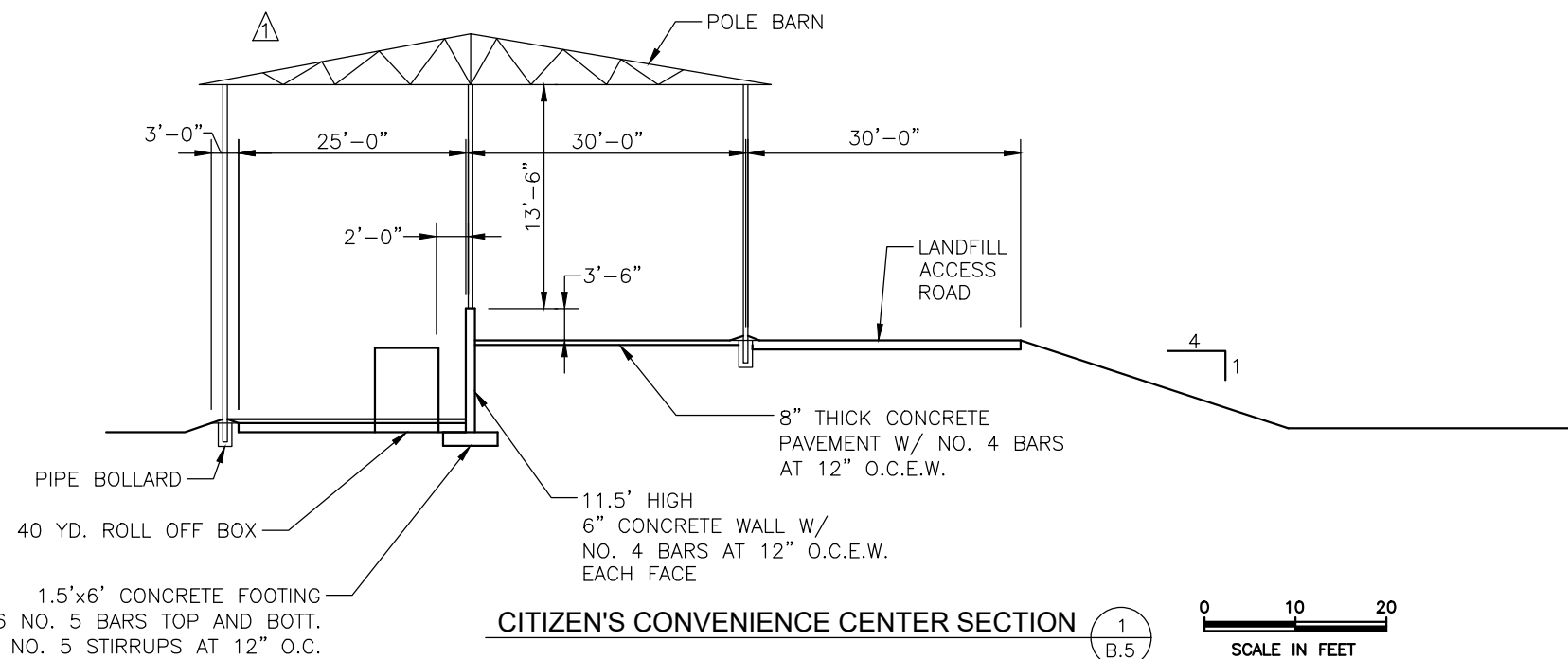


CITIZEN'S CONVENIENCE CENTER PLAN



Revision 1 Revisions:

- citizen's convenience center configuration revised.



STATE OF TEXAS

SHAWN C. BUELL

103345

PROFESSIONAL ENGINEER

SIGNATURE

8-31-2023

DATE

STATE OF TEXAS

DAVID MASON RUHL

131784

PROFESSIONAL ENGINEER

SIGNATURE

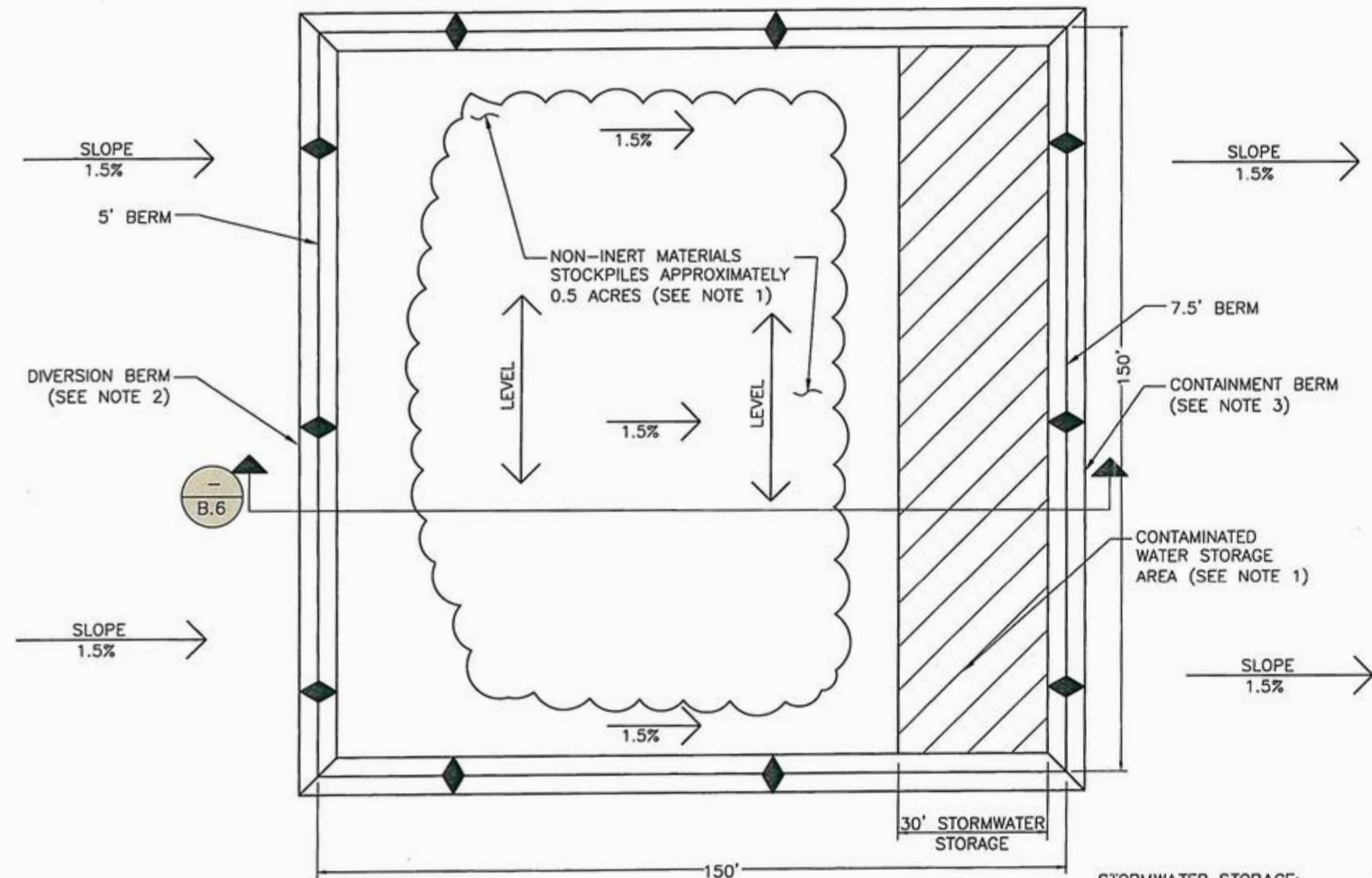
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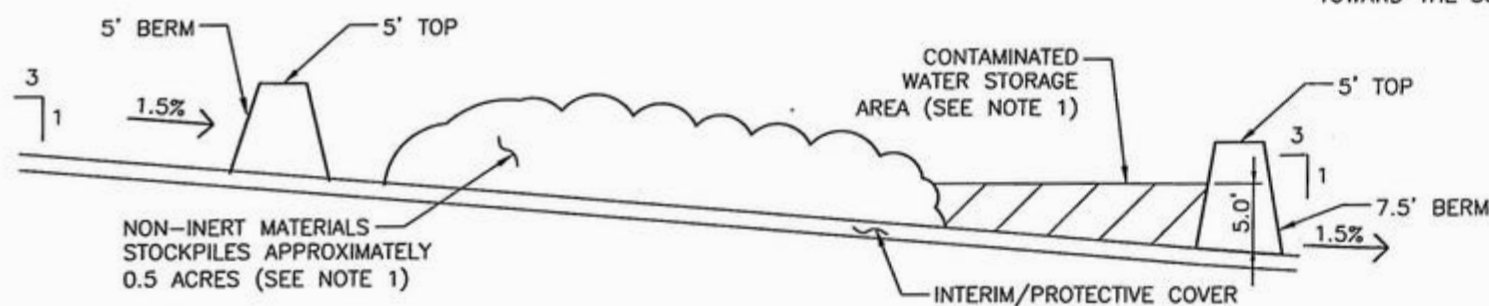
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Project No. 15737



REUSABLE MATERIALS STAGING AREA

0 15 30
SCALE IN FEET



NON-INERT MATERIALS SECTION

SCALE: 1"=30'

B.6

NOTES:

1. INERT (CONCRETE, BRICK, ECT.) AND NON-INERT PAVEMENT AND ASPHALTIC CONCRETE MATERIALS WILL BE STORED IN STOCKPILES WITHIN THE LANDFILL DISPOSAL FOOTPRINT. NON-INERT MATERIALS WILL BE STOCKPILED SEPARATELY FROM INERT MATERIALS AND WILL BE PROVIDED WITH RUN ON AND RUN OFF CONTROLS FOR THE 25-YEAR 24-HOUR RAINFALL EVENT INCLUDING A CONTAINMENT BERM TO MAINTAIN A 1.0' FREEBOARD.
2. WHEN PRACTICAL NON-INERT MATERIALS WILL BE STOCKPILED IN AREAS WITH POSITIVE DRAINAGE AWAY FROM THE STOCKPILE. WHEN NECESSARY, DIVERSION BERMS WILL BE PROVIDED TO DIVERT SURFACE WATER AWAY FROM THE STOCKPILES.
3. CONTAMINATED WATER BERM STORAGE WILL BE PROVIDED DOWNGRADE OF THE NON-INERT MATERIALS STOCKPILE.
4. INERT MATERIALS (WOOD WASTE PROCESSING AREA, DRAWING B.3, et al.) WILL ALSO BE STOCKPILED IN A SIMILAR AREA IN EACH CELL FOR CHIPPING AND REUSE. CONTAINMENT BERMS MAY BE PROVIDED AS NECESSARY TO MANAGE STORM WATER RUN ON AND RUN OFF. ANY CONTAMINATED STORMWATER THAT IS RELEASED FROM THE BERM AREA WILL DRAIN TO THE LEACHATE COLLECTION PUMP SYSTEM AND TO THE LEACHATE COLLECTION FACILITY AND TRUCKED TO AN AUTHORIZED FACILITY FOR DISPOSAL.

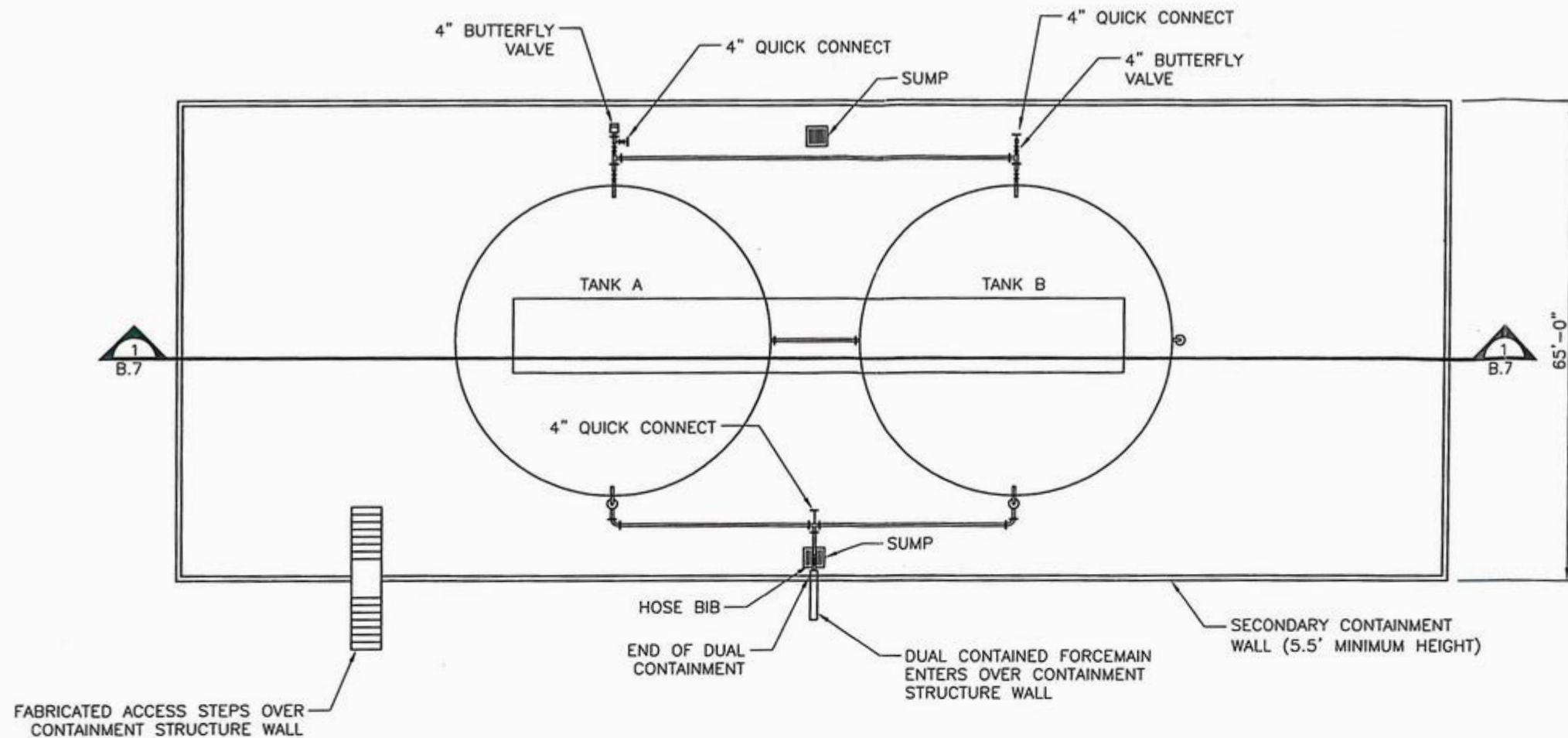
STORMWATER STORAGE:

- 1.) AREA IN NON-INERT MATERIALS STOCKPILE = $150' \times 150' = 22,500$ sf
- 2.) 24-hr, 25-yr storm event = 11.3 inches or 0.94 ft (NOAA ATLAS 14).
- 3.) VOLUME FOR STORAGE OF STORMWATER IS $30' \times 5.0' \times 150' = 22,500$ cf
- 4.) VOLUME OF 24-hr, 25-yr STORM EVENT = $150' \times 150' \times 0.94\text{ft} = 21,150$ cf
- 5.) AVAILABLE STORAGE (22,500 cf) > 24-hr, 25-hr STORM EVENT (21,150 cf)
- 6.) STAGING AREA WILL BE CONSTRUCTED AT A CONTINUOUS 1.5% SLOPE TOWARD THE SUMP AREA WITH A LEVEL CROSS-SLOPE.



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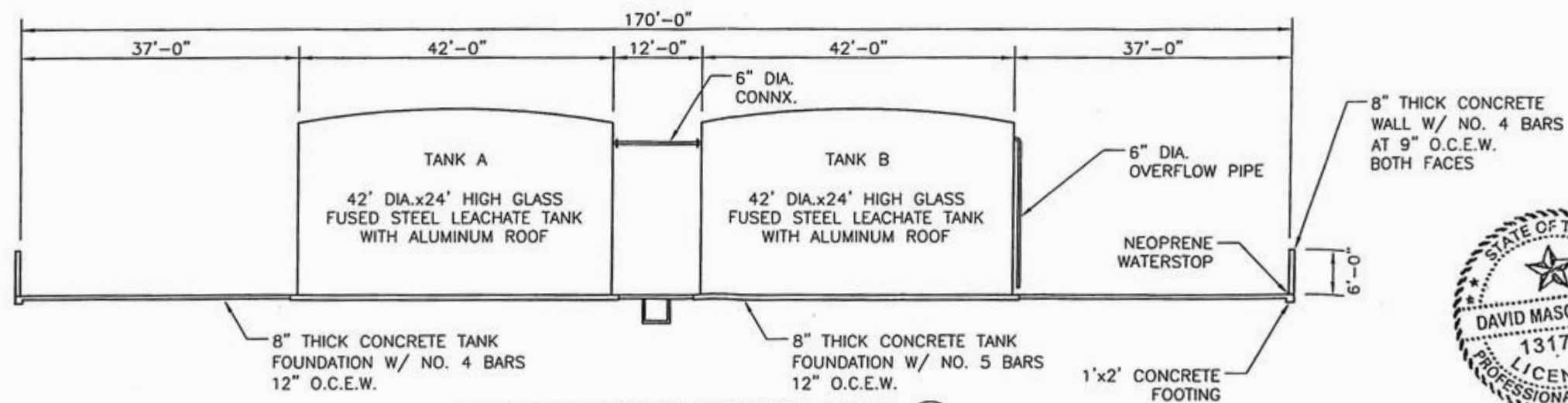
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1	08-13-21	DAVID MASON RUHL	1	REVISION 3 PERMIT DRAWING ONLY	08/13/2021	DAVID MASON RUHL	1	REVISION 3 PERMIT DRAWING ONLY



LEACHATE STORAGE FACILITY PLAN

NOTE:

PRIOR TO OPERATIONS, THE SECONDARY CONTAINMENT STRUCTURE AND TANK A WILL BE INSTALLED. TANK B WILL BE INSTALLED IF REQUIRED.



LEACHATE STORAGE FACILITY SECTION

1
B.7

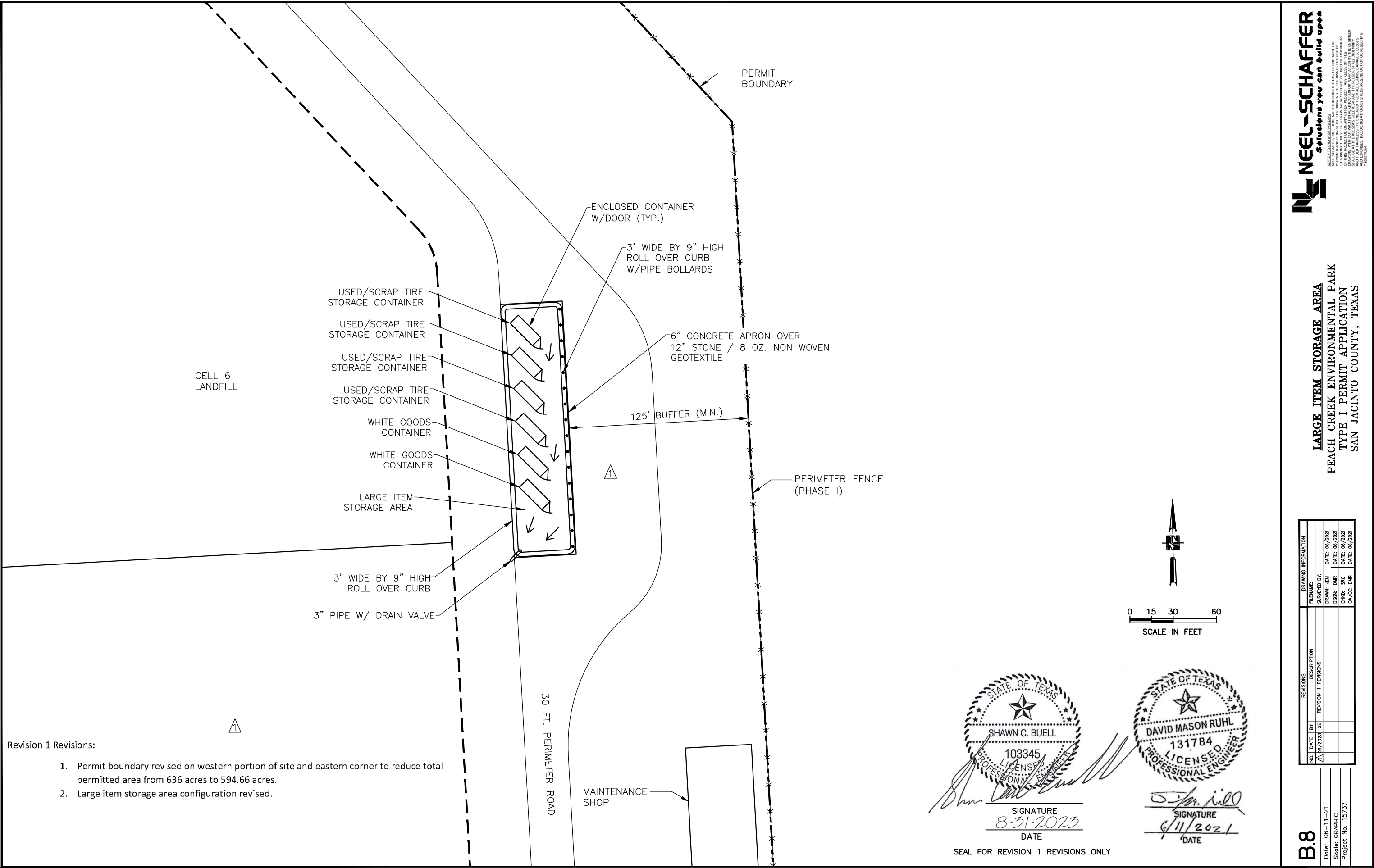


SIGNATURE
08/27/2020
DATE

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2	08/27/2020	DAVID MASON RUHL	REVISION 1 PERMIT DRAWING ONLY
3	08/27/2020	DAVID MASON RUHL	REVISION 2 PERMIT DRAWING ONLY
4	08/27/2020	DAVID MASON RUHL	REVISION 3 PERMIT DRAWING ONLY
5	08/27/2020	DAVID MASON RUHL	REVISION 4 PERMIT DRAWING ONLY

Date: 08-01-20
Scale: GRAPHIC
Project No. 15737

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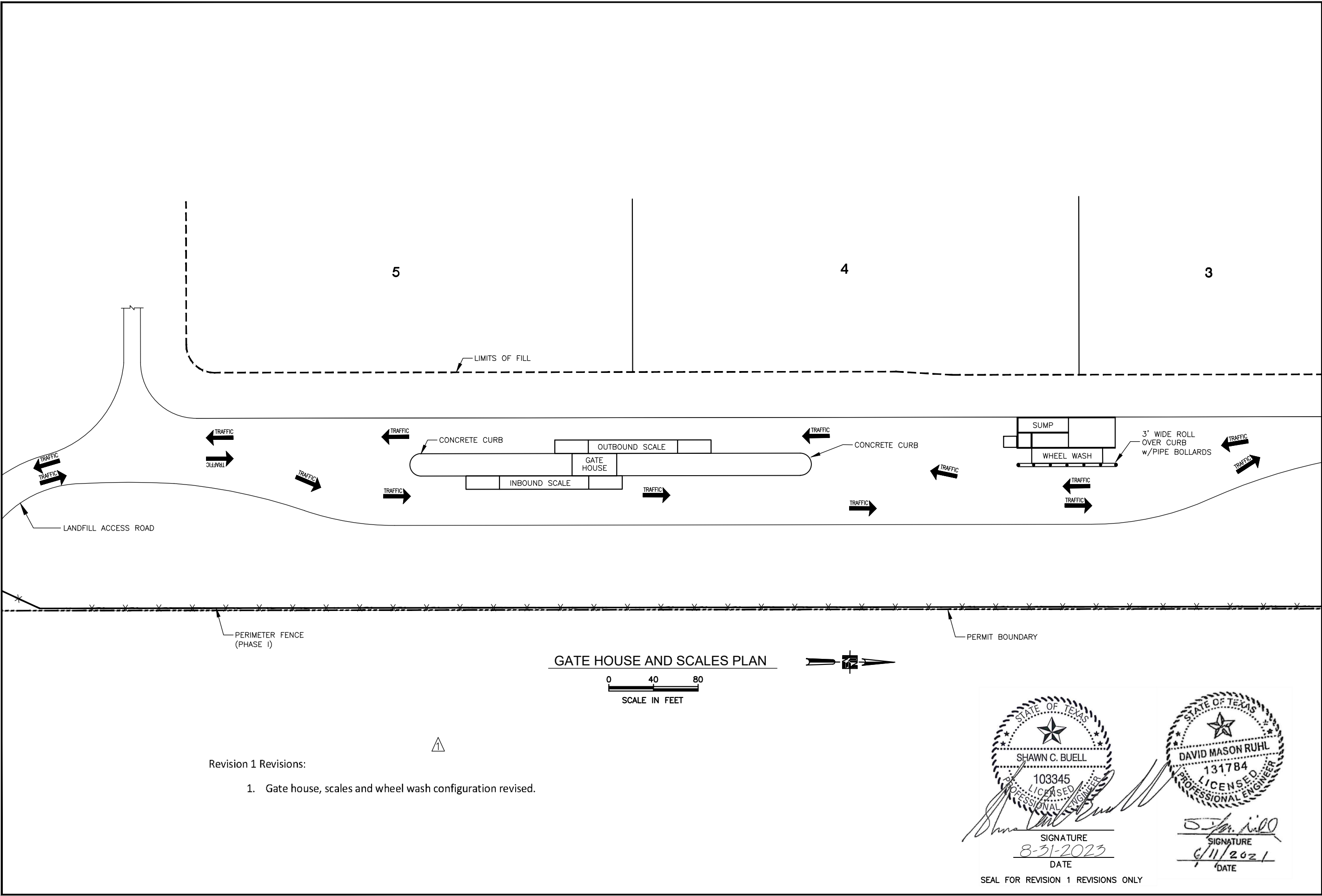


LARGE ITEM STORAGE AREA
PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

DRAWING INFORMATION			
FILENAME:			
NO.	DATE	BY	DESCRIPTION
1	06/06/2021	SB	REVISION 1 REVISIONS
DRAWN: JEM DATE: 06/06/2021			
DSGN: DMR DATE: 06/06/2021			
CHKD: SRC DATE: 06/06/2021			
QA/QC: DMR DATE: 06/06/2021			

B.8

Date: 06-11-21
Scale: GRAPHIC
Project No. 15737



GATE HOUSE AND SCALES PLAN
PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

REVISIONS		DRAWING INFORMATION	
NO.	DATE	BY	DESCRIPTION
1	05/20/2021	DMR	REVISION 0 PERMIT DRAWING ONLY
2	06/20/2023	SB	REVISION 1 REVISIONS
3			
4			
5			

FILENAME:	DATE: 04/2021
SURVED BY:	DATE: 04/2021
DRAWN: JEM	DATE: 04/2021
DSGN: DMR	DATE: 04/2021
CHKD: SRC	DATE: 04/2021
QA/QC: DMR	DATE: 04/2021

- Revision 1 Revisions:
- Gate house, scales and wheel wash configuration revised.

STATE OF TEXAS

SHAWN C. BUELL

103345

LICENSED PROFESSIONAL ENGINEER

SIGNATURE

8-31-2023

DATE

STATE OF TEXAS

DAVID MASON RUHL

131784

LICENSED PROFESSIONAL ENGINEER

SIGNATURE

6/11/2021

DATE

SEAL FOR REVISION 1 REVISIONS ONLY

B.9

Date: 05-21-21
Scale: GRAPHIC
Project No. 15737

PEACH CREEK ENVIRONMENTAL PARK
SAN JACINTO COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2406

TYPE I PERMIT APPLICATION

PART III – FACILITY INVESTIGATION AND DESIGN

ATTACHMENT C
FACILITY SURFACE WATER DRAINAGE REPORT

Prepared for

PC-II, LLC
Rev. 5, August 13, 2021



Prepared by

NEEL-SCHAFER, INC.
13430 NW Freeway, Suite 650
Houston, TX 77040
713-783-7117

David M. Ruhl
08/13/2021

Texas Board of Professional Engineers
Firm Registration No. F-2697

**PEACH CREEK ENVIRONMENTAL PARK
SAN JACINTO COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2406**

TYPE I PERMIT APPLICATION

PART III – FACILITY INVESTIGATION AND DESIGN

**ATTACHMENT C
FACILITY SURFACE WATER DRAINAGE REPORT**

Prepared for

PC-II, LLC

Rev. 2, January 22, 2021



Prepared by

NEEL-SCHAFFER, INC.
13430 NW Freeway, Suite 650
Houston, TX 77040
713-783-7117

Texas Board of Professional Engineers
Firm Registration No. F-2697

CONTENTS

ATTACHMENT C – FACILITY SURFACE WATER DRAINAGE REPORT

1	INTRODUCTION.....	C-1
1.1	Narrative.....	C-1

ATTACHMENTS

Attachment C1	Drainage Analysis and Design
Attachment C2	Drainage Plans and Details
Attachment C3	Erosion and Sediment Control Plan
Attachment C4	Floodplain Determination



1 INTRODUCTION

In compliance with 30 TAC §330.63(c), the facility surface water drainage design information is included in Attachment C – Facility Surface Water Drainage Report. Attachment C includes a narrative discussion, drawings and calculations that demonstrate that the facility is designed to meet the drainage and flood control requirements of §330.63(c) and §§330.303, 330.305 and 330.307. The surface water drainage design report includes analyses of the existing conditions, post-the development conditions and design of the surface water management system including final cover drainage facilities, perimeter drainage channels and detention ponds. The facility surface water drainage design report demonstrates that existing drainage patterns will not be adversely affected. In addition, the proposed facility waste disposal footprint and proposed improvements are not located within the 100-year floodplain.

The area within the proposed permit boundary (as shown on Drawings C1.1 and C1.2) consists of approximately 595 acres. Also as shown, all development and improvements proposed by this application will be located east of Jayhawker Creek (which crosses the site from north to south), including the Phase I landfill unit, entrance road, and appurtenant facilities. No development or improvements are proposed in this application for the western portion of the site where the future expansion area would be located. Because all development proposed in this application will be located within the Jayhawker Creek drainage basin, this surface water drainage report addresses only areas within that drainage basin. No activity is proposed in this application that would alter existing drainage in areas west of Jayhawker Creek drainage basin.

1.1 NARRATIVE

The facility surface water drainage report is prepared as part of a permit application for Peach Creek Environmental Park (PCEP) in compliance with the requirements of §330.63(c) and §§330.301 through 330.307. This report includes the drainage analysis and design and drainage system plans and details. The facility design complies with the requirements of §330.303 (a)-(b) concerning the management of run-on and runoff during peak discharge of a 25-year rainfall event and the control of surface water discharge in and around the facility. Surface water drainage in and around the facility will be controlled to minimize surface water running onto, into and off the disposal area. The following is a brief narrative concerning each of the attachments.

Attachment C1 – Drainage Analysis and Design

Attachment C1 is the drainage analysis and design of the facility, which includes calculations and demonstrations consistent with the requirements of §330.63(c) and §§330.301 through 330.307. This attachment includes a comparison of surface water runoff from the existing condition to the post-development condition of the facility for the 25-year, 24-hour rainfall event. The comparison of the existing and post-developed conditions demonstrates that the PCEP will not adversely alter existing drainage patterns.

Attachment C2 – Drainage System Plans and Details

This attachment includes the permit level site plans and details for the drainage system as required by §330.63(c) and §§330.301 through 330.307.

Attachment C3 – Erosion and Sediment Control Plan

This attachment includes erosion control measures for interim (intermediate) cover, final cover, and post-closure cover during the life of the landfill. The goal of these controls is to limit the movement of sediment from its original position and, for sediment that is displaced, to provide best management practices to capture and replace sediment back onto the cover. Permit level plans, details and discussions for erosion control have been provided as required by §330.305.

Attachment C4 – Floodplain Determination

Per 30 TAC 330.63(c)(2)(B), the current FEMA flood plain map is prima facie evidence of the 100-year flood plain location. This attachment includes the 100-yr floodplain information and documentation that all activities associated with the construction and operation of the landfill will be -outside of the current FEMA100-yr flood plain.

