Auburn Lake Trails Community Disposal System

FEASIBILITY STUDY REPORT

November 16, 2020

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Executive Summary

Georgetown Divide Public Utility District (District) retained the services of Bennett Engineering Services and subconsultants Geocon and Unico to assess the condition of the existing Auburn Lake Trails (ALT) Community Disposal System (CDS) and prepare a feasibility study to determine if improvements are needed. After performing field investigations in August 2020, it was determined that the existing disposal fields are in generally good condition with minor issues such as inoperable distribution valves, distribution piping that is no longer hanging from the top of the infiltrator (not damaged), areas of vegetation showing signs of moisture near the surface, which may be caused by excessive rodent (gopher) activity in the disposal fields. The following alternatives were considered as part of this Feasibility Study to give the District options for future improvements, if required:

- No project
- Replacement of existing system in kind
- Replacement and expansion of existing system
- System regionalization
- System decentralization
- Presby system
- Spray irrigation disposal
- Additional onsite storage

Since it was determined in 2017 that the ALT CDS has adequate capacity and the field investigations from August 2020 found that the system is in generally good condition, it is proposed that the District pursue the “No Project” alternative. We recommend that the District increase maintenance activities in the fields to preserve and increase useful life including:

- Regularly exercise all valves and replace inoperable valves as needed to allow for full operations of the fields
- Increase vegetation maintenance to reduce the presence of invasive species, particularly blackberry vines
- Increase rodent deterrent measures to reduce gopher damage to leach fields
- Test section and recompact soil where gopher holes creating conduits for water to reach the surface
- Add additional cleanouts and blowoff valves in laterals not currently equipped
- Repair or replace section of infiltrators or individual laterals in fields

The other alternatives are cost-prohibitive for a disposal system that is already functioning at capacity.

1 Project Overview

1.1 Auburn Lake Trails Community Disposal System Project Background

The Georgetown Divide Public Utility District (District) Auburn Lake Trails (ALT) Community Disposal System (CDS) received a Notice of Violation (NOV) from the Central Valley Regional Water Quality Control Board (CVRWQCB) on April 13, 2017 regarding average monthly flows recorded in February and March of 2017, which were 89,799 gallons per day (gpd) and 88,446 gpd, respectively. No sewage was spilled during the violations, which indicates the leach fields have the capacity to handle flows larger than allowed by the discharge permit; however, the District completed a leach field capacity analysis, water balance report, and workplan to reduce inflow and infiltration in the collection system to ensure the system could still meet its permit requirements and current wastewater flows. The water balance report and capacity analysis, completed in November 2017, determined that the CDS had adequate capacity to handle flows greater than permitted.

The District operates its CDS under Waste Discharge Requirements (WDR) permit No. R5-2002-0031; the permit is 18 years old and overdue for renewal with the CVRWQCB. Renewal will require a Report of Waste Discharge (ROWD) and an evaluation of any future improvements the District may be required to complete.

1.2 Feasibility Study Goal

The District would like to evaluate the disposal fields to assess existing condition and develop rehabilitation and replacement alternatives for future work on the disposal fields. The purpose of this report is to provide the District with a long-term planning document that can be used for planning of future rehabilitation and replacement work on the disposal fields.

1.3 Reference Documents

The following is a list of reference documents and information used in the preparation of this Feasibility Study.

- Record drawings
- Site visit photos
- Verbal discussion with the District
- Consultation with environmental subconsultant
- Geotechnical investigation

2 Disposal Fields Condition Assessment

2.1 Existing System

The ALT CDS is located just north of Highway 193 and approximately 2 miles east of the community of Cool in El Dorado County, California. The District service area has 1,022 developed lots of which 139 are connected to the CDS. All other lots dispose of effluent from septic tanks onsite through a variety of methods such as mound systems, leach fields, and Presby systems. The CDS is designed to serve a total of 139 lots at buildout, 137 of which are currently occupied and served by the CDS. Each occupied lot maintains a privately owned septic tank that discharges the primary treated effluent into the District-owned collection system. The collection system includes 38 manholes, approximately 13,360 linear feet of 4- to 8-inch diameter polyvinyl chloride (PVC), acrylonitrile butadiene styrene (ABS), or asbestos cement pipe (ACP) collection pipe, a sewage lift station, and approximately 2,950 linear feet of force main. The primary treated effluent collected from the septic tanks and collection system is pumped to the community disposal fields (owned and operated by the District), which consist of approximately 11,600 linear feet of disposal trench.

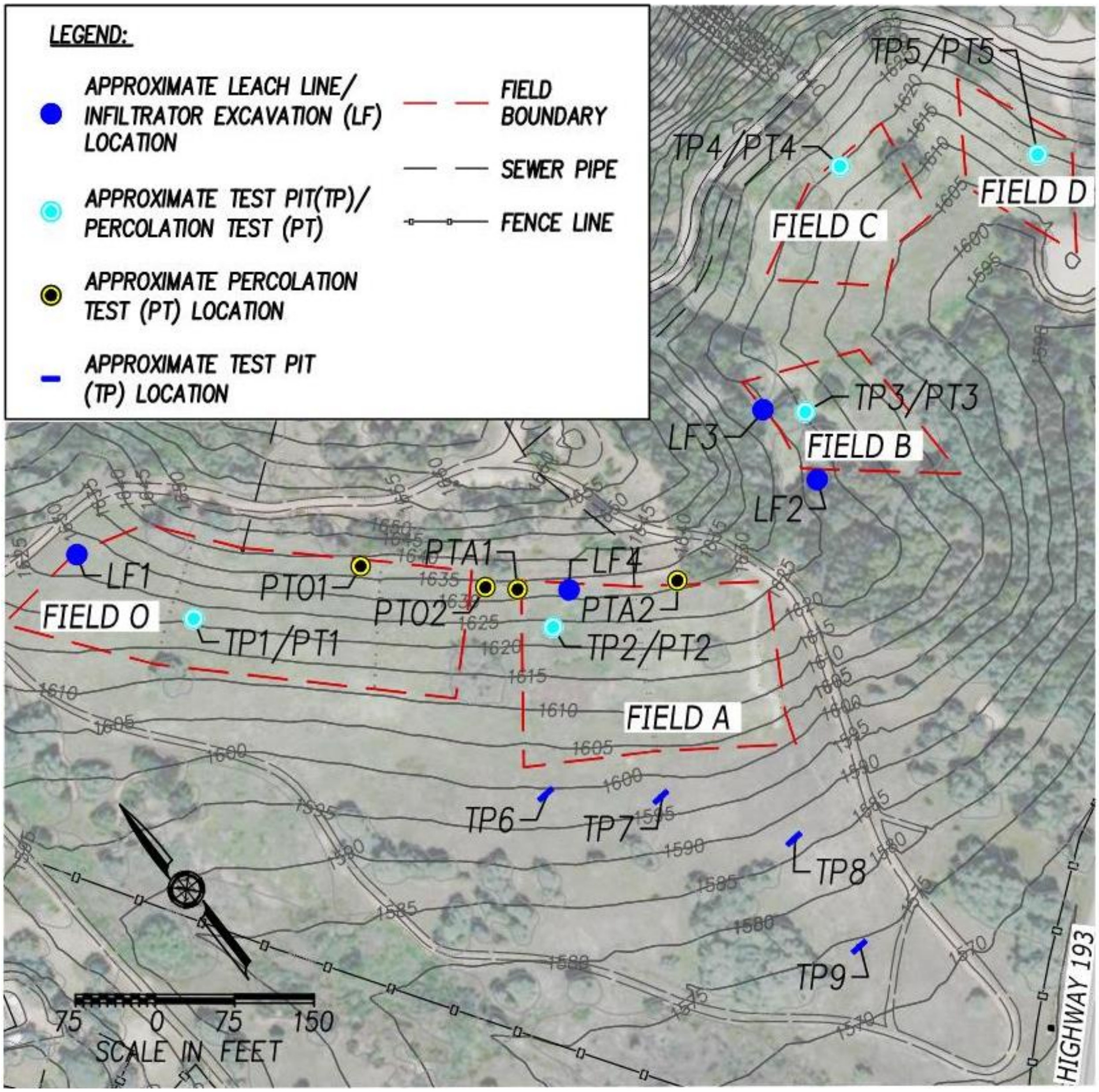
A map of the ALT collection system is shown in Appendix A.

2.2 Disposal Fields Area

The CDS consists of five separate leach fields fed via distribution boxes with effluent from the collection system. The CDS was expanded in 2000 to include four new fields – Fields A, B, C, and D – and the existing Field O was retrofitted. Piping in Fields A, B, C, and D is either 1 ¼- or 1 ½-inch perforated PVC drain pipe, while piping in Field O is 4-inch sliplined with 1 ¼-inch perforated PVC drain pipe. Fields A, B, C, and D have trench cross-sections 3 feet wide and 2 feet deep with drain pipe hung from the top of a high-capacity infiltration chamber. Field O has trench cross-sections of 2 feet wide and 3 feet deep with the pipe buried in 2-inch drain rock. The infiltration chambers include an open area under the pipe that can be considered additional storage during high flow events. Approximately 150,000 gallons of short-term storage is contained within the infiltration chambers in Fields A through D. The CDS is permitted to handle a wastewater flow of 71,800 gpd. A table of wastewater flows to the ALT CDS is shown in Appendix B.

Figure 1 shows a site plan of the District disposal field area.

Figure 1. Disposal Area Site Plan



2.3 Leach Field Condition

In August 2020, Geocon performed a site investigation of the District's leach field system. The investigation had three primary objectives:

1. Investigate the potential cause(s) of shallow soil moisture/lush vegetation in portions of Fields A and B and determine the general condition of the infiltrators.
2. Inspect existing disposal lateral in Field O.
3. Excavate soil profile test pits to identify potential expansion areas.

The investigation included observation of four soil profile test pits and four leach line/infiltrator evaluation excavations in the project area. The excavations were conducted by District staff and equipment and tools. Percolation data collected in 2017 was also analyzed to establish a more comprehensive understanding of field conditions.

Objective #1: Investigate Shallow Soil Moisture and Condition Assessment

There is an area of dense, lush vegetation in the center of Field A and a portion of Field B. District staff excavated and exposed multiple locations along the infiltrators at points LF2, LF3, and LF4 (see Figure 1). Geocon observed and recorded findings.

As expected, fluid was present throughout the entire infiltrator in Field A because effluent flow was sent there approximately three days prior to the investigation. The other locations in the second infiltrator were dry because Field B had not been in use recently. No apparent obstructions, damage, or roots were observed, nor were areas of wet or saturated surface soil observed. The infiltrators were in generally good condition. However, the distribution piping inside the infiltrators was no longer hanging from the top in several locations and instead lying on top of the biosolids due to deteriorated and broken zip-ties. The piping itself had no apparent damage. It is likely that the fields are in good condition due to District staff cycling through using each field during normal operations.

