

Appendix I

An Overview of the MWRA Sewerage System and Facilities

The MWRA is responsible for the collection, transport, pumping, treatment, and disposal of sewage in Boston and the greater Boston area. In addition to the Deer Island Treatment Plant, the MWRA operates another treatment plant, which serves the town of Clinton and the Lancaster Sewer District under special arrangements that originated when the Metropolitan District Commission (MDC) acquired land in Clinton for the Wachusett Reservoir. The Clinton Treatment Plant operates under a separate permit from the Boston NPDES permit and is not discussed in this report.

The MWRA serves 43 communities with a total population of about two million people, 5,500 businesses, and 1,400 industries. More than 5,400 miles of town- and city-owned local sewers connect at over 1,800 points to over 230 miles of MWRA interceptor sewers. Also included in the vast sewerage system are eleven pumping stations, five headworks, over 80 combined sewer relief overflows and six CSO treatment facilities. Table I-1 lists the MWRA treatment facilities and relevant information pertaining to each facility.

The Deer Island Treatment Plant in Winthrop serves the 43 communities in the metropolitan Boston sewerage system and is allowed to discharge under the Boston NPDES Permit. The sewerage system is divided into two major regions: the North and the South Systems. Table I-2 lists the sewerage service area population by community.

Table I-1 List of Treatment Facilities and Discharge Locations

| Facility Name | Location | First year of Operation | Treatment Process | Design Flow (mgd) | Conduit Size At Facility: In | Conduit Size At Facility: Out | Outfall Number | Receiving Water |
|-------------------------|---|-------------------------|--|-------------------|---|-------------------------------|----------------|-------------------|
| POTW | | | | | | | | |
| Deer Island | Deer Island Boston, MA | 1997 | Primary Upgrade | 1270 | | 9'x 10' | MWR001 | Boston |
| | | 1998 | Secondary | | | 6'x 6.5' | MWR002 | Harbor |
| | | | | | | 9' Dia | MWR004 | |
| | | | | | | 9' Dia | MWR005 | |
| Nut Island Headworks | Nut Island Quincy, MA | 1998 | Pre-treatment of South System flows to Deer Island | 360 | | 60" Outfall | 101 | Boston |
| | | | | | | 60" Outfall | 102 | Harbor |
| | | | | | | 60" Outfall | 103 | |
| | | | | | | | Spillway | Hingham Bay |
| CSO FACILITIES | | | | | | | | |
| Cottage Farm | Memorial Dr. near Boston University Bridge, Cambridge | 1971 | Screening Settling Chlorination Detention | 233 | 72" N. Charles Relief 42" S. Charles Relief 54" Brookline | 96" Outfall | MWR201 | Charles River |
| Prison Point | Near Museum of Science Bridge, Cambridge | 1980 | Screening Settling Chlorination Detention | 385 | 10' Conduit | 8' Conduit | MWR203 | Inner Harbor |
| Somerville Marginal | McGrath Highway under Route I-93, Somerville | 1973* | Screening Chlorination | 245 | 7' x 7.5' Conduit 84" Conduit | 6' x 8' Conduit | MWR205 | Mystic River |
| Constitution Beach | Off Shore St. East Boston | 1987 | Screening Chlorination | 20 | 36" Conduit | 36" Conduit | BOS002 | Boston Harbor |
| Fox Point | Freeport Street near Southeast Expressway, Dorchester | 1989 | Screening Chlorination | 119 | 10' x 12' Conduit | 10' x 12' Conduit | BOS089 | Dorchester Bay |
| Commercial Point | Victory Road Dorchester | 1991 | Screening Chlorination | 194 | 15' x 11' Conduit | 15' x 11' Conduit | BOS090 | Dorchester Bay |

