CREEKSIDE ENVIRONMENTAL CONSULTING, LLC

EVREN NORTHWEST INC.
environmental & natural resource consultants

TECHNICAL MEMORANDUM

FINAL REMEDIAL DESIGN/REMEDIAL ACTION (RD/RA) IMPLEMENTATION REPORT

Troh Legacy Landfill

10010 SE Vrandenburg Road
Happy Valley, Oregon

Agency Information

ECSI NO. 5257

Prepared for:

The Holt Group/Holt Homes

2601 NE 163rd Court
Vancouver, Washington 98684

Issued on:

January 7, 2020 (revised April 2, 2020)

Creekside Environmental Consulting, LLC
Project No. CM-2015.2 / 351-14002-06

This

Technical Memorandum
FINAL REMEDIAL DESIGN/REMEDIAL ACTION (RD/RA) IMPLEMENTATION REPORT

for:

Troh Legacy Landfill

10010 SE Vrandenburg Road
Happy Valley, Oregon

Has been prepared for the sole benefit and use of our Client:

The Holt Group/Holt Homes

2601 NE 163rd Court
Vancouver, Washington 98684

Issued April 2, 2020 *by:*

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Brent Jorgensen, *Project Manager, Creekside*

and

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List of Acronyms and Abbreviations

AKS	AKS Engineering & Forestry, LLC
CFSLs	Clean Fill Screening Levels
Client	The Holt Group/Holt Homes
CMMP	Contaminated Media Management Plan
Creekside	Creekside Environmental Consulting LLC
DUs	decision units
ENW	EVREN Northwest, Inc.
ISM	Incremental Sampling Methodology
ODEQ	Oregon Department of Environmental Quality
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action

1.0 Introduction

Creekside Environmental Consulting (Creekside) has collaborated with EVREN Northwest, Inc. (ENW) on this Final Remedial Design/Remedial Action (RD/RA) Implementation Report for the subject site located at 10010 SE Vradenburg Road, in the City of Happy Valley[1] (see Figures 1 and 2) pursuant to Creekside-ENW's RD/RA Work Plan.[2] This report documents completion of the Manage Soil Cap remedial action alternative completed between May/June 2017 and finalized in October 2019.

2.0 Managed Soil Cap Remedial Action Alternative

The major elements of the Managed Soil Cap remedial action alternative in Creekside-ENW's RD/RA Work Plan are as follows.

- Soil/Rock Cap Development
    - Pre-Construction - engineering, permitting, import fill characterization
    - Construction – erosion and sediment controls, utilities, clearing and demolition, surveying, demarcation layer, subdrains, earthwork and post-grading erosion controls
    - Post-Construction – surveying to confirm cap thickness
- Soil Cap Management Plan
- Annual Inspections
- Ongoing Management of Soil According to Contaminated Media Management Plan (CMMP)

A photographic log, which documents key benchmarks achieved during implementation, is included as Attachment A.

3.0 Soil/Rock Cap

A cap consisting of a minimum of three (3) feet of clean soil and/or a minimum of one (1) foot of large diameter (0.5 feet or greater diameter) cobbles and boulder fill was selected as the Managed Soil Cap remedial action alternative and included approximately 56,000 cubic yards of imported clean fill resulting in an engineered fill cap at a minimum of three (3) feet thick with the following characteristics:

- A grading and erosional control plan designed, signed and stamped by a professional engineer;
- Erosion control devices such as seeding (for vegetative cover), matting (blankets), cat tracking (to create ruts or grooves perpendicular to the slope, sediment fence and straw wattles;

[1] Formally described as the "*Eastern part of Tax Lot 401 of the East Scouters Mountain Development*."

[2] Creekside/ENW. November 30, 2018. Remedial Design/Remedial Action Work Plan.

- A demarcation layer installed beneath the fill cap layer;
- A structural berm keyed into the toe of the slope; and
- A subdrain system consisting of longitudinal subdrains installed upslope along existing valleys, tied into a lateral subdrain installed along the edge of the keyway.

3.1 Pre-Construction

3.1.1 Engineering

AKS Engineering & Forestry, LLC (AKS) developed an engineering design, grading and erosion control plan (AKS, 2017[3]) for a buttress fill slope to be constructed in conjunction with the soil cap. AKS' design drew upon a grading plan and geotechnical criteria in GeoPacific Engineering, Inc.'s Geotechnical Engineering Report (GeoPacific, 2017[4]). Subsequent modifications to GeoPacific's grading plan received on May 25, 2018[5], significantly reduced the amount of fill that would be placed over Troh Legacy Landfill. Under this modified plan, the landfill would still be capped with a minimum 3-foot-thick layer of clean soil; however, the majority of the fill would be placed such that the buttress fill slope and excavated keyways are positioned just beyond the south- and north-adjacent sides of the landfill as shown on the attached Figure 3.

3.1.2 Permitting

The necessary permits were all acquired prior to breaking ground:

- National Pollutant Discharge Elimination System (NPDES) 1200-C construction storm-water permit, issued June 19, 2017 from ODEQ, File No. 125300 / EPA No. ORR10E920, Permit No., 32172
- Site Development Permit, issued August 7, 2017 by the City of Happy Valley, Permit No. 17-07.
- Residential Plumping Permit, issued November 21, 2017 by the City of Happy Valley, Permit No. 385-17-000687-PLM.