Although it is not evident from the field investigations, the lush vegetation may potentially be due to gopher holes or a similar rodent burrow. This theory is supported anecdotally by District staff. If this were the case, the creatures would be burrowing below the infiltration chambers which would allow effluent to escape through the burrows outside of the designated leach field.

Objective #2: Investigate Field O

District staff excavated and exposed the northern end of one leach field lateral at location LF1 (see Figure 1). Geocon observed and recorded findings. The lateral was exposed along with its distribution line and a ball valve. The exposed lines were dry and valves at both ends of the lateral were in the off position. Based on the number and location of valves in the central part of Field O, LF1 appeared to be the fourth lateral down from the top of the field. It is assumed that the other laterals in Field O connect to the junction with a ball valve.

Objective #3: Identify Potential Expansion Areas

The District and Geocon identified four soil test pit locations TP6 through TP9 (see Figure 1) to determine if there was viable soil nearby to potentially expand the existing disposal area in the future. The District performed the excavation while Geocon logged the soil profile in accordance with United States Department of Agriculture (USDA) soil classification and description guidelines.

Generally, there are suitable soils immediately downslope of Fields O and A for additional disposal area at locations TP6 and TP7 (see Figure 1). However, shallow clay soil was encountered at approximately 30” depth off the southeastern portion of Field A and downslope from there on the flatter ground closer to the drainage, which makes that area unsuitable at locations TP8 and TP9 (see Figure 1).

A detailed geotechnical letter of findings is included as Appendix C to this Feasibility Study.

3 Project Alternatives

While the District's existing leach field system is in generally good condition, the District may consider replacing or rehabilitating the CDS in the future. As such, several alternatives are presented below for the District's consideration. Conceptual layouts for each alternative (if applicable) are shown in Appendix D. Regardless of the alternative selected, the District will need to renew its WDR permit by preparing a ROWD when requested by the CVRWQCB.

3.1 No Project

This alternative maintains the existing disposal system in its current state with no construction improvements to the project area. With this alternative, the District staff may still opt to perform minor repairs and operations and maintenance (O&M) activities to improve the existing system based on field investigations (discussed in Section 2 of this Feasibility Study) and District staff recommendations. These improvements may include replacement of valve covers, ball valves at junction boxes, installation of additional cleanouts, and other minor work that District operations staff can perform without contracting out the work. This alternative does not resolve the issue of the potential rodent burrows. A more aggressive rodent control program could help mitigate future damage to the system.

No fundamental changes to the existing WDR permit are needed under this alternative for CVRWQCB compliance. Based on the water balance developed in 2017, the District should consider requesting an update to the WDR permit to allow 78,211 gpd instead of 71,800 gpd.

Since the existing disposal system has adequate capacity and is in generally good condition, this alternative is a viable option. No capital cost is required for this alternative; however, additional O&M costs would be required if the District is to perform minor improvements. If this alternative is selected, the savings in capital costs could be redirected to improvements to the collection system to reduce infiltration and inflow and maintain system capacity.

No conceptual layout was prepared for this alternative since it does not change the existing disposal system.

3.2 Replacement of Existing System

3.2-A Replacement of Existing System in Kind

This alternative includes replacement of the existing disposal system (including Field O) with the same design improvements installed in Fields A through D. The project footprint is the same as the existing system. This alternative sequentially removes the existing infrastructure, installs infiltration chambers within new disposal trenches, and replaces the existing junction boxes, distribution piping, and appurtenances with current construction methods and materials.

No fundamental changes to the existing WDR permit are needed under this alternative for CVRWQCB compliance.

Since the existing disposal system has adequate capacity and is in generally good condition, this alternative is not preferred. Although the capital cost for this construction project is not particularly high (approximated at $2.6 million), the resulting disposal system is the same as existing and does not resolve the issue of the potential rodent burrows.

No conceptual layout was prepared for this alternative since it only replaces the existing disposal system in kind.

3.2-B Replacement and Expansion of Existing System

This alternative includes replacement of the existing disposal system as specified in Alternative 3.2-A and also constructs a new Field E downslope of Fields O and A. Under this alternative, Field E is constructed with the same design parameters and methods as Fields A through D.

Based on Geocon's field investigations, test pit locations TP6 and TP7 contain suitable soil for new disposal trenches (see Figure 1 for test pit locations). It was determined that TP8 and TP9 are not viable locations due to shallow clay soil encountered. Although it is unclear where the soil exactly transitions, it is estimated that the proposed Field E under this alternative adds approximately 0.5 acres (approximately 1,500 linear feet of trench) of disposal area. This increases the existing disposal system capacity by 10-15%.

This alternative requires the District to update the existing WDR permit with the new Field E design criteria and increased system capacity.

Since the existing disposal system has adequate capacity and does not anticipate additional growth, this alternative is not preferred. The resulting disposal system does not resolve the issue of the potential rodent burrows. Alternative 3.2-B costs approximately $2.8 million.

A conceptual layout for this alternative is included in Appendix D.

3.3 System Regionalization/Decentralization

3.3-A System Regionalization

This alternative involves consolidating the District's sewer system with another local system in order to decrease O&M costs. Due to the remote location of the District, lack of nearby collection systems, and significant terrain challenges, regionalization is infeasible. The nearest wastewater facilities to connect to are located in the City of Auburn, Placer County, which is over 5 miles away through mountainous terrain. As such, this alternative is not considered any further.

3.3-B System Decentralization

Just like system regionalization, this alternative involves a comprehensive overhaul to the District's disposal system by decentralizing the treatment and disposal process to individual properties instead of the District's disposal fields. The treatment and disposal process would occur using the Hoot system or some other similar proprietary method. The existing sewer collection piping, force main, and disposal fields would be abandoned or removed.

This alternative transfers responsibility of treatment and disposal from the District to individual property owners. However, the District would still need to regulate and oversee the process. It is assumed property owners would need to maintain these systems. Due to the high cost placed onto property owners, additional District administration and recordkeeping, and maintenance challenges, decentralization is infeasible. As such, this alternative is not considered any further.

It is worth noting that this alternative may be viable for an individual large development if one is to enter the District's service area in the future. If so, the District may consider requiring the developer to collect, treat, and dispose of wastewater onsite via a proprietary process such as the Hoot system.

3.4 Altered Treatment/Disposal Method

3.4-A Presby System

This alternative includes removal of the existing disposal fields and installation of a Presby Advanced Enviroseptic system to secondarily treat and dispose of ALT CDS flows. Unlike a traditional infiltrator, the proprietary Presby system is a full-circle ridged chamber network with each individual chamber wrapped in a plastic fiber mat, bio-accelerator fabric, and geotextile fabric to secondarily treat flows (after primary treatment through individual septic tanks) without using electricity or replacing any media. Approximately 5 acres of land is required to construct the Presby system. While there is a potential to reduce this footprint if suitable soil is located deeper, the geotechnical investigation performed under this scope shows that the Presby system would likely need to be installed in a single-stack layer (requiring the full 5 acres). A 20,000 gallon equalization tank is also required upstream of the beds with duplex pumps.Under this alternative, the existing disposal fields need to sequentially decommissioned while the Presby system is constructed.

This alternative requires the District to update the existing WDR permit with the new Presby system design criteria, including the tank and expanded footprint.

The Presby system makes sense for a new development or for installation of a new treatment and disposal system. However, the existing system has adequate capacity, is in good condition, and the Presby system would require a large footprint because of less suitable deep soil; as such, this alternative is not preferred. The resulting system resolves the issue of the potential rodent burrows since they cannot burrow underneath these chambers like they can with traditional infiltrators. Alternative 3.4-A costs approximately $1.0 million.

A conceptual layout for this alternative is included in Appendix D.

3.4-B Spray Irrigation Disposal

This alternative includes removal of the existing disposal trenches and piping, and installation of the following: a chlorine dosing and injection system, an irrigation booster pump, irrigation piping, sprinkler guns, effluent storage ponds (for disposal during the wet season), and approximately 15 acres of irrigation land area. Specific grasses would need to be brought into the fields to adequately dispose of the spray irrigation runoff at the correct application rates. Under this alternative, disinfection products need to be purchased and stored onsite, the grass fields would need to be mowed and maintained, and additional fencing and signage is required at the spray irrigation site. This alternative is a comprehensive overhaul of the existing system and requires more O&M costs than the existing system.

This alternative requires the District to update the existing WDR permit with the new disinfection system criteria and disposal method.

Due to the high capital cost for design and construction, high ongoing O&M costs, and immense amount of land required for spray irrigation and wet weather storage, this alternative is considered an infeasible option. As such, this alternative is not considered any further.

3.5 Additional Onsite Storage

This alternative includes installation of a storage tank upstream of the diversion box to each field to attenuate large flow events that exceed the permitted capacity. The additional storage mitigates the chance of a sanitary sewer overflow occurring by providing several extra days of attenuation for District operations staff to respond accordingly. Normal operations through the tank would allow for permitted flows. While the specific parameters of the tank such as size, material, valving, and piping would be decided during the design phase, this alternative assumes the tank to provide 100,000 gallons of additional storage. For example, this means that flows of 85,000 gallons per day (which exceeds permitted flow) would only allow 71,800 gallons per day (permitted flow) through to the disposal system and the excess would be held in the tank to be slowly released as flows lowered. At 85,000 gallons per day, the tank would allow for over seven days of storage. An overflow system is required within the storage tank.

This alternative requires the District to update the existing WDR permit with the new storage tank design criteria.

Since the existing disposal system has adequate capacity, this alternative is not preferred. The tank would be used infrequently due to the fact that it is designed to handle flows beyond the permitted maximum flows. The addition of a storage tank does not resolve the issue of the potential rodent burrows. This alternative is estimated to cost approximately $500,000.

A conceptual layout for this alternative is included in Appendix D.

4 Recommended Project

4.1 Recommended Project Description

The existing leach field treatment and disposal system are adequately sized and in generally good condition. As such, it is recommended that the District pursue **Alternative 3.1 – No Project**. The other alternatives presented in this Feasibility Study do not provide enough value to warrant the larger associated capital costs.

That being said, it is recommended that the District commit to and increase the regular maintenance activities at the disposal site to preserve the useful life and capacity of the leach fields. The disposal site design allows the district to maintain healthy leach fields by continuing the practice of filed rotation and resting for the soil. This ability to rotate and rest the leach fields should provide at least an additional 30 years of useful life, to the 20 years that Field A-D have been installed, if not more. Field O remains in very good condition and preforms very well even as the oldest field in operation. As discovered during the investigation, the north portion of the filed has not be regular use and will provide additional flexibility in the rotation, when brought back online after repairs.