**PEACH CREEK ENVIRONMENTAL PARK
SAN JACINTO COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2406**

TYPE I PERMIT APPLICATION

PART III – FACILITY INVESTIGATION AND DESIGN

**ATTACHMENT C1
DRAINAGE ANALYSIS AND DESIGN**

Prepared for

PC-II, LLC

Rev. 3, August 13, 2021



Prepared by

NEEL-SCHAFFER, INC.
13430 NW Freeway, Suite 650
Houston, TX 77040
713-783-7117

Texas Board of Professional Engineers
Firm Registration No. F-2697

Sam M. Hill
09/13/2021

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Appendix C1-B	Existing Condition Hydrologic Calculations
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Appendix C1-D	Perimeter Drainage System Design

DRAINAGE ANALYSIS AND DESIGN DRAWINGS

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Drawing C1.2 – Drainage Basin Map
Drawing C1.2A – Existing Drainage Area Map
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Drawing C1.3 – Existing Drainage Conditions
Drawing C1.4 – Proposed Drainage Conditions
Drawing C1.5 - Existing Conditions Curve Numbers
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Drawing C1.8 – 100-YR HMS Results



1 INTRODUCTION

1.1 Purpose

The drainage analysis and design has been prepared as part of a permit application for Peach Creek Environmental Park and includes documentation consistent with the requirements of 30 TAC Chapter 330, §330.63(c) and §§330.301 through 330.307. The drainage analysis and design are organized to include a narrative description of the existing and post-development conditions, the proposed drainage system design and a discussion of the existing vs post-development comparison for Phase I of the facility. Drainage calculations are included in the appendices. Drainage design plans and details are included in attachment C2. For Jayhawker Creek, the following is a brief description of each of the appendices.

Appendix C1-A – Drainage Maps and Existing vs Post-development Comparison

Appendix C1-A includes drainage area maps that identify the drainage areas and permit boundary discharge point locations that affect surface water run-on and runoff for the Phase I area and provide a summary of the peak flow rates, runoff volumes and runoff velocities at locations where the surface water is discharged. Also, the characteristics of Jayhawker Creek are included.

Appendix C1-B – Existing Condition Hydrologic Calculations

The existing condition hydrologic and hydraulic evaluation is included in Appendix C1-B. The existing condition analysis includes identification of drainage area that contribute to surface water runoff and runoff for the Phase I area including along Jayhawker Creek at the permit boundaries.

The results of the existing condition hydrologic analysis are provided on the existing conditions drainage summary which shows the 25-year peak flow rates, runoff volumes and runoff velocities for the Phase I area.

An evaluation of the Jayhawker Creek 100-year flood plain is included in this appendix.

Appendix C1-C – Post-development Hydrologic Calculations

The post-development hydrologic and hydraulic evaluation included in Appendix C1-C is based on the final closure landfill geometry. The post-development analysis includes identification of drainage areas that contribute surface water runoff at the project limits.

The results of the post-development hydrologic evaluation are provided on the post-development analysis summary which shows the 25-year peak flow rates, runoff volumes and runoff velocities at the project discharge locations including along Jayhawker Creek at the permit boundaries.

Appendix C1-D – Perimeter Drainage System Design

Appendix C1-D presents the hydraulic design of the perimeter drainage system. The perimeter drainage plan indicates the locations of the perimeter drainage channels and detention ponds. The detention ponds are designed to provide the necessary storage and outlet control to mitigate impacts to the receiving streams. The perimeter channels are designed to convey the 25-year, 24-hour storm event.

2 METHODOLOGY

2.1 Concepts and Methods

The hydrologic and hydraulic methods used in this study are consistent with the TCEQ regulations and TCEQ's RG-417 regulatory guidance document. The Natural Resource Conservation Service (NRCS) unit hydrograph method discussed in Urban Hydrology for Small Watersheds (TR-55) methodology was used to compute the hydrologic parameters, curve number and time of concentration, to develop runoff hydrographs and runoff volumes. The time of concentration was calculated for the longest flow path and split between sheet flow, shallow concentrated and channel flow. The United States Army Corps of Engineers (USACE) Hydrologic Engineering Center – Hydrologic Modeling System (HEC-HMS) was used to compute the peak flows and runoff volumes. Due to the complexity of the pond outlet structure being beyond the capabilities built into HEC-HMS, the Hydraflow software was used to develop stage-discharge rating curves and was used in the post-development detention analysis within the HEC-HMS model. The Hydraflow software was also utilized for the post development drainage system design. The analysis flowchart was as follows:

- Maps were prepared that provided information about the surface runoff characteristics based on the existing conditions. These maps are included in Appendix C1-B.
- Surface water runoff hydrographs were developed using NRCS unit hydrograph method within HEC-HMS. The existing evaluation is included in Appendix C1-B.
- Maps were prepared that identify the surface water runoff characteristics of the post-developed drainage conditions. These maps are included in Appendix C1-C.
- Surface water hydrographs for the post-developed condition including the detention ponds were evaluated at the site and along Jayhawker Creek at the permit boundaries using the HEC-HMS software.

2.2 Hydrologic and Hydraulic Modeling

2.2.1 HEC-HMS Hydrographs

The HEC-HMS program was developed to simulate the surface water runoff from small watersheds. The HEC-HMS model represents a watershed as a network of hydrologic and hydraulic components. The modeling process results in the computation of stream-flow hydrographs at desired locations in the watershed. HEC-HMS was utilized to perform the hydrologic modeling utilizing the NRCS hydrograph method. Refer to Appendix C1-B for a detailed discussion of the input parameters used for the existing conditions and Appendix C1-C for a detailed discussion of the input parameters used for the post-developed condition.

3 EXISTING CONDITIONS

The Peach Creek Environmental Park is proposed to include a Type 1 municipal solid waste facility located in southern San Jacinto County approximately 7 miles northwest of the intersection of State Highway 115 and 1725. The area around and including the site consists of moderately sloped forest land. All development proposed by this application, including the Phase I landfill unit, will occur east of Jayhawker Creek, where the surface generally slopes to the west and south. The major topographic feature adjacent to Phase I is Jayhawker Creek located to the west. The site is bounded on the east by a ridge with one exception. As shown on Drawing C1.3, offsite surface water enters the site on the north and northeast, including from the 48-acre OFFSITE area. Surface waters from both offsite and onsite exit the Phase I area to the west and discharge to Jayhawker Creek, which exits the site to the south.

Appendix C1-B includes the existing hydrologic calculations. Refer to Drawing C1.3 for the existing condition drainage area map and offsite drainage areas. Refer to Drawing C1.5 for the existing condition land use and Drawing C1.7 for the HEC-HMS model layout and permit boundary discharge point locations.

The following table includes a summary of the existing conditions drainage analysis and provides peak flow rate, volume and velocity for the 25-year, 24-hour rainfall event. The table also identifies stormwater as run-on from offsite or runoff from onsite. The velocities listed are along the natural drainage features including Jayhawker Creek and its tributary at the permit boundaries.

Table C1-1

HEC-HMS Node	Acres	Discharge Point	Discharge Type	25-Yr Peak Discharge (cfs)	25-Yr Peak Volume (ac-ft)	Peak Velocity (fps)
J_PA	15.4		Runoff	46.5	10.3	1.75
J_PB	88.4		Runoff	221.5	61.6	1.46
J_PC	41.8		Runoff	97.9	26.9	0.73
J_PD	42.4		Runoff	114.4	27.8	0.94
J_E01	48.0	1	Run-on	131.5	33.5	0.79
J_T01	270.8	2	Run-on	487.3	179.6	1.10
J_J01	1503.2	3	Run-on	1791.5	802.7	1.17
J_J03	2212.0	4	Runoff	2448.2	1196.8	1.01

Note: cfs – cubic feet/second; ac-ft – acre-feet; fps – feet/second; Node J_PB includes area and flow from the OFFSITE area.

4 POSTDEVELOPMENT CONDITIONS

Appendix C1-C includes the post-developed hydrologic calculations. Refer to Drawing C1.4 for the post-developed drainage conditions map which shows, inter alia, that flow from offsite Area E will be redirected through a culvert adjacent to the perimeter road and discharged to a natural stream channel just north of the Phase I landfill unit. Refer to Drawing C1.6 for the post-developed land use and Drawing C1.7 for the HEC-HMS model layout and permit boundary discharge points.

The following table includes a summary of the post-development conditions drainage analysis which provide the peak flow rate, volume, and velocity for each location of discharge per drainage area for the 25-year, 24-hour rainfall event. All flows listed are runoff. The velocities listed are at the sites discharge locations and along Jayhawker Creek and its tributary at the permit boundaries.

Table C1-2

HEC-HMS Node	Acres	Discharge Point	Discharge Type	25-Yr Peak Discharge (cfs)	25-Yr Peak Volume (ac-ft)	Peak Velocity (fps)
J_PA	14.9		Runoff	53.8	10.6	1.69
J_PB	26.7		Runoff	82.8	19.9	1.84
J_PC	36.2		Runoff	135.5	24.1	0.82
J_PD	62.3		Runoff	164.1	46.3	0.96
J_E01	48.0	1	Run-on	131.5	33.5	0.79
J_T01	270.8	2	Run-on	487.3	179.6	1.10
J_J01	1503.2	3	Run-on	1791.5	802.7	1.17
J_J03	2212.0	4	Runoff	2444.0	1204.8	1.01

Note: cfs – cubic feet/second; ac-ft – acre-feet; fps – feet/second

5 PROPOSED DRAINAGE SYSTEM DESIGN

The proposed drainage system for Peach Creek Environmental park will consist of perimeter channels adjacent to the landfill and detention ponds.

5.1 Perimeter Drainage System Design

The perimeter drainage system is designed to convey the 25-year runoff from the developed landfill consistent with TCEQ regulations. In addition, the channels have been designed with freeboard above the 25-year flow depth which will transport the 100-year rainfall event. The perimeter channel system design calculations are included in Appendix C1-D. The perimeter drainage structure plans are included in Attachment C2.

6 EXISTING/POSTDEVELOPMENT COMPARISON

Consistent with 30 TAC §330.63(c)(1)(D)(iii) and §330.305(a), the proposed facility development will not adversely alter existing drainage patterns. Refer to Table C1-3 for a summary of the existing conditions, post-developed conditions and a comparison of the peak flow rate, volume and peak velocity-at the permit boundary comparison points. The comparison is based on the 25-year 24-hour rainfall event.

The following table demonstrates the non-adverse impact at the 4 permit boundary discharge points. The 25-year frequency event model results show that the proposed development will result in no change to peak flows or volume at discharge points 1-3 where run-on flow enters the permit boundary. The model results do show a - volume increase of 8 ac-ft (less than 0.7%) to Jayhawker Creek at the southern boundary of the project, discharge point 4, as a result of reduced precipitation losses. As per RG-417 Section 1.3.3, this increase in the volume of runoff from existing to post-development conditions will not result in adverse alteration of existing drainage patterns. The modeling results also show that the change in volume will be released at a rate that results in lowering peak flows by 8.3 cfs along Jayhawker Creek and that the change in peak flow does not result in a change of peak velocity at the southern permit boundary. In addition, because there will be no decrease in volume, there will be no adverse impact on downstream water receiving rights and uses. Based on the results, the proposed development will not adversely alter the existing drainage patterns.

Table C1-3

Discharge Point	Condition	25-Year Peak Flow (cfs)	25-Year Volume (ac-ft)	25-Year Peak Velocity (ft/s)
1	Pre-Development	131.5	33.5	0.79
	Post-Development	131.5	33.5	0.79
	Difference	0.0	0.0	0.00
2	Pre-Development	487.3	179.6	1.10
	Post-Development	487.3	179.6	1.10
	Difference	0.0	0.0	0.00
3	Pre-Development	1791.5	802.7	1.17
	Post-Development	1791.5	802.7	1.17
	Difference	0.0	0.0	0.00
4	Pre-Development	2448.2	1196.8	1.01
	Post-Development	2439.9	1204.8	1.01
	Difference	-8.3	8.0	0.00

7 CONCLUSIONS

The following conclusions summarize the results of the drainage analysis and design.

- The drainage design criteria and analyses used for these drainage calculations meet and exceed the requirements of 30 TAC Chapter 330.
- Perimeter channels are designed to accommodate the 25-year 24-hour rainfall event.
- Detention pond capacities and outlets are designed to accommodate the 25-year 24-hour rainfall event.
- The proposed landfill development will not adversely alter existing drainage patterns at the facility boundary.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was the Texas State Plane central zone (FIPSZONE 4203). The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NIMS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

Base map information shown on this FIRM was obtained in digital format from Texas Natural Resources Information System, Texas Railroad Commission, NOAA National Geodetic Survey, U.S. Geological Survey, National Agriculture Imagery Program, and FEMA.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/>.

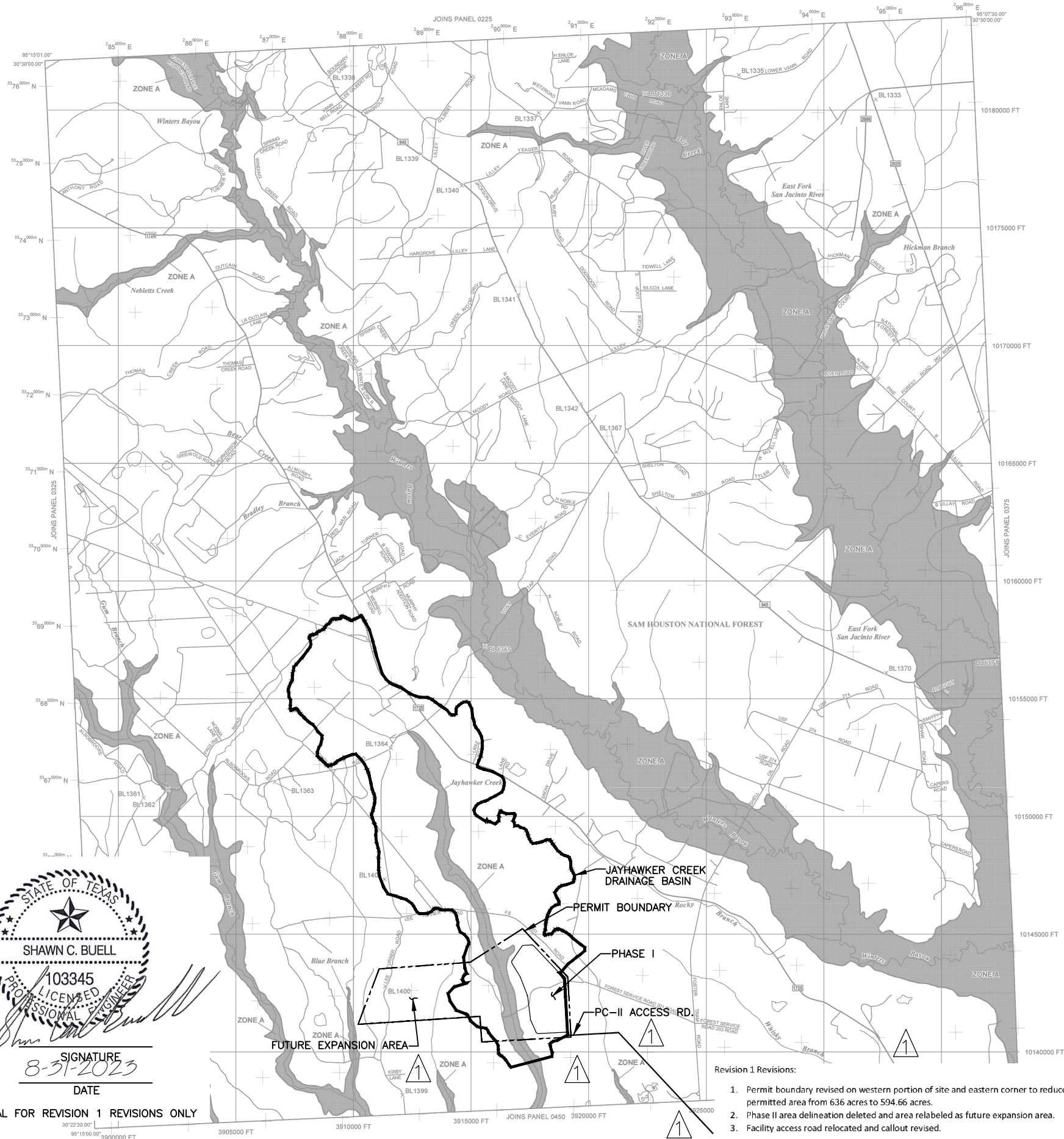


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8-31-2023
DATE

SEAL FOR REVISION 1 REVISIONS ONLY



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, A99, V and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently identified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
Base Flood Elevation line and value; elevation in feet
Base Flood Elevation value where uniform within zone; elevation in feet

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

Cross section line
Transect line
Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
1000-meter Universal Transverse Mercator grid ticks, zone 15
5000-foot grid values: Texas
State Plane coordinate system, central zone (FIPSZONE 4203), Lambert Conformal Conic
Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5
River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index
EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
November 4, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 2000'
0 2000 4000 FEET
0 800 1600 METERS

PANEL 0350C

FIRM
FLOOD INSURANCE RATE MAP
SAN JACINTO COUNTY,
TEXAS
AND INCORPORATED AREAS

PANEL 350 OF 475
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
SAN JACINTO COUNTY 48053 0350 C

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
48407C0350C
EFFECTIVE DATE
NOVEMBER 4, 2010

Federal Emergency Management Agency

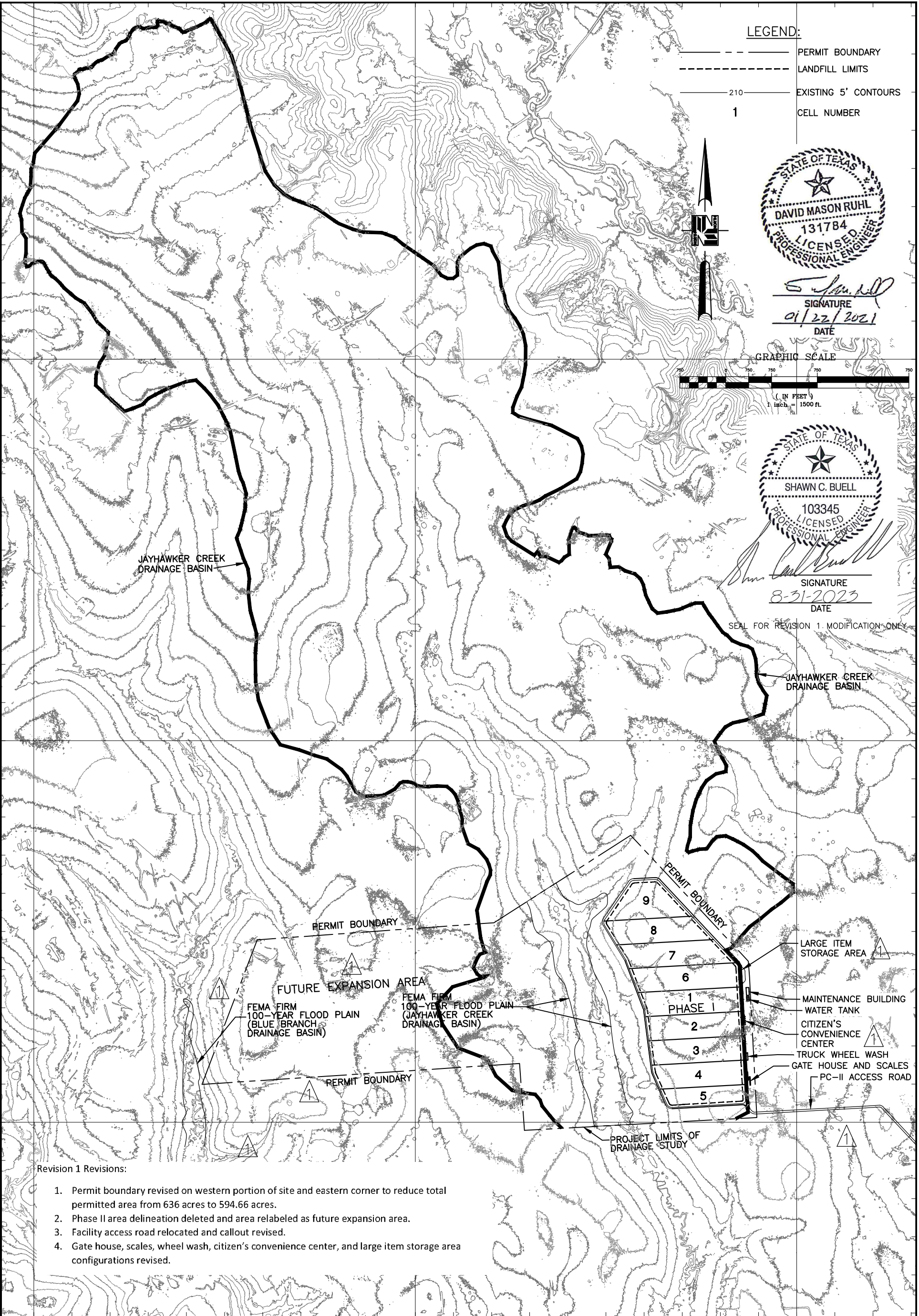
NEEL-SCHAFFER
Solutions you can build upon

FLOOD INSURANCE RATE MAP
PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

DRAWING INFORMATION		REVISIONS		DESCRIPTION	
NO.	DATE	BY	FILENAME	REVISION	DESCRIPTION
1	08/20/2021	DMR	REVISION 1	REVISION 1	PERMIT DRAWING ONLY
2	08/20/2021	DMR	REVISION 1	REVISION 1	PERMIT DRAWING ONLY
3	08/20/2021	DMR	REVISION 1	REVISION 1	PERMIT DRAWING ONLY
4	08/20/2021	DMR	REVISION 1	REVISION 1	PERMIT DRAWING ONLY
5	08/20/2021	DMR	REVISION 1	REVISION 1	PERMIT DRAWING ONLY

Date: 05-21-21
Scale: 1"=5000'
Project No. 15/37

C11



- Revision 1 Revisions:
1. Permit boundary revised on western portion of site and eastern corner to reduce total permitted area from 636 acres to 594.66 acres.
 2. Phase II area delineation deleted and area relabeled as future expansion area.
 3. Facility access road relocated and callout revised.
 4. Gate house, scales, wheel wash, citizen's convenience center, and large item storage area configurations revised.

C1.2

Date: 01-22-21

Scale: 1"=1500'

Project No. 15737


REVISIONS			DRAWING INFORMATION	
NO.	DATE	BY	DESCRIPTION	FILENAME:
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				DSGN: CDM DATE: 08/2020
				CHKD: DMR DATE: 08/2020
				QA/QC: DATE:

DRAINAGE BASIN MAP

PEACH CREEK ENVIRONMENTAL PARK

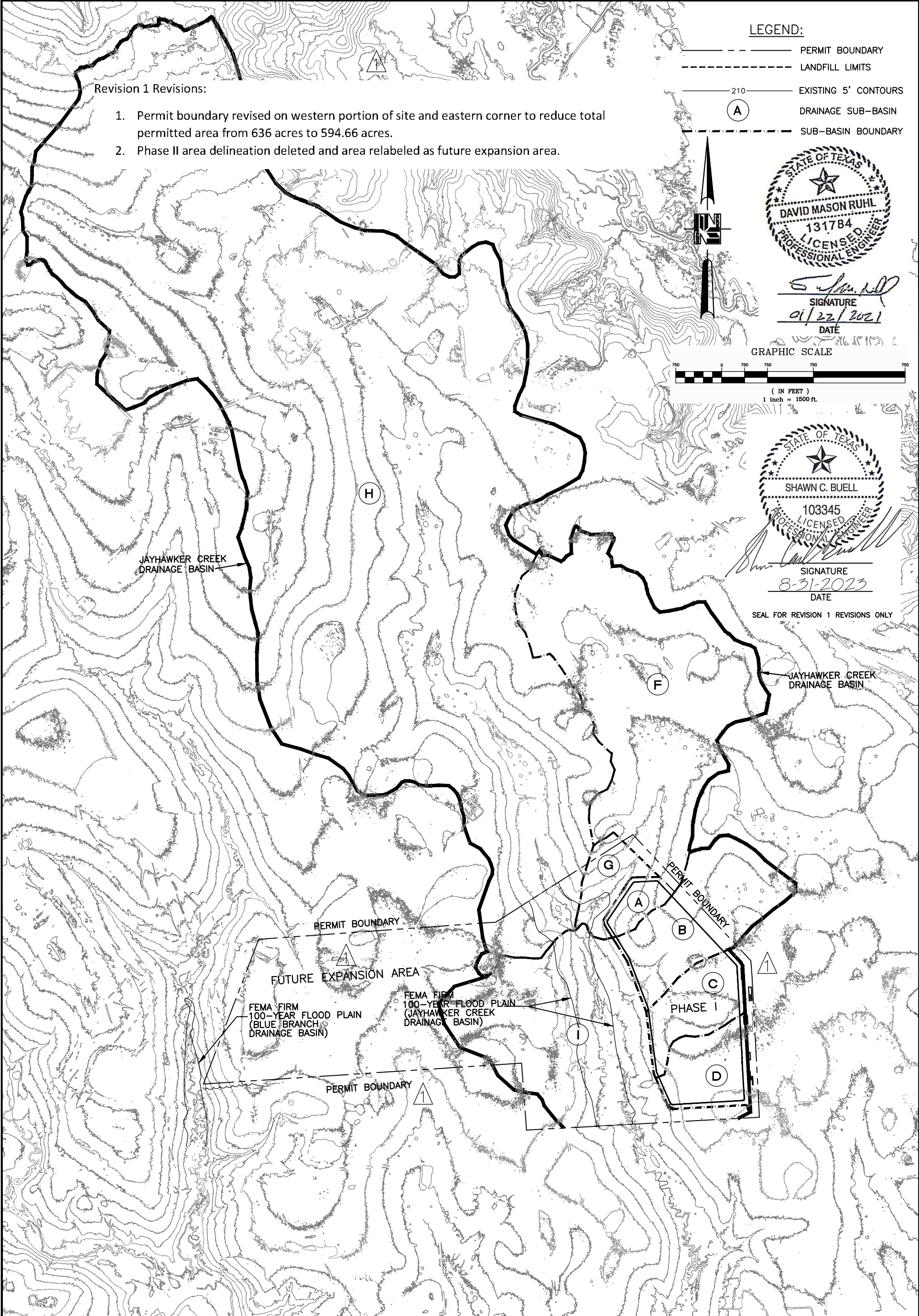
TYPE I PERMIT APPLICATION

SAN JACINTO COUNTY, TEXAS

NEEL-SCHAFFER

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C1.2A			REVISIONS		DRAWING INFORMATION	
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					DSGN: CDM	DATE: 08/2020
					CHKD: DMR	DATE: 08/2020
					QA/QC:	DATE:

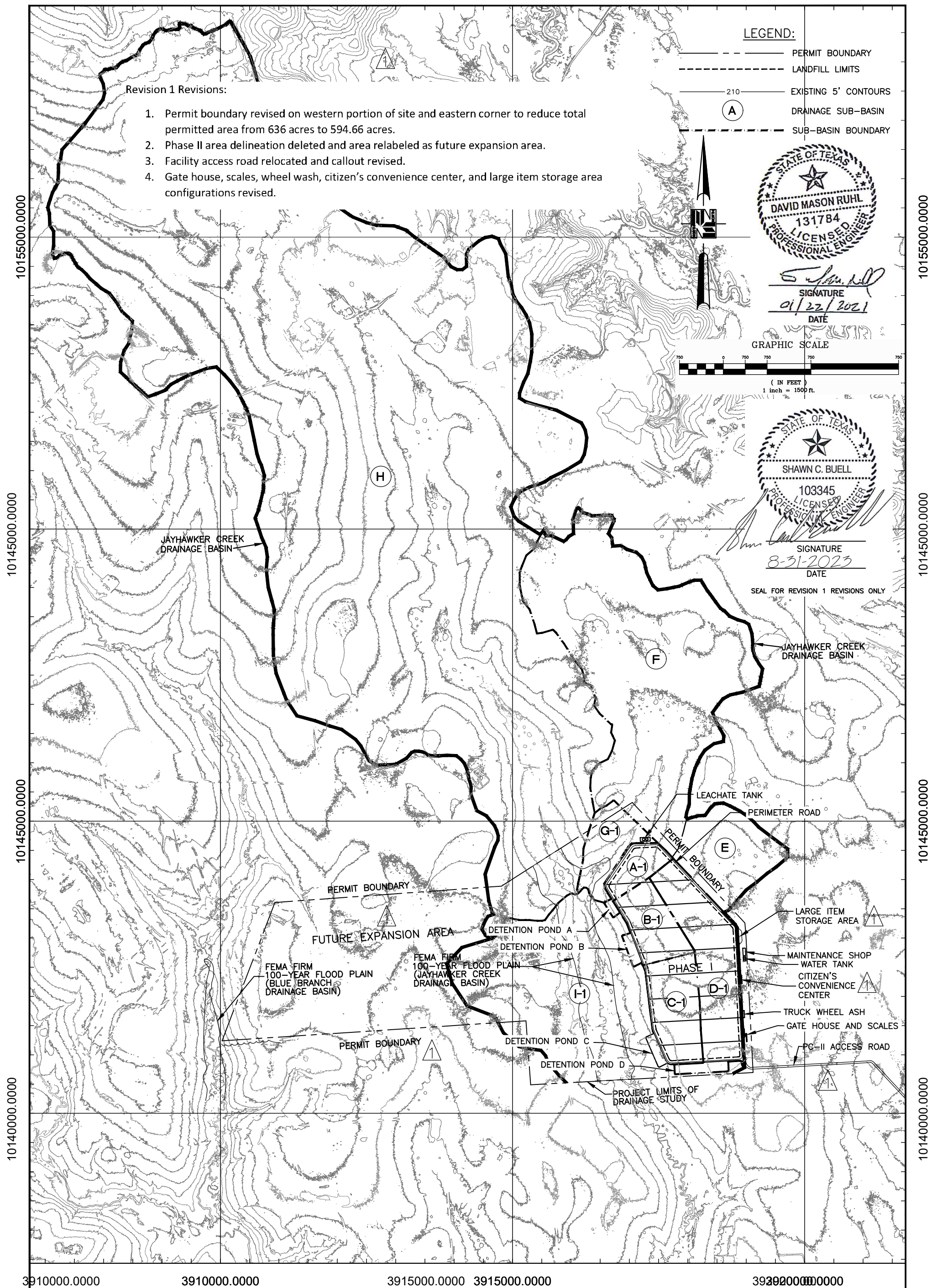
EXISTING DRAINAGE AREA MAP

PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

NEEL-SCHAFFER
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C1.2B

Date: 01-22-21
Scale: 1"=1500'
Project No. 15737

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	06/2023	SB	REVISION 1 REVISIONS

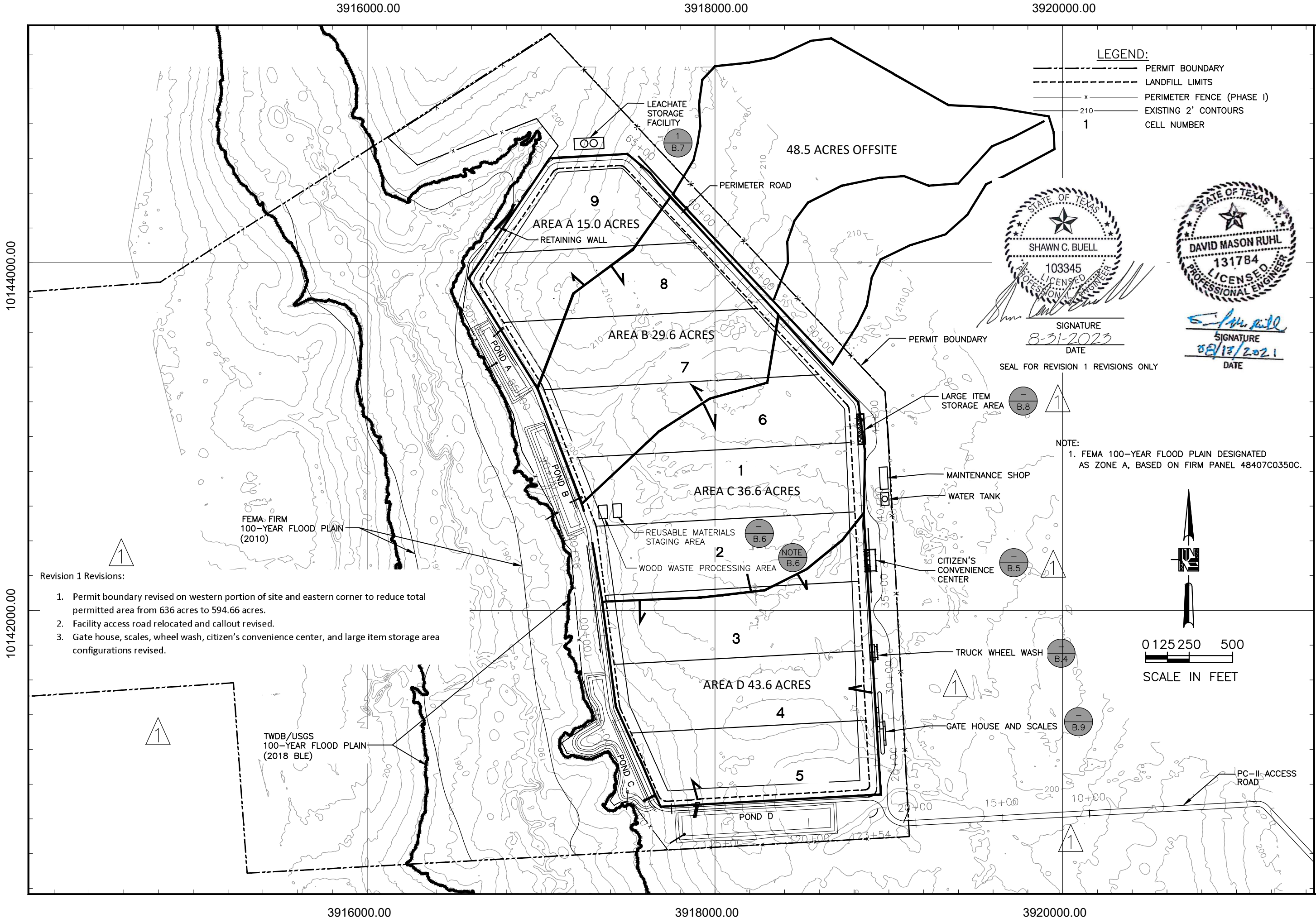
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FILENAME:	
SURVEYED BY:	
DRAWN: CDM	DATE: 08/2020
DSGN: CDM	DATE: 08/2020
CHKD: DMR	DATE: 08/2020
QA/QC:	DATE:

PROPOSED DRAINAGE AREA MAP

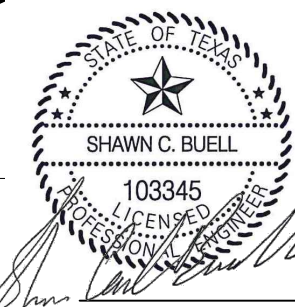
PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS



NOTICE TO DRAWING HOLDER:
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- LEGEND:**
- PERMIT BOUNDARY
 - LANDFILL LIMITS
 - PERIMETER FENCE (PHASE I)
 - EXISTING 2' CONTOURS
 - CELL NUMBER



SIGNATURE
8-31-2023
DATE



SIGNATURE
08/13/2021
DATE

SEAL FOR REVISION 1 REVISIONS ONLY

NOTE:
1. FEMA 100-YEAR FLOOD PLAIN DESIGNATED AS ZONE A, BASED ON FIRM PANEL 48407C0350C.

