

## 3.0 DESCRIPTION OF ALTERNATIVES

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### INTRODUCTION

Under CEQA, the identification and analysis of alternatives to a project is a fundamental part of the environmental review process. Public Resources Code Section 21002.1(a) establishes the need to address alternatives in an EIR by stating that in addition to determining a project's significant environmental impacts and indicating potential means of mitigating or avoiding those impacts, "the purpose of an environmental impact report is to identify the significant effects of a project on the environment, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided."

Direction regarding the definition of project alternatives is provided in the CEQA Guidelines Section 15126.6(a) as follows:

*An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives*

The CEQA Guidelines emphasize that the selection of project alternatives should be based primarily on the ability to reduce impacts relative to the proposed project, "even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly."<sup>1</sup> The Guidelines further direct that the range of alternatives be guided by a "rule of reason," such that only those alternatives necessary to permit a reasonable choice need be addressed.<sup>2</sup>

In selecting project alternatives for analysis, potential alternatives must pass a test of feasibility. CEQA Guidelines Section 15126.6(f)(1) states that:

*Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site . . .*

Beyond these factors, CEQA Guidelines require the analysis of a "no project" alternative and an evaluation of alternative location(s) for the project, if feasible. Based on the alternatives analysis, an Environmentally Superior Alternative is to be designated. If the Environmentally Superior Alternative is the No Project Alternative, then the EIR shall identify an Environmentally Superior Alternative among the other alternatives.<sup>3</sup> In addition, CEQA Guidelines Section 15126.6(c) requires that an EIR identify any alternatives that were considered for analysis but rejected as infeasible and discuss the reasons for their rejection.

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<sup>1</sup> CEQA Guidelines Section 15126.6(b).

<sup>2</sup> CEQA Guidelines Section 15126.6(f).

<sup>3</sup> CEQA Guidelines Section 15126.6(e)(2).

### 3.1. DEVELOPMENT OF ALTERNATIVES TO THE RP'S PROPOSED REMEDY

Development of the alternatives to the RP's Proposed Remedy by the Regional Board was based primarily on the Regional Board's independent review of information contained in the Feasibility Study Report (FS), independent review of the FS and Human Health Risk Assessment by the State Office of Environmental Health Hazard Assessment (OEHHA) and the University of California Los Angeles (UCLA) Expert Panel respectively, and information from the pilot tests that were conducted at the site.

Remedial technologies with potential applicability at the site to meet the Remedial Action Objectives (RAOs) were identified and screened using three criteria: effectiveness, ability to implement, and cost. Technologies evaluated in the FS can be placed into two categories: 1) technologies that interrupt the human health exposure pathway; and 2) technologies that remove COC mass in addition to interrupting the human health exposure pathway. The technologies considered physical removal processes, such as excavation, as well as chemical and biological processes. **Table 3-1, Description and Results of Initial Screening of Technologies Considered for Site Remediation**, shows the technologies evaluated by the two categories and whether or not the technology passed the initial screening.

**Table 3-1**

**Description and Results of Initial Screening of Technologies Considered for Site Remediation**

Technology	Description	Evaluation (Retained or Not Retained for Consideration in Remedial Alternatives)
<b><i>Interrupt the Human Health Exposure Pathway</i></b>		
Sub-Slab Vapor Intrusion Mitigation [Passive venting or Sub-slab depressurization (SSD)]	Install subsurface barriers and/or vapor control systems to mitigate soil vapor migration into buildings	SSD Retained for consideration in remedial alternatives
Capping Portions of the Site	Construct a low permeability cover or cap over the areas of impacted soils to reduce contact with impacted soils, minimize rainwater infiltration and reduce vapor migration to the surface	Retained for consideration in remedial alternatives (could be used in conjunction with excavation)
Removal of All Site Features	Remove all site features (i.e., houses, landscape, hardscape, roads, and utilities)	Retained for consideration in remedial alternatives
Institutional Controls	City of Carson Building Code requirements to obtain a permit for excavations 2 feet bgs or deeper; establish a notification process if permit is requested in order to sample and properly handle any potential impacted soils	Retained for consideration in remedial alternatives
<b><i>Remove COC Mass and Interrupt the Human Health Exposure Pathway</i></b>		
Excavation: <i>Selective Excavation</i>	Excavate impacted soils around existing structures; backfill excavation with imported clean soil; area and depth can vary	Retained for consideration in remedial alternatives

Table 3-1 (Continued)