* Rehabilitated in 1988
MWR refers to MWRA
BOS refers to BWSC

**Table I-2
Sewerage Service Area Population By Community**

| TOWN | COMMUNITY POPULATION ¹ | SEWERED POPULATION ² | North System | South System | North System ³ | South System ³ |
|---------------|-----------------------------------|---------------------------------|--------------|--------------|---------------------------|---------------------------|
| Arlington | 43,431 | 43,388 | x | | 43,388 | |
| Ashland | 13,482 | 8,628 | | x | | 8,628 |
| Bedford | 13,947 | 12,273 | x | | 12,273 | |
| Belmont | 23,907 | 23,429 | x | | 23,429 | |
| Boston | 555,447 | 554,892 | x | x | 418,056 | 136,836 |
| Braintree | 34,906 | 34,871 | | x | | 34,871 |
| Brookline | 53,911 | 53,372 | x | x | 29,381 | 23,991 |
| Burlington | 23,694 | 22,983 | x | | 22,983 | |
| Cambridge | 93,352 | 93,259 | x | | 93,259 | |
| Canton | 20,677 | 15,301 | | x | | 15,301 |
| Chelsea | 27,426 | 27,398 | x | | 27,398 | |
| Dedham | 23,721 | 22,298 | | x | | 22,298 |
| Everett | 34,922 | 34,887 | x | | 34,887 | |
| Framingham | 64,646 | 60,121 | | x | | 60,121 |
| Hingham | 6,289 | 5,283 | | x | | 5,283 |
| Holbrook | 11,125 | 7,287 | | x | | 7,287 |
| Lexington | 29,594 | 28,114 | x | | 28,114 | |
| Malden | 52,644 | 52,591 | x | | 52,591 | |
| Medford | 55,981 | 55,925 | x | | 55,925 | |
| Melrose | 27,376 | 27,349 | x | | 27,349 | |
| Milton | 25,662 | 24,122 | x | x | 1,843 | 22,279 |
| Natick | 31,491 | 26,452 | | x | | 26,452 |
| Needham | 27,924 | 25,690 | | x | | 25,690 |
| Newton | 80,345 | 78,176 | x | x | 42,786 | 35,390 |
| Norwood | 28,824 | 28,507 | | x | | 28,507 |
| Quincy | 85,752 | 85,666 | | x | | 85,666 |
| Randolph | 30,567 | 30,322 | | x | | 30,322 |
| Reading | 23,371 | 21,969 | x | | 21,969 | |
| Revere | 41,663 | 41,621 | x | | 41,621 | |
| Somerville | 74,100 | 74,026 | x | | 74,026 | |
| Stoneham | 22,254 | 21,809 | x | | 21,809 | |
| Stoughton | 27,664 | 17,428 | | x | | 17,428 |
| Wakefield | 24,772 | 23,732 | x | | 23,732 | |
| Walpole | 22,640 | 14,490 | | x | | 14,490 |
| Waltham | 58,540 | 58,481 | x | | 58,481 | |
| Watertown | 32,435 | 32,403 | x | | 32,403 | |
| Wellesley | 26,789 | 25,396 | | x | | 25,396 |
| Westwood | 13,160 | 11,186 | | x | | 11,186 |
| Weymouth | 54,903 | 51,334 | | x | | 51,334 |
| Wilmington | 20,593 | 3,295 | x | | 3,295 | |
| Winchester | 20,339 | 20,319 | x | | 20,319 | |
| Winthrop | 17,179 | 17,162 | x | | 17,162 | |
| Woburn | 37,070 | 36,329 | x | | 36,329 | |
| TOTALS | 2,038,515 | 1,953,564 | | | 1,264,808 | 688,756 |

¹ Community population data are from UMass MISER (Massachusetts Institute for Social and Economic Research) estimates of 1998 population.

² MWRA, preliminary sewer rates estimates for FY01.

³ Boston, Brookline, Milton, and Newton cross over between the North and South Systems. Population data for these communities estimated by MWRA's Infiltration/Inflow Program.

