BEFORE THE HEARING BOARD OF THE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

In The Matter Of SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, Petitioner, vs. CHIQUITA CANYON, LLC, a Delaware Corporation, [Facility ID No. 119219] Respondent.	**Case No. 6177-4** **DECLARATION OF SRIVIDHYA VISWANATHAN, P.E.** Health and Safety Code § 41700, and District Rules 402, 431.1, 3002, 203, 1150 Hearing Date: August 17 and 20, 2024 Time: 10:00 A.M. Place: Santa Clarita Performing Arts Center College of the Canyons 26455 Rockwell Canyon Road Santa Clarita, CA 91355

I, Srividhya Viswanathan, declare as follows:

1. I am of sufficient age and am competent to testify in this proceeding. I make this declaration based upon personal knowledge and am competent to testify to the facts set forth herein.

Background and Experience

2. As discussed in my prior declarations in this Case No. 6177-4, I serve on the Reaction Committee as the expert on the landfill gas well-field and dewatering. I am a Vice President and Director of Engineering of the Southwest Region of SCS Engineers, Inc. ("SCS"). I have over 17 years of experience in solid waste management services and infrastructure projects. I began working with Chiquita Canyon, LLC ("Chiquita") in November 2022, primarily advising on Chiquita's landfill gas well-field and dewatering system. Since then, I have continued working on these components at the Chiquita Canyon Landfill ("Landfill").

3. This declaration is made for the August 17 and 20, 2024 status and modification hearing on the Stipulated Order for Abatement with the South Coast AQMD, most recently modified on April 24, 2024 in Case No. 6177-4 ("Modified Stipulated Order").

Compliance with the April 24, 2024 Modified Stipulated Order

4. On April 24, 2024, Chiquita entered the Modified Stipulated Order with the South Coast AQMD that requires Chiquita to implement new and modified mitigation measures to address dewatering and further increase monitoring.

5. Chiquita has begun implementing these updates and new requirements and reports, many of which are or will be made available on Chiquita's website. Chiquita is implementing and/or working to implement the conditions described below as they relate to Chiquita's landfill gas well system.

Chiquita continues to expand the gas well system through the installation of additional vertical dual extraction wells.

6. Chiquita continues to expand the landfill gas well system to address the landfill reaction. As of August 6, 2024, Chiquita has installed a total of 237 wells since July 2023, when Chiquita first began installing wells in response to the reaction.

7. As required by **Condition 13** and **Condition 15**, Chiquita continues to expand the gas well system and operate new wells and collectors. Chiquita submitted a design and installation schedule for 70 additional dual vertical extraction wells and their associated piping on January 31, 2024 as required by **Condition 15.** All dual vertical extraction wells and their associated piping were installed by April 20, 2024.

8. **Condition 15(b)** requires Chiquita to install additional vertical landfill gas extraction wells in the initial Reaction Area, as defined by Condition 9(a) as the boundary of Cells 1/2A, 2B/3, 4, and Module 2B/3/4 P2, including the associated landfill surface area of the cells and modules that experience well temperatures of at least 170 degrees Fahrenheit, settlement, cracks in the landfill cover, presence and quantity of liquids, the presence of hydrogen in the landfill gas, and readings of temperature probes, at a minimum average density of three wells per acre, with even dispersion of two wells per acre, by January 6, 2025. To achieve this well installation density, Chiquita is planning to install a total of 213 wells in the Reaction Area by January 6, 2025. As required by **Condition 15(b)**, on July 1, 2024, Chiquita completed the installation of at least 50% of the wells necessary to achieve the well installation density. As of July 1, 2024, Chiquita was significantly ahead of schedule. On July 1,

Chiquita notified South Coast AQMD that approximately 78% of the wells necessary to achieve the well installation density were installed. A true and correct copy of the confirmation is attached as **Exhibit A**.

9. As of August 6, 2024, 191 of the 213 wells have been installed. Chiquita is on track to reach the well installation density in the Reaction Area well before January 6, 2025 and currently anticipates reaching the well installation density requirement by November 30, 2024.

10. Chiquita continues to notify South Coast AQMD of the number of added wells in monthly reports pursuant to **Condition 8(m)**. Chiquita provides updates in Section (m) of the **Condition 8** reports. Chiquita also notifies South Coast AQMD each Friday regarding which wells have been installed the prior week and which are scheduled to be installed the following week.

11. During any well drilling, Chiquita complies with the following procedures as required:

a. **Condition 15(e)**: Chiquita uses a landfill gas control box that is vented to an approved emission control system to prevent emissions.

b. **Condition 15(f)**: Chiquita continues to complete each well and cap it the same day its construction commences, unless the well hole is completely covered (using a minimum 8'x8' at least 0.25" thick steel plate, and 12 inches depth of clean dirt), or the subsequently installed pipe is capped.

c. **Condition 15(g)**: Chiquita connects each well to an operating landfill gas header or the ends of the well are sealed with blind flanges, glued or fused caps, or other types of seals approved by South Coast AQMD as soon as well is installed.

d. **Condition 15(h)**: Chiquita continues to properly cover and seal all openings and connections of the landfill gas collection system to prevent leaks in accordance with the South Coast AQMD Title V Permit and all applicable regulations.

e. **Condition 15(i)**: Chiquita will install additional stainless steel, carbon steel, or CPVC wells in the Reaction Area per the recommendation of the Reaction Committee. Stainless steel or carbon steel will be installed for any well which has gas temperatures exceeding 170 degrees Fahrenheit.

f. **Condition 15(l)**: Chiquita installs well boots seals on all wells in the Reaction Area in accordance with the installation schedule for the geosynthetic cover that is being installed pursuant to Condition No. 32 and consistent with requirements of the Local Enforcement Agency.

12. As required by **Condition 15(n)**, as of April 25, 2024, all new vertical extraction wells installed within the Reaction Area have been dual extraction wells with the ability to extract both landfill gas and liquid/leachate within the well. **Condition 15(n)** requires Chiquita to install the associated infrastructure for 75% of wells within 30 days of completion of the vertical extraction well drilling operation, and within 60 days for the remaining 25% of wells. Chiquita is working towards compliance with this condition but is currently behind schedule.

Chiquita has resumed the installation and operation of dewatering pumps and is dewatering to the best of its ability.

13. Chiquita still faces constraints on its ability to pump due to lack of adequate offsite disposal facilities but has successfully restarted dewatering and is dewatering to the maximum extent feasible. I understand that Chiquita has continued working with experts in wastewater treatment to improve its onsite treatment capabilities and has continued to identify additional offsite treatment and disposal facilities to increase its offsite disposal capacity.

14. Despite facing constraints, as required by **Condition 17**, Chiquita is dewatering wells impacted by liquids and taking measures to remove additional liquids in the Reaction Area to limit the reaction severity and spread. Chiquita provides these updates in Section (i) of the **Condition 8** reports as is consistent with **Condition 17** and **Condition 17(a)**. As required by **Condition 65**, since March 29, 2024, Chiquita has been providing to South Coast AQMD each Friday a summary of leachate dewatering pumps that have been installed and resumed operation the prior week, and the number and location of dewatering pumps anticipated to be installed and placed into operation in the following week, and the location of all dewatering pumps installed and/or in operation.

15. **Condition 17** required Chiquita to install dewatering sumps/pumps in at least 60% of the landfill gas vertical extraction wells capable of extracting liquids by March 15, 2024. As of January 31,

2024, Chiquita installed pumps in 44 of 100 wells in the Reaction Area, representing 44% of the vertical extraction wells in the Reaction Area. As explained in a prior declaration and the April 22, 2024 Condition No. 8 report, due to the changed circumstances in February, Chiquita was forced to slow its dewatering efforts and remove 42 of the pumps in wells within the Reaction Area as it no longer had an outlet for the disposal of the liquids. Because of this, installation of pumps in at least 60% of the wells in the Reaction Area by March 15, 2024 was infeasible. As required by **Condition 17(a)**, Chiquita provided detailed rationale and reasoning in Section (i) of the April 22, 2024 Condition 8 report.

16. As of the April hearing, Chiquita had restarted dewatering. As of August 6, 2024, Chiquita has installed 70 pumps in its dual extraction wells and 59 pumps are operational. Previously, the operation of vertical dewatering wells was temporarily impacted in areas where the geosynthetic cover was being installed. The geosynthetic cover has been installed in sections. As each section was installed, pumps and associated landfill gas infrastructure in the area were temporarily removed so as not to interfere with the cover installation. Once the installation of the section was complete, the pumps and landfill gas infrastructure were reinstalled and operation resumed. The cover installation project is near completion and reinstallation activities have resumed in all areas.

17. As required by **Condition 13**, Chiquita also continues to operate the two sumps with pumps along the west slope to dewater the Landfill. As a part of the western slope construction project, Chiquita will remove the two operating sumps with pumps and install approximately five or six new sumps along the west slope of the Landfill. Once this construction project is completed, the geosynthetic cover will be installed over the western slope and additional pumping will resume in this area.

18. On June 7, 2024, Chiquita submitted to South Coast AQMD further revised dewatering guidelines that implemented South Coast AQMD comments received by e-mail on May 21, 2024 consistent with and as required by **Condition 18**. A true and correct copy of the revised dewatering guidelines is attached as **Exhibit B**. Although awaiting approval by South Coast AQMD, Chiquita has already implemented the dewatering guidelines and continues to do so.

Leachate Mitigation and Investigation

19. Since April 25, 2024, Chiquita measures and records the leachate temperature within all the 6-inch leachate pipes feeding into the onsite frac tanks, and at the piping leading into the tanks at all tank farms in accordance with **Condition 27(a).** Chiquita provides these updates in Section (q)(i) of the **Condition 8** reports.

20. Since January 18, 2024, Chiquita measures and records quantities of leachate sent off-site for disposal/treatment during the previous week as long as leachate is transported offsite for disposal. Chiquita also records on a weekly basis quantities of leachate collected and leachate treated onsite in accordance with **Condition 27(d).** Chiquita provides these updates in Section (q)(iv)(d) of the **Condition 8** reports.

21. As required by **Condition 29**, since March 22, 2024, Chiquita monitors whether it has proper capacity to accumulate onsite and/or disposal of collected liquids/leachate at an appropriate facility or facilities. Chiquita provides these updates in Sections (q)(v) and (r) of the **Condition 8** reports.

22. Since January 18, 2024, it is my understanding that Chiquita has taken at least one representative monthly sample of liquids from the Reaction Area of the Landfill and at least one representative monthly sample of leachate from the bottom tanks where liquids/leachate from the entire Landfill collect and analyzed them in accordance with U.S. Environmental Protection Agency ("EPA") Method 624.1 for the presence of volatile organic compounds ("VOCs") and toxic air contaminants ("TACs"). As required by **Condition 38**, the results of these samples are posted on Chiquita's Odor Mitigation website (https://chiquitacanyon.com/reports/odor-mitigation/).

23. As required by **Condition 53**, since April 3, 2024, each Wednesday Chiquita submits, a report on the: (1) number of tanks in each leachate tank group; (2) total number of leachate tanks treated; (3) weekly and year-to-date total quantity of liquid collected; (4) weekly and year-to-date total quantity of liquid treated; and (5) estimated weekly and year-to-date total quantity of seeping, pooling, or

ponding leachate collected. These reports are posted on Chiquita's Odor Mitigation website (https://chiquitacanyon.com/reports/odor-mitigation/).

24. On April 22, 2024, Chiquita provided South Coast AQMD with a schematic of the current leachate treatment and storage system, including connections, flow lines, tank groups, vent lines to flares, lines to and between leachate tanks, and tanks which are connected and not connected to vacuum vent lines in accordance with **Condition 63**. A true and correct copy of the April 22, 2024 schematic is attached as **Exhibit C**.

25. Beginning on April 29, 2024, in accordance with **Condition 72(d)**, Chiquita conducts daily pressure testing and monitoring within the HDPE header(s) venting the leachate storage tanks to quantify the vacuum from the flare station blowers exerted on the leachate tanks, in inches of Water Column. As required by **Condition 72(d),** Chiquita ceased pressure testing and monitoring upon its complete installation of pressure gauges as required by **Condition 68**, which occurred on July 10, 2024. Chiquita provides these updates in Section (u) of the **Condition 8** reports.

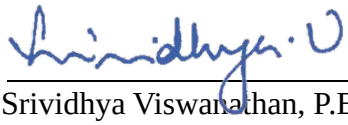
26. As required by **Condition 12(g)(viii)**, the Reaction Committee conducted an investigation into the existing landfill collection and conveyance piping materials, alternative landfill gas collection and conveyance piping materials, and current landfill conditions to determine whether the existing High-density polyethylene ("HDPE") piping was appropriate for the current and expected future temperature conditions at the Landfill, and to determine whether viable alternative landfill gas collection/conveyance piping materials exist. The investigation results were submitted on June 21, 2024. A true and correct copy of the report is attached as **Exhibit D**.

27. As discussed in the report required by **Condition 12(g)(viii)**, the Reaction Committee found that HDPE is the primary landfill gas conveyance piping material used at ETLFs around the country, within the landfill cell boundary, both for above and below grade piping installed.

28. In the report, the Reaction Committee also analyzed the material properties and suitability for landfill gas collection/conveyance piping of the currently used, HDPE piping, and two potential alternative landfill gas collection/conveyance piping materials: Chlorinated Polyvinyl Chloride ("CPVC") and Carbon Steel. We found that the peak temperatures expected to be encountered by the landfill gas conveyance piping is 205°F. This temperature is within the short-term temperature rating of all three materials but exceeds the long-term temperature rating of CPVC and HDPE. Regardless of carbon steel's long-term suitability to high temperatures, the Reaction Committee did not recommend carbon steel for landfill gas conveyance material due to its rigidity, poor corrosion resistance, incompatibility with chemical constituents in landfill gas and condensate, and the mechanical connections. The Reaction Committee also did not recommend CPVC for landfill gas conveyance due to low pliability and high rigidity, lack of resistance to ultraviolet radiation exposure, and incompatibility with typical landfill operations and differential settlement. We concluded that, despite the peak temperature of landfill gas at the wellhead exceeding the long-term maximum temperature rating for HDPE, the use of HDPE pipe for landfill gas collection/conveyance piping at the Landfill is recommended.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct to my personal knowledge.

Executed on this 9th day of August 2024, in San Diego, California.

By: 

Srividhya Viswanathan, P.E.
Vice President
SCS Engineers

BEFORE THE HEARING BOARD OF THE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

In The Matter Of SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, Petitioner, vs. CHIQUITA CANYON, LLC a Delaware Corporation, [Facility ID No. 119219] Respondent.	**Case No. 6177-4** **EXHIBIT A TO DECLARATION OF SRIVIDHYA VISWANATHAN, P.E.** Health and Safety Code § 41700, and District Rules 402, 431.1, 3002, 203, 1150 Hearing Date: August 17 and 20, 2024 Time: 10:00 am Place: Santa Clarita Performing Arts Center College for the Canyons 26455 Rockwell Canyon Rd. Santa Clarita, CA 91355

From: Leigh S. Barton
Sent: Monday, July 1, 2024 11:32 AM
To: Kathryn Roberts; Mary Reichert; Ryan Mansell
Cc: Megan L. Morgan; Jake Duginski
Subject: Chiquita Canyon Landfill - Case No. 6177-4 - Condition 15(b)

Kathryn, Mary, and Ryan,

In accordance with Condition 15(b) of the Stipulated Order for Abatement in Case No. 6177-4, as most recently modified on April 24, 2024, this email hereby notifies South Coast AQMD that Chiquita Canyon, LLC has completed the installation of more than 50% of the wells necessary to achieve the well installation density laid out in Condition 15(b). To date, Chiquita has installed 167 (equivalent to 78%) of the planned 213 wells necessary to achieve the required well installation density.

Regards,
Leigh

Leigh S. Barton
She | Her | Hers
Associate

Beveridge & Diamond

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BEFORE THE HEARING BOARD OF THE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

In The Matter Of SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, Petitioner, vs. CHIQUITA CANYON, LLC a Delaware Corporation, [Facility ID No. 119219] Respondent.	**Case No. 6177-4** **EXHIBIT B TO DECLARATION OF SRIVIDHYA VISWANATHAN, P.E.** Health and Safety Code § 41700, and District Rules 402, 431.1, 3002, 203, 1150 Hearing Date: August 17 and 20, 2024 Time: 10:00 am Place: Santa Clarita Performing Arts Center College for the Canyons 26455 Rockwell Canyon Rd. Santa Clarita, CA 91355

From: Haley, William (Bill) <WCHaley@scsengineers.com>
Sent: Friday, June 7, 2024 5:54 PM
To: Nathaniel Dickel
Cc: Viswanathan, Srividhya; Jones, Art; Christina Ojeda; Guignon, Evan; Han, Jessie; Lizabeth Gomez; Dick, Bob; Baitong Chen; Sullivan, Pat; Stephens, Gabrielle
Subject: RE: Case No. 6177-4; Condition 18 Revised Dewatering Guidelines and Implementation Procedures
Attachments: 2024.06.07 Revised Dewatering Guidelines Chiquita Canyon Landfill V2.pdf

[EXTERNAL SENDER: Use caution with links/attachments]

Nate,

See attached revised dewatering guidelines per SCAQMD comments. If you have any comments or questions please let us know.