## Description and Results of Initial Screening of Technologies Considered for Site Remediation

Technology	Description	Evaluation (Retained or Not Retained for Consideration in Remedial Alternatives)
Excavation: <i>Targeted Excavation</i>	Excavate impacted soils to a deeper depth in targeted areas around existing structures where the potential exists for substantial hydrocarbon mass removal at greater depths; backfill excavation with imported clean soil or sand-cement slurry	Retained for consideration in remedial alternatives
Excavation: <i>Lifting and Cribbing of Houses</i>	Lifting house and cribbing to 4 ft.; cut and cap utilities; demolish drywall, cabinets, toilets, and tub/showers from ground level to 4 ft; demolish fireplaces; install beams that attach to every wall; unbolt walls from foundation; excavate impacted soils; backfill with clean soil; form and pour new foundation; place the house back down on new foundation and attach to foundation; remove cribbing materials; restore interior walls, cabinets, toilets, tub/showers; replace fireplaces; and reconnect utilities	Not Retained for consideration in remedial alternatives
Excavation: <i>Temporarily Moving Houses</i>	Similar process to lifting and cribbing a house, except the house would be loaded onto a trailer and moved to another location	Not Retained for consideration in remedial alternatives
Excavation: Removal of Residual Concrete Slabs	Removal of former tank farm reservoir side walls and/or floors beneath buildings, hardscape, or streets; removal of those site features and excavation would be required	Retained for consideration in remedial alternatives (removal of residual concrete slabs when encountered within excavation boundaries)
Soil Vapor Extraction (SVE) System	Vadose zone vacuum wells to remove volatile COCs from soil; extracted vapors would be treated and discharged	Retained for consideration in remedial alternatives
Bioventing	Induce air and oxygen flow in to the unsaturated zone to enhance the activity of indigenous bacteria and stimulate the natural in-situ biodegradation of organic COCs in soil	Retained for consideration in remedial alternatives (could be used in conjunction with SVE system/wells)
In-Situ Chemical Oxidation (ISCO);	Introduction of a chemical oxidant into the subsurface to reduce contaminant mass and concentrations in soil	Not retained for consideration in remedial alternatives

Table 3-1 (Continued)

## Description and Results of Initial Screening of Technologies Considered for Site Remediation

Technology	Description	Evaluation (Retained or Not Retained for Consideration in Remedial Alternatives)
Mobile Light Non-Aqueous Phase Liquid (LNAPL) Source Removal;	Direct mobile LNAPL removal from wells where LNAPL has accumulated on top of groundwater to a measurable thickness with sorbent socks or, if LNAPL has accumulated to a thickness of greater than 0.5 foot (6 inches), with a dedicated pump, as is currently done at existing on-site monitoring wells	Retained for consideration in remedial alternatives
Groundwater Monitored Natural Attenuation (MNA);	Naturally occurring processes decrease concentrations of COCs in soil and groundwater; monitoring is performed to confirm that COC concentrations are decreasing	Retained for consideration in remedial alternatives (can be used in conjunction with other technologies)
Contingency Remediation of Groundwater (if needed): Air Sparging with SVE	Injection of air into the subsurface saturated zone to enable a transfer of hydrocarbons from a dissolved phase to a vapor phase which is then captured and treated by SVE	Not Retained for consideration in remedial alternatives
Contingency Remediation of Groundwater (if needed): Biosparging	Pulsed injection of saturated oxygen into the saturated zone to significantly elevate dissolved oxygen concentrations (up to 60 mg/L), which enhances the ability of existing indigenous microorganisms to biodegrade the organic constituents in the saturated zone	Not Retained for consideration in remedial alternatives
Contingency Remediation of Groundwater (if needed): Oxidant Injection	Oxidant injection involves the introduction of an oxidant (e.g., ORC®) that produces a controlled and continuous release of oxygen to the saturated zone which accelerates the development of existing indigenous microorganisms to biodegrade the organic constituents	Retained for consideration in remedial alternatives
Sources: Feasibility Study, 2014 and PCR Services Corporation, 2014		

Each technology that was retained after the initial screening would be capable of addressing a specific issue, but none of the technologies alone would constitute a complete approach to site cleanup. Therefore, technologies were combined to create seven (7) remedial alternatives that were further evaluated in the FS. Table 3-2, *Components of Remedial Alternatives Considered & Rejected and Analyzed in this EIR*, shows the alternatives and summarizes the key components of the alternatives evaluated in the FS and discussed in this EIR. The RP's Proposed Remedy is provided in the table for comparison purposes to the alternatives.

