Prepared for

Department of Toxic Substances Control – Brownfields Revitalization Unit
8800 Cal Center Drive
Sacramento, California 95826

TARGETED SITE INVESTIGATION REPORT

CRESCENT MILLS INDUSTRIAL SITE

Prepared by

Geosyntec consultants

engineers | scientists | innovators

3043 Gold Canal Drive, Suite 100
Rando Cordova, California 95670

Project Number: SAC147K

28 April 2017

Targeted Site Investigation Report

Crescent Mills Industrial Site
15690 California Highway 89
Crescent Mills, California

Prepared by

Geosyntec Consultants, Inc.
3043 Gold Canal Drive, Suite 100
Rancho Cordova, California 95670

Arthur Forma, P.G., CEG, CHG
Principal Hydrogeologist

Joseph Niland, P.G.
Senior Principal Hydrogeologist

Project Number: SAC147K
28 April 2017

Geosyntec consultants

3043 Gold Canal Drive, Suite 100
Rancho Cordova, California 95670
PH 916.637.8048
FAX 916.550.9498
www.geosyntec.com

IDENTIFICATION FORM

Document Title	Targeted Site Investigation Report Crescent Mills Industrial Site
Site Location	15690 California Highway 89 Crescent Mills, California
DTSC Site Code:	102305
DTSC EnviroStor No.:	32240003
Contract No.:	16-T4205
Work Order No.:	1-205-1.0-102305
Prepared by:	Geosyntec Consultants, Inc. 2043 Gold Canal Drive, Suite 100 Rancho Cordova, California 95670
Geosyntec Project Number:	SAC147K
Geosyntec Project Manager:	Arthur Forma AForma@Geosyntec.com (916) 637-8327

Geosyntec Project Manager Approval:

[signature]	28 April 2017
Arthur Forma, P.G., CEG, CHG	Date

Geosyntec Program Manager Approval:

[signature]	28 April 2017
Joseph Niland, P.G.	Date

This document has been prepared for the California Environmental Protection Agency (CalEPA), Department of Toxic Substances Control (DTSC). The material herein is not to be disclosed to, discussed with, or made available to any person(s) for any reason without prior express approval of the appropriate responsible DTSC officer.

Geosyntec consultants

3043 Gold Canal Drive, Suite 100
Rancho Cordova, California 95670
PH 916.637.8048
FAX 916.550.9498
www.geosyntec.com

APPROVAL FORM

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Prepared by:	Geosyntec Consultants, Inc. 2043 Gold Canal Drive, Suite 100 Rancho Cordova, California 95670 (916) 637-8048
Geosyntec Project Number:	SAC147K
DTSC Project Manager:	Melessia Downham (916) 255-3745 Melessia.Downham@DTSC.CA.gov

DTSC Project Manager Approval:

Melessia Downham — Date: 4-28-17

DTSC Program Manager Approval:

Steven Becker, P.G. — Date: 4/28/2017

Geosyntec consultants

3043 Gold Canal Drive, Suite 100
Rancho Cordova, California 95670
PH 916.637.8048
FAX 916.550.9498
www.geosyntec.com

28 April 2017

Melessia Downham
Environmental Scientist
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, California 95826

Subject: Targeted Site Investigation Report for the Crescent Mills Industrial Site, 15690 Highway 89, Crescent Mills, California

Dear Ms. Downham:

Geosyntec Consultants, Inc. (Geosyntec) is pleased to submit the enclosed Targeted Site Investigation Report (Report) for the above-referenced site. The Report was prepared in accordance with the scope of work set forth in California Department of Toxic Substances Control (DTSC) Contract Agreement Number 16 T4205 and in the Targeted Site Assessment Work Plan approved by the DTSC on 2 February 2017.

This Report was prepared by Geosyntec for DTSC in a manner consistent with the level of care and skill ordinarily exercised by professional engineers, geologists, and environmental scientists in the geographic area of the above-referenced site. Geosyntec provides no other warranties, either express or implied, concerning the contents of this Report, which was prepared under the technical direction of the undersigned. Please feel free to contact the undersigned at any time if you have any questions or comments.

Sincerely,

Arthur Forma, PG, CEG, CHG
Principal Hydrogeologist

Enclosure (1 original)

Geosyntec consultants

3043 Gold Canal Drive, Suite 100
Rancho Cordova, California 95670
PH 916.637.8048
FAX 916.550.9498
www.geosyntec.com

DISTRIBUTION LIST

PDF Copies to:	Jerry Sipe, Plumas County Department of Environmental Health
	Camille Swezy, Sierra Institute for Community and Environment
	Maryam Tasnif-Abbasi, DTSC, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 128(a) State and Tribal Response Program Grant Coordinator
	Noemi Emeric-Ford, United States Environmental Protection Agency, Regional Brownfields Coordinator

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/kg	micrograms per kilogram
µg/L	micrograms per Liter
2,3,7,8-TCDD	tetrachlorodibenzo-p-dioxin
2,4,6-TCP	2,4,6-trichlorophenol
APN	Assessor's Parcel Numbers
ASTs	aboveground storage tanks
bgs	below ground surface
CA EMI	California Emission Inventory database
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPCs	constituents of potential concern
CSEM	conceptual site exposure model
CSM	conceptual site model
DI	deionized
DPT	direct push technology
DQIs	Data quality indicators
DQOs	data quality objectives
DTSC	Department of Toxic Substances Control
DU	decision unit
E&E	Ecology and Environment
EDR	Environmental Data Resources, Inc.
ELAP	Environmental Laboratory Accreditation Program
EnviroStor	DTSC database of project site data

ESL	Environmental Screening Level
Geosyntec	Geosyntec Consultants, Inc.
GPS	global positioning system
HASP	Health and Safety Plan
HAZNET	database of facility and manifest data
HERO	DTSC Human and Ecological Risk Office
HHRA	Human Health Risk Assessment
HIST UST	database of historical underground storage tank sites
IDW	investigation-derived waste
ISM	incremental sampling methodology
ITRC	Interstate Technology and Regulatory Council
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LP	Louisiana Pacific
LUFT	leaky underground fuel tank
MCL	maximum contaminant limit
MDLs	method detection limits
mg/kg	milligrams per kilogram
mg/L	milligrams per Liter
MS	matrix spike
MSD	matrix spike duplicate
MTBE	methyl tert-butyl ether
PAHs	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PCEHD	Plumas County Environmental Health Department
PCP	pentachlorophenol

PE	Professional Engineer
PEA	Preliminary Endangerment Assessment
PG	Professional Geologist
pg/g	picograms/gram
pg/L	pictograms/Liter
PID	photo-ionization detector
PPE	personal protective equipment
PVC	polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
RECs	recognized environmental conditions
RL	reporting limit
RPD	relative percent difference
RSL	regional screening level
SGC	silica gel cleanup
Sierra Institute	Sierra Institute for Community and Environment
SOPs	Standard Operating Procedures
SU	sampling unit
SWEEPS UST	Statewide Environmental Evaluation and Planning System Underground Storage Tank database
SWF/LF	California Solid Waste Information System database
TCP	trichlorophenol
TEF	toxic equivalency factor
TEQ	toxic equivalent
TPH	total petroleum hydrocarbons
TPH-d	total petroleum hydrocarbons in the diesel range

TPH-g	total petroleum hydrocarbons in the gasoline range
TPH-mo	total petroleum hydrocarbons in the motor oil range
TSI	Targeted Site Assessment
USEPA	United States Environmental Protection Agency
USA	Underground Service Alert
USCS	Unified Soil Classification System
USGS	United States Geologic Survey
USTs	underground storage tanks
VOCs	volatile organic compounds

EXECUTIVE SUMMARY

Geosyntec Consultants, Inc. (Geosyntec) prepared this Targeted Site Investigation (TSI) Report (Report) for the Crescent Mills Industrial Site (the Site or property) located at 15690 California Highway (CA HWY) 89 in Crescent Mills, California. This TSI was performed for the Sierra Institute for Community and Environment (Sierra Institute) under a TSI grant from the United States Environmental Protection Agency (USEPA) with oversight by the California Department of Toxic Substances Control (DTSC). Based on historical information, the Site was operated as a lumber mill from the late 1940s through 1986. The Sierra Institute wishes to redevelop the Site as a woody biomass utilization campus, however previous investigations at the Site documented arsenic in soil above applicable background conditions and total petroleum hydrocarbons (TPH) in the diesel range (TPH-d) in soil and groundwater above environmental screening levels (ESLs). These impacts need to be further evaluated before redevelopment can occur.

Through the TSI process, data gaps were identified based on the locations and results of previous soil and groundwater sampling and the historic operations at the Site. This TSI was conducted to address the data gaps with respect to the Site constituents of potential concern [COPC(s)], including metals (mainly arsenic and hexavalent chromium), TPH and TPH-related compounds including polycyclic aromatic hydrocarbons (PAHs), dioxins and furans, anti-stain agents such as pentachlorophenol (PCP), 2,4,6-trichlorophenol (2,4,6-TCP), and carbamates, volatile organic compounds (VOCs), and polychlorinated biphenyls (PCBs).

The project data quality objectives (DQOs) developed specifically for the planned sampling and analysis program were determined based on USEPA's seven-step DQO process (USEPA, 2000). Samples were collected and analyzed for at least one analyte from 21 incremental sampling methodology (ISM) soil samples, 14 discrete soil samples, 2 duplicate soil samples, 13 groundwater samples, 3 duplicate groundwater samples, and 6 arsenic solubility leachates tests. Laboratory analytical reports are provided in Appendix G of this report. The analytical results are summarized in Table 2 through Table 10, Figures 5a through 5c, and Figures 6a and 6b. In order to evaluate potential impacts, assess potential exposure, and manage risk associated with the Site (if any) the data was compared to screening levels. Soil data was compared to commercial/industrial regional screening levels (RSLs), background arsenic concentrations, and ESLs and groundwater data was compared to residential tap water RSLs, USEPA and CalEPA groundwater maximum contaminant levels (MCLs), and ESLs.

Results reported from soil samples collected and analyzed for this TSI suggest that arsenic and TPH-d remain in soil at concentrations above risk-based thresholds that may influence the proposed redevelopment of the Site. Arsenic in soil was above Site-specific background concentrations throughout the Site including in the soil stockpiles, former mill roads, boiler area, and maintenance shop area. TPH-d was reported above screening levels in soil samples collected from the former mill roads and boiler building area. Dioxins and furans and PCB-1260 were reported at low concentrations that were less than the applicable screening levels. Other soil COPCs that were analyzed were not reported in the samples collected, though some method detection limits (MDLs) were greater than the RSLs due to matrix interference in soil. This matrix interference occurred for PAHs analyzed in numerous locations and for PCP analysis in one sample in the anti-stain area of the Site.

Groundwater impacts of COPCs were reported in samples at concentrations greater than applicable tap water RSLs, but below the groundwater MCL (if available). Exceedances of the tap water RSLs were reported for dioxins and furans as tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) toxic equivalent (TEQ) in multiple locations including the saw mill area, boiler area, and former aboveground storage tank (AST) area. PAHs were reported in groundwater at one location near the maintenance shop waste oil AST above PAH RSLs. TPH-d was reported above ESLs in one groundwater sample collected in 2014 to the west of the maintenance shop, however step-out samples collected during this investigation were below the TPH-d ESL. There were other COPCs including hexavalent chromium, PCP, 2,4,6-TCP and PAHs that were not reported in groundwater but had MDLs that were greater than the tap water RSLs.

A geophysical survey was conducted to attempt to locate a possible UST that remained near the maintenance shop at the Site. The survey was inconclusive but identified several buried metal anomalies including two that were reported as a possible UST and one that was indicated as a possible sewer pipe. Soil borings were advanced adjacent to and downgradient of the possible locations of the remaining UST and results indicated that limited PAH impacts were present in groundwater at this location. Impacts may also be attributed to a former waste oil AST in this area, waste oil spreading for dust suppression that was reported at the Site, or from an off-Site source.

The objectives of this TSI were achieved through the identificiation and investigation of the possible hazardous substances release sources at the Site. Further, the collected data indicate that COPCs in soil and groundwater are suffiently delineated and the potential risk to human health in a commercial/inductrial land use scenario was evaluated. Based on the findings and conclusions of this TSI, the following is recommended:

- Further investigation is not necessary and the data should be used to prepare a Feasibility Study/Remedial Action Plan for selection and implementation of an appropriate remedial alternative to facilitate development and re-use of the Site.
- Though arsenic concentrations reported remain below the background concentrations established for the Site in some of the soil and wood waste stockpiles, the material in the stockpiles should be suitable for unrestricted use only in areas where background arsenic concentrations in soil are similar.
- Erosion control structures should be placed around the existing stockpiles to control run-off of sediment from the piles into the nearby storm water drop inlets and/or Indian Creek.
- The existing log deck supply well and any other wells identified on the property should be decommissioned in accordance with the local and state regulations.

1. INTRODUCTION

This document presents a TSI Report for the Crescent Mills Industrial Site located at 15690 Ca HWY 89 in Crescent Mills, California as shown on Figure 1. This Report was prepared by Geosyntec for the DTSC.

The TSI program was developed by the DTSC under its CERCLA Section 128(a) State and Tribal Response Program Grant, administered by the USEPA. The TSI program is open to government agencies and non-profit organizations with specific Brownfields projects that involve the development of properties that may have environmental impacts. The purpose of the TSI program is to facilitate redevelopment by assisting eligible participants to address specific environmental concerns regarding the property. DTSC offers this service to fill data gaps for sites planned for redevelopment and to reduce the uncertainty associated with perceived contamination at no cost to the selected applicant. TSI projects are selected to receive services through a competitive application process.

The Sierra Institute submitted a TSI application for additional characterization to assess the environmental impacts that remained at the Site in order to redevelop the Site as a woody biomass utilization campus. Developing a market for utilizing low-value forest biomass is a high priority for this region of California given the need to improve forest health and reduce fire risk. Planned biomass utilization facilities include a wood chip processing, bioenergy, and other wood products businesses that utilize forest restoration byproducts and other woody waste. Such a campus will create employment opportunities in Plumas County (a rural and socioeconomically depressed county), and contribute to reduced fire risk and increased forest and watershed health in the Upper Feather River Watershed, which is the headwaters of the California Water Project and a critical source watershed for the state. Furthermore, wood chips produced at this facility will fuel a network of biomass boilers that heat critical institutions around the county. The Site has the potential to bring between 15 and 30 new jobs to the rural community, depending on how many and what types of businesses are created.

