Form DEPLW0105-B2003
Revised December 23, 2008
Updated February 22, 2018

Maine Department of Environmental Protection

General Application for Waste Discharge License (WDL) / Maine Pollutant Discharge Elimination System (MEPDES) Permit

Regulatory requirements for the preparation and filing of applications may be found in Chapters 2, 521 and 522 of the Department's rules.

GENERAL INSTRUCTIONS

1. This general form is to be used to make application for the discharge of pollutants to the surface waters of the State, from all source except from privately owned discharges subject to the Over Board Discharge Program requirements.
2. Applicants are responsible for publishing public notice of their application at the time it is filed with the Department. See pages 7 and 8.
3. For a proposed new discharge of wastewater of more than 25,000 gallons per day or a project involving licenses from more than two bureaus in DEP, an applicant must conduct a public informational meeting before submitting an application to the Department. See page 7.
4. In some circumstances an applicant must have a pre-application or pre-submission meeting with the Department prior to filing of an application. See page 9.
5. At the time an application is filed with the Department, a copy must be provided to the municipal office and notice provided to all abutters by certified mail. See page 7.
6. Application fees must be paid at the time an application for a **new** discharge or permit is filed. Contact the Department for additional information and calculation of the fee amount. For existing discharges, fees are charged on an annual basis and application fees are not required with an application for permit renewal.
7. Attach additional sheets as necessary in answering specific questions. Be sure to number each sheet to identify the question to which it pertains.
8. Failure to fully complete all required forms or to pay necessary application fees will result in the application being returned.
9. After completing the application, submit 2 copies to:

   Maine Department of Environmental Protection
   Bureau of Water Quality
   Division of Water Quality Management
   State House Station 17
   Augusta, Maine 04333-0017

10. Please read the entire application form before furnishing any information. If you need any assistance in filling out the form or required attachments, please contact the Department at the above address or by calling (207) 287-7688.

This application is for a:

☐New discharge ☐Renewal ☐Increased discharge ☐Transfer of owner ☐Modification ☐Other: _____

If assigned: MEPDES#: ME WDL#:W- - - -

FACILITY AND APPLICANT INFORMATION

1. Facility Information (911 Address):

Facility Name: Kingfish Maine Receiving Water Name(s): Chandler Bay
Town: Jonesport State: Maine Zip: 04649
Global Positioning System (GPS) reference data if available
Facility Type: ☐ Federal ☐ State ☐ Other Public ✠ **Private** ☐ Other

2. Applicant Information:

Name: ***Kingfish Maine*** Telephone:
Address: ***33 Salmon Farm Road*** e-mail: ***megan@kingfish-maine.com***
Town: ***Franklin*** State: ***Maine*** Zip: ***04634***

3. Owner Information (if different from Applicant):

Name: Telephone:
Address: e-mail:
Town: State: Zip:

4. Operator Information (if different from Applicant/Owner):

Name: Telephone:
Address: e-mail:
Town: State: Zip:

NOTE: If a wastewater treatment facility is operated under a contract with third party, the contract for services must be reviewed and approved by the Department.

5. Cognizant Official (Person to whom correspondence regarding this application should be sent):

Name: ***Megan Sorby*** Telephone: ***5023878673***
Address: ***33 Salmon Farm Road*** e-mail: ***megan@kingfish-maine.com***
Town: ***Franklin*** State: ***Maine*** Zip:***04634***

6. Person in responsible charge of the treatment facility operations:

Name: ***Kees Kloet,***
Chief Operating Officer,
The Kingfish Company;
Megan Sorby, Tom Sorby,
Operations Managers, Kingfish Maine Telephone: ***5023878673***
Operator's license #: Grade: Professional Engineer?

7. Briefly describe nature of business and activities requiring WDL /MEPDES Permit:

Kingfish Maine is submitting an application for a WDL/MEPDES permit in order to operate a proposed recirculating aquaculture facility growing yellowtail kingfish, Seriola lalandi.

ELECTRONICALLY SIGNED DECISIONS

8. Electronically signed decision options. To expedite processing of applications and reduce paper usage, **all final decisions on an application will be electronically signed by the Commissioner (or his/her designee) and will be sent to the respective e-mail addresses provided for the Applicant and the Cognizant Official** listed on this application, unless the "opt out" signature block is signed below.

I hereby <u>decline</u> to receive an electronically signed decision on the WDL/MEPDES permit via e-mail and choose to receive manually signed (hand written) decision via regular (U.S. Postal) mail.

Sign to DECLINE only N/A

(Applicant): N/A **Date:**

SUPPORTING MATERIALS AND REQUIRED ATTACHMENTS

9. For **new and transfer applications only** from privately-owned facilities, include:

☑ A Certificate of Good Standing issued by the Maine Secretary of State.
Attachment 1

☑ Proof of Title, Right or Interest (TRI) in the property on which the treatment system and outfall pipes and structures are or will be located. See Chapter 2 of the Department's rules for TRI criteria. ***Attachment 2***

10. For **transfer applications only**, answer the following then skip to the Certification on page 6.
N/A

A. Name of current/former owner:
B. Describe any planned changes in the current discharge:

C. Provide a statement describing the technical and financial capacity to comply with the current permit conditions and applicable laws and rules. (use a separate sheet)

11. Unless submitted previously and there have been no changes, provide a topographic map (or other map if a topographic map is unavailable) extending one mile beyond the property boundaries of the source, depicting the facility and each of its intake and discharge structures
Attachment 3

12. If modification of an existing permit is being requested, attach a statement describing the nature of the modification and the reasons or circumstances necessitating the change. Include any relevant modified process flow schematics available.
Not Applicable

13. Attachments for specific activities and circumstances. For each specific question, check 'Yes' or 'No' to indicate if the statement is applicable to a discharge or activity described in this application. Where 'Yes' is checked, attach the applicable form.

Specific Question	Yes	No	Applicable Form
A. Is this facility a publicly owned treatment works treating sanitary wastewaters?			DEP Form: Publicly Owned Treatment Facilities (DEPLW0106)
B. Does this application seek authorization to introduce septage into treatment works?			DEP Form: Disposal of Septage and Holding Tank Wastes in Wastewater Treatment Facility (DEPLW0507-A2004)
C. Is this application for a subsurface wastewater disposal system?			DEP Form: Application for Subsurface Wastewater Disposal System (DEPLW0313-B2005)
D. Is this application for a land surface (including spray irrigation) wastewater disposal system?			DEP Form: Application for Surface Wastewater Disposal System (DEPLW0450-B2005)
E. Is this a food processing facility or POTW that treats food processing wastewaters?	✓		DEP Form: Food Processing Facilities (DEPLW1999-19)
F. Is this an existing discharge of industrial process wastewater?			EPA Form: 2C
G. Is this to be a new discharge of industrial process wastewater?	✓		EPA Form: 2D
H. Is this a discharge of non-contact cooling water?			EPA Form: 2E
I. Is this discharge of storm water associated with an industrial activity?			EPA Form: 2F
J. Is this a discharge of non-process wastewater?			EPA Form 2E
K. Is this application for an Atlantic salmon net pen facility?			DEP Form: Supplemental Information for Atlantic Salmon Aquaculture Net Pen (for Individual Permit) (DEPLW0956)
L. Is this a fish hatchery or rearing facility?	✓		DEP Form: Fish Rearing Facilities (DEPLW1999-18)
M. Does this application involve a new or modified outfall structure?	✓		DEP Form: Outfall Information (DEPLW1999-17)
N. Is this application for a waste snow dump?			DEP Form: Supplemental Information for Snow Dumps (DEPLW0249)

OUTFALL AND TREATMENT INFORMATION

Use attachments as necessary to provide details for each discharge point and treatment system.

14. Describe each discharge location. Include all combined sewer overflow (CSO) points, bypasses, emergency discharge points, at pump stations, etc.

Outfall Number/Name	Description, Volume Discharged and Receiving Water
Outfall A	*One 47.24 inch (1200mm) pipe running 2624ft (800m) out from mean low water into Chandler Bay. Daily discharge volume maximum: 28.7 million gallons per day (mgd) (4525m^3/hr); diffuser is (6) 8.3in (211mm) ports with duckbill-style valves, with additional three capped ports for redundancy/cleaning*
Outfall B	*One 47.24 inch (1200mm) pipe running perpendicular to Outfall A to the same endpoint in Chandler Bay. Provides redundant pipe and will be switched with Outfall A on a regular basis. Daily discharge volume maximum would be the same as listed for Outfall A, i.e. only one outfall is running at a time and total daily discharge maximum is 28.7 mgd. Diffuser set up is the same*

If any of the above-listed discharges (other than CSOs) are intermittent or seasonal, please describe the nature, circumstances and duration of each.
See description above for Outfall B.

15. Briefly describe current treatment facilities or methods for each discharge.
Effluent water treatment including sources and uses is detailed in Attachment 4.

16. If this is a renewal application, please describe all significant modifications to the treatment facilities (and collection system if applicable) since the last permit application was filed.
Not Applicable.

17. Are new or expanded treatment facilities or outfall structures being proposed? ***Yes*** If so, please include a construction schedule. Plans and specifications must be submitted to the Department for review and approval prior to construction of the facilities. ***Please see Attachment 5.***

18. If this application is for a new or increased discharge, include a statement that:
Please see Attachment 6.

A. describes in detail the nature of and reason for the requested increase in pollutant loading to the receiving water;
B. if the Department determines that the discharge will diminish the remaining assimilative capacity of the receiving water, demonstrates that alternative methods to reduce or eliminate the increased discharge are not feasible. Include engineering and economic analyses that consider alternative methods of production, process controls, wastewater minimization methods, improved wastewater treatment methods and alternate disposal sites; and
C. if the Department determines that the discharge will diminish the remaining assimilative capacity of the receiving water, demonstrates that the increased pollutant load will result in important social and economic benefits to the State.

CERTIFICATION

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

Additionally, by signing below, I certify that
(1) notice of this application has been made by publication in
newspaper circulated in the area where the project site is located on or about
(a copy of the advertising form is included in this application); (2) notice has been sent by certified mail or Certificate of Mailing to owners of land abutting the discharge site (a copy of the list of abutters is included in this application); and (3) notice and a copy of this application have been provided to the clerk of the municipality(ies) where the discharge is located. (4) Further, if this is a new discharge over 25, 000 gallons per day, a public meeting attended by approximately members of the public was held on .
The forgoing steps have been taken in accordance with the instructions attached to this application and the provisions of Chapters 2 and 522 of the Department's rules.
Attachment 7 provides documentation of the items certified above.

By: Signature: Ohad Maiman Typ hier uw tekst Date: 8-6-2020

Printed Name: (Ohad Maiman /Kees Kloet)

Title: CEO/COO

Assisting Parties. If the applicant has been assisted in preparing this application, the person assisting must sign below.

Signature: Date: 8/5/2020
Printed Name: Megan Sorby Telephone: 502-387-8673
Affiliation: Kingfish Maine
Address: 33 Salmon Farm Road
Town: Franklin State: Maine Zip: 04634
Professional Registration or Certification:

See following pages for requirements on public notice, public meetings, pre-applications meetings and pre-submission meetings.

Instructions for providing notices of the application. For all applications, the first 3 items must be completed. If the application is for a new discharge, you must also complete item 4.

1. *Publication of Public Notice.* Applicants for waste discharge permits are required to publish a public notice that the application is being file with the Department of Environmental Protection. The notice must be published within 30 days prior to the application being sent to the Department. The notice should be published in the legal advertisement section of a daily or weekly newspaper having general circulation in the area where the discharge will occur. If the public notice is not published at the proper time or if the application is returned because it is incomplete, you may be asked to have the notice published a second time.

Using the form on the next page, fill in the blanks with the appropriate information. Strike out all of the items (CSO, multiple discharge sources, etc.) in the second paragraph that do not apply to your discharge. The form may then be sent to the newspaper that is to publish the notice. Additionally, include a copy of the form with the application filed with the Department.

2. *Notice to Abutters.* Applicants are also required to send a copy of the public notice by certified mail or Certificate of Mailing to all abutting property owners within 30 days prior to the application being filed with the Department. For the purposes of public notice of this application, an "abutter" is any person who owns property that is both (1) adjoining and (2) within 1 mile of the delineated project boundary, including owners of property directly across a public or private right of way. Additionally, include a copy of the form with the application filed with the Department.

3. *Notice to Municipal Office.* Applicants are required to send a copy of the public notice by certified mail to the town or city clerk of each municipality where the discharge is located within 30 days prior to the application being filed with the Department. Applicants must also file a duplicate copy of the application with each municipality.

4. *Public Meeting.* Where the application is for a new discharge of greater than 25,000 gallons per day, you must hold a public meeting in accordance with Chapter 2, Section 8, of the Department's rules. Notice of the meeting must be sent to abutters and the clerk of the municipality(ies) where the discharge is located at least 10 days prior to the meeting. Notice of the meeting must be published in the same newspaper used to publish the notice of filing.

After all required notices have been made, sign the statement on the Certification page of the application.

NOTICE OF INTENT TO FILE
MAINE WASTE DISCHARGE LICENSE / MAINE POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION

Please take note that, pursuant to 38 MRSA, Sections 413 and 414-A, _____ of _____ intends to file a wastewater discharge permit application with the Department of Environmental Protection (DEP). The application is for the discharge of _____ of _____ to the _____ in _____, Maine.

Include as applicable:

CSO: Included in this application is the discharge from _____ Combined Sewer Overflows to_____.

Multiple industrial point sources: The application includes _____ associated with the primary activity described above.

Antidegradation: The application proposes a new or increased discharge that may lower existing receiving water quality within its legal classification, and the application contains a statement regarding important social and economic benefits resulting from the activity causing the discharge, pursuant to 38 MRSA, Section 464.

Mixing Zone: The application includes a request for establishment of a mixing zone in the _____, inside of which classifications standards and uses not need to be met, pursuant to 38 MRSA, Section 451.

The application will filed on or about _____ and will be available for public inspection at DEP's Augusta office during normal business hours. A copy may also be seen at the municipal offices in _____.

A request for a public hearing or request that the Board of Environmental Protection assume jurisdiction over this application must be received by the DEP, in writing, no later than 20 days after the application is found acceptable for processing, or 30 days from the date of this notice, whichever is longer. Requests shall state the nature of the issue(s) to be raised. Unless otherwise provided by law, a hearing is discretionary and may be held if the Commissioner or the Board finds significant public interest or there is conflicting technical information.

During the time specified above, persons wishing to receive copies of draft permits and supporting documents, when available, may request them from DEP. Persons receiving a draft permit shall have 30 days in which to submit comments or to request a public hearing on the draft.

Public comment will be accepted until a final administrative action is taken to approve, approve with conditions or deny this application. Written public comments or requests for information may be made to

Maine Department of Environmental Protection
Division of Water Quality Management
Department of Environmental Protection
State House Station #17
Augusta, Maine 04333-0017
Telephone (207) 287-7688

Pre-application and pre-submission meetings

Pre-application meetings. Pre-application meetings between the applicant and the Department are an opportunity for the applicant to determine the statutory and regulatory requirements that apply to a specific project and to identify a Project Manager for the application. The purpose of these meetings is to identify issues, processing times, fees and the types of information and documentation necessary for the Department to properly assess the project. The applicant shall consult the appropriate bureau Permit Assistance Coordinator to determine what information the applicant must provide before or during a pre-application meeting. Any applicant may request a pre-application meeting. The Department shall make a date available for the meeting as expeditiously as possible, but no later than 30 days from receipt of a written request and receipt of all information required for a pre-application meeting by the bureau. The Department shall prepare a written summary of all pre-application meetings.

For waste discharge permits, pre-application meetings are required prior to submission to or acceptance by the Department of an application for the following:

New wastewater discharge license for a discharge greater than 25,000 gallons per day (38 M.R.S.A. Sections 413, et seq.);

Projects requiring new or amended licenses involving more than two bureaus.

Pre-submission meetings. Pre-submission meetings between the applicant and the Department occur after the applicant has finished preparing the application for submission. These meetings are an opportunity to review the assembled application to ensure that the necessary information has been included prior to filing the application with the Department. An applicant may request a pre-submission meeting by contacting the Project Manager, or the Permit Assistance Coordinator for the bureau if no Project Manager has been identified. The Department shall make a date available for the meeting as expeditiously as possible, but no later than 20 days from receipt of a written request.

For waste discharge permits, a pre-submission meeting is required prior to submission to or acceptance by the Department of an application for the following:

Any application for which a pre-application meeting was held; or

Any application that has been previously rejected by the Department (see Chapter 2, Section 7-B of the Department's rules).

Waivers. The requirement of a pre-application or pre-submission meeting may be waived by written notice from the Department and agreement by the applicant. The Department will agree to waive a pre-application or pre-submission meeting if the Department is satisfied that such a meeting would be of no value in achieving the purposes noted above.

Note: The waiver of a pre-application or pre -submission meeting does not waive the public informational meeting required for new discharges of more than 25,000 gallons per day.

Form DEPLW1999-19
Revised: February 21, 2018

Maine Department of Environmental Protection
Waste Discharge Permit Application

Food Processing Facilities

This form must be attached to the General Application for a Waste Discharge License/MEPDES Permit (Form DEPLW0105-B2003)

Please answer all questions completely, using additional pages as necessary with responses clearly identified by item number on this form.

1. Facility Name: __***Kingfish Maine, Inc***._____ NPDES # ME _____

2. Attach a drawing showing the water flow through the facility. Please include the sources and volumes of intake water, operations contributing to wastewater discharges, treatment units and outfalls with numbers corresponding to those in the general application.

See Attachment 8. Highlighted area shows flow of water from use in processing to specified processing water treatment system, followed by combination with effluent from the culture facility in the main discharge water treatment system. Outfall will be the same as all facility water, Outfall A or B.

3. Is chlorine used in the process or is the intake water chlorinated? __***for cleaning only***__ If so, what is the concentration of chlorine in the final effluent(s)? _***less than 0.1mg/L***_____

4. List chemicals used for sanitation or disinfection during production or clean-up operations, and maximum discharge concentrations. ***See Attachment 9. Items are distinguished by area and purpose of use.***

5. List chemicals used in products or processing, and maximum discharge concentrations. ***See Attachment 9. Items are distinguished by area and purpose of use.***

6. If boiler blowdown or non-contact cooling water is discharged, please complete EPA form 2E. ***Not Applicable.***

7. How are sanitary wastes disposed of? ***Septic system to be established on site after obtaining all relevant building permits***

8. Please complete the attached table of products and productions rates.
   Complete a separate block for each product or type of production.

Product Name: *Yellowtail Kingfish, Seriola lalandi*

Pounds per day processed			Processing period(s) each year		Daily effluent flows	
Average	Maximum	Total pounds per year processed	Total weeks per year	During the months of	Average	Maximum
50,706	126,765	13,200,000	*52*	*Jan-Dec*	53,000gal	80,000gal
Describe processing operation *Fish will be harvested from the culture tank and humanely slaughtered in accordance with state and federal guidelines. Fish will be processed in an area separate from the culture systems, where they will be bled, eviscerated, and placed in temperature controlled containers. The company offers a variety of product cuts, so fish will be sent down designated process lines to be cut accordingly. All handling will be in accordance with state and federal regulation of seafood processing.*						
Type of wastewater treatment *All water used in processing will go through treatment in the processing plant, consisting of primary flocculation to bind particulates as well as fats and oils, mechanical filtration to remove all solids, and a secondary flocculation and water clarification. At this point, water will be piped and combine with all water flowing into the discharge water treatment system, where it will go through additional treatment steps for removing solids, biological filtration for removing nutrients, and sterilization prior to discharge.*						

Product Name: _____

Pounds per day processed			Processing period(s) each year		Daily effluent flows	
Average	Maximum	Total pounds per year processed	Total weeks per year	During the months of	Average	Maximum
Describe processing operation						
Type of wastewater treatment						

Product Name: _____

Pounds per day processed			Processing period(s) each year		Daily effluent flows	
Average	Maximum	Total pounds per year processed	Total weeks per year	During the months of	Average	Maximum
Describe processing operation						
Type of wastewater treatment						

Form Approved. OMB No. 2040-0086. Approval expires 8-31-98.

Please print or type in the unshaded areas only	EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	

Form 2D NPDES

New Sources and New Dischargers Application for Permit to Discharge Process Wastewater

I. Outfall Location

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

Outfall Number (*list*)	Latitude			Longitude			Receiving Water (*name*)
	Deg.	Min.	Sec.	Deg.	Min.	Sec.	
Outfall A	N44	33	30	W67	33	33	Chandler Bay
Outfall B	N44	33	29	W67	33	32	Chandler Bay

II. Discharge Date (When do you expect to begin discharging?)

03/01/2022

III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

Outfall Number	1. Operations Contributing Flow (*List*)	2. Average Flow (*Include Units*)	3. Treatment (*Description or List codes from Table 2D-1)*
Outfall A	Waste Water Treatment System	19,952 gpm (4525m3/hr)	See attached flow diagram, General Application, Attachment 4
Outfall B	Same as A, redundant pipe to	Outfall A;	
	only operates when Outfall A	is off	

B. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item III-A. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in Items III-A be intermittent or seasonal?

☐ YES (*complete the following table*) ☑ NO (*go to Section IV*)

Outfall Number	1. Frequency		2. Flow		
	a. Days Per Week (*specify average*)	b. Months Per Year (*specify average*)	a. Maximum Daily Flow Rate (*in mgd*)	b. Maximum Total Volume (*specify with units*)	c. Duration (*in days*)

IV. Production

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not design), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet).

Year	A. Quantity Per Day	B. Units Of Measure	c. Operation, Product, Material, etc. *(specify)*
			NOT APPLICABLE

CONTINUED FROM THE FRONT	EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	Outfall Number

V. Effluent Characteristics

A and B: These items require you to report estimated amounts (*both concentration and mass*) of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See table 2D-2 for Pollutants)*
Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
Flow	28.7 M gpd	28.7 M gpd	1,4-heat recovery(22.2mgd);culture(6.5mgd)
BOD	2,714 lb	1,629 lb	1,4
TSS	2,714 lb	1,629 lb	1,4
Total N	1,639 lb	1,639 lb	1,4
Total P	393 lb	393 lb	4
pH	6.0-9.0	6.0-9.0	1,4
Temperature (Summer)	7.8-15C	7.8-15C	4
Temperature (Winter)	0-7.8C	0-7.8C	4

CONTINUED FROM THE FRONT	EPA I.D. NUMBER (*copy from Item 1 of Form 1*)	

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant	2. Reason for Discharge
Formalin	Common Trade name: Parasite-S; Active ingredient: 37% Formaldehyde Use: Bath treatment for external issues Treatment level: 200ppm

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☐ Report Available ☑ No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name	Location
Kingfish Zeeland	Oost Zeedijk 13, 4485 PM Kats, Netherlands Receiving Waters: Oosterschelde

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)

VII. Other Information *(Optional)*

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

Please see Attachment 4 and Attachment 6 for further clarification on proposed limitations for Kingfish Maine's proposed RAS facility.

In addition to constant monitoring of intake and effluent water in the facility, Kingfish Maine has been working to develop an appropriate monitoring program together with University of Maine labs. Working with local facility, Downeast Institute (DEI), we are evaluating the possiblity of biological monitoring using species cultured at DEI. These potential monitoring opportunities can aid our facility but also aid in providing framework for future development of other RAS facilities in Maine.

VIII. CERTIFICATION

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

A. Name and Official Title (*type or print*)	B. Phone No.
Ohad Maiman, CEO; Kees Kloet, COO	(502) 387-8673
C. Signature	**D. Date Signed**
	7-8-2020

Form DEPLW1999-18
Revised: February 21, 2018

Maine Department of Environmental Protection
Waste Discharge Permit Application

Fish Rearing Facilities

This form must be attached to the General Application for a Waste Discharge License.
(Form DEPLW0105-B2003)

Please answer all questions completely, using additional pages as necessary with responses clearly identified by item number on this form.

1. Facility Name: ***Kingfish Maine, Inc*** NPDES #ME

2. Source(s) of water supply and average monthly flow of each:
Chandler Bay & private well(s): 861 million gallons;

3. Is any of the hatching or rearing water heated or cooled by mixing with water from another source, use heat exchangers, etc? If yes, explain listing the volumes and maximum temperatures of each source.
We do not utilize water from any other sources than Chandler Bay (99.4%) or private on-site wells (0.6%). We utilize 77.3% of water brought in from Chandler Bay for use in (1) heating the culture water (22.1% of total flow from Chandler Bay), and (2) recovery of thermal energy from the water before it is discharged from the facility (referred to as heat recovery water). Please see Attachment 4 for an explanation of volumes and temperatures.

4. Type(s) of feed used:
commercially produced diet in multiple sizes to support various growth stages

5. Amount of feed used. Average: ***22,000*** lbs/day Maximum: ***26,000*** lbs./day

6. Month(s) of maximum feeding: Because standing stock is stable, feed remains consistent throughout the year.

7. Species of fish raised: ***Yellowtail kingfish (Seriola lalandi)***

8. Maximum quantity of fish at any time.
Broodstock: Pounds ***12,000*** Number of fish: ***300***
First Year Fish: Pounds ***approx. 4,400,000*** Number of fish: ***approx. 1,520,000***
(average: pounds: approx. 3,300,000; Number: approx. 1,140,000)

9. Attach a drawing showing the number, size and arrangement of all rearing tanks.
See Attachment 10.

10. Attach a list of all disinfectants used, giving for each the name, ingredients, frequency of use, concentration of use, and total quantity used per year.
See Attachment 9

11. Attach a list of drugs and/or therapeutic agents used, giving for each a name, ingredients, frequency of use, concentration of use, and total quantity used per year.
See Attachment 9

Maine Department of Environmental Protection

Waste Discharge Permit Application

Outfall Information

DEPLW0102
Revised: 02/22/2018

This form must be attached to the General Application for a Waste Discharge License / MEPDES Permit
(Form DEPLW0105-B2003)

Please answer all questions completely, using additional pages as necessary with responses clearly identified by item number on this form.

1. Facility Name: _***Kingfish Maine, Inc.*** _____MEPDES # ME _____

2. Attach a plan of the treatment facility or discharge sources showing the location of each outfall and the receiving water. Please number each outfall with the corresponding number from the permit application. ***See Attachment 3.***

3. For each outfall, provide the following information. Please use additional forms as necessary to describe all outfall locations.

   A. Outfall name: _***A***_____ Outfall number: _N/A_____

   B. Flow discharged. Average: _***28.7***_____MGD Maximum: __***28.7***_____MGD

   C. Diameter of outfall pipe: __***47.24***_____inches

   D. Depth below mean low water at outlet: ___***approx. 30 ft***

   E. Describe any diffusers, mixers or similar structures used to disperse the effluent. Please include drawings or diagrams as appropriate. (use a separate sheet)
   The point of discharge will be equipped with a multiport diffuser, equipped with duckbill style valves to maintain consistency effluent flow rate. Ports will be oriented upward from the seafloor. See conceptual drawings, Attachment 11.

   F. Outfall name: __***B***_____ Outfall number: __N/A_____

   B. Flow discharged. Average: _***28.7*** MGD (only operates when A is not)__MGD
   Maximum: ___***28.7*** ____MGD

   C. Diameter of outfall pipe: __***47.24***_____inches

   D. Depth below mean low water at outlet: ***approx. 30 ft***

E. Describe any diffusers, mixers or similar structures used to disperse the effluent. Please include drawings or diagrams as appropriate.
This outfall is redundant for Outfall A, i.e. it only operates when A is not (i.e., for cleaning and maintenance); flow is the same as A and NOT in addition to A. The point of discharge will be equipped with a multiport diffuser, equipped with duckbill style valves to maintain consistency effluent flow rate. Ports will be oriented upward from the seafloor. See conceptual drawings, Attachment 11.

State of Maine

Department of the Secretary of State

I, the Secretary of State of Maine, certify *that according to the provisions of the Constitution and Laws of the State of Maine, the Department of the Secretary of State is the legal custodian of the Great Seal of the State of Maine which is hereunto affixed and of the reports of qualification of foreign business corporations in this State and annual reports filed by the same.*

I further certify *that KINGFISH MAINE INC., a DELAWARE corporation, is a duly qualified foreign business corporation under the laws of the State of Maine and that the application for authority to transact business in this State was filed on December 13, 2019.*

I further certify *that said foreign business corporation has filed annual reports due to this Department, and that no action is now pending by or on behalf of the State of Maine to forfeit the authority to transact business in this State and that according to the records in the Department of the Secretary of State, said foreign business corporation is a legally existing business corporation in good standing under the laws of the State of Maine at the present time.*

In testimony whereof, I have caused the Great Seal of the State of Maine to be hereunto affixed. Given under my hand at Augusta, Maine, this fifteenth day of June 2020.

Matthew Dunlap
Secretary of State

OPTION TO PURCHASE REAL ESTATE

THIS AGREEMENT is made as of May 2nd 2019, by and between **W.W. Wood Properties, LLC,** a Maine limited liability company, with a mailing address of **P.O. Box 358, Holden, ME 04429 ("Owner")** and **Kingfish Maine, Inc. ("Optionee"),** WHO AGREE AS FOLLOWS:

1. Option Property: Owner is the owner of certain premises situated at **9 Dun Garvin Road**, consisting of approximately **94 acres** of land, together with all buildings and improvements thereon and all rights and easements appurtenant thereto, which parcel is further identified in the Jonesport, ME assessor's records as **9 Dun Garvin Road, Map/Lot reference of 008-023** and is outlined in heavy line on the attached **Exhibit A** (the "Property") and being the premises described in a deed to Grantor recorded in the Washington County Registry of Deeds in Book 4301, Page 266.

2. Option: In consideration of the "Option Consideration" herewith paid to Owner by Optionee as identified below, Owner hereby grants to Optionee the exclusive, irrevocable right to purchase the Property on the terms set forth in this Agreement (the "Option"). If Optionee elects to purchase the Property, such election shall be made by written notice given to Owner at any time on or before the end of the "Option Period" identified below. Optionee shall have the right, on each occasion by written notice, to extend the Option Period for up to three (3) consecutive "Extension Periods" as described below, in exchange for the corresponding "Extension Consideration" payments set forth below. Each such extension notice and payment shall be made on or before the end of the Option Period (as then extended). The Option and Extension Periods (hereinafter collectively the "Option Period") and their corresponding Option and Extension Consideration payments (hereinafter collectively the "Option Consideration") are as follows:

Option Period	Option Consideration
[redacted] from execution of this Agreement	[redacted]

Extension Periods	Extension Consideration
[redacted] from expiration of Option Period from expiration of First Extension Period from expiration of Second Extension Period	[redacted]

3. Purchase Price: If Optionee elects to exercise this Option, the purchase price for the Property shall be [redacted] ("Purchase Price"). The Option Consideration and first Extension Consideration of [redacted] shall be credited against the Purchase Price payable at the closing. All other Extension Considerations shall not be credited against the Purchase Price. If Optionee does not exercise this Option, or if Optionee fails to close, Owner shall retain all Option and Extension Considerations then paid as full consideration and as its sole remedy. Optionee shall be entitled to a refund of the Option Consideration and Extension Considerations only if Owner's title to the Property proves defective, as provided below.