It is recommended that the District set aside an additional annual budget of approximately $10,000 dedicated to Operations and Maintenance (O&M) Program for the ALT collection and disposal systems regardless if one of the capital investment alternatives is selected. Funds for this Program would be used, or saved for future repairs, to provide labor, equipment, and materials for activities such as, but not limited to:

1. Regularly exercise all valves and replace inoperable valves as needed to allow for full operations of the fields for rotation and resting.
2. Invasive vegetation removal, particularly blackberry vines.
3. Increase vegetation maintenance to reduce the future establishment of invasive plant species.
4. Increase rodent deterrent measures to reduce gopher damage to leach fields.
5. Test section and recompact soil to repair damage caused by gopher holes creating conduits for water to reach the surface.
6. Add additional cleanouts and blowoff valves in laterals not currently equipped.
7. Routinely flush and blowout distribution piping.
8. Repair or replace section of infiltrators or individual laterals in fields if damaged occurs or excessive bio-mat and surface moisture is present for long periods of time after the fields have been rested. This may require additional funds if sections larger than 150 ft are replaced in any given year. The following should be considered if replacement of laterals is performed:
    a. Rehang fallen distribution pipes
    b. Remove accumulated bio-mat and scarify the trench bottom
    c. Install gofer mesh in the trench zone

4.2 Additional Considerations

In addition to the increase O&M on the disposal fields, it is recommend the District consider project to rehabilitate the ALT collection system to reduce infiltration and inflow (I&I) of storm water entering the sewer collection system. The reduction of I&I in the collection system will help alleviate high flows sent to the disposal fields in winter months, reduce the chance of exceeding the permitted discharge flows. Collection rehabilitation may include the following:

1. Manhole replacement
2. Manhole coating
3. Pipe replacement
4. Pipe linings
    - Cure in place liners
    - Slipline
5. Septic tank repair or replacement (private owner responsibility)

In the future, the District will be required by the CVRWQCB to renew discharge permit. A Report of Waste Discharge (ROWD) will be required to obtain the new Waste Discharge Requirement Order permit. At this time the additional capacity found in the 2017 analysis may be added to the permit. The District should budget between $20,000 and $30,000 for the effort of preparing a ROWD.

APPENDIX A

GDPUD Collection System Map

GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT

AUBURN LAKE TRAILS COMMUNITY DISPOSAL SYSTEM

NOVEMBER 2009

APPENDIX B

ALT CDS Flow Data

Average Wastewater Flows
Auburn Lake Trails Wastewater Management Zone
Cool, California

Year	Average Daily Wastewater Flows Per Month (gpd)												Yearly Average (gpd)	Million Gallons per year
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
2020	40,029	25,706	42,416	43,746	23,132	16,526	14,485						29,434	10.74
2019	62,400	81,900	61,900	31,800	31,253	15,220	14,906	15,112	15,366	14,751	16,526	44,596	33,811	12.34
2018	40,458	25,607	62,727	40,000	19,838	16,454	16,845	15,412	16,974	16,761	25,509	31,536	27,343	9.98
2017	86,419	88,446	43,585	51,702	23,445	16,458	24,628	8,257	12,814	16,194	24,274	23,209	34,953	12.76
2016	61,045	29,705	63,493	24,847	15,937	17,841	18,029	17,529	19,386	29,994	42,840	69,827	34,206	12.49
2015	25,256	27,153	27,756	19,592	20,108	16,421	16,587	18,945	16,663	15,210	18,752	30,514	21,080	7.69
2014	21,433	43,641	38,841	30,289	21,050	19,976	17,795	18,364	18,308	16,544	21,772	46,597	26,218	8.29
2013	21,653	17,809	17,733	19,085	18,396	18,541	17,883	18,512	18,425	18,774	20,736	20,440	18,999	6.93
2012	22,399	22,413	43,523	27,705	18,177	16,483	16,448	16,192	16,616	17,838	23,408	31,433	22,720	8.29
2011	30,292	36,596	67,831	35,694	22,083	20,308	17,474	16,270	17,253	25,153	25,425	25,704	28,340	10.34
2010	39,131	33,524	31,929	30,526	20,485	17,213	17,463	16,595	16,946	21,832	31,764	58,526	27,995	10.22
2009	23,175	45,216	34,596	17,944	30,796	20,408	17,289	17,598	17,600	19,815	20,082	28,141	24,388	8.90
2008	39,573	29,736	22,016	19,419	19,625	17,488	19,336	18,106	20,077	17,223	20,679	24,055	22,278	8.13
2007	25,144	56,826	26,164	24,585	19,744	18,950	17,494	17,428	19,509	18,324	25,630	33,811	25,301	9.23
2006	49,155	43,182	72,482	67,207	20,986	19,000	19,000	16,058	20,950	19,064	20,721	27,288	32,924	12.02
2005	49,401	42,472	40,679	35,374	35,337	31,260	31,588	27,418	24,026	30,440	22,528	69,226	36,646	13.38
2004	37,419	56,117	35,348	27,594	26,442	23,850	26,746	29,538	29,003	43,677	44,003	50,300	35,836	13.08
2003	35,900	31,700	39,581	52,572	38,325	28,290	19,970	18,400	21,900	24,696	31,233	60,338	33,575	12.26

Notes:
gpd - gallons per day

Shaded cells represent flows that exceeded permitted flows due to excess infiltration and inflow

APPENDIX C

Letter of Geotechnical Findings

Project No. S1986-05-01
October 6, 2020

VIA EMAIL

Gabriel Rodell, PE
Bennett Engineering Services
1082 Sunrise Avenue, Suite 100
Roseville, California 95661

Subject: DISPOSAL FIELD EVALUATION SUMMARY
AUBURN LAKE TRAILS COMMUNITY DISPOSAL SYSTEM
COOL, CALIFORNIA

Mr. Rodell:

In accordance with your request and our agreement dated July 17, 2020, we have performed disposal field evaluation services at the Georgetown Divide Public Utility District's (GDPUD) community disposal system (CDS) in the Auburn Lake Trails development, located near the community of Cool in El Dorado County, California. The approximate site location is depicted on the Vicinity Map, Figure 1.

BACKGROUND AND PURPOSE

The facility is an existing community wastewater disposal system consisting of five subsurface disposal fields on an approximately 30-acre site in gently rolling oak woodland terrain. The site is generally bounded by State Route 193 to the south, rural residential properties to the north and west, and undeveloped oak woodlands to the north and east. The current site configuration is shown on the Site Plan, Figure 2.

The purpose of our services was to aid Bennett Engineering Services (Ben|En) in evaluating the existing condition of the CDS disposal field and estimating remaining useful life.

SCOPE OF SERVICES

The specific scope of our evaluation was established during a site reconnaissance meeting with GDPUD and Ben|En representatives on August 3, 2020. Based on discussions during that meeting, our evaluation and associated field work followed three lines of investigation:

1. Excavate at the northern margin of Field O (Photo 1) to confirm the presence and construction details of distribution piping in that area (Photo 2).
2. Investigate possible cause(s) of apparent shallow soil moisture (lush vegetation) in portions of Fields A and B by excavating/exposing the mid-portion of the uppermost infiltrator in Field A (Photos 3 and 4) and exposing/opening the ends of infiltrators in Field B (Photos 5 through 10).
3. Excavate soil profile test pits in the open field areas down slope from Fields O and A to identify possible expansion areas (Photos 11 through 20).

We performed the following services for this project:

- Reviewed plans, construction documents, site-specific data previously obtained by Geocon, and other available information pertaining to the existing leach fields and performed a limited geologic/geotechnical literature review to aid in evaluating the geologic conditions present at the site.
- Performed a site reconnaissance with GDPUD and Bennett Engineering representatives to observe existing conditions and features at the site and to select locations for subsequent subsurface exploration and sampling.
- Observed excavation of 4 soil profile test pits (TP6 through TP9) and four leach line/infiltrator evaluation excavations (LF1 through LF4) in the project area on August 6-7, 2020. Field observations were performed by a Geocon Certified Engineering Geologist. The soil profile test pits were excavated by GDPUD using a rubber-tracked mini-excavator. The leach line/infiltrator evaluation excavations were performed by GDPUD using a rubber-tracked mini-excavator and hand tools.
- Logged the soil profile test pits in general accordance with United States Department of Agriculture (USDA) Natural Resources Conservation Service soil classification terminology. Copies of the Soil Profile Logs are presented as Figures 3 through 6.
- Preserved representative soil samples from the soil profile test pits.
- Prepared this letter summarizing our findings and conclusions regarding existing conditions in the CDS disposal field.

FIELD O OBSERVATIONS

Several metal "T-post" fence posts are present along the northern margin of Field O (Photo 1). GDPUD representatives were uncertain whether the existing Field O leachfield extended to that northern margin, or if it represented an area reserved for potential future use. GDPUD staff used the mini-excavator, along with shovels and a soil probe, to expose the northern end of one leachfield lateral at excavation location LF1 (Figure 2). In excavation LF1, we exposed the northern end of a standard leachfield lateral and its junction with a distribution/overflow line which extends northeast/southwest along the northern end of Field O (Photo 2). A ball valve was present on the end of the lateral, near its junction with the distribution/overflow pipe (Photo 2). The leachfield lateral appeared to be the fourth lateral down from the top of the field based on the number and location of valves observed to the southeast in the central part of Field O. The lines we exposed were dry and valves at both ends of the lateral were in the OFF position at the time of our field work.

We located/uncovered additional vault boxes along the northern margin of Field O which were spaced approximately 8 feet apart. We infer from our observations in the vicinity that the distribution/overflow pipe along the northern end of Field O connects to each of the Field O laterals, with a ball valve at the northern end of each lateral near the junction.

FIELD A AND B OBSERVATIONS

In the central portion of Field A, there is an area of dense, lush vegetation that extends downslope approximately 130 feet from near the top of the field (Photos 3 and 4, 13 and 14, 17 and 18). GDPUD staff used shovels/hand tools to excavate and expose the mid-portion of the uppermost infiltrator in Field A (LF4) and open an observation hole in the top of the infiltrator. The top of the infiltrator was approximately 12 inches below the surface. Fluid was present in the infiltrator approximately 21 inches below ground surface. The presence and level of fluid in the infiltrator was an anticipated condition, as effluent flow to Field A was occurring until approximately 3 days before our field investigation.

We used a mirror and flashlight to view the open space inside the infiltrator (between the fluid and top). No obvious obstructions or damage were observed. We noted that distribution pipe was not visible inside the infiltrator).

Spot checks of observation risers at both ends of other infiltrators around the lush vegetation area of Field A showed the presence of fluid, indicating that effluent was reaching the full length of the infiltrators. We did not observe any areas of wet or saturated surface soil.