Thanks, and have a great weekend!

William C. Haley, PE.*
Project Director
SCS ENGINEERS
*Licensed in CO and TX

Office: 303-221-1719
Cell #: 303-519-4503
Email: wchaley@scsengineers.com

From: Nathaniel Dickel <NDickel@aqmd.gov>
Sent: Tuesday, May 21, 2024 6:33 PM
To: Haley, William (Bill) <WCHaley@scsengineers.com>
Cc: Viswanathan, Srividhya <SViswanathan@scsengineers.com>; Jones, Art <AJones@scsengineers.com>; Christina Ojeda <cojeda@aqmd.gov>; Guignon, Evan <EGuignon@scsengineers.com>; Han, Jessie <JHan@scsengineers.com>; Lizabeth Gomez <LGomez@aqmd.gov>; Dick, Bob <BDick@scsengineers.com>; Baitong Chen <BChen@aqmd.gov>; Sullivan, Pat <PSullivan@SCSEngineers.com>; Stephens, Gabrielle <gstephens@scsengineers.com>
Subject: RE: Case No. 6177-4; Condition 18 Revised Dewatering Guidelines and Implementation Procedures

Good Afternoon Bill,

Thank you for providing these Revised Dewatering Guidelines dated April 4, 2024. These have been reviewed and South Coast AQMD has additional comments. Please review the attached document proceed with updating the guidelines as needed.

Please provide an updated version of the Dewatering Guidelines by **June 7, 2024**. Feel free to reach out with any questions.

Thank you,

Nate Dickel | Senior Air Quality Engineer
South Coast Air Quality Management District | www.aqmd.gov
21865 Copley Drive | Diamond Bar, CA 91765
Phone: 909.396.2413 | ndickel@aqmd.gov

From: Haley, William (Bill) <WCHaley@scsengineers.com>
Sent: Thursday, April 4, 2024 10:09 PM
To: Baitong Chen <BChen@aqmd.gov>; Nathaniel Dickel <NDickel@aqmd.gov>; Christina Ojeda <cojeda@aqmd.gov>
Cc: Viswanathan, Srividhya <SViswanathan@scsengineers.com>; Jones, Art <AJones@scsengineers.com>; Guignon, Evan <EGuignon@scsengineers.com>; Han, Jessie <JHan@scsengineers.com>; Dick, Bob <BDick@scsengineers.com>; Sullivan, Pat <PSullivan@SCSEngineers.com>; Stephens, Gabrielle <gstephens@scsengineers.com>
Subject: [EXTERNAL] Case No. 6177-4; Condition 18 Revised Dewatering Guidelines and Implementation Procedures

All,

In accordance with Condition 18 of the Modified Stipulated Order for Abatement in Case No. 6177-4, attached are the Chiquita Canyon Landfill's revised dewatering guidelines and implementation procedures.

Best,

William C. Haley, PE.*
Project Director
SCS ENGINEERS
*Licensed in CO and TX

Office: 303-221-1719
Cell #: 303-519-4503
Email: wchaley@scsengineers.com

June 7, 2024

Baitong Chen, Air Quality Engineer, bchen@aqmd.gov
Nathaniel Dickel, Senior Air Quality Engineer, ndickel@aqmd.gov
Christina Ojeda, Air Quality Inspector, cojeda@aqmd.gov
South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, CA 91765-4182

Subject: Revised Landfill Gas Collection System Dewatering Guidelines for Stipulated Order for Abatement (Case No. 6177-4), Chiquita Canyon Landfill (Facility ID 119219), Castaic, California

To Whom It May Concern:

SCS Engineers (SCS), on behalf of Chiquita Canyon, LLC (Chiquita), hereby provides the South Coast Air Quality Management District (SCAQMD) with Chiquita's revised landfill gas (LFG) collection and control system Reaction Area dewatering guidelines and implementation procedures per Condition No. 18 of the Stipulated Order for Abatement (SOFA) (Case No. 6177-4), as modified on March 21, 2024 (Modified SOFA), for the Chiquita Canyon Landfill (CCL or Landfill).

BACKGROUND

The Landfill is a landfill/solid waste disposal facility located at 29201 Henry Mayo Dr., Castaic, California, 91384 (SCAQMD Facility No. 119219). In connection with the Landfill, Chiquita operates an LFG collection and control system (GCCS). The GCCS includes vertical LFG extraction wells and dedicated dewatering pumps (which have historically been either pneumatic or electric) that can be inserted downhole, into select vertical LFG extraction wells for purposes of extracting liquids that may accumulate in the well. Lowering the liquid levels within individual wells reduces the length of perforated well pipe that is blocked by liquids and has shown to expand the zone-of-influence exerted by each well, resulting in improved LFG recovery (increased LFG flowrates).

In 2023, the conditions at CCL indicated that the Landfill was undergoing an elevated temperature landfill (ETLF) event. On September 6, 2023, a hearing was held before the SCAQMD Hearing Board to approve the SOFA, which includes numerous measures to mitigate emissions resulting from the Landfill's ETLF conditions. The approved SOFA was modified on January 15, 2024, and again on March 21, 2024.

Condition No. 18 of the Modified SOFA requires Chiquita to submit revised Reaction Area dewatering guidelines and implementation procedures to SCAQMD in response to SCAQMD comments on the Reaction Area dewatering guidelines and implementation procedures. Condition No. 18 of the Modified SOFA provides:

Respondent shall, in addition to the installation of dewatering sumps/pumps specified in Condition No. 17 above, within ninety (90) days of the issuance of the Initial Order, provide proposed Reaction Area dewatering guidelines and implementation procedures for the landfill to South Coast AQMD (Baitong Chen, Air Quality Engineer, (bchen@aqmd.gov); Nathaniel Dickel, Senior Air Quality Engineer, (ndickel@aqmd.gov)) that include but are not limited to the following:

A. *Proposed methodologies and monitoring procedures that determine the level of dewatering within the Reaction Area (as defined in Condition 9(a)) wells impacted by liquid. Methods may include the measurement of the gas flow at each landfill gas collection well impacted by liquids;*
B. *Use of dewatering pumps or other methods to remove liquids from Reaction Area (as defined in Condition 9(a)) wells impacted by liquids;*
C. *An implementation plan for the use of dewatering pumps or other methods to remove liquids from the Reaction Area wells impacted by liquids. The plan shall include a list of wells in the Reaction Area and depth where liquids are expected to impact landfill gas collection efficacy or be a concern, the proposed action to remove the liquids, and the schedule for liquid removal. The implementation plan shall also include pro-active measures, such as additional dewatering pumps, to be installed at landfill gas collection wells where liquid impaction issues have not yet occurred, but may be expected to occur.*
D. *Upgrades to the site leachate collection system as needed, including through the addition of increased air compressor and/or drain line infrastructure;*
E. *Protocols for the pumping and monitoring of dewatering pumps and other such methods to remove water from Reaction Area (as defined in Condition 9(a)) wells impacted by liquids;*
F. *Well field liquid sounding in the Reaction Area (as defined in Condition 9(a)), and a proposed schedule for conducting liquid sounding on a consistent basis;*
G. *A timeline for appropriate reporting on impacted wells;*
H. *The feasibility of integrity testing of all vertical gas wells in the Reaction Area (as defined in Condition 9(a)) and a timeline and protocol for addressing any wells that the integrity testing demonstrates are damaged or are exhibiting temperatures of at least 170 degrees Fahrenheit; and*
I. *A timeline for implementation of appropriate dewatering procedures upon discovery of wells impacted by liquids.*

Respondent shall, within 14 calendar days of approval of this Order, revise the dewatering guidelines according to the comments received by email on March 13, 2024, and re-submit the revised dewatering guidelines to South Coast AQMD for final approval. The proposed Reaction Area dewatering guidelines and implementation procedures shall be implemented within seven (7) days of South Coast AQMD approval, and shall be implemented to the maximum extent feasible if Respondent's facility is encountering leachate tank capacity shortages.

DEWATERING GUIDELINES

Section A – Proposed methodologies and monitoring procedures that determine the level of dewatering within the Reaction Area (as defined in Condition 9(a)) wells impacted by liquid. Methods may include the measurement of the gas flow at each landfill gas collection well impacted by liquids;

The LFG industry generally considers the ideal condition for maximizing LFG collection and extraction to be well conditions unencumbered by accumulated liquids (i.e., when the full length of perforated well pipe is open). However, this idealized condition is rarely achievable. The "level of dewatering" means the degree to which the static liquid level in each well is lowered by dewatering pump operations, which extract liquids at a rate equivalent to the well's liquid recharge rate, or "yield." Methodologies and monitoring procedures that can assess the appropriate level of dewatering include measurement of LFG composition (quality), measurement of LFG recovery quantities (flowrate),

measurement of applied vacuum, and measurement of liquid level elevations (depth-to-liquid) within the well casing pipe.

Chiquita utilizes gas quality and flow measurements at individual vertical LFG extraction wells within the Reaction Area and liquid level monitoring to assess the level of dewatering that is being achieved by the pumps installed within select vertical LFG extraction wells positioned within the Reaction Area. These same parameters (composition and flow) are evaluated to decide if the dewatering being achieved is adequate to accomplish the objective of removal of heat through fluid extraction (both gas and liquids).

Extraction wells with low LFG flow of less than 5 cubic feet per minute (cfm) or decreasing gas quality (British thermal unit [BTU] content less than 100 BTU per cubic foot), or equilibration with system vacuum within one minute of opening the wellhead will require additional investigation (root cause analysis) to determine the cause of the decrease. During routine LFG monitoring as prescribed by the Landfill's Title V permit, if a well exhibits one or more of these conditions (low LFG flow of less than 5 cfm, decreasing gas quality (British thermal unit [BTU] content less than 100 BTU per cubic foot), or equilibration with system vacuum within one minute of opening the wellhead), Chiquita will conduct liquid level monitoring of that well within three weeks as prescribed in Section F.

Chiquita conducts routine liquid level monitoring utilizing crews experienced in conducting liquid level monitoring and operating and maintaining dewatering pumps at all vertical LFG extraction wells within the Reaction Area, at a minimum, on a quarterly basis. It is standard industry practice to monitor liquid levels quarterly for landfills with liquid concerns. More frequent liquid level monitoring is impractical for the continued operation of the pumps and would be detrimental to the removal of liquids from the Landfill. Pumps must be shut off to perform the liquid level monitoring, thus halting gas collection. Performing liquid level monitoring at a greater frequency would reduce the amount of gas and liquids extracted from the Landfill. Additionally, more frequent monitoring would not be helpful as the liquid levels within landfills do not appreciably change in a month much less a week. During liquid level monitoring (often referred to as a "sounding" event), a liquid level measurement device that consists of a probe and cable is lowered into the well casing and produces an audible sound when the probe encounters liquids. Alternative instrumentation, such as a tape measure with floatation device or downhole video camera, may be utilized in order to reduce potential interference due to foam formation. The measurements on the cable or tape measure indicate the depth to liquids, as measured from the top of the casing, within the Landfill Reaction Area, and are used to calculate the depth of liquids and the liquid levels within each well casing.

Section B – Use of dewatering pumps or other methods to remove liquids from Reaction Area (as defined in Condition 9(a)) wells impacted by liquids;

Chiquita is installing a dedicated dewatering pump in any vertical LFG well in the Reaction Area where the well exhibits low LFG flow (less than 5 cfm), decreasing gas quality (BTU content less than 100 BTU per cubic foot), or equilibration with system vacuum within one minute of opening the wellhead, as well as in wells where liquids block more than 75% of well casing perforations, provided that the well casing pipe has structural integrity as noted in Section H and a pump can be installed safely. The type of pump, depth of installation, and ancillary features to be installed will vary depending on liquid temperature, composition of the liquids (primarily solids content, etc.), presence of fouling substances (sludge, precipitants, crust, black goo, flubber, taffy, etc.), historical pump performance, and maintenance cycles to maximize liquid extraction for each individual well in the Reaction Area.

It is well-documented within the landfill industry that the use of dedicated dewatering pumps to extract liquids from vertical LFG extraction wells is a challenging endeavor that requires continuous maintenance because the physical properties of the leachate lend itself to clogging the dewatering pumps. This continuous maintenance includes cleaning of the pumps, due to the accumulation of solids in the vertical discharge tubing and pump which occurs during normal operation. These solids will also accumulate in the leachate discharge piping (forcemain) which requires routine cleaning and jetting to remove the solids to prevent blockages. Work performed to safely maintain pumps in the reaction area will be conducted in accordance with the Health and Safety Plan for the reaction area. Pump downtime and servicing needs impose significant demand on resources.

To help mitigate these resource demands and minimize delays in servicing, Chiquita will maintain a maintenance stockpile of spare pumps and all related infrastructure. This stockpile will have a 5 to 1 ratio of equipment, meaning that for every 5 pieces of each type of equipment (e.g., valves, piping, or air pumps) in operation, there will be one piece of that equipment stockpiled onsite. Electrical pumps cannot be stockpiled, because each pump is specifically tailored and designed to each well and the well's temperature. The clearance between the pumps rotating stator and stator seal has to be individually manufactured for the specific temperature expected in the liquids due to the change in seal and stator sizes when exposed to high temperatures. .One temporary backup air pump and rebuild kit will be stockpiled for every 5 electrical pumps in operation. When any portion of the dewatering system needs to be replaced or maintained, it can be swapped with the backup unit until the original can be brought back to operating condition or replaced. If there is less equipment than the specified minimum stockpile amount, the additional equipment will be ordered within 48 hours, with expedited/priority order fulfillment and delivery requested.

The subsurface conditions within an ETLF are a particularly harsh environment, and expectations of liquid quantities removed should be correlated to field conditions that the dewatering system (pumps, pneumatic supply piping, liquid forcemain piping, valves, compressors, electric power equipment, etc.) is being exposed to. Chiquita continues to partner with pump manufacturers to develop new equipment to help withstand the challenging liquid conditions present as well as utilize the best materials for the pumps and related infrastructure, which are the best known practices for dealing with ETLF liquids in the industry.

Section C – An implementation plan for the use of dewatering pumps or other methods to remove liquids from the Reaction Area wells impacted by liquids. The plan shall include a list of wells in the Reaction Area and depth where liquids are expected to impact landfill gas collection efficacy or be a concern, the proposed action to remove the liquids, and the schedule for liquid removal. The implementation plan shall also include pro-active measures, such as additional dewatering pumps, to be installed at landfill gas collection wells where liquid impaction issues have not yet occurred, but may be expected to occur.

Chiquita will install pumps in wells in the Reaction Area that are impacted by liquids, which expands on its prior procedure of installing pumps only after liquids impact LFG collection. Currently, there are 183 vertical LFG extraction wells positioned within the Condition 9A Reaction Area (listed below) of which 56 currently have dewatering pumps installed to remove liquids from the Reaction Area. A specific depth in the Landfill cannot be used to expect impact to LFG collection efficacy, because the depth of liquids impacts can vary by the elevation of the Landfill at that location, the depth of the specific well, the depth of perforations of that well, or the time when that well is drilled. Instead, each well is evaluated for possible depth of impaction individually. Currently, approximately 10 of the 183 wells within the Reaction Area show no open perforations due to liquid levels within the well.