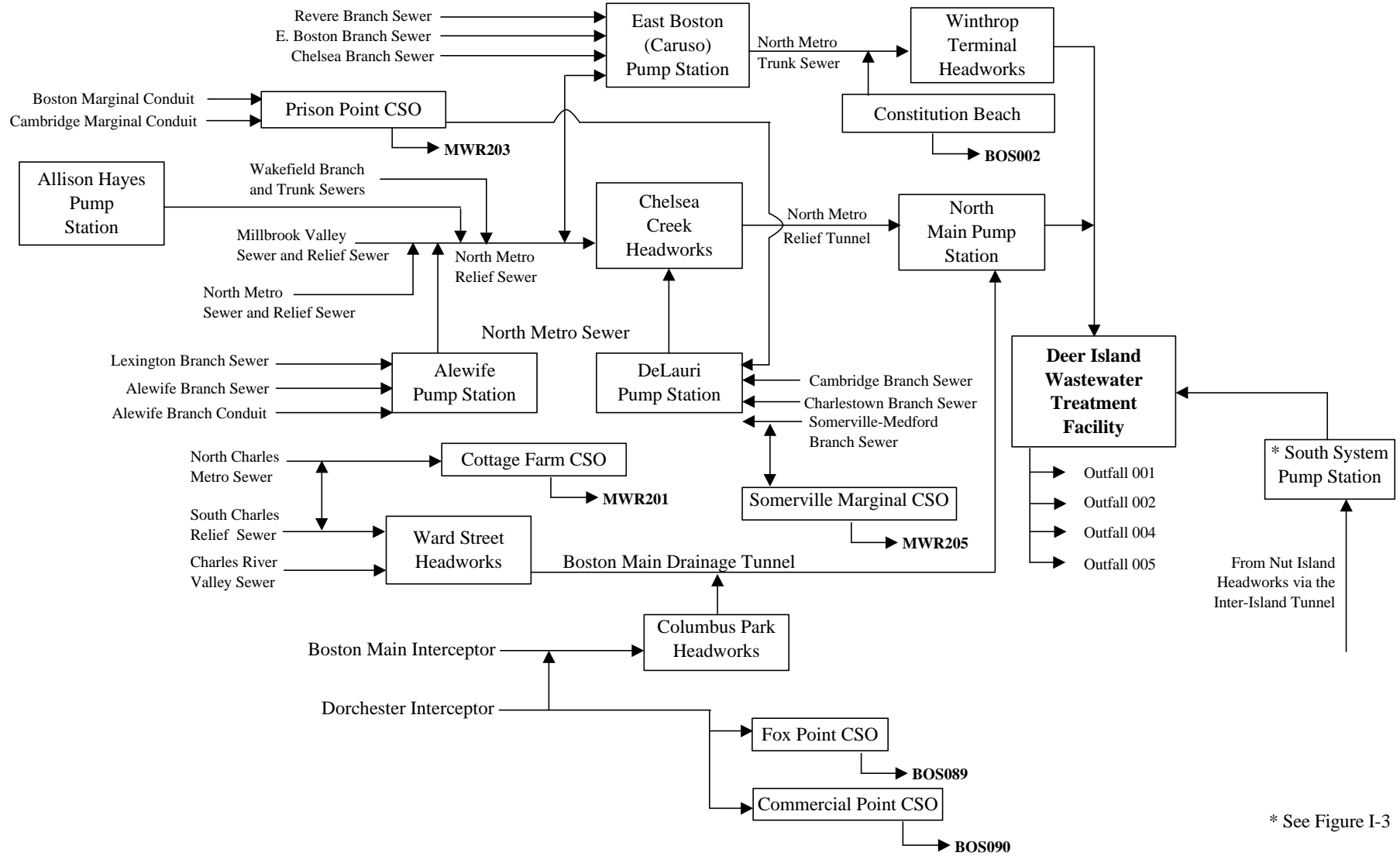
I.1 North System

The North System serves a population of about 1.3 million and is located to the north and west of Boston. It covers an area of about 168 square miles. Most of the North System is a separate system – sanitary wastewater and storm water are carried in different conduits. However, portions of Boston, Cambridge, Somerville, and Chelsea still have combined sewers. Combined sewers serve about 20 percent of the North System service area. Community sewer lines tie into the MWRA system through interceptor lines that feed into remote headwork facilities.

Three remote headworks connect to the North Main Pump Station (NMPS) on Deer Island by two deep rock tunnels, the Boston Main Drainage Tunnel (BMDT) and the North Facilities Metropolitan Relief Tunnel (North Metro Relief). The seven-mile BMDT originates at the Ward Street Headworks, continues to the Columbus Park Headworks, and runs under Boston Harbor to the NMPS. The four-mile North Metro Relief Tunnel connects the Chelsea Creek Headworks to the NMPS. The two tunnels combined can handle approximately 800 mgd, matching the combined peak flow capacity of 788 mgd from the three remote headworks.

A fourth headworks facility, the Winthrop Terminal, is located on Deer Island and receives flows from the city of Winthrop and the East Boston (Caruso) Pump Station through the North Metro Trunk Sewer. Figure I-1 shows the North System schematics.

Figure I-1
North System Pump Stations, Headworks, CSOs and Tunnel Hydraulic Schematic



* See Figure I-3

1.1.a Pump Stations

The MWRA North System has four pump stations. Alewife Brook (64 mgd), Caruso (110 mgd), DeLauri (90 mgd), and Allison Hayes (11 mgd) pump stations convey wastewater to the headworks facilities. The four pump stations receive flow from interceptor lines as follows:

| | |
|-----------------------------------|---|
| Alewife Brook Pump Station | Lexington Branch Sewer Alewife Branch Sewer Alewife Branch Conduit |
| Caruso (East Boston) Pump Station | Revere Branch Sewer East Boston Branch Sewer Chelsea Branch Sewer North Metro Relief Sewer * |
| DeLauri Pump Station | Cambridge Branch Sewer Charlestown Branch Sewer Medford-Somerville Branch Sewer Prison Point Pump Station Somerville Marginal CSO Overflow ** |
| Allison Hayes Pump Station | Wakefield Branch Sewer |

* When flow to the Chelsea Headworks is held back, wastewater is diverted to the Caruso Station.

** During low-intensity rainfall when line capacity is not exceeded, the combined wastewater is pumped back to the trunk sewers and ultimately to the DeLauri Station.

1.1.b Headworks

The Deer Island Treatment Plant receives North System flow from three remote headworks and the Winthrop Terminal Headworks. The three remote headworks, the Ward Street Headworks (256 mgd) located in Roxbury, the Columbus Park Headworks (182 mgd) located in South Boston, and the Chelsea Creek Headworks (350 mgd) located in Chelsea, have a combined pumping capacity of 788 mgd. The Winthrop Terminal Headworks (125 mgd) is located on Deer Island. The four North System headworks receive flows from interceptor lines or pump stations as follows:

| | |
|-----------------------------|---|
| Ward Street Headworks | South Charles Relief Sewer Charles River Valley Sewer North Charles Metro Sewer * Cottage Farm CSO * |
| Columbus Park Headworks | Boston Main Interceptor Dorchester Interceptor |
| Chelsea Creek Headworks | Alewife Pump Station North Metro Relief Sewer DeLauri Pump Station Caruso Pump Station Overflow |
| Winthrop Terminal Headworks | Winthrop Sewer Caruso Pump Station ** |

* During low-intensity rainfall when line or holding capacity are not exceeded, the combined wastewater is pumped back to the trunk sewers and ultimately to the Ward Street Headworks.

