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APPENDIX A – Fee Schedule
APPENDIX B – Drainlayer’s License Application and Bond Form
APPENDIX C - Sewer Flow Estimates
APPENDIX D – Sanitary Sewer Design and Construction Details
DEFINITIONS:

Adjacent Sewer Main shall mean a Sewer Main which is located: 1.) within a right of way or easement which shares a boundary line with the subject lot or estate; and 2.) the Sewer Main is located within that right of way or easement such that a line projected perpendicularly from the axis of that Sewer Main will intersect a boundary line of the subject lot or estate.

Appurtenance shall mean any piece associated with the physical structure or operation of a Sewer System.

ASTM shall mean the material standard of the American Society for Testing and Materials.

Biochemical Oxygen Demand or BOD shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five (5) days at 20 °C, expressed in milligrams per liter.

Board of Selectmen shall mean the Board of Selectmen of the Town of Sandwich. The Board of Selectmen exercises all of the executive powers of the Town and is the chief policy making authority as defined by the Town of Sandwich Charter.

Building Drain shall mean that part of the lowest piping of a drainage system which receives the discharge of wastewater from inside the walls of the building and extends to ten (10) feet outside the inner face of the building wall. By statute, the Building Drain comes under the jurisdiction of the plumbing inspector.

Building Sewer shall mean the extension from the Building Drain to a Sewer Main or other place of disposal, also called: service, building connection, house connection, house service, lateral, private service and service connection. Building Sewer is the preferred term. The Building Sewer is owned by the property Owner up to and including its intersection with and connection to the Sewer Main, and its maintenance, repair and replacement are the sole responsibility of the property Owner.

Controlled Density Fill or CDF shall mean Controlled Density Fill as specified by the MassDOT Standard Specifications.

Clear Water shall mean Unpolluted Water.

Concentric shall mean the relationship between two different circular, cylindrical sewer pipes, when one is exactly centered within the other.

Contact Cooling Water shall mean water used in a process for cooling purposes that has come in direct contact with a raw material, intermediate product, waste product or finished product.
**Cooling Water** shall mean the water discharged from any system or condensation, air conditioning, cooling, refrigeration or other system of heat transfer.

**DEP** shall mean the Massachusetts Department of Environmental Protection.

**Design Engineer** shall mean the Engineer responsible for the specifications, drawings, reports, or other directive instruments for the construction, repair, alteration, operation, maintenance, or other improvement of a Sewer System or portion or component thereof.

**Director** shall mean the Director of the Department of Public Works of the Town of Sandwich, or authorized agent or representative.

**DPW** shall mean the Town of Sandwich Department of Public Works.

**Drainlayer License** shall mean a license required by the Town of Sandwich for any Person to install, repair, or alter Sewer Systems of components thereof in the Town of Sandwich.

**Drainlayer** shall mean a Person fully licensed, bonded, and insured to install, repair, or alter Sewer Systems or components thereof in the Town of Sandwich.

**Easement** shall mean an acquired legal right for the specific use of land owned by others.

**Engineer** shall mean any person who is licensed by the Commonwealth of Massachusetts to perform professional engineering services.

**EPA** shall mean the United States Environmental Protection Agency.

**FOG** shall mean fats, oil, grease, or wax, or any combination thereof.

**Force Main** shall mean a portion of a Sewer System that conveys pressurized flow from one or more wastewater pumping stations and conforming to the specifications in these regulations, generally consisting of pressure sewer pipe, valves, manholes, and appurtenances.

**Gallons Per Day or GPD** shall mean the estimated flow of sewage based on DEP regulations 314 CMR 7.15.

**Garage** shall mean any structure or property where one or more motor vehicles are kept, stored, or serviced, including a public or private garage, carport, motor vehicle repair shop, paint shop, service station, lubritorium, car wash, gasoline station with grease pits or wash racks or areas, or any building used for similar purposes.

**Garbage** shall mean the animal and vegetable waste resulting from the handling preparation, cooking and serving of foods.
Grease, Oil and Sand Interceptors shall mean devices used to prevent grease, oil and sand from entering the waste stream. Also known as “Grease Traps”.

Industrial Waste means any liquid, gaseous, or solid waste substance or a combination thereof resulting from any process of industry, manufacturing, trade, or business or from the development or recovery of any natural resources.

Industrial Wastewater means waste in liquid form resulting from any process of industry, trade, or business, regardless of volume or pollutant content. Waste in liquid form consisting of only sewage is not considered industrial wastewater.

Infiltration means water other than wastewater that enters a Sewer System (including Sewer Connections and foundation drains) from the ground through means which include, but are not limited to, defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from inflow.

Infiltration/Inflow or I/I means the quantity of water from both infiltration and inflow without distinguishing the source.

Inflow means water other than sanitary flow that enters a Sewer System (including Sewer Connections) from sources that include, but are not limited to, roof leaders, cellar drains, yard drains, area drains, drains from springs and swampy areas, manhole covers, cross connections between storm sewers and sanitary sewers, catch basins, cooling towers, storm waters, surface runoff, street wash waters, or drainage. Inflow does not include and is distinguished from, infiltration.

Lot shall mean an area of land in one ownership, with definite boundaries, used, or available for use, as the site of one or more buildings.

M.G.L. shall mean Massachusetts General Law.

Massachusetts Water Quality Standards shall mean the Massachusetts Surface Water Quality Standards (314 CMR 4.00) and the Massachusetts Ground Water Quality Standards (314 CMR 6.00).

MassDOT shall mean the Massachusetts Department of Transportation Highway Division.


May is permissive; shall is mandatory.

Natural Outlet shall mean any outlet, including Storm Sewers into a watercourse, pond, ditch, lake or other body of surface or groundwater.
Non-contact Cooling Water shall mean uncontaminated water used to reduce temperature which does not come into direct contact with any raw material, intermediate product, waste product (other than heat), or finished product.

On-site Disposal System shall mean a system or series of systems for the treatment and disposal of sanitary sewage below the ground as defined in 310 CMR 15.002 and which is located on the property where the sewage is generated and serves only the property on which it is located.

Other Wastes shall mean all liquid discarded matter other than sewage or industrial waste which may cause or contribute to a violation of the Massachusetts Surface Water Quality Standards or interfere with the use of the ground water as an actual or potential source of potable water.

Owner shall mean the Person(s) holding fee simple title to a parcel, tract or lot of land, as shown by the record in the appropriate Land Registration Office, Registry of Deeds or Registry of Probate.

Person shall mean any agency or political subdivision of the Commonwealth, the federal government, any public or private corporation or authority, individual, partnership or association, or other entity, including any officer of a public or private agency or organization, upon whom a duty may be imposed by or pursuant to any provisions of M.G.L. c. 21, §§ 26 through 53.

pH shall mean the negative logarithm of the hydrogen ion concentration. The concentration is the weight of hydrogen ions, in grams, per liter of solution. Neutral water, for example, has a pH value of 7 and a hydrogen ion concentration of $10^{-7}$.

Plans shall mean approved contract drawings, Town standards, working drawings, detail sheets or exact reproductions thereof, which show the location, character, dimensions and details of the work to be done.

Pollutant means any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter, in whatever form and whether originating at a point or major non-point source, which is or may be discharged, drained or otherwise introduced into any sewerage system, treatment works or waters of the Commonwealth.

Pollution means the presence in the environment of pollutants in quantities or characteristics which are or may be injurious to human, plant or animal life or to property or which unreasonably interfere with the comfortable enjoyment of life and property throughout such areas as may be affected thereby.

Potable Water shall mean water from any source that has been approved by the Department for human consumption as defined in 310 CMR 22.02.

Pretreatment shall mean the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW.
**Private On-Site Collection System** shall mean the pipes, pumping systems, and appurtenances necessary to connect multiple buildings located on a single lot or estate to an Adjacent Sewer Main and which is located on the property where the sewage is generated and serves only the property on which it is located. Sewers installed in Private Ways serving multiple distinct lots are not Private On-Site Collection Systems.

**Private Sewer System** shall mean a Sewer System which services multiple distinct lots or estates and is controlled by a Person that is not a public entity. Private Sewer Systems are not part of the Sandwich Municipal Sewer System.

**Private Way** shall mean a privately owned way open for or dedicated to use or travel by members of the general public in accordance with Massachusetts General Laws Chapter 41 section 77.

**Privately Owned Wastewater Treatment Facility or PWTF** shall mean any device or system owned by a private entity that is used for the treatment and disposal (including recycling and reclamation) of sewage and/or industrial wastewater. A Privately Owned Wastewater Treatment Facility includes the sewers, pipes, or other conveyances that convey the wastewater to the treatment facility.

**Properly Shredded Garbage** shall mean the wastes from the preparation, cooking and dispensing of food that have been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than ½ inch in any dimension.

**Public Sewer System** shall mean a Sewer System controlled by a governmental agency or public entity.

**Public Way** shall mean a way open for travel owned in fee or easement by the Town of Sandwich or other public entity.

**Publicly Owned Treatment Works or POTW** shall mean any device or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature which is owned by a public entity. A POTW includes any sewers, pipes, or other conveyances which convey wastewater to a POTW providing treatment.

**Recorded** shall mean recorded in the Registry of Deeds of Barnstable County, except that, as affecting registered land, it shall mean filed with the Recorder of The Land Court. (Section 81-L of Chapter 41, M.G.L.).

**Right-of-Way or ROW** shall mean the area that has been laid out for travel purposes.

**Sandwich Municipal Sewer System or SMSS** shall mean the Sewer System owned or controlled by the Town of Sandwich.

**Sanitary Sewage or Sewage** means the water-carried human or animal wastes from residences, buildings, industrial establishments or other places, together with such ground water infiltration and surface water as may be present.
**Sanitary Sewer or Sewer** shall mean a pipe or conduit that carries Wastewater.

**Septage** shall mean the liquid and solid wastes, primarily of sewage origin, that are removed from a cesspool, septic tank or similar receptacle.

**Sewer Connection** shall mean the sewer pipes and appurtenant works necessary to connect a building or estate to a Sewer System.

**Sewer Extension** shall mean the addition to a Sewer System of sewer pipe, together with appurtenant works, which when connected to the Sewer System becomes the property of, and is operated and maintained by, the Person owning the Sewer System.

**Sewer Main** shall mean a portion of a Sewer System conforming to the specifications of these regulations, generally consisting of gravity sewer pipe, manholes, and appurtenances, together having the necessary characteristics of design, construction, and operation, as determined by the Director, to adequately convey anticipated flow from connected Building Sewers and other Sewer System components to the intended point of discharge.

**Sewer Permit** shall mean an authorization issued pursuant to the Town of Sandwich Sewer Regulations.

**Sewer System** shall mean pipelines or conduits, pumping stations, force mains, and all other structures, devices, appurtenances, and facilities used for collecting and conveying wastes from multiple distinct lots or estates to a site or works for treatment or disposal.

**Shall** is mandatory; **may** is permissive.

**Slope** shall mean the inclination of a trench bottom or a trench sidewall, expressed as a ratio of vertical distance to the horizontal distance. For example, a 3V:1H slope shall rise or fall 3 vertical feet in a distance of 1 horizontal foot.

**Solid Waste** shall mean any unwanted or discarded solid material, consisting of putrecible or nonputrescible solid waste material, including garbage and rubbish.

**Storm Drain or Storm Sewer** shall mean a pipe or conduit for conveying stormwater, groundwater, or surface waters.

**Stormwater** shall mean stormwater runoff, snowmelt runoff, surface runoff, and drainage.

**Subgrade** shall mean the plane at the bottom of the sub-base.

**Surveyor** shall mean a person who is registered by the Commonwealth of Massachusetts to perform professional land surveying services.
**Town Manager** Shall mean the Town Manager for the Town of Sandwich, or his authorized agent or representative.

**Town** shall mean the Town of Sandwich, Massachusetts or any duly authorized officer, agent or representative of the Town of Sandwich.

**TR-16** shall mean the Guides for Design of Wastewater Treatment Works, prepared by the Technical Advisory Board of the New England Interstate Water Pollution Control Commission.

**Uncontaminated Water** shall mean water which does not contain dredge spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological waste materials, radioactive materials, wrecked or discarded equipment, cellar dirt, industrial, municipal or agricultural waste or any other pollutant which upon discharge could cause or contribute to a violation of 314 CMR 4.00: *Massachusetts Surface Water Quality Standards* or interfere with the actual or potential use of ground water as a source of potable water.

**Unpolluted Water** shall mean the water of quality equal to or better than the treated effluent criteria in effect or water that would not cause violation of receiving water quality standards and would not be benefited by discharge to the sewers and wastewater treatment facilities provided.

**User** shall mean any Person that has one or more connections to a Sewer System.

**Wastewater Facility** shall mean the structures, equipment and processes required to collect, transport and treat domestic and industrial wastes and dispose of the effluent.

**Wastewater** shall mean sewage, industrial waste, other wastes or any combination of the three.

**Watercourse** shall mean a natural or artificial channel for the passage of water either continuously or intermittently.

**Zone II** shall mean that area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can realistically be anticipated, as defined in Massachusetts Drinking Water Regulations, 310 CMR 22.02.
1.0 Authority and Purpose

These regulations are adopted by the Board of Selectmen pursuant to its authority set forth in MGL c. 83, s. 10. The Board of Selectmen hereby delegates its authority under these regulations to the Sandwich Director of Public Works (“Director”) to the extent set forth in these regulations.

These regulations are intended to protect the public health, safety and welfare and the environment and to ensure proper and safe operation of the Sandwich Municipal Sewer System (“SMSS”) and Private Sewer Systems by regulating the construction, repair, and alteration of Sewer Systems, and the direct and indirect discharge of wastewater and pollutants to the SMSS in accordance with 314 CMR 7.00 & 314 CMR 12.00. These regulations are intended to apply to both public and private work associated with the SMSS. In addition, the design, construction, and operation of any Private Sewer System within an easement over Town-owned land or located within the layout of a public way shall conform to these regulations. Furthermore, the Owner of any Private Sewer System seeking a connection to the SMSS shall comply with these regulations including, without limitation, all design and construction standards set forth herein.

In the absence of code provisions or in amplification thereof, the materials and procedures as set forth in the following specifications shall apply, as applicable:

A. American Society of Civil Engineers (ASCE), Manuals and Reports in Engineering Practice No.60, “Gravity Sanitary Sewer Design and Construction,” second edition, 2007; American Society of Civil Engineers, Reston, Virginia.


C. Town of Sandwich Sanitary Sewer Design and Construction Details.

D. Town of Sandwich Department of Public Works Standard Special Provisions.


The Director shall, in the case of any discrepancies or questions, direct the Drainlayer accordingly.

2.0 Applicability & Administration

2.1 The Board of Selectmen shall have and exercise all powers vested in the Town by the Massachusetts General Laws or special acts pertaining to Sewer Systems. The Board of Selectmen has designated the Director to administer these regulations.

2.2 The Board of Selectmen, with the assistance of the Director, shall establish, amend and promulgate local limits and regulations consistent with DEP permits, regulations, and guidelines.

2.3 The operation and maintenance of the SMSS shall be performed in accordance with the rules and regulations of the Town of Sandwich and the DEP including, but not limited to, the requirements of 314 CMR 7.00 and 314 CMR 12.00.
2.4 All Drainlayers in the business of installing Sewer Systems regulated hereunder and components thereof shall be licensed by the Board of Selectmen.

2.5 No unauthorized person shall uncover, make any connections with or opening into, use, alter, or disturb any public or private sewer regulated hereunder or appurtenance thereof without first obtaining approval of a Sewer Permit for the connection, extension, repair, or disconnection of a sewer as appropriate from the Director.

2.6 Every person who directly or indirectly discharges wastewater to the SMSS shall ensure that such discharge complies with 314 CMR 7.00 and 314 CMR 12.00. The requirements of 314 CMR 7.00 and 314 CMR 12.00 applies to direct and indirect discharges to the SMSS and to discharges to the SMSS through another Sewer System.

2.7 The Owner shall be responsible for obtaining all other regulatory body approvals, such as but not limited to zoning and planning board, State agencies, etc.

2.8 The Owner shall pay all fees associated with the work performed by professionals retained by the Town of Sandwich for the purpose of reviewing the technical merits of the proposed work, and inspecting the work to ensure it was constructed correctly and according to these standards.

### 3.0 Drainlayer Licensing

#### 3.1 Issuance of Drainlayer Licenses

Work on any part of any Sewer System in the Town of Sandwich regulated hereunder, public or private, may only be performed by a Drainlayer licensed pursuant to these regulations for the type of work to be performed. Drainlayer license applications shall be obtained from the Board of Selectmen through the Director or his designee at the Town of Sandwich Department of Public Works, 500 Route 130, Sandwich, Massachusetts, 02563, telephone number 508-833-8002. The license shall be in the name of the entity or an individual. Licenses shall indicate the types of work a Drainlayer is permitted to perform. A Drainlayer license application is attached in Appendix B.

#### 3.2 Application

A drainlayer license application shall not be considered complete unless a valid State of Massachusetts Heavy Equipment Operators License, Certificate(s) of Insurance, Performance Bond, references, and the appropriate fee accompany it. The entity or individual shall complete the license application and submit it to the Director, who will present the completed application to the Board of Selectmen for approval within twenty-one (21) days. The Town shall maintain an up-to-date list of Drainlayers, which shall be provided to residents and others requesting the same.

The completed license application shall indicate the types of work the applicant is competent in and shall provide three references for each type of work.

#### 3.2.1 Insurance

The Drainlayer shall file an insurance certificate(s) listing the Town as additionally insured and stating that the Town shall be notified thirty (30) days
prior to cancellation annually with the Town of Sandwich for the appropriate insurance coverage shown below:

a. Worker’s Compensation Insurance for the protection of all employees in accordance with applicable state law.

b. Contractor’s Liability with limits of $1,000,000.00.

c. Automotive liability on and off public highways, owned vehicles, hired vehicles, and non-ownership liability with a limit of $1,000,000.00.

Liability insurance shall cover property damage insurance, blasting and explosion, underground damage to utilities, and collapse, and be issued by an insurance agency licensed to do business in Massachusetts.

3.2.2 License Term

The license term for a Drainlayer shall be January 1st to December 31st.

3.2.3 License Fees

Drainlayers shall pay an annual license fee of $250.00 to the Town of Sandwich at the time of application or renewal. All licenses regardless of the date of application date shall expire on December 31st of that year.

3.2.4 Performance Bond

A performance bond in the sum of $5,000 that shall remain in full effect for a period of two (2) years from the effective date of the license and shall be required each year of licensure. The performance bond shall be prepared in accordance with the form of performance bond included in Appendix B of these regulations.

Upon renewal of a license or in subsequent years application the Drainlayer shall either submit a new bond which shall remain in full force for a period of two (2) years from the date of application or renewal, or extend the length of the current bond on file, by means of a certificate of rider so that the expiration date of the current bond will be changed to be in full effect for a period of two (2) years from the date of application or renewal.

