

Analysis of Brownfields Cleanup Alternatives – Preliminary Evaluation

The Landing – Mt. Shasta Commerce Park

South Mt. Shasta Boulevard

Mt. Shasta, California

Prepared By:

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305 N. Mt. Shasta Boulevard

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I. EXECUTIVE SUMMARY

The location of the proposed Mount Shasta Commerce Park (also referred to as The Landing) (Figure 1) historically operated as a lumber mill and box factory from 1900 to 1985. The site was originally developed by the Pioneer Box Factory and after several changes in ownership was finally owned and operated by Roseburg Forest Products. The property, which is currently a vacant lot, will be developed by the City of Mt. Shasta to include various commercial businesses and recreational facilities, including a performing arts center. Current environmental concerns at the site include contaminated surface and subsurface soil which likely occurred during historical lumber mill operations. Contamination is primarily concentrated in areas of historical site facilities, including a former equipment shed, a dip tank for treating lumber products, and a former debris dump area (Figure 2). Additionally, contaminated soil has been identified in the vicinity of the former box factory located on the property. The box factory operated power transformers and also a burner which have impacted surface and shallow soil with various contaminants. Contaminants of concern (COC) present in soil at specific areas of the property do currently exceed state and federal regulatory standards for human health. The purpose of the proposed environmental cleanup at the site is to remedy the environmental impacts to the soil to ensure the protection of human health and the environment. The proposed remedy for the site includes both the excavation and removal of the impacted soil from the site and in areas where excavation and removal of soil is not economically feasible the soil will be covered and contained to prevent human contact (Figure 3).

II. INTRODUCTION AND BACKGROUND

a. Site Location

The site is located on South Mt. Shasta Boulevard in the southern portion of the City of Mt. Shasta, Siskiyou County, California and is bordered by a residential area to the north, Interstate 5 to the west, and a mixture of residences, business parcels, and forest to the south and east (Figures 1 and 2).

b. Previous Site Use(s) and any previous cleanup/remediation

The property was formerly used primarily for lumber milling and log storage. A lumber mill was originally located in the Old Mill area at the northern end of the site. A more recently constructed lumber mill (New Mill) was located in the central portion of the

western property. Former facilities in the New Mill study area included a pentachlorophenol (PCP) dip tank for wood treatment, diesel fuel aboveground storage tank (AST), gasoline fuel underground storage tank (UST), dump area, and an equipment maintenance shed. The AST and UST, while requiring additional assessment, will not be addressed as part of the described cleanup activities. The AST and UST will be addressed at a later date. Southwest of the New Mill facilities is a former box factory, which previously contained a planing mill, a burner, and transformers.

The presence of PCP in shallow soil in the vicinity of the former dip tank was the likely result of spills which occurred over the duration of site operations. Historical documentation has stated that the former dip tank was cleaned three times per year and the rinsate may have been discharged directly to the ground surface. Historical releases of Total Petroleum Hydrocarbons (TPH) in the New Mill area have primarily been the result of spills over the duration of site operations. TPH in the vicinity of the former equipment shed has historically been observed as surface staining suggesting liquids were spilled from containers and/or equipment. No historical documentation was found explaining the release of TPH in the vicinity of the dump area, gasoline UST, or the diesel AST. The UST and AST were removed from the site prior to 1987.

Polychlorinated biphenyls (PCBs) have historically been reported in soil samples collected near the transformers and dioxins/furans have been identified in soil at the former burner location.

The operational and assessment history of the site is outlined below:

1900: The property was first developed by the Pioneer Box Company.

1928: Mount Shasta Pine Manufacturing Company purchased the property.

1954: Property acquired by the Ralph L. Smith Lumber Company (Smith Lumber).

1963: Kimberly-Clark Corporation purchased the property.

1979: Roseburg Forest Products (RFP) purchased the property.

1985: RFP ceased all operations on property and subsequently moved equipment to other facilities.