The TSI investigation was outlined in the Targeted Site Assessment Work Plan (Work Plan) which was approved by the DTSC on 2 February 2017 (Geosyntec, 2017a). The approval letter is included in this Report in Appendix A. Additional characterization to establish a background concentration of arsenic in shallow fill and collect additional PAH data was approved by email communication with the DTSC on 27 March 2017. This Report presents findings of the TSI in general accordance with DTSC's Preliminary

Endangerment Assessment (PEA) Guidance Manual (DTSC, 2013) and other associated advisory documents such as the USEPA's Sampling and Analysis Plan, Guidance and Template (USEPA, 2004). The scope of the TSI was provided by DTSC in Contract Agreement Number 16-T4205 and Work Order Number 1-205-1.0-102305.

1.1 TSI Objectives and Scope

This TSI was performed to determine whether current or historical activities resulted in environmental conditions that need to be evaluated and/or addressed to move forward with the Sierra Institute's proposed redevelopment plans. The overall objective of the TSI was to evaluate whether hazardous substances are present at the Site which may pose unacceptable human health risks in context of future re-use.

To meet this objective, the TSI included the following scope of work:

- Evaluation of available information for indications of current use, past use, storage, disposal, release, or threatened release of hazardous substances at the Site.
- Field sampling and sample analysis for assessment of the nature, concentrations, and general extent of hazardous substances that were present in soil and groundwater at the Site.
- Determination of the potential threat to human health posed by hazardous substances in an assumed commercial/industrial land-use scenario at the Site using the human health screening evaluation procedure described in DTSC's PEA Guidance Manual.

1.2 Project Organization

The table below provides the contact information for various representatives involved with this TSI project:

Title/Responsibility	Name	Telephone Number
DTSC TSI Coordinator	Steven Becker	(916) 255-3586
DTSC Project Manager	Melessia Downham	(916) 255-3745
DTSC Geologist	Lora Jameson	(916) 255-6523
DTSC Toxicologist	Thomas Booze	(916) 255-6628
DTSC Quality Assurance Reviewer	Triss M. Chesney	(714) 484-5447

DTSC CERCLA 128(a) State and Tribal Response Program Grant Coordinator	Maryam Tasnif-Abbasi	(714) 484-5489
USEPA Project Manager (Brownfields Program USEPA Region 9)	Noemi Emeric-Ford	(213) 244-1821
Geosyntec Program Manager	Joseph Niland	(916) 637-8325
Geosyntec Project Manager*	Arthur Forma	(916) 637-8327
Geosyntec Quality Assurance Manager	Peter Dennehy	(916) 637-8341
Geosyntec Health and Safety Manager	Tim Davis	(916) 637-8334
Test America Laboratory Coordinator	Micah Smith	(916) 374-4302
Cascade Drilling Project Manager	Chris Tatum	(510) 236-6282
Sierra Institute (Grantee) Representative	Camille Swezy	(530) 284-1022

*The work performed pursuant to this TSI was under the direction and supervision of the Geosyntec project manager who is a qualified professional geologist (PG) or professional engineer (PE) in compliance with the requirements of the Professional Engineers Act, Business and Professions Code Sections 6700-6899 and Section 7838, and the Geologist and Geophysicists Act, Business and Professions Code sections 7800-7887.

1.3 Report Organization

This Report is organized as follows:

- Section 2: Site background information;
- Section 3: Project and data objectives;
- Section 4: Investigation Methodology used for TSI;
- Section 5: Investigation Results including field observations and presentation of analytical data;
- Section 6: Data Quality Assessment
- Section 7: Screening-Level Health Risk Assessment based on the sample analytical data obtained;
- Section 8: Findings, Conclusions, and Recommendations with respect to this investigation and the future Site use.

2. SITE BACKGROUND

This section summarizes current Site conditions, the Site history, previous investigations and regulatory involvement, geologic and hydrogeological conditions, and potential environmental- and human-health impacts associated with the Site based on information obtained from the references indicated herein. Research of available environmental documents and a Site inspection was conducted to collect pertinent Site information. Numerous information sources, including agency files, owner/operator records, professional trade organizations, maps and photographs were reviewed. Supporting documentation including a Property Transfer Environmental Site Assessment (CH2M HILL, Inc., 1991), a Supplemental Site Investigation Report (Geocon, Inc., 2002), a Phase 1 Environmental Site Assessment (E&E, 2014a), and a Targeted Brownfields Assessment Report (E&E, 2014b), were independently reviewed and included in Appendix C of the Work Plan. Appendix C of the Work Plan also includes aerial photos of the Site that were taken during 1980 and 1988 and not included in previous reports. A Site inspection was conducted on 9 November 2016 to document the physical setting of the Site, verify information gathered, and obtain Site-specific information where no such records were available.

2.1 Site Description and Location

The Site is located at 15690 California Highway 89 in the town of Crescent Mills, Plumas County, California as shown in Figure 1. The Site is currently vacant with the exception of remnants of the former Louisiana Pacific (LP) lumber mill Site as shown in Figure 2.

2.1.1 Site Name, Address, and Size

Site Name:	Crescent Mills Industrial Site (also known as the Louisiana Pacific Lumber Mill)
Address:	15690 California Highway 89 Crescent Mills, California
Size:	26.27 acres

2.1.2 Contact Person, Mailing Address, and Telephone Number

DTSC Contact:	Melessia Downham 8800 Cal Center Drive Sacramento, CA 95826

(916) 255-3745
Melessia.Downham@dtsc.ca.gov

Sierra Institute Contact: Camille Swezy
4438 Main Street, P.O. Box 11
Taylorsville, CA 95983
(530) 284-1022
CSwezy@sierrainstitute.us

2.1.3 Database Identification Number(s)

According to Geosyntec's limited records review and the results of the Phase 1 Report prepared by Ecology and Environment, Inc. (E&E; E&E, 2014a), the Site is listed in several environmental databases. The Site is listed in the DTSC database of project site data (EnviroStor) as Site number 32240003 and project code 102305 in relation to a preliminary assessment performed by the DTSC in 1990. Properties in the EnviroStor database are designated by the DTSC as potential or known hazardous substance release sites. The Site is listed in the California Solid Waste Information System database (SWF/LF) in relation to the stockpiles of wood waste that remain at the Site. The Site is listed in the database of historical underground storage tank sites (HIST UST) and Statewide Environmental Evaluation and Planning System Underground Storage Tank database (SWEEPS UST) in relation to three underground storage tanks (USTs) that were operated under permit at the Site by LP. The Site is listed in the database of facility and manifest data (HAZNET) in relation to the off-Site disposal of approximately 333.75 tons of "contaminated soils from Site cleanup" in 1999 under waste generator CalEPA identification number CAC002199409. Specific information regarding the source of soil or contamination was not provided. The Site is listed in the California Emission Inventory database (CA EMI) for air emissions in 1987 only, though quantities of compounds emitted are not listed. Review of selected regulatory agency databases did not reveal records of any USEPA Identification numbers assigned to the Site.

2.1.4 Assessor's Parcel Number(s)

The Site is comprised of three parcels identified by the Plumas County Assessor's Parcel Numbers (APNs) as 111-050-065, 111-050-066, and 111-050-067.

2.1.5 Site Coordinates

The geographic coordinates for the Site are approximately 40º05’39.34” north latitude and 120º54’37.23” west longitude. The Site is located within Township 26 North, Range 9 and 10 East, Mount Diablo Base and Meridian

2.2 Regulatory Status

The Sierra Institute applied for and received a grant from the DTSC to perform additional investigation in order to assess the viability of Site development for a woody biomass utilization campus. The TSI program is funded under DTSC’s CERCLA Section 128(a) State and Tribal Response Program Grant, administered by the USEPA. The TSI is being performed under the oversight and direction of the DTSC. The DTSC is responsible for reviewing and approving the TSI Work Plan and the TSI Report. There was no other regulatory agency involved with the Site at the time of the TSI.

2.3 Physical and Environmental Characteristics

The Site is located on the southwestern portion of Indian Valley, to the west of Indian Creek, a perennial stream controlled by the Canyon Dam that forms Lake Almanor. The stream flows generally from north to south in the vicinity of the Site. The topography, geology, and hydrogeology is described in the following sections.

2.3.1 Site Topography

According to the Crescent Mills 7.5-Minute Quadrangle topographic map prepared by the United States Geological Survey in 1994, the ground surface elevation of the Site is approximately 3,510 feet above mean sea level. Site topography in this portion of Indian Valley is relatively flat, with drainage from the Site to the east towards Indian Creek. Surface drainage at the Site is likely directed towards the creek through overland flow and below the ground surface through storm drains that were observed at the property.

2.3.2 Site Geology and Hydrogeology

According to the United States Geological Survey (USGS) Bulletin 353 on the Geology of the Taylorsville Region, the Indian Valley is underlain by Quaternary-aged alluvium deposited by Indian Creek, (USGS, 1908). Indian Valley is surrounded by mountains of complex geologic origin formed by uplift, folding, faulting, and volcanic activity related to the formation of the Sierra Nevada mountain range. The mountains in the Indian Creek watershed are predominately of metamorphic origin and are pre-Silurian to Cretaceous in age. There are also some formations of more recent Tertiary age andesitic bedrock of volcanic origin within the Indian Creek watershed.

Boring logs from previous investigations and this investigation at the Site and the adjacent property to the north indicated that the soil beneath the Site is composed of an amalgamation of sand, silt, and gravel, which is typical of an alluvial floodplain (Resna, 1992; E&E, 2014b).

Groundwater at the Site and at the adjacent property to the north was reported at shallow depths from approximately 5 to 10 feet below ground surface (bgs) during past investigations (Resna, 1992; Geocon, 2002; E&E, 2014b). Groundwater flow beneath the Sacramento Valley Moulding site adjacent and north of the Site, was reported in 1992 to be in a southeast direction at 0.01 feet/foot in shallow monitoring wells installed to assess impacts from a leaky UST (Resna, 1992).

The Site is within the floodplain of Indian Creek (USGS, 2012). According to CH2M Hill (1991) and personal communication with the Plumas County Environmental Health Department (PCEHD), the Site reportedly flooded in 1986 and again in 2009. Throughout the TSI field investigation in February 2017, the Site was inundated in standing water in low-lying areas. Due to nearly continuous rain throughout the week of the investigation, the level of Indian Creek rose and by 10 February 2017 the creek entirely flooded the majority of the Site as shown in Photos 31 and 32 of Appendix D.

2.3.3 Site Climatological Setting

Like most of the Sierra Nevada region of California, the climate in Crescent Mills is seasonal and generally dry in the summer months between June and September and wetter in the winter months between October and May. Monthly average temperatures in the nearby town of Quincy range from a low of 48º and high of 89º Fahrenheit in July to a low of 26º and high of 44º Fahrenheit in December (WorldClimate.com). According to the Plumas County Geographic Information Systems Division (2012), annual precipitation in Crescent Mills amounted to 39 to 47 inches of rain between the years 1971 and 2000. Snow in the Sierra Nevada is infrequent but possible in winter months at the elevation of Crescent Mills.

2.4 Current and Historical Land Uses

The Site history was summarized by CH2M Hill (1991) and E&E (2014a). The Site was initially developed as a lumber mill in the late 1940s to early 1950s. Before the lumber mill was built, the property was likely used for agriculture. The Site was reportedly purchased by LP in the early 1970s and the mill was expanded. Prior to the acquisition by LP, the property reportedly contained a planing mill, several dry kilns, a boiler, office buildings, dry lumber storage sheds, several USTs, and a teepee burner for burning wood waste (which is currently located off-Site). The structures were predominantly on the north and west portions of the property as shown in Figure 2. After purchasing the Site, LP added several features to the property including a log deck recycle pond, a sawmill facility, additional dry kilns, a planing mill, and a woodwaste disposal area which was reportedly located outside of the current property boundaries adjacent to the creek as shown in Figure 2. LP reportedly operated the Site as a lumber mill until it was closed in 1986. Based on available aerial imagery of the Site, structures appeared to have been gradually removed after the lumber mill closed. The current Site owner, Greg Lehman, purchased the property from LP in 1998. In 2002, the California Department of Transportation (Caltrans) purchased the eastern portion of the Site along Indian Creek from Mr. Lehman for a wetland and riparian mitigation area. Aerial imagery indicated that the Site was cleared of structures, except for building foundations and residual debris, and remained relatively unchanged from 1998 to present. The current Site layout is shown in Figure 2.

2.5 Site Land Use

At the time of the TSI, the Site was vacant with the exception of lumber mill remains including stockpiles of wood waste and soil, asphalt paving, concrete floor slabs, building foundations, and residual construction and industrial debris. The property was secured with a perimeter fence. The Site is zoned as light industrial and commercial by the Plumas County Assessor’s office (Plumas County GIS Division, 2017).

2.6 Surrounding Property Land Use

The Site is located in an area of mixed use, adjacent to a railroad to the west, the Mount Huff Golf Course to the south, a riparian area and Indian Creek to the east, and the former Sacramento Valley Moulding facility which formerly made wood moulding and currently contains abandoned structures and storage units to the north. A Pacific Gas and Electric electrical substation is located on a small parcel between the Site and the railroad near the center of the western property boundary.

Nearby surroundings of the Site include various residential and commercial properties in the town of Crescent Mills situated adjacent to the Site to the west across the railroad tracks and California Highway 89. Riparian areas and meadows of Indian Valley are situated to the north, east, and south of the Site. Mountains are found to the west of the town of Crescent Mills and beyond the Indian Valley in all directions.

2.7 Previous Investigations

Four key documents regarding investigations conducted from 1991 to 2014 were available for the Site:

- Property Transfer Environmental Site Assessment (CH2M Hill, 1991);
- Supplemental Site Investigation Report (Geocon, 2002);
- Phase 1 Environmental Site Assessment (E&E, 2014a); and
- Targeted Brownfields Assessment Report (E&E, 2014b).

Figure 3 shows the locations of samples collected during previous investigations at the Site.