3.2.5 References

The prospective Drainlayer shall submit with the application for a license a list of at least three references that are familiar with the past work and experience of the prospective Drainlayer for each type of work applied for. The list shall include the name, organization, contact number(s), and brief description of the type of work performed for each reference. Other municipal references are preferred.
3.3 **Terminations and Suspension of License**

The Board of Selectmen may terminate or suspend any Drainlayer license upon due notice and after a public hearing for violating any provision of these regulations. There shall not be any rebate on the annual fee upon termination.

3.4 **License Application/Renewal Forms**

The Application for Drainlayer License can be found in Appendix B of these regulations. The Director may issue a negative recommendation to the Board of Selectmen based on previous violations, negative references, or lack of relevant experience. Also, the Town of Sandwich may withhold approval of any licenses and/or permits for outstanding taxes or fees, in accordance with Section 6.99 of the Town’s General Bylaws.

3.5 **Contractors working on behalf of the Town**

Any contractor performing construction or repair of sewers and drains as part of a contract with the Town of Sandwich who is working on behalf of the Town shall be exempt from the fee requirements of this section.

4.0 **General Use of the Sandwich Municipal Sewer System**

4.1 It shall be unlawful to discharge to the SMSS any polluted water without the applicable town, state and federal discharge permits.

4.2 A separate and independent Building Sewer shall be provided for every building and every independently owned unit except where there is an existing and legally enforceable maintenance agreement between the Owners of the units and the Owner of the property.

4.3 Existing Building Sewers shall not be used to serve a new building and or a building that is substantially remodeled (in excess of 50% of the existing building value) unless it can be demonstrated that the material, capacity, condition, construction, and useful life of the existing sewer is adequate and would be comparable to a new sewer. New Building Sewers shall be installed as follows and as described in these regulations.

4.4 The following discharges are prohibited:

4.4.1 No person(s) shall discharge or cause to be discharged any unpolluted waters such as stormwater, surface water, groundwater, roof or surface runoff, tidewater, subsurface drainage, uncontaminated cooling water, unpolluted industrial process waters, non-contact cooling water, or non-contact industrial process waters to the SMSS. In general, only sanitary sewage shall be discharged to SMSS.

4.4.2 No person shall discharge or cause to be discharged substances, materials, waters, or wastes if it appears likely, in the opinion of the Director, that such wastes can harm either the sewers, sewage treatment process, or equipment, have an adverse effect on the receiving soils/groundwater, or can otherwise endanger life, limb, public property, or constitute a nuisance.
4.4.3 Unless otherwise stated herein the provisions of 314 CMR 7.00 and 314 CMR 12.00 shall govern all discharges to the SMSS.

4.5 No person(s) shall make connection of roof downspouts, foundation drains, sump pumps, floor drains, area drains or other sources of surface runoff or groundwater to a Building Sewer or Building Drain, which in turn, is connected directly or indirectly to the SMSS. The Director or his representative reserves the right to inspect any property to confirm that there are none of the aforementioned unauthorized connections to the SMSS.

4.6 No person(s) shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with the structures, pipes or other appurtenances or equipment which is part of the SMSS or wastewater facilities or public storm drain. Any person(s) violating this provision shall be subject to all civil or criminal penalties as provided by M.G.L. and these regulations.

4.7 The maintenance and cleaning of Building Sewers and Building Drains shall be the responsibility of the Owner of the house or estate benefited by such Building Sewer.

4.8 The Director and other duly authorized employees or agents of the Town bearing proper credentials and identification shall be permitted to enter, at reasonable times, all private properties connected to the SMSS for the purposes of inspection, observation, measurement, sampling, and testing pertinent to discharge to the wastewater facilities in accordance with the provisions of these regulations.

4.9 The Director or other duly authorized employees or agents are authorized to require that any user of the SMSS obtain information concerning industrial processes which have a direct bearing on the kind and source of discharge to the wastewater facilities. The industry may withhold information considered confidential. However, the industry must establish that disclosure of the information in question to the public might result in an advantage to competitors.

4.10 Discharges from restaurants and food preparation establishments and from commercial and industrial facilities shall provide approved structures for pretreatment of FOG. See Section 5.1.4.

4.11 Where connection to the SMSS is not available, the Building Sewer shall be connected to a Private Sewer System or On-Site Disposal System complying with the requirements of the Board of Health of the Town of Sandwich acting under the provisions of Title 5 of the "State Environmental Code for the Commonwealth of Massachusetts, Minimum Requirements for the Subsurface Disposal of Sanitary Sewage", 310 CMR 15, or regulations relative thereto, and/or the Massachusetts Department of Environmental Protection (DEP).

4.12 Connections to the SMSS shall conform to the following:

4.12.1 No person(s) shall uncover (excavate), connect, or cause to be connected to, or make any opening into, use, alter, or disturb any portion of the SMSS, including Building Sewer, Sewer Main, or appurtenances thereof except by written permit from the Director. The permit shall be obtained in accordance with these regulations. Any person proposing a new discharge into the SMSS, a substantial
change in the volume or character of pollutants that are being discharged into the SMSS, or new Sewer Extension shall submit plans and calculations for the connection or extension, stamped by a Massachusetts Registered Professional Engineer in compliance with 250 CMR 4.00, in accordance with these regulations, for approval. A permit must also be obtained for any repair work to existing Building Sewers or Sewer System components, or for any disconnection of an existing sewer.

4.12.2 One Building Sewer will not be allowed to connect and serve more than one house or dwelling unit under separate ownership except in the case of condominiums.

4.12.3 No contractor, person(s), entity or corporation shall be issued a permit or be otherwise allowed to connect, extend, repair or disconnect any sewer or appurtenance unless they possess a current and valid Drainlayer License issued by the Town of Sandwich in accordance with these regulations.

5.0 Sewer Permits

5.0.1 Permit Required

No person shall connect to the SMSS or a Private Sewer System regulated hereunder or construct, effect, modify, or maintain a Sewer Extension, Sewer Connection, repair, or disconnection to or from the SMSS or a Private Sewer System regulated hereunder without a Sewer Permit issued by the Director, and when required a DEP extension/connection permit pursuant to M.G.L. c.21§ 43, 314 CMR 7.00, and/or 314 CMR 12.00.

Permit requirements are published by the DEP, and referenced by the application categories in the following table:

<table>
<thead>
<tr>
<th>DEP Permit Application Categories: 310 CMR 4.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRP WP 13 Major Sewer Extension</td>
</tr>
<tr>
<td>BRP WP 14 Minor Sewer Extension; Connect w/Pump Station</td>
</tr>
<tr>
<td>BRP WP 17 Major Sewer Connection (≥ 50,000 gpd)</td>
</tr>
<tr>
<td>BRP WP 18 Minor Sewer Connection (15,000 to 50,000 gpd)</td>
</tr>
<tr>
<td>BRP WP 55 Industrial Wastewater</td>
</tr>
</tbody>
</table>

5.0.2 State Permits

All Sewer Extensions and Sewer Connections requiring a DEP Permit shall have a plan and necessary calculations prepared by a Registered Professional Engineer in the Commonwealth of Massachusetts. The Department of Environmental Protection (DEP) must approve the Sewer Extension or Connection before the Town will issue any Sewer Connection, Extension, or related Road Work/Trench Permits.
5.0.3 Permit Types

The Director shall issue Sewer Permits for approved repairs, modifications, disconnections, connections, or extensions to the SMSS and Private Sewer Systems regulated hereunder in accordance with the provisions contained herein. In addition, Sewer Permits are required for the expansion of any existing building connected to a system that requires alteration or retrofit of the existing sewer or any of its direct appurtenances. Prior to beginning any work on any part of the SMSS or a Private Sewer System regulated hereunder, a Drainlayer shall obtain the appropriate permits as listed below:

a) Sewer Connections to the SMSS or a Private Sewer System regulated hereunder with sewer flows estimated to be less than 15,000 gallons per day require a Sewer Permit issued by the Director.

b) Sewer Connections to the SMSS or a Private Sewer System regulated hereunder with sewer flows estimated to be greater than 15,000 gallons per day and Sewer Connections with a pump station require both:
   i. An appropriate Massachusetts DEP permit; and
   ii. A Sewer Permit issued by the Director.

c) All Sewer Extensions to the SMSS or a Private Sewer System regulated hereunder require both:
   i. An appropriate Massachusetts DEP permit; and
   ii. A Sewer Permit issued by the Director.

d) Industrial Sewer Connections to the SMSS or a Private Sewer System regulated hereunder require a Sewer Permit issued by the Director.

e) Sewer repairs to the SMSS or a Private Sewer System regulated hereunder require a Sewer Permit issued by the Director.

f) Sewer disconnections (cut and cap) to the SMSS or a Private Sewer System regulated hereunder require a Sewer Permit issued by the Director and an appropriate Massachusetts DEP permit if applicable.

All permits as required by Sandwich Department of Public Works (DPW) and Massachusetts Highway Department for work in the public way.

5.0.4 Additional Requirements

Installation of Sewer Systems and components thereof shall be in accordance with these regulations and standards, the current Town of Sandwich Sanitary Sewer Design and Construction Details, the DPW Standard Special Provisions, the DPW Road Work/Trench Permit, as well as any requirements of the Director. The Town of Sandwich reserves the right to waive any specification or to impose other regulations as required based on field conditions. Details of various Sewer System components are attached in Appendix D and made a part of these regulations and standards.
Emergency repairs within pavement shall comply with MassDOT’s State Highway Access Permit, specifically “Backfilling within Paved Surfaces” and the provisions herein.

5.0.5 Cost of Sewer

All costs and expense(s) incident to the installation and connection of the Building Sewer, including the construction or reconstruction of a Sewer Main if necessary, and inspection by the Town, shall be borne by the Owner. The Owner shall indemnify the Town from any loss or damage that may directly or indirectly be occasioned by the installation of the Building Sewer.

5.0.6 Unauthorized Work

No unauthorized person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment that is a part of the Sewer System. In addition to any penalties described herein, any person violating this provision shall be subject to immediate arrest under the charge of disorderly conduct.

5.0.7 Licensed Contractors (Drainlayers)

Only Drainlayers licensed by the Town of Sandwich will be permitted to construct or repair the SMSS or a Private Sewer System regulated hereunder and components thereof. Any Sewer System component not installed by a Drainlayer licensed by the Town will be rejected. A list of Drainlayers may be obtained at __. **Drainlayers shall not sub-contract Sewer System work to anyone other than a Town licensed Drainlayer.** If the Drainlayer identified on an active Sewer Permit no longer intends to perform the work, the permit will become null and void unless transferred in writing prior to commencing the work to another Drainlayer who is currently licensed under these regulations. Failure to comply with this provision shall lead to a Notice of Violation for the Drainlayer and may result in loss of the Drainlayer License, or other penalty as described herein.

5.0.8 Schedule of Fees

A schedule of fees is located in Appendix A.

5.0.9 Road Work/Trench Permit

A Drainlayer shall obtain a Road Work/Trench Permit from the DPW prior to commencing work, and obtain a police detail when necessary as determined by the Chief of Police, if the work requires construction in a traveled way of a street or work within a Right of Way. Construction must comply with the DPW’s Road Work/Trench Permit. Open pavement cuts are not allowed unless approved in writing by the DPW.

5.0.10 DIGSAFE

Prior to beginning any excavation of a sewer or drain, the Drainlayer shall contact DIGSAFE at telephone number 1-888-DIG-SAFE to have all underground utilities located. The Drainlayer shall also notify the Sandwich Water District (508) 888-2775
and Sandwich DPW (508) 833-8002 at least three (3) business days before construction is to begin to mark out their respective facilities at the site.

5.0.11 Application for Local Permit

The Drainlayer shall complete a Town of Sandwich Application for Sewer Permit in writing and submit the application to the Director. In addition, the applicant may be required to obtain other state or federal permits, as described in section 5.0.8, prior to issuance of a Sewer Permit. The permit application shall be supplemented by a complete set of design plans and specifications stamped by a registered Professional Engineer in the Commonwealth of Massachusetts, and will include but not be limited to existing conditions, proposed grading and drainage, proposed site layout, proposed sewer profile, details and other information considered pertinent in the judgment of the Director. The permit fees, described in Appendix A, shall be paid to the Town at the time the application is filed. The application fee is non-refundable. Applications for Sewer Permits signed by the Drainlayer must be made at the office of the Director.

The Director may require an evaluation of a proposed Sewer Connection be performed by a Massachusetts Registered Professional Engineer, to assess the impact of additional flow on the SMSS. The cost of said evaluation shall be borne by the applicant. A permit application may be denied if the additional flow is determined to have an adverse effect on the SMSS adjacent to and downstream of the proposed connection.

5.0.12 Eligibility

The Town of Sandwich shall only issue permits to Drainlayers licensed in the Town of Sandwich to perform the type of work contained in the Sewer Permit application in accordance with Section 3.0 of these regulations.

NOTE: The Town of Sandwich may deny permits to any applicant who has previously violated, or is currently in violation of, these regulations or any other Town of Sandwich rules, regulations, standards, specifications or details described herein, or has not demonstrated competency to perform the type of work applied for. In addition, the Town of Sandwich may deny permits to any Drainlayer who has not satisfactorily completed or furnished required testing reports or as-builts for previous permits.

5.0.13 Expiration of Permit

a) The Sewer Permit will expire if the work is not initiated within one year (365 days) from the date of issuance. Upon permit expiration, a new permit, including payment of the permit fee, will be required for the future connection and inspection(s).

b) A Sewer Permit will become void if request to cancel the permit is received by either the Owner or Drainlayer who originally applied for the permit. No refunds will be issued for canceled or duplicate permits. No permit shall be transferred to a different Drainlayer unless permission to transfer is granted in writing by the original Drainlayer on a permit.

c) The Town of Sandwich may extend the duration of the permit for a reasonable period. Requests for extension of the permit period must be submitted in writing to the Director in advance of the expiration and must state the reason for request.
5.0.14 Mandatory Inspection of Sewer Work

a) The Drainlayer shall notify the Director or his authorized representative prior to beginning any work and again (if necessary) when that sewer work is available for inspection. Notification is to be provided at least twenty-four (24) hours before the inspection is desired. The Director or his authorized representative will perform inspections on sewers during normal business hours, or as agreed to in advance. No holiday, weekend, or off-hours work shall be allowed except by permission of the Director.

b) It is the responsibility of the Drainlayer to ensure that the sewer is inspected, in its entirety, and that all work is exposed for inspection and constructed in accordance with these regulations. Under no circumstance shall the work be backfilled without an inspection by the Director or his authorized representative.

c) The Director may require re-excavation of a buried Sewer System component if an inspection was not performed at the time of installation.

The Director may need to hire an inspector to insure the construction complies with these regulations. The cost of said inspector shall be borne by the applicant.

5.0.15 Video Camera Inspection

The Director may, at his discretion, require the connection to be inspected using closed circuit television equipment at the Owner’s expense. Video camera inspections shall be performed to inspect for, but not limited to, the following:

a) Joint separation.
b) Pipe sags.
c) Construction debris in sewer line.
d) Properly installed joints.
e) Deformed pipes.
f) Cracks in pipes.
g) Inflow and/or Infiltration.
h) Number of fittings and distance between manholes.
i) Illegal discharge of clear water.

Video camera inspections shall be completed in accordance with the current edition of NASSCO (National Association of Sewer Service Companies) Specifications. If any Sewer System component was not installed correctly, in the sole opinion of the Director, it shall be excavated and re-installed at the expense of the Owner.

5.0.16 Right of Entry

An authorized representative of the Town of Sandwich shall have the right of entry to, upon or through the Owner’s premises for purposes of inspecting Building Sewers or their appurtenances or to determine if any sources of clear water are connected to the Building Sewer. Permission of the land Owner for entry to private land pursuant to this section shall be a condition for all connections to the SMSS.
5.0.17 Performance and Payment Bonds

Where work will be performed on Town property or within a public ROW, a performance bond equal to one hundred percent of the estimated construction cost and a payment bond of the same value shall be provided to the Town of Sandwich at the time application is made for a Sewer Permit. The estimated construction cost shall reflect those costs that the Town may incur, in the opinion of the Director, should it have to complete, alter, and/or repair, all or any part of the work. These bonds shall be issued by a surety company licensed by the Massachusetts Division of Insurance, and shall be in the form provided by the Director. These bonds shall remain in effect until all work under the associated Sewer Permit is complete and approved by the Director. This provision shall not apply to work associated with a Building Sewer or Private On-Site Collection System connection to an Adjacent Sewer Main within public ROW.

5.1 Sewer Connections

A Sewer Permit must be issued before the installation of any Sewer Connection. A Sewer Connection will only be allowed when there is an existing suitable Adjacent Sewer Main. For connections to new or existing buildings, a plan and profile of the Sewer Connection is to be completed by a Massachusetts Registered Professional Engineer and is to be submitted with the Sewer Permit application. The plan and profile of the sewer shall show the proposed sewer including all bends, clean-outs, and manholes, along with the proposed building and all other utilities. In addition, Sewer Connections to existing Sewer Mains shall utilize to the maximum extent possible existing wyes or laterals when available. The Town will make available all information in the form of plans or television inspection logs to determine if a wye or lateral exists to a specific lot or lots. In the absence of records the Town may require that the applicant perform an internal television inspection of the sewer line to determine if and where wyes or laterals exist prior to issuance of a permit.

