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JARED BLUMENFELD
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Los Angeles Regional Water Quality Control Board

October 3, 2019

Mr. Kassidy Jones
Northrop Grumman Systems Corporation
One Hornet Way, W1-902/W2
El Segundo, CA 90245

Certified Mail
Return Receipt Required
Claim No. 7018 2290 0001 8905 2770

GENERAL WASTE DISCHARGE REQUIREMENTS AND MONITORING AND REPORTING PROGRAM FOR ENHANCED IN-SITU BIOREMEDIATION OF VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER – FORMER NORTHROP GRUMMAN EAST COMPLEX, WEST OF CRENSHAW FACILITY, 3901 JACK NORTHROP AVENUE, HAWTHORNE, CALIFORNIA 90250 (ORDER NO. R4-2014-0187, SERIES NO. 142, FILE NO. 18-020, CI No. 10491, GLOBAL ID WDR100039894)

Dear Mr. Jones:

The Los Angeles Regional Water Quality Control Board (Regional Water Board), is the public agency with primary responsibility for the protection of ground and surface water quality for all beneficial uses of water within major portions of Los Angeles and Ventura Counties, including the facility mentioned above.

The Plant 1 Area and Chem Mill Area (Site) of the former Northrop Grumman East Complex, West of Crenshaw Facility are at 3901 Jack Northrop Avenue in Hawthorne. As identified by Northrop Grumman Systems Corporation (Discharger) in the February 16, 2018 Report of Waste Discharge (ROWD), the Plant 1 Area occupies approximately 8.5 acres, and the Chem Mill Area occupies approximately 4.8 acres. The property is owned by Zelman Hawthorne, LLCC Rich, LLC (Discharger). The Department of Toxic Substances Control (DTSC) is the lead agency for assessment and remediation.

Northrop Corporation, a forerunner of the Northrop Grumman Systems Corporation, developed the Site in the 1940s from agricultural land. Northrop Corporation used the Site to cut, stamp, heat treat, quality test, clean, mill, paint and seal aluminum aerospace parts. There were aboveground and underground dip and holding tanks. The tanks contained chemicals and process wastes consisting of acids, alkali solutions,

water rinses, degreasers, and related liquids. All but one tank was removed by late 1997.

Volatile organic compounds (VOCs) were first identified in Site groundwater prior to 1991 when ongoing groundwater monitoring began. April 2019 data indicate site groundwater contains perchloroethene (PCE) to 3,500 µg/L, trichloroethene (TCE) to 230,000 µg/L, and 1,1-dichloroethene (1,1-DCE) to 31,000 µg/L. In addition to VOCs, groundwater contains hexavalent chromium at concentrations to 6,000 µg/L and 1,4-Dioxane at concentrations to 890 µg/L.

On February 16, 2018, the Regional Water Board received a Report of Waste Discharge (ROWD) from the Discharger requesting coverage under General Waste Discharge Requirements (WDRs) for enhanced in situ bioremediation (EISB). The ROWD included the June 19, 2017, *Interim Measures Work Plan Plant 1 Area Groundwater Former East Complex facility West Parcel, Hawthorne, California* (IMWP 1), approved by DTSC on June 30, 2017, and the July 11, 2017, *Interim Measures Work Plan Chem Mill Area Former East Complex, West of Crenshaw Facility, Hawthorne, California* (IMWP 2), approved by DTSC on August 4, 2017. The initial DTSC approvals were followed by further DTSC actions, in part related to the California Environmental Quality Act (CEQA), for the Plant 1 Area and the Chem Mill Area. On July 24, 2019, DTSC issued a letter with the subject Proposed Conditional Approval of Northrop Grumman Systems Corporation Resource Conservation and Recovery Act "Interim Measure Work Plan Plant I Area Groundwater, Former East Complex Facility, West Parcel Hawthorne, California", dated June 19, 2017 [EPA ID Number CAD 008 268 302]. On July 28, 2019, DTSC issued a letter with the subject Proposed Conditional Approval of Resource Conservation and Recovery Act "Interim Measure Work Plan Chem Mill Area, Former East Complex Facility, West of Crenshaw Facility, Hawthorne, California", dated July 11, 2017 [EPA ID Number CAD 008 268 302]. On August 1, 2019, a Waste Discharge Requirements application fee was submitted to the Regional Water Board.