3.1.3 Import Fill Characterization

In May and June 2017, Creekside-ENW characterized surface soils[6] at Scouters Mountain Phase I residential subdivision marked for excavation and placement as cap materials on the nearby Troh Legacy Landfill. Scouters Mountain Phase I was divided into thirteen decision units (DUs), and representative surface soil samples were collected from each DU using Incremental Sampling Methodology (ISM). Thirteen surface soil samples and two replicate samples were analyzed for Resource Conservation and Recovery Act (RCRA) 8 Metals. All metals analyzed in 13 ISM samples and two replicate samples were either not detected or were below Oregon Department of Environmental Quality's (ODEQ's) Clean Fill Screening Levels (CFSLs). Based on these findings, surface soils at Scouters Mountain Phase I met or

[3] AKS, March 17, 2017. *Troh Landfill Grading, Erosion and Sediment Control Plans*, 11 sheets..

[4] GeoPacific, May 3, 2017. *Geotechnical Engineering Report*, 10010 SE Vradenburg Road, Happy Valley, Oregon.

[5] AKS, 2018. Troh Landfill Grading Plan, received May 25, 2018.

[6] Creekside/ENW, June 14, 2017. *Offsite Cap Soil Source Surface Soil Assessment*, Troh Legacy Landfill Property, 10010 SE Vradenburg Road, Happy Valley, Oregon.

exceeded the clean fill criteria for placement at upland sites and were deemed suitable as buttress fill / cap material for the Troh Legacy Landfill.

3.2 Construction

Construction activities conducted by Kerr Contractors were reported to the ODEQ in a progress report.[7] Highlights of construction activities are briefly summarized in this section. Site photographs representative of construction activities conducted during the implementation period are included in Attachment A. A stamped engineering As-Built and Grading Plan for the final fill cap surface including elevation reference points documenting cap thickness in several areas are provided in Attachment B.

3.2.1 Erosion and Sediment Controls

By August 2017, erosion control measures were installed around the perimeter of the subject area (see Clearing and Demolition, below), and construction fence was installed on the bluff overlooking the landfill to restrict access to this area. In addition, two construction entrances bedded with pit run rock and gravel were constructed along the western boundary of the disturbed area. These construction entrances connected to haul routes for dump trucks and other heavy equipment transporting materials to and from the Subject Area.

3.2.2 Utilities

An overhead utility pole that crossed the landfill area was removed. A domestic water line that passed through the landfill area was re-routed around the perimeter of the landfill.

3.2.3 Clearing and Demolition

In August 2017, trees were felled, brush cleared, and grasses/weeds grubbed from the surface of the entire disturbed area. Logs, brush, root masses, and grass were hauled off-site for disposal. A shed was demolished, and demolition debris and metal were removed from the site for disposal and recycling. Just over four tons of demolition debris was hauled to the Hillsboro Landfill for disposal. Straw was placed over the entire disturbed area of the site for erosion and sediment control purposes.

3.2.4 Pre-Surveying the landfill

By January 2018, AKS surveyed and placed stakes around the perimeter of the landfill. This surveyed area provided a visual boundary for demarcation grid placement, as well as pre-grading reference surface elevations for fill placement.

3.2.5 Demarcation Layer

In middle February 2018, White Securgrid® demarcation geotextile began to be installed in the ravine over the southern part of the landfill. The demarcation grid overlapped the surveyed landfill boundary by at least a few feet. The 20-foot-wide rolls were overlapped a foot or more, taking care to thoroughly cover the entire surveyed Troh Legacy Landfill area. Demarcation grid installation continued through the end of May 2018, at the north end of the landfill, covering the entire former landfill area.

[7] Creekside/ENW, December 4, 2018. *RE: Status of Soil Cap Placement* – Troh Legacy Landfill (ECSI No. 5257), presented to ODEQ Cleanup Program, NW Region, Attn: Kevin Dana.

3.2.6 Subdrains

Four (4)-inch perforated flexible ABS drain pipe was installed along the centerline of the south ravine, the buttress fill structural keyways. These subdrains were bedded in and covered with drain rock and discharge along the eastern boundary of the Subject Area.

3.2.7 Landfill Cap

Earthwork began on the south buttress fill and landfill cap in early February 2018 and concluded in late August 2018. A structural keyway was excavated along the north and east sides of the buttress, and a subdrain was installed in this keyway. Imported soil transported to the south buttress and south part of the landfill was delivered to the east end of the haul route located near the southwest corner of the disturbed area, where it was unloaded. From there, bulldozers pushed the soil to the south buttress fill area and south ravine of the landfill after the demarcation and subdrain were installed. The buttress fill was compacted using a sheeps-foot roller. The majority of fill ended up being placed in the south buttress area.

Earthwork began on the north buttress fill and landfill cap in the first of June 2018 and continued through the end of August 2018. A structural keyway was excavated along the south and east sides of the buttress, and a subdrain was placed along the keyway. Imported soil transported to the north buttress and northern parts of the landfill was delivered to the southeast end of the haul road located near the northwest corner of the disturbed area, where it was unloaded. Bulldozers pushed the soil to the north buttress fill area and north part of the landfill after the demarcation grid was installed.