Due to the presence of thriving vegetation (primarily blackberry) on a portion of Field B, we investigated Field B infiltrators for evidence of possible clogging or other issues that could impact effluent distribution. For comparison, we exposed and opened the end of one infiltrator in the area of increased/dense vegetation growth (southwest end of Field B, Row 4; Excavation LF2) and the end of one infiltrator in an area of "normal" vegetation growth (northeast end of Field B, Row 2; Excavation LF3). The excavation locations are depicted on Figure 2. GDPUD staff used the mini-excavator, along with shovels, a soil probe, and other hand tools to expose and open the ends of the specified infiltrators. Photos 5 through 10 show the areas of excavation and features/conditions encountered. Field B had not been in recent use/operation at the time of our field investigation and the infiltrators we observed were dry.

The two infiltrators we opened did not exhibit plugging or other obvious damages and appeared to be in generally good condition (Photos 7 through 10). We observed approximately 2 to 4 inches of biosolids on the interior bottom of the infiltrators, with somewhat greater accumulations (up to approximately 6 inches) near the ends where overflow distribution piping penetrates the infiltrators Photos 8 and 10). We did not observe any plugging or significant accumulations of roots. We noted that the distribution piping inside the infiltrators was no longer hanging from top of infiltrator in many places, rather it was laying on top of the biosolids due to deteriorated/broken zip-ties. The distribution piping appeared intact with no breaks observed. We did not note ant significant differences between condition of the infiltrators at the two locations (LF2 and LF3).

EXPANSION AREA EXPLORATION

We performed a preliminary evaluation of possible CDS expansion area in open field areas downslope from Fields A and O (Photos 11 and 12). Specifically, four soil profile test pits (TP6 through TP9) were excavated to observe subsurface soils in the area. The locations of the Soil Profile Test Pits are depicted on Figure 2. GDPUD staff used the mini-excavator to excavate the test pits to refusal depth, which ranged from approximately 5 feet (TP6) to 6½ feet (TP9). John Pfeiffer, a Geocon Certified Engineering Geologist, logged the soil profile in each test pit in general accordance with USDA soil classification/description guidelines. The Soil Profile Logs (Figures 3 through 6) detail soil type, color, moisture, texture, and other pertinent details specific to the evaluation of subsurface conditions for subsurface wastewater disposal. Photos 13 through 20 show the soil profile test pits and surrounding area and typical soil profiles.

Soils directly downslope of the Field A/O area (TP6 and TP7) are predominantly loamy/silty with varied (laterally and vertically) sand, clay, and gravel content. These soils transition into completely weathered metamorphic rock at a depth of approximately 30 inches. The completely weathered rock extends to varied depths on the order of 4½ to 5 feet, where it transitions to highly weathered, intensely fractured bedrock. Excavation refusal was encountered in/at moderately weathered, intensely fractured rock at depths of approximately 5 to 6 feet in TP6 and TP7. Neither groundwater nor associated evidence (e.g., mottled soils) were observed in TP6 or TP7 soils.

The soil profiles in TP8 and TP9, located further downslope, were somewhat similar to TP6 and TP7 at/near the surface (silty/loamy) and at depth (weathered metamorphic rock), but contained a significant clay horizon first encountered at depths of 18 to 30 inches. Neither groundwater nor associated evidence (e.g., mottled soils) were observed in TP8, but gray and strong brown mottling were observed in TP9 soils at and below the 6-foot depth.

CONCLUSIONS

Standard leach field piping extends to northern margin of Field O, which was roughly marked by a line of metal "T-posts" at the time of our investigation. The line we exposed was dry and valves at both ends were in OFF position at the time of our field work.

Our limited investigation of Field A did not reveal obvious signs of damage to or plugging of infiltrators that might be the cause of high soil moisture/lush vegetation in that field. We speculate that gopher/rodent burrows are a possible cause.

The Field B infiltrators we opened did not exhibit plugging or other obvious damage and appeared to be in generally good condition. There was approximately 2 to 4 inches of biosolids on the interior bottom of the infiltrators, with somewhat greater accumulations (up to approximately 6 inches) near the ends where overflow distribution piping penetrates the infiltrators. We did not observe any plugging or significant accumulations of roots. The distribution piping inside the infiltrators was no longer hanging from top of infiltrator in many places; rather it was laying on top of the biosolids due to deteriorated/broken zip-ties. The distribution piping appeared intact with no breaks observed.

Generally, the soils directly downslope of the Field A/O area (Test Pits TP6 and TP7 area) appear potentially suitable for additional disposal area if needed. However, we encountered shallow clay soil off the southeastern portion of Field A (Test Pit TP8) and downslope from there on the flatter ground closer to the drainage (Test Pit TP9) which makes those areas unsuitable.

LIMITATIONS

Our professional services were performed and our findings were obtained in accordance with generally accepted geotechnical engineering principles and practices used in the site area at this time. No warranty is provided, express or implied.

Please contact us if you have any questions regarding the contents of this letter or if we may be of further service.

Sincerely,

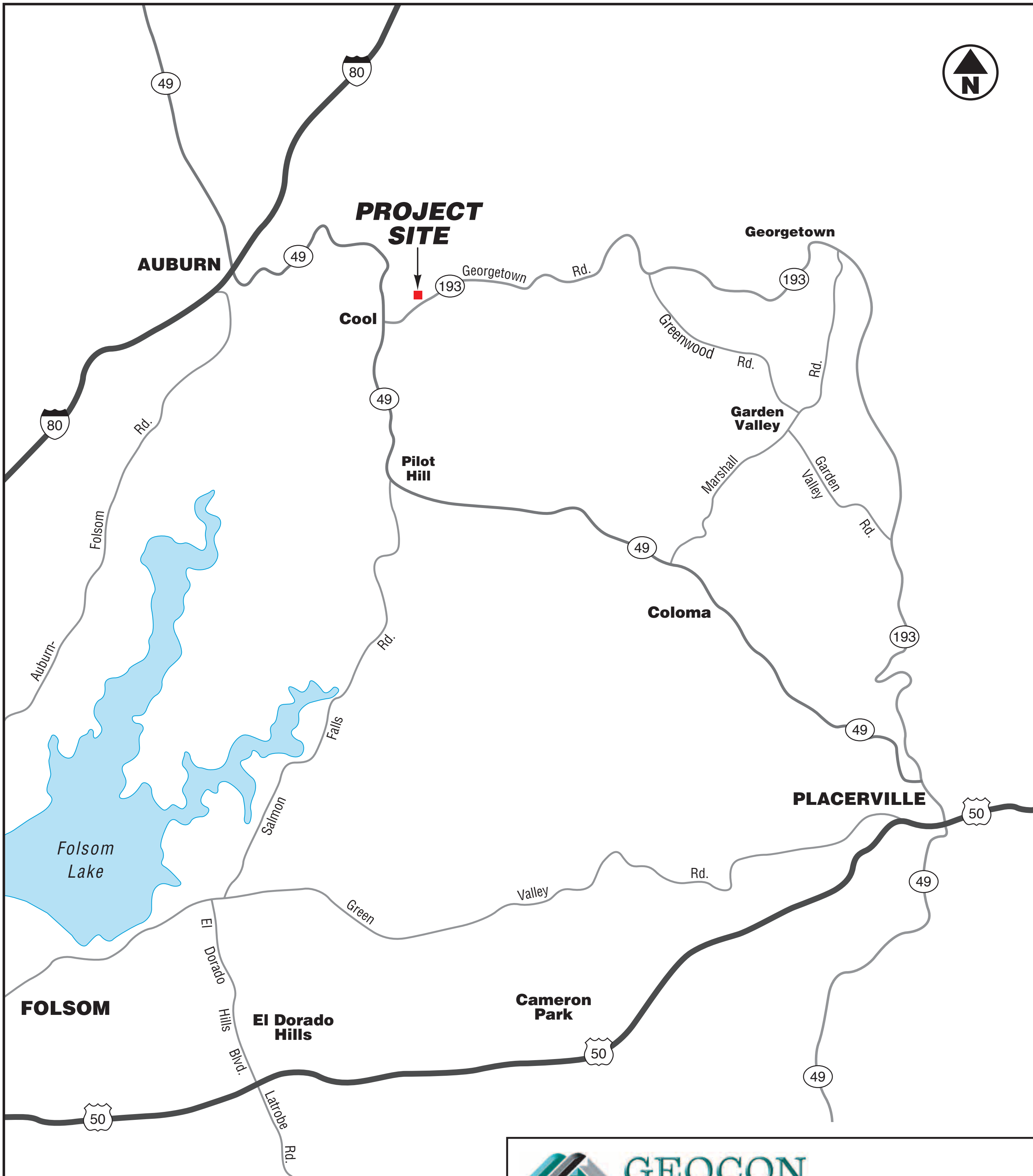
GEOCON CONSULTANTS, INC.

PROFESSIONAL GEOLOGIST
JOHN C. PFEIFFER
No. 2372
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

John C. Pfeiffer, PG, CEG
Senior Geologist

Jeremy J. Zorne, PE, GE
Senior Engineer

Attachments: Figure 1, Vicinity Map
Figure 2, Site Plan
Figures 3 through 6, Soil Profile Logs (TP6 through TP9)
Photographs 1 through 20