5.1.1 Minimum Size, Fittings and Clean-outs

a. Building Sewers must be a minimum of six (6) inches in diameter and sized based on the anticipated flows. Building Sewers must have a tee-wye clean-out located (10) feet from the buildings exterior wall.

b. Sewer service is to begin a maximum of ten (10) feet off the inside wall of building foundation.

c. Six (6) inch pipe must be used to within ten (10) feet of the building, at which point the plumbing regulations will be adhered to. If a four (4) inch pipe extends from the building, a four (4) to six (6) inch Fernco Flexible Coupling (or approved equal) shall be used in joining the six (6) inch to the four (4) inch pipe. A licensed plumber must perform all work within ten (10) feet of the building.

d. All changes in direction are to be made with either twenty-two and a half (22½) or forty-five (45) degree bends with at least three (3) feet of horizontal pipe between fittings. At a minimum, where two bends are used to form a ninety (90) degree turn, a tee-wye clean-out shall be provided. A clean-out shall be provided every one hundred (100) feet. Where conditions warrant, as determined by the Director, a sewer manhole shall be provided in lieu of a clean-out.
e. All clean-outs must be the same diameter as the horizontal Building Sewer into which the clean-out is connected; minimum of six (6) inches.

f. All clean-outs must be extended to within six (6) inches of finished grade and be provided with a screw on cap. A steel strap or piece of rebar shall be placed on or against the vertical section of pipe to aid in future recovery with a metal detector.

g. If a cleanout is installed under a paved or traveled area, an appropriate size frame and cover shall be provided and brought to grade with courses of barrel block, brick, and mortar. The frame and cover shall be installed as to prevent any load from being transferred onto the PVC riser or screw plug.

h. Crushed stone shall be placed a minimum of six (6) inches above and below and all around the sewer pipe at full width of the trench and around any cleanouts.

i. Slope requirements within the building must conform to the latest edition of the State of Massachusetts Plumbing Code, local codes, and to these standards, whichever is more stringent.

j. Building Sewers must be installed at a minimum slope of 2.00% (1/4” per foot) and a maximum slope of 7.00%. The Town, depending on site conditions, may modify the slope requirements.

k. Sewers must not connect directly into any manhole without the prior written approval of the Director. Inside drop connections to manholes are not permitted, unless prior approval of the Director is granted.

l. Building Sewers must maintain a minimum cover (from finished grade to top of pipe) of three (3) feet. The Town will not accept sewers installed with less than three (3) feet of cover in a right-of-way or easement, unless prior permission has been obtained from the Director.

m. A separate and independent Building Sewer shall be provided for every building. However, where one building stands at the rear of another on an interior lot, both buildings are located in Sandwich, and a connection cannot be constructed to the rear of the building through an adjoining alley, court, yard, or driveway, the Building Sewer from the front building may be extended to the rear building and the whole considered as one Building Sewer. If in the case of a residential accessory structure, an existing separate lateral or tee is to be used if available. If no available lateral or tee exists, the accessory structure may be connected by a wye into the existing house service provided that the entire service is upgraded to PVC. In no case shall a Building Sewer serve more than two buildings.

n. Where flow from multiple Building Sewers is to be collected prior to discharge to an Adjacent Sewer Main, a Private On-Site Collection System shall be provided, except as allowed in the preceding paragraph. Private On-Site Collection Systems may utilize gravity flow or pump systems or a combination of these. Gravity sewers shall conform to the technical requirements for Sewer Extensions. Pump systems shall conform to the technical requirements for pressure sewer systems or wastewater pumping stations and force mains. All requirements for design, construction, inspection, testing, and record drawings shall apply. Plans, specifications, and calculations prepared by an Engineer
shall be provided with the Sewer Permit application for a Sewer Connection. Operation and maintenance of the Private On-Site Collection System shall be the Owner’s responsibility.

o. All commercial, industrial, and residential apartment and condominium buildings with 4 or more units shall use a sewer manhole, in place of a clean-out, outside of the building foundation and for changes in direction.

5.1.2 Service Connections

a. All service connections to new sewer pipe shall utilize a wye fitting.

b. For existing pipe where a lateral or tee does not service a property, a wye saddle may only be used on the Sewer Main with approval of the Director, however, no saddle connections to the sewer will be allowed on existing PVC Sewer Mains. Only rigid slip couplings shall be allowed on PVC Sewer Mains.

5.1.3 Minimum Elevations for Gravity Connection

a. Upon exiting the building, the Sewer must maintain a minimum cover (from finished grade to top of pipe) of three (3) feet. Where an existing sewer pipe exits an existing building with less than three (3) feet of cover, the Drainlayer shall install the connection so as to meet minimum cover requirements as soon as is practical.

b. In cases where the Building Sewer crosses a water main or service with less than eighteen (18) inches of vertical separation between the pipes, the Drainlayer shall completely encase the joints of the sewer pipe with six (6) inches of 3,000 PSI concrete using a form (not free flow). Any joint in the sewer pipe which falls within ten (10) feet measured horizontally from the centerline of the water main or service shall be encased. This encasement must be inspected by the Director prior to backfill. Based on existing or anticipated field conditions, the Director may require additional concrete encasement.

5.1.4 Grease Traps

a. All restaurant and food service establishments, as defined in 105 CMR 590.001 or any successor regulation, shall be equipped with a grease trap which complies with the construction and maintenance specifications set forth in Title V of the State Environmental Code 310 CMR 15.05 and 314 CMR 7.00.

b. All grease traps shall be installed on the exterior of the building and shall be located as to be readily and easily accessible for cleaning and inspection. Grease traps shall not be installed unless tested, rated and bear the seal of acceptance from the State Plumbing Board or approved by the Director.

c. Installation of a grease trap shall require the installation of an inspection manhole, immediately downstream of the grease trap. This inspection manhole shall be used to confirm the serviceability of the grease trap.

d. Where pretreatment or flow-equalizing facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the Owner at his own expense and reported to the Director on an annual basis.
e. Grease traps shall be equipped with devices to control the rate of water flow through the traps so that the flow rate does not exceed the rated design flow of the grease traps.

f. The waste from food and waste grinders shall not discharge to the Sewer System through a grease trap or otherwise.

g. The use of water-cooled grease traps is prohibited.

h. In the maintaining of these grease traps, the Owner(s) shall be responsible for the proper removal and disposal by appropriate means of the captured material and shall maintain records of dates and means of disposal that are subject to review by the Director and the Board of Health. Licensed waste disposal firms must perform any removal and handling of the collected materials.

i. Failure to properly maintain a grease trap shall be a violation of these regulations.

j. The Director, or Sandwich Board of Health, may require installation, use and maintenance of monitoring equipment, keeping records and reporting the results of such monitoring to the Director and Board of Health. Such records shall be made available upon request by the Director to other agencies having jurisdiction over the wastewater treatment facilities discharges. Sampling frequencies for year round food preparation establishments shall be on a semi-annual basis or as established by the Director.

k. FOG shall not exceed 100 mg/l from any establishment.

l. Food preparation businesses and other FOG dischargers must obtain a grease trap permit from the Board of Health prior to discharge, or prior to the expiration date of any previously issued permit. Permits are valid for two years from the date of approval, and are not transferable. Each business for which a grease trap permit is required shall be charged a fee for such permit in an amount established by the Town. The Town will conduct random tests in permitted businesses. In the event a discharge sample exceeds the above 100 mg/l limitation, the Owner of the food preparation business or other FOG discharger will be billed the cost for sampling and retesting. Such a failure on two consecutive tests shall constitute a violation of this regulation. A change in ownership of the food preparation business or other FOG discharger requires a new application, permit and fee. Applications for renewal of grease trap permits must be submitted 60 days prior to expiration date of the existing permit. The permit application can be obtained from the Board of Health.

5.1.5 Oil and Sand Interceptors

Grease, oil, and sand interceptors shall be provided at the Owner's expense when, in the judgment of the Director, these devices are necessary for the pretreatment of wastewater containing excessive amounts of grease and oil, or sand; except that such interceptors shall not be required for residential users. All interception units shall be of a type and capacity approved by the Director and shall be so located to be easily accessible for cleaning and inspection. Such interceptors shall be inspected, cleaned, and repaired regularly, as needed, by the user at their expense. The Owner shall be responsible for the proper removal and disposal by appropriate means of the captured materials and shall maintain records of the dates and means of disposal, which shall be subject to periodic
review by the Director. Any removal and hauling of the collected materials shall be performed by currently licensed waste disposal firms.

5.1.6 Industrial Connections

a. When required, the Owner of any property serviced by a Building Sewer carrying industrial wastes shall install a suitable control manhole together with such necessary meters, and other appurtenances in the Building Sewer to facilitate observation, sampling, and measurement of wastes. Such manhole, when required, shall be accessible and safely located and shall be maintained by the Owner so as to be safe and accessible at all times.

b. The Director or other duly authorized employees or agents are authorized to obtain information concerning industrial processes which have a direct bearing on the kind and source of discharge to the wastewater facilities. The industry may withhold information considered confidential. However, the industry must establish that disclosure of the information in question to the public might result in an advantage to competitors.

c. When requested by the Director or other duly authorized employees or agents, or Sandwich Board of Health, a user must submit information on the nature and characteristics of its wastewater within sixty (60) days of the request. The Director is authorized to prepare a form for this purpose and may periodically require users to update this information.

d. When required by the Director, the Commonwealth of Massachusetts Department of Environmental Protection (DEP), or U.S. Environmental Protection Agency (EPA), industrial users may be required to provide wastewater pretreatment as necessary to comply with this Regulation or specified limits, prohibitions, and requirements within the time limitations specified by EPA, DEP, or the Director, whichever is more stringent. All facilities required to achieve and maintain compliance shall be provided, operated, and maintained at the user's expense. Detailed plans describing such facilities and operating procedures shall be submitted to the Director for review, and shall be acceptable to the Director and the DEP before such facilities are constructed. The review of such plans and operating procedures shall in no way relieve the user from the responsibility of modifying such facilities as necessary to produce a discharge acceptable to the Town.

5.1.7 Inspection

a. At the time of inspection, the sewer shall be connected to the building plumbing. No portion of the sewer may be backfilled, except for the bedding described herein, until the Town has completed its inspection. All pipe installed shall be inspected by the Director or his designee prior to approval. The pipe shall be bedded and backfilled to the springline of the pipe with the specified 3/4-inch crushed stone (to a minimum of 6-inches below the invert of the pipe). Once the pipe has been inspected, the Drainlayer may then complete the stone and gravel backfill as specified above. No stones or other materials greater than 6 inches shall be allowed within the backfilled trench. The Drainlayer shall contact the Director a minimum of 24 hours prior to the inspection request, and again when ready for inspection.

b. The Director and other duly authorized employees or agents of the Town bearing proper credentials and identification shall be permitted to enter all private properties through which the Town holds an easement for the purposes of, but not limited to, inspection,
observation, measurement, repair and maintenance of any portion of the wastewater facilities or storm drain facilities lying within said easement. All entry and subsequent work, if any, on said easement shall be done in full accordance with the terms of the easement pertaining to the private property involved.

c. At the time of inspection, the Drainlayer shall have prepared an as-built sketch of the service connection. The as-built shall include three measurements to fixed locations for the connection at the property line, cleanouts, bends, and Fernco.

5.1.8 Grinder Pumps and Sewage Ejectors

In cases where the existing sewer will not drain by gravity to the Sewer System, a pump system shall be designed and installed in accordance with Section 6.5.

5.1.9 Testing of Service Connections

Vacuum testing will be required for all manholes (See Section 6). Air pressure tests may be required in some circumstances or when private Sewer Mains have been installed on a lot or estate as part of a permitted Sewer Connection (See Section 6).

5.2 Sewer Extensions

5.2.1 Design

All Sewer Extensions shall be designed by a Massachusetts Registered Professional Engineer in accordance with TR-16, these regulations, and the Sanitary Sewer Design and Construction Details. All sizes, slopes and materials are to adhere to TR-16. Stamped plan and profile along with associated details of the Sewer Extension, and specifications shall be submitted to the Director with the permit application for review.

The Director may elect to have the design reviewed by a Massachusetts Registered Professional Engineer. The cost of said review shall be borne by the applicant.

5.2.2 Master Plan

All Sewer Extensions shall be designed to conform to the current Town of Sandwich Sewer Master Plan, or applicable documents as approved by the Director. In no case shall a Sewer Extension be approved or installed unless the proposed sewer provides the proper sewer pipe material, size, depth, and alignment to achieve the current and future goals or intent of the Master Plan or applicable Town planning documents.

In the absence of a Master Plan, or as an interpretation or clarification thereto, the Director may reasonably require a particular material, size, depth and alignment of a proposed Sewer Extension be modified to allow for future sewer service.

5.2.3 Future Connections

Where a Sewer Main is to be laid in front of or adjacent to a property, a provision for future connection(s) of that property shall be provided by the Drainlayer and documented on the as-built plan.
For future connections of Building Sewers to the Sewer Main extension, wye connections and laterals shall be installed adjacent to each property that the Sewer Extension passes. Laterals shall extend past the proposed edge of pavement, to the edge of the right-of-way unless otherwise approved by the Director. A standard 2”x4” with the top four feet painted green must be installed at the end of the plugged wyes or laterals and the locations of each shall be recorded on the as-built plan.

5.2.4 Minimum Size

No gravity Sewer Main shall be less than eight inches (20 cm) in diameter.

5.2.5 Depth

In general, sewers should be designed deep enough to drain basement fixtures and to prevent freezing. Insulation shall be provided for sewers that cannot be placed at a minimum depth of four (4) feet. This minimum depth shall be taken as the distance from the existing ground surface to the top of the pipe.

5.2.6 Slope

All sewers should be so designed and constructed to give a velocity when flowing full of not less than 2.0 feet per second (0.61 m/s) based on Manning’s formula using an “n” value of 0.013. Use of other “n” values may be permitted by the Director if deemed justifiable on the basis of research or field data presented. The following minimum slopes may be used only if absolutely necessary because of grade restrictions; however slopes greater than these are desirable.

<table>
<thead>
<tr>
<th>Sewer Size</th>
<th>Minimum Slope in Feet (m/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 inch (203mm)</td>
<td>0.004</td>
</tr>
<tr>
<td>10 inch (254mm)</td>
<td>0.0028</td>
</tr>
<tr>
<td>12 inch (305mm)</td>
<td>0.0022</td>
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<tr>
<td>14 inch (356mm)</td>
<td>0.0017</td>
</tr>
<tr>
<td>15 inch (381mm)</td>
<td>0.0015</td>
</tr>
<tr>
<td>16 inch (406mm)</td>
<td>0.0014</td>
</tr>
<tr>
<td>18 inch (457mm)</td>
<td>0.0012</td>
</tr>
<tr>
<td>21 inch (533mm)</td>
<td>0.0010</td>
</tr>
<tr>
<td>24 inch (610mm)</td>
<td>0.0008</td>
</tr>
<tr>
<td>27 inch (686mm)</td>
<td>0.00067</td>
</tr>
<tr>
<td>30 inch (762mm)</td>
<td>0.00058</td>
</tr>
<tr>
<td>36 inch (914mm)</td>
<td>0.00046</td>
</tr>
</tbody>
</table>

5.2.7 Minimize Solids Deposition

The pipe diameter and slope shall be selected to obtain the greatest practical velocities to minimize settling problems. Oversizing of sewers in order to justify using flatter slopes is discouraged. If the proposed slope is less than the minimum slope of the smallest pipe which can accommodate the design peak hourly flow, the actual depths and velocities at minimum, average and maximum day and peak hourly flow for each design section of the sewer shall be calculated by the Design Engineer and submitted to the Director.
5.2.8 Slope Between Manholes

Sewers shall be laid with uniform slope between manholes.

5.2.9 High Velocity Protection

Velocities greater than 10 feet per second (3.0 m/s) will not be permitted under any flow conditions, unless adequate special provision is made to protect against displacement by erosion and impact.

5.2.10 Steep Slope Protection

Sewers on 15 percent slopes or greater shall be anchored securely to prevent displacement.

5.2.11 Impervious Dams

Impervious dams shall be provided every 100 feet or between each manhole to manhole segment to control the flow of groundwater within the pipe bedding material.

5.2.12 Alignment

In general, sewers 30 inches or less in diameter should be laid out in a straight line and alignment should be checked with a laser beam.

5.2.13 Changes in Pipe Size

When a smaller sewer joins one of a larger diameter, the invert of the smaller sewer should be raised sufficiently to maintain the same energy gradient. An approximate method for securing these results is to match crowns.

5.2.14 Manhole Locations

Manholes shall be installed at the end of each line; at all changes in grade, size or alignment; at all intersections; and distances not greater than 300 feet. Greater spacing may be permitted between manholes with prior approval of the Director.

5.3 Sewer Repairs

5.3.1 If any Building Sewer, Private On-Site Collection System, or Private Sewer System regulated hereunder becomes obstructed or otherwise fails to work properly, notice must be given to the Director or his duly authorized agent. If maintenance or repair work is necessary on private property or on the Building Sewer or Private On-Site Collection System between a building and the connection to the SMSS, the Owner shall pay the cost of such work. Repair work or maintenance of the SMSS on Town Property or within a Town easement will be performed and paid for by the Town of Sandwich. Repair work or maintenance of a Private Sewer System regulated hereunder shall be performed and paid for by the controlling entity of said system. The property Owner(s) affected shall be responsible to determine that the obstruction is not on his property or in his Building...
Sewer or Private On-Site Collection System. In no way will the Town pay for or reimburse any Owner or Drainlayer who performs work on private property as a result of a blockage or maintenance issue on Town property.

5.3.2 A Sewer Permit must be issued before the repair of any sewer service, main, manhole or other appurtenance associated with the SMSS or Private Sewer System regulated hereunder. A completed sketch of the proposed repair shall be included with the Sewer Permit application. This sketch shall show the general alignment of the sewer including any bends, clean-outs, or manholes. The sketch shall also show the proximity of the sewer line to any significant features such as buildings, structures, paved areas, and water lines.

5.3.3 At the time of inspection, the Drainlayer shall have prepared an as-built sketch of the repair. The as-built shall include three measurements to fixed locations for the connection to existing pipes, cleanouts, and bends.

5.3.4 The Director may require that a clean-out be installed as part of any physical repair performed, regardless of the scope of the repair, if a clean-out does not exist.

5.4 Disconnections

Prior to the demolition of any building or structure that is connected to the SMSS or a Private Sewer System regulated hereunder, the sewer service for that building or structure must be permanently capped at the Sewer Main or at another location with the approval of the Director. A Drainlayer shall obtain a Sewer Permit for the work, and the work shall be inspected and as-built plan submitted to the Director.

5.4.1 Credit for Existing Flow

For buildings being demolished for the purpose of constructing a new building or buildings on the same lot, the estimated average daily flow per 314 CMR 7.15 of the existing structure will be credited towards the proposed average daily flow of the proposed structure(s) in the fee calculation as provided in Appendix A under the following circumstances:

a) The existing building(s) was in existence and connected to the Sewer System within two (2) years of the new building connection Sewer Permit application;

b) The existing buildings(s) are located on the same lot;

c) A valid disconnection Sewer Permit was issued prior to demolition.

However, in no event will a credit be issued or refund given if the proposed flow is less than the existing flow.

6.0 Technical Requirements

Note: A number of technical standards are also included in section 5.1 and 5.2.
6.1 Trench Excavation and Backfill

6.1.1 Traffic Control & Safety

a. Work zone areas including construction signing, drums, barricades, and other devices to protect road users and workers shall conform to the most recent manual on uniform traffic control devices (MUTCD) and Massachusetts amendments.

b) If work is being performed in a travelled way, it shall be at the discretion of the Chief of Police to require an assigned Police Detail to any and all work performed in the travelled way.

c) Any work within a State Highway shall be coordinated with MassDOT.

d) All trench work shall comply with the DPW’s Road Work/Trench Permit, including OSHA regulations, G.L. c87A, 520 CMR 14.00, and 29 CFR 1926.650 et. Seq. entitled subpart p – excavations.