1998: E&E conducted a Brownfields Targeted Site Investigation (TSI) for the EPA, which involved collecting soil, sediment, surface water, and groundwater samples. Fifteen areas of potential contamination were identified based on available historical information. Analytical results indicated that additional investigation was warranted at four of the 15 areas where samples were collected. These included the New Mill dip tank and the Old Mill dip tank. A sample collected at the dump reported diesel fuel at 2,250 mg/kg. A soil sample collected from 1 ft bgs from the transformer area of the former box factory reported a polychlorinated biphenyls (PCB) (Aroclor-1260) at a concentration of 0.120 mg/kg.

2005: E&E conducted a second Brownfields TSI to delineate the previously identified areas of contamination. PCP contamination was confirmed in soil and groundwater at

the Old Mill dip tank and at the New Mill dip tank. However, the vertical and lateral extent of the PCP groundwater contamination was not delineated in these areas.

February 15, 2007: URS collected soil samples for PCB analysis from the box factory transformer area in December 2006 and again in February 2007. Additional soil sampling was conducted during this phase of the TSI to define the appropriate excavation area and depth for remediation of this location.

November 11-14, 2014: TRC conducted a soil and groundwater site investigation of the New Mill, including the former equipment shed, former dip tank, dump area in accordance with the Sampling and Analysis Plan (SAP) approved by the EPA and DTSC. A soil investigation was also conducted at the former transformer and former burner areas of the Box factory.

c. Site Assessment Findings

Significant detections of contaminants are discussed below. Refer to Table 1 for the current federal human health standards for comparison to detections of contaminants found at the site.

1. Equipment Shed Area

In November 2014, TRC completed soil borings to a depth of 15 ft bgs at the former equipment shed to further delineate the presence of TPH as diesel, TPH as gasoline, and TPH as motor oil in shallow soil. The locations represented areas that had elevated TPH detections during past assessments or had not been previously sampled. The highest TPH as diesel concentration in soil observed in the equipment shed area was 3,100 mg/kg in sample EQSH-5-7.5. The highest TPH-mo concentration in soil observed in the equipment shed area was 7,400 mg/kg. TPH-g was not detected above the investigation screening level.

In December 2006, the City completed an excavation (identified as Pit 5), which primarily targeted stained surface soils adjacent to the equipment shed. Sample depths from 2007 equipment shed soil samples range from surface to 2 ft bgs. Historical concentrations of TPH as diesel in soil samples from the equipment shed area have ranged from 3.8 mg/kg to 12,000 mg/kg. Historical concentrations of TPH as motor oil in soil samples from the equipment shed area have ranged from 47 mg/kg to 34,000 mg/kg. No PCP has been detected in historical soil samples from the equipment shed area.

2. Dump Area

In November 2014, TRC completed soil borings to a depth of 15 ft bgs at the New Mill dump area to delineate the vertical extent of TPH as diesel, TPH as gasoline, and TPH as motor oil impacts in soil. The TPH as diesel maximum concentration detected was 310 mg/kg. The TPH as motor oil maximum concentration detected was 3,400 mg/kg at. No TPH as gasoline detections were detected.

Historical soil analytical data from the former dump and surrounding area includes sampling from May 1998, December 2006, February 2007, and May 2007. TPH as diesel and TPH as motor oil were detected at elevated levels in shallow soil, with a maximum TPH

as diesel concentration of 2,250 mg/kg (May 1998) and a maximum TPH as motor oil concentration of 1,900 mg/kg (February 2007).

Historical metal detections above the current U.S. EPA Regional Screening Levels (RSLs) for shallow soil within the dump area include only arsenic, which was detected above the RSL of 0.25 mg/kg in two soil samples. The highest historic arsenic detection in shallow soil at the dump area is 0.78 mg/kg from a surface soil sample.

3. Former New Mill Dip Tank

In November 2014, TRC completed soil borings to a depth of 15 ft bgs to investigate the vertical extent of PCP in soil. Additionally, the soil samples from the dip tank were analyzed for TPH and metals. There were no detections of PCP or any other analytes over the laboratory reporting limit.

