TETRA TECH

NOR-02908

March 18, 2022

Mr. Jason Pelton
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau A, 12th Floor
625 Broadway
Albany, New York 12233-7015

Reference: CLEAN Contract No. N6247016D9008
Contract Task Order WE13

Subject: Final CERCLA Letter Work Plan
Recovery Wells RW8 and RW9 Installation
Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, New York

Dear Mr. Pelton:

On behalf of the Department of the Navy, Tetra Tech is submitting the *Final CERCLA Letter Work Plan Recovery Wells RW8 and RW9 Installation, NWIRP Bethpage* to the New York State Department of Environmental Conservation (NYSDEC) for its records.

If you have any questions, please contact Mr. Scott Sokolowski, NAVFAC MIDLANT, at scott.c.sokolowski.civ@us.navy.mil or (757) 341-2011.

Sincerely,

Ernie Wu
Project Manager

Enclosures: Final CERCLA Letter Work Plan
Recovery Wells RW8 and RW9 Installation
NWIRP Bethpage, New York

Distribution:
NAVFAC MIDLANT, Scott Sokolowski
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Project File

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FINAL CERCLA LETTER WORK PLAN
RECOVERY WELLS RW8 AND RW9 INSTALLATION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP)
BETHPAGE, NEW YORK
JANUARY 2022

1.0 INTRODUCTION

The Department of Navy (Navy) will be installing groundwater recovery wells as part of its Phase III Southern Plume Intercept System (hereafter Phase III System) at Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage (Figure 1). This work plan addresses the installation and initial development of recovery wells RW8 and RW9 (herein referred to as RW8 and RW9). These recovery wells are being installed to extract groundwater in the area downgradient from the leading edge of the Operable Unit (OU) 2 offsite groundwater volatile organic compound (VOC) plume (hereafter OU2 VOC plume) (Figure 2), specifically the deeper western plume.

The OU2 VOC plume consists of a deeper western plume and a shallow eastern plume. The leading edge of the deeper western plume is identified by monitoring well RE117D1 (screened at 730 to 755 feet below ground surface [bgs]) (Figure 2). Groundwater samples collected from monitoring well RE117D1 in December 2019 contained concentrations of trichloroethene (TCE) at 57.2 micrograms per liter (µg/L). RW8 and RW9 target the southern extent of the groundwater associated with the deeper western plume. Recovery wells RW10 and RW11 will target extraction and treatment of the shallow eastern OU2 VOC plume. The requirements for installation of recovery wells RW10 and RW11 will be described in a separate, subsequent work document.

The Navy is currently conducting a pre-design investigation to support the Phase III System at NWIRP Bethpage. This investigation is being conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERLCA) Letter Work Plan, Initial Pre-Design Investigation for the Phase III Southern Plume Intercept System, NWIRP Bethpage (Tetra Tech, 2020). The investigation activities consist of drilling vertical profile borings (VPBs) and groundwater monitoring wells. Navy groundwater modeling of the OU2 VOC plume migration along with data collected from a VPB at each recovery well location will be used to finalize recovery well RW8 and RW9 details.

The Navy undertakes and documents its environmental remedial activities with respect to releases/suspected releases from the former NWRIP through Navy Work Plans. These documents outline technical requirements for conducting these activities and include provisions to protect health and safety and to minimize impact to the local

community. These provisions include restricting impacts to noise, dust, work hours, and site maintenance (e.g., cleanliness).

This work plan has been prepared by Tetra Tech for the Mid-Atlantic Division of the Naval Facilities Engineering Systems Command (NAVFAC) pursuant to Contract Task Order (CTO) WE13, issued under Comprehensive Long-term Environmental Action Navy (CLEAN) Contract Number N6247016D9008.

This document is provided for review and comment in accordance with CERLCA requirements for notice of environmental restoration activities. The Navy will address reviewer's comments prior to finalization of the document.