Regional Water Board staff completed review of the ROWD and determined that the proposed discharge meets the conditions specified in General WDRs Order No. R4-2014-0187, *General Waste Discharge Requirements for In-Situ Groundwater Remediation and Groundwater Re-Injection,* adopted by this Regional Water Board on September 11, 2014. Therefore, the Site is enrolled under General WDRs Order No. R4-2014-0187.

Enclosed are the General Waste Discharge Requirements, consisting of Order No. R4-2014-0187 (Series No. 142), and Monitoring and Reporting Program (MRP) No. CI-10491. The proposed discharge shall not cause the mineral constituents of the receiving groundwater downgradient outside the injection area, to reach concentrations in excess of applicable limits (groundwater quality objectives) for the West Coast Subbasin of the Coastal Plain of Los Angeles, Groundwater Basin, as given in Attachment B of General WDRs Order No. R4-2014-0187. The groundwater quality

objectives are 800 milligrams per liter (mg/L) for total dissolved solids, 250 mg/L for sulfate, 250 mg/L for chloride, and 1.5 mg/L for boron.

MRP No. CI-10491 requires you to implement the monitoring program on the effective date of this enrollment (**October 3, 2019**) under Regional Water Board Order No. R4-2014-0187. When submitting monitoring or technical reports to the Regional Water Board per these requirements, please do not combine other reports with your monitoring reports. Submit each type of report as a separate document.

The Discharger shall comply with the Electronic Submittal of information (ESI) requirements by submitting all reports required under the MRP, including groundwater monitoring data, discharge location data, and pdf monitoring reports to the State Water Resources Control Board GeoTracker database under Global ID **WDR100039894**.

Please see Paperless Office Notice for GeoTracker Users, dated December 12, 2011 for further details at:
http://www.waterboards.ca.gov/losangeles/resources/Paperless/Paperless%20Office%20for%20GT%20Users.pdf

To avoid paying future annual fees, please submit a written request for termination of your enrollment under the general permit in a separate letter, when your project has been completed and the permit is no longer needed. Be aware that the annual fee covers the fiscal year billing period beginning July 1 and ending June 30, the following year. You will pay the full annual fee if your request for termination is made after the beginning of the new fiscal year (July 1).

If you have any questions, please contact the Project Manager, Mr. Peter Raftery at (213) 620-6156 (Peter.Raftery@waterboards.ca.gov), or the Chief of the Groundwater Permitting Unit, Dr. Eric Wu at (213) 576-6683 (Eric.Wu@waterboards.ca.gov).

Sincerely,

Renee Purdy
Executive Officer

Enclosures: 1) Regional Water Board WDR Order No. R4-2014-0187
2) Monitoring and Reporting Program CI No. 10491

cc (via email): Ms. Maria Fabela, DTSC, Chatsworth
Mr. Mike Lamar, CDM Smith, Denver
Dr. Ravi Sabramanian CDM Smith, Denver

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

MONITORING AND REPORTING PROGRAM NO. CI-10491
FOR
FORMER NORTHROP GRUMMAN EAST COMPLEX
WEST OF CRENSHAW FACILITY
3901 JACK NORTHROP AVENUE
HAWTHORNE, CALIFORNIA 90250

ENROLLMENT UNDER REGIONAL BOARD
ORDER NO. R4-2014-0187 (SERIES NO. 142)
FILE NO. 18-020

I. REPORTING REQUIREMENTS

A. Northrop Grumman Systems Corporation (Discharger) shall implement this Monitoring and Reporting Program (MRP) at the former Northrop Grumman East Complex, West of Crenshaw Facility (Site) at 3901 Jack Northrop Avenue, Hawthorne, California (Figures 1, 2, and 3), between Prairie Avenue and Crenshaw Boulevard, on the effective date of this enrollment (**October 3, 2019**) under Regional Board Order No. R4-2014-0187. The first monitoring report under this monitoring program is due January 30, 2020.

Subsequent monitoring reports shall be received by the dates in the following schedule:

Reporting Period	Report Due
January – March	April 30
April – June	July 30
July – September	October 30
October – December	January 30

B. If there is no discharge during any reporting period, the report shall so state.

C. By March 30th of each year, beginning March 30, 2020, the Discharger shall submit an annual summary report to the Regional Water Board. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous calendar year. In addition, the Discharger shall discuss the compliance record and the corrective actions taken, or planned, which may be needed to bring the discharge into full compliance with the waste discharge requirements.