Table 3-2

## Components of Remedial Alternatives Considered &amp; Rejected and Analyzed in this EIR

Alt.	Remove all Site Features	Cap Site	Excavation Depth (bgs)	Excavate Entire Site	Excavate Beneath Residential Hardscape and/or Landscape	# Properties Excavated/Excavation Avg. Amount per Property	SVE/Bioventing (# Properties)	LNAPL Removal, Groundwater MNA, and Supplemental Groundwater Remediation	Sub-Slab Mitigation (# of properties)	Estimated total truckloads of import and export	Slot Trenching or Bucket Auger with Slurry Backfill	Duration of Active Remediation
RP's Proposed Remedy (Base Remedy)	-	-	5 ft. with targeted 10 ft.	-	Hardscape and Landscape	219 Properties [611 CY (5 ft.) to 867 CY (10 ft.)]	236	X	28 with offer to all	23,700	X	6 years (4 years under the Expedited Implementation Option)
<b>Alternatives Analyzed in this EIR</b>												
Alternative 1: No Project Alternative (FS Alt 1)	-	-	-	-	-	-	-	-	-	-	-	-
Alternative 2: Excavate Beneath Landscape and Hardscape to 10 Ft (FS Alt 4E)	-	-	10 ft.	-	Hardscape and Landscape	241 Properties (1,222 CY)	236	X	28 with offer to all	42,700	X	8.4 years
Alternative 3: No Excavation Beneath Hardscape - 5 Ft. With Targeted 10 Ft. (FS Alt 5D)	-	-	5 ft. with targeted areas to 10 ft.	-	Landscape	219 Properties (330 CY)	236	X	28 with offer to all	10,900	X	4.4 years
<b>Alternatives Considered and Rejected from Evaluation in this EIR</b>												
Remove Site Features/Excavate Impacted Soils (FS Alt 2)	X	-	> 10 ft.	X	-	-	-	X	-	250,000	-	4.5 years
Remove Site Features/Excavate to 10 Ft. (FS Alt 3)	X	-	10 ft.	X	-	-	-	X	-	130,000	-	2.5 years
Excavate 2 Ft. (Landscape & Residential Hardscape) (FS Alt 4A)	-	-	2 ft.	-	Hardscape and Landscape	123 Properties (244 CY)	236	X	28 with offer to all	4,600	-	1.5 years

Table 3-2 (Continued)

## Components of Remedial Alternatives Considered &amp; Rejected and Analyzed in this EIR

Alt.	Remove all Site Features	Cap Site	Excavation Depth (bgs)	Excavate Entire Site	Excavate Beneath Residential Hardscape and/or Landscape	# Properties Excavated/Excavation Avg. Amount per Property	SVE/Bioventing (# Properties)	LNAPL Removal, Groundwater MNA, and Supplemental Groundwater Remediation	Sub-Slab Mitigation (# of properties)	Estimated total truckloads of import and export	Slot Trenching or Bucket Auger with Slurry Backfill	Duration of Active Remediation
Excavate Beneath Landscaped Areas - 2 Ft. (FS 5A)	-	-	2 ft.	-	Landscape	123 Properties (109 CY)	236	X	28 with offer to all	1,400	-	1.2 years
Excavate Beneath Landscaped Areas - 3 Ft. (FS Alt 5B)	--	-	3 ft.	-	Landscape	219 Properties (159 CY)	236	X	28 with offer to all	4,300	-	2.7 years
Excavate Beneath Landscaped Areas - 5 Ft. (FS Alt 5C)	-	-	5 ft.	-	Landscape	219 Properties (265 CY)	236	X	28 with offer to all	8,300	X	3.3 years
Excavate Beneath Landscaped Areas - 10 Ft. (FS Alt 5E)	-	-	10 ft.	-	Landscape	241 Properties (530 CY)	236	X	28 with offer to all	18,200	X	6.0 years
Cap Site (FS Alt 6)	X	X	-	-	-	-	--	X	-	12,500	-	4.5 years
Cap Exposed Soils (FS Alt 7)	-	X	-	-	-	285 Properties (No excavation)	236	X	28 with offer to all	-	-	1.1 years
<b>Alternatives Considered in the Revised FS - Within Parameters of RP's Proposed Remedy</b>												
Excavate Landscape & Res. Hardscape (3 ft.) (FS Alt 4B)	-	-	3 ft.	-	Hardscape and Landscape	219 Properties (367 CY)	236	X	28 with offer to all	12,000	-	3.3 years
Excavate Landscape & Res. Hardscape (5 ft.) (FS Alt 4C)	-	-	5 ft.	-	Hardscape and Landscape	219 Properties (611 CY)	236	X	28 with offer to all	19,700	X	4.4 years

bgs = below ground surface ft.<sup>3</sup> = cubic feet CY = cubic yards

Notes:

"X" indicates the action would occur. "-" indicates action would not occur or is not applicable.

Source: Feasibility Study, 2014; PCR Services Corporation, 2014.

A discussion of the alternatives considered and rejected as well as the alternatives evaluated in this EIR is provided in the following subsections.

Each section in Chapter 5, *Environmental Impact Analysis*, of this EIR, contains an analysis of the alternatives analyzed in the EIR. Chapter 6, *Comparison of Alternatives*, provides a summary comparison of the environmental impacts of the alternatives to the RP's Proposed Remedy.

### **3.2 ALTERNATIVES CONSIDERED AND REJECTED FROM EVALUATION IN THIS EIR**

In accordance with CEQA Guidelines Section 15126.6(c), an EIR should identify any alternatives that were considered for analysis but rejected as infeasible and briefly explain the reasons for their rejection. The following alternatives were considered but rejected as detailed below.

In addition, CEQA Guidelines Section 15126.6(f)(2) addresses alternative locations, which are generally evaluated for a project. However, the project is the remediation of a site and therefore, the consideration of alternative locations is not meaningful. Therefore, a discussion of alternative location is rejected from further evaluation.