2.0 SCOPE AND OBJECTIVE

The Navy will install recovery well RW8 (Figure 3) and RW9 (Figure 4) on New York State Department of Parks, Recreation, and Historic Preservation (NYS Parks) property. An access agreement between the Navy and NYS Parks has been finalized. Drilling and installation of recovery wells RW8 and RW9 will consist of the following tasks:

- Mobilization of drilling equipment and preparation of the drilling location includes:
    - Installation and maintenance of a lockable gate in the fence line restricting access to the drill site from the adjacent neighborhood.
    - Prior to the onset of drilling, where necessary, sound barriers will be installed around the engine of the drill rig, and
    - Utility clearance.
- Installation of a single recovery well at the RW8 and RW9 locations using reverse circulation drilling techniques.
- Recovery well development and sampling.
- Demobilization of drilling equipment.
- Site Survey.

3.0 PROTECTION OF THE COMMUNITY

The drilling site will be maintained in a manner to protect the health and safety of the surrounding community. This protection will be achieved through implementation of best operational practices and controls applicable to drilling activities in residential areas. This section provides a summary of these practices and controls. Recovery well drilling activities at each site is expected to have a duration of approximately three months.

3.1 Notification of Drilling Activities

Prior to mobilization of equipment, drilling notifications will be distributed to residents located near the drilling site to inform them of the Navy's intent and plans. Notifications will be hand-delivered a minimum of one week prior to mobilization to residents in the vicinity of a drill site. The notifications will include points of contact for the Navy, the Navy's prime contractor (Tetra Tech), New York State Department of Environmental Conservation (NYSDEC), and New York State Department of Health (NYSDOH). Tailored letters may be provided to residents at addresses located immediately adjacent to each drilling site. The NYSDEC, NYSDOH, and NYS Parks will be notified at least 48-hours prior to the distribution of residential drilling notifications.

3.2 Drilling Controls

Installation of recovery wells will be accomplished using reverse circulation techniques. General work hours for active operation of the drill rig will typically be weekdays from 8:00 AM to approximately 6:00 PM (no machinery will operate before 8:00 AM). The work site will be maintained to ensure cleanliness both inside and outside of the drill site. Trash will be maintained in an acceptable receptacle and be removed on a regular basis from the site as to not allow for excessive accumulation. The Navy's contractor will provide a field operations manager to visit the site and inspect for cleanliness and safety.

Although work is not routinely conducted on weekends or holidays, there may be instances where work will be required outside of the general work hours. For example, over a weekend or holiday, an active borehole may require inspection or the addition of drilling fluid to ensure the integrity of the hole. Also, the day the actual well is installed, work hours may extend until approximately 11:00 pm that night. Site workers will minimize their time at the drill site during non-routine work hour visits, but during the period of active drilling, personnel may be present overnight to monitor the drilling fluid level for safety reasons.

3.3 Site Controls

A security fence equipped with a lockable gate will restrict access to the drill rig, equipment and materials, and waste receptacle(s) from the surrounding neighborhood. The gate will be secured with a lock at the end of each workday. As necessary, a sound barrier(s) will be installed to mitigate excessive noise from the drill site prior to the onset of drilling.

3.4 Traffic Control

Caution will be exercised when entering/exiting the site. Temporary traffic control devices shall be utilized, to provide adequate warning of conditions created by work

vehicles entering and exiting the site. Temporary traffic control devices which may be used are as follows:

- Signage shall be used as necessary to warn and direct traffic;
- Channelizing devices such as traffic cones shall be used as necessary, to warn road users of the temporary disruption caused by equipment/vehicles entering and exiting the site; and
- Flaggers may be used if alternate traffic management systems are not feasible.

All workers involved in traffic management activities shall wear high visibility vests. Temporary traffic control measures shall be removed as soon as practical when they are no longer needed.

3.5 Monitoring for Airborne Matter

Excessive airborne matter and VOCs are not expected to be generated during drilling of VPBs and installation of the recovery wells; however, to ensure safety to workers and the surrounding community, air monitoring will be conducted during these operations. The Navy's plan closely follows procedures outlined in NYSDEC's guidance for community air monitoring during restoration activities.

The constituents of concern in the OU2 plume area are VOCs. VOCs will be monitored during drilling activities using a photo-ionization detector (PID) equipped with a 10.2 eV or 10.6 eV lamp. Drilling activities will not likely result in the generation of particulate matter which would trigger particulate monitoring; however, to ensure the safety of the workers and community, particulate monitoring will be conducted during drilling. Particulates will be monitored using a particulate air monitor equipped with a micro-processor to perform real-time measurement of airborne concentrations in microgram per cubic meter ($\mu g/m^3$).

