

INTERMUNICIPAL AGREEMENT

For

Wastewater Collection and Treatment by and between

(CHATHAM/HARWICH)

This Intermunicipal Agreement ("Agreement") is entered into as of _____ (the "Effective Date") by and between the Town of CHATHAM, Massachusetts ("Chatham"), a municipal corporation, and the Town of HARWICH, Massachusetts ("Harwich"), a municipal corporation (collectively, with their successors and assigns, the "Parties").

RECITALS

WHEREAS, Chatham owns and operates a sewage collection, treatment and disposal system, including customer service operations for which the Commonwealth of Massachusetts Department of Environmental Protection ("DEP") has issued a Ground Water Discharge Permit (Permit No.: 44-1), located within the municipal corporate boundaries of Chatham; and

WHEREAS, Harwich plans to construct and operate a sanitary wastewater system within the boundaries of Harwich to service the East Harwich area but desires to deliver its wastewater from the East Harwich area to the Chatham System for treatment and recharge; and

WHEREAS, Chatham and Harwich deem it to be in the public interest to enter into an intermunicipal agreement whereby Chatham would receive and treat Harwich's wastewater and septage at the Chatham Water Pollution Control Facility (the "WPCF") in consideration of Harwich's contribution toward the capital and operational expenses generated by said connection and the other terms and conditions set forth herein, and

WHEREAS, in order to accommodate the additional flow of wastewater from East Harwich as set forth on Figure 13-1 attached hereto as Exhibit A, Chatham must allow construction of a connection with Harwich (the "Connection Point"). Costs associated with the Connection Point shall be borne by Harwich in accordance with Section 9.a herein. Costs associated with the collection system from the Connection Point to the WPCF shall be apportioned in accordance with the Harwich Project Share. The Chatham WPCF can accommodate the flow from East Harwich as set forth in Exhibit A while it continues to expand the Chatham collection system to other parts of Chatham not currently connected to the Chatham collection system. Chatham will continue to evaluate the need to design and build upgrades to the WPCF taking into account Chatham's needs, the Harwich flow, and water conservation efforts in both communities; and

WHEREAS, municipalities are authorized in accordance with G.L. c. 40 §§ 4 and 4A to enter into intermunicipal agreements for the purpose of aiding the prevention or abatement of water pollution; and

WHEREAS, Chatham and Harwich have been authorized to enter into this Agreement as evidenced by the execution of this Agreement by their respective Boards of Selectmen.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged and for the mutual covenants, promises, obligations and agreements contained herein, the Parties hereto, intending to be legally bound, agree as follows:

AGREEMENT

1. DEFINITIONS.

The below terms, as used in this Agreement, shall have the following meanings:

- a. "Connection Point" means an underground sewage pipe at which the Chatham collection system is connected to the Harwich collection system and which Connection Point is in approximately the location indicated on the diagram attached hereto as Exhibit B.
- b. "Harwich Flow" means the sum of metered flow, which is metered at the Connection Point, and Unmetered Flow.
- c. "Harwich Project Share" means Harwich's proportionate share of Project Costs which shall be calculated on the ratio between the 300,000 gpd and the total treatment capacity of the WPCF at the time of the Project (1.3 mgd). With respect to PS6 and associated piping, the Harwich Project Share shall be a proportional share as mutually agreed to by the Parties prior to design and construction.
- d. "East Harwich Flow" means the amount of wastewater flowing into Chatham from East Harwich Service Area via the Connection Point.
- e. "East Harwich Service Area" means the areas in East Harwich, specifically sub-watersheds to Upper Muddy Creek, Lower Muddy Creek, Pleasant Bay, Round Cove, and potentially the Great Sand Lakes Area provided the combined flow does not exceed 300,000 gpd daily annual average, as described in the Harwich Comprehensive Wastewater Management Plan dated March 2016. (Figure 13-1, Exhibit A).
- f. "Operation and Maintenance Expenses" (O&M Expense) includes the total annual expenses actually incurred by Chatham in the operation and maintenance of the System pursuant to a budget covering the categories of annual operating and maintenance expense listed on Exhibit C attached hereto, which budget shall be adopted prior to the commencement of each

Fiscal Year; provided, however, that O&M Expense (a) shall not exceed in the aggregate the total amount of the budget for such fiscal year, (b) shall not include any principal, interest or other charges in connection with any indebtedness incurred by Chatham, and (c) shall not include any Chatham expenses not directly attributable to and included in such annual budget of the System except for supplemental and/or emergency appropriations.

- g. "O&M Share" means that portion of Harwich's Fixed and Flow Variable O&M Expenses determined quarterly as defined in Section 4.
 - h. "Project" means any future upgrades or capital improvements to the System required by regulatory or other legal authority, including without limitation by MassDEP, any future capital improvements to the System deemed necessary by Chatham to preserve the System's useful life, add/improve treatment quality or parameters treated, or maintain capacity to the System and any cost-saving capital modifications to the System. The term "Project" shall also include pumping station(s), gravity sewer, forcemain and any other wastewater infrastructure used to convey Harwich wastewater to the Chatham WPCF.
 - i. "Project Cost" means the total cost to be incurred in the execution of the Project, including, but not limited to, assessment/feasibility, architectural, permitting, and engineering services, and construction work and construction phase services, interest or other costs of borrowing.
 - j. "System" means the WPCF, including the effluent recharge beds, the Connection Point(s), pumping station(s), and the gravity sewer and forcemain to convey the collected wastewater from Harwich to the Chatham WPCF.
 - k. "Total Flow" means the sum of measured flow received at the WPCF including, but not limited to, wastewater from Chatham, East Harwich Service Area, septage, and grease. Flow shall be calculated on a 12 month rolling average. Exhibit D depicts the average daily Total Flow into the WPCF for the period July, 2015 through June, 2016.
 - l. "Unmetered Flow" means flow from Harwich which is not measured by Harwich metering devices at the Connection Point as a result of Harwich residential sewer users being connected directly to the Chatham collection system and billed directly by Harwich. Unmetered flow shall be calculated based upon water usage of those users as set forth in the regulations and shall be paid by Harwich directly to Chatham on a quarterly basis.
 - m. "WPCF" means the Chatham Water Pollution Control Facility and all components thereof, including improvements constructed and as may be amended from time to time.
2. EAST HARWICH SERVICE AREA.

2.1 Chatham agrees to receive and treat wastewater from Harwich users in the East Harwich Service Area at an annual average daily volume of up to 300,000 gpd at the Connection Point, and at such other mutually agreeable connection locations as may be designated by Chatham and Harwich. Notwithstanding the foregoing, Harwich may expand the East Harwich Service Area to serve the Great Sand Lakes Area, subject to the approval of Chatham, which approval shall not be unreasonably withheld, provided that Harwich shall not extend its sewer system beyond the East Harwich Service Area if the result of such an extension would cause Harwich to deliver wastewater to Chatham for treatment in excess of 300,000 gpd, unless this Agreement is amended.

2.2 Flow Management Plan. When the Harwich total annual flow metered at the Connection Point exceeds 80 percent of the purchased capacity for a three month period, then Harwich shall present, within 90 days, a plan to Chatham explaining how Harwich intends to manage the remaining 20 percent of the purchased capacity so that total flow exceedances do not occur on a 12-month rolling average. The plan shall 1.) define measures to be taken by Harwich to limit flow connection areas in the future; 2.) define measures to be taken by Harwich to reduce existing flows entering the system; 3.) discuss potential expansion options at the Chatham WPCF; or 4.), define other appropriate action as may be required to enforce the flow capacity allocation. Such Flow Management Plan measures shall be subject to Chatham's approval, which shall not be unreasonably withheld, and, upon written notification to Harwich of such approval, Harwich shall be bound to undertake such measures. Any failure of Harwich to satisfactorily complete such Flow Management Plan measures shall be deemed a material breach of this Agreement. Likewise, Chatham's failure or refusal to approve a Flow Management Plan without reasonable basis shall be deemed a material breach of this agreement.

3. CAPACITY PURCHASE FEE

Harwich will purchase 300,000 gpd average annual daily flow capacity of the Chatham WPCF, for the amount of \$6,765,000. Harwich shall make an initial payment of \$2,265,000 upon execution of this Agreement; a second payment of \$1,500,000 shall be made upon the commencement of flow from the East Harwich Service Area to the WPCF; a third payment of \$1,500,000 shall be made upon an average daily flow of over 50,000 gpd or five (5) years from the date of signing of this Agreement, whichever occurs first; and, a fourth payment of \$1,500,000 shall be made upon an average daily flow of over 150,000 gpd or seven (7) years from the date of signing this Agreement, whichever occurs first.

4. O&M EXPENSES

Terms for paying these costs will be defined into two categories: Fixed and Flow Variable.