2.7.1 Property Transfer Site Assessment (CH2M Hill, 1991)

CH2M Hill conducted a property transfer Site assessment on behalf of LP in 1991. At the time of the investigation, most of the buildings remained on-Site. Pertinent findings from the investigation report were as follows:

- Sawmill – An anti-stain agent containing PCP was sprayed onto cut lumber near the sawmill between 1974 and 1979. According to CH2M Hill, LP staff collected two soil samples in 1988 at a depth of 10 to 12 inches bgs and PCP was reported at concentrations of 2 and 5 milligrams per kilogram (mg/kg) and trichlorophenol (TCP) was reported at 1 and 3 mg/kg. The exact location where these samples were collected was not indicated. Two transformers were located near the sawmill during the Site walk. According to CH2M Hill, LP personnel removed polychlorinated biphenyl (PCB) containing transformers from the Site prior to 1984 and PCB containing capacitators in 1988.

- Boiler building – Chemicals were used for boiler maintenance and condensate from the boiler was discharged to sumps near the boiler building and collected in tanks and recycled during various stages of mill operations. Several sacks and containers of chemicals were observed during the Site walk and discolored soil was observed at the southeast corner of the boiler building. The trade names of these chemicals reportedly used at the Site included Series 145, 160, and 195 Boiler Water Treatment containing hydroxides, Series 580 and 590 Colloidal Boiler Treatment containing primary amines and Series 622 Closed System Treatment containing secondary amines.
- Maintenance shop – A maintenance shop was used to store paints and lubricants.
- Oil shed – The oil shed was used to store and dispense oils and lubricants. According to CH2M Hill, the floor of the shed was found to contain oil covered sawdust. At the time of the Site visit, the shed was fully enclosed, the floor was free of cracks, and the building was surrounded by berms on all four sides.
- New planing mill – An oil dispensing unit and transformer were indicated to the south of the new planing mill building constructed in 1977 and discolored soil was observed in the oil-dispensing area during the Site visit. An end-seal application area reportedly existed at the northern end of the new planing mill.
- USTs – Three USTs were reportedly removed from the west side of the Site in 1987 including two 6,000-gallon diesel tanks and one 10,000-gallon leaded gasoline tank, however confirmatory soil samples were not collected to assess if the tanks leaked because the tanks were partially submerged in water. According to CH2M Hill, in addition to the above referenced USTs, a single storage tank was brought to the Site from another property and remained near the maintenance shop. There was no indication that this tank was used or installed at the Site.
- Aboveground storage tanks (ASTs) – ASTs at the Site included a waste oil tank to the north of the maintenance shop, two condensate tanks near the boiler building, one water storage tank, and one tank of unidentified nature in an area indicated as a possible fueling area. The size of the individual ASTs was not noted.
- Former mill roadways – An August 1984 inspection by the Regional Water Quality Control Board indicated that ash from the boiler was spread on the roadways around the Site. Waste oil was also reportedly spread on the mill roads for dust suppression.

- Wood waste stockpiles – Wood waste including ash from the boiler was disposed in an approximately 1,700 by 600 feet area between the mill buildings and Indian Creek to the east of the current property boundary since 1976. A specific portion of this stockpile near Indian Creek was reportedly used for disposal of ash from the boiler and the former teepee burner. The stockpiles and ash disposal areas were located during the investigation Site walk.
- Wells – The Site was reportedly supplied by municipal water; however, two wells were reported on-Site during the Site walk that were used to fill the log deck recycle pond and for fire control, respectively. According to LP staff, the wells were reportedly installed with screen intervals between 38 and 90 feet bgs.
- Log deck recycle pond – A spray system was used to keep new lumber moist prior to processing. According to CH2M Hill, no biocides were used during this process.

2.7.2 Supplemental Site Investigation Report (Geocon, 2002)

A Supplemental Site Investigation was conducted by Geocon on behalf of Caltrans to assist with the property transfer of the eastern portion of the property along Indian Creek for a wetland restoration project. The investigation focused on areas of concern identified by CH2M Hill during their initial Site investigation (CH2M Hill, 1991). The investigation included advancement of five direct-push borings to a maximum depth of 9 feet bgs for soil and groundwater sampling and six hand auger borings for soil sampling. Borings were advanced in the vicinity of the sawmill anti-stain area, near the boiler, at the new planing mill oil dispensing unit, in front of the maintenance shop, near the UST excavation, adjacent to the old dry kiln from the first phase of the mill where above ground piping was observed, and in the area that is currently off-Site where ash and wood waste were disposed as shown on Figure 3. Laboratory analytical reports were not provided in the available document; data was only reported in tables within the report. Samples were analyzed for phenols, TPH, metals, and VOCs.

The only contaminant impacts reported were of low concentrations of TPH in the motor oil range (TPH-mo) at HA3 west of the maintenance shop and methyl-ethyl ketone and acetone near the anti-stain area. Metals were analyzed in some samples and were well below project specific screening levels. A slight hydrocarbon odor was noted in boring HA6, but a soil sample was not collected from the depth where the odor was noted, and TPH was not reported in the samples collected from the boring.

2.7.3 Phase 1 Environmental Site Assessment (E&E, 2014a)

A Phase 1 Environmental Site Assessment was prepared by E&E on behalf of the USEPA (2014a). E&E identified several recognized environmental conditions (RECs) at the Site including the documented presence of PCP near the anti-stain area, the presence of discolored soil in front of the maintenance shop and southeast corner of the boiler building, the practice of disposing of boiler and incinerator ash on roadways and in wood waste stockpiles, and the presence of wood waste stockpiles that may have contained ash and anti-stain agent-treated wood waste.

The majority of information provided in the report was discussed in Sections 2.7.1 and 2.7.2 for the CH2M Hill and Geocon reports, respectively. New information was mainly obtained from an Environmental Data Resources Inc. (EDR) report provided as an Appendix C to the investigation report. Every structure shown on Site aerials (including the building east of the maintenance building shown on the 1962 aerial of the pre-LP Site layout) was not identified in discussion or Site plans. It is assumed that these unidentified structures were not heavily used or used as storage, and therefore are not likely a major source of contaminants at the Site. New information related to COPCs included the following:

- The 1962 aerial clearly shows the locations of former mill roads at the Site between log piles. This aerial was apparently used to delineate mill road composite samples collected by E&E in a subsequent investigation (2014b).
- The location of a septic tank was indicated to the east of the sawmill in LP building plans. No other septic tanks were identified at the Site.
- Additional interviews with Mr. Lehman, the property owner, and Mr. McKee of the Sierra Institute did not resolve if the fourth UST currently remains at the Site near the maintenance shop. Mr. Lehman also indicated that some of the fill on the southern end of the Site was from the eastern portion of the Site that Caltrans purchased and was analyzed for potential contaminants prior to emplacement at the Site, but could not locate the analytical records.
- A records review revealed several findings. When the Site was owned by LP, it was listed under the California state solid waste facilities and landfill sites records as facility number 32-AA-0020 with a 30 tons/day of wood waste disposal capacity. Neither a permit date or active status was reported. Also, while under ownership of LP, the Site was included on the underground storage tank registry

in 1991 for having two 6,000-gallon diesel and one 10,000-gallon leaded gasoline USTs. The Site is identified by the CalEPA identification number CAT000646117 in the HAZNET database for removal of approximately 330 tons of contaminated soil in 1999. No indication of the source or exact location of this impacted soil was given.

2.7.4 Targeted Brownfields Assessment Report (E&E, 2014b)

Following the Phase 1 investigation summarized in Section 2.7.3, a Targeted Brownfields Assessment was conducted and a report was prepared by E&E (2014b). The investigation included collection of eight 5-point composite samples, four of which were from former mill roads and four of which were from soil and wood waste stockpiles, and advancement of three borings for soil sampling, two of which were advanced for groundwater sampling (Figure 3). Original laboratory analytical reports were not provided in the available report; the analytical results were summarized in tables within the report. Soil and groundwater sample analyses included PCP, TCP, TPH, metals, dioxins and furans, and VOCs.

Contaminant impacts above project-specific screening levels were reported in numerous samples. TPH-d and TPH-mo was reported in soil and groundwater at boring LP-B03 and in the soil composite samples LP-SC01 from the former mill road near the maintenance shop and LP-SC04 from the former mill road near the location of the former USTs and ASTs on the western portion of the Site. Dioxins and furans were reported at low concentrations in all of the soil composite samples from wood waste stockpiles and former mill roads. The former mill road sample LP SC03, that included the area around the boiler buildings had a reported dioxin and furan TEQ concentration of 19.98 picograms per gram (pg/g), which was the only dioxin and furan TEQ concentration above the selected project screening level of 18 pg/g. Dioxins and furans were not analyzed in soil or groundwater samples from soil borings. Arsenic exceeded the project selected screening level of 5 mg/kg in soil samples from two of the soil borings, and in each stockpile and road composite sample. Arsenic was reported in all soil samples where it was analyzed and ranged from 5.9 to 130 mg/kg, with the majority reported at less than 25 mg/kg. These results suggest that background concentrations of arsenic may be greater than the screening level at this Site. Arsenic was not reported in the two groundwater samples collected. Other metals were reported in soil and groundwater but remained well below selected project screening levels. PCP and TCP were not reported in soil or groundwater from any of the soil borings or wood waste stockpile samples, however the groundwater laboratory reporting limit of 10 micrograms per liter (µg/L) was greater than the current MCL of 1 µg/L for PCP.

2.8 Site Water Supply

There is currently one uncapped well at the Site identified in previous reports as the log deck recycle pond well (CH2M Hill, 1991; Figure 2). DWR records are available indicating that two wells were installed at the Site at total depths of 90 and 155 feet bgs (Geosyntec, 2017b). One of these wells is presumably the log deck recycle pond well and the other is likely the Fire Well that may be present on the portion of the property that was purchased by Caltrans in 2002 (Figure 2). The log deck recycle pond well is installed with no surface covering in a standpipe set in an elevated concrete pad as shown in Photo 37 of Appendix D. The well was gauged on 29 March 2017 and the depth to water was found to be 5.16 feet below the top of the stickup casing and the depth to the bottom of the well was found to be 58 feet below the top of the casing (Appendix C). There were indications of an “Old Well” near the saw mill and an “Irrigation Well” in an undisclosed location at the Site reported in Plumas County Building Records (Geosyntec, 2017b). Neither of these wells were identified during previous Site investigations and or observed during Site visits for the TSI.

2.9 Observations from Site Reconnaissance

A Site reconnaissance was performed by DTSC, Geosyntec, Sierra Institute, and Plumas County staff on 9 November 2016. Relevant findings of the Site walk that influenced the conceptual Site exposure model and data collection strategy were as follows:

- Transformer pads were confirmed near the new planing mill and sawmill based on the numerous heavy-gauge electrical conduits present. The transformers had been removed and no soil or asphalt staining was observed.
- None of the surface staining indicated in past reports was noted, although there was an area free of vegetation between the sawmill, sorter/stacker building, and green chain that may be related to application of the PCP-containing anti-stain agent.
- An uncapped well was located adjacent to the log deck recycle pond as discussed in Section 2.8.

- The former UST area indicated by E&E (2014a; 2014b) on their Site plans was observed to be a ramp with no apparent signs of the former presence of USTs or excavation activities (i.e. patched asphalt).
- Five storm water drainage drop inlets were observed across the Site. The outlet for these drains was not identified on the property.
- A gap with a conveyor chain and ramp was observed bisecting the fuel shed. There was a pit at the western side, below the top of the ramp, where a crushed 55-gallon drum was observed.
- Each wood waste stockpile was found to contain soil, gravel and in some cases metal and demolition debris along with wood waste.

2.10 Recognized Environmental Concerns

There were numerous potential sources of hazardous substances contamination that were identified at the Site in the Work Plan. Details regarding available data, information, and COPCs identified in conjunction with each REC was included in the Work Plan. Table 1 identifies the samples collected to assess each REC. The investigated Site RECs included the following areas and possible sources of impacts:

- Sawmill, Green Chain, and Sorter/Stacker Building area – Historical application of anti-stain on lumber, use of PCB-containing transformers, and presence of a septic tank;
- Boiler Building and Boiler Fuel Shed area – Fuel used to power the boiler, ash and other waste generated by boiler, and chemicals associated with boiler maintenance;
- Maintenance shop and Old Planing Mill/Oil Shed area – Vehicle and equipment maintenance, chemical storage including a waste oil AST and possible presence of an UST, and observations of stained soil near the maintenance shop trench drain and oil soaked sawdust in the oil shed;
- New Planing Mill – PCB-containing transformers and oil dispensing unit and an end-seal application area;
- Old Dry Kiln Piping - Aboveground piping covered in a tar-like substance and indication of petroleum hydrocarbon odor in soil;

- Possible Fueling Area ASTs and USTs - ASTs of unknown contents and USTs that were removed from the Site but not sufficiently investigated during previous investigations;
- Former Mill Roads – Historical practice of spreading ash and waste oil on the dirt mill roads; and
- Wood Waste and Soil Stockpiles – Boiler and teepee burner ash disposed of in the wood waste stockpiles at the Site.

3. PROJECT AND DATA OBJECTIVES

This section summarizes information regarding the DQOs, data quality indicators [DQI(s)], data review and validation procedures, data management tasks, and assessment oversight associated with project activities. The project DQOs developed specifically for the planned sampling and analysis program were determined based on USEPA's seven-step DQO process (USEPA, 2000). The project definition associated with each step of the DQO process was summarized as follows:

State the problem: The purpose of the sampling program was to determine whether the Site is acceptable for development as a woody biomass utilization campus. The problem was that the historical Site-use as a lumber mill may have impacted the soil and groundwater at the Site with a variety of contaminants including carbamates, metals, dioxins and furans, PAHs, PCP, 2,4,6-TCP, PCBs, TPH, and VOCs. Although the proposed development of the Site may result in asphalt or concrete surfacing over part of the Site, exposed soils may exist in landscaped and other areas where Site workers could come into contact. In addition, groundwater is shallow at the Site and may be contacted by future Site construction workers and may pose a possible vapor intrusion risk for VOCs. The goal of this project is to provide credible information regarding these COPCs that can be used to evaluate potential impacts and manage risk associated with the Site (if any).