- Revision 1 Revisions:
1. Permit boundary revised on western portion of site and eastern corner to reduce total permitted area from 636 acres to 594.66 acres.
 2. Facility access road relocated and callout revised.
 3. Gate house, scales, wheel wash, citizen's convenience center, and large item storage area configurations revised.

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Solutions you can build upon

EXISTING DRAINAGE CONDITIONS

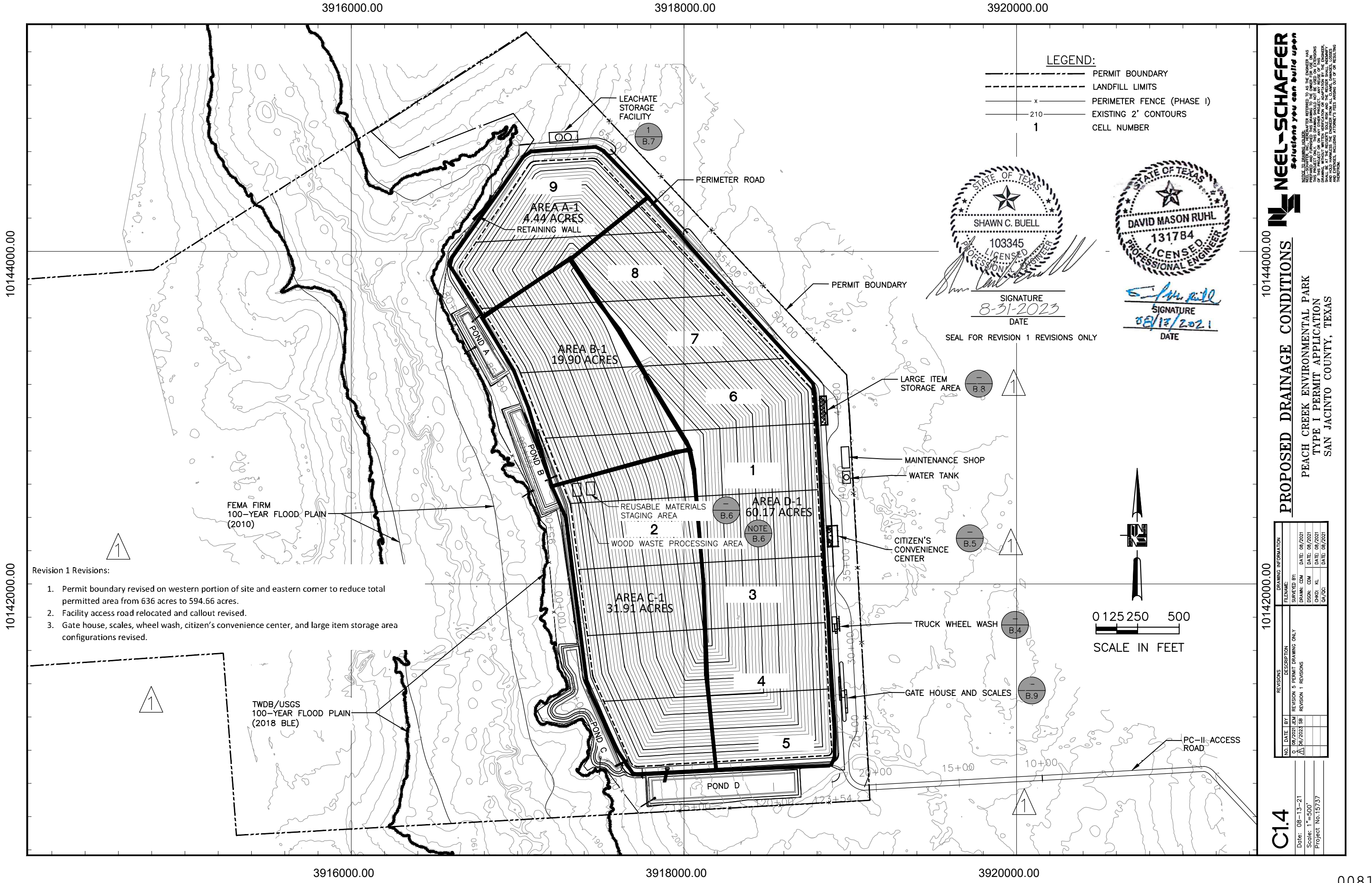
PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

C1.3

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1	08/2023	SB	REVISION 1 REVISIONS

DRAWING INFORMATION	
FILENAME:	DATE:
DRAWN: CDM	08/2021
DSN: CDM	08/2021
CHK: KL	08/2021
QA/QC:	08/2021

Date: 08-13-21
Scale: 1"=500'
Project No. 15737



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Date: 08-13-21
Scale: 1"=500'
Project No. 15737

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NO.	DATE	BY	DESCRIPTION
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1	09/2023	SB	REVISION 1 REVISIONS

PROPOSED DRAINAGE CONDITIONS
PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

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LEGEND:

- PERMIT BOUNDARY
- LANDFILL LIMITS
- PERIMETER FENCE (PHASE I)
- EXISTING 2' CONTOURS
- CELL NUMBER



SIGNATURE
8-31-2023
DATE

SEAL FOR REVISION 1 REVISIONS ONLY



SIGNATURE
8/13/2021
DATE



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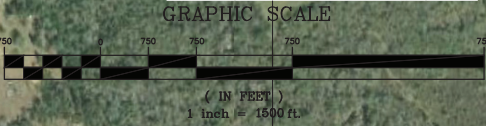
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Legend

- Landfill Site
- Site Boundary
- Existing Drainage Basins
- Brush - Good, (Soil Group A), CN 30
- Brush - Good, (Soil Group B), CN 48
- Brush - Good, (Soil Group D), CN 73
- Open Space - Good, (Soil Group B), CN 61
- Open Space - Good, (Soil Group C), CN 74
- Open Space - Good, (Soil Group D), CN 80
- Pasture - Good, (Soil Group B), CN 61
- Pasture - Good, (Soil Group C), CN 74
- Residential, (Soil Group A), CN 46
- Residential, (Soil Group B), CN 65
- Residential, (Soil Group C), CN 77
- Woods - Good, (Soil Group A), CN 30
- Woods - Good, (Soil Group B), CN 55
- Woods - Good, (Soil Group C), CN 70
- Woods - Good, (Soil Group D), CN 77

STATE OF TEXAS
SHAWN C. BUELL
103345
LICENSED PROFESSIONAL ENGINEER
SIGNATURE
2/23/2024
DATE
SEAL FOR REVISIONS 1 & 2 ONLY

STATE OF TEXAS
DAVID MASON RUHL
131784
LICENSED PROFESSIONAL ENGINEER
SIGNATURE
09/20/2020
DATE



- Revision 1 Revision:
- Permit boundary revised on western portion of site and eastern corner to reduce total permitted area from 636 acres to 594.66 acres.
- Revision 2 Revision:
- Landfill site boundary revised on southeast corner.

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REVISIONS				DRAWING INFORMATION	
NO.	DATE	BY	DESCRIPTION	FILENAME:	
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2	02/2024	SB	REVISION 2 REVISIONS	DSGN: CDM	DATE: 08/2020
				CHKD: DMR	DATE: 08/2020
				QA/QC:	DATE:

EXISTING CURVE NUMBERS

PEACH CREEK ENVIRONMENTAL PARK

TYPE I PERMIT APPLICATION

SAN JACINTO COUNTY, TEXAS

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Legend

Landfill Site

Site Boundary

Proposed Drainage Basins

Brush - Good, (Soil Group A), CN 30

Brush - Good, (Soil Group B), CN 48

Brush - Good, (Soil Group D), CN 73

Open Space - Good, (Soil Group A), CN 39

Open Space - Good, (Soil Group B), CN 61

Open Space - Good, (Soil Group C), CN 74

Open Space - Good, (Soil Group D), CN 80

Pasture - Good, (Soil Group B), CN 61

Pasture - Good, (Soil Group C), CN 74

Residential, (Soil Group A), CN 46

Residential, (Soil Group B), CN 65

Residential, (Soil Group C), CN 77

Water, CN 100

Woods - Good, (Soil Group A), CN 30

Woods - Good, (Soil Group B), CN 55

Woods - Good, (Soil Group C), CN 70

Woods - Good, (Soil Group D), CN 77

Subbasin H
1503.2 ac

Subbasin F
270.8 ac

PERIMETER ROAD

Subbasin G-1
24.3 ac

Subbasin A-1
13.9 ac

Subbasin Pond A
1.0 ac

Subbasin B-1
24.7 ac

Subbasin Pond B
2.0 ac

Subbasin D-1
58.7 ac

Subbasin I-1
225.7 ac

Subbasin C-1
34.2 ac

Subbasin Pond C
1.9 ac

Subbasin Pond D
3.6 ac

Revision 1 Revision:

1. Permit boundary revised on western portion of site and eastern corner to reduce total permitted area from 636 acres to 594.66 acres.

Revision 2 Revision:

1. Landfill site boundary revised on southeast corner.

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C1.6	REVISIONS				DRAWING INFORMATION	
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	2	02/2024	SB	REVISION 2 REVISIONS	DSGN: CDM DATE: 08/2020	
					CHKD: DMR	DATE: 08/2020
					QA/QC:	DATE:

Date: 10-13-20

Scale: 1"=1500'

Project No. 15737

PROPOSED CONDITIONS
CURVE NUMBERS

PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

NEEL-SCHAFFER

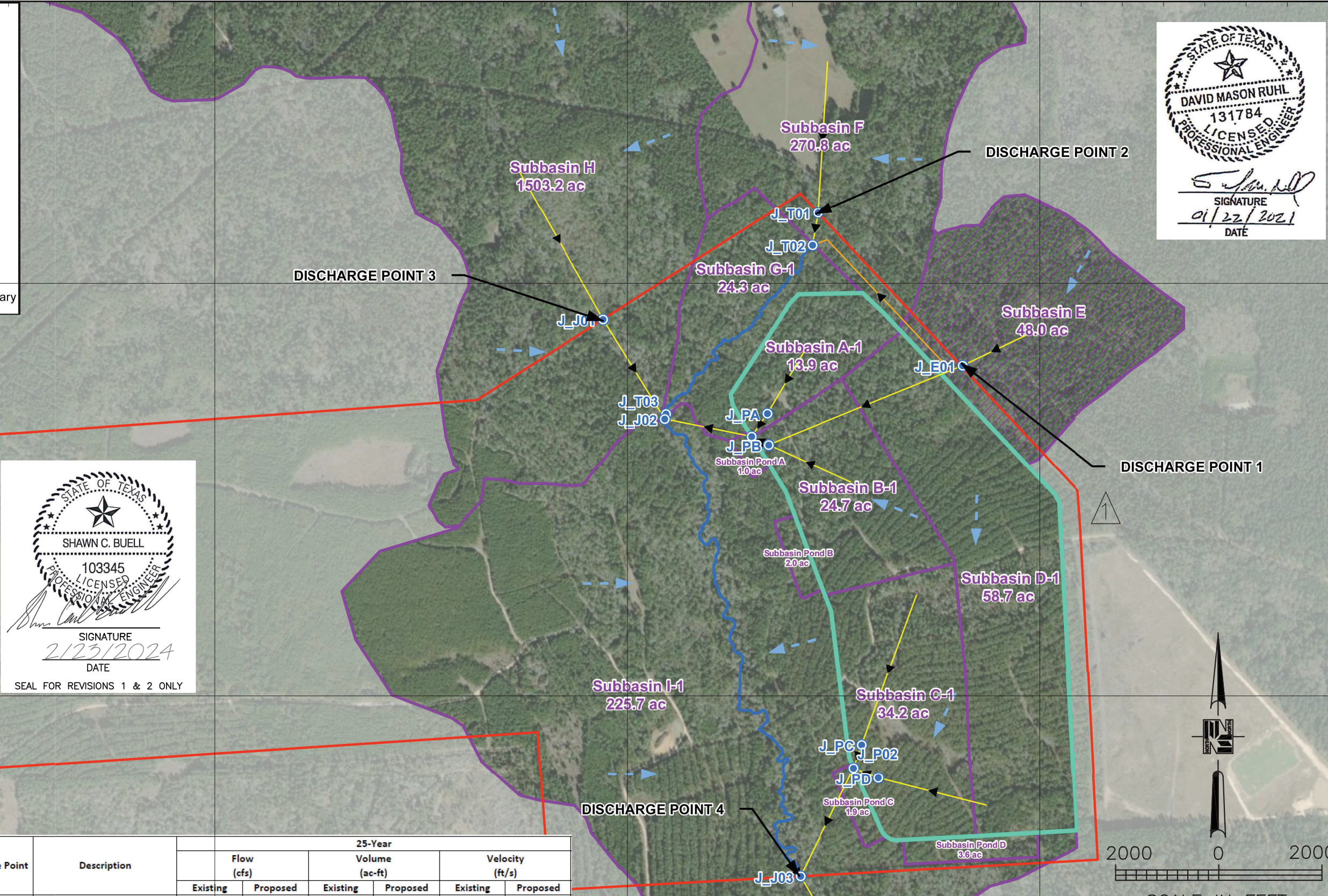
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Legend

- OverlandFlowPath
- HMS Junctions
- Permit Boundary
- Existing Flow Direction
- Proposed Flow Direction
- Routing Reach
- Landfill Site
- Drainage
- Offsite; Diverted to Tributary



STATE OF TEXAS
DAVID MASON RUHL
131784
LICENSED PROFESSIONAL ENGINEER
SIGNATURE
01/22/2021
DATE

STATE OF TEXAS
SHAWN C. BUELL
103345
LICENSED PROFESSIONAL ENGINEER
SIGNATURE
2/23/2024
DATE
SEAL FOR REVISIONS 1 & 2 ONLY

Discharge Point	Description	25-Year					
		Flow (cfs)		Volume (ac-ft)		Velocity (ft/s)	
		Existing	Proposed	Existing	Proposed	Existing	Proposed
1	Offsite at eastern permit boundary	131.5	131.5	33.5	33.5	0.79	1.79
2	Jayhawker Tributary at northern permit boundary	487.3	487.3	179.6	179.6	1.10	1.10
3	Jayhawker at northern permit boundary	1791.5	1791.6	802.7	802.7	1.17	1.17
4	Jayhawker at southern permit boundary	2448.2	2440.0	1196.8	1204.8	1.01	1.01

- Revision 1 Revision:
- Permit boundary revised on western portion of site and eastern corner to reduce total permitted area from 636 acres to 594.66 acres.
- Revision 2 Revision:
- Landfill site boundary revised on southeast corner.

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25-YR HMS RESULTS

PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

C1.7

Date: 09-28-20
Scale: 1"=500'
Project No. 15737

REVISIONS		DRAWING INFORMATION	
NO.	DATE	BY	DESCRIPTION
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2	02/22/24	SB	REVISION 2 REVISIONS

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DSGN: CDM	08/2020
CHKD: DMR	08/2020
QA/QC:	08/2020


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Legend


 OverlandFlowPath


 HMS Junctions


 Permit Boundary


 Existing Flow Direction

 Proposed Flow Direction

 Routing Reach

 Landfill Site

 Drainage Area

 Offsite; Diverted to Tributary

STATE OF TEXAS



SHAWN C. BUELL

103345

LICENSED PROFESSIONAL ENGINEER




SIGNATURE

2/23/2024

DATE

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STATE OF TEXAS



DAVID MASON RUHL

131784

LICENSED PROFESSIONAL ENGINEER




SIGNATURE

01/22/2021

DATE

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100-YR HMS RESULTS

PEACH CREEK ENVIRONMENTAL PARK

TYPE I PERMIT APPLICATION

SAN JACINTO COUNTY, TEXAS

REVISIONS		DRAWING INFORMATION	
NO.	DATE	BY	DESCRIPTION
0	09/20/2020	JEM	REVISION 2 PERMIT DRAWING ONLY
1	06/20/2023	SB	REVISION 1 REVISIONS
2	02/20/2024	SB	REVISION 2 REVISIONS
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		CHKD: DMR	DATE: 08/20/2020
		QA/QC:	DATE:

C18


Date: 09-28-20

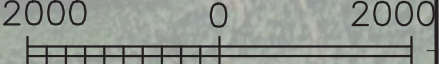
Scale: 1"=500'

Project No.15737


Discharge Point	Description	100-Year					
		Flow		Volume		Velocity	
		Existing	Proposed	Existing	Proposed	Existing	Proposed
1	Offsite at eastern permit boundary	183.1	183.1	53.9	53.9	0.89	0.89
2	Jayhawker Tributary at northern permit boundary	719.8	719.8	293.9	293.9	1.19	1.19
3	Jayhawker at northern permit boundary	2920.1	2920.3	1399.4	1399.4	1.25	1.25
4	Jayhawker at southern permit boundary	4017.3	3990.1	2072.7	2081.7	1.10	1.10

- Revision 1 Revision:
1. Permit boundary revised on western portion of site and eastern corner to reduce total permitted area from 636 acres to 594.66 acres.
- Revision 2 Revision:
1. Landfill site boundary revised on southeast corner.





SCALE IN FEET



ATTACHMENT C1

APPENDIX C1-A

EXISTING/POSTDEVELOPMENT COMPARISON

EXISTING DRAINAGE SUMMARY						
HEC-HMS Node	Acres	Discharge Point	Discharge Type	25-Yr Peak Discharge (cfs)	25-Yr Peak Volume (ac-ft)	Peak Velocity (fps)
J_PA	15.4		Runoff	46.5	10.3	1.75
J_PB*	88.4		Runoff	221.5	61.6	1.46
J_PC	41.8		Runoff	97.9	26.9	0.73
J_PD	42.4		Runoff	114.4	27.8	0.94
J_E01	48.0	1	Run-on	131.5	33.5	0.79
J_T01	270.8	2	Run-on	487.3	179.6	1.1
J_J01	1503.2	3	Run-on	1791.5	802.7	1.17
J_J03	2212.0	4	Runoff	2448.2	1196.8	1.01

Note: cfs – cubic feet/second; ac-ft – acre-feet; fps – feet/second; B includes area and flow from E

POSTDEVELOPED DRAINAGE SUMMARY						
HEC-HMS Node	Acres	Discharge Point	Discharge Type	25-Yr Peak Discharge (cfs)	25-Yr Peak Volume (ac-ft)	Peak Velocity (fps)
J_PA	14.9		Runoff	53.8	10.6	1.69
J_PB	26.7		Runoff	82.8	19.9	1.84
J_PC	36.2		Runoff	135.5	24.1	0.82
J_PD	62.3		Runoff	164.1	46.3	0.96
J_E01	48.0	1	Run-on	131.5	33.5	0.79
J_T01	270.8	2	Run-on	487.3	179.6	1.10
J_J01	1503.2	3	Run-on	1791.5	802.7	1.17
J_J03	2212.0	4	Runoff	2439.9	1204.8	1.01

Note: cfs – cubic feet/second; ac-ft – acre-feet; fps – feet/second

ATTACHMENT C1

APPENDIX C1-B

EXISTING CONDITION HYDROLOGIC CALCULATIONS

EXISTING CONDITION NARRATIVE (PHASE I)

The existing condition evaluation represents the hydrologic calculations for Peach Creek Environmental Park in accordance with §330.63(c)(1) and §330.305.

EXISTING CONDITION DRAINAGE AREA DRAWING PHASE I

The existing condition drainage area map, Drawing C1.1 and C1.2, depicts the eastern portion of the Peach Creek Environmental Park and surrounding contributing drainage areas.

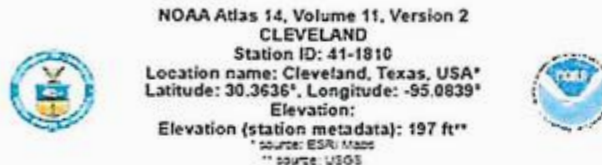
WATERSHED CHARACTERISTICS

Watershed characteristics have been developed for the existing condition hydrologic evaluation. The watershed characteristics address drainage area runoff characteristics, unit hydrograph data and reach characteristics. A summary table of the values follows. This table features a summary of the drainage areas, Curve Numbers (CN) and basin slope. The Soil Conservation Service (SCS) CN values were derived from watershed characteristic table from the Urban Hydrology for Small Watersheds, Technical Report 55 (TR-55) which included evaluation of soil and surface cover/condition characteristics. The soil values for CN determination were based on NRCS Web Soil Survey data available for the area.

WATERSHED CHARACTERISTICS SUMMARY			
Drainage Area	Acres	CN	Slope Ft/FT
A	15.4	74	0.008
B	88.4	77	0.005
C	41.8	74	0.005
D	42.4	73	0.008
E	48.0	77	0.005
F	270.8	74	0.006
G	24.3	48	0.022
H	1503.2	63	0.016
I	225.7	51	0.005

RAINFALL DATA

The rainfall depth, duration, and frequency relationships for the storm event for the facility were extracted from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 11, Version 2.0, Texas. The nearest station was in Cleveland, Texas. The following is the NOAA data.



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sanja Pavlovic, Michael St. Laurent, Carl Trzasko, Dale Unruh, Brian White

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & panels

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.492 (0.372-0.549)	0.580 (0.443-0.755)	0.724 (0.552-0.951)	0.844 (0.634-1.13)	1.01 (0.734-1.35)	1.14 (0.805-1.51)	1.27 (0.875-1.84)	1.41 (0.947-2.19)	1.60 (1.04-2.47)	1.76 (1.11-2.77)
10-min	0.778 (0.559-1.03)	0.920 (0.702-1.20)	1.15 (0.875-1.51)	1.34 (1.01-1.79)	1.61 (1.17-2.21)	1.82 (1.29-2.57)	2.03 (1.40-2.84)	2.24 (1.51-3.33)	2.53 (1.64-3.89)	2.74 (1.74-4.33)
15-min	0.994 (0.753-1.31)	1.17 (0.893-1.53)	1.45 (1.11-1.91)	1.69 (1.27-2.25)	2.02 (1.45-2.77)	2.27 (1.60-3.20)	2.52 (1.74-3.66)	2.80 (1.93-4.17)	3.16 (2.07-4.90)	3.48 (2.29-5.50)
30-min	1.43 (1.03-1.99)	1.67 (1.23-2.19)	2.07 (1.59-2.72)	2.40 (1.80-3.20)	2.85 (2.06-3.90)	3.16 (2.25-4.48)	3.54 (2.44-5.13)	3.93 (2.65-5.56)	4.51 (2.93-6.96)	4.96 (3.15-7.57)
60-min	1.88 (1.40-2.45)	2.22 (1.69-2.90)	2.77 (2.11-3.64)	3.23 (2.42-4.30)	3.86 (2.80-5.28)	4.34 (3.09-6.11)	4.85 (3.38-7.04)	5.45 (3.67-8.12)	6.34 (4.12-9.79)	7.08 (4.45-11.2)
2-hr	2.35 (1.71-3.07)	2.77 (2.10-3.54)	3.55 (2.70-4.52)	4.24 (3.19-5.62)	5.24 (3.82-7.15)	6.05 (4.29-8.50)	6.85 (4.81-10.0)	8.00 (5.40-11.9)	9.60 (6.26-14.8)	10.9 (6.96-17.2)
3-hr	2.45 (1.87-3.22)	3.05 (2.33-3.91)	4.03 (3.09-5.23)	4.90 (3.70-6.49)	6.19 (4.54-8.46)	7.27 (5.19-10.2)	8.50 (5.99-12.3)	9.94 (6.71-14.7)	12.1 (7.91-18.6)	14.6 (8.90-22.0)
6-hr	2.81 (2.15-3.55)	3.68 (2.75-4.96)	4.90 (3.75-6.32)	6.08 (4.61-8.02)	7.86 (5.81-10.7)	9.43 (6.77-13.2)	11.2 (7.82-15.1)	13.3 (8.03-19.6)	16.5 (10.5-25.2)	19.2 (12.3-30.1)
12-hr	3.23 (2.49-4.21)	4.31 (3.21-5.78)	5.81 (4.45-7.44)	7.27 (5.54-9.55)	9.53 (7.06-13.0)	11.5 (8.30-16.1)	13.8 (9.67-19.6)	16.5 (11.2-24.2)	20.7 (13.5-31.5)	24.2 (15.5-37.7)
24-hr	3.70 (2.85-4.80)	5.00 (3.73-6.07)	6.79 (5.23-8.86)	8.56 (6.55-11.2)	11.3 (8.44-15.4)	13.8 (9.59-19.3)	16.6 (11.7-23.7)	19.9 (13.5-29.1)	24.8 (16.4-37.7)	29.0 (18.7-46.1)
2-day	4.18 (3.23-5.39)	5.76 (4.25-7.91)	7.91 (6.11-10.0)	10.1 (7.74-13.1)	13.5 (10.1-18.4)	16.6 (12.1-23.2)	20.2 (14.2-29.6)	24.0 (16.4-34.8)	29.4 (19.4-44.3)	33.8 (21.9-52.4)
3-day	4.55 (3.53-5.95)	6.28 (4.68-8.52)	8.64 (6.69-10.9)	11.0 (8.47-14.3)	14.7 (11.1-20.0)	18.1 (13.3-25.3)	21.9 (15.5-31.1)	25.9 (17.9-37.6)	31.5 (20.9-47.3)	36.0 (23.3-55.5)
4-day	4.88 (3.80-6.28)	6.68 (5.01-8.92)	9.15 (7.10-11.5)	11.6 (8.94-15.1)	15.4 (11.7-20.9)	18.5 (13.9-26.3)	22.8 (16.1-32.2)	26.8 (18.4-39.8)	32.4 (21.5-48.6)	36.9 (23.9-55.9)
7-day	5.70 (4.45-7.31)	7.57 (5.74-9.15)	10.2 (7.95-12.9)	12.7 (9.85-16.5)	16.7 (12.6-22.5)	20.2 (14.8-28.0)	24.1 (17.1-34.0)	28.1 (19.4-42.6)	33.7 (22.5-50.5)	38.2 (24.8-58.7)
10-day	6.39 (5.00-8.15)	8.31 (6.35-10.1)	11.0 (8.63-13.9)	13.7 (10.6-17.5)	17.7 (13.4-23.7)	21.2 (15.6-29.3)	25.1 (17.9-35.3)	29.1 (20.1-42.0)	34.7 (23.2-51.9)	39.1 (25.5-60.1)
20-day	8.51 (6.69-10.5)	10.6 (8.22-13.0)	13.6 (10.7-17.2)	16.4 (12.5-21.1)	20.6 (15.6-27.4)	24.1 (17.7-33.0)	27.8 (19.9-39.0)	31.9 (22.1-45.8)	37.5 (25.2-55.9)	42.0 (27.5-64.3)
30-day	10.3 (8.19-13.1)	12.5 (9.80-15.5)	15.8 (12.5-19.5)	18.7 (14.6-24.0)	23.0 (17.4-30.4)	26.4 (19.4-35.9)	30.0 (21.5-42.0)	34.0 (23.7-48.6)	39.5 (26.5-58.6)	44.0 (28.9-67.1)
45-day	12.9 (10.2-16.4)	15.2 (12.1-19.1)	19.0 (15.1-23.9)	22.1 (17.3-28.3)	26.4 (20.0-34.8)	29.8 (21.9-40.4)	33.2 (23.8-46.3)	36.9 (25.9-52.9)	42.0 (28.3-62.3)	46.0 (30.2-70.1)
60-day	15.3 (12.1-19.4)	17.7 (14.2-22.4)	21.8 (17.4-27.5)	25.1 (19.7-32.1)	29.6 (22.3-38.5)	32.8 (24.1-44.3)	36.0 (26.9-49.2)	39.4 (27.6-55.4)	44.0 (29.8-65.2)	47.6 (31.3-72.3)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parentheses are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%.

Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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HYDROLOGIC ANALYSIS (PHASE I)

For the hydrologic evaluation, HEC-HMS was used for the precipitation-runoff simulation for the existing condition of Phase I.

Time Step

The time step, or program computation interval, selected for the analysis is 5 minutes which results in 288 hydrograph ordinates in 24 hours.

Hypothetical Precipitation

Return periods for the 25-year 24-hour rainfall event were used for the design. For overflow and overtopping conditions, the 100-year 24-hour rainfall event was also used to assure functionality and capacity.

Precipitation Losses

Precipitation losses (the precipitation that does not contribute to runoff) are calculated using the Soil Conservation Service (SCS) Curve Number (CN) method. CN is a function of soil cover, land use and antecedent moisture conditions.

Synthetic Unit Hydrographs

The rainfall/runoff transformation was performed with the Natural Resources Conservation Service (NRCS) Unit Hydrograph Method. The synthetic unit hydrographs for each drainage area used a single peak unit hydrograph model developed by the SCS and described in Urban Hydrology for Small Watersheds (TR-55). The hydrologic parameters time of concentration and lag time were calculated utilizing the velocity method discussed in the Natural Resources Conservation Service (NRCS) National Engineering Handbook, Part 630, Chapter 15.

Hyetograph Development Procedure

Based on the current Texas Department of Transportation (TxDOT) Hydraulic Design Manual (2019), the NRCS design storm hyetographs are no longer recommended based on the results of the NOAA Atlas 14 rainfall data. As recommended in the TxDOT Hydraulic Design Manual, the balanced storm method (also known as the Frequency Storm in HEC-HMS) was utilized with the center of the storm specified to be at 50% of the total storm duration.

EXISTING CONDITION DRAINAGE AREA DRAWING (JAYHAWKER CREEK BASIN)

The existing condition drainage area map, Drawing C1.3, and the existing land use map, Drawing C1.5, depict the Peach Creek Environmental Park and surrounding contributing drainage areas. The permit area is approximately 595 acres and is divided by Jayhawker Creek running from north to south.

WATERSHED CHARACTERISTICS (JAYHAWKER CREEK BASIN)

Watershed characteristics have been developed for the existing condition hydrologic evaluation. The watershed characteristics address drainage area runoff characteristics and reach characteristics. The drainage area basin was considered from the southern permit boundary to the upstream limit of the basin. This area is approximately 2,212 acres. The Jayhawker Creek drainage basin encompasses 333 acres within the facility boundary. The FIRM map 48407C0350C is included in Attachment C-2 and indicates the permit boundary and the Phase I area. The area west of Jayhawker Creek will not be affected by the Phase I development and drainage patterns there will remain unchanged. Of note, the 25-year 24-hour existing condition peak flow for Jayhawker Creek at the southern permit boundary is 2,448.2 cfs. The post-development peak flow for Jayhawker Creek at the southern permit boundary will be 2,444 cfs. This will result in the peak flow in Jayhawker Creek at the southern boundary being 4.2 cfs less than the existing condition peak flow. The resulting peak flow change which corresponds to a 0.2% decrease in peak flow in Jayhawker Creek at the southern boundary does not result in a change to the existing velocities of 1.01 feet/second.