A. WPCF

- 1) Given that Chatham will be reserving capacity for Harwich which will require ongoing O&M expenses to maintain the WPCF, Harwich shall pay Fixed O&M expenses (including but not limited to Contract Services, Plant Maintenance, 20% of Chatham DPW Director salary, SCADA contracts, etc.) based on the actual percentage (%) of wastewater flow capacity for East Harwich Service Area to Chatham WPCF Phase I design flow capacity (300,000 gpd/1,300,000 gpd = 23.08%). Fixed O&M payments shall begin at the time of Harwich connection.
- 2) Flow Variable O&M expenses for the WPCF (including but not limited to chemicals, electricity, natural gas, diesel, sludge removal/disposal, testing, etc.) shall be paid based on the actual percentage (%) of wastewater flow from the East Harwich Service Area as measured at the Connection Point(s) to Total Flow. Flow Variable O&M payments shall begin once flow is measured at the Connection Point.

B. Collection System

- 1) Harwich shall pay Fixed O&M costs in a ratio of Harwich design flow to Chatham design flow for that portion of the conveyance system from the Connection Point(s), through pumping station(s), to the WPCF and any off-site effluent recharge location within Chatham, if applicable. Fixed O&M payments shall begin at the time of Harwich connection.
- 2) Flow Variable O&M expenses for the collection system (including but not limited to chemicals, electricity, natural gas, diesel, testing, etc.) shall be paid based on the actual percentage (%) of wastewater flow from the East Harwich Service Area as measured at the Connection Point(s) to total flow measured at Pump Station 6 or other such pump station designation. Flow Variable O&M payments shall begin once flow is measured at the Connection Point.
- 3) For the avoidance of any doubt, Harwich shall not be responsible for the payment of any O&M expenses incurred by Chatham that relate solely and exclusively to the operation and maintenance of any portion of the Chatham sewer collection system or other components thereof that are not used by Harwich.

C. Within thirty (30) days after the end of each calendar quarter, Chatham will send a statement to Harwich showing, for the period since the beginning of the Fiscal Year to the end of such quarter, Total Flow, flow for that quarter as measured at the Connection Point and the total flow measured at Pump Station 6 or other such pump station designation.

5. EFFLUENT RECHARGE

Chatham shall recharge effluent originating from the East Harwich Service Area at the Chatham WPCF site during the initial years of the Agreement. While the existing recharge system was sized for the capacity of the Chatham WPCF, the Groundwater Discharge Permit (GDP) is limited to five (5) years. The discharge allowed by the current GDP is 1.0 MGD, below the WPCF's capacity of 1.3 MGD. The duration of the initial recharge of Harwich effluent at the Chatham WPCF would be at least until the Chatham facility reaches 80% of its permitted flow capacity. Upon being notified by MassDEP that Chatham must redirect effluent recharge, Chatham shall notify Harwich, in which case Harwich shall construct, maintain and repair the necessary infrastructure to redirect the Harwich flow to a suitable site in Harwich, in an amount necessary to meet the requirements of the MassDEP. In the event that Chatham notifies Harwich of the need to construct infrastructure required to redirect treated effluent back to Harwich for recharge, Harwich shall, at its sole cost and expense, complete the infrastructure construction within three years of said notice from Chatham. Thereafter, the Harwich share of O&M costs shall not include any costs incurred by Chatham for effluent recharge for the portion of effluent directed back to Harwich for recharge. Chatham shall provide any easements necessary at the Chatham WPCF to locate a treated effluent pumping station and appurtenances, including forcemain easements necessary on town-owned properties or within existing rights-of-way from the Chatham WPCF to Harwich. Chatham shall have the right to review and comment on the location of any proposed easements to ensure coordination with other Chatham infrastructure. Chatham shall not unreasonably deny, delay or condition the granting of such easements.

6. SEPTAGE

Chatham shall accept septage pumped from properties located in the East Harwich Service Area upon abandonment of the septic system as part of the connection to sewer process, subject to appropriate documentation, and at the prevailing rate of the Chatham WPCF.

7. FLOW BUY BACK PROVISION

Harwich shall notify Chatham upon completion of the sewerage of the East Harwich Service Area in accordance with the Harwich Comprehensive Wastewater Management program. In the event Harwich does not use the entirety of the 300,000 gpd allocated to it at any time during the term of this Agreement, Chatham may buy back any unused flow at a price reflecting the ratio of the amount of gallons to be bought back to the total number of gallons purchased by Harwich at the commencement of this Agreement multiplied by \$6,765,000 which amount shall be adjusted for inflation in accordance with the Consumer Price Index – Northeast Region or any other mutually accepted cost method. Harwich shall not transfer any portion of the 300,000 gpd allocation to any other entity. Harwich shall not divert any portion of the 300,000 gpd allocation to any area outside the East Harwich Service Area.

8. TERM.

This Agreement shall commence on Execution of the Agreement and shall continue, unless sooner terminated, for a Term of twenty five (25) years. This Agreement shall continue in full force and effect on the Expiration Date unless it is modified in writing by the Parties or notice is provided by one of the Parties to the other Party of the intent not to renew this Agreement. Such notice shall be provided no later than five (5) years prior to the Expiration Date. If this Agreement is not renewed, Harwich shall pay to Chatham any unpaid amounts owing hereunder. If this Agreement is extended beyond the original 25 year Term Harwich shall not be responsible for any additional Capacity Purchase Fee.

9. CONNECTION POINT.

- a. Harwich may construct and connect the East Harwich Service Area portion of its wastewater system as set forth on Exhibit A in coordination with Chatham's infrastructure implementation schedule. Chatham will furnish to Harwich wastewater conveyance and treatment services. The connection of Harwich with the System shall take place by means of the Connection Point at or near the Chatham town line. The cost for initial design, construction, and any future expansion or additions to the Connection Point necessary to accommodate any increases in wastewater flow of the East Harwich Service Area shall be borne by Harwich at no cost to Chatham and shall be subject to approval by Chatham.
- b. Harwich hereby grants Chatham and its agents and independent contractors the authority, right and license at all times to have access to such portion of the Connection Point located within Harwich for the purpose of improving, repairing, using and inspecting the same and will issue, promptly upon request therefor, such permits and licenses as shall be necessary to accomplish any of such purposes.
- c. Harwich will pay its proportional share of System Project Costs to convey the collected wastewater from the Connection Point to the Chatham WPCF. The proportional share shall be based on the ratio of Harwich's design flow and Chatham's design flow for that segment of the collection system.

10. REGULATIONS.

- a. Sewer Use Regulations. Harwich shall adopt local Sewer Use Regulations ("Harwich Regulations") for residential and commercial users of the Harwich System located in East Harwich, which is no less stringent and is as broad in scope as the sewer use regulations set forth in the Chatham Regulations, as amended. The Harwich Regulations shall include pollutant specific local limits which address at least the same pollutant parameters and are at least as stringent as the local limits enacted by Chatham. Harwich shall forward to Chatham for review a proposed draft of the Harwich Regulations within six (6) months, or such longer period of time as may be reasonably agreed upon by the parties, of the date of this Agreement, and shall adopt the Harwich Regulations within

sixty (60) days of receiving approval from Chatham of the content thereof or by any other time as reasonably agreed to by the parties..

- b. Revisions by Chatham. Whenever Chatham proposes to adopt revisions to its sewer use Regulations it shall forward to Harwich for review the proposed revisions. Whenever Chatham adopts a revision to its sewer use Regulations, it shall forward a copy of the revisions to Harwich within ten (10) business days of enactment thereof. Harwich shall adopt revisions to the Harwich Regulations that are consistent with and at least as stringent as those adopted by Chatham. Harwich shall forward to Chatham for review its proposed revisions within thirty (30) days of receipt of Chatham's revisions. Harwich shall adopt its revisions within sixty (60) days of receiving approval from Chatham of the content thereof or by any time as reasonably agreed to by the parties.
- c. Revisions by Harwich. Harwich shall forward a copy of any proposed revisions to the Harwich Regulations to Chatham for review and comment no later than forty-five (45) days prior to proposed adoption. Chatham shall provide comment to Harwich within fifteen (15) days of receipt. Harwich shall not enact any such revisions inconsistent with this Agreement.
- d. Review. The Parties shall periodically review their respective sewer use Bylaw(s) and/or Regulations and jointly draft and adopt amendments (which are equivalent in scope and stringency) when deemed necessary for the effective administration and operation of Chatham's or Harwich's pretreatment program or may be responsive to requirements of MassDEP or address other matters which Chatham or Harwich deem appropriate to maintain the System. This review shall be conducted not less than once every five (5) years. However, either Party may request a joint review whenever such party believes that a review is necessary.
- e. Compliance with Law. Each of the Parties shall comply with all applicable current and subsequent regulations of the U.S. E.P.A. and MassDEP relating to the administration, operation and control of the System during the term of this Agreement, and no party shall be liable for the act or neglect of the other. Chatham shall maintain compliance with the MassDEP permit requirements applicable to the WPCF and all federal, state, and local laws, water quality standards, orders and decrees of governmental authorities with jurisdiction over the treatment and discharge of wastewater. Chatham shall comply with any orders issued by governmental entities relating to the WPCF and shall pay any fines, penalties, or costs resulting from such enforcement actions without recourse to Harwich, except to the extent the violation is caused by flow entering the System from Harwich or other acts or omissions directly attributable to Harwich.