D. Laboratory analyses – all chemical, bacteriological, and/or toxicity analyses shall be conducted at a laboratory certified for such analyses by the State Water Resources Control Board, Division of Drinking Water (SWRCB-DDW) Environmental Laboratory Accreditation Program (ELAP).

E. The method limits (MLs) employed for analyses shall be lower than the permit limits established for a given parameter, unless the Discharger can demonstrate that a particular ML is not attainable and obtains approval for a higher ML from the Executive Officer. At least once a year, the Discharger shall submit a list of the analytical methods employed for each test and the associated laboratory quality assurance/quality control (QA/QC) procedures.

F. All QA/QC samples must be run on the same dates the samples were analyzed. The Discharger shall make available for inspection and/or submit the QA/QC documentation upon request by Regional Board staff. Proper chain of custody procedures must be followed and a copy of the chain of custody documentation shall be submitted with the report.

G. Each monitoring report must affirm in writing that "All analyses were conducted at a laboratory certified for such analyses by the SWRCB-DDW ELAP, and in accordance with current United States Environmental Protection Agency (USEPA) guideline procedures or as specified in this Monitoring Program." Proper chain of custody procedures must be followed and a copy of the completed chain of custody form shall be submitted with the report.

H. For every item where the requirements are not met, the Discharger shall submit a statement of the cause(s), and actions undertaken or proposed which will bring the discharge into full compliance with waste discharge requirements at the earliest possible time, including a timetable for implementation of those actions.

I. The Discharger shall maintain all sampling and analytical results, including strip charts, date, exact place, and time of sampling, dates analyses were performed, analyst's name, analytical techniques used, and results of all analyses. Such records shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

J. In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized to demonstrate compliance with the requirements and, where applicable, shall include results of receiving water observations.

K. Any mitigation/remedial activity including any pre-discharge treatment conducted at the site must be reported in the quarterly monitoring report.

L. Each monitoring report shall contain a separate section titled "Summary of Non-Compliance" which discusses the compliance record and the corrective actions taken or planned that may be needed to bring the discharge into full compliance with Waste Discharge Requirements (WDRs). This section shall be located at the front of the report and shall clearly list all non-compliance with discharge requirements, as well as all excursions of effluent limitations.

M. The Discharger shall comply with requirements contained in Section G of Order No. R4-2014-0187 "*Monitoring and Reporting Requirements*" in addition to the aforementioned requirements.

II. INJECTION MONITORING REQUIREMENTS

A "fast-release" sodium lactate product (WilClear Plus™), a Dehalococcoides mixture (KB-1™ or SDC-9™), and anoxic chase water will be injected into groundwater. At the Plant 1 Area they will be injected through 12 existing injection wells (Figure 2). At the Plant 1 Area the KB-1™ or SDC-9™ and anoxic chase water may also be injected through 8 groundwater monitoring wells (P1-MW-39B to P1-MW-46B) to assist the distribution of the KB-1™ or SDC-9™. At the Chem Mill Area the WilClear Plus™, KB-1™ or SDC-9™, and anoxic chase water will be injected through 8 existing injection wells (Figure 3). At the Chem Mill Area the KB-1™ or SDC-9™ and anoxic chase water may also be injected through 7 groundwater monitoring wells (CMW-03B, CMW-14B, CMW-15B, CMW-16AB, CMW-17AB, CMW-18AB, and CMW-21B) to assist the distribution of the KB-1™ or SDC-9™.

The quarterly reports shall contain the following regarding the quarterly injection activities:

1. Location map showing injection, extraction, and monitoring wells.

2. Written summary providing:
   - Injection period (date and time)
   - Injection depth (well screen interval or direct push depth)
   - Injected volume (each day)
   - Injected volume (total)
   - Injection flow rates (daily minimum and maximum), and
   - Injection pressures (daily minimum and maximum)

3. During injection, weekly visual inspections shall be conducted at the injection locations. The quarterly report shall include a summary of the results of the visual inspections, including representative photographs.