4. Inspections and Approvals: During the Option Period, Optionee and its employees, contractors and agents shall have the right and easement, at Optionee's expense and after reasonable notice to Owner, to enter upon the Property for the purposes of conducting inspections, surveys, soils tests, and other testing. Optionee shall reasonably restore the Property to its prior condition in the event that Optionee's activities disturb or damage the Property. During the Option Period, Optionee may seek at its expense such rezoning, permits and approvals for permits and programs necessary to make the project feasible (for example, the State of Maine's Pine Tree Zone Program and/or permits that will allow the company to build and sustain its desired business) and the like as Optionee requires ("Approvals"), and Owner agrees to cooperate and join with Optionee in obtaining such Approvals. If, at the end of the Extension Periods, Optionee shall be diligently pursuing any such Approvals, Optionee shall have the right, upon written notice to Owner, to further extend the Option Period for a reasonable period of time (not to exceed [redacted]) in order that Optionee may receive a final decision thereon. If Optionee elects to exercise this Option period extension, Optionee shall pay to Owner an Option Consideration of [redacted] or a prorated portion thereof if

DS

said Option Period extension is less than 6 months.

Promptly following execution of this Agreement, Owner shall provide the following ("Due Diligence Materials") to Optionee, to the extent the same are in Owner's possession or control:

a) Title documents pertaining to the Property
b) Copies of all applicable licenses, permits, zoning, development and governmental approvals received by the Owner (or, if requested but not yet received by Owner, copies of all applicable requests/applications and related documents);
c) Copies of all environmental, soils, traffic and other pre-development reports or studies in Owner's possession;
d) Any other relevant material documentation such as tax abatement agreements, easement agreements, ground leases and the like, if applicable;
e) Property tax bills for the prior two years;

Any and all material written correspondence with governmental bodies in Owner's possession relating to the Property

5. Closing: If Optionee elects to purchase the Property, Owner shall convey the Property to Optionee (or its designee) by good and sufficient general Warranty Deed conveying marketable title, free and clear of all encumbrances, defects, liens, tenants and occupants ("Title Defects"), and utilizing the description obtained by Optionee's survey if requested. The closing shall take place within 90 days after written notice from Optionee that it has exercised the Option at the date, time and place specified in the notice. Optionee shall have the right to apply the Purchase Price at the Closing to the removal of any mortgages encumbering the Property. The parties agree to execute and deliver such documents as are reasonably necessary and customary to complete the closing. Real estate taxes and utilities shall be prorated as of the closing date. Real estate transfer taxes, income taxes and gains taxes shall be paid by Owner.

6. Broker: The parties agree that no broker has been involved in this transaction, other than The Boulos Company and Bold Coast Properties. Optionee shall be responsible for any fees to The Boulos Company. Owner shall be directly responsible for any fees to be paid to Bold Coast Properties or any other broker engaged by Owner. Each party agrees to indemnify the other from and against any damages, costs or expenses (including reasonable attorneys' fees) that the other party may suffer as a result of claims made or suits brought by any broker, finder or agent in connection with this transaction, the obligated party hereunder to be the party whose conduct gives rise to such claims. This indemnity shall survive the closing and any termination of this Option.

7. Ownership/Risk of Loss: Owner hereby warrants that Owner is the owner of the Property in fee simple, that Owner has the full right and authority to grant the Option described in this Agreement, and that there is no other option, contract or other right to purchase the Property in existence. Prior to the Closing, the risk of loss to the Property or taking by eminent domain shall be on Owner. Possession of the Property will be delivered to Buyer upon Closing.

8. Owner's Warranties: To the best of Owner's knowledge and belief there are no and have never been any Hazardous Materials on, under, in or about, or migrating to or from the Property. The presence of such materials at or any time prior to the Closing shall constitute a Title Defect, rendering the title unmarketable as aforesaid. As used herein, "Hazardous Materials" means any hazardous or toxic materials, waste, substances or matter, oil or other petroleum products, underground tanks, asbestos, or similar materials, including as defined in any federal, state or local law or regulation, or any other substances constituting a hazard or threat to the health of persons, animals or plants. This warranty shall survive the Closing and any expiration or other termination of this Option.

9. Memorandum of Option; No Further Encumbrances: Owner agrees to execute a document for recording purposes which will include the primary terms of this Option, other than the Purchase Price. During the term of this Option Agreement, Owner agrees not to further encumber the Property in any manner without Optionee's consent.

10. Notice: Any notice required to be given by Optionee to extend or exercise this Option shall be in writing, shall be addressed to Owner as set forth above, and shall be sent by registered or certified mail, return

receipt requested, or by a reputable overnight carrier that provides a receipt, such as FedEx or Airborne, and shall be deemed delivered on the date postmarked or the date deposited with the overnight carrier.

11. Confidentiality: Owner agrees not to disclose any Confidential Information to any person or other entity without Optionee's prior written consent, except to Owner's professional consultants who agree to be bound by this paragraph. For purposes of this Agreement, "Confidential Information" includes Optionee's interest in the Property; the prospective use of the Property (if disclosed); and the terms of this Agreement and any other agreements between the parties with respect to the Property, except to the extent Optionee may have publicly disclosed any such information.

12. Binding Effect: This Option Agreement shall be binding upon the parties and their heirs, administrators, successors and assigns upon full execution by Owner and Optionee in the spaces provided below. Optionee may freely assign its rights hereunder.

IN WITNESS WHEREOF, Owner and Optionee have executed this Agreement as of the date first set forth above.

OWNER:
W.W. Wood Properties, LLC.

DocuSigned by:
222CE152A0EF4DD...

By: Wayne Wright
Its: Authorized Signatory

OPTIONEE:
Kingfish Maine, Inc.

By: Ohad Maiman
Its: CEO

Exhibit A

MEPDES Application – Attachment 3 – Map Depicting Facility Intake and Discharge Structures

MAP REFERENCE: USGS JONESPORT QUADRANGLE 2018

Gartley & Dorsky
ENGINEERING SURVEYING
CAMDEN, ME (207) 236-4365
WWW.GARTLEYDORSKY.COM

KINGFISH MAINE
Jonesport, Maine
RAS Facility

JUNE, 2020 | 19412 | SITE LOCATION EXHIBIT

LEGEND

- SUBJECT PARCEL PROPERTY LINE
- APPROXIMATE PROPERTY LINE
- SETBACK LINE
- IRON ROD FOUND
- IRON PIPE FOUND
- 5/8" REBAR SET (4/23/2020)
- GRANITE MONUMENT FOUND
- 56 EXISTING CONTOUR
- 23 EXISTING CONTOURS (BATHYMETRIC)
- UTILITY POLE
- OH OVERHEAD UTILITY LINE
- STREAM
- POSSIBLE STREAM (SEE NOTE #6)
- DRAINAGE COURSE (SEE NOTE #6)
- PIT TEST PIT
- BOR EL=32.1' BORING & GROUND ELEVATION
- POST
- DUG WELL
- TREE
- BUSH
- VEGETATION
- LITTORAL ZONE OF SURVEYED PARCEL

NAD 83 MAINE EAST ZONE GRID NORTH

MAGNETIC 2020

MAINE COAST HERITAGE TRUST
BOWDOIN MILL ISLAND #201
TOPSHAM, ME 04086

KENT T. INGVES
756 WATERMAN ROAD
LEBANON, CT 06249

PAULA STAHL
46 BELLEVUE STREET
WILLIMANTIC, CT 06226
BOOK 4607, PAGE 208
TAX MAP 8, LOT 26

W.W. WOOD PROPERTIES, LLC
BOOK 4301, PAGE 266
TAX MAP 8, LOT 23
93.2 ACRES

UNITED STATES OF AMERICA
USCG
BOOK 4301, PAGE 266
TAX MAP 8, LOT 20

AGNES EVA SAWYER PATTERSON
18 FROST LANE
ORONO, MAINE 04473
BOOK 2286, PAGE 196
(SEE BOOK 567, PAGE 313)
TAX MAP 8, LOT 1

CHANDLER BAY
A/K/A ENGLISHMAN BAY
ZONE VE (EL 15')

JOSH WOODWARD LN
MASON BAY ROAD
DUN GARVIN ROAD
HOPPE STONE BEACH
NATT POINT
LITTLE POND BEACH
ELMER SAWYER'S POINT ROAD
FIRE ROAD
GREENWOOD CEMETERY
GRAVEL BEACH
LEDGE
REMAINS OF HOUSE
BUILDING
MAILBOX
WELL HOUSE
CABLE GATE
SEPTIC FIELDS
WATER
STREAM

BASE OF 1" IRON PIPE, 0.9' ABOVE GRND.
5/8" REBAR, "WEST FALLS SURVEYING", 0.3' ABOVE GRND.
BASE OF 1" IRON PIPE, 1.2' ABOVE GRND.
3/4" REBAR, "RLS 11168", 1.3' ABOVE GRND.
BASE OF 3/4" REBAR, 1.5' ABOVE GRND.
MEAN HIGH WATER (MHW) EL.=5.9'
BASE OF 1" REBAR, "RLS 11168", 1.6' ABOVE GRND.
BASE OF 3/4" REBAR, 1' ABOVE GRND.
MEAN LOW WATER (MLW) EL.=-6.3'
1534'-31'± [467.66m]
2020 HIGHEST ANNUAL TIDE (HAT) AS PUBLISHED BY NOAA FOR SHOPPEE POINT ELEVATION =8.3' (SEE NOTE #3)
LIMIT OF SPECIAL FLOOD HAZARD AREA ZONE VE (EL 15')
250' SHORELAND ZONE
75' SETBACK - SEE NOTE #6
TBM 1/2" REBAR WITH "G4D CONTROL" CAP FLUSH WITH GRND. ELEV. =23.13' (SEE NOTE #3)
14" SPRUCE
SEE NOTE #9
LEDGE & BOULDERS
858'-10'± [261.78m]
MEAN HIGH WATER (MHW) EL.=5.9'
INV.=56.7
INV.=57.1
5/8" REBAR, "CES PLS 23247", 0.3' ABOVE GRND.
1" IRON ROD, 1' ABOVE GRND.
BASE OF 1" IRON ROD, 0.7' BELOW GRND.
BASE OF 1" IRON ROD, .8' ABOVE GRND.
BASE OF 4" REBAR, 1' ABOVE GRND. 2' ABOVE GRND.
5/8" REBAR, "CES PLS 23247", 1' ABOVE GRND.
12"x12" TAPERED STONE MON 2' ABOVE GRND.
OUTFALL A
N:326455.50 E:1229322.29
N:326498.71 E:1229446.24
N:326352.60 E:1229353.82
N:326395.47 E:1229480.09
OUTFALL B
N:325974.53 E:1228097.98
PROJECTED INTAKE
APPROXIMATE LIMIT OF W.W. WOOD PROPERTIES, LLC LITTORAL ZONE
W.W. WOOD PROPERTIES, LLC LITTORAL ZONE (1,000' FROM MEAN LOW WATER)
LIMIT OF W.W. WOOD PROPERTIES, LLC LITTORAL ZONE
LIMIT OF AGNES EVA SAWYER PATTERSON LITTORAL ZONE
LITTORAL ZONE BASE LINE
LITTORAL ZONE BASE LINE
BASE LINE USED IN DETERMINING INTERTIDAL BOUNDARIES (MLW)
MEAN HIGH WATER (MHW) EL.=5.9'

PLAN REFERENCES:

1) "TOPOGRAPHIC SURVEY, KINGFISH MAINE" BY GARTLEY & DORSKY ENGINEERING & SURVEYING DATED FEBRUARY 11, 2020 AND AS REVISED.

NOTES FROM PLAN REF. 1:

1) ALL DIRECTIONS ARE REFERENCED TO THE MAINE COORDINATE SYSTEM OF 1983 (2011), EAST ZONE, BASED ON AN RTK GPS SURVEY. ALL DISTANCES ARE GRID DISTANCES. THE COMBINED FACTOR IS 0.99996999.

2) ELEVATIONS ARE REFERENCED TO NAVD 1988 BASED ON STATIC GPS OBSERVATIONS PERFORMED ON DECEMBER 17, 2019 AND PROCESSED THROUGH THE NATIONAL GEODETIC SURVEY'S ONLINE POSITIONING USER SERVICE (OPUS). TIDAL DATUMS WERE CALCULATED USING NOAA'S VERTICAL DATUM TRANSFORMATION SOFTWARE (VDATUM).

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

NO.	REVISIONS	DATE

SHEET TITLE: **EXHIBIT 2**

SCALE: 1" = 200'

DRAWN BY: AM

CHECKED BY:

DATE: JULY 27, 2020

CLIENT/PROJECT: **KINGFISH MAINE**

LOCATION: ROUTE 187

TOWN: JONESPORT COUNTY: WASHINGTON STATE: MAINE

Gartley & Dorsky ENGINEERING & SURVEYING
59 Union Street, Unit 1, P.O. Box 1031, Camden, ME 04843-1031
Ph. (207) 236-4365 Fax: (207) 236-3055 Toll Free: 1-888-282-4365
165 Main Street Suite 2D P.O. Box 1072 Damariscotta, Maine 04543
Ph. (207) 790-5095

STATE OF MAINE WILLIAM J. LANE No. 6977 LICENSED PROFESSIONAL ENGINEER 7.27.20

PROJ. NO. 2019-412

EX2

KINGFISH
MAINE

INTAKE & DISCHARGE WATER TREATMENT

SUMMARY OF KINGFISH MAINE MEPDES PERMIT

- Land based recirculating aquaculture facility, annually growing 6000-8000 ton of yellowtail kingfish, *Seriola lalandi*
- Employing approximately 70 people, potentially more if processing
- Site location: 9 Dun Garvin Road, Jonesport, Maine
- Receiving water: Chandler Bay
- ***Key Features***:
  - Kingfish Maine will complete the whole culture cycle here in Jonesport – hatchery, growout, and harvest
  - Kingfish Maine application includes processing of fish on site, though we are still deciding to what level.
  - Kingfish Maine will draw water from Chandler Bay; when referring to water use throughout the application, it is in one of three distinctions:

HEAT RECOVERY WATER

No contact with fish

Heat exchangers or Heat pumps

Discharge Tank

77.3% of total water

CULTURE WATER

Contacts fish

Wastewater Treatment

Discharge Tank

22.1% of total water

PROCESSING WATER

Contacts fish

Processing Area Treatment

Wastewater Treatment

Discharge Tank

0.6% of total water

SUMMARY OF KINGFISH MAINE WATER USE & FILTRATION

The facility will take in 19,812 gallons per minute (gpm) of seawater from Chandler Bay through two seawater intake pipes. It will go through large particle filtration and then be piped to the pump station to be split in two ways.

Heat Recovery Water

15,410gpm (3500m^3/hr) of seawater will go through heat exchangers where Kingfish Maine will extract the thermal energy in the water in a countercurrent flow system. This energy will be utilized in heating the temperature of the water in the culture systems to our target range. This heat recovery water does not come in contact with culture water or fish. It has reduced suspended solids and colder temperature than when it was taken into the pump station but is otherwise unaltered from its natural state. Therefore, it will not go through any further treatment but will go directly to the discharge reservoir prior to being discharged in Outfall A or B.

Culture System & Processing Water

4,402 gpm (1000m^3/hr) of seawater will be filtered for medium and fine solids and sent to a holding tank, which will feed hatchery, growout, and processing operation.

Culture System Water

Water leaving the culture tanks will go through mechanical filtration, which removes large and fine solids, within the recirculating system (40-60um). After mechanical filtration, new ("make up") water will be added and an equal amount of water will leave the culture system and go through heat exchangers, where we will recover all possible thermal energy from the discharged culture water by utilizing a countercurrent flow system and heat pumps with the *Heat Recovery Water.* The energy will be redirected back to maintain target water temperature in the culture systems. After this step, the culture system water will then be piped to the discharge water filtration system. In this system, water will go through large and fine solids filtration (mechanical, 100um), followed by biofilters for the reduction of nutrient load, and finally, sterilization. The water will then combine with other effluent sources in the discharge reservoir prior to being discharged in Outfall A or B.

Processing Water

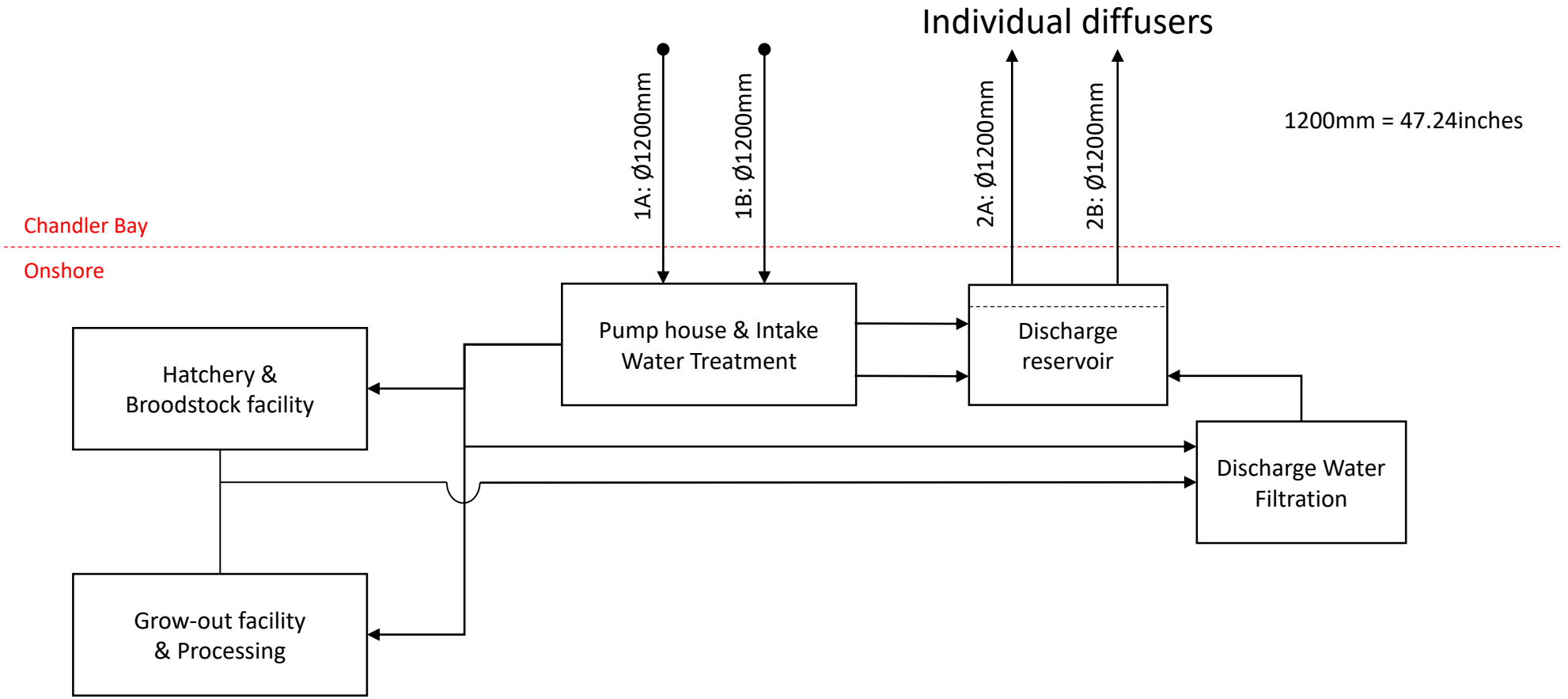
The processing plant will use a small amount of the total seawater listed above in addition to a maximum of 107 gpm (25m^3/hr) of freshwater as well. All water utilized in processing plant will be collected and go through its own dedicated filtration system first, consisting of a primary flocculation to bind fats, oils, and other biproducts of processing; mechanical filtration to remove solids and bound materials; then a secondary flocculation and water clarification. It will then progress to the main discharge water filtration system, where it will combine with the outflow from the culture systems, go through the same filtration steps, meaning this water, just as the culture water, has redundant filtration systems prior to discharge. It will finally go to the discharge reservoir with all filtered water prior to being discharged in Outfall A or B.

SUMMARY OF KINGFISH MAINE SOLID WASTE REMOVAL

As mentioned in “Summary of Kingfish Maine Water Use & Filtration”, solids filtration for the culture water, both large and fine particles, will occur using fish exclusion barriers and drum or disc filters to remove solids down to 40-60um in the culture systems, and 100um in the additional wastewater treatment system. The solids collected in the processing area will be filtered utilizing similar mechanical filtration and, if required, include chemical flocculants for improved clarification and removal.

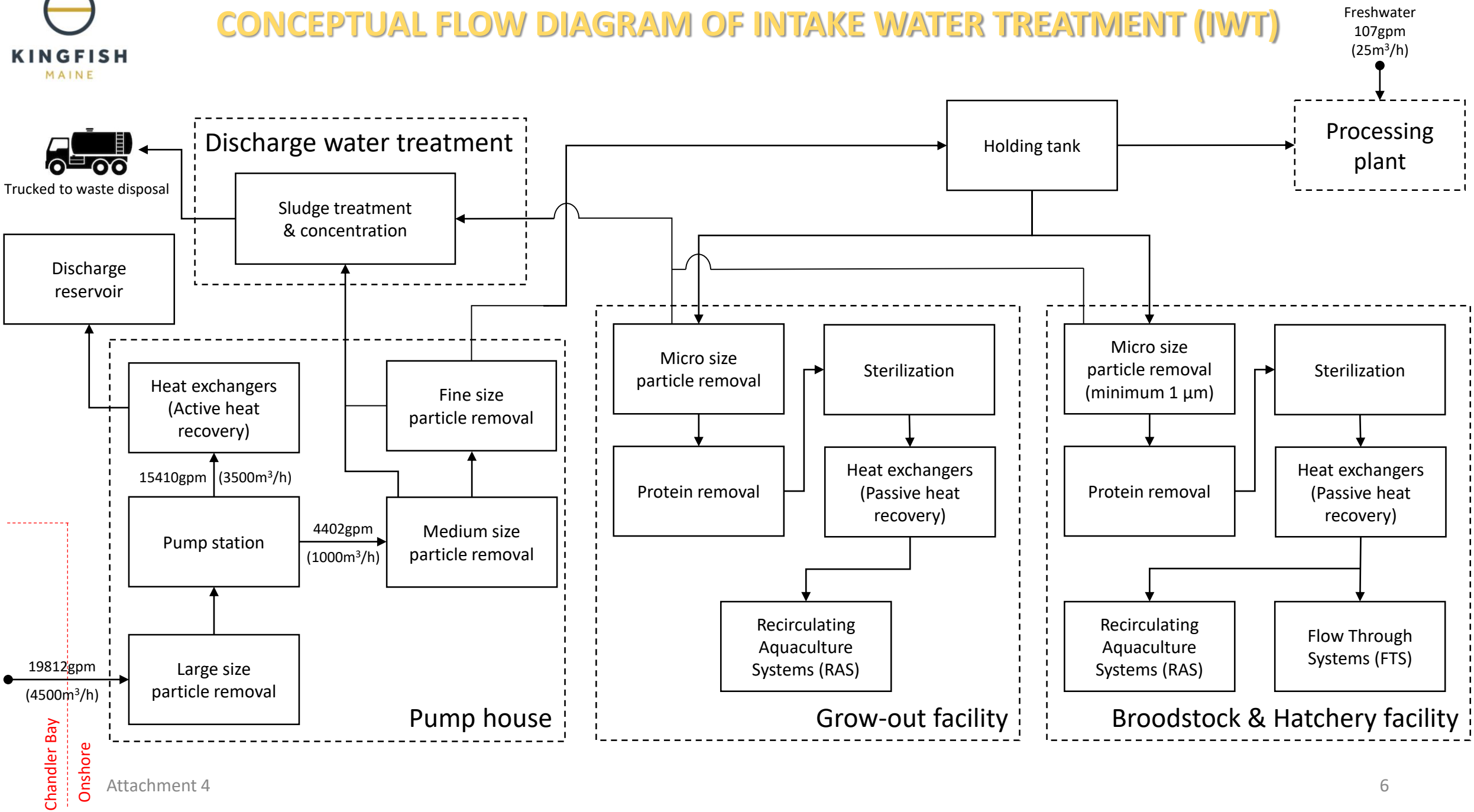
All solid waste will be combined and trucked offsite for disposal. Kingfish Maine is exploring secondary uses for any waste from processing activities on site, such as composting with Coast of Maine Organic Products Inc., an organic compost producer located in East Machias, ME. Due to the high or concentrated salt level in our sludge, options for additional uses are limited, but we continue to explore all new technology for making use of this nutrient rich material.

CONCEPTUAL FLOW DIAGRAM – INTAKE & EFFLUENT

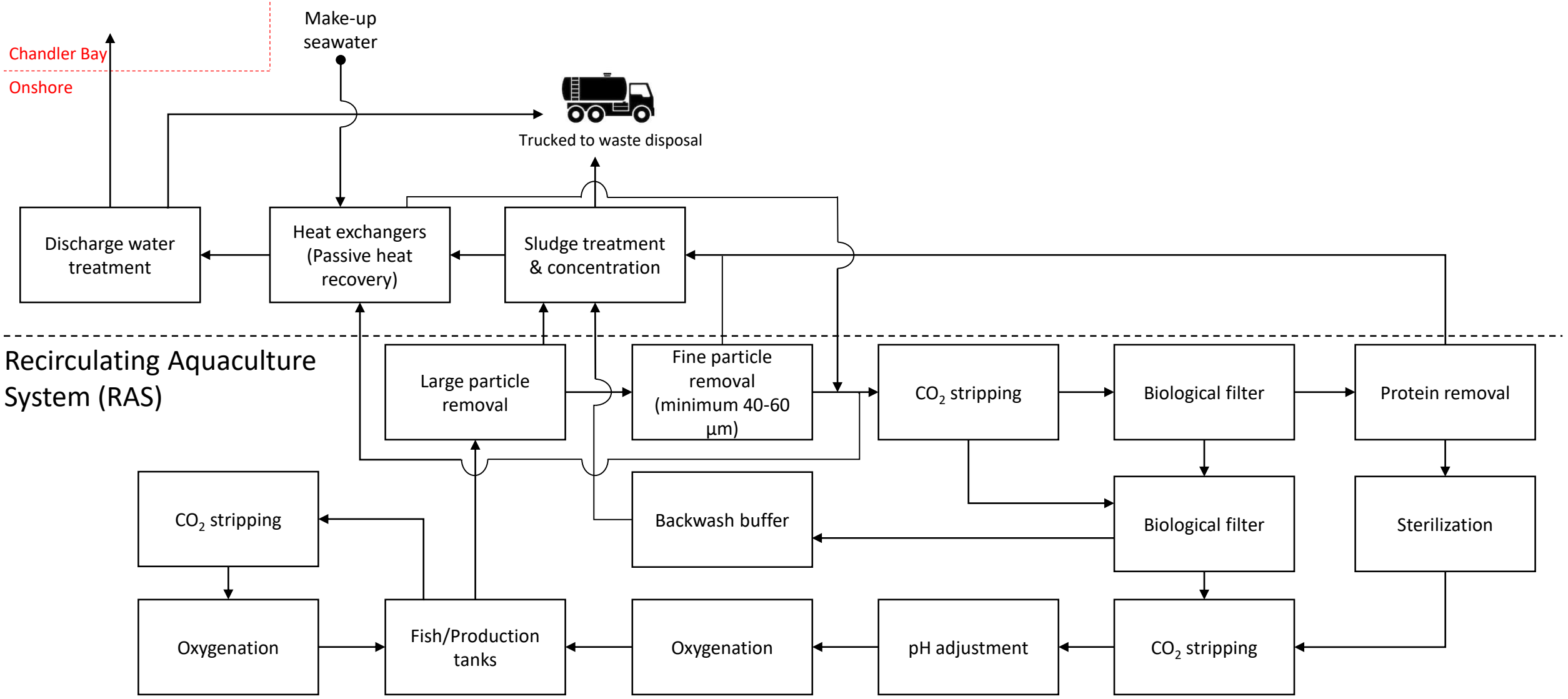


KINGFISH MAINE

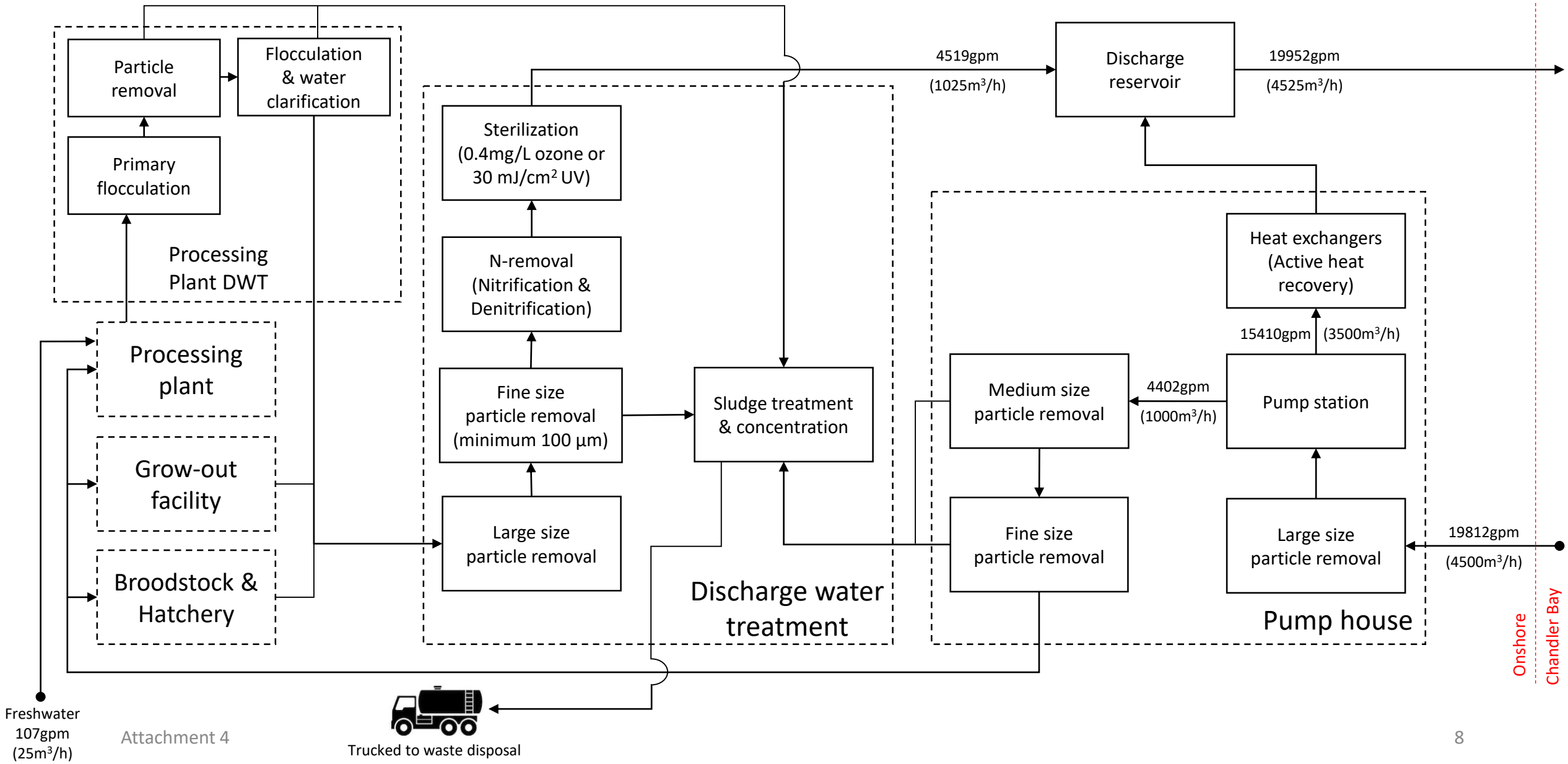
CONCEPTUAL FLOW DIAGRAM OF INTAKE WATER TREATMENT (IWT)