Both the PID and particulate monitoring equipment will be calibrated on a daily basis when they are used. The PID will be calibrated using a 100 parts per million (ppm) isobutylene air standard as per the manufacturer instructions. The particulate air monitoring equipment will be calibrated using the appropriate air standard as specified in the equipment manufacturer's instructions. Calibration records will be maintained in the field log/notes.

Both VOCs and particulate monitoring will be conducted at the upwind and downwind perimeter of the drill site. The location of the monitoring equipment may be adjusted as necessary based on wind shifts. Real-time air monitoring field logs/data will be maintained to allow for interpretation of the data when necessary and will be available

for review. Site conditions, weather conditions, work activities, and, implemented engineering controls will be documented in field logs/notes.

VOC and particulate monitoring recordings will be maintained in the project files. These records will be made available for NYSDEC and NYSDOH personnel to review upon request. Any exceedances of the action levels will be reported to NYSDEC and NYSDOH personnel.

In additional to real time air monitoring, during drilling activities at each site, an air sample will be collected and analyzed for VOCs using United States Environmental Protection Agency (EPA) Method TO-15. Collection of air samples will be conducted at the onset of each boring. Air samples will be collected using SUMMA canisters over an approximate 8-hour period. One air sample will be collected near/downwind of the drill rig and one air sample will be collected upwind of the drill rig.

4.0 FIELD ACTIVITIES

The following section provides a description of site work and drilling field activities. Figure 3 and Figure 4 provides the site layout and location for recovery well RW8 and RW9, respectively. Drilling at each recovery well site is expected to have a duration of approximately three months.

4.1 Utility Clearance

Prior to the initiation of intrusive fieldwork, the drilling subcontractor will contact Dig Safely New York to arrange for the location and marking of all underground utilities in the vicinity of the proposed soil boring and recovery well locations, as required by the New York Code of Rules and Regulations (NYCRR) Part 753. The drilling subcontractor will make the one call ticket available for review. In addition to the one call ticket, a third party independent utility company will be contracted to confirm utility locations.

During drilling, the first five feet of borehole will be cleared in a safe manner, to locate/avoid any utilities that may have not been identified during utility clearance.

Alteration of utilities is to be avoided and not anticipated. However, if alteration of utilities are required to perform this work, the Navy will coordinate potential disruptions with the affected residents.

4.2 Recovery Well

Recovery wells RW8 and RW9 will each be constructed as a 12-inch diameter well. Based on data collected during the pre-design investigation, both recovery wells are

anticipated to be drilled to a depth of approximately 800 feet bgs and screened from mid-600 feet to approximately 800 feet bgs. The final recovery well depth, screen slot size, and screen interval will be selected based upon evaluation of the data collected from the VPB installed at each recovery well location. The recovery well screens will also consider upgradient lithology and groundwater chemical data in the area of the leading edge of the OU2 VOC plume.

To prevent sloughing of the upper borehole, a dual-rotary rig will be used to over-drill the borehole and a 24-inch steel surface casing will be installed. The well borehole will be drilled using reverse circulation drilling techniques with the casings installed plumb and true to line.

The wells will be installed in an 18-inch diameter borehole and consist of 12-inch Schedule 40 black steel casing, approximately 150 feet (screen length assumed) of stainless steel well screen, and welded bottom cap with filter pack, sand and bentonite seals, and cement seal. A 5-foot sump will be installed immediately below the well screen. Well centralizers will be welded to the casing at 40 foot intervals.

A permanent 24-inch steel surface casing (approximately 60 feet in depth) set in concrete will be used to support the upper borehole walls. In the future, a submersible pump with a pumping capacity of approximately 200 to 700 gallons per minute is planned to be installed in the well. The details of a typical recovery well construction are provided in Attachment 1.

- The filter pack sand size will be selected based on the results of grain size analyses performed on soil samples collected from the VPB installed at the recovery well location. Soil samples from the VPBs are collected from the anticipated screened zones of the recovery wells. Filter pack sand will be installed using the gravity method through a tremie pipe. The filter pack sand will be placed a minimum of 25 feet above the top of the screen.
- A fine transition sand layer (finer than the filter pack sand) will be placed in the annulus on top of the filter pack in the same manner as the filter pack. The transition sand layer will be approximately 5 feet thick.
- A 5-foot thick bentonite seal will be installed above the fine transition sand layer. The bentonite seal will be installed using a tremie pipe.
- The annulus above the bentonite seal will be grouted with a cement bentonite seal. The cement bentonite seal will be installed using a tremie pipe. The cement seal will be grouted to a depth of 8 feet below the top of the permanent 24-inch diameter surface steel casing.