Historical soil analytical data from the former dip tank and surrounding area includes samples from May 1998, March 2005, and May 2007. Sample depths from the dip tank area range from surface to 10 ft bgs. Historical detections of COCs include one (1) detection of TPH as diesel and multiple detections TPH as motor oil and PCP. Historical concentrations of TPH as diesel and TPH as motor oil in shallow soil have all been below current RSLs. Historical concentrations of PCP in shallow soil have ranged from <0.020 mg/kg to 340 mg/kg. Six (6) soil samples from the former dip tank area have exceeded the current RSL of 2.7 mg/kg for PCP.

Metals detected above both current RSLs and background concentrations in shallow soil within the dip tank area include only arsenic, which was detected above the RSL of 2.4 mg/kg and the maximum background concentration of 2.4 mg/kg in two (2) historical soil samples. The highest historical arsenic detection at the dip tank area in shallow soil (1 foot bgs) is 5.1 mg/kg.

4. Former Box Factory Transformer Area

In November 2014, TRC completed soil borings to a depth of 15 ft bgs to investigate the lateral and vertical extent of PCBs in shallow soil that were detected during previous investigations. There were no detections of PCBs over the method detection limit.

Historical soil analytical data from the former transformer area includes shallow soil samples from May 1998, surface soil samples from December 2006, surface soil samples from February 2007, and surface soil samples from May 2007. Historical investigations of the transformer area have primarily addressed polychlorinated biphenyls (PCBs) and metals in shallow soil. Historical detections of the PCBs Aroclor 1254 and Aroclor 1260 have been relatively low; however, two (2) historical soil samples have exceeded the current RSL of 1.0 mg/kg for Aroclor 1254 and Aroclor 1260 in shallow soil.

5. Former Box Factory Burner

In November 2014, TRC completed soil borings to a depth of 15 ft bgs in the vicinity of the former Box Factory burner to investigate dioxins and furans in shallow soil. Four (4) soil samples exceeded the U.S. EPA screening level of 22 pg/g. The maximum 2,3,7,8 -TCDD toxic equivalency concentration (TEQ) detected during the investigation was 272.76 pg/g.

Historical soil analytical data from the former burner area includes one (1) surface soil samples from May 1998 and three (3) surface soil samples from December 2006. Analysis of soil during historical investigations has been limited to dioxin and furan analysis and suggests that minor dioxin and furan impacts to shallow soil are present. Three samples from the December 2006 soil investigation had TCDD Toxic Equivalency Concentrations (TEQ) that exceed the current November 2013 USEPA RSLs. This impacted soil appears to be limited in size and likely confined to shallow soils.

d. Project Goal

The planned reuse for the property is a mixed use development with various commercial businesses combined with associated recreational uses such as a recreational vehicle park and performing arts center.

III. Applicable Regulations and Cleanup Standards

a. Cleanup Oversight Responsibility

The site remedial action will be conducted under the oversight of the California Department of Toxic Substances Control (DTSC). The DTSC signed a Voluntary Cleanup Agreement (VCA) with the City on July 3, 2013, to provide project oversight. TRC was retained by the SCEDC and the City to address environmental issues at the site.

b. Cleanup Standards for Major Contaminants

The U.S. EPA RSLs for industrial site soils (U.S EPA, 2015) will be used as cleanup goals for the site. RSLs are risk-based concentrations derived from standardized equations combining exposure information assumptions with EPA toxicity data. RSLs are considered by the U.S. EPA to be protective for humans (including sensitive groups) over a lifetime. RSLs provide long-term targets to use during the analysis of different remedial alternatives (U.S. EPA, 2015). Refer to Table 1 for the RSLs for contaminants found at the site.

c. Laws & Regulations Applicable to the Cleanup

Laws and regulations that are applicable to the portion of this cleanup that is being funded by the EPA Brownfields grant include the Federal Small Business Liability Relief and Brownfields Revitalization Act, the Federal Davis-Bacon Act, State of California environmental law, City of Mt. Shasta and Siskiyou County by-laws. Federal, state, and local laws regarding procurement of contractors to conduct the cleanup will be followed.