#### **Remove Site Features/Excavate Impacted Soils (FS Alternative 2)**

This alternative would include the removal of all development on the site (i.e., houses, residential hardscape, sidewalks, roads, and utilities) and the excavation to a minimum depth of 10 feet below ground surface (bgs) of impacted soils identified based on the RAOs for protection of groundwater over the entire site. This alternative would result in the permanent relocation of all of the residents within the Carousel Tract. While the site would be remediated to residential standards, the future use of the site is speculative. Previous soil samples taken at all depths would be used to identify locations where RAOs are not met and therefore require excavation, although additional sampling may be required. Excavation likely would proceed to or near groundwater over some portions of the site but to an assumed 10 feet bgs over the entire site.<sup>4</sup>

Excavated soil, residual reservoir slabs, and materials from the demolition of the houses and hardscape would be removed from the site using trucks or a newly constructed rail spur. Hardscape demolition materials would be recycled offsite, and excavated soil and debris would be disposed of offsite or treated offsite and recycled in a similar manner as the project. The rail spur, if it were to be developed, would be used for the exportation of excavated soil. Approximately 250,000 truckloads of COC-impacted and non-impacted soil, as well as other construction debris from the demolition of structures (including asbestos), would be hauled to or from the site. As shown in Table 3-2, in addition to excavation, this alternative would implement LNAPL removal, groundwater MNA and supplemental groundwater remediation similar to the project. This alternative is estimated to take approximately 4.5 years, which is approximately 1.5 years shorter than the RP's Proposed Remedy.

Implementation of this alternative would require the permanent relocation of all of the residents from the site. If some homeowners declined to move, the presence of some residents on the site would make it untenable to remove all of the surrounding houses, streets and utilities, which would be required to excavate

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<sup>4</sup> *The shallowest groundwater beneath the site occurs at a depth of approximately 53 feet.*

all the impacted soils from beneath the entire site. The Regional Board does not have the legal authority to require residents to relocate from their homes or to require the responsible party to remove the homes.

If all residents were relocated and this alternative were implemented, it would not meet the project objective to “Maintain the residential land use of the site and avoid permanently displacing residents from their homes or physically dividing the established Carousel Tract community” since it would result in the displacement of residents. Therefore, this alternative has been rejected for further analysis in this EIR.

### **Remove Site Features/Excavate to 10 Feet (FS Alternative 3)**

As shown in Table 3-2, this alternative would be similar to the Remove Site Features/Excavate Impacted Soils Alternative above in that it would include the removal of all on-site development and relocation of Carousel Tract residents, followed by site excavation up to 10 feet across the entire site. In addition to excavation, this alternative would implement SVE/bioventing, LNAPL removal, groundwater MNA, and contingency supplemental groundwater remediation similar to the RP’s Proposed Remedy. The SVE/bioventing system would result in the installation of 63 nested wells in the City streets to remediate the intermediate and deeper zones. The primary difference between this alternative and the Remove Site Features/Excavate Impacted Soils Alternative is that excavation would occur to a depth of 10 feet bgs over the entire site and an SVE/bioventing system would be installed. Thus, this alternative would meet the RAOs for the upper 10 feet of site soils only following excavation activities. Long-term regulatory controls similar to the project would be required for post-remediation excavations beneath 10 feet. Approximately 130,000 truckloads of COC-impacted and non-impacted soil, as well as other construction debris from the demolished structures (including asbestos) would be hauled to or from the site. This alternative is estimated to take approximately 2.5 years, which is approximately 3.5 years shorter than the RP’s Proposed Remedy.

This alternative would meet RAOs in the upper 10 feet of the on-site soils in the short term via soil excavation to 10 feet and in the soils beneath 10 bgs over the long term via SVE/bioventing operation. This alternative would not meet the project objective to “Maintain the residential land use of the site and avoid permanently displacing residents from their homes or physically dividing the established Carousel Tract community” since it would result in the displacement of all the residents. In addition, the Regional Board does not have the legal authority to require residents to relocate from their homes or to require the responsible party to remove the homes. For these reasons, this alternative has been rejected for further analysis in this EIR.

### **Excavate to 2 Ft. (Landscape and Residential Hardscape) Alternative (FS Alternative 4A)**

FS Alternative 4 includes five variations all of which would include excavation beneath residential landscaped and hardscaped areas as the key remedial element. FS Alternative 4D is the RP’s Proposed Remedy and Alternative 4E is Alternative 2 in this EIR. FS Alternatives 4A and 4B would result in reduced depths of excavation compared to the RP’s Proposed Remedy and are discussed below in the subsection titled Alternative Considered in the FS – Within Parameters of RP’s Proposed Remedy.

As shown in Table 3-2, this alternative (Revised FS Alternative 4A) would result in excavation to a depth of 2 feet bgs under landscape and residential hardscape areas at 123 properties on the site based on analytical data from soil samples which indicate properties that do not meet RAOs. Shoring of the excavated areas would not be required and utilities would not be affected. In addition to the excavation, SVE/bioventing would be installed at 236 properties. The remediation activities would also include backfill, sub-slab vapor mitigation, site restoration, LNAPL removal, and groundwater MNA. Under this alternative, excavation

would not occur under patios covered by structures and roofs; pool decking surrounding swimming pools; City streets; City sidewalks; or houses. Site restoration would occur after excavation. Implementation is predicted to last approximately 1.5 years.