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Scale in Miles

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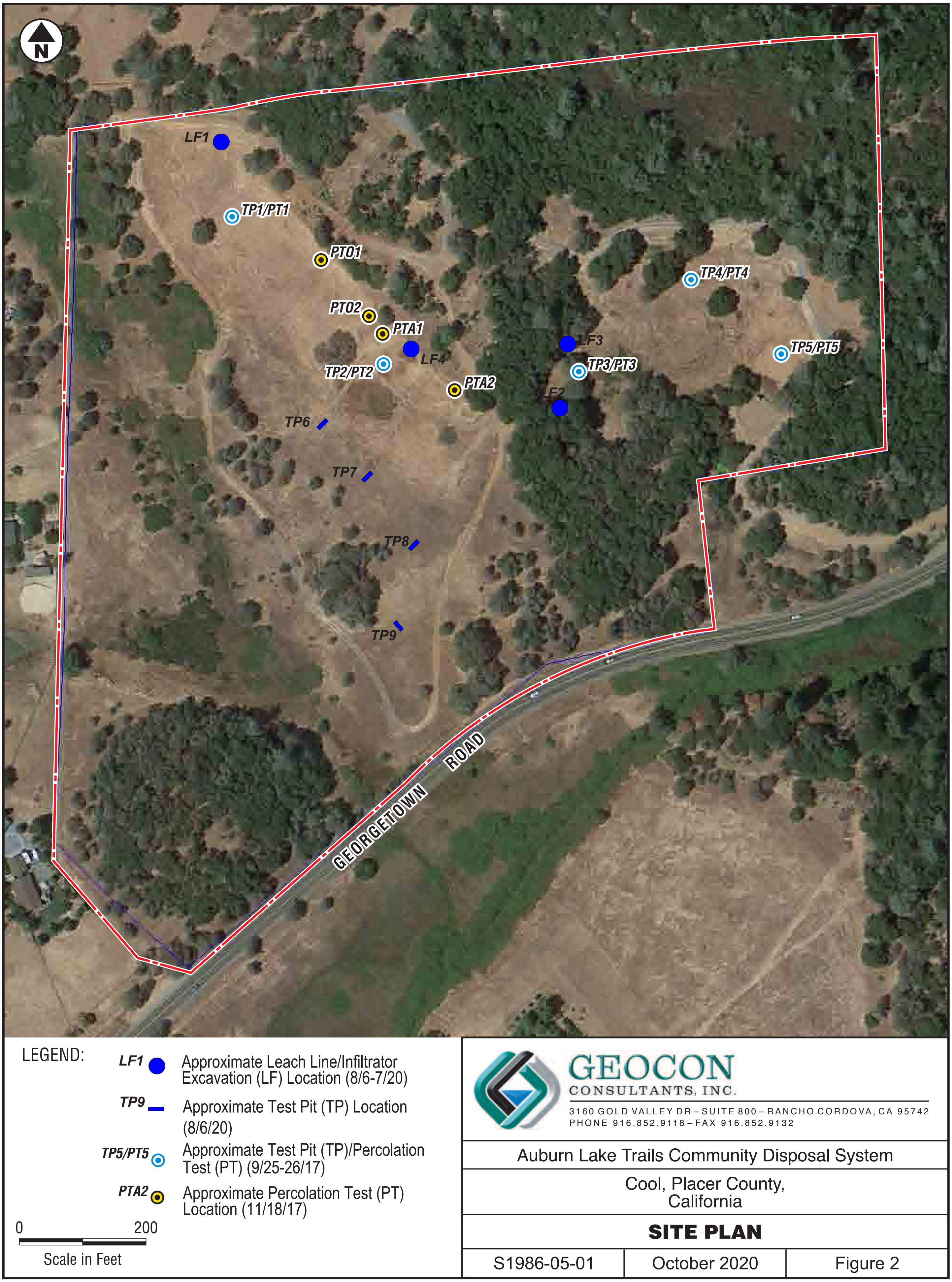
PHONE 916.852.9118 – FAX 916.852.9132

Auburn Lake Trails Community Disposal System

Cool, Placer County, California

VICINITY MAP

S1986-05-01	October 2020	Figure 1



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Auburn Lake Trails Community Disposal System		
Cool, Placer County, California		
SITE PLAN		
S1986-05-01	October 2020	Figure 2

SOIL PROFILE LOG

APN: GDPUD ALT CDS

Initials JCP Date 8/6/20

Pg ____ of ____

Consultant Geocon

Profile # TP6 Slope 4 %

Depth 0 to 4"
Texture: scl sc **sl** l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: 7.5YR 5/6 strong brown
Mottles ______ 2% 2-20% faint distinct prominent
Structure: **gr** abk sbk mass Other ______
Consistence: L **VFr** Fr F VF EF S(refusal)
Plasticity: **NP** SP P VP Stickiness: **NS** SS S VS
Roots: none few **common** many vf **f** m c
Boundary: Topography- s **w** i b
Distinctness- a **c** g d
cm **<2** 2-5 5-15 >15
Moisture: **Dr** D M S Se
Comments ______
Similar to horizon ____ of SM ____

Depth 4" to 20"
Texture: scl sc **sl** l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: 5YR 4/6 yellowish-red
Mottles ______ <2% 2-20% faint distinct prominent
Structure: gr abk **sbk** mass Other ______
Consistence: L VFr **Fr** F VF EF S(refusal)
Plasticity: **NP** SP P VP Stickiness: **NS** SS S VS
Roots: none **few** common many vf **f m** c
Boundary: Topography- **s** w i b
Distinctness- a **c** g d
cm **<2** 2-5 5-15 >15
Moisture: **Dr** D M S Se
Comments: 3-5% angular gvl/cbl to 5"
Similar to horizon ____ of SM ____

Depth 20" to 30"
Texture: **scl** sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: 5YR 5/6 yellowish-red
Mottles ______ <2% 2-20% faint distinct prominent
Structure: gr abk **sbk** mass Other ______
Consistence: L VFr **Fr F** VF EF S(refusal)
Plasticity: NP **SP** P VP Stickiness: NS **SS** S VS
Roots: **none** few common many vf f m c
Boundary: Topography- **s** w i b
Distinctness- a c **g** d
cm <2 **2-5** 5-15 >15
Moisture: **Dr** D M S Se
Comments: ______
Similar to horizon ____ of SM ____

Depth 30" to 39"
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney **DRX** IWRX MWRX Dg
Color: 10YR 5/4 yellowish-brown
Mottles ______ <2% 2-20% faint distinct prominent
Structure: gr abk sbk **mass** Other ______
Consistence: L VFr **Fr F** VF EF S(refusal)
Plasticity: NP **SP** P VP Stickiness: NS **SS** S VS
Roots: **none** few common many vf f m c
Boundary: Topography- s **w** i b
Distinctness- a c **g** d
cm <2 **2-5** 5-15 >15
Moisture: Dr **D** M S Se
Comments: ______
Similar to Horizon ______ of SM ______

Depth 39 to 56"
Texture: scl sc sl l c cl sic sicl sil sic
Gravelly Cobbly Stoney DRX **IWRX** MWRX Dg
Color: 10YR 5/4 yellowish-brown
Mottles ______ <2% 2-20% faint distinct prominent
Structure: gr **abk** sbk mass Other ______
Consistence: L VFr Fr F **VF** EF S(refusal)
Plasticity: **NP** SP P VP Stickiness: **NS** SS S VS
Roots: none **few** common many vf **f** m c
Boundary: Topography- **s** w i b
Distinctness- a c **g** d
cm <2 **2-5** 5-15 >15
Moisture: **Dr** D M S Se
Comments: ______
Similar to horizon ______ of SM ______

Depth 56" to 58"
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX **MWRX** Dg
Color: 10YR 5/4 yellowish-brown
Mottles ______ <2% 2-20% faint distinct prominent
Structure: gr abk sbk **mass** Other ______
Consistence: L VFr Fr F VF EF **S(refusal)**
Plasticity: **NP** SP P VP Stickiness: **NS** SS S VS
Roots: **none** few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr **D** M S Se
Comments: refusal at 58"
Similar to ______ of SM ______

Depth ______ to ______
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: ______
Mottles ______ <2% 2-20% faint distinct prominent
Structure: gr abk sbk mass Other ______
Consistence: L VFr Fr F VF EF S(refusal)
Plasticity: NP SP P VP Stickiness: NS SS S VS
Roots: none few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr D M S Se
Comments: ______
Similar to horizon ______ of SM ______

Depth ______ to ______
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color ______
Mottles ______ <2% 2-20% faint distinct prominent
Structure: gr abk sbk mass Other ______
Consistence: L VFr Fr F VF EF S(refusal)
Plasticity: NP SP P VP Stickiness: NS SS S VS
Roots: none few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr D M S Se
Comments: ______
Similar to Horizon ______ of SM ______

Total Depth 58" **GW Depth** >58"

Figure 3

SOIL PROFILE LOG

APN: GDPUD ALT CDS

Initials JCP Date 8/6/20

Pg ____ of ____

Consultant Geocon

Profile # TP7 Slope 4 %

Depth 0 to 6"
Texture: scl sc **sl** l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: 7.5YR 5/6 strong brown
Mottles ________ 2% 2-20% faint distinct prominent
Structure: **gr** abk sbk mass Other ________
Consistence: L **VFr** Fr F VF EF S(refusal)
Plasticity: **NP** SP P VP **Stickiness**: **NS** SS S VS
Roots: none few **common** many vf **f** m c
Boundary: Topography- s **w** i b
Distinctness- a **c** g d
cm **<2** 2-5 5-15 >15
Moisture: **Dr** D M S Se
Comments ________
Similar to horizon 1 **of SM** TP6

Depth 6" to 18"
Texture: scl sc **sl** l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: 5YR 4/6 yellowish-red
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk **sbk** mass Other ________
Consistence: L VFr **Fr** F VF EF S(refusal)
Plasticity: **NP** SP P VP **Stickiness**: **NS** SS S VS
Roots: none **few** common many vf **f m** c
Boundary: Topography- **s** w i b
Distinctness- a **c** g d
cm **<2** 2-5 5-15 >15
Moisture: **Dr** D M S Se
Comments: 3-5% angular gvl/cbl to 5"
Similar to horizon 2 **of SM** TP6

Depth 18" to 32"
Texture: **scl** sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: 5YR 5/6 yellowish-red
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk **sbk** mass Other ________
Consistence: L VFr **Fr F** VF EF S(refusal)
Plasticity: NP **SP** P VP **Stickiness**: NS **SS** S VS
Roots: **none** few common many vf f m c
Boundary: Topography- **s** w i b
Distinctness- a c **g** d
cm <2 **2-5** 5-15 >15
Moisture: **Dr** D M S Se
Comments: ________
Similar to horizon 3 **of SM** TP6

Depth 32" to 61"
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney **DRX** IWRX MWRX Dg
Color: 10YR 5/4 yellowish-brown
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk sbk **mass** Other ________
Consistence: L VFr **Fr F** VF EF S(refusal)
Plasticity: NP **SP** P VP **Stickiness**: NS **SS** S VS
Roots: **none** few common many vf f m c
Boundary: Topography- s **w** i b
Distinctness- a c **g** d
cm <2 **2-5** 5-15 >15
Moisture: Dr **D** M S Se
Comments: ________
Similar to Horizon 4 **of SM** TP6

Depth 61" to 72"
Texture: scl sc sl l c cl sic sicl sil sic
Gravelly Cobbly Stoney DRX **IWRX** MWRX Dg
Color: 10YR 5/4 yellowish-brown
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr **abk** sbk mass Other ________
Consistence: L VFr Fr F VF EF **S(refusal)**
Plasticity: **NP** SP P VP **Stickiness**: **NS** SS S VS
Roots: none **few** common many vf **f** m c
Boundary: Topography- **s** w i b
Distinctness- a c **g** d
cm <2 **2-5** 5-15 >15
Moisture: Dr **D** M S Se
Comments: refusal at 72"
Similar to horizon 5 **of SM** TP6

Depth ________ to ________
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: ________
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk sbk mass Other ________
Consistence: L VFr Fr F VF EF S(refusal)
Plasticity: NP SP P VP **Stickiness**: NS SS S VS
Roots: none few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr D M S Se
Comments: ________
Similar to ______ **of SM** ______