Prior to conducting the site remediation activities all approvals associated with the California Environmental Quality Act (CEQA) will be obtained including biological resource and cultural resource approvals.

Prior to conducting any soil removal activities, all appropriate permits will be obtained from both City and County agencies. All soil excavation areas will be marked with white paint or staked according to Underground Services Alert (USA) requirements. At least two days prior to commencing work at the site, USA will be notified.

IV. Evaluation of Cleanup Alternatives

a. Cleanup Alternatives Considered

The remedial alternatives analysis identification process focuses on several options that exhibit the potential to eliminate or significantly reduce exposure to the COCs observed in shallow soil at the site and are most likely to achieve a permanent or temporary solution.

The following remedial alternatives are evaluated for effectiveness and implementation with respect to current site conditions.

1. Option 1 – No Action

No Action assumes no additional efforts are undertaken to eliminate potential future exposures to surface and subsurface soil impacts at the site. It appears that this technology would not eliminate risk to human health or the environment. Additionally, no action could impair the property from a financing and redevelopment perspective.

2. Option 2 – Use Restrictions/Institutional Controls

Institutional controls establish restrictions on the use of a site that would otherwise result in exposure to the COCs that remain. Restrictions can be in the form of allowed uses and controls and also physical barriers such as fences. This would require the filing of a deed restriction in the form of an Activity and Use Limitation (AUL). The current use of the site is a vacant lot and anticipated future use of this site is for various commercial businesses combined with associated recreational uses. In order to achieve a condition of No Significant Risk (NSR), certain uses of the site would need to be restricted.

The objectives of the AUL would include the following:

- Restrict direct contact with the historic fill material;
- Restrict vegetable cultivation;
- Require maintenance of pavement areas and landscaping;
- Restrict use of property for single-family residential use, unpaved playgrounds, parks, and daycare facilities unless additional exposure mitigation is conducted; and
- Restrict access to the historic fill material unless supervised by an environmental professional utilizing a Soil Management Plan.

Institutional controls have been retained for consideration in the development of remedial alternatives for soil and groundwater.

3. Option 3 – Use Restrictions/Institutional Controls with Containment

Containment measures are designed to isolate chemicals to prevent direct contact, erosion, and potential chemical leaching. The alternative of excavating soil can be difficult based on site conditions and can also be prohibitively expensive, particularly

when the volume of impacted soil is large as is the case at the New Mill dump area. Capping generally provides a cost-effective and proven method of containment for managing large volumes of impacted soil where related groundwater issues are not also present.

A containment remedy could consist of a layer of soil, asphalt, concrete, or other containment technology consistent with site development plans which will eliminate or minimize direct contact with the underlying soils, and will address all chemicals. When containment is selected for a remedial solution, it is implemented in conjunction with an institutional control that would require cap maintenance and prohibit uncontrolled cap removal or penetration. Containment is retained as a remedy for further consideration in the detailed evaluation.

4. Option 4 – Excavation and Off-Site Disposal

Physical removal addresses COCs in soil by physically removing impacted media from the site with disposal or recycling at an appropriately licensed off-site facility. Excavation and off-site disposal is a proven and commonly used method that addresses all contaminants. This remedy will effectively remove soil that exceeds human health standards. This alternative often targets small volumes due to the increased costs associated with excavation, transportation, and disposal fees. Given the proven performance of excavation as a site remedy at similar sites, this technology will be retained for further evaluation.

Removed soil volumes presented below are estimates based on field observations and analytical data obtained to date and are presented as in-place volumes. Further refinement of soil volume estimates by additional soil sampling and/or inspection may be warranted. Proposed areas for soil excavation and removal are presented in Figure 3.