The remainder of the landfill was capped by pushing imported soil north from the south ravine area and south from the north buttress fill area, until all but the steep eastern edge of the landfill was capped with a minimum of three feet of clean imported soil. Due to steep terrain, a small area at the eastern margin of the former landfill site was covered by demarcation fabric; however, did not immediately receive a protective cap. Based on Creekside test pit log for TP17, this area of the landfill has been covered with approximately one to two feet of pre-existing inert soil cap materials, which overlie the construction and demolition debris. The demarcation fabric and natural vegetation was anticipated to secure this uncapped area until it will be capped in October of 2019 (see below). Regular inspections completed by Creekside/ENW were conducted to monitor surface conditions.

It should also be noted, test pit TP18 had pre-existing soil cap of 1.5’ to 2.’ An additional 1.68’ of soil cover (cap) was installed in this area. Test pit TP20 had a pre-existing soil cap of 1.5 to 2’. An additional 1.52’ feet of soil cover (cap) was installed in the area of TP20. Therefore, these area meet the cap specification of at least 3’. Test pit logs are included as Attachment C.

3.2.8 Revised Cap Design at East Margin

Due to steep terrain, soil placed over the uncapped portion of the steep, eastern edge of the landfill was deemed impracticable to compact and stabilize. Stabilizing the eastward sloping terrain is important in protecting the forested area further downslope of the landfill. Accordingly, Creekside/ENW and AKS Engineering proposed an alternative protective cover.

Specifically:

1. An additional 0.6-feet of cap material (soil or rip rap) in the TP17 cap area.

2. Placement of 1-foot thick layer of rip-rap.

Creekside/ENW and AKS provided engineered drawings to ODEQ of the revised cap in this area based on data in Geopacific's engineering report dated July 25, 2019, and provided engineered drawings dated August 12, 2019.[8]

Kerr Contractors installed the additional cap in October 2019 according to plan. A road was constructed to provide access from the haul route at the south entrance, down the south ravine to the placement site. A track hoe unloaded the rip-rap directly from the trucks and pushed it downslope from the top of the east margin bank. Logs were placed at the toe of the embankment to contain the new rip-rap and preventing it from entering the downslope forested area. After the rip-rap cover was installed, the work site was stabilized with hay cover for erosion control. Drawings in Attachment B includes a final topo survey showing where the soil versus rip-rap were placed, the minimum design thickness required in these areas, and as-built cross sections.

3.3 Post-Construction

3.3.1 Erosion and Sediment Controls

At the end of August 2018, the north buttress fill was hydroseeded and straw wattles placed according to the Erosion and Sediment Control Plan. In early October 2019, straw wattles were placed on the remaining portions of the landfill and the south buttress fill, and the surface was hydroseeded. A disc was used to prepare the buttress fills and landfill cap surfaces for seeding. By November 2018, the grass seed had taken root and covered the buttress fills and landfill cap with a lush, green grass cover. Evidence of minor soil erosion was observed beyond the limits of the planned soil cap during Creekside/ENW's site inspections in November 30, 2019. The two areas were immediately stabilized with diversion of a drainage pipe and regrading of the sloped area.

3.3.2 Final Engineered Survey

A survey of the final CAP surface was performed by AKS in November 2019 and final as-built design was prepared.[9] Thirteen survey control points were remeasured, three of which fall within the east margin rip-rap placement area. The measured cap thickness of greater than 3 feet (up to as much as 10 feet) are shown in all but two locations. Surveyed elevations taken at test pits TP18 and TP20 before and after cap placement indicate less than 3 feet of additional cap was applied. These locations had an existing cover thickness of at least 2.5 feet prior to cap placement, resulting in total thickness of five feet or more. The difference between pre-grading and post-grading elevations document that a minimum 3-foot clean soil cap was placed over the entire landfill area (Attachment B).

4.0 Closing

With the final survey completed, installation of the Soil Cap is complete and complies with the specifications in the RD/RA. Continued monitoring of cap surface conditions will commence beginning in

[8] AKS, August 12, 2019. Troh Landfill Cap and Grading Plan, 2 sheets.

[9] AKS, November 21, 2019. Troh Landfill Soil Cap As-Built.

Summer of 2020, as detailed in the Soil Cap Management plan[10] and residual impacted soil and landfilled materials will be managed in accordance with the approved Contaminated Media Management Plan.[11]

Based on the above determination, Creekside/ENW respectfully requests review by ODEQ and final determination for site closure.

5.0 Limitations

The scope of this report is limited to observations made during on-site work; interviews with knowledgeable sources; and review of readily available published and unpublished reports and literature. As a result, these conclusions are based on information supplied by others as well as interpretations by qualified parties.

The focus of the work does not extend to the presence of the following conditions:

1. Naturally occurring toxic or hazardous substances in the subsurface soils, geology and water,
2. Toxicity of substances common in current habitable environments, such as stored chemicals, products, building materials and consumables,
3. Contaminants or contaminant concentrations that are not a concern now but may be under future regulatory standards,
4. Unpredictable events that may occur after Creekside/ENW's site work, such as illegal dumping or accidental spillage.

There is no practice that is thorough enough to absolutely identify the presence of all hazardous substances that may be present at a given site. Creekside/ENW's investigation has been focused only on the potential for contamination that was specifically identified in the Scope of Work. Therefore, if contamination other than that specifically mentioned is present and not identified as part of a limited Scope of Work, Creekside/ENW's environmental investigation shall not be construed as a guaranteed absence of such materials. Creekside/ENW has endeavored to collect representative analytical samples for the locations and depths indicated in this report. However, no sampling program can thoroughly identify all variations in contaminant distribution.