11. IMPLEMENTATION; ENFORCEMENT.

- a. Agency. As holder of Groundwater Discharge Permit #44-1 Chatham is responsible for complying with all conditions in said Permit. In order to ensure that flow entering the Harwich collection system does not place Chatham in a potential Permit violation, Harwich designates Chatham as an agent of Harwich for the purposes of implementation and enforcement of Harwich's sewer use Regulations against all users located in the East Harwich Service Area. Chatham may take any action under Harwich's sewer use Regulations that could have been taken by Harwich, including the enforcement of the Regulations in courts of law. Chatham shall have concurrent authority with Harwich to enforce its sewer use Regulation in Harwich. The foregoing authorization is not an abdication of Harwich's obligations to in good faith enforce this Agreement but in addition thereto. Harwich's Regulations shall indicate said designation of Chatham as a supplemental implementation/ enforcement authority. Notwithstanding the foregoing, Harwich shall have the responsibility of all collections related to users of Unmetered Flow. Harwich shall be required, regardless of the users' collection status, to pay Chatham on a quarterly basis for all Unmetered Flow.
- b. Duties. Chatham, on behalf of and as agent for Harwich, may, at its sole option , perform any and all technical and administrative duties necessary to implement and enforce Harwich's sewer use Regulations or its own sewer use Bylaw. Chatham may, at its sole option: (1) update the industrial waste survey; (2) issue permits to all industrial users required to obtain a permit; (3) conduct inspections, sampling, and analysis; (4) take all appropriate enforcement action; and (5) perform any other technical and administrative duties the Parties mutually deem appropriate.
- c. Permitting. Under no circumstances may Harwich discharge any industrial waste or other waste requiring pretreatment into Chatham's wastewater treatment system until an industrial wastewater pretreatment permit (or modification to an existing permit) is issued by Chatham which allows such industrial waste discharges. Any future industrial user must apply for a permit in conformance with this Agreement and the controlling sewer use Bylaw. Chatham shall not unreasonably deny, delay or condition the granting of such an application.
- d. Right of Access. Harwich grants to Chatham the authority to access all parts of Harwich's sewer system which flow to the Connection Point and, as permitted by applicable law, all parts of the facilities of industrial users located within Harwich that contribute to Chatham's System, including the right to review and copy all records compiled by Harwich and, as permitted by applicable law, industrial users in relation to discharge activities, to periodically verify compliance with all applicable permits, orders, rules, Regulations and Bylaws, including pretreatment standards and requirements. On-site inspections and monitoring may be conducted (i) during business hours without prior notice or (ii) during non-business

hours with notification to the Harwich Police Department or Public Works Department.

- e. Restriction on Foreign Wastewater. Harwich shall not authorize the use of the Connection Point for the transmission of wastewater to the System generated by any source of wastewater that is not located in East Harwich Service Area.
- f. Violations. Industrial users of the system in Harwich, if any, shall be subject to enforcement action by Chatham for any violation of Harwich's or Chatham's sewer use Bylaw or Regulations, or any applicable federal, state or local pretreatment regulation or standard, including, but not limited to, administrative orders, fines and penalties (up to such limits as may be then applicable under state and federal law), injunctive relief, and/or termination of sewer service; provided, however, that Chatham shall be entitled to implement the remedy of termination of sewer services only if any such violation by the industrial user results in a discharge which, in Chatham's sole determination, reasonably appears to present a danger or threat as described in Section (11)(g) of this Agreement.
- g. Emergencies. Notwithstanding anything to the contrary contained herein, Chatham shall have the immediate and effective authority, on its own behalf and as the agent of Harwich, to take emergency action to halt or prevent any discharge to the System which (i) presents or may present an imminent danger to the health or welfare of humans, (ii) reasonably appears to threaten the environment, (iii) threatens to cause to pass through sludge contamination or substantial interference with the appropriate operation of the System, or (iv) may result in a Permit violation.
- h. Costs. All costs and expenses (including, but not limited to, labor, equipment, attorneys' fees, etc.) incurred by Chatham in implementing and enforcing Harwich's sewer use Regulations against users of the System located in East Harwich shall be paid by Harwich upon issuance of a quarterly invoice by Chatham itemizing the same.
- i. Secondary Authority. If the authority of Chatham to act as agent for Harwich under this Agreement is questioned by an industrial or any other user, court of law, or otherwise, Harwich will take whatever action is necessary to ensure the implementation and enforcement of its sewer use Regulations against any of its users, including, but not limited to, implementing and enforcing its sewer use Regulations on its own behalf and/or amending this Agreement to clarify Chatham's authority.
- j. Natural Disasters. In the event of floods or other natural disasters that cause water flows in the System to exceed capacity limits and/or that result in an unsafe condition, and/or that cause, or threaten to cause, harm to the public health, the Parties shall cooperate fully and reasonably to resolve such capacity, safety and public health concerns in accordance

with the broad objectives of this Agreement and applicable laws and regulations.

12. ALLOCATIONS OF MAXIMUM FLOWS; FLOW CHARACTERISTICS.

- a. Maximum Flows. The annual average daily flow from the East Harwich Service Area shall be 300,000 gpd or less calculated on a 12 month rolling average. This represents 23.08% of the initial design average annual flow of the WPCF. Because the flow from Harwich will be pumped to the Chatham WPCF, Harwich is allowed 23.08% of other measured or calculated flows including, but not limited to, maximum 30 day average, peak day, and peak hour.
- b. Flow Characteristics. Harwich will not authorize, and Chatham shall exclude, wastewater flows into the System in excess of the rates of flow specified above for the East Harwich Service Area; provided, however, that before excluding flow from the East Harwich Service Area hereunder, a determination based on actual data over a period of at least twelve (12) months shall have been made that the average flow from the East Harwich Service Area shall have exceeded the limitation applicable thereto and Harwich shall have been given at least ninety (90) days prior written notice thereof. Chatham and Harwich shall take all reasonable steps to preclude the introduction into the System of wastewater having characteristics, including, but not limited to, BOD, TSS, Total Nitrogen, Nitrate Nitrogen, Turbidity, TOC, Oil & Grease, Sodium, not in accordance with the local limits in place from time to time as established by Chatham.

Local Limits shall be defined as follows:

1. BOD, TSS, Total Nitrogen – Harwich shall be allowed a share of the influent load planned for the WPCF that is commensurate with the flow from the East Harwich Service Area. Preliminary Design Memo M-1B defines the Chatham WPCF loads (Exhibit E).
2. Turbidity, Oil & Grease, TOC, and Nitrate Nitrogen – are expected to be similar to Chatham's influent.
3. Harwich shall not discharge into the Harwich or Chatham system waste originating from marine pumpout facilities, or other non-standard sources, without the prior written approval of Chatham.

13. METHODS OF DETERMINING FLOWS.

- a. East Harwich Service Area Flow, other than Unmetered Flow, shall be measured by a standard metering device to be located and installed at the Connection Point in the location indicated on Exhibit B. Unless replaced or changed pursuant to a future agreement between the parties, such standard metering device will consist of the following apparatus: One

Venturi Meter, a direct reading totalizer, indicator, and recorder-transmitter with instantaneous flow signal data transmitted to the Chatham Water Pollution Control Facility SCADA system on a continuous basis. Chatham shall be responsible for maintaining the SCADA system. Said apparatus shall be subject to the approval of Chatham, which shall not be unreasonably withheld.

- b. Chatham will cause the flow of wastewater from East Harwich to be measured and recorded on a continuous basis in the same manner as set forth in Section 13(a) above, so that the Total Flow (other than Unmetered Flow) and flow from East Harwich shall at all times be known.
- c. In the event any metering device fails to register or registers incorrectly the flow of wastewater, Chatham and Harwich will agree on an estimate (if an historic record is not available from earlier similar periods) of the period of time during which the metering device failed to register or registered incorrectly and the quantity of wastewater that would have been measured were the metering device operating correctly, and an appropriate adjustment based thereon shall be made in the wastewater flow to be used as the basis on which to determine Harwich's O&M Share.
- d. For billing purposes, Chatham shall read the metering devices at intervals of approximately thirty (30) days. Harwich, at its expense, shall periodically, but not less than twice each year (spring and fall), inspect, test and calibrate the Venturi metering device referred to in Section 13(a) and within 48 hours after any failure of the meter.
- e. Harwich recognizes that the System has a maximum permitted flow of One (1) MGD and that further there are portions of Chatham that still require connection to the System. Harwich, therefore, shall be entitled to no more than 300,000 gpd of permitted Flow into the System.