** Overflow from the Caruso Pump Station.

1.1.c Combined Sewer Overflow Facilities

The conditions for discharge of effluent from three CSO chlorination facilities are also included in MWRA's Boston NPDES permit. These three CSO chlorination facilities, Cottage Farm in Cambridge, Prison Point in Cambridge, and Somerville Marginal in Somerville, discharge to the Charles River, the Inner Harbor, and the Mystic River respectively. Three other CSO chlorination facilities, Constitution Beach in East Boston, Fox Point in Dorchester, and Commercial Point in Dorchester, are owned and operated by the MWRA. These facilities, which discharge to Boston Water and Sewer Commission (BWSC) lines, are included in the BWSC NPDES permit. The new

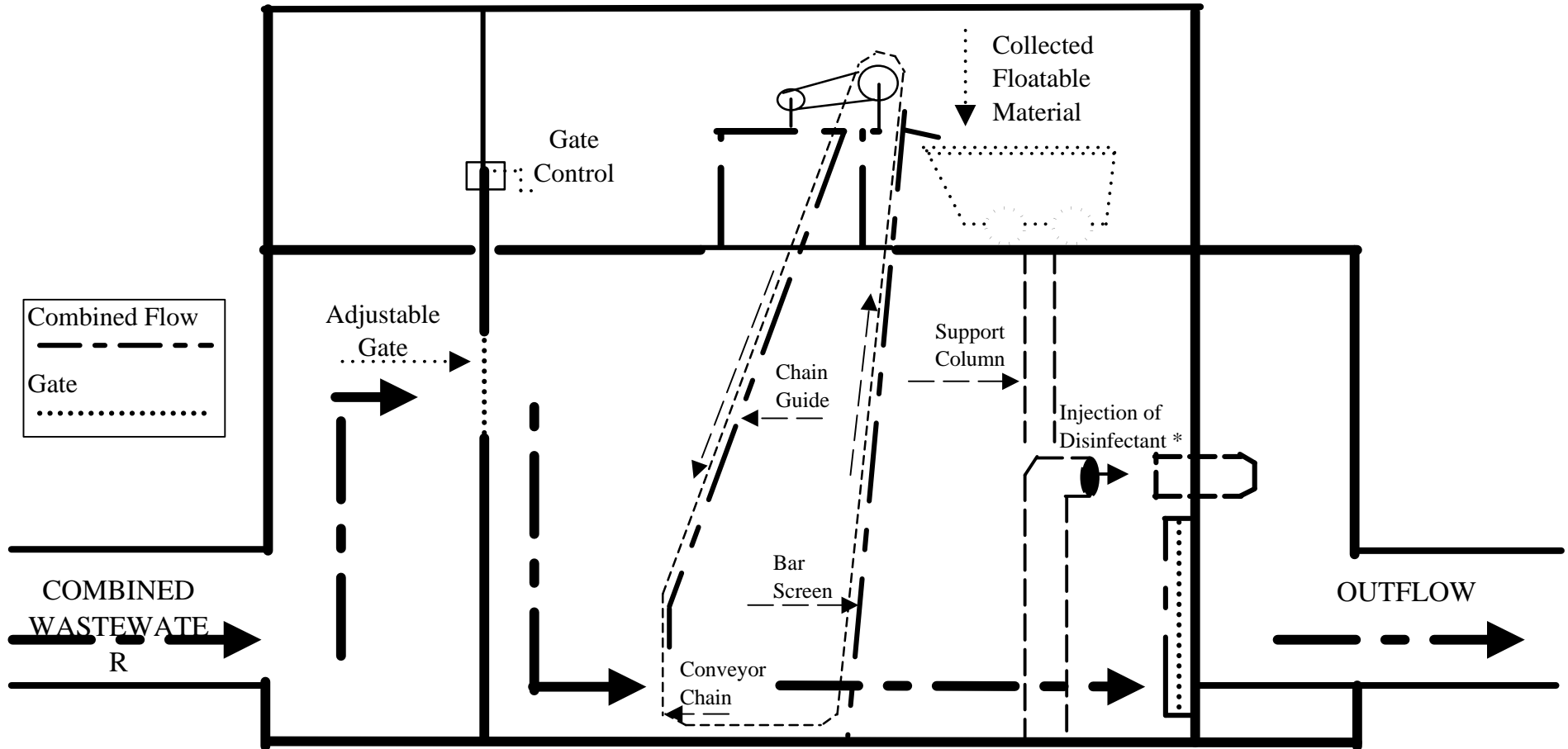
MWRA NPDES permit will include all six CSO facilities.