Identify the Decision: The data obtained from the sampling and testing activities was used to evaluate whether releases of hazardous substances from historical uses have occurred at the Site and if applicable, to what extent any found contamination or naturally occurring constituent concentration will result in risk of exposure. The data results were compiled and used to assess the relative threat associated with onsite constituent concentrations through screening risk evaluations performed in accordance with the procedures set forth in DTSC's PEA Guidance Manual. Based on the screening risk calculations for the Site, the suitability of the property for its intended development was determined.

Identify Inputs to the Decision: Inputs to the decision included results of analytical testing of ISM soil samples, discrete soil samples, and groundwater samples from selected locations on the Site. Each of these matrices was tested for the specified analytes presented in Table 1.

Define the Study Boundaries: The boundaries of the field sampling and analysis program were the perimeter of the Site as defined by the Plumas County Assessor Office. The depth was limited to five feet below encountered groundwater. The field investigation components of the TSI was completed by the end of April 2017.

Develop a Decision Rule: Decisions were based upon laboratory results for the target constituents presented in Table 1 for each respective matrix tested. If no valid detectable concentrations of target compounds were reported for the given samples, then a decision was made that the Site was adequately characterized with respect to these compounds tested and no further sampling will be required as part of this TSI. Target constituents reported in samples were compiled for comparison to screening levels for protection of human health so that the results could be used to request a determination from DTSC as summarized in Section 7.2.

Specify Limits on Decision Error: The results of the analytical testing were subject to data evaluation following the procedures for data review specified as specified in the Work Plan. Data was determined to be valid if the specified limits on precision, accuracy, representativeness, comparability, completeness, and sensitivity were achieved. The results of any reported target constituents were considered in evaluating the need for additional sampling of soil or groundwater, and assessing the necessity for reducing any risks posed by the potential contamination.

Develop the Plan for Obtaining Data: The field-sampling program was designed to provide the type and quantity of data needed to satisfy each of the aforementioned objectives. The Work Plan provided the specifications for the data collection activities, including the numbers of samples, respective locations and sampling techniques. The quality of the data was assessed through the procedures further described herein.

4. INVESTIGATION METHODS

The TSI field investigation consisted of soil and groundwater sampling and analysis to assess environmental conditions for the RECs identified in Section 2.10. Figures 4, 4a, 4b, and 4c show the TSI sampling locations. Sampling was completed during two mobilizations; the first was from 6 to 10 February 2017 and the second was completed on 29 March 2017. All field work was performed in accordance with the Health and Safety Plan (HASP) presented in Appendix A of the Work Plan and Geosyntec Standard Operating Procedures (SOPs) in Appendix B of the Work Plan. All engineering or geologic work performed as a portion of the TSI was implemented or supervised by a registered PE and/or PG in compliance with the requirements of the Professional Engineers Act, Business and Professions Code Sections 6700-6899 and Section 7838, and the Geologist and Geophysicists Act, Business and Professions Code sections 7800-7887.

The following sections describe the sampling strategy, rationale, investigative methods and procedures, sample analysis program, sample handling, decontamination procedures, and management of investigation derived wastes (IDW) as they applied to the TSI.

4.1 Investigation Preparation

Cascade Drilling, a certified environmental driller was selected to assist with soil borings for soil and groundwater sample collection. Test America, a California-certified laboratory was selected for analysis of soil and groundwater samples. Geosyntec and Cascade Drilling obtained a soil boring permit from Plumas County prior to initiating the subsurface investigation at the Site (Appendix B). Utility clearance of soil borings included a 48-hour prior notification of Underground Service Alert (USA) and a geophysical survey at the Site. Prior to the TSI the boundaries of the investigation at the Site were clearly marked with white paint at the Site entrance. USA contacted all utility owners of record within the Site vicinity and notified them of the intention to conduct subsurface investigations in proximity to buried utilities and all utility owners of record, or their designated agents, clearly marked that the Site was free of their utilities.

4.2 Geophysical Survey

Subtronic Corporation of Martinez, California conducted a geophysical survey on 6 February 2017 to attempt to locate a UST that possibly remained at the Site near the maintenance shop and clear borings for utilities, as needed. The geophysical evaluation included visual, electromagnetic, and ground penetrating radar methods. Results of the geophysical survey are presented in Appendix E and discussed in Section 5.1. Based on a lack of evidence suggesting active subsurface utilities at the Site, a subsurface geophysical survey was only conducted in the vicinity of boring SB-15 which was adjacent to an apparent trench line from the USTs to the sawmill and SB-8 which was advanced in the vicinity of a possible remaining UST at the Site. The survey near SB-15 did not reveal any likely subsurface utilities and was not included in the Geophysical Report in Appendix E. The results of the survey conducted in the vicinity of boring SB-8 is discussed further in Section 5.1.

4.3 Incremental Sampling Methodology Soil Sampling

Shallow soil samples were collected from various areas of the Site using a modified version of ISM sampling as defined by the Interstate Technology and Regulatory Council (ITRC; ITRC, 2012), discussed below, and explained in more detail in the Geosyntec SOP in Appendix B of the Work Plan and Laboratory SOP in Appendix D of the Work Plan. Shallow ISM samples were collected in locations shown in Figures 4, 4a, 4b, and 4c and summarized on Table 1.

ISM is a structured composite sampling and processing protocol intended to reduce data variability and provide a reasonably unbiased estimate of mean contaminant concentrations in a volume of soil targeted for sampling. From each decision unit (DU) designated for sampling, 30 soil increments were collected from relatively equal sized sampling units (SUs), which combined created one composite soil sample representing that DU. Composite samples were collected at approximate depths of 0 to 0.5 feet bgs for DU-1 through DU-9 and DU-11 through DU-14, and between 0.5 and 5 feet bgs for DU-15 through DU 21, the wood waste and fill stockpile samples. No sample was collected from DU-10 as proposed in the Work Plan as discussed in Section 4.12. Traditional ISM sampling includes collection of three replicates from each DU. However, as described in the Work Plan, because of the uncertainty of the extent of various COPC-impacts at the Site and budgetary constraints, replicate ISM samples will not be collected in this phase of investigation. Replicate samples may be collected in a second phase of investigation on a later date in order to confirm the presence of COPCs that were detected close to or above respective risk screening levels.

ISM samples for DU-1 through DU-9 and DU-11 through DU-14 were collected in dedicated acetate sample liners using direct-push technology (DPT) drill rig advanced by

Cascade Drilling. ISM samples DU-15 through DU-21 from soil and wood waste stockpiles were collected using a shovel and/or hand sampling implement advanced by Geosyntec staff in accordance with the SOP included in Appendix B of the Work Plan. Shallow DPT borings or hand sampling implements were advanced to collect samples at the relative center of each SU. Samples were analyzed for various COPCs as summarized in Table 1 based on the RECs discussed in Section 2.10. The ITRC recommends collection of three replicate ISM samples for each DU, however, because of the uncertainty of the extent of various COPC-impacts at the Site and budgetary constraints, replicate ISM samples were not collected for this TSI. Per the ITRC guidance (ITRC, 2012), to avoid losing COPC mass of during the composite process, sub-samples for PAH analysis were collected from the ISM composite samples prior to the drying step, then corrected for soil moisture content after analysis as outlined in the laboratory SOP in Appendix D of the Work Plan.

Soil lithology was not recorded for ISM soil borings at each SU. Approximately 33.3 grams of soil was weighed and collected from each SU and composited into approximately 1 kg samples. Samples were collected in resealable plastic bags, clearly labeled in the field as specified by the sample identification in Table 1, and delivered to the analytical laboratory on ice.

4.4 Discrete Soil Boring Soil Sampling

Discrete soil samples were collected from fourteen soil borings at locations shown on Figure 4, 4a, 4b and 4c from the approximate depths indicated on Table 1. Discrete soil samples were collected from soil borings SB-1 through SB-15 that were advanced using a DPT drill rig and from shallow borings SB-16 through SB-20 that were advanced using a hand auger and shovel. Soil boring logs were recorded for each location that included a soil description using the Unified Soil Classification System (USCS) format as specified in the SOP in Appendix B of the Work Plan. Soil boring logs are included in Appendix C. Soil was evaluated for visual and olfactory indications of chemical impacts (i.e., presence of non-soil debris, soil discoloration, and odor) and screened for volatile content using a photo-ionization detector (PID). PID readings were recorded on the soil boring logs. Intervals from the non-saturated portion of recovered soil were selected for sampling and sample locations were recorded on the soil boring logs.

4.5 Groundwater Sampling

Groundwater samples were collected from thirteen soil borings at the Site as specified in Table 1 in locations shown on Figures 4, 4a, and 4b. Groundwater samples were collected from soil borings by installing a temporary 1-inch diameter polyvinyl chloride (PVC) slotted well screen within the casing to the bottom of the boring. Due to heavy precipitation prior to and during the sampling event there was standing water covering much of the Site, and groundwater levels were found near the ground surface at most sampling locations. Care was taken to advance borings in locations that were not under ponded water and the DPT casing was left in the ground to prevent surface run-off into the open borings (Photo 25, Appendix D). In general, borings were advanced to 10 feet bgs, the soil was extracted from the center of the core, and the casing was raised 1- to 5-feet to expose a material through which to collect the groundwater sample. If groundwater did not recover at the depth that the casing was initially raised, then the casing was raised again to no higher than 4 feet bgs. At location SB-4, which was advanced on an elevated portion of the Site near the boiler building, sufficient groundwater to sample did not recover in the top 10 feet, so the boring was advanced to 15-feet bgs and the casing was raised to 9-feet bgs to collect a groundwater sample.

Groundwater samples were collected using a peristaltic pump and low flow sampling methodology. Samples were collected once groundwater quality parameters measured using a water quality probe and flow-through cell stabilized within acceptable thresholds outlined in Geosyntec's groundwater sampling SOP (Appendix B of the Work Plan). Samples collected for VOC analysis were collected with no headspace and the vials were tightly sealed immediately following collection. Samples collected for metals analysis were filtered using a 0.45-micrometer filter and acidified in the field. Samples were stored on ice in coolers until delivered to the analytical laboratory under proper chain of custody procedures.

Even though USEPA-approved analytical methods were used, and boreholes were purged until groundwater parameters stabilized, groundwater analytical results were considered screening-level data due to the method of sample collection (i.e. grab groundwater from soil borings) which offers little protection against turbidity interference and volatilization due to sample agitation.

4.6 Arsenic Sampling

Arsenic concentrations were consistently reported above project screening levels during previous investigations, therefore two background arsenic ISM samples were collected to establish background arsenic values for the Site. The first ISM sample collected, Arsenic-DU was collected as a non-structured composite of 30 increments from native soil between 3 and 10 feet bgs during the initial investigation. These samples were collected from various borings throughout the Site that were advanced into native, undisturbed materials for shallow ISM sampling, discrete sampling, and from ten borings that were advanced near the western property boundary adjacent to the Site entrance for collection of additional material at the conclusion of the investigation. The exact locations of each of these increments was not recorded, as specified in the Work Plan. Increments were only collected from soil that was not thought to be fill and had no obvious contaminant impacts such as odor or staining. A second arsenic background sample, Arsenic-DU-2, was collected in a second mobilization to the Site from shallow fill materials from 0.5 to 1 foot bgs in the southern end of the Site along the western property boundary (Figures 4 and 4c). This location was selected as having the least likelihood of impact from lumber mill practices, therefore should be indicative of the shallow fill used to elevate and level the Site. The arsenic results of these samples were used in this TSI as the background arsenic concentrations for the shallow fill and deeper native soil.

After arsenic soil results were obtained from the initial phase of investigation, arsenic solubility was tested on samples with higher arsenic soil concentrations. Deionized water was used as a leaching solution using the Deionized (DI) Water Waste Extraction Test method, and arsenic was analyzed in the solution by USEPA Method 6010B.

4.7 Sample Collection and Analysis

The requirements for sample containers, volumes, preservatives, and holding times for various analysis were summarized in the Work Plan. Details regarding the analytical methods selected for each sample collected for this TSI are included in Table 1 and in the Work Plan. Field QC samples collected for this TSI were equipment rinsate blanks, field duplicates, and trip blanks as described in the Work Plan and as summarized in Table 1. Equipment blanks were collected from the DPT drilling shoe on 6, 7, 8 and 10 February 2017 and from the shovel and soil sampling implement on 9 February. During the second phase of investigation on 29 March 2017, an equipment blank was collected from the hand auger and shovel used to collect the ISM and discrete soil samples. Field duplicates were collected simultaneously with a standard sample from the same source under conditions as identical as feasible to the primary sample (USEPA, 2012). Project soil and groundwater samples were also collected for matrix spike (MS) / Matrix Spike Duplicate (MSD) analysis by the laboratory for assessment of potential matrix affects to the precision and accuracy of the data.

4.8 Field Information and Sample Documentation

4.8.1 Field Logs

Field logs were recorded to document where, when, how, and from whom any vital project information was obtained. Field log records are included in Appendix C. Log entries were complete and accurate enough to permit reconstruction of field activities. All entries were legible and written in ink. Language was factual, objective, and free of personal opinions or other terminology, which might prove inappropriate. If an error was made, corrections were made by crossing a line through the error and entering the correct information. Corrections were initialed. No entries were obliterated or rendered unreadable.

4.8.2 Photographs

Photographs were taken to verify information entered in the field logbook. A photographic log is included in Appendix D containing the following information:

- Time, date, location, and, if appropriate, weather conditions;
- Description of the subject photographed, including sample identification number;
- Point-of-view orientation of the photo (e.g., to the west; to the east-southeast); and
- Name of person taking the photograph.

4.8.3 Sample Locating

A global positioning system (GPS) logging device was used to record the latitude/longitude and elevation coordinates of the discrete and groundwater sample locations. The borders of the ISM sampling DUs were not logged using the GPS device due to flooding of the Site before the locations were collected.

4.9 Decontamination Procedures

Prior to and after each use, all re-usable equipment that could potentially contact and influence subsequent soil and/or groundwater samples was decontaminated to assure the quality of samples collected. Disposable equipment intended for one-time use supplied new and was not decontaminated before use. Equipment was decontaminated using the following procedures:

- Non-phosphate detergent and tap water wash, using a brush if necessary;
- Tap-water rinse;
- Final deionized/distilled water rinse; and
- Set on clean plastic sheeting to air dry (if possible).