14. COLLECTION OF AMOUNTS PAYABLE.

- a. O&M Share. Within thirty (30) days after the end of each calendar quarter, Chatham will send a statement to Harwich showing, for the period since the beginning of the Fiscal Year to the end of such quarter, (a) East Harwich Flow, (b) the Total Flow, (c) O&M Expense incurred, (d) Harwich's O&M Share thereof and (e) the amount, if any, previously paid by Harwich on account thereof. Harwich shall remit payment of the balance due to Chatham within thirty (30) days of receipt of such statement.
- b. Harwich Project Share. Harwich shall pay the Harwich Project Share of the Project Costs. Such payments shall be based upon the payments actually made by Chatham pursuant to all financings and/or borrowings, including, without limitation, interest costs, in connection with the Project, but shall not include any amounts reimbursed to Chatham under

any federal or state grant program. Chatham will send a monthly statement to Harwich showing the amount actually paid to Chatham's lender. Harwich shall remit payment to Chatham within thirty (30) days of receipt of such statement.

- c. Construction Costs Following Early Termination. In the event of any termination of this Agreement prior to the Expiration Date, Harwich shall pay to Chatham the full amount of (i) Harwich's Project Share of the Project Costs for work actually performed and invoiced to Chatham and which remains unpaid as of the date of termination, (ii) Harwich's Project Share of the Project Costs for all then-remaining work to be performed in connection with the Upgrades resulting from Harwich's use of the WPCF and (iii) any other amounts owing hereunder. Such payment shall be made to Chatham within thirty (30) days of the date of notice of termination or, for work not yet performed at the time of the notice of termination, within thirty (30) days of the date of invoicing for work when it is actually performed. In the event that any payment due under this Section 14 is not received by Chatham within forty-five (45) days of Harwich's receipt of Chatham's statement, interest on the amount overdue shall accrue at the rates and in the manner as is charged to Chatham ratepayers who have amounts owed and past due. The provisions of this Section 14 shall survive any termination of this Agreement.
- d. Fees. Harwich shall be responsible for collecting, and Chatham shall be entitled to receive the proceeds from, the issuance and collection of sewer use and pretreatment fees and assessments, if any, as set forth in the controlling sewer use Bylaw or Regulations, as amended, from any and all contributing users located within Harwich. Harwich hereby covenants and agrees that East Harwich-based users of the System shall be subject to and responsible for the payment of such fees, including without limitation any special assessment or similar charge to the extent such fees, assessments or charges are also payable by Chatham-based users of the System, and that Harwich shall bill and collect said amounts and pay to Chatham, at no cost or expense to Chatham, all such amounts on a quarterly basis.

15. MATTERS SUBJECT TO CONFERENCE BETWEEN THE PARTIES.

Chatham and Harwich recognize and agree that they are both users of the System and contribute financially to the O&M Expense of the same, and that such use of the System and financial contribution to Chatham from Harwich shall be considered whenever such facts are pertinent to the observance and performance of this Agreement. Representatives of Harwich may be requested to attend any conference with Chatham where the matters discussed are or may be affected by such use and contribution or may affect such use and contribution. Further, Chatham and Harwich shall create an advisory board for the purpose of exchanging communication regarding the System. Such board shall consist of five (5) members, comprised of three (3) from Chatham and two (2) members from Harwich. The Chatham Town Manager shall serve as one of Chatham's

designated members and shall also act as chair. The board shall meet quarterly to discuss the status of the System and any major issues related thereto. The board shall be advisory in nature, and may make recommendations to Chatham with respect to proposed improvements or other modifications to the administration of the System, but shall not have the legal authority to require or direct that its recommendations be implemented. Each Town shall determine on their own, how to designate their remaining members of the board.

16. DISPUTE RESOLUTION.

Any disputes arising out of this Agreement shall be submitted to non-binding mediation performed by an independent mediator stipulated by Chatham and Harwich. A resolution reached in mediation shall in no way limit Chatham's power to enforce pretreatment standards and requirements directly against industrial users or other users located in Harwich, nor shall it preclude the parties from seeking other remedies against each other including without limitation proceedings in a court of competent jurisdiction. The cost of such mediation, except for the cost of each Party's direct representation, shall be shared equally between the Parties.

17. REMEDIES.

- a. Legal and Equitable Relief. The Parties acknowledge and agree that money damages may not be a sufficient remedy for any breach of this Agreement, that either Chatham or Harwich may be entitled to equitable relief (including, without limitation, injunction, specific performance and termination of this Agreement) as a remedy for any such breach or threatened breach, and that neither Party shall oppose the granting of any such relief to Chatham. Such remedy shall not be deemed to be the exclusive remedy for a breach of this Agreement but shall be in addition to all other remedies available to either Party for all damages, costs and expenses, including reasonable attorneys' fees, incurred by it in this regard.
- b. Waiver. No delay or failure to exercise a right resulting from breach of this Agreement shall impair such right or be construed as a waiver thereof, so that such right may be exercised from time to time and as may be deemed expedient. Any waiver shall be in writing and signed by the party granting such waiver. If any provision contained in this Agreement is breached by either Party and thereafter waived by the other Party, such waiver shall be limited to the particular breach so waived and shall not be deemed to waive any other breach under this Agreement.

18. TERMINATION.

- 18.1 Either party may terminate this Agreement for convenience by providing at least five (5) years advance written notice to the other party, provided that such notice is delivered to the other Party on or after the Tenth Anniversary of this Agreement. All benefits and obligations under this Agreement will cease upon

the termination date set forth in such written notice. Upon the effective date of such termination, Chatham shall discontinue the services of its System, including collection and treatment of wastewater discharge, for any and all residential, industrial and other users located in Harwich. All users located in Harwich shall cease and desist discharging into Chatham's System upon Chatham's election to discontinue services. In the event of any termination of this Agreement prior to the Expiration Date, Harwich shall pay to Chatham the amount described in Section 14 hereof, in addition to any other amounts owing hereunder.

In the event that Chatham terminates this Agreement pursuant to this section, Chatham shall pay to Harwich the unamortized portion of the Capacity Purchase Fee remaining on the effective date of the termination in accordance with the following formula:

$((50 \text{ year WPCF Life}) \text{ minus } (\text{Year from Date of original agreement that Termination takes effect})) \text{ times } (\$135,300))$.

- Where \$135,300 is the Capital Purchase Fee divided 50.
- Payment to Harwich shall be reduced by \$135,300 per year up to the “Initiate Termination” year 44 from the execution date of the original Agreement following renewal of said Agreement.

Example:

- Chatham Initiates Termination in Year 10 (notice not allowed prior to Year 10 per Agreement)
- Termination takes effect in Year 15 (Agreement requires 5 years minimum Notice)
- Therefore, Payment to Harwich = $(50 - 15) * \$135,300 = \$4,735,500$

Table below shows full schedule estimated for 50 year WPCF system life.

Initiate Termination at year (years from original agreement date)	Year Termination takes effect (5 years after “Initiate Termination”)	Years remaining in WPCF Life	Payment to Harwich
10	15	35	\$ 4,735,500
11	16	34	\$ 4,600,200
12	17	33	\$ 4,464,900
13	18	32	\$ 4,329,600

14	19	31	\$ 4,194,300
15	20	30	\$ 4,059,000
16	21	29	\$ 3,923,700
17	22	28	\$ 3,788,400
18	23	27	\$ 3,653,100
19 ⁽¹⁾	24	26	\$ 3,517,800
20	25	25	\$ 3,382,500
21	26	24	\$ 3,247,200
22	27	23	\$ 3,111,900
23	28	22	\$ 2,976,600
24	29	21	\$ 2,841,300
25	30	20	\$ 2,706,000
26	31	19	\$ 2,570,700
27	32	18	\$ 2,435,400
28	33	17	\$ 2,300,100
29	34	16	\$ 2,164,800
30	35	15	\$ 2,029,500
31	36	14	\$ 1,894,200
32	37	13	\$ 1,758,900
33	38	12	\$ 1,623,600
34	39	11	\$ 1,488,300
35	40	10	\$ 1,353,000
36	41	9	\$ 1,217,700
37	42	8	\$ 1,082,400
38	43	7	\$ 947,100

39	44	6	\$ 811,800
40	45	5	\$ 676,500
41	46	4	\$ 541,200
42	47	3	\$ 405,900
43	48	2	\$ 270,600
44	49	1	\$ 135,300
45	50	0	\$ -

Notes:

1. Termination for convenience per the Agreement may not be initiated after year 19 without the renewal or renegotiation of the Agreement between Chatham and Harwich.