Excavated soil, residual concrete slabs from the reservoirs (where encountered during excavation), and materials from the demolition of hardscape would be trucked from the site. Disposal and recycling of materials would be conducted in a manner similar to the project. On average, excavation of (244 CY) of soil per property would result with approximately 4,600 truckloads of impacted and non-impacted soil hauled to or from the site under this alternative.

While this alternative would remove COCs from the upper 2 feet of soils, there are no long-term regulatory controls to limit access to soils between 2 feet and 3 feet bgs. Therefore, residents would not be protected against potential exposure to impacted soils in the 2-to-3-foot depth zone unless homeowners agreed to additional land use covenants (LUCs), such as the recording of an environmental covenant. Thus, this alternative was considered but rejected as it would not result in unrestricted land use as required by the Regional Board.

### **Excavate Beneath Landscaped Areas Alternatives: 2 to 10 feet BGS (FS Alternatives 5A-5C and 5E)**

These Alternatives would include excavation beneath residential landscaped areas as the key remedial element. There would be no excavation under residential hardscape, which differentiates this alternative from the RP's Proposed Remedy and Alternative 4 considered in the FS. Under these Excavate Beneath Landscaped Areas Alternatives, soils would be excavated to a depth of 2, 3, or 10 feet below existing grade at residential properties where RAOs are not met. Table 3-2 provides the characteristics associated with each of these alternatives, including the number of properties that would be excavated, volumes of soil excavated and truckloads associated with each alternative. At any excavation depth, this alternative would include SVE/bioventing at 236 properties, similar to the project. The duration of the remediation activities under these alternatives would range from 1.2 to 6 years.

The 2 ft. excavation alternative was not retained in the initial screening conducted in the FS due to the lack of protection that would be provided. As discussed above, while this alternative would remove COCs from the upper 2 feet of soils, there are no long-term regulatory controls to limit access to soils between 2 feet and 3 feet bgs. In addition, if residents were to remove hardscape on their property people could come into contact with the impacted soils. Therefore, this alternative was eliminated as it would not result in sufficient protection.

The 3-foot and 10-foot alternatives evaluated under this scenario would result in limited removal of impacted soils. As such the Regional Board determined that these alternatives would not provide protection to residents. Generally, under this alternative, there are no existing long-term regulatory controls restricting removal of residential hardscape after remedial action is complete. The City of Carson does not require that homeowners obtain a permit or notify the City prior to removing residential hardscape from their property. Because of the lack of a permitting or notification requirement, these alternatives, which would not include excavation of impacted soils beneath residential hardscape, would not be as protective as the remedial

alternatives that do include excavation beneath residential hardscape. Therefore, these alternatives have been considered and rejected from further analysis in this EIR.<sup>5</sup>

### Cap Site (FS Alternative 6)

This alternative would result in the removal of all development on the site and the placement of a cap on the entire site. The cap would be hardscape or some equivalent to prevent access to impacted soils. While the site would be remediated to residential standards, the future use of the site is speculative. All of the technologies identified for the project would be included in this alternative, with the exception of the sub-slab vapor intrusion mitigation which would not be necessary because the houses would be removed. Approximately 12,500 truckloads of import fill and construction debris would be hauled to or from the site by truck. Implementation of this alternative is estimated to take approximately 4.5 years.

This alternative would meet RAOs by limiting contact with soil, but would not achieve the other soil goals. However, the exposure pathway would be eliminated because residents would not occupy the site and the site would be capped. COCs would be less likely to leach into groundwater due to the large reduction in stormwater and irrigation water passing through the soil. SVE/bioventing would be conducted to remediate COCs present in soils. LNAPL goals would be achieved through LNAPL removal and groundwater remediation would occur by MNA. Groundwater goals (MCLs) would be met in the long term, and background levels for groundwater would be achieved in the longer term, both through MNA. Supplemental groundwater remediation (i.e., where COCs exceed 100x MCLs) would be evaluated if groundwater plumes are not stable or declining after five years of operation of the SVE/bioventing system to reduce the time to achieve the cleanup goals.

While this alternative would meet RAOs by limiting contact with soil, it could also limit the ability for long-term future development to occur on the site. Since the cap would need to be maintained and protected, restrictions and limitations on construction and operation of a future use would need to be put in place that could be restrictive for development opportunities. In addition, this alternative would not meet the project objective to “Maintain the residential land use of the site and avoid permanently displacing residents from their homes or physically dividing the established Carousel Tract community” since it would result in the permanent displacement of residents. For these reasons, this alternative has been rejected from further analysis in this EIR.