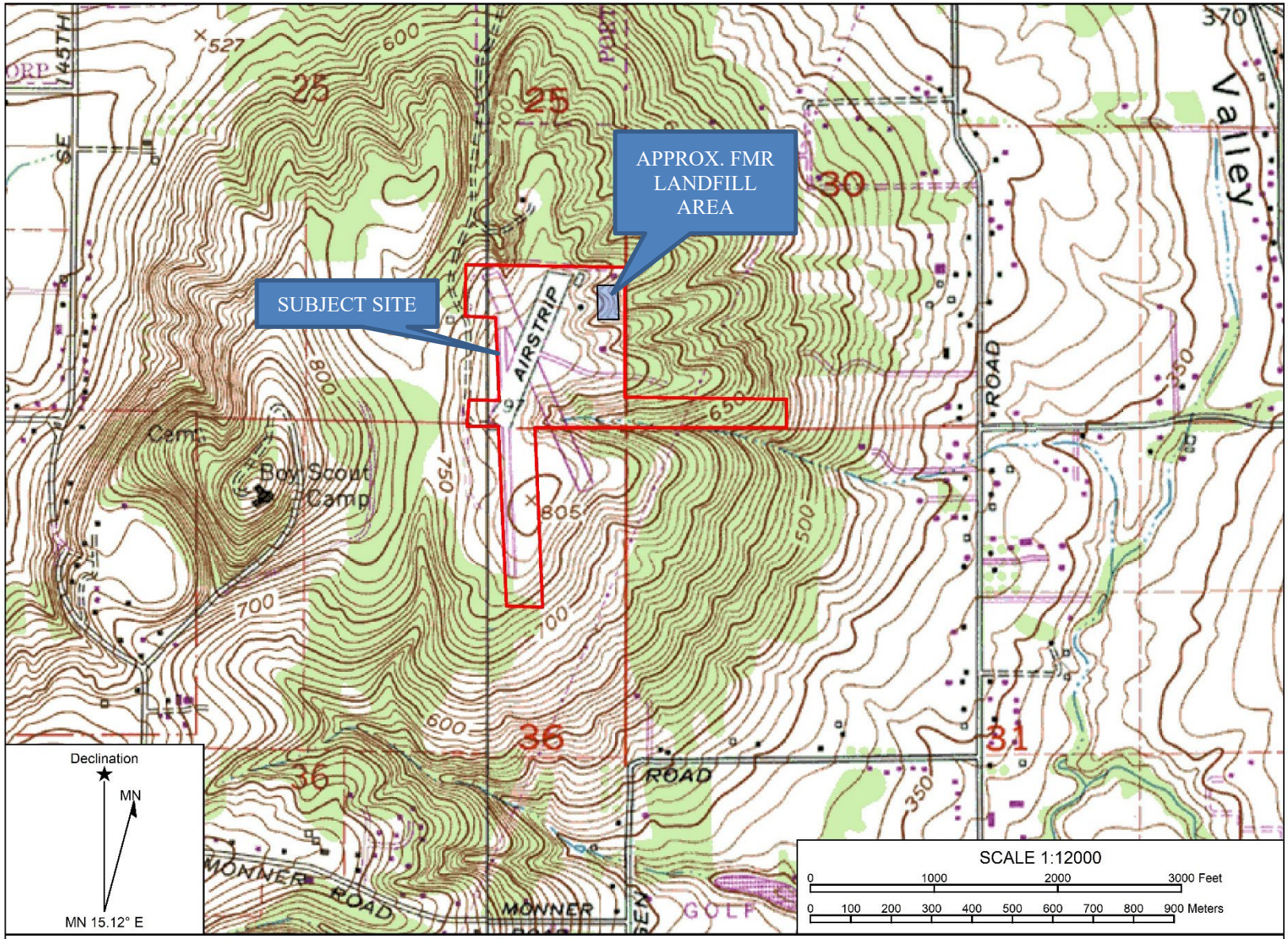
We have performed our services for this project in accordance with our agreement and understanding with the client. This document and the information contained herein have been prepared solely for the use of the client.

Creekside/ENW performed this study under a limited scope of services per our agreement. Creekside/ENW assumes no responsibility for conditions that we did not specifically evaluate or conditions that were not generally recognized as environmentally unacceptable at the time this report was prepared.

[10] Creekside. May 4, 2017. Soil Cap Management.