CONCEPTUAL FLOW DIAGRAM OF RAS SYSTEM



CONCEPTUAL FLOW DIAGRAM OF DISCHARGE WATER FILTRATION (DWF)



KINGFISH MAINE

SUMMARY OF KEY PARAMETERS OF EFFLUENT

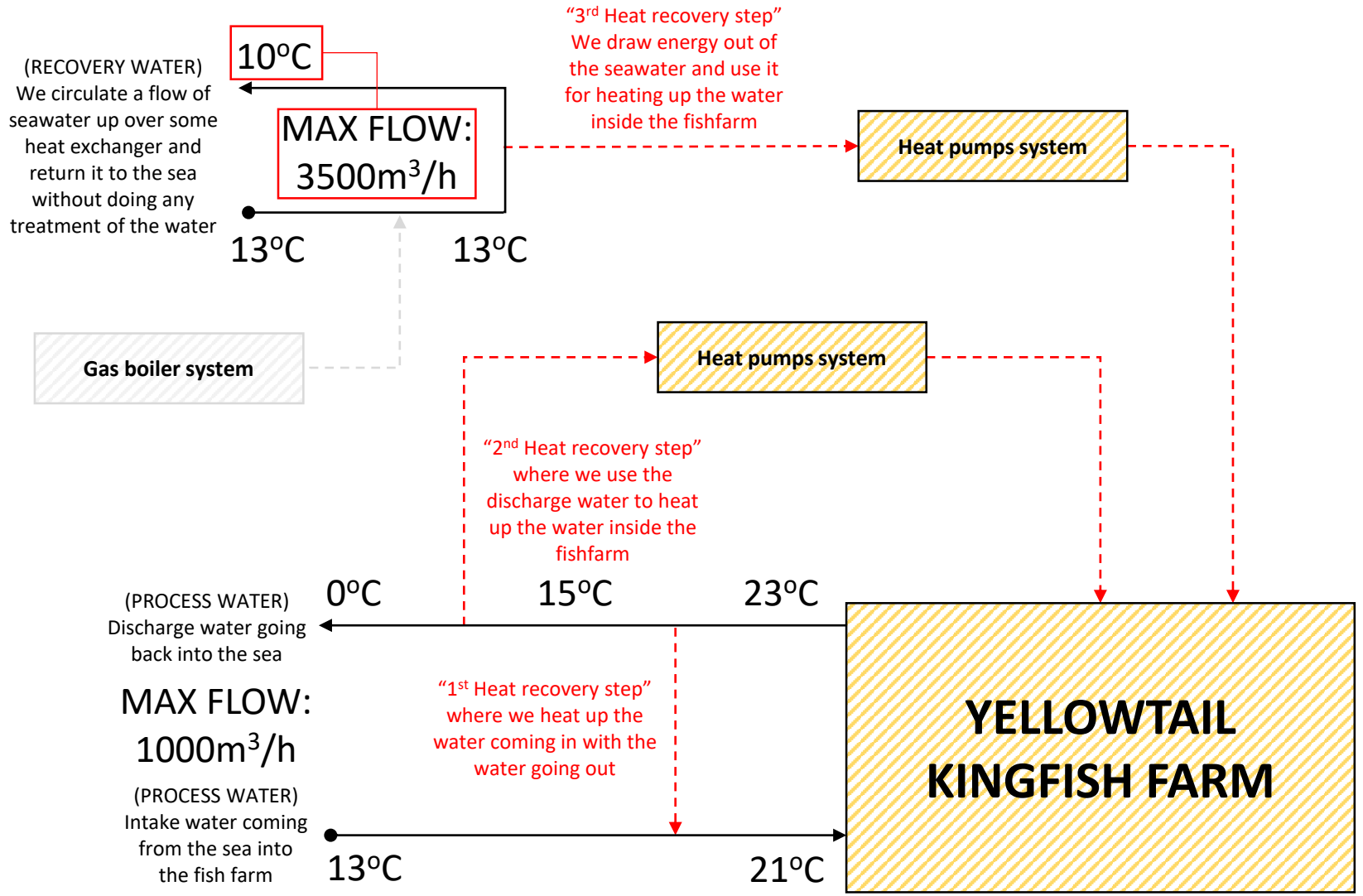
Parameter	Total Discharge (kg)	Total discharge (lbs)
Flow	108600m3/day	28.7MGD
BOD	740.5	1628.99
TSS	740.5	1628.99
Total N	745.0	1639
Total P	178.7	393
	Range	
pH	6.0-9.0	-
Salinity	Ambient	-
Temperature - Summer	7.8-15C	46-59F
Temperature - Winter	0-7.8C	32-46F
Near Field Dilution	60x	
Far Field Dilution	173x	

Amounts calculated from standing biomass and feed rates for yellowtail kingfish, *Seriola lalandi*, as well as wastewater treatment efficacy. Further explanation of these parameters is included as Attachment 6 to main application.

FISHFARM THERMODYNAMICS – EXAMPLE, SUMMER

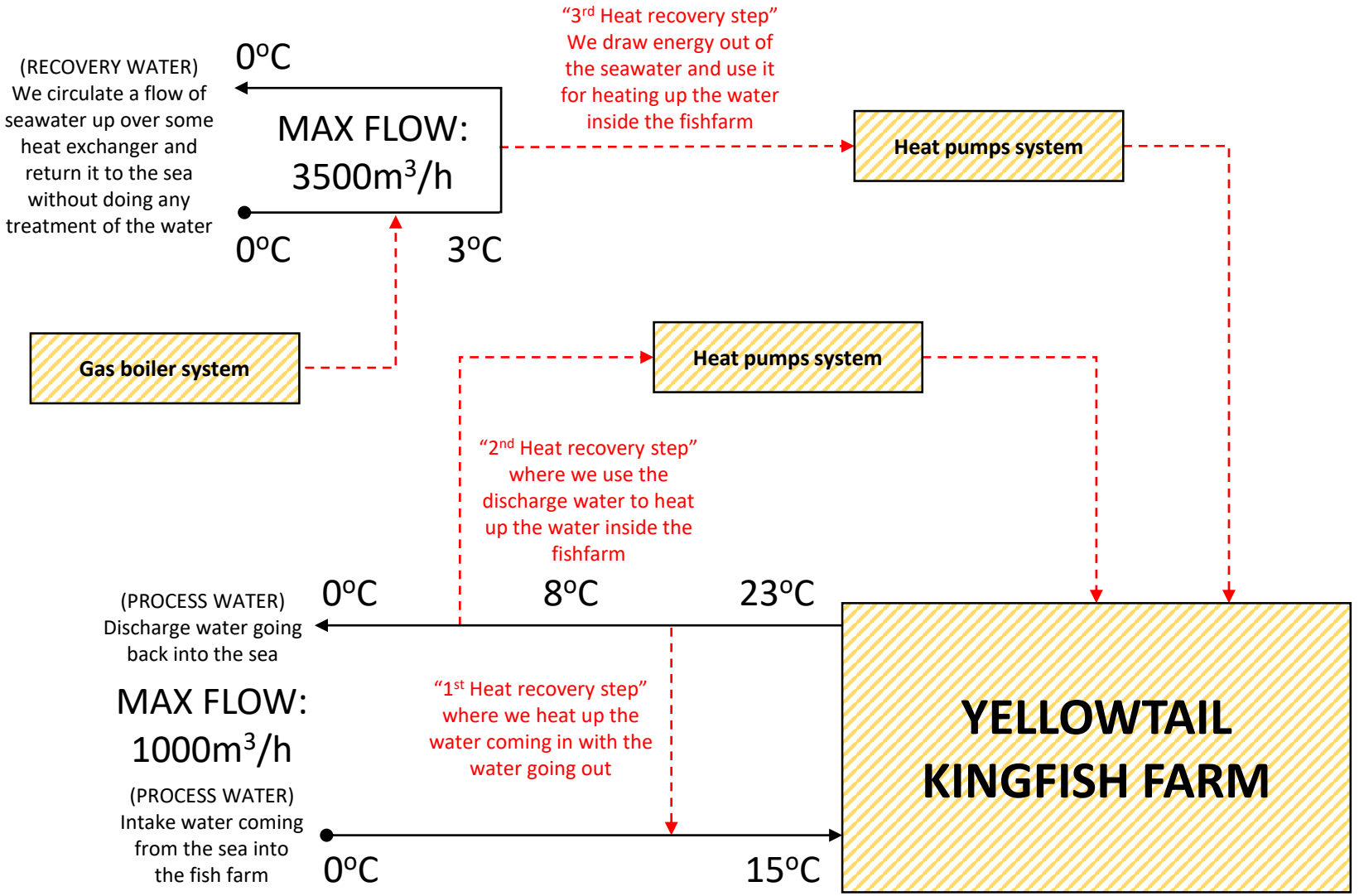
This one-pager shows the general principle and example temperature behind Kingfish Maine's heat recovery methods.

BLENDED FLOW
TEMP: 7.8°C



FISHFARM THERMODYNAMICS – EXAMPLE, WINTER

This one-pager shows the general principle and example temperature behind Kingfish Maine's heat recovery methods.



MEPDES Application – Attachment 5 – Construction Schedule of Treatment Facility and Outfall Structure

Kingfish Maine is currently in the permitting process for a land-based recirculating aquaculture facility with a goal of beginning construction in H2 of 2021. Construction of the facility will begin once necessary permits have been obtained, and construction documents have been issued. We estimate this to be within 1-3 months after all permits are acquired.

Specifically related to intake and outfall construction, any in-water construction will be completed within the recommended construction window for protection of marine resources, which is determined to be November to April in this area. The points of connection in the upland area for the intake and outfall pipes will be the pumphouse and wastewater treatment buildings, respectively. Construction of these building structures will be part of the larger construction schedule, which will be determined once Kingfish Maine has received necessary permits. Accordingly, connection of the intake and outfall pipes to their respective points on the upland will occur once the pipes have been completely configured in the aquatic environment and transitioned to the upland area.

MEPDES Application – Attachment 6 – Question 18, Main Form:

Kingfish Maine proposes to construct and operate a recirculating aquaculture facility to grow 6000-8000 ton of yellowtail kingfish, *Seriola lalandi*, in Jonesport, Maine. This facility would be completely vertically integrated, beginning with broodstock and egg production through to harvest and initial processing.

Company Background
The Kingfish Company began with the development of a site in the province of Zeeland in the Netherlands, located along the Oosterschelde, a Natura 2000 nature reserve. The company's focus in sustainability and responsible production practices is evidenced by the accolades of becoming the first land based Best Aquaculture Practices certified facility as well as the first Aquaculture Stewardship Council certified source of yellowtail kingfish. Beginning in 2019, The Kingfish Company began an expansion of its initial site to double production capacity and began looking for a location in the US to establish a new development.

In both Europe and the United States, the Kingfish Company continues to implement the best available technologies together with well established systems and operational protocols to maintain this focus on environmental sustainability.

Kingfish Maine Development
A key part of the Kingfish Company's growth is expansion to a facility in the US. Kingfish Maine was established in 2019 with the aim of creating a new farm site in Jonesport, Maine. The location identified brought one of the most critical elements needed for a marine fish land-based fish farm: direct access to good quality seawater. This water, coupled with recirculating aquaculture technology, allows us to not only maintain ideal conditions for the fish but also minimize environmental impact.

Intake and Outfall Siting
Kingfish Maine engaged with the local community early to get a first-hand understanding of priorities in Jonesport for an aquaculture facility. Discussions with residents of the Jonesport area indicated it was critical to them that the development of any pipes for this facility take up as short a footprint as possible into Chandler Bay because of fishing activity. Kingfish Maine approached siting the location of the intake and outfall pipes and modelling of effluent flow with this concern in mind, looking for an area that would achieve both regulatory compliance and the concerns of residents; we are fortunate that the local fishing community has such accurate knowledge of Chandler Bay, providing us great detail regarding seafloor characterization, depths, and areas of least impact on their activities.

To add to the local knowledge provided, Kingfish Maine engaged in data collection on the background water quality, flow, and current conditions in Chandler Bay; this, along with Maine DEP data were used to inform modelling of our effluent to ensure the application of Kingfish Company's system technology would be suitable for this specific site in Jonesport (see **Table 1** for summary ranges of these values).

Parameter	Background Level Chandler Bay
BOD5	<80mg/L
TSS	2.5-22mg/L
Total N	0.17-0.4mg/L
Total P	0.031-0.051mg/L
Temperature	2C - 16C (35-60.8F)
pH	8.0
Salinity	32-33ppt
Dissolved Oxygen	78%-115%

Table 1. Summary of background water quality parameters in Chandler Bay, Jonesport, Maine. Source of information is from Maine DEP data collection sites in the surrounding area, which include stations R1-3, ME02-0229, ME01-0064, and ME05-0016, as well as Kingfish Maine data collection, performed by internal staff as well as Normandeau and Associates.

We performed both near-field modelling using CORMIX and far-field modeling using TUFLOW, a 3-dimensional far-field model, of the facility's effluent in order to locate the outfall in a position that would maximize mixing and dispersion. Kingfish Maine assessed modelling results for effluent points progressively farther from shore in order to achieve the point of maximum mixing and dispersion with minimal disturbance to local activity.

Kingfish Maine Effluent Filtration and Pipe Design

In any aquaculture facility, there is an effluent consisting water that has been used to rear the fish and the byproducts of feeding and growing those fish: fish waste, which mainly consists of solids and naturally occurring nutrients, such as nitrogen and phosphorus. Because RAS facilities minimize demand or consumption of water by reusing it in the systems, effluent can be higher in these constituents, which is why wastewater filtration and treatment is specifically designed and sized to extract as much of that waste as possible. Kingfish Maine has employed best practicable treatment strategies in the design of our effluent filtration system (*detailed in Attachment 4 of the main application*), demonstrated in the following ways:

- Our system is designed to the specifications required of The Kingfish Company's certifications with Best Aquaculture Practices (BAP) and Aquaculture Stewardship Council, two globally recognized certification standards within the aquaculture industry.
- We incorporate redundancy in our treatment by water first being filtered within the recirculating culture systems themselves; water only leaves the system once it has been filtered and then goes to the wastewater filtration system, where it goes through a second round of multistep filtration and sterilization.
- We utilize proven technology in design our effluent treatment to ensure we maximize efficiency (see **Appendix B** for Wastewater Treatment diagram), which includes:
    - Large and fine particle filtration to remove solids (TSS), which is the major contributor to BOD
    - Moving and fixed bed bioreactors for nitrification and denitrification, or removal of nutrient load
    - Sterilization utilizing ozone or UV at recommended levels
- Locally, we have consulted with Maine Department of Marine Resources regarding solids filtration levels and water sterilization treatment application.

When incorporating our data and calculations into the modelling, we used conservative removal rate assumptions for each parameter in the effluent characterization to ensure the results provided a prudent depiction of how the effluent flow would behave in Chandler Bay (see **Appendix A**, Kingfish Maine

Near- and Far- Field Modelling Report – Chandler Bay, Maine for complete description of models and assumptions used to construct).

Kingfish Maine also incorporated a diffuser design on the end of each effluent pipe in order to aid in improved dispersion and mixing of the flow; this includes a six-port diffuser, each measuring 8.3 inches (211mm) with duckbill-style valves as well as an additional three, capped ports for redundancy and cleaning.

Kingfish Maine Effluent Characterization and Modelling Results

Sustainability and responsible environmental practices are at the core of The Kingfish Company's company values. Methods by which Kingfish Maine minimizes impacts in development of this project:

- By growing a marine species, Kingfish Maine uses minimal amounts of a limited resource, freshwater, and relies mainly on the use of seawater from Chandler Bay for operations.
- By utilizing recirculating aquaculture systems, Kingfish Maine is reducing as much as possible the demand for that seawater, focusing on continued efficiency improvements to reduce that necessary supply.
- By implementing multiple types and redundant filtration systems, Kingfish Maine is maximizing effluent treatment capability, improving the water quality of our effluent.
- By implementing the same multistep redundancy in our heat recovery systems, Kingfish Maine will be discharging cooler water than the facility takes in.

The results of modelling show that Kingfish Maine can achieve maximum mixing and dispersion without significant impacts to surrounding habitat and fishing activity by placing our effluent approximately 2,624 ft (800m) off the shore of the proposed site with the diffuser configuration described above. Dilution factors obtained were 60x at the edge of the near-field mixing zone (CORMIX), which is limited to 230ft from effluent point, and 173x in the far-field (TUFLOW) (see **Appendix A**, Kingfish Maine Near- and Far- Field Modelling Report – Chandler Bay, Maine for complete description of model results).

Key parameters in review show:

- *Total Flow*: 28.7 million gallons per day, of which
  - 6.4 million gallons is for the culture and processing of fish ("culture water", "processing water"), and
  - 22.3 is used in reclaiming thermal energy from the water prior to discharge ("heat recovery water")
- *pH and Salinity*: Kingfish Maine will not be altering pH or salinity outside of the normal range found in Chandler Bay as yellowtail kingfish require these parameters to remain with the ambient range naturally occurring.
- *Temperature*: Because of Kingfish Maine's heat recovery process, we will be sending out effluent that is colder than ambient temperatures in Chandler Bay, and we have no significant effect on the overall temperature of Chandler Bay. The maximum temperature difference shown in the far-field modelling results is 0.09°F cooler than ambient (see **Appendix A**, Kingfish Maine Near- and Far- Field Modelling Report – Chandler Bay, Maine for complete description of model results).
- *Total Nitrogen*: The dilution factor of 173x in the far-field model results in a total nitrogen (TN) level of 0.038mg/L contributed by Kingfish Maine effluent. With a median and mean background TN of 0.25mg/L and 0.27mg/L, respectively, total nitrogen in Chandler Bay would be 0.29mg/L-0.31mg/L, which is within the protective limits set by DEP for preservation of dissolved oxygen and eelgrass.

- *BOD_5 and TSS*: Presuming the standard permissible limits for BOD and TSS of 30mg/L average daily concentration and 50mg/L maximum daily concentration to be included in a discharge permit from DEP, at a dilution factor of 173x, Kingfish Maine effluent would result in less than 0.035mg/L change on dissolved oxygen in Chandler Bay. This would meet standard DEP assessment criteria.

Kingfish Maine will also be drawing water from Chandler Bay, allowing for ongoing monitoring of the water quality. Our intake pipes will be located at approximately half the distance, or 1,312 ft (400m) from shore along the same trajectory as the effluent pipes. This demonstrates our commitment to maintaining the environment in which we are located as any negative impact would be detrimental to our own operation.

Alternatives

As discussed above, Kingfish Maine is implementing best practicable treatment that has been demonstrably achieved in our industry in our wastewater treatment system and meeting standards of two globally recognized best aquaculture practices certifying agencies. In our modelling, we also completed model runs at a location further from shore that demonstrated greater dilution of a critical parameter, nitrogen. However, in order to achieve this, the discharge point was approximately 2 miles from shore in order to avoid depth limitations to tidal mixing caused by the presence of two islands, Ballast and Mark Islands. Locating the discharge at this point not only presents an economic limitation for Kingfish Maine but also requires far greater impact to the seafloor and to local fishing activity, in direct contrast to the main concerns voiced by the community. Assessing these factors, the placement of our discharge point at 2,624 ft (800m) and intake at 1,312 ft (400m) from shore of the site is the most favorable option.

From the design of our treatment system to the location of both our intake and effluent locations, Kingfish Maine continues to maintain our focus on sustainability, not just from an environmental perspective of our choices but also with respect to how we operate as a part of the local community.

Kingfish Maine Social and Economic Benefits

The Kingfish Company works to bring positive benefit to the communities where we develop. In establishing a vertically integrated business of this scale, encompassing all aspects of the aquaculture process of taking yellowtail kingfish from egg to market, provides significant opportunity for growth in Jonesport, Washington County, and Maine across a multitude of sectors in both direct and indirect engagement. Kingfish Maine can demonstrate and quantify this growth through our current activities.

- Kingfish Maine is already developing hatchery production in the University of Maine's Center for Cooperative Aquaculture Research. The company will be able to utilize this not just for immediate hatchery production but also to begin training a small group of individuals in a company standard, which can then be translated to new staff that is assembled for the larger facility. Through this measured approach to development, the workforce can be brought on systematically, allowing for Kingfish Maine to source employees locally as much as possible and collaborate with local entities to build education and training programs to fill the workforce.
- Kingfish Maine is already beginning to build this training program. In collaboration with teachers and administrators at Jonesport-Beals High School, Kingfish Maine is working to build an aquaculture focused education program with hands on work, such as constructing a small RAS system in the classroom with Kingfish Maine staff. We have spoken with

University of Maine, Washington County Community College, and Downeast Institute to explore how this program can tie into those at their institutions to provide greater opportunity for higher level education. Our goal is to create a lasting effect, providing not only attractive employment opportunities today but attract future generations to stay in the area.

- The company is dedicated to providing quality employment opportunities to build a stronger, more resilient community. Kingfish Maine has consulted with Sunrise County Economic Council, Downeast Institute, as well as local individuals to better understand those aspects of a career package development that are most important as well as initiatives in which the company can participate to improve the community.

In order to attempt to quantify these benefits, Kingfish Maine engaged the University of Maine to perform an economic impact assessment. An IMPLAN model was used to evaluate the impact of the planning, construction, and ongoing operation of $108 million-dollar RAS facility in Jonesport. Kingfish Maine is shown to provide significant numbers of both direct and indirect employment opportunities to Washington County. Between 2008 and 2018, Washington County saw private employment decline by 6.8% across all industries while the state, as a whole, saw a 3.2% increase. Ongoing operations of Kingfish Maine stands to provide 126 direct and indirect jobs to Washington County, accounting for an increase of 2% in private employment - 1/3 of the private employment jobs that were lost in 2008 to 2018. While the construction phase has wider implications at the state level, Kingfish Maine's ongoing operations provide significant benefits to both Jonesport and Washington county in terms of economic output, employment, and income level. The full report is still in draft as more information is added as details become available through the design process; however, a summary of the findings of this study is attached as **Appendix C**.

APPENDIX A *Kingfish Maine Near- and Far- Field Modelling Report – Chandler Bay, Maine, Ramboll Environmental*

Intended for
Kingfish Maine

Date
August 2020

Project Number
1690016697

KINGFISH MAINE
NEAR- AND FAR- FIELD DISCHARGE MODELING REPORT – CHANDLER BAY, MAINE

RAMBOLL

KINGFISH MAINE
NEAR- AND FAR- FIELD DISCHARGE MODELING
REPORT – CHANDLER BAY, MAINE

Project No.	**1690016697**
Issue No.	**Final**
Date	**04 August 2020**
Made by	**Holly Leslie**
Checked by	**Richard Wenning**
Approved by	**Richard Wenning**

Ramboll
217 Commercial Street
Suite 500
Portland, Maine 04101
T +1 207 517 8220
www.ramboll.com

CONTENTS

APPENDICES

EXECUTIVE SUMMARY

The Kingfish Company and its subsidiary, Kingfish Maine (Kingfish), are proposing to construct and operate a 6,000 – 8,000 metric ton (MT) Yellowtail kingfish Recirculating Aquaculture System (RAS) facility in Jonesport, Maine. Included among the local, state, and federal permits that must be obtained before construction can begin is the requirement to apply for a Maine Pollutant Discharge Elimination System (MEPDES) permit, which governs the discharge of wastewater from the RAS facility.

This report describes the results of environmental modeling work performed by Ramboll to support the MEPDES permit application. This report aims to:

1. Describe the modeling approach and work conducted to predict likely discharges from the proposed facility;
2. Describe the spatial footprint of the near-field and dilution factors achieved in the NMZ;
3. Describe the movement of the discharge plume in the far-field zone; and,
4. Describe the spatial extent of possible contact of the discharge plume with the shoreline.

Ramboll used two US Federal Agency-approved surface water dispersion models in this work to predict the mixing behavior and dispersion of combined culture water and heat recovery water discharged to Chandler Bay from a proposed submerged ocean outfall. The Cornell Mixing Zone Model (CORMIX) 3D dilution model was used to predict the near-field mixing zone (NMZ) of wastewater discharges. The TUFLOW Finite Volume (FV) model was used to predict the spatial extent of dispersion of the wastewater discharge in Chandler Bay.

Engineering specifications for the location of the pipeline and configuration of diffusers at the proposed ocean outfall, as well as characteristics of the wastewater discharge, were provided to Ramboll by Kingfish. The ambient conditions in Chandler Bay and characteristics of the receiving seawater were obtained from coastal monitoring records available on the Internet from the State of Maine and from other available public sources. Hydrodynamic conditions were simulated in the models to be representative of conditions typical for winter and summer seasons along downeast coastal Maine.

Results from the CORMIX model used to predict seawater conditions at the ocean outfall indicate the NMZ is likely to extend approximately 230 ft from the location of the pipeline outfall during either summer or winter conditions. At the edge of the NMZ, the wastewater discharge will have been subjected to a dilution factor of 60x; i.e., the levels of residual nutrients in the wastewater at 230 ft from the outfall will be 60-times lower than levels at the point of discharge.

Once beyond the NMZ, the wastewater discharge in the far-field zone, which is expected to continue to mix and dilute with seawater, is predicted to move with offshore flow currents and tidal forces in the bay. During tidal cycles, the diluted wastewater discharge is expected to move with offshore flow currents up to 3 miles to the north with incoming tides and up to 1 mile south with outgoing tides. The TUFLOW FV model predicts that the diluted wastewater discharge plume may reach its north and south limits approximately 7 days after commencement of discharges; i.e., the model predicts the diluted wastewater discharge is highly unlikely to move beyond 3 miles north of the discharge location or 1 mile south of the discharge location during any given tidal cycle.

The modeling results predict that wastewater from the outfall may reach the western shore of Chandler Bay along Route 187. Using total nitrogen concentrations in the wastewater discharge as an indicator, the modeling results predict the wastewater discharge will have been subjected to a dilution factor of 173x; i.e., total nitrogen levels will be 173-times lower than at the point of discharge. Any total nitrogen associated with the wastewater discharge that reaches the shoreline is predicted to fall within the threshold range that Maine DEP cites as protective of eelgrass and dissolved oxygen conditions.

1. INTRODUCTION

1.1 Background

On behalf of Kingfish Maine (Kingfish), Ramboll developed near-field and far-field surface water dispersion models to support Kingfish's application for a Maine Pollutant Discharge Elimination System (MEPDES) permit for their proposed Recirculating Aquaculture System (RAS) facility in Jonesport, Maine. Development of the RAS facility requires the construction of an ocean outfall in Chandler Bay for discharging culture water and heat recovery water (hereafter referred to collectively as wastewater discharge). Kingfish is required by the Maine Department of Environmental Protection (DEP) to obtain a wastewater discharge license under the MEDPES program. This report describes the modeling work performed to delineate the near-field mixing of the wastewater at the initial point of discharge and predict the likely far-field dilution behavior of the wastewater discharge plume as it disperses further away from the location of the proposed ocean outfall in Chandler Bay.

Maine DEP has established the following procedures for understanding near-field mixing and far-field dilution characteristics associated with obtaining a license for wastewater discharges to the ocean in the State of Maine:

- Near-field (initial) dilution: Near-field Mixing Zone (NMZ) is defined as the distance from the point of discharge where mixing patterns are driven by the exit velocities of the discharge. Maine DEP specifies the conditions under which near-field dilution should be estimated – *"dilution available as the effluent plume rises from the point of discharge to its trapping level, at mean low water level and slack tide for acute exposure analysis and at mean tide for the chronic exposure analysis."*[1] Near-field dilution is estimated based on the dilution factor derived from established and accepted near-field mixing models.
- Far-field dilution: Far-field dilution is the mixing and dispersion that occurs within the plume that is outside of the zone of influence of the exit velocities from the point of discharge. Maine DEP has not established specific licensing criteria for determining appropriate far-field dilution conditions. For Kingfish's proposed discharge, Ramboll has developed a three-dimensional (3D) hydrodynamic model to estimate the dispersion and mixing characteristics in the far-field zone and calculated far-field dilution factors based on the model results.

1.2 Modeling Approach

The specific objectives of the hydrodynamic modeling are as follows:

1. Describe the modeling approach and work conducted to predict likely discharges from the proposed facility specifically with respect to total nitrogen and temperature;
2. Describe the spatial footprint of the near-field results and dilution factors achieved in the NMZ;
3. Describe the movement of the discharge plume in the far-field; and,
4. Describe the spatial extent of possible contact of the discharge plume with the shoreline.

Both the near-field and far-field models are US Federal Agency-approved surface water dispersion models. Both models are used consistent with their intended purpose to predict the likely route and trajectory of wastewater discharges from a point source location (in this case, a submerged ocean outfall). In the NMZ, the characteristics of the discharge govern how the discharge plume is likely to mix with the receiving water. The primary forces that typically influence hydrodynamics and the movement of the wastewater in the receiving environment beyond the NMZ are ocean currents, and winds. Thermal/density stratification commonly

[1] 06-096 CMR Chapter 530 – Surface Water Toxics Control Program, §4(A) (calculation of dilution factors) states in part as §4(A)(2)(a)

influences mixing patterns but water profile data from Chandler Bay collected by Maine DEP in 2001-2010 and by Kingfish in 2019 suggests that water temperatures are not strongly stratified. Wind-generated waves may also occasionally also modify movement and influence the behavior of the plume.

The wastewater discharge from the proposed Kingfish facility will include a combination of heat recovery water and culture water from the RAS. For the modeling work, the discharge water is described by Kingfish to consist of a mixture of nearly three-quarters heat recovery water and one-quarter RAS culture water.

