AUTHORIZATION TO DISCHARGE UNDER
THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Clean Water Act as amended, 33 U.S.C. §§ 1251 et seq. (the "CWA"),

Boston Ship Repair

is authorized to discharge from a facility located at

Boston Ship Repair
32A Drydock Avenue
Boston, MA 02210

to receiving water named

Boston Inner Harbor
Boston Harbor Watershed

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This Permit shall become effective on [DATE].[1]

This Permit expires at midnight on [DATE].

This Permit supersedes the Permit issued on November 18, 2013.

This Permit consists of this **cover page**, **Part I**, **Attachment A** (Marine Acute Toxicity Test Procedure and Protocol, July 2012) and **Part II** (NPDES Part II Standard Conditions, April 2018).

Signed this day of

_____
Ken Moraff, Director
Water Division
Environmental Protection Agency
Region 1
Boston, MA

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[1] Pursuant to 40 Code of Federal Regulations (CFR) § 124.15(b)(3), if no comments requesting a change to the Draft Permit are received, the Permit will become effective upon the date of signature. Procedures for appealing EPA's Final Permit decision may be found at 40 CFR § 124.19.

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date and lasting through the expiration date, the Permittee is authorized to discharge stormwater, groundwater infiltration, and seawater through **Outfall Serial Number 002** to Boston Inner Harbor. The discharge shall be limited and monitored as specified below; the receiving water shall be monitored as specified below.

Effluent Characteristic	**Effluent Limitations**		**Monitoring Requirements[1,2,3]**	
	Average Monthly	**Maximum Daily**	**Measurement Frequency[4]**	**Sample Type[5]**
Total Effluent Flow[6]	Report MGD	8.06 MGD	Continuous	Meter
pH[7]	6.5 - 8.5 S.U.		1/week	Grab
Total Suspended Solids (TSS)	Report mg/L	Report mg/L	1/week	Grab
Oil and Grease	---	Report mg/L	1/month	Grab
Fecal Coliform	---	Report MPN / 100 mL	1/quarter	Grab
Enterococcus	---	Report colonies / 100 mL	1/quarter	Grab
Total Copper	---	376 µg/L	2/month	Grab
Whole Effluent Toxicity (WET) Testing[8,9]				
LC_{50}	---	Report %	2/year	Composite
Ammonia Nitrogen	---	Report mg/L	2/year	Composite
Total Cadmium	---	Report µg/L	2/year	Composite
Total Copper	---	Report µg/L	2/year	Composite
Total Nickel	---	Report µg/L	2/year	Composite
Total Lead	---	Report µg/L	2/year	Composite
Total Zinc	---	Report µg/L	2/year	Composite

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Ambient Characteristic[10]	Reporting Requirements		Monitoring Requirements[1,2,3]	
	Average Monthly	Maximum Daily	Measurement Frequency[4]	Sample Type[5]
Salinity	---	Report g/kg	2/year	Grab
Ammonia Nitrogen	---	Report mg/L	2/year	Grab
Total Cadmium	---	Report µg/L	2/year	Grab
Total Copper	---	Report µg/L	2/year	Grab
Total Nickel	---	Report µg/L	2/year	Grab
Total Lead	---	Report µg/L	2/year	Grab
Total Zinc	---	Report µg/L	2/year	Grab
pH[11]	---	Report S.U.	2/year	Grab
Temperature[11]	---	Report °C	2/year	Grab

Footnotes:

1. Effluent samples shall yield data representative of the discharge. A routine sampling program shall be developed in which samples are taken prior to discharge to Boston Harbor and prior to co-mingling with any other wastestream. The current sampling location is at the piping leaving the pump house leading towards the Outfall 001 tunnel. Changes in sampling location must be approved in writing by the Environmental Protection Agency Region 1 (EPA). The Permittee shall report the results to EPA and the State of any additional testing above that required herein, if testing is done in accordance with 40 CFR Part 136.

2. In accordance with 40 CFR § 122.44(i)(1)(iv), the Permittee shall monitor according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR Part 136 or required under 40 CFR chapter I, subchapter N or O, for the analysis of pollutants or pollutant parameters (except WET). A method is "sufficiently sensitive" when: 1) The method minimum level (ML) is at or below the level of the effluent limitation established in the permit for the measured pollutant or pollutant parameter; or 2) The method has the lowest ML of the analytical methods approved under 40 CFR Part 136 or required under 40 CFR chapter I, subchapter N or O for the measured pollutant or pollutant parameter. The term "minimum level" refers to either the sample concentration equivalent to the lowest calibration point in a method or a multiple of the method detection limit (MDL), whichever is higher. Minimum levels may be obtained in several ways: They may be published in a method; they may be based on the lowest acceptable calibration point used by a laboratory; or they may be calculated by multiplying the MDL in a method, or the MDL determined by a laboratory, by a factor.

3. When a parameter is not detected above the ML, the Permittee must report the data qualifier signifying less than the ML for that parameter (e.g., < 50 µg/L, if the ML for a parameter is

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50 µg/L). For calculating and reporting the average monthly concentration when one or more values are not detected, assign a value of zero to all non-detects and report the average of all the results. The number of exceedances shall be enumerated for each parameter in the field provided on every Discharge Monitoring Report (DMR).

4. Measurement frequency of continuous is defined as the recording of the entire record of effluent flow. Measurement frequency of 1/week is defined as the sampling of one discharge event in each seven-day calendar week. Measurement frequency of 1/month is defined as the sampling of one discharge event in each calendar month; 2/month corresponds to monitoring of a discharge event in two separate weeks of each calendar month. Measurement frequency of 1/quarter is defined as the sampling of one discharge event in each calendar quarter. Measurement frequency of 2/year is defined as the sampling of one discharge event during the first two quarters of the calendar year and one discharge event during the second two quarters. Calendar quarters are defined as January through March, inclusive, April through June, inclusive, July through September, inclusive and October through December, inclusive. If no sample is collected during the measurement frequencies defined above (e.g. a discharge did not occur), the Permittee must report an appropriate No Data Indicator Code.

5. Each composite sample will consist of at least eight grab samples taken during one consecutive 24-hour period, either collected at equal intervals and combined proportional to flow or continuously collected proportionally to flow.

6. Total Effluent Flow shall be reported in million gallons per day (MGD) and represent the total flow discharged for that calendar month, recording using a flow meter.

7. The pH shall be within the specified range at all times. The minimum and maximum pH sample measurement values for the month shall be reported in standard units (S.U.).

8. The Permittee shall conduct acute toxicity tests (LC_{50}) 2/year in accordance with test procedures and protocols specified in **Attachment A** of this permit. LC_{50} is defined in Part II.E. of this permit. The Permittee shall test the mysid shrimp (*Americamysis bahia*) and inland silverside (*Menidia beryllina*). The complete report for each toxicity test shall be submitted as an attachment to the DMR submittal that includes the results for that toxicity test. Sampling for the first WET test shall be taken during the first 2 calendar quarters and be reported on the June DMR. Sampling for the second WET test sample shall be taken during the last 2 calendar quarters and reported on the December DMR.

9. For Part I.A.1., Whole Effluent Toxicity Testing, the Permittee shall conduct the analyses specified in **Attachment A**, Part VI. CHEMICAL ANALYSIS for the effluent sample. If toxicity test(s) using the receiving water as diluent show the receiving water to be toxic or unreliable, the Permittee shall follow procedures outlined in **Attachment A**, Section IV., DILUTION WATER. Even where alternate dilution water has been used, the results of the receiving water control (0% effluent) analyses must be reported. Minimum levels and test methods are specified in **Attachment A**, Part VI. CHEMICAL ANALYSIS.

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10. For Part I.A.1., Ambient Characteristic, the Permittee shall conduct the analyses specified in **Attachment A**, Part VI. CHEMICAL ANALYSIS for the receiving water sample collected as part of the WET testing requirements. Such samples shall be taken from the receiving water at a point immediately upstream of the permitted discharge's zone of influence at a reasonably accessible location, as specified in **Attachment A**. Minimum levels and test methods are specified in **Attachment A**, Part VI. CHEMICAL ANALYSIS.

11. A pH and temperature measurement shall be taken of each receiving water sample at the time of collection and the results reported on the appropriate DMR. These pH and temperature measurements are independent from any pH and temperature measurements required by the WET testing protocols.

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Part I.A. continued.

2. The discharge shall not cause a violation of the water quality standards of the receiving water.

3. The discharge shall be free from pollutants in concentrations or combinations that, in the receiving water, settle to form objectionable deposits; float as debris, scum or other matter to form nuisances; produce objectionable odor, color, taste or turbidity; or produce undesirable or nuisance species of aquatic life.

4. The discharge shall be free from pollutants in concentrations or combinations that adversely affect the physical, chemical, or biological nature of the bottom.

5. The discharge shall not result in pollutants in concentrations or combinations in the receiving water that are toxic to humans, aquatic life or wildlife.

6. The discharge shall be free from floating, suspended and settleable solids in concentrations or combinations that would impair any use assigned to the receiving water.

7. The discharge shall be free from oil, grease and petrochemicals that produce a visible film on the surface of the water, impart an oily taste to the water or an oily or other undesirable taste to the edible portions of aquatic life, coat the banks or bottom of the water course, or are deleterious or become toxic to aquatic life.

8. All existing manufacturing, commercial, mining, and silvicultural dischargers must notify EPA as soon as they know or have reason to believe (40 CFR § 122.42):

   a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

      (1) 100 micrograms per liter (µg/L);
      (2) 200 µg/L for acrolein and acrylonitrile; 500 µg/L for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (mg/L) for antimony;
      (3) Five times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR § 122.21(g)(7); or
      (4) Any other notification level established by EPA in accordance with 40 CFR § 122.44(f) and State regulations.

   b. That any activity has occurred or will occur which would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

      (1) 500 µg/L;
      (2) One mg/L for antimony;

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(3) 10 times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR § 122.21(g)(7); or
(4) Any other notification level established by EPA in accordance with 40 CFR § 122.44(f) and State regulations.

c. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

B. UNAUTHORIZED DISCHARGES

1. This permit authorizes discharges only from the outfall(s) listed in Part I.A.1, in accordance with the terms and conditions of this permit. Discharges of wastewater from any other point sources are not authorized by this permit and shall be reported in accordance with Part II.D.1.e.(1) of the Standard Conditions of this permit (24-hour reporting).

2. The discharge of any vessel waste or solid waste to the receiving water is prohibited.

C. Cooling Water Intake Structure (CWIS-Fire Main Pumps) Best Technology Available

1. Cease or reduce the intake of cooling water whenever the withdrawal of source water is not necessary.

2. Maintain a physical screening or exclusion technology with a maximum CWIS through-screen velocity of 0.5 feet per second (fps).

3. Any change in the location, design, or capacity of the fire main pumps must be approved in advance in writing by EPA and MassDEP and may require a permit modification. The Permittee shall notify EPA and MassDEP of any such proposed change.

4. Notify EPA and MassDEP if fish mortalities are observed in the vicinity of the fire main pumps that are believed to be associated with the use of the pumps.

5. In its Permit renewal application, the Permittee shall provide the following information related to its use of cooling water:

   a. The range of cooling water flows supplied to all vessels serviced at the site since permit issuance. This can be estimated.
   b. The number of days that cooling water was used since permit issuance.
   c. Any changes or modifications to the fire main system.
   d. A characterization of the habitat provided for aquatic life by the source water body in the vicinity of the CWIS during the seasons when the CWIS may be in use. Include a characterization of the following: the abundance of fish eggs, larvae, juveniles and adults; the density of these life stages; and the potential for entrainment of fish eggs and larvae in the CWIS intake water. Include information such as the fish species expected in the waterbody, stocking programs affecting their presence, and the quality of the local

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spawning and nursery habitat. This characterization may be based on sampling, water body characteristics, CWIS features, available documentation of the presence of fish species (or the absence of fish species) in the surface water body, and/or other information. Fully cite any reports, documents, or personal observations used as references for this characterization, and, if available, provide a copy of such references.

D. SPECIAL CONDITIONS

1. Best Management Practices (BMPs)

The Permittee shall design, install, and implement control measures to minimize the discharge of pollutants from the operations at the Facility to the receiving water. At a minimum, the Permittee must implement control measures including but not limited to structural controls (e.g., treatment systems, containment areas, holding tanks) and non-structural controls (e.g., operational procedures and operator training).

a. The Permittee must comply with the following limitations described in Part 2.1.2 of EPA's 2015 Multi-Sector General Permit (MSGP):

(1) Minimize exposure of processing and material storage areas to stormwater discharges;
(2) Design good housekeeping measures to maintain areas that are potential sources of pollutants;
(3) Implement preventative maintenance programs to avoid leaks, spills, and other releases of pollutants to stormwater that is discharged to receiving waters;
(4) Implement spill prevention and response procedures to ensure effective response to spills and leaks if or when they occur. The Permittee shall report immediately the appearance of any size sheen attributable to the discharge from the Terminal to the appropriate U.S. Coast Guard Officer in accordance with Section 311 of the Clean Water Act (CWA);
(5) Design of erosion and sediment controls to stabilize exposed areas and contain runoff using structural and/or non-structural control measures to minimize onsite erosion and sedimentation, and the resulting discharge of pollutants;
(6) Utilize runoff management practices to divert, infiltrate, reuse, contain, or otherwise reduce stormwater runoff;
(7) Develop proper handling procedures for salt or materials containing chlorides that are used for snow and ice control;
(8) Conduct employee training to ensure personnel understand the requirements of this permit;
(9) Evaluate for the presence of non-stormwater discharges. Any non-stormwater discharges not explicitly authorized in the Draft Permit or covered by another NPDES permit must be eliminated.
(10) Minimize dust generation and vehicle tracking of industrial materials;

b. In addition to the general limitations described above, the Permittee must design, install, and implement the following BMPs:

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(1) The Permittee shall comply with the inspection requirements in Part 3.1 and 3.2 of the 2015 MSGP and the corrective action requirements in Part 4.1 through 4.5 of the 2015 MSGP.[2] For the purposes of this permit, the following must be included: areas exposed to stormwater, potential pollutant sources, discharge points, and control measures.
(2) The Permittee shall comply with the control measure requirements in Part 2.1 and 2.1.1 of the 2015 MSGP in order to identify pollutant sources and select, design, install and maintain the pollution control technology necessary to meet the effluent limitations in the permit that ensure dilution is not used as a form of treatment;
(3) The Permittee shall comply with the additional technology-based effluent limits for the Ship and Boat Building and Repair Yards in Part 8, Subpart R of the MSGP; including the six Good Housekeeping Measures (8.R.3.1), Employee Training (8.R.3.2), and Preventative Maintenance (8.R.3.4); and
(4) The Permittee shall document monitoring requirements, sample analysis procedures, a schedule for the review of sample results and data validation and reporting processes.

2. Stormwater Pollution Prevention Plan (SWPPP)

The Permittee shall continue to implement and modify, as needed, by a Stormwater Pollution Prevention Plan (SWPPP) to document the selection, design and installation of control measures, including BMPs, selected to meet the effluent limitations required in this permit, and, consistent with Parts 2.1.2, 8.R.4 of the 2015 MSGP, minimize the discharge of pollutants from the operations at the Facility to the receiving water. The SWPPP shall be a written document and consistent with the terms of this Permit.

a. The SWPPP shall be developed and signed consistent with the signatory requirements in Part II.D.2 of this Permit within 90 days after the effective date of this Permit.

b. The SWPPP shall be consistent with the general provisions for SWPPPs included in Part 5 of EPA's MSGP. The SWPPP shall be prepared in accordance with good engineering practices and manufacturer's specifications. The SWPPP must identify potential sources of pollution that may reasonably be expected to affect the quality of the stormwater discharges, and document the implementation of non-numeric technology based effluent limitations in Part I.C.1 that will be used to reduce the pollutants and assure compliance with this Permit, including any corrective action taken when non-compliance occurs. Specifically, the SWPPP shall contain the elements listed in Parts 5.2.1 through 5.2.5 of the 2015 MSGP as listed below:

(1) Stormwater pollution prevention team;
(2) Site description;
(3) Drainage area site map;

2 Where the MSGP refers to limitations, conditions or benchmarks, including the SWPPP, for the purposes of this Permit, these shall refer to the limitations and conditions in this Permit.

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(4) Summary of potential pollutant sources;
(5) Description of all stormwater control measures; and
(6) Schedules and procedures pertaining to implementation of stormwater control measures, inspections and assessments, and monitoring.

c. The Permittee shall amend and update the SWPPP within 14 days of any changes at the facility affecting the SWPPP. Changes that may affect the SWPPP include, but are not limited to: a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to the waters of the United States; a release of a reportable quantity of pollutants as described in 40 CFR § 302; a determination by the Permittee or EPA that the SWPPP appears to be ineffective in achieving the general objective of controlling pollutants in stormwater discharges associated with industrial activity; and revisions or improvements are made to the stormwater management program based on new information and experiences with wet weather events. Any amended or new versions of the SWPPP shall be re-certified by the Permittee. Such re-certifications also shall be signed in accordance with the requirements identified in Part II.D.2 of this Permit.

d. The Permittee shall certify at least annually that the previous year's required inspections, corrective actions, control measures, and training activities were conducted, results were recorded, and records were maintained, as described. If the facility is not in compliance with any limitations and/or BMPs, the annual certification shall state the non-compliance and the remedies that are or will be undertaken. Such annual certifications also shall be signed in accordance with the requirements identified in Part II.D.2 of this Permit. The Permittee shall keep a copy of the current SWPPP and all SWPPP certifications (i.e., the initial certification, recertifications, and annual certifications) signed during the effective period of this Permit at the Facility and shall make them available for inspection by EPA. All documentation of SWPPP activities shall be kept at the Facility for at least three years and provided to EPA upon request.

3. The Permittee may request a reduction in toxicity testing requirements after submitting a minimum of twelve consecutive WET testing results, all of which must be valid tests and demonstrate no effluent toxicity (i.e., $LC_{50} \geq 100\%$). Until written notice is received from EPA indicating that the WET testing requirements have been changed, the Permittee is required to continue the WET testing specified in this permit.

4. Discharges of Chemicals and Additives

The discharge of any chemical or additive, including chemical substitution that was not reported in the application submitted to EPA or provided through a subsequent written notification submitted to EPA is prohibited. Upon the effective date of this permit, chemicals and/or additives that have been disclosed to EPA may be discharged up to the frequency and level disclosed, provided that such discharge does not violate §§ 307 or 311 of the CWA or applicable State water quality standards. Discharges of a new chemical or additive are authorized under this permit 30 days following written notification to EPA unless otherwise notified by EPA. To request authorization to discharge a new chemical or additive, the Permittee must submit a

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written notification to EPA in accordance with Part I.D.3 of this permit. The written notification must include the following information, at a minimum:

a. The following information for each chemical and/or additive that will be discharged:

   (1) Product name, chemical formula, general description, and manufacturer of the chemical/additive;
   (2) Purpose or use of the chemical/additive;
   (3) Safety Data Sheet (SDS), Chemical Abstracts Service (CAS) Registry number, and EPA registration number, if applicable, for each chemical/additive;
   (4) The frequency (e.g., daily), magnitude (i.e., maximum application concentration), duration (e.g., hours), and method of application for the chemical/additive;
   (5) The maximum discharge concentration; and
   (6) The vendor's reported aquatic toxicity, if available (i.e., NOAEL and/or LC_{50} in percent for aquatic organism(s)).

b. Written rationale that demonstrates that the discharge of such chemicals and/or additives as proposed will not: 1) will not add any pollutants in concentrations that exceed any permit effluent limitation; and 2) will not add any pollutants that would justify the application of permit conditions different from, or in addition to those currently in this permit.

E. REPORTING REQUIREMENTS

Unless otherwise specified in this Permit, the Permittee shall submit reports, requests, and information and provide notices in the manner described in this section.

1. Submittal of DMRs Using NetDMR

   The Permittee shall continue to submit its monthly monitoring data in discharge monitoring reports (DMRs) to EPA and the State electronically using NetDMR no later than the 15th day of the month following the monitoring period. When the Permittee submits DMRs using NetDMR, it is not required to submit hard copies of DMRs to EPA or the State. NetDMR is accessible through EPA's Central Data Exchange at https://cdx.epa.gov/.

2. Submittal of Reports as NetDMR Attachments

   Unless otherwise specified in this Permit, the Permittee shall electronically submit all reports to EPA as NetDMR attachments rather than as hard copies. *See* Part I.D.5. for more information on State reporting. Because the due dates for reports described in this Permit may not coincide with the due date for submitting DMRs (which is no later than the 15th day of the month following the monitoring period), a report submitted electronically as a NetDMR attachment shall be considered timely if it is electronically submitted to EPA using NetDMR with the next DMR due following the particular report due date specified in this Permit.

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3. Submittal of Requests and Reports to EPA Water Division (WD)

   a. The following requests, reports, and information described in this Permit shall be submitted to the NPDES Applications Coordinator in EPA WD:

      (1) Transfer of Permit notice;
      (2) Request for changes in sampling location;
      (3) SWPPP reports and certifications, if required;
      (4) Request for change in WET testing;
      (5) Report on unacceptable dilution water/request for alternative dilution water for WET testing; and
      (6) Request to discharge new chemicals or additives.

   b. These reports, information, and requests shall be submitted to EPA WD electronically at R1NPDESReporting@epa.gov or by hard copy mail to the following address:

U.S. Environmental Protection Agency
Water Division
NPDES Applications Coordinator
5 Post Office Square - Suite 100 (06-03)
Boston, MA 02109-3912

4. Submittal of Reports in Hard Copy Form

   a. The following notifications and reports shall be signed and dated originals, submitted in hard copy, with a cover letter describing the submission:

      (1) Prior to December 21, 2020, written notifications required under Part II. Starting on December 21, 2020, such notifications must be done electronically using EPA's NPDES Electronic Reporting Tool ("NeT"), or another approved EPA system, which will be accessible through EPA's Central Data Exchange at https://cdx.epa.gov/.

   b. This information shall be submitted to EPA ECAD at the following address:

U.S. Environmental Protection Agency
Enforcement and Compliance Assurance Division
Water Compliance Section
5 Post Office Square, Suite 100 (04-SMR)
Boston, MA 02109-3912

5. State Reporting

Duplicate signed copies of all WET test reports shall be submitted to the Massachusetts Department of Environmental Protection, Division of Watershed Management, at the following address:

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Massachusetts Department of Environmental Protection
Bureau of Water Resources
Division of Watershed Management
8 New Bond Street
Worcester, Massachusetts 01606

6. Verbal Reports and Verbal Notifications

   a. Any verbal reports or verbal notifications, if required in Parts I and/or II of this Permit, shall be made to both EPA and to the State. This includes verbal reports and notifications which require reporting within 24 hours (e.g., Part II.B.4.c. (2), Part II.B.5.c. (3), and Part II.D.1.e.).

   b. Verbal reports and verbal notifications shall be made to EPA's Enforcement and Compliance Assurance Division at:

617-918-1510

   c. Verbal reports and verbal notifications shall be made to the State's Emergency Response at:

888-304-1133

F. STATE 401 CERTIFICATION CONDITIONS

1. This Permit is in the process of receiving state water quality certification issued by the State under § 401(a) of the CWA and 40 CFR § 124.53. EPA will incorporate by reference all State water quality certification requirements (if any) into the Final Permit.

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MARINE ACUTE

TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall conduct acceptable acute toxicity tests in accordance with the appropriate test protocols described below:

- **2007.0 - Mysid Shrimp (Americamysis bahia) definitive 48 hour test.**
- **2006.0 - Inland Silverside (Menidia beryllina) definitive 48 hour test.**

Acute toxicity data shall be reported as outlined in Section VIII.

II. METHODS

The permittee shall use the most recent 40 CFR Part 136 methods. Whole Effluent Toxicity (WET) Test Methods and guidance may be found at:

http://water.epa.gov/scitech/methods/cwa/wet/index.cfm#methods

The permittee shall also meet the sampling, analysis and reporting requirements included in this protocol. This protocol defines more specific requirements while still being consistent with the Part 136 methods. If, due to modifications of Part 136, there are conflicting requirements between the Part 136 method and this protocol, the permittee shall comply with the requirements of the Part 136 method.

III. SAMPLE COLLECTION

A discharge and receiving water sample shall be collected. The receiving water control sample must be collected immediately upstream of the permitted discharge's zone of influence. The acceptable holding times until initial use of a sample are 24 and 36 hours for on-site and off-site testing, respectively. A written waiver is required from the regulating authority for any holding time extension. Sampling guidance dictates that, where appropriate, aliquots for the analysis required in this protocol shall be split from the samples, containerized and immediately preserved, or analyzed as per 40 CFR Part 136. EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection. Testing for the presence of total residual chlorine[1] (TRC) must be analyzed immediately or as soon as possible, for all effluent samples, prior to WET testing. TRC analysis may be performed on-site or by the toxicity testing laboratory and the samples must be dechlorinated, as necessary, using sodium thiosulfate

[1] For this protocol, total residual chlorine is synonymous with total residual oxidants.

prior to sample use for toxicity testing. If performed on site the results should be included on the chain of custody (COC) presented to WET laboratory.

Standard Methods for the Examination of Water and Wastewater describes dechlorination of samples (APHA, 1992). Dechlorination can be achieved using a ratio of 6.7 mg/L anhydrous sodium thiosulfate to reduce 1 mg/L chlorine. If dechlorination is necessary, a thiosulfate control consisting of the maximum concentration of thiosulfate used to dechlorinate the sample in the toxicity test control water must also be run in the WET test.

All samples submitted for chemical and physical analyses will be analyzed according to Section VI of this protocol. Grab samples must be used for pH, temperature, and total residual chlorine (as per 40 CFR Part 122.21).

All samples held for use beyond the day of sampling shall be refrigerated and maintained at a temperature range of 0-6° C.

IV. DILUTION WATER

Samples of receiving water must be collected from a reasonably accessible location in the receiving water body immediately upstream of the permitted discharge's zone of influence. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. EPA strongly urges that screening for toxicity be performed prior to the set up of a full, definitive toxicity test any time there is a question about the test dilution water's ability to achieve test acceptability criteria (TAC) as indicated in Section V of this protocol. The test dilution water control response will be used in the statistical analysis of the toxicity test data. All other control(s) required to be run in the test will be reported as specified in the Discharge Monitoring Report (DMR) Instructions, Attachment F, page 2,Test Results & Permit Limits.

The test dilution water must be used to determine whether the test met the applicable TAC. When receiving water is used for test dilution, an additional control made up of standard laboratory water (0% effluent) is required. This control will be used to verify the health of the test organisms and evaluate to what extent, if any, the receiving water itself is responsible for any toxic response observed.

If dechlorination of a sample by the toxicity testing laboratory is necessary a "sodium thiosulfate" control, representing the concentration of sodium thiosulfate used to adequately dechlorinate the sample prior to toxicity testing, must be included in the test.

If the use of alternate dilution water (ADW) is authorized, in addition to the ADW test control, the testing laboratory must, for the purpose of monitoring the receiving water, also run a receiving water control.

If the receiving water is found to be, or suspected to be toxic or unreliable, ADW of known quality with hardness similar to that of the receiving water may be substituted. Substitution is

species specific meaning that the decision to use ADW is made for each species and is based on the toxic response of that particular species. Substitution to an ADW is authorized in two cases. The first case is when repeating a test due to toxicity in the site dilution water requires an **immediate decision** for ADW use by the permittee and toxicity testing laboratory. The second is when two of the most recent documented incidents of unacceptable site dilution water toxicity require ADW use in future WET testing.

For the second case, written notification from the permittee requesting ADW use **and** written authorization from the permit issuing agency(s) is required **prior to** switching to a long-term use of ADW for the duration of the permit.

Written requests for use of ADW must be mailed with supporting documentation to the following addresses:

Director
Office of Ecosystem Protection (CAA)
U.S. Environmental Protection Agency, Region 1
Five Post Office Square, Suite 100
Mail Code OEP06-5
Boston, MA 02109-3912

and

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Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the most current annual DMR instructions which can be found on the EPA Region 1 website at http://www.epa.gov/region1/enforcementandassistance/dmr.html for further important details on alternate dilution water substitution requests.

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

EPA Region 1 requires tests be performed using four replicates of each control and effluent concentration because the non-parametric statistical tests cannot be used with data from fewer replicates. The following tables summarize the accepted Americamysis and Menidia toxicity test conditions and test acceptability criteria:

EPA NEW ENGLAND EFFLUENT TOXICITY TEST CONDITIONS FOR THE MYSID, AMERICAMYSIS BAHIA 48 HOUR TEST[1]

1. Test type	48hr Static, non-renewal
2. Salinity	25ppt ± 10 percent for all dilutions by adding dry ocean salts
3. Temperature (^oC)	$20^oC \pm 1^oC$ or $25^oC \pm 1^oC$, temperature must not deviate by more than 3^oC during test
4. Light quality	Ambient laboratory illumination
5. Photoperiod	16 hour light, 8 hour dark
6. Test chamber size	250 ml (minimum)
7. Test solution volume	200 ml/replicate (minimum)
8. Age of test organisms	1-5 days, < 24 hours age range
9. No. Mysids per test chamber	10
10. No. of replicate test chambers per treatment	4
11. Total no. Mysids per test concentration	40
12. Feeding regime	Light feeding using concentrated Artemia naupli while holding prior to initiating the test
13. Aeration [2]	None
14. Dilution water	5-30 ppt, +/- 10%; Natural seawater, or deionized water mixed with artificial sea salts
15. Dilution factor	≥ 0.5
16. Number of dilutions [3]	5 plus a control. An additional dilution at the permitted effluent concentration (%

	effluent) is required if it is not included in the dilution series.
17. Effect measured	Mortality - no movement of body appendages on gentle prodding
18. Test acceptability	90% or greater survival of test organisms in control solution
19. Sampling requirements	For on-site tests, samples are used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples must be first used within 36 hours of collection.
20. Sample volume required	Minimum 1 liter for effluents and 2 liters for receiving waters

Footnotes:

[1] Adapted from EPA 821-R-02-012.

[2] If dissolved oxygen falls below 4.0 mg/L, aerate at rate of less than 100 bubbles/min. Routine D.O. checks are recommended.

[3] When receiving water is used for dilution, an additional control made up of standard laboratory dilution water (0% effluent) is required.

EPA NEW ENGLAND TOXICITY TEST CONDITIONS FOR THE INLAND SILVERSIDE, MENIDIA BERYLLINA 48 HOUR TEST[1]

1. Test Type	48 hr Static, non-renewal
2. Salinity	25 ppt ± 10 % by adding dry ocean salts
3. Temperature	20°C ± 1°C or 25°C ± 1°C, temperature must not deviate by more than 3°C during test
4. Light Quality	Ambient laboratory illumination
5. Photoperiod	16 hr light, 8 hr dark
6. Size of test vessel	250 mL (minimum)
7. Volume of test solution	200 mL/replicate (minimum)
8. Age of fish	9-14 days; 24 hr age range
9. No. fish per chamber	10 (not to exceed loading limits)
10. No. of replicate test vessels per treatment	4
11. Total no. organisms per concentration	40
12. Feeding regime	Light feeding using concentrated Artemia nauplii while holding prior to initiating the test
13. Aeration[2]	None
14. Dilution water	5-32 ppt, +/- 10% ; Natural seawater, or deionized water mixed with artificial sea salts.
15. Dilution factor	≥ 0.5
16. Number of dilutions[3]	5 plus a control. An additional dilution at the permitted concentration (% effluent) is required if it is not included in the dilution series.
17. Effect measured	Mortality-no movement on gentle prodding.

18. Test acceptability	90% or greater survival of test organisms in control solution.
19. Sampling requirements	For on-site tests, samples must be used within 24 hours of the time they are removed from the sampling device. Off-site test samples must be used within 36 hours of collection.
20. Sample volume required	Minimum 1 liter for effluents and 2 liters for receiving waters.

Footnotes:

[1] Adapted from EPA 821-R-02-012.

[2] If dissolved oxygen falls below 4.0 mg/L, aerate at rate of less than 100 bubbles/min. Routine D.O. checks recommended.

[3] When receiving water is used for dilution, an additional control made up of standard laboratory dilution water (0% effluent) is required.

V.1. Test Acceptability Criteria

If a test does not meet TAC the test must be repeated with fresh samples within 30 days of the initial test completion date.

V.2. Use of Reference Toxicity Testing

Reference toxicity test results and applicable control charts must be included in the toxicity testing report.

In general, if reference toxicity test results fall outside the control limits established by the laboratory for a specific test endpoint, a reason or reasons for this excursion must be evaluated, correction made and reference toxicity tests rerun as necessary as prescribed below.

If a test endpoint value exceeds the control limits at a frequency of more than one out of twenty then causes for the reference toxicity test failure must be examined and if problems are identified corrective action taken. The reference toxicity test must be repeated during the same month in which the exceedance occurred.

If two consecutive reference toxicity tests fall outside control limits, the possible cause(s) for the exceedance must be examined, corrective actions taken and a repeat of the reference toxicity test must take place immediately. Actions taken to resolve the problem must be reported.

V.2.a. Use of Concurrent Reference Toxicity Testing

In the case where concurrent reference toxicity testing is required due to a low frequency of testing with a particular method, if the reference toxicity test results fall slightly outside of laboratory established control limits, but the primary test met the TAC, the results of the primary test will be considered acceptable. However, if the results of the concurrent test fall well outside the established **upper** control limits i.e. ≥3 standard deviations for IC25s and LC50 values and ≥ two concentration intervals for NOECs or NOAECs, and even though the primary test meets TAC, the primary test will be considered unacceptable and must be repeated.

VI. CHEMICAL ANALYSIS

At the beginning of the static acute test, pH, salinity, and temperature must be measured at the beginning and end of each 24 hour period in each dilution and in the controls. The following chemical analyses shall be performed for each sampling event.

