



May 18, 2021
Project No. 2020-260
Via Email

David Yelton
Assistant Director/Building Official
Community Development
City of Beverly Hills
455 North Rexford Drive
Beverly Hills, CA 90210

Re: *Review of Jacobs's Final Removal Action Work Plan, dated February 19, 2021, for Lots 12, 13 and 13A*

Dear Mr. Yelton:

In accordance with your request, Lindmark Engineering (LE) has reviewed the *Final Removal Action Work Plan* (RAW) dated February 19, 2021 and prepared by Jacobs Engineering Group Inc (Jacobs) for Lots 12, 13 and 13A located south of North Santa Monica Boulevard between Alpine Drive and Doheny Drive in the City of Beverly Hills (site). Union Pacific Railroad (UPRR) is the responsible party for the removal action.

The site is owned by the Beverly Hills Land Company (BHLC). Adjoining properties are City of Beverly Hills (City) rights-of-way. The final RAW, hereinafter referred to as RAW, was posted on Envirostor in March 2021 when it came to our attention.

On October 21, 2020, LE submitted our comments on the Draft RAW dated September 20, 2020, and on the same date, October 21, LE submitted our comments on DTSC's CEQA Initial Study, dated September 15, 2020.

The RAW appends a portion of LE's comments and also includes comments from the City, the community, Caltrans and SCAQMD. LE's comments that DTSC did not append, included our summary of draft RAW assumptions, figures depicting borings and soil samples completed between 2015 and 2018, photos of trains and dual tracks, and an article about the former railroad operator's (Pacific Electric) use of arsenic in a water solution for weed abatement on its railroad rights-of-way. The RAW also includes DTSC's response to comments.

Based on LE's comments, some revisions were made to the draft RAW, but LE noted only revisions that had no impact on the cost for implementation of the RAW. LE did not note any changes to the CEQA Initial Study based on LE's comments.

In summary, based on the RAW only soil within designated areas on the site, deemed to have arsenic concentrations exceeding 25 mg/kg above a depth of 2 feet below ground surface (bgs), will be excavated regardless of the arsenic concentrations at, or below, 2 feet bgs. The soil within the site that is outside the designated areas will not be excavated, and the upper 2 feet of this soil (outside the designated excavation areas) will serve as a 2-foot cover for underlying soil. Similarly, the backfilled soils in the designated excavation areas would serve as a 2-foot cover for underlying soil. The soil at 2 feet bgs and to 5 feet bgs, that is above the 75 milligrams per kilogram (mg/kg) arsenic action level for that depth interval, will be left-in-place with institutional controls (IC), i.e. deed restriction and future

soil management. The RAW proposes collecting confirmation samples from the excavation sidewalls after the removal of soil from the designated areas. The RAW also appends a Pre-Construction Investigation Work Plan that includes the proposed collection of soil samples on a 25-foot grid spacing.

The CEQA Initial Study includes a table that presents the maximum detected arsenic concentration, 996 mg/kg, from 0 to 2 feet bgs, and the cleanup level 25 mg/kg, giving the impression this soil will be removed. However, because the sample was considered collected below 2 feet bgs, that soil will be left in place. Furthermore, if the sample collected at 0.5 feet bgs in that boring with the highest arsenic concentration had had a concentration less than 25 mg/kg, no soil would be excavated from that location because it would be considered clean from the ground surface to a depth of 2 feet bgs. This matter was addressed with Ms. Sara Vela of DTSC in a recent conversation and she responded that the community could read the excavation depth in the RAW and understand that the highest known arsenic concentration at a depth of 2 feet bgs, or any other elevated concentration at 2 feet bgs beneath the site, would not be excavated.

PROPOSED SITE USE

The RAW does not address the proposed site use although it will substantially increase the volume of the potentially arsenic-impacted soil, to be excavated for the development of Lot 12.

Lot 12 is proposed for a 4-story office building development with subterranean parking. Lot 13 and 13A are proposed to be deeded to the City for an undetermined future use. The City-owned property directly west of Lot 12 and east of Civic Center Drive will not be developed.

The excavation for the subterranean parking on Lot 12 will be approximately 25 feet deep. There will be ramps to the subterranean parking from Civic Center Drive at both ends and along the south side from Civic Center Drive. Approximately 200 feet from both ends of Lot 12, the subterranean parking space will extend 23 feet south of the property line, below Civic Center Drive.