- The annulus above the cement seal will consist of sand that is tremied into the annulus, to the top of the permanent 24-inch diameter surface steel casing. Placing sand in this zone will easily allow accommodations for the future connection of the recovery wells to the Phase III System as compared to having the cement seal installed to the top of recovery well/surface casing.
- The well will be temporarily finished flush to the ground surface with a Prefab 24-inch H Concrete Collar with a 24-inch traffic-rated manhole cover, and an inner 24-inch surface casing that is capped/sealed with a 12-inch blind flange/gasket assembly. The top of the well riser will be set approximately 6 to 12 inches below grade. The blind flange on top of the riser pipe will be lockable. This configuration will protect the recovery wells until incorporation into the Phase III System in the future.

4.3 Recovery Well Development

Following installation, each recovery well will be developed to evacuate drilling fluids, silts and other fine-grained sediments which may have accumulated within the wells during their installation. Well development will not commence until at least five days after well installation. Due to the depth of the wells, it is anticipated development will be conducted using air lift methods and over pumping using a submersible pump. Field parameters (pH, temperature, specific conductivity, oxidation reduction potential, dissolved oxygen, and turbidity) will be monitored and recorded throughout well development.

In compliance with NYSDEC policy, well development will continue until turbidity has stabilized (to a target turbidity of less than 50 nephelometric turbidity units [NTUs], if possible). Special care will be taken to develop the recovery wells properly in order to ensure adequate hydraulic connection between the wells and the aquifer.

During development, the specific capacity of the wells (discharge rate/feet of drawdown) will be measured manually; drawdown will also be measured during and following equilibration after development. Development water will be discharged directly to tanker trucks and it will be transported to frac tanks located at the investigation derived waste (IDW) staging area at the former NWIRP facility. Groundwater from the recovery wells will be sampled at the end of development and analyzed for the parameters below via a NYSDEC certified and DoD approved laboratory. This data will be used to support design of the Phase III Treatment System.

Analytes	EPA Method of
Volatile Organic Compounds (VOCs)	8260B
Semi Volatile Organic Compounds	8270D
Total Suspended Solids (TSS)	2540D
pH	4500_H+B
Biological Oxygen Demand (BOD)	5210B
Total Dissolved Solids (TDS)	2540C
Total Kjehldahl Nitrogen (TKN)	351.2
Ammonia	350.1
Total Organic Carbon	E 415.1
Chemical Oxygen Demand	E 410.1
1,4-Dioxane	8270D SIM
Total Metals/Dissolved Metals	6020A/7470A

4.4 DEMOBILIZATION AND SITE RESTORATION

Upon completion of drilling, temporary fencing installed will be removed and site restoration will be conducted. However, the cleared drilling area will remain for future planned activities such as recovery well pumping tests and treatment system construction. The lockable gate in the fence line restricting access to the drill site from the adjacent neighborhood will be locked and maintained following completion of recovery well drilling.

5.0 INVESTIGATION DERIVED WASTE

IDW generated during this program will include soil cuttings, well development water (groundwater), and decontamination fluids. It is anticipated all IDW will be non-hazardous. All IDW will be containerized and properly labelled, characterized, and disposed of properly based on waste characterization results. Soil cuttings generated during installation of the recovery wells will require temporary storage at the drilling site due to the speed and volume of cuttings generated on a daily basis. Arrangements will be made to expedite removal from the site for proper disposal. IDW containers stored at the drill site will be properly labelled and secured within the fence and lockable gate.

IDW generated during this investigation will follow procedures outlined in Tetra Tech Standard Operating Procedure (SOP) SA-7.1 Decontamination of Field Equipment and Management of Investigation Derived Waste (Tetra Tech, 2016) and United States EPA Guide to Management of Investigation-Derived Wastes (OSWER, 1992).