The heat recovery water includes only water that is taken from Chandler Bay and cycled through heat exchangers to remove heat energy. Heat recovery water does not interact with any RAS processes involved in growing fish and, thus, is identical to ambient seawater conditions in Chandler Bay in all aspects (e.g., salinity, nutrient characteristics) except for water temperature. During most times of the year, the temperature of water returned to Chandler Bay is anticipated to be approximately 5 degrees (F) *below* (i.e., colder than) ambient conditions due to the heat recovery process that will be used by Kingfish to maintain growing conditions in the culture tanks.[2]

The culture water from the RAS facility includes water that interacts with RAS processes involved in growing fish. Culture water from the hatchery and grow-out tanks in which yellowtail kingfish will be raised at the facility will be discharged to Chandler Bay. The suspended solids and nutrient (primarily phosphorus and nitrogen) content of the culture water, as well as the biological oxygen demand (BOD) condition of the culture water, may be present at levels above ambient conditions in Chandler Bay.

The near-field modeling work described in this report was conducted to simulate the mixing of the wastewater discharge with the ambient receiving seawater in the bay, and predict the near-field dilution factor based on two relevant water quality characteristics of the discharge water, total nitrogen and temperature. Total nitrogen is the primary wastewater constituent of concern with respect to water quality in Chandler Bay. Although the nature of nitrogen in the discharge and the form it takes in the environment are variable, the modeling considers total nitrogen as a non-transformative conservative constituent that does not change its form in the receiving environment. Water temperature is a common parameter when assessing wastewater mixing. In this case, the wastewater temperature will typically be colder than surface water temperature in Chandler Bay.

There is currently little understanding of the variation in the magnitude and direction or velocity with depth of the counter currents and helicoidal flows in the bay. This understanding is important when considering potential plume movements, which may vary with water depth. Therefore, both the CORMIX and TUFLOW FV models were performed using a 3D modeling approach to simulate the behavior of mixing, dilution and dispersion conditions of the wastewater discharge in this particular setting.

Lastly, the modeling approach included a variable water level boundary to reflect the tidal cycle in Chandler Bay. Tide curves of variable lengths were utilized, generally based on tidal peaks set at the Mean High Water (MHW) level. MHW is the average of all the observed high-water heights. In accordance with Maine DEP requirements, influences from the wind at the water surface were omitted from the model.

1.3 Dispersion Models

Two types of modeling have been completed, both in 3D:

[2] This is expected to be true throughout the year with the only exception of when surface water temperatures in Chandler Bay reach freezing. Wastewater discharges during these times will be the same temperature as ambient surface water.

- CORMIX near-field plume modeling; and
- TUFLOW FV far-field advection-dispersion modeling.

CORMIX is an industry-standard mixing zone model which is primarily used to determine detailed wastewater plume characteristics close to the outfall (<300 ft). Whilst CORMIX does not include a sophisticated hydrodynamic model to simulate the unsteady (i.e. time-varying) movement of the receiving environment, it has the functionality to model the discrete hydraulic effects associated with pipe outfalls and diffusers, typically used to aid wastewater dispersion in situations such as this. Beyond the near-field zone of the receiving water, the accuracy of CORMIX to predict mixing characteristics is reduced. Likewise, in coastal environments, flow conditions normally vary over time in response to the rise and fall of tides.

The 3D TUFLOW FV[3] far-field model used in this work encompasses the area of Maine coastline extending from the headland at Jonesport in the south west to the headland at Point of Man in the north east. The bay between the two headlands is split by a central island; Roque Island. The bay to the south west of Roque Island, adjacent to Jonesport is Chandler Bay. The bay to the north and east of Roque Island is Englishman Bay. Within the model area, there are several smaller islands and rocky outcrops, smaller inlets and bays and a complicated bathymetric environment. The full area has been modeled to understand the complicated flow regime operating within the bay as tides rise and fall. Figure 1-1 shows boundary conditions and the key locations within the Jonesport, Maine, TUFLOW-FV model.

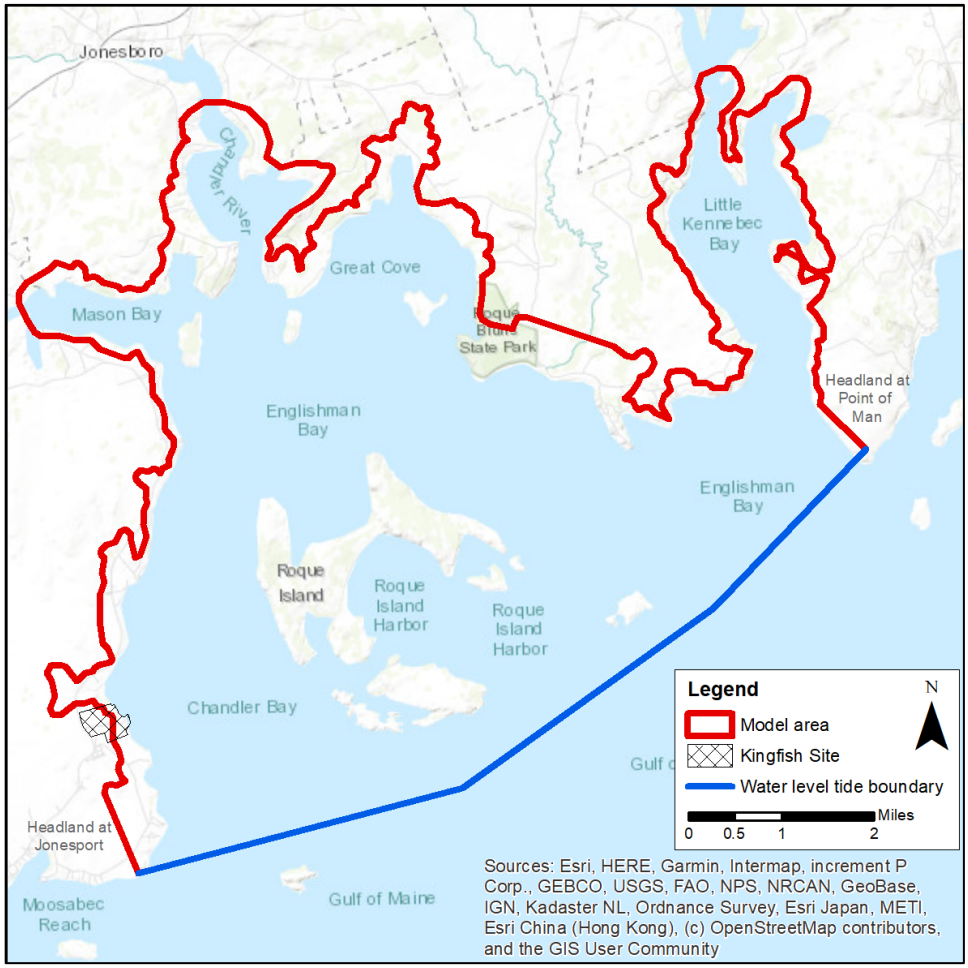


Figure 1-1: Boundary conditions and locations within the Jonesport, Maine, TUFLOW-FV model

3 BMT WBM, TUFLOW FV Science Manual, Flexible Mesh Modeling 2013

2. CORMIX MODEL APPROACH

2.1 CORMIX Model

Wastewater discharge modeling was undertaken using the Cornell Mixing Zone Model (CORMIX) Version 11, a 3D dilution model for the definition of discharge plumes. Consistent with its intended use, the CORMIX model was used to model continuous point source discharges using the role of boundary interaction to predict steady-state mixing behavior and plume geometry at the outfall location specified by Kingfish.

Separate calibration of the results of the model has not been possible because there is insufficient data on water quality in the near vicinity of the proposed outfall (and as the outfall is not yet operational). It has not, therefore, been possible to directly verify the model outputs against available water quality information. However, conservative input data were used to ensure a conservative approach was taken with respect to the model's predictions.

Data on the proposed outfall and receiving environment were obtained from several sources (indicated below by brackets []). The discharge is based on the initial proposed outfall design provided to Ramboll by Kingfish. Hydrodynamics, concentrations of selected constituent parameters, recirculation, and dispersion were evaluated using the following conditions (representative conditions for winter and summer seasons have been modeled):

- Pipe outfall = 6No. 211 mm wide fanned-out ports with 5 m spacing [Kingfish];
- Outfall location = central port 800 m offshore [Kingfish];
- Effluent flow rate = 1,250 L/s (44.14 cfs) [Kingfish];
- Effluent nitrogen concentration = 6.9 mg/L [Kingfish];
- Summer effluent density = 1,024.75 kg/m^3 (calculated from average temperature of 9.3°C [Kingfish] and salinity equivalent to Chandler Bay of 3.2% [Kingfish]);
- Winter effluent density = 1,025.71 kg/m^3 (calculated from average temperature of 0°C [Kingfish] and salinity equivalent to Chandler Bay of 3.2% [Kingfish]);
- Average background nitrogen concentration in receiving environment = 0.27 mg/L [Kingfish];
- Average depth of Chandler Bay in vicinity of outfall = 13 m [C-MAP (see Section 3.6)];
- Depth at discharge = 13 m [as above];
- Average width of Chandler Bay = unbounded [calculated using GIS];
- Flow Currents = 0.1 m/s [TUFLOW model (see Section 3)]; and
- Manning's roughness (n) = 0.03 [NLCD (see Section 3.5)].

The orientation of the diffuser at the outfall was assumed to be perpendicular to the shoreline and to the ambient current axis. The nozzles on the diffuser were assumed to be oriented downstream in the direction of the ambient current. For the purposes of near-field modeling, ambient flow currents were modeled as uni-directional. Design details may be subject to change as the design progresses. The configuration and orientation of the diffuser is applicable for determining the mixing and dilution potential of the wastewater discharge in the near-field.

For the sake of brevity in reporting, a full description of design iterations is not provided herein. Appendix 1 presents a comparison of different modeling results in the far-field showing how changes in the location of the outfall in Chandler Bay influences the mixing and dilution conditions of the wastewater discharge.

3. TUFLOW FV MODEL APPROACH

3.1 Software

The hydrodynamic model of the Jonesport, Maine, coastline was developed using industry-standard TUFLOW Finite Volume (FV) software. The most recent release was used, build 2019.01.008. TUFLOW FV is a flexible mesh, finite volume numerical model that simulates hydrodynamic, sediment transport, and water quality processes in oceans, coastal waters, estuaries, rivers, and floodplains. The model was used because the flexible mesh structure allows users to modify the resolution of different spatial boundaries, which can improve model resolution in specific areas of interest.

TUFLOW has been benchmarked for use in many coastal environments in the United States. TUFLOW is certified by the US Federal Emergency Management Agency for use under the National Flood Insurance Program. TUFLOW also has approved status for use within the United States Army Corps of Engineers National Hydrology, Hydraulics and Coastal Software list.

TUFLOW FV includes a module for Advection Dispersion (AD). AD refers to the transport of dissolved constituents within hydrodynamic flows. An AD module within a numerical modeling suite is used to simulate a range of environmental processes including salinity dynamics, constituent fate and transport and heat, amongst others. TUFLOW FV applies the AD module to simulate the time evolution of salinity, temperature, suspended sediment, passive tracers and water quality constituents.

3.2 Model Area and Mesh Design

TUFLOW FV is designed for solving Non-Linear Shallow Water Equations (NLSWE) on unstructured meshes, comprising triangular and quadrilateral elements. The flexible mesh approach allows for a seamless boundary fitting along complex coastlines or open channels as well as accurately and efficiently representing complex bathymetries with the minimum number of computational elements. The flexible mesh capability is particularly efficient at resolving a range of resolutions within a single model without requiring multiple domain nesting, allowing for a fine resolution within the area of interest and coarser resolution in the regional extents.

Figure 3-1 shows the TUFLOW FV mesh for the Jonesport coastline and the tidal water level boundary. The mesh was primarily developed to assess the movement of discharge wastewater released offshore within Chandler Bay. Consequently, the mesh was constructed with smaller mesh elements (higher mesh resolution) close to Jonesport to resolve the complex hydrodynamic environment at this location. Larger mesh elements (lower mesh resolution) were progressively applied with increasing distance away from Chandler Bay, and for the out of bank, dry land areas. The unstructured flexible mesh was created using the mesh generation tool Rising Water Software GIS Mesher[4].

[4] https://www.risingwatersoftware.com/

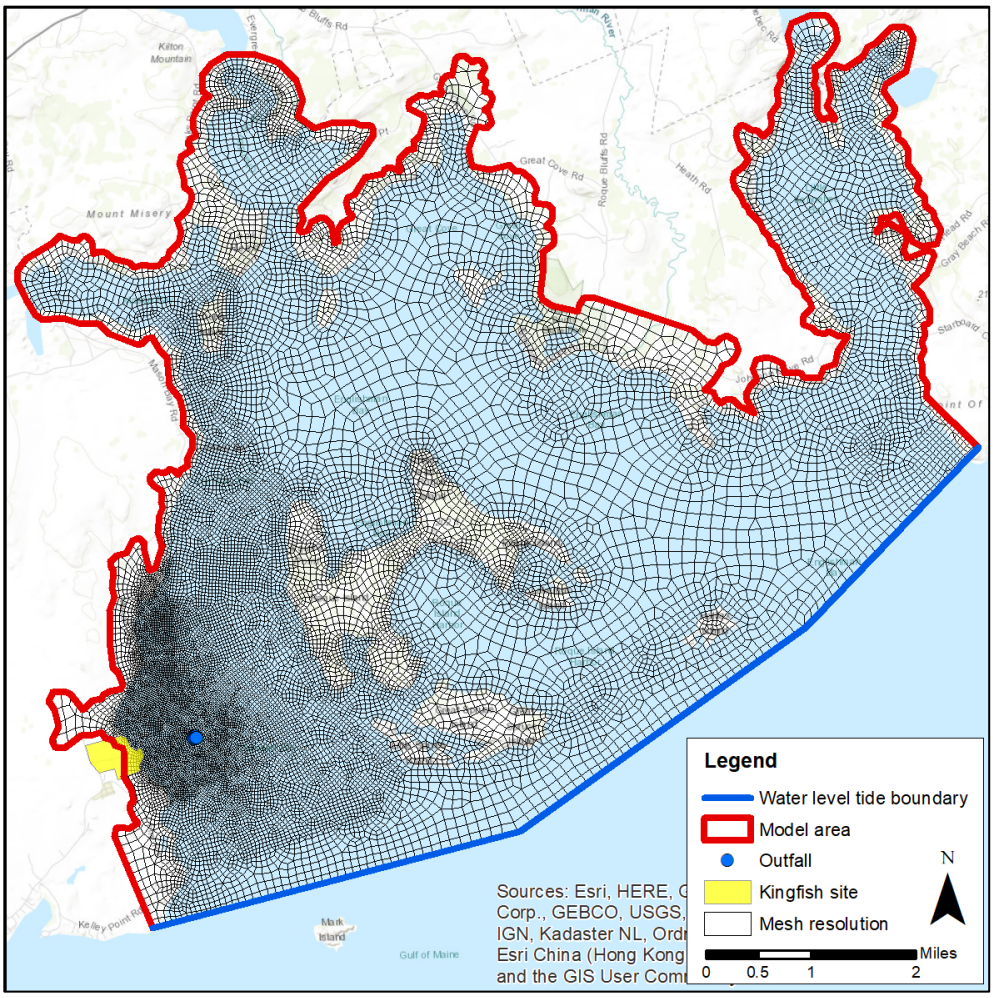


Figure 3-1: TUFLOW FV mesh for Jonesport, Maine

3.3 3D Layer Z Coordinate Approach

TUFLOW FV includes three-dimensional (3D) capability. Two-Dimensional (2D) depth averaged simulations can be an excellent approximation for many applications however, there are cases where 3D modeling is required to sufficiently describe the observed flow characteristics. For example, 3D modeling is useful in areas where there is a significant variation in magnitude and direction of velocity with depth, such as counter currents and helicoidal flows, or where the effects of density become important such as in stratified environments or dense plume outfalls. A 3D modeling approach has been applied for the Jonesport model to be able to understand the vertical movement of wastewater released from the outfall within Chandler Bay.

Modeling with 3D layers involves setting vertical cells similar to the way that horizontal cells are defined in the mesh (Figure 3-2). These can be set with a fixed elevation depth (z) for each cell (e.g. each layer is 2 ft thick); by dividing the depth of the river into an equal number of evenly distributed sigma layers (e.g. 4 sigma layers throughout the model would mean a 16 ft depth has 4 x 4 ft layers, an 8 ft depth has 4 x 2 ft layers); or a combination (hybrid) of the two schemes.

The Jonesport model has applied a hybrid z-sigma layering method for vertical layers with the hybrid z-sigma layer method defined by a series of surface sigma layers overlaid on a z scheme at depth. The hybrid z-sigma layering method provides flexibility and stability in areas of wetting and drying not available via a z only coordinate system while providing the potential for high resolution near-surface exchange and gradient capturing.

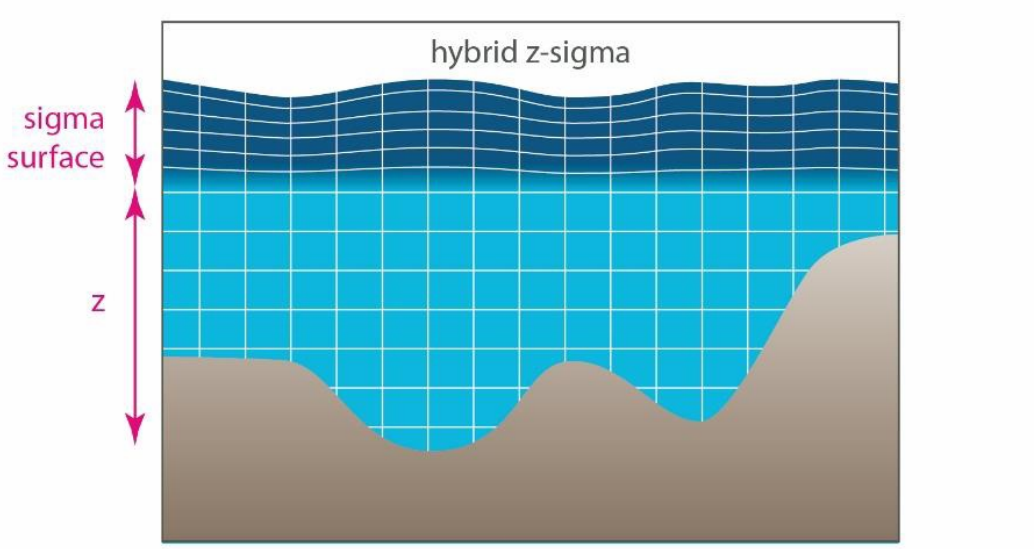


Figure 3-2: 3D Model z-sigma Vertical Discretization Approach

The vertical datum applied in this study is the North American Vertical Datum of 1988 (NAVD88). The hybrid z-sigma approach applied for the Jonesport model is as follows:

- 11 z layers
  - 6.56 ft (2 m) intervals from -13.12 ft (-4 m) NAVD88 to -65.62 ft (-20 m) NAVD88,
  - 13.12 ft (4 m) intervals from -65.62 ft (-20 m) NAVD88 to -104.99 ft (-32 m) NAVD88.
- 4 surface sigma layers.
- 1.64 ft (0.5 m) minimum bottom layer thickness to ensure the bottom layer of the 3D solution at the bed is not less than 1.64 ft (0.5 m), avoiding 'skinny' vertical layers where the bed elevation is between two z coordinate layers.
- 6.56 ft (2 m) water depth required before 3D calculations are applied.

3.4 Tidal Boundary

3.4.1 Data Availability

Exceedance probability, the likelihood that water levels will exceed a given elevation, is based on a statistical analysis of historic values. Extreme Water Level data is available from the National Oceanic and Atmospheric Administration (NOAA). NOAA provides exceedance probability levels for select CO-OPS water level stations with at least 30-years of data. A NOAA Technical Report, "Extreme Water Levels of the United States 1893-2010"[5] describes the methods and data used in the calculation of the exceedance probability levels.

Annual Exceedance Probability (AEP) levels were derived relative to the National Tidal Datum Epoch (1983-2001) Mean Sea Level datum at gauge stations. Two AEP levels are provided; AEP levels for the mid-year of the National Tidal Datum Epoch and the projected AEP levels and tidal datums assuming continuation of the linear historic trend.

This study is concerned with everyday tide data and, as such, has utilized the 99% projected AEP level. The 99% AEP level is the tide level that will be exceeded in all but one year per century, although it could be exceeded more than once in other years.

Extreme levels measured by the CO-OPS tide gauges during storms are called storm tides, which are a combination of the astronomical tide, the storm surge, and limited wave setup caused by

[5] NOAA, NOAA Technical Report NOS CO-OPS 067, "Extreme Water Levels of the United States 1893-2010", September 2013

breaking waves. They do not include wave runup; the movement of water up a slope. The 99% AEP level was used as it was considered to be a peak tide level frequently experienced and as such, represents an everyday tide level.

The closest two CO-OPS water level stations with extreme water level data predictions are Eastport and Bar Harbor (Table 3.1).

Table 3.1: NOAA station information for water level CO-OPS sites used to estimate projected 99% AEP tide levels

Station Name	Station ID	NOAA Chart number	Sensor Information	Latitude, Longitude	Projected 99% AEP Tide Level for 2018 (NAVD88)
Bar Harbor, ME	8413320	13318	Acoustic water level (A1)	44° 23.5' N, 68° 12.2' W	7.579 ft (2.310 m)
Eastport, ME	8410140	13328	Acoustic water level (A1)	44° 54.2' N, 66° 59.1' W	12.467 ft (3.800 m)

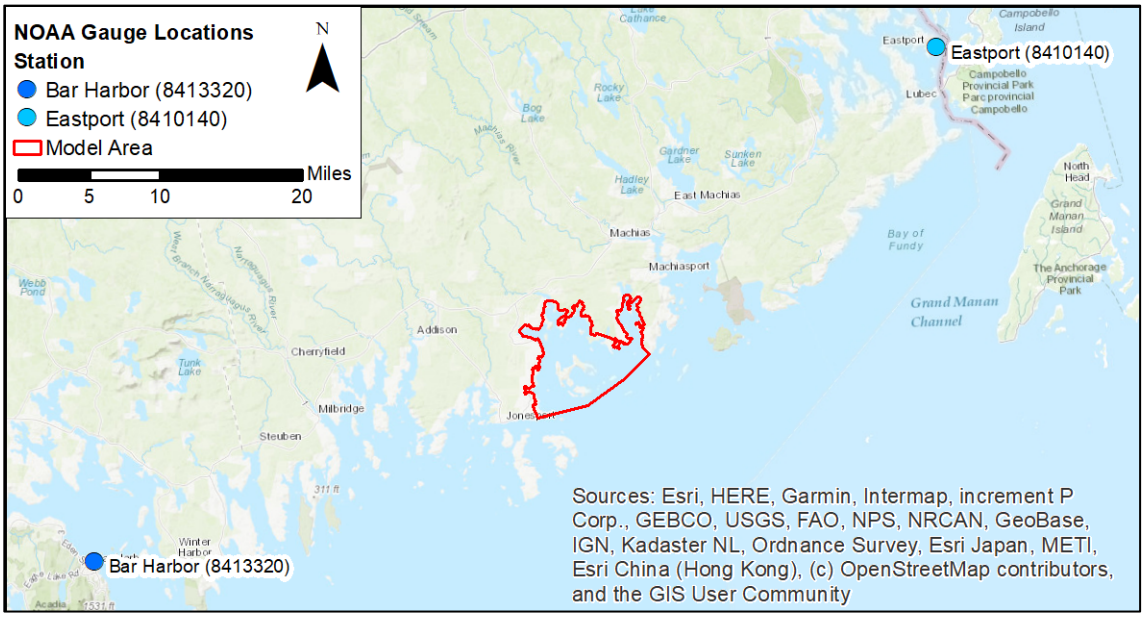


Figure 3-3: NOAA station water level CO-OPS sites in relation to the TUFLOW-FV model location

The AEP tide levels are station specific so their use for evaluating surrounding areas may be limited. Considering the significant distance between the two stations, a simple linear interpolation to derive the 99% AEP tide level for Chandler Bay using only Eastport and Bar Harbor data would not be appropriate.

Tidal datum information was available for NOAA stations in between Eastport and Bar Harbor. This data was utilized to characterize the tide level variation along the Maine coastline. This information was fed into the interpolation calculation to provide greater confidence to the 99% AEP water levels derived for Chandler Bay (Table 3.2).

Table 3.2: NOAA station information for used to calculated projected 99% AEP tide levels for TUFLOW-FV hydraulic model.

Station Name	Station ID	Sensor Information	MHW (NAVD88)	Cumulative Distance	Projected 99% AEP Tide Level for 2018 (NAVD88)	
					NOAA	Interpolated using MHW
Bar Harbor	8413320	Acoustic water level	4.99 ft (1.52 m)	0 miles (0 km)	7.58 ft (2.31 m)	7.58 ft (2.31 m)
Milbridge	8412581	Tidal Datum	5.45 ft (1.66 m)	19.2 miles (30.876 km)	-	8.14 ft (2.48 m)
Model - West	-	-	-	33.3 miles (53.564 km)	-	8.73 ft (2.66 m)
Model - East	-	-	-	40 miles (64.312 km)	-	8.99 ft (2.74 m)
Cutler Naval Base	8411250	Tidal Datum	6.4 ft (1.95 m)	48.6 miles (78.152 km)	-	9.35 ft (2.85 m)
Cutler Farris Wharf	8411060	Tidal Datum	6.59 ft (2.01 m)	53.2 miles (85.674 km)	-	9.58 ft (2.92 m)
Eastport	8410140	Acoustic water level	8.86 ft (2.7 m)	73.4 miles (118.082 km)	12.47 ft (3.8 m)	12.47 ft (3.8 m)

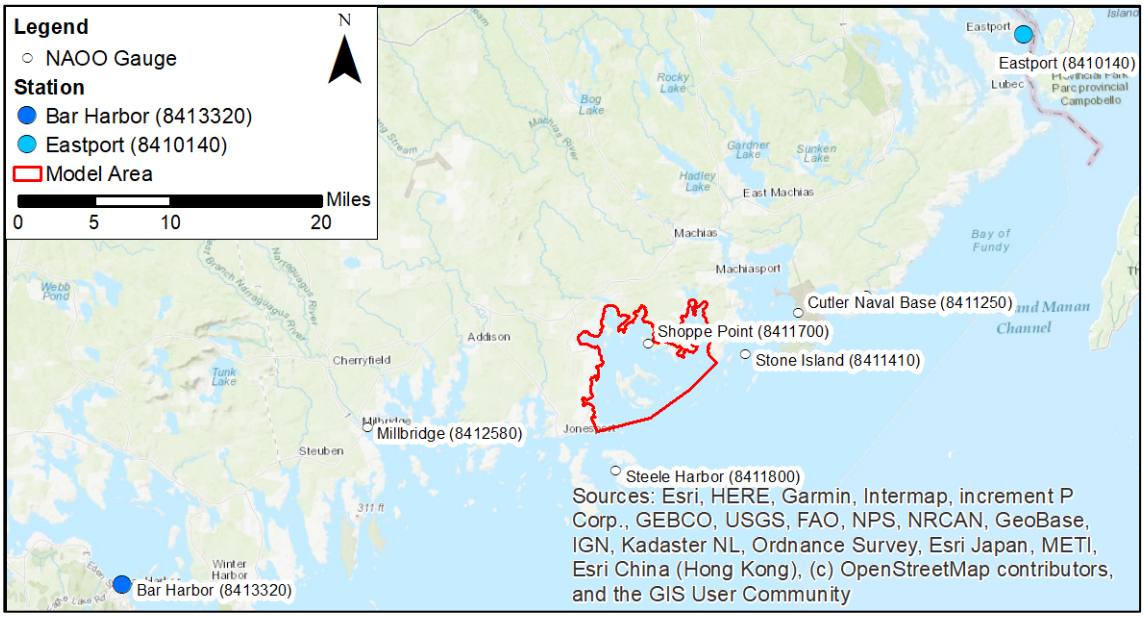


Figure 3-4: NOAA station sites in relation to the TUFLOW-FV model location

Tides can be influenced by a range of different conditions that are unrelated to the movement of the sun and moon. Weather conditions can lead to low- or high-pressure systems which impact the timing and height of tides as do winds and offshore currents which can contribute to storm surges. In order to avoid distorting model results, astronomical tides were used which ignore those extraneous influences.

The closest available NOAA tide gauge station providing a continuous astronomical tide timeseries dataset was Cutler Farris Wharf (8411060). A timeseries of astronomical tide data was extracted from the NOAA database. The tide levels were then scaled to the 99% AEP tide levels derived in Table 3.2. Figure 3-5 shows the scaled tide curves applied in the TUFLOW FV model.

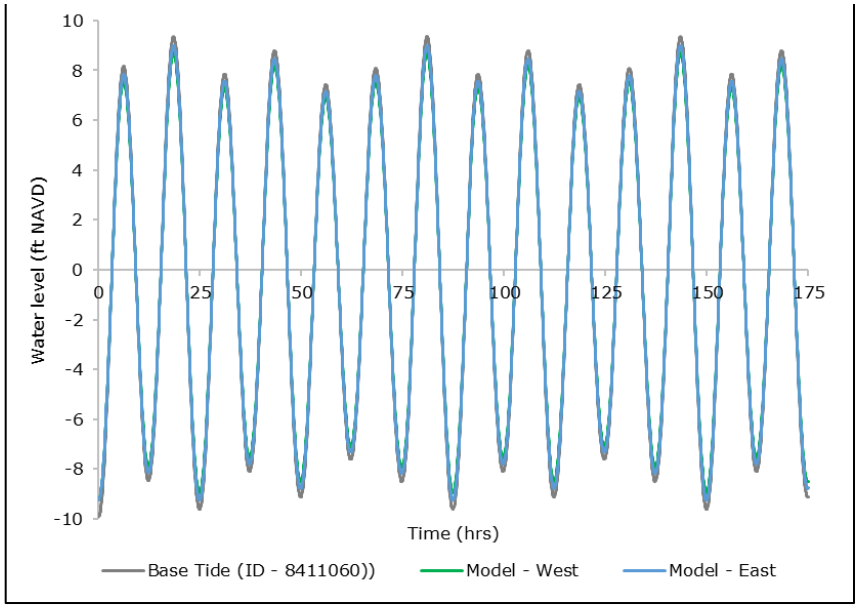


Figure 3-5: Scaled tide curve applied in the TUFLOW-FV model

The tidal boundary of the model was set to span the mouth of Chandler and Englishman's Bay, stretching from the headland at Jonesport in the south-west to the headland at Point of Man in the north-east (Figure 3-1).

3.5 Model Roughness

Model roughness values within the TUFLOW FV model have been defined using data sourced from the National Land Cover Database[6] (NLCD) Roughness Layer 2011 Edition, sourced from the US Geological Survey (USGS). Modeling judgement is required when assigning model roughness values as there are no specific guidelines. The Conveyance Estimation System[7] (CES) cross-referenced against values presented in Chow[8] (1959) were used to derive suitable Manning's 'n' values.