Table 1. Vertical Extraction Wells within Reaction Area

CV-100	CV-2303	CV-2403	CV-2498	CV-2443
CV-103	CV-2304	CV-2404	CV-2499	CV-2450
CV-108-52	CV-2305	CV-2406	CV-24126	CV-2456
CV-113	CV-2306	CV-2407	CV-74R	CV-2466
CV-114	CV-2308 PLR	CV-2408	CV-85S	CV-2434
CV-1420	CV-2310 PLR	CV-2409	CV-2477	CV-2412
CV-1421	CV-2311	CV-2410	CV-2414	CV-2420
CV-1425	CV-2312	CV-2413	CV-2442	CV-2425
CV-1426	CV-2314	CV-2435	CV-24122	CV-2427
CV-1532	CV-2315	CV-2447	CV-2411	CV-2432
CV-1532A	CV-2322	CV-2465	CV-2416	CV-2433
CV-1534	CV-2326	CV-2473	CV-2417	CV-2437
CV-1534A PLR	CV-2327	CV-2475	CV-2418	CV-2438
CV-1535	CV-2328	CV-2481	CV-2419	CV-2439
CV-1601S	CV-2333	CV-2484	CV-2421	CV-2440
CV-1601D	CV-2335	CV-24100	CV-2441	CV-2445
CV-1607	CV-2336	CV-24101	CV-2479	CV-2452
CV-1610	CV-2337	CV-24120	CV-24102	CV-2457
CV-1901	CV-2338	CV-24121	CV-2449	CV-2459
CV-1902A	CV-2339	CV-24138	CV-2455	CV-2478
CV-1902D	CV-2340	CV-24139	CV-2460	CV-2480
CV-1902S	CV-2341	CV-24140	CV-2461	CV-2485

CV-1903	CV-2342A PLR	CV-24141	CV-2462	CV-2486
CV-1906	CV-2343	CV-24142	CV-2463	CV-2487
CV-2001	CV-2344	CV-24143	CV-2464	CV-2489
CV-2002	CV-2345	CV-24144	CV-2469	CV-2490
CV-2003	CV-2346	CV-2415	CV-2471	CV-24103
CV-2004	CV-2347	CV-2422	CV-2472	CV-24104
CV-2006	CV-2348	CV-2423	CV-2474	CV-24105
CV-2007	CV-2349	CV-2424 PLR	CV-2476	CV-24106
CV-2201 PLR	CV-2350	CV-2428	CV-2482	CV-24145
CV-2202	CV-2351	CV-2429	CV-2483	CV-24170
CV-2203 PLR	CV-2352	CV-2430	CV-2488	CV-24175
CV-2204 PLR	CV-2353 PLR	CV-2453	CV-2491	CV-24174
CV-2206 PLR	CV-2354	CV-2495	CV-2493	CV-2431
CV-2301	CV-2401	CV-2496	CV-2494	CV-2436
CV-2302	CV-2402	CV-2497		

To proactively plan for future dewatering pump installation, Chiquita is installing dewatering infrastructure (pneumatic supply piping and liquid forcemain piping) to all existing wells. All newly drilled wells will be evaluated based upon Condition 15(n) of the revised SOFA to determine if the well needs the dewatering pump to maintain proper performance. Additionally, Chiquita is continually ordering new pumps both to install in existing LFG extraction wells and to stock on-site, if an existing well begins to have liquid impacts or an existing pump needs to be removed from the LFG extraction well for servicing and maintenance. Pumps in wells are being pulled for cleaning and maintenance when they are no longer producing liquids. This maintenance interval, which is based on routine inspections, has ranged from a 3 to 14 day period of time within the Reaction Area, with replacement occurring within 24 hours of determining the pump is no longer functioning for the pneumatic pumps. The maintenance interval ranges from 3 to 14 days depending on what needs to be replaced or fixed on the pump and if the pump is electrical or pneumatic. Operational time for the electric Lorenz pumps is still being evaluated as additional units are brought online. Chiquita continues to order new pumps; even with expedited fulfillment and delivery requested by CCL, timelines have ranged from 3 days to 3 months depending on the pump type and specification. The range of times is due to the variance in

pump types and specification on-site, pneumatic pumps that are not specifically tailored to each well are typically in-stock and can be delivered within 3 days. Electric pumps that must first have the well evaluated and then the pump and associated control panels manufactured can take up to 3 months depending on availability and specifications. Due to the constant maintenance and delivery timelines, Chiquita maintains an inventory of spare pumps on site, so that every 5 operational pumps has at least 1 backup pump ready to be installed as described further in Section B, This 5 to 1 ratio is based on past pump operational history, and the maintenance timelines to repair a pump that needs to be pulled, so that any pump that needs to be pulled for maintenance is immediately replaced with a functional pump.

While the schedule for dewatering infrastructure installation is highly dependent on manufacturing, vendors, and contractors, each of which may have unexpected circumstances arise, Chiquita will continue expediting these processes. Chiquita is focusing on expeditiously installing the dewatering pumps into the most impacted and newly installed wells while concurrently working on installing dewatering infrastructure to all wells on-site. Chiquita will strive to have this full installation completed by August 30, 2024. The pumps (both pneumatic and/or electric) are configured to actuate and commence liquid removal when liquids are present, so the pumping activities are ongoing and continuous when liquids are present, and the pump is operational.

Section D – Upgrades to the site leachate collection system as needed, including through the addition of increased air compressor and/or drain line infrastructure;

The leachate management system at the Landfill is comprised of various liquids handling infrastructure and subsystems, including the bottom liner drainage layer, the leachate sump pumps, leachate pump stations and forcemain piping, the leachate storage tanks, tanker truck loadout stations, etc. The dewatering infrastructure that is the focus of these dewatering guidelines also serves the LFG collection system and contributes to the liquids handling efforts at the Landfill.

Chiquita has expanded the leachate management system with additional storage tanks and the LFG wellfield dewatering system with liquid conveyance lines and compressed air lines to collect and convey leachate extracted from LFG wells impacted by liquids to the leachate storage tanks. Chiquita continues to install permanent electrical infrastructure for the electrical pumps, power poles, transformers, and armored cabling. If electrical pumps are too far away from the electrical infrastructure, the pumps will be operated via portable generators. Additionally, as described in Section C, Chiquita will continue to expand the LFG wellfield dewatering system so that every vertical LFG extraction well within the Reaction Area is capable of receiving a pump. The leachate forcemain lines will have the ability to convey 500,000 gallons a day, and the leachate storage tanks will have the ability to store 5,000,000 gallons.

Section E – Protocols for the pumping and monitoring of dewatering pumps and other such methods to remove water from Reaction Area (as defined in Condition 9(a)) wells impacted by liquids;

Pumps installed in vertical LFG extraction wells at CCL are monitored daily to check that the pumps are properly functioning. If a pump is found to be non-functional, it is diagnosed and, if it cannot be fixed-in-place, it is swapped for a functional pump while the original pump is cleaned/maintained. This diagnosis, fix in-place, or replacement is done within one day. If a pump is found to be operational at the time of the daily monitoring event, it is noted as a currently operational pump until checked on the following calendar day. Each pump is not monitored at a specific time of day, because the Landfill's conditions and access to certain areas are constantly changing, resulting in changes to the order

pumps are checked. Pumps are checked each day beginning first thing in the morning with those pumps that have shown a possible pressurized leachate release (PLR) and condensate sumps in order to prioritize pumps that if failed may cause leachate seep, then the remaining pumps are checked based on site conditions (e.g., construction in areas of remaining pumps to be checked or priority locations that need to be investigated first) until all pumps have been checked that day. Pumps are operated as frequently as possible to maximize the dewatering at CCL. It is worth noting that the dewatering pumps installed in LFG wells are subject to occasional stalling because of the conditions in the well (primarily solids content of the liquids and other fouling mechanisms), and field technicians verify proper operation daily and utilize various techniques to restart (referred to as "bump") the pump. This daily monitoring, pump restarts, and maintenance performance is logged using mobile forms. For pneumatic pumps, this often involves temporarily connecting the air supply line to the exhaust hose in an attempt to dislodge any debris and re-seat the float check valve.

Section F – Well field liquid sounding in the Reaction Area (as defined in Condition 9(a)), and a proposed schedule for conducting liquid sounding on a consistent basis;

Chiquita proposes to conduct quarterly liquid level sounding on all vertical LFG extraction wells in the Reaction Area, as explained in Section A, as well as conduct liquid level sounding at any vertical LFG extraction well in the Reaction Area found to have declining gas quality or flow, or immediate equilibration with system vacuum, as detailed in Section A. Wells unsafe for wellhead removal—in accordance with the site's Health and Safety Plan and Containment Feasibility Study—may not be monitored for liquid levels during the routine monitoring until the work can be performed safely. Some of these unsafe conditions may include high wellhead pressure (in excess of 0.1 inch of WC) with no applied vacuum, free flowing liquids on the leachate discharge line without pump operation, or liquids temperature exceeding 180 degrees at the wellhead. Approximately 10% of wells within the Reaction Area currently exhibit these systems and no additional mitigation is required beyond the other best management practices being implemented in accordance with the Modified SOFA to slow the reaction, like expansion of the gas well system. Wells not monitored for liquids levels will be re-checked for high pressures, free flowing liquids, or high temperatures on a monthly basis until safe to conduct liquid level monitoring. Based on the experiences of other ETLF landfills, wells exhibiting these unsafe conditions may take months or years to abate to the point of being safe to monitor liquids levels. During liquid level monitoring (often referred to as a "sounding" event), a liquid level measurement device that consists of a probe and cable is lowered into the well casing and produces an audible sound when the probe encounters liquids. Alternative instrumentation, such as a tape measure with floatation device or downhole video camera, may be utilized in order to reduce potential interference due to foam formation. The measurements on the cable or tape measure indicate the depth to liquids, as measured from the top of the casing, within the Landfill Reaction Area, and are used to calculate the depth of liquids and the liquid levels within each well casing.

Section G – A timeline for appropriate reporting on impacted wells;

Any monitoring data will be reported quarterly in conjunction with the regular quarterly monitoring of depths to liquids of all vertical LFG extraction wells in the Reaction Area. It is standard industry practice to monitor liquid levels quarterly for landfills with liquid concerns. More frequent liquid level monitoring is impractical for the continued operation of the pumps and would be detrimental to the removal of liquids from the Landfill. Pumps must be shut off to perform the liquid level monitoring, thus halting gas collection. Performing liquid level monitoring at a greater frequency would reduce the amount of gas and liquids extracted from the Landfill. Additionally, more frequent monitoring would not be helpful as the liquid levels within landfills do not appreciably change in a month much less a week. Liquid

impaction on LFG flow or quality is identified through routine LFG monitoring and is reported in the monthly report submissions required under SOFA Condition No. 8(i).

Section H – The feasibility of integrity testing of all vertical gas wells in the Reaction Area (as defined in Condition 9(a)) and a timeline and protocol for addressing any wells that the integrity testing demonstrates are damaged or are exhibiting temperatures of at least 170 degrees Fahrenheit;

All vertical LFG extraction wells within the Reaction Area will be checked for well casing integrity on a quarterly basis, or more frequently as dictated by the monthly analysis of LFG monitoring data or at a minimum in conjunction with the proposed quarterly liquid level sounding, provided it is safe to remove the wellhead on the LFG extraction well for the manually performed integrity testing. For purposes of this effort, the structural integrity of the well will be evaluated to assess the extent to which pinching, crimping, shearing or other deformation or deflection of the well riser pipe has occurred to such degree that the well is no longer capable of insertion of a dewatering pump or measurement device, and the well is no longer productive for recovering. LFG Vertical LFG extraction wells discovered to be damaged during the integrity testing will be re-drilled or repaired in accordance with the GCCS design plan.

Section I – A timeline for implementation of appropriate dewatering procedures upon discovery of wells impacted by liquids;

Based on the evaluation of the installation and monitoring data, Chiquita proposes to install dewatering infrastructure and pumps in any impacted vertical LFG extraction per the April modified SOFA, when all vertical wells locations on-site will have the infrastructure to power pumps and convey leachate from the pumps. Specially, if the LFG extraction well has 25% or less available perforations, dewatering infrastructure activities such as pump installation will be initiated. This implementation will commence in conjunction with the reporting of liquid impactions discussed in Section G. As described in Section C, Chiquita is acquiring additional pumps to have on site and expanding piping proactively. If there are less pumps or associated equipment on site than the specified minimum in Section B, the additional pumps and/or equipment shall be ordered within 48 hours. Orders will be placed requesting expedited/priority services, order fulfillment, and delivery. Chiquita will log and record the placement and installation of the pump within one week of receipt.

CLOSING

If you have any questions or need any additional information, please contact the undersigned at (303) 519-4503.

Sincerely,

Arthur E Jones Jr
Vice President
SCS Engineers

Bill Haley, P.E.
Project Director
SCS Engineers

Enclosures

cc: Steve Cassulo, Chiquita Canyon Landfill, LLC
Pat Sullivan, SCS Engineers
Bob Dick, SCS Engineers
Srividhya Viswanathan, SCS Engineers
Gabrielle Stephens, SCS Engineers

BEFORE THE HEARING BOARD OF THE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

In The Matter Of

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT,

Petitioner,

vs.

CHIQUITA CANYON, LLC a Delaware Corporation,
[Facility ID No. 119219]

Respondent.

Case No. 6177-4

EXHIBIT C TO DECLARATION OF SRIVIDHYA VISWANATHAN, P.E.

Health and Safety Code § 41700, and District Rules 402, 431.1, 3002, 203, 1150

Hearing Date: August 17 and 20, 2024
Time: 10:00 am
Place: Santa Clarita Performing Arts Center
College for the Canyons
26455 Rockwell Canyon Rd.
Santa Clarita, CA 91355

From: Haley, William (Bill) <WCHaley@scsengineers.com>
Sent: Monday, April 22, 2024 9:06 PM
To: bchen@aqmd.gov; ndickel@aqmd.gov; Christina Ojeda
Cc: Dylan Smith; Steve Cassulo
Subject: Case No. 6177-4 Stipulated Order for Abatement – Condition 63 Schematic
Attachments: 2024 CCLF SCAQMD SAO_Tank Farm(s) As-Built_2024-04-22.pdf

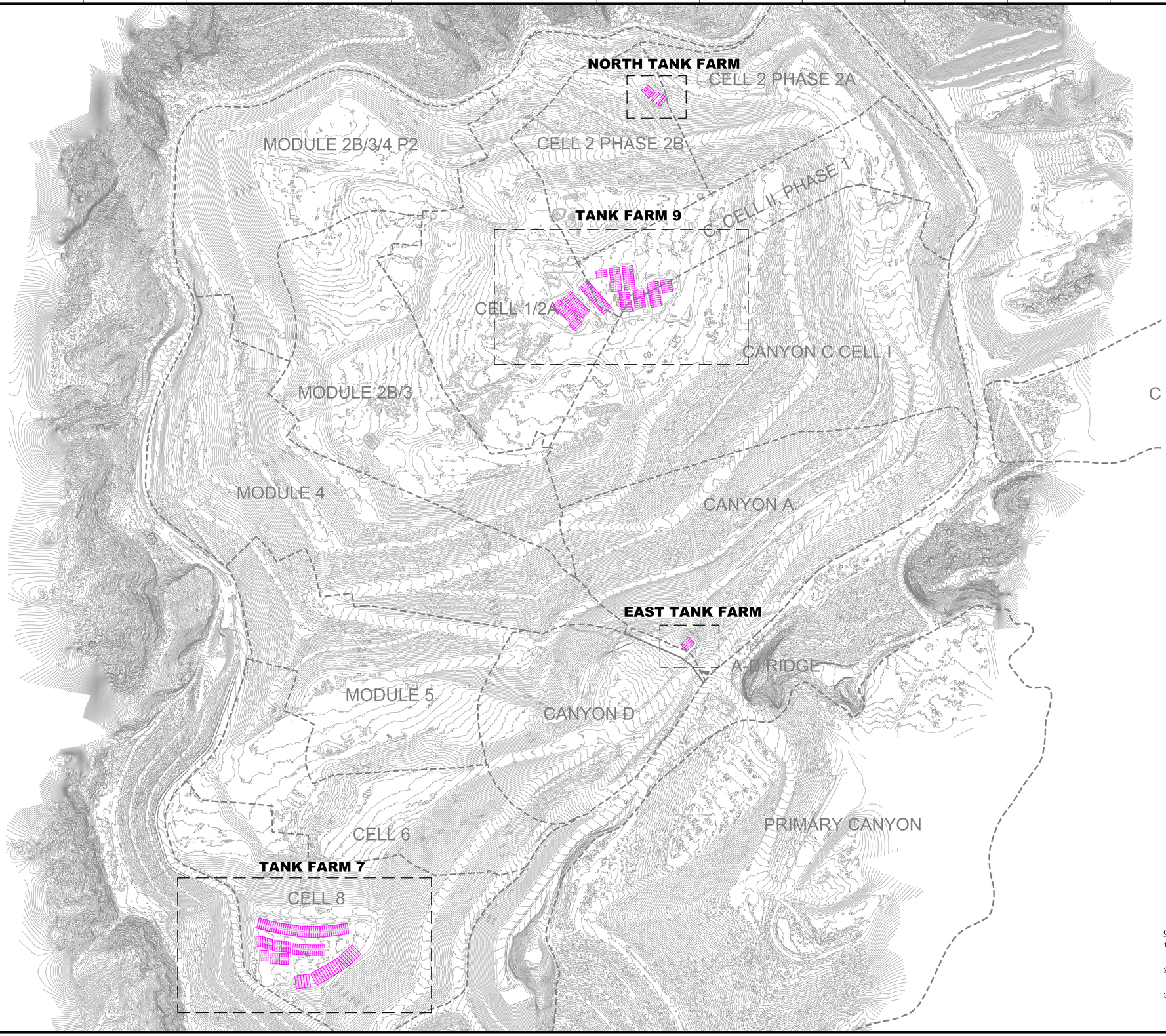
Mr. Chen:

In accordance with Condition 63 of the March 21, 2024 Modified Stipulated Order, attached is a schematic of the current leachate treatment and storage system at the Chiquita Canyon Landfill.

Thank you,

William C. Haley, PE.*
Project Director
SCS ENGINEERS
*Licensed in CO and TX

Office: 303-221-1719
Cell #: 303-519-4503
Email: wchaley@scsengineers.com



N

GRAPHIC SCALE

200 100 0 200 400 600

SCALE: 1"=200'

LEGEND

1150 TOPOGRAPHIC CONTOUR

EXISTING CELL LIMITS (APPROXIMATE)

EXISTING FRAK TANK

GENERAL DRAWING NOTES:

1. EXISTING TOPOGRAPHIC SURVEY INFORMATION SHOWN WAS PROVIDED BY PROPELLOR. AERIAL PHOTOGRAPHY DATED APRIL 10, 2024.
2. NORTH ARROW SHOWN HERE IS REFERENCE TO THE CALIFORNIA STATE PLANE ZONE V COORDINATE SYSTEM, NAD 83.
3. ACTUAL FIELD CONDITIONS MAY VARY AND SUBJECT TO CHANGE BASED ON FUTURE FILL OPERATIONS, WASTE PLACEMENT, TOPOGRAPHIC FEATURES, AND OTHER SITE-SPECIFIC FACTORS.