Discharge of combined wastewater from a CSO treatment facility to a receiving body of water is defined in this report as a CSO activation. Discharge of combined wastewater to a CSO outfall pipe is defined as a CSO overflow. CSO overflows will not be discussed in this report. In general, CSO activations occur as a result of heavy rain, snowmelt, or choking at the headworks.

Choking is the process by which the headworks restricts the flow to Deer Island. During wet weather, when the wastewater volume exceeds the hydraulic capacity of the treatment plant, the headworks “chokes” the flow and holds the wastewater in the lines. As a result, the combined wastewater backs up into the system, forcing the combined wastewater to overflow to CSO treatment facilities and CSO outfall pipes, resulting in potential CSO activations and overflow. In addition to choking in response to hydraulic demand on the system, the headworks may choke so that emergency repairs, system testing, or maintenance work can be performed at the treatment plant. Choking at Ward Street and Columbus Park Headworks influences Cottage Farm activations. Choking at the Columbus Park Headworks can influence activations at Fox Point and Commercial Point CSOs. Backups at the DeLauri Pumping Station brought about by choking at the Chelsea Headworks can activate the Somerville Marginal CSO.

At the CSO facilities, the combined wastewater is chlorinated prior to discharge. Of the six CSO facilities, only Cottage Farm and Prison Point have tank storage capacity. This allows the chlorinated wastewater to be held at these facilities prior to discharge. When the CSO facility’s storage capacity is exceeded, treated wastewater overflows and is discharged to the river. The four other CSO facilities are gravity CSO facilities, which means that combined wastewater arrives and leaves the CSO facility by gravity. This type of facility provides disinfection and allows the chlorinated combined wastewater to overflow to the receiving water as quickly as the wastewater arrives at the facility. Figure I-2 is a schematic of a typical gravity CSO treatment facility.

Figure I-2
 Combined Sewer Overflow Treatment Facility



* At Somerville Marginal, injection occurs at the influent gate

The six CSO facilities provide treatment for approximately 50% of the CSO volume while the other half overflows in any of 80-plus permitted CSO overflow structures of the sewerage system without the benefit of any type of treatment. Of the more than 80 permitted CSO overflow structures, 53 are located in Boston, 15 in Cambridge, 5 in Chelsea, and 12 in Somerville. These outfalls discharge into Boston Harbor, the Alewife Brook, the Mystic River, the Charles River, and the Neponset River.

Prison Point Combined Sewer Overflow Facility

Prison Point is both a dry weather and storm water pumping station. The dry weather phase is a five-mgd capacity sewer pumping station that receives flow from the Boston Marginal Conduit and the Cambridge Marginal Conduit. Prison Point feeds into the DeLauri Pumping Station.

The storm water phase has a maximum pumping capacity of 385 mgd. Treatment includes screening, disinfection, and detention. During wet weather, if the dry pumping capacity is exceeded, the combined flow is screened, chlorinated, and held in detention basins. Once the basins fill, treated flow is discharged downstream below the new Charles River Dam at outfall MWR203. Combined wastewater volume that is held back, up to 1.2 mgd, is pumped back to the DeLauri Station. This facility came on-line in 1980.

Cottage Farm Combined Sewer Overflow Facility

During dry weather conditions, wastewater arrives at the Ward Street Headworks where it is pumped to the Deer Island Plant. Under storm conditions, wastewater backs up into sewer lines and into the Cottage Farm CSO facility. Cottage Farm detains wastewater up to a volume of 1.3 MG. Any excess flow is screened, settled, chlorinated, and discharged to the Charles River through outfall MWR201. Combined wastewater that is held back is pumped back to the Ward Street Headworks. This facility, on-line since 1971, has a design pumping capacity of 233 mgd.

Somerville Marginal Combined Sewer Overflow Facility

Somerville Marginal CSO is an unmanned gravity facility with a design capacity of 245 mgd. It receives wet weather flow from the northeast portion of Somerville and part of Medford. Normally,

dry weather flow from these areas arrives at the DeLauri Station via the Somerville-Medford trunk sewers. During wet weather, combined sewer flow backs up to the Somerville CSO facility. Unlike Cottage Farm or Prison Point, this facility does not provide any detention capacity during storm conditions. Treatment consists of screening and chlorination. Effluent is discharged to the lower Mystic River basin at outfall number MWR205. During low-intensity rainfall when line capacity is not exceeded, the combined wastewater is pumped back from a wet well to the DeLauri Station. This facility came on-line in 1973 and was upgraded in 1988.

Constitution Beach Combined Sewer Overflow Facility

Constitution Beach is an unmanned gravity facility with a design capacity of 20 mgd. It receives flows from the North Metro Trunk sewer. Treatment consists of screening and disinfection. Effluent is discharged to a BWSC line that ultimately discharges to Boston Harbor through outfall number BOS002. This outfall is included in the BWSC permit. Since the issuance of that permit, full ownership of Constitution Beach CSO Facility has been transferred to MWRA. This facility came on-line in 1987.