The proposed excavations at the site are discussed below:

i. New Mill Equipment Shed

The New Mill equipment shed, located along the eastern portion of the site along South Mt. Shasta Boulevard, consists of a total area of approximately 7,275 square feet that exceeds proposed cleanup levels for TPH. Approximately 5,127 square feet will be excavated to a depth of 1 ft bgs. Approximately 1,092 square feet will be excavated to a depth of 3 ft bgs. Lastly, approximately 1,056 square feet will be excavated to a depth of 8 ft bgs. The in-place volume of TPH impacted soil in this area is estimated to be 623 cubic yards. Excavated areas with depths of 3 ft bgs and 8 ft bgs will be backfilled to grade with clean backfill material.

ii. Box Factory Transformer Area

The Box Factory transformer area, located on the southern portion of the Site, consists of a total area of approximately 1,362 square feet that exceeds proposed cleanup levels for PCBs. The entire remediation area for the transformer area square feet will be excavated to a depth of 1 ft bgs. The in-place volume of PCB impacted soil in this area is estimated to be 50 cubic yards.

iii. Box Factory Burner

The Box Factory burner area, located along the southern portion of the site, consists of a total area of approximately 4,561 square feet that exceeds proposed cleanup levels for dioxins and furans. Approximately 3,880 square feet will be excavated to a depth of 1 ft bgs. Approximately 681 square feet will be excavated to a depth of 3 ft bgs. The in-place volume of dioxin and furan impacted soil in this area is estimated to be 219 cubic yards. Excavated areas with depths of 3 ft bgs will be backfilled to grade with clean backfill material.

b. **Comparison of Cleanup Alternatives**

1. Effectiveness

Remedial Option #4 is the most effective means to mitigate exposure from site COCs as impacted material is removed from the site. Remedial Option #3 is also effective in mitigating exposure to COCs but does not remove COCs from the site. Remedial Options #1 and #2 are considered the least effective.

Remedial Option #4 is more reliable than the other remedial options in preventing exposure to future users of the site because the COCs in soil are removed from the site entirely. Due to the relatively simple nature of design and construction, there is low potential for failure associated with Remedial Option #4. The degree of certainty that Remedial Option #3 would be successful is dependent on maintenance of engineering controls that would need to be implemented.

2. Difficulty of Implementation

Since the site is currently a vacant lot with small areas of concrete foundations, excavation and off-site disposal of targeted soil is relatively easy to implement. However, Remedial Option #4 would become more difficult to implement in areas where large amounts of soil would require excavation, such as the New Mill dump area.

The implementation of remedial Option #3 would be difficult due to the engineering that would be required to stabilize site soils, including areas of steep slopes or inadequately compacted soil. The containment cap would require engineering to ensure lasting protection from the underlying soil.

3. Cost Effectiveness

Depending on the area of the site, the overall cost to implement Remedial Option #3 is less than Remedial Option #4 due to the costs associated with excavating, soil transportation and disposal, and backfilling. However, in smaller areas, such as the New Mill equipment shed and the Box Factory, excavating soil would be more cost effective in the long term because the COCs would be removed and an AUL and its associated engineering and maintenance would not be required. An implementation of an AUL is more cost effective way to manage exposure to site COCs where the volume of impacted soil is large, such as the New Mill dump area.

4. Potential Risks

The potential short-term and long-term risks associated with each alternative are considered low to moderate. Potential short-term risks associated with soil excavation/disposal include possible accidental spills of contaminated soil during soil transport, which could result in short-term exposure to the contaminated soil by surrounding human populations. However, any accidental spill of contaminated soil would be immediately cleaned-up, and therefore, the duration of any potential human exposure to the contaminated soil would be extremely short-term. Prior to site activities a Spill Prevention, Control, and Countermeasure Plan (SPCC) will be developed and will be kept onsite during work activities. The short term risks for no-action or the sole use of an AUL would be considered moderate to high, due to concerns over worker health and safety during redevelopment of the site.