NO.	REVISION	DATE

SHEET TITLE: OVERALL TANK FARM SITE PLAN

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
8799 BALBOA AVENUE SUITE 290
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PROJ. NO. 01204123.35 | DSN. BY: - | DWN. BY: SRM | CHK. BY: WCH | ACAD FILE: | APP. BY: WCH

DATE: 04/18/2024

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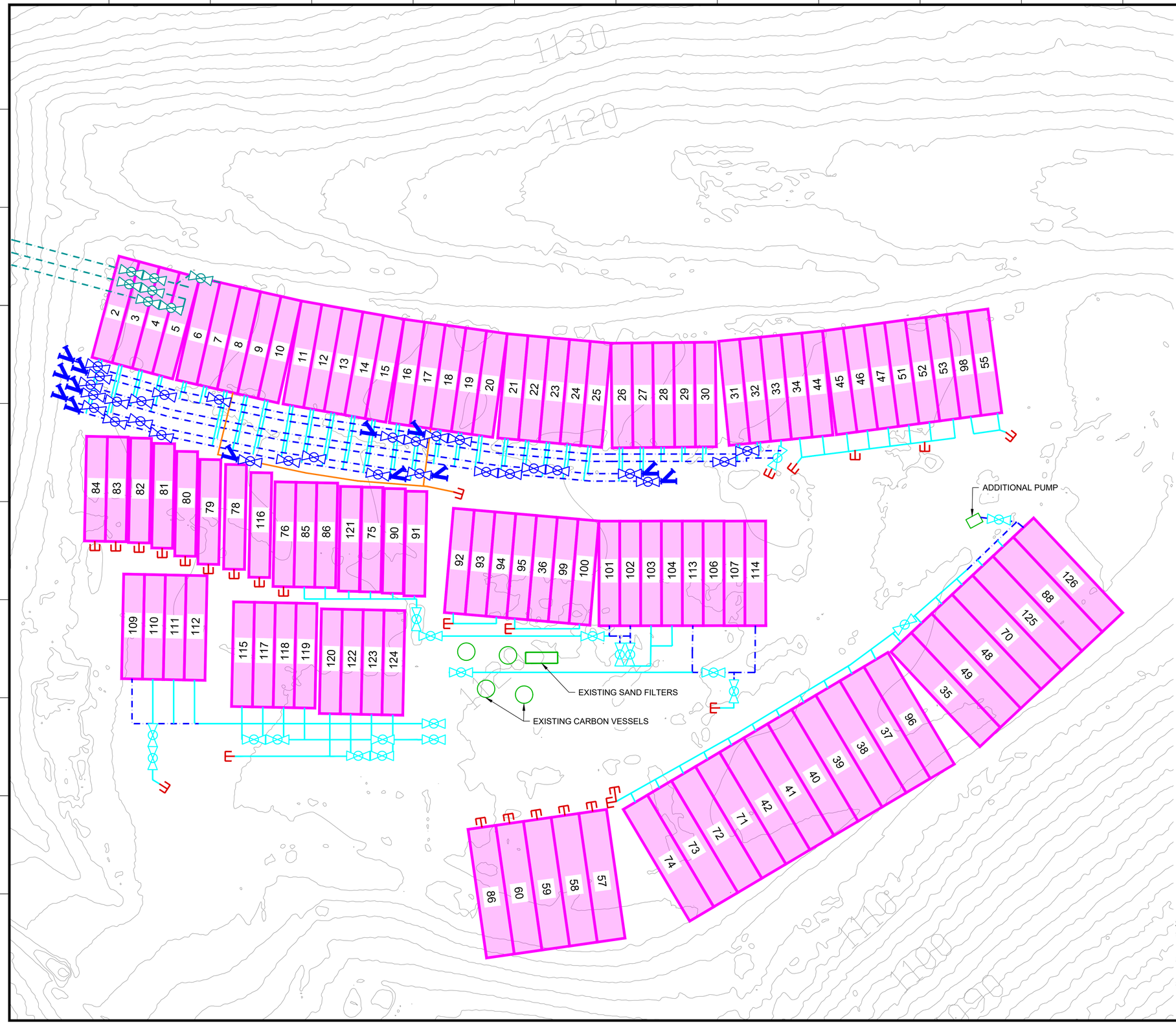
SHEET: 1



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GRAPHIC SCALE

20 10 0 20 40 60

SCALE: 1"=20'

LEGEND

- 1150 — TOPOGRAPHIC CONTOUR
- EXISTING 6" HDPE SDR 11 FORCE MAIN
- EXISTING 4" HDPE SDR 11 FORCE MAIN
- EXISTING 4" POWERTRACK HOSE
- EXISTING 4" HDPE SDR 11 ATMOS RETURN LINE
- EXISTING SINGLE-WYE CLEANOUT
- EXISTING 6" ISOLATION POLYVALVE
- EXISTING 4" ISOLATION POLYVALVE
- EXISTING 4" ISOLATION BALLVALVE
- EXISTING CAMLOCK CONNECTION
- EXISTING FRAK TANK

GENERAL DRAWING NOTES:

1. EXISTING TOPOGRAPHIC SURVEY INFORMATION SHOWN WAS PROVIDED BY PROPELLOR. AERIAL PHOTOGRAPHY DATED APRIL 10, 2024.
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3. ACTUAL FIELD CONDITIONS MAY VARY AND SUBJECT TO CHANGE BASED ON FUTURE FILL OPERATIONS, WASTE PLACEMENT, TOPOGRAPHIC FEATURES, AND OTHER SITE-SPECIFIC FACTORS.

NO.	REVISION	DATE

SHEET TITLE: TANK FARM 7 - DE-WATERING SYSTEM LAYOUT

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

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PROJ. NO: 01204123.35 | DSN. BY: - | DWN. BY: SRM | CHK. BY: WCH | ACAD FILE: - | APP. BY: WCH

DATE: 04/18/2024

SCALE: AS SHOWN

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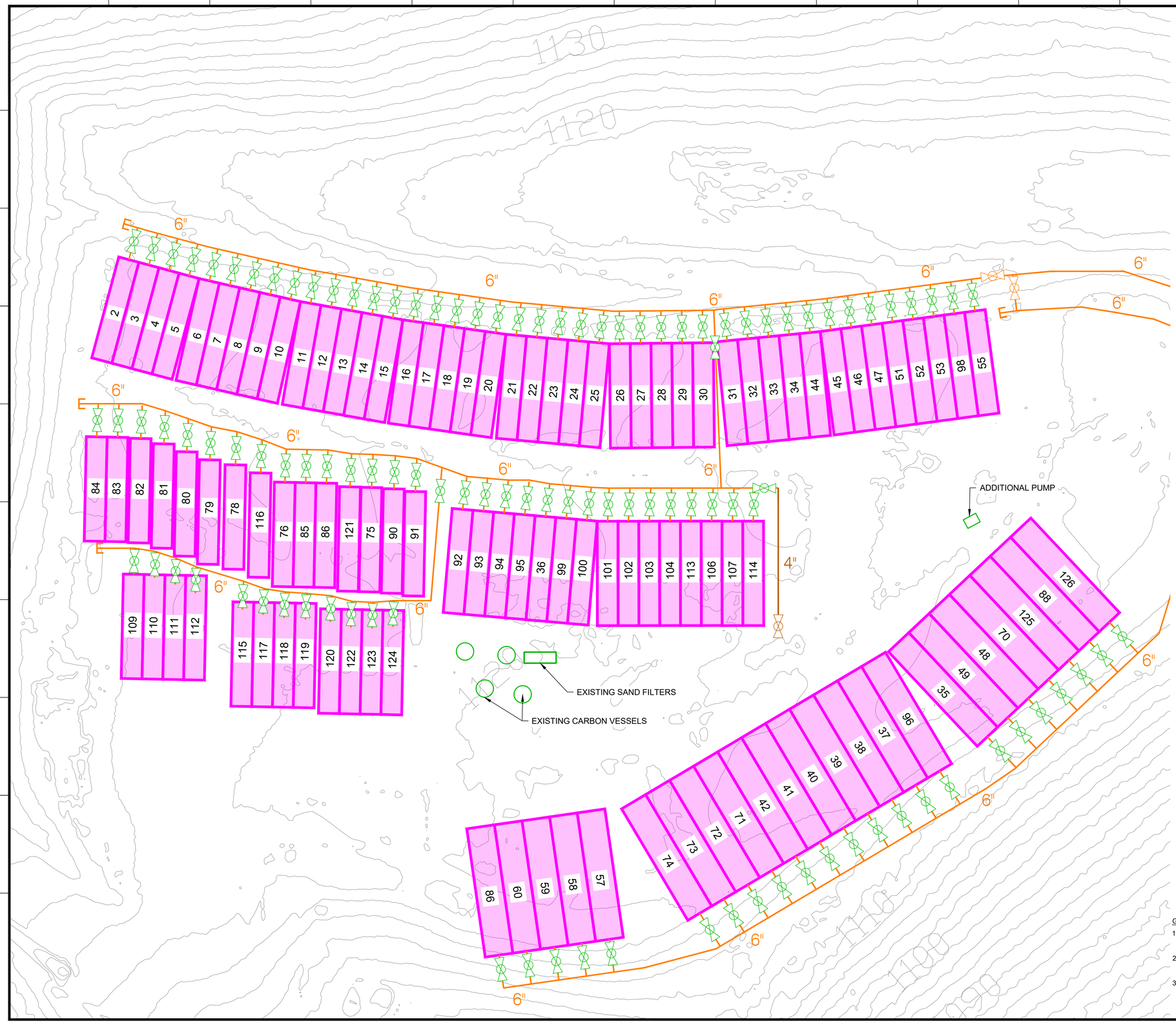

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GRAPHIC SCALE

20 10 0 20 40 60

SCALE: 1"=20'

LEGEND

- 1150 — TOPOGRAPHIC CONTOUR
- EXISTING 6" HDPE SDR 17 VACUUM LATERAL
- EXISTING 4" HDPE SDR 17 VACUUM LATERAL
- EXISTING 6" ISOLATION POLYVALVE
- EXISTING 3" ISOLATION POLYVALVE
- EXISTING 4" ISOLATION BALLVALVE
- EXISTING HDPE FUSED CAP
- EXISTING FRAK TANK

GENERAL DRAWING NOTES:

1. EXISTING TOPOGRAPHIC SURVEY INFORMATION SHOWN WAS PROVIDED BY PROPELLOR. AERIAL PHOTOGRAPHY DATED APRIL 10, 2024.
2. NORTH ARROW SHOWN HERE IS REFERENCE TO THE CALIFORNIA STATE PLANE ZONE V COORDINATE SYSTEM, NAD 83.
3. ACTUAL FIELD CONDITIONS MAY VARY AND SUBJECT TO CHANGE BASED ON FUTURE FILL OPERATIONS, WASTE PLACEMENT, TOPOGRAPHIC FEATURES, AND OTHER SITE-SPECIFIC FACTORS.

DATE | REVISION | NO.

SHEET TITLE: TANK FARM 7 - VENTILATION (VACUUM) SYSTEM LAYOUT

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

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PROJ. NO: 01204123.35 | DWN. BY: SRM | CHK. BY: WCH | ACAD FILE: | APP. BY: WCH | DSN. BY: - | ENGINEERS

DATE: 04/18/2024

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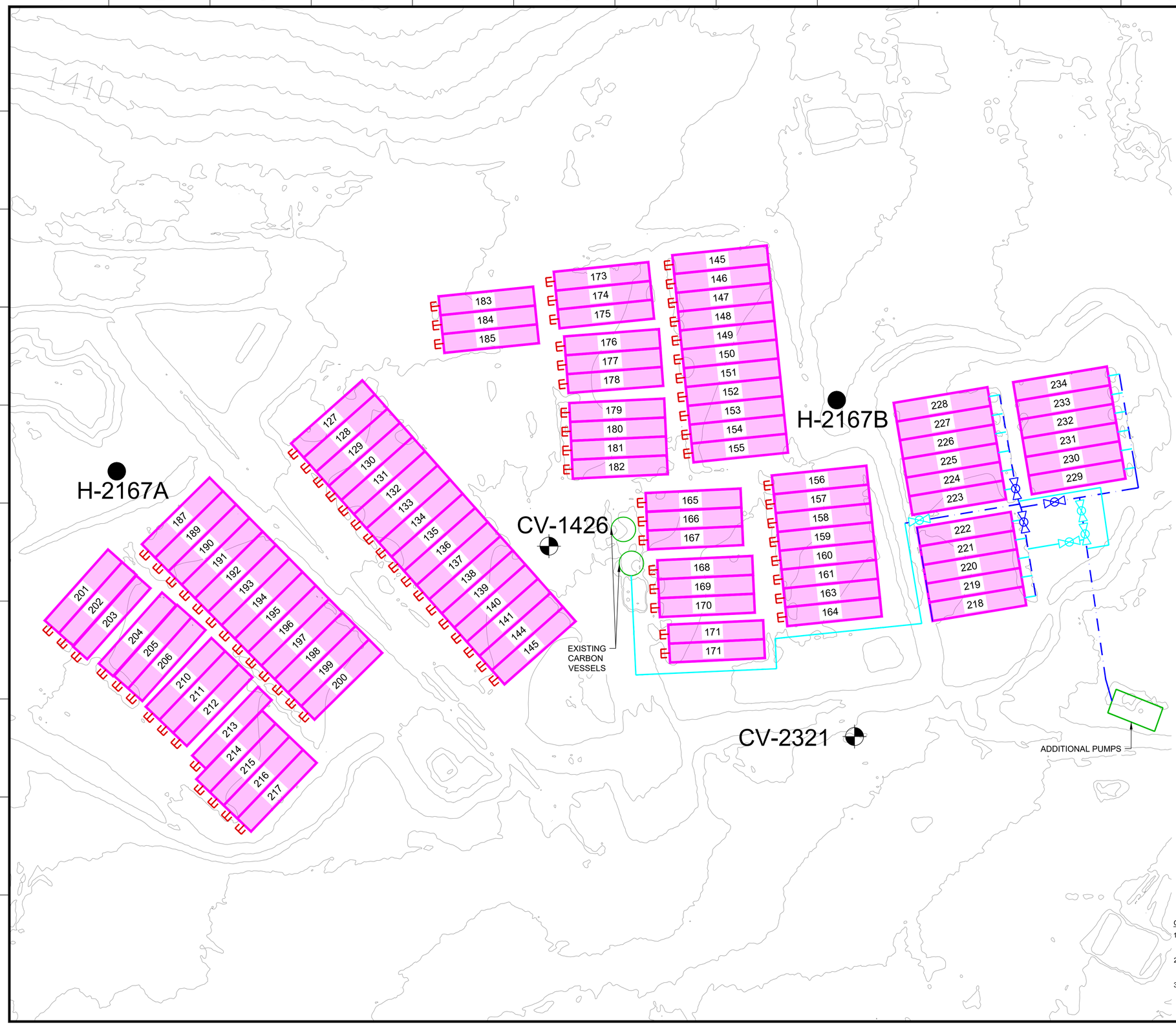

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GRAPHIC SCALE

22 11 0 22 44 66

SCALE: 1"= 22'

LEGEND

1150	TOPOGRAPHIC CONTOUR
CV-XX	EXISTING LFG VERTICAL EXTRACTION WELL
H-XX	EXISTING HORIZONTAL COLLECTOR WELL
	EXISTING 4" HDPE SDR 11 FORCE MAIN
	EXISTING 4" POWERTRACK HOSE
	EXISTING 4" ISOLATION POLYVALVE
	EXISTING 4" ISOLATION BALLVALVE
	EXISTING CAMLOCK CONNECTION
	EXISTING FRAK TANK

GENERAL DRAWING NOTES:

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DATE | REVISION | NO.