The 25-year 24-hour existing condition peak volume for Jayhawker creek at the southern permit boundary is 1196.8 acre-feet. The post-development peak volume for Jayhawker Creek at the southern permit boundary is 1204.8 acre-feet. This will result in a peak volume in Jayhawker Creek at the southern boundary being 8.0 acre-feet more than the existing condition. As per RG-417 Section 1.3.3, any increase or decrease (change) in the peak volume of runoff from existing to post-development conditions must be demonstrated to have no adverse alteration of existing drainage patterns. The modeling results also show that the change in volume is released at a rate that results in lowering of peak flows of 4.2 cfs along Jayhawker Creek and will therefore not adversely alter the existing drainage pattern.

Existing Conditions NRCS Land Use Calculations																
Drainage Subarea ID	Drainage Area (acres)	NRCS Land Use														
		Open Space - Good			Wood - Good				Residential			Brush - Good			Pasture - Good	
		B CN=61	C CN=74	D CN=80	A CN=30	B CN=55	C CN=70	D CN=77	A CN=46	B CN=65	C CN=77	A CN=30	B CN=48	D CN=73	B CN=61	C CN=74
A	14.5				1.1			13.4								74
B	86.4							86.4								77
C	39.9				2.6			37.3								74
D	38.9				3.1			35.8								73
F	270.8		11.5	7.4		5.8	107.1	139.0								74
G	24.3				14.0		7.6	2.6								48
H	1503.2	136.1	1.8	4.8	155.4	358.9	215.8	428.3	12.9	17.8	63.6			5.7	77.0	253
I	225.7				76.7	15.9		38.0				6.8	54.6	33.6		50
Pond A	1.0							1.0								77
Pond B	2.0				0.1			1.9								76
Pond C	1.9				1.6			0.3								38
Pond D	3.6							3.6								77

Project: Jayhawker Creek Simulation Run: 25yr_Existing

Start of Run: 01May2000, 00:00 Basin Model: Existing
 End of Run: 04May2000, 01:00 Meteorologic Model: 25yr
 Compute Time: 14Oct2020, 14:43:34 Control Specifications: 25yr

Show Elements: All Elements

Volume Units: ☐ IN ☒ ACRE-FT

Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
F	0.4232	487.3	01May2000, 13:55	179.6
J_T01	0.4232	487.3	01May2000, 13:55	179.6
J_T02	0.4232	487.3	01May2000, 13:55	179.6
Trib	0.4232	485.6	01May2000, 14:10	179.6
G	0.0379	40.6	01May2000, 12:40	8.4
H	2.3487	1791.5	01May2000, 14:40	802.7
J_J01	2.3487	1791.5	01May2000, 14:40	802.7
J_T03	0.4611	499.3	01May2000, 14:05	188.1
B	0.1350	219.5	01May2000, 13:10	60.2
Pond B	0.0030780	13.9	01May2000, 12:05	1.4
J_PB	0.1380780	221.5	01May2000, 13:05	61.6
A	0.0226	45.2	01May2000, 12:45	9.6
Pond A	0.0015074	6.9	01May2000, 12:05	0.7
J_PA	0.0241074	46.5	01May2000, 12:45	10.3
J_P01	0.1621854	259.6	01May2000, 13:00	71.9
J_J02	2.9719854	2367.8	01May2000, 14:30	1062.7
Main	2.9719854	2263.7	01May2000, 15:20	1057.9
I	0.3526	259.3	01May2000, 13:35	84.3
C	0.0623	97.0	01May2000, 13:10	26.4
Pond C	0.0030259	4.0	01May2000, 12:10	0.4
D	0.0607	109.7	01May2000, 12:50	25.3
Pond D	0.0055924	25.5	01May2000, 12:05	2.5
J_PD	0.0662924	114.4	01May2000, 12:50	27.8
J_PC	0.0653259	97.9	01May2000, 13:10	26.9
J_P02	0.1316183	207.3	01May2000, 12:55	54.7
J_J03	3.4562037	2448.2	01May2000, 15:10	1196.8

Project: Jayhawker Creek Simulation Run: 100yr_Existing

Start of Run: 01May2000, 00:00 Basin Model: Existing
 End of Run: 04May2000, 01:00 Meteorologic Model: 100yr
 Compute Time: 14Oct2020, 14:43:30 Control Specifications: 100yr

Show Elements: All Elements

Volume Units: ☐ IN ☒ ACRE-FT

Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
F	0.4232	719.8	01May2000, 13:55	293.9
J_T01	0.4232	719.8	01May2000, 13:55	293.9
J_T02	0.4232	719.8	01May2000, 13:55	293.9
Trib	0.4232	718.3	01May2000, 14:05	293.9
G	0.0379	72.4	01May2000, 12:40	16.7
H	2.3487	2920.1	01May2000, 14:40	1399.4
J_J01	2.3487	2920.1	01May2000, 14:40	1399.4
J_T03	0.4611	745.7	01May2000, 14:05	310.6
B	0.1350	308.0	01May2000, 13:05	97.1
Pond B	0.0030780	18.8	01May2000, 12:05	2.2
J_PB	0.1380780	311.5	01May2000, 13:05	99.3
A	0.0226	63.0	01May2000, 12:45	15.7
Pond A	0.0015074	9.3	01May2000, 12:05	1.1
J_PA	0.0241074	65.1	01May2000, 12:45	16.8
J_P01	0.1621854	366.0	01May2000, 13:00	116.1
J_J02	2.9719854	3789.2	01May2000, 14:25	1826.1
Main	2.9719854	3655.5	01May2000, 15:05	1819.9
I	0.3526	465.4	01May2000, 13:35	162.9
C	0.0623	138.5	01May2000, 13:05	43.3
Pond C	0.0030259	8.5	01May2000, 12:10	1.0
D	0.0607	155.3	01May2000, 12:50	41.6
Pond D	0.0055924	34.4	01May2000, 12:05	4.0
J_PD	0.0662924	162.7	01May2000, 12:50	45.7
J_PC	0.0653259	140.5	01May2000, 13:05	44.2
J_P02	0.1316183	297.1	01May2000, 12:55	89.9
J_J03	3.4562037	4017.3	01May2000, 15:00	2072.7

ATTACHMENT C1

APPENDIX C1-C

POSTDEVELOPMENT HYDROLOGIC CALCULATIONS

POSTDEVELOPMENT NARRATIVE

The post-development hydrologic analysis represents the hydrologic calculations after the proposed landfill is developed in accordance with §330.63(c) and §330.305.

POSTDEVELOPMENT DRAINAGE AREA DRAWING

The postdevelopment drainage area map, Drawing C1.4, and the postdevelopment land use map, Drawing C1.6, depicts the Phase I area of the Peach Creek Environmental Park facility.

WATERSHED CHARACTERISTICS

Watershed characteristics have been developed for the postdevelopment hydrologic evaluation. The watershed characteristics address drainage area runoff characteristics, unit hydrograph data and reach characteristics and the final condition drainage system including the detention ponds. A summary table of the values follows. This table features a summary of the drainage areas, Curve Numbers (CN) and basin slope. The Soil Conservation Service (SCS) CN values were derived from watershed characteristic table from the Urban Hydrology for Small Watersheds, Technical Report 55 (TR-55) which included evaluation of soil and surface cover/condition characteristics. The soil values for CN determination were based on proposed soil classification of the proposed facility cover.

WATERSHED CHARACTERISTICS SUMMARY			
Drainage Area	Acres	CN	Slope Ft/FT
A-1	14.9	78	0.008
B-1	26.7	81	0.005
C-1	36.2	75	0.005
D-1	62.3	81	0.008
E	48.0	77	0.005
F	270.7	74	0.006
G-1	24.3	48	0.022
H	1502.3	63	0.016
I-1	225.5	50	0.005

HYDROLOGIC ANALYSIS

For the hydrologic evaluation, HEC-HMS was used for the precipitation-runoff simulation for the postdevelopment condition.

Time Step

The time step, or program computation interval, selected for the analysis is 5 minutes which results in 288 hydrograph ordinates in 24 hours.

Hypothetical Precipitation

Return periods for the 25-year 24-hour rainfall event were used for the design. For overflow and overtopping conditions, the 100-year 24-hour rainfall event was also used to assure functionality and capacity.

Precipitation Losses

Precipitation losses (the precipitation that does not contribute to runoff) are calculated using the Soil Conservation Service (SCS) Curve Number (CN) method. CN is a function of soil cover, land use and antecedent moisture conditions.

Synthetic Unit Hydrographs

The rainfall/runoff transformation was performed with the Natural Resources Conservation Service (NRCS) Unit Hydrograph Method. The synthetic unit hydrographs for each drainage area used a single peak unit hydrograph model developed by the SCS and described in Urban Hydrology for Small Watersheds (TR-55). The hydrologic parameters time of concentration and lag time were calculated utilizing the velocity method discussed in the Natural Resources Conservation Service (NRCS) National Engineering Handbook, Part 630, Chapter 15.

Hyetograph Development Procedure

Based on the current Texas Department of Transportation (TxDOT) Hydraulic Design Manual (2019), the NRCS design storm hyetographs are no longer recommended based on the results of the NOAA Atlas 14 rainfall data. As recommended in the TxDOT Hydraulic Design Manual, the balanced storm method (also known as the Frequency Storm in HEC-HMS) was utilized with the center of the storm specified to be at 50% of the total storm duration.

Proposed Conditions NRCS Land Use Calculations																			
Drainage Subarea ID	Drainage Area (acres)	NRCS Land Use																	
		Open Space - Good				Wood - Good				Residential			Brush - Good			Pasture - Good Water			Computed Weighted CN Value
		A	B	C	D	A	B	C	D	A	B	C	A	B	D	B	C		
		CN=39	CN=61	CN=74	CN=80	CN=30	CN=55	CN=70	CN=77	CN=46	CN=65	CN=77	CN=30	CN=48	CN=73	CN=61	CN=74	CN=100	
A-1	13.9	1.1			12.9														77
B-1	24.7				24.7														80
C-1	34.2	5.7			28.6														73
D-1	58.7				58.7														80
E	48.0								48.0										77
F	270.8			11.5	7.4		5.8	107.1	139.0										74
G-1	24.3					14.0		7.6	2.6										48
H	1503.2		136.1	1.8	4.8	155.4	358.9	215.8	428.3	12.9	17.8	63.6			5.7	77.0	25.3		63
I-1	225.7					76.7	15.9		38.0				6.8	54.6	33.6				50
Pond A	1.0																	1.0	100
Pond B	2.0																	2.0	100
Pond C	1.9																	1.9	100
Pond D	3.6																	3.6	100

Detail of Time of Concentration Calculation - Proposed Conditions																					
Time of Concentration					Sheet Flow			Shallow Concentrated			Channel Flow										
Drainage Area ID	Total Time of Concentration	Channel Flow Travel Time	Shallow Concentrated Flow Travel Time	Sheet Flow Travel Time	Overland Sheet Flow	Overland Flow Roughness Coefficient	2-Year, 24-Hour Rainfall Depth	Shallow Concentrated Flow		"K" Parameter	Channel Flow		Channel Shape	Channel Side Slope	Manning's Roughness Coefficient	Channel Depth	Channel Top Width	Channel Cross Sectional Area	Wetted Perimeter	Channel Hydraulic Radius	Type
								Length (ft)	Slope (ft/ft)		Length (ft)	Slope (ft/ft)									
(--)	(min)	(h)	(h)	(h)	(ft)	(ft/ft)	(in)	(ft)	(ft/ft)	(in)	(ft)	(ft/ft)	(--)	(--)	(n)	(ft)	(ft)	(ft ²)	(ft)	(ft)	(--)
A	19.61	0.24	0.00	0.09	261	0.3333	5	0	0.0080	16.13	1732	0.0020	Trapezoidal	3	0.050	4.00	24.00	48.00	25.30	1.90	Ditch
B	7.47	0.04	0.00	0.08	220	0.3333	5	0	0.0070	16.13	330	0.0020	Trapezoidal	3	0.050	4.00	24.00	48.00	25.30	1.90	Ditch
C	16.41	0.17	0.00	0.10	264	0.3333	5	0	0.0050	16.13	1272	0.0020	Trapezoidal	3	0.050	4.00	24.00	48.00	25.30	1.90	Ditch
D	25.59	0.33	0.00	0.09	268	0.3333	5	0	0.0050	16.13	2450	0.0020	Trapezoidal	3	0.050	4.00	24.00	48.00	25.30	1.90	Ditch
E	90.11	0.06	0.27	1.17	290	0.0050	5	857	0.0010	16.13	470	0.0070	Triangular	6	0.060	1.50	18.00	13.50	18.25	0.74	Ditch
F	171.54	0.70	1.05	1.11	299	0.0060	5	3043	0.0025	16.13	2451	0.0030	Irregular	--	0.080	1.25	169.86	284.19	370.14	0.77	Ditch
G	54.92	0.25	0.07	0.66	298	0.0220	5	600	0.0190	16.13	1346	0.0050	Triangular	6	0.080	2.50	30.00	37.50	30.41	1.23	Ditch
H	214.02	3.01	0.14	0.75	299	0.0160	5	1500	0.0350	16.13	17356	0.0038	Irregular	--	0.087	5.00	286.91	674.77	288.21	2.34	Channel
I	132.40	0.68	0.49	1.04	250	0.0050	5	2903	0.0066	20.32	3363	0.0020	Irregular	--	0.095	6.30	716.49	1971.95	718.20	2.75	Channel

Project: Jayhawker Creek Simulation Run: 25yr_Proposed_Outlet

Start of Run: 01May2000, 00:00 Basin Model: Proposed
 End of Run: 04May2000, 01:00 Meteorologic Model: 25yr
 Compute Time: 14Oct2020, 14:51:50 Control Specifications: 25yr

Show Elements: All Elements

Volume Units: ☒ IN ☐ ACRE-FT

Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI ²)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
F	0.4232000	487.3	01May2000, 13:55	7.96
J_T01	0.4232000	487.3	01May2000, 13:55	7.96
E	0.0750000	131.5	01May2000, 13:00	8.37
J_E01	0.0750000	131.5	01May2000, 13:00	8.37
J_T02	0.4982000	567.5	01May2000, 13:40	8.02
Trib	0.4982000	566.3	01May2000, 13:55	8.02
G-1	0.0379000	40.6	01May2000, 12:40	4.18
H	2.3487000	1791.6	01May2000, 14:40	6.41
J_J01	2.3487000	1791.6	01May2000, 14:40	6.41
J_T03	0.5361000	582.6	01May2000, 13:55	7.75
A-1	0.0217736	81.1	01May2000, 12:15	8.37
B-1	0.0386668	193.3	01May2000, 12:05	8.77
Detention Pond B	0.0417448	82.8	01May2000, 12:20	8.95
Detention Pond A	0.0232810	53.8	01May2000, 12:25	8.55
J_P01	0.0650258	135.3	01May2000, 12:25	8.81
J_J02	2.9498258	2349.0	01May2000, 14:30	6.70
Main	2.9498258	2244.8	01May2000, 15:20	6.68
I-1	0.3525800	259.4	01May2000, 13:35	4.48
D-1	0.0917906	315.2	01May2000, 12:20	8.77
Pond D	0.0055924	30.0	01May2000, 12:05	11.18
Detention Pond D	0.0973830	164.1	01May2000, 12:40	8.91
C-1	0.0534792	196.3	01May2000, 12:10	7.82
Detention Pond C	0.0565051	135.5	01May2000, 12:25	8.00
J_P02	0.1538881	279.7	01May2000, 12:30	8.58
J_J03	3.4562939	2440.0	01May2000, 15:15	6.54
Pond C	0.0030259	16.2	01May2000, 12:05	11.18
Pond B	0.0030780	16.5	01May2000, 12:05	11.18
Pond A	0.0015074	8.1	01May2000, 12:05	11.18

Project: Jayhawker Creek Simulation Run: 100yr_Proposed Outlet

Start of Run: 01May2000, 00:00 Basin Model: Proposed
 End of Run: 04May2000, 01:00 Meteorologic Model: 100yr
 Compute Time: 14Oct2020, 14:51:44 Control Specifications: 100yr

Show Elements: All Elements

Volume Units: ☒ IN ☐ ACRE-FT

Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
F	0.4232000	719.8	01May2000, 13:55	13.02
J_T01	0.4232000	719.8	01May2000, 13:55	13.02
E	0.0750000	183.1	01May2000, 13:00	13.49
J_E01	0.0750000	183.1	01May2000, 13:00	13.49
J_T02	0.4982000	838.8	01May2000, 13:40	13.09
Trib	0.4982000	837.7	01May2000, 13:55	13.09
G-1	0.0379000	72.3	01May2000, 12:40	8.24
H	2.3487000	2920.3	01May2000, 14:40	11.17
J_J01	2.3487000	2920.3	01May2000, 14:40	11.17
J_T03	0.5361000	869.8	01May2000, 13:50	12.75
A-1	0.0217736	108.9	01May2000, 12:15	13.49
B-1	0.0386668	255.9	01May2000, 12:05	13.94
Detention Pond B	0.0417448	137.1	01May2000, 12:20	14.12
Detention Pond A	0.0232810	78.8	01May2000, 12:25	13.68
J_P01	0.0650258	210.8	01May2000, 12:20	13.96
J_J02	2.9498258	3751.9	01May2000, 14:25	11.52
Main	2.9498258	3618.5	01May2000, 15:10	11.48
I-1	0.3525800	465.5	01May2000, 13:35	8.67
D-1	0.0917906	416.9	01May2000, 12:20	13.94
Pond D	0.0055924	37.5	01May2000, 12:05	16.48
Detention Pond D	0.0973830	288.4	01May2000, 12:30	14.08
C-1	0.0534792	271.0	01May2000, 12:10	12.86
Detention Pond C	0.0565051	209.3	01May2000, 12:20	13.05
J_P02	0.1538881	473.0	01May2000, 12:30	13.70
J_J03	3.4562939	3990.1	01May2000, 15:00	11.29
Pond C	0.0030259	20.3	01May2000, 12:05	16.48
Pond B	0.0030780	20.6	01May2000, 12:05	16.48
Pond A	0.0015074	10.1	01May2000, 12:05	16.48

**POSTDEVELOPMENT SURFACE WATER DETENTION PONDS
DESIGN PARAMETERS**

Pond Report

2

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Tuesday, 07 / 14 / 2020

Pond No. 16 - a 1 pond

Pond Data

Trapezoid -Bottom L x W = 200.0 x 70.0 ft, Side slope = 3.00:1, Bottom elev. = 100.00 ft, Depth = 8.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	14,000	0	0
0.80	100.80	15,319	11,725	11,725
1.60	101.60	16,684	12,798	24,523
2.40	102.40	18,095	13,909	38,431
3.20	103.20	19,553	15,056	53,488
4.00	104.00	21,056	16,240	69,728
4.80	104.80	22,605	17,461	87,189
5.60	105.60	24,201	18,719	105,909
6.40	106.40	25,843	20,014	125,923
7.20	107.20	27,530	21,346	147,269
8.00	108.00	29,264	22,715	169,984

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (In)	= 24.00	0.00	0.00	0.00
Span (In)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.00	0.00	0.00	0.00
Length (ft)	= 40.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

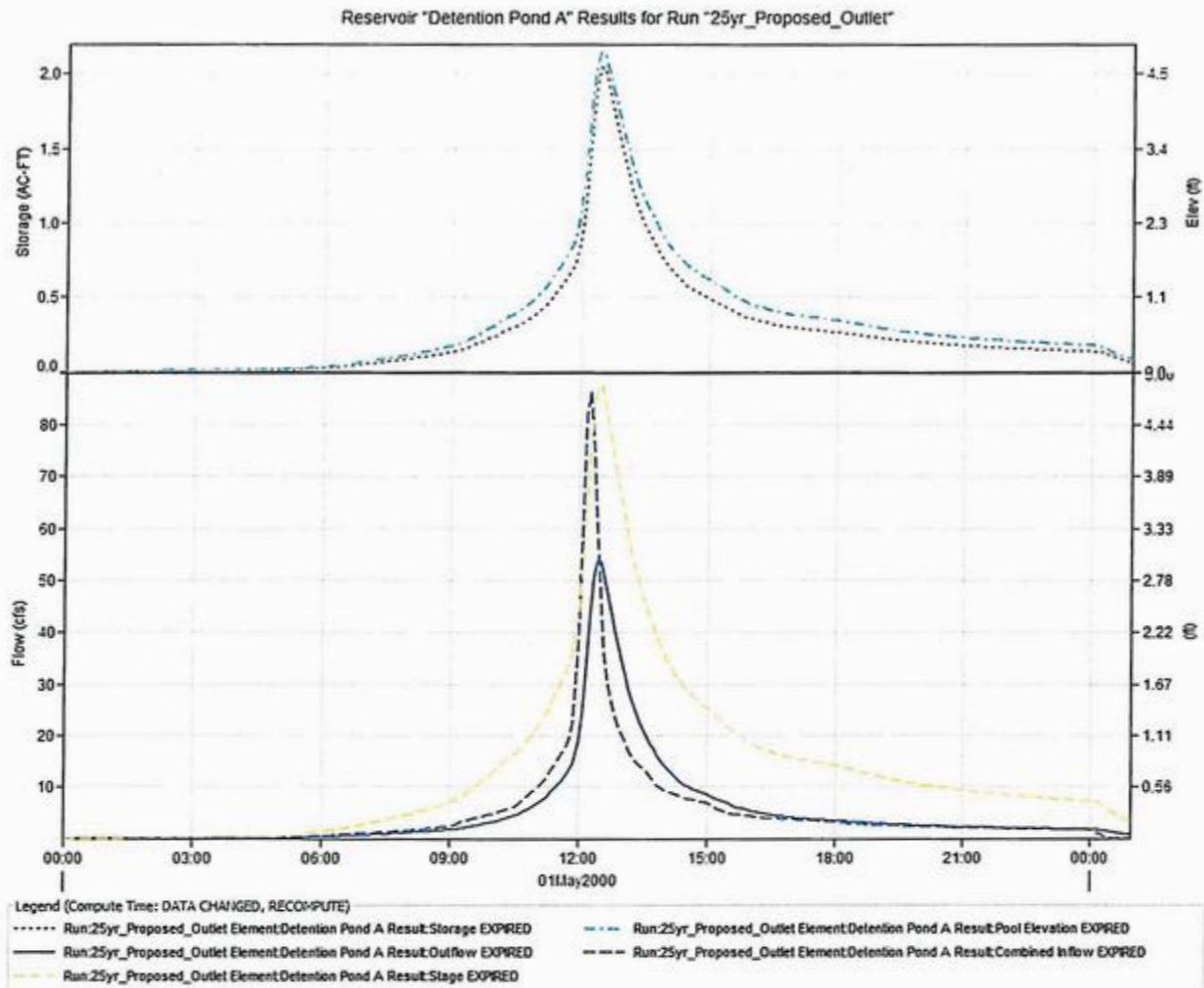
Weir Structures

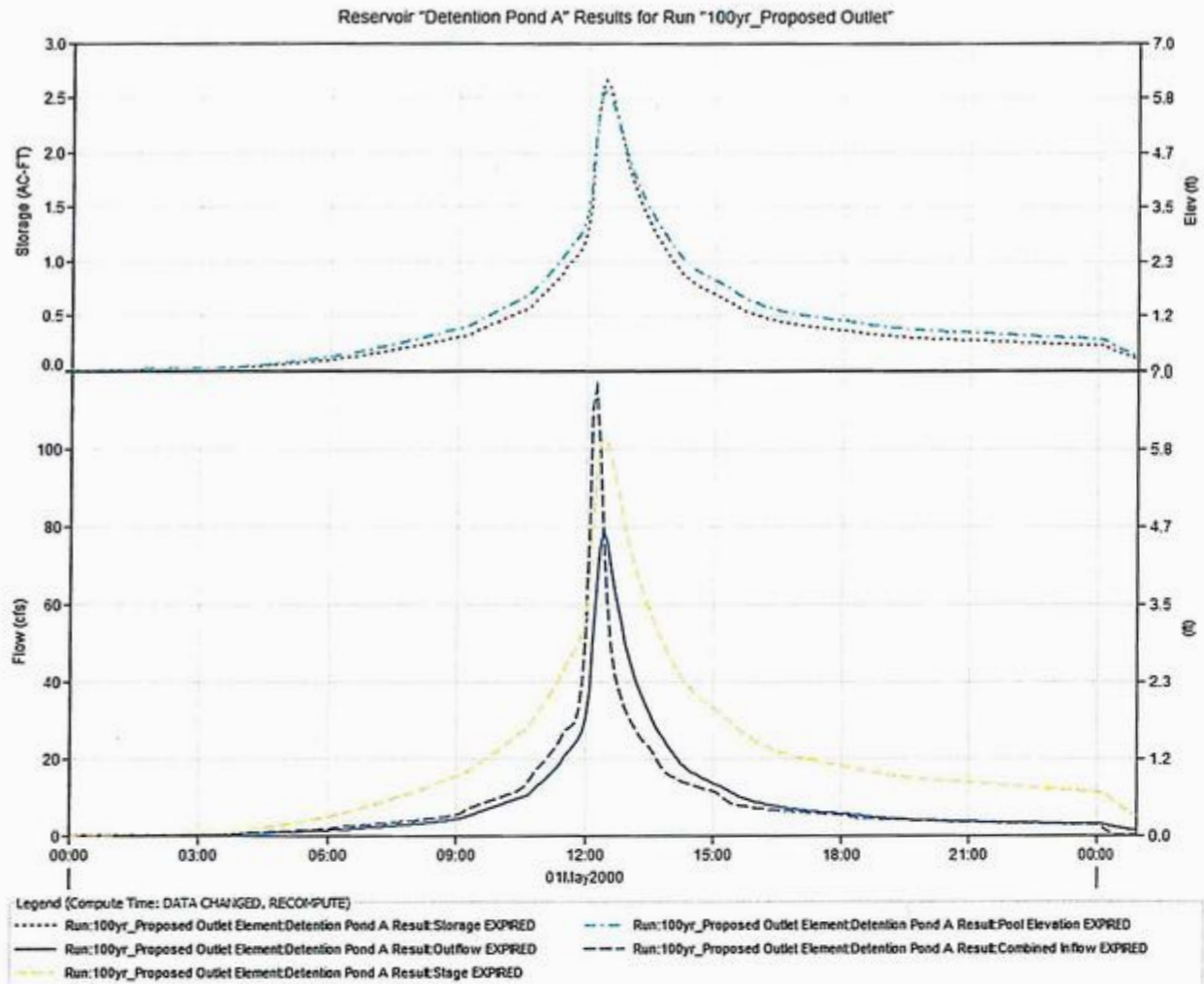
	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.56	1.50	0.00	0.00
Crest El. (ft)	= 106.00	100.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	—	—
Multi-Stage	= Yes	No	No	No
Exfil. (In/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for entrance conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	—	—	—	0.00	0.00	—	—	—	—	0.000
0.80	11,725	100.80	0.00	—	—	—	0.00	3.57	—	—	—	—	3.574
1.60	24,523	101.60	0.00	—	—	—	0.00	10.11	—	—	—	—	10.11
2.40	38,431	102.40	0.00	—	—	—	0.00	18.57	—	—	—	—	18.57
3.20	53,488	103.20	0.00	—	—	—	0.00	28.59	—	—	—	—	28.59
4.00	69,728	104.00	0.00	—	—	—	0.00	39.96	—	—	—	—	39.96
4.80	87,189	104.80	0.00	—	—	—	0.00	52.53	—	—	—	—	52.53
5.60	105,909	105.60	0.00	—	—	—	0.00	66.19	—	—	—	—	66.19
6.40	125,923	106.40	10.58 oc	—	—	—	10.58	80.87	—	—	—	—	91.45
7.20	147,269	107.20	36.74 ic	—	—	—	36.73 s	96.50	—	—	—	—	133.24
8.00	169,984	108.00	39.79 ic	—	—	—	39.78 s	113.02	—	—	—	—	152.81





Pond Report

2

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Tuesday, 07 / 14 / 2020

Pond No. 17 - new pond b

Pond Data

Trapezoid -Bottom L x W = 450.0 x 70.0 ft, Side slope = 3.00:1, Bottom elev. = 100.00 ft, Depth = 8.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	31,500	0	0
0.80	100.80	34,019	26,205	26,205
1.60	101.60	36,584	28,238	54,443
2.40	102.40	39,195	30,309	84,751
3.20	103.20	41,853	32,416	117,168
4.00	104.00	44,556	34,560	151,728
4.80	104.80	47,305	36,742	188,470
5.60	105.60	50,101	38,959	227,429
6.40	106.40	52,943	41,214	268,643
7.20	107.20	55,830	43,506	312,149
8.00	108.00	58,764	45,835	357,984

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.00	0.00	0.00	0.00
Length (ft)	= 40.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

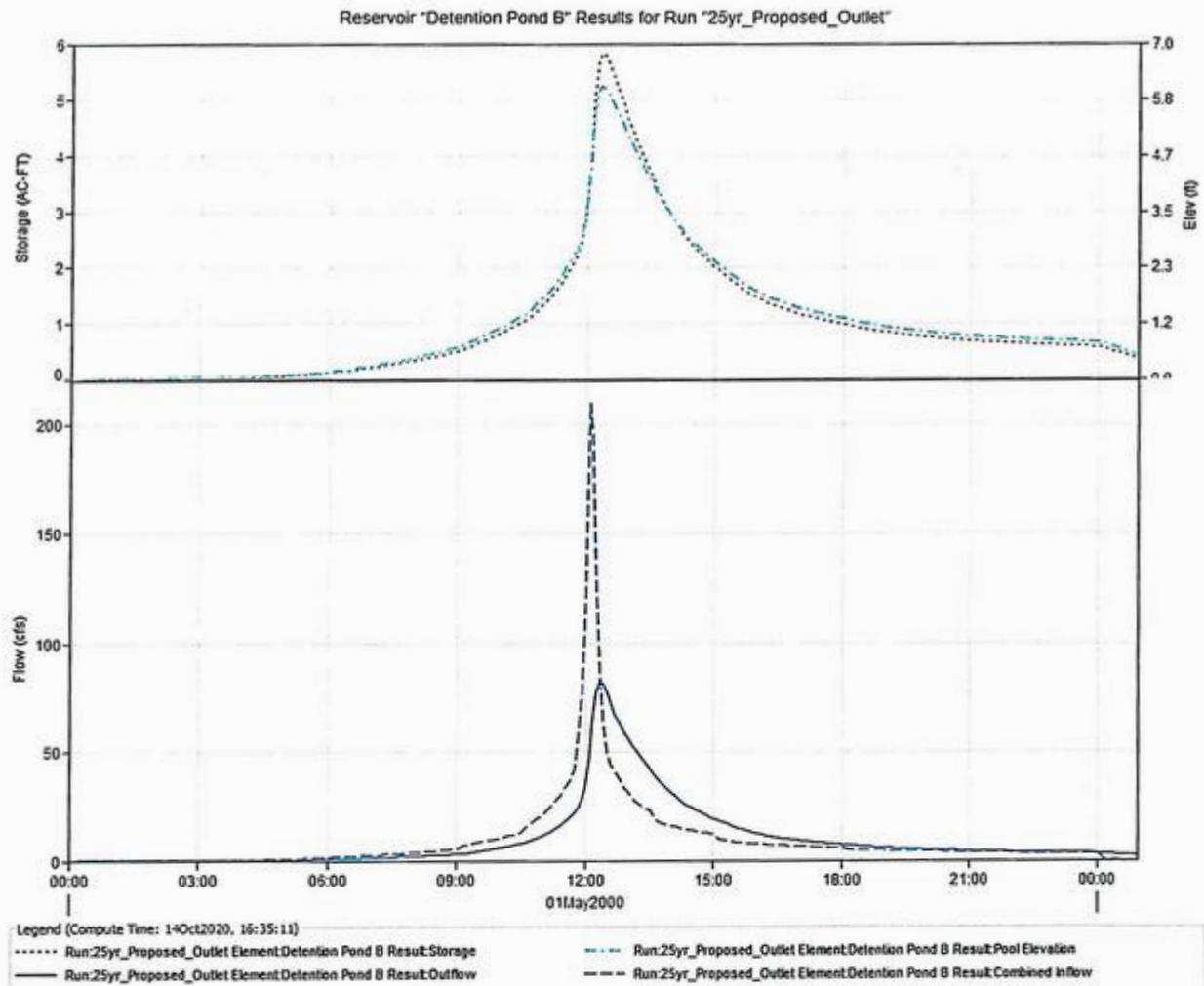
Weir Structures

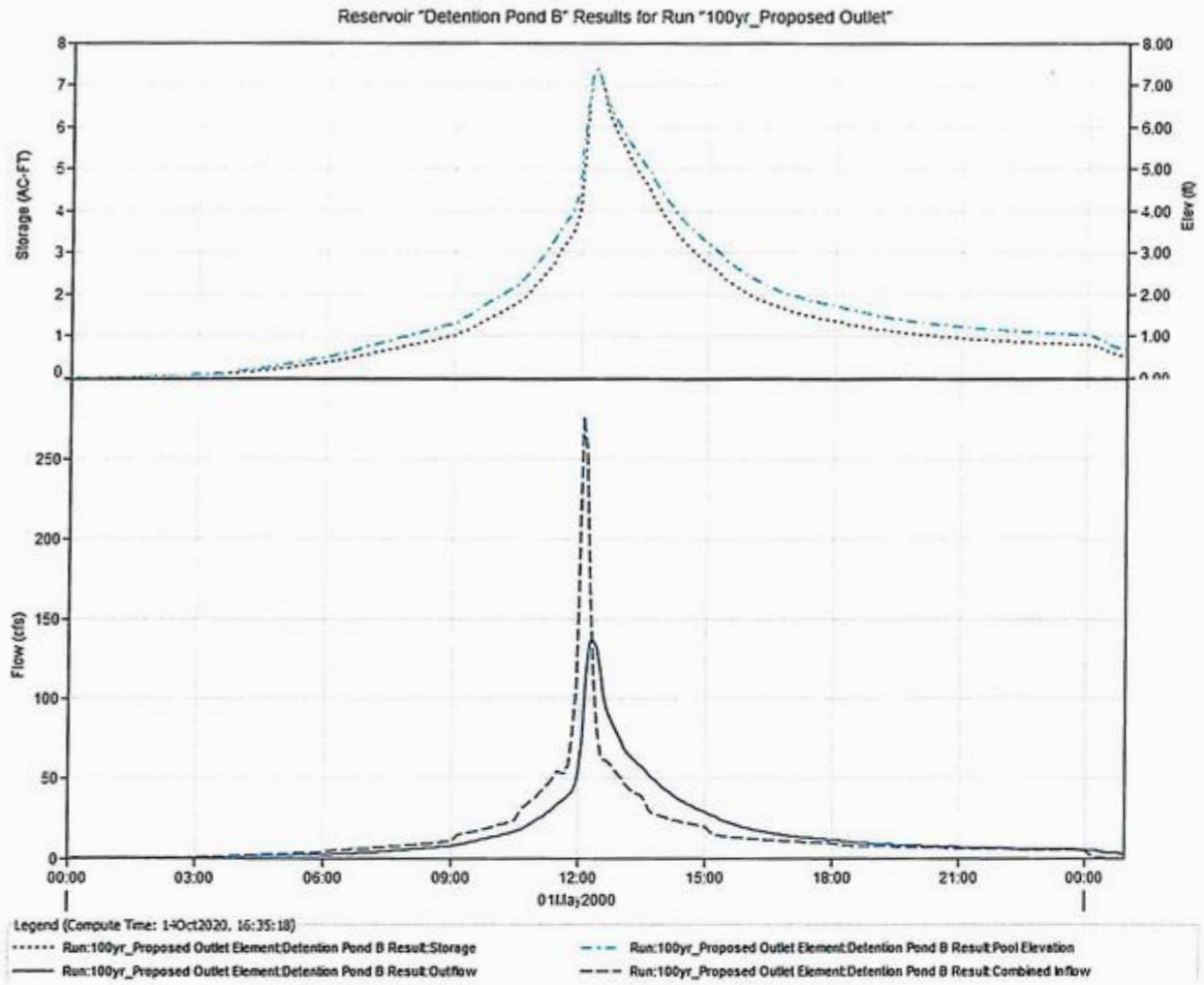
	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.56	1.50	0.00	0.00
Crest El. (ft)	= 106.00	100.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	—	—
Multi-Stage	= Yes	No	No	No
Exfil. (in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir users checked for orifice conditions (c) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	—	—	—	0.00	0.00	—	—	—	—	0.000
0.80	26,205	100.80	0.00	—	—	—	0.00	3.57	—	—	—	—	3.574
1.60	54,443	101.60	0.00	—	—	—	0.00	10.11	—	—	—	—	10.11
2.40	84,751	102.40	0.00	—	—	—	0.00	18.57	—	—	—	—	18.57
3.20	117,168	103.20	0.00	—	—	—	0.00	28.59	—	—	—	—	28.59
4.00	151,728	104.00	0.00	—	—	—	0.00	39.96	—	—	—	—	39.96
4.80	188,470	104.80	0.00	—	—	—	0.00	52.53	—	—	—	—	52.53
5.60	227,429	105.60	0.00	—	—	—	0.00	66.19	—	—	—	—	66.19
6.40	268,643	106.40	10.58 oc	—	—	—	10.58	80.87	—	—	—	—	91.45
7.20	312,149	107.20	36.74 ic	—	—	—	36.73 s	96.50	—	—	—	—	133.24
8.00	357,984	108.00	39.79 ic	—	—	—	39.78 s	113.02	—	—	—	—	152.81





Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Wednesday, 08 / 11 / 2021

Pond No. 25 - 2 new pond c

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beging Elevation = 193.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	193.00	32,272	0	0
1.00	194.00	38,362	35,270	35,270
2.00	195.00	44,586	41,431	76,701
3.00	196.00	50,896	47,701	124,402
4.00	197.00	57,158	53,991	178,393
5.00	198.00	63,494	60,292	238,686
6.00	199.00	69,716	66,574	305,260

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	0.00	0.00	0.00
Span (in)	= 30.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 193.00	0.00	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

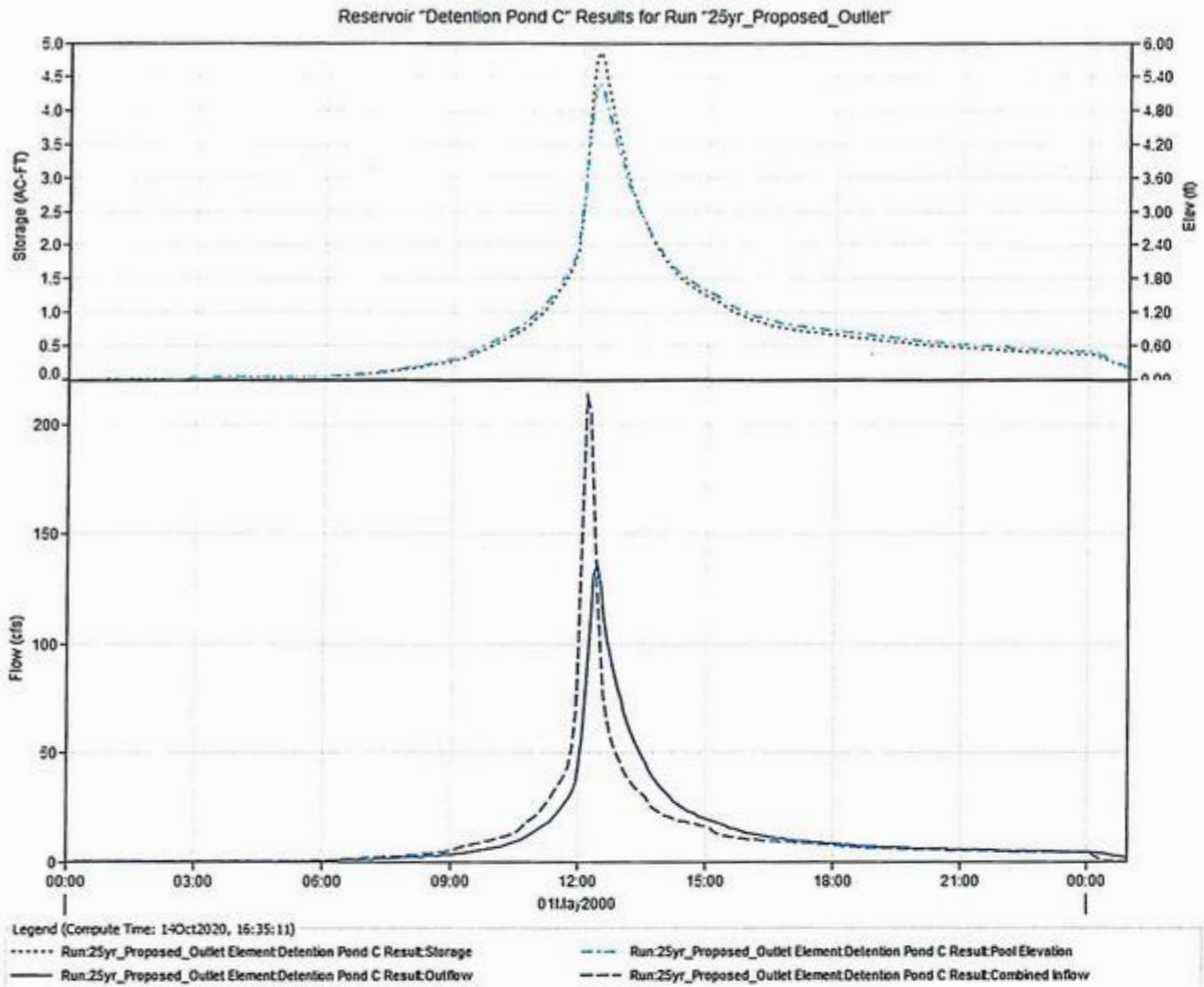
Weir Structures

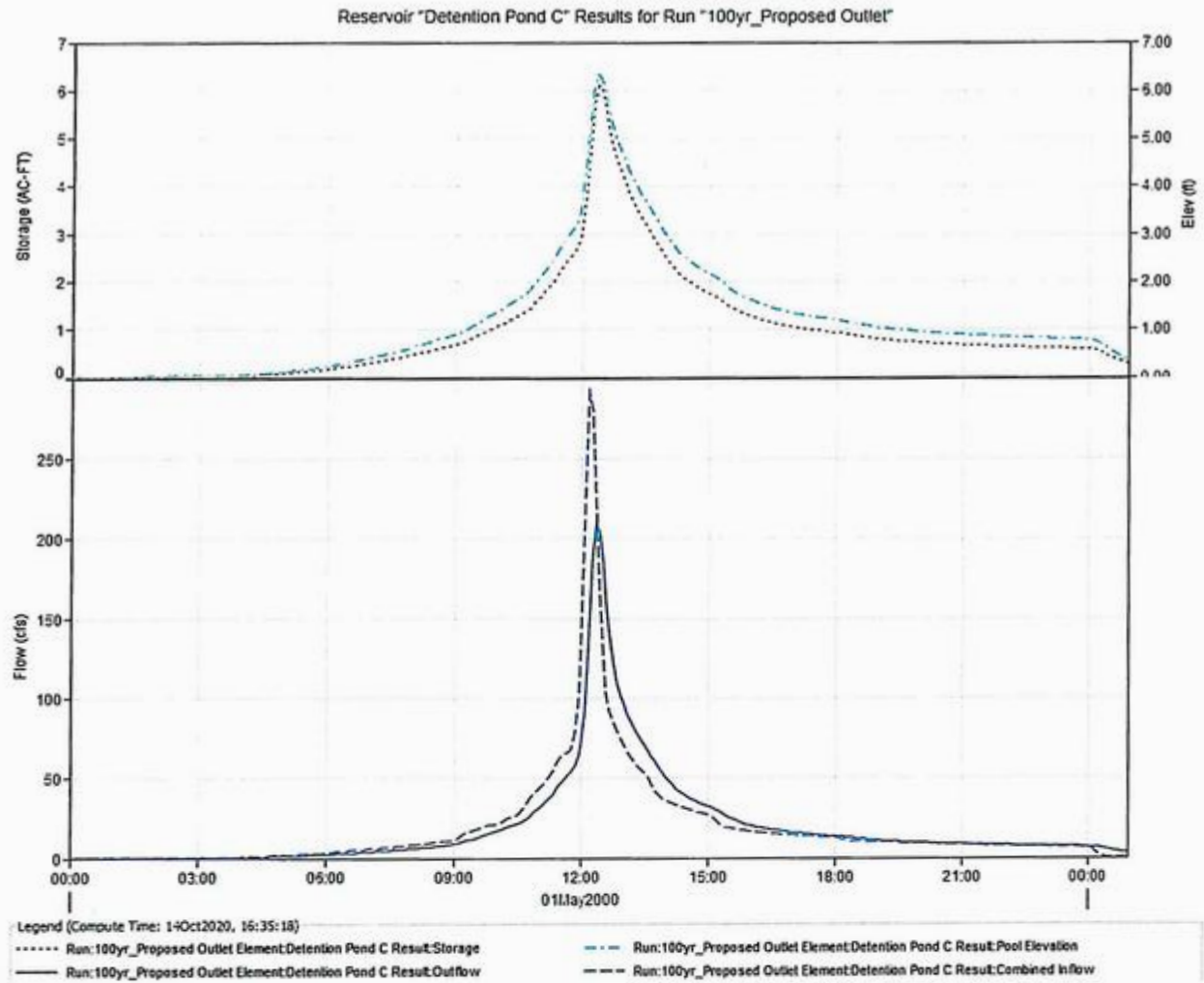
	[A]	[B]	[C]	[D]
Crest Len (ft)	= 15.70	3.00	0.00	0.00
Crest El. (ft)	= 197.00	193.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	—	—
Multi-Stage	= Yes	No	No	No
Exfil. (in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir users checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	193.00	0.00	—	—	—	0.00	0.00	—	—	—	—	0.000
1.00	35,270	194.00	0.00	—	—	—	0.00	9.99	—	—	—	—	9.990
2.00	76,701	195.00	0.00	—	—	—	0.00	28.26	—	—	—	—	28.26
3.00	124,402	196.00	0.00	—	—	—	0.00	51.91	—	—	—	—	51.91
4.00	178,393	197.00	0.00	—	—	—	0.00	79.92	—	—	—	—	79.92
5.00	238,686	198.00	42.70 oc	—	—	—	42.70 s	111.69	—	—	—	—	154.39
6.00	305,260	199.00	51.04 ic	—	—	—	51.03 s	146.82	—	—	—	—	197.85





Pond Report

2

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Tuesday, 07 / 14 / 2020

Pond No. 19 - new pond d

Pond Data

Trapezoid -Bottom L x W = 850.0 x 100.0 ft, Side slope = 3.00:1, Bottom elev. = 100.00 ft, Depth = 8.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	85,000	0	0
0.80	100.80	89,583	69,830	69,830
1.60	101.60	94,212	73,515	143,345
2.40	102.40	98,887	77,237	220,582
3.20	103.20	103,609	80,995	301,577
4.00	104.00	108,376	84,791	386,368
4.80	104.80	113,189	88,623	474,991
5.60	105.60	118,049	92,492	567,483
6.40	106.40	122,955	96,398	663,882
7.20	107.20	127,906	100,341	764,223
8.00	108.00	132,904	104,321	868,544

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 48.00	0.00	0.00	0.00
Span (in)	= 48.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert EL. (ft)	= 100.00	0.00	0.00	0.00
Length (ft)	= 40.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

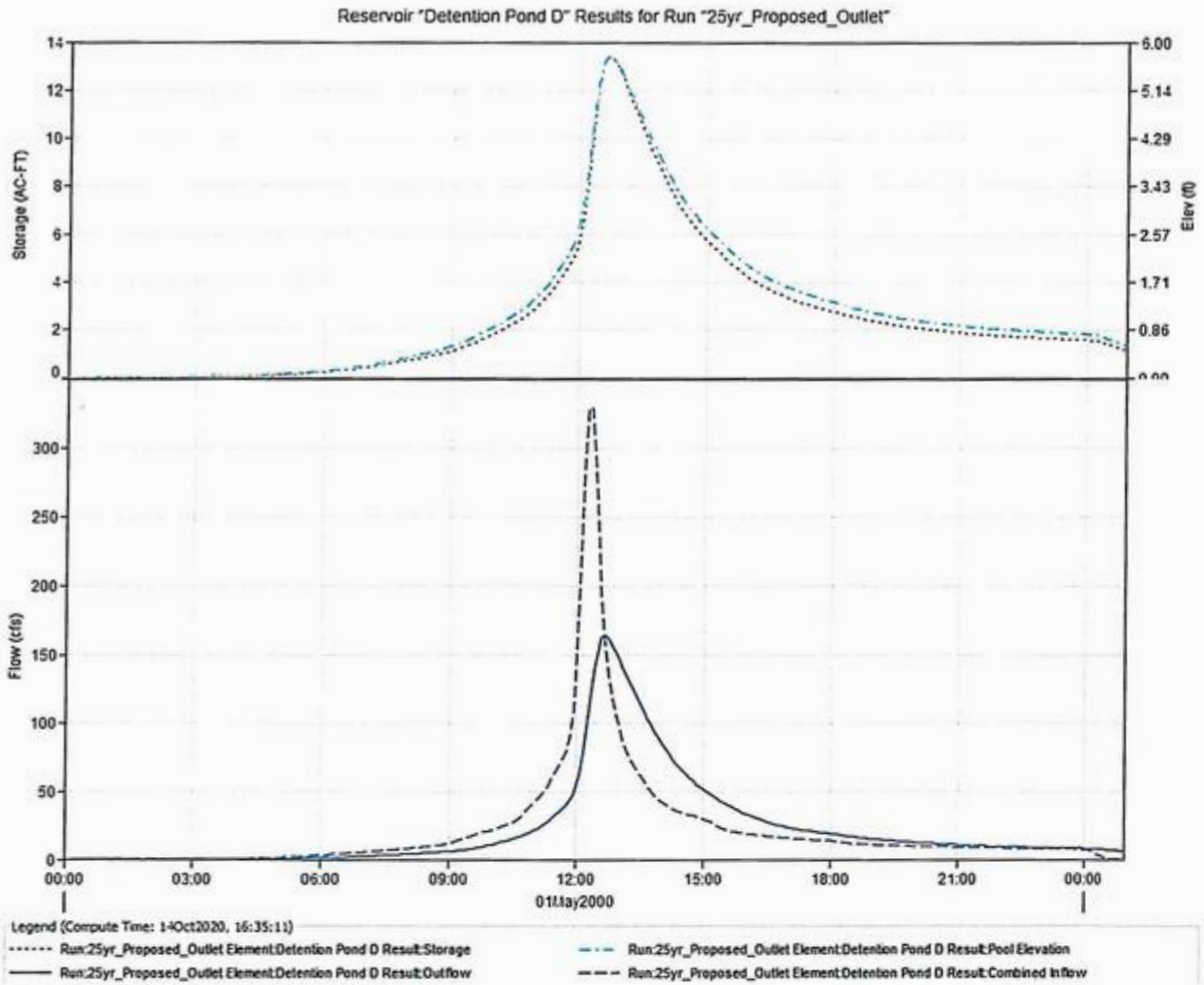
Weir Structures

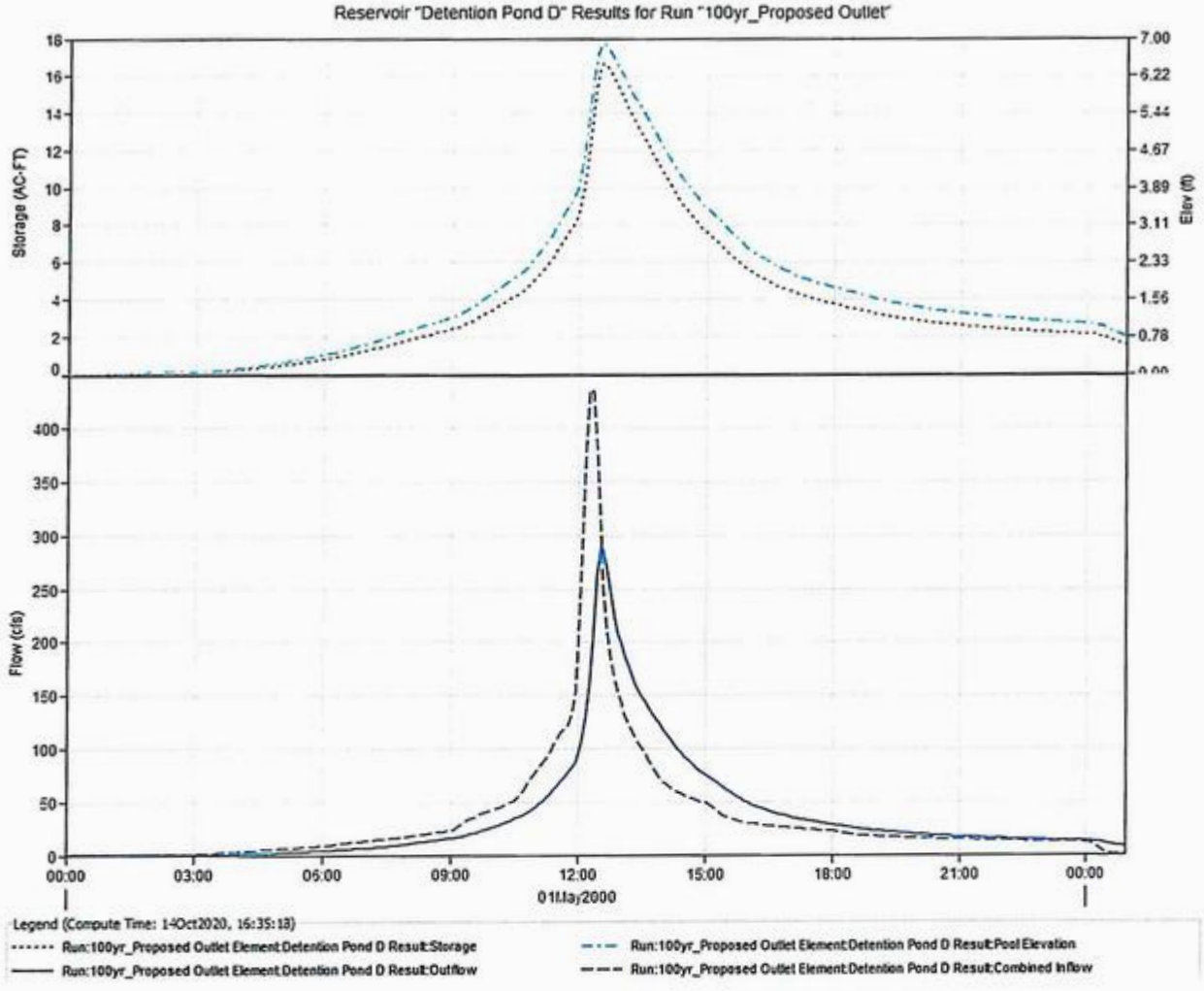
	[A]	[B]	[C]	[D]
Crest Len (ft)	= 25.12	3.50	0.00	0.00
Crest El. (ft)	= 106.00	100.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	—	—
Multi-Stage	= Yes	No	No	No
Exfil. (in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir users checked for orifice conditions (ic) and submergence (s)

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	—	—	—	0.00	0.00	—	—	—	—	0.000
0.80	69,830	100.80	0.00	—	—	—	0.00	8.34	—	—	—	—	8.340
1.60	143,345	101.60	0.00	—	—	—	0.00	23.59	—	—	—	—	23.59
2.40	220,582	102.40	0.00	—	—	—	0.00	43.33	—	—	—	—	43.33
3.20	301,577	103.20	0.00	—	—	—	0.00	66.72	—	—	—	—	66.72
4.00	386,368	104.00	0.00	—	—	—	0.00	93.24	—	—	—	—	93.24
4.80	474,991	104.80	0.00	—	—	—	0.00	122.57	—	—	—	—	122.57
5.60	567,483	105.60	0.00	—	—	—	0.00	154.45	—	—	—	—	154.45
6.40	663,882	106.40	21.23 oc	—	—	—	21.16	188.70	—	—	—	—	209.87
7.20	764,223	107.20	109.96 oc	—	—	—	109.96	225.17	—	—	—	—	335.13
8.00	868,544	108.00	143.40 ic	—	—	—	143.39 s	263.72	—	—	—	—	407.11





ATTACHMENT C1
APPENDIX C1-D
PERIMETER DRAINAGE SYSTEM DESIGN

NARRATIVE

This appendix presents the design of Peach Creek Environmental Park perimeter drainage channels in accordance with §330.305(a)-(d).

PERIMETER DRAINAGE PLAN

Drawing C2.3 Proposed Drainage Improvements depicts the perimeter drainage system and detention pond locations. The perimeter channel hydraulic analysis is included for the 25-year rainfall event.

PERIMETER CHANNEL DESIGN SUMMARY

The perimeter channels are designed for peak discharge resulting from the 25-year storm event and will pass the 100-year storm event. The perimeter channel depths and calculated normal depths are summarized in the table below. The channel has 3:1 side slope and a 4-foot flat bottom. The exception is D-1(a) and D-1(b). D-1(a) has a 4-foot flat bottom while D-1(b) has a 7-foot flat bottom.

PERIMETER CHANNEL SUMMARY			
Drainage Area	Depth (feet)	25-Yr Flow Depth (feet)	100-Year Flow Depth (feet)
A-1	4	1.19	2.40
B-1	4	2.65	3.30
C-1	4	3.15	3.91
D-1(a)	4	3.56	3.63
D-1(b)	4	3.25	3.87

PEACH CREEK ENVIRONMENTAL PARK
SAN JACINTO COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2406

TYPE I PERMIT APPLICATION
PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT C2
DRAINAGE SYSTEM PLANS AND DETAILS

Prepared for

PC-II, LLC

Rev. 2, January 22, 2021



Prepared by

NEEL-SCHAFFER, INC.
13430 NW Freeway, Suite 650
Houston, TX 77040
713-783-7117

Texas Board of Professional Engineers
Firm Registration No. F-2697

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ATTACHMENT C2 – DRAINAGE SYSTEM PLANS AND DETAILS

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Drawing C2.1 – Proposed Drainage Improvements

Drawing C2.2 – Drainage Details

Drawing C2.3 – Proposed Drainage Channels

Drawing C2.4– Channel Profiles

Drawing C2.5 – Channel Profiles

Drawing C2.6 – Drainage Pond Cross Sections

Drawing C2.7 – Drainage Pond Cross Sections

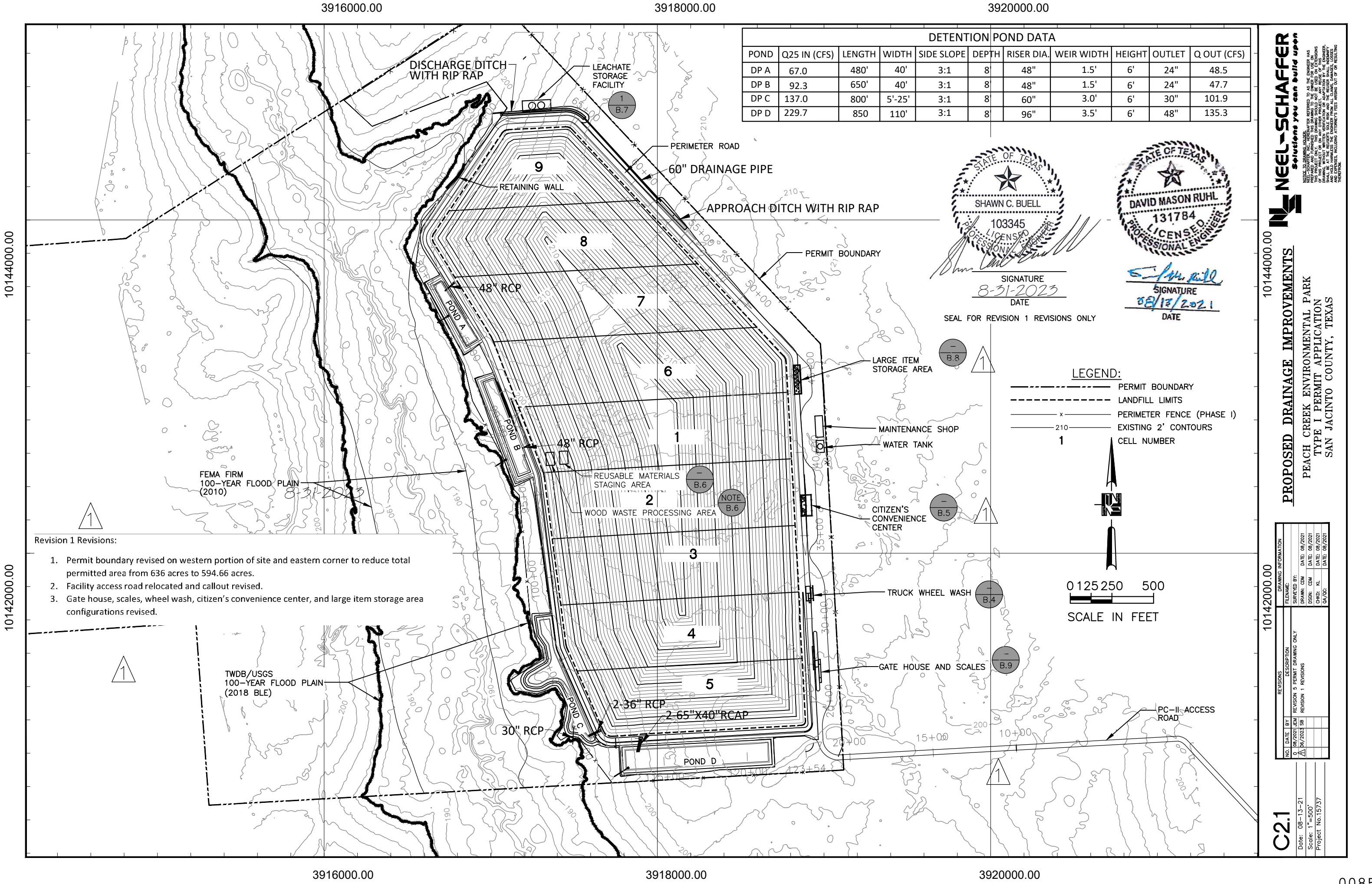


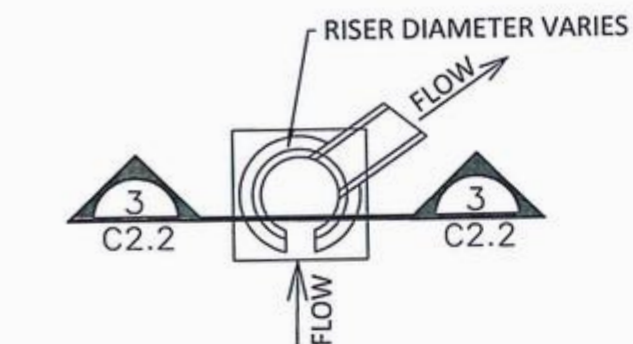
1 NARRATIVE

The proposed facility will be located within drainage basins where surface water flows generally southward. The site is relatively flat, and slopes gently to the south. Surface water generally drains south from the eastern portion of the facility (Phase 1 area) into Jayhawker Creek, which flows south and eventually drains into Peach Creek. Surface water from the western portion of the facility (where future expansion may occur) drains into Blue Branch which flows south and joins Gum Branch prior to discharging into Peach Creek. Peach Creek eventually discharges into Caney Creek before finally discharging into Lake Houston approximately 17 miles south of the facility.

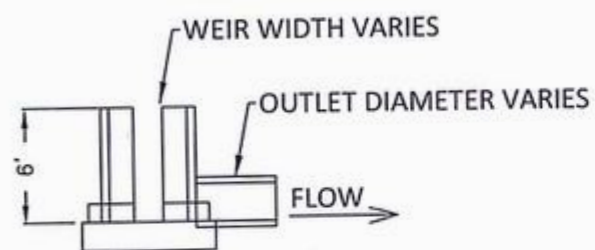
Stormwater runoff from the developed landfill in the Phase I area will be conveyed by perimeter drainage channels that discharge into retention basins prior to discharging off the facility. The surface water drainage system for the developed landfill is designed in accordance with 30 TAC §330.63(c). Stormwater will be conveyed from the retention ponds into natural drainage features draining into Jayhawker Creek. Surface water run-on from drainage areas to the northeast of the site will be routed around the side of the landfill unit in a 60-inch reinforced concrete pipe then into a ditch with riprap, then into a natural drainage feature that drains to Jayhawker Creek. The drainage system components are shown on Drawings C2.1 thru C2.7.

In accordance with §330.303(a) and (b), the drainage system ensures the facility will be constructed, maintained, and operated to manage run-on and runoff during the peak discharge of a 25-year rainfall event and will prevent the off-site discharge of waste and feedstock material, including, but not limited to, in-process and/or processed materials. In addition, surface water drainage in and around the facility will be controlled to minimize surface water running onto, into, and off the landfill disposal and treatment areas.