When not in use, decontaminated sampling equipment was covered, wrapped in, or covered with clean plastic or aluminum foil.

4.10 Investigative Waste Management

In the process of collecting environmental samples during on-Site soil and groundwater sampling, different types of potentially contaminated IDW were generated including the following:

- Used personal protective equipment (PPE);
- Disposable sampling equipment;
- Decontamination fluids;
- Purged groundwater and excess groundwater collected for sample container filling; and
- Soil cuttings.

The USEPA's National Contingency Plan requires that management of IDW generated during such investigations comply with all applicable or relevant and appropriate requirements to the extent practicable.

IDW was collected in 55-gallon drums, sealed, labeled with the drum contents, and placed near the Site entrance. IDW included one drum of soil cuttings and two drums of water from groundwater purging and decontamination. Used PPE and disposable equipment such as acetate liners were double bagged and placed in a municipal refuse dumpster. These wastes were not considered hazardous due to the limited amount of site media that may adhere to this solid material and can be sent to any acceptable municipal landfill. After review of the analytical results the drums were transported off Site to an appropriate facility for disposal by Doulos Environmental, a California-certified waste handler. A signed waste manifest is included as Appendix F.

4.11 Sample Analysis

Soil and water analytical services were provided by laboratories that are accredited by the California Department of Health Services, Environmental Laboratory Accreditation Program (ELAP). Analytical services were predominately provided by Test America West Sacramento location with the exception of the following. PAH and PCP analyses of groundwater by USEPA 8270-SIM were subcontracted to the Test America Pleasanton location; Arsenic analysis by USEPA 6020 was subcontracted to the Test America Irvine location; Carbamates by USEPA 8321A in soil were subcontracted to Test America's Denver laboratory; and Carbamate analysis in water which were provided by Agriculture and Priority Pollutants Laboratories, Inc. of Clovis, California. Test America West Sacramento provided ISM sample processing per their SOP provided in Appendix D of the Work Plan.

4.12 Variances from the Work Plan

Variances from the DTSC-approved Work Plan were implemented during field sampling activities at the Site as follows:

1. A sample from DU-10 was not collected during the first phase of sampling due to inundation of the area by surface flooding. After review of the mill road sample data, it was decided in conjunction with the DTSC that the sample was not necessary, and therefore no sample was collected during the second phase of investigation.
2. The DU-20 and -21 boundaries were adjusted from the proposed boundaries in the Work Plan based on field observations. DU-20 soil was observed to contain more gravel and construction debris than DU-21. DU-21 was found to predominantly consist of clay and peat that was not indicative of soil or wood

waste stockpiles. Flooding between and around the decision units caused a reduction in the area sampled from the proposed boundaries in the Work Plan.

3. Locations of borings for ISM, groundwater, and shallow soil sampling were moved to dry locations across the Site due to Site-wide ponding of water and flooding during the TSI investigation.
4. The cable for the groundwater sampling multi-parameter probe malfunctioned in the field. Readings for pH were noticeably inconsistent and tended to drift towards low pH. Consequently, pH readings should be considered unreliable and could not be used to assess the pH of groundwater in the boiler area as proposed in the Work Plan.
5. Not all borings were fully sealed with hydrated bentonite, or another impermeable material during the first phase of investigation due to Site flooding between 9 and 10 February preventing access to unsealed borings. Pat Sanders of PCEHD was notified of this condition and allowed the variance based on Site access issues. During the second phase of investigation on 29 March 2017, all borings that were located were filled with grout to the ground surface using a tremie pipe. Some borings were either not able to be located or had filled or collapsed due to flood waters.
6. Additional samples were collected during a second phase of investigation that were not included in the Work Plan. These samples included a shallow fill background arsenic ISM composite sample (Arsenic DU-2) and five discrete soil samples for PAH analysis in areas where PAH laboratory reporting levels were elevated during the initial phase of investigation due to matrix interference (SB-16 through SB-20).

There were no other variances in the activities proposed in the Work Plan that diminished our ability to evaluate areas of potential concern or negatively impact project goals.

5. INVESTIGATION RESULTS

This section summarizes information gathered during the TSI investigation including field observations and analytical data.

5.1 Field Observations

Representative Site conditions during the fieldwork are shown in the Photographic Log provided in Appendix D. During the first phase of investigation from 6 to 10 February 2017, the weather was rainy with temperatures between 40 and 60 degrees Fahrenheit. Persistent rain before and during the initial phase of the TSI investigation led to flooding of the majority of the Site by conclusion of the investigation. During the second phase of investigation on 29 March 2017, standing water at the Site had drained or evaporated, and the weather was partly cloudy with temperatures near 60 degrees Fahrenheit.

Subsurface conditions at the Site were fairly uniform in each soil boring with notable exceptions described below. The surface soil consisted of compacted fill to approximately 3 to 5 feet bgs throughout the Site. Beneath the fill, mixtures of fine- to coarse-grained sediments typical of an alluvial flood plain were prominent. Obvious indications of chemical impacts (e.g. soil discoloration, odor, and PID readings) were not observed in the soil borings, with the exception of green coloration of the soil at SB-12 (Photo 29, Appendix D). Additional samples were collected from this location in order to assess possible metals and TPH impacts. PID readings in sediment were less than 1.3 parts per million, suggesting that substantial volatile contaminants were not present.

The native sediments beneath the fill ranged in color from red to green suggesting that oxidation and reduction of constituents in the sediment had occurred. Oxidized sediments were prominent on the upgradient western portion of the Site including borings SB-8, -9, -13, -14, and -15. Reduced constituents in sediments were prominent on the downgradient eastern and central portions of the Site including borings SB-1, -3, and -12. Groundwater quality measurements recorded on a multi-parameter probe corroborated that each of these borings was either oxidized or reduced, respectively. One possible reason for the variation in oxidation state across the Site was the prominence of readily available organic carbon in the form of sawdust and wood waste that was degraded by aerobic native microbial communities, driving the system towards anaerobic, reduced states.

5.2 Geophysical Survey

The geophysical survey conducted on 6 February 2017 identified buried metal objects near the maintenance shop (Appendix E). Two anomalies were indicated in the geophysical report as possible buried USTs, though these findings were inconclusive. Soil borings SB-8 and SB-16 were advanced adjacent to and downgradient of these two possible USTs and minimal COPC impacts were reported in groundwater as discussed in Section 5.3. During the search for the possible UST, a possible sewer line was identified extending approximately 40 feet to the east-southeast to the property boundary from the northeast corner of the maintenance shop. The terminus of this pipe appeared to extend off-Site onto what is now Caltrans property.

5.3 Analytical Results

Samples were collected and analyzed for at least one analyte from 21 ISM soil samples, 14 discrete soil samples, 2 duplicate soil samples, 13 groundwater samples, 3 duplicate groundwater samples, 6 arsenic solubility leachates tests, 2 trip blanks, and 6 equipment blanks. Laboratory analytical reports are provided in Appendix G of this report. The analytical results are summarized in Table 2 through Table 10, Figures 5a through 5c, and Figures 6a and 6b and in the sections below. Historical data is presented on tables and figures from past investigations (Geocon 2002, E&E, 2014b) but is not discussed in this section. Note that the laboratory results from these historical reports were not available; therefore, the results could not be verified for quality or accuracy.

The data presented in the following sections is primarily discussed if concentrations exceeded risk-based screening criteria such as the RSL or MCL as discussed in the DQOs in Section 3. The duplicate results for soil and groundwater samples and laboratory replicates for ISM samples were primarily used for quality assurance (QA) / quality control (QC) evaluation of the sampling and analytical procedures, and not discussed in the sections below.

Data validation was conducted by Geosyntec and is discussed in Data Quality Assessment Section 6. Data validation documentation is included in Appendix H. Data presented included laboratory QA/QC flags including J-qualifiers for data that was estimated as greater than the MDL but less than the laboratory reporting limit (RL).

5.3.1 Metals

Metals analytical results are summarized in Table 2 and Figures 5a through 5c for soil and Table 6 and Figures 6a and 6b for groundwater. Arsenic solubility data is presented on Table 10.

5.3.1.1 Metals in Soil

Metals were analyzed in sixteen primary ISM and discrete soil samples. Metals that were reported in one or more soil sample included antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, thallium, vanadium, and zinc. With the exception of arsenic and copper, reported concentrations of metals throughout the Site were relatively low and consistent with background concentrations reported in California soils (Kearney Foundation, 1996). Arsenic was reported in each of the sixteen soil samples analyzed at concentrations that ranged from 1.3 to 35 mg/kg. Copper was reported in each of the sixteen samples at concentrations that ranged from 10 to 490 mg/kg.

5.3.1.2 Metals in Groundwater

Metals were analyzed in two primary groundwater sample. Metals reported in one or both of the samples included arsenic, barium, beryllium, chromium, hexavalent chromium, cobalt, lead, nickel, silver, vanadium, and zinc. In general, metals were present at higher concentrations at SB-12 in the new planing mill end-seal area, than at SB-4 located near the former boiler building fuel shed. Arsenic was reported above the MDL at SB-12 and in the duplicate sample for SB-4. Hexavalent chromium was not reported in the primary sample from SB-4. There was hexavalent chromium reported by the laboratory at low concentrations of 0.015 J mg/L in the duplicate sample for SB-4 and 0.007 J mg/L for SB-12 (Appendix G), however hexavalent chromium was also reported in the associated equipment blank for these samples, therefore the data was validated as not reported above the RL as discussed in more detail in Section 6 and Appendix H. Therefore, the validated hexavalent chromium concentrations of these two samples are <0.050 and <0.010 mg/L for the duplicate sample from SB-4 and SB-12, respectively. Chromium was not reported above the MDL at SB-4 and was reported between the MDL and RL at a concentration of 0.0036 J mg/L at SB-12.

5.3.1.3 Arsenic Solubility

Arsenic solubility was tested using DI water as a leaching solution on six ISM samples with elevated reported arsenic concentrations, including samples from DU 5, DU-9, DU-11, DU-13, DU-17, and DU-21. Arsenic solubility results reported on Table 10 indicate that arsenic was not reported in the DI water leachate solution.

5.3.2 Dioxins and Furans

Dioxin and furan analytical results are summarized in Table 3 for soil and Table 7 and Figure 6a and 6b for groundwater. The 2,3,7,8-TCDD TEQ was calculated using the advanced EPA dioxin and furan calculator (USEPA, 2014) based on concentrations of each dioxin and furan isomer reported per the DTSC Human Health Risk Assessment (HHRA) Note 2 in order to compare results to the 2,3,7,8-TCDD screening level (DTSC, 2017). Of the isomers, only 2,3,7,8-TCDD has an RSL or MCL, therefore the summary below only includes discussion of this isomer and the TEQ.

5.3.2.1 Dioxins and Furans in Soil

Dioxins and furans were analyzed in 21 primary ISM and discrete soil samples. Of these, 2,3,7,8-TCDD, was reported in fifteen samples. Reported concentrations of 2,3,7,8-TCDD ranged from 0.23 J to 2.6 pg/g. Of the reported detections, ten of the samples were J-qualified as results reported were above the MDL but below the RL. The 2,3,7,8-TCDD TEQ was calculated for each sample and ranged from 0.61 J to 170 pg/g. The sample with the reported maximum 2,3,7,8-TCDD TEQ was DU-1 which was collected in the anti-stain area located to the north of the saw mill.

5.3.2.2 Dioxins and Furans in Groundwater

Dioxins and furans were analyzed in four primary groundwater samples. 2,3,7,8-TCDD was not reported above the MDL in the samples analyzed. At least one isomer was reported above the MDL for each primary sample, however each reported result was J-qualified as estimated below the RL. There was other qualification applied to the data based on detections of isomers in associated equipment blanks, detections in laboratory method blanks, and lack of reproducibility between duplicate samples as discussed in Section 6 and in Appendix H. The 2,3,7,8-TCDD TEQ calculation result was estimated for each primary sample and ranged from 4.6 J to 45 J picograms per Liter (pg/L). The maximum TEQ was reported at SB-4, which is located downgradient of the boiler area.

5.3.3 PAHs

PAH analytical results are summarized in Table 4 for soil and Table 8 and Figure 6a and 6b for groundwater. The benzo(a)pyrene TEQ was calculated using toxic equivalency factors (TEF) from the USEPA for select carcinogenic PAHs for comparison of the cumulative toxicity of PAH results to the screening levels for benzo(a)pyrene (USEPA, 2016).

5.3.3.1 PAHs in Soil

PAHs were analyzed in 28 primary ISM and discrete soil samples and were not reported above the laboratory MDL in any of the samples. MDLs for benzo(a)pyrene reported in soil were 98 to 11,000 µg/kg. MDLs were elevated in these samples due to matrix interference that forced the laboratory to dilute the samples for analysis. Discrete samples SB-16 through SB-20 were collected during a second phase of investigation in an attempt to obtain discrete data that did not require dilution during laboratory analysis.

5.3.3.2 PAHs in Groundwater

PAHs were analyzed in ten primary groundwater samples. Of these, detections of PAHs were only reported in one sample from SB-8. This sample was collected downgradient of the former AST north of the maintenance shop and adjacent to and downgradient of the possible UST that remained in the area. PAH results reported at SB-8 were between 0.061 J and 0.069 J µg/L for the PAHs benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibonz(a,h)anthracene, fluorine, and indeno(1,2,3-cd)pyrene. These results were each J qualified as estimated due to the concentrations falling between the laboratory MDL and the RL. The corresponding benzo(a)pyrene TEQ for this sample was 0.14 µg/L.

5.3.4 TPH and VOCs

TPH-d and TPH mo analytical results are summarized in Table 4 and Figures 5a through 5c for soil and Table 9 and Figures 6a and 6b for groundwater. TPH in the gasoline range (TPH-g) and VOCs were only collected during this investigation in groundwater and were reported in Table 9. As discussed in the Work Plan, soil sampling for VOCs and TPH-g was not planned for this phase of the investigation; rather groundwater data was used to assess the nature and extent of VOC and TPH-g impacts at the Site. VOCs released in soil during Site operations would have already leached to the shallow groundwater .

Additionally, the uncertainty of the location of any source of VOC and TPH-g impacts at the Site makes groundwater sampling a more reliable tool for assessment of potential impacts at this Site.