In DTSC's response to comments, it stated that any excavation associated with potential development would be required to be conducted in accordance with plans approved by the DTSC. It is not clear whether the DTSC will require approved plans for excavation of the adjoining City properties that are impacted with arsenic concentrations above cleanup levels.

ASSUMPTIONS OF RAW

The RAW is developed based on several assumptions as noted below. These are the same assumptions used in the Draft RAW.

1. According to the site conceptual model, the site was a former railroad right-of-way and there are no known railroad operations.
2. The source of arsenic contamination is unknown and is likely associated with fill material placed at the site. Soil sample data does not indicate elevated levels of arsenic in soil below 5 feet bgs.
3. The highest arsenic concentrations are within the shallow soil along the centerline of the site and decrease in concentrations away from the centerline of the site.
4. The site is gently sloping from the south to the north.

5. The Soluble Threshold Limit Concentration (STLC) analysis and the groundwater investigation have shown that the arsenic in soils is not leachable and has not impacted groundwater.
6. Excavations will be conducted within the upper 2 feet of soil where arsenic concentrations exceed 25 mg/kg within the site boundaries. Arsenic concentrations in soil samples collected at 2 feet bgs are considered representative of soils below 2 feet and are not used to identify removal areas.
7. Soil removal goals will be verified upon excavation to maximum 2 feet bgs within designated areas by collecting one sample per every 10 feet of sidewall at a depth of approximately 1 foot bgs. No samples will be collected at the bottom of the excavations. If a sidewall confirmation sample result exceeds 25 mg/kg, over-excavation of arsenic-impacted soil will be conducted to the extent feasible.
8. Excavated areas within the proposed development footprint would be left open, i.e., not backfilled, to allow construction to proceed.
9. Dust monitoring will follow the South Coast Air Quality Management District's (AQMD) Rule 1466.
10. The groundwater beneath the site does not present a complete exposure pathway.
11. The site investigatory data referenced in the RAW reasonably characterize the subsurface contamination of arsenic to the point that a remedy and scope can be selected to be supplemented with a pre-construction investigation.

CONCERNS

Based on LE's review of the RAW, and in accordance with LE's October 21, 2020 comments on the Draft RAW, LE has identified three major concerns that affect the City:

1. There is a high probability that areas on the site with elevated arsenic contamination from 0 to 2 feet bgs will be overlooked and not excavated.
2. Adjoining City rights-of-way with documented shallow arsenic contamination above 25 mg/kg from 0 to 2 feet bgs will not be further assessed and remediated.
3. There is a high probability that arsenic releases at the site have contaminated the underlying first groundwater and contributed to elevated arsenic concentrations detected in nearby municipal wells, located as close as approximately 100 feet from the site.

These concerns are discussed in more detail below.

Residual Shallow Arsenic-Impacted Soil

As mentioned above, contrary to the evidence presented in LE's October 21, 2020 report, the conceptual site model presented in the RAW assumes there were no railroad operations and that arsenic was brought to the site in fill material. This assumption of the RAW is of critical importance since it is used to support an orderly placement of arsenic-contaminated soil rather than the spraying of arsenic in a solution from the two former railroad tracks which would have impacted a larger area and resulted in more discrete hot spots. If the arsenic-impacted soil had been brought in as fill material and placed at

the site, LE believes the concentrations would likely have been more uniform and not fluctuated so widely, and the vertical migration would have been limited.

LE believes there is a high probability that arsenic-impacted soil at the site in the upper 2 feet, will be overlooked and not excavated because the RAW does not take the sampling from 2015 to 2018 into consideration and assumes all soils sampled at 2 feet bgs belong to a depth below 2 feet and that all soil not sampled above 2 feet bgs is clean.

To address data gaps, the RAW proposes pre-construction field sampling on a 25-foot grid and post-excavation confirmation sampling on sidewalls at a 10-foot spacing. However, due to the pronounced variability in arsenic concentrations within small areas at the site, LE believes there is a significant potential that pre-construction soil sampling on a 25-foot grid could miss very high shallow arsenic concentrations, such as the hazardous surface soil LE detected at the east end of Lot 12, in which case the soil would not be removed and would be subject to potential future human exposure.