Parameter	Effluent	Diluent	Minimum Level for effluent[*1] (mg/L)
pH	x	x	---
Salinity	x	x	ppt(o/oo)
Total Residual Chlorine [*2]	x	x	0.02
Total Solids and Suspended Solids	x	x	---
Ammonia	x	x	0.1
Total Organic Carbon	x	x	0.5
Total Metals			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005

Superscript:

[*1] These are the minimum levels for effluent (fresh water) samples. Tests on diluents (marine waters) shall be conducted using the Part 136 methods that yield the lowest MLs.

[*2] Either of the following methods from the 18th Edition of the APHA Standard Methods for the Examination of Water and Wastewater must be used for these analyses:

-Method 4500-Cl E Low Level Amperometric Titration (the preferred method);
-Method 4500-CL G DPD Photometric Method.

VII. TOXICITY TEST DATA ANALYSIS

LC50 Median Lethal Concentration

An estimate of the concentration of effluent or toxicant that is lethal to 50% of the test organisms during the time prescribed by the test method.

Methods of Estimation:

- Probit Method
- Spearman-Karber
- Trimmed Spearman-Karber
- Graphical

See flow chart in Figure 6 on page 73 of EPA 821-R-02-012 for appropriate method to use on a given data set.

No Observed Acute Effect Level (NOAEL)

See flow chart in Figure 13 on page 87 of EPA 821-R-02-012.

VIII. TOXICITY TEST REPORTING

A report of results must include the following:

- Toxicity Test summary sheet(s) (Attachment F to the DMR Instructions) which includes:
    - Facility name
    - NPDES permit number
    - Outfall number
    - Sample type
    - Sampling method
    - Effluent TRC concentration
    - Dilution water used
    - Receiving water name and sampling location
    - Test type and species
    - Test start date
    - Effluent concentrations tested (%) and permit limit concentration
    - Applicable reference toxicity test date and whether acceptable or not
    - Age, age range and source of test organisms used for testing
    - Results of TAC review for all applicable controls
    - Permit limit and toxicity test results
    - Summary of any test sensitivity and concentration response evaluation that was conducted

Please note: The NPDES Permit Program Instructions for the Discharge Monitoring Report Forms (DMRs) are available on EPA's website at http://www.epa.gov/NE/enforcementandassistance/dmr.html

In addition to the summary sheets the report must include:

- A brief description of sample collection procedures;
- Chain of custody documentation including names of individuals collecting samples, times and dates of sample collection, sample locations, requested analysis and lab receipt with time and date received, lab receipt personnel and condition of samples upon receipt at the lab(s);
- Reference toxicity test control charts;
- All sample chemical/physical data generated, including minimum levels (MLs) and analytical methods used;
- All toxicity test raw data including daily ambient test conditions, toxicity test chemistry, sample dechlorination details as necessary, bench sheets and statistical analysis;
- A discussion of any deviations from test conditions; and
- Any further discussion of reported test results, statistical analysis and concentration-response relationship and test sensitivity review per species per endpoint.

NPDES PART II STANDARD CONDITIONS
(April 26, 2018)[1]

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[1] Updated July 17, 2018 to fix typographical errors.

A. GENERAL REQUIREMENTS

1. Duty to Comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA or Act) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

a. The Permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.

b. Penalties for Violations of Permit Conditions: The Director will adjust the civil and administrative penalties listed below in accordance with the Civil Monetary Penalty Inflation Adjustment Rule (83 Fed. Reg. 1190-1194 (January 10, 2018) and the 2015 amendments to the Federal Civil Penalties Inflation Adjustment Act of 1990, 28 U.S.C. § 2461 note. See Pub. L.114-74, Section 701 (Nov. 2, 2015)). These requirements help ensure that EPA penalties keep pace with inflation. Under the above-cited 2015 amendments to inflationary adjustment law, EPA must review its statutory civil penalties each year and adjust them as necessary.

(1) Criminal Penalties

(a) *Negligent Violations.* The CWA provides that any person who negligently violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to criminal penalties of not less than $2,500 nor more than $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation or by imprisonment of not more than 2 years, or both.

(b) *Knowing Violations.* The CWA provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both.

(c) *Knowing Endangerment.* The CWA provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 303, 306, 307, 308, 318, or 405 of the Act and who knows at that time that he or she is placing another person in imminent danger of death or serious bodily injury shall upon conviction be subject to a fine of not more than $250,000 or by imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing

endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in Section 309(c)(3)(B)(iii) of the Act, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

(d) *False Statement.* The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. The Act further provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

(2) *Civil Penalties*. The CWA provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed the maximum amounts authorized by Section 309(d) of the Act, the 2015 amendments to the Federal Civil Penalties Inflation Adjustment Act of 1990, 28 U.S.C. § 2461 note, and 40 C.F.R. Part 19. *See* Pub. L.114-74, Section 701 (Nov. 2, 2015); 83 Fed. Reg. 1190 (January 10, 2018).

(3) *Administrative Penalties*. The CWA provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty as follows:

(a) *Class I Penalty.* Not to exceed the maximum amounts authorized by Section 309(g)(2)(A) of the Act, the 2015 amendments to the Federal Civil Penalties Inflation Adjustment Act of 1990, 28 U.S.C. § 2461 note, and 40 C.F.R. Part 19. *See* Pub. L.114-74, Section 701 (Nov. 2, 2015); 83 Fed. Reg. 1190 (January 10, 2018).

(b) *Class II Penalty.* Not to exceed the maximum amounts authorized by Section 309(g)(2)(B) of the Act the 2015 amendments to the Federal Civil Penalties Inflation Adjustment Act of 1990, 28 U.S.C. § 2461 note, and 40 C.F.R. Part 19. *See* Pub. L.114-74, Section 701 (Nov. 2, 2015); 83 Fed. Reg. 1190 (January 10, 2018).

2. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit

condition.

3. Duty to Provide Information

The Permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

4. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the Permittee from responsibilities, liabilities or penalties to which the Permittee is or may be subject under Section 311 of the CWA, or Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

5. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege.

6. Confidentiality of Information

a. In accordance with 40 C.F.R. Part 2, any information submitted to EPA pursuant to these regulations may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions or, in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 C.F.R. Part 2 (Public Information).

b. Claims of confidentiality for the following information will be denied:

(1) The name and address of any permit applicant or Permittee;
(2) Permit applications, permits, and effluent data.

c. Information required by NPDES application forms provided by the Director under 40 C.F.R. § 122.21 may not be claimed confidential. This includes information submitted on the forms themselves and any attachments used to supply information required by the forms.

7. Duty to Reapply

If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a new permit. The Permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Director. (The Director shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

8. State Authorities

Nothing in Parts 122, 123, or 124 precludes more stringent State regulation of any activity

covered by the regulations in 40 C.F.R. Parts 122, 123, and 124, whether or not under an approved State program.

9. Other Laws

The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, or any infringement of State or local law or regulations.

B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Need to Halt or Reduce Not a Defense

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Duty to Mitigate

The Permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

4. Bypass

a. Definitions

(1) *Bypass* means the intentional diversion of waste streams from any portion of a treatment facility.

(2) *Severe property damage* means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. *Bypass not exceeding limitations.* The Permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs (c) and (d) of this Section.

c. Notice

(1) *Anticipated bypass*. If the Permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass. As of December 21, 2020 all notices submitted in compliance with this Section must be submitted electronically by the Permittee to the Director or initial recipient, as defined in 40 C.F.R. § 127.2(b), in compliance with this Section and 40 C.F.R. Part 3 (including, in all cases, Subpart D to Part 3), § 122.22, and 40 C.F.R. Part 127. Part 127 is not intended to undo existing requirements for electronic reporting. Prior to this date, and independent of Part 127, Permittees may be required to report electronically if specified by a particular permit or if required to do so by state law.

(2) *Unanticipated bypass*. The Permittee shall submit notice of an unanticipated bypass as required in paragraph D.1.e. of this part (24-hour notice). As of December 21, 2020 all notices submitted in compliance with this Section must be submitted electronically by the Permittee to the Director or initial recipient, as defined in 40 C.F.R. § 127.2(b), in compliance with this Section and 40 C.F.R. Part 3 (including, in all cases, Subpart D to Part 3), § 122.22, and 40 C.F.R. Part 127. Part 127 is not intended to undo existing requirements for electronic reporting. Prior to this date, and independent of Part 127, Permittees may be required to report electronically if specified by a particular permit or required to do so by law.

d. *Prohibition of bypass.*

(1) Bypass is prohibited, and the Director may take enforcement action against a Permittee for bypass, unless:

(a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and

(c) The Permittee submitted notices as required under paragraph 4.c of this Section.

(2) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph 4.d of this Section.

5. <u>Upset</u>

a. *Definition*. *Upset* means an exceptional incident in which there is an unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or

improper operation.

b. *Effect of an upset.* An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph B.5.c. of this Section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. *Conditions necessary for a demonstration of upset.* A Permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the Permittee can identify the cause(s) of the upset;
(2) The permitted facility was at the time being properly operated; and
(3) The Permittee submitted notice of the upset as required in paragraph D.1.e.2.b. (24-hour notice).
(4) The Permittee complied with any remedial measures required under B.3. above.

d. *Burden of proof.* In any enforcement proceeding the Permittee seeking to establish the occurrence of an upset has the burden of proof.

C. MONITORING REQUIREMENTS

1. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. Except for records of monitoring information required by this permit related to the Permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least 5 years (or longer as required by 40 C.F.R. § 503), the Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

c. Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;
(2) The individual(s) who performed the sampling or measurements;
(3) The date(s) analyses were performed;
(4) The individual(s) who performed the analyses;
(5) The analytical techniques or methods used; and
(6) The results of such analyses.

d. Monitoring must be conducted according to test procedures approved under 40 C.F.R. § 136 unless another method is required under 40 C.F.R. Subchapters N or O.

e. The Clean Water Act provides that any person who falsifies, tampers with, or

knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

2. Inspection and Entry

The Permittee shall allow the Director, or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

a. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

D. REPORTING REQUIREMENTS

1. Reporting Requirements

a. *Planned Changes*. The Permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 C.F.R. § 122.29(b); or

(2) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements at 40 C.F.R. § 122.42(a)(1).

(3) The alteration or addition results in a significant change in the Permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

b. *Anticipated noncompliance*. The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

c. *Transfers*. This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the Permittee and incorporate such other requirements as may be necessary under the Clean Water Act. *See* 40 C.F.R. § 122.61; in some cases, modification or revocation and reissuance is mandatory.

d. *Monitoring reports*. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(1) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the Director for reporting results of monitoring of sludge use or disposal practices. As of December 21, 2016 all reports and forms submitted in compliance with this Section must be submitted electronically by the Permittee to the Director or initial recipient, as defined in 40 C.F.R. § 127.2(b), in compliance with this Section and 40 C.F.R. Part 3 (including, in all cases, Subpart D to Part 3), § 122.22, and 40 C.F.R. Part 127. Part 127 is not intended to undo existing requirements for electronic reporting. Prior to this date, and independent of Part 127, Permittees may be required to report electronically if specified by a particular permit or if required to do so by State law.

(2) If the Permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 C.F.R. § 136, or another method required for an industry-specific waste stream under 40 C.F.R. Subchapters N or O, the results of such monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Director.

(3) Calculations for all limitations which require averaging or measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

e. *Twenty-four hour reporting.*

(1) The Permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Permittee becomes aware of the circumstances. A written report shall also be provided within 5 days of the time the Permittee becomes aware of the circumstances. The written report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. For noncompliance events related to combined sewer overflows, sanitary sewer overflows, or bypass events, these reports must include the data described above (with the exception of time of discovery) as well as the type of event (combined sewer overflows, sanitary sewer overflows, or bypass events), type of sewer overflow structure (e.g., manhole, combined sewer overflow outfall), discharge volumes untreated by the treatment works treating domestic sewage, types of human health and environmental impacts of the sewer overflow event, and whether the noncompliance was related to wet weather. As of December 21, 2020 all

reports related to combined sewer overflows, sanitary sewer overflows, or bypass events submitted in compliance with this section must be submitted electronically by the Permittee to the Director or initial recipient, as defined in 40 C.F.R. § 127.2(b), in compliance with this Section and 40 C.F.R. Part 3 (including, in all cases Subpart D to Part 3), § 122.22, and 40 C.F.R. Part 127. Part 127 is not intended to undo existing requirements for electronic reporting. Prior to this date, and independent of Part 127, Permittees may be required to electronically submit reports related to combined sewer overflows, sanitary sewer overflows, or bypass events under this section by a particular permit or if required to do so by state law. The Director may also require Permittees to electronically submit reports not related to combined sewer overflows, sanitary sewer overflows, or bypass events under this section.

(2) The following shall be included as information which must be reported within 24 hours under this paragraph.

(a) Any unanticipated bypass which exceeds any effluent limitation in the permit. *See* 40 C.F.R. § 122.41(g).
(b) Any upset which exceeds any effluent limitation in the permit.
(c) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in the permit to be reported within 24 hours. *See* 40 C.F.R. § 122.44(g).

(3) The Director may waive the written report on a case-by-case basis for reports under paragraph D.1.e. of this Section if the oral report has been received within 24 hours.

f. *Compliance Schedules.* Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

g. *Other noncompliance.* The Permittee shall report all instances of noncompliance not reported under paragraphs D.1.d., D.1.e., and D.1.f. of this Section, at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph D.1.e. of this Section. For noncompliance events related to combined sewer overflows, sanitary sewer overflows, or bypass events, these reports shall contain the information described in paragraph D.1.e. and the applicable required data in Appendix A to 40 C.F.R. Part 127. As of December 21, 2020 all reports related to combined sewer overflows, sanitary sewer overflows, or bypass events submitted in compliance with this section must be submitted electronically by the Permittee to the Director or initial recipient, as defined in 40 C.F.R. § 127.2(b), in compliance with this Section and 40 C.F.R. Part 3 (including, in all cases, Subpart D to Part 3), §122.22, and 40 C.F.R. Part 127. Part 127 is not intended to undo existing requirements for electronic reporting. Prior to this date, and independent of Part 127, Permittees may be required to electronically submit reports related to combined sewer overflows, sanitary sewer overflows, or bypass events under this section by a particular permit or if required to do so by state law. The Director may also require Permittees to electronically submit reports not related to combined sewer overflows, sanitary sewer overflows, or bypass events under this Section.

h. *Other information.* Where the Permittee becomes aware that it failed to submit any

relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

i. *Identification of the initial recipient for NPDES electronic reporting data*. The owner, operator, or the duly authorized representative of an NPDES-regulated entity is required to electronically submit the required NPDES information (as specified in Appendix A to 40 C.F.R. Part 127) to the appropriate initial recipient, as determined by EPA, and as defined in 40 C.F.R. § 127.2(b). EPA will identify and publish the list of initial recipients on its Web site and in the FEDERAL REGISTER, by state and by NPDES data group (see 40 C.F.R. § 127.2(c) of this Chapter). EPA will update and maintain this listing.

2. Signatory Requirement

a. All applications, reports, or information submitted to the Director shall be signed and certified. *See* 40 C.F.R. §122.22.

b. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

3. Availability of Reports.

Except for data determined to be confidential under paragraph A.6. above, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Director. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statements on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the CWA.

E. DEFINITIONS AND ABBREVIATIONS

1. General Definitions

For more definitions related to sludge use and disposal requirements, see EPA Region 1's NPDES Permit Sludge Compliance Guidance document (4 November 1999, modified to add regulatory definitions, April 2018).

Administrator means the Administrator of the United States Environmental Protection Agency, or an authorized representative.

Applicable standards and limitations means all, State, interstate, and federal standards and limitations to which a "discharge," a "sewage sludge use or disposal practice," or a related activity is subject under the CWA, including "effluent limitations," water quality standards, standards of performance, toxic effluent standards or prohibitions, "best management practices," pretreatment standards, and "standards for sewage sludge use or disposal" under Sections 301, 302, 303, 304, 306, 307, 308, 403 and 405 of the CWA.

Application means the EPA standard national forms for applying for a permit, including any additions, revisions, or modifications to the forms; or forms approved by EPA for use in

"approved States," including any approved modifications or revisions.

Approved program or *approved State* means a State or interstate program which has been approved or authorized by EPA under Part 123.

Average monthly discharge limitation means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

Average weekly discharge limitation means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week.

Best Management Practices ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Bypass see B.4.a.1 above.

C-NOEC or *"Chronic (Long-term Exposure Test) – No Observed Effect Concentration" means* the highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specified time of observation.

Class I sludge management facility is any publicly owned treatment works (POTW), as defined in 40 C.F.R. § 501.2, required to have an approved pretreatment program under 40 C.F.R. § 403.8 (a) (including any POTW located in a State that has elected to assume local program responsibilities pursuant to 40 C.F.R. § 403.10 (e)) and any treatment works treating domestic sewage, as defined in 40 C.F.R. § 122.2, classified as a Class I sludge management facility by the EPA Regional Administrator, or, in the case of approved State programs, the Regional Administrator in conjunction with the State Director, because of the potential for its sewage sludge use or disposal practice to affect public health and the environment adversely.

Contiguous zone means the entire zone established by the United States under Article 24 of the Convention on the Territorial Sea and the Contiguous Zone.

Continuous discharge means a "discharge" which occurs without interruption throughout the operating hours of the facility, except for infrequent shutdowns for maintenance, process changes, or similar activities.

CWA means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Public Law 92-500, as amended by Public Law 95-217, Public Law 95-576, Public Law 96-483and Public Law 97-117, 33 U.S.C. 1251 *et seq*.

CWA and regulations means the Clean Water Act (CWA) and applicable regulations promulgated thereunder. In the case of an approved State program, it includes State program requirements.

Daily Discharge means the "discharge of a pollutant" measured during a calendar day or any

other 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Direct Discharge means the "discharge of a pollutant."

Director means the Regional Administrator or an authorized representative. In the case of a permit also issued under Massachusetts' authority, it also refers to the Director of the Division of Watershed Management, Department of Environmental Protection, Commonwealth of Massachusetts.

Discharge

(a) When used without qualification, *discharge* means the "discharge of a pollutant."

(b) As used in the definitions for "interference" and "pass through," *discharge* means the introduction of pollutants into a POTW from any non-domestic source regulated under Section 307(b), (c) or (d) of the Act.

Discharge Monitoring Report ("DMR") means the EPA uniform national form, including any subsequent additions, revisions, or modifications for the reporting of self-monitoring results by Permittees. DMRs must be used by "approved States" as well as by EPA. EPA will supply DMRs to any approved State upon request. The EPA national forms may be modified to substitute the State Agency name, address, logo, and other similar information, as appropriate, in place of EPA's.

Discharge of a pollutant means:

(a) Any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source," or

(b) Any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation.

This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works. This term does not include an addition of pollutants by any "indirect discharger."

Effluent limitation means any restriction imposed by the Director on quantities, discharge rates, and concentrations of "pollutants" which are "discharged" from "point sources" into "waters of the United States," the waters of the "contiguous zone," or the ocean.

Effluent limitation guidelines means a regulation published by the Administrator under section 304(b) of CWA to adopt or revise "effluent limitations."

Environmental Protection Agency ("EPA") means the United States Environmental Protection

Agency.

Grab Sample means an individual sample collected in a period of less than 15 minutes.

Hazardous substance means any substance designated under 40 C.F.R. Part 116 pursuant to Section 311 of CWA.

Incineration is the combustion of organic matter and inorganic matter in sewage sludge by high temperatures in an enclosed device.

Indirect discharger means a nondomestic discharger introducing "pollutants" to a "publicly owned treatment works."

Interference means a discharge (see definition above) which, alone or in conjunction with a discharge or discharges from other sources, both:

(a) Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

(b) Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resources Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SDWA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile.

Land application is the spraying or spreading of sewage sludge onto the land surface; the injection of sewage sludge below the land surface; or the incorporation of sewage sludge into the soil so that the sewage sludge can either condition the soil or fertilize crops or vegetation grown in the soil.

Land application unit means an area where wastes are applied onto or incorporated into the soil surface (excluding manure spreading operations) for agricultural purposes or for treatment and disposal.

LC_{50} means the concentration of a sample that causes mortality of 50% of the test population at a specific time of observation. The LC_{50} = 100% is defined as a sample of undiluted effluent.

Maximum daily discharge limitation means the highest allowable "daily discharge."

Municipal solid waste landfill (MSWLF) unit means a discrete area of land or an excavation that receives household waste, and that is not a land application unit, surface impoundment, injection well, or waste pile, as those terms are defined under 40 C.F.R. § 257.2. A MSWLF unit also may receive other types of RCRA Subtitle D wastes, such as commercial solid waste, nonhazardous sludge, very small quantity generator waste and industrial solid waste. Such a landfill may be

publicly or privately owned. A MSWLF unit may be a new MSWLF unit, an existing MSWLF unit or a lateral expansion. A construction and demolition landfill that receives residential lead-based paint waste and does not receive any other household waste is not a MSWLF unit.

Municipality

(a) When used without qualification *municipality* means a city, town, borough, county, parish, district, association, or other public body created by or under State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of CWA.

(b) As related to sludge use and disposal, *municipality* means a city, town, borough, county, parish, district, association, or other public body (including an intermunicipal Agency of two or more of the foregoing entities) created by or under State law; an Indian tribe or an authorized Indian tribal organization having jurisdiction over sewage sludge management; or a designated and approved management Agency under Section 208 of the CWA, as amended. The definition includes a special district created under State law, such as a water district, sewer district, sanitary district, utility district, drainage district, or similar entity, or an integrated waste management facility as defined in Section 201 (e) of the CWA, as amended, that has as one of its principal responsibilities the treatment, transport, use or disposal of sewage sludge.

National Pollutant Discharge Elimination System means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318, and 405 of the CWA. The term includes an "approved program."

New Discharger means any building, structure, facility, or installation:

(a) From which there is or may be a "discharge of pollutants;"

(b) That did not commence the "discharge of pollutants" at a particular "site" prior to August 13, 1979;

(c) Which is not a "new source;" and

(d) Which has never received a finally effective NPDES permit for discharges at that "site."

This definition includes an "indirect discharger" which commences discharging into "waters of the United States" after August 13, 1979. It also includes any existing mobile point source (other than an offshore or coastal oil and gas exploratory drilling rig or a coastal oil and gas exploratory drilling rig or a coastal oil and gas exploratory drilling rig or a coastal oil and gas developmental drilling rig) such as a seafood processing rig, seafood processing vessel, or aggregate plant, that begins discharging at a "site" for which it does not have a permit; and any offshore or coastal mobile oil and gas exploratory drilling rig or coastal mobile oil and gas developmental drilling rig that commences the discharge of pollutants after August 13, 1979, at a "site" under EPA's permitting jurisdiction for which it is not covered by an individual or general permit and which is located in an area determined by the Director in the issuance of a final permit to be in an area of biological concern. In determining whether an area is an area of biological concern, the Director shall consider the factors specified in 40 C.F.R. §§ 125.122 (a) (1) through (10).

An offshore or coastal mobile exploratory drilling rig or coastal mobile developmental drilling rig will be considered a "new discharger" only for the duration of its discharge in an area of biological concern.

New source means any building, structure, facility, or installation from which there is or may be a "discharge of pollutants," the construction of which commenced:

(a) After promulgation of standards of performance under Section 306 of CWA which are applicable to such source, or

(b) After proposal of standards of performance in accordance with Section 306 of CWA which are applicable to such source, but only if the standards are promulgated in accordance with Section 306 within 120 days of their proposal.

NPDES means "National Pollutant Discharge Elimination System."

Owner or operator means the owner or operator of any "facility or activity" subject to regulation under the NPDES programs.

Pass through means a Discharge (see definition above) which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

Pathogenic organisms are disease-causing organisms. These include, but are not limited to, certain bacteria, protozoa, viruses, and viable helminth ova.

Permit means an authorization, license, or equivalent control document issued by EPA or an "approved State" to implement the requirements of Parts 122, 123, and 124. "Permit" includes an NPDES "general permit" (40 C.F.R § 122.28). "Permit" does not include any permit which has not yet been the subject of final agency action, such as a "draft permit" or "proposed permit."

Person means an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

Person who prepares sewage sludge is either the person who generates sewage sludge during the treatment of domestic sewage in a treatment works or the person who derives a material from sewage sludge.

pH means the logarithm of the reciprocal of the hydrogen ion concentration measured at 25° Centigrade or measured at another temperature and then converted to an equivalent value at 25° Centigrade.

Point Source means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff (see 40 C.F.R. § 122.3).

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials

(except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 *et seq*.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

(a) Sewage from vessels; or

(b) Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well is used either to facilitate production or for disposal purposes is approved by the authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Primary industry category means any industry category listed in the NRDC settlement agreement (*Natural Resources Defense Council et al. v. Train*, 8 E.R.C. 2120 (D.D.C. 1976), *modified* 12 E.R.C. 1833 (D.D.C. 1979)); also listed in Appendix A of 40 C.F.R. Part 122.

Privately owned treatment works means any device or system which is (a) used to treat wastes from any facility whose operator is not the operator of the treatment works and (b) not a "POTW."

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

Publicly owned treatment works (POTW) means a treatment works as defined by Section 212 of the Act, which is owned by a State or municipality (as defined by Section 504(4) of the Act). This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey wastewater to a POTW Treatment Plant. The term also means the municipality as defined in Section 502(4) of the Act, which has jurisdiction over the indirect discharges to and the discharges from such a treatment works.

Regional Administrator means the Regional Administrator, EPA, Region I, Boston, Massachusetts.

Secondary industry category means any industry which is not a "primary industry category."

Septage means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.

Sewage Sludge means any solid, semi-solid, or liquid residue removed during the treatment of municipal waste water or domestic sewage. Sewage sludge includes, but is not limited to, solids removed during primary, secondary, or advanced waste water treatment, scum, septage, portable toilet pumpings, type III marine sanitation device pumpings (33 C.F.R. Part 159), and sewage sludge products. Sewage sludge does not include grit or screenings, or ash generated during the incineration of sewage sludge.

Sewage sludge incinerator is an enclosed device in which only sewage sludge and auxiliary fuel are fired.

Sewage sludge unit is land on which only sewage sludge is placed for final disposal. This does

not include land on which sewage sludge is either stored or treated. Land does not include waters of the United States, as defined in 40 C.F.R. § 122.2.

Sewage sludge use or disposal practice means the collection, storage, treatment, transportation, processing, monitoring, use, or disposal of sewage sludge.

Significant materials includes, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substance designated under Section 101(14) of CERCLA; any chemical the facility is required to report pursuant to Section 313 of title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag and sludge that have the potential to be released with storm water discharges.

Significant spills includes, but is not limited to, releases of oil or hazardous substances in excess of reportable quantities under Section 311 of the CWA (see 40 C.F.R. §§ 110.10 and 117.21) or Section 102 of CERCLA (*see* 40 C.F.R. § 302.4).

Sludge-only facility means any "treatment works treating domestic sewage" whose methods of sewage sludge use or disposal are subject to regulations promulgated pursuant to section 405(d) of the CWA, and is required to obtain a permit under 40 C.F.R. § 122.1(b)(2).

State means any of the 50 States, the District of Columbia, Guam, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, the Commonwealth of the Northern Mariana Islands, the Trust Territory of the Pacific Islands, or an Indian Tribe as defined in the regulations which meets the requirements of 40 C.F.R. § 123.31.

Store or storage of sewage sludge is the placement of sewage sludge on land on which the sewage sludge remains for two years or less. This does not include the placement of sewage sludge on land for treatment.

Storm water means storm water runoff, snow melt runoff, and surface runoff and drainage.

Storm water discharge associated with industrial activity means the discharge from any conveyance that is used for collecting and conveying storm water and that is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant.

Surface disposal site is an area of land that contains one or more active sewage sludge units.

Toxic pollutant means any pollutant listed as toxic under Section 307(a)(1) or, in the case of "sludge use or disposal practices," any pollutant identified in regulations implementing Section 405(d) of the CWA.

Treatment works treating domestic sewage means a POTW or any other sewage sludge or waste water treatment devices or systems, regardless of ownership (including federal facilities), used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated for the disposal of sewage sludge. This definition does not include septic tanks or similar devices.

For purposes of this definition, "domestic sewage" includes waste and waste water from humans or household operations that are discharged to or otherwise enter a treatment works. In States where there is no approved State sludge management program under Section 405(f) of the CWA, the Director may designate any person subject to the standards for sewage sludge use and

disposal in 40 C.F.R. Part 503 as a "treatment works treating domestic sewage," where he or she finds that there is a potential for adverse effects on public health and the environment from poor sludge quality or poor sludge handling, use or disposal practices, or where he or she finds that such designation is necessary to ensure that such person is in compliance with 40 C.F.R. Part 503.

Upset see B.5.a. above.

Vector attraction is the characteristic of sewage sludge that attracts rodents, flies, mosquitoes, or other organisms capable of transporting infectious agents.

Waste pile or *pile* means any non-containerized accumulation of solid, non-flowing waste that is used for treatment or storage.

Waters of the United States or waters of the U.S. means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(b) All interstate waters, including interstate "wetlands;"

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands", sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

    (1) Which are or could be used by interstate or foreign travelers for recreational or other purpose;

    (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

    (3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in paragraphs (a) through (d) of this definition;

(f) The territorial sea; and

(g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 C.F.R. § 423.11(m) which also meet the criteria of this definition) are not waters of the United States. This exclusion applies only to manmade bodies of water which neither were originally created in waters of the United States (such as disposal area in wetlands) nor resulted from the impoundment of waters of the United States. Waters of the United States do not include prior converted cropland.

Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

Wetlands means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Whole Effluent Toxicity (WET) means the aggregate toxic effect of an effluent measured directly by a toxicity test.

*Zone of Initial Dilution (*ZID) means the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports, provided that the ZID may not be larger than allowed by mixing zone restrictions in applicable water quality standards.

2. Commonly Used Abbreviations

BOD	Five-day biochemical oxygen demand unless otherwise specified
CBOD	Carbonaceous BOD
CFS	Cubic feet per second
COD	Chemical oxygen demand
Chlorine	
Cl_2	Total residual chlorine
TRC	Total residual chlorine which is a combination of free available chlorine (FAC, see below) and combined chlorine (chloramines, etc.)
TRO	Total residual chlorine in marine waters where halogen compounds are present
FAC	Free available chlorine (aqueous molecular chlorine, hypochlorous acid, and hypochlorite ion)
Coliform	
Coliform, Fecal	Total fecal coliform bacteria
Coliform, Total	Total coliform bacteria
Cont.	Continuous recording of the parameter being monitored, i.e. flow, temperature, pH, etc.
Cu. M/day or M^3/day	Cubic meters per day
DO	Dissolved oxygen

kg/day	Kilograms per day
lbs/day	Pounds per day
mg/L	Milligram(s) per liter
mL/L	Milliliters per liter
MGD	Million gallons per day
Nitrogen	
Total N	Total nitrogen
NH3-N	Ammonia nitrogen as nitrogen
NO3-N	Nitrate as nitrogen
NO2-N	Nitrite as nitrogen
NO3-NO2	Combined nitrate and nitrite nitrogen as nitrogen
TKN	Total Kjeldahl nitrogen as nitrogen
Oil & Grease	Freon extractable material
PCB	Polychlorinated biphenyl
Surfactant	Surface-active agent
Temp. °C	Temperature in degrees Centigrade
Temp. °F	Temperature in degrees Fahrenheit
TOC	Total organic carbon
Total P	Total phosphorus
TSS or NFR	Total suspended solids or total nonfilterable residue
Turb. or Turbidity	Turbidity measured by the Nephelometric Method (NTU)
µg/L	Microgram(s) per liter
WET	“Whole effluent toxicity”
ZID	Zone of Initial Dilution

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES PURSUANT TO THE CLEAN WATER ACT (CWA)

NPDES PERMIT NUMBER: MA0040142

PUBLIC NOTICE START AND END DATES: January 12, 2021 – February 10, 2021

NAME AND MAILING ADDRESS OF APPLICANT:

Boston Ship Repair, LLC
32A Drydock Avenue
Boston, MA 02210

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Boston Ship Repair, LLC
32A Drydock Avenue
Boston, MA 02210

RECEIVING WATER AND CLASSIFICATION:

Boston Inner Harbor (MA70-02)
Boston Harbor Watershed
Class SB (CSO)

SIC CODE: 3732 (Ship building and repairing)

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1.0 Proposed Action

Boston Ship Repair (the Permittee) has applied to the U.S. Environmental Protection Agency (EPA) for reissuance of a National Pollutant Discharge Elimination System (NPDES) permit to discharge from the Boston Ship Repair facility in Boston, Massachusetts (the Facility) into Boston Inner Harbor.

The permit currently in effect was issued on November 18, 2013 with an effective date of November 18, 2013 and expired on October 31, 2018 (the 2013 Permit). The Permittee filed an application for permit reissuance with EPA dated May 9, 2018, as required by 40 Code of Federal Regulations (CFR) § 122.6. Since the permit application was deemed timely and complete by EPA on March 12, 2019, the Facility's 2013 Permit has been administratively continued pursuant to 40 CFR § 122.6 and § 122.21(d). EPA and the State conducted a site visit on March 3, 2020.

2.0 Statutory and Regulatory Authority

Congress enacted the Federal Water Pollution Control Act, codified at 33 U.S.C. § 1251 – 1387 and commonly known as the Clean Water Act (CWA), "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." CWA § 101(a). To achieve this objective, the CWA makes it unlawful for any person to discharge any pollutant into the waters of the United States from any point source, except as authorized by specific permitting sections of the CWA, one of which is § 402. *See* CWA §§ 301(a), 402(a). Section 402(a) established one of the CWA's principal permitting programs, the NPDES Permit Program. Under this section, EPA may "issue a permit for the discharge of any pollutant or combination of pollutants" in accordance with certain conditions. CWA § 402(a). NPDES permits generally contain discharge limitations and establish related monitoring and reporting requirements. *See* CWA § 402(a)(1) and (2). The regulations governing EPA's NPDES permit program are generally found in 40 CFR §§ 122, 124, 125, and 136.