SHEET TITLE: TANK FARM 9- DE-WATERING SYSTEM LAYOUT

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

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PROJ. NO. 01204123.35 | DWN. BY: SRM | CHK. BY: WCH | ACAD FILE: - | APP. BY: WCH | PE/ENGINEERS

DSN. BY: -

DATE: 04/18/2024

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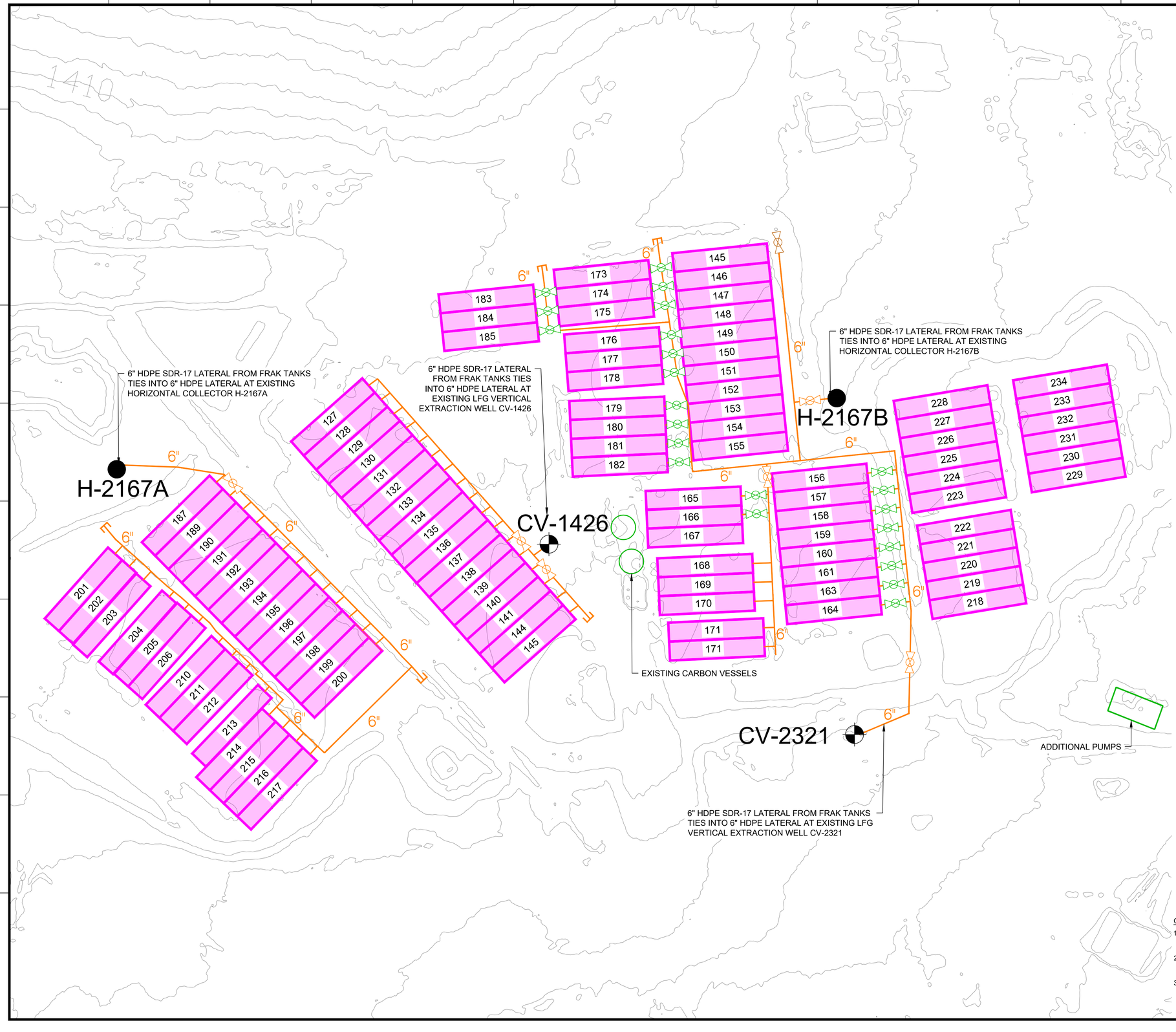

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GRAPHIC SCALE

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SCALE: 1"=22'

LEGEND

1150	TOPOGRAPHIC CONTOUR
CV-XX	EXISTING LFG VERTICAL EXTRACTION WELL
H-XX	EXISTING HORIZONTAL WELL
	EXISTING 6" HDPE SDR 17 VACUUM LATERAL
	EXISTING 4" HDPE SDR 17 VACUUM LATERAL
	EXISTING 6" ISOLATION POLYVALVE
	EXISTING 3" ISOLATION POLYVALVE
	EXISTING 3" ISOLATION BALLVALVE
	EXISTING HDPE FUSED CAP
	EXISTING FRAK TANK

GENERAL DRAWING NOTES:

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DATE | REVISION | NO.

SHEET TITLE: TANK FARM 9 - VENTILATION (VACUUM) SYSTEM LAYOUT

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
8799 BALBOA AVENUE SUITE 290
SAN DIEGO, CA 92123
(858) 571-3500 FAX: (562) 427-0805

PROJ. NO. 01204123.35 | DSN. BY: - | DWN. BY: SRM | CHK. BY: WCH | APP. BY: WCH | ACAD FILE: FIGENGINEERS

DATE: 04/18/2024

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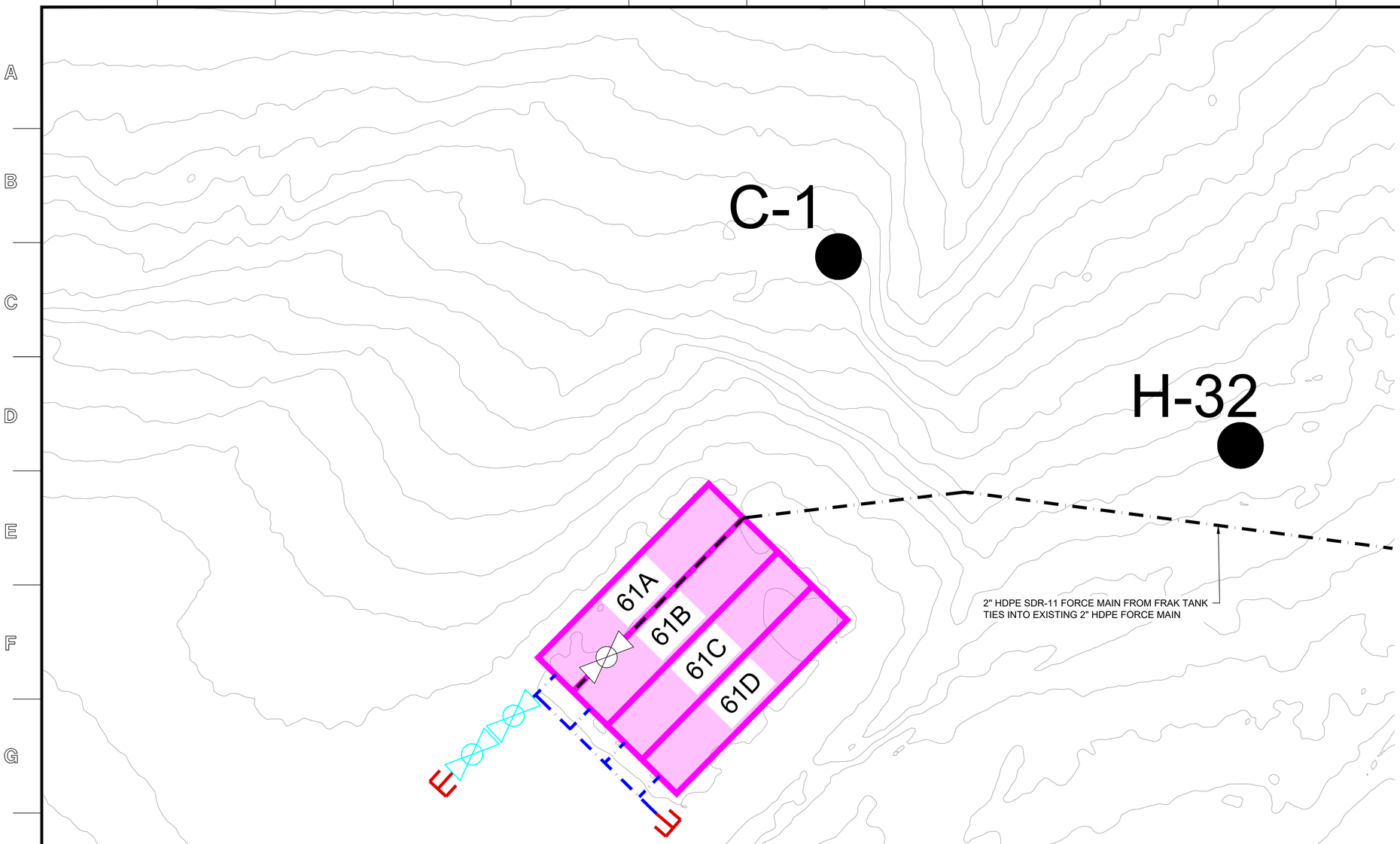

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GRAPHIC SCALE

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SCALE: 1"=10'

LEGEND

- TOPOGRAPHIC CONTOUR
- H-XX — EXISTING HORIZONTAL COLLECTOR WELL
- EXISTING 4" HDPE SDR 11 FORCE MAIN
- EXISTING 2" HDPE SDR 11 FORCE MAIN
- EXISTING 4" ISOLATION BALLVALVE
- EXISTING 2" ISOLATION POLYVALVE
- EXISTING CAMLOCK CONNECTION
- EXISTING FRAK TANK

GENERAL DRAWING NOTES:

1. EXISTING TOPOGRAPHIC SURVEY INFORMATION SHOWN WAS PROVIDED BY PROPELLOR. AERIAL PHOTOGRAPHY DATED APRIL 10, 2024.
2. NORTH ARROW SHOWN HERE IS REFERENCE TO THE CALIFORNIA STATE PLANE ZONE V COORDINATE SYSTEM, NAD 83.
3. ACTUAL FIELD CONDITIONS MAY VARY AND SUBJECT TO CHANGE BASED ON FUTURE FILL OPERATIONS, WASTE PLACEMENT, TOPOGRAPHIC FEATURES, AND OTHER SITE-SPECIFIC FACTORS.

NO.	REVISION	DATE

SHEET TITLE: EAST TANK FARM - DE-WATERING SYSTEM LAYOUT

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
8799 BALBOA AVENUE SUITE 290
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PROJ. NO. 01204123.35 | DSN. BY: - | CHK. BY: WCH | DWN. BY: SRM | APP. BY: WCH | ACAD FILE: PE ENGINEERS

DATE: 04/18/2024

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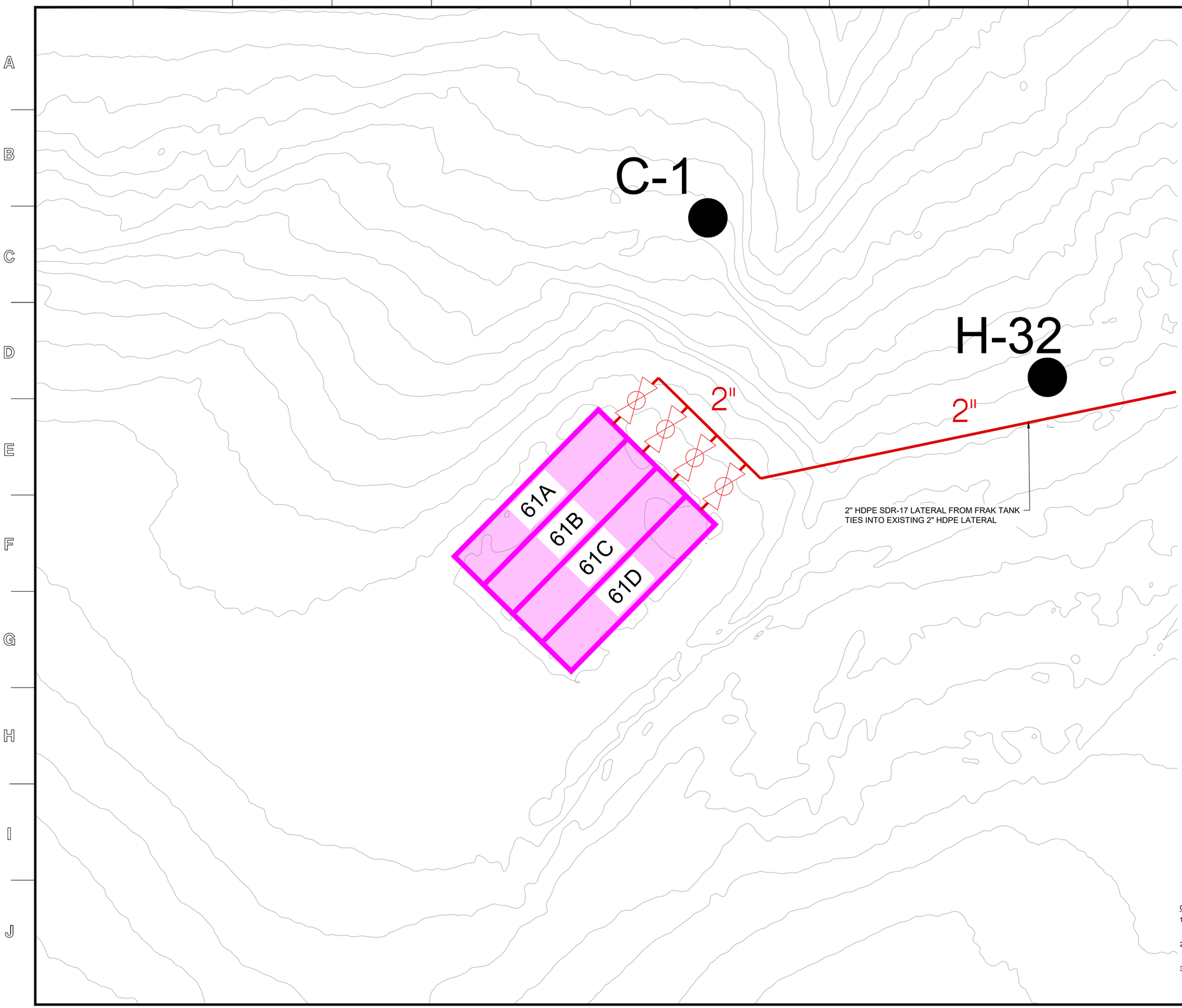

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GRAPHIC SCALE

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SCALE: 1"=10'

LEGEND

- TOPOGRAPHIC CONTOUR
- H-XX EXISTING HORIZONTAL COLLECTOR WELL
- EXISTING 2" HDPE SDR 17 VACUUM LATERAL
- EXISTING 2" ISOLATION POLYVALVE
- EXISTING FRAK TANK

GENERAL DRAWING NOTES:

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2. NORTH ARROW SHOWN HERE IS REFERENCE TO THE CALIFORNIA STATE PLANE ZONE V COORDINATE SYSTEM, NAD 83.
3. ACTUAL FIELD CONDITIONS MAY VARY AND SUBJECT TO CHANGE BASED ON FUTURE FILL OPERATIONS, WASTE PLACEMENT, TOPOGRAPHIC FEATURES, AND OTHER SITE-SPECIFIC FACTORS.

DATE

REVISION

NO.