6.1.2 Materials

a. Trench Backfill

Trench backfilling operations performed within Right-of-Way or paved areas shall be backfilled in accordance with the DPW’s Road Work/Trench Permit and these regulations.

Trench backfilling operations performed out of Right-of-Way or paved areas shall consist of the placement and compaction of common backfill material. No backfill shall be placed on or against structures, pipes, or any other masonry until the Director or its authorized agent has performed a visual inspection. Unacceptable material shall be removed at the direction of the Director.

b. Crushed Stone

Material for pipe bedding shall be 3/4 inch minus crushed stone, having reasonably even gradation from coarse to fine, in accordance with the MassDOT Standard Specifications M2.01.0 (Sect. 230.61).

c. Common Backfill Material

Common backfill material is herein classified as the material generated during trench excavation operations. This material may be reused for trench backfill with approval by the Director, within the approved areas as indicted above, provided the material is suitable and that all stones greater than 4 inches in diameter are removed from the material prior to placement and compaction.
d. **Bituminous Concrete**

Bituminous concrete shall be hot mix asphalt, as specified by Section 460 of the MassDOT Standard Specifications. Drainlayer shall replace bituminous concrete in two lifts, binder and wearing course in thickness equal to or greater than adjacent pavement, or as specified by the Sandwich DPW. In no case shall compacted pavement thicknesses be less than 2" binder and 1" wearing course.

### 6.2 General Construction

#### 6.2.1 Clearing the Right of Way

Where clearing of the right of way is necessary, it shall be completed prior to the start of the trenching. Trees and brush shall be cut as near to the surface of the ground as practicable and piled for disposal. Drainlayer shall remove all organic material, grub stumps and strip loam & subsoil to granular mineral material. The Drainlayer shall observe all state laws relating to fire permits and local regulations relating to burning such materials. Under no conditions shall excavated materials be permitted to cover brush or trees prior to clearing and disposal. In accordance with MassDOT Standard Specifications (Sect 101).

#### 6.2.2 Pavement Removal and Replacement

All bituminous and concrete pavements, regardless of the thickness, shall be saw-cut where required prior to excavation of trenches. Width of the pavement cut shall be at least twelve (12) inches greater than the required width of the trench at ground surface on each side and this material shall be removed to a depth of seven (7) inches. Pavement removed during excavation shall be piled separately from the earth spoil and removed from the site and shall not be used in backfilling the trench. After the trench has been backfilled and compacted according to the design specifications, the Drainlayer shall bring the trench to a smooth even grade at the proper depth below the existing surface to provide for the required depth of pavement. The Drainlayer shall saw-cut the existing pavement to a straight line and remove any pavement that has been damaged during work as required by the Director of Public Works and or the Director. The entire existing paved surface shall be cleaned and the sawn edges prepared with tack before resurfacing is begun. The trench shall be repaired per the specifications set forth in the Road Work/Trench Permit issued by the Sandwich DPW.

#### 6.2.3 Blasting

Blasting for excavation will be permitted only after securing approval of the Sandwich Fire Department and only when proper precautions are taken for the protection of persons and property. The Drainlayer at his own expense shall repair any damages caused by the blasting. The Drainlayer’s methods of procedure and blasting shall conform to all applicable State laws and municipal ordinances.
6.2.4 Trench Width

In all cases, trench width shall be confined to dedicated right-of-way for public thoroughfares or within areas for which construction easements have been obtained, unless special arrangements have been made with the affected property Owners beforehand and approved by the Director.

6.2.5 Grade

The bottom of the trench shall be carried to the lines and grades shown on the Plans or as established by the Design Engineer, with proper allowance for pipe thickness and for proper bedding.

6.2.6 Shoring, Sheeting, and Boxing of Trenches

Whenever necessary to prevent caving during excavation in gravel, sandy soil, or other unstable material, the trench shall be adequately sheeted and braced. Failure to comply with proper applicable OSHA standards with regard to; sheeting, shoring, or bracing shall be cause for a Notice of Violation. All sheeting, shoring and bracing of trenches shall conform to those standard requirements.

6.2.7 Location of Excavated Materials

During trench excavation, the Drainlayer shall locate the excavated material so it will not obstruct a traveled roadway or street; and, unless otherwise approved by the Director, all streets and roadways shall be kept open to at least one-way traffic, or as directed by the Sandwich Police Department.

6.2.8 Debris

No groundwater, septic water, gravel, stones, etc. shall enter the sewer during construction. The Drainlayer shall be responsible to protect the sewers from these occurrences.

6.2.9 Safety

The Drainlayer shall be responsible for the proper excavation and safety measures during construction. All work shall be in accordance with OSHA standards. The Town of Sandwich is not responsible for proper safety standards employed by the Drainlayer and accepts no responsibility for accidents.

6.2.10 Removal of Water

a) The Drainlayer shall provide and maintain ample means and devices with which to promptly remove and properly dispose of all water, including flow from existing sewer lines, entering the trench excavation during the time the trench is being prepared for the pipe laying, during the laying of the pipe, and inspection, until the backfill above the pipe has been completed accordingly.
b) The Drainlayer shall be responsible for dewatering the trench. If the Drainlayer wishes to dewater into a Town of Sandwich Storm Drain, the Director must approve any and all means for the transfer, treatment and disposal thereof before any discharge occurs.

c) The Drainlayer shall dispose of the water and or sewage in accordance with state and local regulations. Precautions against sedimentation control must be maintained at all times.

6.2.11 Trench Backfill Compaction

After the Drainlayer has backfilled the pipe zone of the trench as required, he shall then backfill the balance of the trench, mechanically compacting each layer to 95% of maximum density in roadways and 90% in all other areas. Where fill is required, use approved backfill material as indicated in Section 6.1.2.

6.2.12 Excess Excavated Material

All excess excavated materials shall be hauled and properly disposed of by the Drainlayer. The Drainlayer shall make his own arrangements for the disposal of the excavated material.

6.2.13 Rock Excavation

Before proceeding with rock excavation, the Drainlayer shall have completed the common excavation to such depths that only rock excavation remains. At this time the trench shall be made available to the Design Engineer and measurements will be taken to determine the amount of rock excavation remaining. Any redirection of a Sewer Connection to avoid ledge outcrops must be approved by the Director.

6.2.14 Controlled Density Fill

Controlled Density Fill (CDF) where required, shall be Type 2E Flowable and Excavatable as specified by MassDOT Standards Specifications M4.08.0. CDF may be approved as an alternative to “Gravel for Trench Backfill.”

The use of CDF as approved backfill material shall be performed as indicated in the Road Work/Trench Permit.

Drainlayer shall provide steel plates k-36 steel (k-56 recommended) to span trenches or otherwise prevent traffic or construction equipment coming in contact with CDF until the CDF has hardened sufficiently to prevent rutting. Drainlayer shall provide cold patch on all edges of steel plates used for vehicular transition in any affected area.
6.3  Sewer Pipe Installation

6.3.1  Scope

This item shall include the work necessary for the installation of sewer pipe and fittings of the sizes and classes indicated, including but not limited to furnishing materials, placing crushed gravel pipe base, providing bell holes in the trench bottom; laying and jointing the pipe; installing sewer tees, wyes and laterals; furnishing pipe necessary for physical test; and testing of the line. Ductile iron pipe shall be used when the sewer line is to be located less than three (3) feet below existing finished grade where allowed by the Director.

6.3.2  Materials

All materials used in new sewer construction must have a useful design life of 50 to 100 years. The use of pipe, couplings, or any other material that does not meet the design life requirement is prohibited. The primary sewer and Building Sewer pipe material shall be SDR-35 PVC. Cement lined Ductile Iron Pipe, High Density Polyethylene (HDPE), and Reinforced Concrete Pipe (RCP) will be considered on a case-by-case basis by the Director.

6.3.3  Joints

All gravity pipe joints shall be push-on types with proper gaskets for sealing the Sewer. Where push-on joints are not feasible, rigid slip couplings or mechanical joint couplings shall be used. Fernco type joints will only be allowed with prior approval of the Director. When Fernco joints are used they shall be provided with stainless steel shear bands or encased in concrete to prevent joint settlement and separation.

6.3.4  Preparation of Trench

Crushed stone base for pipe shall be placed in the trench to a minimum depth of six (6) inches below the invert of the pipe. The base shall be placed and leveled to approximate flow line grade in advance of the pipe laying. Immediately following the placement of each pipe, the crushed gravel pipe base shall be placed to the centerline of the pipe and properly chinked.

6.3.5  Preparation of Sewer Pipe

All pipes and fittings shall be carefully inspected before being laid and no cracked, broken or defective pipe or fittings shall be used in the work. The ends of the pipe shall be cleaned with a brush, washed and thoroughly scrubbed where necessary to remove dirt or other foreign material.

Extreme care shall be exercised to insure that the inside surfaces of the bell are smooth and free from any projections which would interfere with the assembly or water tightness of the joint.
6.3.6 Laying and Jointing Pipe and Fittings

Sewer pipe shall be laid in full lengths as manufactured and shall be laid on a constant grade and in a straight alignment from manhole to manhole or clean-out. Wherever possible, pipe shall not be installed with elbows or bends. A manhole shall be located at every change in grade or horizontal alignment, but no more than three hundred (300) feet apart unless approved by the Director.

The Drainlayer shall layout his own work and be responsible for the execution of the work to such lines and grades to comply with the specifications stated herein.

PVC pipe is flexible in nature and may be out of grade and alignment through the middle of a pipe length even though each end is on grade and in alignment as evidenced by a laser beam or grade boards. To prevent the above situation from occurring, the Drainlayer shall check the elevation of the top of each length of PVC pipe laid at each end and at the midpoint. The midpoint elevation shall be within 0.01 foot of the average elevation of the two ends.

6.3.7 Sewer Installation

PVC Sewer Pipe shall be installed in accordance with the manufacturers recommended installation procedures.

PVC Sewer Pipe shall be connected to concrete manholes by means of an approved coupling with an elastomeric gasket. Use of Portland Cement grout for connecting PVC Sewer Pipe to manholes will not be permitted. Pipe laying shall proceed upgrade with the bell ends of bell and spigot pipe pointing in the direction of flow (uphill). Each piece shall be laid true to line and grade and in such a manner as to form a closed concentric joint with the adjoining pipe in order to prevent any sudden offsets in the flowline.

All Sewer mains shall be installed using a laser or other approved means to insure correct line and grade. The Drainlayer is responsible for the line and grade of the pipe.

Every precaution shall be taken to prevent foreign materials from entering the pipe while it is being placed in the trench. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe. The Director or their representative shall inspect any and all piping before backfilling occurs. No de-watering of the trench shall take place into the sewer pipe or any appurtenance.

Sewer pipe shall be bedded in ¾ inch crushed stone six inches above and below the pipe and at full width of the trench. The Drainlayer shall backfill the sewer line with approved material, which is free of stones larger than six inches or 50 pounds.

No gravity sewer, lateral connection, or sewer manhole shall allow the introduction of rainwater, surface drainage, groundwater or any other source of inflow to the Sewer System.
No transition of pipe diameter or material is allowed between manhole sections, unless approved by the Director.

If, due to topography, the sewer is more than approximately three (3) feet deeper than is required for the service connection depth, then a chimney is to be used to reduce the depth and associated cost of the lateral service connection. Refer to the Design and Construction Details for installing chimneys.

Service lateral wye branches shall be located as indicated on the plans or specified by the Director. Sewer laterals shall be provided for every home or buildable lot. Final service lateral locations may be determined in the field after consultation with the property Owner. The 6-inch side outlet shall be installed at an angle of approximately 45 degrees above the horizontal. After the Wye is in position, special pipe bedding material and select backfill shall be hand-placed and chinked around the Wye to prevent any movement of the next pipe.

The sewer lateral will be installed to the edge of the right-of-way unless otherwise directed by the Director. The service lateral outlet shall be plugged with a 6-inch plug and marked with a standard 2”x4” painted green.

Upon completion of the sewer, a Registered Professional Engineer shall complete an as-built plan and profile drawing. See Section 8.0 Record Drawings for more information.

6.3.8 Testing of Sewer Pipe & Appurtenances

After completion of the Sewer Main and all laterals, the Drainlayer shall hire an approved independent testing service to conduct low-pressure air leakage tests on all sections of new sewer and negative air pressure tests on all new manholes using ASTM and Town of Sandwich Standards outlined in Section 7 of this document.

Prior to final operation of a Sewer Main extension or Building Sewer, the Director may also require the following additional testing to identify defects and/or sources of infiltration/inflow (I/I):

a) Video camera inspection of all lines in the presence of the Director.
b) Smoke testing of all lines in the presence of the Director.
c) Deflection testing of all lines in the presence of the Director.
d) Site inspection of the Owner’s premises, including the interior of the building.

6.4 Manhole Construction

6.4.1 Design Requirements

Manholes shall be pre-cast concrete with O-ring or bituminous-based gasketed joints or poured-in place concrete type, and shall conform to ASTM C478-97 except as modified herein. Manholes shall be designed for "Normal Sanitary Exposure" (Z=115) with a minimum 28 day compressive strength of: \( f'c = 4,000 \)
psi. Reinforcing Steel shall be ASTM A615 grade 60 deformed bars. Minimum reinforcing steel in all concrete sections shall be no less than 0.003 times the gross area of the concrete section. Concrete cover on reinforcing steel: 1½ inches minimum.

Manholes shall have a minimum of 5" thick walls at the base, tapering to not less than 8 inches at the top, top slabs and base slabs, and be designed to a live load on top slab = HS-20 vehicular loading.

6.4.2 Precast Manhole Sections

Precast concrete sections for manholes shall be minimum of 48 inches in interior diameter. Cones shall be eccentric. The tops and bottoms of the cones shall be parallel. Any manhole having a depth greater than nine (9) feet shall have an extended base.

6.4.3 Special Fittings

The wyes, tees, and bends used in the construction of the drop manholes assembly and the clean-outs shall be either PVC or ductile iron. The pipe and fittings shall conform to the specifications as set forth in these Specifications. Drop manhole assemblies shall be encased in concrete or as required by the Director.

6.4.4 Drop Manholes

A drop pipe should be provided for a sewer, with an invert entering a manhole at an elevation of 24 inches (61 cm) or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 24 inches (61 cm), the invert shall be filleted to prevent solids deposition. Drop manholes should be constructed with an outside drop connection where appropriate. Outside drop connections shall be encased in concrete. Inside drop connections, where necessary, shall be secured to the interior wall of the manhole and provide access for cleaning. Inside drop manholes will only be allowed if the manhole diameter is 60 inches or greater.

6.4.5 Manhole Frames and Covers

All manhole frames and covers shall be of a size and shape detailed on the plans or approved equal. The castings shall be tough, close-grained, gray iron, free from blowholes, shrinkage and cold shuts. They shall conform to ASTM A 48 - Class 30 and shall be sound, smooth, clean and free from blisters and all defects. All castings shall be planed and ground where necessary to ensure perfectly flat and true surfaces. Covers shall be true and shall seat within the ring at all points.

All Manholes shall have the word “SEWER”, cast upon the cover and be American made.
6.4.6 Watertightness

Solid manhole covers shall be used and watertight manhole covers are to be used in areas subject to flooding. Manhole lift holes and grade adjustment rings shall be sealed with a non-shrinking mortar or other material approved by the Director. Inlet and outlet pipes shall be joined to the manhole with a gasketted flexible watertight connection or other watertight connection arrangement that allows differential settlement of the pipe and the manhole to take place.

6.4.7 Coating

The exterior surfaces of all manholes shall be given two (2) heavy coats of bituminous waterproofing material.

6.4.8 Manhole Steps

Steps for precast manholes shall be polyethylene coated steel safety type designed with a minimum concentrated live load of 300 pounds. All steps shall be in conformance with ASTM C478-06 for load carrying capacity and pull out resistance and shall be aligned vertically. All steps within a manhole shall be of the same design, type and size. Mixing of unmatched steps within the same manhole is not permitted. Manhole steps shall be cast into walls of the precast section so as to form a continuous ladder with a distance of 12-inches between steps.

Steps shall be placed where there are no incoming or outgoing lines. Loose steps shall be cause for rejection of that manhole cone or section.

6.4.9 Manhole Stubs

Provide plugged manhole stubs for Sewer Extensions as shown on the plan or as required by the Director. The intent of the plugged stub is to provide a means by which future sewer lines can be connected to the manhole with a minimum of inconvenience. Construct invert channels to the manhole wall at the plugged stub in accordance with the invert elevation directed by the Design Engineer.

6.4.10 Manhole Bench (Table)

A bench shall be provided on each side of any manhole channel wherever practical. The bench should be sloped no less than ½ inch (13 mm) per foot (305 mm) (4 percent) or greater than 1.0 inch per foot. No lateral sewer, service connection, or drop manhole pipe shall discharge onto the surface of the bench. The bench shall be constructed of brick masonry.

6.4.11 Manhole Inverts (Flow Channel)

The manhole inverts shall provide a smooth flow-through characteristic. No sharp edges or rough sections that will tend to obstruct the flow of sewerage will be permitted. The flow channel through the manholes shall be made to conform in shape and slope to that of the sewers entering and leaving the manholes. The
top of the flow channel shall be constructed so that under the peak design conditions the flow will remain in the channel. The channel walls should be formed or shaped to the full height of the crown of the outlet sewer in such a manner to not obstruct maintenance, inspection or flow in the sewers. When curved flow channels are required in manholes, including branch inlets, minimum slopes should be increased to maintain acceptable velocities. A minimum 0.1’ drop shall be provided through the manhole.

Inverts shall be constructed of brick and mortar. The brick shall be sound, hard and uniformly burned brick, regular and uniform in shape and size, of compact texture, and satisfactory to the Director. Designation M32-73, AASHO M91-42, red sewer brick only Grade S.A. Brick shall comply with the ASTM Standard Specification of sewer and manhole brick (made from clay or shale). The mortar shall be composed of Portland cement, hydrated lime and sand in which the volume of sand shall not exceed three (3) times the sum of the volume of cement and lime. The proportions of cement and lime may vary from 1:1/4 for hard brick to 1:3/4 for softer brick, but in no case shall the volume of sand exceed 3 times the sum of the volume of cement and lime.

6.4.12 Buoyancy

Buoyancy of manholes shall be considered and floatation shall be prevented. The precast concrete structure shall be sized to resist floatation. A Factor of safety of 1.15 shall be used against floatation based on weights of empty structure and soil directly over footing extensions. The base slab may be extended beyond the face of the wall to provide additional resistance to flotation. Ground water shall be assumed to originate at finish grade.

6.5 Grinder Pumps and Sewage Ejectors

6.5.1 In cases where the existing sewer will not drain by gravity to the sewerage system, a pump system shall be employed. A pump system shall include a precast pump chamber, with a minimum storage capacity of 24 hours of the design flow, a grinder style pump (1/2-horsepower or larger), a discharge pipe rated for pressure in excess of 150 PSI, and a receiving manhole.