"Congress has vested in the Administrator [of EPA] broad discretion to establish conditions for NPDES permits" in order to achieve the statutory mandates of Section 301 and 402. *Arkansas v. Oklahoma,* 503 U.S. 91, 105 (1992). *See also* 40 CFR §§ 122.4(d), 122.44(d)(1), and 122.44(d)(5). CWA §§ 301 and 306 provide for two types of effluent limitations to be included in NPDES permits: "technology-based" effluent limitations (TBELs) and "water quality-based" effluent limitations (WQBELs). *See* CWA §§ 301 and 304(b); 40 CFR §§ 122, 125, and 131.

2.1 Technology-Based Requirements

Technology-based treatment requirements represent the minimum level of control that must be imposed under CWA §§ 301(b) and 402 to meet best practicable control technology currently available (BPT) for conventional pollutants and some metals, best conventional control technology (BCT) for conventional pollutants, and best available technology economically achievable (BAT) for toxic and non-conventional pollutants. *See* 40 CFR § 125 Subpart A.

Subpart A of 40 CFR Part 125 establishes criteria and standards for the imposition of technology-based treatment requirements in permits under § 301(b) of the CWA, including the application of EPA promulgated Effluent Limitation Guidelines (ELGs) and case-by-case determinations of effluent limitations under CWA § 402(a)(1). EPA promulgates New Source Performance Standards (NSPS) under CWA § 306 and 40 CFR § 401.12. *See also* 40 CFR §§ 122.2 (definition of "new source") and 122.29.

In general, ELGs for non-POTW facilities must be complied with as expeditiously as practicable but in no case later than three years after the date such limitations are established and in no case later than March 31, 1989. *See* 40 CFR § 125.3(a)(2). Compliance schedules and deadlines not in accordance with the statutory provisions of the CWA cannot be authorized by a NPDES permit. In the absence of published technology-based effluent guidelines, the permit writer is authorized under CWA § 402(a)(1)(B) to establish effluent limitations on a case-by-case basis using best professional judgment (BPJ).

2.2 Water Quality-Based Requirements

The CWA and federal regulations require that effluent limitations based on water quality considerations be established for point source discharges when such limitations are necessary to meet state or federal water quality standards that are applicable to the designated receiving water. This is necessary when less stringent TBELs would interfere with the attainment or maintenance of water quality criteria in the receiving water. *See* CWA § 301(b)(1)(C) and 40 CFR §§ 122.44(d)(1),122.44(d)(5), 125.84(e) and 125.94(i).

2.2.1 Water Quality Standards

The CWA requires that each state develop water quality standards (WQSs) for all water bodies within the State. *See* CWA § 303 and 40 CFR §§ 131.10-12. Generally, WQSs consist of three parts: 1) beneficial designated use or uses for a water body or a segment of a water body; 2) numeric or narrative water quality criteria sufficient to protect the assigned designated use(s); and 3) antidegradation requirements to ensure that once a use is attained it will not be degraded and to protect high quality and National resource waters. *See* CWA § 303(c)(2)(A) and 40 CFR § 131.12. The applicable State WQSs can be found in Title 314 of the Code of Massachusetts Regulations, Chapter 4 (314 CMR 4.00).

As a matter of state law, state WQSs specify different water body classifications, each of which is associated with certain designated uses and numeric and narrative water quality criteria. When using chemical-specific numeric criteria to develop permit limitations, acute and chronic aquatic life criteria and human health criteria are used and expressed in terms of maximum allowable in-stream pollutant concentrations. In general, aquatic-life acute criteria are considered applicable to daily time periods (maximum daily limit) and aquatic-life chronic criteria are considered applicable to monthly time periods (average monthly limit). Chemical-specific human health criteria are typically based on lifetime chronic exposure and, therefore, are typically applicable to monthly average limits.

When permit effluent limitation(s) are necessary to ensure that the receiving water meets narrative water quality criteria, the permitting authority must establish effluent limits in one of the following three ways: 1) based on a "calculated numeric criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and fully protect the designated use," 2) based on a "case-by-case basis" using CWA § 304(a) recommended water quality criteria, supplemented as necessary by other relevant information; or, 3) in certain circumstances, based on use of an indicator parameter. *See* 40 CFR § 122.44(d)(1)(vi)(A-C).

2.2.2 Antidegradation

Federal regulations found at 40 CFR § 131.12 require states to develop and adopt a statewide antidegradation policy that maintains and protects existing in-stream water uses and the level of water quality necessary to protect these existing uses. In addition, the antidegradation policy ensures maintenance of high quality waters which exceed levels necessary to support propagation of fish, shellfish, and wildlife and to support recreation in and on the water, unless the State finds that allowing degradation is necessary to accommodate important economic or social development in the area in which the waters are located.

Massachusetts' statewide antidegradation policy, entitled "Antidegradation Provisions," is found in the State's WQSs at 314 CMR 4.04. Massachusetts guidance for the implementation of this policy is in an associated document entitled "Implementation Procedures for the Anti-degradation Provisions of the Massachusetts Surface Water Quality Standards, 314 CMR 4.00" dated October 21, 2009. According to the policy, no lowering of water quality is allowed, except in accordance with the antidegradation policy, and all existing in-stream uses, and the level of water quality necessary to protect the existing uses of a receiving water body must be maintained and protected.

This permit is being reissued with effluent limitations sufficiently stringent to satisfy the State's antidegradation requirements, including the protection of the existing uses of the receiving water.

2.2.3 Assessment and Listing of Waters and Total Maximum Daily Loads

The objective of the CWA is to restore and maintain the chemical, physical and biological integrity of the Nation's waters. To meet this goal, the CWA requires states to develop information on the quality of their water resources and report this information to EPA, the U.S. Congress, and the public. To this end, EPA released guidance on November 19, 2001, for the preparation of an integrated "List of Waters" that could combine reporting elements of both § 305(b) and § 303(d) of the CWA. The integrated list format allows states to provide the status of all their assessed waters in one list. States choosing this option must list each water body or segment in one of the following five categories: 1) unimpaired and not threatened for all designated uses; 2) unimpaired waters for some uses and not assessed for others; 3) insufficient information to make assessments for any uses; 4) impaired or threatened for one or more uses but not requiring the calculation of a Total Maximum Daily Load (TMDL); and 5) impaired or threatened for one or more uses and requiring a TMDL.

A TMDL is a planning tool and potential starting point for restoration activities with the ultimate goal of attaining water quality standards. A TMDL essentially provides a pollution budget designed to restore the health of an impaired water body. A TMDL typically identifies the source(s) of the pollutant from point sources and non-point sources, determines the maximum load of the pollutant that the water body can tolerate while still attaining WQSs for the designated uses, and allocates that load among the various sources, including point source discharges, subject to NPDES permits. *See* 40 CFR § 130.7.

For impaired waters where a TMDL has been developed for a particular pollutant and the TMDL includes a waste load allocation (WLA) for a NPDES permitted discharge, the effluent limitation in the permit must be "consistent with the assumptions and requirements of any available WLA". 40 CFR § 122.44(d)(1)(vii)(B).

2.2.4 Reasonable Potential

Pursuant to CWA § 301(b)(1)(C) and 40 CFR § 122.44(d)(1), NPDES permits must contain any requirements in addition to TBELs that are necessary to achieve water quality standards established under § 303 of the CWA. *See also* 33 U.S.C. § 1311(b)(1)(C). In addition, limitations "must control any pollutant or pollutant parameter (conventional, non-conventional, or toxic) which the permitting authority determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any water quality standard, including State narrative criteria for water quality." 40 CFR § 122.44(d)(1)(i). To determine if the discharge causes, or has the reasonable potential to cause, or contribute to an excursion above any WQS, EPA considers: 1) existing controls on point and non-point sources of pollution; 2) the variability of the pollutant or pollutant parameter in the effluent; 3) the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity); and 4) where appropriate, the dilution of the effluent by the receiving water. *See* 40 CFR § 122.44(d)(1)(ii).

If the permitting authority determines that the discharge of a pollutant will cause, has the reasonable potential to cause, or contribute to an excursion above WQSs, the permit must contain WQBELs for that pollutant. *See* 40 CFR § 122.44(d)(1)(i).

2.2.5 State Certification

EPA may not issue a permit unless the State Water Pollution Control Agency with jurisdiction over the receiving water(s) either certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate the State WQSs, the State waives, or is deemed to have waived, its right to certify. *See* 33 U.S.C. § 1341(a)(1). Regulations governing state certification are set forth in 40 CFR § 124.53 and § 124.55. EPA has requested permit certification by the State pursuant to 40 CFR § 124.53 and expects that the Draft Permit will be certified.

If the State believes that conditions more stringent than those contained in the Draft Permit are necessary to meet the requirements of either CWA §§ 208(e), 301, 302, 303, 306 and 307, or applicable requirements of State law, the State should include such conditions in its certification

and, in each case, cite the CWA or State law provisions upon which that condition is based. Failure to provide such a citation waives the right to certify as to that condition. EPA includes properly supported State certification conditions in the NPDES permit. The only exception to this is that the permit conditions/requirements regulating sewage sludge management and implementing CWA § 405(d) are not subject to the State certification requirements. Reviews and appeals of limitations and conditions attributable to State certification shall be made through the applicable procedures of the State and may not be made through EPA's permit appeal procedures of 40 CFR Part 124.

In addition, the State should provide a statement of the extent to which any condition of the Draft Permit can be made less stringent without violating the requirements of State law. Since the State's certification is provided prior to final permit issuance, any failure by the State to provide this statement waives the State's right to certify or object to any less stringent condition.

It should be noted that under CWA § 401, EPA's duty to defer to considerations of State law is intended to prevent EPA from relaxing any requirements, limitations or conditions imposed by State law. Therefore, "[a] State may not condition or deny a certification on the grounds that State law allows a less stringent permit condition." 40 CFR § 124.55(c). In such an instance, the regulation provides that, "The Regional Administrator shall disregard any such certification conditions or denials as waivers of certification." *Id.* EPA regulations pertaining to permit limitations based upon WQSs and State requirements are contained in 40 CFR §§ 122.4(d) and 122.44(d).

2.3 Effluent Flow Requirements

Generally, EPA uses effluent flow both to determine whether an NPDES permit needs certain effluent limitations and to calculate the effluent limitations themselves. EPA practice is to use effluent flow as a reasonable and important worst-case condition in EPA's reasonable potential and WQBEL calculations to ensure compliance with WQSs under CWA § 301(b)(1)(C). Should the effluent flow exceed the flow assumed in these calculations, the in-stream dilution would be reduced and the calculated effluent limitations might not be sufficiently protective (i.e., might not meet WQSs). Further, pollutants that do not have the reasonable potential to exceed WQSs at a lower discharge flow may have reasonable potential at a higher flow due to the decreased dilution. In order to ensure that the assumptions underlying EPA's reasonable potential analyses and permit effluent limitation derivations remain sound for the duration of the permit, EPA may ensure the validity of its "worst-case" effluent flow assumptions through imposition of permit conditions for effluent flow.[1] In this regard, the effluent flow limitation is a component of WQBELs because the WQBELs are premised on a maximum level flow. The effluent flow limit is also necessary to ensure that other pollutants remain at levels that do not have a reasonable potential to exceed WQSs.

[1] EPA's regulations regarding "reasonable potential" require EPA to consider "where appropriate, the dilution of the effluent in the receiving water," *id.* 40 CFR §122.44(d)(1)(ii). *Both* the effluent flow and receiving water flow may be considered when assessing reasonable potential. *In re Upper Blackstone Water Pollution Abatement Dist.*, 14 E.A.D. 577, 599 (EAB 2010). EPA guidance directs that this "reasonable potential" analysis be based on "worst-case" conditions. *See In re Washington Aqueduct Water Supply Sys., 11 E.A.D. 565, 584 (EAB 2004)*.

The limitation on effluent flow is within EPA's authority to condition a permit to carry out the objectives and satisfy the requirements of the CWA. *See* CWA §§ 402(a)(2) and 301(b)(1)(C); 40 CFR §§ 122.4(a) and (d), 122.43 and 122.44(d). A condition on the discharge designed to ensure the validity of EPA's WQBELs and reasonable potential calculations that account for "worst case" conditions is encompassed by the references to "condition" and "limitations" in CWA §§402 and 301 and the implementing regulations, as WQBELs are designed to assure compliance with applicable water quality regulations, including antidegradation requirements. Regulating the quantity of pollutants in the discharge through a restriction on the quantity of effluent is also consistent with the CWA.

In addition, as provided in Part II.B.1 of this permit and 40 CFR § 122.41(e), the Permittee is required to properly operate and maintain all facilities and systems of treatment and control. Improper operation and maintenance may result in non-compliance with permit effluent limitations. Consequently, the effluent flow limit is a permit condition that relates to the Permittee's duty to mitigate (*i.e.*, minimize or prevent any discharge in violation of the permit that has a reasonable likelihood of adversely affecting human health or the environment) and to properly operate and maintain the treatment works. *See* 40 CFR §§ 122.41(d), (e).

2.4 Monitoring and Reporting Requirements

2.4.1 Monitoring Requirements

Sections 308(a) and 402(a)(2) of the CWA and the implementing regulations at 40 CFR Parts 122, 124, 125, and 136 authorize EPA to include monitoring and reporting requirements in NPDES permits.

The monitoring requirements included in this permit have been established to yield data representative of the Facility's discharges in accordance with CWA §§ 308(a) and 402(a)(2), and consistent with 40 CFR §§ 122.41(j), 122.43(a), 122.44(i) and 122.48. The Draft Permit specifies routine sampling and analysis requirements to provide ongoing, representative information on the levels of regulated constituents in the discharges. The monitoring program is needed to enable EPA and the State to assess the characteristics of the Facility's effluent, whether Facility discharges are complying with permit limits, and whether different permit conditions may be necessary in the future to ensure compliance with technology-based and water quality-based standards under the CWA. EPA and/or the State may use the results of the chemical analyses conducted pursuant to this permit, as well as national water quality criteria developed pursuant to CWA § 304(a)(1), State water quality criteria, and any other appropriate information or data, to develop numerical effluent limitations for any pollutants, including, but not limited to, those pollutants listed in Appendix D of 40 CFR Part 122.

NPDES permits require that the approved analytical procedures found in 40 CFR Part 136 be used for sampling and analysis unless other procedures are explicitly specified. Permits also include requirements necessary to comply with the *National Pollutant Discharge Elimination System (NPDES): Use of Sufficiently Sensitive Test Methods for Permit Applications and*

Reporting Rule.[2] This Rule requires that where EPA-approved methods exist, NPDES applicants must use sufficiently sensitive EPA-approved analytical methods when quantifying the presence of pollutants in a discharge. Further, the permitting authority must prescribe that only sufficiently sensitive EPA-approved methods be used for analyses of pollutants or pollutant parameters under the permit. The NPDES regulations at 40 CFR § 122.21(e)(3) (completeness), 40 CFR § 122.44(i)(1)(iv) (monitoring requirements) and/or as cross referenced at 40 CFR § 136.1(c) (applicability) indicate that an EPA-approved method is sufficiently sensitive where:

- The method minimum level[3] (ML) is at or below the level of the effluent limitation established in the permit for the measured pollutant or pollutant parameter; or
- In the case of permit applications, the ML is above the applicable water quality criterion, but the amount of the pollutant or pollutant parameter in a facility's discharge is high enough that the method detects and quantifies the level of the pollutant or parameter in the discharge; or
- The method has the lowest ML of the analytical methods approved under 40 CFR Part 136 or required under 40 CFR chapter I, subchapter N or O for the measured pollutant or pollutant parameter.

2.4.2 Reporting Requirements

The Draft Permit requires the Permittee to report monitoring results obtained during each calendar month to EPA and the State electronically using NetDMR. The Permittee must submit a Discharge Monitoring Report (DMR) for each calendar month no later than the 15th day of the month following the completed reporting period.

NetDMR is a national web-based tool enabling regulated CWA permittees to submit DMRs electronically via a secure internet application to EPA through the Environmental Information Exchange Network. NetDMR has eliminated the need for participants to mail in paper forms to EPA under 40 CFR §§ 122.41 and 403.12. NetDMR is accessible through EPA's Central Data Exchange at https://cdx.epa.gov/. Further information about NetDMR can be found on EPA's NetDMR support portal webpage.[4]

With the use of NetDMR, the Permittee is no longer required to submit hard copies of DMRs and reports to EPA and the State unless otherwise specified in the Draft Permit. In most cases, reports required under the permit shall be submitted to EPA as an electronic attachment through NetDMR. Certain exceptions are provided in the permit such as for providing written notifications required under the Part II Standard Conditions.

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[2] Fed. Reg. 49,001 (Aug. 19, 2014).
[3] The term "minimum level" refers to either the sample concentration equivalent to the lowest calibration point in a method or a multiple of the method detection limit (MDL), whichever is higher. Minimum levels may be obtained in several ways: They may be published in a method; they may be based on the lowest acceptable calibration point used by a laboratory; or they may be calculated by multiplying the MDL in a method, or the MDL determined by a laboratory, by a factor. EPA is considering the following terms related to analytical method sensitivity to be synonymous: "quantitation limit," "reporting limit," "level of quantitation," and "minimum level." *See* Fed. Reg. 49,001 (Aug. 19, 2014).
[4] https://netdmr.zendesk.com/hc/en-us

2.5 Standard Conditions

The Standard Conditions, included as Part II of the Draft Permit, are based on applicable regulations found in the Code of Federal Regulations. *See generally* 40 CFR Part 122.

2.6 Anti-backsliding

The CWA's anti-backsliding requirements prohibit a permit from being renewed, reissued or modified to include less stringent limitations or conditions than those contained in a previous permit except in compliance with one of the specified exceptions to those requirements. *See* CWA §§ 402(o) and 303(d)(4) and 40 CFR § 122.44(*l*). Anti-backsliding provisions apply to effluent limits based on technology, water quality, and/or State certification requirements.

All proposed limitations in the Draft Permit are at least as stringent as limitations included in the 2013 Permit unless specific conditions exist to justify relaxation in accordance with CWA § 402(o) or § 303(d)(4). Discussion of any less stringent limitations and corresponding exceptions to anti-backsliding provisions is provided in the sections that follow.

3.0 Description of Facility and Discharge

3.1 Location and Type of Facility

The Facility is located on an 11-acre site along the western bank of Boston Inner Harbor off Drydock Avenue in Boston, Massachusetts. A location map is provided in Figure 1. The drydock is constructed of concrete, stone, and granite and is approximately 1075 feet long, 149 feet wide, and 51 feet deep. Various buildings, temporary storage structures, and mechanical equipment line the lateral edges of the drydock. Notable structures of interest for this permit include the pump house in the southeasternmost building, a covered hazardous materials storage area on the north side of the drydock, and an adjacent 10,000-gallon above ground storage tank for bilge water. The facility consists of 5 outfalls, 4 of which drain to Boston Inner Harbor while one outfall discharges infiltrated groundwater to the public sewer. Docked vessels receive the following services in the drydock: abrasive blasting, painting, and mechanical repairs. A detailed site plan is provided in Figure 2.

3.1.1 Effluent Limitation Guidelines

EPA has not promulgated technology-based effluent limitation guidelines (ELGs) for Ship Building and Repairing (SIC 3732) in 40 CFR Subchapter N Parts 405 through 471. Therefore, in accordance with CWA § 402(a)(1)(B) and 40 CFR § 125.3(c)(2), EPA may establish effluent limitations on a case-by-case basis using BPJ. The NPDES regulations in 40 CFR §125.3(c)(2) state that permits developed on a case-by-case basis under Section 402 (a)(1) of the CWA shall apply the appropriate factors listed in 40 CFR § 125.3(d) and must consider 1) the appropriate technology for the category class of point sources of which the applicant is a member, based on available information, and 2) any unique factors relating to the applicant.

To the extent applicable to the Facility, EPA has incorporated technology-based limitations and conditions from EPA's 2015 Multi-Sector General Permit (MSGP) for consistency with requirements imposed in managing stormwater from Sector R: Ship and Boat Building and Repairing Yards.

3.2 Location and Type of Discharge

Seagoing vessels contract with the Permittee for service and repairs and typically have a scheduled time period when they will be docked at the Facility for such service. When there is no vessel in the drydock, the drydock is typically kept flooded. As a vessel approaches the drydock, the caisson gate to Boston Harbor is opened and the vessel is brought into the drydock with the assistance of tugboats and winches. The following sections describe the associated discharges and outfalls. A water flow diagram for the referenced discharges is included in Figure 3.

3.2.1 Outfall 001 and Outfall 002 – Drydock Dewatering Pumps

There are two main systems for dewatering the drydock once a vessel is securely inside and positioned over keel blocks. The caisson gate is sealed and up to 50 million gallons of harbor water is pumped through an opening below the pump house via the "main pump" out to Boston Harbor. The pumping rate for the main pump is up to 105,000 gallons per minute (GPM) and the discharge point to the harbor is at the edge of the cement landing, about 34 feet below the mean low water level at Latitude 42° 20' 42.6", Longitude -71° 01' 35.5". This outlet has historically been considered Outfall 001 and been associated with the discharge from the main pump.

Not all water in the drydock is discharged by the main pump, as the main pump loses head when the drydock water depth is less than approximately three feet. The remaining water is removed by a stripping pump with a 5600 GPM capacity. The inlet for the stripping pump sits below the main pump's inlet on the floor of the drydock. When the majority of water in the drydock has been removed, facility personnel cover the inlet with a metal plate and line the plate with hay bales as a temporary sediment control measure. In addition to removing the last three feet of head from the drydock, the stripping pump is used as needed to remove seawater leaking into the drydock from the caisson seal, groundwater infiltrating from the drydock walls, non-contact cooling water described below, and stormwater. When a boat is docked, the stripping pump is on for 1.7 hours on average, with a 7.6 hour average downtime when the pump is off.

The stripping pump routes water through the pump house where Outfall 002 serves as an internal outfall, with water travelling through an open conduit before discharging through Outfall 001 to Boston Inner Harbor. Historically, EPA has considered the discharge from the stripping pump as the sole source of pollutants to Boston Inner Harbor. Potential sources of pollutants include sediments accumulated on the floor of the drydock from the opening and closing of the caisson gate, paint and other debris that fall to the drydock floor from the cleaning of docked vessels, groundwater infiltrating from the sides of the drydock, and stormwater associated with industrial activity. EPA finds that the dewatering discharge from the main pump is consistent with the definition of Water Transfers at 40 CFR § 122.3(i). "Water transfer means an activity that conveys or connects waters of the United States without subjecting the transferred water to intervening industrial, municipal, or commercial use." These discharges are excluded from

NPDES permit coverage. The transfer of water in and out of Boston Harbor, associated with the docking and undocking of vessels is not expected to add pollutants, whereas the discharge from the stripping pump consists of waters with larger sediment loads and which are exposed to industrial activity and are a potential source of pollutants.

For the Draft Permit, EPA continues to authorize and regulate the discharge of stripping pump discharges to Boston Inner Harbor. The monitoring requirements and limitations associated with this discharge will continue to be referred to as discharges through Outfall 002 and references to Outfall 002 are meant to denote the discharge location into Boston Harbor (Latitude 42° 20' 42.6", Longitude -71° 01' 35.5").

3.2.2 Outfall 003 – Fire Suppression and Non-Contact Cooling Water Pump

The shipyard maintains an ocean water fire main as a safety precaution while vessels are docked at the Facility. The fire main consists of two separate pumps, never run simultaneously, seated outside of the drydock, adjacent to the caisson gate. One pump serves as a backup when repairs of the other are required. The fire main pump only runs when vessels are docked, and the amount of water required varies based on the vessel size and type. Typically, most of the fire pump water returns to the harbor, about 50 feet from the pump location through Outfall 003 (see Figure 2). The pumps were replaced during the last permit term and now each have a pumping rate capacity of 1,200 gallons per minute, or 1.728 million gallons per day (MGD). As with the discharge from the main pump, EPA considers the discharge of water from the fire main that does not enter the drydock, a water transfer, not associated with industrial activity, and is excluded from NPDES permit coverage.

A portion of the water taken up by the fire pump is diverted for use on-board docked vessels as non-contact cooling water (NCCW) in refrigeration and air conditioning systems. The NCCW is discharged from the vessels directly to the drydock floor where it is collected by the stripping pump and discharged through Outfall 002. The amount of water used varies considerably based on the size of the vessel, the number of crew on board, and the time of year. EPA has determined that since the Facility is withdrawing water for use as non-contact cooling, the fire main pumps are subject to CWA Section 316(b) requirements. Further discussion and applicable permit requirements are provided in Section 5.2 below.

3.2.3 Outfall 004 – Sump Pump

The pumphouse containing the main drydock dewatering pump and stripping pumps extends to the base of the drydock and contains a sump for collecting any leaking water from pump valves or drydock infiltration. The sump contains a pump with a pumping capacity of 150 GPM, with a daily average flow of 1000 GPD. Historically, discharge from the sump pump does not enter Boston Inner Harbor and is pumped to the Boston Municipal Sewer system. Therefore, this NPDES permit continues to prohibit the discharge of sump pump water to Boston Inner Harbor.

3.2.4 Outfall 005 – Caisson Ballast Water

The caisson gate contains ballast water that serves to raise and lower the gate. Water from the caisson ballast is discharged to Boston Inner Harbor and replaced with air, raising the caisson and sealing the drydock. Each docking and undocking operation results in an estimated discharge of 363,400 gallons of water from this caisson system. As with the discharge from the main pump, EPA considers the movement of ballast water in and out of the caisson gate a water transfer not associated with industrial activity and is excluded from NPDES permit coverage.

3.2.5 Vessel Discharges

The Draft Permit does not authorize the discharge of vessel wastes, sediments or solid wastes. Vessel waste consists of normal wastes produced aboard seagoing vessels, but also includes sanitary water, grey water, and contaminated bilge water. Non-contact cooling water sourced from the fire pump as described above for Outfall 003 continues to be authorized to discharge through Outfall 002 with other stripping pump discharges. Vessel wastewaters are not authorized to discharge to Boston Inner Harbor and should be either discharged to the Boston Municipal Sewer system or hauled off site for appropriate disposal. The handling of these waters is detailed in the facility's Stormwater Pollution Prevention Plan (SWPPP).

3.2.6 Sediment Disposal

Sediment enters the drydock when the caisson is lowered to dock or undock a ship. Sediment removed from the drydock floor is not allowed to be discharged to Boston Inner Harbor. These sediments are collected and hauled off site for disposal in accordance with solid waste disposal regulations. The handling of these waters shall be detailed in the facility's SWPPP. A total suspended solids (TSS) monitoring requirement has been maintained for Outfall 002, to confirm that the BMPs are effective in minimizing the solids being discharged to Boston Inner Harbor.

3.2.7 Solid Wastes

Solid wastes include blasting grit, paint chips, paint cans, and all other forms of solid waste generated by industrial activity. These wastes are disposed of offsite in conformance with the appropriate solid waste regulations. The Facility's SWPPP addresses these activities and explains measures the Permittee takes to minimize the discharge of any of these materials to Boston Inner Harbor.

A quantitative description of the discharge in terms of effluent parameters, based on monitoring data submitted by the Permittee, including Discharge Monitoring Reports (DMRs), from September 2015 through August 2020 is provided in Appendix A of this Fact Sheet.

4.0 Description of Receiving Water and Dilution

4.1 Receiving Water

The Facility discharges through Outfall 002 to Boston Inner Harbor (Segment ID MA70-02), which consists of 2.56 Square Miles in Boston, Massachusetts. Boston Inner Harbor is part of the Boston Harbor Watershed. From the Massachusetts WQSs, 314 Code of Massachusetts

Regulations (CMR) 4.06, "*Boston Inner Harbor is delineated as westerly inside a line from the southern tip of Governors Island to Fort Independence including the Charles, Mystic, Island End and Chelsea (Creek) Rivers and Reserved, Fort Point and Little Mystic Channels.*"

Boston Inner Harbor is classified as Class SB (CSO), in the 314 CMR 4.06. Class SB (CSO) waters are described in the Commonwealth of Massachusetts Water Quality Standards (314 CMR 4.05(4)(b)) as follows: *"designated as a habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. In certain waters, habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass. Where designated in the tables to 314 CMR 4.00 for shellfishing, these waters shall be suitable for shellfish harvesting with depuration (Restricted and Conditionally Restricted Shellfish Areas). These waters shall have consistently good aesthetic value."* Waters with a SB(CSO) designation are occasionally subject to short-term impairment of swimming or other recreational uses due to untreated combined sewer overflows (CSO) discharges in a typical year; *see* 314 CMR 4.06(1)(d)(11).

Boston Inner Harbor is listed in the *Massachusetts Year 2016 Integrated List of Waters* ("303(d) List") as a Category 5 "Waters Requiring a TMDL.[5] The causes of impairments listed are contaminants in fish and/or shellfish, dissolved oxygen, enterococcus, fecal coliform, and PCBs in fish tissue. The status of each designated use is presented in Table 1.

Table 1: Summary of Designated Uses and Listing Status

Designated Use	Status
Aquatic Life	Support
Aesthetics	Not Assessed
Primary Contact Recreation	Support
Secondary Contact Recreation	Support
Fish Consumption	Impaired
Shellfish Harvesting	Impaired

According to the *Boston Harbor 2004-2008 Water Quality Assessment Report*,[6] this water body segment is impaired for designated uses for fish consumption, shellfish harvesting, and sections of Boston Inner Harbor for aquatic life, primary contact recreation and secondary contact recreation, while designated uses aesthetics have not been assessed. A final pathogen TMDL has been published by MassDEP and EPA for the Boston Harbor Watershed (excluding the Neponset River sub-basin) which includes Boston Inner Harbor. The majority of pathogen impairments among the various segments in the watershed are due to discharges from CSOs, municipal point sources, illicit sewer connections, and urban runoff/storm sewers, while for other impaired segments, the potential contamination sources are unknown.

[5] *Massachusetts Year 2016 Integrated List of Waters*. MassDEP Division of Watershed Management Watershed Planning Program, Worcester, Massachusetts, December, 2019, Control Number: 470.1.
[6] *Boston Harbor 2004 – 2008 Water Quality Assessment Report*. MassDEP Division of Watershed Management, Worcester, Massachusetts, August, 2010, Report Number: 07-AC-2.

4.2 Available Dilution

To ensure that discharges do not cause or contribute to violations of WQSs under all expected conditions, WQBELs are derived assuming critical conditions for the receiving water.[7] The critical flow in marine and coastal waters is determined on a case-by-case basis. State WQSs specify that, "the Department will establish extreme hydrologic conditions at which aquatic life criteria must be applied on a case-by-case basis. In all cases existing uses shall be protected and the selection shall not interfere with the attainment of designated uses." *See* 314 CMR 4.03(3)(c). State WQSs further specify that, "human health-based criteria may be applied at conditions the Department determines will result in protection at least equivalent to that provided for rivers and streams." *See* 314 CMR 4.03(3)(d).

In determining what dilution is appropriate to represent "extreme hydrologic conditions" for the purposes of setting WQBELs, the State determined that the designation of a mixing zone at the Facility was necessary. As defined in State WQSs at 314 CMR 4.03(2), a mixing zone is a limited area or volume of a waterbody that may fail to meet specific water quality criteria provided the following conditions are met:

(a) Mixing zones shall be limited to an area or volume as small as feasible. There shall be no lethality to organisms passing through the mixing zone as determined by the Department. The location, design and operation of the discharge shall minimize impacts on aquatic life and other existing and designated uses within and beyond the mixing zone.
(b) Mixing zones shall not interfere with the migration or free movement of fish or other aquatic life. There shall be safe and adequate passage for swimming and drifting organisms with no deleterious effects on their populations.
(c) Mixing zones shall not create nuisance conditions, accumulate pollutants in sediments or biota in toxic amounts or otherwise interfere with the existing or designated uses of surface waters.

EPA, MassDEP, and the Permittee discussed options for designating a mixing zone and a corresponding dilution allowance. The discharge from the stripping pump travels through an open conduit approximately 400 feet long, 14 feet wide, and 15 feet deep before discharging through Outfall 002. This conduit is continuously submerged and due to its size, the discharge exits the outfall with a velocity of less than 0.1 feet per second. Given these facts, minimum near-field mixing is expected to occur, with far-field mixing of the effluent in the canal outside of the drydock dominating pollutant fate and transport. Further discussions between the agencies and the Permittee led to the Permittee contracting with Epsilon Associates, Inc. and Hodge Water Resources (the Consultants) to conduct a modeling analysis to evaluate the transport of pollutants from Outfall 002 into Boston Harbor (Appendix B).

The Consultants used the numerical model *Environmental Fluid Dynamics Code*[8] to simulate the hydrodynamics from the outfall through the canal leading out to Boston Harbor. A dynamic

[7] EPA Permit Writer's Manual, Section 6.2.4
[8] Available at https://www.epa.gov/ceam/environment-fluid-dynamics-code-efdc-download-page. For more information see https://www.epa.gov/ceam/environmental-fluid-dynamics-code-efdc.

model was chosen due to the variable daily pumping schedule and the important control that daily tidal cycles have in moving water in and out of the canal. The model was run to simulate a hypothetical month (September 2019) where a ship was docked at the Facility and the hydrologic conditions were representative of annual "worst case" low flow conditions. Hydrologic boundary conditions included the tidal cycle in Boston Harbor, river flow from the Charles, Malden, and Mystic Rivers, and a surficial wind boundary condition. For a complete discussion of these boundary conditions, see Section 4.2 in Appendix B of the Consultant's report. September was chosen for the simulation period as this month is representative of low flow conditions where river flow is at a hydrologic minimum; consequently, the river boundary conditions have less control on flow near the outfall, while tidal pumping dominates hydrodynamics in the area of interest. Higher river flows would lead to greater expected dilution. This choice of monitoring period is in line with the requirements from the State WQSs for extreme hydrologic conditions.