5.3.4.1 TPH in Soil

TPH-d and TPH-mo were analyzed in 16 primary ISM and discrete soil samples. TPH-d with silica gel cleanup (SGC) was reported in all but two samples analyzed at concentrations that ranged from 1.1 to 1,600 mg/kg and was reported without SGC in all but two samples analyzed at concentrations between 0.60 J and 1,600 mg/kg. The highest concentrations were reported at the locations with the most laboratory sample dilution due to matrix interference (between 20 and 100 times dilution). TPH-mo with SGC was reported above the MDL in ten primary samples at concentrations of 22 J to 3,900 mg/kg and TPH mo without SGC was reported in twelve primary samples at concentrations of 4.6 J to 4,700 mg/kg. As with TPH-d, the TPH-mo concentrations were generally higher in ISM samples that were diluted for analysis due to matrix interference.

5.3.4.2 TPH and VOCs in Groundwater

TPH-d and TPH-mo were analyzed in ten primary groundwater samples, TPH-g was analyzed in two primary samples, and VOCs were analyzed in ten primary samples. TPH-d with SGC was reported in three primary samples at concentrations of 19 J to 28 J mg/L. TPH-d without SGC was only reported at a concentration of 51 mg/L at SB-5. Other results for TPH-d without SGC were reported below the RL by the laboratory but were U-qualified due to detections of TPH-d in the associated method blank as specified in Section 6 and in Appendix H. TPH-mo both with and without SGC, TPH-g, and VOCs including methyl tert-butyl ether (MTBE) were not reported above laboratory MDLs.

5.3.5 Anti-Stain Agents

Anti-stain agents analyzed in soil and groundwater at the Site included PCP, 2,4,6-TCP, and carbamates. Analytical results of these compounds are summarized in Table 5 for soil and Table 9 for groundwater. Carbamate compound analysis included ten common carbamates as specified in Table 2 of the Work Plan and in the laboratory reports in Appendix G. Phenols were reported previously in soil and groundwater by Geocon (2002), therefore the results were included with the phenolic anti-stain agents on the corresponding soil and groundwater summary tables.

5.3.5.1 Anti-Stain Agents in Soil

Anti-stain agents were analyzed and not reported above laboratory MDLs in twelve primary soil samples. As with PAH and TPH samples, dilution was necessary to analyze most of the PCP and 2,4,6-TCP samples, therefore the MDLs for these compounds were elevated.

5.3.5.2 Anti-Stain Agents in Groundwater

Anti-stain agents were analyzed and not reported above laboratory MDLs in three primary groundwater samples.

5.3.6 PCBs

Analytical results for PCBs are summarized in Table 5 for soil and Table 9 for groundwater.

5.3.6.1 PCBs in Soil

PCBs were analyzed in two primary discrete soil samples. PCB-1260, one of the PCB isomers, was reported at a concentration of 7.5 J micrograms per kilogram (µg/kg) in sample SB-11 from the former saw mill transformer area.

5.3.6.2 PCBs in Groundwater

PCBs were analyzed in two primary groundwater samples. PCBs were not reported above MDLs, however as noted in the Work Plan, the MDLs for several of the PCB isomers exceeded groundwater RSLs.

6. DATA QUALITY ASSESSMENT

This section summarizes our assessment of the data obtained during the TSI to document that the type, quantity, and quality of data that were used in decision-making were useful for intended applications. The results of the field and laboratory QC samples were used as DQIs as defined in Section 3 in the data quality assessment. The quality of data was assessed in terms of the parameters of precision, accuracy, representativeness, completeness, comparability, and sensitivity. Geosyntec's Data Validation Checklists evaluating Site data are presented in Appendix H and summarized in the sections below. The data as qualified were found to be useful for their intended purpose of achieving the DQOs as discussed in Section 3 and in the sections below. Data validation was conducted by Geosyntec and is discussed in Data Quality Assessment Section 6. Data validation documentation is included in Appendix H including definitions of the data qualifiers used.

6.1 Precision and Accuracy

Precision is the degree of mutual agreement between or among independent measures of a similar property and relates to the analysis of duplicate laboratory and/or field samples. The precision of laboratory results was assessed using field duplicate, laboratory duplicate, laboratory control sample (LCS) / LCS duplicate (LCSD), and MS/MSD relative percent difference (RPD) results.

Accuracy is the degree of an agreement of a measurement with a known or true value and is generally determined by QC indicators such as MS/MSD samples, surrogate spikes, laboratory control samples, calibration and method detection criteria, and performance samples. The accuracy of laboratory results was assessed using method blanks, laboratory control sample recoveries, surrogate recoveries, isotope dilution recoveries, MS/MSD recoveries, and other information provided by the laboratory such as calibration standard recoveries and chromatographic results. Accuracy was also assessed using field blank results. Qualifications were applied to data due to accuracy discrepancies as summarized in Appendix H.

Qualification applied to data due to precision and accuracy deficiencies that were significant to the outcome of this TSI are summarized as follows:

- TPH-d was reported in method blanks associated with some soil and groundwater samples, therefore, estimated concentrations of TPH-D greater than the MDLs and less than the RLs in the associated soil and groundwater samples were U-qualified at the RL.

- Benzo(g,h,i)perylene was reported in groundwater at SB-8 at a concentration of 0.059 J µg/L, however due to detection of benzo(g,h,i)perylene in the associated equipment blank, this result was U-qualified.
- Hexavalent chromium was reported in the duplicate groundwater sample for SB-4 at 0.015 J mg/L and primary sample at SB-12 at 0.007 mg/L, however hexavalent chromium was also reported in the associated equipment blank for these samples, therefore the results were qualified as 0.050 U mg/L and 0.010 U mg/L, respectively.
- Qualifications were applied to dioxins and furan data for a variety of reasons explained in detail in Appendix H including RPD outside of acceptable limits and contamination of the associated equipment blanks.
- Several PAH and PCP groundwater samples were run slightly past hold times, therefore these results which were all reported below the MDL were UJ-qualified.

6.2 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent the characteristics of a population, variations in parameters at a sampling point, or an environmental condition that they are intended to represent. Representativeness of data was controlled by adherence to consistent field and laboratory procedures.

No inconsistencies with respect to data representativeness were identified. Geosyntec's assessment indicates that with respect to representativeness, the quality of data obtained for this project was acceptable for use and reliability.

6.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under normal conditions. Completeness with respect to sample access and collection was 100% and acceptable. One antimony result was rejected due to low MS/MSD recovery. Therefore, analytical completeness was 99.97% acceptable for use.

6.4 Comparability

The comparability objective determines whether analytical conditions are sufficiently uniform for each analytical run to ensure that all reported data will be consistent. Comparability is ensured by using similar analytical methods from one investigation to the next. For this TSI, comparability was maintained by adhering to consistent field sample collection and handling methods between sampling locations and using consistent laboratory procedures.

Based on Site observations, field conditions, and information in laboratory reports, Geosyntec's assessment indicates that with respect to comparability, the quality of data obtained for this project was acceptable for use and reliability.

6.5 Sensitivity

Sensitivity is the limit to which the laboratory achieved valid measurable results by a given method. Sensitivity is evaluated by comparing method reporting limits to project screening values. Laboratory methods were selected such that MDLs were below Site-specific screening levels summarized in Section 7.2. Exceptions included hexavalent chromium, antimony, PCP, 2,4,6-TCP, and PCBs had RSLs for residential tap water provided by the DTSC or USEPA that are below the MDLs, however these are the only practicable detection limits available for these analytes.

As noted in Section 5.2.3, some ISM and discrete soil sample extractions were diluted by the laboratory due to matrix interference. This resulted in elevated MDLs, which in turn led to exceedances of several PAH RSLs at numerous locations and the PCP RSL at DU-1.

7. SCREENING LEVEL HEALTH RISK ASSESSMENT

As previously stated, the objectives of this TSI were to characterize Site soil and groundwater with respect to the COPCs to provide information that can be used to evaluate potential impacts, assess potential exposure, and manage risk associated with the Site (if any). This section summarizes the results of our human health screening evaluation based on the sample analytical data for the COPCs that were obtained. The Conceptual Site Exposure Model (CSEM) is summarized in Figure 7. Concentrations of the COPCs that were reported during this TSI and in past investigations above MDLs and the applicable risk-screening values are shown on Figures 5a through 5c for soil and Figures 6a and 6b for groundwater.

7.1 Conceptual Site Exposure Model

The CSEM shown in Figure 7 evaluates the exposure pathways and the mechanisms by which the most likely human receptors, given the intended uses of the Site, may come into contact with the Site-related chemicals. According to information provided by the DTSC, the Site is intended to be used as a wood waste processing facility and therefore will continue to be zoned as commercial and industrial. Given the current and likely future use of the Site, the primary potential human receptors are current and future commercial workers, students, and visitors to the Site. These receptors may be exposed to chemicals that remain in soil and/or groundwater. Potential exposure routes associated with chemicals in soil are incidental ingestion, dermal contact, and inhalation of particulates and volatile contaminants in ambient air. Potential exposure routes for groundwater are ingestion or dermal contact.

7.2 Screening Levels

Analytical results for soil were compared to screening levels for composite Site workers and analytical results for groundwater were compared to screening levels for residential tap water and MCLs for groundwater. Screening levels were primarily provided by the DTSC HHRA Human and Ecological Risk Office (HERO) Note 3 (DTSC, 2016); if there was no value provided by the DTSC, the USEPA Region 9 (USEPA, 2017) RSLs were used. Screening levels from these two sources are collectively referred to in this TSI as RSLs. In addition to tap water RSLs, groundwater results were also compared to primary and secondary MCLs for groundwater published by California Water Resources Control Board (CWRCB, 2006; 2014) and the USEPA (USEPA, 2017). San Francisco Bay

Regional Water Quality Control Board (SFRWQCB) ESLs (SFBRWQCB, 2016) were used for TPH in soil and groundwater as there are no values provided for these compounds by the DTSC or USEPA.

Historical arsenic soil data and the geologic setting for the Site suggested that native arsenic concentrations were likely above RSLs established by the DTSC (DTSC, 2016) and therefore it was necessary to establish a background decision rule. Two background arsenic ISM samples were ultimately collected – one from the shallow fill from 0.5 to 1 foot bgs at the Site southwestern margin (Arsenic DU-2) and one from the deeper native material from 3 to 10 feet bgs from soil borings advanced in the northern half of the Site (Arsenic DU). Site soil sample results from 0 to 3 feet bgs were compared to the shallow fill background concentration and samples from 3 feet and deeper were compared to the native concentration. Therefore, the arsenic background concentration was established at 9.8 mg/kg for the soil stockpiles and shallow fill above 3 feet bgs and 4.7 mg/kg for native soil deeper than 3 feet bgs. This data is not reported in tables but the results can be found in laboratory reports in Appendix G.

7.3 <u>Metals</u>

With the exception of arsenic, reported concentrations of metals did not exceed the soil screening criteria for the Site. Of the arsenic analytical results, nine of fifteen shallow fill samples analyzed exceeded the background concentration of 9.8 mg/kg for the shallow fill material. The sample collected at SB-12 was the only soil sample collected during this investigation from deeper than 3-feet bgs and was below the native soil screening level of 4.7 mg/kg. Historical data collected during previous investigations also exceeded arsenic screening levels in fourteen of eighteen samples with concentrations up to 130 mg/kg. Concentrations in general seemed to decline with depth, however there were exceptions such as the concentration of 44 mg/kg reported at 6 feet bgs at LP-B01. Other than arsenic, there were no other metals reported in soil above applicable screening levels for this TSI.

Reported concentrations of metals in groundwater during this investigation did not exceed groundwater MCLs or RSLs. Groundwater data collected from the Site was considered screening level data as the grab sampling methods used for this TSI and previous investigations led to collection of turbid samples that may affect bias metals results high. Metals samples collected during this investigation, with the exception of hexavalent chromium were filtered and acidified in the field in order to avoid false positives, however there was no indication that samples were filtered in the field for historical results reported for the Site.

Arsenic was reported above the MDL in one of the two groundwater samples at a low concentration of 0.0022 mg/L. This concentration is below the arsenic RSL for tap water and groundwater MCL. As shown with solubility test results in Table 10, the samples with the highest arsenic concentrations in soil were not found to be soluble using deionized water as a buffer.

The MDL for hexavalent chromium was greater than the RSL of 0.000035 mg/L for each sample and approached the MCL of 0.010 mg/L in two samples. The duplicate sample from SB-4 had a reported hexavalent chromium concentration of 0.015 J mg/L, however the equipment blank associated with this sample also had detection of hexavalent chromium, therefore the result was qualified as not reported above the laboratory RL of 0.05 mg/L. This RL exceeds the RSL and MCL. Like the duplicate sample from SB-4, the primary sample from SB-12 was detected by the laboratory at a concentration of 0.007 J mg/L but was qualified as not detected above the RL of 0.010 mg/L due to contamination of the equipment blank. Total chromium was below screening levels in groundwater samples. It was was only reported at SB-12 at a concentration of 0.0036 J mg/L and was below the MDL of 0.0012 mg/L at SB-4.

Antimony was not reported at the laboratory method detection limit, of 0.0098 mg/L; however, this result is above the MCL for the metal of 0.006 mg/L. This limitation of the laboratory method was discussed in Section 6.6.

The groundwater samples reported during previous investigations were collected using a bailer or check valve from a hand auger or DPT boring with no indication of field filtering, therefore it is likely that the samples included soil particles that may have led to false positive results and elevated MDLs.

Historical results from HA3, which was collected near the maintenance shop waste oil AST, were reported above the screening levels selected for this TSI. Screening levels exceedances at HA3 included barium (1.4 mg/L reported; MCL of 1 mg/L), lead (0.082 mg/L reported; MCL and RSL of 0.015 mg/L), and nickel (0.14 mg/L reported; MCL of 0.1 mg/L). Results for these metals in soil and groundwater from this investigation and other historical borings were relatively low and below the respective screening levels, therefore the results from this previous investigation appear to be anomalous.

Lead and arsenic were not reported above MDLs at LP-B01 and LP-B03, however the MDLs were above the RSLs of the respective compounds. As was previously mentioned, results for these metals were found to be below screening levels during this TSI.