Depth ________ to ________
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: ________
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk sbk mass Other ________
Consistence: L VFr Fr F VF EF S(refusal)
Plasticity: NP SP P VP **Stickiness**: NS SS S VS
Roots: none few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr D M S Se
Comments: ________
Similar to horizon ______ **of SM** ______

Depth ________ to ________
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color ________
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk sbk mass Other ________
Consistence: L VFr Fr F VF EF S(refusal)
Plasticity: NP SP P VP **Stickiness**: NS SS S VS
Roots none few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr D M S Se
Comments: ________
Similar to Horizon ________ **of SM** ________

Total Depth 72" **GW Depth** >72"

Figure 4

SOIL PROFILE LOG

APN: GDPUD ALT CDS

Initials JCP Date 8/6/20

Pg ____ of ____

Consultant Geocon

Profile # TP8 Slope 3 %

Depth 0 to 2"
Texture: scl sc **sl** l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: 7.5YR 5/6 strong brown
Mottles ________ 2% 2-20% faint distinct prominent
Structure: **gr** abk sbk mass Other ________
Consistence: L **VFr** Fr F VF EF S(refusal)
Plasticity: **NP** SP P VP **Stickiness**: **NS** SS S VS
Roots: none few **common** many vf **f** m c
Boundary: Topography- s **w** i b
Distinctness- a **c** g d
cm **<2** 2-5 5-15 >15
Moisture: **Dr** D M S Se
Comments ________
Similar to horizon 1 **of SM** TP6

Depth 2" to 12"
Texture: scl sc **sl** l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: 5YR 4/6 yellowish-red
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk **sbk** mass Other ________
Consistence: L VFr **Fr** F VF EF S(refusal)
Plasticity: **NP** SP P VP **Stickiness**: **NS** SS S VS
Roots: none **few** common many vf **f** **m** c
Boundary: Topography- **s** w i b
Distinctness- a **c** g d
cm **<2** 2-5 5-15 >15
Moisture: **Dr** D M S Se
Comments: 3-5% angular gvl/cbl to 5"
Similar to horizon 2 **of SM** TP6

Depth 12" to 28"
Texture: scl sc **sl** l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: 5YR 5/6 yellowish-red
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk **sbk** mass Other ________
Consistence: L VFr **Fr F** VF EF S(refusal)
Plasticity: NP **SP** P VP **Stickiness**: NS **SS** S VS
Roots: **none** few common many vf f m c
Boundary: Topography- **s** w i b
Distinctness- a c **g** d
cm <2 **2-5** 5-15 >15
Moisture: **Dr** D M S Se
Comments: ________
Similar to horizon 3 **of SM** TP6

Depth 28" to 36"
Texture: scl sc sl l **c** cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: gray
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk sbk **mass** Other ________
Consistence: L VFr Fr **F** VF EF S(refusal)
Plasticity: NP SP **P** VP **Stickiness**: NS SS **S** VS
Roots: **none** few common many vf f m c
Boundary: Topography- s **w** i b
Distinctness- a **c** g d
cm <2 **2-5** 5-15 >15
Moisture: Dr D **M** S Se
Comments: ________
Similar to Horizon ________ **of SM** ________

Depth 36" to 63"
Texture: scl sc sl l c cl sic sicl sil sic
Gravelly Cobbly Stoney **DRX** IWRX MWRX Dg
Color: 10YR 5/4 yellowish-brown
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk sbk **mass** Other ________
Consistence: L VFr **Fr F** VF EF S(refusal)
Plasticity: NP **SP** P VP **Stickiness**: NS **SS** S VS
Roots: **none** few common many vf f m c
Boundary: Topography- s **w** i b
Distinctness- a c **g** d
cm <2 **2-5** 5-15 >15
Moisture: Dr **D** M S Se
Comments: ________
Similar to horizon 4 **of SM** TP6

Depth 63" to 71"
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX **IWRX** MWRX Dg
Color: 10YR 5/4 yellowish-brown
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk sbk **mass** Other ________
Consistence: L VFr Fr F VF EF **S(refusal)**
Plasticity: **NP** SP P VP **Stickiness**: **NS** SS S VS
Roots: **none** few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr **D** M S Se
Comments: refusal at 71"
Similar to 5 **of SM** TP6

Depth ________ to ________
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: ________
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk sbk mass Other ________
Consistence: L VFr Fr F VF EF S(refusal)
Plasticity: NP SP P VP **Stickiness**: NS SS S VS
Roots: none few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr D M S Se
Comments: ________
Similar to horizon ________ **of SM** ________

Depth ________ to ________
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color ________
Mottles ________ <2% 2-20% faint distinct prominent
Structure: gr abk sbk mass Other ________
Consistence: L VFr Fr F VF EF S(refusal)
Plasticity: NP SP P VP **Stickiness**: NS SS S VS
Roots none few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr D M S Se
Comments: ________
Similar to Horizon ________ **of SM** ________

Total Depth 71" **GW Depth** >71"

Figure 5

SOIL PROFILE LOG

APN: GDPUD ALT CDS Pg ____ of ____

Initials JCP Date 8/6/20 Consultant Geocon

Profile # TP9 Slope 2 %

Depth 0 to 4"
Texture: scl sc **sl** l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: 7.5YR 5/6 strong brown
Mottles ____ 2% 2-20% faint distinct prominent
Structure: **gr** abk sbk mass Other ____
Consistence: L **VFr** Fr F VF EF S(refusal)
Plasticity: **NP** SP P VP Stickiness: **NS** SS S VS
Roots: none few **common** many vf **f** m c
Boundary: Topography- s **w** i b
Distinctness- a **c** g d
cm **<2** 2-5 5-15 >15
Moisture: **Dr** D M S Se
Comments ____
Similar to horizon 1 of SM TP6

Depth 4" to 18"
Texture: scl sc **sl** l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: 5YR 4/6 yellowish-red
Mottles ____ <2% 2-20% faint distinct prominent
Structure: gr abk **sbk** mass Other ____
Consistence: L VFr **Fr** F VF EF S(refusal)
Plasticity: **NP** SP P VP Stickiness: **NS** SS S VS
Roots: none **few** common many vf **f** **m** c
Boundary: Topography- **s** w i b
Distinctness- a **c** g d
cm **<2** 2-5 5-15 >15
Moisture: **Dr** D M S Se
Comments: 3-5% angular gvl/cbl to 5"
Similar to horizon 2 of SM TP6

Depth 18" to 31"
Texture: scl sc sl l **c** cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: gray
Mottles ____ <2% 2-20% faint distinct prominent
Structure: gr abk sbk **mass** Other ____
Consistence: L VFr Fr **F** VF EF S(refusal)
Plasticity: NP SP **P** VP Stickiness: NS SS **S** VS
Roots: **none** few common many vf f m c
Boundary: Topography- s **w** i b
Distinctness- a c **g** d
cm <2 **2-5** 5-15 >15
Moisture: Dr D **M** S Se
Comments: ____
Similar to horizon 4 of SM TP8

Depth 31" to 72"
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney **DRX** IWRX MWRX Dg
Color: 10YR 5/4 yellowish-brown
Mottles ____ <2% 2-20% faint distinct prominent
Structure: gr abk sbk **mass** Other ____
Consistence: L VFr **Fr F** VF EF S(refusal)
Plasticity: NP **SP** P VP Stickiness: NS **SS** S VS
Roots: **none** few common many vf f m c
Boundary: Topography- s **w** i b
Distinctness- a c **g** d
cm <2 **2-5** 5-15 >15
Moisture: Dr **D** M S Se
Comments: ____
Similar to Horizon 4 of SM TP6

Depth 72" to 78"
Texture: scl sc sl l c cl sic sicl sil sic
Gravelly Cobbly Stoney DRX **IWRX** MWRX Dg
Color: 10YR 5/4 yellowish-brown
Mottles gray <2% **2-20%** faint **distinct** prominent
Structure: gr **abk** sbk mass Other ____
Consistence: L VFr Fr F VF EF **S(refusal)**
Plasticity: **NP** SP P VP Stickiness: **NS** SS S VS
Roots: none **few** common many vf **f** m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr **D** M S Se
Comments: refusal at 78"
Similar to horizon 5 of SM TP6

Depth ____ to ____
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: ____
Mottles ____ <2% 2-20% faint distinct prominent
Structure: gr abk sbk mass Other ____
Consistence: L VFr Fr F VF EF S(refusal)
Plasticity: NP SP P VP Stickiness: NS SS S VS
Roots: none few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr D M S Se
Comments: ____
Similar to ____ of SM ____

Depth ____ to ____
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color: ____
Mottles ____ <2% 2-20% faint distinct prominent
Structure: gr abk sbk mass Other ____
Consistence: L VFr Fr F VF EF S(refusal)
Plasticity: NP SP P VP Stickiness: NS SS S VS
Roots: none few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr D M S Se
Comments: ____
Similar to horizon ____ of SM ____

Depth ____ to ____
Texture: scl sc sl l c cl sic sicl sil si
Gravelly Cobbly Stoney DRX IWRX MWRX Dg
Color ____
Mottles ____ <2% 2-20% faint distinct prominent
Structure: gr abk sbk mass Other ____
Consistence: L VFr Fr F VF EF S(refusal)
Plasticity: NP SP P VP Stickiness: NS SS S VS
Roots none few common many vf f m c
Boundary: Topography- s w i b
Distinctness- a c g d
cm <2 2-5 5-15 >15
Moisture: Dr D M S Se
Comments: ____
Similar to Horizon ____ of SM ____

Total Depth 78" GW Depth >78"

Figure 6

KEY

Note: Only the soil classification terms commonly used in this county are included. Use the comment section for other descriptions when appropriate.

Texture:
- sic=silty clay
- sicl=silty clay loam
- sil=silt loam
- si=silt
- sl=sandy loam
- sc=sandy clay
- scl=sandy clay loam
- l=loam
- c=clay
- cl=clay loam
- DRX=decomposed rock
- IWRX=intensely weathered rock
- MWRX=moderately weathered rock
- Dg=decomposed granite

Structure:
- gr=granular
- abk=angular blocky
- abk=subangular blockly
- mass=massive

Consistence:
- L=Loose
- VFr=very friable
- Fr=friable
- F=firm
- VF=very firm
- EF=extremely firm
- S=solid (refusal)

Plasticity:
- NP=nonplastic
- SP=slightly plastic
- P=plastic
- VP=very plastic

Stickiness:
- NS=nonsticky
- SS=slightly sticky
- S=sticky
- VS=very sticky

Roots:
- vf=very fine
- f=fine
- m=medium
- c=coarse

Boundary:
- Topography:
  - s=smooth
  - w=wavy
  - i=irregular
  - b=broken
- Distinctness:
  - a=abrupt
  - c=clear
  - g=gradual
  - d=diffuse

Moisture:
- Dr=dry
- D=damp
- M=moist
- S=saturated
- Se=seepage

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8/97

Figure 7

Photo No. 1 Northern portion/margin of Field O. View is looking downslope to the southwest. Excavation LF1 was located at the post with white flagging (photo date 8/3/2020).