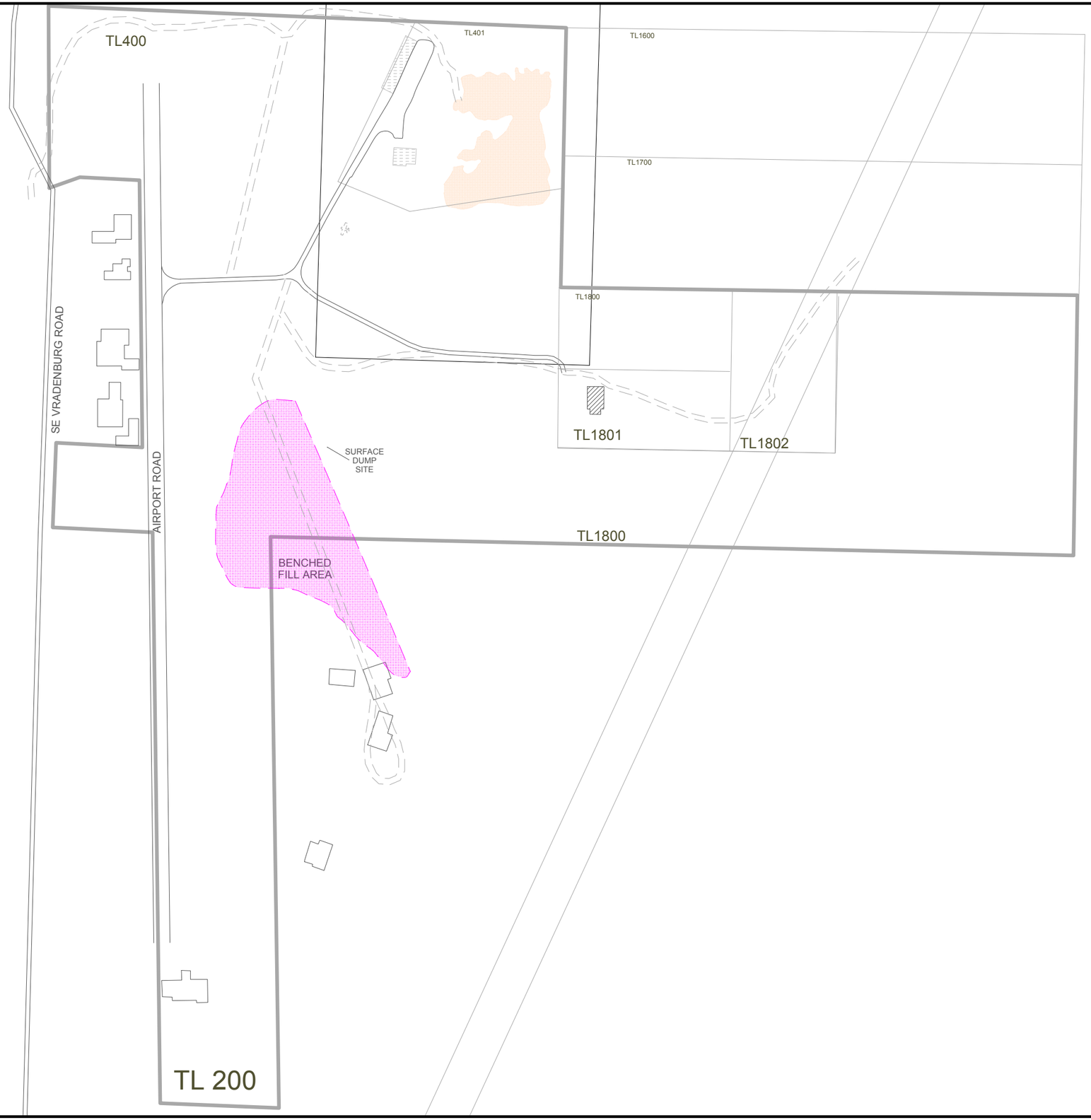
[11] Creekside. August 16, 2014. Contaminated Media Management Plan.

Figures



	Date Drawn: 3/18/2020 CAD File Name: 351-14002fig1sv_map(v03) Drawn By: KMC Approved By: BJ	Former Troh Legacy Landfill Property 10010 SE Vradenburg Road Happy Valley, Clackamas County, Oregon	**Site Vicinity Map**	Project No. 351-14002-05 Figure No. **1**

DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
C.ROSEBROOK 05/28/2014	P. TRONE 12/26/2019	B.JORGENSEN 12/26/2019	351-14002(v05)



LEGEND:

- SUBJECT BUILDINGS
- FORMER SUBJECT BUILDINGS
- BUILDINGS
- TAX LOT BOUNDARIES
- SUBJECT PROPERTY BOUNDARIES
- TROH LEGACY LANDFILL (SUBJECT AREA)
- FORMER CLEARED AREA (NO SOLID WASTE)
- SURFACE DUMP SITE (NO BURIED SOLID WASTE)
- BENCHED FILL AREA (NO SOLID WASTE)
- FORMER ROADS AND AIRSTRIPS

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2012.
2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.

APPROXIMATE SCALE

0 265 530 FEET

N

CREEKSIDE ENVIRONMENTAL CONSULTING, LLC
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FIGURE 2

SITE PLAN

FORMER TROH LEGACY LANDFILL PROPERTY
10010 SE VRADENBURG ROAD
HAPPY VALLEY, CLACKAMAS COUNTY, OREGON

DRAWING NUMBER 351-14002(v05)

APPROVED BY B.JORGENSEN 03/17/2020

CHECKED BY L. GREEN 03/17/2020

DRAWN BY C. ROSEBROOK 03/17/2020

TL401

TL1600

TL1700

TL1800

PASS COURT ST

SE RAVEN ST

SE BOYCE AVE

SE MERIT WAY

SE STAR VISTA CT

SE REVEILLE LN (PVT)

364 365 366 367 368 369 370 371 372 373 374 375 378 377 376 387 388 389 390 391 392 393 394 395 402 403 404 405 406 407 408 411 410 409 418 419 420 421 422 423 424 438 437 436 435 434 433 432 431 430 429 428 427 426

TP16 TP17 TP18 TP19 TP20 TP21 TP22 TP23 TP24 TP25 TP27 TP28 TP29

LEGEND:

- SUBJECT PROPERTY BOUNDARIES
- SUBJECT BUILDINGS
- BUILDING LOCATIONS
- TAX LOT BOUNDARIES
- 352 BUILDING LOTS (PROPOSED)
- FORMER LANDFILL AREA (CAPPED)
- GRADING LIMITS/ORANGE CONSTRUCTION FENCE
- BUTTRESS FILL
- SOIL FILL
- DEMARCATION LAYER WITH 3' MIN. SOIL CAP OR RIP/RAP
- RIP/RAP
- TP1 TEST PITS BY CREEKSIDE/ENW
- —ST—ST— DRAINAGE PIPE
- HAUL ROUTE

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2012.
2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.