7.4 Dioxins and Furans

Dioxin and furan soil data did not exceed the RSL of 200 pg/g for 2,3,7,8-TCDD or 2,3,7,8-TCDD TEQ. The Site maximum calculated 2,3,7,8-TCDD TEQ was 170 pg/g at DU 1, which was collected in the anti-stain area located to the north of the saw mill. The Site maximum 2,3,7,8-TCDD concentration was 2.2 J pg/g at DU-1, and was also below the RSL.

The dioxin and furan 2,3,7,8-TCDD TEQ calculation for groundwater results was above the RSL of 0.12 pg/L for each sample. The groundwater sample from SB-4 had an estimated 2,3,7,8-TCDD TEQ of 45 J pg/L that was above the MCL of 30 pg/L. The data for this sample for numerous isomers was U-validated as not reported at the RL as noted in Section 6 and Appendix H. SB-4 is located downgradient of the boiler area. The other 2,3,7,8-TCDD TEQ calculation results were below the MCL at concentrations that ranged from 4.6 J to 14 J pg/L. 2,3,7,8-TCDD was not reported in samples, but the MDL was 0.16 to 0.22 pg/L which was slightly above the RSL and below the MCL.

7.5 PAHs

There were no positive detections reported for PAHs in soil samples during this TSI, however MDLs were greater than several of the applicable soil RSLs including the RSL of 2,110 µg/kg for benzo(a)pyrene. For 10 of the 28 samples analyzed, MDLs of individual PAHs including benzo(a)pyrene exceeded RSLs due to matrix interference resulting in dilution of the samples by the laboratory. Matrix interference may have been related in part to other COPCs found at the Site such as TPH, but is also likely due to organic compounds from wood waste from the former mill operations.

In consultation with the DTSC toxicologist, a value of ½ the reported MDL was used for non-detected results to calculate the benzo(a)pyrene TEQ. The benzo(a)pyrene TEQ results for the non-diluted samples were below the RSL, however 11 TEQ results for diluted samples exceeded the benzo(a)pyrene RSL.

There were exceedances of the benzo(a)pyrene and dibenz(a,h)anthracene tap water RSLs of 0.0251 µg/L for both COPCs in the groundwater sample collected from SB-8, however groundwater results and TEQ calculations were not reported above the benzo(a)pyrene groundwater MCL of 0.2 µg/L. The benzo(a)pyrene TEQ for the sample from SB-8 was 0.14 µg/L. Other than the groundwater sample collected at SB-8, there were no other PAH results reported above MDLs for the other nine groundwater samples analyzed and the MDLs were less than the RSLs for each PAH. However, the benzo(a)pyrene TEQ was above the RSL for benzo(a)pyrene for samples without a PAH detection when calculated using an estimated concentration of ½ the MDL for each analyte.

7.6 TPHs and VOCs

There were exceedances of the TPH-d soil ESL of 230 mg/kg but no exceedances of the TPH-mo soil ESL of 5,100 mg/kg. TPH-g and VOCs were not analyzed in soil. Seven of sixteen reported soil concentrations for TPH-d were above the ESL. All of these samples happened to be ISM samples which were diluted due to matrix interference. As discussed in Section 7.5, matrix interference was likely due to organic material related to former lumber mill operations. None of the TPH-mo results exceeded the ESL of 5,100 mg/kg.

There were no TPH exceedances of the groundwater ESLs, VOC RSLs, or MCLs reported during this TSI. The TPH-d ESL of 100 mg/L was not exceeded by reported TPH-d results, which had a maximum concentration of 51 mg/L. There were no detections of TPH-mo, TPH-g or VOCs in groundwater. There was one historical TPH-d ESL exceedance in groundwater at boring LP-B01 (400 J mg/L) and one exceedance of the ESL by the reporting limit in non-detect sample LP-B03. However, these samples were grab samples collected using a bailer and therefore may have been influenced by matrix interference due to sample turbidity.

7.7 Anti-Stain Agents

Anti-stain agents were not reported above MDLs in soil or groundwater at the Site, however, there were several exceedances of the RSLs by MDLs. The PCP sample from DU-1 was diluted due to matrix interference and therefore the MDL was reported at 6,000 µg/kg, which exceeded the PCP commercial soil RSL of 4,000 µg/kg. The MDLs reported for PCP in the other eleven soil samples were between 57 and 3,200 µg/kg and below the RSL. Of the three groundwater samples analyzed, each of the MDLs exceeded the PCP and 2,4,6-TCP RSLs of 0.041 and 0.63 µg/L, respectively, however did not exceed the PCP MCL of 1 µg/L. MDLs for PCP were 0.05 µg/L and MDLs for 2,4,6 TCP were 1.9

µg/L. A groundwater sample result from 2014 for PCP at LP-B03 was also not reported above the MDL, but the MDL was elevated to 10 µg/L

7.8 PCBs

PCBs were only reported in soil for PCB-1260 at 7.5 J µg/kg at SB-11. This concentration did not approach or exceed the RSL for this isomer of 990 µg/kg. PCBs were not reported in groundwater, however some of the PCB isomer RSLs were below the MDLs as indicated in Section 6.6.

8. FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The following section provides context for the results of this TSI and past investigations at the Site. The Site analytical data and observations from the TSI were used to develop a Conceptual Site Model (CSM) for the Site. A discussion of the COPC distribution with respect to the various RECs that were identified in the Work Plan and investigated with this TSI Report is included below.

8.1 Conceptual Site Model

This section describes our conceptual understanding of the Site as it pertains to hydrogeology and potential COPC impacts.

Geologically, the northern half of the Site appears to be underlain by a continuous layer of permeable fill. Soil borings were not advanced in the southern portion of the Site to assess the subsurface composition, but it is likely similar across the Site. Seven stockpiles containing variable amounts of soil, wood waste, and lumber mill debris were found on top of the fill. Documentation regarding the origin of surficial fill was not identified, however personal communication with the PCEHD provided anecdotal evidence that at least some of it may have originated from tailings from local mines in the region (Geosyntec, 2017b).

A continuous deposit of fine- to coarse-grained alluvial floodplain sediments was encountered beneath the surficial fill at approximately 3 to 5-feet bgs. Groundwater at the Site is typically shallow with depths from approximately 5 to 10-feet bgs during past investigations (Resna, 1992; Geocon, 2002; E&E, 2014b). The shallow sediment was oxidized on the upgradient western side of the Site and reduced on the downgradient eastern side of the Site. Reduction of sediments was likely caused by the breakdown of substantial amounts of bioavailable carbon from lumber mill practices which consumed the available oxygen in groundwater and shallow soil.

Due to the Site's location within the floodplain of Indian Creek, it is subjected to periodic floods, as was observed during this TSI and also reported at least two other times since 1987 (CH2M Hill, 1991; Personal communication with PCEHD). Periodic flooding during the last two decades has likely flushed and diluted the majority of shallow soil COPCs originating from lumber mill operations from the late 1940s to 1987. Arsenic was reported at higher concentrations in most of the 2014 5-point soil composite samples from former mill roads and stockpiles in comparison to 2017 30-point ISM composite samples from the same locations as shown on Figures 5a through 5c. Some of this variability may be due to sample heterogeneity and differences between the sample collection methods. Another example of diminishing impacts is TPH-d and TPH-mo, which were reported near the maintenance shop above the groundwater ESL in 2014 at boring LP-B01 (E&E, 2014b), but were reported at about an order of magnitude lower concentration in the same general area during this investigation at borings SB-7 through SB-10. A third example of potential diminishing impacts are the reported detections of anti-stain agents TCP and PCP in soil in the "anti-stain area" in 1988, that were not reported in three subsequent sampling events in the area in 2002, 2014, and during this investigation. The laboratory analytical data suggests that impacts exist at the Site at concentrations above applicable screening levels, but that they appear to be attenuating over time since the lumber mill ceased operation.

8.2 Findings for Recognized Environmental Concerns

Impacts above screening levels reported in soil samples were shown in Figures 5a through 5c and groundwater samples in Figures 6a and 6b. The following sections discuss the findings in terms of the RECs identified in Section 2.10.

8.2.1 Sawmill, Green Chain, and Sorter/Stacker Building

The sawmill, green chain, and sorter/stacker building was a potential location of impacts due to the historical application in the area of anti-stain agents containing PCP, 2,4,6 TCP, and possibly other COPCs such as carbamates and dioxins and furans. In addition, other potential RECs in this area were investigated, including the septic system, where COPCs may have been disposed, and a transformer that reportedly used hydraulic fluid containing PCBs.

With the exception of the reported detection of PCP and TCP in soil in 1988 at an unidentified location near the saw mill (CH2M Hill, 1991), COPCs related to anti-stain agents including PCP, 2,4,6-TCP, and carbamates were not reported above detection limits during this TSI or previous investigations. The reported use at the Site of anti-stain agents including PCP and 2,4,6-TCP have not appeared to impact the soil or groundwater in the areas where it was applied or may have dripped.

Dioxins and furans, which are found with anti-stain agents at other lumber mills in California, were reported in soil and groundwater at this location, at 2,3,7,8-TCDD TEQ concentrations up to 170 pg/g in soil and 4.7 J pg/L in groundwater. The reported data indicate that some dioxin and furan impacts are present at low concentrations below commercial soil screening levels and the groundwater MCL, but above the tap water RSL.

The septic tank located to the east of the sawmill did not appear to be a source of COPC impacts to groundwater. At boring SB-1 adjacent to the septic tank, anti-stain agents, VOCs, PCBs, and dioxins and furans were either not reported above MDLs or were only present at low concentrations. Like the anti-stain area, the dioxin and furan 2,3,7,8-TCDD TEQ exceeded the tap water RSL but was less than the groundwater MCL.

Soil adjacent to the transformer area to the west of the former saw mill did not contain PCBs at reportable concentrations. Therefore, it is not likely that a substantial release of PCBs had occurred at this location.

8.2.2 Boiler Building and Fuel Shed

The boiler building and fuel shed were potential locations of impacts due to the following: 1) production, disposal, and dispersion of ash from combustion that contained metals such as arsenic and dioxins and furans; 2) the use of fuel containing TPH, PAHs, and leaky underground fuel tank (LUFT) metals such as cadmium, chromium, lead, nickel, and zinc; and 3) boiler maintenance using chemicals that contained or released hexavalent chromium and other metals. Arsenic and TPH-d impacts above screening levels were reported in soil in the boiler building and fuel shed area. Groundwater in this area did not appear to be impacted with COPCs, however there was some uncertainty of this finding due to several MDLs reported above the screening levels as noted in Section 7.

Impacts from ash were primarily assessed using arsenic and dioxin and furan data. Arsenic was reported at concentrations above background in the boiler area in both ISM samples DU-4 and DU-5. LP-SPC03 which was classified as a road 5-point composite sample, but included areas that may have been impacted by Site-use of the boiler and fuel shed, had arsenic concentration in soil reported at 130 mg/kg, which was a Site-wide maximum concentration. Arsenic was analyzed in groundwater at SB-4 but was not reported above the MDL. Dioxins and furans as 2,3,7,8-TCDD TEQ, were reported at relatively low concentrations in soil at DU-4, DU 5, and LP-SC03, and in groundwater at SB-4. The groundwater concentration for 2,3,7,8-TCDD TEQ was above the MCL for groundwater at SB-4, however this result appeared to be a false positive due to qualification applied to the data as discussed in Section 6 and in Appendix H. Due to limited dioxin and furan impacts in relation to arsenic, the data suggests that the source of arsenic above background in the boiler and fuel shed area may not be ash from the boiler, but may potentially be related to the fill that was used to raise and level the Site.

Fuel impacts as TPH-d were observed above the ESL in the boiler and fuel shed area in soil, however, TPH was not reported above the ESL in groundwater. ISM samples DU-4 and DU-5 had TPH-d concentrations reported above the ESL, while soil samples from SB-4, SB-5, SB-6, and LP-B02 had TPH-d and TPH-mo concentrations were reported below the ESLs. TPH was analyzed and not reported at DP-4 above the MDLs. PAH compounds were analyzed but not reported above MDLs in this area in soil or groundwater. However, as noted previously, the PAH MDLs were elevated for soil and groundwater above applicable RSLs for shallow ISM samples DU-4 and DU-5, but not for the deeper discrete samples collected from borings SB-5 and SB-6. The VOCs acetone and 2 butanone (or methyl ethyl ketone) were reported in soil at DP-4 in 2002, however the reported concentrations were well below the RSL.

Hexavalent chromium was not reported in the primary sample from SB-4, however the duplicate result reported by the laboratory at 0.015 J mg/L (Appendix G) was qualified as not detected above the RL of 0.05 mg/L based on detection of hexavalent chromium in the assoiciated equipment blank sample as discussed in Section 6 and Appendix H. Both the primary and duplicate RLs reported for SB-4 were greater than the RSL for tap water, and the duplicate RL reported was greater than the groundwater MCL of 0.010 mg/L.

8.2.3 Maintenance Shop and Old Planing Mill/Oil Shed Area

The maintenance shop and old planing mill/oil shed were used as a shop and chemical storage for the LP lumber mill. Potential RECs identified by CH2M Hill (1991) and E&E (2014a) included a waste oil AST that was reportedly located to the north of the maintenance shop, a trench drain located on the western side of the maintenance shop that had stained soil around it, oil soaked sawdust on the floor of the oil shed, and various containers of chemicals observed in both areas. There was also an UST of unknown purpose that was reported to be brought on Site from a different location and placed in front of the maintenance shop but was not necessarily installed and not located during previous investigations (E&E, 2014a; Geosyntec, 2017b). The UST was searched for using geophysical methods and was not definitively located. However, an area with geophysical anomalies was identified and investigated with SB-8 and SB-16.

In shallow soil in the maintenance shop area, TPH-d impacts were reported above the MDL, but below the ESL at DU-6, DU-7, LP-B01, and HA3. Arsenic was reported above screening levels in shallow soil in 2012 at LP-B01 but was not analyzed in subsequent samples as it was not related to the identified RECs. Arsenic concentrations of up to 56 J mg/kg at LP-B01 were likely from fill or another unidentified anthropogenic source. LUFT metals were analyzed at DU-6 and DU-7 and were found to be below screening levels and at similar concentrations to other areas of the Site.