18.2.

- A. For any material breach of this Agreement, either party may terminate this Agreement by giving the other party written notice thereof with an effective termination date twelve (12) months after receipt of the notice to terminate and after providing an opportunity to cure such material breach. For purposes of this Agreement, a material Breach is defined as a substantial failure of a party to perform its duties or obligations hereunder which prevents the Agreement from being completed, alters the financial burdens of the Parties, or defeats the purpose of the Agreement.
- B. No failure or delay in any performance hereunder shall be deemed to be a breach of this Agreement when such failure or delay is occasioned by or due to an Act of God, strike, lockout, war, riot, epidemic, explosion, sabotage, breakage, or accident to machinery or line or pipes or binding order of any court or governmental authority, or any other cause whether of the kind herein enumerated or otherwise not attributable to or within the control of the Party against whom the breach is alleged.
- C. It shall be deemed a material breach of this Agreement if sixty (60) days passes after which Chatham has sent to Harwich a written notice of overdue payment of any undisputed amount and Harwich does not pay same within ten (10) days after receipt of said overdue notice. It shall further be deemed a material breach of this Agreement if Harwich fails to timely adopt/revise Sewer Use Regulations as required by Section 10 or fails to timely fund, construct, maintain and repair the necessary effluent recharge infrastructure to redirect the Harwich flow to a suitable site in Harwich as required by Section 5 as triggered by notification from DEP that Chatham must re-direct effluent recharge.

19. NOTICES.

Whenever notice shall be required to be given pursuant to the terms of this Agreement, it shall be in writing and shall be deemed given when mailed by United States registered or certified mail, postage prepaid, return receipt requested and addressed as follows:

To Chatham:

Town Manager
549 Main St.
Chatham, MA 02633
With copy to Board of Selectmen

To Harwich:

Town Administrator
732 Main St.
Harwich, MA 02645
With copy to Board of Selectmen

20. MISCELLANEOUS.

- a. Entire Agreement. This Agreement constitutes the entire agreement between the Parties with respect to implementation and enforcement of a pretreatment program to control wastewater discharges from all industrial users of the System.
- b. Periodic Review. The Parties will review and revise this Agreement to ensure compliance with the Federal Clean Water Act (33 U.S.C. § 1251 et seq.) and rules and regulations (see 40 C.F.R. Part 403) and the rules and regulations of the DEP, as necessary.
- c. Further Assurances. Each of the Parties hereto shall execute and deliver any and all additional documents or instruments (including easements and other rights in land), in recordable form as appropriate, shall provide other assurances, shall make any necessary applications or filings and submit any records or data to any regulatory body, governmental entity or agency having jurisdiction as necessary to obtain any additional permits, licenses and approvals required, and shall do any and all acts and things reasonably necessary to carry out the intent of the Parties hereto and to confirm the continued effectiveness of this Agreement. Without limiting the foregoing, the Parties agree to amend their respective facilities plans as necessary in connection with any change in applicable industrial pretreatment requirements.
- d. Industrial User Contracts. Nothing in this Agreement precludes Chatham from entering into direct contracts with users located in Harwich establishing wastewater discharge restrictions and pretreatment

requirements that are at least as stringent as those provided for in Harwich's sewer use Regulations.

- e. Relationship. This Agreement does not create a fiduciary relationship between the Parties. Nothing in this Agreement is intended to constitute either Party an agent, legal representative, subsidiary, joint venture, partner, employee, or servant of the other for any purpose.
- f. Modification. No modification, alternation, amendment or waiver of any provision of this Agreement shall be effective or binding on either party unless mutually agreed to in writing by the Parties.
- g. Captions. The captions appearing in this Agreement are inserted only as a matter of convenience and for reference, and in no way define, limit construe or describe the scope or intent of any provisions of this Agreement nor in any way affect this Agreement.
- h. Governing Law. This Agreement shall be governed by, construed and interpreted in accordance with the laws of the Commonwealth of Massachusetts, which shall also be determinative in any litigation in connection with, or enforcement of this Agreement.
- i. Severability. If any term of this Agreement is held to be invalid in any judicial action, it shall be severed from this Agreement and the remaining terms will be unaffected.
- j. Third Parties. Nothing contained in this Agreement shall create a contractual relationship with, or a cause of action in favor of, a third party against any or all of the Parties.
- k. Binding Effect. The terms, covenants, and conditions contained in this Agreement shall be binding upon and inure to the benefit of the Parties hereto and their respective legal representatives, successors and assigns and any person or persons, natural or corporate, claiming through or under them, or any of them.
- l. Assignment. No assignment of this Agreement or any Party's rights, interests or obligations hereunder may be made without the other Party's consent, which shall not be unreasonably denied, withheld, delayed or conditioned.
- m. The obligation of Harwich to pay Chatham the Capacity Purchase Fee and its proportionate share of the improvements to the System required to deliver wastewater to the WPCF, including the construction of conveyance infrastructure, shall be subject to appropriation. Notwithstanding the legal requirement for an appropriation, any failure of Harwich to pay any sum due hereunder to Chatham in a timely basis shall constitute a material breach of the terms hereof for purposes of Article 18.2.

[Signature page follows]

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their duly authorized officers and their respective seals to be affixed as of the dates given below.