The modeling study found that the currents in the canal outside of the drydock primarily point west on a rising tide and east on a falling tide. The stripping pump discharge through Outfall 002 does not drive the flow of water or circulation patterns; instead, mixing of the effluent with the receiving waterbody is primarily driven by tides. Using dye tracing simulations to represent the transport of a generic, non-reactive pollutant, the Consultants mapped out the maximum extent of the plume during the simulated month as well as the likelihood at any one location (model cell) that the effluent would meet a certain dilution (the study looked at dilution factors of 81:1 and 125:1); these maps are shown in Figures 10, 11, and 12 in Appendix B of the Consultant's report. Based on the month-long simulation, a dilution of 81:1 would be achieved at all times within 1,250 feet of the outfall; and a dilution of 125:1 would be achieved at all times within 1,350 feet of the outfall. 50% of the time the effluent plume is diluted by a factor of 81 within 250 feet of the outfall, and 95% of the time the plume is diluted by a factor of 81 within 650 feet of the outfall. These percentages are deterministic, not probabilistic; in other words, the model does not find that there is a 5% chance in any given month that the plume will extend beyond 650 feet at dilutions greater than 81:1, instead the model finds that the plume extends outside of the 650 feet boundary for 5% of the month modeled (September 2019) at dilutions greater than 81:1.

It is evident from the modeling results, that the canal is a natural geographic and hydrologic boundary for the mixing zone. The Facility's effluent is significantly diluted (>100 times) by the time it reaches the end of the canal. Figure 10 shows that a dilution of 50:1 is achieved in the receiving water well within the bounds of the canal, approximately 600 feet from the outfall. While a dilution range of 50-81 extends to the outer edge of the canal.

Based on the modeling study, MassDEP and EPA have concluded that a mixing zone contained within the canal, with a boundary extending 700 feet radially eastward from the outfall will satisfy the conditions for delineating a mixing zone consistent with 314 CMR 4.03(2). Since the canal is approximately 1,000 feet long from the caisson gate at the Facility to the opening of Boston Inner Harbor, there is a 300-foot buffer between the boundary of the mixing zone and the opening to Boston Inner Harbor. The mixing zone is not expected to interfere with the migration or free movement of aquatic life in Boston Inner Harbor as the discharge will be significantly diluted (>100 times) by the time it reaches the end of the canal. To ensure that the authorization of a mixing zone does not adversely affect aquatic organisms, EPA has included "end of pipe"

whole effluent toxicity testing requirements in the Draft Permit to assess lethality before mixing. Additional, effluent limitations and monitoring requirements, including for solids and metals, are in place in the Draft Permit to ensure that pollutants will not accumulate in sediments and biota in toxic amounts or interfere with the existing designated uses of Boston Inner Harbor.

Given the results of the modeling study, a dilution factor of approximately 65:1 would be met at the edge of the mixing zone, 700 feet from Outfall 002. EPA used this dilution factor (DF) in its quantitative derivation of WQBELs for pollutants in the Draft Permit.

5.0 Proposed Effluent Limitations and Conditions

The proposed effluent limitations and conditions derived under the CWA and State WQSs are described below. These proposed effluent limitations and conditions, the basis of which is discussed throughout this Fact Sheet, may be found in Part I of the Draft Permit.

5.1 Effluent Limitations and Monitoring Requirements

Effluent limitations and monitoring requirements are imposed in the Draft Permit for the discharge of water in the drydock, from the stripping pump, through Outfall 002. The requirement from the 2013 Permit to report total flow for Outfall 001, Outfall 003, and Outfall 005 has been removed.

State and Federal regulations, data regarding discharge characteristics, and data regarding ambient characteristics described above, were used during the effluent limitations development process. Sources of pollutants considered when deriving effluent limitations and monitoring requirements include: sediments accumulated on the floor of the drydock from the opening and closing of the caisson gate; paint and other debris that fall to the drydock floor from the cleaning of docked vessels; groundwater infiltrating from the sides of the drydock, and stormwater associated with industrial activity.

Discharge data are included in Appendix A. EPA's Reasonable Potential Analysis is included in Appendix C and the results are discussed in the applicable sections below.

5.1.1 Effluent Flow

From September 1, 2015 through August 31, 2020, total monthly effluent flow from the stripping pump ranged from no flow to 4.5 million gallons per day (MGD) through Outfall 002 (Appendix A). The maximum design flow rate of the stripping pump is 5600 GPM, equivalent to 8.06 MGD. The Draft Permit includes a maximum daily flow limitation of 8.06 MGD based on the design flow capacity of the stripping pump, monitored continuously using a totalizer or similar device, when the Facility is discharging.

5.1.2 pH

The hydrogen-ion concentration in an aqueous solution is represented by the pH using a logarithmic scale of 0 to 14 standard units (S.U.). Solutions with pH 7.0 S.U. are neutral, while

those with pH less than 7.0 S.U. are acidic and those with pH greater than 7.0 S.U. are basic. Discharges with pH values markedly different from the receiving water pH can have a detrimental effect on the environment. Sudden pH changes can kill aquatic life. pH can also have an indirect effect on the toxicity of other pollutants in the water.

The Facility has never been required to monitor for pH in their discharges. State WQSs for Coastal and Marine Class SB Waters, found at 314 CMR 4.05(4)(b)3., require that the pH of the receiving water be in the range of 6.5 to 8.5. Therefore, the Draft Permit includes this range as an effluent limitation for the discharge from Outfall 002. These limitations are based on CWA § 301(b)(1)(C) and 40 CFR § 122.44(d).

5.1.3 Total Suspended Solids

Solids could include inorganic (e.g., silt, sand, clay, and insoluble hydrated metal oxides) and organic matter (e.g., flocculated colloids and compounds that contribute to color). Solids can clog fish gills, resulting in an increase in susceptibility to infection or asphyxiation. Suspended solids can increase turbidity in receiving waters and reduce light penetration through the water column or settle to form bottom deposits in the receiving water. Suspended solids also provide a medium for the transport of other adsorbed pollutants, such as metals, which may accumulate in settled deposits that can have a long-term impact on the water column through cycles of re-suspension.

The 2013 Permit included weekly total suspended solids (TSS) monitoring and reporting of daily maximum and monthly average TSS measurements. From September 1, 2015 through August 31, 2020, daily maximum TSS ranged from below minimum levels to 52.4 mg/L, while monthly average TSS ranged from below minimum levels to 23.6 mg/L.

There are no specific ELGs for TSS from the Ship Building and Repair sector. The 2015 MSGP outlines specific BMPs meant to minimize the discharge of solids. These include good housekeeping measures to contain and cleanup after abrasive blasting and painting, employee training, and preventative maintenance. WQSs for solids for Class SB contain narrative criteria for solids, *see* 314 CMR 4.05(4)(b)5. "*These waters shall be free from floating, suspended and settleable solids in concentrations or combinations that would impair any use assigned to this class, that would cause aesthetically objectionable conditions, or that would impair the benthic biota or degrade the chemical composition of the bottom.*" Boston Inner Harbor is not currently impaired for solids. For the Draft Permit, EPA has chosen to continue BMP requirements to control solids, while imposing chemical-specific limitations as necessary for toxic pollutants observed in the effluent. The Draft Permit continues the existing permit's monitoring requirements so that EPA can assess the success of Facility BMPs by looking for any trends in the data.

5.1.4 Oil and Grease

Oil and Grease is not a single chemical constituent, but includes a large range of organic compounds, which can be both petroleum-related (e.g., hydrocarbons) and non-petroleum (e.g., vegetable and animal oils and greases, fats, and waxes). These compounds have varying

physical, chemical, and toxicological properties. Generally, oils and greases in surface waters either float on the surface, are solubilized or emulsified in the water column, adsorb onto floating or suspended solids and debris, or settle on the bottom or banks. Oil and grease, or certain compounds within an oil and grease mixture, can be lethal to fish, benthic organisms and water-dwelling wildlife.

The Facility engages in activities that have the potential to discharge oil and grease. Various motorized cranes, trucks, unloading equipment, and cleaning equipment line the drydock with the potential to spill and release small to large amounts of associated oil and grease products. Stormwater or groundwater infiltrating the drydock could lead to the discharge of these products if not cleaned up properly. The Facility has never been required to monitor for oil and grease and did not submit any monitoring data for this parameter in their permit renewal application. Given these considerations, the Draft Permit includes monthly oil and grease monitoring, when the Facility is discharging.

5.1.5 Bacteria

Fecal coliform, E. coli, and enterococci bacteria, are indicators of contamination from sewage and/or the feces of warm-blooded wildlife (mammals and birds). Bacteria can survive in freshwater and saltwater environments and can impact water quality. While the Facility does not engage in activities that would be expected to generate large sources of bacteria, stormwater runoff can readily transport bacteria from surfaces susceptible to the waste products of warm-blooded animals or pathogens, which attach to organic and inorganic particles. In addition, pathogens could be discharged from the illicit release of vessel wastes.

As described above, Boston Inner Harbor is impaired for multiple designated uses with pathogens as a cited cause. Boston Inner Harbor is a Class SB water. Where designated, Class SB waters shall be suitable for shellfish harvesting with depuration (Restricted and Conditionally Restricted Shellfish Areas). Waters with a shellfishing designated use have fecal coliform as the indicator bacteria for shellfishing use. *See* 314 CMR 4.05(4)(b)(4)(a). The Massachusetts Division of Marine Fisheries (DMF) Shellfish Sanitation and Management classifies the shellfish area including Boston Inner Harbor (GBH4) as prohibited for shellfishing (closed to harvest of shellfish under all conditions, except gathering of seeds for municipal propagation programs under a DMF permit).[9]

The Massachusetts WQSs at 314 CMR 4.05(4)(b)(4)(a) limit fecal coliform in Class SB waters designated for shellfishing. The Massachusetts water quality standards limit fecal coliform to a geometric mean MPN (most probable number) of 88 organisms per 100 mL and not more than 10% of the samples exceeding an MPN of 260 organisms per 100 mL or other values of equivalent protection based on sampling and analytical methods used by the Massachusetts Division of Marine Fisheries and approved by the National Shellfish Sanitation Program in the latest revision of the *Guide For The Control of Molluscan Shellfish* (more stringent regulations may apply, *see* 314 CMR 4.06(1)(d)(5)).

[9] Massachusetts Division of Marine Fisheries Shellfish Area Classification Map. Growing Area Code GBH4. Available at http://www.massmarinefisheries.net/shellfish/dsga/GBH4.pdf.

In addition, when primary contact recreation is a designated use, as is the case for Class SB waters, specific criteria apply for enterococci based on the presence of bathing and non-bathing beaches, *see* 314 CMR 4.05(4)(b)(4)(b). For bathing beach waters and non-bathing beach waters, no single enterococci sample shall exceed 104 colonies per 100 mL and the geometric mean of the five most recent samples shall not exceed 35 enterococci colonies per 100 mL.

MassDEP released the Final Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds in October 2018.[10] The TMDL contains specific water quality targets for pathogens in the Mystic River sub-basin, including for Boston Inner Harbor (MA70-02). According to the TMDL, bacteria problems persist over much of the area due to a combination of discharges from CSOs, urban runoff, and illicit boat discharges. The TMDL lists enterococci and fecal coliform as indicator parameters for the pathogens in Boston Inner Harbor and prescribes waste load allocations based on Massachusetts WQSs for these parameters.

It is unknown if the Facility discharges bacteria at concentrations that would lead to exceedances of WQSs. Therefore, the Draft Permit includes quarterly monitoring requirements for both TMDL indicator parameters, *Enterococcus* and fecal coliform. Monitoring will ensure the Facility is not contributing to the pathogen impairments in Boston Harbor.

5.1.6 Metals

Metals are naturally occurring constituents in the environment and generally vary in concentration according to local geology. Metals are neither created nor destroyed by biological or chemical processes. However, metals can be transformed through processes including adsorption, precipitation, co-precipitation, and complexation. Some metals are essential nutrients at low levels for humans, animals, plants and microorganisms, but toxic at higher levels (e.g., copper and zinc). Other metals have no known biological function (e.g., lead). The environmental chemistry of metals strongly influences their fate and transport in the environment and their effects on human and ecological receptors. In aquatic systems, metal bioavailability refers to the concentration of soluble metal that adsorb onto, or absorb into and across, membranes of living organisms. The greater the bioavailability, the greater the potential for bioaccumulation, leading to increased toxicological effects.[11] Toxicity results when metals are biologically available at toxic concentrations affecting the survival, reproduction and behavior of an organism.

In its 2018 Permit renewal application, the Permittee reported that copper and zinc have the potential to be discharged at the Facility. Copper is found in various forms in antifoulant paints, including as cuprous oxide, cupric oxide, and elemental copper. Zinc is also sometimes present in these paints in the form of zinc oxide. The Permittee provided data for these metals and nickel,

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[10] *Final Pathogen TMDL for the Boston Harbor, Weymouth-Weir, and Mystic Watersheds*. MassDEP Division of Watershed Management, Watershed Planning Program, Worcester, Massachusetts, October, 2018 Control Number: 157.1. https://www.mass.gov/total-maximum-daily-loads-tmdls

[11] Magelhaes, Danielly et al. 2015. *Metal bioavailability and toxicity in freshwaters.* Environmental Chemistry Letters. DOI 10.1007/s10311-015-0491-9.

all of which were detected in the priority pollutant scan monitoring required for the 2013 Permit. This data is summarized in Tables A-1, A-2 and A-3 in Appendix B.

EPA completed an analysis to determine if these discharges cause, or have a reasonable potential to cause, or contribute to an excursion above State WQSs using EPA's 2002 *National Recommended Water Quality Criteria* for metals (Appendix C). State WQSs contain minimum criteria applicable to all surface waters for toxic pollutants, which requires the use of EPA's *National Recommended Water Quality Criteria: 2002, EPA 822-R-02-047, November 2002* where a specific pollutant is not otherwise listed in 314 CMR 4.00. *See* 314 CMR 4.05(5)(e).

The discharge is intermittent and therefore, acute effects are of greater relevance than chronic effects. EPA considered acute, saltwater aquatic life criteria for copper, nickel, and zinc. The acute saltwater aquatic life EPA *National Recommended Water Quality Criteria* for metals, expressed in terms of the dissolved metal in the water column, are as follows:

	Saltwater Acute Criteria
Copper	4.8 µg/L
Nickel	74 µg/L
Zinc	90 µg/L

In addition, to the criteria and projected effluent concentration provided by the Permittee, EPA also used the dilution factor discussed above to conduct the reasonable potential analysis. Again, the mixing zone used to derive the dilution factor was chosen to provide a reasonable hydrologic buffer between Boston Inner Harbor and the outfall. A larger mixing zone, extending to the edge of the canal would lead to a larger dilution factor, similarly a smaller mixing zone confined to the immediate area around the outfall could lead to a much smaller dilution factor. EPA finds that a dilution of 65:1 balances the need to control metals discharges from the Facility, while also accounting for the large mixing volume afforded by tidal exchange in Boston Harbor.

The results of EPA's analysis indicate discharges of nickel and zinc do not cause, or have a reasonable potential to cause, or contribute to an excursion above WQSs. As a result, the Draft Permit does not include effluent limitations for these metals. However, EPA's analysis does indicate discharges of copper cause, or have a reasonable potential to cause, or contribute to an excursion above the acute aquatic life water quality criterion. As a result, the Draft Permit includes a daily maximum copper limitation of 376 µg/L (0.376 mg/L). Due to the historically high copper concentrations and the variable nature of the discharge, monitoring frequency for copper has been increased to twice monthly when the Facility is discharging.

Twice per year monitoring for metals (cadmium, lead, copper, zinc, and nickel) in the discharge and the receiving water will be required in conjunction with Whole Effluent Toxicity Testing, discussed further below.

5.1.7 Whole Effluent Toxicity

CWA §§ 402(a)(2) and 308(a) provide EPA and States with the authority to require toxicity testing. Section 308 specifically describes biological monitoring methods as techniques that may be used to carry out objectives of the CWA. Whole effluent toxicity (WET) testing is conducted to ensure that the additivity, antagonism, synergism, and persistence of the pollutants in the discharge do not cause toxicity, even when the individual pollutants are present at low concentrations in the effluent. The inclusion of WET requirements in the Draft Permit will assure that the Facility does not discharge combinations of pollutants into the receiving water in amounts that would be toxic to aquatic life or human health.

In addition, under CWA § 301(b)(1)(C), discharges are subject to effluent limitations based on WQSs. Under CWA §§ 301, 303 and 402, EPA and the States may establish toxicity-based limitations to implement narrative water quality criteria calling for "no toxics in toxic amounts." *See also* 40 CFR § 122.44(d)(1). The Massachusetts WQSs at 314 CMR 4.05(5)(e) state, "All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife." In addition, the Massachusetts WQSs at 314 CMR 4.03(2)(a) require no lethality to organisms passing through a mixing zone.

In accordance with current EPA guidance and State policy,[12] whole effluent chronic effects are regulated by limiting the highest measured continuous concentration of an effluent that causes no observed chronic effect on a representative standard test organism, known as the chronic No Observed Effect Concentration (C-NOEC). Whole effluent acute effects are regulated by limiting the concentration that is lethal to 50% of the test organisms, known as the LC_{50}. Both EPA's *Technical Support Document for Water Quality-based Toxics Control* (1991) and the *Massachusetts Water Quality Standards Implementation Policy for the Control of Toxic Pollutants in Surface Waters* (February 23, 1990) recommended criterion to prevent acutely toxic effects is 0.3 T.U. Further, for discharges with dilution factors between 20 and 100, if there is reasonable potential to exceed water quality criteria, the *Massachusetts Water Quality Standards Implementation Policy for the Control of Toxic Pollutants in Surface Waters* (February 23, 1990) specifies that the end-of-pipe acute (i.e., LC_{50}) limit is 1.0 toxic units (T.U.), equivalent to an LC_{50} of 100%.

EPA finds that the effluent from the Facility is at high risk for toxicity: the available dilution is less than 100:1, little near field mixing of the effluent occurs at the discharge point to Boston Inner Harbor, and multiple toxic pollutants have been observed in the effluent. The discharge is intermittent and therefore, acute effects are of greater relevance than chronic effects. Toxicity testing has never been conducted at the Facility and therefore EPA cannot properly assess reasonable potential to exceed the acute toxicity criterion.

The Draft Permit includes a requirement to conduct WET testing twice per year so EPA can evaluate effluent toxicity relative to State WQSs. The test species are the mysid shrimp (*Americamysis bahia*) and inland silverside (*Menidia beryllina*). Toxicity testing must be performed in accordance with EPA Region 1's test procedures and protocols specified in

[12] *Massachusetts Water Quality Standards Implementation Policy for the Control of Toxic Pollutants in Surface Waters*. February 23, 1990.

Attachment A, *Saltwater Acute Toxicity Test Procedure and Protocol* (February 2011), of the Draft Permit.

5.1.8 Temperature

Section 502(6) of the Clean Water Act defines heat as a "pollutant." *See* 33 U.S.C. § 1362(6). Water temperature affects the metabolic and reproductive activities of aquatic organisms and can determine which fish and macroinvertebrate species can survive in a given water body. Certain cold-blooded species cannot regulate their body temperature through physiological means, so their body temperature reflects the temperature of the water they inhabit. Rapid increases or decreases in ambient water temperature can directly affect aquatic life, particularly fish. Ambient water temperature can indirectly affect aquatic life by influencing water quality parameters such as dissolved oxygen, by which the solubility of oxygen decreases as water temperature increases.

The Facility discharges NCCW through Outfall 002. This water originates from the fire main which diverts a portion of the seawater it pumps from the harbor to docked vessels for cooling of onboard refrigeration and air conditioning systems (Figure 3). The volume of water used for NCCW varies based on the vessel's specific needs, but the Permittee estimates that for a typical vessel, around 26% of the water discharged by the stripping pump is composed of NCCW. Of note, the NCCW discharged does not immediately travel through the stripping pump but accumulates on the drydock floor, equilibrating with atmospheric conditions, before discharging. In addition, this water is mixed with cooler, infiltrated groundwater and seawater before discharge. The Facility has not been required to monitor temperature in the past.

In developing the Draft Permit, EPA considered whether the discharge had the potential to violate WQSs for temperature at Outfall 002. The state waterbody classification for Boston Inner Harbor is Class SB. The WQSs at 314 CMR 4.05(4)(b)(2)(a) require that the instream water temperature, "shall not exceed 85°F (29.4°C) nor a maximum daily mean of 80°F (26.7°C), and the rise in temperature due to a discharge shall not exceed 1.5°F (0.8°C) during the summer months (July through September) nor 4°F (2.2°C) during the winter months (October through June)."

Given the dilution afforded by the outfall's mixing zone, EPA performed a mass-balance calculation to determine the effluent temperature that would be required to exceed the 1.5°F rise in temperature WQS. The calculation is similar to the reasonable potential analysis used for other pollutants in Appendix B:

$$T_{mixed} = \frac{T_{ambient}(DF - 1) + T_{effluent}}{DF}$$

Here, $T_{ambient}$ is the water temperature of Boston Inner Harbor; $T_{effluent}$ is the water temperature of the effluent discharged through Outfall 002; DF is the dilution factor – 65; and T_{mixed} is the water temperature of the diluted and mixed effluent. Assuming that the WQS is just met, T_{mixed} would be equal to the ambient temperature plus 1.5 degrees, such that:

$$T_{ambient} + 1.5°F = \frac{T_{ambient}(DF - 1) + T_{effluent}}{DF}$$

Rearranging the equation with the corresponding dilution factor:

$$T_{ambient} + 1.5°F = \frac{T_{ambient}(65 - 1) + T_{effluent}}{65}$$

$$65T_{ambient} + 97.5°F = 64T_{ambient} + T_{effluent}$$

$$97.5°F + T_{ambient} = T_{effluent}$$

For the WQS to be violated, the effluent temperature would have to be 97.5°F greater than the ambient temperature (for the 4°F winter WQS, the effluent temperature would have to be 260°F greater than the ambient temperature). Given this finding in addition to the fact that the NCCW is mixed with colder infiltrated water prior to discharge, EPA finds that the NCCW is unlikely to cause a violation of WQSs. Therefore, the Draft Permit does not include temperature limitations or monitoring requirements.

5.2 Clean Water Act 316(b)

During the issuance or reissuance of a NPDES permit, EPA is required to evaluate or re-evaluate compliance with applicable standards, including the technology standard specified in Section 316(b) of the CWA for cooling water intake structures (CWIS). Section 316(b) requires that:

> [a]ny standard established pursuant to section 301 or section 306 of this Act and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

33 U.S.C. § 1326(b). The operation of CWISs can cause or contribute to a variety of adverse environmental effects, such as killing or injuring fish larvae and eggs entrained in the water withdrawn from a water body and sent through a facility's cooling system, or by killing or injuring fish and other organisms by impinging them against the intake structure's screens. The effects of impingement and entrainment are referred to as adverse environmental impacts (See 79 FR 48303). CWA § 316(b) applies if a point source discharger seeks to withdraw cooling water from a water of the United States through a CWIS.

On August 15, 2014, EPA published *National Pollutant Discharge Elimination System—Final Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities and Amend Requirements at Phase I Facilities; Final Rule* (Final Rule)[13]. For existing facilities, the Final Rule codified Best Technology Available (BTA) requirements to reduce impingement

[13] EPA. *National Pollutant Discharge Elimination System—Final Regulations to Establish Requirements for Cooling Water Intake Structures at Existing Facilities and Amend Requirements at Phase I Facilities; Final Rule*. August 15, 2014. F.R. Vol 79 No. 158.

and entrainment of fish and other aquatic organisms at CWISs at existing facilities with a design intake flow (DIF) greater than 2 MGD and which use at least 25 percent of the water withdrawn exclusively for cooling purposes. 40 CFR § 125.91. The 2014 Final Rule established BTA standards for impingement mortality (40 CFR § 125.94(c)) and site-specific entrainment requirements (40 CFR § 124.94(d)). The Final Rule does not apply to the Facility because its DIF is less than 2 MGD; instead, 40 CFR § 125.90(b) dictates that "*Cooling water intake structures not subject to requirements under §§125.94 through 125.99 or subparts I or N of this part must meet requirements under section 316(b) of the CWA established by the Director on a case-by-case, best professional judgment (BPJ) basis.*" As a result, EPA has developed technology-based requirements for the Facility's CWIS by applying CWA § 316(b) on a BPJ, site-specific basis.

Neither the CWA nor EPA regulations dictate a specific methodology for developing BPJ-based limits under § 316(b). In the preamble to the proposed regulations for CWISs at existing facilities, EPA indicates that the Agency has broad discretion in determining the "best" available technology for minimizing adverse environmental impact (See 76 FR 22196). EPA has read CWA § 316(b) to intend that entrainment and impingement be regarded as "adverse impacts" that must be minimized by application of the BTA. While the factors from the effluent limitation development process, *see* 40 C.F.R. § 125.3(d)(3), are not strictly applicable as a matter of law to a BTA determination under § 316(b) because they are not specified in § 316(b), EPA has looked to the effluent limitation development process for guidance and will consider these factors, and perhaps other factors, to the extent the Agency deems them relevant to its determination of the BTA. Ultimately, EPA's determination of the BTA must be reasonable.

According to 40 CFR § 125.3(c)(2), a BPJ-based BAT analysis also should consider the "appropriate technology for the category of point sources of which the applicant is a member, based on all available information," and "any unique factors relating to the applicant." Unlike "typical" cooling water intake structures at electric power plants and manufacturing facilities, Boston Ship Repair uses cooling water as a temporary service to docked vessels rather than as a continuous part of Facility operations. As such, the appropriate technology for this facility may not be comparable to the operation of CWISs at steam electric power plants and manufacturing facilities.

5.2.1 State Water Quality Standards

In addition to satisfying technology-based requirements, NPDES permit limits for CWISs must also satisfy any more stringent provisions of State WQSs or other state legal requirements that may apply, as well as any applicable conditions of a state certification under CWA § 401. See CWA §§ 301(b)(1)(C), 401(a)(1), 401(d), 510; 40 C.F.R. §§ 122.4(d), 122.44(d). See also 40 CFR § 125.84(e). This means that permit conditions for CWISs must satisfy numeric and narrative water quality criteria and protect designated uses that may apply from the state's WQSs.

Massachusetts WQSs at 314 CMR 4.05(4)(b)(2)(d) for Class SB waters state "in the case of a cooling water intake structure (CWIS) regulated by EPA under 33 USC § 1251 (FWPCA, §316(b)), the Department has the authority under 33 USC § 1251 (FWPCA, §401), M.G.L. c. 21,

§§ 26 through 53 and 314 CMR 3.00 to condition the CWIS to assure compliance of the withdrawal activity with 314 CMR 4.00, including, but not limited to, compliance with narrative and numerical criteria and protection of existing and designated uses." Though the standard for Class SB waters, such as Boston Inner Harbor, does not include any specific numeric criteria that apply to cooling water intake structures, it is nevertheless clear that MassDEP must impose the conditions it concludes are necessary to protect the designated uses of the channel, including that it provide good quality habitat for fish and other aquatic life and be a recreational fishing resource. See 314 CMR 4.05(4)(b). In addition, 314 CMR 4.05(1) of the Massachusetts WQSs provides that each water classification "is identified by the most sensitive, and therefore governing, water uses to be achieved and protected." This means that where a classification lists several uses, permit requirements must be sufficient to protect the most sensitive use.

In summary, the Massachusetts WQSs apply to CWISs and the Draft Permit requirements must be sufficient to ensure that the Facility's CWIS neither causes nor contributes to violations of the WQSs and satisfy the terms of the State's water quality certification under § CWA 401. EPA anticipates that MassDEP will provide such certification before the issuance of the Final Permit.

5.2.2 Current Technology

Boston Ship Repair's CWIS consists of two separate pumps seated vertically in the canal outside of the drydock adjacent to Outfall 002. The pumps both have individual DIFs of 1,200 gallons per minute (1.728 MGD) but the second pump is redundant, and the current piping does not allow them to be simultaneously run. One pump is kept as a backup for when repairs or maintenance issues arise. Each pump is covered by a 12-inch diameter, 6-inch tall cylindrical mesh basket screen with square 5/8-inch wide openings. The screen is continuously submerged, while the pump itself extends up to land surface where it is connected to the fire main for use both as emergency fire suppression water and to connect to the cooling system on docked vessels. Images of one of the pumps and its mesh screen are provided in Figure 4.

Vessels undergoing repairs in the drydock may require seawater for two main systems: (1) the fire main and (2) for onboard cooling. Federal, State, and local regulations require that a drydock facility provide sufficient water pressure for a vessel's firefighting system. A vessel docked at Boston Ship Repair may either have a "Dry" connection to the drydock's fire main where no water flow is supplied except as needed during firefighting, or a "Charged" connection where a constant flow is supplied onboard the vessel's fire main. CWA 316(b) does not apply to withdrawals used for fire suppression, only for cooling water. Water withdrawals for fire suppression is not considered in making a BTA determination. The Permittee has estimated that 5,400 gallons per hour (0.13 MGD) are used for the fire main when the vessel is in a "Charged" connection; this water is discharged to the floor of the drydock. In a "Dry" connection, water would return to the harbor through Outfall 003 without passing onto the drydock.

Non-contact cooling water (NCCW) is not needed during the entire drydocking maintenance period because there is no power to the vessel. NCCW is used onboard vessels to provide ambient temperature requirements for crew, equipment and other ancillary systems. The main uses of cooling water are air conditioning systems in electronics rooms, cooling for refrigerated cargo, and air conditioning systems when crew are onboard. The amount of cooling water used

varies between vessels due to their range of sizes and cooling water needs. Cooling water use also varies throughout the duration of the time a vessel is docked. The Permittee has estimated that on an average day for a typical vessel about 0.25 MGD of cooling water and fire main water is used and discharged. In addition, the Permittee estimated that the maximum cooling water and fire main water that could be supplied to a vessel, based on the pump's DIF and the size of the fire main supply connection, would be 24,948 gallons per hour (0.60 MGD).

After a vessel is docked and the drydock is emptied, the vessel's cooling water system is connected to the drydock fire main. The system is connected through a single regulating valve, with multiple potential locations or "Alters" spanning the length of the drydock (Figure 5). The water then is rerouted as needed by the specific vessel once onboard. NCCW is discharged directly to the floor of the drydock from the docked vessel; there it mixes with other water sources before discharging through Outfall 002 to Boston Inner Harbor. The fire main is disconnected from the vessel before re-flooding the drydock.

Cooling water flow can vary from 0 MGD (if no vessel is docked or a docked vessel does not require cooling water) to 0.60 MGD (the maximum pump cooling water capacity). The Permittee has provided a "typical" estimate of 0.25 MGD which is the average cooling water use of a given vessel and representative only of times when cooling water is needed (i.e., this average value does not capture days when a vessel is docked but no cooling water is needed). Based on the range of flows used for cooling water, EPA calculated what the CWIS's through screen velocity (TSV) would be at the intake pump. Given a cylinder (12-in diameter and 6-in high) with one opening blocked by the pump, the cross-sectional surface area of the screen would be 339 in^2. With 5/8-in square openings, EPA estimated that about 80% of this area is permeable, leading to a cross-sectional surface area of 271 in^2 (1.88 ft^2). Dividing this area into the various flow scenarios (and converting to ft/s) results in the following TSV estimates:

Flow Scenario	Flow (MGD)	TSV (ft/s)
No flow	0.0	0.0
Typical vessel	0.25	0.21
Maximum flow given pressure regulating valves	0.60	0.49
Maximum flow based on pump's design capacity	1.782	1.47

The last scenario (based on pump capacity) assumes that the pump is not connected to any pressure regulating valves on the drydock and is running at its design flow capacity; however, this is not currently feasible at the Facility.

5.2.3 BTA Determination and Requirements

The 2013 Permit did not include any 316(b) conditions and no determination has been made on the BTA to minimize adverse environmental impacts related to the Facility's cooling water withdrawal. The Permittee is not aware of any biological monitoring outside of the drydock and

visual inspection of the submerged pump and mesh screen occurs only when the existing pumps require repair.

The use of cooling water at Boston Ship Repair is not typical of other existing facilities in Region 1 to which 316(b) requirements have been applied. For instance, the use and withdrawal of cooling water at Boston Ship Repair is highly variable and, given the variety of vessels that are docked and the vessel's own changing needs, flow requirements cannot be precisely predicted ahead of time. In addition, cooling water and fire suppression water do not diverge until they are on board a ship. Fire suppression water is not regulated under CWA 316(b). See 40 CFR § 125.92(g) ("D[esign] I[ntake] F[low] does not include values associated with…fire suppression capacity…").

One potential source of guidance for this BTA determination is EPA's 2014 Noncontact Cooling Water General Permit for Massachusetts and New Hampshire (NCCW GP).[14] The NCCW GP is an appropriate point of comparison since it regulates facilities with cooling water flows of similar magnitude to the Facility and is in accordance with Massachusetts WQSs. The conditions in the NCCW GP are comprehensive and flexible in that they apply to a broad range of small cooling water dischargers across Region 1. In addition to those conditions from the NCCW GP, EPA considered the following factors related to the Facility's cooling water withdrawal:

- An alternate CWIS location in Boston Inner Harbor is not feasible given the location of the Facility at the end of a canal.
- The Facility's current use of cooling water is intermittent and variable and of relatively small volume as compared to the Final Rule's 2 MGD applicability threshold and the NCCW GP's 1 MGD flow limitation. The majority of operations require no cooling water use.
- The intake, a 12-inch diameter basket screen, is small and impingement of multiple fish would be unlikely, if not impossible.
- The intake screens enclosing the pumps are submerged and organisms are not removed from the source water.
- The Facility does not employ chlorination or other chemicals to treat the intake screens.

Given these considerations and the NCCW GP as a reference point, EPA finds that the existing technology at the Facility is the BTA for impingement and entrainment. The Facility withdraws a low volume of cooling water relative to regulatory thresholds and does so only as needed by docked vessels. Future withdrawals at current volumes and the minimization of withdrawals when cooling water is not needed is the BTA for entrainment. For impingement, the intake flows and the screens surrounding the fire main pumps are such that the typical and maximum TSV is below 0.5 ft/s. Continued operation of the pumps as described by the Facility with a screen of equivalent dimensions is the BTA for impingement.