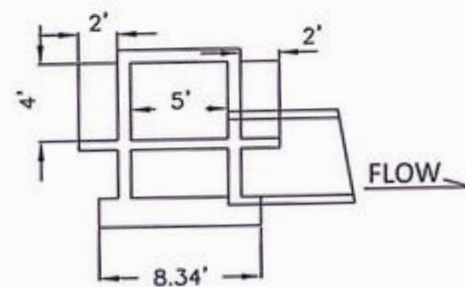




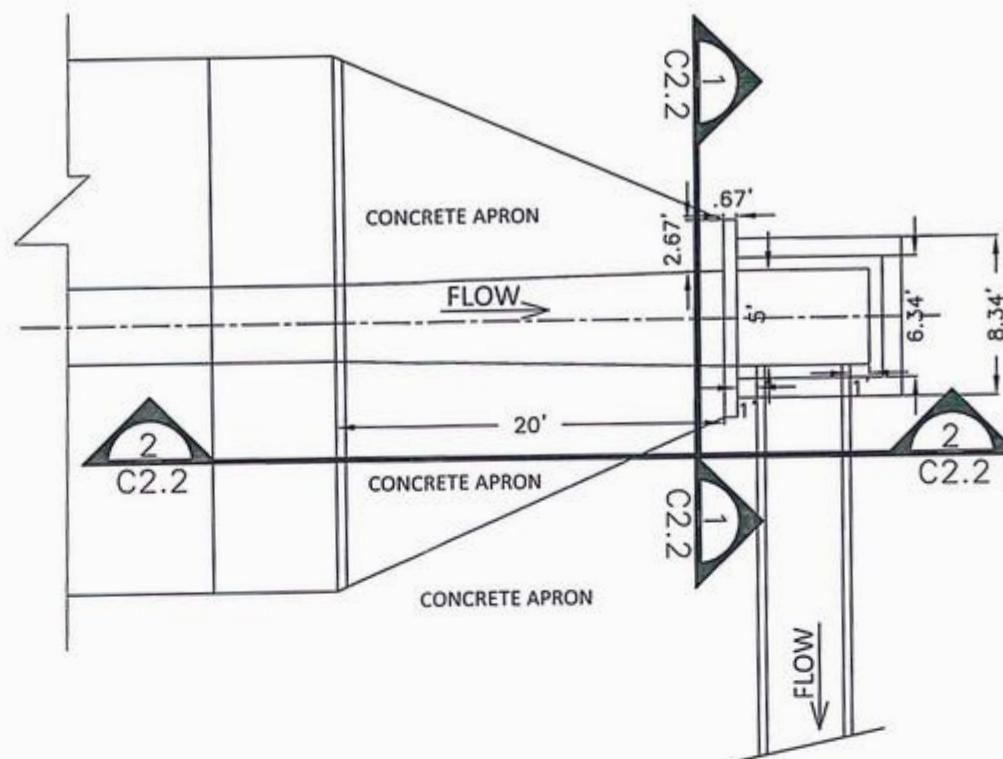
POND OUTLET STRUCTURE PLAN
SCALE: 1"=10'



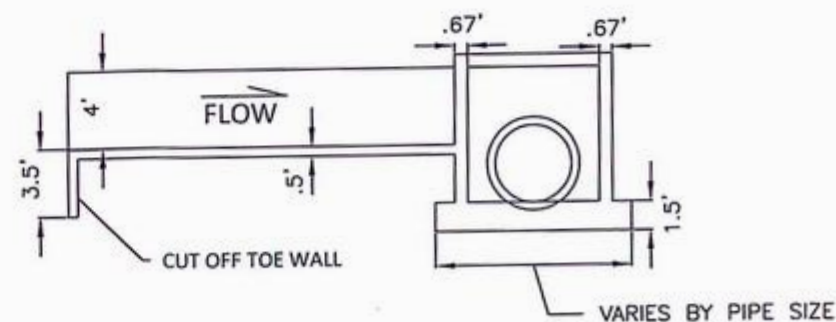
POND OUTLET STRUCTURE SECTION
SCALE: 1"=10' (3) C2.2



DITCH OUTLET STRUCTURE SECTION
SCALE: 1"=10' (1) C2.2



DITCH OUTLET STRUCTURE PLAN
SCALE: 1"=10'



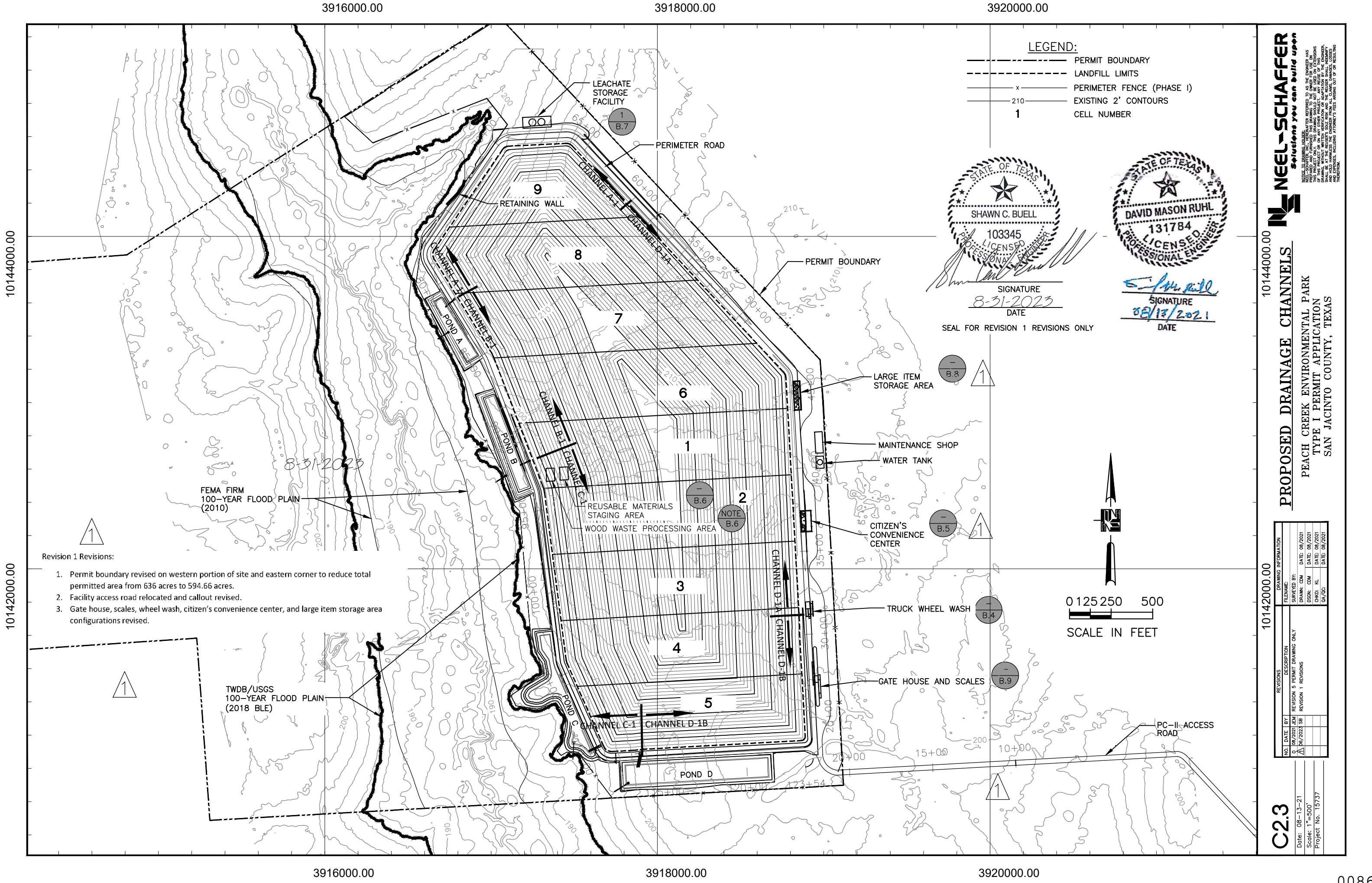
DITCH OUTLET STRUCTURE SECTION
SCALE: 1"=10' (2) C2.2



David Mason Ruhl
SIGNATURE
9/23/20
DATE

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NO.	DATE	BY	DESCRIPTION
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2	08/20/20	AM	
3	08/20/20	AM	



C2.3
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PROPOSED DRAINAGE CHANNELS
PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

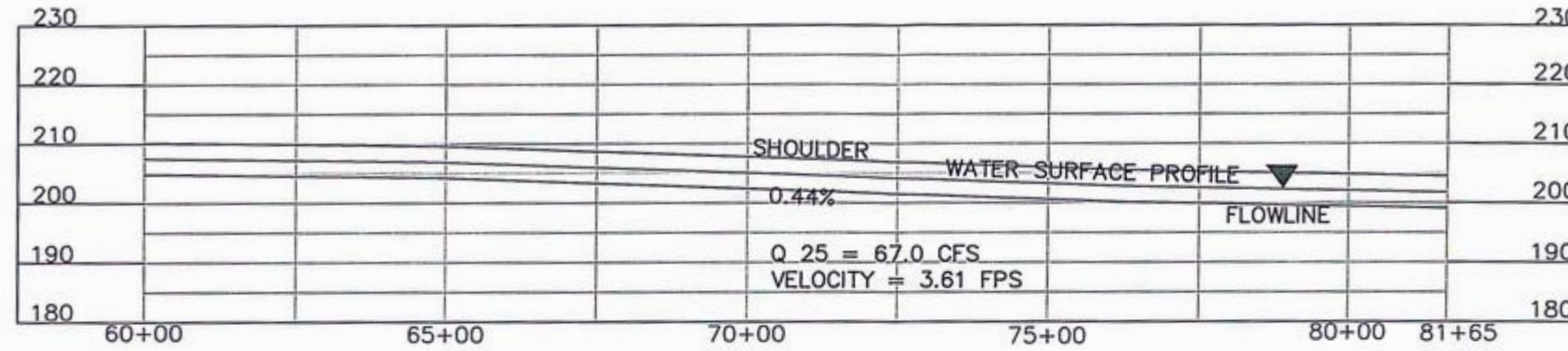
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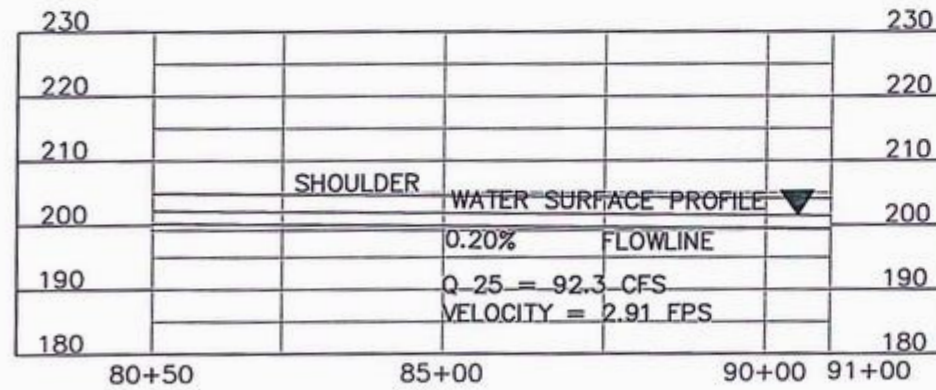
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103345
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
SIGNATURE: *[Signature]*
DATE: 8-31-2023

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131784
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
SIGNATURE: *[Signature]*
DATE: 08/13/2021

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CHANNEL A-1
SCALE: 1"=300'



CHANNEL B-1
SCALE: 1"=300'



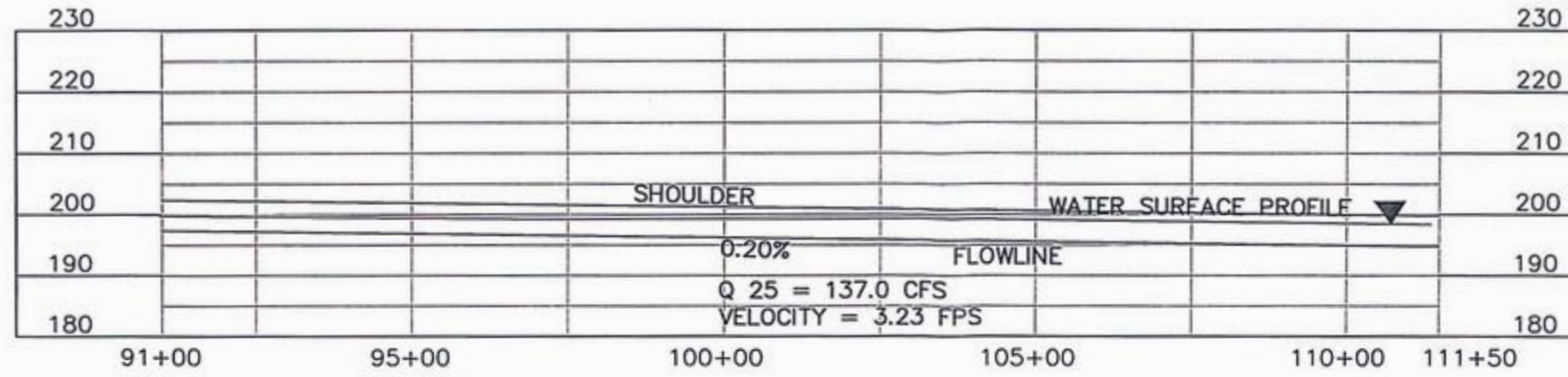
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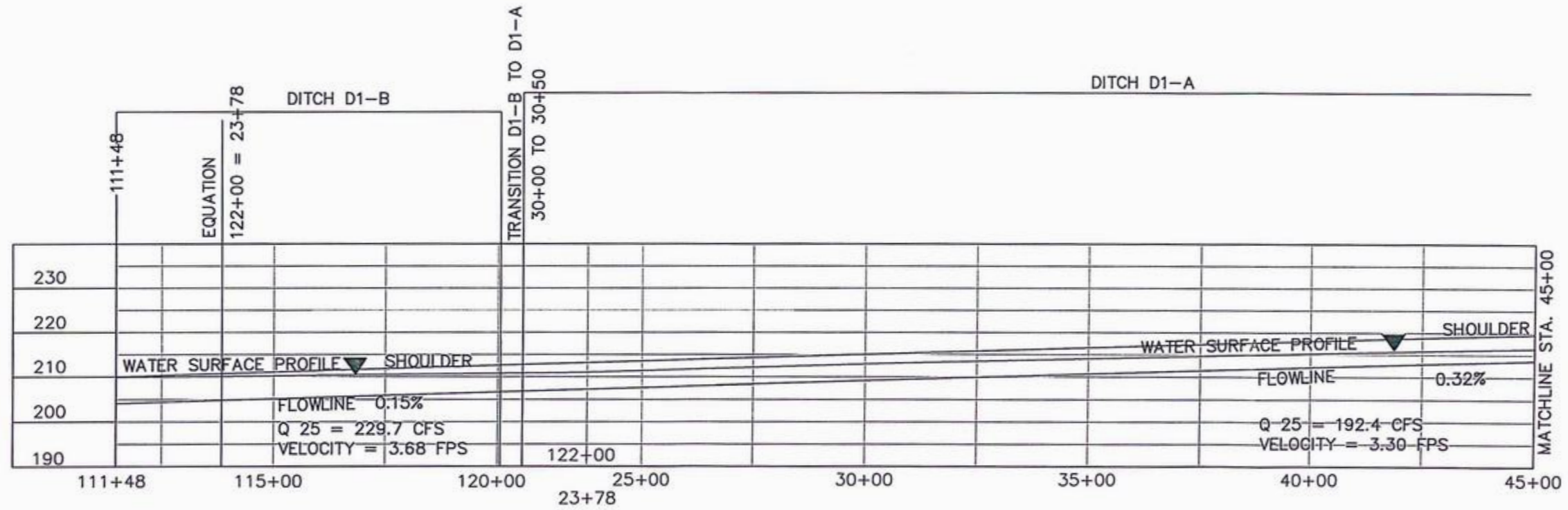
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Project No. 15737

CHANNEL PROFILES
PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

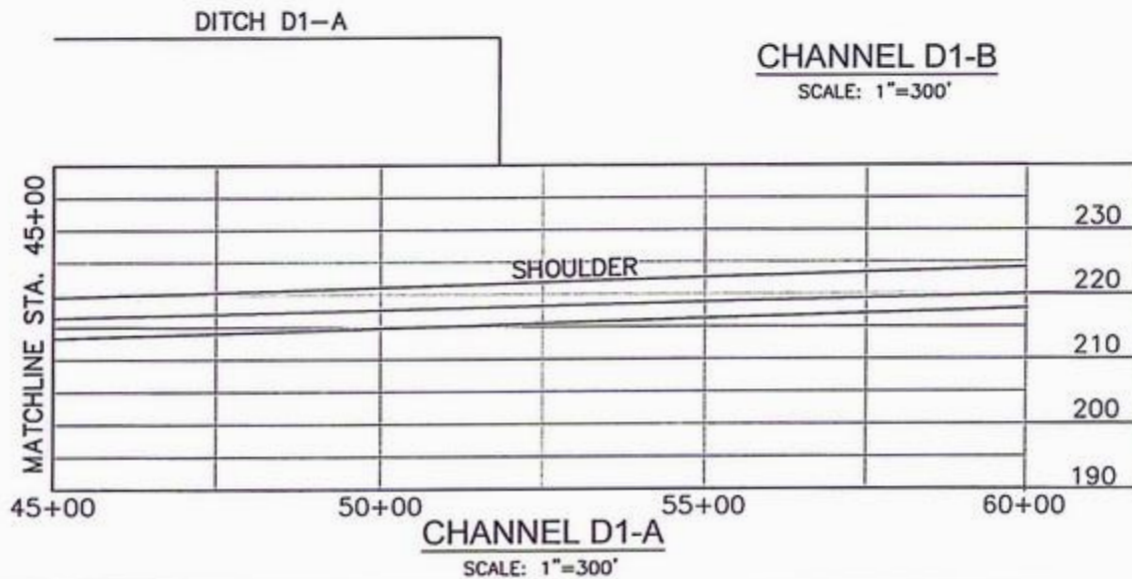


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CHANNEL D1-B
SCALE: 1"=300'

CHANNEL D1-A
SCALE: 1"=300'



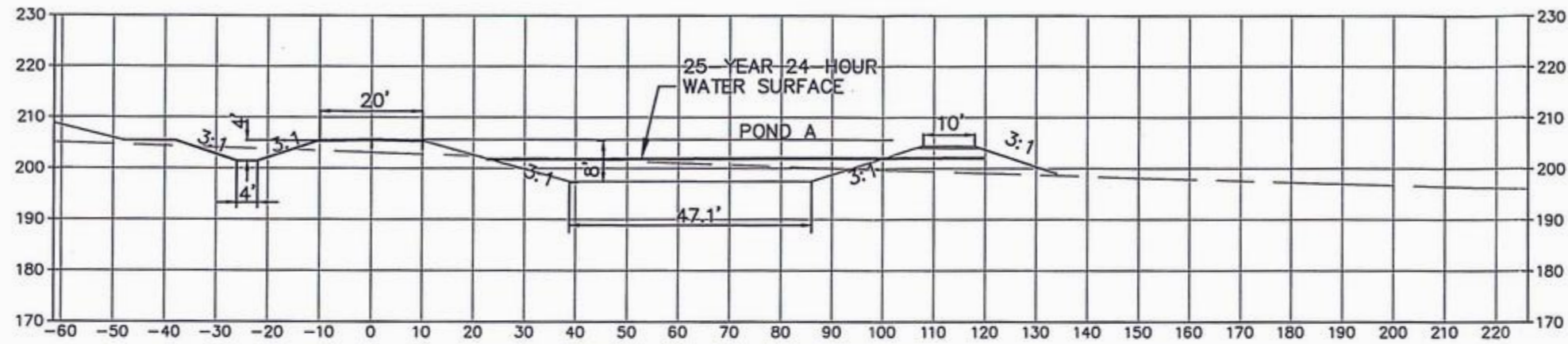
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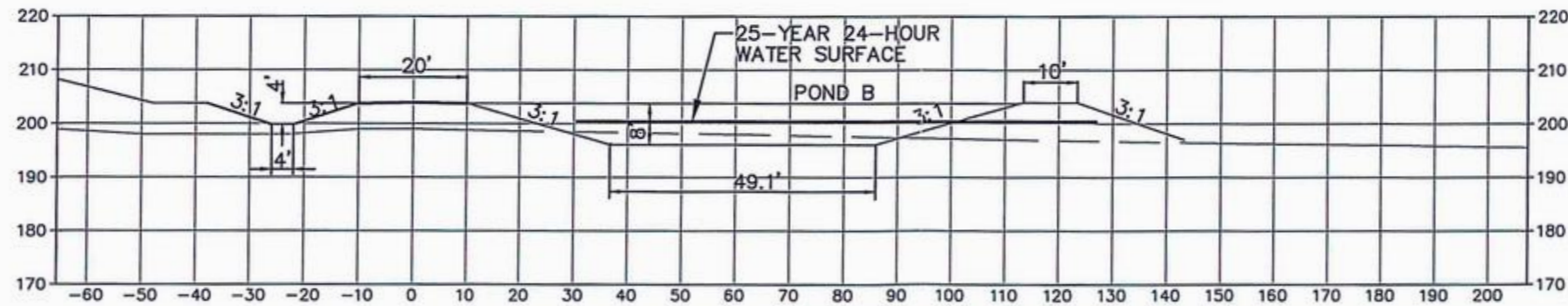
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C2.5
Date: 09-28-20
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Project No: 15737



(DRAINAGE POND A)
STA. 81+85.29
SCALE: 1"=30'



(DRAINAGE POND B)
STA. 89+85.15
SCALE: 1"=30'



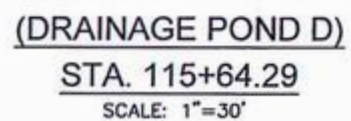
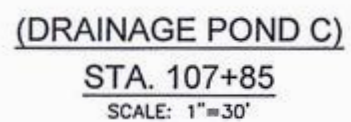
David Mason Ruhl
SIGNATURE
04/30/2021
DATE

DRAWING INFORMATION	
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SERIALIZED BY	DATE 04/2021
DRAWN BY	DATE 04/2021
CHECKED BY	DATE 04/2021
DATE 04/2021	DATE 04/2021

C2.6
Date: 04-30-21
Scale: 1"=30'
Project No. 15737

DRAINAGE PONDS CROSS SECTIONS
PEACH CREEK ENVIRONMENTAL PARK
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SAN JACINTO COUNTY, TEXAS

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C27

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Project No. 15737

**PEACH CREEK ENVIRONMENTAL PARK
SAN JACINTO COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2406**

TYPE I PERMIT APPLICATION

PART III – FACILITY INVESTIGATION AND DESIGN

**ATTACHMENT C3
EROSION AND SEDIMENT CONTROL**

Prepared for

PC-II, LLC
Rev. 5, August 13, 2021



Prepared by

NEEL-SCHAFER, INC.
13430 NW Freeway, Suite 650
Houston, TX 77040
713-783-7117

David M. Ruhl
08/13/2021

Texas Board of Professional Engineers
Firm Registration No. F-2697

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4	POSTCLOSURE COVER EROSION CONTROL	C3-10
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EROSION AND SEDIMENT CONTROL DRAWINGS

Drawing C3.1 – Cell Development Cross-Section

Drawing C3.2 – Interim Cover Erosion Control

Drawing C3.3 – Final Cover Erosion Control

Drawing C3.4 – Landfill Final Cover Swale Drainage Details

Drawing C3.5 – Landfill Final Cover Pipe Discharge Details

Drawing C3.6 - Final Cover Stormwater Details

APPENDICES

Appendix C3-1 – RUSLE2 Soil Loss Model Results



J. M. Hill
08/13/2021

1 INTRODUCTION

1.1 Purpose

This erosion and sediment control attachment has been prepared as part of a permit application for PCEP and includes documentation consistent with the requirements of 30 TAC Chapter 330, §330.

2 INTERIM COVER EROSION CONTROL

All areas of the landfill that have not received waste within 180 days must receive interim cover. Interim cover must be at least 12-inches thick and have a 6-inch top layer of soil that will promote vegetative growth. In addition, interim cover must be protected from erosion using appropriate erosion control practices. Some of the practices that will be used throughout the life of the landfill are included below:

- Wattles
- Silt Fence
- Check Dams
- Stone
- Erosion Control Blankets – temporary and permanent
- Sodding
- Seeding
- Mulch
- Temporary and permanent sediment basins
- Sandbags,
- Berms and dikes
- Let-down Pipes
- Chutes

During the process of filling each cell, temporary interim control measures will be employed by the landfill operator to prevent sediment from leaving the face of the landfill and entering the perimeter ditches. During the cell development, temporary drainage ditches and sediment basins will be installed adjacent to each cell on the north and/or south side of each cell, so that water that has been diverted from the active portion of the landfill, and that has not come into contact with MSW, leachate, or other contaminated water, can be pumped out of the bottom of the cell and into temporary ditches and sediment basins that will tie into the permanent perimeter ditches. In addition, as shown on Drawing C3.1, interim roads along the north and south sides of each cell will be built up to prevent runoff from adjacent areas into the landfill, diverting clean stormwater toward and into Jayhawker Creek to the west.

In addition to the measures above, other BMPs (Best Management Practices) such as berms, silt fences, wattles, check dams and others may be deployed to intercept sediment prior to reaching the interior cell water pumping areas. So, while cells are being constructed and filled, there are several opportunities to capture and retain sediment prior to discharging into the interim and permanent perimeter ditches located around each cell.

Once an area of the landfill has been filled and not received waste within 180 days, the landfill must apply an interim cover and install appropriate erosion control measures. This typically will require construction of berms and chutes to control the velocity of stormwater descending the landfill. A berm is used to refer to a temporary soil feature that diverts stormwater off the interim cover face to the open channel down chute on the interim cover. The down chute is a rocked or

Flexamat open channel which conveys water down the temporary interim cover slope to the perimeter channel.

A 25-year / 24-hour Texas storm event (NOAA 14) was modeled using the computer program Interconnected Channel and Pond Routing Model (ICPR). Stormwater peak flow was calculated using traditional unit hydrographs and the curve number method consistent with §330.305(f)(2). The highest (most conservative) reasonable curve number reflecting poor grass coverage in combination with poor draining soil conditions was used for the model. The curve number for this model was obtained from the United States Department of Agriculture's Urban Hydrology for Small Watersheds, Technical Release 55, Table 2-2c resulting in an estimated curve number of 89. This value was rounded to 90 for the ICPR and StormCAD calculations. Time of concentration calculations took into consideration these soil and cover parameters as well as slope conditions. The ICPR model output was also used to estimate the maximum stages in the berms and chutes. The stage information was used to design the berm and chute cross-sections with adequate freeboard. Maximum stages and minimum berm heights are indicated in the following Tables C3-1 and C3-2

Design spacing of berms is 90 feet for top slope (6% gradient) and 120 feet for side slopes (25% gradient). Berms on interim cover (5% cross gradient) will be constructed at spacings no greater than the design spacing.

Seeding will be immediately established and maintained until the area is either reactivated for disposal or taken into closure. A minimum of 95 percent grass cover on the interim slopes was used to estimate the amount of soil loss from the RUSLE2 program. At this coverage, soil loss was approximately 19.7 tons/acre/year from the side slopes and 2.55 tons/acre/year from the top slopes for the interim cover. This is below the TCEQ requirement of less than 50 tons/acre/year for interim cover soil loss. The results from the RUSLE2 program are in Appendix C3-1.

Additional seeding and erosion control fabric will be used to further increase vegetative growth until a healthy stand of grass is at least 95 percent on the interim cover. Other BMPs will be provided to limit sediment transport into perimeter ditches. Tables C3-1 and C3-2 depict areas and how the chutes and interim berms will react to drainage conditions when the slopes are adequately vegetated and maintained.

A typical interim down chute at maximum 4:1 slope (4-ft bottom and 3:1 sides) constructed of standard Flexamat will be limited to a maximum contributing area of approximately 500,000 square feet. Drawing C3.1 shows how the cells may be developed at the PCEP landfill. Drawing C3.2 is an example of a berm and chute application for an area that has interim cover applied to a slope on Cell 3.

Table C3-1 – Interim Cover Chute (Rock or Flexamat)

Area of interim cover (square feet)	Maximum Flow Rate (CFS)	Depth of flow in bottom (feet)	*Maximum Flow Velocity (ft/s) 25-yr/24-hr Texas storm (NOAA ATLAS 14)	Minimum Height of Chute to Construct (feet)	Maximum Total Storm Volume (CF)
50,000	2.59	0.62	7.34	1.00	47,083
100,000	5.19	0.82	8.70	1.00	94,167
200,000	10.38	1.06	10.35	2.00	188,333
400,000	20.75	1.37	12.31	2.00	376,667
500,000	25.94	1.48	13.07	2.00	470,833
*Maximum velocity Flexamat to prevent scour = 30 ft/s			Chute: 2-ft depth, 4-ft bottom, 3:1 sideslopes		
*Maximum velocity rate in rock to prevent scour = 6 ft/s			Maximum Longitudinal Slope = 4:1		

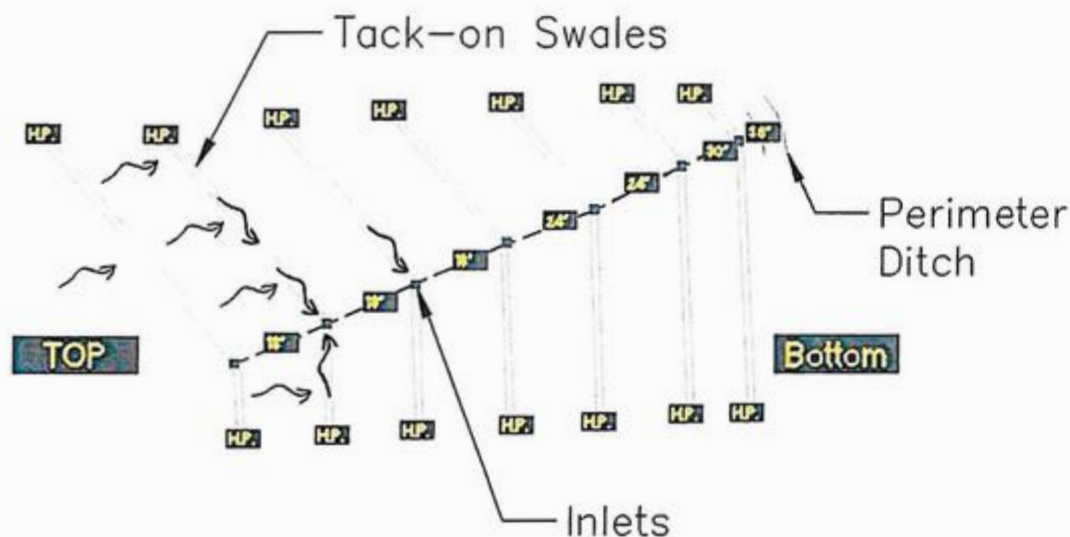
Table C3-2 – Interim Cover Grass Covered Berm

Area of interim cover (square feet)	Maximum Flow Rate (CFS)	Depth of flow in bottom (feet)	*Maximum Flow Velocity (ft/s) 25-yr/24-hr Texas storm (NOAA ATLAS 14)	Minimum Height of Interim Berm to Construct (feet)	Maximum Total Storm Volume (CF)
2,500	0.13	0.27	1.88	1.00	2,354
10,000	0.52	0.46	2.67	1.00	9,417
25,000	1.30	0.66	3.30	1.00	23,542
50,000	2.59	0.86	3.98	1.00	47,083
‡Maximum velocity rate in grass to prevent scour = 4 ft/s			Maximum Longitudinal Slope = 20:1 (5%)		

3 FINAL COVER EROSION CONTROL

The final cover consists of grassed topslopes (6% gradient) and 4:1 grassed sideslopes (25% gradient) draining to grassed tack-on swales (5% cross-gradient) located horizontally across the cells. Runoff from the sloped areas is intercepted by the tack-on swales, routed toward the center of the cell where the swales convene and drain into drop inlets, and then into dual-wall HDPE piping. The HDPE drop down pipe collects stormwater from several sets of tack-on swales and drop inlets directing stormwater downhill and eventually discharging into perimeter ditches surrounding the landfill (see Figure C3-1).

Figure C3-1 – Final Cover Drainage Schematic



A 25-year / 24-hour Texas storm event (NOAA 14) was modeled using the computer program Interconnected Channel and Pond Routing Model (ICPR). Stormwater runoff was calculated using traditional unit hydrographs and the curve number method. Time of concentration calculations took into consideration these soil and cover parameters as well as slope conditions. The design of the tack-on swale inlets and dropdown pipes was accomplished with the computer program StormCAD. Initial estimates of inlet and pipe size, location, materials, and elevations were adjusted to maintain reasonable flow rates and velocities to ensure the hydraulic grade line does not breach the inlet grates for the 25-year / 24-hour storm event. The combination of high curve numbers with maximum estimated basin (and sub-basin) size and local area storm information was used to model several different storm events. The inlet grates were limited to only 50% capture of the flow. Pipes and inlets were designed to perform adequately while maintaining the hydraulic grade line below the grate in all storm conditions. StormCAD modeling results are included in Table C3-3. Pipe and Inlet information are included on the plans.