SHEET TITLE: EAST TANK FARM - VENTILATION (VACUUM) SYSTEM LAYOUT

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
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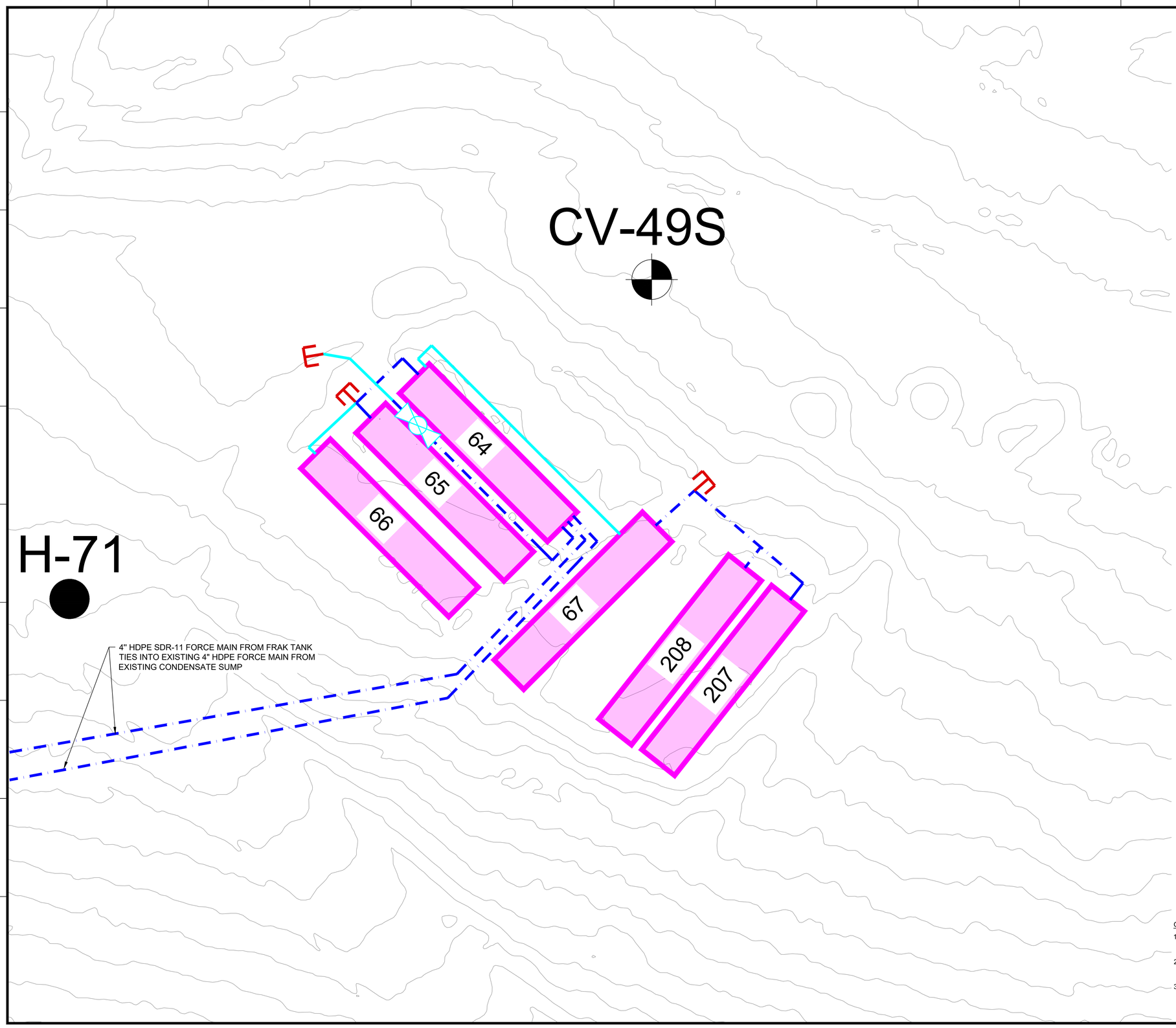
PROJ. NO: 01204123.35
DSN. BY: -
DWN. BY: SRM
CHK. BY: WCH
ACAD FILE:
PE/ENGINEERS
APP. BY: WCH

DATE: 04/18/2024

SCALE: AS SHOWN

SHEET: 7



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GRAPHIC SCALE

20 10 0 20 40 60

SCALE: 1"=20'

LEGEND

- TOPOGRAPHIC CONTOUR
- CV-XX — EXISTING LFG VERTICAL EXTRACTION WELL
- H-XX — EXISTING HORIZONTAL COLLECTOR WELL
- EXISTING 4" HDPE SDR 11 FORCE MAIN
- EXISTING 4" POWERTRACK HOSE
- EXISTING 4" ISOLATION POLYVALVE
- EXISTING 4" ISOLATION BALLVALVE
- EXISTING CAMLOCK CONNECTION
- EXISTING FRAK TANK

GENERAL DRAWING NOTES:

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NO.	REVISION	DATE

SHEET TITLE: NORTH TANK FARM - DE-WATERING SYSTEM LAYOUT

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

SCS ENGINEERS
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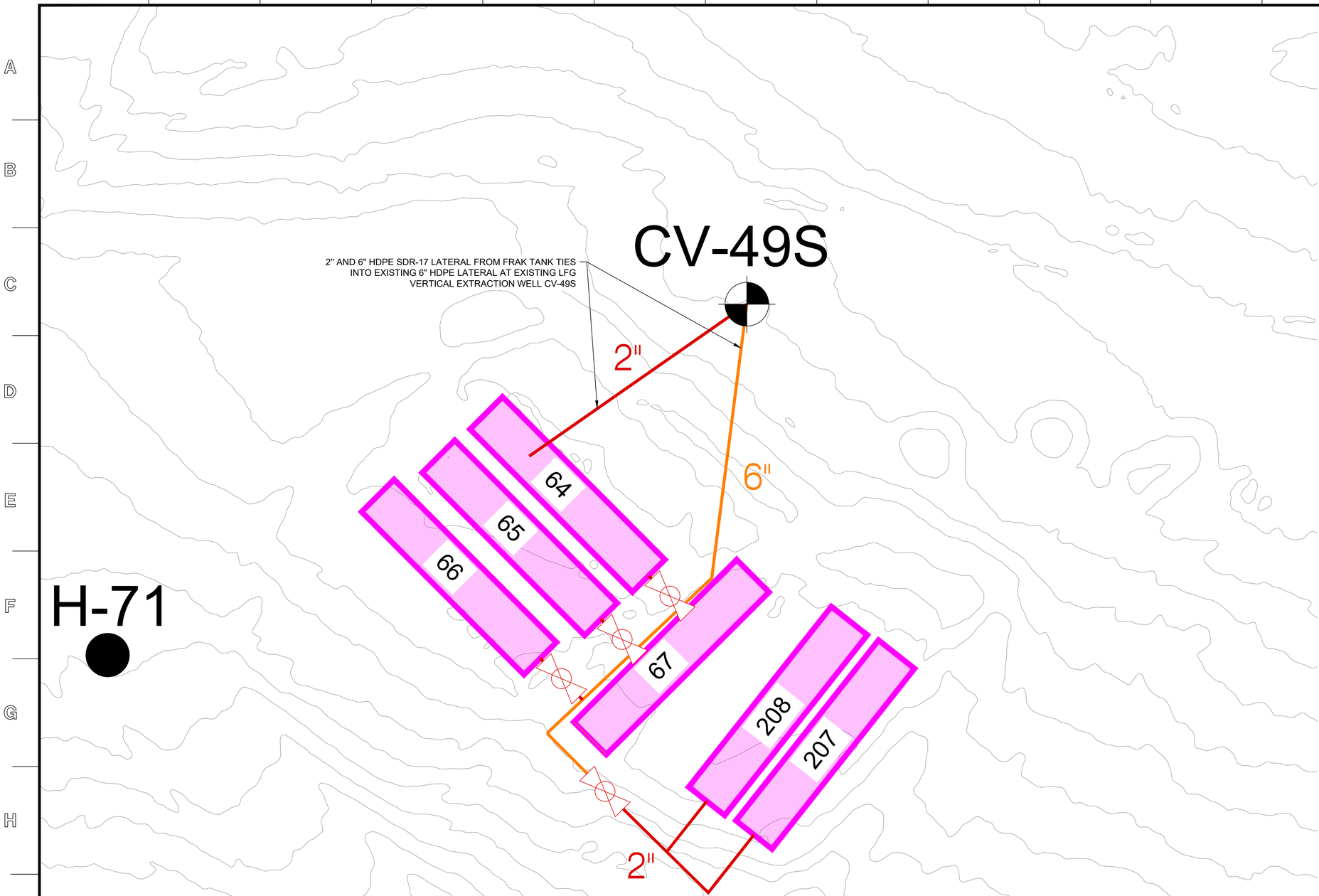
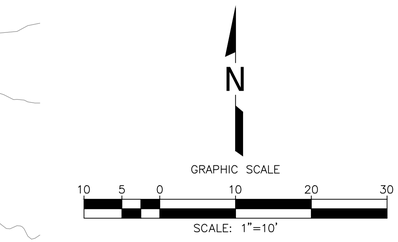
DATE: 04/18/2024

SCALE: AS SHOWN

SHEET: 8





LEGEND

	TOPOGRAPHIC CONTOUR
CV-XX	EXISTING LFG VERTICAL EXTRACTION WELL
H-XX	EXISTING HORIZONTAL COLLECTOR WELL
	EXISTING 6" HDPE SDR 17 VACUUM LATERAL
	EXISTING 2" HDPE SDR 17 VACUUM LATERAL
	EXISTING 6" ISOLATION POLYVALVE
	EXISTING 2" ISOLATION POLYVALVE
	EXISTING FRAK TANK

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NO.	REVISION	DATE

SHEET TITLE: NORTH TANK FARM - VENTILATION (VACUUM) SYSTEM LAYOUT

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

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DATE: 04/18/2024

SCALE: AS SHOWN

SHEET: 9

BEFORE THE HEARING BOARD OF THE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

In The Matter Of SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, Petitioner, vs. CHIQUITA CANYON, LLC a Delaware Corporation, [Facility ID No. 119219] Respondent.	**Case No. 6177-4** **EXHIBIT D TO DECLARATION OF SRIVIDHYA VISWANATHAN, P.E.** Health and Safety Code § 41700, and District Rules 402, 431.1, 3002, 203, 1150 Hearing Date: August 17 and 20, 2024 Time: 10:00 am Place: Santa Clarita Performing Arts Center College for the Canyons 26455 Rockwell Canyon Rd. Santa Clarita, CA 91355

From: Haley, William (Bill) <WCHaley@scsengineers.com>
Sent: Friday, June 21, 2024 4:59 PM
To: Baitong Chen; ndickel@aqmd.gov; Christina Ojeda
Cc: Sullivan, Pat; Viswanathan, Srividhya; Dick, Bob
Subject: Case No. 6177-4 Stipulated Order Condition 12(g)(viii) Pipe Temperature Investigation
Attachments: 2024 CCL_SOFA_Cond_12(g)(viii)_Pipe Materials Temperature Study 2024-06-21.pdf

Mr. Chen:

In accordance with Condition 12(g)(viii) of the Modified Stipulated Order, attached is the LFG conveyance pipe temperature investigation.

Thank you, and have a great weekend!

William C. Haley, PE.*
Project Director
SCS ENGINEERS
*Licensed in CO and TX

Office: 303-221-1719
Cell #: 303-519-4503
Email: wchaley@scsengineers.com

June 21, 2024
File No. 01204123.21-13

Baitong Chen, Air Quality Engineer, bchen@aqmd.gov
Nathaniel Dickel, Senior Air Quality Engineer, ndickel@aqmd.gov
Christina Ojeda, Air Quality Inspector, cojeda@aqmd.gov
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Subject: Landfill Gas Collection Piping Temperature Suitability Investigation Chiquita Canyon Landfill
Chiquita Canyon Landfill – Castaic, California

Dear Mr. Chen:

In accordance with Condition No. 12(g)(viii) of the Modified Stipulated Order for Abatement (SOFA) pertaining to the Chiquita Canyon Landfill (CCL or Landfill) (Case No. 6177-4), Chiquita Canyon, LLC (Chiquita) submits this investigation into the existing landfill gas (LFG) collection and conveyance piping, as well as potential alternative pipe materials, to evaluate whether the existing high-density polyethylene (HDPE) piping is appropriate for the current and future temperature conditions at the Landfill. Condition No. 12(g)(viii) requires the following:

> *The Reaction Committee, on behalf of Respondent, shall conduct an investigation into the existing landfill gas collection and conveyance piping materials (e.g. high-density polyethylene (HDPE)), alternative landfill gas collection and conveyance piping materials, and current landfill conditions to determine whether the existing HDPE piping is appropriate for the current and expected future temperature conditions at the landfill, and to determine whether viable alternative landfill gas collection/conveyance piping materials exist, which shall include investigation results of materials used by other landfills that have experienced high temperature events. The investigation shall include a study of the material properties, specifications, and ratings and manufacturer's operating properties of piping (e.g. HDPE) within a landfill, including but not limited to, short term maximum manufacturer's temperature rating, long-term manufacturer's maximum temperature rating, effects and associated timeline of effects from operating above manufacturer rated temperatures or specifications, effects and associated timeline effects from consistent exposure of piping to sunlight, ability to convey landfill gas with minimal fugitive vapor leaks, and pliability for integrity of the system during landfill settlement or other common landfill operations or occurrences. These properties shall then be compared with several landfill gas conveyance piping material alternatives. Respondent shall submit a report on this investigation which includes the details of the material and manufacturer operating properties and specifications of piping (e.g. HDPE) and alternative piping as specified above. It shall additionally detail existing and future expected landfill gas temperatures within the landfill gas conveyance piping, including expected temperatures within the piping leaving the landfill gas extraction wells and within the larger conveyance header within the Reaction Area. If applicable, it shall additionally include an analysis on existing landfill gas conveyance piping and future planned piping, and associated piping lengths and diameters, which conveys or*

will convey landfill gas above the existing HDPE piping's manufacturer rated temperature threshold. Finally, the report shall include a recommendation of the appropriate piping material to use moving forward and when existing piping materials shall be replaced with more robust materials or replaced with existing materials at higher frequencies, at the landfill while the landfill is experiencing elevated temperatures.

1 INTRODUCTION

Chiquita operates a municipal solid waste (MSW) landfill/solid waste disposal facility located in Castaic, California under South Coast Air Quality Management District (SCAQMD) Facility ID No. 119219.

CCL is located at 29201 Henry Mayo Drive, Castaic, California, in northern Los Angeles County. It is a Class III non-hazardous MSW landfill and operates under Solid Waste Facilities Permit (SWFP) No. 19-AA-0052, issued by CalRecycle (formerly the California Integrated Waste Management Board [CIWMB]). CCL accepts non-hazardous solid waste, including MSW, from various areas within Los Angeles County in accordance with Title 27 of the California Code of Regulations (27 CCR), Section 20005, et seq.

A discrete portion of the waste mass at the Landfill is experiencing elevated temperature landfill (ETLF) conditions. ETLF conditions can generally be characterized as when the typical waste decomposition processes and corresponding methanogenesis associated with anaerobic digestion of organic solid waste materials disposed in a landfill are impeded because of heat accumulation. As a result, certain abiotic (non-biological) processes and chemical reactions within the buried wastes occur instead.

This report presents a summary of the current conditions present at Chiquita, a discussion into the existing LFG piping utilized by the landfill, an investigation into possible alternative piping materials, findings, and recommendations for the LFG conveyance piping going forward.

2 SITE CONDITIONS RELATIVE TO LFG TEMPERATURES

2.1 CURRENT CONDITIONS

Chiquita has been documenting subsurface waste and LFG temperatures observed at the Landfill, both during the time of drilling activities, during routine monitoring activities conducted at each wellhead, and utilizing in-situ waste temperature probes. Temperatures recorded during LFG extraction well drilling activities are measured using a temperature probe inserted into the waste cuttings recovered from the borehole. For wellhead temperatures, a temperature probe is inserted into the gas stream being collected at each LFG extraction wellhead.

It is generally recognized at all landfills, that the LFG system piping material subjected to the highest temperature is the vertical well riser piping (or horizontal collector piping) that is buried deep within the subsurface waste mass. As the LFG is extracted out of the well, passes through the wellhead, and is conveyed through the LFG collection piping while being transported to the blower/flare station, the gas experiences cooling and the LFG temperature decreases. In other words, "downhole" temperatures within the well are greater than wellhead temperatures, which are greater than temperatures in the LFG header and lateral piping. Upon arriving at the blower/flare station, the LFG temperature across the blower increases (i.e., the temperature at the blower outlet is

greater than the temperature at the blower inlet) because the mechanical energy of the blower impellers is converted into heat.

Based on a review of the data for the period March 17, 2024 – June 17, 2024 for LFG temperatures and for the period 2014 to June 17, 2024 for waste drilling, average waste temperatures of the drill cuttings observed at the Landfill during LFG extraction well drilling activities conducted within the reaction area boundary, as defined under Condition 9a of the SCAQMD SOFA, ranged between 92 and 148 degrees (˚) Fahrenheit (F). The peak temperature of waste materials removed from the borehole as drill cuttings over the same period and within the reaction area boundary was found to be 200˚F. A map of peak temperatures encountered during LFG extraction well drilling activities at each drilling location is provided in Attachment A.

The average LFG wellhead temperatures observed at the Landfill during routine wellhead monitoring activities for LFG extraction wells within the reaction area boundary from March 17, 2024 – June 17, 2024 ranged between 109 and 127˚F. The peak LFG wellhead temperature encountered in the wellfield over the same period and within the reaction area boundary during routing monitoring of the LFG wells was 204.5˚F. A map of peak LFG temperatures is also provided in Attachment A.

2.2 FUTURE EXPECTED CONDITIONS

Between February and April 2024, Chiquita installed twenty (20) in-situ waste temperature probes at various locations within the Condition 9a reaction area boundary. These probes ranged between 55 and 192 feet in depth. A '*Revised Final Construction Report for the 2024 Temperature Monitoring Probe Installation at the Chiquita Canyon Landfill*' was submitted to the Local Enforcement Agency (LEA) on June 6, 2024. The peak in-situ waste temperature observed within the waste mass is 230˚F at Temperature Probe No. 3 (TP-3) at 45-feet deep.

Additionally, in accordance with Condition 9 of the SOFA, the Reaction Committee reviews the boundaries of the Reaction Area (both data-driven and Condition 9a boundaries) on a monthly basis. In addition, the Reaction Committee meets with the SCAQMD on a monthly basis to provide updates on various aspects of the Landfill. In recent communications, the Reaction Committee shared that the in-situ temperature probe data, described in the above referenced report, indicate that while a decrease in temperatures of the waste mass within the Reaction Area has not yet been observed, no increases in waste mass temperatures have been observed. In other words, the in-situ waste temperatures being recorded at the 20 probes have been consistent and stable during the initial six weeks or so of measurement activities.

As discussed previously, a review of the in-situ waste and wellhead temperature data indicates a cooling of the extracted LFG as it moves from the waste mass and travels through the wellhead and enters the LFG conveyance piping. This is primarily a result of the cooler temperatures surrounding the conveyance piping (i.e., being exposed to ambient air), and also attributed to a simultaneous increase in volume and decrease in pressure of the LFG as it moves into the larger diameter conveyance piping, through the wellfield.

As the heat in the Reaction Area continues to be reduced, through removal of liquids and LFG, a further reduction in LFG temperatures entering and moving within the conveyance piping is expected.