Roughness values are used to define the land use variation in the model active area, examples include: Pasture, Roads, Buildings, Forest, Mangroves etc. Each material is assigned a constant Manning's n value. Table 3.3 details the roughness values assigned to each land type identified in the model active area. Figure 3-6 shows the roughness mapping applied in the TUFLOW-FV model.

Table 3.3: Model roughness values

ID	Manning's 'n'	Land Type - Roughness
11	0.03	Open Water
21	0.025	Developed Land
24	0.032	Developed, High Intensity
31	0.035	Barren Land
44	0.2808	All Forest Types
52	0.0539	Shrub/Scrub
71	0.0456	Herbaceous
81	0.0922	Hay/Pasture
82	0.0539	Cultivated Crops
90	0.2008	Woody Wetlands
95	0.1511	Emergent Herbaceous Wetlands
100	0.0508	Roughness Stability Patch 01
101	0.2	Roughness Stability Patch 02
102	0.1	Roughness Stability Patch 02

6 https://www.usgs.gov/centers/eros/science/national-land-cover-database
7 http://www.river-conveyance.net/
8 Chow, V.T., 1959, Open-channel hydraulics: New York, McGraw-Hill.

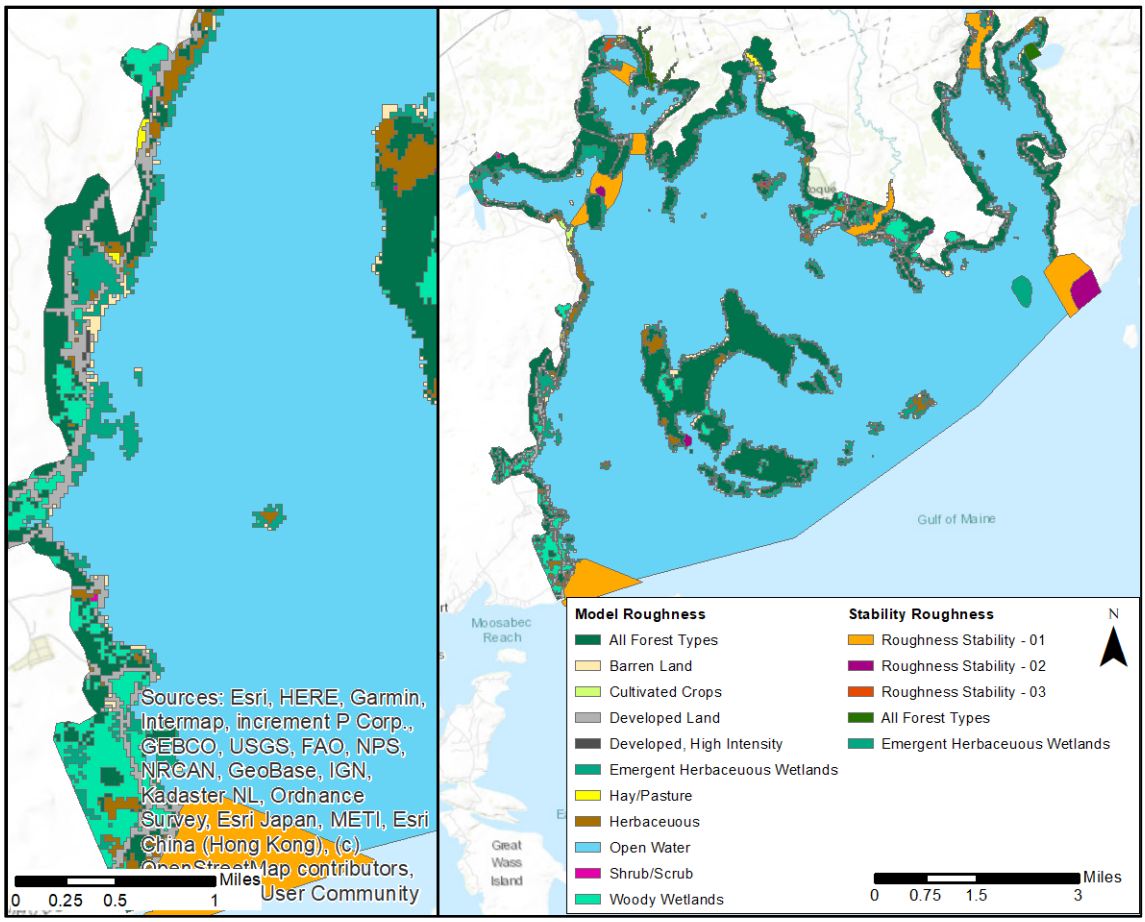


Figure 3-6: Roughness mapping applied in the Jonesport TUFLOW-FV model

Figure 3-6 also shows the locations of the Stability Roughness patches applied in the TUFLOW-FV model. These were applied in locations that caused model instability, where unrealistic flow rates were simulated or there were unnatural isolated spikes in the simulated water level. The patches are sufficiently distant from the key areas of interest to not interfere with model results.

3.6 Model Terrain

LiDAR and Bathymetry survey datasets were used to represent the base model terrain. The LiDAR dataset was sourced from the USGS[9]. The Bathymetry dataset was sourced from DHI's C-MAP[10] database.

3.6.1 USGS LiDAR

The Jonesport modeling study has utilized USGS NED 1/3 arc-second LiDAR data to represent the model terrain for the land surface. This data was made available through the USGS 3D Elevation Program (3DEP). 3DEP data comprise an elevation dataset of seamless, high resolution layers that represent the best available raster elevation data of the conterminous United States. 3DEP data are updated continually as new data become available. Seamless 3DEP data are derived from diverse source data that are processed to a common coordinate system and unit of vertical measure. The details for the LiDAR data are summarized in Table 3.4.

[9] https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services
[10] https://www.c-map.com/

Table 3.4: USGS LiDAR details

Source	U.S. Geological Survey
Publication Date	30/09/2019
Title	USGS NED 1/3 arc-second n45w068 1 x 1-degree GridFloat 2019
Format	Raster digital data
Survey date	2017
Horizontal datum	North American Datum of 1983 (NAD 83)
Vertical Datum	North American Vertical Datum of 1988 (NAVD 88)
Resolution	1/3 arc-second (approximately 10 meters)

3.6.2 C-MAP Bathymetry Data

The Jonesport model utilized bathymetry data sourced from C-MAP, an online licensed data platform of Bathymetry datasets. The bathymetry data available for Chandler Bay and Englishman Bay was surveyed in 2010. The data was provided in ESRI mesh format.

3.7 Wastewater Discharge Modeling

Total nitrogen is modeled as a scalar variable; physical quantities that are tracked within TUFLOW FV and can be represented by one value per cell using the TUFLOW-FV Advection Dispersion (AD) module.

3.7.1 Advection Dispersion Module Conceptual Framework

The TUFLOW AD module is an extension of the hydrodynamic engines, simulating constituent fate and transport. Both dissolved and particulate constituents can be simulated. The AD module takes hydrodynamic information computed by the TUFLOW-FV engine, using it in combination with initial and boundary conditions, to simulate the advection and dispersion of constituents.

3.7.2 Effluent model setup

Table 3.5 outlines the concentrations of constituents simulated to be released from the ocean outfall during different seasons of the year using the TUFLOW-FV model. The discharge rate, temperature, and concentrations of nitrogen were constant throughout each simulation, they did not vary with time. Figure 3-7 shows the diffuser location within Chandler Bay, situated 2625 ft (800 m) offshore and situated on the seabed (-41.3 ft NAVD88 (-12.6 m NAVD88)).

Table 3.5: Discharge, temperature and concentrations of total nitrogen released from the effluent diffuser locations for each model scenario

Season	Temp (°C)	Total Discharge	Number of Diffusers	Discharge per diffuser	Nitrogen Conc (mg/L)	Distance offshore	Elevation of Diffuser (bed level)
Summer	9.3	44.14 ft^3/s (1.25 m^3/s)	6	7.35 ft^3/s (0.208 m^3/s)	6.9	2,625 ft (800 m)	-41.3 ft NAVD88 (-12.6 m NAVD88)
Winter	0	44.14 ft^3/s (1.25 m^3/s)	6	7.35 ft^3/s (0.208 m^3/s)	6.9	2,625 ft (800 m)	-41.3 ft NAVD88 (-12.6 m NAVD88)

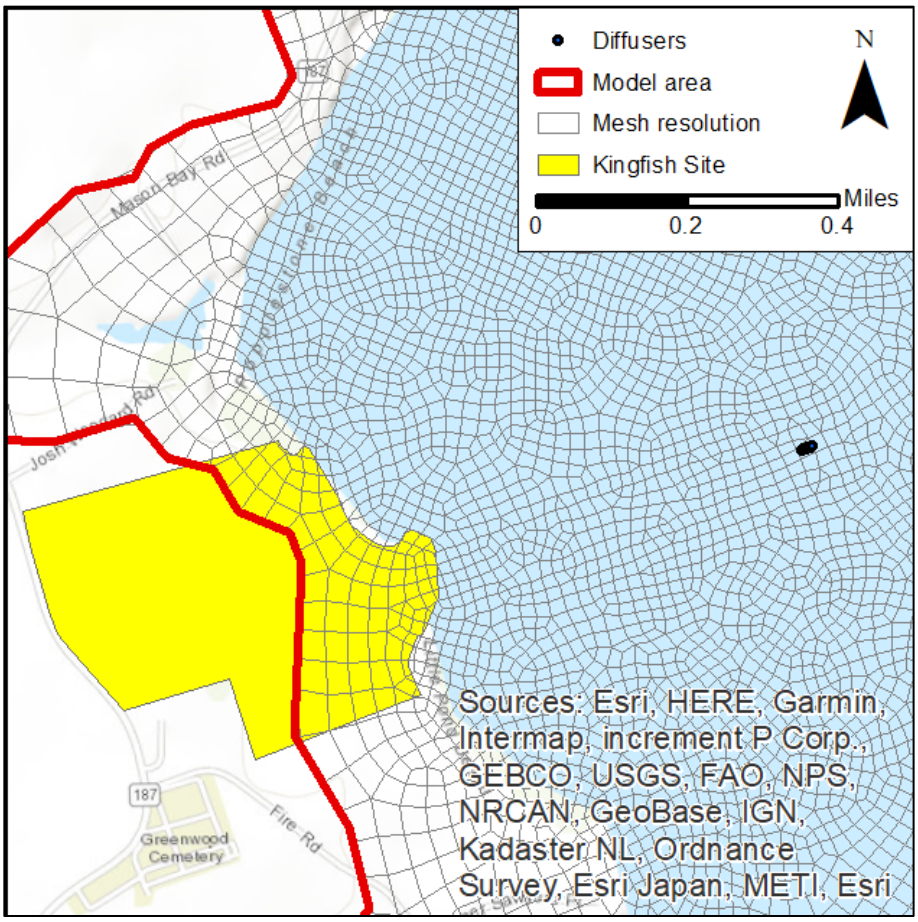


Figure 3-7: Diffuser locations within Chandler Bay

3.8 Model Parameters

3.8.1 Solution Terms

Various options are available which allow for the inclusion of a variety of solutions, including salinity, temperature, sediment, and atmospheric heat exchange. For the Jonesport TUFLOW FV model, the key interest is in the movement of the wastewater discharge in coastal waters and therefore, salinity, temperature, sediment, and tracer solutions have been included.

Complex flow regimes are in operation in Chandler Bay; a 2nd Order horizontal and vertical spatial scheme has been specified to capture these. For hydrodynamic simulations, the bed boundary resistances are described using a Bottom-Drag Model. The Jonesport TUFLOW FV model utilizes Manning, the default setting, where the Manning's 'n' coefficient is specified.

3.8.2 Model Timestep

The default time format (hours) for TUFLOW FV has been utilized. The model has been run for 175 hours (7 days), or 14 full tidal cycles from trough to trough. TUFLOW FV uses an adaptive timestep where a stable timestep must be bounded by the Courant-Friedrich-Lewy (CFL) criterion[11] for the wave propagation and advective terms and by Peclet criterion for the diffusive terms. The CFL number is a function of the cell size and shape, water depth, flow velocity and model timestep. The default setting is 1, which is the theoretical stability limit. In practice however, the value is commonly lowered to provide stability for models with large gradients. For the TUFLOW FV model, the CFL model is set to 0.6. The minimum and maximum variable time

[11] Courant, R.; Friedrichs, K.; Lewy, H. (March 1967) [1928], "On the partial difference equations of mathematical physics", IBM Journal of Research and Development, 11 (2): 215–234

step allowed according to the CFL stability criterion are set to 0.01 and 40 respectively. Sensitivity testing, which involved running the model for longer periods to see how this would affect the extent of the plume was carried out as presented in Appendix 1.

3.8.3 Turbulence Parameters

TUFLOW FV[3] has a variety of options for simulating horizonal and vertical mixing options. The horizonal mixing eddy viscosity is set to be calculated using the Smagorinsky model[12] which sets diffusivity proportional to the local strain rate. The default global horizontal eddy viscosity (0.2) for the Smagorinsky coefficient is used. The vertical-mixing eddy viscosity is calculated using the external scheme General Ocean Turbulent Model[13] (GOTM). This approach is recommended for systems with strong vertical gradients.

3.8.4 Bed Shear Stress

Bed shear stress is defined as the stress exerted by fluid on the channel bed. The opposing force is the critical shear stress, which is the stress required to initiate the motion of sediment at the channel bed. TUFLOW calculates bed shear stress using the following equation, where ρ is density, g is gravity, V is velocity, n is Manning's n and y is depth:

Metric Units: $\tau_{bed} = \frac{\rho g V^2 n^2}{y^{\frac{1}{3}}}$

3.9 Calibration

As with the near-field model, separate calibration of the results of the model has not been possible as there is insufficient data on water quality in the near vicinity of the proposed outfall (and as the outfall is not yet operational). However, some monitoring of flow currents has been undertaken and far-field modeling has been compared with this as presented in Appendix 2.

[12] Smagorinsky, Joseph (March 1963). "General Circulation Experiments with the Primitive Equations". Monthly Weather Review. 91 (3): 99–164.
[13] Bolding, K.; Bruggeman, J.; Klingbell, K., GOTM, [online], Germany, Bootstapious.com (2016), February 2020, https://gotm.net/

4. MODEL RESULTS

4.1 Mixing Zone Criteria

Far-field dispersion and mixing patterns were assumed to be the relevant scale for describing the potential consequences of total nitrogen and temperature in the wastewater discharge on water quality in Chandler Bay. Total nitrogen and temperature are the focus because nitrogen is the limiting nutrient in coastal marine waters and temperature influences the response of aquatic communities in the vicinity of the point of discharge.

Maine DEP has not adopted numeric total nitrogen criteria for protection of coastal water quality that can be used for assessing modeling results for seawater conditions at the edge of mixing zones or in the far-field. At other sites, Maine DEP has used screening levels for total nitrogen in coastal waters that depend on site conditions such as a total nitrogen concentration of 0.32 mg/L where eelgrass beds have been historically mapped as present near an outfall or 0.45 mg/L for maintenance of dissolved oxygen concentrations in the receiving water body.[14] Protective nutrient thresholds depend on site-specific conditions such as water depth and mixing and circulation patterns, among others and, throughout USEPA Region 1, numeric nutrient criteria for total nitrogen for the protection of eelgrass beds range from 0.30 mg/L to 0.39 mg/L and criteria for the protection of dissolved oxygen conditions range from 0.35 mg/L to 0.50 mg/L.[15]

In all cases, far-field results presented in this section are for concentrations above background conditions. Based on data collected by Maine DEP from Chandler and Englishman's Bay in summers between 2004 and 2010, total nitrogen concentrations are variable, but the mean and median background concentrations are 0.27 mg/kg and 0.25 mg/kg, respectively.

4.2 Near-field

Findings from the near-field modelling are presented in Table 4.1 and present the distance to the edge of the NMZ and dilution achieved at that point. Full CORMIX outputs are available from Kingfish upon request.

Table 4.1: Maximum total nitrogen concentration along the shoreline for each scenario and diffuser location

Scenario	Distance to edge of Near-field Mixing Zone (NMZ) (ft)	Dilution Factor at Edge of NMZ
Summer	230	60x
Winter	230	60x

A 60-fold dilution is achieved at a distance of 230 ft from the point of release at the outfall. This distance is defined as the edge of the NMZ and indicates the spatial extent of the influence of the outfall diffusers on mixing and dilution of the wastewater discharge.

4.3 Far-field

4.3.1 Maximum Total Nitrogen Concentrations

Figure 4-2, shows the maximum extent of total nitrogen concentrations simulated from the outfall diffusers for both the summer and winter scenarios. Figure 4-3 shows how the plume moves within Chandler Bay over time. Table 4.2 shows predicted maximum excess

[14] https://www.epa.gov/sites/production/files/2019-03/documents/draftme0002780permit.pdf, https://www.epa.gov/sites/production/files/2018-10/documents/draftme0037478permit.pdf, https://www3.epa.gov/region1/npdes/permits/2017/finalme0102075permit.pdf

[15] https://www.epa.gov/sites/production/files/2018-10/documents/draftme0037478permit.pdf

concentrations of total nitrogen predicted in near-shore areas based on an observation line as presented in Figure 4-1.

Table 4.2: Maximum excess total nitrogen concentration along the shoreline for each scenario and diffuser location

Scenario	Maximum Excess Nitrogen Concentration Along Shoreline (mg/L)	Dilution Factor for Maximum Nitrogen Concentration
Summer	0.038	173x
Winter	0.038	173x

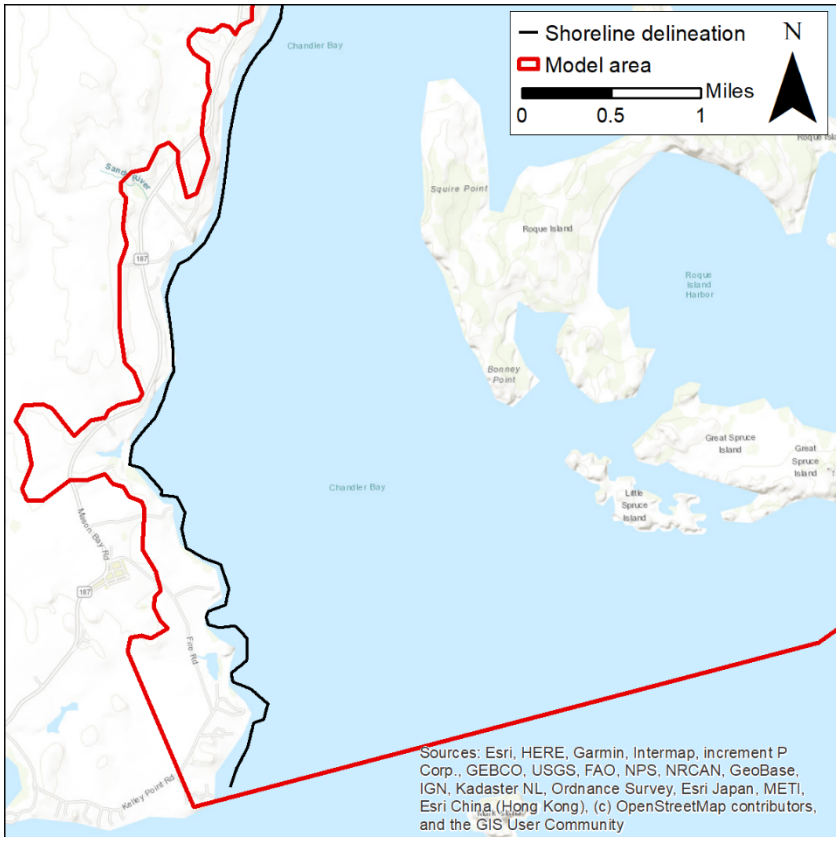


Figure 4-1: Line applied to calculate the maximum concentration at the shoreline

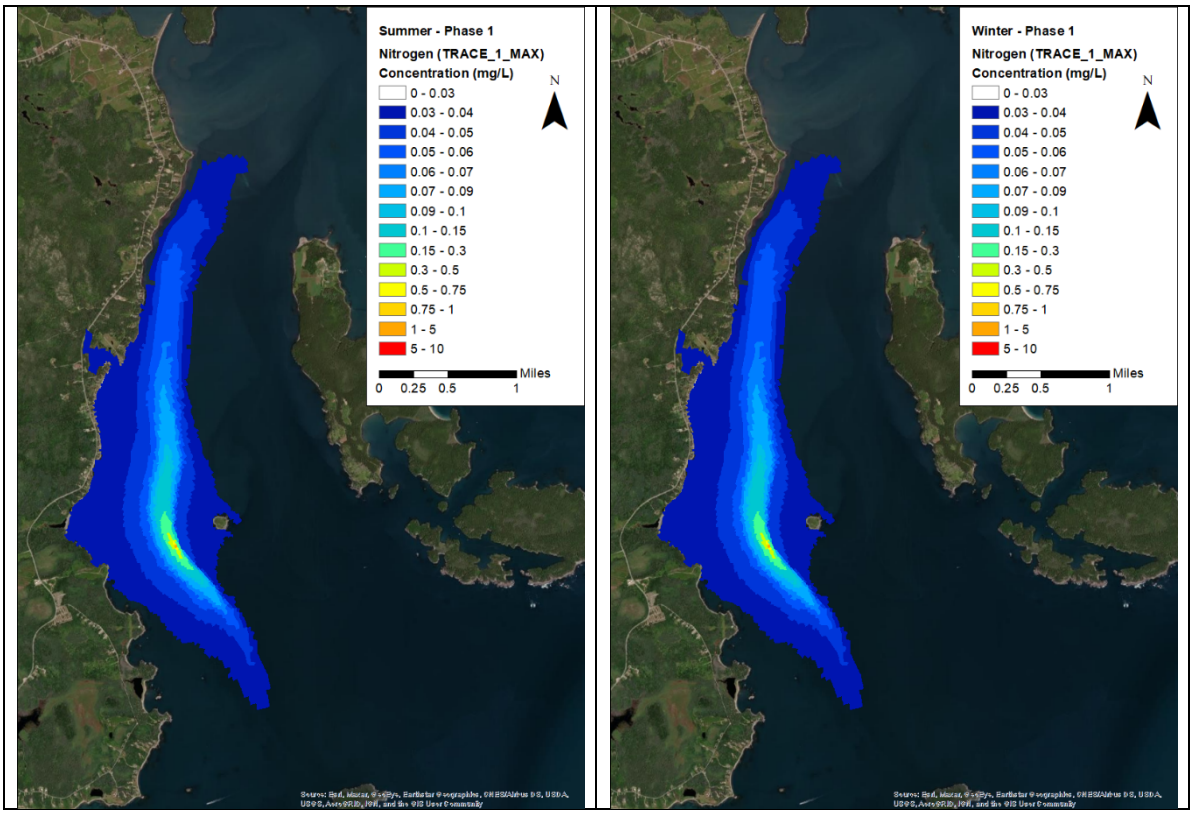


Figure 4-2: Maximum excess total nitrogen concentration under the two scenarios, Summer (left), Winter (right)

Figure 4-2 presents a composite depiction of the wastewater discharge plume indicating the maximum concentrations of total nitrogen predicted by the TUFLOW FV model across the entirety of the 7-day model run. In reality, the discharge plume moves up and down the bay (see Figure 4-3) such that the plume does not remain in one place. As presented in Appendix 2, model runs were also conducted over 14 days and 28 days. The spatial maximum extent of the discharge plume was not found to substantially increase in area after approximately 7 days of the model run, indicating that plume conditions approach equilibrium over these timescales.

4.3.2 Total Nitrogen Plume Characteristics

Figure 4-3 shows the movement of the wastewater discharge plume between 76 and 87 hours of the TUFLOW FV model run for the summer scenario. The total nitrogen content of the wastewater discharge plume moves in and out of Chandler Bay with the tide. Higher total nitrogen concentrations remain situated in the center of the plume and do not encroach to within near-shore areas.

The model results show that, as time progresses, the wastewater discharge plume moves further from the outfall location in both the north and south direction until it approaches equilibrium with ambient seawater conditions, whereby the plume is no longer predicted to reach any further north or south over time. Model results indicate the wastewater discharge plume moves no more than approximately 3 miles to the north of the outfall and no more than approximately 1 mile to the south. As described in Appendix 2, the movement of the plume was found to follow a similar pattern to this over model runs that lasted up to 4 weeks.

4.3.3 Contact with the Shoreline

As evident in Figure 4-3, the outer edges of the wastewater discharge plume are predicted to contact the shoreline in some locations on the western side of Chandler Bay. The maximum total nitrogen concentration above background in near-shore areas is predicted to be approximately 0.038 mg/L (Table 4.2). The model predicts seawater conditions at the shoreline represent a 173x dilution of the initial wastewater discharge plume. Based on the average background concentrations of total nitrogen in Chandler Bay (0.27 mg/L), seawater total nitrogen conditions at the shoreline may reach 0.31 mg/L.

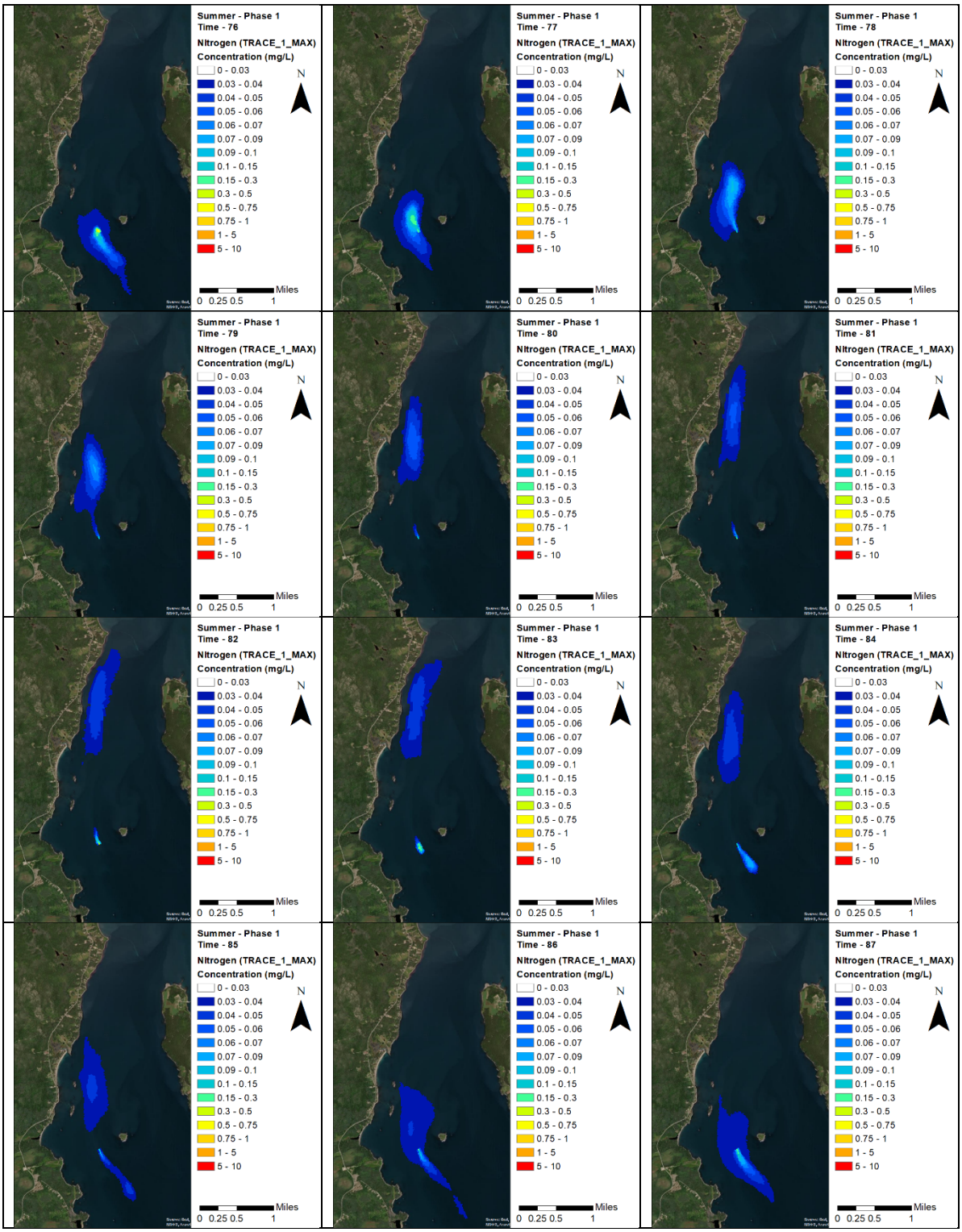


Figure 4-3: Excess total nitrogen concentrations - Summer Phase 1 - Model time 76 to 87 hours

4.3.4 Temperature

Because the wastewater will pass through the heat recovery system to maintain optimal growth conditions in the RAS, the temperature of the water released from the diffuser will be lower than temperatures in Chandler Bay during all but the coldest times of the year.[16] Therefore, potential impacts to water temperatures in Chandler Bay were examined. This exercise was completed for the Summer scenarios only, as the wastewater temperatures during the coldest times of the winter are projected to be nearly the same as the ambient water temperature in Chandler Bay (near freezing). Therefore, summer conditions represent the time when temperature differential between the colder wastewater and ambient Chandler Bay water will be the largest.

The TUFLOW-FV model set the water temperature of the Bay to be 59°F (15°C). The temperature of the effluent released from the diffuser locations were set at a lower temperature of 48.7°F (9.3°C). Figure 4-4 shows the modeled temperature differences from background. Note that the model results are consistent with the available background data from Chandler Bay which indicates that the water is vertically mixed. The model results indicate a minimal impact to the temperature of the Bay. For much of Chandler Bay, the temperature difference is less than 0.09°F (0.05°C) below ambient surface water temperature.