The Draft Permit's 316(b) conditions in Part I.C.1. and I.C.2. require the Facility to continue current operations of the fire main pumps to minimize adverse environmental impacts related to

[14] The NCCW GP can be found at https://www.epa.gov/npdes-permits/noncontact-cooling-water-general-permit-nccw-gp-massachusetts-new-hampshire.

impingement and entrainment. Relatedly, Part I.C.3. is included as a notification requirement to ensure that any CWIS design modifications will continue to meet BTA for impingement and entrainment. For Part I.C.4., while the Permittee has not observed any mortality of adult or juvenile fish associated with the fire pumps, observation of such in the future will alert both the Facility and the Agencies of the failure of the CWIS to prevent adverse environmental impact. Lastly, the information requirements in Part I.C.5. will ensure that EPA has enough information on the CWIS and source water to modify the 316(b) requirements as needed during a future permit renewal. These conditions were derived from the NCCW GP and have been modified to fit this Facility.

5.3 Special Conditions

5.3.1 Best Management Practices

Best management practices (BMPs) may be expressly incorporated into a permit on a case-by-case basis where it is determined that they are necessary to achieve effluent limitations and standards or to carry out the purpose and intent of the CWA under § 402(a)(1). BMPs may be necessary to control or abate the discharge of pollutants when: 1) authorized under section 304(e) of the CWA for the control of toxic pollutants and hazardous substances from ancillary industrial activities; 2) authorized under CWA § 402(p) for the control of storm water discharges; 3) numeric effluent limitations are infeasible; or 4) the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA. *See* 40 CFR § 122.44(k). Pollutants may be present because they are generated during Facility operations, which could result in significant amounts of these pollutants reaching waters of the United States via discharges of wastewater and stormwater.

In this case, the Draft Permit requires the selection, design, installation, and implementation of control measures for any water held in the drydock and discharged by the stripping pump through Outfall 002. Such sources of water include stormwater, groundwater infiltration, non-contact cooling water from docked vessels, and seawater leaking in from the caisson gate. The Draft Permit requires the Permittee to implement and continually evaluate the Facility's structural controls (e.g., pump intakes, containment areas, holding tanks), and non-structural controls (operational procedures, site inspections, and operator training). Proper implementation of BMPs will minimize the potential discharge of pollutants related to inadequate treatment, human error, and/or equipment malfunction. The non-numeric limitations are consistent with the limitations specified in Part 2.1.2 of EPA's 2015 Multi-Sector General Permit (MSGP).[15] Non-numeric limitations include:

- Minimize exposure of processing and material storage areas to stormwater discharges;
- Design good housekeeping measures to maintain areas that are potential sources of pollutants;
- Implement preventative maintenance programs to avoid leaks, spills, and other releases of pollutants to stormwater that is discharged to receiving waters;

[15] The MSGP is currently available at: https://www.epa.gov/npdes/final-2015-msgp-documents.

- Implement spill prevention and response procedures to ensure effective response to spills and leaks if or when they occur;
- Design of erosion and sediment controls to stabilize exposed areas and contain runoff using structural and/or non-structural control measures to minimize onsite erosion and sedimentation, and the resulting discharge of pollutants;
- Utilize runoff management practices to divert, infiltrate, reuse, contain, or otherwise reduce stormwater runoff;
- Develop proper handling procedures for salt or materials containing chlorides that are used for snow and ice control;
- Conduct employee training to ensure personnel understand the requirements of this permit;
- Evaluate for the presence of non-stormwater discharges. Any non-stormwater discharges not explicitly authorized in the Draft Permit or covered by another NPDES permit must be eliminated; and
- Minimize dust generation and vehicle tracking of industrial materials.

In addition to the general limitations described above, the Draft Permit also includes BMPs based on EPA's 2015 MSGP, including Part 8, Sector R – Ship and Boat Building and Repair Yards.[16] BMP requirements include:

- The Draft Permit requires the Permittee to comply with the inspection requirements in Parts 3.1 and 3.2 of the 2015 MSGP and the corrective action requirements in Parts 4.1 through 4.5 of the 2015 MSGP;[17]
- The Draft Permit requires the Permittee to comply with the control measure requirements in Parts 2.1 and 2.1.1 of the 2015 MSGP in order to identify pollutant sources and select, design, install and maintain the pollution control technology necessary to meet the effluent limitations in the permit that ensure dilution is not used as a form of treatment;[18]
- The Draft Permit requires the Permittee to comply with sector specific non-numeric technology-based effluent limitations included in Sector R – Ship and Boat Building and Repair Yards;

These non-numeric effluent limitations support, and are equally enforceable as, the numeric effluent limitations included in the Draft Permit. The purpose of these requirements is to reduce or eliminate the discharge of pollutants to waters of the United States. They have been selected on a case-by-case basis based on those appropriate for this specific facility. *See* CWA §§ 304(e) and 402(a)(1) and 40 CFR § 122.44(k). These requirements will also ensure that discharges from the Facility will meet State WQSs pursuant to CWA § 301(b)(1)(C) and 40 CFR § 122.44(d)(1). Unless otherwise stated, the Permittee may select, design, install, implement and maintain BMPs

[16] The 2015 MSGP is currently available at: https://www.epa.gov/npdes/final-2015-msgp-documents.
[17] Where the MSGP refers to limitations, conditions or benchmarks, including the SWPPP, for the purposes of this permit, these shall refer to the limitations and conditions in this permit.
[18] Page 7-113 of EPA-821-R-04-014 states, "[w]astewater requiring primary and/or secondary treatment (because it is contaminated with oil and grease and total petroleum hydrocarbons) is typically tank bottom water, loading/unloading rack water, a portion of the tank basin water, wastewater generated during remediation, and water used for hydrostatic testing." *See* Part 2.5.2.d of the 2017 RGP for example technologies and additional resources.

as the Permittee deems appropriate to meet the permit requirements. The selection, design, installation, implementation and maintenance of control measures must be in accordance with good engineering practices and manufacturer's specifications.

5.3.2 Stormwater Pollution Prevention Plan

On September 9, 1992, EPA issued its general permit for stormwater discharges associated with industrial activity, which, among other things, required all facilities to prepare a Stormwater Pollution Prevention Plan (SWPPP) to implement technology-based pollution prevention measures in lieu of numeric limitations. [19] The general permit established a process whereby the operator of the industrial facility evaluates potential pollutant sources at the site and selects and implements appropriate measures designed to prevent or control the discharge of pollutants in stormwater runoff.[20] This Draft Permit contains BMPs for stormwater and other drydock water associated with industrial activity. In addition to BMPs, the Draft Permit also contains requirements for the Permittee to develop, implement, and maintain a SWPPP for stormwater discharges associated with industrial activity. These requirements are consistent with EPA's MSGP effective June 4, 2015. The Draft Permit specifies that the SWPPP must include the following, at a minimum:

- Stormwater pollution prevention team;
- Site description;
- Drainage area site map;
- Summary of potential pollutant sources;
- Documentation of good housekeeping measures including blasting and painting areas and storage areas; and
- Schedules and procedures pertaining to implementation of stormwater control measures, inspections and assessments, and monitoring.

The development and implementation of the SWPPP is an enforceable element of the permit. The Draft Permit directs the Permittee to incorporate BMPs, as described above, directly into the SWPPP, which serves to document the selection, design and installation of control measures selected to meet the permit effluent limitations. The goal of the SWPPP is to reduce or prevent the discharge of pollutants to waters of the United States either directly or indirectly through stormwater runoff.

The Draft Permit requires the Permittee within ninety (90) days of the effective date of the permit to certify that the SWPPP has been prepared, meets the requirements of the permit, and documents the control measures, including BMPs, that have been implemented to reduce or eliminate the discharge of pollutants from drydock water associated with industrial activity. The Permittee must also certify at least annually that the Facility has complied with the BMPs described in the SWPPP, including inspections, maintenance, and training activities. The Permittee is required to amend and update the SWPPP if any change occurs at the Facility

[19] Fed. Reg. 41264 (September 9, 1992).
[20] Fed. Reg. 41242 (September 9, 1992).

affecting the SWPPP, such as changes in the design, construction, operation, or maintenance of the Facility. The SWPPP must be maintained on site at the Facility and provided to EPA and/or the State upon request. All SWPPP records must be maintained on-site for at least three years.

5.3.3 Discharges of Chemicals and Additives

Chemicals and additives include, but are not limited to: algaecides/biocides, antifoams, coagulants, corrosion/scale inhibitors/coatings, disinfectants, flocculants, neutralizing agents, oxidants, oxygen scavengers, pH conditioners, and surfactants. The Draft Permit allows the discharge of only those chemicals and additives specifically disclosed by the Permittee to EPA. No chemicals or additives were disclosed to EPA.

EPA recognizes that chemicals and additives in use at a Facility may change during the term of the permit. As a result, the Draft Permit includes a provision that requires the Permittee to notify EPA in writing of the discharge a new chemical or additive; allows for EPA review of the change; and provides the factors for consideration of such changes. The Draft Permit specifies that for each chemical or additive, the Permittee must submit the following information, at a minimum, in writing to EPA:

- Product name, chemical formula, and manufacturer of the chemical/additive.
- Purpose or use of the chemical/additive.
- Safety Data Sheet (SDS) and Chemical Abstracts Service (CAS) Registry number for each chemical/additive.
- The frequency (e.g., hourly, daily), magnitude (e.g., maximum and average), duration (e.g., hours, days), and method of application for the chemical/additive.
- If available, the vendor's reported aquatic toxicity (i.e., NOAEL and/or LC_{50} in percent for aquatic organism(s)).

The Permittee must also provide an explanation that demonstrates that the discharge of such chemical or additive: 1) will not add any pollutants in concentrations that exceed any permit effluent limitation; and 2) will not add any pollutants that would justify the application of permit conditions different from, or in addition to those currently in this permit.

Assuming these requirements are met, discharges of a new chemical or additive is authorized under the permit upon notification to EPA unless otherwise notified by EPA.

6.0 Federal Permitting Requirements

6.1 Endangered Species Act

Section 7(a) of the Endangered Species Act of 1973, as amended (ESA), grants authority to and imposes requirements on Federal agencies regarding endangered or threatened species of fish, wildlife, or plants (listed species) and any habitat of such species that has been designated as critical under the ESA (i.e., “critical habitat”).

Section 7(a)(2) of the ESA requires every Federal agency, in consultation with and with the assistance of the Secretary of Interior, to ensure that any action it authorizes, funds or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. The United States Fish and Wildlife Service (USFWS) administers Section 7 consultations for freshwater species. The National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) administers Section 7 consultations for marine and anadromous species.

The Federal action being considered in this case is EPA's proposed NPDES permit for the Facility's discharges of pollutants and intake of Boston Harbor water. The Draft Permit is intended to replace the 2013 Permit in governing the Facility. As the federal agency charged with authorizing the discharge from this Facility, EPA determines potential impacts to federally listed species, and initiates consultation with the Services, when required under § 7(a)(2) of the ESA.

EPA has reviewed the federal endangered or threatened species of fish, wildlife, and plants under the jurisdiction of USFWS in the action area to determine if EPA's proposed NPDES permit could potentially impact any such listed species. One federally listed threatened species has been identified for the action area, the piping plover (*Charadrius melodus)*, a nesting shorebird found along the Atlantic Coast and in the vicinity of Boston Inner Harbor.[21] The piping plover is found along coastal sand and gravel beaches in the northeast from March to August. They eat mainly insects, marine worms, and crustaceans. The population is threatened from habitat loss and degradation due to coastal development and stabilization, as well as predation and human disturbance.

The outfall does not disturb the shoreline habitat of this bird and does not come in contact with the sandy shore intertidal fish, worms and crustaceans that this bird feeds on. Based on this assessment, EPA has determined that this federally protected shorebird species, as well as its prey, are not present in the action area.

Another listed endangered species, the northern long-eared bat (*Myotis septentrionalis*), was identified as "statewide". According to the USFWS, the northern long-eared bat is seasonally found as follows, "winter – mines and caves, summer – wide variety of forested habitats." This species is not aquatic. Therefore, the proposed permit action will have no direct or indirect effect on this listed species, since the species is not expected to overlap with the action area. Based on the assessment that these two species do not occur in the action area, consultation with USFWS under Section 7 of the ESA is not required.

Regarding protected species under the jurisdiction of NOAA Fisheries, a number of anadromous and marine species and life stages likely overlap the action area of the Facility. Subadult and adult life stages of Atlantic sturgeon (*Acipenser oxyrinchus*), adult shortnose sturgeon (*Acipenser brevirostrom*), adult and juvenile life stages of the following sea turtles - leatherback sea turtles (*Dermochelys coriacea*), loggerhead sea turtles (*Caretta caretta*), Kemp's ridley sea turtles (*Lepidochelys kempii*), green sea turtles (*Chelonia mydas*); adult and juvenile life stages

[21] See https://ecos.fws.gov/ipac/ [for UFWS] and/or https://www.greateratlantic.fisheries.noaa.gov/protected/section7/index.html [for NMFS]

of the following whales - North Atlantic right whales (*Eubalaena glacialis*) and fin whales (*Balaenoptera physalus*) are all expected to be present in Massachusetts coastal waters and may overlap the action area of the discharge in the Boston Inner Harbor.[22] These protected species life stages are likely influenced by the discharge from this Facility.

Because these species may be affected by the discharge authorized by the proposed permit, EPA has evaluated the potential impacts of the permit action on these anadromous and marine species. On the basis of the evaluation, EPA's preliminary determination is that this action may affect, but is not likely to adversely affect, the relevant life stages of the NOAA Fisheries listed species above that are expected to inhabit the immediate coast near the Facility in the vicinity of the action area of the discharge. Therefore, EPA has judged that a formal consultation pursuant to Section 7 of the ESA is not required. EPA is seeking concurrence from NOAA Fisheries regarding this determination through the information in the Draft Permit, this Fact Sheet, as well as a letter that will be sent to NOAA Fisheries Protected Resources Division under separate cover.

Re-initiation of consultation will take place: (a) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in the consultation; (b) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the consultation; or (c) if a new species is listed or critical habitat is designated that may be affected by the identified action.

6.2 Essential Fish Habitat

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (*see* 16 U.S.C. § 1801 *et seq*., 1998), EPA is required to consult with the NOAA Fisheries if EPA's action or proposed actions that it funds, permits, or undertakes, "may adversely impact any essential fish habitat". 16 U.S.C. § 1855(b).

The Amendments broadly define "essential fish habitat" (EFH) as: "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity". 16 U.S.C. § 1802(10). "Adverse impact" means any impact that reduces the quality and/or quantity of EFH. 50 CFR § 600.910(a). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), or site specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

EFH is only designated for fish species for which federal Fisheries Management Plans exist. *See* U.S.C. § 1855(b)(1)(A). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999.

[22] https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=1bc332edc5204e03b250ac11f9914a27

A review of the relevant essential fish habitat information provided by NOAA Fisheries[23] indicates that the outfall exists within designated EFH for 26 federally managed species. The EFH species and life stages are listed in Table 3.

EPA's Finding of all Potential Impacts to EFH Species

- This Draft Permit action does not constitute a new source of pollutants because it is the reissuance of an existing NPDES permit;
- The effluent discharged consists of intake water from Boston Inner Harbor and stormwater, groundwater, and non-contact cooling water collected in secondary containment areas, managed using BMPs, minimizing the likelihood of any toxic pollutants in the discharge;
- Acute toxicity tests will be conducted bi-annually to evaluate the lethality of the discharge;
- A monitoring requirement for flow will be implemented year-round in order to allow predicted mixing with the receiving water;
- Discharge monitoring requirements have been proposed for flow, pH, total suspended solids, oil and grease, and total copper in order to meet federal effluent limitations guidelines and state water quality standards;
- The Draft Permit prohibits the discharge of pollutants or combination of pollutants in toxic amounts;
- The effluent limitations and conditions in the Draft Permit were developed to be protective of all aquatic life; and
- The Draft Permit prohibits violations of the state water quality standards.

EPA believes that the conditions and limitations contained within the Boston Ship Repair Draft Permit adequately protects all aquatic life, including those species with designated EFH in the receiving water. Further mitigation is not warranted. Should adverse impacts to EFH be detected as a result of this permit action, or if new information is received that changes the basis for EPA's conclusions, NOAA Fisheries will be contacted and an EFH consultation will be re-initiated.

In addition to this Fact Sheet and the Draft Permit, information to support EPA's finding is included in a letter under separate cover that will be sent to the NOAA Fisheries Habitat Division after the public comment period has begun.

7.0 Public Comments, Hearing Requests, and Permit Appeals

All persons, including applicants, who believe any condition of the Draft Permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to:

[23] NOAA EFH Mapper available at http://www.habitat.noaa.gov/protection/efh/efhmapper/

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Prior to the close of the public comment period, any person may submit a written request to EPA for a public hearing to consider the Draft Permit. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held if the criteria stated in 40 CFR § 124.12 are satisfied. In reaching a final decision on the Draft Permit, EPA will respond to all significant comments in a Response to Comments document attached to the Final Permit and make these responses available to the public at EPA's Boston office and on EPA's website.

Following the close of the comment period, and after any public hearings, if such hearings are held, EPA will issue a Final Permit decision, forward a copy of the final decision to the applicant, and provide a copy or notice of availability of the final decision to each person who submitted written comments or requested notice. Within 30 days after EPA serves notice of the issuance of the Final Permit decision, an appeal of the federal NPDES permit may be commenced by filing a petition for review of the permit with the Clerk of EPA's Environmental Appeals Board in accordance with the procedures at 40 CFR § 124.19.

8.0 Administrative Record

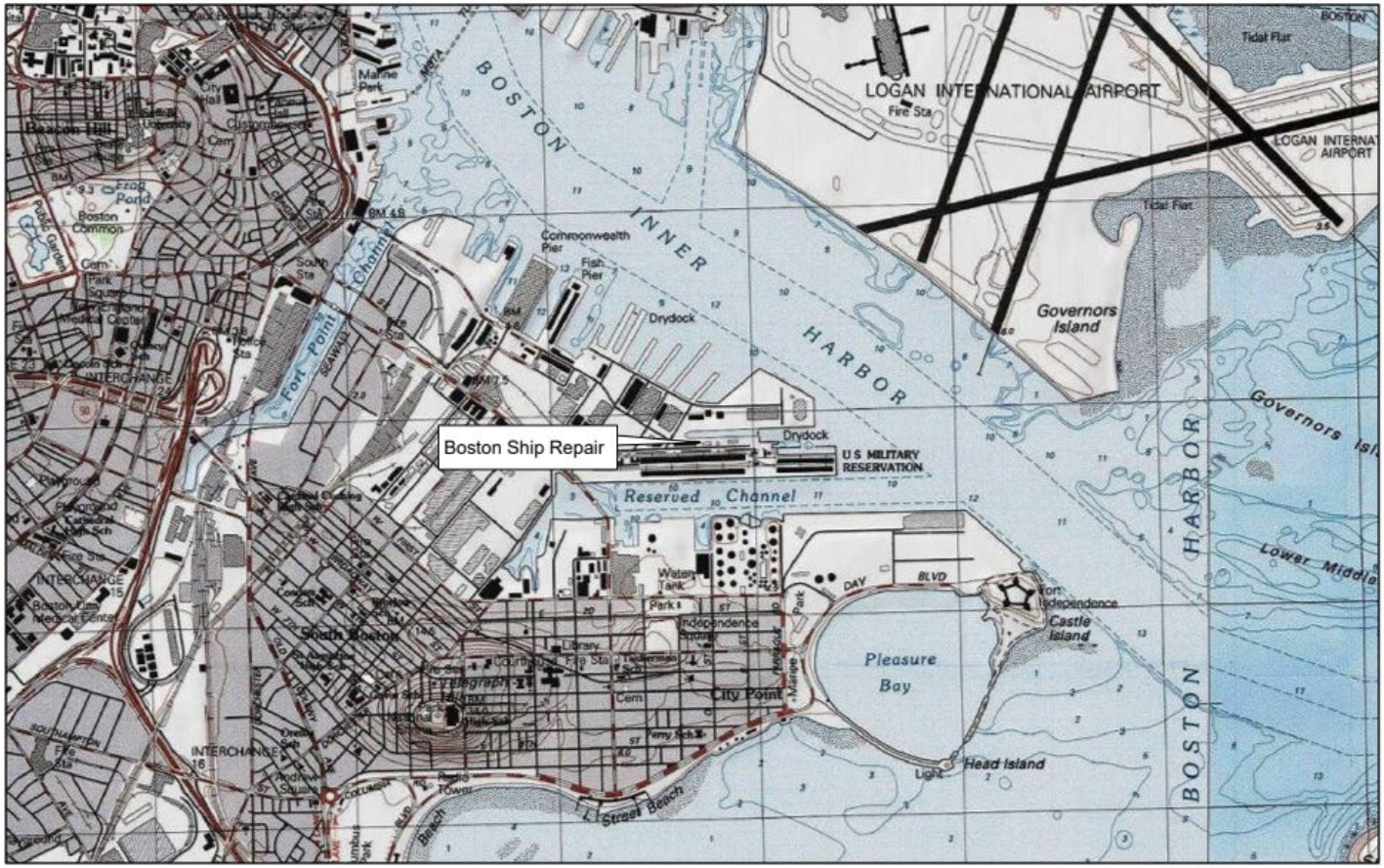
The administrative record on which this Draft Permit is based may be accessed at EPA's Boston office by appointment, Monday through Friday, excluding holidays from Nathan Chien, EPA Region 1, 5 Post Office Square, Suite-100 (06-1), Boston, MA 02109-3912, or via email to chien.nathan@epa.gov.

January 12, 2021

Ken Moraff, Director
Water Division
U.S. Environmental Protection Agency

Figure 1: Location Map

Boston Ship Repair Facility Location



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1:36,112

0 0.23 0.45 0.9 mi

0 0.35 0.7 1.4 km

Copyright:© 2013 National Geographic Society, i-cubed

Figure 2: Site Plan

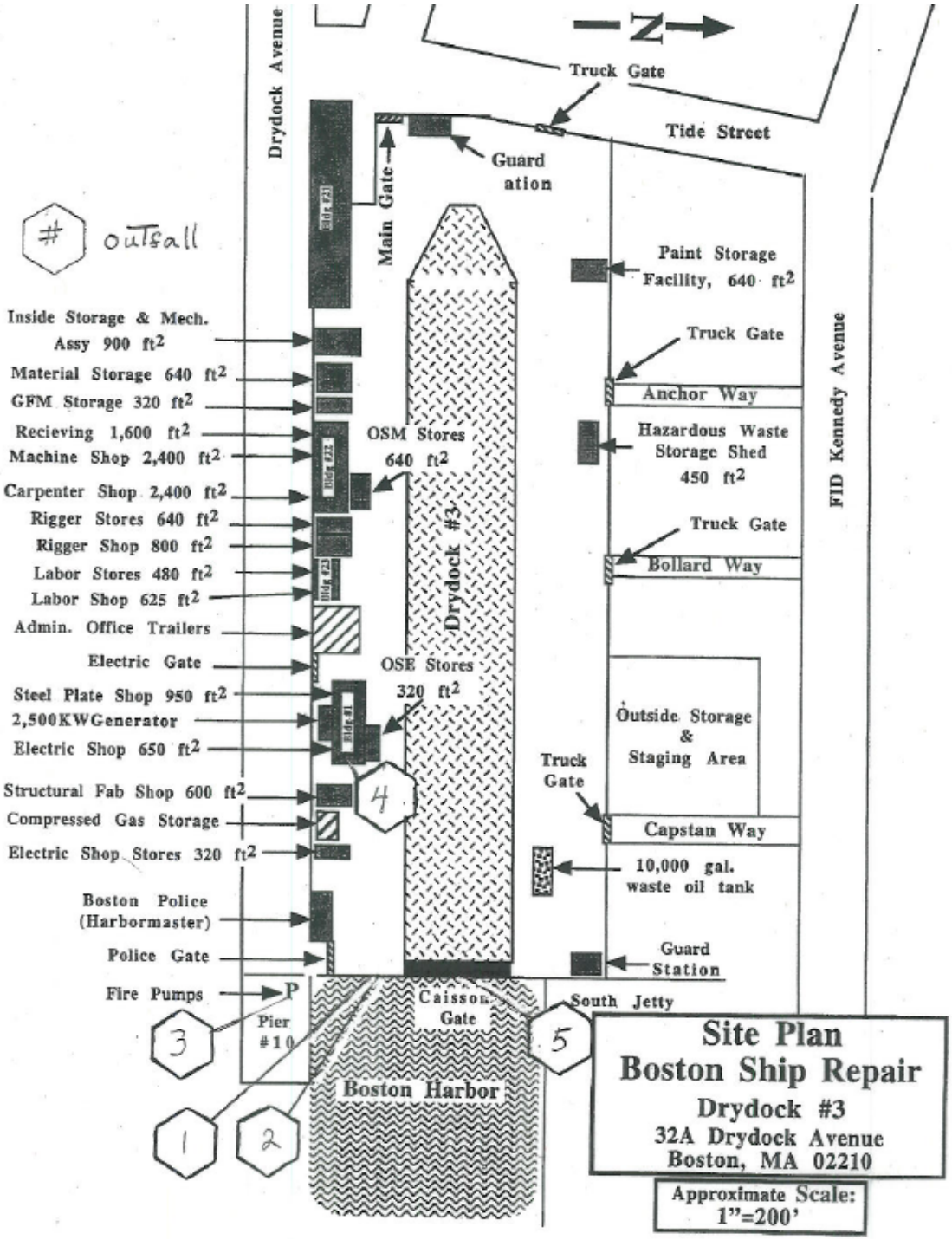
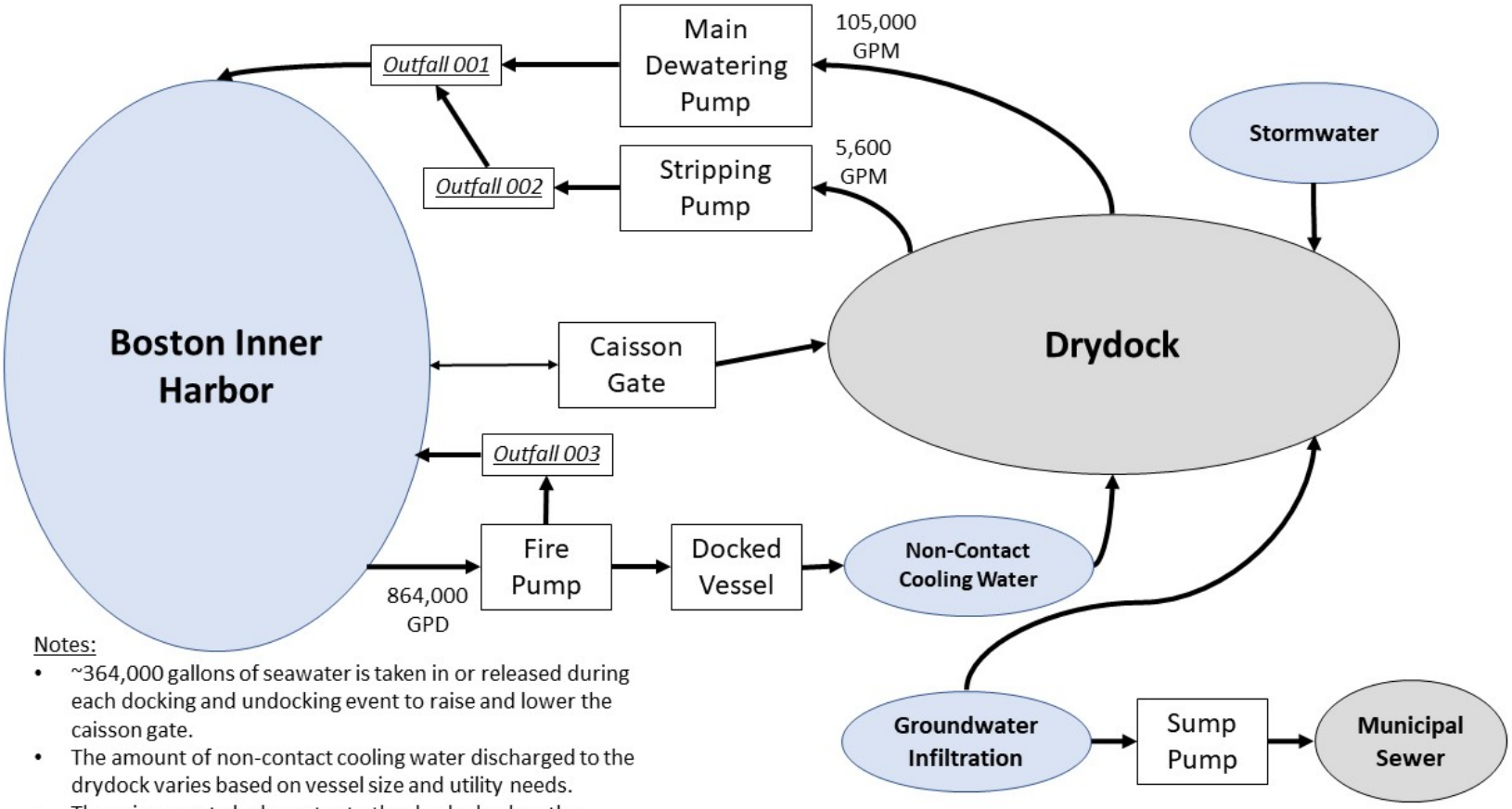


Figure 3: Schematic of Water Flow

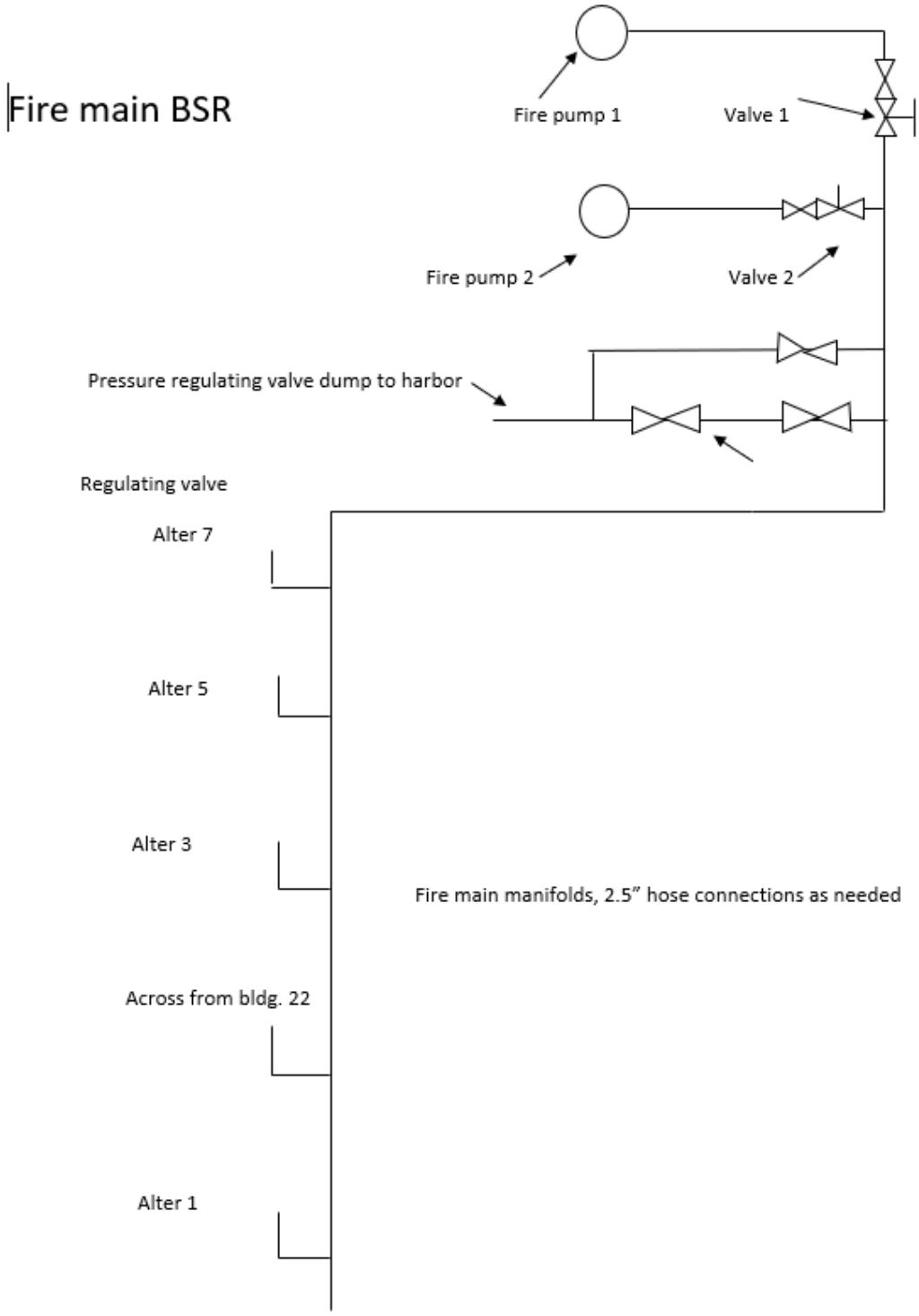


Notes:

- ~364,000 gallons of seawater is taken in or released during each docking and undocking event to raise and lower the caisson gate.
- The amount of non-contact cooling water discharged to the drydock varies based on vessel size and utility needs.
- The caisson gate leaks water to the drydock when the drydock is not flooded.