5. Cost Estimate

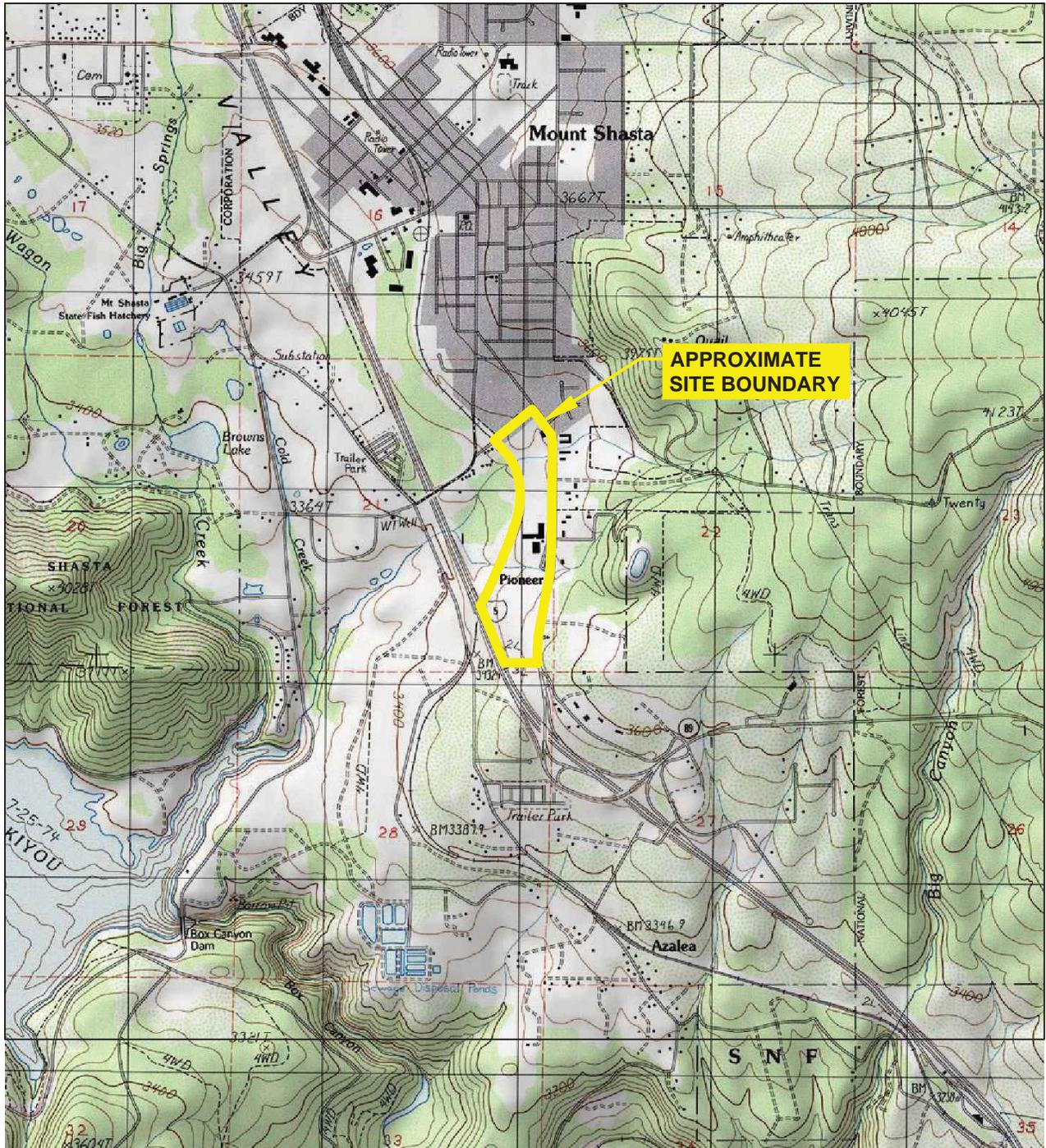
- For Option #1, there would be no costs;
- For Option #2, there would be administrative costs associated with applying a deed restriction to specific areas of the site. Additional costs would include a property survey by a professional surveyor and regular monitoring of the site's institutional controls to ensure compliance and ensure protection to human health. The cost to implement this option could be highly variable depending on the final development plans for the property, which are currently uncertain.
- For Option #3, total costs would include the costs associated with Option #2 in addition to costs for applying a soil containment technology to specific areas of the site. The application of a containment technology (e.g. asphalt or concrete parking surfaces) would likely be conducted concurrently with development of the property and would be paid for by property development funds. The option would also include regular monitoring of the containment technology to ensure its integrity. The cost to implement this option could be highly variable depending on the final development plans for the property, which are currently uncertain.
- For Option #4, the estimated costs are \$197,383. This estimate includes costs for an excavation subcontractor to excavate and dispose of site soils at a certified disposal facility. The estimate also includes field oversight by an environmental consultant and confirmation soil sampling and analysis costs.