Table C3-3 - StormCAD Pipe Network Simulation Results

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Flow (cfs)	Velocity (ft/s)	Length (Scaled) (ft)	Hydraulic Grade Line (In) (ft)	Elevation Ground (Start) (ft)	Hydraulic Grade Line (Out) (ft)	Elevation Ground (Stop) (ft)	Cover (Start) (ft)	Cover (Stop) (ft)
P-1	D-1	375.00	D-2	345.00	0.244	18.0	0.012	9.91	23.98	72.9	376.21	380.00	346.94	350.00	3.50	3.50
P-2	D-2	345.00	D-3	315.00	0.244	18.0	0.012	19.76	29.02	90.4	346.47	350.00	317.03	320.00	3.50	3.50
P-3	D-3	315.00	D-4	285.00	0.244	24.0	0.012	29.54	31.81	75.4	316.86	320.00	287.24	290.00	3.00	3.00
P-4	D-4	285.00	D-5	255.00	0.244	24.0	0.012	39.28	34.40	77.3	286.95	290.00	257.43	260.00	3.00	3.00
P-5	D-5	255.00	D-6	225.00	0.244	24.0	0.012	48.98	36.49	87.7	256.98	260.00	227.57	230.00	3.00	3.00
P-6	D-6	225.00	D-7	195.00	0.244	30.0	0.012	58.64	37.85	89.6	227.38	230.00	197.75	200.00	2.50	2.50
P-7	D-7	195.00	Int. Ditch	190.00	0.167	36.0	0.012	68.25	33.96	46.4	197.63	200.00	191.39	190.00	2.00	-3.00

Label	Start Node	Stop Node	Length (Unified) (ft)	Upstream Inlet Area (acres)	System CA (acres)	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Elevation Ground (Start) (ft)
P-1	D-1	D-2	123.0	1.240	0.856	9.91	56.20	23.98	375.00	345.00	0.244	376.21	346.94	380.00
P-2	D-2	D-3	123.0	1.240	1.711	19.76	56.20	29.02	345.00	315.00	0.244	346.47	317.03	350.00
P-3	D-3	D-4	123.0	1.240	2.567	29.54	121.03	31.81	315.00	285.00	0.244	316.86	287.24	320.00
P-4	D-4	D-5	123.0	1.240	3.422	39.28	121.03	34.40	285.00	255.00	0.244	286.95	257.43	290.00
P-5	D-5	D-6	123.0	1.240	4.278	48.98	121.03	36.49	255.00	225.00	0.244	256.98	227.57	260.00
P-6	D-6	D-7	123.0	1.240	5.134	58.64	219.44	37.85	225.00	195.00	0.244	227.38	197.75	230.00
P-7	D-7	Int. Ditch	30.0	1.240	5.989	68.25	294.97	33.96	195.00	190.00	0.167	197.63	191.39	200.00

The results from the model indicate a single side slope tack-on swale, at a 5% (20:1) slope from their high point to the inlets with grass cover, spaced a distance of 120 feet downhill from the previous swale will be adequate to prevent scour in either the downhill reach or the swale itself. The spacing of the top slope tack-on swale is 90 feet downhill. Final cover swales shall be constructed at no greater spacings than the design spacings.

Stormwater from the perimeter ditch is directed into one of four dry stormwater ponds located along the south and west side of the Phase I area. Water in the ponds is allowed to stage up and outfall to the west through a collection of control structures and stormwater pipes and into Jayhawker Creek. Calculations were performed using the computer program Interconnected Channel and Pond Routing Model (ICPR). See Drawings C3.3-C3.6 for final closure cover plans and details which will be installed, certified, and maintained through the 30-year postclosure period.

The ICPR program was also used to estimate the maximum stages in the swale. The stage information was used to design the swale cross-section with adequate freeboard. Maximum stages and minimum swale depths are indicated Tables C3-4 and C3-5. As shown in these tables, the maximum velocity of 3.98 ft/s and 3.01 ft/s is below the allowable velocity for a grassed surface of 4 ft/s.

Table C3-4– Final Cover 4:1 Side-Slope Swale ICPR Results

Area of final cover (square feet)	Maximum Flow Rate (CFS)	Depth of flow in bottom (feet)	*Maximum Flow Velocity (ft/s) 25-yr/24-hr Texas storm (NOAA 14)	Minimum Height of Final Swale to Construct (feet)	Maximum Total Storm Volume (CF)
2,500	0.13	0.27	1.88	1.00	2,354
10,000	0.52	0.46	2.67	1.00	9,417
25,000	1.30	0.66	3.30	1.00	23,542
50,000	2.59	0.86	3.98	1.00	47,083
‡Maximum velocity rate in grass to prevent scour = 4 ft/s			Maximum Longitudinal Slope = 20:1 (5%)		

Table C3-5 – Final Top Cover Swale ICPR Results

Area of final cover (square feet)	Maximum Flow Rate (CFS)	Depth of flow in bottom (feet)	*Maximum Flow Velocity (ft/s) 25-yr/24-hr Texas storm (NOAA 14)	Minimum Height of Final Swale to Construct (feet)	Maximum Total Storm Volume (CF)
2,500	0.13	0.18	1.45	1.00	2,354
10,000	0.52	0.31	2.00	1.00	9,417
25,000	1.30	0.44	2.52	1.00	23,542
50,000	2.59	0.55	3.01	1.00	47,083
‡Maximum velocity rate in grass to prevent scour = 4 ft/s			Maximum Longitudinal Slope = 20:1 (5%)		

Seeding, sodding, and erosion control fabric, as specified, will be immediately applied on the final cover and maintained until the final cover area achieves a minimum of 95 percent vegetative cover. Other BMPs will be implemented to keep sediment on the landfill surface. Using this information and other assumptions in the RUSLE2 Model, approximately 2.56 tons/acre/year from the side slopes and 0.54 tons/acre/year for the top was calculated to be scoured off the final cover. The TCEQ requirement for final cover erosion control is less than 3 tons/acre/year of soil loss. See Appendix C3-1 for RUSLE2 assumptions and output.

3.1 Top Slope Overland Flow

The final cover for all cells will be a 6% grassed top slope. The overland flow rate was calculated to determine the maximum runoff velocity. Table C3-6 below represents the top slope scour calculations. As indicated, the maximum calculated velocity of 0.52 ft/s is less than the allowable velocity.

Table C3-6 – Final Cover 6% Top-Slope Scour Calculations

Scour Calculation Top-slope reach				
Depth of flow based on 1' wide rectangular section of slope				
L =	Max slope length	90	feet	
A _v =	Area (calculated)	2.07E-03	acres	Assume vertical area 1' wide x slope length'
i =	Rainfall intensity	11.3	inches/hr	Source: NOAA ATLAS 14
Q =	Flow (CiA)	4.67E-03	cfs/LF	Where A is vertical = 1' x Length of slope
C =		0.2		Pervious C 100% (imp*.8 + per*.2)
$D = [(n/k) * (Q/S^{1/2})]^{3/5}$	D = Depth (calculated)	0.0089	feet	Manning's
S =	H:V =	0.06	ft/ft	Slope
k =	(fixed)	1.49		Conversion factor
Velocity of flow based on 1' wide rectangular section of slope				
W =	assumed	1	feet	Width - assume per linear foot (W=1)
A _{find} =	End area = W*D	D	feet	Assume per linear foot of width (W=1)
n =	Manning's	0.03		Grass lined channels
R _h =	D	D	feet	"For channels of a given width, the hydraulic radius is greater for deeper channels. In wide rectangular channels, the hydraulic radius is approximated by the flow depth."
$V = k/n (R_h)^{2/3} S^{1/2}$	V _{DS} = Velocity (calculated)	0.52	ft/s	Down slope velocity
Check for scour velocity in Grass				
V _{DS} =	Velocity downstream (maximum allowed)	4.0	ft/s	Maximum grass velocity to prevent scour † From Stormwater BMP Academy June 26-27, 2001 Raleigh, NC.
V _{max} =	Velocity upstream (maximum allowed)	1.3	ft/s	Per Stormwater BMP Academy flows concentrate downslope to ≈ 1/3 width of original flow
V _{DS} < V _{max} ?		Ok		Test for scour velocity

3.2 Side Slope Overland Flow

The final cover for all cells will be 4:1 grassed side slopes. The overland flow rate was calculated to determine the maximum runoff velocity. This velocity does not exceed the maximum recommended scour velocity for grassed surfaces. The following Table C3-7 represents the scour calculations for the side slopes. As indicated, the calculated overland velocity is 0.90 ft/s and the calculated maximum swale velocity is 3.98 ft/s, which do not exceed the allowable velocities for scour.

Table C3-7 – Final Cover 4:1 Side-Slope Scour Calculations

Scour Calculation Side-slope reach				
Depth of flow based on 1' wide rectangular section of slope				
L =	Max slope length	120	feet	
A _v =	Area	2.75E-03	acres	Assume vertical area 1' wide x slope length'
i =	Rainfall intensity	11.3	inches/hr	Source: NOAA ATLAS 14
Q =	Flow (CiA)	6.23E-03	cfs/LF	Where A is vertical = 1' x Length of slope
C =		0.2		Pervious C 100% (imp*.8 + per*.2)
$D = [(n/k) * (Q/S^{1/2})]^{3/5}$		D =	Depth calculated	0.0069 feet Manning's
S =	H:V =	0.25	ft/ft	Slope
k =	given	1.49		Conversion factor
Velocity of flow based on 1' wide rectangular section of slope				
W =	assumed	1	feet	Width - assume per linear foot (W=1)
A _{ind} =	End area = W*D	D	feet	Assume per linear foot of width (W=1)
n =	Manning's	0.03		Grass lined channels
R _h =	D	D	feet	"For channels of a given width, the hydraulic radius is greater for deeper channels. In wide rectangular channels, the hydraulic radius is approximated by the flow depth."
$V = k/n (R_h)^{2/3} S^{1/2}$		V _{DS} =	0.90	ft/s Down slope velocity
Check for scour velocity in Grass				
V _{DS} =	Velocity downstream	4.0	ft/s	Maximum grass velocity to prevent scour † From Stormwater BMP Academy June 26-27, 2001 Raleigh, NC.
V _{max} =	Maximum Up-slope Velocity	1.3	ft/s	Per Stormwater BMP Academy flows concentrate downslope to ≈ 1/3 width of original flow
V _{DS} < V _{max} ?		Ok		Test for scour velocity

4 POSTCLOSURE COVER EROSION CONTROL

Once the final closure has been accepted by the TCEQ, postclosure is currently required for the facility for 30 years. This includes the protection and maintenance of the final cover system. Quarterly inspections are required to determine maintenance needs that must be completed after quarterly inspections. This may include bringing areas where erosion occurs back to design lines and grades, reseeding, sodding, installation of erosion control blanket, removal of sediment from ditches and ponds, etc.

5 CONCLUSIONS

The following conclusions summarize the results of the erosion control analysis and design.

- Erosion control is an ongoing prevention and maintenance issue from the day construction begins until the end of the post-closure monitoring period.
- Numerous best management practices are discussed above, and new methods introduced in the future will be required to comply with future construction and industrial storm water permits and Storm Water Pollution Prevention Plans.
- PCEP is committed to operating in compliance with TCEQ storm water regulations.

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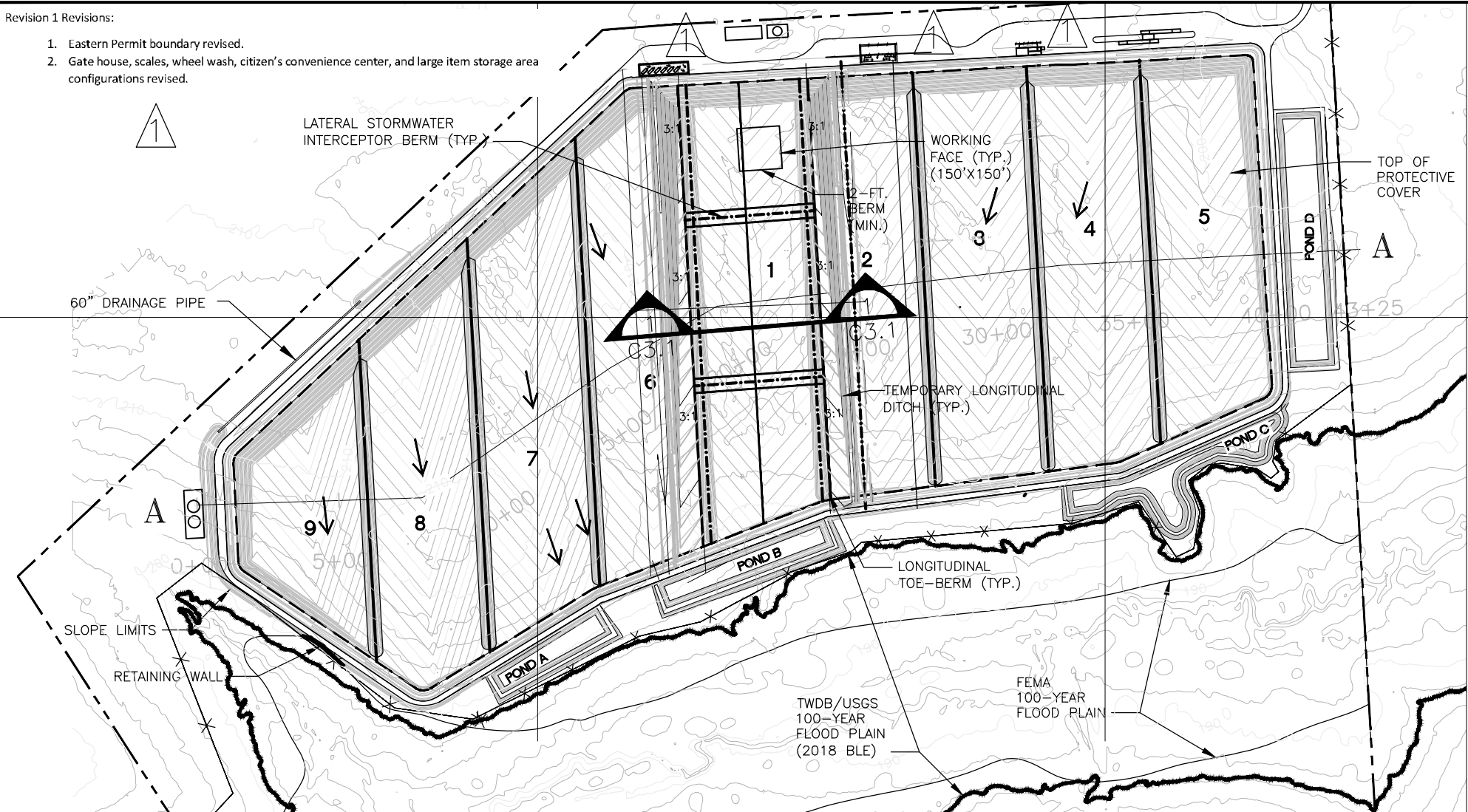
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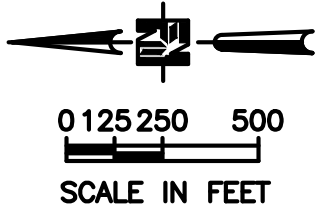
Revision 1 Revisions:

- 1. Eastern Permit boundary revised.
- 2. Gate house, scales, wheel wash, citizen's convenience center, and large item storage area configurations revised.

3918000.00

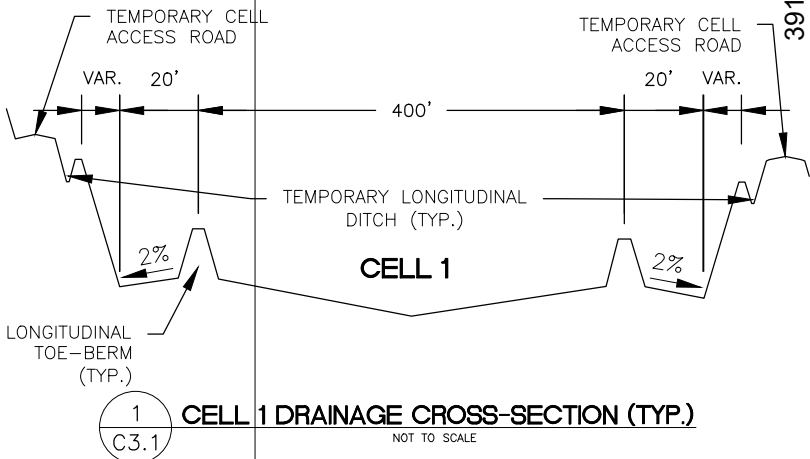


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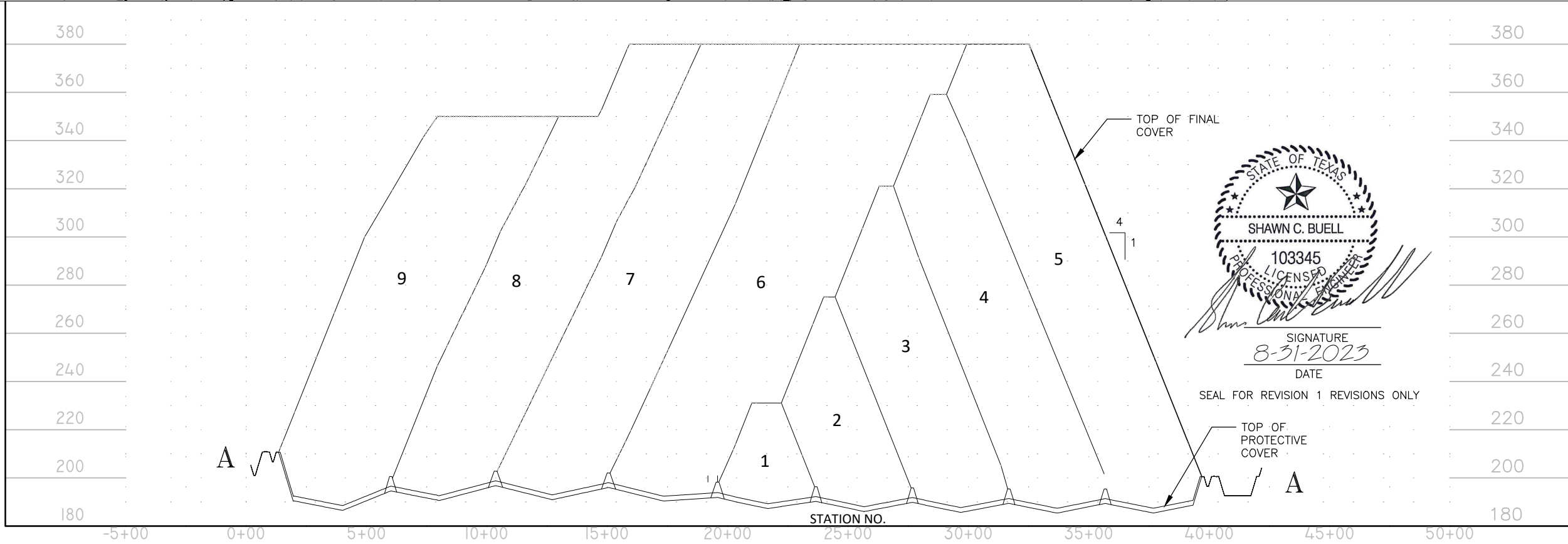


LEGEND:

- 210— EXISTING 2' CONTOURS
- 180— 1' PROTECTIVE COVER CONTOURS
- EXISTING GRADE DRAINAGE ARROWS



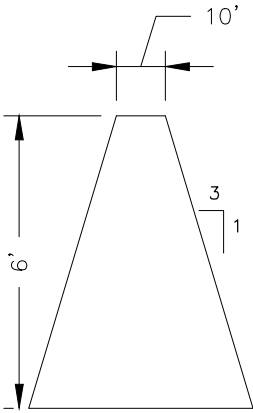
FINAL COVER ELEVATION (FT-MSL)



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8-31-2023
DATE

SEAL FOR REVISION 1 REVISIONS ONLY

TOP OF PROTECTIVE COVER



TOE BERM
LONGITUDINAL
DETAIL
NOT TO SCALE

CELL DEVELOPMENT CROSS-SECTION

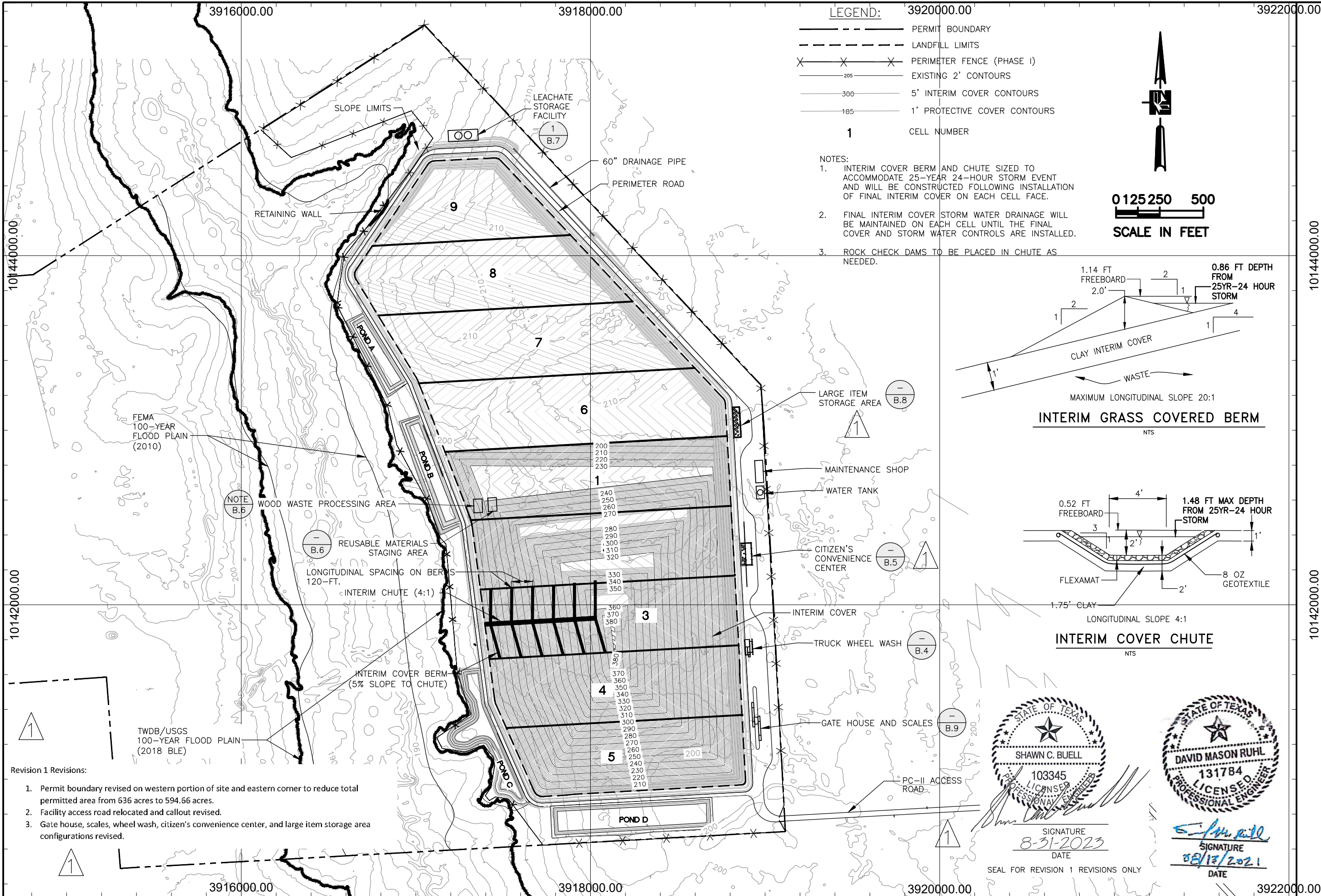
PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS



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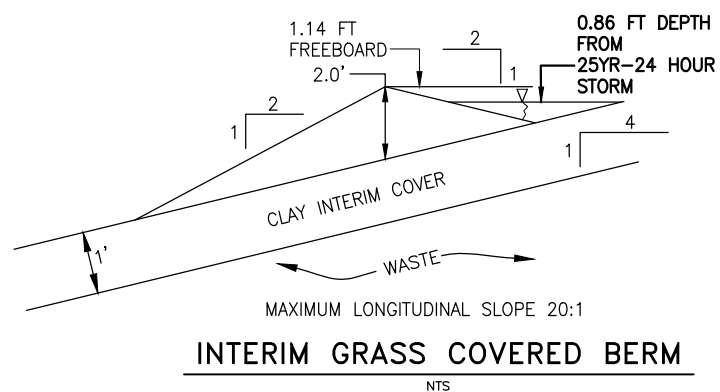
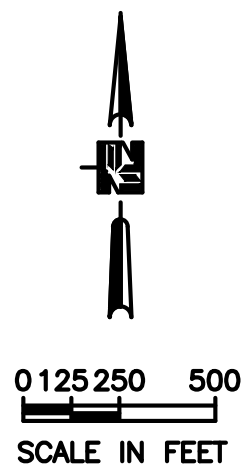
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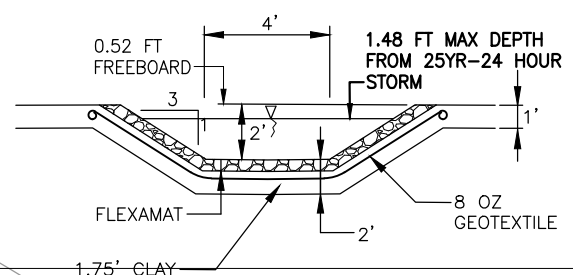


- LEGEND:**
- PERMIT BOUNDARY
 - LANDFILL LIMITS
 - PERIMETER FENCE (PHASE I)
 - EXISTING 2' CONTOURS
 - 5' INTERIM COVER CONTOURS
 - 1' PROTECTIVE COVER CONTOURS
 - CELL NUMBER

- NOTES:**
- INTERIM COVER BERM AND CHUTE SIZED TO ACCOMMODATE 25-YEAR 24-HOUR STORM EVENT AND WILL BE CONSTRUCTED FOLLOWING INSTALLATION OF FINAL INTERIM COVER ON EACH CELL FACE.
 - FINAL INTERIM COVER STORM WATER DRAINAGE WILL BE MAINTAINED ON EACH CELL UNTIL THE FINAL COVER AND STORM WATER CONTROLS ARE INSTALLED.
 - ROCK CHECK DAMS TO BE PLACED IN CHUTE AS NEEDED.



INTERIM GRASS COVERED BERM



INTERIM COVER CHUTE

- Revision 1 Revisions:**
- Permit boundary revised on western portion of site and eastern corner to reduce total permitted area from 636 acres to 594.66 acres.
 - Facility access road relocated and callout revised.
 - Gate house, scales, wheel wash, citizen's convenience center, and large item storage area configurations revised.



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DATE



SIGNATURE
8/13/2021
DATE

NEEL-SCHAFER
Solutions you can build upon

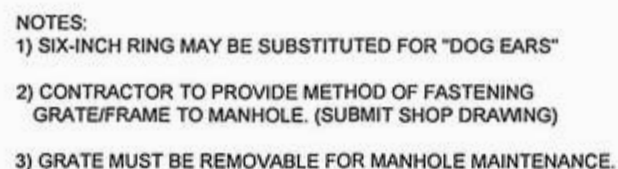
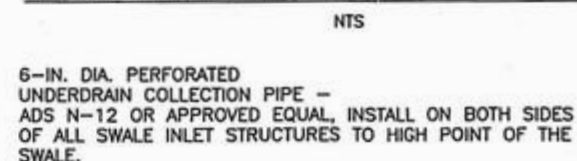
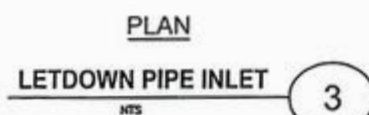
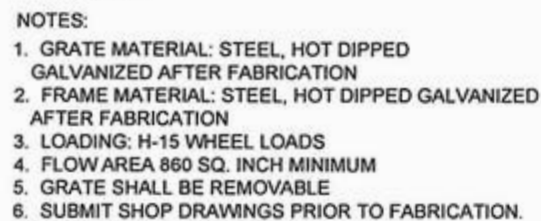
INTERIM COVER EROSION CONTROL

PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

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2	06/2023

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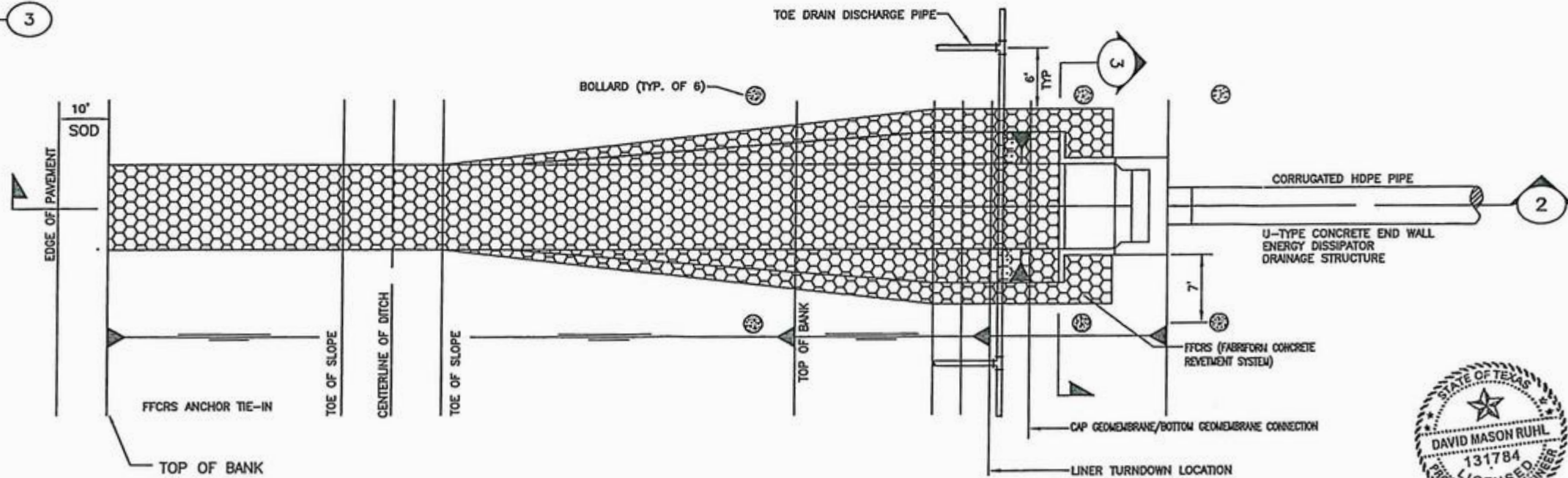
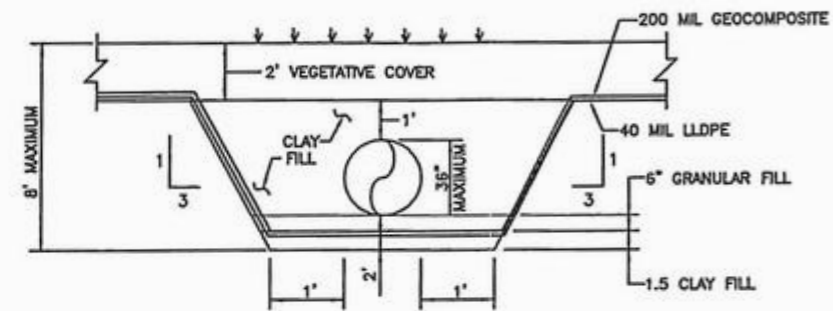
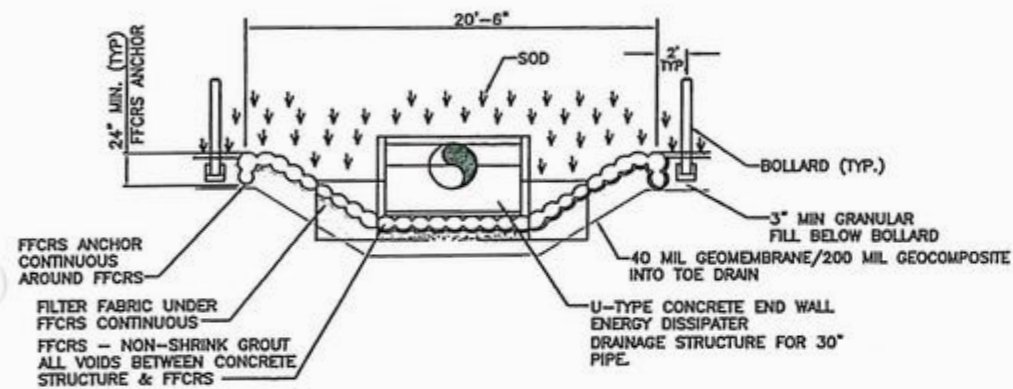
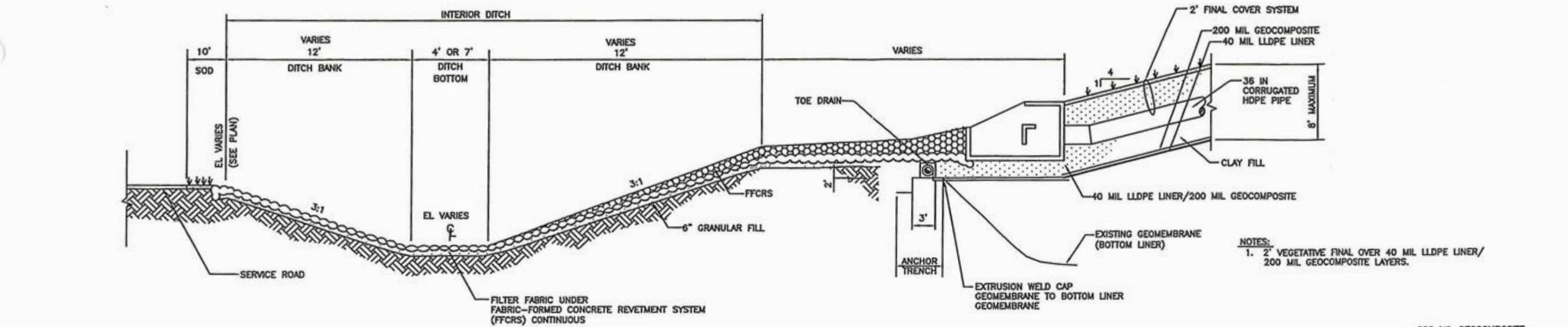
NEEL-SCHAFER
Solutions you can build upon