Figure 4: Cooling Water Intake Pump and Mesh Screen

Figure 5: Fire Main Piping Schematic



Appendix A: Discharge Monitoring Data

BOSTON SHIP REPAIR Outfall 002 Monthly Effluent Monitoring				
Parameter	**Total Flow**	**TSS**	**TSS**	**Copper**
	Daily Max	**Monthly Avg**	**Daily Max**	**Daily Max**
Units	**MGD**	**mg/L**	**mg/L**	**mg/L**
Effluent Limit	**Report**	**Report**	**Report**	**Report**
Minimum	**0.78**	**0**	**0**	**0.0078**
Maximum	**4.49**	**23.6**	**52.4**	**0.64**
Median	**1.59**	**Non-Detect**	**12.25**	**0.08675**
No. of Violations	**N/A**	**N/A**	**N/A**	**N/A**
Monitoring Period End Date				
9/30/2015	NODI: C	NODI: C	NODI: C	NODI: C
10/31/2015	1.98	2.65	5.3	NODI: C
11/30/2015	1.60	23.6	40	0.14
12/31/2015	0.80	4.65	9.3	NODI: C
1/31/2016	NODI: C	NODI: C	NODI: C	NODI: C
2/29/2016	1.85	6	6	0.037
3/31/2016	NODI: C	NODI: C	NODI: C	NODI: C
4/30/2016	NODI: C	NODI: C	NODI: C	0.64
5/31/2016	1.20	4.1	8.7	0.64
6/30/2016	1.74	9.6	19	0.64
7/31/2016	1.74	5.5	11	0.076
8/31/2016	1.90	10.8	42	0.076

9/30/2016	1.15	7.4	14	0.076
10/31/2016	NODI: C	NODI: C	NODI: C	0.0078
11/30/2016	2.27	4.8	4.8	0.0078
12/31/2016	2.41	< 2	2	0.0078
1/31/2017	2.38	8.1	20	0.071
2/28/2017	NODI: C	NODI: C	NODI: C	0.071
3/31/2017	4.49	8.2	15.9	0.071
4/30/2017	2.87	4.75	5.5	0.178
5/31/2017	1.00	7.7	18.3	0.0395
6/30/2017	1.85	12.8	14.6	0.178
7/31/2017	NODI: C	NODI: C	NODI: C	0.0863
8/31/2017	1.68	17.8	21.5	0.0863
9/30/2017	1.94	13.5	17.1	0.0863
10/31/2017	1.55	15.9	20.1	0.0128
11/30/2017	1.58	15.3	17.5	0.0128
12/31/2017	2.97	17.5	21.8	0.0128
1/31/2018	2.83	16.13	25.4	0.039
2/28/2018	3.32	9.4	14.1	0.039
3/31/2018	3.26	13	19.4	0.039
4/30/2018	0.96	11.49	20.2	0.0872
5/31/2018	3.32	< 10.4	17.6	0.0872
6/30/2018	2.25	< 11.6	18	0.0872
7/31/2018	2.09	< 10.03	21.2	0.0804
8/31/2018	1.44	7.89	12.6	0.0804
9/30/2018	NODI: C	NODI: C	NODI: C	0.0804
10/31/2018	1.23	8.75	8.75	0.299
11/30/2018	3.48	< 5.85	7.88	0.299
12/31/2018	2.43	< 4.41	8.25	0.299
1/31/2019	3.37	< 15.44	52.4	0.248
2/28/2019	NODI: C	NODI: C	NODI: C	0.248
3/31/2019	2.34	10.01	11.9	0.248

4/30/2019	1.14	< 18.48	39.3	0.149
5/31/2019	1.15	< 7.72	26.1	0.149
6/30/2019	1.56	< 6.21	12	0.149
7/31/2019	NODI: C	NODI: C	NODI: C	0.109
8/31/2019	2.78	15.76	25.4	0.109
9/30/2019	1.27	13.3	18.4	0.109
10/31/2019	0.78	< 6.41	16.3	0.102
11/30/2019	1.00	< 5.12	9.75	0.102
12/31/2019	1.29	< 9.7	28.3	0.102
1/31/2020	2.57	< 4.69	6.25	0.115
2/29/2020	1.85	< 3.13	< 3.13	0.115
3/31/2020	1.96	< 7.69	10.8	0.115
4/30/2020	1.68	< 5.8	12.5	0.127
5/31/2020	1.18	< 9.2	18.8	0.127
6/30/2020	1.18	< 4.06	5	0.127
7/31/2020	NODI: C	NODI: C	NODI: C	NODI: C
8/31/2020	NODI: C	NODI: C	NODI: C	NODI: C

Notes:

gal/d = gallons per day
mg/L = milligrams per liter
0 = parameter not detected
NA = not applicable
NODI: C = no discharge

Appendix B: Dilution Modeling Report

Link to Dilution Modeling Report

Appendix C: Reasonable Potential Analysis

Methodology

A reasonable potential analysis is completed using a single set of critical conditions for flow and pollutant concentration that will ensure the protection of water quality standards. To determine the critical condition of the effluent, EPA projects an upper bound of the effluent concentration based on the observed monitoring data and a selected probability basis. EPA generally applies the quantitative approach found in Appendix E of the *Technical Support Document for Water Quality-based Toxics Control* (TSD)[1] to determine the upper bound of the effluent data. This methodology accounts for effluent variability based on the size of the dataset and the occurrence of non-detects (i.e., samples results in which a parameter is not detected above laboratory minimum levels). The Permittee provided 95th percentile estimates for pollutants of concern using this methodology (Appendix B) which EPA validated.

EPA uses the calculated upper bound of the effluent data and a concentration representative of the parameter in the receiving water outside of the zone of influence of the discharge to project the downstream concentration after complete mixing using the following simple mass-balance equation:

$$C_s(DF - 1) + \mathrm{C_e} = \mathrm{C_d}(\mathrm{DF})$$

Where:

C_d = downstream receiving water concentration
C_s = upstream receiving water concentration
C_e = effluent concentration (95th percentile of effluent concentrations)
DF = dilution factor (See Available Dilution section of the Fact Sheet)

Solving for the receiving water concentration downstream of the discharge (C_d) yields:

$$C_d = \frac{C_s(DF - 1) + C_e}{DF}$$

Where there is no available dilution (i.e., DF = 1), the receiving water concentration downstream of the discharge (C_d) is equal to the effluent concentration.

[1] USEPA, *Technical Support Document for Water Quality-Based Toxics Control*, Office of Water, Washington, D.C., March 1991.

When the downstream concentration exceeds the applicable criterion, there is reasonable potential for the discharge to cause, or contribute to an excursion above WQSs. *See* 40 CFR § 122.44(d). When EPA determines that a discharge causes, has the reasonable potential to cause, or contribute to such an excursion, the permit must contain WQBELs for the parameter. The limitation is calculated by rearranging the above mass balance equation to solve for the effluent concentration using the applicable criterion as the downstream concentration. *See* 40 CFR § 122.44(d)(1)(iii).

Determination of Applicable Criteria

State water quality criteria are derived from EPA's *National Recommended Water Quality Criteria: 2002*, which are incorporated into the state WQSs by reference at 315 CMR 4.05(5).

Saltwater aquatic life criteria for copper, nickel, and zinc are established in terms of dissolved metals and converted to total recoverable metals using published conversion factors. The applicable criteria are summarized in the table below.

Summary of Applicable Criteria

Parameter	Dissolved Metals Acute Criteria (CMC)	Conversion Factors[1]	Applicable Total Metals Acute Criteria
Units	**µg/L**	**—**	**µg/L**
Copper	4.8	0.830	5.78
Nickel	74	0.990	74.75
Zinc	90	0.946	95.14

[1]For dissolved to total recoverable metal conversion, *See Appendix A - Conversion Factors for Dissolved Metals:* http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm#appendxa; Required by Env-Wq 1703.23.

Calculation of Reasonable Potential

EPA first calculated the upper bound of expected effluent concentrations for each parameter. For copper, the 95th percentile was calculated based on the lognormal distribution. The sample size for nickel and zinc was small such that a clear distribution could not be inferred. EPA assumed a lognormal distribution and calculated the 95th percentile using a coefficient of variation of 0.6 following the methodology in Appendix E of the TSD. The summary statistics for these calculations are shown below.

Summary Statistics for Estimating 95th Percentile

	Copper	Nickel	Zinc
k = number of samples =	23	5	5
r = number of non-detects =	0	0	0
u_y *= Avg of Nat. Log =*	-2.5965859	-4.67629	-2.80112
s_y^2 = estimated variance =	1.0057488	N/A	N/A
s_y *= Std Dev. of Nat Log =*	1.0028703	N/A	N/A
***cv(x) = Coefficient of Variation =*	0.3862265	0.6	0.6
δ = # of nondetects / # of samples = r / k =	0	0	0
99th	0.7680429	0.0756	1.008
95th	0.3879556	0.0414	0.552
Max	0.64	0.018	0.24
Median	0.0804	0.0069	0.0717

All concentration values (99th, 95th, Max, Median) are in mg/L
* For data without non-detects: σ_y^2 = estimated variance = (SUM[$(y_i - u_y)^2$]) / (k-1); for data with non-detects: s_y^2 = estimated variance = (S[$(y_i - u_y)$]) / (k-r-1)
**For data with <10 samples, a conservative CV of 0.6 was chosen as described in Box 3-2 of the Technical Support Document for Water Quality Based Toxics Control

EPA then used the calculated upper bound of expected effluent concentrations, the permitted daily maximum effluent flow and the dilution factor to project the in-stream concentration downstream from the discharge. No ambient monitoring data was available. When this resultant in-stream concentration (C) exceeds the applicable criterion, there is reasonable potential for the discharge to cause, or contribute to an excursion above water quality standards. The results are summarized in the table below.

Summary of Reasonable Potential Results

Parameter	Effluent Concentration[1]	Downstream Concentration[2]	Acute Criterion	Acute Reasonable Potential[3,4]
Units	**µg/L**	**µg/L**	**µg/L**	**—**
Copper	388	6.0	5.78	**Y**
Nickel	41.4	0.64	74.75	N
Zinc	552	8.49	95.14	N

[1] Values represent the 95th percentile concentration calculated using the monitoring data reported by the Facility (*See* Appendix A).
[2] Values represent the 95th percentile concentration divided by the dilution factor 65:1.
[3] "Y" is indicated if downstream concentration exceeds the criteria.

[4] "N" is indicated if downstream concentration does not exceed the criteria.

Copper has a reasonable potential to cause or contribute to an excursion above water quality standards.

Calculation of Effluent Limitations

EPA calculated the effluent limitations for total recoverable copper by setting the maximum allowable effluent concentration equal to the applicable criterion, adjusted for available dilution. The results are summarized in the table below.

Summary of Effluent Limitations

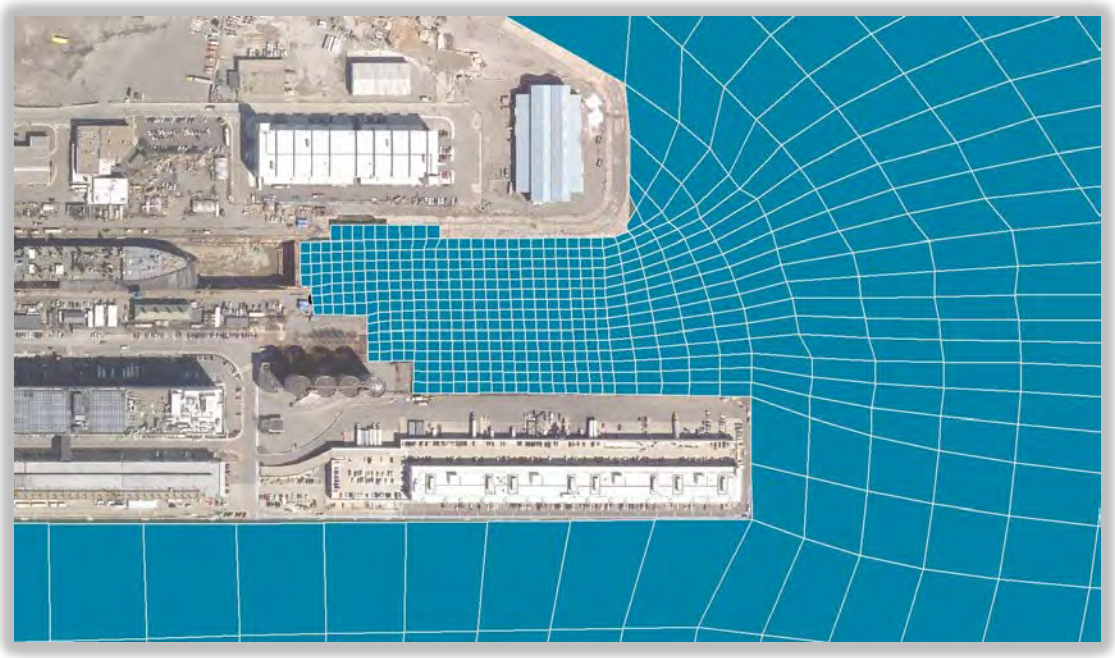
Parameter	Acute Criterion	Chronic Criterion	Available Dilution	Daily Max Effluent Limitation	Monthly Avg Effluent Limitation
Units	**µg/L**	**µg/L**	**---**	**µg/L**	**µg/L**
Copper	5.78	3.73	65:1	376	242

Note that when the effluent limitation is calculated to be lower than the applicable criterion, then the effluent limitation is set equal to the criterion. Because regulations at 40 CFR § 122.45(c) require, with limited exceptions, that effluent limits for metals in NPDES permits be expressed as total recoverable metals, effluent limitations are expressed as total recoverable metals. *See* EPA-823-B96-007, *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion:*1996.

Table 2: EFH Species and Life Stages in the Vicinity of Boston Ship Repair Outfalls at Latitude 42° 20' 42.6", Longitude -71° 01' 35.5"

EFH Species	Lifestage(s) Found at Location
Atlantic Wolffish	ALL
Winter Flounder	Eggs, Juvenile, Larvae/Adult
Little Skate	Juvenile, Adult
Ocean Pout	Adult, Juvenile
Atlantic Herring	Juvenile, Adult, Larvae
Atlantic Cod	Larvae, Adult, Juvenile, Eggs
Pollock	Juvenile, Eggs, Larvae
Red Hake	Adult, Eggs/Larvae/Juvenile
Silver Hake	Eggs/Larvae, Adult
Yellowtail Flounder	Adult, Juvenile, Larvae, Eggs
White Hake	Larvae, Adult, Eggs, Juvenile
Windowpane Flounder	Adult, Larvae, Eggs, Juvenile
Winter Skate	Adult, Juvenile
American Plaice	Adult, Juvenile, Larvae, Eggs
Thorny Skate	Juvenile
Bluefin Tuna	Adult
Northern Shortfin Squid	Adult
Longfin Inshore Squid	Adult, Juvenile
Atlantic Mackerel	Eggs, Larvae, Juvenile, Adult
Bluefish	Juvenile, Adult
Atlantic Butterfish	Eggs, Larvae, Adult
Spiny Dogfish	Sub-Adult Female, Adult Male, Adult Female
Atlantic Surfclam	Juvenile, Adult
Scup	Juvenile
Summer Flounder	Adult
Black Sea Bass	Adult

NPDES Modeling Report



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September 9, 2020

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Section 1.0

Introduction

1.0 INTRODUCTION

Boston Ship Repair, LLC (BSR) operates a drydock located in Boston Harbor which is subject to National Pollutant Discharge Elimination System (NPDES) permitting managed by the United States Environmental Protection Agency (USEPA) and surface water discharge permitting managed by the Massachusetts Department of Environmental Protection (MassDEP). USEPA and MassDEP have requested hydraulic modeling of dispersion of copper from the drydock discharge to support their NPDES permitting efforts. This report provides background and results of hydraulic modeling conducted subsequent to the request.

1.1 Boston Ship Repair

BSR is owned by Northeast Ship Repair, Inc., which also operates a drydock in the Philadelphia, Pennsylvania area. BSR is located at 32A Drydock Avenue in Boston, Massachusetts. The drydock is used to service ships requiring maintenance and repair. NSRI operates two of the four drydocks on the East Coast that can handle large ships.

Ships can undergo a variety of repairs while drydocked, both interior and exterior. However, exterior ship maintenance and drydock cleaning operations are of most relevance to the NPDES permitting. While in the drydock a ship typically undergoes exterior ultra-high pressure water blasting to remove loose paint and scale, and may be repainted either completely or partially. The type of paints used on the exterior of the ships are antifoulants, that is, they have properties that discourage the growth of marine life on the exterior of the ship. The current primary antifoulant component of paints used is copper. Formerly zinc was used and for future use, new paint types are under research and investigation by environmental divisions of the military.

BSR does not select the paints that are specified for use on the ships. Most of the ships serviced are military vessels or part of the military sealift command (MSC). The military or MSC specify the paints that will be used. BSR may only refuse to use a specific paint if it does not meet the Federal National Emission Standards for Hazardous Air Pollutants (NESHAPs) standards. NESHAPS do not account for the paint antifoulant (metal) properties, rather they focus on the volatile organic chemicals that make up the solvents in the paints.

The main mechanism for introduction of contaminants from the drydock to Boston Harbor is discharge of water collected at the bottom of the drydock during ship repair operations. Contaminants are prevented from collecting in the water at the bottom of the drydock through BSR's use of best management practices (BMPs) which focus on spill control and good housekeeping. BSR also maintains a stormwater pollution prevention plan (SWPPP) and a spill prevention, countermeasures, and control (SPCC) plan to further prevent contaminants from entering the water collected at the bottom of the drydock. During the repair of a ship, the water collected at the bottom of the drydock is periodically removed using one of two stripping pumps and the discharge enters a channel leading to Boston Harbor via Outfall 002.

1.2 NPDES Permit Renewal

USEPA NPDES permits are subject to renewal on a five year cycle. Until very recently, USEPA and MassDEP jointly issued NPDES permits in Massachusetts, sometimes including state-only requirements from MassDEP. For the current permitting cycle, MassDEP will issue a parallel surface water discharge permit in approximately the same timeframe as the NPDES permit renewal.

BSR's current NPDES permit was issued on November 18, 2013. Since a timely NPDES renewal application was filed by BSR, the current permit remains in effect until superseded by the next issued permit.

1.3 Prior Dilution Estimating Method and Result

When the 2013 NPDES permit was issued, it was based on a review of metals discharges from the drydock and a simplified dilution methodology. The dilution methodology relied on a 1992 tidal exchange box modeling exercise by Signell and Butman. During the development of the 2013 NPDES permit, USEPA assumed 800 million gallons per day (MGD) of tidal flushing would be available to dilute a 1.76 MGD BSR stripping pump discharge at Outfall 002. This amount of tidal flushing was calculated to be adequate to enable BSR to meet copper and zinc water quality criteria.

1.4 Regulatory Request

USEPA and MassDEP requested more sophisticated modeling of dilution of metals discharge from the drydock by email on March 12, 2020, and further clarified that request in a conference call on April 20, 2020. The purpose of the request was to gain additional technical input for the finalization of the draft NPDES permit. Discussions of appropriate hydraulic modeling methodologies occurred on May 15, 2020 and preliminary modeling results were presented to USEPA and MassDEP on August 3, 2020. After the presentation of the preliminary work, USEPA and MassDEP requested some adjustment to the data inputs to the model and requested a formal report of results. This report is intended to satisfy the regulatory request.

1.5 Report Outline

The remainder of the report addresses metals data (Section 2.0 and Appendix A), discharge characteristics and mixing zone (Section 3.0 and Appendix B), modeling inputs and results (Section 4.0 and Appendix C), discharge mitigation opportunities (Section 5.0 and Appendix D), agency requirements (Section 6.0), and conclusions (Section 7.0).

Section 2.0

Review of Metals Data

2.0 REVIEW OF METALS DATA

BSR conducts an annual priority pollutant scan for discharge of contaminants from the stripping pump outfall (Outfall 002). In addition, total suspended solids (TSS) are monitored weekly and copper is monitored quarterly at the same outfall, when the stripping pump is in operation. Of the multitude of pollutants included in the priority pollutant scans, the majority are not found to be present at Outfall 002 at analytical detection limits.

2.1 Metals of Interest

Copper, zinc, and nickel have been routinely detected and measured in the priority pollutant scans collected from 2015 through 2019, inclusive. The 2015 through 2019 period represents the most recent five year timeframe relevant for review. These metals were therefore selected for further review in conjunction with the modeling described in this report.

TSS is not a metal, and is used as an indicator of the relative cleanliness of the stripping pump discharge and as feedback to BSR on the effectiveness of their implementation of the BMPs. It indicates the relative presence or absence of dust and sediment entering the bottom of the drydock.

2.2 Chronic and Acute Limits

Chronic and acute limits for copper (Cu), zinc (Zn), and nickel (Ni) have been published by USEPA. The following criteria, presented in Table 2-1, are applicable to saltwater environments. MassDEP has adopted the same criteria for their surface water discharge program.

Table 2-1 Chronic and Acute Water Quality Criteria for Cu, Zn, and Ni

Metal	Chronic Criteria (ug/L)	Acute Criteria (ug/L)
Copper (Cu)	3.1	4.8
Zinc (Zn)	81	90
Nickel (Ni)	8.2	74

There are no chronic or acute water quality criteria associated with TSS.

2.3 Statistical Analysis

In order to determine the number of dilutions of the stripping pump discharge necessary to meet the water quality criteria, a statistical analysis of data collected from BSR effluent is necessary. The statistical analysis defines the pollutant levels that will be compared to the water quality criteria.

2.3.1 Discharge Sampling

Results of stripping pump (Outfall 002) discharge sampling from 2015 through 2019, inclusive, are presented in Table A-1 for copper (there are 23 copper samples collected and analyzed) and Table A-2 for zinc and nickel (there are 5 zinc and 5 nickel samples collected and analyzed).

2.3.2 Data Compilation Timeframe

The most recent five calendar years of data (2015 – 2019) are considered representative as they take into account implementation of the most recent BSR BMPs and types of paints in use on the ships serviced.

2.3.3 Lognormal versus Normal Distribution

USEPA reviewed the five year data compilation presented in Tables A-1 and A-2, and recommended that the data be analyzed on a lognormal basis, consistent with the apparent distribution of the data and with standard practice.

2.3.4 95th Percentile

Epsilon conducted a lognormal statistical analysis to identify the upper 95th percentile concentration of copper, zinc, and nickel. The 95th percentile is used as the USEPA and MassDEP basis for the upper bound of each contaminant reasonably expected to be present in the discharge, for modeling purposes. The statistical analysis is presented in Table A-3, and the results are summarized in Table 2-2.

Table 2-2 Statistical Summary of Metals Data

Metal	Mean (ug/L)	Upper 95th Percentile (ug/L)
Copper (Cu)	75	388
Zinc (Zn)	61	286
Nickel (Ni)	9.3	21

2.4 Target Dilutions

Target dilutions are calculated by dividing the 95th percentile by the respective water quality criteria (chronic and acute). The target dilutions for copper, zinc, and nickel are presented below in Table 2-3.

Table 2-3 Target Dilutions for Metals (Dimensionless)

Metal	Chronic	Acute
Copper (Cu)	125	81
Zinc (Zn)	4	3
Nickel (Ni)	3	0.3

Of the three metals, copper dilution requirements clearly dominate and overshadow zinc and nickel dilution requirements. Therefore, the modeling has been conducted focusing on the dilutions needed for copper.

Section 3.0

Discharge Characteristics and Mixing Zone

3.0 DISCHARGE CHARACTERISTICS AND MIXING ZONE

Discharge characteristics and mixing zone information are briefly summarized below. More detailed information may be found in the technical memorandum prepared by Hodge WaterResources, LLC (HWR) which is included as Appendix B.

3.1 Discharge Characteristics

The discharge conduit is a concrete vault 14 feet wide by 15 feet deep. Thus the discharge are is 210 square feet. Each stripping pump is designed to discharge 5,600 gallons per minute (gpm), which is equivalent to 12.48 cubic feet per second (ft3/sec). Therefore the discharge velocity is approximately 0.06 fps (rounds to 0.1 fps). One of the two stripping pumps operates at any given time.

3.2 Pumping Frequency Analysis

Stripping pump operation is intermittent. A stripping pump is operated when the level of water accumulates under the floor of the drydock reaches a certain level. A pumping frequency analysis was conducted on three years (2017 to 2019) of pump log data. The average duration of pumping was found to be 1.73 hours and the pumping duration did not appear to vary much from one ship docked to another.

The pump downtime between pumping intervals has a greater variability from one ship docked to another. This is because the caisson seal (the drydock closure mechanism) is different each time a new ship is docked, with a different characteristic in-leakage, each ship has a different non-contact cooling water demand (and the cooling water is discharged to the bottom of the drydock), and storm events during the docking can add variability. Average pump downtime for the 2017 to 2019 ships in the dock ranged from 5.46 hours for the USNS Dahl to 11.37 for the MBT-35 barge. Epsilon recommended use of the shorter (and more conservative) 5.46 hour USNS Dahl downtime for the modeling, rather than the average downtime of 7.60 hours.

3.3 Channel Leading to/from Drydock

Epsilon proposes, on behalf of BSR, the channel/canal leading from the drydock to Boston Harbor be considered as the mixing zone within which pollutants may temporarily exceed the water quality criteria as they undergo tidal dilution.

Section 4.0

Modeling Inputs and Results

4.0 MODELING INPUTS AND RESULTS

Modeling inputs and results are fully described in the HWR technical memorandum presented in Appendix B. A digital copy of the model files is provided on CD-ROM in Appendix B-1.

Section 5.0

Discharge Mitigation Opportunities

5.0 DISCHARGE MITIGATION OPPORTUNITIES

USEPA and MassDEP requested suggestions for operational opportunities that might mitigate discharge of copper or synchronize discharge with ideal mixing conditions.

5.1 Evolution of Best Management Practices and SWPPP

Through experience and based on TSS measurements feedback, BSR has improved their BMPs/SWPPP and their implementation of BMPs/SWPPP over the years. The most recent version of the BMPs is dated December 2019 and the most recent version of the SWPPP is dated May 2018. These documents represent state-of-the-art practices for environmental maintenance of the drydock and should minimize discharge of copper.

5.2 Historical Copper Discharge Concentrations

A graph showing historical copper discharge concentrations from 2008 through 2019 is presented as Figure A-1. This graph shows the apparent effectiveness of the most recent BMPs/SWPPP implementation. Historical discharge concentrations have dropped over time and are approaching and asymptote / leveling off. This indicates that BSR has achieved the most effective operational practices currently available to them for environmental maintenance of the drydock.

5.3 Stripping Pump Management Options

Synchronization of pumping with tidal flushing has been suggested as a mitigation measure by USEPA. This would be operationally difficult for BSR to implement, since the pump downtime varies by ship docked (as described in Section 3.2) and most average downtimes are not similar to the eleven to twelve hour tide cycle.

Section 6.0

Agency Requirements

6.0 AGENCY REQUIREMENTS

USEPA and MassDEP requirements and BSR proposed compliance with the requirements are listed below.

6.1 Applicable USEPA Regulations

The key portions of the applicable regulation are as follows:

> *40 CFR §122.44 Establishing limitations, standards, and other permit conditions*
>
> *…each NPDES permit shall include conditions meeting the following requirements when applicable*
>
> *(d) Water quality standards and State requirements: any requirements in addition to or more stringent than promulgated effluent limitations guidelines or standards… necessary to:*
>
> *(1) Achieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality.*
>
> *…*
>
> *(ii) When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, … and where appropriate, the dilution of the effluent in the receiving water.*

The analysis is based on sample data, which accounts for existing controls on the sources of pollution, and addresses the variability of the parameters in the effluent. The analysis provides a procedure to account for the dilution of the effluent in the receiving water.

6.2 Applicable NPDES Permit Precedent

Section 6.2 of the 2013 Fact Sheet (MA0040142) includes an analysis to document "to determine whether [potential pollutants that are present on the dry dock floor from activities conducted on vessels] would have the potential to cause or contribute to any WQS [water quality standard] violations" and concluded that after available dilution the instream concentration of potential pollutants would be below each applicable water quality criterion. The available dilution was "the area of BSR's discharge".

The new analysis more specifically identifies the discharge channel/canal as the area of BSR's discharge, and documents that available dilution for the instream concentration of potential pollutants would be below each applicable water quality criterion.

6.3 Applicable MassDEP Guidance

The MassDEP mixing zone policy (January 1993) states "Within a mixing zone excursions from certain water quality criteria may be tolerable, provided this does not interfere with the existing or designated uses of the segment." The proposed use of the discharge channel/canal as mixing zone is compliant with the policy because the existing and designated uses of the discharge channel/canal are to promote the vessel and harbor use, with no critical water uses. Specifically per the mixing zone policy:

Per II a) it is limited to an area as small as feasible. The unique character of the discharge structure and the pump-out process makes further pollutant control, and more active mixing, infeasible.

Per II b) it will not interfere with the migration or free movement of fish or other aquatic life. The discharge channel/canal is a "dead end" structure.

Per II c) it does not create nuisance conditions. Existing operations have not created such nuisance conditions or diminished the existing or designated uses of the discharge channel/canal.

Per III a) the mixing zone is not at or near public water supply intakes, shellfish harvest waters, public bathing beaches, or conservation areas.

Per III b) no zone of passage is needed because the discharge channel/canal is a dead-end structure that does not pose any barrier to migration.

Per IV a) the mixing zone will not reasonably contribute to health risks through drinking water ingestion or fish and shellfish consumption.

Per IV b) the mixing zone is located and sized such that any loss of aquatic life is not significant to the biological community of the receiving water segment.

Per IV c) the waters within the mixing zone do not currently create nuisance conditions.

Per V) the use of the discharge channel/canal as the mixing zone is justified because no less environmentally damaging alternative site for the activity, source for disposal, or method of elimination of the discharge is reasonably available or feasible; to the extent feasible the discharge or activity is designed and conducted to minimize the size and shape of the mixing zone; and the mixing zone will not impair the integrity of the waterbody as a whole.

Section 7.0

Report Conclusions

7.0 REPORT CONCLUSIONS

In conclusion, representative modeling has been conducted, dilutions are accomplished in the mixing zone, and USEPA and MassDEP requirements are proposed to have been met.

7.1 Representative Modeling Conducted

HWR has conducted representative modeling, as described in this report and in particular in the technical memorandum included as Appendix B.

7.2 Dilutions Accomplished in Mixing Zone

In general, dilutions are accomplished within the channel/canal leading from Boston Harbor to/from the drydock. Figures 10, 11, and 12 in Appendix B show maximum and probabilistic extents of necessary dilutions for chronic and acute thresholds.

Regarding the acute threshold, there are no indications of 81 dilutions to threshold outside the channel/canal.

Regarding the chronic threshold, based on model result intervals of 30 minutes, only six increments in the 1,440 model results exceeded 125 dilutions to threshold outside the channel/canal. This represents 0.4% of the time intervals. Given that the chronic exposure conditions occur so infrequently, there is no risk of chronic exposure in the harbor outside of the channel/canal.

7.3 Agency Requirements Proposed as Met

BSR proposes that all USEPA and MassDEP regulations, precedents, and guidance have been met (see Section 6.0).