Fox Point Combined Sewer Overflow Facility

Fox Point is an unmanned gravity facility with a design capacity of 119 mgd. It receives wet weather flows from the Dorchester Interceptor sewer line. Operation of this facility parallels that of the Constitution Beach CSO; treatment includes screening and disinfection. Effluent is discharged to a BWSC sewer line that discharges to Dorchester Bay through outfall number BOS089. This outfall is included in the BWSC permit. This facility came on-line in 1989.

Commercial Point Combined Sewer Overflow Facility

Commercial Point is an unmanned gravity CSO with a design capacity of 194 mgd. This facility also receives wet weather backups from the Dorchester Interceptor. Treatment includes screening and disinfection. Effluent is discharged to a BWSC line that ultimately discharges to Dorchester Bay through outfall number BOS090. This outfall is included in the BWSC permit. This facility came on-line in 1991.

I.2 South System

The South System serves a population of about 700,000 people and is located to the south and southwest of Boston. The South System covers an area of approximately 237 square miles. Figure I-3 illustrates the South System schematics. Community sewer lines tie into the South System through MWRA interceptor lines. The Framingham Extension Sewer, Wellesley Extension Sewer, Upper Neponset Valley Sewer, Wellesley Extension Relief Sewer, Neponset Valley Sewer, Walpole Extension Sewer, Stoughton Extension Sewer, Braintree-Randolph Trunk Sewer, and several other branch sewers discharge to the South System High Level Sewer. The High Level Sewer has a capacity of 360 mgd. Pump stations move the wastewater through the High Level Sewer to the Nut Island Headworks for preliminary treatment. The South System flows are then conveyed to the South System Pump Station at Deer Island through the 4.7-mile Inter-Island Tunnel for treatment at the Deer Island Treatment Plant.

I.2.a Pump Stations

Seven MWRA pump stations move wastewater from low-lying areas to the High Level Sewer: Hingham Pump Station (16.5 mgd), Braintree-Weymouth Pump Station (60 mgd), Squantum Pump Station (12 mgd), Houghs Neck Lift Station (2.8 mgd), Neponset Pump Station (90 mgd), Framingham Pump Station (48 mgd) and Quincy Pump Station (52 mgd). The high level sewer conveys wastewater to the Nut Island Headworks for preliminary treatment .

The seven pumping stations receive flow from interceptor or community lines as follows:

| | |
|---------------------------------|---|
| Hingham Pump Station | Weymouth-Hingham Sewer Lines |
| Braintree-Weymouth Pump Station | Braintree-Randolph Trunk Sewer Braintree-Weymouth Extension Sewer Holbrook Extension Sewer Hingham Pumping Station |
| Squantum Pump Station | Squantum Sewers |
| Houghs Neck Lift Station | Houghs Neck Sewer |
| Neponset Pump Station | Neponset Valley Sewer |

Framingham Pump Station

Framingham Sewers

Quincy Pump Station

Quincy and Upstream Sewers

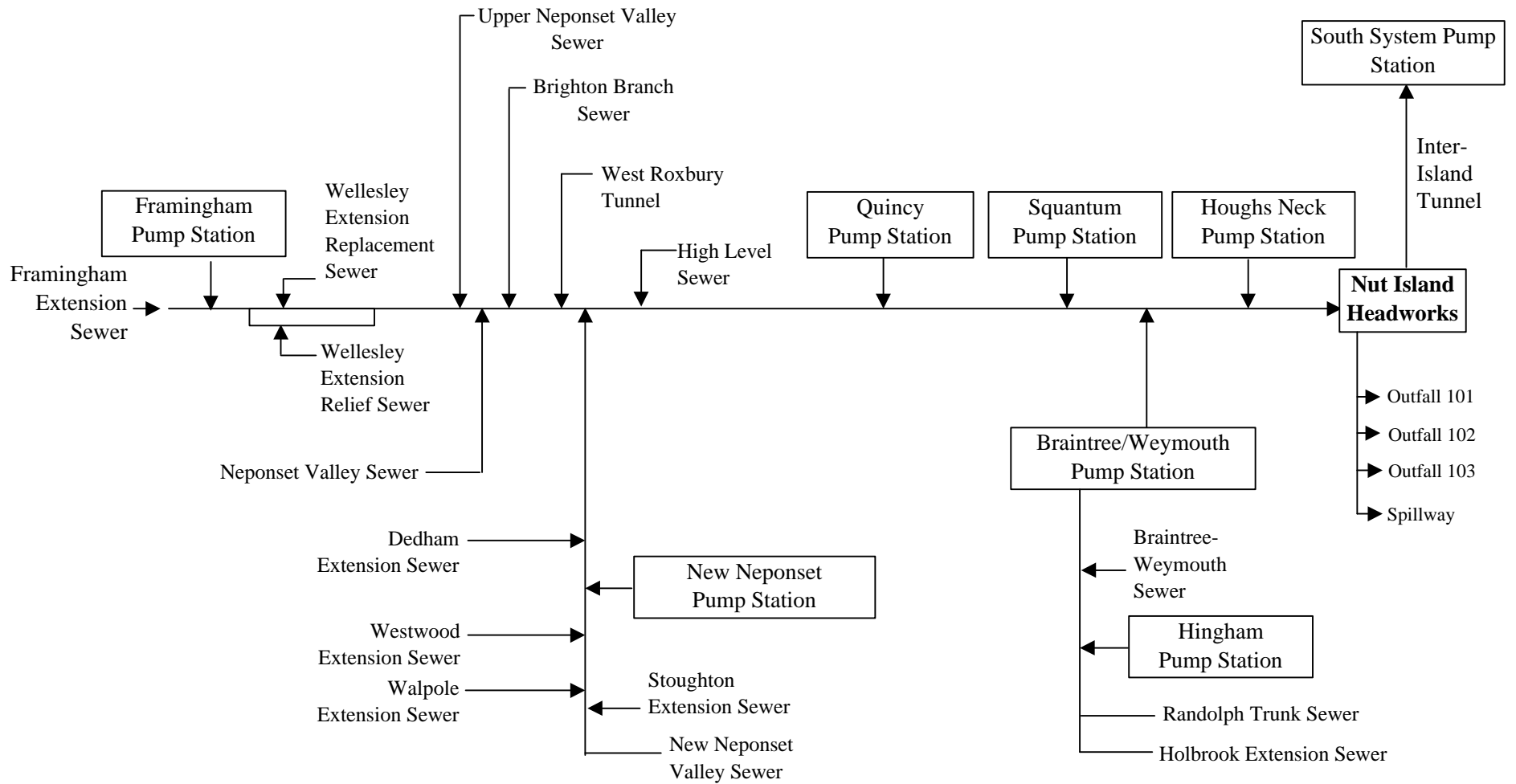
Wastewater collected from the South System communities is conveyed to Deer Island via the 4.7-mile Inter-Island Tunnel. The South System Pump Station, located on Deer Island, delivers the South System flow to the Deer Island Treatment Plant. This South System wastewater has already been screened and degrittied by the Nut Island Headworks.