Since this investigation focuses on the material properties for the LFG collection/conveyance piping, peak LFG temperature observed at the wellhead is critical. The in-situ waste temperatures are not as relevant. As such, for the purposes of this investigation, the expected peak temperature for LFG entering the LFG conveyance system is assumed to be 205˚F, since the peak LFG wellhead temperature encountered in the wellfield from March 17, 2024 – June 17, 2024 and within the reaction area boundary during routing monitoring of the LFG wells was 204.5˚F, as noted in the prior section.

3 LFG COLLECTION/CONVEYANCE PIPING MATERIALS

3.1 LFG COLLECTION/CONVEYANCE PIPING MATERIAL OPTIONS

3.1.1 Piping Materials Currently Used On-Site

Currently, Chiquita utilizes HDPE piping for its LFG conveyance piping materials within the waste mass. HDPE materials are commonly used in the industry as a standard piping material due to the following criteria:

- workability and vacuum-tight method of joining (butt-fusion welding or mechanical joints);
- flexibility (modulus of elasticity);
- resistance to corrosion and favorable overall chemical compatibility; and
- resiliency to varying landfill conditions.

SCS investigated materials utilized at other ETLFs, and HDPE was found to be the primary LFG conveyance piping material used at ETLFs around the country, within the landfill cell boundary, both for above and below grade piping installed. Nearly all of the historical high-profile ETLF facilities in the US that have been studied by the landfill industry utilize HDPE pipe as the gas collection/conveyance piping network for transporting reaction gas and liquids from the ETLF portion of the waste mass without detrimental consequences.

3.1.2 Potential Alternative Piping Materials

SCS also investigated potential alternative LFG collection/conveyance piping materials as part of this effort. As further described in section 3.2 of this report, we identified two (2) potentially viable alternatives – Chlorinated Polyvinyl Chloride (CPVC), and Carbon Steel – and reviewed both for material properties and suitability for LFG collection/conveyance piping.

Polypropylene Pipe with Random Copolymer with Modified Crystallinity and Temperature Resistance (PP-RCT)

In conjunction with the advent of ETLF conditions at more landfill facilities, the landfill industry experimented with utilizing polypropylene pipe with random copolymer with modified crystallinity and temperature resistance (PP-RCT) for the vertical well riser piping. There were substantial challenges with PP-RCT, which were related to supply (there is no domestic manufacturer and pipe had to be imported) and incompatibility with butt-fusion welding equipment (it was only available in metric sizes so supplemental jig inserts were required). Ultimately, it did not provide the value and benefit the industry sought for actual well piping, and SCS is unaware of any ETLFs installing PP-RCT for well riser piping during the past five years. It was never considered to be a potentially viable candidate

for LFG collection/conveyance piping at ETLF landfills because of the same challenges (supply shortage and fusion equipment incompatibility) and because the existing HDPE LFG header and lateral piping networks at ETLF sites were handling the increased temperature reaction gas without problems. Accordingly, it is not considered as a potentially viable candidate for LFG collection/conveyance piping at Chiquita Canyon Landfill.

Polyethylene for Raised Temperatures (PE-RT)

Another pipe material that has been evaluated by SCS for vertical well riser piping is polyethylene for raised temperatures (PE-RT). This pipe is fabricated with a polyethylene resin in which the molecular architecture has been designed such that a sufficient number of tie chains are incorporated to allow operation at elevated or raised temperatures. Tie chains "tie" together the crystalline structures in the polymer, resulting in improved properties such as elevated temperature strength and performance, chemical resistance, and resistance to slow crack growth. However, while PE-RT does possess a full pressure rating at a higher temperature (180°F), it does not have a higher melting point than standard HDPE. Similar to PP-RCT, it has not provided the value and benefit the industry sought for actual well piping, and SCS is unaware of many ETLFs installing PE-RT for well riser piping during the past five years. It was never considered to be a candidate for LFG collection/conveyance piping at Chiquita or other ETLF's because of the limited supply challenges (only supplied by ISCO) and because the existing HDPE LFG header and lateral piping networks at ETLF sites were handling the increased temperature reaction gas without problems. Accordingly, it would only be considered as a potential candidate for LFG collection/conveyance piping at Chiquita Canyon Landfill if there was compelling evidence of HDPE piping failures.

3.1.3 Summary of Material Properties

A summary table of the material properties for the currently used HDPE, and potentially viable alternatives, CPVC and Carbon Steel, are presented below in Table 1.

Table 1: LFG Collection/Conveyance Pipe Material Properties

MATERIAL / PROPERTY	CARBON STEEL	CPVC SCH. 80	HDPE
Design Temperature (˚F)	900	200	140
Melting Temp. (˚F)	2,597	NA	275
Softening Temp. (˚F)	NA	295	256
Corrosion Rating	+	+++	++
Minor Field Modifications	Contactor	Site Personnel	Site Personnel

3.2 LFG COLLECTION/CONVEYANCE PIPING MATERIAL PROPERTY REVIEW

3.2.1 HDPE Piping Materials

HDPE piping materials are non-conducting and offer medium resistance to corrosion and favorable chemical compatibility. They have a short-term maximum temperature rating (softening

temperature) of 256˚F, and a long-term maximum temperature rating of 140˚F as shown in the manufacture pec sheets in attachment B. Above the short-term temperature rating of 256˚F, HDPE becomes soft and begins to deform and lose its pressure rating. The long-term temperature rating of 140˚F is based upon a lifespan of 100 years, and above 140˚F, the HDPE experiences a reduction in lifespan due to a faster rate of anti-oxidant package consumption. When the anti-oxidant packages in the HDPE are depleted, the piping becomes vulnerable to cracking prior to the 100-year lifespan. SCS contacted various manufacturers to understand the impact of increased temperatures on lifespan reduction. However, manufacturers were unable to provide this information as this relationship of heat to reduction of lifespan has never been tested.

HDPE is available in 40-foot (ft.) sections and fittings connected by butt fusion welding. When properly welded, the HDPE welds are as strong or stronger than the HDPE pipe itself, and the pipe and fittings maintain very high pliability. Due to its high pliability, HDPE is resistant to cracking and developing leaks during differential settlement in landfills or movement of the pipe. Additionally, HDPE pipes have a minimum carbon black content of 2 percent (%), are highly resistant to damage from ultraviolet (UV) radiation, and maintain their properties during prolonged exposure to the sun.

3.2.2 Schedule 80 CPVC

Schedule 80 CVPC offers the best corrosion resistance of the materials investigated. However, it has a short-term temperature rating of 295˚F, and a long-term temperature rating of 200˚F. Exceeding the short-term temperature rating causes the CVPC to deform and collapse, which results in immediate failure of the CPVC. Exceeding the long-term temperature rating of CVPC (200˚F) causes softening of the material and a reduction in pressure rating as well as the lifespan, from the rated 50 years, due to premature brittleness of the pipe. Manufacturers do not specify the relationship between reduction of lifespan and increases in temperature above 200˚F. While CVPC can maintain its integrity for LFG flow in direct sunlight, consistent exposure to UV light causes significant degradation of the CVPC, leading to brittleness and a potential for air intrusion into vacuum distribution piping or potential fugitive gas leaks. Thus, exposure to UV light can greatly decrease the material's lifespan.

CVPC is available in 20 ft. or 40 ft. sections and fittings, which need to be connected mechanically. Due to the number of fittings required for CVPC piping and its low pliability, the material has a low tolerance for movement and/or landfill settlement and is less desirable in conveyance piping applications. Excessive differential settlement of the surface over which the conveyance piping is installed typically results in cracking or snapping of the piping. This can result in an increased potential for fugitive gas leaks and air intrusion into the conveyance piping, which can ultimately cause the destruction devices to shut down completely.

3.2.1 Carbon Steel

As presented above in Table 1, carbon steel has the highest temperature rating of the materials investigated and performs well where some of the higher LFG temperatures at Chiquita have been observed within the wellfield. The material has a long- and short-term maximum temperature rating of 900˚F, and exceeding these temperatures would result in softening of the steel. While exposure to sunlight does not cause degradation of carbon steel material, its corrosion resistance is low when compared to HDPE and CPVC, and it can rust with continued exposure to moisture, potentially resulting in leaks when used as conveyance piping.

Carbon steel is available in 20 ft. or 40 ft. sections, which need to be connected mechanically. Similar to CPVC, the material has low pliability. As such, due to the rigidity of the material, it does not perform well in applications that require allowance for movement as is experienced in differential settlement occurring at a landfill. When used in conveyance piping applications, it can be expected that pipe connections can get damaged from differential settlement, resulting in an increased potential for fugitive vapor leaks and air intrusion into the conveyance piping, which can ultimately cause the destruction devices to shut down completely.

4 FINDINGS AND RECOMMENDATIONS

As discussed above, and based on the information currently available, the peak temperatures expected to be encountered by the LFG conveyance piping is 205˚F, as recorded in the immediate vicinity of the fitting connection where the LFG exits the wellheads and enters the LFG conveyance lines, and prior to cooling due to various factors.

This temperature of 205˚F is within the short-term temperature rating of HDPE, CPVC, and carbon steel but exceeds the long-term temperature rating of both CPVC and HDPE, i.e., 200˚F and 140˚F respectively. Despite being well-suited for the high temperature LFG, carbon steel is not recommended for LFG conveyance material due to its rigidity, poor corrosion resistance, incompatibility with chemical constituents in LFG and condensate, and the use of mechanical connections. Also, carbon steel piping is not easily modified to install tees, branch saddles, monitoring ports, etc. When used in conveyance piping applications, pipe connections can get damaged from differential settlement during the course of typical landfill operations, resulting in an increased potential for fugitive gas leaks and air intrusion into the conveyance piping, which can ultimately cause the destruction devices to shut down completely. Additionally, when compared to CPVC and HDPE, carbon steel has a higher thermal conductivity, or the ability to transfer or conduct heat, which can introduce safety concerns when handling the piping during maintenance, modification, and repair operations.

CPVC is also not recommended for LFG conveyance use due to similar issues of low pliability/high rigidity, and the use of mechanical connections making it incompatible with typical landfill operations and differential settlement. Additionally, CPVC's lack of resistance to UV radiation exposure, calling for additional protection, increases the potential for pipe damage, fugitive emissions and air intrusion which can impact the entire gas collection and control system. Finally, at Chiquita, this material cannot be buried within the capping limits of the Reaction Area, rendering it unsuitable for long-term use as LFG conveyance piping.

Despite the peak temperature of LFG at the wellhead exceeding the long-term maximum temperature rating for HDPE, which results in a reduction in lifespan to under 100 years, SCS recommends the use of HDPE pipe for LFG collection/conveyance piping at the Landfill. This pipe material is compatible with the chemical constituents in LFG and condensate. The pipe material is known to be flexible and can accommodate the differential settlement observed at the Landfill. This flexibility, along with the material's resistance to UV radiation, welded connections, and minimal potential for emissions or air intrusion when compared to CPVC and Carbon Steel, makes it the most suitable material for use as LFG collection/conveyance piping at Chiquita. Hundreds of LFG collection systems installed throughout the country, including well-documented ETLF sites with high temperature reaction gas and liquids, utilize HDPE as the preferred material for LFG conveyance piping and liquid forcemain piping.

Given the lack of studies or data from manufacturers, or information currently available on the exact amount of reduction in lifespan due to increased temperature, and considering the notable absence of field evidence of HDPE piping network failures at ETLF facilities, SCS recommends that Chiquita evaluate LFG temperature after the LFG exits the wellhead and enters the LFG conveyance piping to better understand current temperatures in the LFG conveyance piping. LFG temperature in the conveyance piping entering the hydrogen sulfide tanks was observed to be 120°F during the June 2024 monitoring event. Understanding temperatures in the LFG conveyance piping after it has exited the LFG extraction well can help drive future design decisions and increase the lifespan of existing infrastructure at the Landfill.

Please contact either of the undersigned if you have questions or require additional information.

Sincerely,

Bill Haley, PE
Project Director
SCS Engineers

Srividhya Viswanathan, PE
Vice President
SCS Engineers

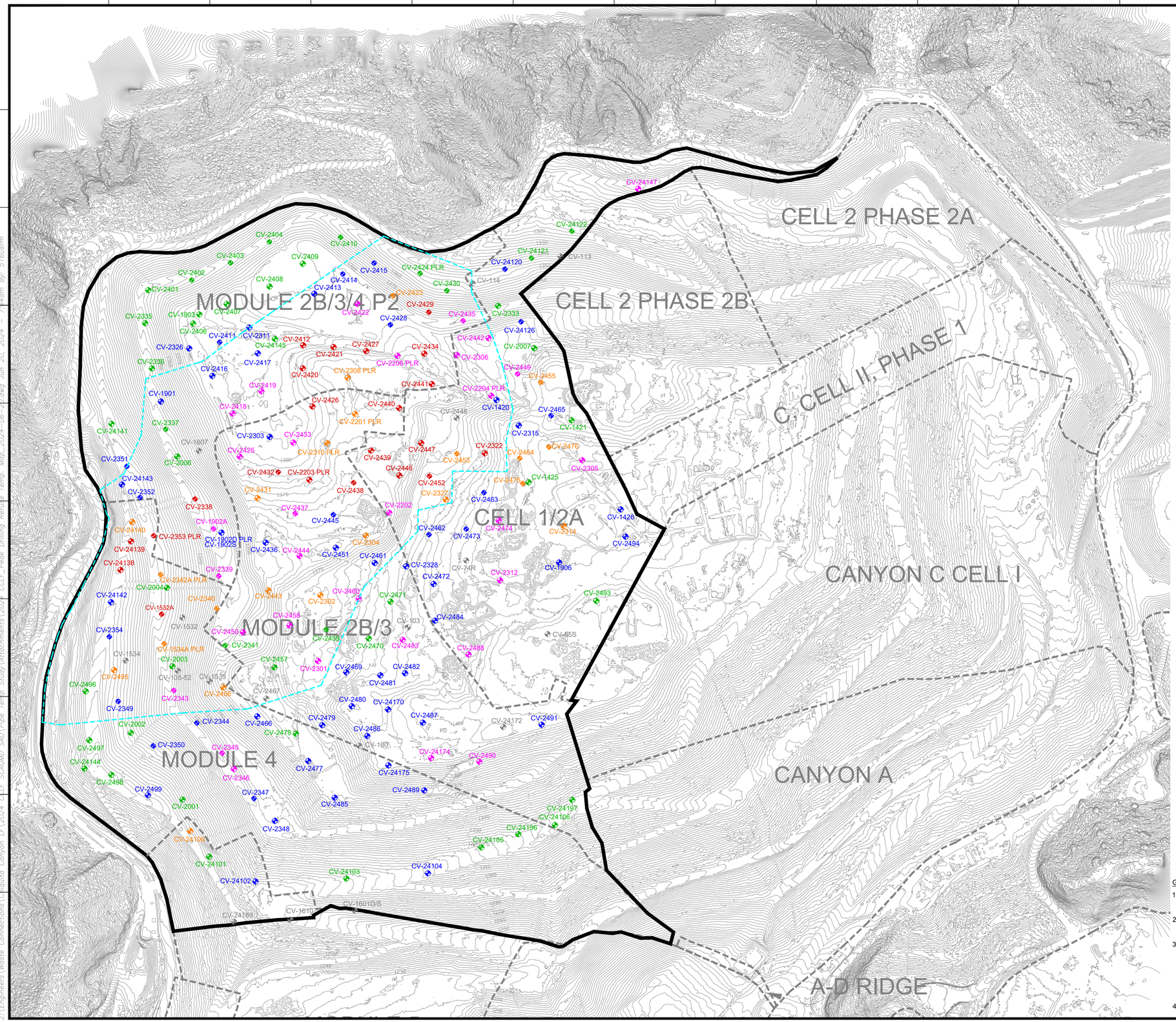
cc: Robert Dick, PE SCS Engineers
Patrick S. Sullivan, BCES, CCP, SCS Engineers

Enclosure:

Attachment A – HDPE Manufacture Specifications
Attachment B – LFG Temperatures

Attachment A

LFG Temperatures



GENERAL DRAWING NOTES:

1. EXISTING TOPOGRAPHIC SURVEY INFORMATION SHOWN WAS PROVIDED BY PROPELLOR. AERIAL PHOTOGRAPHY DATED MAY 29, 2024.
2. NORTH ARROW SHOWN HERE IS REFERENCE TO THE CALIFORNIA STATE PLANE ZONE V COORDINATE SYSTEM, NAD 83.
3. THE LOCATION OF ANY EXISTING GCCS COMPONENTS AND OTHER FEATURES ARE APPROXIMATE AND SHOULD BE USED FOR INFORMATION PURPOSES ONLY. ACTUAL FIELD CONDITIONS MAY VARY AND SUBJECT TO CHANGE BASED ON FUTURE FILL OPERATIONS, WASTE PLACEMENT, TOPOGRAPHIC FEATURES, AND OTHER SITE-SPECIFIC FACTORS.
4. EXISTING GCCS AS-BUILT DATED JUNE 17, 2024.