LANDFILL FINAL COVER
TERRACE DRAINAGE DETAILS
PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

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				CHECKED BY	DATE	04/21/2021
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C3.4

Date: 04-30-2021
Scale: N/A
Project No. 15737



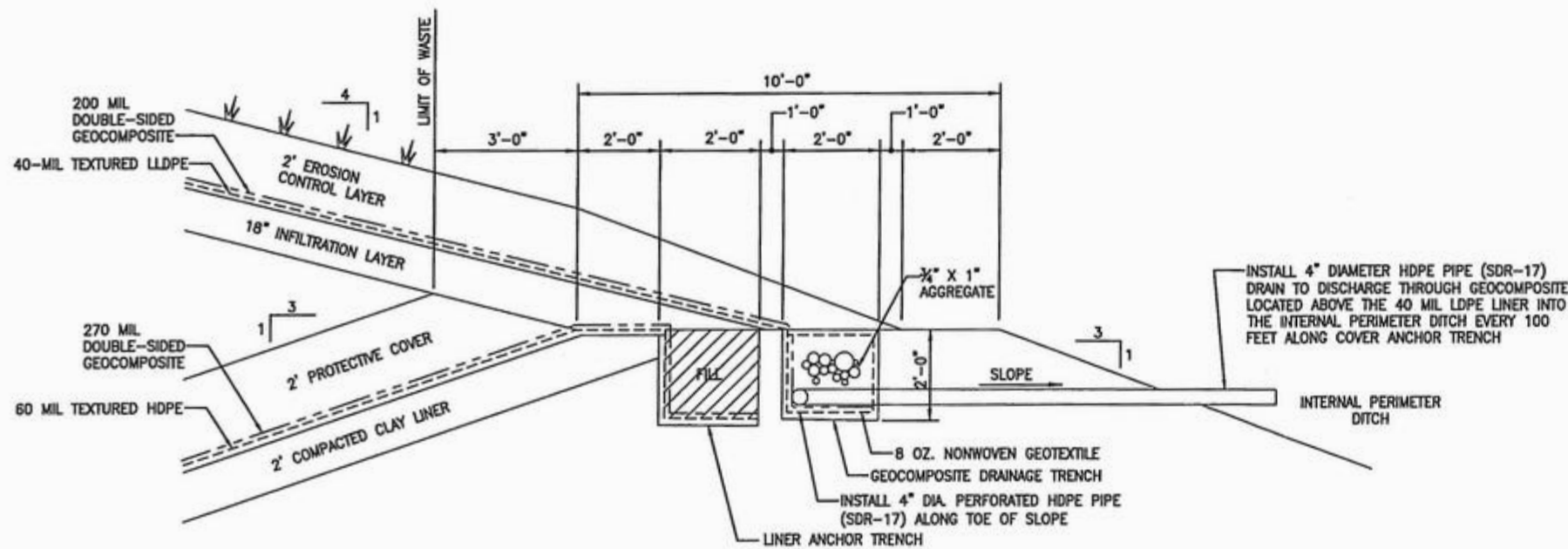
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Solutions you can build upon

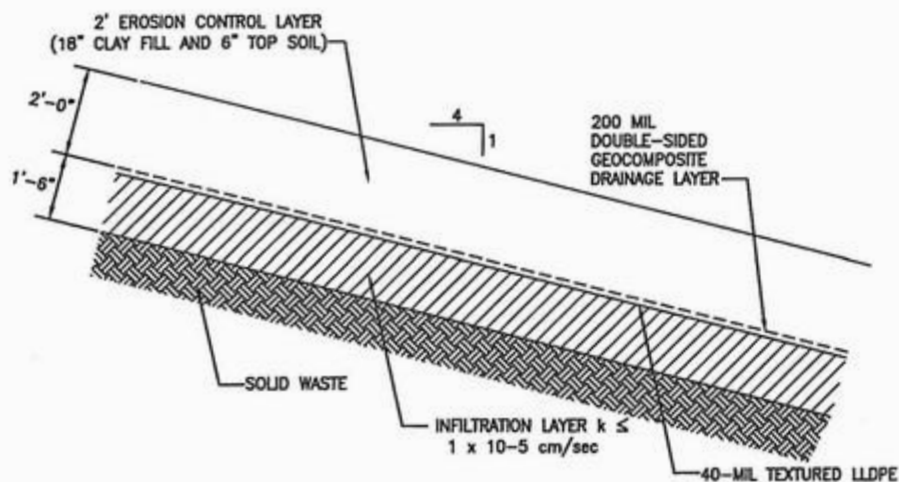
LANDFILL FINAL COVER PIPE
DISCHARGE DETAILS
PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

NO.	DATE	BY	REVISIONS	DESCRIPTION
1	04/30/2021	DAVID MASON RUHL	REVISION 1	PERMIT DRAWING ONLY
2	04/30/2021	DAVID MASON RUHL	REVISION 2	PERMIT DRAWING ONLY
3	04/30/2021	DAVID MASON RUHL	REVISION 3	PERMIT DRAWING ONLY
4	04/30/2021	DAVID MASON RUHL	REVISION 4	PERMIT DRAWING ONLY
5	04/30/2021	DAVID MASON RUHL	REVISION 5	PERMIT DRAWING ONLY

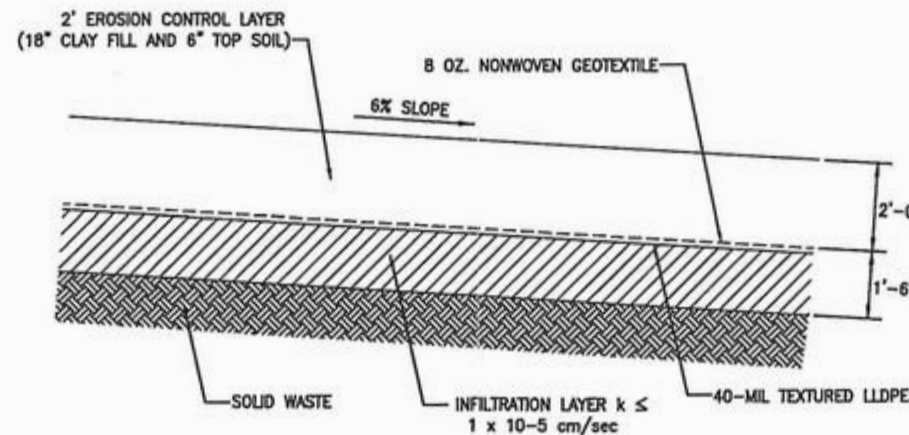
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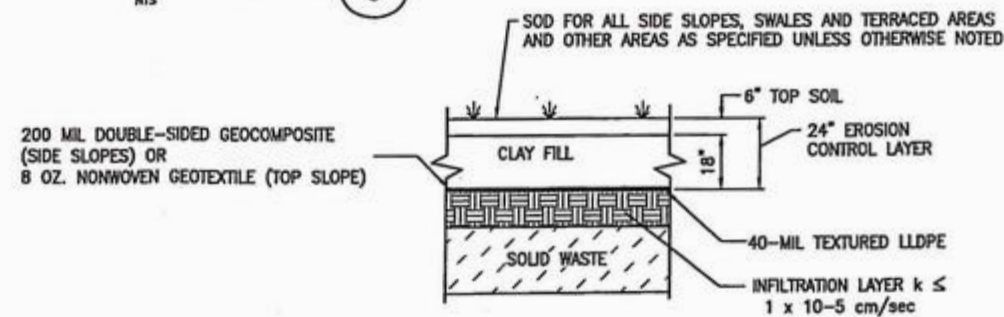
FINAL COVER ANCHOR TRENCH 1



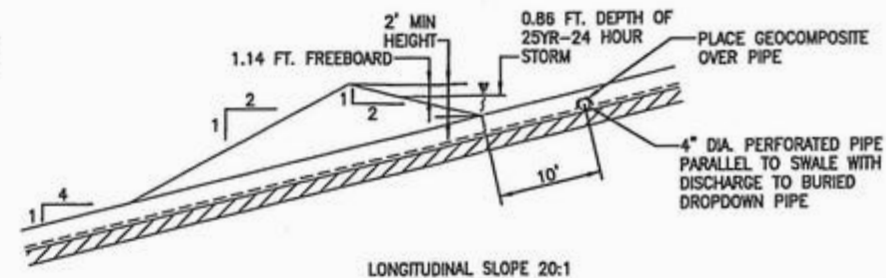
FINAL COVER SIDESLOPE 4



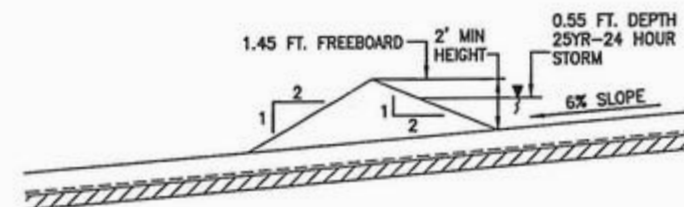
FINAL COVER TOPSLOPE 5



FINAL COVER SYSTEM DETAIL 6



SIDESLOPE TACK-ON SWALE 2



TOPSLOPE TACK-ON SWALE 3



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08/13/2021
DATE

REVISIONS		DRAWING INFORMATION	
NO.	DATE	BY	DESCRIPTION
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3	08/13/21	DAVID MASON RUHL	REVISION 3 PERMIT DRAWING ONLY
4	08/13/21	DAVID MASON RUHL	REVISION 4 PERMIT DRAWING ONLY
5	08/13/21	DAVID MASON RUHL	REVISION 5 PERMIT DRAWING ONLY
6	08/13/21	DAVID MASON RUHL	REVISION 6 PERMIT DRAWING ONLY

ATTACHMENT C3
APPENDIX C3-1
RUSLE2 SOIL LOSS MODEL RESULTS FOR INTERIM AND FINAL COVER

RUSLE2 RESULTS - SUMMARY

RUSLE2 Version 2.6.8.4 (Mar 27 2017) - [Worksheet: PC-II*]

File Database Edit View Options Tools Window Help

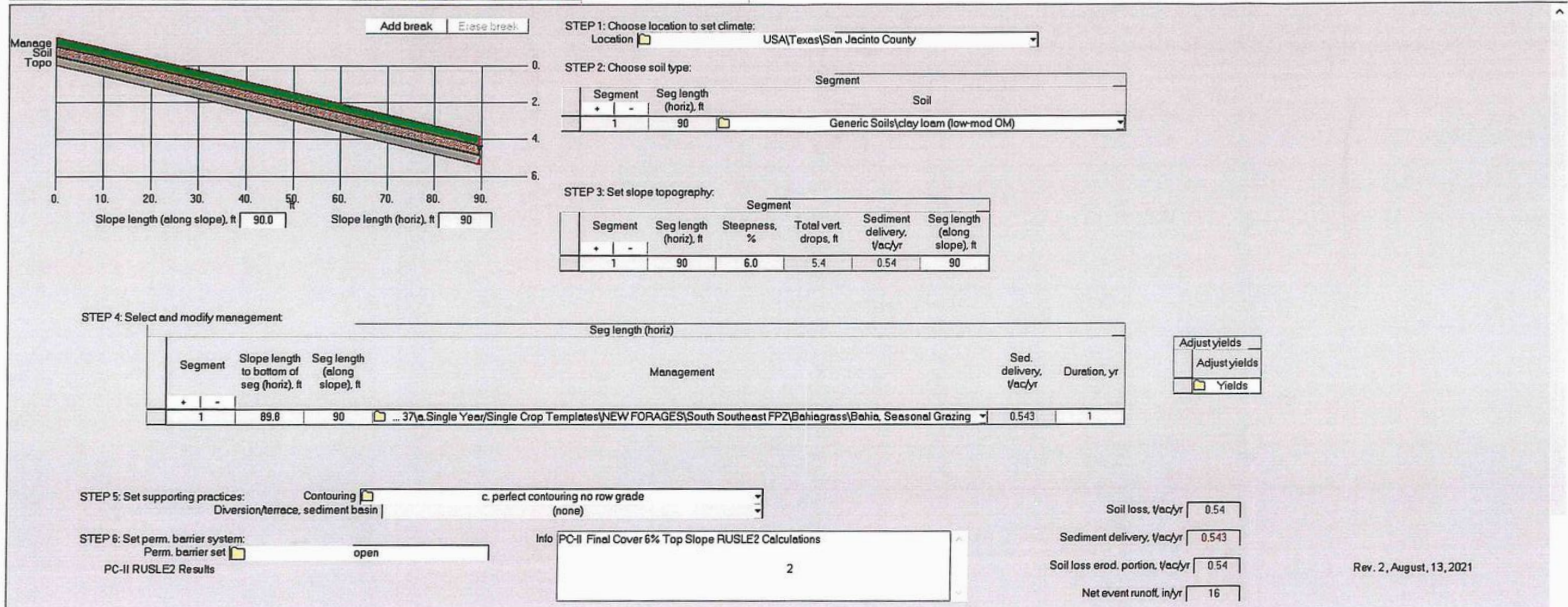
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Tract # Phase I
Owner name PC-II
Field name 6% Top Slope and 25% Sideslope

Info 90-ft (topslope) to 120-ft (sideslope) horizontal, longitudinal downhill grassed slopes at 6% (topslopes) and 25% (sideslopes), w/ grassed/sod/permanent erosion control fabric on tack-on swales/berms for storm water interception into open channel rock/concrete revetment (interim cover) or manholes and buried, dual-wall HDPE pipe (final cover) to convey strm water to base of slope perimeter ditches.

COMPARE_BEFORE_AND_AFTER_CONSTRUCTION

Hillslope		Soil	Management	Sediment delivery, t/acre/yr	Soil loss erod. portion, t/acre/yr
+	-				
...	...II Topslope Potential Erodibility Profile TemplateTSFinalCover*	Generic Soils\clay loam (low-mod OM)	...ES\South Southeast FPZ\Bahia\grass\Bahia, Seasonal Grazing	0.543	0.54
...	...II Sideslope Potential Erodibility Profile TemplateSSFinalCover*	Generic Soils\clay loam (low-mod OM)	...ES\South Southeast FPZ\Bahia\grass\Bahia, Seasonal Grazing	2.56	2.6
...	...II Topslope Potential Erodibility Profile TemplateTSInterimCover	Generic Soils\clay loam (low-mod OM)	CMZ 37\d.Construction Site Templates\Hydro seeding	2.55	2.5
...	...Sideslope Potential Erodibility Profile TemplateSSInterimCover*	Generic Soils\clay loam (low-mod OM)	CMZ 37\d.Construction Site Templates\Hydro seeding	19.7	20



DETAILED_OUTPUTS

Years			
Years	Yearly cons. plan soil loss, t/ac/yr	Yearly sed. del., t/ac/yr	
4/1/0 – 3/31/1	0.543	0.54	

Sed. delivery				
Composite segment	Sed. delivery, t/ac/yr	Soil loss, t/ac/yr	Composite segment management	Comp seg length (horiz), ft
1	0.54	0.54	AGES\South Southeast FPZ\Bahia grass\Bahia, Seasonal Grazing	90

CC					
Simulation day, m/d/y	El. %	Live canopy cover, %	Net canopy cover, %	Non-erod. cover, %	Res. surf. cover, %
4/15/0	0.23	17	17	0	79
4/16/0	0.24	19	19	0	79
4/17/0	0.24	20	20	0	79
4/18/0	0.24	21	21	0	78
4/19/0	0.24	23	23	0	78
4/20/0	0.24	24	24	0	78
4/21/0	0.24	26	26	0	77
4/22/0	0.24	27	27	0	77
4/23/0	0.24	29	29	0	77
4/24/0	0.24	30	30	0	77
4/25/0	0.25	31	31	0	76
4/26/0	0.27	33	33	0	76
4/27/0	0.28	34	34	0	76
4/28/0	0.30	35	35	0	75
4/29/0	0.32	37	37	0	75
4/30/0	0.33	38	38	0	74
5/1/0	0.35	39	39	0	74
5/2/0	0.37	41	41	0	74
5/3/0	0.39	42	42	0	73
5/4/0	0.41	43	43	0	73

Composite segment 1

PC-II RUSLE2 Results

3

Rev. 2, August, 13, 2021

Finished calculating

R2_NRCS_Fld_Office Construction site 11182015 MOSES 2016

Manage
Soil
Topo

Add break

Erase break

STEP 1: Choose location to set climate:
Location

STEP 2: Choose soil type:

Segment	Seg length (horiz), ft	Soil
1	120	Generic Soils\clay loam (low-mod OM)

STEP 3: Set slope topography:

Segment	Seg length (horiz), ft	Steepness, %	Total vert drops, ft	Sediment delivery, t/ac/yr	Seg length (along slope), ft
1	120	25	30	2.6	120

STEP 4: Select and modify management

Segment	Slope length to bottom of seg (horiz), ft	Seg length (along slope), ft	Management	Sed. delivery, t/ac/yr	Duration, yr
1	120	120	... 37a.Single Year/Single Crop Templates\NEW FORAGES\South Southeast FPZ\Bahia grass\Bahia, Seasonal Grazing	2.56	1

Adjust yields

Adjust yields

☐ Yields

STEP 5: Set supporting practices:
Contouring
Diversion/terrace, sediment basin

STEP 6: Set perm. barrier system:
Perm. barrier set
PC-II RUSLE2 Results

Info

PC-II Final Cover 25% Side Slope RUSLE2 Calculations
4

Soil loss, t/ac/yr

2.6

Sediment delivery, t/ac/yr

2.56

Soil loss erod. portion, t/ac/yr

2.6

Net event runoff, in/yr

16

Rev. 2, August, 13, 2021

DETAILED_OUTPUTS

Years			
Years	Yearly cons. plan soil loss, t/ac/yr	Yearly sed. del., t/ac/yr	
4/1/0 – 3/31/1	2.56	2.6	

Sed. delivery				
Composite segment	Sed. delivery, t/ac/yr	Soil loss, t/ac/yr	Composite segment management	Comp seg length (horiz), ft
1	2.6	2.6	\\AGES\South Southeast FP2\Bahia\grass\Bahia, Seasonal Grazing	120

CC					
Simulation day, m/d/y	El. %	Live canopy cover, %	Net canopy cover, %	Non-erod. cover, %	Res. surf. cover, %
4/27/0	0.28	34	34	0	76
4/28/0	0.30	35	35	0	75
4/29/0	0.32	37	37	0	75
4/30/0	0.33	38	38	0	74
5/1/0	0.35	39	39	0	74
5/2/0	0.37	41	41	0	74
5/3/0	0.39	42	42	0	73
5/4/0	0.41	43	43	0	73
5/5/0	0.42	44	44	0	73
5/6/0	0.42	46	46	0	72
5/7/0	0.42	47	47	0	72
5/8/0	0.43	48	48	0	71
5/9/0	0.43	49	49	0	71
5/10/0	0.43	50	50	0	70
5/11/0	0.43	52	52	0	70
5/12/0	0.43	53	53	0	70
5/13/0	0.43	54	54	0	69
5/14/0	0.43	55	55	0	69
5/15/0	0.43	56	56	0	68
5/16/0	0.43	57	57	0	68

Composite segment 1

PC-II RUSLE2 Results

Finished calculating

Manage
Soil
Topo

Slope length (along slope), ft 90.0 Slope length (horiz), ft 90

Add break Erase break

STEP 1: Choose location to set climate:
Location USA\Texas\San Jacinto County

STEP 2: Choose soil type:
Segment

Segment	Seg length (horiz), ft	Soil
1	90	Generic Soils\clay loam (low-mod OM)

STEP 3: Set slope topography:
Segment

Segment	Seg length (horiz), ft	Steepness, %	Total vert drops, ft	Sediment delivery, t/acre/yr	Seg length (along slope), ft
1	90	6.0	5.4	2.5	90

STEP 4: Select and modify management

Segment	Slope length to bottom of seg (horiz), ft	Seg length (along slope), ft	Management	Sed. delivery, t/acre/yr	Duration, yr
1	89.8	90	CMZ 37\Construction Site Templates\Hydro seeding	2.55	1

Adjust yields

Adjust yields

Yields

STEP 5: Set supporting practices:
Contouring c. perfect contouring no row grade
Diversion/terrace, sediment basin (none)

STEP 6: Set perm. barrier system:
Perm. barrier set open

PC-II RUSLE2 Results

Info PC-II Interim Cover 6% Top Slope RUSLE2 Calculations

6

Soil loss, t/acre/yr 2.5

Sediment delivery, t/acre/yr 2.55

Soil loss erod. portion, t/acre/yr 2.5

Net event runoff, in/yr 18

Rev. 2, August, 13, 2021

NEEL-SCHAFER

C3-18

Rev. 0, August 13, 2021

00890

DETAILED_OUTPUTS

Years			
	Years	Yearly cons. plan soil loss, Vacyr	Yearly sed. del., Vacyr
	4/1/0 - 3/31/1	2.55	2.5

Composite segment	Sed. delivery, t/acre/yr	Soil loss, t/acre/yr	Sed. delivery		Comp seg length (horiz), ft
			Composite segment management		
1	2.5	2.5	CMZ 37	d.Construction Site Templates\Hydro seeding	90

CC						
	Simulation day, m/d/y	El. %	Live canopy cover, %	Net canopy cover, %	Non-erod. cover, %	Res. surf. cover, %
	4/1/0	0.22	0	20	0	45
	4/2/0	0.22	0	20	0	44
	4/3/0	0.22	0	20	0	44
	4/4/0	0.23	0	20	0	44
	4/5/0	0.23	0	20	0	43
	4/6/0	0.23	0	19	0	43
	4/7/0	0.23	0	19	0	43
	4/8/0	0.23	0	19	0	42
	4/9/0	0.23	0	19	0	42
	4/10/0	0.23	0	18	0	42
	4/11/0	0.23	0	18	0	42
	4/12/0	0.23	0	18	0	42
	4/13/0	0.23	0	17	0	42
	4/14/0	0.23	0	17	0	41
	4/15/0	0.23	0	4.6	0	21
	4/16/0	0.24	0	2.5	0	38
	4/17/0	0.24	0.33	2.7	0	94
	4/18/0	0.24	0.67	3.0	0	94
	4/19/0	0.24	1.0	3.2	0	94
	4/20/0	0.24	1.3	3.5	0	94

PC-II RUSLE2 Results

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Rev. 2, August, 13, 2021

Finished calculating

R2_NRCS_Fld_Office

Construction site 11182015

MOSES 2016

Manage Soil Topo

Slope length (along slope), ft: 124
Slope length (horiz), ft: 120

STEP 1: Choose location to set climate:
Location: USA\Texas\San Jacinto County

STEP 2: Choose soil type:

Segment	Seg length (horiz), ft	Soil
1	120	Generic Soils\clay loam (low-mod OM)

STEP 3: Set slope topography:

Segment	Seg length (horiz), ft	Steepness, %	Total vert. drops, ft	Sediment delivery, t/ac/yr	Seg length (along slope), ft
1	120	25	30	20	120

STEP 4: Select and modify management:

Segment	Slope length to bottom of seg (horiz), ft	Seg length (along slope), ft	Management	Sed. delivery, t/ac/yr	Duration, yr
1	120	120	CMZ 37\d.Construction Site Templates\Hydro seeding	19.7	1

STEP 5: Set supporting practices:
Contouring: c. perfect contouring no row grade
Diversion/terrace, sediment basin: (none)

STEP 6: Set perm. barrier system:
Perm. barrier set: open

PC-II RUSLE2 Results

Info: PC-II Interim Cover 25% Side Slope RUSLE2 Calculations

8

Soil loss, t/ac/yr: 20

Sediment delivery, t/ac/yr: 19.7

Soil loss erod. portion, t/ac/yr: 20

Net event runoff, in/yr: 18

Rev. 2, August, 13, 2021

DETAILED_OUTPUTS

Years			
Years	Yearly cons. plan soil loss, t/ac/yr	Yearly sed. del., t/ac/yr	
4/1/0 - 3/31/1	19.7	20	

Sed. delivery					
Composite segment	Sed. delivery, t/ac/yr	Soil loss, t/ac/yr	Composite segment management		Comp seg length (horiz), ft
1	20	20	CMZ 37(d.Construction Site Templates)\Hydro seeding		120

PC-II RUSLE2 Results

CC						
Simulation day, m/d/y	El. %	Live canopy cover, %	Net canopy cover, %	Non-erod. cover, %	Res. surf. cover, %	
4/1/0	0.22	0	20	0	45	
4/2/0	0.22	0	20	0	44	
4/3/0	0.22	0	20	0	44	
4/4/0	0.23	0	20	0	44	
4/5/0	0.23	0	20	0	43	
4/6/0	0.23	0	19	0	43	
4/7/0	0.23	0	19	0	43	
4/8/0	0.23	0	19	0	42	
4/9/0	0.23	0	19	0	42	
4/10/0	0.23	0	18	0	42	
4/11/0	0.23	0	18	0	42	
4/12/0	0.23	0	18	0	42	
4/13/0	0.23	0	17	0	42	
4/14/0	0.23	0	17	0	41	
4/15/0	0.23	0	4.6	0	21	
4/16/0	0.24	0	2.5	0	38	
4/17/0	0.24	0.33	2.7	0	94	
4/18/0	0.24	0.67	3.0	0	94	
4/19/0	0.24	1.0	3.2	0	94	
4/20/0	0.24	1.3	3.5	0	94	

< > \ Composite segment 1 /

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Rev. 2, August, 13, 2021

Finished calculating

R2_NRCS_Fld_Office

Construction site 11182015

MOSES 2016

**PEACH CREEK ENVIRONMENTAL PARK
SAN JACINTO COUNTY, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 2406**

TYPE I PERMIT APPLICATION

PART III – FACILITY INVESTIGATION AND DESIGN

**ATTACHMENT C4
FLOODPLAIN DETERMINATION**

Prepared for

PC-II, LLC

Rev. 1, September 28, 2020



Prepared by

NEEL-SCHAFER, INC.
13430 NW Freeway, Suite 650
Houston, TX 77040
713-783-7117

Texas Board of Professional Engineers
Firm Registration No. F-2697

CONTENTS

ATTACHMENT C4 – FLOODPLAIN DETERMINATION

1	NARRATIVE	C4-1
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Drawing C4.1 – Flood Insurance Rate Map

Drawing C4.2 – Facility Layout Plan

Drawing C4.3 – Drainage Basin Map



NARRATIVE

Small portions of the facility are within the 100-year floodplain of Jayhawker Creek, which crosses the site from north to south just west of the Phase I area, and Blue Branch, which crosses the far southwestern corner of the site. The floodplain limits were obtained from the relevant FEMA flood map, the current effective FEMA Flood Insurance Rate Map (Panel 48407CO350C, eff. 11/4/2010), which 30 TAC §330.63(c)(2)(B) specifies is prima facie evidence of the floodplain location. The FEMA map is provided in Drawings C1 .1 and C4.1; the 100-year floodplain is shown relative to Phase I improvements on Drawings C4.2 and on the cross-sections on Drawings D2.4-D2.6.

The proposed waste disposal footprint, storage and processing facilities, and all construction will be located outside the limits of the 100-year floodplain. As a result, no levee or other flood protection improvement is necessary or proposed, and no levee approval, floodplain development permit, or Conditional Letter of Map Amendment is applicable or required (30 TAC §330.63(c)(2)(D)), and the facility will not restrict the flow of the 100-year flood, reduce the temporary storage capacity of the floodplain, or result in washout of solid waste (30 TAC §330.547(b)).

3912000.00

3915000.00

3918000.00

3921000.00

10146000.00

10143000.00

10140000.00

MONITORING WELL NO. +	NORTHING*	EASTING *	GROUND ELEVATION (FT/MSL)*	TOTAL DEPTH	
				ELEV. (FT/MSL)*	(FT/BGS)*
1	10140996.32	3919048.67	202	158	44
2	10140773.77	3918760.64	202	158	44
3	10140659.15	3918208.72	202	159	43
4	10140697.91	3917719.29	204	160	44
5	10140906.12	3917426.79	197	161	36
6	10141209.48	3917150.35	193	162	31
7	10141711.23	3917266.07	192	164	28
8	10142209.08	3917219.98	193	167	26
9	10142735.29	3916952.88	194	169	25
10	10143165.66	3916880.86	196	171	25
11	10143678.14	3916589.15	196	173	23
12	10144058.24	3916660.19	197	171	26
13	10144471.28	3916962.83	199	174	25
14	10144763.50	3917269.01	200	175	25
15	10144691.83	3917582.21	204	172	32
16	10144362.28	3917888.04	213	170	43
17	10143939.74	3918280.94	211	171	40
18	10143541.95	3918651.16	206	168	38
19	10143128.77	3918975.06	209	163	46
20	10142542.50	3918984.11	207	161	46
21	10142097.87	3919006.07	205	162	43
22	10141528.50	3919032.69	204	162	42

* ACTUAL VALUES WILL BE DETERMINED AT THE TIME OF INSTALLATION.
+ ACTUAL WELL NUMBERS MAY VARY.

GULF SOUTH PIPELINE CO., LLC
NG PIPELINE

FEMA FIRM
100-YEAR FLOOD PLAIN
(BLUE BRANCH
DRAINAGE BASIN)

FUTURE EXPANSION AREA

TWDB/USGS
100-YEAR FLOOD PLAIN
(2018 BLE)

FEMA FIRM
100-YEAR FLOOD PLAIN
(JAYHAWKER CREEK
DRAINAGE BASIN)

Revision 1 Revisions:

1. Permit boundary revised on western portion of site and eastern corner to reduce total permitted area from 636 acres to 594.66 acres.
2. Phase II area delineation deleted and area relabeled as future expansion area.
3. Facility access road relocated and callout revised.
4. UGPL Easement callout renamed to Gulf South Pipeline Co., LLC NG Pipeline.
5. Gate house, scales, wheel wash, citizen's convenience center, and large item storage area configurations revised.

NOTES:

1. 100-YEAR FLOOD PLAIN BASED ON FIRM PANEL 48407C0350C.
2. BUFFER ZONES AROUND THE WASTE LIMITS WILL BE A MINIMUM OF 125 FEET.
3. THE MAXIMUM ELEVATIONS OF FINAL COVER AND WASTE ARE RESPECTIVELY 385.4-FT MSL AND 381.9-FT MSL.
4. PERMANENT BENCHMARK: REF FRAME: NAD83(2011)(EPOCH:2010.0000) TEXAS CENTRAL ZONE ELEVATION BASED ON NAVD88 - GEOID18

LEGEND:

- PERIMETER FENCE (PHASE I)
- ROAD
- EXISTING 2' CONTOURS
- PERMIT BOUNDARY
- LANDFILL LIMITS
- CELL NUMBER
- PERMANENT BENCHMARK
- PROPOSED GROUNDWATER MONITOR WELL
- POINT OF COMPLIANCE
- PROPOSED GROUNDWATER MONITOR WELL NO.
- MEASURED DISTANCE BETWEEN GROUNDWATER MONITOR WELLS

RETAINING WALL

LEACHATE STORAGE FACILITY

PHASE I

PERIMETER ROAD

LARGE ITEM STORAGE AREA

PERMANENT BENCHMARK
N 10,142,891.41
E 3,919,027.91
ELEV. = 206.99

WATER TANK

CITIZEN'S CONVENIENCE CENTER
TRUCK WHEEL WASH

GATE HOUSE AND SCALES

PC-II ACCESS ROAD



SIGNATURE
8-31-2023
DATE



SIGNATURE
08/13/2021
DATE

SEAL FOR REVISION 1 REVISIONS ONLY

NEEL-SCHAFFER
Solutions you can build upon

FACILITY LAYOUT PLAN

PEACH CREEK ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION
SAN JACINTO COUNTY, TEXAS

DRAWING INFORMATION	
FILENAME:	
SURVEYED BY:	DATE: 08/2021
DRAWN: JEM	DATE: 08/2021
DSGN: DMR	DATE: 08/2021
CHKD: KL	DATE: 08/2021
QA/QC: DMR	DATE: 08/2021

C4.2

Date: 08-13-21
Scale: 1" = 800'
Project No. 15737

SOURCE:

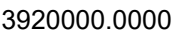
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