Appendix A

Epsilon Tables and Figures

Table A-1 Copper Data

Quarterly and PPS

Year	Quarter	Cu (mg/L)	ln(Cu)
2019	Q1	0.248	-1.39433
2019	Q2	0.149	-1.90381
2019	Q3	0.109	-2.21641
2019	Q4	0.102	-2.28278
2019	PPS	0.0195	-3.93734
2018	Q1	0.039	-3.24419
2018	Q2/PPS	0.0872	-2.43955
2018	Q3	0.0804	-2.52074
2018	Q4	0.299	-1.20731
2017	Q1	0.071	-2.64508
2017	Q2	0.178	-1.72597
2017	Q3	0.0863	-2.44993
2017	Q4	0.0128	-4.35831
2017	PPS	0.0395	-3.23145
2016	Q1	0.037	-3.29684
2016	Q2/PPS	0.64	-0.44629
2016	Q3	0.076	-2.57702
2016	Q4	0.0078	-4.85363
2015	Q1	0.042	-3.17009
2015	Q2	0.12	-2.12026
2015	Q3	0.042	-3.17009
2015	Q4	0.14	-1.96611
2015	PPS	0.077	-2.56395

average (μ)	-2.59659
std.dev (σ)	1.00287
(μ+1.645*σ)	-0.94686
exp(μ+1.645*σ)	0.387956

Table A-2 Zinc and Nickel Data

Year	Quarter	Zn (mg/L)	Ni (mg/L)	ln(Zn)	ln(Ni)
2019	PPS	0.0215	0.014	-3.839702	-4.268698
2018	PPS	0.0717	0.0069	-2.635265	-4.976234
2017	PPS	0.0298	0.0065	-3.513247	-5.035953
2016	PPS	0.24	0.018	-1.427116	-4.017384
2015	PPS	0.075	0.0062	-2.590267	-5.083206

Table A-3 Statistical Analysis of Metals

2015-2019

Confidence.T with Stdev.S

Pollutant	**Cu**	**Zn**	**Ni**
average of ln data (μ)	-2.60	-2.80	-4.68
average (exp of u)	0.075	0.061	0.0093
std.dev of ln data (σ)	1.00	0.94	0.50
(μ+1.645*σ)	-0.95	-1.25	-3.86
exp(μ+1.645*σ)	0.39	0.29	0.02
95% High (mg/L)	**0.388**	**0.286**	**0.021**

Federal Chronic (mg/L)	0.0031	0.081	0.0082
Federal Acute (mg/L)	0.0048	0.090	0.074

Chronic Dilution 95% UCL	125	4	3
Acute Dilution 95% UCL	81	3	0.3

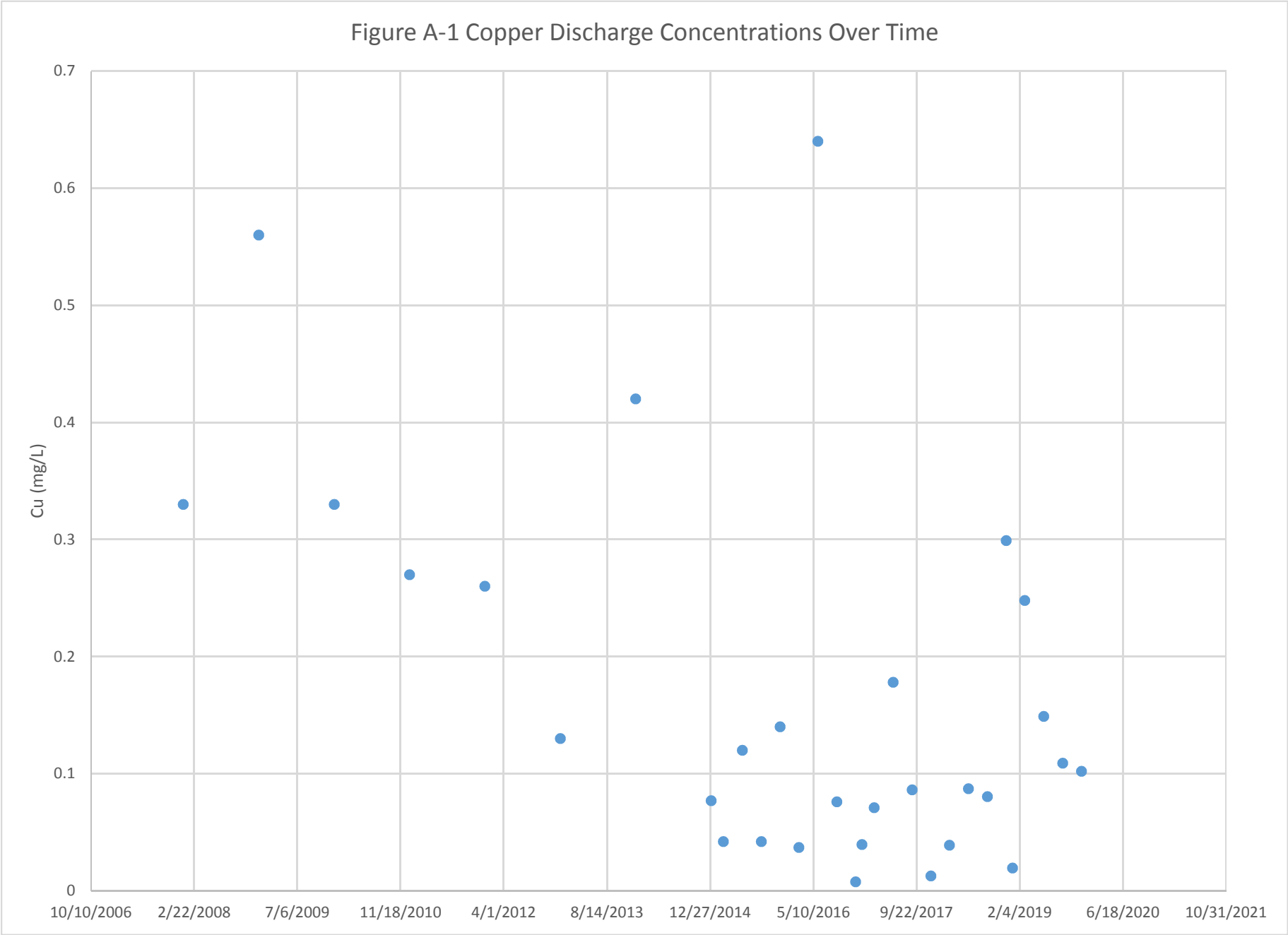
Figure A-1 Copper Discharge Concentrations Over Time
Cu (mg/L)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10/10/2006
2/22/2008
7/6/2009
11/18/2010
4/1/2012
8/14/2013
12/27/2014
5/10/2016
9/22/2017
2/4/2019
6/18/2020
10/31/2021

Appendix B

Hodge WaterResources, LLC Technical Memorandum

Hodge.WaterResources

95 Arlington St.
Brighton, MA 02135
617-903-0340

September 4, 2020

TECHNICAL MEMORANDUM

To:	Dorothy Buckoski, Epsilon Associates, Inc.	Pages:	19
CC:			
Subject:	Boston Ship Repair, Dilution Modeling		
From:	Matt Hodge, Hodge.WaterResources, LLC		

1.0 INTRODUCTION

The purpose of this technical memorandum is to describe the numerical modeling completed by Hodge.WaterResources, LLC (HWR) in support of the renewal application for the National Pollutant Discharge Elimination System (NPDES) permit for Boston Ship Repair. HWR used a numerical model to simulate the movement of dye released into the Boston Ship Repair discharge canal. HWR used the simulated dye concentrations to estimate dilution of the Boston Ship Repair effluent that will occur in the canal. The dilution results provide the information necessary to determine the distance from the outfall where the effluent is sufficiently mixed with ambient water to meet water quality standards. These distances form the basis of a mixing zone determination.

The results of the numerical modeling indicate that the acute water quality standards will be met within a distance of 1,250 feet from the outfall and the chronic water quality standards will be met within a distance of 1,350 feet from the outfall.

This memorandum provides a description of Boston Ship Repair's discharge, the hydrodynamic model used, the model setup, and the model results.

2.0 DISCHARGE DESCRIPTION

Boston Ship Repair is located in Boston, Massachusetts. Boston Ship Repair repairs ships in a drydock that is part of the same property. The caisson to the dry dock opens onto the discharge canal, and the canal is connected to the Boston Harbor Main Channel. Figure 1 shows aerial imagery of the drydock and a map of the Boston Harbor Main Channel.

The drydock caisson remains open and the drydock is filled with seawater when there is no ship in the drydock. Once a ship enters the drydock, the caisson is closed. Boston Ship Repair uses a system of pumps to drain the drydock. Two main pumps are used to drain the drydock until the depth is less than three feet. Boston Ship Repair then uses two stripping pumps to drain the final three feet of water. Only one stripping pump operates at a time. Each stripping pump has a maximum pumping rate of 5,600 gallons per minute (gpm).

Once the caisson is closed and the drydock is dry, additional water can enter the drydock in multiple ways. Water can seep through the caisson seal and into the drydock. Stormwater can enter the drydock when it rains, and some ships require non-contact cooling water while they are in the drydock. The non-contact cooling water is discharged to the drydock floor. All of this additional water is pumped out into the canal using the stripping pumps.

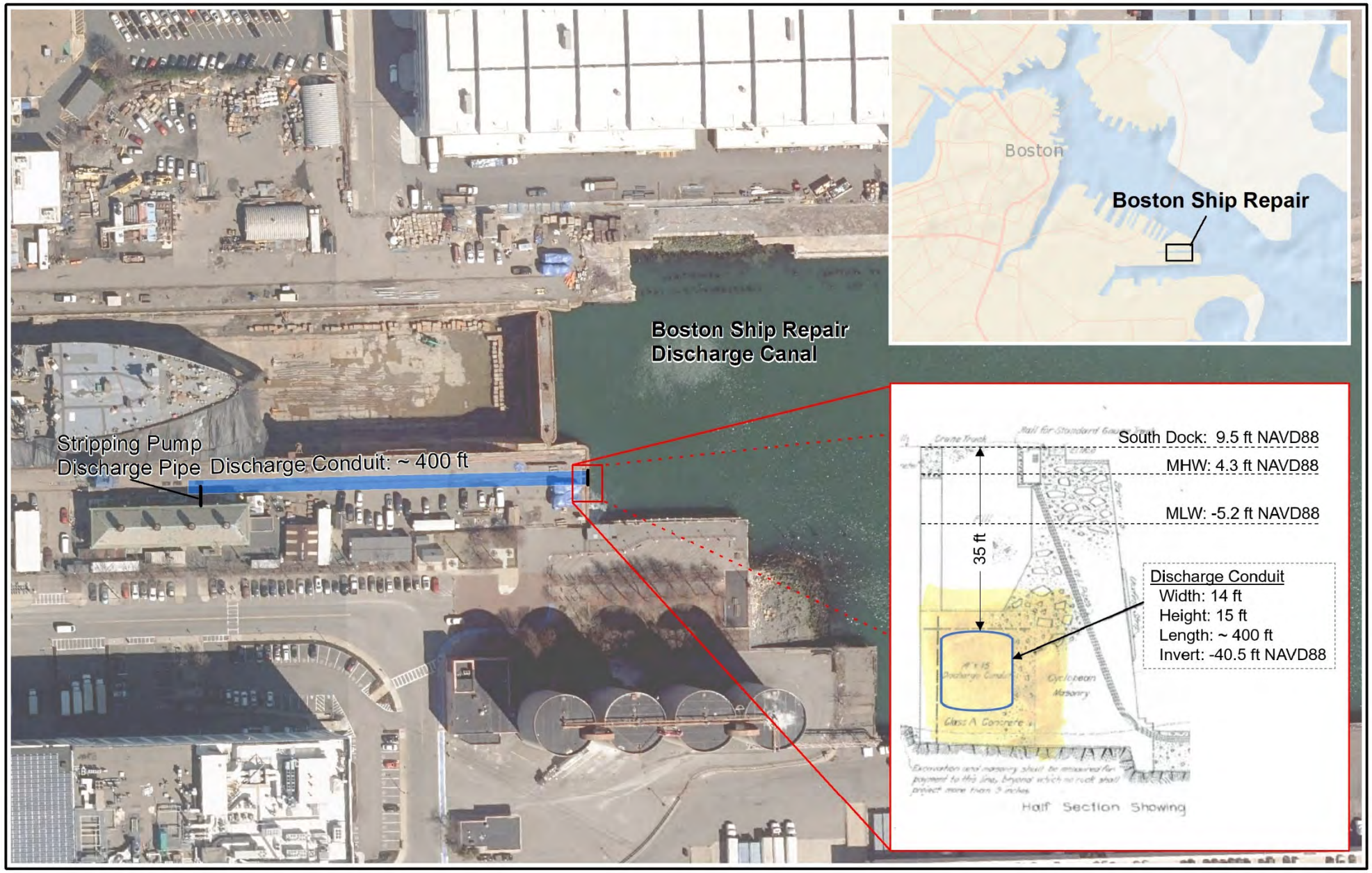

Figure 1: Site Map

Boston Ship Repair
Boston, Massachusetts

Notes:
- Discharge Conduit length approximately aerial imagery suggests 400 ft
- Cross-section sheet assumed to scale

Hodge WaterResources

N

0 100 200
Feet

Historically, the main pumps and the stripping pumps had separate outfall pipes. Boston Ship Repair discovered in 2007 that the outfall for the stripping pumps was damaged. Boston Ship Repair rerouted the stripping pumps to the same outfall as the main pumps. The main pumps and the stripping pumps discharge water from the drydock into a discharge conduit. The conduit is a concrete vault that is located underneath the south dock. It is approximately 400 feet long, 14 feet wide and 15 feet deep. According to Boston Ship Repair, there are two vertical access tunnels in the south dock that provide access to the conduit. Figure 1 shows the approximate location of the conduit and a cross section of the conduit's open end.

The top of the discharge conduit is approximately 35 feet below the south dock. The mouth of the conduit always remains submerged. This means that the conduit is always full of water. There is likely some tidally driven flushing of the conduit, but the volume of that flushing is small relative to the amount of water forced out of the conduit when a pump is in operation.

While both the main pumps and the stripping pumps exit the drydock into the same conduit, they are permitted as two separate outfalls. The focus of this study is the outfall from the stripping pumps.

2.1 Pumping Analysis

HWR understands that while there are two stripping pumps, Boston Ship Repair only operates one pump at a time. HWR analyzed Boston Ship Repair's pumping logs for the stripping pumps for the years 2017, 2018, and 2019. Our goal was to understand the typical pumping duration and pumping downtime (i.e., the time between pump shutdown and startup) for the stripping pumps. A total of eight ships were repaired in the drydock in 2017, 2018, and 2019. Table 1 lists each ship, the average duration, and the average downtime for each ship.

Table 1: Ships Repaired in Drydock, Pumping Duration and Downtime

Ship	Average Duration (hours)	Average Downtime (hours)
MBT-35	1.62	11.37
SS Gopher State	1.84	7.34
USNS Comfort	1.66	9.35
USNS Dahl	1.80	5.46
USNS Leroy Grumman	1.50	10.13
USNS Pililaau	1.15	9.04
USNS Seay	1.90	6.86
USNS Supply	2.41	9.08
None	1.48	18.23

Table 1 demonstrates that there is variability in both duration and downtime. In order to understand that variability, HWR developed probability distribution curves for both duration and downtime. Figure 2 shows the probability distribution for pumping duration for all activity when a ship was in the drydock (i.e., excluding "None"). The average pumping duration is 1.73 hours, and the distribution of duration is normal with a standard deviation of 0.70 hours. Figure 3 shows the probability distribution for pumping downtime for all activity when a ship was in the drydock (i.e., excluding "None"). The average pumping downtime is 7.60 hours. Figure 3 shows that downtime is much more variable than duration, and a visual assessment of the distribution indicates that the distribution may be non-normal. The standard deviation for downtime is 7.57 hours.

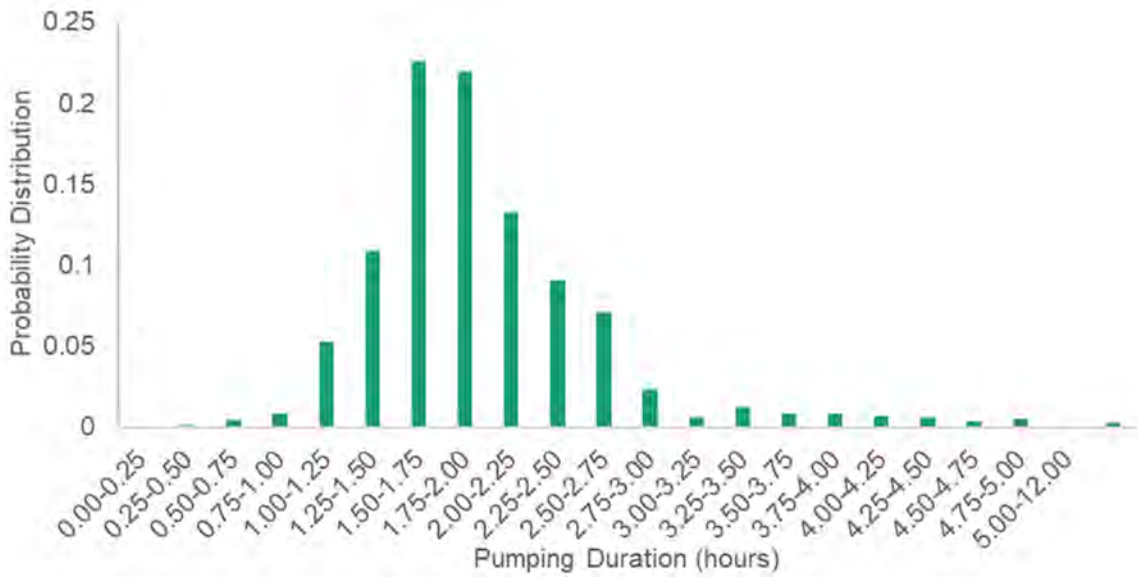

Figure 2 Pumping Duration Probability Distribution

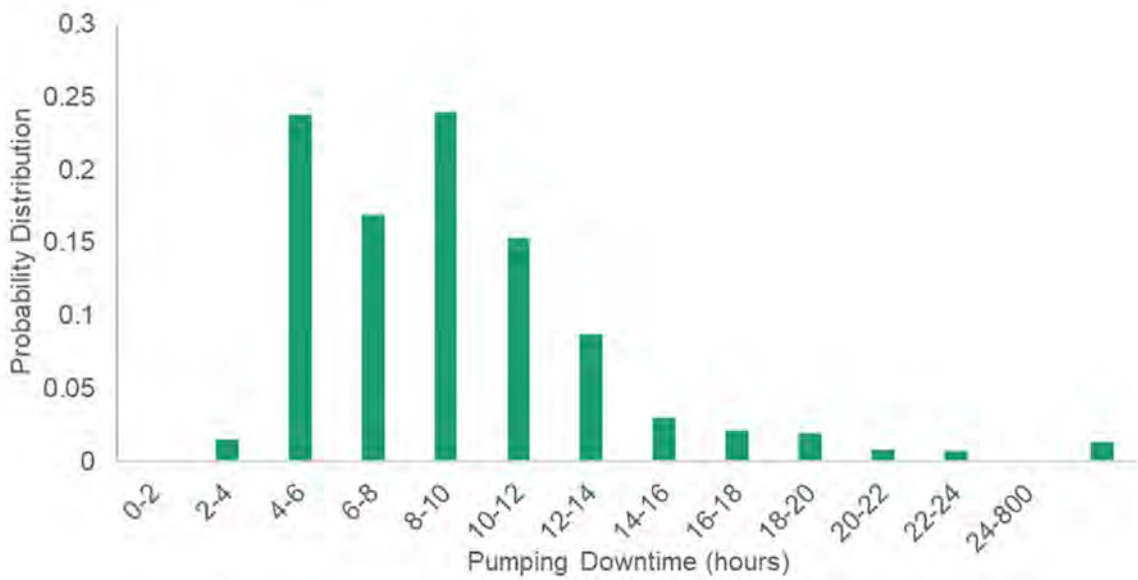

Figure 3 Pump Downtime Probability Distribution

2.2 Water Quality and Dilution

Past water quality sampling of water pumped through the stripping pumps has shown elevated concentrations of some contaminants of concern including copper, zinc, and nickel. Boston Ship Repair intends to request a mixing zone as a part of their NPDES renewal application for the stripping pumps outfall. A mixing zone is a region of a receiving water where it is not required that water quality standards be met. Within the mixing zone, effluent mixes with ambient water and this dilution of the effluent leads to water quality standards being met at the boundary of the mixing zone.

Epsilon Associates, Inc. (Epsilon) reviewed the available effluent water quality sampling data and determined the dilution required for stripping pump effluent to meet water quality standards. According to Epsilon, an 81-

fold (81 x) dilution will ensure that the effluent meets the acute concentration water quality standards, and a 125-fold (125 x) dilution will ensure that the effluent meets chronic concentration water quality standards.

A hydrodynamic model can be used to predict dilution, and the predicted dilution can be used to determine the size of the required mixing zone. HWR has completed this modeling, and it is described in the following sections of this memorandum.

3.0 MODEL SELECTION

The movement of water in the canal and the Boston Harbor Main Channel is dynamic. It is controlled by tides, winds, and flow from tributaries to the Boston Harbor Main Channel. Tides, winds, and flow are interrelated and they also change with time. Any modeling that attempts to determine the required mixing zone, must take into account the dynamic nature of both the outfall (i.e., pumping duration and downtime) and ambient conditions. The model cannot be steady state (e.g., CORMIX). The model must also be able to account for the configuration of the Boston Ship Repair discharge conduit.

Each stripping pump has a maximum pumping capacity of 5,600 gpm. Water is pumped from the drydock into the discharge conduit at this rate. Given that the conduit is always full of water, we made the simplifying assumption that water exits the discharge conduit at the same rate. The resulting exit velocity, for the water passing through the 14 ft by 15 ft mouth of the conduit, is less than 0.1 feet per second (fps). When the discharge velocity is so low, there is minimal discharge-induced (i.e., near-field) mixing. The primary driver of dilution is the movement of water in the canal (i.e., far-field mixing). The selected model must accurately simulate far-field mixing.

Water depths in the canal are approximately 30 feet relative to mean lower low water (MLLW). The height of the conduit is only 15 feet. The discharge makes up a maximum of 50% of the water column at low tide and less than 50% at other times. The selected model must be a three-dimensional model to account for the fact that the effluent only enters the canal through the bottom portion of the water column.

HWR selected the numerical model EFDC (Environmental Fluid Dynamics Code) to simulate the hydrodynamics in the canal and the Boston Harbor Main Channel. EFDC is a three-dimensional hydrodynamic model that simulates far-field mixing. The U.S. Environmental Protection Agency (US EPA) supports and maintains a version of EFDC. EFDC is a versatile model that is regularly used by government agencies, educational institutions, and consultants. EFDC is appropriate for modeling a wide variety of environmental flow and transport problems, and it is well suited to modeling far-field mixing in coastal waters. The dynamic capability of the EFDC model allows model predictions to capture the varying nature of the hydrodynamic and meteorological conditions as well as the vertical dimensions of the discharge conduit.

HWR used EFDC version 1.01 which is available directly from the US EPA (US EPA, 2020).

4.0 MODEL SETUP

This section describes the setup of the EFDC model. Model setup involves developing the computational grid (i.e., how the overall model domain is subdivided) and assigning appropriate boundary conditions (e.g., a tidal boundary) that drive the movement of water within the model domain. This section of the memorandum also includes a discussion of how the Boston Ship Repair outfall is incorporated into the EFDC model.

4.1 Computational Grid

HWR developed a curvilinear grid to discretize the canal and the Boston Harbor Main Channel. Figure 4 shows the extent of the model domain and the computational grid. The model domain extends from the mouth of the Boston Harbor Main Channel to the Mystic River just south of the Mystic Valley Parkway in Medford, Massachusetts. The model domain also extends into Chelsea Creek just south of the Revere Beach Parkway in Revere, Massachusetts.

The model domain is divided into 940 cells. Model cells vary in size from 850 square feet (ft^2) to 700,000 ft^2. The canal has the highest resolution. Typical cell dimensions in the canal are 30 feet by 30 feet. Farther away from the canal, the model domain is subdivided into larger grid cells. Model resolution is less important far away from the canal. This variable grid size approach provides the necessary resolution in the vicinity of the discharge to determine the required mixing zone while saving computational time in the areas of the model domain that are not relevant to evaluating the mixing zone. The model domain is divided into eight vertical layers using a sigma-stretch form of EFDC. Each vertical layer represents one-eighth of the water depth at each cell. These layers allow the Boston Ship Repair outfall to be incorporated into the model domain at the correct depth.

The thickness of each layer is a function of the water depth in each cell. The elevation of the sea floor at each cell in the model domain is based on soundings collected in 2001 by the National Oceanic and Atmospheric Administration (NOAA) (2020a).

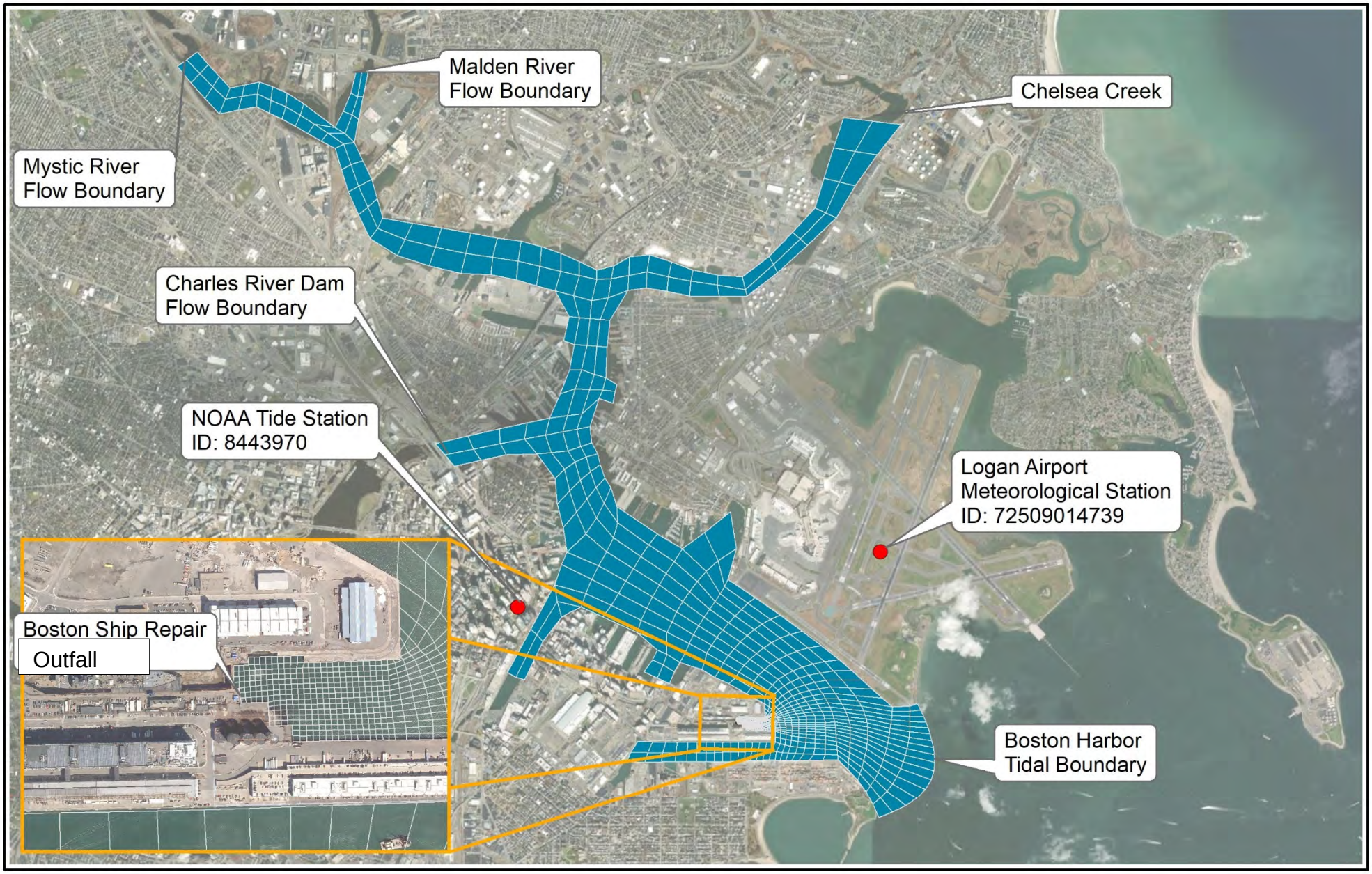

Figure 4: Model Domain Notes:

Boston Ship Repair
Boston, Massachusetts

Hodge WaterResources

N

0 2,000 4,000 6,000 8,000

Feet

4.2 Boundary Conditions

The model domain and computational grid define the region where the hydrodynamic model simulates the movement of water and the resolution of that simulation. Model inputs at specific locations within the model domain drive the movement of water, respectively. These inputs, or boundary conditions, add or remove water from the model domain which in turn results in changing water levels and creating currents in each cell of the model. The model has three types of boundary conditions: tide, flow, and wind.

All of these boundary conditions are dynamic. A common approach to modeling dynamic conditions is to select a historical period of time that is representative of the typical variability in the boundary conditions. HWR chose to model the month of September 2019. Prior to running the model, we confirmed that September 2019 included typical variability for each boundary condition and did not include any extreme events that might bias the model results.

4.2.1 Tides

The mouth of the Boston Harbor Main Channel connects to the greater Boston Harbor. As water levels in Boston Harbor rise and fall, the water levels in the main channel also rise and fall. The nearest water level monitoring station is NOAA tide station 8443970 (NOAA, 2020b). The station is located in the Fort Point Channel northwest of the Boston Ship Repair drydock. The location is shown in Figure 4. Figure 5 shows the measured water levels relative to the North American Vertical Datum 1988 (NAVD88) at this tide station in September 2019 and three station datums that describe the typical tidal range: mean higher high water (MHHW), mean tide level (MTL), and MLLW.

September 2019 was a typical month. The month included spring tides and neap tides, and there were no storm surge events or storms. This time period captures typical tides and excludes extreme events.

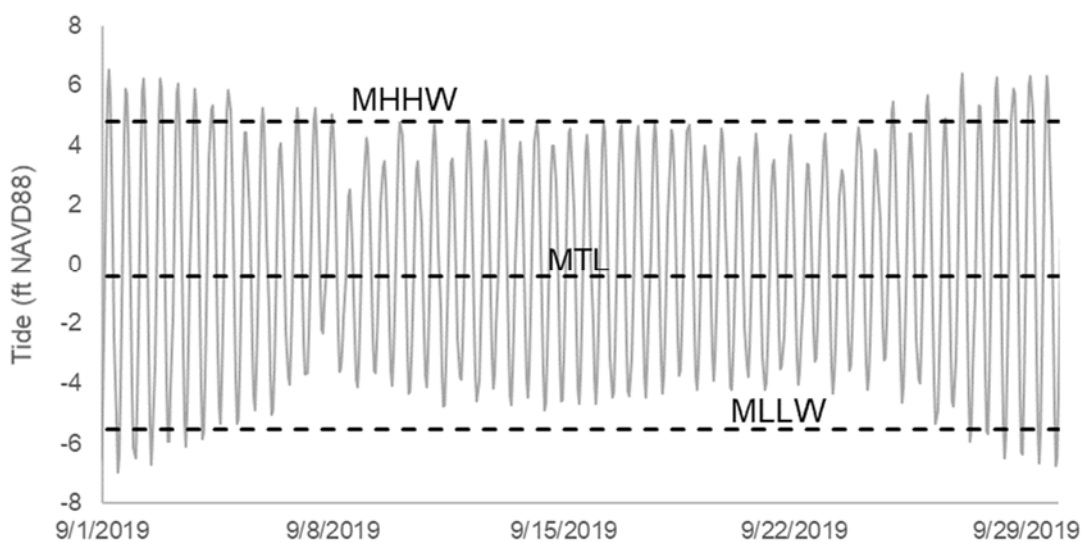

Figure 5 Water Levels at NOAA Tide Station: 8443970

The tide monitoring station is approximately three miles from the mouth of the Main Channel. It is likely that there is a small time lag between the actual tides at the mouth of the main channel and the tide monitoring station. The tide at the mouth will rise just before the tide at the monitoring station, but the delay is likely on the order of seconds, and both locations experience the same tidal range during each tidal cycle. HWR concluded

that the small temporal shift in the time series is inconsequential to the goals of this study. This tide time series is incorporated into the model at the Boston Harbor Tidal Boundary as shown in Figure 4.

4.2.2 Flows

In addition to the tide at the mouth of the Boston Harbor Main Channel, flow from the rivers that drain to the Boston Harbor Main Channel influence both water levels and currents in the main channel. The two largest rivers that drain to the main channel are the Mystic River and the Charles River. The Malden River and Chelsea Creek also drain to the main channel. None of these rivers have flow monitoring stations at, or near, the location of the flow boundaries shown in Figure 4, but some of the rivers' watersheds have flow monitoring stations within them. Figure 6 shows the watershed for each river and any flow monitoring stations in their watersheds.

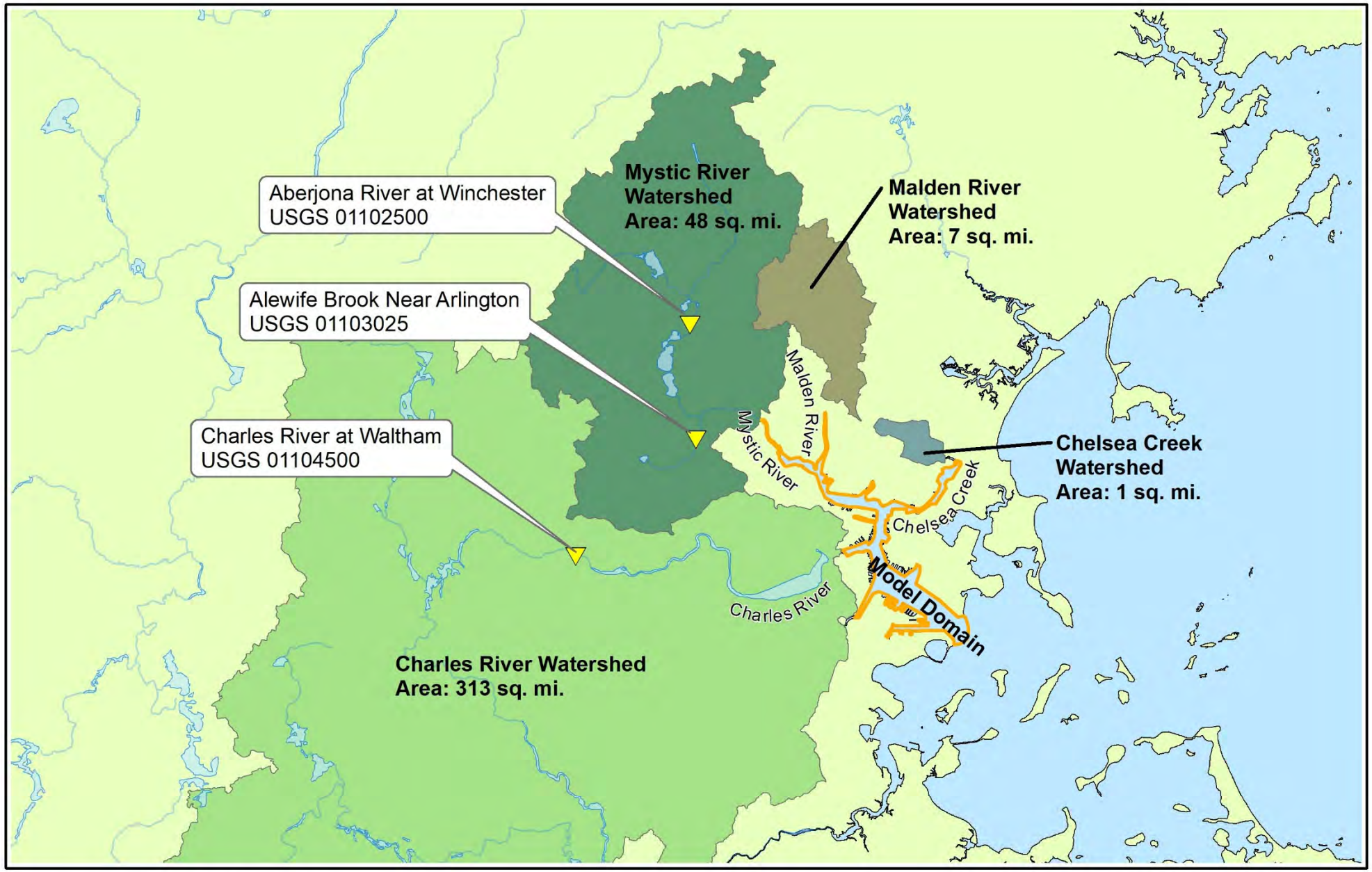

Figure 6: River Watersheds Notes:

Boston Ship Repair
Boston, Massachusetts

Hodge WaterResources

N

0 2 4 6
Miles

River flow is primarily a function of precipitation in the watershed. In the month of September 2019, there were no precipitation events that were greater than 1.1 inches of total precipitation at Logan Airport (Weather Underground, 2020). A 1.1-inch rainfall event occurred on September 3, 2019. There were four other days where precipitation was recorded, but each of these days had a total rainfall of 0.1 inches to 0.3 inches. There were no significant precipitation events that led to high flow entering the main channel during the month. Figure 7 shows the daily average flow at three flow monitoring stations for 2018 and 2019. These stations are in watersheds that drain to the Boston Harbor Main Channel. September 2019 was a relatively low flow month when compared to the rest of the year. September 2019 does not capture the typical variability in flow, but it does exclude large flow events. Low flow reduces the tidal exchange in Boston Harbor, and reduced tidal exchange is a conservative modeling condition. HWR concluded that while the typical range of flow was not captured, the conditions were conservative and therefore appropriate for this modeling study.