APPROXIMATE SCALE

0 100 200 FEET

N

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FIGURE 3

MANAGED LANDFILL CAP DIAGRAM

FORMER TROH LEGACY LANDFILL PROPERTY
10010 SE VRADENBURG ROAD
HAPPY VALLEY, CLACKAMAS COUNTY, OREGON

Attachment A

Site Photographs

Import Soil Characterization - soil samples were obtained to ensure imported soil for the landfill cap was not impacted. Sample location on nearby parcels that were not part of the landfill area.

Surface of Troh Legacy Landfill was logged and cleared of brush – view south (August 16, 2017).

A silt fence was installed around the perimeter of the disturbed area – view of east boundary looking south (August 16, 2017).

View south of cleared landfill surface with brush piles (August 22, 2017).

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View looking west showing the de-vegetated landfill cap (August 31, 2017).

Near surface debris was gathered and disposed of or recycled (August 31, 2017).

Straw was placed over the soil surface for erosion control purposes – view south (September 29, 2017).

Water line to an east-adjacent residence was diverted around the landfill (October 13, 2017).

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Rock was placed over the haul routes on the upslope west side of the landfill (October 13, 2017).

Ponded water on the south side of the landfill at the base of the ravine – view south (December 13, 2017).

Surveyed landfill boundary (south) – looking west (January 2, 2018).

Northwest graveled haul road (January 2, 2018).

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Steel plates positioned at unloading platform at the west margin of the landfill (January 18, 2018).

Graveled haul road west of the landfill (January 18, 2018).

A roll of demarcation grid (geotextile) to be placed over the landfill footprint prior to installing cap (February 12, 2013).

A portion of the demarcation layer rolled out over the landfill – view east (February 12, 2018).

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Close-up photo showing the overlapped demarcation grid – view west (February 12, 2018).

Construction of the buttress fill south of the landfill (right side of the demarcation represents the southernmost extent of the landfill) – view southeast (February 12, 2018).

Demarcation placed over southwest corner of landfill. Note drain pipe placed along centerline of ravine – view north (February 13, 2018).

Drain pipe were bedded and covered with gravel prior to placing the soil cap (March 2, 2018).

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View south of buttress fill and soil cap beginning to be installed above the demarcation grid (March 2, 2018).

Continued cap installation over the demarcation grid on the southwest part of the landfill – view northwest (March 3, 2018).

View west showing the buttress fill (left) and demarcation grid and cap (right). Note cap is substantially > 3 feet thick (March 29, 2018).

Landfill cap as it appears on May 17, 2018 – view southeast. Heavy equipment is sitting on the south buttress fill.

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Keyway excavation of south buttress (May 17, 2018).

South buttress keyway (left) and bench (right) as seen on May 17, 2018).

Soil cap being installed over the demarcation grid at the east-central part of the landfill – view south (May 30, 2018).

Keyway excavation along the east side of the north buttress fill - view south (June 1, 2018).

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Demarcation grid installation along the east-central edge of the landfill - view south (June 1, 2018).

Cap installation at the north end of the landfill – view south (June 1, 2018).

View north of cap at the north end of the landfill (June 7, 2018).

South buttress fill (June 7, 2018).
Cap over the eastern landfill boundary – view north (June 14, 2018).

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Cap surface was tracked and compacted with a sheepsfoot roller perpendicular to slope (June 25, 2018).

View north of the capped landfill from the vantage of the south buttress fill (July 6, 2018).

North buttress fill (July 24, 2018).

South buttress fill (under construction) from the perspective of the north buttress (July 24, 2018).

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North end of landfill cap being prepared for seeding.

Drain rock was placed over the ravine drain line. Drain pipe exits at the eastern landfill boundary, which has not yet been capped as of this date (August 8, 2018).

South buttress fill on August 17, 2018.

North buttress fill on August 22, 2018.

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North buttress fill was hydroseeded and straw wattles placed according to erosion and sediment control plan (August 29, 2018).

Grass has taken root on the north buttress fill, and the remainder of the landfill is being prepared for hydroseeding (September 14, 2018).

Straw wattles were placed on the remaining portions of the landfill, after which the ground surface was hydroseeded– view south (October 9, 2018).

Grass has taken root over the capped landfill and buttress fills – view south (November 6, 2018).

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North buttress fill – view east (November 6, 2018).

Area where rip-rap was proposed to cap the steep, eastern margin of the landfill where the demarcation grid is still visible.

Rip-rap placement began shortly before October 14, 2019 (note, demarcation barrier is present beneath area where rip-rap was placed, however is obscured by growing grass.

View of final rip-rap placement taken on October 25, 2019.

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The toe of the rip-rap extended to the east margin of the landfill covering all remining demarcation fabric.

Logs secure and stabilize the downslope margin of rip-rap.