### Cap Exposed Soils Only (FS Alternative 7)

This alternative would involve the capping of exposed soils and landscaped areas of the site at all 285 properties with hardscape or equivalent to prevent access to impacted soils. Capping approaches could include concrete or other impervious materials. Hardscape, roads and houses would remain in place during and following the capping process. The intent of this alternative would be to allow residents to remain at the site in the long-term following capping.

This alternative would result in removal of COCs through: SVE/bioventing (236 properties and 128 locations in City streets), LNAPL removal, groundwater MNA, and contingency supplemental groundwater remediation, if necessary. The soil vapor goals would be addressed by installation of a sub-slab

<sup>5</sup> However, since the RP's Proposed Remedy would result in significant noise impacts, the Regional Board determined that the evaluation of Alternative 5D would be appropriate since the Alternative would reduce noise impacts. Please see Alternative 3 in this EIR.

depressurization system for houses where RAOs are not met for sub-slab soil vapor. Assuming sources of COCs are successfully addressed through SVE/bioventing and LNAPL removal, LNAPL goals would be achieved and groundwater goals (MCLs) would be met in the long-term. Background levels for groundwater would be achieved in the longer term, both through MNA. Supplemental groundwater remediation (i.e., where concentrations exceed 100x MCLs) would be evaluated if groundwater plumes are not stable or declining after five years of operation of the SVE/bioventing system to reduce the time to achieve the cleanup goals. This alternative is estimated to take approximately 1.1 years to implement.

Under this alternative, COCs would be less likely to leach into groundwater compared to the project due to the reduction in stormwater and irrigation water passing through the soil. Overall, in the long-term, RAOs would be met for the site. However, implementation of this alternative would take longer to meet groundwater RAOs compared to the project, as less impacted soils would be removed by excavation. A new LUC would be required to prohibit residential hardscape/cap removal.

This alternative would also result in generation of large quantities of stormwater that would need to be managed. The County may require captured stormwater to be percolated, which could exacerbate groundwater contamination issues.

Generally, the combination of technologies used for this alternative is anticipated to be effective at reducing exposure to COCs in the long-term. The difference compared to the excavation alternatives (FS Alternatives 4 and 5) is the method of exposure reduction. Excavation alternatives would remove COCs directly from the site, while for this alternative those COCs would be removed through longer-term SVE/bioventing.

While this alternative would ultimately be effective to treat COCs on the site, the long-term social impacts to residents would be increased. Residents would lose existing landscaping, and future landscaping would have to be done above the cap in planter boxes. This could result in decreased aesthetic appeal to the community. Further, an objective of the project is to “Allow residents the long-term ability to safely and efficiently make improvements requiring excavation or penetration into site soils (i.e., landscaping, pools, hardscape, etc.) on their properties.” This objective would not be met under this alternative. For these reasons, this alternative has been considered and rejected from further analysis in this EIR.

## **Alternatives Considered in the FS – Within Parameters of RP’s Proposed Remedy**

### **Excavate Landscape and Residential Hardscape Alternatives: 3 ft. and 5 ft. bgs (FS Alternative 4B and 4C)**

Table 3-2 provides the characteristics for alternatives similar to the RP’s Proposed Remedy, which would excavate landscape areas as well as remove residential hardscape and excavate in those areas. The FS evaluated various depths, including 3 ft. and 5 ft. bgs. As with the RP’s Proposed Remedy, these alternatives would result in excavation at 219 properties based on analytical data from soil samples which indicate properties that do not meet RAOs. Shoring may be required at some locations for the 5 ft. excavation but would not be necessary under the 3 ft. excavation alternative. As with the RP’s Proposed Remedy, under these alternatives, excavation would not occur under patios covered by structures and roofs; pool decking surrounding swimming pools; City streets; City sidewalks; or houses. Site restoration would occur after excavation. Excavated soil, residual concrete slabs (where encountered during excavation), and materials from the demolition of hardscape and landscaping would be trucked from the site. Disposal and recycling of materials would be conducted in a manner similar to the project.

In addition to the excavation, these alternatives would include the installation of SVE/bioventing at 236 properties. The remediation activities for these alternatives would also include backfill, sub-slab vapor mitigation, site restoration, LNAPL removal, and groundwater MNA. Timeframes for implementation of these alternatives would vary and would be 3.3 years for the 3 ft. excavation and 4.4 years for the 5 ft. excavation.

These alternatives are very similar to the RP's Proposed Remedy. They differ primarily in the depth of excavation. Alternative 4B would be less likely to achieve the project cleanup goal of residential (i.e., unrestricted) land use. However, these alternatives would result in less construction activity on the site and less truck trips because of the reduced excavation compared with the RP's Proposed Remedy. Similar to the RP's Proposed Remedy, certain noise impacts would be expected to be significant without mitigation, but mitigation is feasible, but other noise impacts would be expected to remain significant and unavoidable even with the implementation of mitigation measures. (See Section 5.6, Noise, of this EIR for a detailed analysis and discussion.) However, because the project would take less time than the RP's Proposed Project, the impacts would not occur for as long. Given the similarity of the impacts for FS Alternatives 4B and 4C compared to the RP's Proposed Remedy, analyses conducted and presented in this EIR for the RP's Proposed Remedy would address these two alternatives. In other words, the analyses for the RP's Proposed Remedy would represent a worst case analysis if either of these alternatives were determined to be appropriate.