Photo No. 2 Distribution piping exposed in LF1 at the northern margin of Field O. View is looking approximately along contour to the southwest (photo date 8/6/20).

PHOTOS NO. 1 & 2

GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Auburn Lake Trails Community Disposal System	
Cool, Placer County California	
GEOCON Proj. No. S1986-05-01	October 2020

Photo No. 3 View looking directly downslope (southwest) from the top of Field A. Excavation LF4 is in the foreground (photo date 8/7/2020).

Photo No. 4 View looking to the west from near the top, eastern corner of Field A. (photo date 8/7/2020).

PHOTOS NO. 3 & 4

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3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
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Photo No. 5 View looking east (downslope) at the southwestern portion of Field B and excavation LF2, exposing the end of an infiltrator (photo date 8/7/2020).

Photo No. 6 View looking southeast at the southwestern end of Field B and excavation LF2 (photo date 8/7/2020).

PHOTOS NO. 5 & 6

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Photo No. 7 Southwest end of Field B, Row 4 infiltrator exposed in excavation LF2. (photo date 8/7/2020).

Photo No. 8 Looking into the southwest end of Field B, Row 4 infiltrator (looking to the northeast) (photo date 8/7/2020).

PHOTOS NO. 7 & 8

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Photo No. 9   Northeast end of Field B, Row 2 infiltrator exposed in excavation LF3. View is looking to the southwest (photo date 8/7/2020).

Photo No. 10   Looking into the northeast end of Field B, Row 2 infiltrator (looking to the southwest) (photo date 8/7/2020).

PHOTOS NO. 9 & 10

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Photo No. 11 View looking to the north-northwest at possible expansion area downslope of Fields A and O. Downslope limit of lush vegetation in Field A is in upper right (photo date 8/3/2020).

Photo No. 12 View looking to the south at possible expansion area downslope of Field A. Foreground stake marks the location of Soil Profile Test Pit TP8 (photo date 8/3/2020).

PHOTOS NO. 11 & 12

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Photo No. 13 View looking northeast at Soil Profile Test Pit TP6. Downslope limit of lush vegetation in Field A is in upper right (photo date 8/6/2020).

Photo No. 14 View looking southeast at Soil Profile Test Pit TP6. Downslope limit of lush vegetation in Field A is in upper left (photo date 8/6/2020).

PHOTOS NO. 13 & 14

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Photo No. 15 View looking to the southeast at Soil Profile Test Pit TP6, with TP7 excavation visible beyond (photo date 8/6/2020).

Photo No. 16 Soil profile in Test Pit 6 (photo date 8/6/2020).

PHOTOS NO. 15 & 16

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Photo No. 17 View looking to the north (upslope) at Soil Profile Test Pit TP7, with Field A in the background. White riser beyond the test pit is bottom (south corner) of Field A (photo date 8/6/2020).

Photo No. 18 View looking to the northwest at Soil Profile Test Pit TP7, with lush vegetation of Field A in the upper right and TP6 excavation near upper lest (photo date 8/6/2020).

PHOTOS NO. 17 & 18

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Photo No. 19 View looking to the north at Soil Profile Test Pit TP8 (photo date 8/6/2020).

Photo No. 20 Soil profile in Test Pit TP9 (photo date 8/6/2020).

PHOTOS NO. 19 & 20

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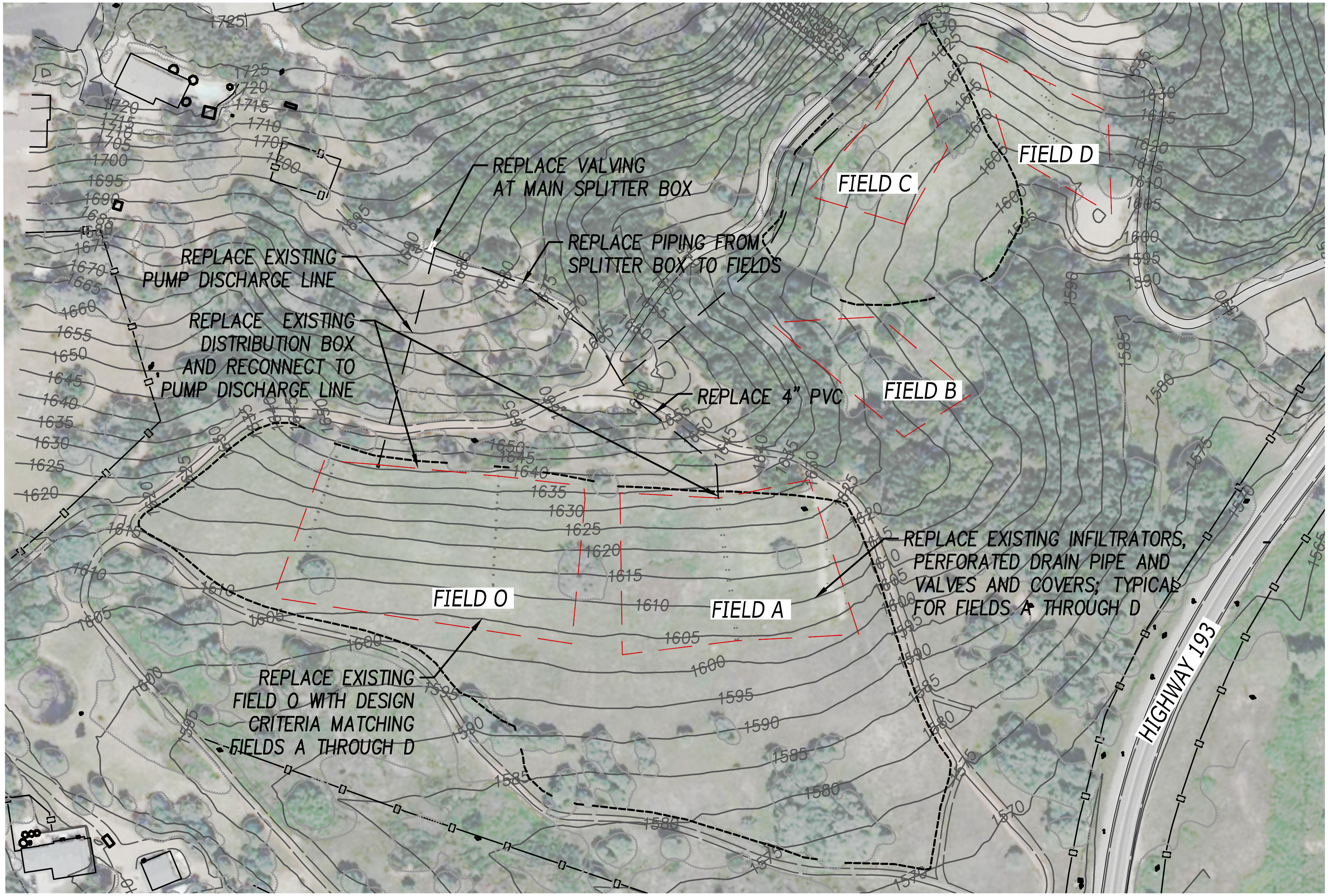
Cool, Placer County
California

GEOCON Proj. No. S1986-05-01 | October 2020

APPENDIX D

Project Alternatives Exhibits



OCTOBER 2020

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ALTERNATIVE 3.2-A REPLACEMENT OF EXISTING SYSTEM IN KIND

AUBURN LAKE TRAILS COMMUNITY DISPOSAL SYSTEM: FEASIBILITY STUDY

PROJECT No. 20206

SCALE: 1"=150'

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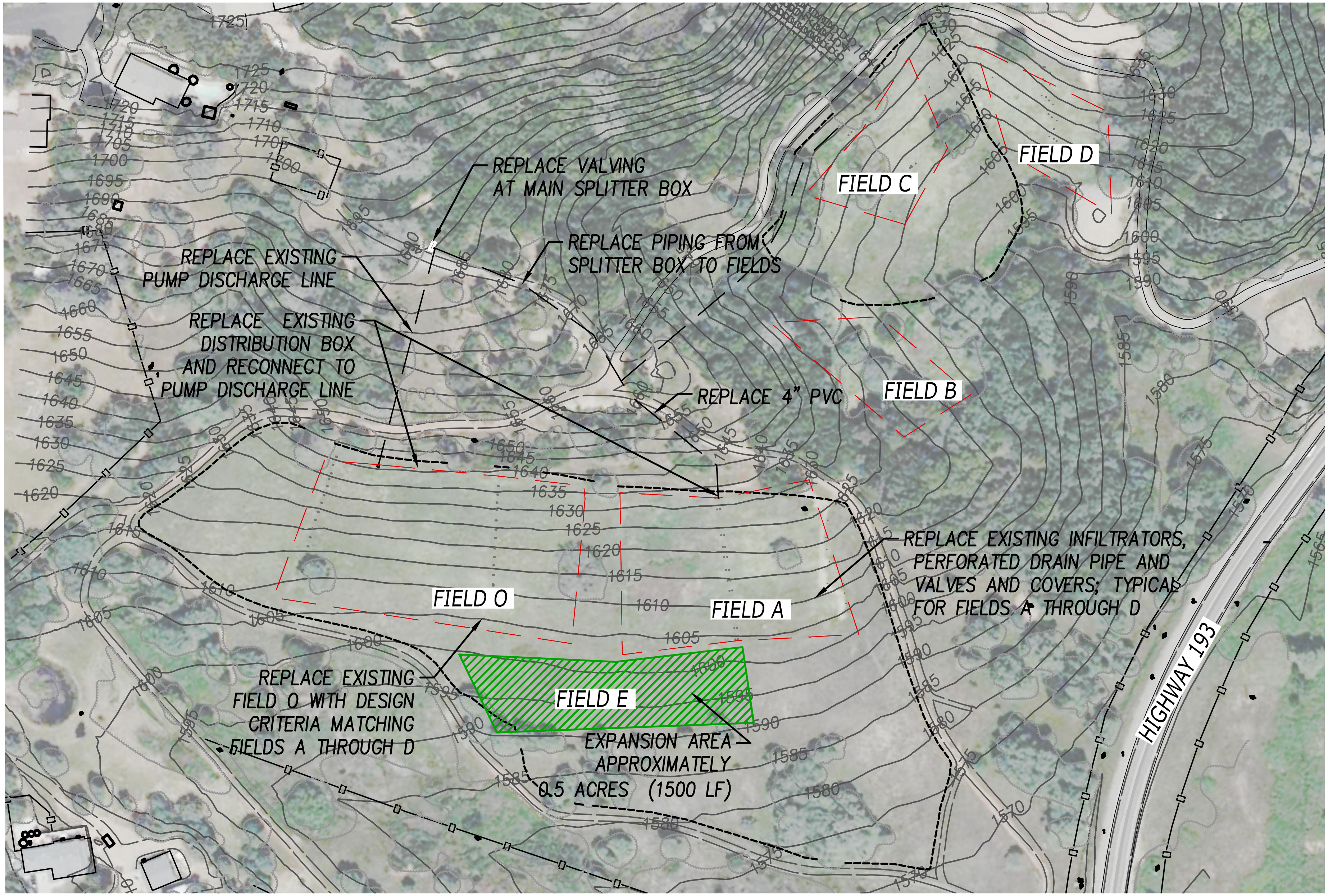