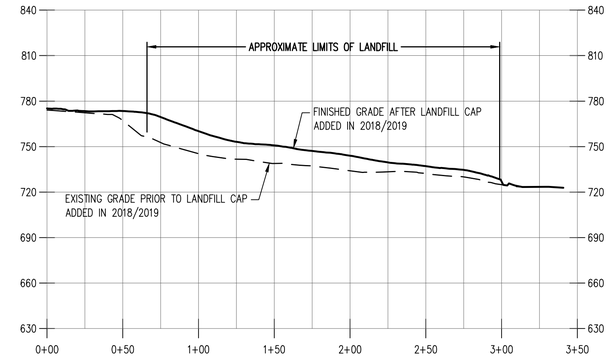
View of access road used to facilitate access for loading equipment while installing the rip-rap.

The construction area was stabilized and reseeded following installation of the rip-rap cover.

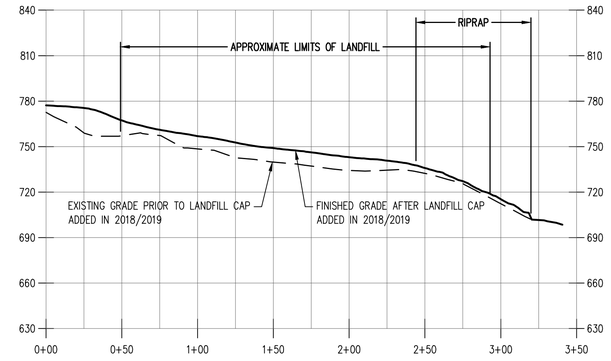
EVREN NORTHWEST INC. environmental natural resource consultants	Troh Legacy Landfill, RD/RA Implementation 10010 SE Vradenburg Road Happy Valley, Oregon	**Site Photographs**	Project No. 351-14002-06 Attachment **A**

Attachment B

Troh Landfill Soil Cap As-Built



CROSS SECTION A–A
Hor. Scale: 1"= 50'
Vert. Scale: 1"= 50'

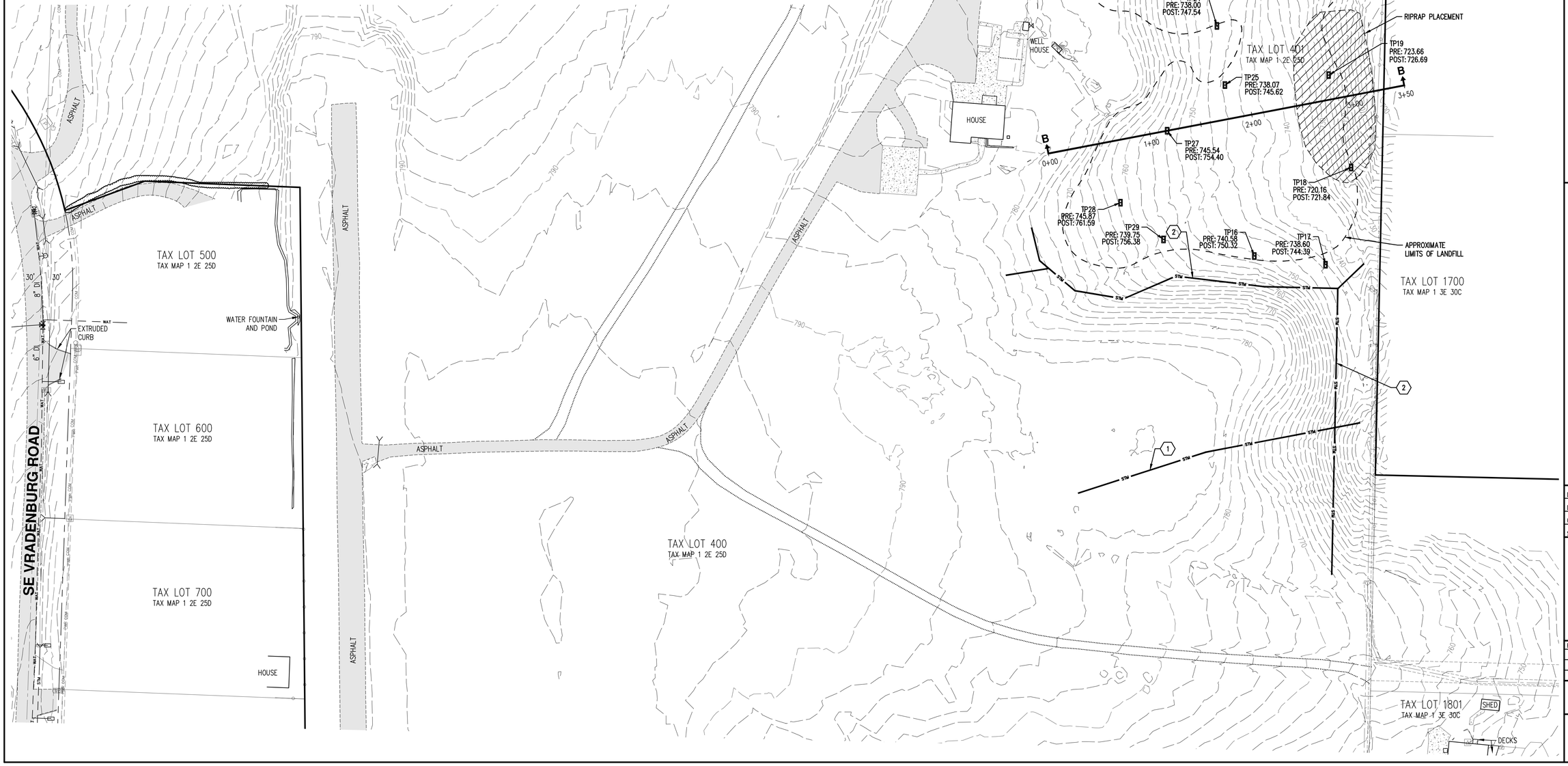


CROSS SECTION B–B
Hor. Scale: 1"= 50'
Vert. Scale: 1"= 50'