6.5.2 Pump systems are to be designed by a Massachusetts Registered Professional Engineer in accordance with TR-16.

6.5.3 Discharge pipes shall be bedded in clean sand.

6.5.4 Connections to low-pressure collection sewers shall include a curb box type shut off valve at the property line in conformance with the low-pressure collection sewer manufacturer’s recommendations.

6.5.5 Pump system connections to the SMSS shall be allowed only as approved by the Director. At no time shall a pump system discharge tie directly into any gravity Sewer Main. The pump system discharge pipe shall connect to a sewer manhole, and then the connection shall flow by gravity to the existing Sewer Main.
6.5.6 Pumps and holding tanks must be external to the building similar to an E-One pump station. Any backup into the building will be the sole responsibility of the property Owner. The Town of Sandwich is not liable or responsible in any way for damages due to sewage backups served by grinder/ejector pumps, or the discharge line itself. The operations, maintenance, repair and replacement of the pump and appurtenances shall be the sole responsibility of the property Owner. This also includes the discharge pipe and/or gravity Sewer from the building to its connection into the SMSS.

6.5.7 Wiring and electrical connections should be NEMA rated for the environment in which they are to be placed.

6.5.8 Level sensing devices should be used to detect wastewater levels for initiating pump operation and to detect high water levels. Level sensing devices are recommended over mercury float-type switches. These devices should not be located near flows entering the well.

6.5.9 Inspection of pump system shall be performed by the Director. Drainlayer shall provide water and shall run the pump through several cycles. Connection shall be inspected for workmanship and materials, and either be passed or failed at the time of inspection. The Town of Sandwich Building Department shall inspect all wiring.

6.6 Pressure Sewer Systems

Wastewater can be conveyed to the pressure sewer using various approaches, such as septic tank effluent pumping (STEP) or grinder pumps. A pressure main is common to both systems. In addition, components such as isolation valves, air release valves, and cleanouts make up a pressure Sewer System.

6.6.1 Layout

The branched configuration of a pressure sewer is similar to that of a conventional gravity Sewer System. Looped piping is not permitted. Pipe routing should include long radius sweeps no less than those recommended by the pipe manufacturer. Pressure pipes should be deep enough to prevent freezing.

6.6.2 Pipe Size

Size the diameter of the pressure sewer so that it provides a cleansing velocity based on the average daily flow of the system.

6.6.3 Pipe Material

Shall be HDPE or welded PVC as approved by the grinder pump manufacturer, and provide the necessary working pressure rating for the system to provide durability during installation and operation.
6.6.4 Valves

Curb box shut off valves shall be provided at the property line on each service line. In addition, isolation valves should be considered where system expansion is projected, and at key locations on very long runs.

6.6.5 Air Release Valves

To release air trapped in the pressure lines, site air release valves at high points in the system and as recommended by system manufacturers. Air release valves should be located in a manhole or structure to allow access for repair and maintenance.

Also, place air release manholes at least 14 pipe diameters downstream of the locations where hydraulic jumps occur. Hydraulic “jumps” form in sections where the pipeline intersects with the hydraulic grade line. Air bubbles formed by hydraulic jump conditions are carried downstream with the wastewater flow.

6.6.6 Cleanout Connections

Provide a means for cleaning out the pressure mains at sags and other locations where debris can accumulate and clog the lines. Provide proper valving to conduct required maintenance.

6.7 Wastewater Pumping Stations and Force Mains

All wastewater pumping stations and force mains shall be designed by a professional engineer in accordance with TR-16, *Guides for the Design of Wastewater Treatment Works*, Prepared by the New England Interstate Water Pollution Control Commission; and the provisions contained herein.

6.7.1 Force Mains

a. Minimum Size:

Minimum force main pipe size shall be 4-inches in diameter. Smaller sizes may be considered for smaller grinder pump systems with approval of the Director.

b. Force Main Pipe Material:

Force main pipe shall be either: High Density Polyethylene (HDPE), cement lined ductile iron pipe, or fusible pressure rated PVC (C-900, C-905). Other pipe materials shall require prior written approval of the Director.

c. Velocity:

At design average flow, velocity in excess of 3 feet per second (0.91m/s) shall be maintained.
When the daily average design detention time, in the force main, exceeds 20 minutes, the manhole and sewer line receiving the force main discharge or the sewage shall be treated so that hydrogen sulfide corrosion of the manhole and the exiting line are prevented.

d. **Force Main Installation:**

The alignment and depth of a force main should provide a constant upgrade profile. In those instances where it is impossible to maintain a constant uphill alignment, automatic air release valves shall be installed at relative high points in the force main. Drain valves shall be installed on relative low point on longer (300'+) and larger (8''+) force mains.

All force mains shall be designed and installed so that a minimum of five (5’) feet of cover material is over the crown (top) of the pipe at all times.

Trenching, bedding, and backfilling shall be as show in the attached details and approved by the authority having jurisdiction over the property, such as but not limited to: MassDOT, Sandwich DPW, and the Director.

Anchorages, concrete blocking, and/or mechanical restraint shall be provided when there is a change of direction of 7-1/2 degrees or greater.

e. **Air Relief Valve:**

An automatic air relief valve shall be shall be specially designed for use with sewage and placed at all relative high points in the force main and at 400 feet intervals on level force main runs. All air relief valves shall be protected from freezing. Odor control shall be provided unless waived by the Director.

f. **Drain Valves:**

Drain valves shall be placed at all relative low points in the force main. These valves shall be connected to gravity sewers or provided with connections for vacuum pumper trucks. All drain valves shall be protected from freezing.


g. **Termination:**

Terminate force mains at receiving manholes by matching the crown elevations of the sewer and force main (or 80% pipe flow elevations).

### 6.7.2 Pump Stations

a. **Design Capacity:**

A sewage pumping station shall handle the projected peak sewage flows of its tributary sewer collection system as recommended by TR-16, Guides for the Design of Wastewater Treatment Works (Technical Report #16) and the Hydraulic Institute’s Recommended Standards for Pumping Stations. This information may be included in the Comprehensive Management Plan or other engineering report and any applicable updates or amendments. Pumping stations
shall accommodate future expansion, when in the opinion of the Director it is appropriate, but in all cases pump station capacity shall be approved by the Director prior to proceeding with design.

b. **Site Layout:**

Pump stations shall be readily accessible to personnel and service vehicles during all weather conditions.

c. **Flood Protection:**

Wastewater pumping stations shall be protected from physical damage by the 100-year flood elevation and shall remain fully operational and accessible during the 100-year flood. All entrances and/or unsealable openings of the station shall be a minimum of one (1’) foot above the 100-year flood elevation. These flood elevations shall be determined from the Federal Emergency Management Agency, and U.S. Army Corps of Engineers, and from local regulations and ordinances.

d. **Environmental Considerations:**

Wastewater pumping stations shall be sensitive to the environmental conditions of the site. Visual impacts, architectural style, security, noise levels, odor control, and landscaping shall be considered carefully in station design and shall be reviewed and approved by the Director.

e. **Types of Pump Stations:**

Wastewater pumping stations fall into three major categories: wetwell/drywell, submersible, or suction lift. The preferred type of pump station in the Town of Sandwich is the submersible type. The Director may approve other types under certain circumstances.

f. **Structural Design:**

- **Earthquake Loads and Uplift Forces:**

  Stations shall withstand earthquake loads and uplift forces from high groundwater conditions.

- **Separation:**

  Pump stations with both a wet and drywells shall have the wet well and dry well be completely separated. Common walls shall be sealed against gas leaks.

- **Equipment Removal:**

  Provisions shall be made for removing all equipment (i.e., pumps, motors, mechanical screens, motor control centers, etc.) from the pump station.
Access openings, hatches, and/or skylights shall be sized accordingly. Permanent hoisting devices shall be provided as necessary.

Substructure:

Station substructures shall be constructed of reinforced concrete, either cast-in-place or precast.

Access:

The designer shall minimize the confined spaces and shall indicate which spaces meet the definition of confined space on the drawings. Suitable, safe, and separate means of access shall be provided for dry and wetwells. Stairways and/or steps are required for drywells and wetwells containing either bar screens or mechanical equipment that requires inspection or maintenance. A landing with railings shall be provided for stairways or ladders for every 10 vertical feet. Local, state and federal safety codes shall govern in all cases.

g. Pumps:

General:

All pumps shall be capable of pumping raw, unscreened wastewater and at a minimum shall be able to easily pass a 3-inch solid or stringy material. A description of the main type of acceptable pumps and their particular design limitations is included in TR-16, Guides for the Design of Wastewater Treatment Works, Prepared by the New England Interstate Water Pollution Control Commission;

Number of Pumps:

As a minimum, two pumps shall be provided, with each pump being capable of handling peak design flows. Where three or more pumps are provided, the overall pump station capacity shall be capable of handling peak design flow when any one pump is out of service.

Incoming Wastewater and Rate Discharge:

Pumping stations shall balance the rate of incoming wastewater with the rate discharged.

h. Wetwells:

Design:

Wet wells shall be constructed of precast or cast-in-place reinforced concrete. The concrete shall have a minimum compressive strength of 5,000 psi at 28 days. Reinforcing steel shall be grade 60 deformed bars and conform to ASTM A615. The top slab shall be H-20 rated. Segmented structures
shall be designed and installed for watertight joints with no leaking at the joints.

**Storage Capacity:**

The effective storage capacity of the wetwell shall be based upon the recommended number of pump starts per hour and the design filling time. The effective volume of the wetwell shall be based on a filling time of 30 minutes or less under design average daily-flow rates. To determine the frequency of starts used for design, refer to the pump manufacturer’s recommendations.

**Pump Protection:**

For large pump stations the Director may require that the pumps be protected from large solids by readily accessible mechanically cleaned bar racks (screen) or combination device located at the wetwell influent. In the case that a bar rack is required, provisions shall be made in the design for the handling and storage of the associated residuals.

**Floor Slope:**

The wetwell floor shall have a minimum slope of 1-to-1 to the hopper bottom. The horizontal area of the hopper bottom shall be no greater than is needed for proper installation and function of the wetwell inlet.

**Vortexes:**

The wetwell, and suction inlets of pumps/inlet piping, shall be designed to eliminate the possibility of vortexes. Consult the pump manufacturer for their recommendations. Every effort shall be made to minimize flow rotation in the wetwell as well.

**Sewage Channels:**

On larger, custom designed, pump stations, sewage channels located in wetwells shall be covered with nonskid, aluminum, corrosion-resistant grating. They shall be installed flush with a floor, and capable of supporting at least 1.5 times the anticipated loads. All channels shall be drained when not in use. Where the side meets the floor of the channel, fillets shall be provided.

**Divided Wells:**

On larger pump stations, where directed by the Director, the wetwell shall be divided into two sections that are properly interconnected and gated to facilitate repair and cleaning.
Inlet Sewers:

Sewer piping entering the wetwell shall be located to avoid air entrainment in the pump/inlet suction line.

i. Drywells:

Lighting, automatic heating, appropriate ventilation for occupied spaces, and dehumidification equipment shall be provided in all drywells. Further requirements and the electrical requirements shall meet those outlined TR-16, *Guides for the Design of Wastewater Treatment Works*.

A sump pump shall be provided in the drywell to remove extraneous water. The discharge pipe of the sump pump shall be equipped with dual check valves and shall be pumped from the drywell into the wetwell above the high water level. Water ejectors connected to a potable water supply shall not be permitted. All floor and walkway surfaces shall slope to a point of drainage. Pump seal leakage shall be piped or channeled directly to the sump.

j. Valves:

Suitable shutoff valves shall be placed on the suction lines and on the discharge lines of each pump (except on submersible and vacuum-primed pumps where valves on the suction side are not required). A suitable check valve shall be placed on a horizontal section of each discharge line between the shutoff valve and the pump. Valves shall not be located in the well. For submersible pump stations valves on the discharge piping (including flow meters, if required) shall be in a separate underground precast concrete vault.

Every pump station shall include appropriate valves and quick disconnects to allow the Town to bypass the existing pumping equipment and valves. The piping shall allow the Town to install temporary piping into the wet well, and discharge to a location downstream of the check and shutoff valves.

k. Controls:

All pump stations and other sewer handling facilities required by the Director shall be connected to the Departments’ Supervisory Control and Data Acquisition (SCADA) System.

All sensing, alarm, and SCADA system devices shall be of the type, configuration, and function as required by the Director. Each pumping station shall have its own screen display, processor logic controller (PLC), and communications equipment for the SCADA system and shall also display the required monitoring controls and alarm on the all SCADA system screens of the water and/or Sewer Systems.

There will be a HAND-OFF-AUTO selector switch at the Control Panel for each pump. In the HAND position, the associated pump shall run
continuously. In the OFF position, the pump will not be allowed to run. In the AUTO position, The PLC will automatically start and stop the pumps based on adjustable LEAD/LAG PUMP ON and LEAD/LAG PUMP OFF elevations. The pumps shall be automatically alternated. The operator will be capable of enabling AUTOMATIC ALTERNATION. In the AUTO ALT position, the pumps will be alternated each time the active pump is cycled and shut down. Once the pump cycle is completed, (i.e., when the pumps shut off), the pumps shall alternate lead and lag position. Running-time meters shall be installed at all pumping stations for each pump.

All wall penetrations between the wet and drywells shall withstand gas leaks and be located as high as possible to prevent overflow from the wetwell to the drywell.

1. **Level Sensing Devices:**

   The pump station PLC will control the activation of the pumps based on liquid level in the wetwell, as measured by a submersible pressure transducer, or a bubbler system as approved by the Director. In addition, backup float switches will be provided for alarm annunciation if the submersible pressure transducer should fail. Level sensing devices shall not be affected by flows entering the wetwell or by the suction of the pumps.

m. **Alarm Systems:**

   Alarm systems shall be provided for all pumping stations. At a minimum, the alarm system shall be activated in any one of the following cases:

   i. Pump Fail;

   ii. High water in the wetwell;

   iii. Low water in the wetwell;

   iv. Loss of one or more phases of power supply;

   v. High water level in the pump room, valve vault, or dry well sump;

   vi. Loss of the alarm transmission or communications;

   vii. Loss of air pressure in the bubbler tube system/level sensing trouble or failure;

   viii. Standby power failure (where applicable);

   ix. Flooding of building or drywell (where applicable);

   x. Smoke/fire alarms (where applicable);

   xi. Low temperature (where applicable);
xii. Surge suppressor failure;

xiii. PLC processor failed;

xiv. PLC low battery;

xv. Intrusion; and

xvi. Provide at least three spare alarm connections for future use.

n. Pump Station Ventilation

General:

Adequate ventilation shall be provided for all pumping stations. Where the pump pit is below the ground surface, mechanical ventilation is required, especially when screens or mechanical equipment requiring maintenance or inspection are located in the wetwell. The wet and dry well ventilation systems shall not be connected. In pits more than 15 feet (4.6 m) deep, multiple inlets and outlets shall be installed. Switches for the operation of ventilation equipment shall be marked and located conveniently. If odors are a problem as determined by the Director, an odor control system shall be installed.

Wetwells:

Ventilation may be either continuous or intermittent for wet wells that can be occupied (not applicable for submersible pump station wet wells). The Director must approve the method selected as it will affect how the space is rated. For continuous ventilation, at least 12 air changes per hour shall be provided. For intermittent ventilation, at least 30 air changes per hour shall be provided. Heating shall be installed where needed.

Drywells:

Ventilation shall be continuous. Heating and dehumidification is required. At least 6 complete air changes per hour shall be provided.

o. Flow Measurement:

Where required by the Director, suitable devices shall be provided for measuring wastewater flow and power consumption at the pump stations.

p. Pump Station Water Supply:

Where required by the Director, water under pressure shall be provided for cleanup at the pumping station. If a public water supply is used, a Reduced Pressure Zone (RPZ) backflow preventer or other approved device shall be installed on the water service entering the station.
q. Electric Equipment:

Electrical systems shall be designed and installed in strict conformance with the latest edition of the Massachusetts Electrical Code. Electrical equipment in enclosed places where gas may accumulate shall be noncorrosive and in compliance with the requirements of the National Electrical Code for Class I Group D, Division I locations.

r. Submersible Pump Motors

Electrical supply and control circuits shall allow disconnection at a junction box located at or accessible from outside the wetwell. Terminals and connectors shall have watertight seals located outside of the wetwell and shall be protected by separate strain relief.

The motor control center shall be located outside of the wetwell and protected by a conduit seal or other appropriate sealing method meeting the requirements of the National Electrical Code for Class I. Division 2 locations.

The pump motor shall meet the requirements or the National Electrical Code for Class 1. Division 2 locations.

Power cords for pump motor shall be flexible and serviceable under conditions of extra hard use. Ground fault interruption protection shall deenergize the circuit in the event of any failure in the electrical integrity of the cable.

Power cord terminal fittings shall be provided with strain relief appurtenances, and shall facilitate field connecting.

s. Emergency Operations:

When the Director deems it is necessary, an independent natural gas or propane engine-generator type source of electric power shall be provided for electrically driven pumps. This source shall be automatically activated when or if any phase of the power supply fails or upon any fluctuation in voltage. Installation shall comply with all applicable requirements of the National Electrical Code.

Small Pumping Stations:

When the Director agrees that a small pump station does not require a permanent alternative power supply, electrical connections for portable standby generator shall be installed as approved by the Director. In this case, additional storage at the direction of the Director shall be provided between the high level alarm elevation and the elevation of the lowest sewer service served by the pump station.
Size:

Unit size shall be sufficient to start up and run all pumps needed to handle peak flows as well as lighting, ventilation, pump controls, and the sump pump.

Exerciser:

The engine controls shall be equipped with an automatic exerciser that may be set on any selected schedule to start the generator, to run it under no-load conditions, and to shut it off without activating the alarm system.

Noise Attenuation:

Noise attenuation components must be incorporated in the design to produce no more than 60 decibles (db) of noise at the property line.

t. Safety

Adequate provisions shall be made to protect the operator and visitors from hazards. The design and construction of pumping stations shall meet all prescribed local, state, and federal safety laws and codes. Safety provisions shall include the following:

1. Handrails at openings, stairways, and other hazardous areas;
2. Guards around the belt drives, gears, rotating shafts, and moving equipment;
3. Warning signs as appropriate;
4. Provisions for power lockout controls at all pumps and equipment;
5. Eye wash stations where chemicals are used;
6. Adequate lighting in all areas of the pumping station;
7. Provisions for confined space entry in accordance with OSHA and regulatory agency requirements;
8. First aid equipment; and

u. Overflows and Bypasses

Overflows shall not be allowed on pumping stations serving sanitary sewage collection systems.
v. Site Protection and Aesthetics:

The Director will review the design and location of the pump stations and may determine that fencing, aesthetics vegetation plantings, intrusion alarms, and aesthetics superstructures style or any other site conditions may warrant site protection and/or aesthetics.

w. Odor Control:

Odor control equipment may be required by the Director, depending on the location of the pumping station and force main discharge point.