Furthermore, if a “clean” post-excavation confirmation sample is collected close to a spot where significant arsenic contamination was detected, it does not mean that the soil immediately surrounding the confirmation sample is “clean”. It is impossible to know exactly where along the two tracks, the liquid arsenic solution was applied to the subsurface in the greatest quantities.

Arsenic Impact on Adjoining City Properties

LE believes the assumptions of the RAW that there were no railroad operations and that arsenic was brought to the site in fill material, have also been used to disregard the arsenic contamination on the adjoining City properties since off-site migration would be limited from a fill material scenario.

As late as August 2020, DTSC requested lateral delineation of the arsenic impact beyond the site boundaries. UPPR responded that sampling beneath the streets was not feasible. However, LE believes no sampling beneath the streets would be required since the City properties, surrounding the site, are fully accessible for drilling. From LE’s sampling between 2016 and 2018, DTSC knows the arsenic impact above the 25 mg/kg cleanup level extends to the adjoining City properties. Removal of the arsenic-impacted soil on the City rights-of-way would increase the cost substantially.

Jacobs attached its response to DTSC’s comments on the August 2020 RAW to the letter transmitting the draft RAW. The DTSC commented that the arsenic characterization should extend to background concentrations regardless of property lines or depth. In response to this comment Jacobs stated arsenic characterization is not proposed outside the site boundaries due to physical limitations by the presence of busy streets. However, the City has indicated it would permit drilling on its properties, if necessary.

Deep Soil and Groundwater Arsenic Contamination

Based on site assessment data, LE believes there is evidence of significant arsenic migration below 5 feet bgs and that the arsenic has impacted first groundwater and probably has contributed to the arsenic contamination in the City’s water supply.

Arsenic Leachability and Vertical Migration in Soil

LE believes the assumptions of the RAW that there were no railroad operations and that arsenic was brought to the site in fill material, have also been used in the argument that arsenic is not leachable since the use of arsenic in a liquid solution that caused soil contamination is by definition leachable.

The RAW states STLC analyses of soil have shown arsenic not to be leachable and not impacting groundwater. The RAW further states that arsenic in soils is not migrating from the shallow soils and the centerline of the site. However, as discussed in detail in LE's October 21, 2020 report, the above referenced STLC analyses were run on samples containing a maximum of 90.5 mg/kg arsenic. The maximum concentration of arsenic detected to date at the site, 996 mg/kg, is an order of magnitude greater and is by definition hazardous. This maximum concentration was detected at 2 feet bgs near the east end of Lot 13. In response to LE's October 21, 2020 comments that the elevated arsenic concentrations and LE's STLC testing and analyses indicate arsenic leachability, DTSC deflected to answer and stated that the excavated soil will be waste-profiled; however, that does not address the leachability in soil remaining below the site after the RAW has been implemented. LE believes the highly arsenic-impacted soil that will be left in place at 2 feet bgs and below present a leachability concern especially for Lot 13 and 13A which have an undetermined future use with preliminary consideration given to park/recreational public use.

Furthermore, soil analytical data near the western end of Lot 12 show the presence of elevated arsenic concentrations (152 mg/kg) into the native soil at a depth of 30 feet bgs which indicates vertical migration. This sample was not STLC tested but the elevated concentration suggests a probable exceedance of 5 mg/L if it had been STLC tested. A sample collected at 10 feet bgs in this boring had an even higher arsenic concentration (160 mg/kg) but was also not STLC tested. The samples from this boring that were STLC tested were collected from 2 and 5 feet bgs and had a maximum concentration of only 29.5 mg/kg. This concentration is below the minimum concentration (50 mg/kg) that could render the soil hazardous based on STLC testing, and therefore there was no need to STLC test those samples but the samples with the higher concentrations should have been STLC tested.

The DTSC has established an arsenic background concentration of 25 mg/kg in soils in the area. This background is much higher than the general background for California soils of 11.32 mg/kg. Since there were elevated concentrations of arsenic detected as deep as 45 feet bgs, 43.2 mg/kg, LE believes that is additional evidence of significant vertical migration of arsenic beneath the site to the approximate depth of groundwater.