CONSTRUCTION KEYED NOTES:

1. SUBDRAIN
2. KEYWAY SUBDRAIN

NOTE:
A CAP CONSISTING OF THREE (3) FEET OF CLEAN SOIL AND/OR A MINIMUM OF ONE (1) FOOT OF LARGE DIAMETER (0.5 FEET OR GREATER DIAMETER) COBBLES AND BOULDER FILL WAS SELECTED AS THE MANAGED SOIL CAP REMEDIAL ACTION.



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ENGINEERING · SURVEYING · NATURAL RESOURCES
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

10010 SE VRADENBURG ROAD

ENG-01-17 PUD-02-15

HAPPY VALLEY OREGON

CLACKAMAS COUNTY TAX MAPS 1 2E 25D

TAX LOTS 400 & 401

TROH LANDFILL SOIL CAP AS-BUILT

DESIGNED BY:	JRN
DRAWN BY:	JRN
CHECKED BY:	MBH
SCALE:	AS NOTED

DATE: 03/13/2020

REGISTERED PROFESSIONAL ENGINEER
58542PE
OREGON
MAY 9, 2002
MONTGOMERY B. HURLEY
RENEWAL DATE: 6/30/21

REVISIONS

JOB NUMBER
3415

SHEET
EXA

AKS DRAWING FILE: 3415 20200313 SOIL CAP AS-BUILT.DWG | LAYOUT: EXHIBIT

Attachment C

Test Pit Logs

EVREN Northwest, Inc.

DRILL LOG

PROJECT	PROJECT NO.	BORING NO.
Troh Landfill	351-14002-01	**TP18**

SITE	BEGUN	COMPLETED	HOLE SIZE	ANGLE FROM HORIZ.
10010 SE Vradenburg Road, Happy Valley, OR 97086	6/29/2016	6/29/2016	test pit	

COORDINATES	DEPTH GROUND WATER	DATE SL	STATIC LEVEL	FIRST WATER	GROUND ELEVATION
E: 7689664.106, N: 656181.696					653

DRILLER	CORE RECOVERY (%)	# SAMPLES	# CORE BOXES	DEPTH TOP OF ROCK
Dan Sajko				

DRILL MAKE AND MODEL	LOGGED BY:	DEPTH BOTTOM OF HOLE
Excavator	E. Bruggeman	8.2

DEPTH	STRATA ELEVATION/ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE DATA: SAMPLE NO.	SAMPLE TYPE AND DIAMETER	SAMPLE LENGTH	SAMPLE RECOVERY	N-VALUE/ RQD (%)	REMARKS: NOTES ON WATER LEVELS, LOSSES, CAVING, CASING, DEPTH & DRILLING CONDITIONS.
0	652		Soil Cap						
			Brown, medium stiff, dry to slightly moist SILT (ML) with organic matter.						
4	648		Wood and rubber debris.						
			Light brown, dry to slightly moist SILT (ML) and large silt or clay nodules.						
			Gray, stiff, slightly moist CLAY (CL).						
8	644		End of test pit; backfill with soil.						
12	640								
16	636								
20	632								
24	628								
28	624								

EVREN Northwest, Inc.

DRILL LOG

PROJECT	PROJECT NO.	BORING NO.
Troh Landfill	351-14002-01	**TP20**

SITE	BEGUN	COMPLETED	HOLE SIZE	ANGLE FROM HORIZ.
10010 SE Vradenburg Road, Happy Valley, OR 97086	6/29/16	6/29/16	Test Pit	

COORDINATES	DEPTH GROUND WATER	DATE SL	STATIC LEVEL	FIRST WATER	GROUND ELEVATION
E: 7689650.583, N: 656384.647					643

DRILLER	CORE RECOVERY (%)	# SAMPLES	# CORE BOXES	DEPTH TOP OF ROCK
Dan Sajko				

DRILL MAKE AND MODEL	LOGGED BY:	DEPTH BOTTOM OF HOLE
Excavator	E. Bruggeman	9

DEPTH	STRATA ELEVATION/ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE DATA: SAMPLE NO.	SAMPLE TYPE AND DIAMETER	SAMPLE LENGTH	SAMPLE RECOVERY	N-VALUE/ RQD (%)	REMARKS: NOTES ON WATER LEVELS, LOSSES, CAVING, CASING, DEPTH & DRILLING CONDITIONS.
0			Soil Cap						
	640		Brown, medium stiff, slightly moist to dry, SILT (ML) with organics.						
4			Scrap pipe and sheet metal, plaster and tile, light colored powder.						
	636		Light brown, dry to slightly moist SILT (ML).						
8									
			End of test pit; backfill with soil.						
	632								
12									
	628								
16									
	624								
20									
	620								
24									
	616								
28									