III. GROUNDWATER MONITORING PROGRAM FOR EISB OF THE BELLFLOWER AQUIFER B ZONE

A groundwater monitoring program shall be designed to detect and evaluate impacts associated with the injection of WilClear Plus™, the KB-1™ or SDC-9™, and the anoxic chase water. The monitoring program shall assess: (i) performance of the EISB by sampling monitoring wells within the treatment zone, and (ii) potential downgradient impacts associated with the EISB activities by sampling downgradient monitoring wells. Given these monitoring objectives, the following groundwater monitoring wells (Figures 1, 2, and 3) shall be included in the monitoring program:

Plant 1 Area

Upgradient of EISB area:	P1MW-04B (screened 70 - 80 feet)
Within EISB area:	P1MW-20B (screened 70 - 80 feet) and P1MW-37B (screened 70 – 80 feet)
Down gradient of EISB area:	P1MW-36B (screened 70 - 80 feet) and P1MW-12B (screened 75 – 85 feet)

Chem Mill Area

Upgradient of EISB area:	CMW-08 (screened 80 - 90 feet)
Within EISB area:	CMW-03B (screened 78 - 88 feet) and CMW-14B (screened 78 – 88 feet)
Down gradient of EISB area:	NAW-2B (screened 82 - 92 feet)

The monitoring locations shall not be changed, and any proposed changes shall be provided to and approved by the Regional Board Executive Officer (Executive Officer) prior to implementation.

The following shall constitute the Monitoring and Reporting Program for the groundwater monitoring wells identified above. Table 1 identifies the constituents that shall be analyzed during the baseline sampling event prior to injection and subsequent groundwater monitoring events for the purpose of evaluating EISB effectiveness and impact.

TABLE 1 – GROUNDWATER MONITORING CONSTITUENTS

CONSTITUENT	UNITS [1]	SAMPLE TYPE	MINIMUM FREQUENCY OF ANALYSIS
Water Temperature[2]	°C	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Specific Conductance[2]	µS/cm	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Dissolved Oxygen[2]	mg/L	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
pH[2]	pH units	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Oxidation-Reduction Potential[2]	mV	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Turbidity[2]	NTUs	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Dehalococcoides	cells/ml	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Nitrate and Nitrite	mg/L	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Total Organic Carbon	mg/L	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Volatile Organic Compounds	µg/L	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Dissolved Gases	µg/L	grab	Baseline prior to injection, weekly

(Methane, ethane, ethene)			for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Chloride	mg/L	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly thereafter for the next 2 months, quarterly thereafter
Sulfate	mg/L	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Boron	mg/L	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter
Total Dissolved Solids	mg/L	grab	Baseline prior to injection, weekly for 4 weeks following injection, monthly for the next 2 months, quarterly thereafter

[1] mg/L: milligrams per liter; µg/L: micrograms per liter; µS/cm: microsiemens per centimeter; mV: millivolts;
°C: degree Celsius.
[2] Field instrument can be used to test for this constituent.

All groundwater monitoring reports must include, at minimum, the following:

a. Well identification, date, and time of sampling;
b. Sampler identification, and laboratory identification;
c. Quarterly observation of groundwater levels, recorded to 0.01 feet mean sea level and groundwater flow direction.

IV. MONITORING FREQUENCIES

Specifications in this monitoring program are subject to periodic revisions. Monitoring requirements may be modified or revised by the Executive Officer based on review of monitoring data submitted pursuant to this Order. Monitoring frequencies may be adjusted to a less frequent basis or parameters and locations dropped by the Executive Officer if the Discharger makes a request and the request is backed by statistical trends of in the submitted monitoring data.

V. CERTIFICATION STATEMENT

Each report shall contain the following completed declaration:

"I certify under penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

Executed on the _____day of _____ at _____.