NO.	REVISION	DATE

SHEET TITLE: VERTICAL LFG EXTRACTION WELLS PEAK REFUSE TEMPERATURE - CONDITION 9A REACTION AREA

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

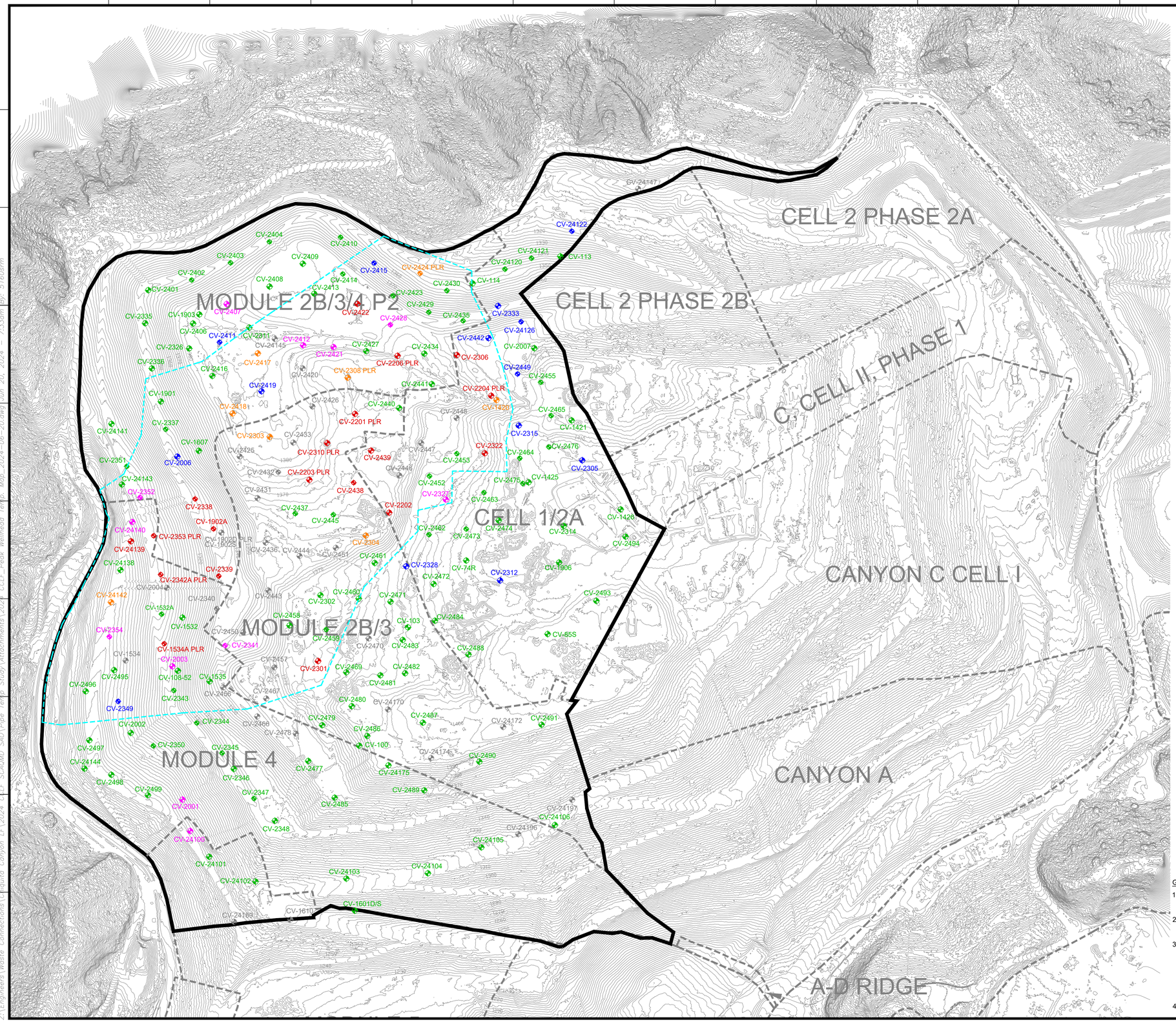
SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
8799 BALBOA AVENUE SUITE 290
SAN DIEGO, CA 92123
(858) 571-5500 FAX: (562) 427-0805

PROJ. NO. 01204123.35 | DWN. BY: SRM | CHK. BY: WCH | DSN. BY: - | ACAD. FILE: FIELD SERVICES | APP. BY: WCH

DATE: 06/20/2024

SCALE: AS SHOWN

SHEET: 1



N

GRAPHIC SCALE

125 75 0 250 500 750

SCALE: 1"=250'

LEGEND

- 1150 — TOPOGRAPHIC CONTOUR
- EXISTING CELL LIMITS (APPROXIMATE)
- CV-XX — EXISTING VERTICAL LFG EXTRACTION WELL WELLHEAD TEMP. 60°F - 130°F
- CV-XX — EXISTING VERTICAL LFG EXTRACTION WELL WELLHEAD TEMP. 130°F - 150°F
- CV-XX — EXISTING VERTICAL LFG EXTRACTION WELL WELLHEAD TEMP. 150°F - 165°F
- CV-XX — EXISTING VERTICAL LFG EXTRACTION WELL WELLHEAD TEMP. 165°F - 180°F
- CV-XX — EXISTING VERTICAL LFG EXTRACTION WELL WELLHEAD TEMP. 180°F - 200+°F
- CV-XX — EXISTING VERTICAL LFG EXTRACTION WELL WELLHEAD TEMP. DATA NOT AVAILABLE
- REACTION AREA BOUNDARY (APPROXIMATE) - BASED ON DATA REVIEW
- REACTION AREA LIMITS - CONDITION 9A

GENERAL DRAWING NOTES:

1. EXISTING TOPOGRAPHIC SURVEY INFORMATION SHOWN WAS PROVIDED BY PROPELLOR. AERIAL PHOTOGRAPHY DATED MAY 29, 2024.
2. NORTH ARROW SHOWN HERE IS REFERENCE TO THE CALIFORNIA STATE PLANE ZONE V COORDINATE SYSTEM, NAD 83.
3. THE LOCATION OF ANY EXISTING GCCS COMPONENTS AND OTHER FEATURES ARE APPROXIMATE AND SHOULD BE USED FOR INFORMATION PURPOSES ONLY. ACTUAL FIELD CONDITIONS MAY VARY AND SUBJECT TO CHANGE BASED ON FUTURE FILL OPERATIONS, WASTE PLACEMENT, TOPOGRAPHIC FEATURES, AND OTHER SITE-SPECIFIC FACTORS.
4. EXISTING GCCS AS-BUILT DATED JUNE 17, 2024.

NO.	REVISION	DATE

SHEET TITLE:
VERTICAL LFG EXTRACTION WELLS PEAK WELLHEAD TEMPERATURE - CONDITION 9A REACTION AREA

PROJECT TITLE:
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

CLIENT:
CHIQUITA CANYON LANDFILL
CASTAIC, CALIFORNIA

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
8799 BALBOA AVENUE SUITE 290
SAN DIEGO, CA 92123
(858) 571-5500 FAX: (562) 427-0805

PROJ. NO. 01204123.35 | DSN. BY: - | DWN. BY: SRM | CHK. BY: WCH | ACAD. FILE: FIELD SERVICES | APP. BY: WCH

DATE: 06/20/2024

SCALE: AS SHOWN

SHEET: 1

Wellhead Peak Temperatures		
#	Well I.D.	Peak Temp. (°F)
1	CV-100	119.4
2	CV-103	112.1
3	CV-108-52	124.0
4	CV-113	127.0
5	CV-114	127.4
6	CV-1420	165.9
7	CV-1421	109.8
8	CV-1425	91.9
9	CV-1426	105.4
10	CV-1532	87.9
11	CV-1532A	76.6
12	CV-1534A PLR	195.4
13	CV-1535	128.2
14	CV-1601S	104.1
15	CV-1601D	100.2
16	CV-1607	118.3
17	CV-1901	121.9
18	CV-1902A	186.0
19	CV-1903	115.1
20	CV-1906	91.6
21	CV-2001	153.6
22	CV-2002	124.2
23	CV-2003	161.8
24	CV-2006	136.8
25	CV-2007	126.9
26	CV-2201 PLR	204.5
27	CV-2202	198.1
28	CV-2203 PLR	187.7
29	CV-2204 PLR	196.4
30	CV-2206 PLR	199.9
31	CV-2301	180.6
32	CV-2302	110.3
33	CV-2303	180
34	CV-2304	179.2
35	CV-2305	137.8
36	CV-2306	194.1
37	CV-2308 PLR	177.1
38	CV-2310 PLR	193.7
39	CV-2311	116.1
40	CV-2312	141.6
41	CV-2314	124.6
42	CV-2315	146.5
43	CV-2322	196.0
44	CV-2326	122.8
45	CV-2327	163.2

46	CV-2328	148.6
47	CV-2333	131.9
48	CV-2335	107.8
49	CV-2336	93.4
50	CV-2337	68.6
51	CV-2338	183.6
52	CV-2339	189.1
53	CV-2341	154.2
54	CV-2342A PLR	197.7
55	CV-2343	112.6
56	CV-2344	118.0
57	CV-2345	117.7
58	CV-2346	127.5
59	CV-2347	102.9
60	CV-2348	118.5
61	CV-2349	132.7
62	CV-2350	119.9
63	CV-2351	119
64	CV-2352	155.8
65	CV-2353 PLR	189.0
66	CV-2354	151.9
67	CV-2401	97.9
68	CV-2402	108.9
69	CV-2403	110.9
70	CV-2404	110.9
71	CV-2406	123.7
72	CV-2407	163.5
73	CV-2408	118.2
74	CV-2409	124.7
75	CV-2410	115.7
76	CV-2413	88.9
77	CV-2435	108.6
78	CV-2465	110.6
79	CV-2473	114.3
80	CV-2475	124.5
81	CV-2481	113.7
82	CV-2484	117.5
83	CV-24100	151.2
84	CV-24101	112.6
85	CV-24120	86.7
86	CV-24121	84.6
87	CV-24138	99.8
88	CV-24139	191.1
89	CV-24140	162.3
90	CV-24141	104.0
91	CV-24142	177.0
92	CV-24143	104.9

93	CV-24144	73.5
94	CV-2415	148.2
95	CV-2422	186.6
96	CV-2423	92.4
97	CV-2424 PLR	178.9
98	CV-2428	164.9
99	CV-2429	83.1
100	CV-2430	108.1
101	CV-2453	118.3
102	CV-2495	100.8
103	CV-2496	70.0
104	CV-2497	97.1
105	CV-2498	95.4
106	CV-2499	103.1
107	CV-24126	131.3
108	CV-74R	120.2
109	CV-85S	102.5
110	CV-2477	116.9
111	CV-2414	126.6
112	CV-2442	132.3
113	CV-24122	131.1
114	CV-2411	130.9
115	CV-2416	117.5
116	CV-2417	167.7
117	CV-2418	165.1
118	CV-2419	139.7
119	CV-2421	151.8
120	CV-2441	82.8
121	CV-2479	107.0
122	CV-24102	84.8
123	CV-2449	131.7
124	CV-2455	107.8
125	CV-2460	124.7
126	CV-2461	96.8
127	CV-2462	114.8
128	CV-2463	121.7
129	CV-2464	108.8
130	CV-2469	119.8
131	CV-2471	82.6
132	CV-2472	105.9
133	CV-2474	105.3
134	CV-2476	102.6
135	CV-2482	114.2
136	CV-2483	127.4
137	CV-2488	113.4
138	CV-2491	121.7
139	CV-2493	111.4

140	CV-2494	116.2
141	CV-2434	87.7
142	CV-2412	161.3
143	CV-2427	79.1
144	CV-2437	96.2
145	CV-2438	183.7
146	CV-2439	183.7
147	CV-2440	83.6
148	CV-2445	113.3
149	CV-2452	93.5
150	CV-2459	113.6
151	CV-2480	120.2
152	CV-2485	112.3
153	CV-2486	118.4
154	CV-2487	109.3
155	CV-2489	114.5
156	CV-2490	101.4
157	CV-24103	113.9
158	CV-24104	105.0
159	CV-24105	122.9
160	CV-24106	123.4
161	CV-24175	90.4
162	CV-2458	85.0

AVERAGE:	127

Attachment B

HDPE Manufacture Specifications

For more information and technical assistance contact:

Performance Pipe, a division of
Chevron Phillips Chemical Company LP
P.O. Box 269006
Plano, TX 75026-9006
800.527.0662

DriscoPlex®
PE4710 / (PE3408)
Pipe and Fittings Data Sheet

Typical material Physical Properties of DriscoPlex® PE4710 / (3408)

High Density Polyethylene Materials

Property	Unit	Test Procedure	Typical Value
Material Designation	---	PPI TR-4	PE4710
Cell Classification	---	ASTM D3350	445474C
Pipe Properties			
Density	gms / cm^3	ASTM D1505	0.960 (black)
Melt Index Condition 190 / 2.16	gms / 10 minutes	ASTM D1238	0.05
Hydrostatic Design Basis 73°F (23°C)	psi	ASTM D2837	1600
Hydrostatic Design Basis 140°F (60°C)	psi	ASTM D2837	1000
Material Properties			
Flxural Modulus 2% Secant - 16:1 span: depth, 0.5 in / min	psi	ASTM D790	>115,000
Tensile Strength at Yield	psi	ASTM D638 Type IV	>3400
Elongation at Break 2 in / min., Type IV bar	%	ASTM D638	>700
Elastic Modulus	psi	ASTM D638	>175,000
Hardness	Shore D	ASTM D2240	62
PENT	hrs	ASTM F1473	>500
Thermal Properties			
Vicat Softening Temperature	°F	ASTM D1525	256
Brittleness Temperature	°F	ASTM D746	-103
Thermal Expansion	in / in / °F	ASTM D696	1.0×10^{-4}

TUB121NTW Polyethylene Copolymer

TUB121NTW is a natural high density bimodal polyethylene copolymer designed for extrusion of large diameter, thick wall piping for potable water, industrial and mining applications. When blended with an approved black concentrate, the resulting formulation ("TUB 121") is listed by the Plastics Pipe Institute (in PPI TR-4, as PE4710 and PE100) and is certified to ANSI/NSF Standard 14.

Typical Properties [1]

	Values		ASTM
	English Units	SI Units	Method
Resin			
Density	–	0.949 g/cc	**D4883**
Melt Index 190°C/5.0 kg	–	0.25 g/10 min	**D1238**
Melt Index 190°C/ 21.6 kg	–	8 g/10 min	**D1238**
Compression Molded Sample			
Tensile Strength (2 in/min)			**D638**
@ Yield	3,500 psi	24.1 MPa	
@ Break	4,400 psi	30.3 MPa	
Elongation (2 in/min)			**D638**
@Yield	10 %	10 %	
@ Break	>600 %	>600 %	
Flexural Modulus			**D790A**
2% Secant Method	130,000 psi	900 MPa	
Notched Izod Impact Strength	12 ft-lbf/in	63 kJ/m^2	**D256**
Hardness			**D2240**
Shore D	64	64	
Vicat Softening Point	259 °F	126 °C	**D1525**
Brittleness Temperature	<-180 °F	<-118 °C	**D746**
Environmental Stress Crack Resistance			**D1693**
Condition C, 100 % Igepal, F50 (hrs.)	>5,000	>5,000	
Hydrostatic Design Basis[2]			**D2837**
@ 23 C	1,600 psi	11.0 MPa	
@ 60 C	1,000 psi	6.9 MPa	
Minimum Required Strength (MRS)[2]	1,450 psi	10.0 MPa	**ISO 9080/12162**
Notch Tensile (PENT) (hrs.)	>10,000	>10,000	**F1473**
Oxidation Induction Time			**D3895**
@ 210 C	>20 min	>20 min	
Thermal Stability	>464 F	>240 C	**D 3350**
Cell Classification	445574C [2]	445576C [2]	**D 3350**
Oxidative Resistance Classification	CC3	CC3	**D3350**

2600 South Shore Boulevard
League City, TX 77573
Tel: 281-535-6600
www.ineos-op.com

INEOS
Olefins & Polymers USA

TUB121NTW Polyethylene Copolymer

[1] **Typical properties will vary and are not to be used for specification purposes.** (Last revised 2/8/2017)

[2] **Blended with approved black concentrate. Contact INEOS Technical Service for a list of approved concentrates.**

Regulatory Information

The product and uses described herein may require global product registrations and notifications for chemical inventory listings, or for use in food contact or medical devices. For further information, call + 1-800-527-5419.

Health and Safety Information

The product described herein may require precautions in handling and use because of toxicity, flammability, or other consideration. The Material Safety Data Sheet (MSDS) contains the available product health and safety information for this material and can be found at **www.ineos-op.com**. Before using any material, a customer is advised to consult the MSDS for the product under consideration for use.

The Material Safety Data Sheet for this product contains shipping descriptions and should be consulted, before transportation, as a reference in determining the proper shipping description. If the material shipped by INEOS is altered or modified, different shipping descriptions may apply and the MSDS of the original material should not be used.

For additional information, samples, pricing and availability, please contact:

INEOS Olefins & Polymers, USA
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