OCTOBER 2020

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TRUSTED ENGINEERING ADVISORS

ALTERNATIVE 3.2-B REPLACEMENT OF EXISTING SYSTEM IN KIND WITH EXPANSION

AUBURN LAKE TRAILS COMMUNITY DISPOSAL SYSTEM: FEASIBILITY STUDY

PROJECT No. 20206

SCALE: 1"=150'

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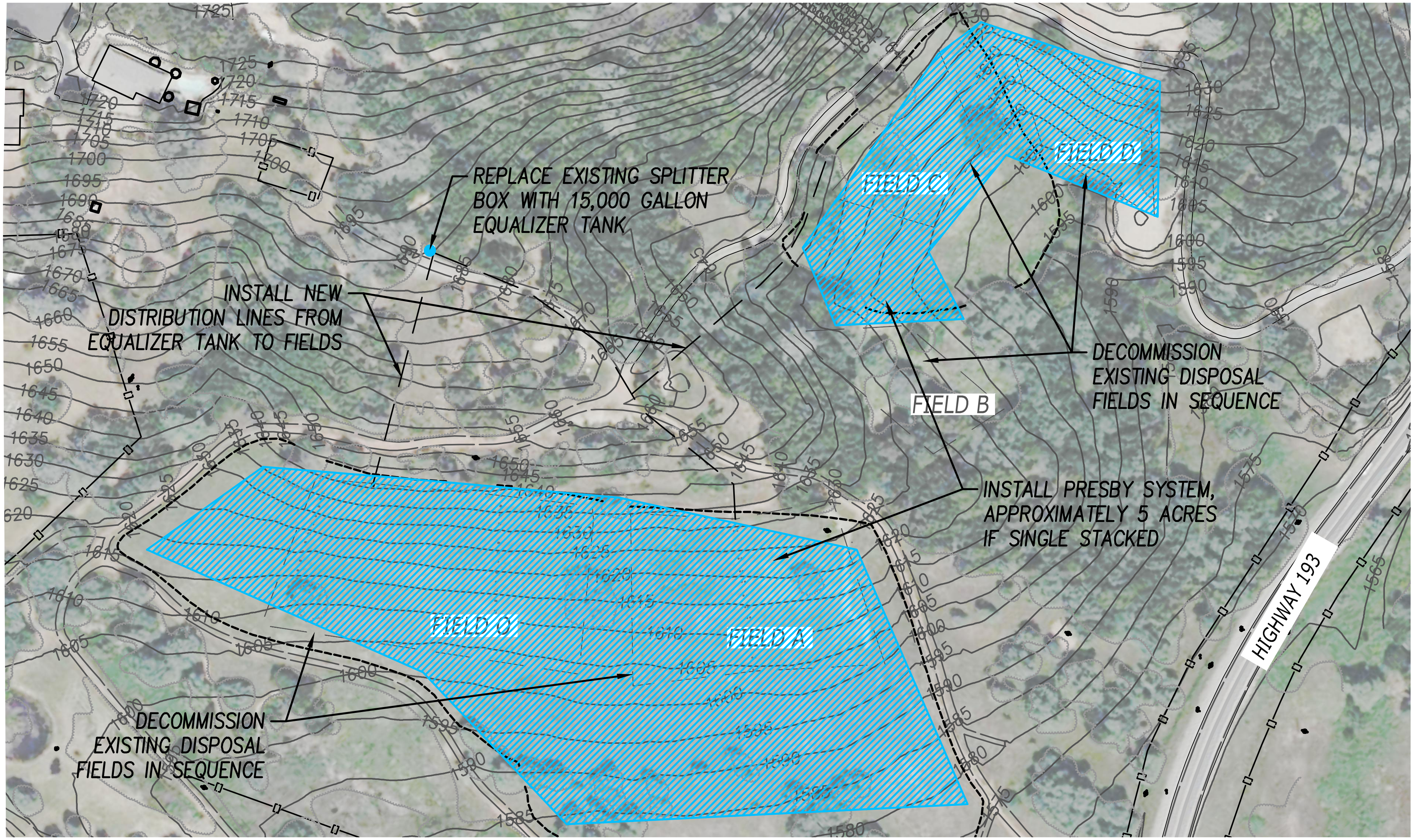

OCTOBER 2020

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ALTERNATIVE 3.4-A PRESBY ENVIROFIN SEPTIC SYSTEM

AUBURN LAKE TRAILS COMMUNITY DISPOSAL SYSTEM: FEASIBILITY STUDY

PROJECT No. 20206

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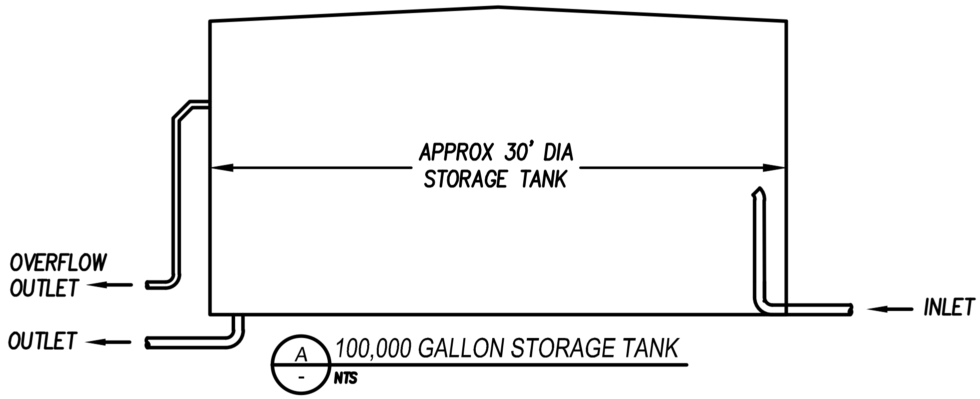

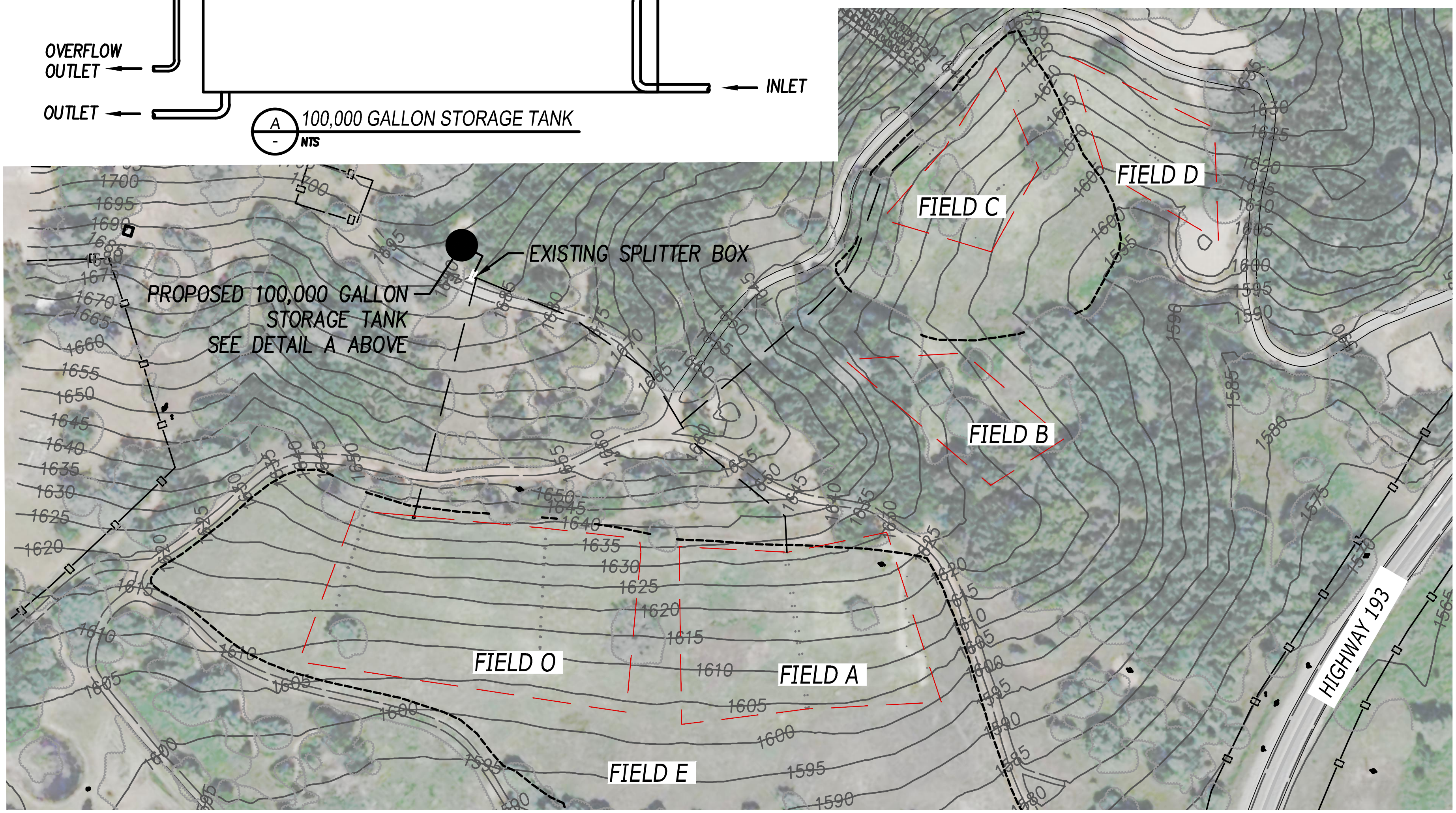

OCTOBER 2020

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ALTERNATIVE 3.5 ADDITIONAL ON SITE STORAGE

AUBURN LAKE TRAILS COMMUNITY DISPOSAL SYSTEM: FEASIBILITY STUDY
PROJECT No. 20206

SCALE: 1"=150'

Plot Date: October 08, 2020 - 12:35 pm
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