_____ (Signature)

_____ (Title)"

VI. ELECTRONIC SUBMITTAL OF INFORMATION (ESI) TO GEOTRACKER

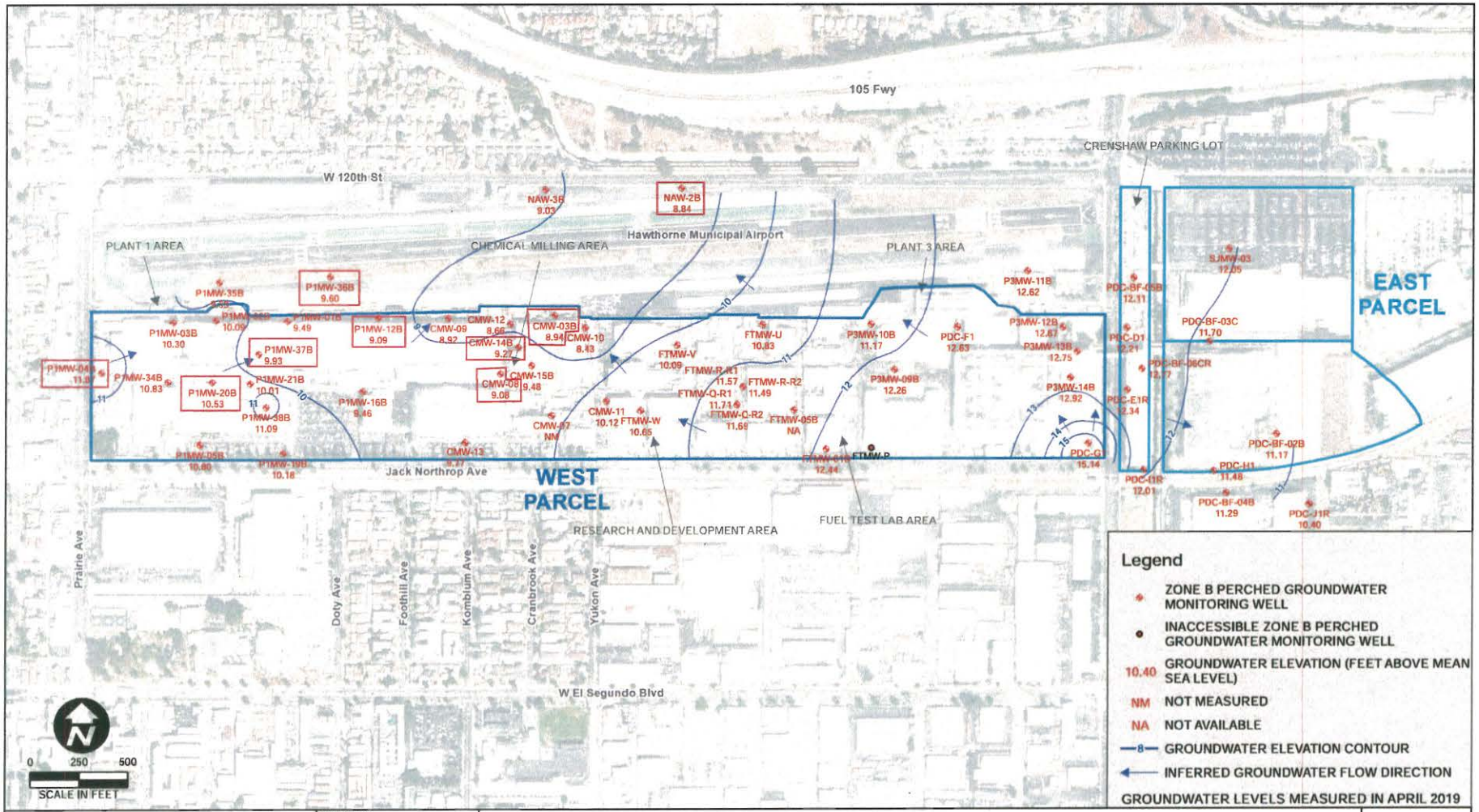
The Discharger shall comply with the Electronic Submittal of Information (ESI) requirements by submitting all reports required under the MRP, including groundwater monitoring data, discharge location data, correspondence, and portable document format (pdf) copies of monitoring reports to the State Water Resources Control Board GeoTracker database under Global ID **WDR100039894**.

All records and reports submitted in compliance with this Order are public documents and will be made available for inspection during business hours at the office of the California Regional Water Quality Control Board, Los Angeles Region, upon request by interested parties. Only proprietary information, and only at the request of the Discharger, will be treated as confidential.