Two force mains deliver the South System flow to one of two locations. The South System flow is normally discharged to the effluent channel of the Grit Facility, where it is combined with the North System and recycle flows, then split between Primary Clarifier Batteries A through D. The alternate discharge location is directly to the Primary Clarifier Battery D influent channel, which allows the South System flow to be isolated.

1.2.b Headworks

The Deer Island Treatment Plant receives South System flow from the new Nut Island Headworks. The Nut Island Headworks went on-line on July 7, 1998. It is located in Quincy and has a capacity of 360 mgd.

Figure I-3
South System Hydraulic Schematic



I.3 Deer Island Treatment Plant

Until FY99, wastewater flows from the North System were treated at the Deer Island Treatment Plant and flows from the South System were treated at the Nut Island Treatment Plant. In July 1998, the Nut Island Treatment Plant was decommissioned and all flows were treated at Deer Island.

Four lines convey sewage to the Deer Island Treatment Plant. North System wastewater is delivered to the plant via the Boston Main Drainage Tunnel (from the Ward Street and Columbus Park Headworks), the North Metropolitan Relief Tunnel (from the Chelsea Creek Headworks), and the North Metropolitan Trunk Sewer. South System wastewater is transferred to the plant from the Nut Island Headworks via the 4.7-mile Inter-Island Tunnel.