### **3.3. ALTERNATIVES ANALYZED IN THE EIR**

The alternatives selected for analysis in this EIR are described below. The analyses and environmental impacts associated with each of these alternatives are provided in Chapter 5 of this EIR.

#### **Alternative 1 – No Project Alternative**

In accordance with the CEQA Guidelines, the No Project Alternative for a project consists of the circumstance under which the project does not proceed. Section 15126.6(e)(3)(B) of the Guidelines states that, "In certain instances, the no project alternative means "no build" wherein the existing environmental setting is maintained." In this case, the No Project Alternative would mean that the RAP is not implemented at the site. Therefore, no excavation would occur and no SVE wells and SVE system or sub-slab mitigation would be installed. Monitoring of the site would continue. All existing site features, such as residences, landscaping, hardscape, fences, patios, and ancillary structures would remain. No relocation of residents would occur. In other words, the residential subdivision would remain as it currently exists today without remediation of site impacts.

#### **Alternative 2 - Excavation Beneath Landscape and Hardscape to 10 Feet (FS Alternative 4E)**

The Excavation Beneath Landscape and Hardscape to 10 Feet Alternative would include the same remedial technologies as the project, but would excavate soils to a depth of 10 feet bgs (as compared to 5 feet with targeted excavation to 10 feet bgs under the project) beneath landscaped and hardscaped areas where human health or groundwater goals are exceeded. Excavation to 10 feet would occur in all the areas compared with 5 feet with targeted areas to 10 feet under the RP's Proposed Remedy.

Data from sampling that occurred at  $\leq 10$  feet bgs would be used to identify properties for excavation. If sample data indicate that soils on a given property do not meet RAOs, the residential hardscape of the

property would be removed and excavation would occur to remove exposed soils to the depth where the deepest detection took place. While the same remedial technologies implemented by the project would be included in this alternative, SVE/ bioventing infrastructure may be modified for a 10-foot excavation depth.

As shown in Table 3-2, excavation under this alternative would occur at 241 properties, or an increase of 22 properties compared with the RP's Proposed Remedy. (An additional 22 properties would be excavated because while these properties meet RAOs from 0 to 5 feet they do not meet RAOs from 1 to 10 feet.) Similar to the project, sub-slab vapor mitigation system would be installed at approximately 28 houses and SVE/bioventing units would be installed at 236 properties.

Excavations to 10 feet bgs would require geotechnical investigations to support excavation design and establishment of necessary setbacks from buildings. Excavation to 10 feet would create challenges due to shoring of structures down to 10 feet and the shoring, setback and other protections required could limit the ability to reach a depth of 10 feet throughout the site. Excavations to 10 feet bgs either could be shored or done by slot trenches with vertical sidewalls. It is possible that vertical sidewalls would not be permitted at 10 feet as a result of geotechnical stability. In addition, leaving vertical sidewalls adjacent to structures overnight could result in slope failure and structure damage.

In some areas, a limited access bucket auger drilling rig would be used in conjunction with conventional excavation equipment. Conventional excavation using slot-trenching as necessary to protect structures or other features and open bulk excavation with appropriate sloping, setbacks, and/or shoring would be used where possible as the preferred excavation method. Auger excavation using a limited access rig would allow work in relatively tight spaces adjacent to structures to remove a column of soil.

The Excavate Beneath Landscape and Hardscape to 10 Feet Alternative would require on average, excavation of 1,222 CY of soil per property [compared to 611 to 867 CY per property under the RP's Proposed Remedy]. Approximately 274,700 CY of impacted soil would be excavated from the residential properties and approximately 43,900 CY of impacted soil would be excavated from other areas on the site. This alternative would result in a total of approximately 317,600 CY of impacted soil hauled from the site in about 21,639 truckloads over the timeframe of the implementation of this alternative. Clean fill would be imported to the site in a similar quantity.

As with the RP's Proposed Remedy, under this alternative excavation would occur around utilities, including water and gas, which are located about 3 to 3.5 feet inside the sidewalks in the front yards of approximately one-half of the properties in the Carousel Tract. These water pipes are of asbestos-cement (transite) construction and would need to be avoided during excavation.

Where it is possible to excavate to 10 feet in back yards, a long-reach excavator would be used. The overhead power lines would potentially need to be removed due to the potential for the excavator to hit the overhead utility lines, which could create an electrocution hazard for workers. The overhead power lines would be restored upon completion of the excavation.

This alternative is estimated to take approximately 8.4 years, which is approximately 2.4 years longer than the project.

As with the RP's Proposed Remedy, excavation of the upper 10 feet of soil and replacement with sand-cement slurry and clean soil would prevent most contact with impacted soils. The City of Carson Building

Code Section 8105, which amends the L.A. County Building Code Section 7003.1, is an existing long-term regulatory control that would limit exposure to soils below 3 feet.