Board of Selectmen, Town of Chatham




Dean P. Nicastro

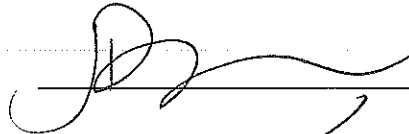
Sharon Davis

Jeffrey B. Bue

Andrew V. Lane

Board of Selectmen, Town of Harwich





John J. Fawcett

Robert H. Fawcett

Larry Ballantyne

Exhibit A

East Harwich Service Area

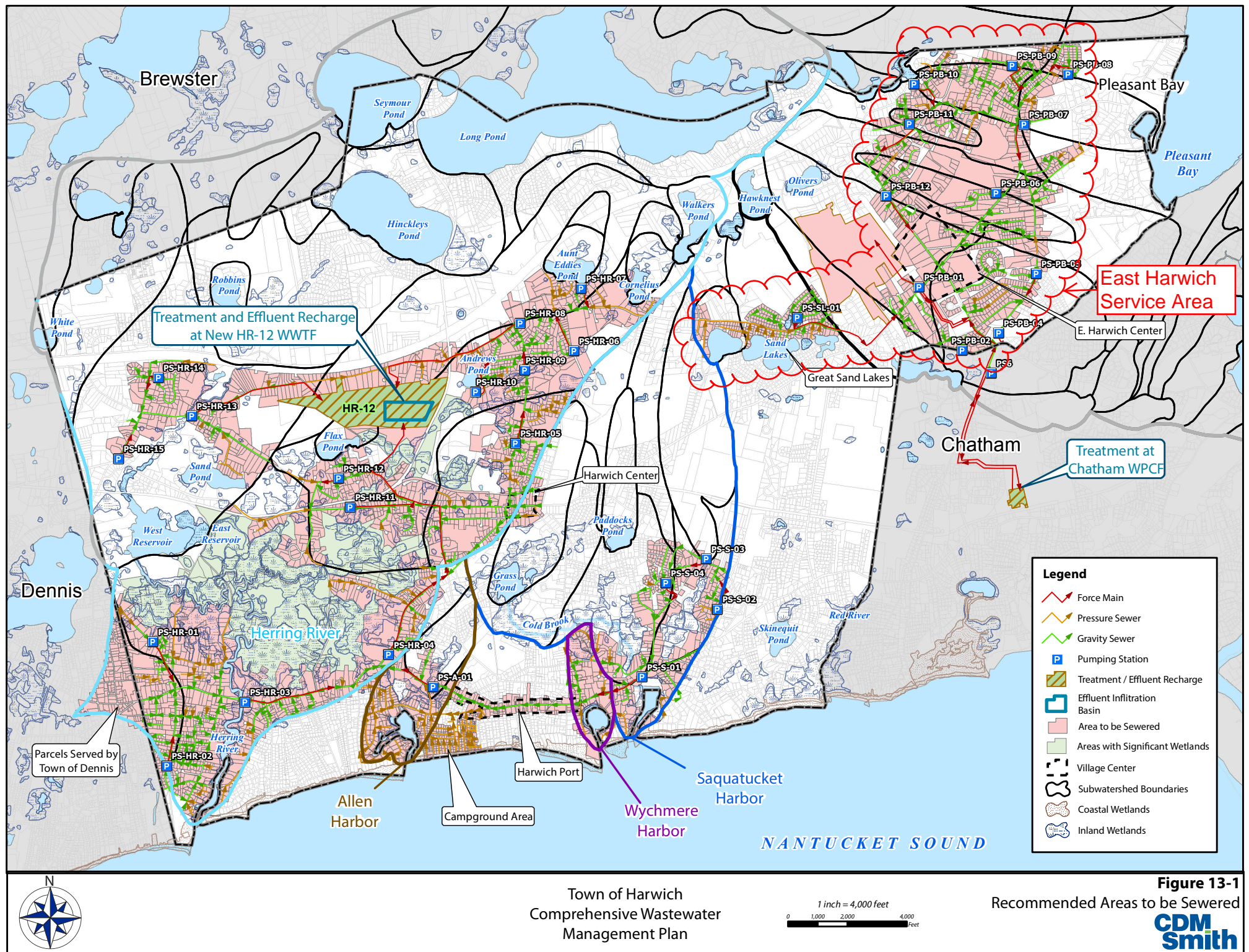
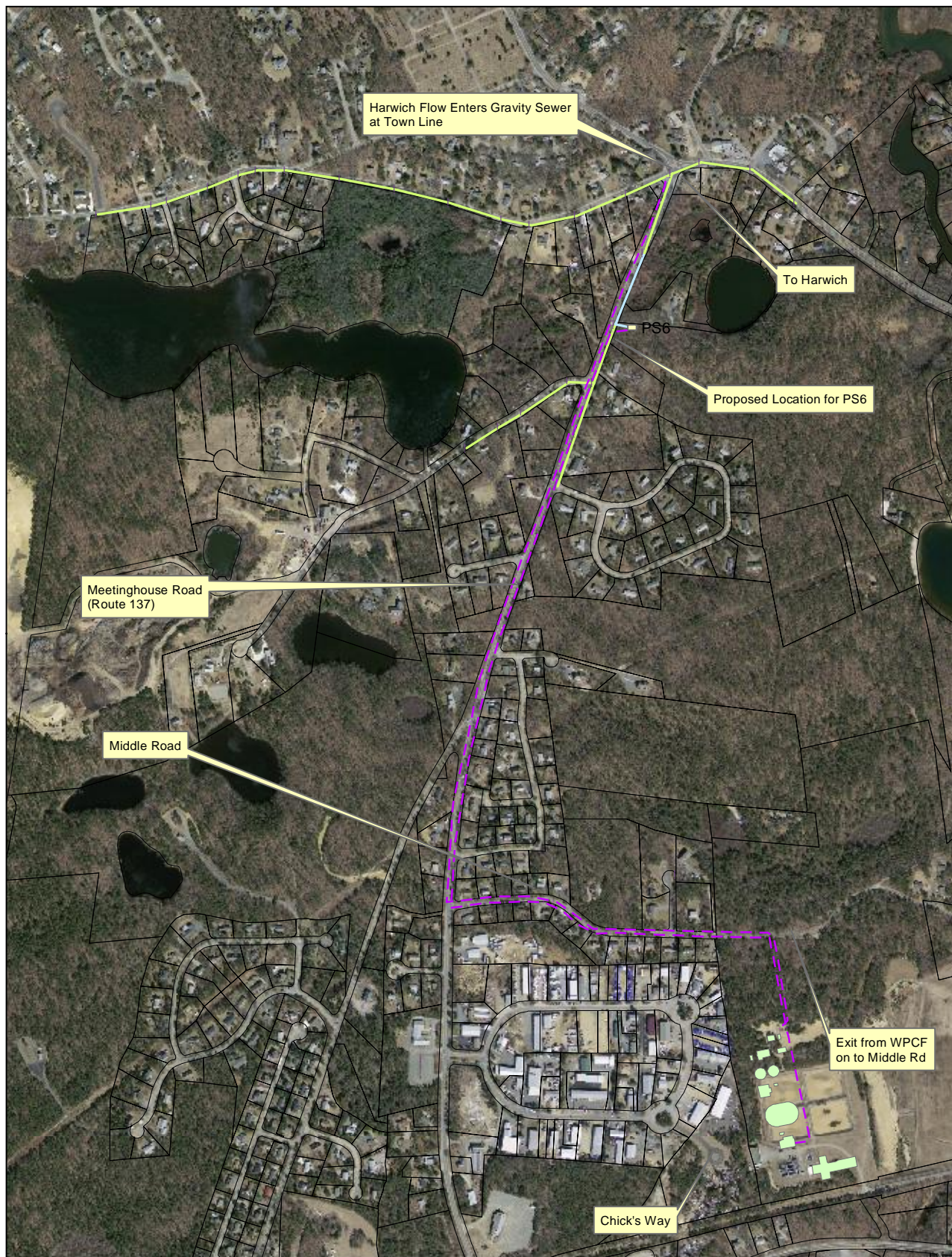


Exhibit B

Connection Point



Legend

Force Main	Gravity Sewer	Manholes
10" -	8" -	•
12" -	12" -	New Buildings

0 250 500 1,000 Feet



Paper Size ANSI B



Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet

CDM Smith Inc.
Harwich Comprehensive
Wastewater Management Plan

Job Number | 86-14969
Revision | A
Date | 11 Jun 2012

Site 6 Gravity
and Force Main Extents

Figure 5

G:\0614969\GIS\Fig 5 - Site 6.mxd
© 2012. Whilst every care has been taken to prepare this map, GHD (and DATA CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
Data source: Data Custodian, Data Set Name/Title, Version/Date. Created by: archs

1545 Iyannough Rd Hyannis MA 02601 USA T 774-470-1630 F 774-470-1631 E hyamail@ghd.com W www.ghd.com

Exhibit C

O&M Expenses


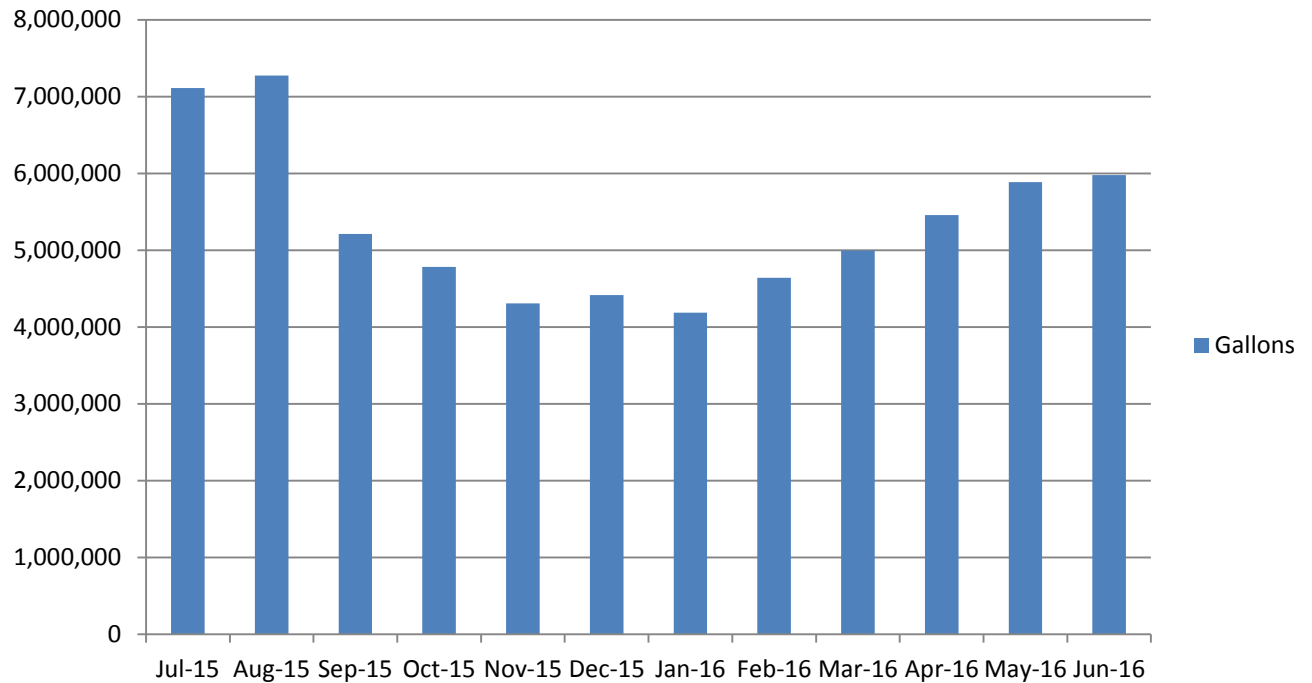
Department Detail								
	FY 2018 Budget		Dept - 443 Sewer		Department Detail			
		FY 2015 Actual	FY 2016 Actual	FY 2017 Budget	FY 2017 YTD 12/31/16	FY 2018 Dept Req	Supplemental Request	FY 2018 Town Manager
5110	Regular Wages	22,884	27,021	22,753	10,971	23,910	-	23,910
5120	Temporary Wages	-	-	-	-	-	-	-
5130	Overtime	-	-	-	-	-	-	-
5141	Longevity	-	-	-	-	-	-	-
	Personnel Services	22,884	27,021	22,753	10,971	23,910	0	23,910
5200	Purchase of Services	-	8,083	500	-	500	-	500
5203	Testing	17,261	17,225	20,000	9,259	20,000	(1,500)	18,500
5209	Electric WWFT	106,099	116,207	140,000	69,713	140,000	(8,000)	132,000
5210	Electric-Pump Station	37,511	35,168	45,000	16,658	45,000	4,000	49,000
5212	Gas Heat	35,528	24,709	40,000	3,603	40,000	(2,700)	37,300
5249	Plant Maintenance	107,763	100,603	90,000	63,935	90,000	30,000	120,000
5289	Solid Waste Disposal	26,537	32,831	26,000	14,066	26,000	16,000	42,000
5307	Contract Services	487,630	497,410	507,190	252,780	516,970	-	516,970
5312	Traffic Control/Public Safety	6,584	7,958	5,000	5,786	5,000	5,400	10,400
5317	Professional/Legal/Consulting	7,630	3,652	5,000	1,874	5,000	-	5,000
5340	Telecommunications	-	-	500	-	500	(500)	-
5343	Advertising	129	185	500	-	500	-	500
5344	Printing	420	-	100	-	100	-	100
5345	Postage	183	47	100	-	100	-	100
5400	Operational Supplies	585	2,643	500	-	500	-	500
5420	Office Supplies	212	416	250	577	250	-	250
5430	Building & Grounds Maintenance	-	175	500	-	500	-	500
5432	Chemicals	36,696	34,308	30,000	19,287	30,000	6,000	36,000
5481	Vehicle & Equipment Maint	9,999	6,028	4,800	2,705	4,800	1,500	6,300
5705	Meetings/Dues & Travel	189	-	250	-	250	-	250
5800	Capital Outlay-Operating	-	-	200	-	200	(200)	-
5805	Ground Water Monitoring	23,806	20,850	24,000	-	24,000	-	24,000
	Expenses	904,761	908,498	940,390	460,243	950,170	50,000	1,000,170
	Total Sewer	927,645	935,518	963,143	471,214	974,080	50,000	1,024,080