c. **Recommended Cleanup Alternative**

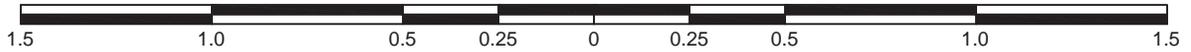
Due to the large size of the property and the various environmental conditions at each area of the property, a combination of options will be employed to most effectively remediate the property. Remedial Options #3 and #4 are the best selections as targeted removal of soil and an implementation of a soil containment technology along with an AUL are anticipated to achieve NSR in a relatively efficient manner. While Remedial Option #4 (Excavation and Off-Site Disposal) will be the primary remedy for most of the impacted areas, Remedial Option #3 (Use Restrictions/Institutional Controls with Containment) is proposed for the former dump area due to its size and the economic limitations of excavating and removing soil from such a large area.

Appendix A

Site Figures



APPROXIMATE SCALE (MILES)



SOURCE:
 United States Geological Survey
 7.5 Minute Topographic Maps:
 City of Mount Shasta Quadrangle, California



QUADRANGLE
 LOCATION

VICINITY MAP

The Landing - Mt. Shasta Commerce Park
 Mount Shasta, California



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FIGURE 1



Legend

 Former Industrial Area (approx.)

Figure 2

Site Plan

The Landing - Mt. Shasta Commerce Park
Mt. Shasta, California



1 in = 175 ft



Legend
 [Dashed Box] Former Industrial Area (approx.)

Figure 3
 Removal Action Work Plan
 The Landing - Mt. Shasta Commerce Park
 Mt. Shasta, California



1 in = 175 ft

Appendix B

Site Tables

Table 1
Proposed Site Cleanup Levels
 Removal Action Work Plan
 The Landing - Mt. Shasta Commerce Park
 Mt. Shasta, California

Contaminant of Concern (COC) in Soil		Industrial Soil Standards (USEPA RSLs, January 2015) (mg/kg)
Total Petroleum Hydrocarbons (TPH)	Gasoline	420 (Aromatic)/ 2,200 (Aliphatic)
	Diesel	600 (Aromatic)/ 440 (Aliphatic)
	Motor Oil	3,300 (Aromatic)/ 3,500,000 (Aliphatic)
Pentachlorophenol (PCP)		4
Polychlorinated Biphenyls (PCB)	Aroclor 1016	30
	Aroclor 1221	0.66
	Aroclor 1232	0.66
	Aroclor 1242	1
	Aroclor 1248	1
	Aroclor 1254	1
	Aroclor 1260	1
Dioxins and Furans	2,3,7,8-TCDD TEQ	22 pg/g

Notes

mg/kg = milligrams per kilogram

pg/g = picograms per gram

TEQ = Toxic Equivalency Factor