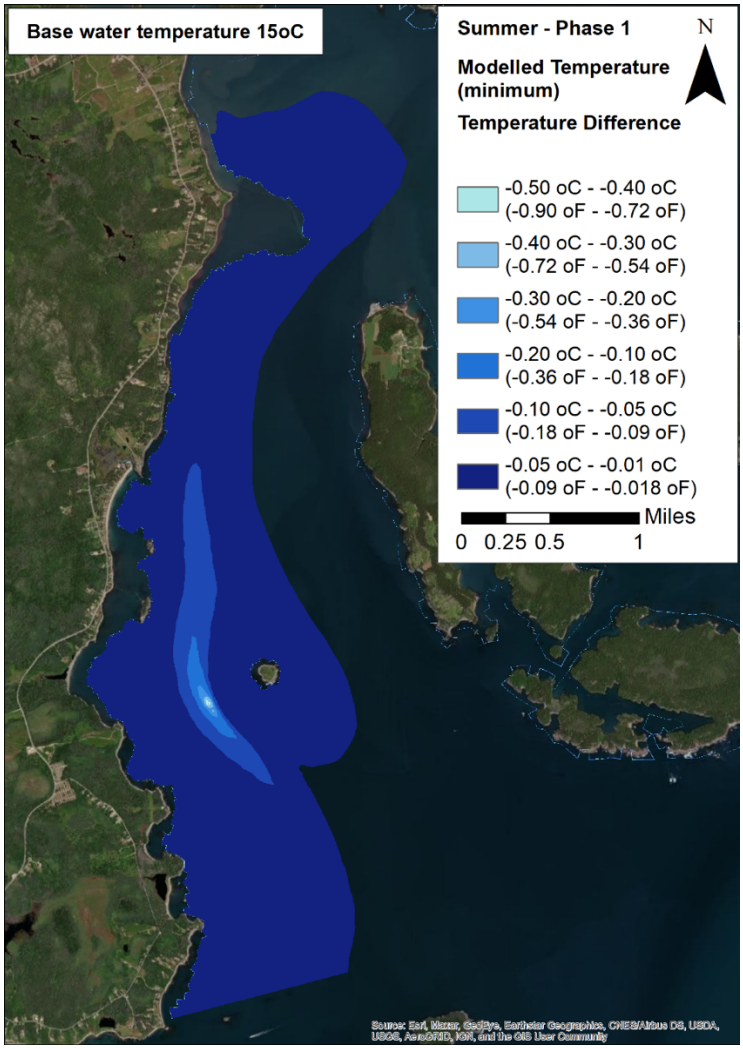


Figure 4-4: Modelled temperature differential from background for the Summer Phase 1 Scenario

[16] Discharge water temperature will be equal to ambient surface water temperatures when the temperatures in Chandler Bay reach freezing.

5. SUMMARY

The results of the CORMIX model used to simulate near-field conditions after discharge of the wastewater at the outfall indicate the extent of the plume is likely to extend not more than approximately 230 ft from the location of the outfall during either summer or winter conditions. At the edge of the NMZ, the discharge plume will have been subjected to a dilution factor of 60x.

Once beyond the NMZ, the wastewater discharge plume in the far-field is predicted to move primarily by offshore flow currents and tidal flow. The plume may move up to 3 miles to the north and 1 mile to the south, further diluting as the plume disperses in the bay. TUFLOW FV modeling predicts that the wastewater discharge plume will not move beyond these limits approximately 7 days after the initial discharge, indicating that the plume reaches equilibrium with the surrounding ambient seawater. And while model results indicate that the diluted wastewater discharge plume may reach the western shoreline of Chandler Bay at some locations, the discharge plume in these areas will be diluted by as much as 173x. Total nitrogen concentrations in these areas, therefore, are predicted to be 0.038 mg/L above background conditions and temperature decreased by no more than 0.09 degrees F.

APPENDIX 1
OUTFALL LOCATION ANALYSIS

Four locations within Chandler Bay were examined for the location of outfall diffusers (Figure 5-1). Location 3 was the final choice presented in this report.

Figure 5-2 shows the maximum nitrogen concentration simulated at four proposed diffuser locations. The model results show that increases in nitrogen concentrations above 0.03 mg/L are limited to the confines of Chandler Bay for each of the diffuser locations. The location of the diffuser had an impact on nitrogen concentration levels, indicating that the further offshore the diffusers are located, the lower the simulated nitrogen concentrations, particularly at the shoreline.

Locations 1, 2, and 3 are located progressively further offshore, with location 1 nearest to the site. Location 4 is situated offshore of Rogue Island to the south west (Figure 5-1). Table 5.1 shows the maximum nitrogen concentration along the shoreline for each diffuser location. The maximum nitrogen concentration measured along the shoreline progressively decreased with increasing diffuser distance offshore.

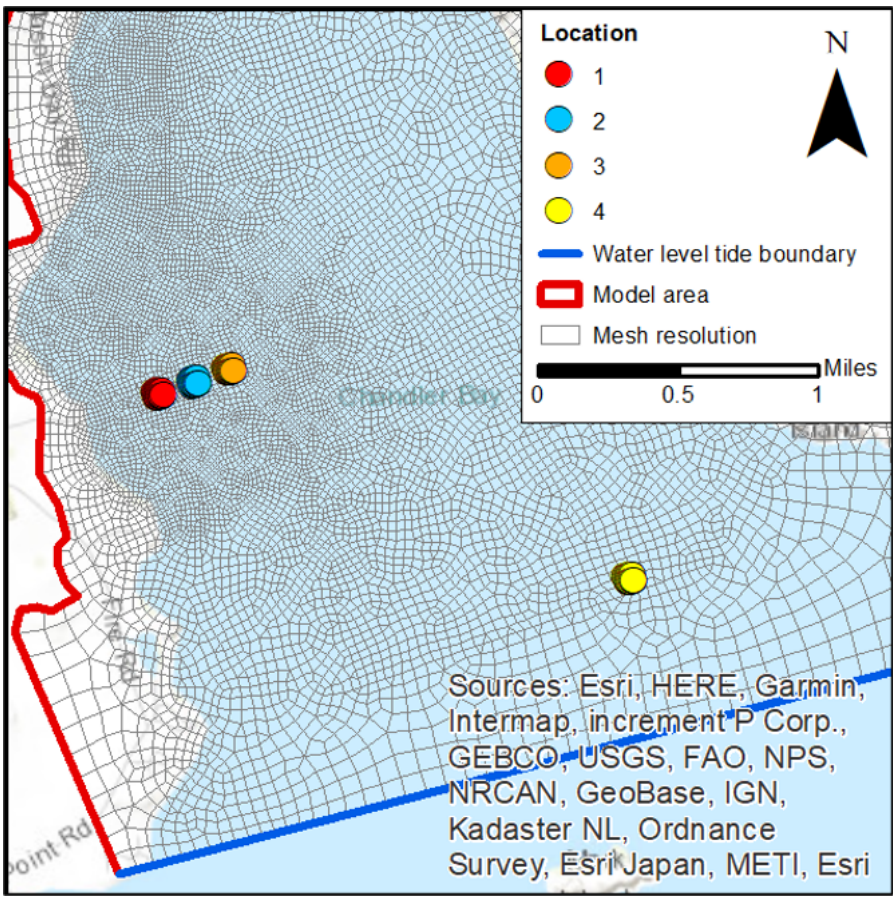


Figure 5-1: Proposed diffuser locations within Chandler Bay

Table 5.1: Maximum excess total nitrogen concentration along the shoreline for each scenario and diffuser location

Scenario	Maximum Nitrogen Concentration (mg/L) along shoreline			
	Location 1	Location 2	Location 3	Location 4
Summer Phase 1	0.101	0.053	0.038	0.007
Winter Phase 1	0.101	0.053	0.038	0.007

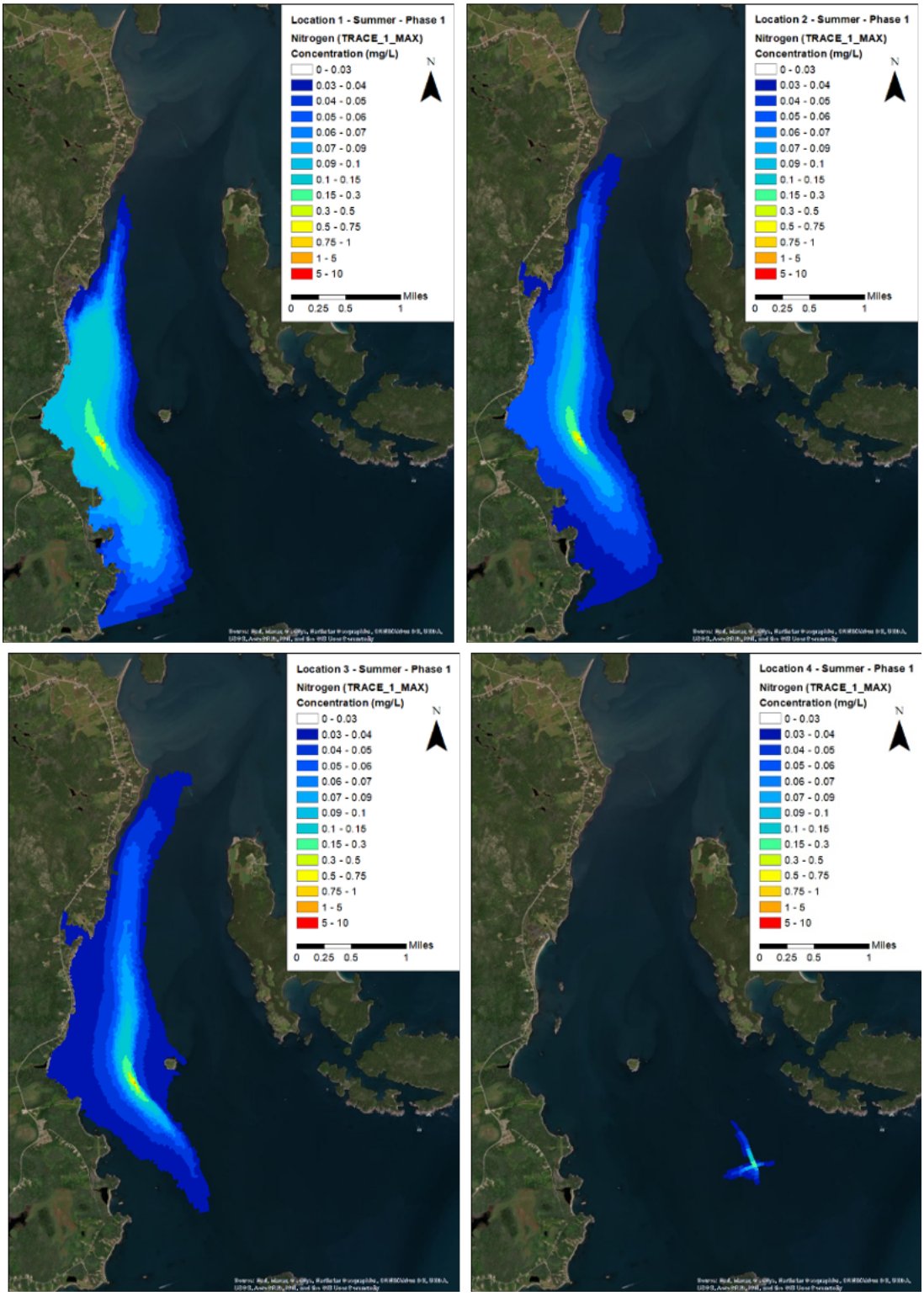


Figure 5-2: Maximum excess total nitrogen concentrations during summer at Locations 1 (top left), 2 (top right), 3 (bottom left), and 4 (bottom right)

APPENDIX 2
MODEL CALIBRATION

Georeferenced current velocity survey was collected was a vessel-mounted acoustic Doppler current profiler (ADCP) along the three transects in the project area, throughout as much of the tidal cycle as practicable to assess the variability in tidal currents in the project site. Water current velocity measurements were collected along these transects over a consecutive two-day period from the 20th to 21st November 2019.

The current velocity measurements were collected with a Teledyne RD Instruments (TRDI) 600 kHz Workhorse Sentinel ADCP mounted to an aluminum pole and from the starboard side of Normandeau's 24-foot Privateer vessel mounted 0.7m below the water surface at the transducer faces.

The November 2019 tides were simulated through the TUFLOW-FV model and the results were compared with the recorded data. Figure 5-3, Figure 5-4, Figure 5-5 and Figure 5-6 compares the ADCP recorded data and the TUFLOW-FV modeled velocity magnitude and vectors at the equivalent time for the Early Flood, Flood, Late Ebb and Near Low Slack respectively. Figure 5-7 shows the velocity magnitude for the ADCP recorded data and the TUFLOW-FV modeled data for Early Flood, Flood, Late Ebb and Near Low Slack. Comparison of the ADCP recorded and TUFLOW-FV modeled data shows the TUFLOW-FV model is replicating the overall velocity direction and magnitude at Chandler Bay. It is noted that the TUFLOW-FV modeled velocity is marginally larger than the ADCP recorded data however, the velocity magnitude changes recorded is comparable to the TUFLOW-FV modeled data. This indicates the TUFLOW-FV model is replicating the hydrodynamic environment of the Chandler Bay.

Simulation Time

The model simulation time was tested to assess the most appropriate simulation time to run the model. Figure 5-8 shows the maximum nitrogen concentration for the simulation times tested, 1 week, 2 weeks and 4 weeks. The model results show that overall, the shape and concentration distribution of the plume is generally constant for the various simulation times.

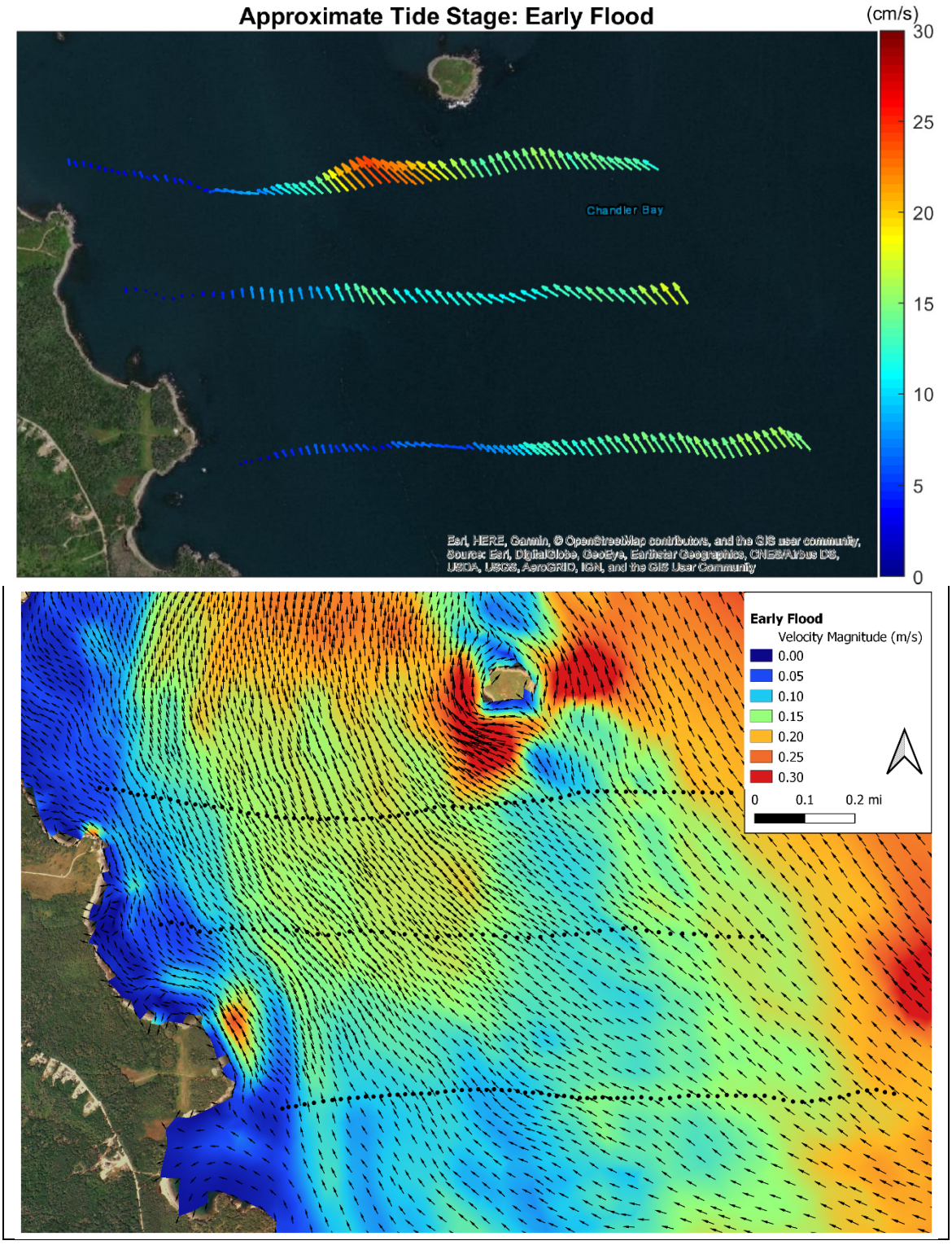


Figure 5-3: ADCP recorded data during Early Flood (top) and TUFLOW-FV modeled velocity magnitude and vectors at equal time (bottom)

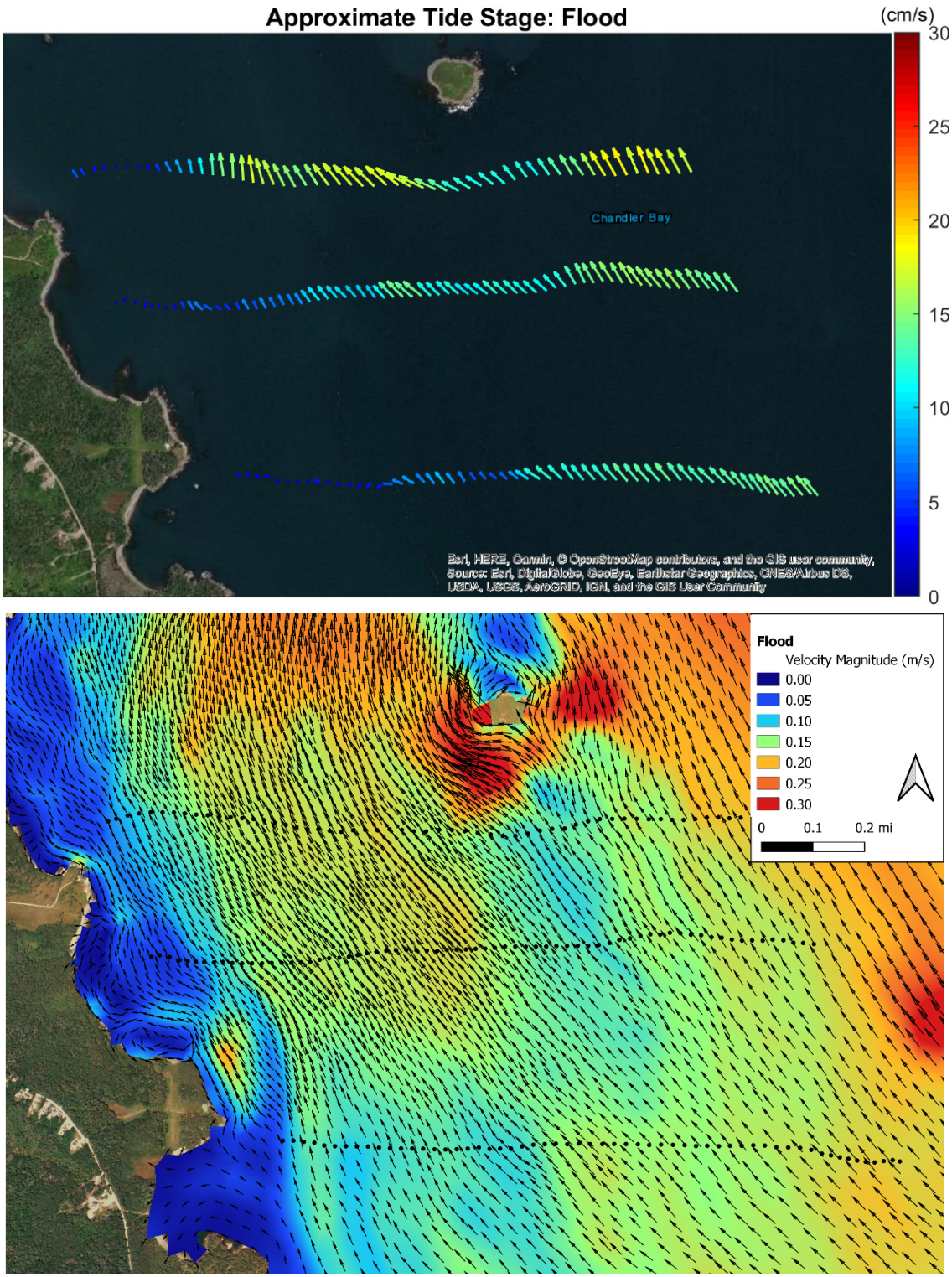


Figure 5-4: ADCP recorded data during Flood (top) and TUFLOW-FV modeled velocity magnitude and vectors at equal time (bottom)

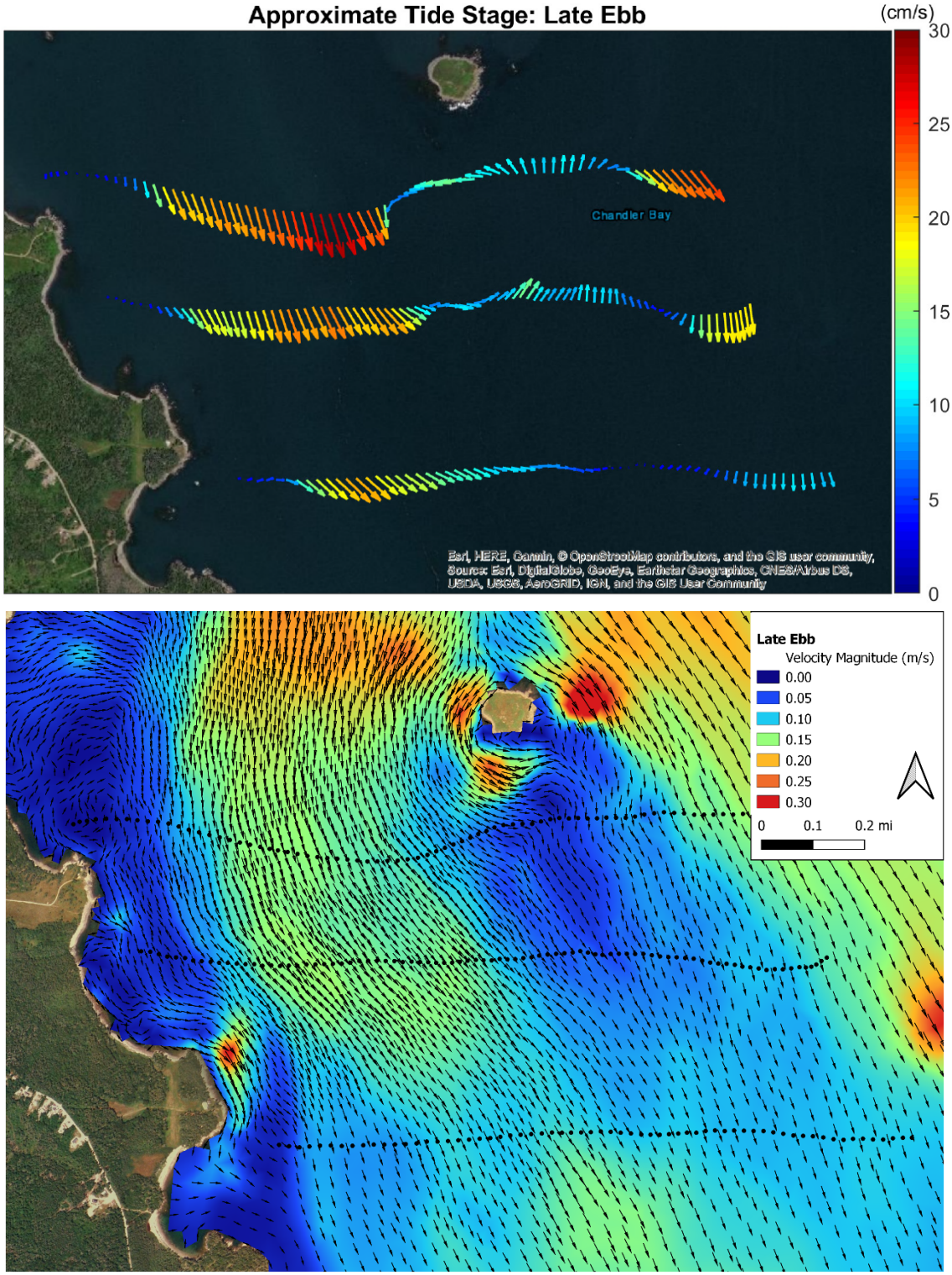


Figure 5-5: ADCP recorded data during Late Ebb (top) and TUFLOW-FV modeled velocity magnitude and vectors at equal time (bottom)

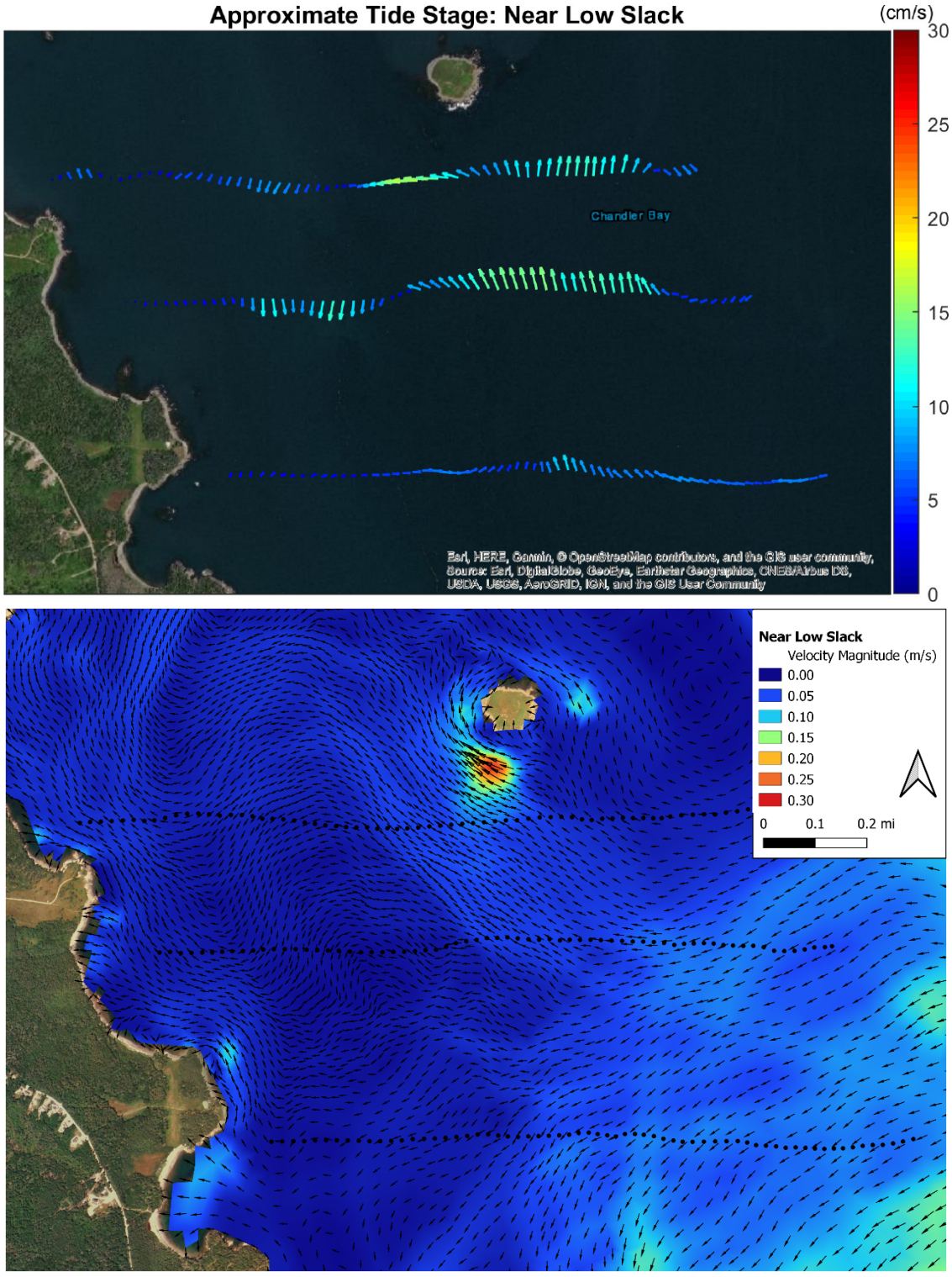


Figure 5-6: ADCP recorded data during Near Low Slack (top) and TUFLOW-FV modeled velocity magnitude and vectors at equal time (bottom)

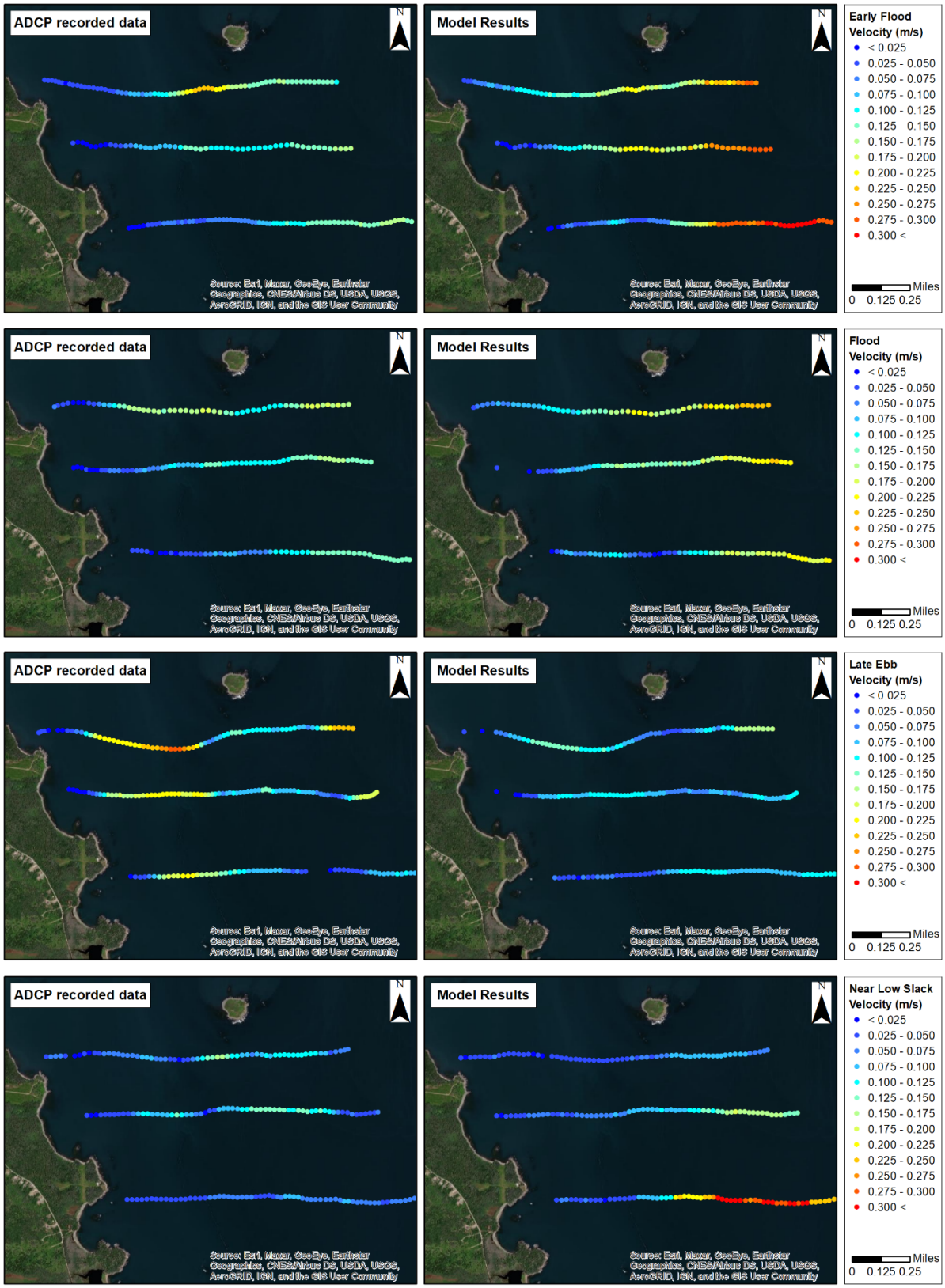


Figure 5-7: Velocity magnitude at ADCP recorded data (left) and TUFLOW-FV modeled data (right) during Early Flood (top), Flood (2nd top), Late Ebb (2nd bottom), Near Low Slack (bottom)