Exhibit D

WPCF Flow

Total Monthly Effluent Flows July 2015 to June 2016



Average Daily Effluent Flows July 2015 to June 2016

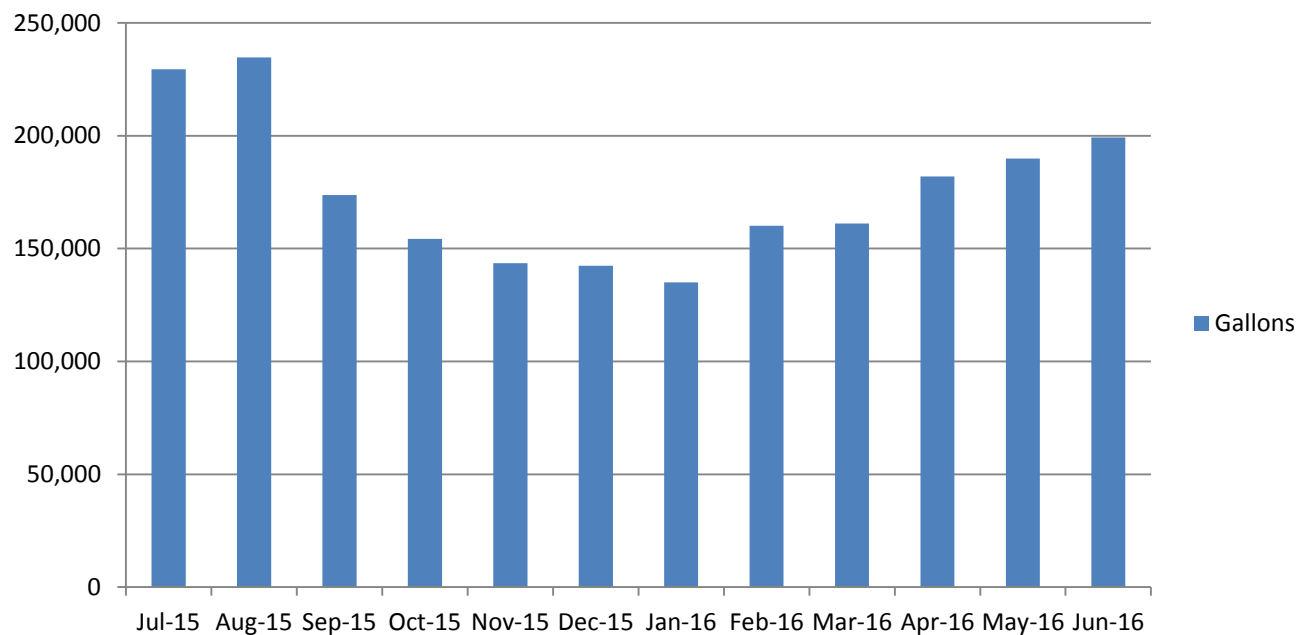


Exhibit E

Draft Preliminary Design Memorandum M-1B Flows and Loadings



From: J. Jefferson Gregg, P.E.
Date: April 21, 2006
Re: Chatham, MA Preliminary Design
Flows and Loadings

Purpose of Memo

The purpose of this memorandum is to summarize the development of wastewater flows and loadings for the Town of Chatham (Town) to be used in the preliminary design of wastewater facilities.

Average Wastewater Flows Development

To remain consistent with the facilities planning process to date and the Massachusetts Estuaries Project Efforts, the Town's existing water consumption data has been used as the basis for the future Wastewater Treatment WWTF design flows and loadings.

The following is a summary of the Town's water data analysis and how it is being applied to this project:

1. 2002-2003 Water data (provided by the Town – summer to summer, and used as part of the Massachusetts Estuaries Project (MEP)). Currently approximately 90 percent of the Town is on public water.
2. Ninety percent reduction applied to convert water use to wastewater generation (facilities plan, and MEP). This 90% reduction is based on an analysis of the wastewater flows to the existing Chatham WWTF.
3. Calculated average water use per parcel for those parcels without known irrigation systems, as identified by Town.
4. Actual water data was used where available, if no water data was available the following approach was used:
 - a. Average water use for single family home was estimated to be 120 gpd/parcel (rounded to two significant figures). Estimations based on the parcel by parcel analysis.
 - b. For non-single family homes, estimated water use assigned to these parcels was based on the average water use of parcels with the same state class code (similar property type).
 - c. Build-out parcels (future) were assigned 120 gpd/parcel.
5. Build-out projections based on the approach established as part of the facilities planning effort and accepted by the Town and Cape Cod Commission (CCC).



6. Existing developed-properties wastewater flow compared to projected build-out flow, and the higher of the two values used.

7. Additional build-out criteria used, as agreed upon with the Town:

- Residential properties are redeveloped to full extent based on current zoning.
- Commercial and Industrial, vacant-developable land is converted to residential.
- All other existing uses remain the same.
- Maps were reviewed with the Town and site specific modifications were made.

Wastewater Flows and Peaking Factors

Table 1 presents the average flows seen at the existing Chatham wastewater treatment facility, generated from the existing collection system.

TABLE 1

EXISTING WWTF FLOWS (2002-2005)

CONDITION	FLOW (MGD)
Average Flow	0.10
Minimum Month Flow	0.07
Maximum Month Flow	0.16

Water use and wastewater flow peaking factors were evaluated and compared to TR-16. The peaking factors considered for the preliminary design are presented in Table 2. As part of the evaluation, both the wastewater flows recorded at the existing WWTF and the drinking water well pumping records were evaluated for the following reasons:

- The limited size of the existing collection system may not be representative of the Town demographics.
- Existing WWTF peaking factors may represent a more year round population and might not be representative of the entire Town (if sewerage).
- Town water supply well pumping records are more likely to show the seasonal impacts of the entire Town.
- Well pumping records also reflect higher peak pumping rates in the summer because of additional uses like car washing, lawn irrigation, etc, and therefore would require downward adjustments to the wastewater estimate.
- Well pumping does not equate to 100% wastewater generation, and therefore should not be considered as the sole means of estimating peaking factors.

Therefore, peaking factors falling between those seen at the WWTF and from the well pumping records were considered as a reasonable approximation of those for a Townwide system and were compared to estimated TR-16 values, for validation purposes. The peak day and peak hour estimates



were well within the range recommended by TR-16. TR-16 does not have estimates for summer average, minimum month or maximum month flows.