Arsenic Impact on First Groundwater

Based on the groundwater arsenic data, ranging to 270 micrograms per liter ($\mu\text{g/L}$), from eight boreholes completed in 2008, two groundwater monitoring wells were installed at the site near the two hot spots in 2009. The wells were sampled twice. The maximum arsenic concentration detected was 4.1 $\mu\text{g/L}$.

Over the years, the DTSC has changed its position from believing arsenic has migrated through the soil down to the groundwater and has caused contamination to believe that arsenic at the site has not contaminated the groundwater.

In DTSC's 2010 letter approving the abandonment of the two wells, it stated the site "had elevated levels of arsenic in soil down to groundwater". DTSC also stated that "hydropunch samples and the two rounds of well samples all show that arsenic in groundwater is below the allowed maximum contaminant level (MCL) of 10 $\mu\text{g/L}$ ". However, it should be noted that many hydropunch samples had arsenic concentrations above the MCL, ranging to 270 $\mu\text{g/L}$. Therefore, LE believes the hydropunch sampling results, 27 times higher than the MCL, did not justify the closure of the groundwater case for the site.

The distances from the former two groundwater monitoring wells, MW-1 and MW-2, to the corresponding two borings, No. 2 and No. 3, with the highest arsenic concentrations in groundwater are unknown. LE believes installing just two groundwater monitoring wells and sampling twice on such a large site (approximately 5 acres), with nearby municipal wells, without establishing groundwater flow directions and upgradient and downgradient arsenic concentrations, is inadequate.

In a March 7, 2008 letter to the DTSC that is posted on Envirostor, assembly member Mike Feuer, stated the importance that DTSC confirms at regular intervals that the water table remains uncontaminated. However, prior to Mr. Feuer's letter, the maximum detected arsenic concentration in groundwater beneath the site was 35 µg/L which was below the California MCL of 50 µg/L at that time. Because the highest arsenic concentration (35 µg/L) was below this MCL, in February 2008, DTSC determined no remediation of groundwater was required. However, on November 28, 2008, the California MCL for arsenic was lowered to 10 µg/L. This should not have been unexpected because the federal MCL had already been lowered from 50 µg/L to 10 µg/L in January 2006.

Arsenic Impact on the Municipal Drinking Water Supply

DTSC's position is that the arsenic in soil beneath the site is immobile and has not caused groundwater contamination on the basis of the data from the two groundwater monitoring wells and the leachability study presented in the RAW.

The groundwater table measured in soil borings drilled in 2008 was in the direction from the site to the City's well 4, opposite to the shallow regional flow direction to the southeast. LE's concern is that this flow direction could have resulted from communication between the shallow groundwater and the deeper usable groundwater. In DTSC's response to comments contained in the RAW, it states that Lindmark Engineering in 1998 and 2003 concluded that perched groundwater is not connected to the regional aquifer system; however, Lindmark Engineering never made such a conclusion. While there is no known conduit from shallow to deep groundwater, such conduits could exist from for instance undocumented private water wells or faults. The California Geological Survey (CGS) has mapped earthquake fault zones and hazard zones adjacent to the site, including a liquefaction zone within the site.

The human health risk assessment, which is referenced in the RAW and relied on, was performed in 2007 before the highest arsenic concentrations, ranging to 270 µg/L, were detected in the groundwater. Furthermore, the risk assessment assumed there were no nearby drinking water wells, although well extraction began by 2004, and cited reports regarding hydrogeology that were prepared before the four municipal wells had been installed and placed in operation. The risk assessment stated there were no drinking water wells within a one-mile radius of the site, although there were four City wells in operation within one-third of a mile from the site at that time, with the closest well, No.4, approximately 100 feet from the site. The arsenic concentrations in groundwater beneath the site were attributed to relatively high concentrations of arsenic in the native soil. The soil was the only pathway evaluated and the associated risk from dust inhalation to nearby residents and site workers. The groundwater was not considered in the evaluation of risk although the nearby drinking water wells in normal circumstances would be evaluated as obvious potential receptors.