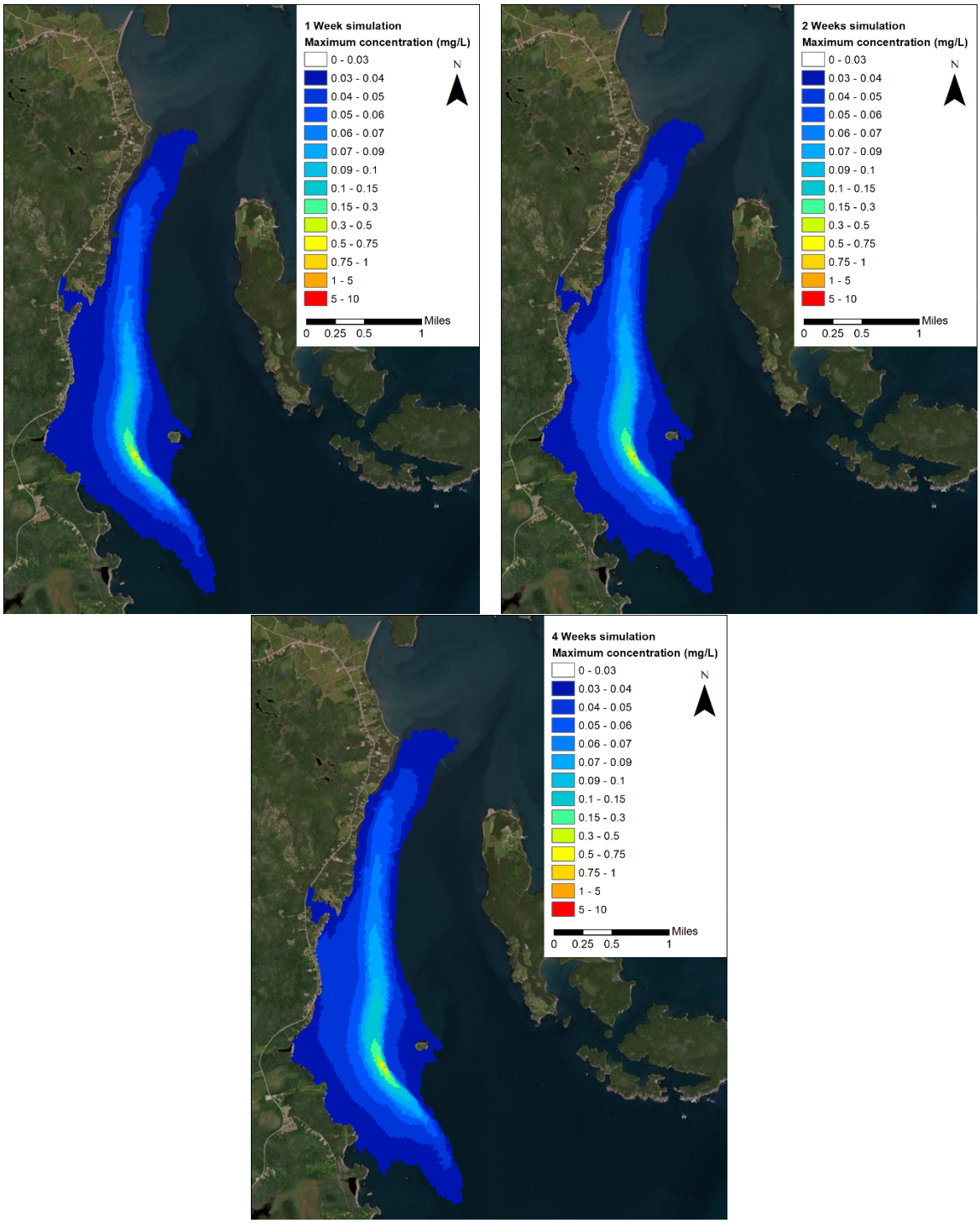
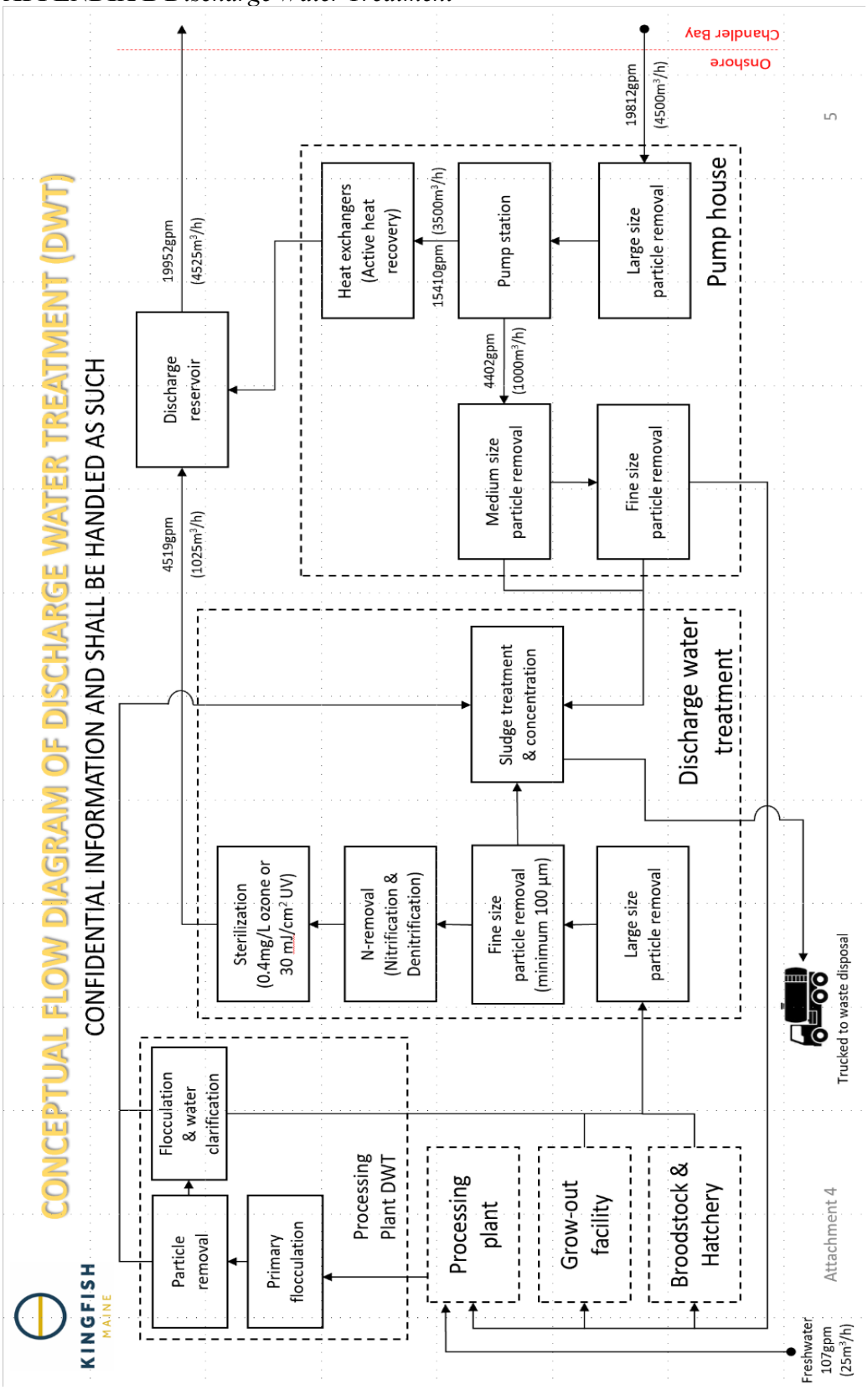


Figure 5-8: Maximum excess total nitrogen concentrations for simulation time of Week 1 (top left), Week 2 (top right) and Week 4 (bottom)

APPENDIX B *Discharge Water Treatment*



APPENDIX C *Kingfish Maine Economic Impact Assessment Summary, University of Maine*

ECONOMIC AND FISCAL IMPACTS OF A PROPOSED RECIRUCLATING AQUACULTURE FACILITY IN JONESPORT, MAINE[1]

Prepared for: Kingfish Maine

Prepared by:

Megan Bailey[2] and Sheldon Green[3]

Margaret Chase Smith Policy Center
University of Maine

July 2020

[1] This research has been supported by Kingfish Maine. We would like to thank Drs. Todd Gabe and Andrew Crawley from the University of Maine School of Economics for their feedback on the input-output model throughout the process of preparing this report.
[2] Research Associate
[3] Undergraduate Research Assistant

APPENDIX C *Kingfish Maine Economic Impact Assessment Summary, University of Maine*

HIGHLIGHTS OF MAIN FINDINGS

Planning and Construction Impacts

- Including multiplier effects, the planning and construction of the RAS facility (based on a total investment of $108 million) would have an annual *statewide* economic impact – for the two years of the project – of an estimated $44 million in output, and 366 full- and part-time jobs across Maine, with those workers earning an estimated $19 million in labor income per year.
- The employment multiplier of 1.7 means that each worker directly involved with the planning and construction of the RAS facility would support an additional 0.7 workers across the state.
- Including multiplier effects, it is estimated that the planning and construction of a $108 million RAS facility would support 180 full-and part-time jobs in *Washington County* annually – for the two years of the project – and would provide $7 million in labor income to Washington County workers.
- The income multiplier of 1.28 implies that each dollar of income by Washington County workers directly involved in the planning and construction of the facility would lead to an additional $0.28 earned by workers within the county.

Ongoing Operations Impacts

- Including multiplier effects, the ongoing operations and maintenance of Kingfish Maine's RAS facility would have a statewide economic impact of an estimated $28 million in output, 129 full- and part-time jobs, and $8.4 million in labor income in 2023.
- The impact increases annually as estimated direct expenditures increase. In 2026, the estimated statewide economic impact would be $52 million in output, 155 full-and part-time jobs, and $9.4 million in labor income.
- The statewide employment multiplier (for 2026) of 2.2 (obtained by dividing the total statewide employment impact by the direct employment impact) implies that each worker directly employed by Kingfish Maine's facility would support an additional 1.2 workers within the state.
- It is estimated that Kingfish Maine would have a total, including multiplier effects, value-added impact of $46 million. This is equivalent to approximately 0.1 percent of the state's gross domestic product in 2019.

- Including multiplier effects, it is estimated that by 2026 the facility would support the employment of 126 Washington County workers and provide $8 million in labor income.

- The Washington County income multiplier (for 2026) of 1.34 implies that each dollar of income by Washington County workers directly employed by the RAS facility would lead to an additional $0.34 earned by other workers across the county.

- The estimated Washington County employment impact of 126 jobs is equivalent to about 2 percent of all private employer jobs in Washington County as of 2018.

KINGFISH
MAINE

MEPDES Application – Attachment 7 – Summary of Notice Filing & Public Meeting

Kingfish Maine held a public meeting in accordance with Chapter 2, Section 8 of the Department's rules on Tuesday, July 21st, 2020 from 6-7:30pm. This meeting could be attended in person at the Jonesport Fire Station (state guidance on adequate social distancing observed) or online via Zoom link provided in the attached Notice of Intent to File.

The notice was published in the Machias Valley News Observer on July 8th, 2020 and again on July 15th, 2020 as well as being posted on the local post office door per a public request. Documentation of copies sent to abutters and municipality is attached.

Attendance at the Public Meeting:
In person: 10-12
Online: 13, not including panel of The Kingfish Company management joining from the Netherlands
A recording was kept of the Zoom call and in-person questions for company reference.

Listing of Abutters and Parcel Numbers

North: (008-026) -Kent Ingves, Paula Stahl - Josh Woodward Road
46 Bellevue St
Willimantic, CT. 06226

Also owns interest in the property:
Maine Coast Heritage Trust
1 Main St
Bowdoin Mill suite 201
Topsham ME 04086

South: (008-020) - USCG Housing - Mason Bay Road
475 Kilvert St
Suite 100
Warwick, RI 02886

South: (008-001) - Agnes Patterson - 54/56/57 Elmer Sawyers Point
18 Frost Lane
Orono, ME 04473

West: (008-022) - Worcester Peat Company Inc - Mason Bay Road, Jonesport, ME, 04649
241 Lane Rd
Dublois, ME 04622

West: (008-024) - New England Diversified - 300 Mason Bay Road, Jonesport, ME, 04649
927 Mason Bay Rd
Jonesport, ME 04649 same for below---- Sanford Kelley Jr

West: (008-025) - Kelley Jr., Sanford - Mason Bay Road, Jonesport, ME, 04649
Sanford Kelley Jr. and his son have both passed.
The notice should be sent to the address for New England Diversified.

NOTICE OF INTENT TO FILE MAINE WASTE DISCHARGE LICENSE / MAINE POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION

Please take note that, pursuant to 38 MRSA, Sections 413 and 414-A, Kingfish Maine Inc. intends to file a wastewater discharge permit application with the Department of Environmental Protection (DEP). The application is for the discharge of a land-based aquaculture facility in Jonesport, Maine at 9 Dun Garvin Road. The application proposes a new or increased discharge that may lower existing receiving water quality within its legal classification, and the application contains a statement regarding important social and economic benefits resulting from the activity causing the discharge, pursuant to 38 MRSA, Section 464, Department of Environmental Protection Antidegradation Policy. This permit evaluates the facility's discharge to ensure that Kingfish Maine will maintain the water quality of the area based on the location of the discharge point and the make-up of the effluent water.

Kingfish Maine is owned by the Kingfish Company, which currently operates a land-based recirculating aquaculture system (RAS) in a Natura 2000 nature reserve in the Netherlands. Kingfish Zeeland has been awarded a number of sustainable practice certifications: It's the first land-based farm to receive Best Aquaculture Practices certification and the first Aquaculture Stewardship Council certified source of yellowtail kingfish. Kingfish Maine will utilize the same advanced technology solutions used at Kingfish Zeeland, to mitigate the impacts of the effluent discharged and will abide by the parameters required by Maine DEP to protect the water quality and marine habitat.

Kingfish Maine has been actively developing its plan for the Jonesport facility over the last 18 months, communicating the details of the proposed land-based facility to the residents of Jonesport and listening to the concerns of the local community in order to minimize the operation's impact. Therefore, this application addresses the two primary areas of interest as outlined in Kingfish Maine's ongoing dialogue: The length of intake and discharge pipes and protecting the environment from water temperature increases.

The proposed position and length of the intake and discharge pipes, as outlined in the permit application, minimizes the pipe footprint to ensure as little intrusion on fishing activity as possible in Chandler Bay. To minimize the length of pipe, Kingfish Maine is investing in significant filtration of effluent, which allows for the length of the discharge pipe to be limited to just under half a mile.

The permit application fully outlines Kingfish Maine's solids and nutrient filtration system as well as its heat recovery process. The facility's advanced technology will allow the reclamation of heat energy before it is discharged, therefore preventing temperature rise impacts on the bay.

Kingfish Maine has currently engaged the University of Maine to conduct an economic impact study for Jonesport and the region. Preliminary data from the study shows a potential value-added, multiplier impact of $46 million to the region. Kingfish Maine is expected to employ 70 full-time positions at full production.

Kingfish Maine is looking forward to continued conversations and close cooperation with the residents of Jonesport regarding the permitting process. The application will be filed on or about August 7, 2020 and will be available for public inspection at DEP's Augusta office during normal business hours. A copy may also be seen at the Jonesport municipal offices at 70 Snare Creek Lane, Jonesport, ME.

Please take note that Kingfish Maine Inc. will hold a public meeting on Tuesday, July 21 at 6pm at the Jonesport Fire Station, 44 Main Street, Jonesport. The meeting will also be available online via Zoom at https://zoom.us/j/97684896684 At that time, the company will present project details pertaining to its wastewater discharge application, take any questions, and provide information on further opportunity for public comment related to this application (Chapter 2, Department of Environmental Protection Rules).

A request for a public hearing or request that the Board of Environmental Protection assume jurisdiction over this application must be received by the DEP, in writing, no later than 20 days after the application is found acceptable for processing, or 30 days from the date of this notice, whichever is longer. Requests shall state the nature of the issue(s) to be raised. Unless otherwise provided by law, a hearing is discretionary and may be held if the Commissioner or the Board finds significant public interest or there is conflicting technical information.

During the time specified above, persons wishing to receive copies of draft permits and supporting documents, when available, may request them from the DEP. Persons receiving a draft permit shall have 30 days in which to submit comments or to request a public hearing on the draft.

Public comment will be accepted until a final administrative action is taken to approve, approve with conditions or deny this application. Written public comments or requests for information may be made to

Maine Department of Environmental Protection
Division of Water Quality Management
Department of Environmental Protection
State House Station #17
Augusta, Maine 04333-0017
Telephone (207) 287-7688

Kingfish Maine welcomes questions and comments regarding permitting and project scope. The public can email the Kingfish Maine team at admin@kingfish-maine.com

MVNO0000008381

NOTICE OF INTENT TO FILE MAINE WASTE DISCHARGE LICENSE / MAINE POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT APPLICATION

Please take note that, pursuant to 38 MRSA, Sections 413 and 414-A, Kingfish Maine Inc. intends to file a wastewater discharge permit application with the Department of Environmental Protection (DEP). The application is for the discharge of a land-based aquaculture facility in Jonesport, Maine at 9 Dun Garvin Road. The application proposes a new or increased discharge that may lower existing receiving water quality within its legal classification, and the application contains a statement regarding important social and economic benefits resulting from the activity causing the discharge, pursuant to 38 MRSA, Section 464, Department of Environmental Protection Antidegradation Policy. This permit evaluates the facility's discharge to ensure that Kingfish Maine will maintain the water quality of the area based on the location of the discharge point and the make-up of the effluent water.

Kingfish Maine is owned by the Kingfish Company, which currently operates a land-based recirculating aquaculture system (RAS) in a Natura 2000 nature reserve in the Netherlands. Kingfish Zeeland has been awarded a number of sustainable practice certifications: It's the first land-based farm to receive Best Aquaculture Practices certification and the first Aquaculture Stewardship Council certified source of yellowtail kingfish. Kingfish Maine will utilize the same advanced technology solutions used at Kingfish Zeeland, to mitigate the impacts of the effluent discharged and will abide by the parameters required by Maine DEP to protect the water quality and marine habitat.

Kingfish Maine has been actively developing its plan for the Jonesport facility over the last 18 months, communicating the details of the proposed land-based facility to the residents of Jonesport and listening to the concerns of the local community in order to minimize the operation's impact. Therefore, this application addresses the two primary areas of interest as outlined in Kingfish Maine's ongoing dialogue: The length of intake and discharge pipes and protecting the environment from water temperature increases.

The proposed position and length of the intake and discharge pipes, as outlined in the permit application, minimizes the pipe footprint to ensure as little intrusion on fishing activity as possible in Chandler Bay. To minimize the length of pipe, Kingfish Maine is investing in significant filtration of effluent, which allows for the length of the discharge pipe to be limited to just under half a mile.

The permit application fully outlines Kingfish Maine's solids and nutrient filtration system as well as its heat recovery process. The facility's advanced technology will allow the reclamation of heat energy before it is discharged, therefore preventing temperature rise impacts on the bay.

Kingfish Maine has currently engaged the University of Maine to conduct an economic impact study for Jonesport and the region. Preliminary data from the study shows a potential value-added, multiplier impact of $46 million to the region. Kingfish Maine is expected to employ 70 full-time positions at full production.

Kingfish Maine is looking forward to continued conversations and close cooperation with the residents of Jonesport regarding the permitting process. The application will be filed on or about August 7, 2020 and will be available for public inspection at DEP's Augusta office during normal business hours. A copy may also be seen at the Jonesport municipal offices at 70 Snare Creek Lane, Jonesport, ME.

Please take note that Kingfish Maine Inc. will hold a public meeting on Tuesday, July 21 at 6pm at the Jonesport Fire Station, 44 Main Street, Jonesport. The meeting will also be available online via Zoom at https://us02web.zoom.us/j/84559648405 At that time, the company will present project details pertaining to its wastewater discharge application, take any questions, and provide information on further opportunity for public comment related to this application (Chapter 2, Department of Environmental Protection Rules).

A request for a public hearing or request that the Board of Environmental Protection assume jurisdiction over this application must be received by the DEP, in writing, no later than 20 days after the application is found acceptable for processing, or 30 days from the date of this notice, whichever is longer. Requests shall state the nature of the issue(s) to be raised. Unless otherwise provided by law, a hearing is discretionary and may be held if the Commissioner or the Board finds significant public interest or there is conflicting technical information.

During the time specified above, persons wishing to receive copies of draft permits and supporting documents, when available, may request them from the DEP. Persons receiving a draft permit shall have 30 days in which to submit comments or to request a public hearing on the draft.

Public comment will be accepted until a final administrative action is taken to approve, approve with conditions or deny this application. Written public comments or requests for information may be made to

Maine Department of Environmental Protection
Division of Water Quality Management
Department of Environmental Protection
State House Station #17
Augusta, Maine 04333-0017
Telephone (207) 287-7688

Kingfish Maine welcomes questions and comments regarding permitting and project scope. The public can email the Kingfish Maine team at admin@kingfish-maine.com

MVNO000008381

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Agnes Patterson
18 Frost Lane
Orono, ME 04473

9590 9402 5445 9189 4276 55

2. Article Number *(Transfer from service label)*

7019 1640 0001 1794 9038

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X [signature] ☒ Agent ☐ Addressee

B. Received by *(Printed Name)* RVC

C. Date of Delivery 7-8-20

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

PLACE STICKER AT TOP OF ENVELOPE TO THE RIGHT OF THE RETURN ADDRESS, FOLD AT DOTTED LINE

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Worcester Peat Company, Inc.
241 Lane Rd.
Dublois, ME 04622

9590 9402 5445 9189 4276 48

2. Article Number *(Transfer from service label)*

19 1640 0001 1794 9045

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X [signature] ☒ Agent ☐ Addressee

B. Received by *(Printed Name)* [illegible] C. Date of Delivery 07-13-20

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

New England Diversified
9227 Mason Bay Rd.
Jonesport, ME 04649

9590 9402 5445 9189 4276 24

2. Article Number *(Transfer from service label)*

7019 1640 0001 1794 9021

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

United States Coast Guard
Housing
475 Kilvert Street
Suite 100
Warwick, RI 02886

9590 9402 5445 9189 4276 62

2. Article Number *(Transfer from service label)*

7019 1640 0001 1794 8864

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 — Domestic Return Receipt

---

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Maine Coast Heritage Trust
1 Main St
Bowdoin Mill, Suite 201
Topsham, ME 04086

9590 9402 5445 9189 4276 79

2. Article Number *(Transfer from service label)*

7019 1640 0001 1794 8871

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X JG 86003 CIG ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* J GLIDDEN | C. Date of Delivery 7-8

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 — Domestic Return Receipt

---

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Kent Ingvesi Paula Stahl
46 Bellevue Street
Willimantic, CT 06226

9590 9402 5445 9189 4276 86

2. Article Number *(Transfer from service label)*

7019 1640 0001 1794 8895

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X [signature] ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* MARTHA INGVESI | C. Date of Delivery 7/23/20

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 — Domestic Return Receipt

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Town of Jonesport
c/o Irene Rogers
70 Snare Creek Lane
Jonesport, ME 04649

9590 9402 5445 9189 4276 93

2. Article Number *(Transfer from service label)*

7019 1640 0001 1794 8888

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X CBL RR2 019

☐ Agent
☐ Addressee

B. Received by *(Printed Name)*

C. Date of Delivery

7/8/20

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type

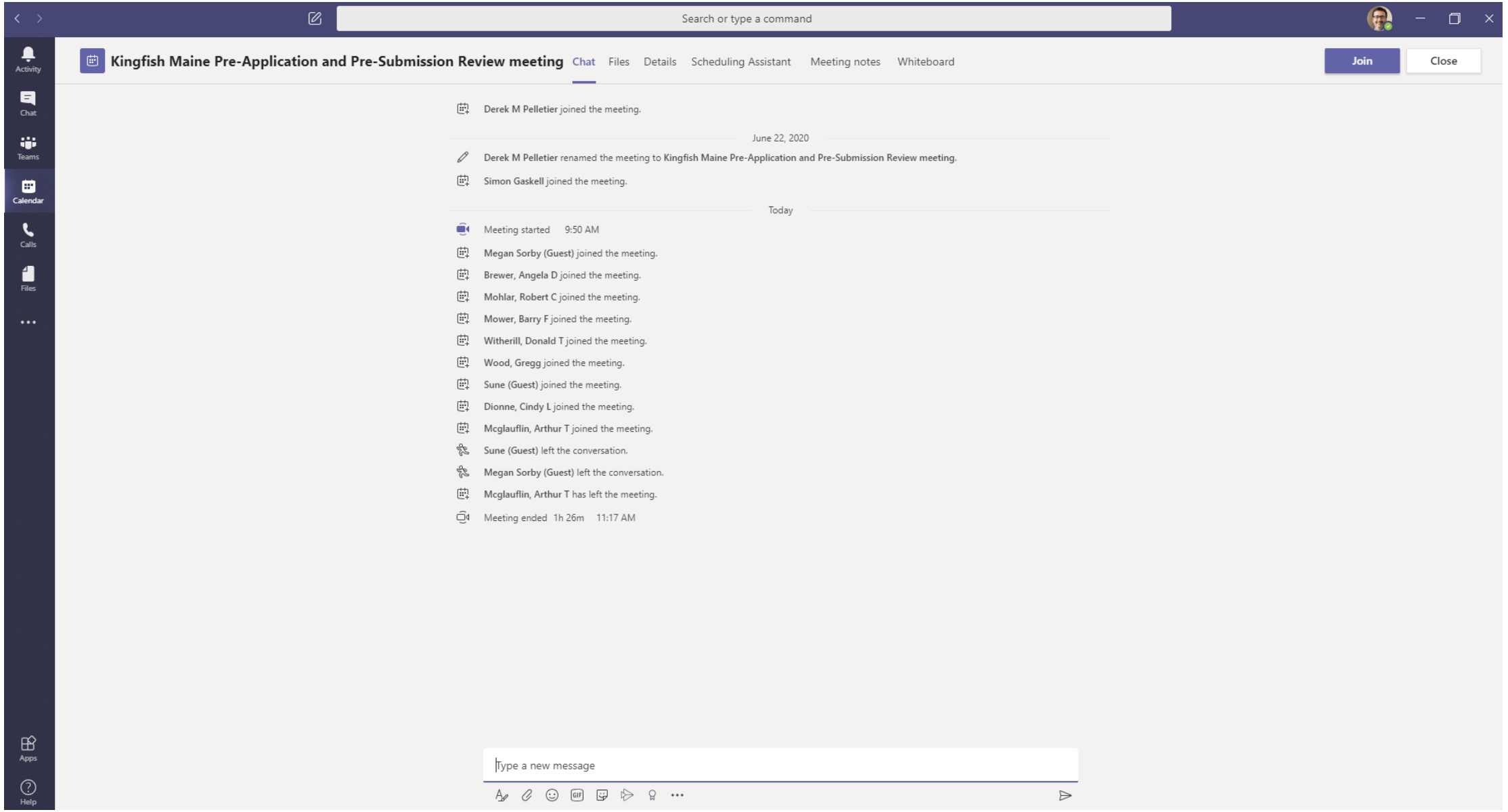
- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

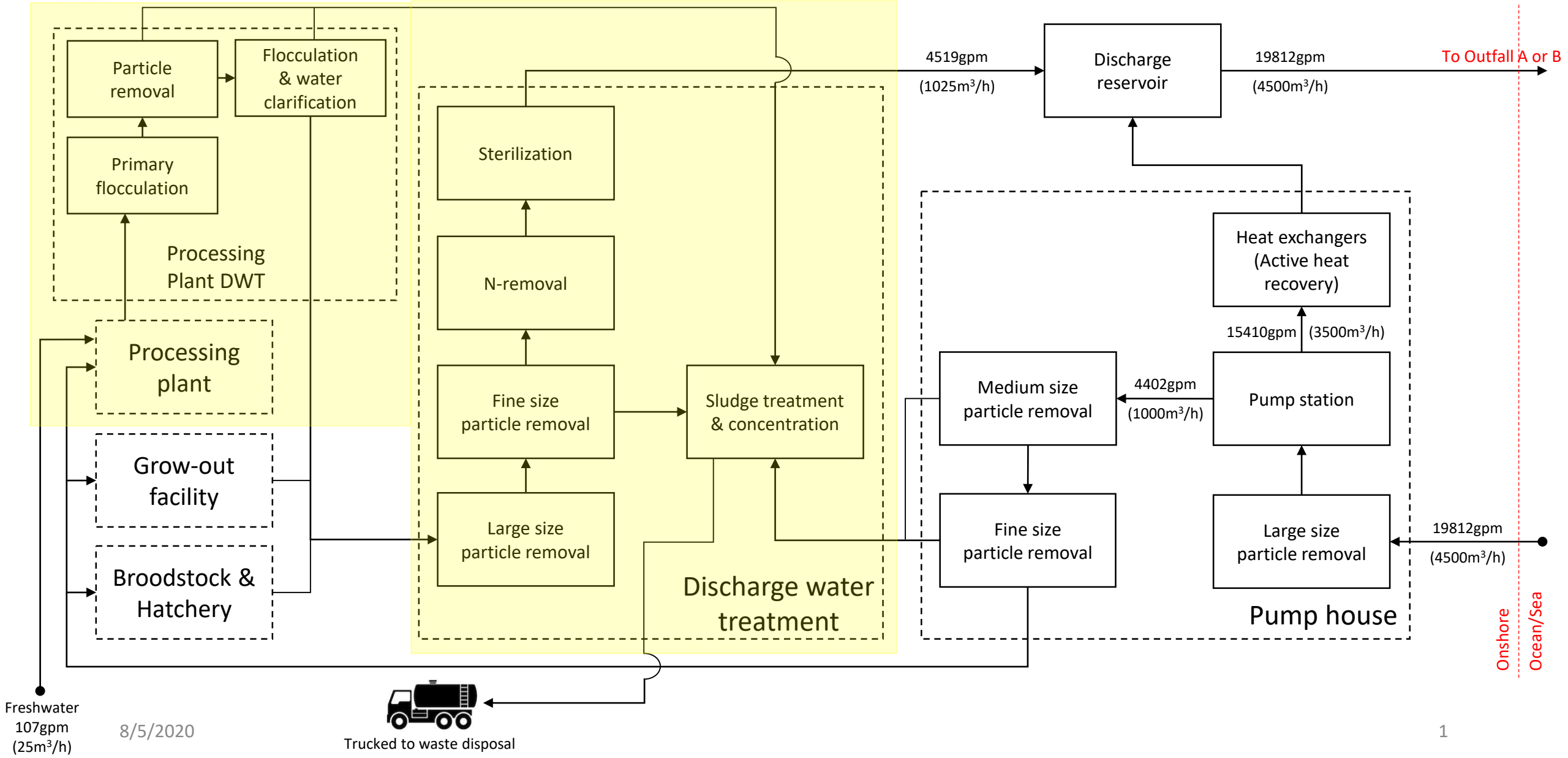
KINGFISH MAINE

Record of Kingfish Maine Pre-Application and Pre-Submission Meeting with DEP, held June 22, 2020.