TPH-d was reported in groundwater in 2014 at LP-B01 at concentrations in excess of the ESL. The extent of TPH-d above the ESL was delineated laterally by borings SB-7 through SB-10. TPH-d was not reported in these borings at concentrations above the ESL, therefore the lateral extents of the TPH-d reported above the ESL in groundwater appeared to be localized to the area around LP-B01.

Groundwater in the maintenance shop area was investigated for PAHs at SB-8 through SB-10. PAHs were reported at SB-8 at concentrations that exceeded several PAH tap water RSLs for benzo(a)pyrene TEQ, benzo(a)pyrene, and dibenz(a,h)anthracene, but were below applicable groundwater MCLs for benzo(a)pyrene. PAH results from this boring were estimated as concentrations were between the MDL and RL. PAHs were not reported in groundwater in other borings in this area or at the Site. SB-8 was located near the property boundary, therefore PAH impacts may potentially extend off-Site to the north and east.

Metals data reported in sample HA3 collected in 2002 (Geocon, 2002) included concentrations of barium, lead, and nickel that exceeded the contaminant-specific MCLs. These groundwater samples were collected in a hand auger boring and there was no mention of filtering the sample, therefore it is possible that sample turbidity influenced the concentrations of metals. Lead and nickel were not reported above the RSL or MCL for any other soil or groundwater samples collected throughout the Site, including groundwater samples from LP-B01 in the maintenance shop area and SB-12 downgradient at the end seal area near the New Planing Mill. Based on these factors, the reported detections of lead and nickel above screening levels at this location are considered to be anomalous.

8.2.4 New Planing Mill

The new planing mill RECs identified in previous reports included a transformer and oil dispensing unit to the south of the building and an end-seal application area at the northern end of the building (CH2M Hill, 1991).

Soil adjacent to the transformer area to the south of the New Planing Mill was analyzed at SB-11 and did not contain elevated concentrations of PCBs. Sample data reported in the area from DP5 in 2002 did not report any TPH or VOC concentrations above detection limits. Therefore, it is not likely that a substantial release of PCBs or oil occurred at this location.

Boring SB-12 was advanced in the end-seal area. Green coloration of the soil was observed, therefore in addition to the planned VOC groundwater sampling in the area, soil and groundwater samples were collected for metals including hexavalent chromium and TPH in soil. No VOCs were reported above their MDLs. In general, the other analytes were either reported at low concentrations below the applicable screening levels or not reported above the MDLs, with exception of the following. Due to contamination of the associated equipment blank sample as specified in Section 6 and Appendix H, hexavalent chromium was reported by the laboratory in groundwater at a concentration of 0.0070 J mg/L (Appendix G), but was validated as not reported above the RL. The RL of 0.01 mg/L for this sample was above the tap water RSL and equal to the groundwater MCL of 0.01 mg/L. Antimony was not reported in groundwater above the MDL, but the MDL of 0.0098 mg/L was above the RSL of 0.006 mg/L. Other analytes reported were below applicable screening levels.

8.2.5 Old Dry Kiln Piping

Aboveground piping covered in a tar-like substance was observed by CH2M Hill on the western side of the old dry kiln and was found to remain at the Site during the Site walk. Geocon advanced soil boring HA6 in this area in 2002 and noted that there was a petroleum hydrocarbon odor, however the sample that they collected for analysis appeared to be at a different depth than where the odor was noted, and TPH was not reported (Geocon, 2002). Soil and groundwater samples were collected from SB-13 for analysis of TPH or PAHs. TPH-d was reported in soil and groundwater at low concentrations below the ESL. There were no other detections of analytes above the

MDLs. The aboveground piping in the Old Dry Kiln area did not appear to be a source of impacts to the Site.

8.2.6 Possible Fueling Area ASTs and USTs

Samples were analyzed in soil and groundwater at SB-14 where ASTs of unknown contents were located and at SB-15 where possible fuel USTs were located. Borings DP1 and DP2 were also advanced in 2002 near the former USTs.

In general, analytical results from these borings did not reveal substantial COPC-impacts in either of these areas. There were low concentrations of TPH-d and TPH-mo reported in soil and groundwater at SB-13 and SB-14 and no detections of TPH or VOCs in soil at DP1 or DP2. There were no detections of PAHs in soil or groundwater at SB-14 or SB-15. Dioxins and furans in groundwater at SB-14 were reported at low concentrations that were above the tap water RSL but below the groundwater MCL. PCP and 2,4,6-TCP were analyzed in groundwater at SB-14, and like the saw mill area, were not reported above the MDL, but the MDL was above the tap water RSL and below the groundwater MCL for PCP.

8.2.7 Former Mill Roads

A historical practice at the Site was to spread ash from the boiler and waste oil on the dirt mill roads (CH2M Hill, 1991). Most of the former mill roads were paved over during development of the LP lumber mill in the 1970s, at which point this practice would have likely ceased in areas where asphalt was present.

COPC-impacts were reported in soil in former mill roads samples at concentrations above Site screening levels. Four of the six ISM samples collected in former mill road areas during this TSI had arsenic reported above background concentrations. Arsenic in soil reported by E&E (2014b) from 5-point composite samples collected at the former mill roads was above background concentrations established in this TSI in two of three samples. The maximum concentration of arsenic in soil of 130 mg/kg was reported by E&E in the former mill road 5-point composite sample that also transected the boiler building. TPH-d was also reported to exceed the ESL in five of six ISM samples collected during this TSI, while one of four 5-point composite samples collected by E&E exceeded the ESL. Dioxins and furans were reported at low concentrations that were below RSLs in the former mill road ISM samples collected during this investigation and with 5-point composite samples collected by E&E. PAHs were not reported in ISM samples, but as with other PAH samples analyzed at the Site, MDLs were elevated due to matrix interference and therefore the MDLs exceeded the RSLs in all but one sample.

8.2.8 Wood Waste and Soil Stockpiles

CH2M Hill indicated that boiler and teepee burner ash was disposed of in the wood waste stockpiles at the Site, primarily in a pile east of the current property boundary (CH2M Hill, 1991). The current Site owner indicated that soil from the former eastern portion of the Site which is now Caltrans property was placed in the southern portion of the Site, presumably in stockpile #6 (E&E, 2014a; Figure 2). The majority of the wood waste and soil stockpiles were observed to be a mix of soil and wood waste at various stages of decomposition into soil.

COPC impacts were reported in soil in the wood waste and soil stockpile samples at concentrations above Site screening levels. Three of the seven ISM samples collected in stockpile areas during this TSI had arsenic reported above background concentrations. Arsenic in soil reported by E&E (2014b) from 5-point composite samples collected at the soil stockpiles was above background concentrations established in this TSI in three of four samples. Arsenic concentrations were relatively low in soil and wood waste stockpiles, with reported results between 7.2 mg/kg and 26 mg/kg. Despite arsenic concentrations being above background in samples collected from soil and wood waste stockpiles #3, #5, and the northern portion of stockpile #6 sampled as DU-20, concentrations were well above the RSL of 0.25 mg/kg that would be protective of human health in a commercial setting established by HHRA Note 3 (DTSC, 2016), therefore are not suitable for unrestricted reuse except for at areas with a similar background arsenic soil concentration. Dioxins and furans were reported at low concentrations that were below RSLs in the soil and wood waste stockpile ISM samples collected during this investigation and 5-point composite samples collected by E&E (2014b). PAHs were not reported in ISM samples, but as with other PAH samples analyzed at the Site, MDLs were elevated due to matrix interference and therefore the MDLs exceeded the RSLs insamples from DU-18 and DU-19. Anti-stain agents were not reported in ISM samples and MDLs were below respective RSLs.

8.3 <u>Conclusions and Recommendations</u>

Based on historical information, the Site was operated as a lumber mill from the late 1940s to 1986 and previous investigations at the Site have documented impacts to soil and groundwater associated with the former Site use. Additional soil and groundwater samples were collected as part of this investigation to address data gaps and assess the extent of the remaining impacts. The Site was evaluated using commercial/industrial screening levels based on the planned future commercial/industrial use.

Of the COPCs remaining at the Site above the compound-specific screening levels, arsenic in soil appears to be the most wide-spread, being found in most soil borings and ISM samples at concentrations that were above background concentrations and the arsenic RSL. Solubility tests and groundwater data indicate that the arsenic reported in soil has not resulted in groundwater impacts at the Site. The source of arsenic that is present throughout the Site may be related to lumber mill operations, but could also potentially have been present in the import fill material brought to the Site to raise the surface grade. The import fill may have been derived from off-Site mining operations, as the Crescent Mills area has several reported gold mines and arsenic is commonly found to be associated with gold deposits (Straskraba and Moran, 2006). Whether from fill imported from off-Site or from Site use, arsenic concentrations reported in shallow soil exceed the established background concentration across a majority of the Site.

TPH-d was also reported in soil in numerous locations at the Site in exceedance of screening levels. TPH-d was reportedly stored at the Site, used to operate the boiler and various other machinery, and may have been spread on former mill roads along with waste oil for dust suppression. TPH-d was found above the screening level in the boiler area and in samples from nearly all of the former mill roads. TPH-mo was also reported in these samples but at concentrations below the applicable screening level.

PAHs and PCP were reported in soil with MDLs greater than the screening level. Due to limitations of the currently available laboratory methods and the presence of either COPC-derived or naturally occurring matrix interferences the MDLs and RLs for these analytes were reported above the applicable screening levels. However, based on the lack of positive detections above MDLs in soil at the Site for either PCP or PAHs, their potential presence is unlikely at concentrations that would be a concern.

Dioxins and furans were reported in groundwater near the saw mill, boiler building, and former AST area in exceedeance of the RSLs. One estimated dioxin and furan result from near the boiler building exceeded the MCL, however this result appeared to be a false positive due to laboratory validation of the data. PAHs and TPH-d were reported in groundwater above their respective screening criteria near the maintenance shop.

Hexavalent chromium was reported in groundwater by the laboratory at an estimated concentration in exceedance of the MCL, however the associated equipment blank also had low concentrations of hexavalent chromium, causing the sample to be reported as not detectable above the laboratory reporting limit. In general, the reported concentrations of groundwater constituents were narrowly above the screening levels and may have been influenced by elevated turbidity introduced by the collection method.

A geophysical survey was conducted to attempt to locate a possible UST that remained near the maintenance shop at the Site. The survey was inconclusive but identified several buried metal anomalies including two that were reported as a possible UST and one that was indicated as a possible sewer pipe. Soil borings were advanced adjacent to and downgradient of the possible locations of a remaining UST and results indicated that limited PAH impacts were present in groundwater at this location. Impacts may also be attributed to a former waste oil AST in this area, waste oil spreading for dust suppression that was reported at the Site, or from the former UST at the Sacramento Valley Moulding Site.

The findings of this report do not include evaluation or investigation of any adjacent or off-Site properties that may or may not be contaminated. This is particularly pertinent as the neighboring properties to the north and east were part of the former LP lumber mill and therefore had similar use as the Site. During this TSI, there were PAH detections in groundwater above the screening level along the northern property boundary. As mentioned in the Work Plan, the Sacramento Valley Moulding Site to the north of the property had a known UST investigation conducted (Resna, 1992), therefore there is a possibility that the source of impacts observed along the property boundaries may originate off-Site.

The objectives of this TSI were achieved through the identificiation and investigation of the possible hazardous substances release sources at the Site. Further, the collected data indicate that COPCs in soil and groundwater are suffiently delineated and the potential risk to human health in a commercial/inductrial land use scenario was evaluated. Based on the findings and conclusions of this TSI, the following is recommended:

- Further investigation is not necessary and the data should be used to prepare a Feasibility Study/Remedial Action Plan for selection and implementation of an appropriate remedial alternative to facilitate the development and re-use of the Site.

- Though arsenic concentrations remained below the background concentration established for the Site in some of the soil and wood waste stockpiles, the material in the stockpiles should be suitable for unrestricted use only in areas where background arsenic concentrations in soil are similar.
- Erosion control structures should be placed around the existing stockpiles to control run-off of sediment from the piles into the nearby storm water drop inlets and/or Indian Creek.
- The existing log deck supply well and any other wells identified on the property should be decommissioned in accordance with the PCEHD and state regulations.

9. LIMITATIONS AND EXCEPTIONS

This report was prepared for the DTSC. Geosyntec-authorized users of this Report are limited to the DTSC, the Sierra Institute, the USEPA, and individuals or organizations deemed appropriate by them.

Users of this Report should understand that this project was not a comprehensive characterization of the Site with respect to all media or all chemicals. TSI activities were limited to the specified COPCs for this project and the specific areas of potential concern identified in this report. The potential exists that the areas of potential concern identified in this report have been impacted by other COPCs or that other areas of the Site have been impacted by the same or other COPCs at concentrations that could require additional investigation to characterize or mitigate.

We do not guarantee or warranty, either express or implied, that there is no environmental, health, or financial risk associated with the specific areas identified in this Report, other areas of the Site, or the Site as a whole. Users of this Report must evaluate the risk of reliance upon the information herein and assume that risk (if any). Geosyntec is not responsible for unfavorable results due to reliance on information provided in this Report.

Information herein with respect to the condition of the specific areas associated with this project is valid only as of the dates of our field activities. Changes in Site conditions not brought to our attention between or subsequent to those dates (if any) could result in the need for additional characterization investigation and/or mitigation activities.

Information in this Report and Geosyntec's conclusions and recommendations are based on our Site observations, analytical results and associated QC data reported for soil and groundwater samples we collected and our experience with similar sites and projects. Geosyntec does not certify or guarantee that the information obtained and reported by others is accurate or suitable for the intended purpose.

The authors of this report declare that, to the best of their knowledge, the information provided herein is truthful and accurate, notwithstanding unknown incidental errors or omissions that would not materially impact or change results of this project or our conclusions. We strived to conduct activities for this project in accordance with the standard level of care in the local geographic area at the time the activities were rendered.

10. REFERENCES

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TABLES

FIGURES

APPENDIX A

DTSC Approval of the Work Plan

APPENDIX B

Boring Permits

APPENDIX C

Field Logs and Notes

APPENDIX D

Site Photograph Log

APPENDIX E

Geophysical Survey Report

APPENDIX F

Waste Manifest

APPENDIX G

Laboratory Analytical Reports

APPENDIX H

Data Validation Documentation