Ordered by: RPurdy

Renee Purdy
Executive Officer

Date: October 3, 2019



EQUIPOISE CORPORATION

DRAWN BY: KG

CHECKED BY: WG

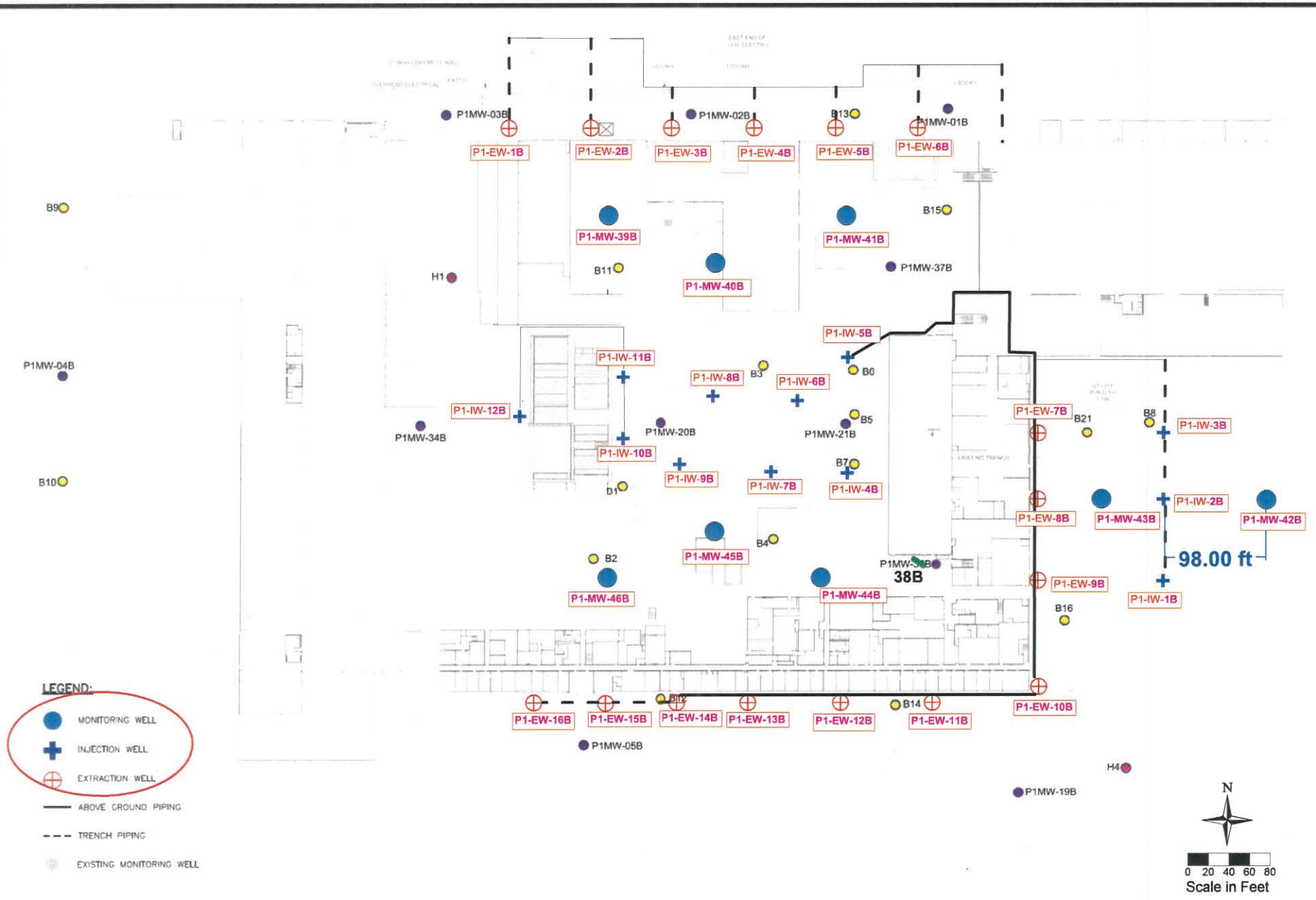
DATE: MAY 2019

FILE NAME: PLATE 5- ZONE B GROUNDWATER ELEVATIONS.MXD

GROUNDWATER ELEVATIONS - PERCHED ZONE B - APRIL 2019

NORTHROP GRUMMAN SYSTEMS CORPORATION
EAST COMPLEX-EAST AND WEST PARCELS
HAWTHORNE, CALIFORNIA

Figure 1



CDM Smith Inc.
555 17th Street, Suite #1100
Denver, CO 80202
303-383-2300

Interim Measures Work Plan
Plant 1 Area Groundwater
Former East Complex Facility, West Parcel
Hawthorne, California

Figure 2

Proposed Well Location Map

Notes:
1. The locations of the proposed extraction, injection, and monitoring wells are approximate only and may be adjusted in the field based on access and utility constraints.

CDM Smith

General WDR Permit Application
Plant 1 and Chem Mill Areas
Former East Complex Facility,
West Parcel
Hawthorne, California

Figure 3
Chem Mill Area EISB Injection, Extraction, and Monitoring Well Network