### **Alternative 3 – No Excavation Beneath Hardscape - 5 Feet With Targeted 10 Feet (FS Alternative 5D)**

The No Excavation Beneath Hardscape -5 Feet With Targeted 10 Feet Alternative would include the same remedial technologies as the project, and would excavate soils to a depth of 5 feet bgs with targeted 10 feet excavation. Alternative 3 would excavate only under landscaped areas where human health or groundwater goals are exceeded and removal of hardscape would not occur.

As shown in Table 3-2, as with the RP's Proposed Remedy, excavation under this alternative would occur at 219 properties. Similar to the project, sub-slab vapor mitigation system would be installed at approximately 28 houses and SVE/bioventing units would be installed at 236 properties.

As with the RP's Proposed Remedy and Alternative 2, excavations to 10 feet bgs would require geotechnical investigations to support excavation design and establishment of necessary setbacks from buildings. Excavation to 10 feet would create challenges due to shoring of structures down to 10 feet and the shoring, setback and other protections required could limit the ability to reach a depth of 10 feet throughout the site. Excavations to 10 feet bgs either could be shored or done by slot trenches with vertical sidewalls. It is possible that vertical sidewalls would not be permitted at 10 feet as a result of geotechnical stability. In addition, leaving vertical sidewalls adjacent to structures overnight could result in slope failure and structure damage.

In some areas where targeted excavation from 5 to 10 feet would be conducted, a limited access bucket auger drilling rig would be used in conjunction with conventional excavation equipment. Auger excavation using a limited access rig would allow excavation to be conducted in relatively tight spaces adjacent to structures to remove a column of soil. Auger excavation using a limited access rig would allow work in relatively tight spaces adjacent to structures to remove a column of soil.

The No Excavation Beneath Hardscape would require on average excavation of 330 CY of soil per property [compared to 611 to 867 CY per property under the RP's Proposed Remedy]. Approximately 76,300 CY of impacted soils would be excavated from the residential properties. With the 10 percent contingency and the 8,100 CY of soils that would be excavated from the street trenching, this alternative would result in a total of approximately 83,930 CY of impacted soil hauled from the site in about 5,450 truckloads over the timeframe of the implementation of this alternative. Clean fill would be imported to the site in a similar quantity.

As with the RP's Proposed Remedy, under this alternative excavation would occur around utilities, including water and gas, which are located about 3 to 3.5 feet inside the sidewalks in the front yards of approximately one-half of the properties in the Carousel Tract. These water pipes are of asbestos-cement (transite) construction and would need to be avoided during excavation.

As with the RP's Proposed Remedy, under this alternative where it is possible to excavate to 10 feet in back yards, a long-reach excavator would be used. The overhead power lines would potentially need to be removed due to the potential for the excavator to hit the overhead utility lines, which could create an electrocution hazard for workers. The overhead power lines would be restored upon completion of the excavation.

As indicated above, under this alternative hardscape, such as walkways and driveways, would not be removed and no excavation would occur beneath the hardscape. The City of Carson does not require that homeowners obtain a permit or notify the City prior to removing residential hardscape from their property. Therefore, this alternative would include the development of long-term regulatory controls restricting removal of residential hardscape within the Carousel Tract in order to reduce the potential contact with impacted soils.

This alternative is estimated to take approximately 4.4 years, which is approximately 1.4 years shorter than the project.

### 3.4 ANALYSIS FORMAT

In accordance with CEQA Guidelines Section 15126.6(d), each alternative is evaluated in Chapter 5, *Environmental Impact Analysis*, of this EIR in sufficient detail to determine whether the overall environmental impacts would be fewer, similar or greater than the corresponding impacts resulting from implementation of the project. As stated above, Chapter 6, *Comparison of Alternatives*, provides a summary of each alternative's impacts in comparison to the project. Furthermore, Chapter 6, provides a discussion of each alternative's consistency with the "project objectives," as listed in Chapter 2, *Project Description*, of this EIR. That is, a determination is made as to whether or not the alternative would substantially attain the project objectives.

The evaluation of each of the alternatives in Chapters 5 and 6 follows the process described below:

- a. The net environmental impacts of the alternative after implementation of reasonable mitigation measures are determined for each environmental issue area analyzed in the EIR. (Chapter 5)
- b. Post-mitigation significant and non-significant environmental impacts of the alternative and the project are compared for each environmental issue area. Where the net impact of the alternative would be clearly less adverse or more beneficial than the impact resulting from the project, the comparative impact is said to be "less." Where the alternative's net impact would be clearly more adverse or less beneficial than that of the project, the comparative impact is said to be "greater." Where the impacts of the alternative and the project would be roughly equivalent, the comparative impact is said to be "similar." (Chapter 6)
- c. The comparative analysis of the impacts is followed by a general discussion of whether the underlying purpose and basic project objectives are substantially attained by the alternative. (Chapter 6)
- d. Based on the alternatives analysis, a discussion regarding an Environmentally Superior Alternative is provided. (Chapter 6)

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