6.0 DECONTAMINATION

A centrally-located decontamination pad at NWIRP Bethpage will be used to decontaminate drilling equipment and tooling. All decontamination fluids will be collected from the pad and managed as IDW. As necessary a decontamination pad may be required to be constructed at the drill site within the secured fence and lockable gate. Decontamination activities conducted during this investigation will follow procedures outlined in Tetra Tech SOP SA-7.1 Decontamination of Field Equipment and Management of Investigation Derived Waste (Tetra Tech, 2016).

7.0 SITE SURVEY

The location of the newly installed recovery wells will be surveyed by a New York State licensed surveyor.

8.0 REPORTING

8.1 Field Documentation

Field documentation required to support this project will consist of the following items:

- Field notebook.
- Boring log for each boring.
- Groundwater and soil sample log sheets.
- Chain of custody forms documenting shipment of sample to a fixed based analytical laboratory.
- Well completion form for each well.
- Well development record.
- Survey map identifying newly installed recovery well.
- Analytical data summary.

8.2 Recovery Well Installation Report

A well installation report will be developed summarizing field activities and documenting installation of RW8 and RW9. Figures and tables will be used to present well construction data and development records. The report will include log sheets documenting recovery well drilling, well construction details and development logs. The Navy will provide reports to the NYSDEC for review and concurrence.

9.0 REFERENCES

Office of Solid Waste and Emergency Response (OSWER), 1992. Guide to Management of Investigation-Derived Wastes, April.

Tetra Tech, 2016. Standard Operating Procedure SA-7.1 Decontamination of Field Equipment and Management of Investigation Derived Waste, July.

Tetra Tech, 2020. CERLCA Letter Work Plan, Initial Pre-Design Investigation for the Phase III Southern Plume Intercept System, NWIRP Bethpage, August.

FIGURES

NAVFAC

GENERAL LOCATION MAP
NWIRP BETHPAGE, NEW YORK

CTO	N62470-16-D-9008 WE13
DRAWN BY	DATE
MC	08/15/19
CHECKED BY	DATE
EW	08/15/19
FIGURE NUMBER	
1	

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NWIRP
Bethpage

Northrop
Grumman

State Hwy 135

N

Hicksville Rd

Hempstead Tpke

Hempstead Tpke

State Hwy 135

Hicksville Rd

Groundwater
Flow

VPB-153

RE117D1

Southern State Pkwy

VPB-RW11

VPB-RW10

Southern State Pkwy

VPB-RW08

VPB-RW09

1,500 0 1,500 Feet

Legend

- Groundwater Monitoring Well
- Vertical Profile Boring
- Groundwater Flow Direction
- 1997 NWIRP Bethpage Property
- 1997 Northrop Grumman Property
- 5 to 100 µg/L TCE
- >100 to 1,000 µg/L TCE
- >1,000 µg/L TCE

2016 NYGIS Clearinghouse Aerial Imagery

P:\GIS_files\Bethpage\MAP DOCS\MXD\BP_OU2_2018\BP_hotspots_RW08_09_10_11.mxd

NAVFAC

VPB-RW08, VPB-RW09, VPB-RW10, AND VPB-RW11 BORING LOCATIONS

NWIRP BETHPAGE, NEW YORK

CTO	112G08005-WE13
DRAWN BY	KB
DATE	—
CHECKED BY	—
DATE	08/06/20
FIGURE NUMBER	2

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VPBRW-8, MONITORING WELLS MW01S, MW01D1, MW01D2, MW01D3 AND RECOVERY WELL RW8
SITE LAYOUT
TWIN LANE NORTH - WANTAGH
NWIRP BETHPAGE, NEW YORK

NAVFAC Naval Facilities Engineering Systems Command

DRAWN BY	DATE	CTO
VV	12/08/21	WE13
CHECKED BY	DATE	FIGURE NUMBER
EW	12/08/21	3

VPBRW-9, PROPOSED MONITORING WELLS MW01S, MW01D1, MW01D2, MW01D3 AND RECOVERY WELL RW-9

SITE LAYOUT

ALKEN AVENUE - SEAFORD

NWIRP BETHPAGE, NEW YORK

NAVFAC Naval Facilities Engineering Systems Command

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VV	12/08/21	WE13
CHECKED BY	DATE	FIGURE NUMBER
EW	12/08/21	4