6.8 Trenchless Technology

All sewers installed using trenchless methods must be designed by a Massachusetts Professional Engineer, and must conform to slope, grade, and alignment as specified in these regulations. Any alternate materials used in trenchless technologies must meet the minimum requirements as specified in these regulations for conventional materials. The Director will review any proposed trenchless technology on a case-by-case basis.

6.8.1 Existing Utilities

In preparation of pipe jacking or directional drilling activities, an as-built showing any and all existing utilities in the area of work must be verified by test pits or by vacuum hole methods. These field locations must be submitted in lieu of any proposed sewer work.

6.8.2 Pipe Jacking

A specialized tunneling method for installing underground pipelines with minimal surface disruption. Primarily used for new sewer construction, it is also used for sewer replacement and relining.

6.8.3 Horizontal Directional Drilling

Horizontal Directional Drilling (HDD) is a trenchless method for installing any number of utilities. It is a multi-stage process consisting of site preparation, and restoration, equipment setup, and drilling a pilot bore along a predetermined path and then pulling the product back through the drilled space. Alignment of the bore is accomplished by a hydraulic jack as the drill bit head is pushed into the ground. The orientation and tracking of the head is determined by an above ground radio detection device, which picks up radio signals generated from a transmitter on the drill itself.

Drainlayer is responsible for selecting or designing drilling fluids for the site-specific soil and groundwater conditions. Confine free flowing (escaping) slurry or drilling fluids at the ground surface during pull-back or drilling. This can be accomplished by creating sump areas or vacuum operations to prevent damage or hazardous conditions in surrounding areas.
6.8.4 **Boring Path Report**

Furnish a Bore Path Report to the Director within seven (7) days of the completion of each bore path. Include the following in the report:

a) Location of project including the Permit Number and when assigned.
b) Name of person collecting the data, including title, position and company name.
c) Investigation site location.
d) Identification of the detection method used.
e) Elevations and offset dimensions as required.

6.8.5 **As-Built Trenchless Sewers**

Any sewers installed by trenchless methods must meet the required minimum slopes, alignment, and grade as proposed in the original design plans. Any sewers that do not meet the minimum requirements shall be rejected.

7.0 **Sewer Testing**

7.1 **Low Pressure Air Testing**

7.1.1 All new Sewer Mains, and services where required, must successfully pass an air leakage test as described in this section.

7.1.2 At the time of the test, the Drainlayer shall determine the groundwater elevation from observation wells, excavations or other means, all subject to review by the Director.

7.1.3 For making the low-pressure air test, the testing service shall use equipment specifically designed and manufactured for the purpose of testing sewer pipelines using low-pressure air. The equipment shall be provided with an appropriate air regulatory valve or air safety to prevent excessive internal air pressure in the pipeline.

7.1.4 The leakage test using low-pressure air shall be made on each manhole-to-manhole section of pipeline and any stubs and stoppers after placement of the backfill.

7.1.5 The pipe shall be tested after the Drainlayer has completed the work described in the permit. If the Drainlayer is going to be installing laterals, then they should be installed as close to the building as practical and properly plugged for low pressure testing. If any connections are made to the Building Sewers it shall be the responsibility of the Drainlayer to temporarily disconnect or plug the connections.

7.1.6 Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be tested. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
7.1.7  All air used shall pass through a single control panel.

7.1.8  Low-pressure air shall be introduced into the sealed line until the internal air pressure reaches 4 psig greater than the average groundwater pressure. Groundwater is assumed to be at ground surface unless the Drainlayer can prove by otherwise by test pitting.

7.1.9  At least two (2) minutes shall be allowed for the air pressure to stabilize in the section under test to a minimum of 3.5 psig greater than the groundwater pressure. After the stabilization period, the low-pressure air supply hose shall be quickly disconnected from the control panel. The pipeline will be acceptable if the pressure decrease is not greater than 1/2 psig in the time stated in the following table.

<table>
<thead>
<tr>
<th>Pipe Diameter in Inches</th>
<th>Minutes</th>
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<tbody>
<tr>
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</tr>
<tr>
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<tr>
<td>27</td>
<td>43:00</td>
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</tbody>
</table>

7.1.10 Should the sections under test fail to meet the requirements, the Drainlayer shall do all work of locating and repairing leaks and retesting as the Director may require.

7.2 Vacuum Test (Negative Air Pressure)

7.2.1 All manholes, wet wells, valve pits, grease traps, or any other structure or appurtenance other than Sewer Mains, laterals, and clean-outs, which are connected to the sanitary Sewer System, must be tested by means of either vacuum or exfiltration testing. Exfiltration testing will only be allowed when in the opinion of the Director it is not feasible to conduct vacuum testing due to size and configuration of openings or extreme shallow depth of a structure.

7.2.2 All lift holes and pipes entering the manhole are to be plugged. A vacuum will be drawn and the vacuum drop over a specified period of time is used to determine the acceptability of the manhole (ASTM-C1244-93).

7.2.3 All manholes shall be made as tight as possible to prevent infiltration and inflow and to ensure no leaks are present.

7.2.4 The Director or his designee prior to testing shall inspect all manholes.
7.2.5 Manholes shall be tested using approved testing techniques and equipment described by the American Society for Testing Materials after all connections to the manhole have been made. Backfill is not required for manhole testing.

7.2.6 All manholes shall pass a Negative Air Pressure (Vacuum) Test as detailed below prior to approval by the Director or his designee.

7.2.7 All lift holes are to be permanently plugged and joints in sections and around entering pipes sealed.

7.2.8 All pipes entering the manhole are to be temporarily plugged taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.

7.2.9 All manholes are to be individually tested, and the values obtained are applicable only to the manhole being tested at the time and conditions of testing.

7.2.10 The test head shall be placed on top of the manhole or inside the opening in accordance with the manufacturer’s recommendation.

7.2.11 It is the responsibility of the drainlayer to ensure the manhole has a flat surface and testing head is able to make a tight seal.

7.2.12 If manhole cannot be tested due to leakage around testing head, necessary repairs shall be made and the manhole retested. In cases of retesting, the Director or his designee reserves the right to reschedule or delay the test to conform with his/her schedule.

7.2.13 A vacuum of ten (10) inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop from ten (10) inches of mercury to nine (9) inches.

7.2.14 The manhole shall pass if the time for the vacuum to drop from ten (10) inches to nine (9) inches of mercury meets or exceeds the value indicated in the following table.

<table>
<thead>
<tr>
<th>Depth of manhole</th>
<th>Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10 feet</td>
<td>2</td>
</tr>
<tr>
<td>10 to 15 feet</td>
<td>2.5</td>
</tr>
<tr>
<td>Greater than 15 feet</td>
<td>3</td>
</tr>
</tbody>
</table>

7.2.15 Depth of a manhole is to be measured from the lowest inside elevation of the manhole to the surface on which the vacuum head is to be placed.

7.2.16 If the manhole fails the initial test, necessary repairs shall be made and the manhole retested. In cases of retesting, the Director or his designee reserves the right to reschedule or delay the test to conform with his/her schedule.
7.2.17 The Director or his designee may deem a manhole failed after successful completion of a vacuum test if water is observed in the manhole after completing the test or the level of standing water in a manhole rises after completing the test.

7.3 Exfiltration Testing (only allowed with the approval of the Director)

7.3.1 Maximum allowable exfiltration for new sanitary sewer sections or manholes is 200 gallons per inch of diameter per mile of pipe per day.

7.3.2 Exfiltration testing will not be allowed if the temperature of components is below 33 degrees Fahrenheit.

7.3.3 Plug all inlets and outlets.

7.3.4 The manhole or structure shall be completely filled with water to the top, or at a level as specified by the Director, but not less than 2 feet above ground water level.

7.3.5 The water level shall be clearly marked or measured from a reference point.

7.3.6 Allow water to stand in manhole for one hour, then refill to original water level and begin test.

7.3.7 After one hour, measure the drop in water level. For 48-inch diameter manhole, use measured water level drop to determine equivalent gallons lost per 24 hours from table in Section 6.3.8 (i.e. 2" drop = 376 gal; 2 ¼" drop = 423 gal.). For other manhole sizes, calculate the 24-hour equivalent loss using the formula stated therein.

7.3.8 Exfiltration Rate: The following table may be used to determine exfiltration in gallons per 24 hours by measuring loss that occurs in 1 hour. The table is applicable only for 48-inch diameter manholes.

<table>
<thead>
<tr>
<th>DROP</th>
<th>0&quot;</th>
<th>1&quot;</th>
<th>2&quot;</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>5&quot;</th>
<th>6&quot;</th>
<th>7&quot;</th>
<th>8&quot;</th>
<th>9&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>188</td>
<td>376</td>
<td>564</td>
<td>752</td>
<td>940</td>
<td>1128</td>
<td>1316</td>
<td>1504</td>
<td>1692</td>
<td></td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>47</td>
<td>235</td>
<td>423</td>
<td>611</td>
<td>799</td>
<td>987</td>
<td>1175</td>
<td>1363</td>
<td>1551</td>
<td>1739</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>94</td>
<td>282</td>
<td>470</td>
<td>658</td>
<td>846</td>
<td>1034</td>
<td>1222</td>
<td>1410</td>
<td>1598</td>
<td>1786</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>141</td>
<td>329</td>
<td>517</td>
<td>705</td>
<td>893</td>
<td>1081</td>
<td>1269</td>
<td>1457</td>
<td>1645</td>
<td>1833</td>
</tr>
</tbody>
</table>

For manholes larger than 48" diameter use the following formula.

\[ G = 0.0816(H)(D^2) \]

Where:

- \( G \) = gallons drop in 24 hours in inches.
- \( D \) = diameter of manhole in inches.
- \( H \) = drop in manhole in inches.
TOWN OF SANDWICH  SEWER REGULATIONS  AUGUST 22, 2013

7.3.9 The maximum allowable exfiltration (leakage) per 24 hours is 200 Gallons per inch per mile per day, or 0.003 gallons per foot of diameter per foot of depth.

7.3.10 Allowable exfiltration per day (Gallons) = 0.003 x Diameter (FT) x Depth (FT)

7.3.11 Test failure is indicated by water loss greater than maximum allowable exfiltration.

7.4 Force Main and Low Pressure Sewer Testing

7.4.1 As a minimum, all sewer force mains and low pressure sewers shall be tested in accordance with the Hydrostatic Testing Requirements of AWWA C600.

7.4.2 All force mains and low pressure sewers shall be given a hydrostatic test of at least 1.5 times the shutoff head of the connected pumps or 150 psi (100 psi for low pressure sewers), whichever is greater. Loss of water pressure during test shall not exceed 5 psi in a 2-hour period.

7.4.3 Where practicable, pipelines shall be tested between line valves or plugs in lengths of not more than 1500 feet.

7.4.4 The pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe. Before applying the specified test pressure, all air shall be expelled from the pipe. If permanent air vents are not located at all high points, the drainlayer shall install corporation cocks at such points so the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied.

7.4.5 Duration of test shall not be less than two hours.

7.4.6 The test pressure shall not exceed the rated pressure of the valves in the pipeline.

7.4.7 Where leaks are visible at exposed joints and/or evident on the surface where joints are covered, the drainlayer shall repair the joints, retighten the bolts, relay the pipe, or replace the pipe until the leak is eliminated--regardless of total leakage as shown by the hydrostatic test.

7.4.8 All pipe, fittings and other materials found to be defective under test shall be removed and replaced by the Drainlayer.

7.4.9 Lines that fail to meet test requirements shall be repaired and retested as necessary until test requirements are complied with.

7.4.10 No pipe installation will be accepted if the leakage is greater than that determined by the formula:

\[
L = \frac{SD(P)^{1/2}}{133,200}
\]

in which \(L\) is the allowable leakage, in gallons per hour; \(S\) is the length of pipeline tested, in feet; \(D\) is the nominal diameter of the pipe, in inches; and \(P\) is
the average test pressure during the leakage test, in pounds per square inch gauge.

7.5 Deflection Testing

7.5.1 Allowable Deflection Test

Pipe deflection measured not less than ninety days (90) after the backfill has been completed as specified shall not exceed five (5.0) percent. Deflection shall be computed by multiplying the amount of deflection (nominal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.

7.5.2 Deflection shall be measured with a rigid mandrel (Go/No-Go) device cylindrical in shape and constructed with a minimum of nine or ten evenly spaced arms or prongs. Drawings of the mandrel with complete dimensions shall be submitted to the Director for each diameter of pipe to be tested. The mandrel shall be hand pulled by the drainlayer through all sewer lines.

7.5.3 Any section of sewer not passing the mandrel shall be uncovered at the Drainlayer’s expense and the bedding and backfill replaced to prevent excessive deflection. Repaired pipe shall be retested.

8.0 Record Drawings

At the completion of the project, deliver accurate record documents to the Director.

8.1 General Field Recording Issues

A. All ties should be taken from existing, permanent features such as utility poles, corners of houses and hydrants. Porches, sheds or other house additions should be avoided for they could be torn down. A minimum of two ties should be taken.
B. Stations should be recorded to the nearest foot.
C. Inverts should be recorded to the nearest hundredth of a foot.
D. Elevations should be recorded to the nearest hundredth of a foot.
E. Building dimensions should be recorded to the nearest 1/4”.

8.2 Project Record Drawings

Record drawings shall include, but not be limited to the following (where applicable):

A. Existing Utilities - Water mains and services, water main gate valves, Sewer Mains and services, storm drains, culverts, steam lines, gas lines, buried electrical lines, tanks, septic tanks, wells, and other existing utilities encountered during construction must be accurately located and shown on the Drawings. In congested areas the Director may require supplemental drawings or enlargements.
   a. Show any existing utilities encountered in plan and profile and properly labeled showing size, material and type of utility. Ties should be shown on plan. Utility should be drawn to scale in section (horizontally and vertically) and an elevation should be called out to the nearest hundredth of a foot.
b. When existing utility lines are broken and repaired, ties should be taken to
these locations.
c. If existing water lines are replaced or relocated, document the area involved
and pipe materials, size, etc. in a note, and with ties.

B. Manholes, Catch Basins, Valve Pits and other structures.
   a. Show ties to center of structure covers or hatches.
   b. In general, show inverts at center of structures. However, for manholes
      with drop structures, or steep channels (greater than 0.2’ change on slope),
      show inverts at face of manhole.
   c. Show inverts for other structures at the face of the structure.
   d. Draw any new structures that are added on plan and profile.
   e. Show any redesigns.
   f. Redraw plan if the structure's location is moved more than 5 feet in any
      direction. [Note: It is important to show existing utilities, as outlined in
      Paragraph 1 above, especially if they were one reason for relocating the
      sewer, manholes and other structures.]
   g. Redraw profile if inverts changed by more than 6 inches.

C. Gravity Sewer Line
   a. Change sewer line slopes indicated on Drawings if inverts are changed.
   b. Draw any new gravity lines that are added on plan and profile.
   c. Show any field or office redesigns.
   d. Redraw the sewer line profile if manhole inverts are redrawn.
   e. Redraw the sewer line on plan corresponding to relocated manholes.

D. Water Mains and Force Mains
   a. Show ties to the location of all valves, bends (horizontal and vertical), tees
      and other fittings. The use of thrust blocks should be recorded.
   b. Revise elevations indicated on the Drawings to reflect actual
      construction.

E. Services
   a. Draw all services (even to empty lots) on plan view, and show ties.
   b. Show ties or distances to wyes from manhole.
   c. Show chimneys heights in the profile.
   d. Use the As-Built Forms to independently record sewer service information.
      A copy of these forms should be provided to the Director, along with the
      record drawings.

F. Ledge
   a. Ledge profiles should be shown. Note whether the plotted ledge profile
      reflects undisturbed or expanded conditions.

G. Yard Piping and Buried Electrical Conduit
   a. Site piping should be drawn to reflect the installed locations, with ties and
      elevation of all bends (horizontal and vertical).
   b. Show routing for electrical conduits and pull boxes, especially in close
      proximity to buildings and when the conduits change direction or cross
      process piping.

H. Roads
   a. Show centerline road profile and level spot elevations.
   b. Show pavement widths.
   c. On road cross sections, show the pavement cross slope.
   d. Show any deviations from the design plans.
9.0  Sewer Easements

9.1  Sandwich Municipal Sewer System Easements

The SMSS shall be constructed within existing public rights of way when applicable to the extent physically and legally possible. If a SMSS component must be constructed within a private way or across private property, a permanent easement of no less than twenty (20) feet in width, for the construction, maintenance and operation of said SMSS component shall be acquired by the Town. All sewer easements must provide reasonable and safe access for construction and vehicular maintenance equipment. No SMSS component will be permitted to be constructed within an easement if wetlands, uneven terrain, or other physical obstructions would limit reasonable vehicular access at any time.

9.2  Private Sewer Easements

9.2.1  A permit will not be issued until all easements necessary for the construction, operation, and maintenance of the subject Building Sewer or Private Sewer System has been obtained and copies of the recorded documents have been provided to the Director.

9.2.2  No more than one (1) Building Sewer will be permitted to be located within an existing private sewer easement unless the prior written approval of the Director has been obtained.

9.2.3  All costs for initial installation, subsequent repair, relocation, change or replacement of Building Sewers and Private Sewer Systems shall be at the Owner’s expense.

9.3  Rules Regarding Sewer Easements

9.3.1  The Owner shall not place or permit to be placed any trees or other deep-rooted landscaping within the easement or directly over or within ten (10) feet horizontally of the edge of the sewer line. Any trees or landscaping placed within the easements or rights-of-ways are at risk of being damaged or removed by the Town without the obligation of replacement.

9.3.2  Owner shall not place or permit to be placed any permanent or temporary structures, mounding, lighting, fencing, signs, retaining/landscaping/entrance walls, irrigation lines, pools, etc. within the easement or directly over or ten (10) feet horizontally of the edge of the Building Sewers or any other sewer facility. Any of the above listed items placed within easements or rights-of-ways are at risk of being damaged or removed by the Town without the obligation of replacement.

9.3.3  It shall also be the responsibility of the Owner to insure that all manhole and clean-out top of castings extend to finish grade and are not buried, sodded over, placed in concrete, or obstructed in any way.
9.3.4 The Town may periodically perform field inspections to verify compliance with the abovementioned requirements. If a violation exists then the Owner must immediately remedy the situation.

9.3.5 Bolted and gasketted water tight sewer manhole covers will be required at all off road locations, 100 year flood zones, or anywhere deemed necessary by the Director.

10.0 Protection of Water Supply

All requirements shall be coordinated with the Sandwich Water District, and the Director will request review and comment from the Sandwich Water District on all Sewer Permit applications and designs that may affect the District’s facilities.