TABLE 2

PEAKING FACTORS

CONDITION	EXISTING WWTF ⁽¹⁾	TR-16 ⁽⁵⁾	PROPOSED
Minimum Month	0.7		0.5
Summer Average ⁽²⁾	1.3		1.6
Maximum Month ⁽³⁾	1.6		1.9
Peak Day ⁽⁴⁾	1.8	2.1	2.2
Peak Hour		3.4	3.4
Notes: 1. Based on 2002 through 2005 data 2. Three month average (June, July, and August) divided by average annual 3. Maximum month divided by average annual 4. Peak day divided by average annual 5. TR-16 estimates based on average annual flow of 1.5 mgd			

Summer average flows during the years 2002 through 2005 were evaluated for June through August, June through September and July through September. The highest average summer flow occurred during the June through August period, although all three periods yielded similar results.

Table 3 presents the Townwide wastewater flow estimates. Existing average annual flow and build-out flows are based on the previously agreed upon approach. Peaking factors are then applied to calculate the remaining build-out flows. Build-out is considered the design conditions for this project.

TABLE 3

**TOWN-WIDE FLOW ESTIMATES
(not including I/I)**

CONDITION	FLOW (MGD)
Existing (2003) Average Annual Flow ⁽¹⁾	1.0
Build-out (BO) Average Annual Flow	1.3
BO Summer Average Flow	2.1
BO Minimum Month Flow	0.86
BO Maximum Month Flow	2.5
BO Peak Day Flow	2.9
BO Peak Hourly Flow	4.5
Note: 1. Calculated flow based on 2002-2003 water data and existing Town wide land use and units based on 2004 Town assessors data.	



The future Chatham collection system will be a new system over very significant areas of Town. The new gravity PVC sewers and manhole joints and covers will be gasketed. Portions of the Town will be low pressure sewers. All new connections will be wye-connections with new laterals to the house, and no roof leaders or sump pumps and/or foundation drain connections will be allowed under any condition. In addition, public education programs should be employed to prevent illegal connections. Because of this, inflow is expected to be negligible.

Table 4 summarizes the projected Infiltration and Inflow (I/I) estimates for the collection system. The “startup” condition is based on the existing collection system and an infiltration rate of 500 gpd/in-mile (based on TR-16). I/I was calculated based on the preliminary sewer layouts developed at the time of this memorandum, and based on 8-inch diameter pipe, and using an I/I rate of 500 gpd/in-mile. I/I for laterals is based on 500 gpd/in-mile for approximately 5,100 4-inch connections each approximately 80 feet long. Estimated length based on Town-wide average distance of building to property line based on GIS information. Although 500 gpd/in-mile is on the high end of the TR-16 range for just infiltration, for this preliminary design it will be used to represent infiltration and inflow.

TABLE 4
INFILTRATION / INFLOW ESTIMATE

CONDITION	FLOW (GPD)
Existing Collection System	20,000
Preliminary Gravity Sewer Layout	350,000
Laterals (All Phases)	160,000
Total	530,000

The proposed sewer areas presented in Table 4 are based on future areas of Town to be sewered as presented in a memorandum to the Town dated June 7, 2005 and entitled Wastewater System Implementation Capital Improvement Planning Items.

Once the proposed sewer layouts are finalized, the estimated I/I values will be adjusted. At this time, the lengths of pressure sewers and gravity sewers have not been finalized. I/I values are not peaked and represent the condition of maximum I/I occurring under any flow condition.

Table 5 presents the proposed WWTF design flows, which are the total of the Townwide flows under build-out conditions presented in Table 3 and the I/I flows presented in Table 4.



TABLE 5

TOTAL PROPOSED WWTF DESIGN FLOWS ⁽¹⁾

CONDITION	FLOW (MGD)
Startup Minimum Month Flow	0.08
Average Annual Flow	1.9
Average Summer Design Flow	2.7
Minimum Month Design Flow	1.2
Maximum Month Design Flow	3.1
Peak Day Design Flow	3.5
Peak Hourly Design Flow	5.1
Note: 1. Includes I/I	

Maximum month flows and loadings will be critical for meeting any effluent nitrogen limit. Peak flows are also critical for process design and hydraulic considerations and effluent disposal. Also, with continued reconstruction of homes in Chatham, it is quite possible that a higher proportion of year-round residents may eventually reside in Town. However, such projections are not available at the time of this technical memorandum, so for planning purposes the present distribution of seasonal and year-round properties (outside of the projected growth due to Build-out) would remain the same in the future. To minimize the impact of future conversion of seasonal to year round homes, the facility will also consider a summer average flow rate and loading, which would account for the majority of the potential residential sewer users in the future. However the fact that the facility will be designed around maximum month and peak day conditions will address this increase in flow and loading.

Development of Loadings

Table 6 presents TR-16 factors for loading variability.

TABLE 6

TR-16 LOADING FACTORS

CONDITION	MAXIMUM MONTH	PEAK DAY
BOD	1.14	1.8
TSS	1.3	2.1



Table 7 presents the existing loadings for the Chatham WWTF (2002-2005).

TABLE 7
EXISTING WWTF FLOWS AND LOADINGS (2002-2005)

CONDITION	AVERAGE	MINIMUM MONTH	MAXIMUM MONTH
Flow, mgd	0.1	0.08	0.16
BOD ₅ , lb/day	180	70	420
TSS, lb/day	180	80	300
TKN, lb/day	30	10	60
Ammonia, lb/day	20	< 10	40
Note: Flows and loadings represent a 4 year average (through October 2005) Rounded to two significant figures			

Table 8 presents the flows and loads for the entire WWTF (Phase 1 and 2). Loadings were based on concentrations currently seen at the existing WWTF, increased with build-out estimates, and TR-16 factors were applied for Maximum Month and Peak Day conditions for TSS, and BOD.

TABLE 8
WWTF DESIGN FLOWS AND LOADINGS

CONDITION	STARTUP ⁽³⁾	AVERAGE ANNUAL	DESIGN SUMMER AVERAGE	MINIMUM MONTH	MAXIMUM MONTH	PEAK DAY	PEAK HOUR ⁽²⁾
Flow, mgd	0.08	1.9	2.7	1.2	3.1	3.5	5.1
BOD ₅ , lb/day ⁽¹⁾	100	3,200	6,200	1,400	7,400	8,500	-
TSS, lb/day ⁽¹⁾	160	3,400	5,900	2,200	7,000	8,100	-
TKN, lb/day	20	600	900	200	1,100	1,300	-
Ammonia, lb/day	10	400	600	100	800	900	-
Notes: 1. BOD and TSS loadings for Maximum Month and Peak Day adjusted based on recommended Loading Factors listed in Table 8. 2. Peak Hour loadings not calculated. 3. Start-up loadings based on 2005 data.							

For design purposes, seasonal correlations were developed showing under what temperature conditions the facility might see its maximum loading conditions. This impacts the sizing of the facility.



TABLE 9

SEASONAL CORRELATION OF FLOWS AND LOADS

SEASON	DESIGN FLOW	DESIGN LOAD	DESIGN AVERAGE MONTHLY TEMPERATURE (DEGREES C)
Dec-Feb	Use Min. Month	Use Min. Month	7
March-May	Use Average Design Flow	Use Average Design Flow	10
June-Aug	Use Max Month	Use Max Month	20
Sept-Nov	Use Average Design Flow	Use Average Design Flow	16

WWTF Phasing

Preliminary design of the WWTF is based on two phases, based on a preliminary division of the Town to address potential sewerage options. Phase I flows would cover portions of the Town located generally south of Route 28, and Phase II would encompass the remaining areas of Town.

Table 10 summarizes the approximate flow split.

TABLE 10

PHASED WWTF DESIGN FLOWS ⁽¹⁾

CONDITION	PHASE I FLOWS (MGD)	PHASE II FLOWS (MGD)
Startup Minimum Month Flow	0.08	0.8
Average Annual Flow	1.3	1.9
Average Summer Design Flow	1.8	2.7
Minimum Month Design Flow	0.8	1.2
Maximum Month Design Flow	2.1	3.1
Peak Day Design Flow	2.3	3.5
Peak Hourly Design Flow	3.5	5.1
Note: 1. Includes I/I		



Other Flow Considerations

1. Future Harwich Sewer Extensions:

The Town is currently in discussions with the Town of Harwich regarding the possible extension of any proposed collection system into Harwich. This would require an inter-municipal agreement between the two Towns establishing the quantity of flow and other requirements. No flow estimate is available at this time, and the ultimate ability of Chatham to extend sewers into Harwich will be dependant on the effluent disposal capacity of the Town of Chatham.

2. Septage:

As identified in the 1999 Needs Assessment Report (Table 5-8), “Septage and grease are treated in the sludge holding tanks and the decant liquid and belt filter press filtrate from these flows have minimal contributions to the wastewater treatment process.” Therefore for this analysis concentrations from septage are considered to have minimal impact on the new WWTF. Also, the Town of Chatham only receives septage from the Town, therefore as more of the Town is sewered, an even smaller portion of the wastewater flow stream will originate from this source. However, the septage will be considered in the sludge processing and disposal calculations.