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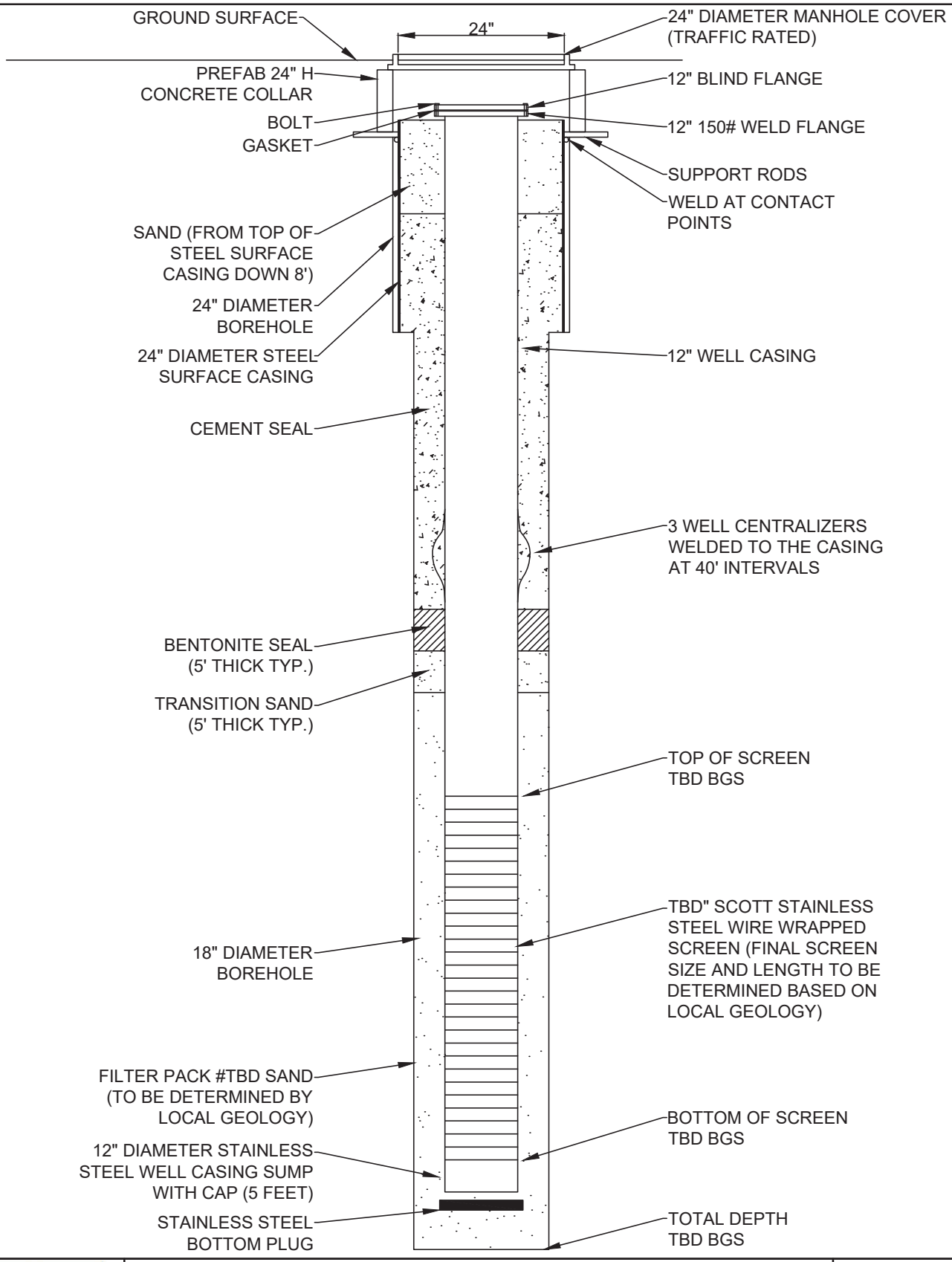
ATTACHMENT 1
RECOVERY WELL CONSTRUCTION DETAIL (TYPICAL)

S:\Jordan\CADD\Projects\Bethpage\Drawings\Monitoring Well Detail.dwg MKB 5/13/20



NAVFAC

TYPICAL RECOVERY WELL CONSTRUCTION DETAIL

SCALE	
N.T.S.	
FILE	
REV	DATE
0	5/13/20
FIGURE NUMBER	
FIGURE 4	