10.1 Cross Connections

There shall be no physical connections between a public or private potable water supply system and a sewer or any sewer appurtenance that would permit the passage of wastewater or polluted water into the potable supply. No water pipe should pass through or come into contact with any part of a sewer manhole.

10.2 Relation to Water Main

10.2.1 Horizontal Separation

Whenever possible, sewers shall be installed at least ten (10) feet from any existing or proposed water main. If local conditions prevent a lateral separation of ten (10) feet, the Director may make an exception on a case-by-case basis when supported by data from the Design Engineer. Such an exception may allow the sewer to be installed closer than ten (10) feet to a water main, provided that it is laid out in a separate trench with top (crown) of the sewer at least 18 inches below the bottom (invert) of the water main.

10.2.2 Vertical Separation

Whenever sewers must cross water mains, the sewer shall be laid so that the top of the sewer is at least 18 inches below the bottom of the water main. The sewer joints should be equidistant to and located as far away as possible from the water main.

10.2.3 Concrete Encasement

Where the required separations are not maintained, the Director may require that the sewer shall be concrete encased ten (10) feet horizontally on either side of the crossing, or continuously where there is less than ten (10) feet of separation. As an alternate, the sewer and water lines may also be constructed of mechanical joint cement lined ductile iron pipe, which shall be tested to 150 psi to assure watertightness.
10.3 Well Areas-Zone II

Any sewers within one thousand (1,000) feet of a public water system well or fifty (50) feet of a domestic well shall be of watertight construction and approved by the Director and Sandwich Water District.

For all parts of new Sewer Connections within a designated Zone II, only hard connections will be allowed. No fernco or flexible rubber connections shall be permissible, unless approved by the Director.

10.4 Location of Sewers in Streams

Sewers will not be allowed in streams unless approved by the Director. In those cases sewers should only cross streams perpendicular to the flow without a change in grade, be at least 3 feet below the bottom of the stream and encased in concrete unless otherwise approved by the Director.

11.0 Validity

All regulations or parts of regulations in conflict herewith are hereby repealed.

The invalidity of any section, clause, sentence or provision of these regulations shall not affect the validity of any other part of these regulations, which can be given effect without such invalid part or parts.

These regulations shall not contravene, nor render ineffective any of the lawfully established rules and regulations of the Massachusetts Department of Environmental Protection.

12.0 Enforcement and Appeals

Notice of Violation

The Town will issue a “Notice of Violation” whenever it determines that:

a) A contractor is performing work without proper licensure.
b) A contractor is in non-compliance with the Rules and Regulations set forth by the Massachusetts Department of Public Safety.
c) Construction is proceeding in a manner that jeopardizes public safety.
d) Construction is occurring in violation of these regulations and/or any other applicable approved specification or detail.
e) Sewer construction work has proceeded without a valid permit.
f) There is a connection of any source of clear water (inflow and/or infiltration) to the SMSS.
g) There is, or has been, a discharge, into the SMSS of any prohibited water or wastes as defined herein.
h) Work is taking place in the right-of-way without proper permits and/or notifications.
i) There is damage to the roadway, public property, or utilities resulting from the work.
j) There are debris and/or soils in the roadway resulting from the work.
k) Work is not completed, including necessary testing and as-built documentation.
Any person found to be violating any provision of these regulations shall be served by the Town with written notice stating the nature of the violation and provided with a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease and correct all violations. Any violation which the Director determines threatens health, safety, or the environment shall be corrected immediately upon notification to the Owner.

The Director is hereby authorized to enforce these Regulations

Penalties

The Director may impose a $300.00 fine for any violation of these regulations. Each day that a violation continues shall be considered a separate offense. The fine may be enforced through the non criminal disposition procedures set forth in Section 2.80 of the General Bylaws of the Town.

In addition, and not in lieu of a fine, any person(s) violating any of the provisions of these regulations shall be subject to a civil penalty up to $5,000.00 for each violation, as provided by M.G.L. Chapter 83, Section 10. Each day a violation shall continue shall be deemed a separate offense.

Any person violating any of the provisions of these regulations shall become liable to the Town for any expense, loss or damage incurred by the Town by reason of such violations.

In addition, the Town may seek injunctive or other judicial remedies for any violation of these regulations.

The Town Manager shall receive appeals for arbitration of differences between the Director and the sewer users on matters concerning interpretation and execution of the provisions of the regulations. The appeal must be made in writing within 10 business days of issuance.

13.0 Changes In These Regulations

These regulations may be rescinded or modified or added to by the Board of Selectmen at any time when, in their opinion, such action is in the best interests of the Town of Sandwich, provided all provisions of the Massachusetts General Laws, as amended, have been complied with. This shall include publishing a list of proposed changes and holding a public hearing when appropriate.
14.0 Regulations In Force

These regulations shall be in full force and effect from and after the issuance by the Board of Selectmen and publication as provided by law.

Issued by the Board of Selectmen of the Town of Sandwich, State of Massachusetts, on the _________ day of ______________, 2013.

________________________________________________________________________

Attest:

_____________________________________________         _______________
(Town Clerk)        Date
APPENDIX A

SCHEDULE OF FEES:

SEWER REPAIR PERMIT FEE: $250.00

SEWER DISCONNECTION PERMIT FEE: $250.00

SEWER EXTENSION PERMIT FEE: $250.00 Plus $2.00 per linear foot

SEWER CONNECTION PERMIT FEE: $250.00 Plus $4.50 per gallon per day

The Sewer Connection fee shall be calculated using the “Sewage Flow Estimates” as indicated in 314 CMR 7.00: Sewer System Extension and Connection Permit Program, Section 7.15. In cases where an existing building existed on the same lot where a new building is proposed a credit for the existing flow shall be granted in accordance with section 5.4.1. The table of “Sewage Flow Estimates” is included below.

For example, a single family, three bedroom house contributes 110 gallons per day per bedroom to the Sewer System. Therefore:

3 bedrooms x 110 gallons per day x $4.50 per gallon per day = $1,485
$1,485 + $250 = $1,735 (Total Sewer Connection Fee)

**All permit fees are due at the time of application.**
APPLICATION FOR DRAINLAYERS LICENSE
TOWN OF SANDWICH
SANDWICH, MASSACHUSETTS 02563

Application Type: □ New License □ License Renewal If Renewal, list previous License # ____________

Work Type: __Building Sewers __Sewer Extensions __Wastewater Pumping Stations __Force Mains __Pressure Sewers

Name of Corporation: ____________________________________________

Contact Person: ________________________________________________

Mailing Address: _______________________________________________

Street Address: _________________________________________________

Phone: ____________________________

FAX: ___________________________

24-Hour Phone: ____________________

The Following items must be attached:

☐ A copy of Valid Heavy Equipment Operators License
☐ Insurance Certificate (Town must be listed as additionally insured)
☐ Performance Bond (USE ATTACHED FORM)
☐ Three (3) references who are familiar with your work with telephone numbers (NOT REQUIRED FOR RENEWALS)
☐ License fee of $250.00

THE UNDERSIGNED HEREBY ACKNOWLEDGES RECEIPT AND UNDERSTANDING OF THE SEWER REGULATIONS, AND THAT HE/SHE HAS READ THE ENTIRE DOCUMENT.

Signature: _______________________________ Date: ________________
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, __________________________________________ (an individual, partnership, corporation or company) duly organized under the Laws of the State of Massachusetts, and having a usual place of business at:

_____________________________________________________________________________ as Principal, and

_____________________________________________________ a corporation duly organized under the Laws of
the State of __________________________________ and duly authorized to do business in the Commonwealth of Massachusetts, and having a usual place of business at _______________________________________________ as Surety, are holden and stand firmly bond and obligated unto the Town of Sandwich, Massachusetts, as obligee, in the sum of Five Thousand Dollars and no/cents ($5,000.00) lawful money of the United States of America, to and for the true payments whereof we bind ourselves and, each of us, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal, by means of a written AGREEMENT (current revision of the Town of Sandwich Sewer Regulations) shall install drains and sewers in the Town of Sandwich in accordance with the regulations.

Whenever the Company shall be, and declared by the Town to be in default under the Sewer Regulations shall promptly remedy the default or complete the drain and sewer work.

No right of action shall accrue on the Bond to or for the use of any persons other than the Town named herein or the heirs, executors, administrators, successors and assigns of the Town.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this day _________ of __________________.

Principal: ___________________________ Surety: ___________________________

(SEAL) By: ___________________________ By: ___________________________ (SEAL)

Title: ___________________________ Title: ___________________________

IMPORTANT

Surety Companies executing BONDS must appear on the U.S. Treasury Department’s most current list of “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts and be authorized to transact business in the State of Massachusetts.

The attention of the Surety Companies and Company executing this Performance Bond is directed to the fact that said Bond shall remain in full effect for a period of two (2) years from the effective date of the issuance of a Drainlayer’s License.
## SEWAGE FLOW ESTIMATES:

<table>
<thead>
<tr>
<th>Type of Establishment</th>
<th>Gallons Per Person Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boarding Schools, Colleges</td>
<td>65</td>
</tr>
<tr>
<td>Nursing Home and Rest Home</td>
<td>100</td>
</tr>
<tr>
<td>School, without cafeteria, gymnasium or showers</td>
<td>10</td>
</tr>
<tr>
<td>School, with cafeteria, but not gymnasium or showers</td>
<td>15</td>
</tr>
<tr>
<td>School, with cafeteria, gymnasium and showers</td>
<td>20</td>
</tr>
<tr>
<td>Swimming Pool</td>
<td>10</td>
</tr>
<tr>
<td>Camp, resident - washroom and toilets</td>
<td>25</td>
</tr>
<tr>
<td>Camp, resident - mess hall</td>
<td>10</td>
</tr>
<tr>
<td>Camp, day - washroom and toilets</td>
<td>10</td>
</tr>
<tr>
<td>Camp, day - mess hall</td>
<td>3</td>
</tr>
<tr>
<td>Camp Ground - showers and toilets – per site</td>
<td>75</td>
</tr>
<tr>
<td>Gymnasium - per spectator</td>
<td>3</td>
</tr>
<tr>
<td>Gymnasium - per participant</td>
<td>25</td>
</tr>
<tr>
<td>Theater, Auditorium</td>
<td>3</td>
</tr>
<tr>
<td>Public Park - toilet wastes only</td>
<td>5</td>
</tr>
<tr>
<td>Public Park - bathhouse, showers, and flush toilets</td>
<td>10</td>
</tr>
<tr>
<td>Factory or Industrial Plant, without cafeteria</td>
<td>15</td>
</tr>
<tr>
<td>Factory of Industrial Plant, with cafeteria</td>
<td>20</td>
</tr>
<tr>
<td>Work or Construction Camp</td>
<td>50</td>
</tr>
<tr>
<td>Single and multiple dwelling units - Per Bedroom motels, hotels, boarding houses</td>
<td>110</td>
</tr>
<tr>
<td>Tennis Club - per court</td>
<td>250</td>
</tr>
<tr>
<td>Bowling Alley - per alley</td>
<td>100</td>
</tr>
<tr>
<td>Country Club - dining room - per seat</td>
<td>10</td>
</tr>
<tr>
<td>Country Club - snack bar or lunch room - per seat</td>
<td>10</td>
</tr>
<tr>
<td>Country Club - locker and showers - per locker</td>
<td>20</td>
</tr>
<tr>
<td>Church - per seat</td>
<td>3</td>
</tr>
<tr>
<td>Church - vestry/kitchen - per person at capacity</td>
<td>5</td>
</tr>
<tr>
<td>Trailer, dump station - per site or per trailer</td>
<td>50</td>
</tr>
<tr>
<td>Mobile Home Park - per site</td>
<td>200</td>
</tr>
<tr>
<td>Office Building - per 1,000 sq. ft.</td>
<td>75</td>
</tr>
<tr>
<td>Dry Goods Stores - per 100 sq. ft.</td>
<td>5</td>
</tr>
<tr>
<td>Drive-In - per stall</td>
<td>5</td>
</tr>
<tr>
<td>Non-single family, Automatic clothes washer per washing machine</td>
<td>400</td>
</tr>
<tr>
<td>Hospital - per bed</td>
<td>200</td>
</tr>
<tr>
<td>Type of Establishment</td>
<td>Gallons Per Person Per Day</td>
</tr>
<tr>
<td>------------------------------------------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Service Station, excluding thruway - per island</td>
<td>300</td>
</tr>
<tr>
<td>Skating Rink - 3,000 gallons per day plus 5 gallons per seat</td>
<td>300</td>
</tr>
<tr>
<td>Dog Pounds - Veterinary Clinics - per pen</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Establishment</th>
<th>Gallons Per Seat or Chair Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restaurant, food service establishment, lounge, tavern</td>
<td>35</td>
</tr>
<tr>
<td>Restaurant, thruway service area</td>
<td>150</td>
</tr>
<tr>
<td>Restaurant, kitchen flow</td>
<td>15</td>
</tr>
<tr>
<td>Barber Shop/Beauty Salon per chair</td>
<td>100</td>
</tr>
</tbody>
</table>

For purposes of 314 CMR 7.15, a "bedroom" means any portion of a dwelling which is so designed as to furnish the minimum isolation necessary for use as a sleeping area. Such area shall not include kitchen, bathroom, dining room, halls, or unfinished cellar; but may include bedroom, den, study, sewing room, or sleeping loft.
APPENDIX D

SANITARY SEWER DESIGN AND CONSTRUCTION DETAILS
COMMONWEALTH OF MASSACHUSETTS
TOWN OF SANDWICH

SANITARY SEWER
DESIGN AND CONSTRUCTION DETAILS
## SANITARY SEWER

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<th>DETAIL NUMBER</th>
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<td>SS.GN</td>
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<td>SS.01</td>
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<td>TRENCH SECTION IN UNSUITABLE MATERIAL</td>
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<tr>
<td>MANHOLE RISER WITH ECCENTRIC CONE TOP</td>
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<td>4’-0’’ OR 5’-0’’ PRECAST REINFORCED CONCRETE MANHOLE BASE FOR SEWERS</td>
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<td>TYPICAL SUPPORTS FOR UTILITIES</td>
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<td>WATERTIGHT RESILIENT CONNECTOR FOR CONNECTING PIPES TO PRECAST CONCRETE MANHOLES</td>
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<td>NON-SHRINK MORTAR JOINTS FOR CONNECTING PIPES TO BRICK OR BLOCK MASONRY MANHOLES</td>
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<td>PRECAST REINFORCED CONCRETE SEWER CHIMNEY</td>
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<td>RECONSTRUCTED BUILDING CONNECTION</td>
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<tr>
<td>INSIDE DROP INLETS FOR PVC PIPE SEWERS (12 INCH DIAMETER AND SMALLER)</td>
<td>SS.11</td>
</tr>
<tr>
<td>ABANDON EXISTING MANHOLES/CESSPOOLS</td>
<td>SS.12</td>
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</tbody>
</table>

### TOWN OF SANDWICH
**SANITARY SEWER**
**DESIGN & CONSTRUCTION DETAILS**
**DETAIL INDEX**
**SANITARY SEWER**

---

**SCALE:** NTS
**DATE OF ISSUE:** 8/22/2013
**REVISIONS:**
**DETAIL NUMBER:** SS–INDEX.01
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<td>TYPICAL SEWER PLAN</td>
<td>SS.13</td>
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<tr>
<td>TYPICAL SEWER PROFILE</td>
<td>SS.14</td>
</tr>
<tr>
<td>TYPICAL SEWER CLEANOUT DETAIL</td>
<td>SS.15</td>
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<tr>
<td>TYPICAL OUTSIDE DROP MANHOLE DETAIL</td>
<td>SS.16</td>
</tr>
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<td>FORCE MAIN CLEANOUT MANHOLE DETAIL</td>
<td>SS.17</td>
</tr>
<tr>
<td>PIPE TRENCH DAM DETAIL</td>
<td>SS.18</td>
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<tr>
<td>WYE-SADDLE DETAIL FOR R.C. PIPE SERVICE CONNECTION</td>
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<td>P.V.C. WYE-BRANCH DETAIL</td>
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</tr>
<tr>
<td>TYPICAL SEWER CLEANOUT DETAIL WITHIN 10’ OF BUILDING FOUNDATION</td>
<td>SS.21</td>
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<tr>
<td>MANHOLE FRAME &amp; COVER MARKED SEWER</td>
<td>SS.22</td>
</tr>
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GENERAL NOTES

1. ALL WORK SHALL BE IN CONFORMANCE WITH THE FOLLOWING:
   A. THE TOWN OF SANDWICH SEWER REGULATIONS;
   B. THE TOWN OF SANDWICH DEPARTMENT OF PUBLIC WORKS STANDARD SPECIAL
      PROVISIONS;
   C. THE TOWN OF SANDWICH PLANNING BOARD SUBDIVISION RULES AND
      REGULATIONS;
   D. MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION STANDARD
      SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988;
   E. MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION
      SUPPLEMENTAL SPECIFICATIONS, DATED JUNE 15, 2012;
   F. MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION
      CONSTRUCTION STANDARD DETAILS DATED MARCH 2012;
   G. THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS
      AND HIGHWAYS WITH LATEST REVISIONS WITH MASSACHUSETTS AMENDMENTS;
   H. MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION 1990
      STANDARD DRAWINGS FOR SIGNS AND SUPPORTS;
   I. MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION 1968
      STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING;
   J. THE AMERICAN STANDARDS FOR NURSERY STOCK (ANSI–Z60.1–2004);
   K. AND THE PROVISIONS CONTAINED HEREIN.

2. NO WORK MAY BE PERFORMED UNTIL ALL REQUIRED FEDERAL, STATE, AND LOCAL
   PERMITS HAVE BEEN SECURED.

3. UTILITIES SHALL BE LOCATED OUTSIDE OF PAVED AREAS UNLESS APPROVED IN
   WRITING BY THE DEPARTMENT OF PUBLIC WORKS.
GENERAL NOTES

FOR PIPE TRENCHES

1. PIPE TRENCHES MAY BE EXCAVATED WIDER THAN TRENCH WIDTH Ws (SHEETED) OR Wu (UNSheetED) ABOVE THE TOP OF PIPE ZONE.

2. TRENCHES SHALL NOT BE EXCAVATED BEYOND THE TRENCH WIDTH Wu BELOW THE TOP OF PIPE ZONE.

3. SHEETING MUST BE USED IF EXCAVATION AND BACKFILL, BELOW NORMAL DEPTH, IS REQUIRED. SHEETING SHALL BE LEFT IN PLACE AS SPECIFIED.

4. ALL ROCK WITHIN 3’-0” HORIZONTALLY OF THE ENDS OF BUILDING CONNECTIONS, BRANCHES OR STUBS AND DOWN TO A HORIZONTAL PLANE 6” BELOW THE BOTTOMS OF SUCH CONNECTIONS, BRANCHES OR STUBS, SHALL BE EXCAVATED.