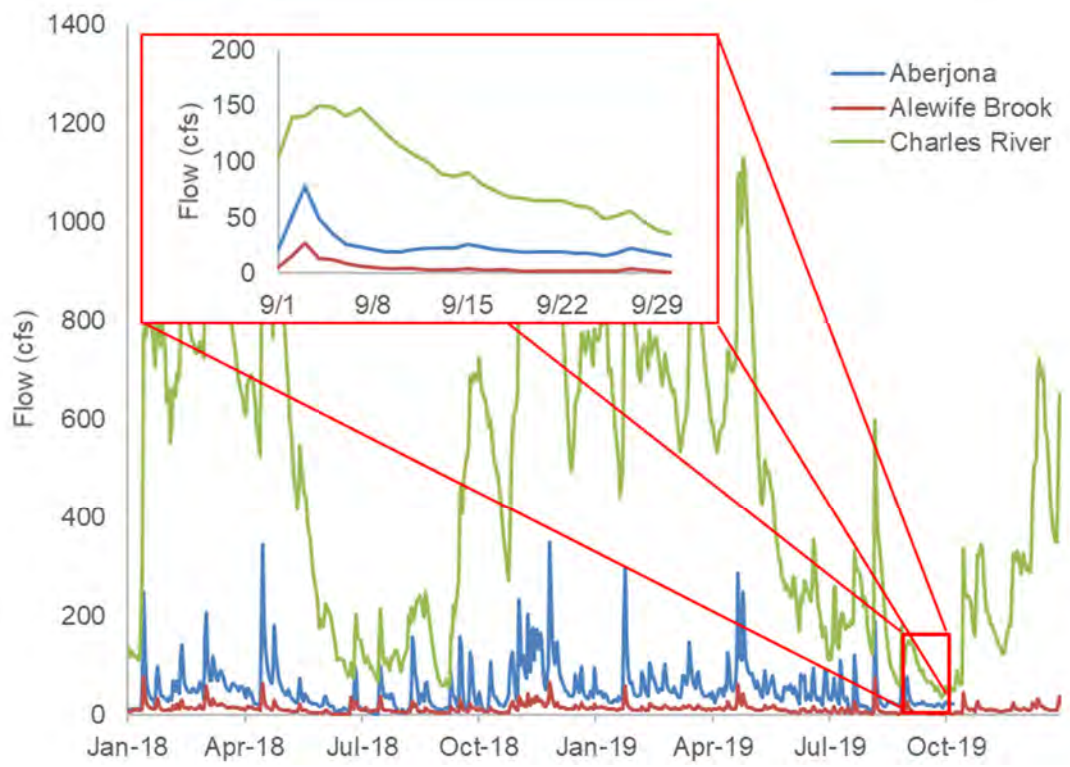

Figure 7 Flow Monitoring Station Flowrates for 2019 (USGS, 2020a, 2020b, 2020c)

The watershed to Chelsea Creek is too small to influence the hydrodynamic behavior near the discharge. We did not include Chelsea Creek as a flow boundary in the model. The flow boundaries for the Mystic River and the Malden River are based on the flow recorded at Alewife Brook (USGS Station 01103025). The model input flow was scaled up or down based on the overall watershed size relative to the watershed size for the Alewife Brook flow monitoring station. The model input flow for the Charles River is based on the flow record for the Charles River at Waltham and was scaled up based on the overall watershed size.

4.2.3 Wind

The nearest meteorological station to Boston Ship Repair is located at Logan Airport, approximately 1.5 miles away. HWR analyzed wind speed and direction measurements for 2018 and 2019 (NOAA, 2020c) from this

meteorological station to understand general wind patterns and then compared those patterns to the pattern that occurred in September 2019. Figure 8 shows a wind rose for 2018 and 2019 and a wind rose for September 2019. A wind rose is a polar diagram that shows both wind speed and prevailing wind direction. The prevailing wind over the longer period was from the west whereas the prevailing wind in September 2019 was from the southwest. The mean wind speed in 2018 and 2019 was 4.9 meters per second (m/s) whereas the mean wind speed in September 2019 was 4.4 m/s. September 2019 includes variable winds and has a mean wind speed that is within 10% of the mean wind speed for 2018 and 2019. The wind patterns are similar based on a visual comparison of the two wind roses shown in Figure 8. The winds that occurred in September 2019 are appropriate for use in this modeling study.

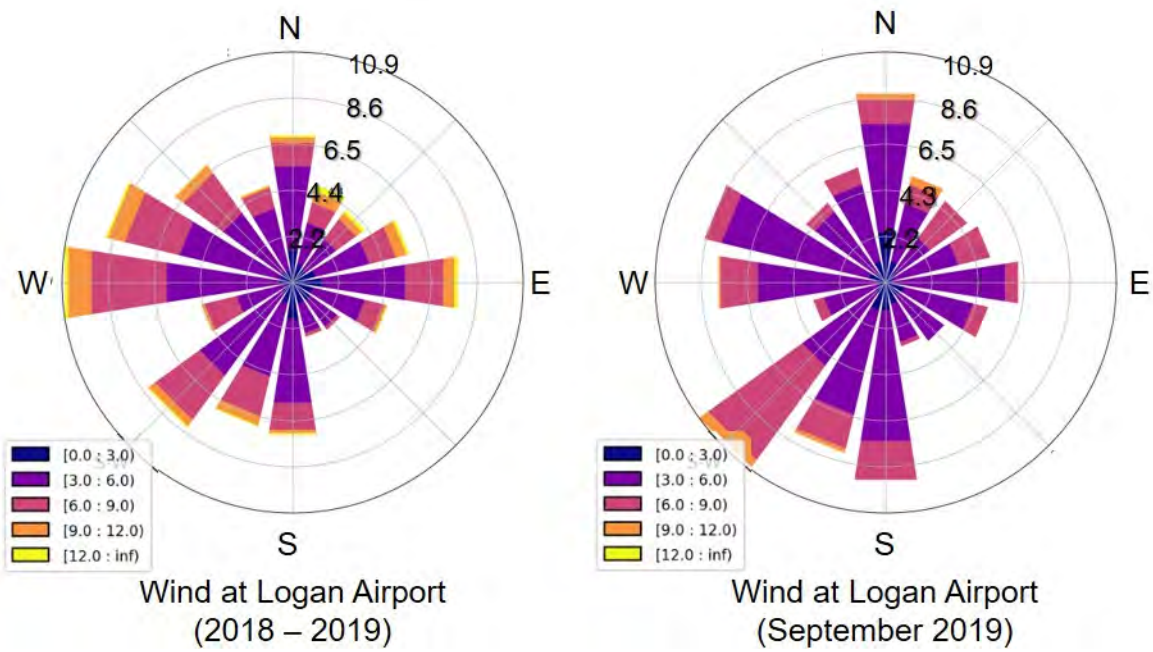

Figure 8 Wind Speed and Direction at Logan Airport 2018 and 2019

The wind boundary condition is applied across the entire model domain at the surface in contrast to the tidal and flow boundary conditions which are applied at specific locations within the model domain.

4.3 Boston Ship Repair Discharge

The flow that enters the model domain from the Boston Ship Repair outfall is also a boundary condition. The location of the outfall is shown in Figure 4. The top of the discharge conduit is 15 feet to 30 feet below the water surface depending on the tide. Flow from the conduit enters the model domain in the bottom four layers to appropriately account for the dimensions of the conduit.

Section 2.1 of this memorandum discusses the operation of the Boston Ship Repair stripping pumps. Only one pump operates at a time, and pumping occurs intermittently but on a continuous cycle when a ship is in the drydock. The discharge of effluent is incorporated into the model as an intermittent flow boundary. The flow boundary inputs water to the model at the maximum pumping rate for a single stripping pump, 5,600 gpm. The flow is on for 1.73 hours and then turned off for 5.46 hours. At the end of this time, the pumping starts again and effluent flows into the model for another 1.73 hours. This cycle repeats continuously throughout the duration of the September 2019 model run.

The pumping duration and pumping downtime used in the model are based on the observed duration and downtime measurements from the pumping analysis. The pumping duration (i.e., 1.73 hours) is the mean duration for all pumping when a ship was in the drydock. The small standard deviation relative to the mean leads HWR to conclude that the mean pumping duration is an appropriate value to use in the model. The mean pumping downtime is 7.60 hours. The standard deviation is large relative to the mean value. Less downtime results in less mixing of the effluent. HWR consulted with Epsilon, and we jointly concluded that the best approach for selecting a pumping downtime for use in the model would be to incorporate additional conservatism into the model. We selected a downtime that is less than the mean. The selected value (5.46 hours) is the mean pumping downtime that occurred when the USNS Dahl was in the drydock in late 2017 and early 2018.

5.0 MODEL APPLICATION

The goal of this modeling is to understand how quickly the effluent from Boston Ship Repair is mixed with ambient water. In lieu of explicitly modeling each contaminant of concern, HWR used the hydrodynamic model to simulate the movement and dilution of a dye tracer throughout the model domain. HWR included a dye concentration with the flow that enters the model from the outfall. The dye concentration of the effluent was set to 1,000 milligrams per liter (mg/l), and the concentration throughout the rest of the model was set to 0 mg/l.

HWR reviewed the hydrodynamic model results to ensure that the model appropriately simulates the movement of water. We then reviewed the dye tracer results to determine the size of the mixing zone necessary to meet water quality standards.

5.1 Hydrodynamic Modeling Results

HWR did not calibrate the hydrodynamic model, but we did confirm that the simulated hydrodynamic behavior was consistent with the expected behavior. It is possible for the hydrodynamic model to be calibrated in the future if appropriate measurements of tides and current speeds are recorded. HWR does not believe that the level of effort required to calibrate the model is warranted at this time.

The area of interest for the study is the discharge canal immediately outside of the Boston Ship Repair drydock. The hydrodynamic model predicts that most of the time the currents in the discharge canal point west on a rising tide and east on a falling tide, but some of the time a counter-clockwise gyre (i.e., a spiral pattern) forms in the canal. Figure 9 shows an example of the gyre. Peak flood/ebb currents are approximately 0.06 fps, and current speeds during slack tide approach 0 fps.

Exit velocities from the discharge conduit are the same order of magnitude as the peak flood/ebb currents in the discharge canal. The discharge of effluent from Boston Ship Repair does not drive the flow of water or circulation patterns in the discharge canal. The hydrodynamic behavior and the resulting mixing of effluent are driven primarily by tides.

The movement of water and the slow current speeds in the canal are all consistent with HWR's conceptual understanding of the hydrodynamics of the canal and the Boston Harbor Main Channel. HWR concludes that the model provides an appropriate approximation of the likely hydrodynamic behavior in the canal, and that the results from this modeling are at least as reliable as other commonly used approaches (e.g., CORMIX) for the determination of mixing zones for industrial discharges.

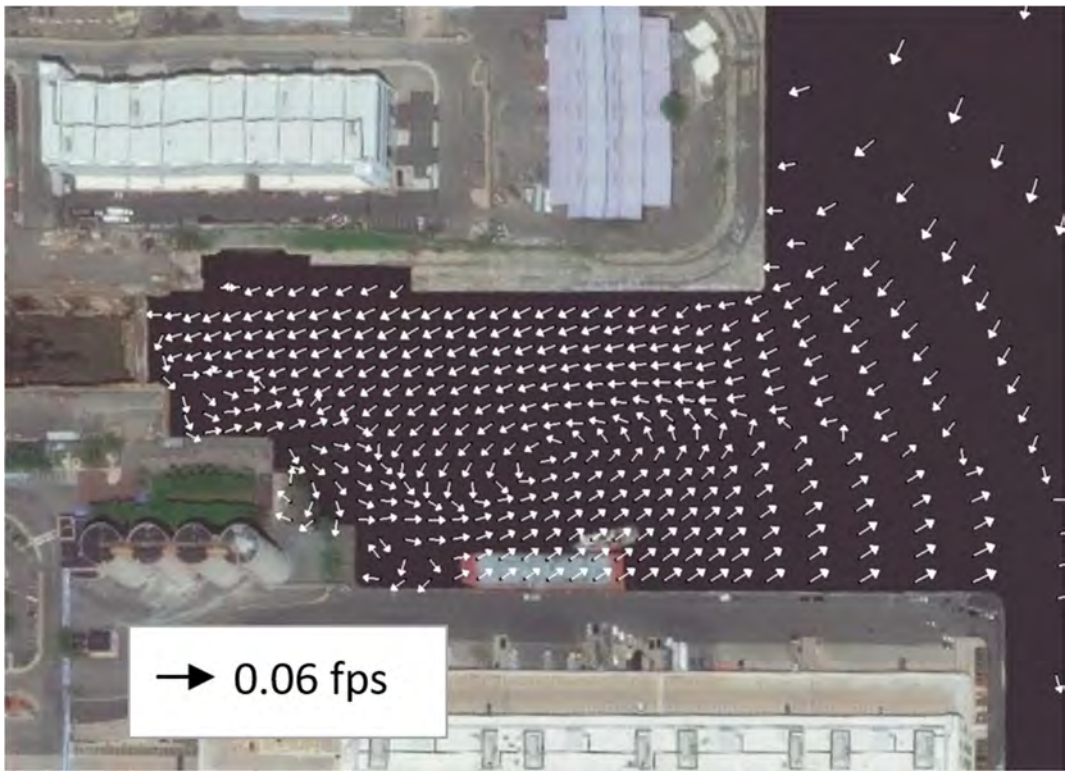

Figure 9 Example Gyre in Boston Ship Repair Discharge Canal

5.2 Dye Tracer Modeling Results

Section 2.2 of this memorandum discusses the dilution needed to meet water quality standards. The acute water quality standards will be met when a dilution factor of 81 x is achieved, and the chronic water quality standards will be met when a dilution factor of 125 x is achieved. HWR analyzed the modeled dye results to determine where the required acute and chronic dilutions occur.

For the purposes of this study, the term “plume” is defined as the region where effluent concentrations do not yet meet water quality standards. The plume from the Boston Ship Repair discharge is dynamic. The location of the plume responds to hydrodynamic behavior in the canal and the operation of the stripping pumps. The plume is pushed back towards the drydock caisson on a rising tide, and it is pulled out into the canal on a falling tide. When the counter-clockwise gyre is present, the plume moves along the southern side of the canal.

In order to capture the range of possible plume configurations, HWR ran the dye simulation for the entire modeled period of September 2019. We then analyzed the model results to determine the maximum concentration at each point within the model domain for the duration of the model run. We converted that maximum concentration to a minimum dilution by dividing the maximum concentration at each location by the original effluent concentration (i.e., 1,000 mg/L). Figure 10 shows the discharge canal and the minimum dilution observed at each location throughout the model run for September 2019. Figure 10 superimposes every position of the plume over the length of the model run. This means that the actual plume from the discharge will never be anywhere near as large as what is shown in Figure 10.

Figure 10 shows that the acute mixing zone boundary (i.e., the limit of where dilution may be less than 81 x) is located approximately 1,250 feet from the outfall, and the chronic mixing zone boundary (i.e., the limit where dilution may be less than 125 x) is located approximately 1,350 feet from the outfall. In both cases, the occasional counterclockwise gyre leads to a slight extension of the plume when it travels along the southern wall of the canal.

Figure 10 is helpful in determining the extent of the necessary mixing zone, but it is not helpful in assessing how likely it is that the plume will extend a given distance from the outfall. Figure 11 and Figure 12 show the probability of dilution being less than a given threshold value, 81 x (for Figure 11) and 125 x (for Figure 12). During the September 2019 model run, the plume from the outfall remained within 650 feet of the outfall more than 95% of the time. The plume from the outfall remained within 250 feet of the outfall approximately 50% of the time.

HWR ran the EFDC model with a model time step of one second, and we evaluated model results at 30-minute intervals. Using results every 30 minutes, the model results indicate that all acute water quality conditions (i.e., dilution less than 81 x) are sufficiently diluted within the canal at all times in the model run. Chronic water quality conditions (i.e., dilutions less than 125 x) are sufficiently diluted within the canal more than 99% of the time. Of the 1,440 30-minute increments in the model result, only six increments indicated chronic water quality conditions present beyond the canal.

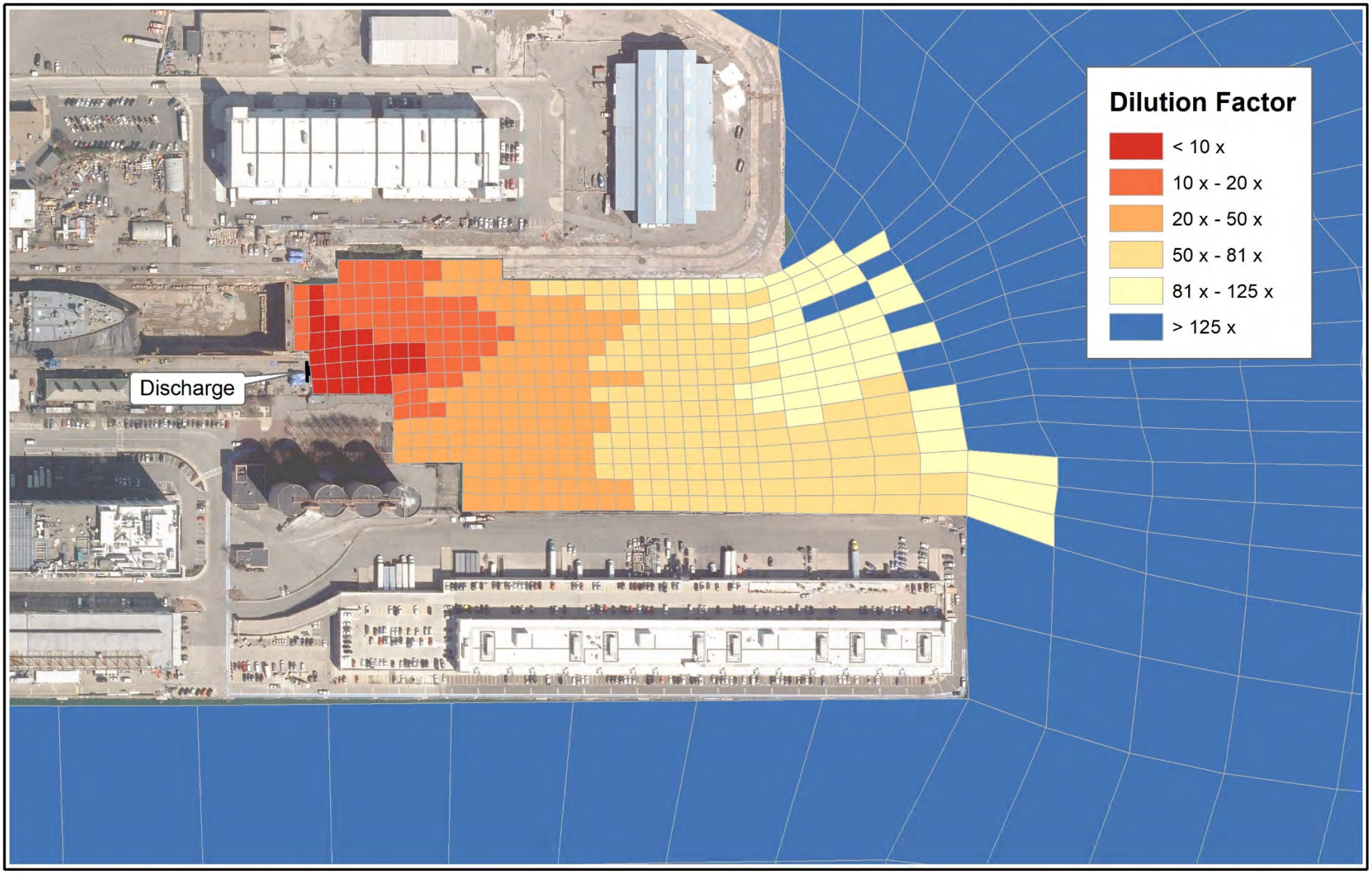

Figure 10: Model Results

Boston Ship Repair
Boston, Massachusetts

Notes:
- Dilution calculated as the ratio of the discharge concentration and the maximum concentration observed at all depths at any time during the model run.

Hodge WaterResources

N

0 100 200 300 400 500
Feet

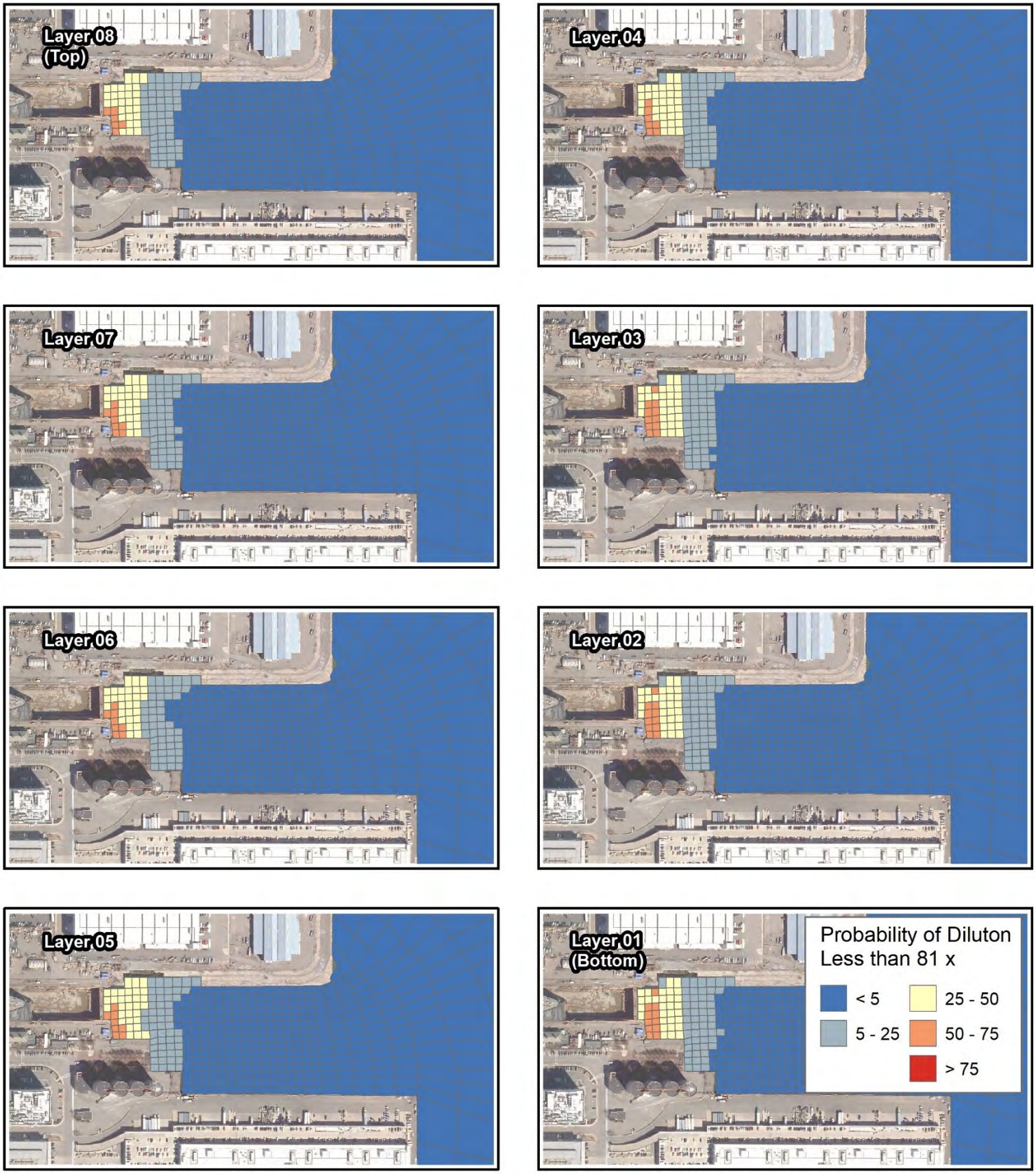

Figure 11: Probability of 81 x Dilution

Boston Ship Repair
Boston, Massachusetts

Hodge WaterResources

N

0 250 500 750 1,000

Feet

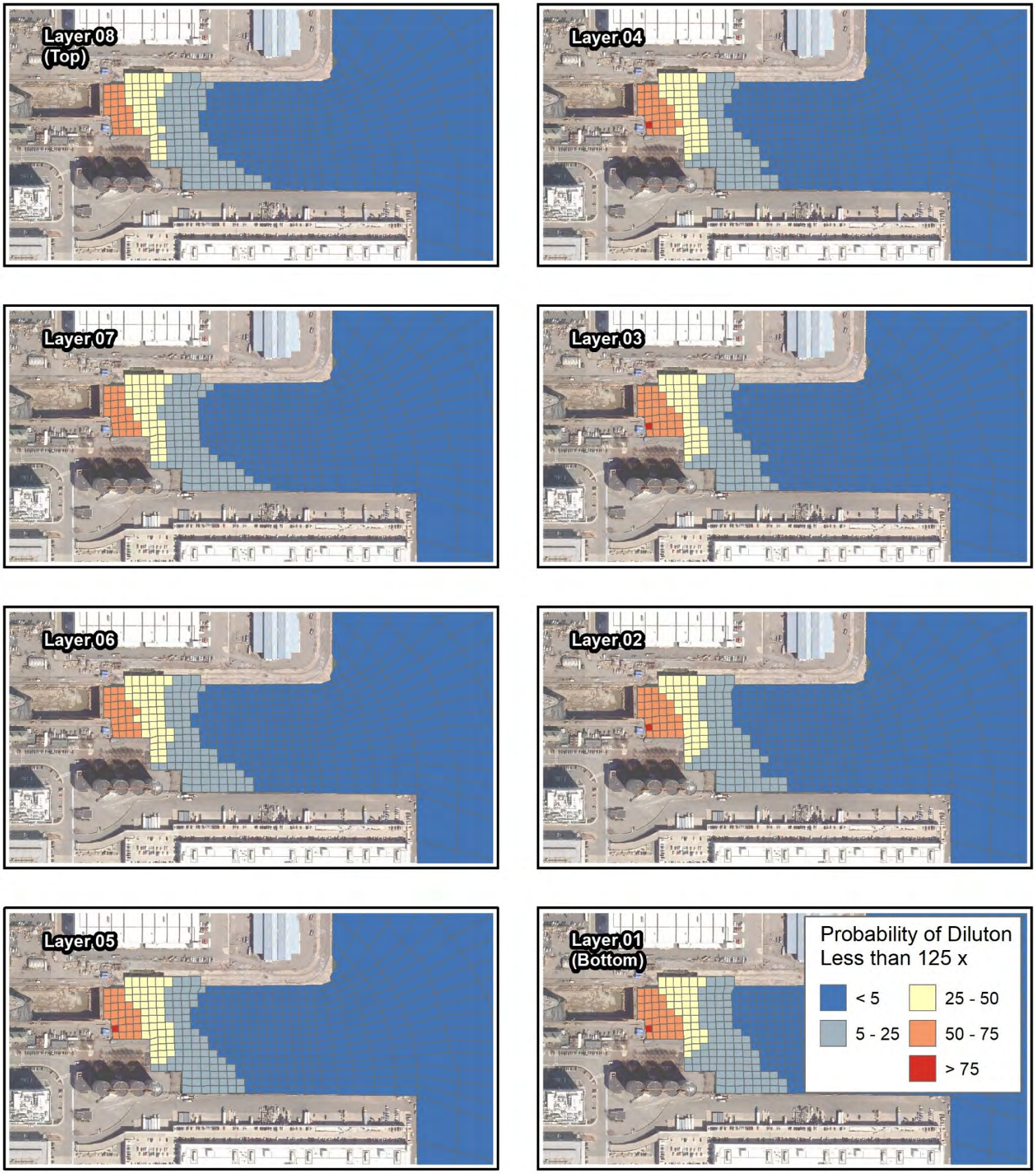

Figure 12: Probability of 125 x Dilution

Boston Ship Repair
Boston, Massachusetts

Hodge WaterResources

N

0 250 500 750 1,000

Feet

6.0 REFERENCES

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Appendix B-1

Digital Copy of Model Files

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY – REGION 1 (EPA)
WATER DIVISION
5 POST OFFICE SQUARE
BOSTON, MASSACHUSETTS 02109

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (MASSDEP)
COMMONWEALTH OF MASSACHUSETTS
1 WINTER STREET
BOSTON, MASSACHUSETTS 02108

EPA PUBLIC NOTICE OF A DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE INTO WATERS OF THE UNITED STATES UNDER SECTION 402 OF THE CLEAN WATER ACT (CWA), AS AMENDED, AND MASSDEP PUBLIC NOTICE OF EPA REQUEST FOR STATE CERTIFICATION UNDER SECTION 401 OF THE CWA.

PUBLIC NOTICE PERIOD: **January 12, 2021 – February 10, 2021**

PERMIT NUMBER: **MA0040142**

PUBLIC NOTICE NUMBER: **MA-007-21**

NAME AND MAILING ADDRESS OF APPLICANT:

Boston Ship Repair, LLC
32A Drydock Avenue
Boston, MA 02210

NAME AND ADDRESS OF THE FACILITY WHERE DISCHARGE OCCURS:

Boston Ship Repair, LLC
32A Drydock Avenue
Boston, MA 02210

RECEIVING WATER AND CLASSIFICATION:

Boston Inner Harbor – Class SB (CSO)

PREPARATION OF THE DRAFT PERMIT AND EPA REQUEST FOR CWA § 401 CERTIFICATION:

EPA is issuing for public notice and comment the Draft NPDES Permit for the Boston Ship Repair facility, which discharges stormwater, seawater, and groundwater to Boston Inner Harbor. The effluent limits and permit conditions imposed have been drafted pursuant to, and assure compliance with, the CWA, including EPA-approved State Surface Water Quality Standards at 314 CMR 4.00. MassDEP cooperated with EPA in the development of the Draft NPDES Permit. MassDEP retains independent authority under State law to issue a separate Surface Water Discharge Permit for the discharge, not the subject of this notice, under the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53.

In addition, EPA has requested that MassDEP grant or deny certification of this Draft Permit pursuant to Section 401 of the CWA and implementing regulations. Under federal regulations governing the NPDES program at 40 Code of Federal Regulations (CFR) § 124.53(e), state certification shall contain conditions that are necessary to assure compliance with the applicable provisions of CWA sections 208(e), 301, 302, 303, 306, and 307 and with appropriate requirements of State law, including any conditions more stringent than those in the Draft Permit that MassDEP finds necessary to meet these requirements. In addition, MassDEP may provide a statement of the extent to which each condition of the Draft Permit can be made less stringent without violating the requirements of State law.

INFORMATION ABOUT THE DRAFT PERMIT:

The Draft Permit and explanatory Fact Sheet may be obtained at no cost at https://www.epa.gov/npdes-permits/massachusetts-draft-individual-npdes-permits or by contacting:

Nathan Chien
U.S. Environmental Protection Agency – Region 1
5 Post Office Square, Suite 100 (06-1)
Boston, MA 02109-3912
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Chien.Nathan@epa.gov

Following U.S. Centers for Disease Control and Prevention (CDC) and U.S. Office of Personnel Management (OPM) guidance and specific state guidelines impacting our regional offices, EPA's workforce has been directed to telework to help prevent transmission of the coronavirus. While in this workforce telework status, there are practical limitations on the ability of Agency personnel to allow the public to review the administrative record in person at the EPA Boston office. However, any electronically available documents that are part of the administrative record can be requested from the EPA contact above.

PUBLIC COMMENT AND REQUESTS FOR PUBLIC HEARINGS:

All persons, including applicants, who believe any condition of this Draft Permit is inappropriate must raise all reasonably ascertainable issues and submit all reasonably available arguments supporting their position by **February 10, 2021,** which is the close of the public comment period. Comments, including those pertaining to EPA's request for CWA § 401 certification, should be submitted to the EPA contact at the address or email listed above. Upon the close of the public comment period, EPA will make all comments available to MassDEP.

Any person, prior to the close of the public comment period, may submit a request in writing to EPA for a public hearing on the Draft Permit under 40 CFR § 124.10. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty days public notice if the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on this Draft Permit, the Regional Administrator will respond to all significant comments and make the responses available to the public.

Due to the COVID-19 National Emergency, if comments are submitted in hard copy form, please also email a copy to the EPA contact above.

FINAL PERMIT DECISION:

Following the close of the comment period, and after a public hearing, if such hearing is held, the Regional Administrator will issue a final permit decision and notify the applicant and each person who has submitted written comments or requested notice.

KEN MORAFF, DIRECTOR
WATER DIVISION
UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY – REGION 1

LEALDON LANGLEY, DIRECTOR
DIVISION OF WATERSHED MGMT
MASSACHUSETTS DEPARTMENT OF
ENVIRONMENTAL PROTECTION