Prior Pre-Application Meeting was held in person on March 10th, 2020 at 10:30am – Attendees, Cindy Dionne (DEP), Rob Mohlar (DEP), Gregg Wood (DEP), Megan Sorby (Kingfish Maine), Tom Sorby (Kingfish Maine), Derek Pelletier (Ramboll Environmental), and Bill Lane (Gartley & Dorsky)



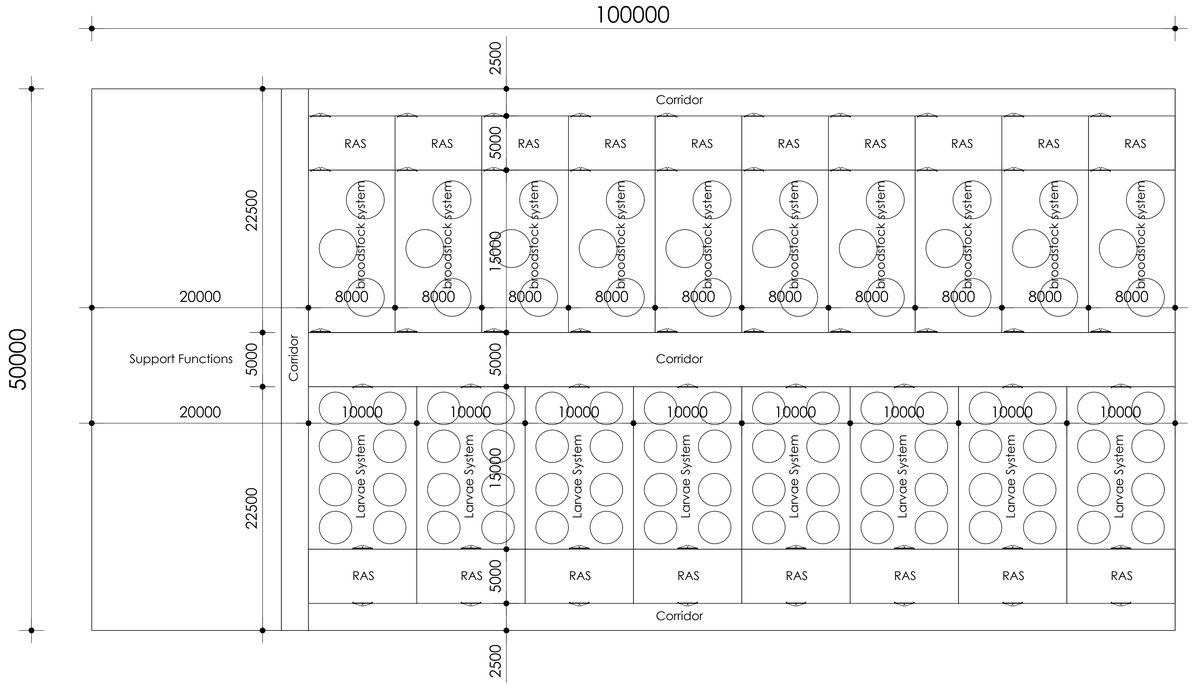
CONCEPTUAL FLOW DIAGRAM OF PROCESSING PLANT DISCHARGE TREATMENT



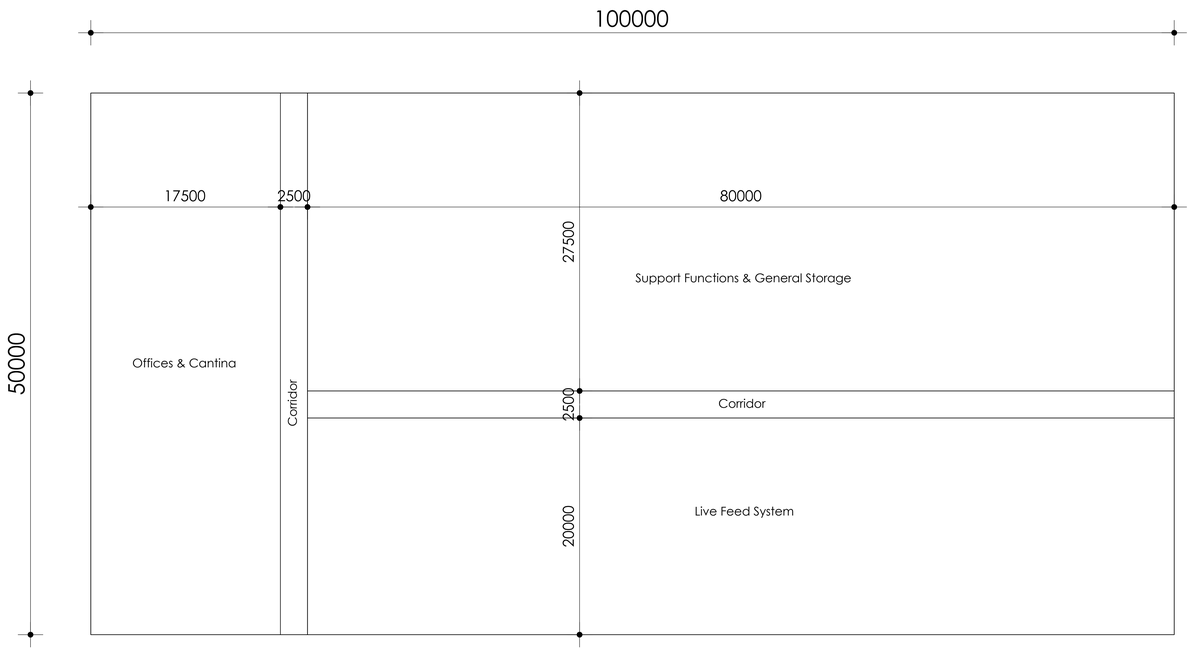
KINGFISH MAINE CHEMICAL LIST

Chemical	Trade Name	Application	Method	Max Dosage	Areas of Potential Use
Hydrochloric Acid		pH Balancing, Cleaning Equipment	Diluted and Applied	n/a	Hatchery/Growout
Sodium Hydroxide		pH Balancing, Cleaning Equipment	Diluted and Applied	n/a	Hatchery/Growout
Demineralized water		Calibrating Equipment	n/a	n/a	Hatchery/Growout/Processing
Sodium Bicarbonate		pH Balancing	Diluted and Applied	n/a	Hatchery/Growout
Sodium Hypochlorite		Cleaning and Disinfecting Equipment	Diluted and Applied	150ppm	Hatchery/Growout/Processing
Sodium Thiosulfate		Neutralizing Sodium hypochlorite	Added to water in proportion to sodium hypochlorite used	300ppm	Hatchery/Growout
Hydrogen Peroxide	Perox-aid, Perosan	Cleaning Equipment; External Fish Treatments	Spray or Bath Immersion	1000ppm	Hatchery/Growout
Formalin	Parasite-S	Extrernal Fish Treatment	Bath Treatment	200ppm	Hatchery/Growout
PVP Iodine	Ovadine	Disinfection of Fish Eggs	Bath Treatment	100ppm	Hatchery
Tricaine Methanesulfonate	MS-222, Tricane-S	Anesthesia	Bath Treatment	750ppm	Hatchery/Growout
Antimicrobial Hand Soap		General Cleaning	n/a	n/a	Hatchery/Growout/Processing
Citric Acid		General Cleaning	Diluted and Applied	n/a	Hatchery/Growout/Processing
Pentapotassium bis (peroxymonosulphate) bis(sulphate) & Sodium Dodecylbenzene Sulfonate	Virkon Aquatic	Cleaning & Disinfecting Equipment	Diluted and Applied	10g/l	Hatchery/Growout/Processing
Phosphoric Acid		Cleaning Processing Equipment	Diluted and Applied	As per label instructions	Processing
Chlorinated Alkaline		Cleaning Processing Equipment	Diluted and Applied	As per label instructions	Processing
Didecyldimethylammonum Chloride		Cleaning & Disinfecting Processing Equipment	Diluted and Applied	As per label instructions	Processing
Ferric Chloride					Hatchery/Growout
Ammonium Chloride		Biofilter Startup	Diluted and Applied	n/a	Hatchery/Growout
Sodium Nitrite		Biofilter Startup	Diluted and Applied	n/a	Hatchery/Growout
Methanol		Carbon source for Denitrification	Diluted and Applied	n/a	
Ethanol		Carbon source for Denitrification	Diluted and Applied	n/a	
MicroC		Carbon source for Denitrification	Diluted and Applied	n/a	

MEPDES ATTACHMENT 10 – Fish Rearing Facility Rearing Tank Number, Size, Arrangement



First floor

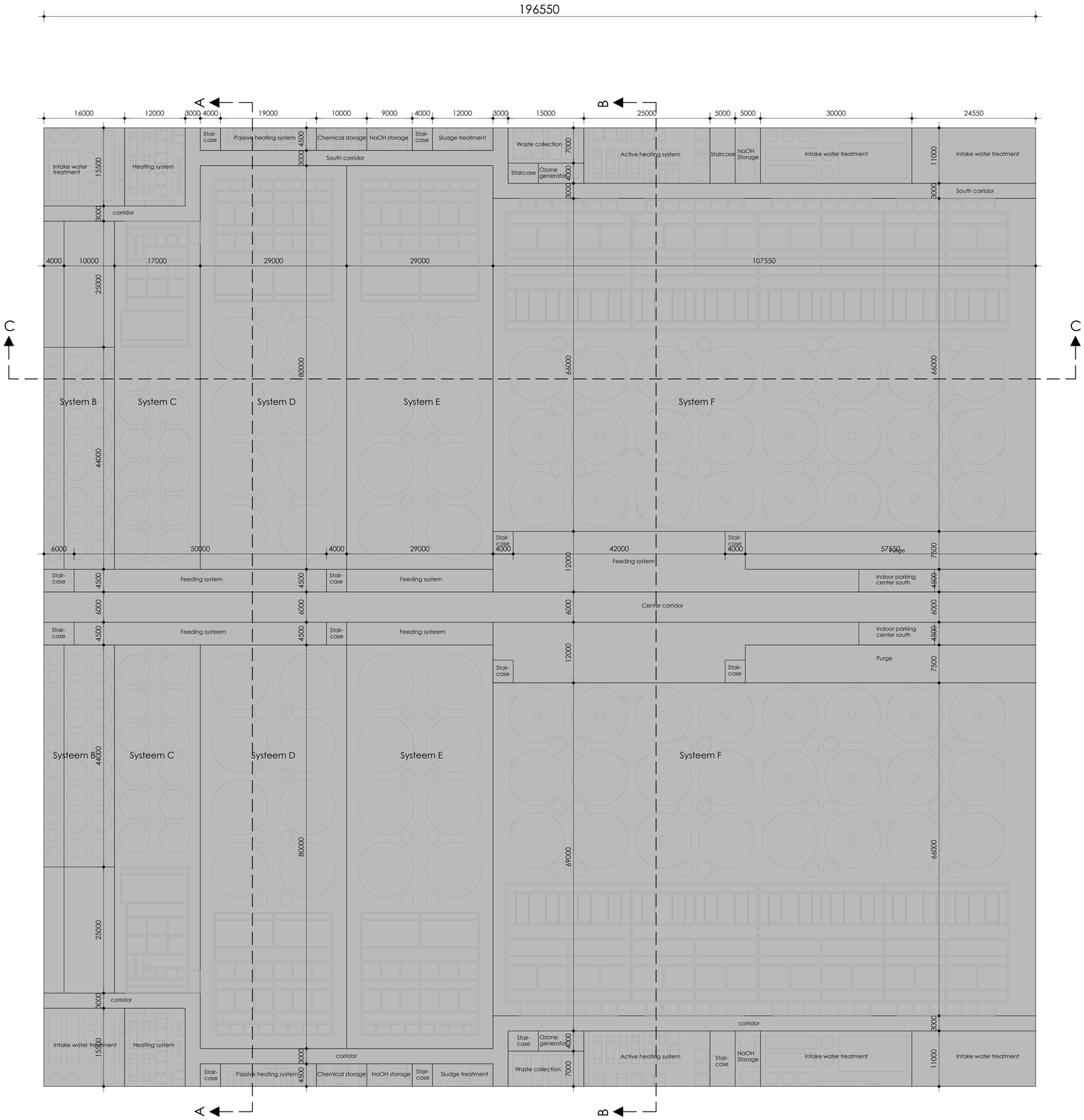


Second floor

Bouwkundig Buro Laban B.V.
buro voor
architektuur en konstrukties

Bouwkundig Buro Laban B.V.
Klaproos 2 - 4421 MB Kapelle
Tel: (0113)343883
buro@labanbv.nl
www.labanbv.nl

Opdrachtgever:	Kingfish Zeeland BV, Oost-Zeedijk 13, 4326PM te Kats
Onderwerp:	Nieuwbouw Kingfish Maine
Onderdeel:	CONCEPT DRAWING Hatchery & Broodstock facility
Datum:	040620
Schaal:	1:200
Get:	A0
Werk no.:	19-34
Blad no.:	00



1ST FLOOR

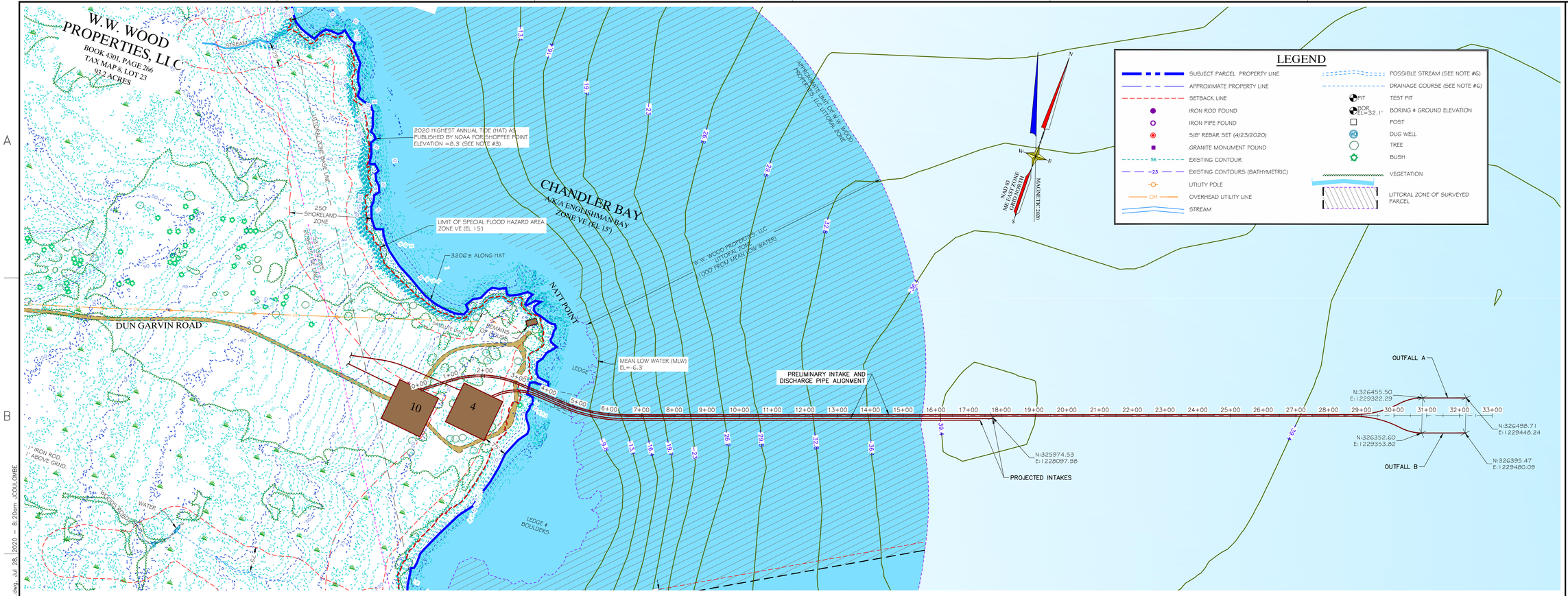
Kingfish Maine

Bouwkundig Buro Laban B.V.
buro voor
architektuur en konstrukties

Bouwkundig Buro Laban B.V.
Klaproos 2 - 4421 MB Kapelle
Tel: (0113)343883
buro@labanbv.nl
www.labanbv.nl

Opdrachtgever:	Kingfish Zeeland BV, Oost-Zeedijk 13, 4326PM te Kats
Onderwerp:	Nieuwbouw Kingfish Maine
Onderdeel:	CONCEPT DRAWING 1st FLOOR
Datum:	061119 a 131119 b 040620 c
Schaal:	1:300 d e f
Get:	AO g h i
Werk no.:	19-34
Blad no.:	01

MEPDES Application – Attachment 11 – Intake and Outfall Pipe, Screening, and Diffuser Figures



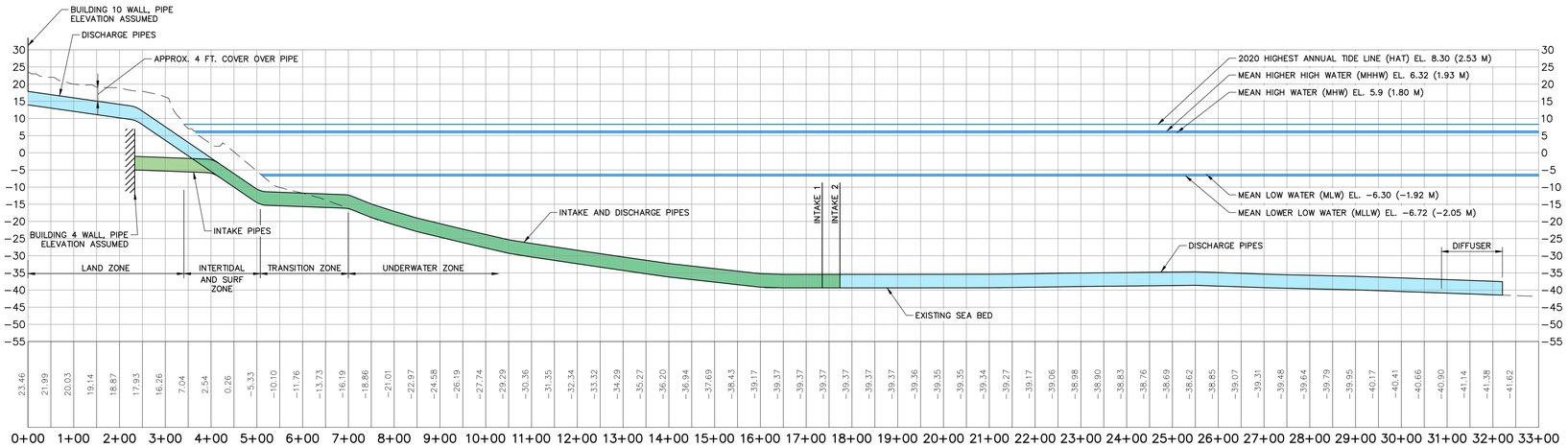
PLAN REFERENCES:

1) "TOPOGRAPHIC SURVEY, KINGFISH MAINE" BY GARTLEY & DORSKY ENGINEERING & SURVEYING DATED FEBRUARY 11, 2020 AND AS REVISED.

NOTES FROM PLAN REF. 1:

1) ALL DIRECTIONS ARE REFERENCED TO THE MAINE COORDINATE SYSTEM OF 1983 (2011), EAST ZONE, BASED ON AN RTK GPS SURVEY. ALL DISTANCES ARE GRID DISTANCES. THE COMBINED FACTOR IS 0.99996999.

2) ELEVATIONS ARE REFERENCED TO NAVD 1988 BASED ON STATIC GPS OBSERVATIONS PERFORMED ON DECEMBER 17, 2019 AND PROCESSED THROUGH THE NATIONAL GEODETIC SURVEYS ONLINE POSITIONING USER SERVICE (OPUS). TIDAL DATUMS WERE CALCULATED USING NOAA'S VERTICAL DATUM TRANSFORMATION SOFTWARE (VDATUM).



PROFILE STA. 0+00 TO STA. 33+00

HORIZONTAL SCALE: 1" = 150'
VERTICAL SCALE: 1" = 20'

BAR SCALE
1" = 20' VERTICAL
CHECK GRAPHIC SCALE BEFORE USING

BAR SCALE
1" = 150' HORIZONTAL
CHECK GRAPHIC SCALE BEFORE USING

NOT FOR CONSTRUCTION

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
DESIGNED BY: PJP	CHECKED BY: JW	
DRAWN BY: JBC	0232754.00-C-201.dwg	

PLAN AND PROFILE

KINGFISH MAINE

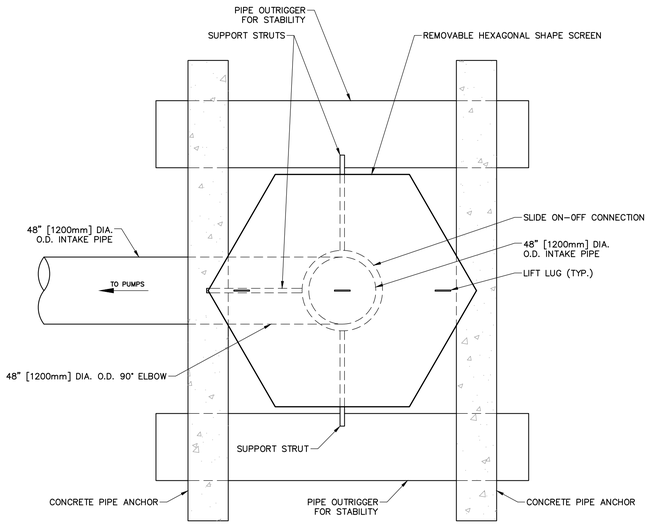
KINGFISH MAINE RAS FACILITY
JONESPORT, MAINE

JOB NO.:0232754.00
DATE: JULY 2020
SCALE: AS NOTED
SHEET: 1 OF 3

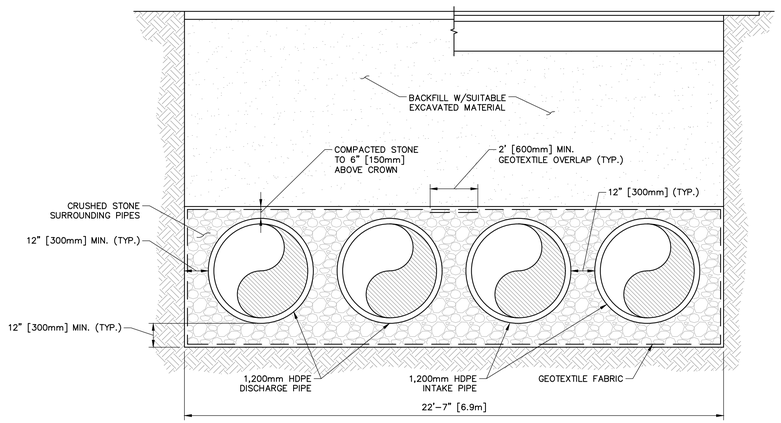
C-201

24x36 SHEET
1:1

C:\Users\jcoulombe\onedrive - woodard & curran_pcfolders\documents_000 projects\0232754.00 clanbro - kingfish zealand\Drawings\Civil\0232754.00-C-201.dwg, Jul 28, 2020 - 8:20am jCOULOMBE

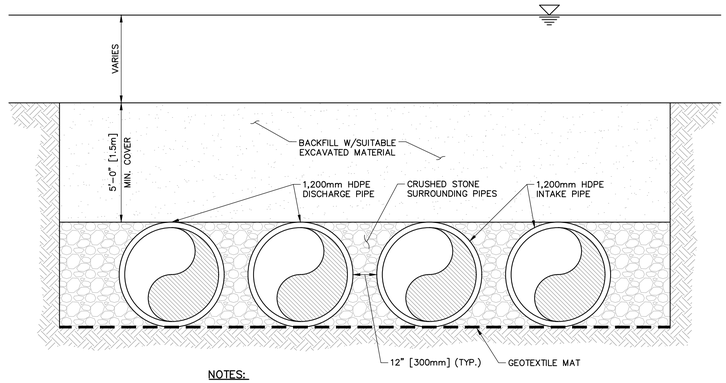


PLAN



LAND – BURIED PIPE TRENCH

SCALE: NOT TO SCALE

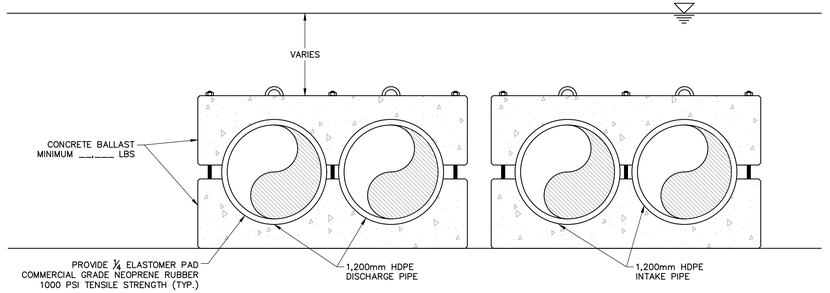


NOTES:

- PROVIDE MINIMUM OF 200 LBS PER LINEAR FOOT OF PIPE STONE WEIGHT IN MARINE MATTRESS (4 PIPES – 800 LBS/LF)
- PENDING PIPELINE INSTALLATION METHODS CONCRETE COLLARS AT 200 LBS PER LINEAR FOOT PER PIPE MAY BE REQUIRED IN TRENCHED AREAS. TYPICAL SPACING 10 FEET TO 20 FEET.

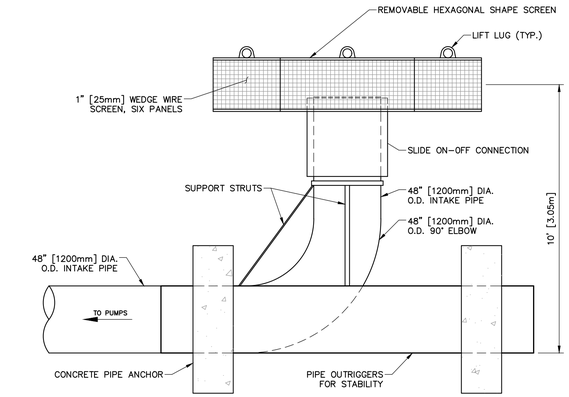
INTERTIDAL AND SURF ZONES

SCALE: NOT TO SCALE



UNDERWATER ZONE PIPE ANCHOR

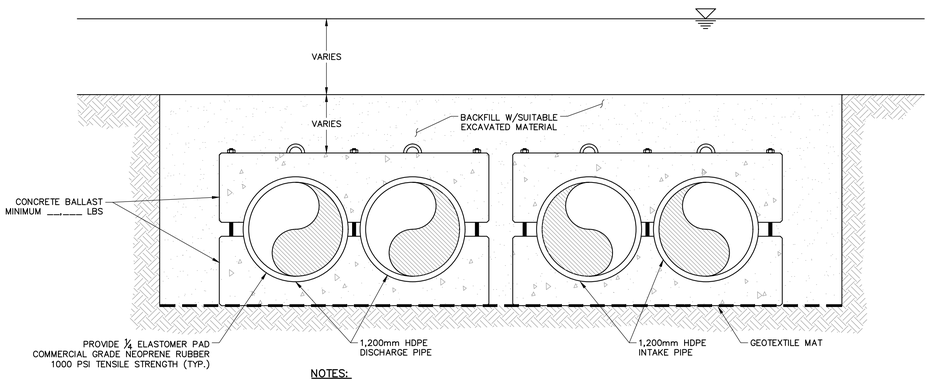
SCALE: NOT TO SCALE



SECTION

INTAKE STRUCTURE DETAIL

SCALE: NOT TO SCALE

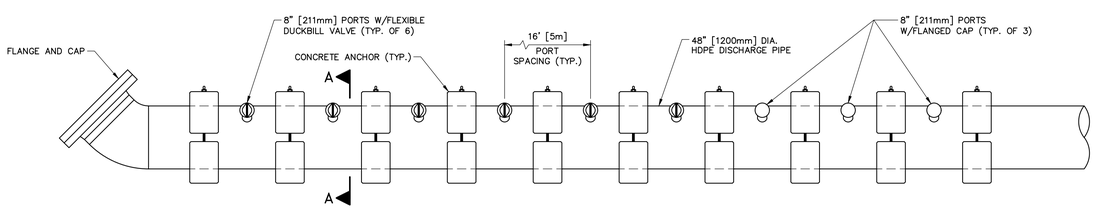


NOTES:

- PROVIDE MINIMUM OF 200 LBS PER LINEAR FOOT OF PIPE CONCRETE WEIGHT.
- 2 PIPES = ___,___ LBS SPACED __' ON CENTER

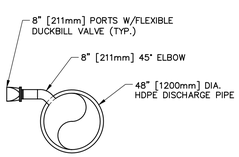
TRANSITION ZONE INTERTIDAL TO UNDERWATER

SCALE: NOT TO SCALE



DISCHARGE DIFFUSER DETAIL

SCALE: NOT TO SCALE



SECTION A–A

NOT FOR CONSTRUCTION

41 Hutchins Drive
Portland, Maine 04102
800.426.4262 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE

DESIGNED BY: PJP / JW
DRAWN BY: JBC
CHECKED BY: JW
0232754.00-C-300 - C-305.dwg

INTAKE AND DISCHARGE PIPE DETAILS

KINGFISH MAINE

KINGFISH MAINE RAS FACILITY
JONESPORT, MAINE

JOB NO.:0232754.00
DATE: JULY 2020
SCALE: AS NOTED
SHEET: 2 OF 3

C-300