5. WHERE INDICATED ON THE DRAWINGS, GEOTEXTILE FILTER FABRIC SHALL BE PROVIDED FOR SEWER AND BUILDING CONNECTION FOUNDATIONS. OVERLAP FABRIC ABOVE THE PIPE CROWN AND PROVIDE A MINIMUM OF 12” FABRIC OVERLAP.

<table>
<thead>
<tr>
<th>TRENCH WIDTH Ws OR Wu</th>
<th>NOMINAL PIPE DIAMETER D</th>
<th>DEPTH OF PIPE INVERT BELOW GROUND SURFACE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0 TO 12’</td>
</tr>
<tr>
<td>OVER 24”</td>
<td></td>
<td>5’-0”</td>
</tr>
<tr>
<td>24” AND SMALLER</td>
<td></td>
<td>D + 3’-0”</td>
</tr>
</tbody>
</table>
NOTES:

1. TRENCH BACKFILL TO BE USED WITHIN THE RIGHT-OF-WAY SHALL CONSIST OF EITHER GRAVEL BORROW MEETING MHD SPECIFICATION M1.03.0, TYPE "B" OR PROCESSED GRAVEL BORROW FOR SUBBASE MEETING MHD SPECIFICATION M1.03.1.

2. WHERE THE REMOVAL OF 100 SQUARE FEET OR LESS OF ASPHALT IS REQUIRED WITHIN THE RIGHT-OF-WAY, THEN THE TRENCH BACKFILL MATERIAL SHALL CONSIST OF CONTROLLED DENSITY FILL MEETING MHD SPECIFICATION M4.08.0, TYPE "1E" OR "2E".

3. TRENCH BACKFILL MATERIAL TO BE USED OUTSIDE OF THE RIGHT-OF-WAY MAY CONSIST OF MATERIAL GENERATED DURING EXCAVATIONS PROVIDED ALL STONES GREATER THAN 4" ARE REMOVED PRIOR TO PLACEMENT AND COMPACTION.

4. GRANULAR TRENCH BACKFILL MATERIAL USED WITHIN THE RIGHT-OF-WAY SHALL BE PLACED IN MAXIMUM 6" LIFTS AND MECHANICALLY COMPACTED TO A MINIMUM OF 95% OF THE MATERIAL'S MAXIMUM DRY DENSITY AND TO 90% ELSEWHERE AS DETERMINED BY ASTM D 1557.
NON-SHRINK MORTAR MAY BE USED.
SLEEVE, PRESS WEDGE SEAL OR PROVIDE MECHANICAL SEAL (LINK SEAL GASKET) EXCEPT (LOCK-JOINT FLEXIBLE M.H. IN STORM DRAINS WHERE APPROVED (TYPICAL)

A

12" SCREENED GRAVEL BEDDING

6" MIN. (TYP.)

HORIZONTAL PIPE.

DROP CONNECTION SHALL DIRECTED BY THE ENGINEER.

INSTALL A

NON-SHRINK GROUT, (TYP.)

PVC PUSH CAP

6" MIN. TYPICAL CAST IN PLACE CONCRETE. USE

HORIZONTAL FORMS BE SAME SIZE AS THE BUILD MASONRY DAM AS

SEE SHELF

FLOW

SHELF

SECTION A - A

DETAILS NOT SHOWN ARE SAME AS TRENCH SECTIONS SHOWN ELSEWHERE

TOWN OF SANDWICH
SANITARY SEWER
DESIGN & CONSTRUCTION DETAILS
TRENCH SECTION IN UNSUITABLE MATERIAL

SCALE:
DATE OF ISSUE:
REvised:
DETAIL NUMBER:
NOTE:
ALL EXTERIOR SURFACES OF MANHOLE GRADE ADJUSTMENT COURSES SHALL BE COVERED WITH 1/4" TO 3/8" MASONRY CEMENT PLASTER.
BRICK MASONRY INVERT CHANNELS FOR SEWERS 18 INCH DIAMETER OR LARGER MAY BE CONSTRUCTED ENTIRELY OF 3000 PSI CONCRETE.

SECTION

PRECAST REINFORCED CONCRETE MH RISER
PRECAST REINFORCED CONCRETE MH BASE

6" (TYP.)

FORM INVERT WITH BRICK MASONRY OR 3000 PSI CONCRETE TO FULL HEIGHT OF PIPE

PRECAST REINFORCED CONCRETE MH RISER
PRECAST REINFORCED CONCRETE MH BASE

6 X 6-W7.4 X W7.4 WELDED WIRE FABRIC OR EQUIVALENT

SECTION

REINFORCEMENT TO BE SAME AS FOR MANHOLE RISERS AT PIPE OPENINGS. WELD STEEL HOOP TO INTERRUPTED REINFORCEMENT (EXCEPT FOR CORED HOLE)

1" WASH
WATERTIGHT RESILIENT CONNECTOR (TYP.)

1'-0" MIN.

COMPACTED SCREENED GRAVEL
NON-WOVEN GEOTEXTILE FILTER FABRIC WHERE REQUIRED

1.1 DIA.
5" MIN.
6" MIN.(4'-0" DIA.)
8" MIN.(5'-0" DIA.)
6" MIN.

UNDISTURBED MATERIAL

NOTE: MANHOLE CHANNELS REQUIRING CHANGE IN ALIGNMENT ARE TO BE BUILT ON A SMOOTH RADIUS. IF SIDE PIPES ENTER CHANNEL, SHAPE TO RECEIVE ADDED SIDE FLOW ACCORDINGLY.

TOWN OF SANDWICH
SANITARY SEWER
DESIGN & CONSTRUCTION DETAILS

4'-0" OR 5'-0" PRECAST REINFORCED CONCRETE MANHOLE BASE FOR SEWERS

SCALE: NTS
DATE OF ISSUE: 8/22/2013
REVISED:
DETAIL NUMBER: SS.05
COMPACTED SCREENED GRAVEL TO BE PLACED BETWEEN SIDES OF MAIN TRENCH

TOP OF COMPACTED SCREENED GRAVEL CRADLE FOR PVC OR DI PIPE FOR RC PIPE

PIECE
HALF SECTION
RC PIPE
PVC PIPE 21 IN. AND LARGER
DI PIPE 20 IN. AND LARGER

TYPE A

COMPACTED SCREENED GRAVEL CONTAINED BY SHEETING AND SIDES OF TRENCH
EXISTING UTILITY
PROVIDE 1" MINIMUM CLEARANCE BETWEEN SHEETING AND TOP OF PIPE

TOP OF COMPACTED SCREENED GRAVEL CRADLE FOR PVC OR DI PIPE FOR RC PIPE

HALF SECTION
RC PIPE
PVC PIPE 21 IN. AND LARGER
DI PIPE 20 IN. AND LARGER

TYPE B

TRENCH BACKFILL TO BE PLACED AND COMPACTED CONCURRENTLY TO SAME ELEVATION ON EACH SIDE

SUITABLE SHEETING AND BRACING TO BE PLACED ACROSS MAIN TRENCH
EXCAVATION AND CUT OFF AND LEFT IN PLACE

TOP OF COMPACTED SCREENED GRAVEL ENVELOPE

TYPE C

SYMETRICAL ABOUT
UTILITY CONDUIT

UTILITY PIPE

UNDISTURBED MATERIAL OR SHEETING

1500 PSI CONCRETE FOR FULL WIDTH OF TRENCH

COMPACTED SCREENED GRAVEL
PRECAST REINFORCED CONCRETE MH WALL

MAX. CORED OPENING O.D. + 4"

PLAN

STAINLESS STEEL STRAP CLAMP

SECTION

TOWN OF SANDWICH
SANITARY SEWER
DESIGN & CONSTRUCTION DETAILS

WATERTIGHT RESILIENT CONNECTOR FOR CONNECTING PIPES TO PRECAST CONCRETE MANHOLES

SCALE: NTS
DATE OF ISSUE: 8/22/2013
REVISED:
DETAIL NUMBER: SS.07
PIECE

BRICK OR BLOCK MASONRY MH WALL

MAX. OPENING O.D. + 4” IF CUT IN FIELD

NON-SHRINK MORTAR

PLAN

SECTION

BRICK OR BLOCK MASONRY MH WALL

RUBBER RING WATER STOP

ROUGHEN PIPE SURFACE

TOWN OF SANDWICH
SANITARY SEWER
DESIGN & CONSTRUCTION DETAILS
NON-SHRINK MORTAR JOINTS FOR CONNECTING PIPES TO BRICK OR BLOCK MASONRY MANHOLES

SCALE: NTS
DATE OF ISSUE: 8/22/2013
REVISED:
DETAIL NUMBER: SS.08
TOWN OF SANDWICH
SANITARY SEWER
DESIGN & CONSTRUCTION DETAILS
PRECAST REINFORCED CONCRETE SEWER CHIMNEY

SCALE: NTS
DATE OF ISSUE: 8/22/2013
REVISED:
DETAIL NUMBER: SS.09

1. Provide mechanical seal (Lock-Joint Flexible M.H. Sleeve, Press Wedge Seal or Link Seal Gasket) except non-shrink mortar may be used in storm drains where approved (typical).

2. Use drop connection when this dimension exceeds 2'-9".

3. Install a 1 1/2 PVC push cap or build masonry dam as directed by the engineer.

4. Provide screened gravel bedding 12".

5. Compacted section 6" end pipe section.

6. Compacted selected backfill.

7. Payment limits for chimneys.

8. Rectangular riser sections with 6" diam. formed opening.

9. Set base section on compacted pipe bedding.

10. Virgin soil.

11. O-ring gaskets between section.

12. 6" PVC gasketed sleeve cast into base section.

13. Limit of payment for building connection.


15. 6" PVC cleanout plug.

16. 6" PVC tee cast into top section.

17. BOLTING HARDWARE (TYPICAL).

18. PLATFORM FOR BUILDING CONNECTION.

19. 1'-6".

20. PLAN.
TOWN OF SANDWICH
SANITARY SEWER
DESIGN & CONSTRUCTION DETAILS
RECONSTRUCTED BUILDING CONNECTION

SECTION

GROUND SURFACE

FLEXIBLE ELASTOMERIC PLASTIC COUPLING WITH STEEL CLAMPS (TYP.)

EXISTING 4" OR 6" DIA. VC OR PVC BUILDING CONNECTION

PROVIDE CURVES, BENDS, INCREASES AND/OR OTHER FITTINGS AS REQUIRED

REMOVE AS DIRECTED BY ENGINEER

BUILDING CONNECTION
MIN. SLOPE 1/4" PER FOOT UNLESS OTHERWISE DIRECTED

BEND (ROTATE AS REQUIRED)
Y-BRANCH

LENGTH AS DIRECTED OR SPECIFIED

PLAN

PAYMENT LIMITS
FOR BUILDING CONNECTIONS

UNDISTURBED MATERIAL
SCREENED GRAVEL ENVELOPE

SCHEMATIC VIEW

TRENCH BACKFILL
(SEE NOTES IN DETAIL NUMBER SS.02)

COMPACTED SCREENED GRAVEL

6" MIN.

UNDISTURBED MATERIAL

GEOTEXTILE FILTER FABRIC AS REQUIRED

6" MIN.
PIPE SIZE TABLE

<table>
<thead>
<tr>
<th>PIPE SIZES (IN)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>INLET SEWER D₁</td>
<td>DROP PIPE D₂</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

PIPE SIZE TABLE

INVERT DETAIL AT SIDE DROPS

INVERT DETAIL AT MAIN RUN DROPS

TOWN OF SANDWICH
SANITARY SEWER
DESIGN & CONSTRUCTION DETAILS
INSIDE DROP INLETS FOR PVC PIPE SEWERS
12 INCH DIAMETER AND SMALLER

SCALE:  NTS
DATE OF ISSUE:  8/22/2013
REVISED:
DETAIL NUMBER:  SS.11
MANHOLE, FRAME, COVER, ADJUSTING COURSES AND CONE SECTION TO BE REMOVED AND DISPOSED OF TO A MINIMUM DEPTH 4-FEET BELOW EXISTING SURFACE. (ONLY WHEN MANHOLE/CESSPOOL TO BE ABANDONED)

MANHOLE/CESSPOOL TO BE COMPLETELY FILLED WITH BANK-RUN GRAVEL AND COMPACTED IN 2 FOOT LIFTS (ONLY WHEN MANHOLE/CESSPOOL TO BE ABANDONED)

EXISTING SEWER PIPE TO BE PLACED OUT OF SERVICE

BRICK MASONRY BULKHEADS
**SHELF**

- Pipe length as short as possible
- Provide mechanical seal (lock-joint flexible M.H. sleeve, press wedge seal or link seal gasket) except non-shrink mortar may be used in storm drains where approved (typical)
- Use drop connection when this dimension exceeds 2'-9"

**SHELF A**

- Install a 12" screened gravel bedding
- Drop connection shall be same size as the horizontal pipe.
- 6" min. typical cast in place concrete. Use forms 1/2(1') tee
- Non-shrink grout, (typ.)
- Provide mechanical seal (lock-joint flexible M.H. sleeve, press wedge seal or link seal gasket) except non-shrink mortar may be used in storm drains where approved (typical)

**SECTION A - A**

- Prop. trench patch
- See detail no. SDSW.36

**TOWN OF SANDBICH**

**SANITARY SEWER**

**DESIGN & CONSTRUCTION DETAILS**

**TYPICAL SEWER PLAN**

**SCALE:** NTS

**DATE OF ISSUE:** 8/22/2013

**REVISED:**

**DETAIL NUMBER:** SS.13
SECTION A - A

SHELF

PIPE LENGTH AS SHORT AS POSSIBLE

PROVIDE MECHANICAL SEAL
(LOCK-JOINT FLEXIBLE M.H. SLEEVE, PRESS WEDGE SEAL OR LINK SEAL GASKET) EXCEPT NON-SHRINK MORTAR MAY BE USED IN STORM DRAINS WHERE APPROVED (TYPICAL)

USE DROP CONNECTION WHEN THIS DIMENSION EXCEEDS 2'-9"

SHELF

FLOW PLAN

INSTALL A 12" SCREENED GRAVEL BEDDING

DROP CONNECTION SHALL BE SAME SIZE AS THE HORIZONTAL PIPE.

6" MIN. TYPICAL CAST IN PLACE CONCRETE. USE FORMS 1/2'(1' TEE

PROVIDE MECHANICAL SEAL (LOCK-JOINT FLEXIBLE M.H. SLEEVE, PRESS WEDGE SEAL OR LINK SEAL GASKET) EXCEPT NON-SHRINK GROUT, (TYP.) 6" MIN.(TYP.)

TOWN OF SANDWICH
SANITARY SEWER
DESIGN & CONSTRUCTION DETAILS
TYPICAL SEWER PROFILE

DATE OF ISSUE: 8/22/2013
REVISED:
DETAIL NUMBER: SS.14
LOAM AND SEED

SEWER CLEANOUT FRAME & COVER

SET CASTING ASSEMBLY IN CONCRETE COLLAR

6" PVC RISER PIPE

8"

6" PVC SEWER SERVICE

7 1/8"

NOTE:
CLEANOUT TOP SHALL BE ENCLOSED IN CASTING AND/OR FABRICATED COVER ASSEMBLY.
TOWN OF SANDWICH
SANITARY SEWER
DESIGN & CONSTRUCTION DETAILS
TYPICAL OUTSIDE DROP MANHOLE DETAIL

SECTION A - A

- PROVIDE MECHANICAL SEAL
  (LOCK-JOINT FLEXIBLE M.H.
  SLEEVE, PRESS WEDGE SEAL OR
  LINK SEAL GASKET) EXCEPT
  NON-SHRINK MORTAR MAY BE USED
  IN STORM DRAINS WHERE
  APPROVED (TYPICAL)

- INSTALL A PVC PUSH CAP OR
  BUILD MASONRY DAM AS
  DIRECTED BY THE ENGINEER

- USE DROP
  CONNECTION WHEN
  THIS DIMENSION
  EXCEEDS 2'-9"

- 12" SCREENED
  GRAVEL BEDDING

- PIPE LENGTH AS SHORT AS POSSIBLE

- 6" MIN. TYPICAL CAST IN
  PLACE CONCRETE. USE
  FORMS

- 90° BEND

- 6" MIN. (TYP.)

- NON-SHRINK GROUT, (TYP.)

- TEE

- DROP CONNECTION SHALL
  BE SAME SIZE AS THE
  HORIZONTAL PIPE.

SCALE: NTS
DATE OF ISSUE: 8/22/2013
REVISED:
DETAIL NUMBER: SS.16
NOTES:

1.) PROVIDE MANHOLE STEPS
   1' – 0" O.C.

2.) CONTRACTOR SHALL CONFIRM
    ELEVATION AND ALIGNMENT OF
    PROPOSED FORCE MAIN AND GROUND
    SURFACE AT EACH MANHOLE PRIOR
    TO ORDERING SECTION
SECTION

IMPERVIOUS DAM AS SPECIFIED
CLAY DAM FOR P.V.C. PIPE
CONCRETE DAM FOR DI
AND RC PIPE

NEW SEWER

1" MIN.
2" MIN. KEY WAY

UNDISTURBED MATERIAL

PLAN

EXCAVATED TRENCH
SEE TRENCH DETAIL

NEW SEWER

12"

2" MIN. KEY WAY

UNDISTURBED MATERIAL
STAINLESS STEEL BANDS

P.V.C. OR FERNCO WYE—SADDLE

6" MIN. CONCRETE ALL AROUND

PLAN

COMMON FILL

SCREENED GRAVEL

UNDISTURBED EARTH

6" MIN.

SECTION

TOWN OF SANDWICH
SANITARY SEWER
DESIGN & CONSTRUCTION DETAILS

WYE—SADDLE DETAIL FOR R.C. OR V.C.
PIPE SERVICE CONNECTION

SCALE: NTS
DATE OF ISSUE: 8/22/2013
REVISED:
DETAIL NUMBER: SS.19
SECTION

TOWN OF SANDWICH
SANITARY SEWER
DESIGN & CONSTRUCTION DETAILS
P.V.C. WYE–BRANCH DETAIL

SCALE: NTS
DATE OF ISSUE: 8/22/2013
REVISED:
DETAIL NUMBER: SS.20
NOTES:


2. ALL WORK TO BE CONDUCTED WITHIN THE 10' ZONE SHALL BE PERFORMED BY A PLUMBER LICENSED IN THE STATE OF MASSACHUSETTS AND SHALL CONFORM TO 248 CMR 2.00 AND 248 CMR 10.00.
NOTE:

FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS CATALOG NOS. 2110A & 2114Z MARKED "SEWER", OR APPROVED EQUAL.