While the highest level of arsenic allowed in drinking water (MCL) is 10 ug/L, the maximum contaminant level goal (MCLG) is only 0.004 µg/L. The MCLG is the level of arsenic in drinking water below which there is no known or expected risk to health. Considering that arsenic concentrations as high as 270 µg/L have been detected in groundwater samples beneath the site, elevated arsenic concentrations in soil extend from the surface to groundwater and the maximum arsenic concentration

(22.7 µg/L) detected in the nearby drinking water wells, LE concludes the arsenic releases at the site has contaminated the groundwater and very likely significantly contributed to the elevated arsenic in the nearby City water wells. The City well that is least impacted by arsenic is well 6 which is located farthest away from the site.

The fact that the City of Beverly Hills drinking water wells are impacted by arsenic, including concentrations exceeding the MCL, is evidence there is a complete pathway in the groundwater supply beneath the site. The arsenic contamination in soil and groundwater beneath the site is the closest known potential source area for the arsenic contamination in the City's drinking water supply.

In addition to treating the raw groundwater, the City has been relying on blending the well water with water from the Metropolitan Water District to reduce the arsenic concentration in distributed drinking water to acceptable levels.

The California Regional Water Quality Control Board, Los Angeles Region (RWQCB) is the public agency with primary responsibility for the protection of groundwater quality for all beneficial uses within Los Angeles County.

To LE's knowledge, the RWQCB has not been asked to comment on the RAW despite the high concentrations of arsenic in the soil at depth, the elevated concentrations detected at the groundwater table beneath the site and in nearby off-site sampling points, and the closest drinking water well located within approximately 100 feet from the site.

The Porter-Cologne Water Quality Control Act is not listed as an Applicable or Relevant and Appropriate Requirement (ARAR) in the RAW. In accordance with this act, cleanup levels in groundwater should be equal to background concentrations unless such levels are technically and economically infeasible to achieve. The previous work plans, including the Draft Final RAW prepared by CH2MHill in June 2015, also stated that the site had not caused any groundwater contamination and that the groundwater does not present a complete exposure pathway. The work plans did not mention the nearby City water wells, located as close as within approximately 100 feet from the site and impacted by elevated concentrations of arsenic.

RAW IMPLEMENTATION COST

Implementation of the recommendations made by LE in the October 21, 2020 report, would increase the cost of soil removal action substantially.

In its January 27, 2021 response to one of LE's comments, the DTSC stated a minimum excavation to 2 feet bgs for the entire site would be cost-prohibitive, and later in a conversation with Ms. Vela she stated the cost could not exceed \$2 million. The current cost estimate is \$1,508,000. In order to perform a RAW, LE understands the estimated implementation cost must be below \$2 million. For the removal of all soil beneath the site to a depth of maximum 5 feet, the RAW estimated a cost of \$5,501,000. However, the RAW did not include an estimate of the cost for excavating all soil beneath the site to a depth of 2 feet which is the action LE recommended in the October 21, 2020 report. Based on the unit costs included in the RAW and the estimated volume of soil for such an excavation (8,000 cubic yards), LE calculated that cost would be approximately \$2,800,000 which does not include soil removal costs for the adjoining City properties.

RECENT COMMUNICATION WITH DTSC

In our October 21, 2020 report, LE requested information on water sampling and well abandonment for the two former groundwater monitoring wells. DTSC has provided this information and uploaded it to Envirostor.

In a recent conversation with Ms. Vela, she stated once the site has been remediated in accordance with the RAW, DTSC will not require any dust monitoring for regular maintenance and landscaping activities since:

1. The shallow soil (0-2 feet) will meet the cleanup level either by importing clean soil for the excavated areas or the verification samples for areas not excavated will meet the cleanup goal of 25 mg/kg, and
2. Land use controls (LUCs) will be implemented

Although some areas of the adjoining City rights-of-way contain arsenic concentrations above the 25 mg/kg cleanup level in soil from 0 to 2 feet bgs, Ms. Vela stated that DTSC would not require dust monitoring for future maintenance and landscaping after the site has been remediated.

PUBLIC PARTICIPATION

Section 10, Public Participation, of the RAW, gives the impression there will be additional public review and comments, and a public meeting, if there is sufficient community interest; however, after the DTSC had approved the RAW, Ms. Vela told LE there are no meetings planned and no further comments will be considered.

Please call me at 818-707-6100 if you have any questions.

Best regards,



Ulf Lindmark, PE, BCEE
President

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