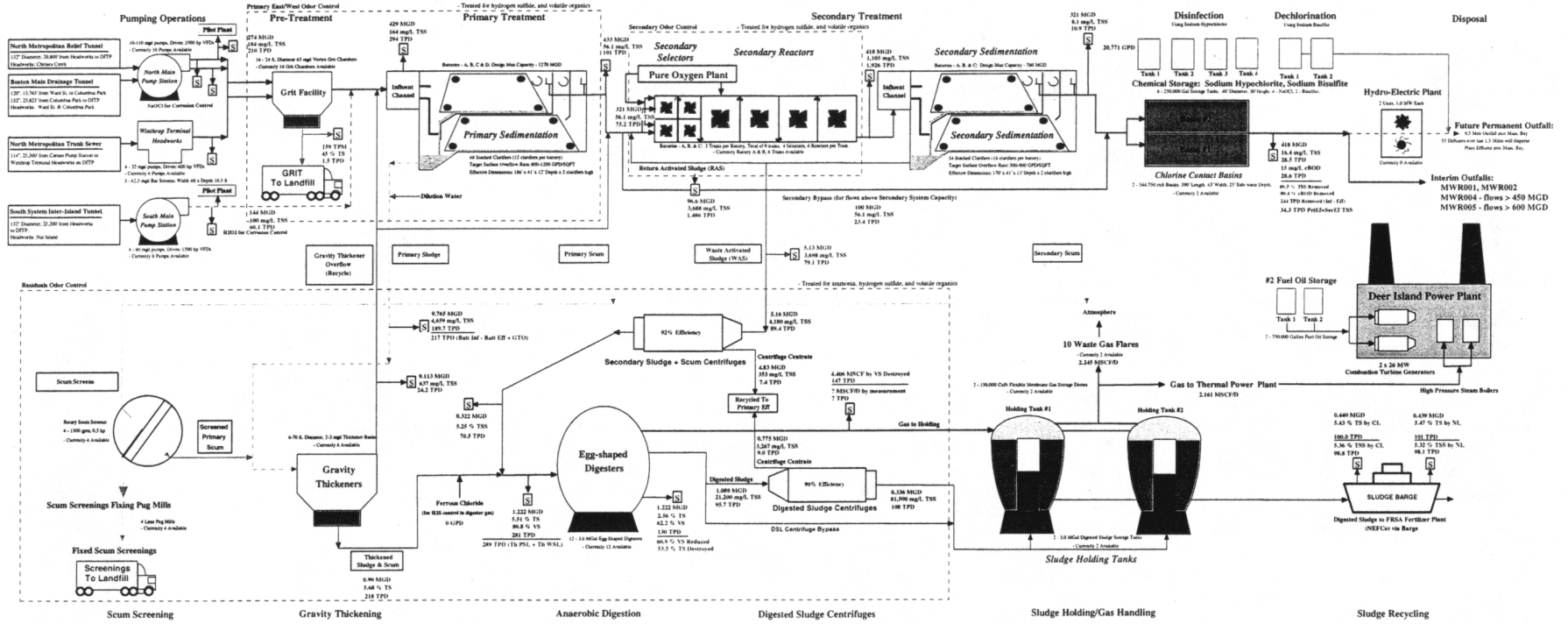
The Deer Island Treatment Plant receives wastewater at the North Main Pump Station (NMPS), the Winthrop Terminal, and the new South System Pump Station (SSPS). The North Metro Relief Tunnel and the Boston Main Drainage Tunnel connect to the NMPS, which consists of ten pumps, each rated at 110 mgd, for a total pumping capacity of 1,100 mgd. The North Metro Trunk Sewer connects to the Winthrop Terminal. The Inter-Island Tunnel connects to the SSPS, which consists of eight pumps, each rated at 66.7 mgd.

Grit removal and screening (preliminary treatment) is provided at the remote headworks. Flow from the South System receives preliminary treatment at the Nut Island Headworks. Flow from the city of Winthrop is degrittied at the Winthrop Terminal. Grit chambers and screens remove heavy particles and debris from the wastewater. Grit and screenings are landfilled off-site.

The upgraded primary treatment plant came on-line on January 21, 1995. The first battery of secondary treatment was initiated at Deer Island in July 1997. By the end of FY98, there were two batteries of secondary treatment on-line. A third battery will be added sometime in FY00. Figure I-4 presents the new Deer Island plant process flow diagram.

DEER ISLAND TREATMENT PLANT - PROCESS OVERVIEW

Population Served: 2.08 Million People. Average Design Flow: 480 MGD. Peak Design Flow: 1270 MGD
Current Operation - June, 2000



□ - Sample Withdrawal Point

Wastewater from the North System flows through the grit chambers for additional grit removal. It then flows to the primary settling tanks where floatables (consisting mainly of oil, grease, and plastics) rise to the surface while the sludge (consisting of heavy solid particles) settles to the bottom. A portion of the primary effluent (the allowable capacity for secondary treatment) is sent to secondary treatment, while the remaining portion (from high flow conditions due to rainfall) is sent directly to the disinfection basins to be treated with sodium hypochlorite. Effluent from secondary treatment is then sent to the disinfection basins, and is combined with the primary effluent.

The scum (floatables) is skimmed off the top of the primary and secondary settling tanks while the sludge (settled solids) is scraped from the bottom of the tanks. Scum is pumped to the scum concentrator while the sludge is pumped to the sludge thickeners. After the scum and sludge are concentrated and thickened, they are conveyed to the anaerobic digesters for further treatment. The digested sludge/scum is barged to the Fore River Pelletizing Plant, where it is converted into fertilizer.

1.3.a Deer Island Outfalls

Effluent is channeled through a common conduit to four potential outfall pipes, 001, 002, 004, and 005. Figure I-5 illustrates the Deer Island outfall schematics while Table I-3 presents the specifics of each outfall. Outfalls 001, 002 and 004 connect to Chamber C while outfall 005 connects to Chamber A. A sluice gate in Chamber A controls discharge from outfall 005. Likewise, a sluice gate in Chamber C isolates discharge from outfall 004. Of the four permitted outfalls, only outfalls 001 and 002 are used regularly. Outfall 004 is used only during high flow conditions, while relief outfall 005, although not generally used, can be activated during extremely high flows or emergency situations. Outfall 003 is permanently blocked and out of service.

The amount of wastewater that can be pumped to the plant is not only limited by sewer line capacity, treatment plant capacity, and pumping capacity, but also by the outfall pipe capacity. The approximate amounts of treatment plant effluent that can be discharged through the outfalls are as follows:

Outfalls 001 & 002
 High tide 400 mgd
 Low tide 735 mgd

Outfalls 001 & 002 & 004
 High tide 635 mgd
 Low tide 900 mgd

Outfalls 001 & 002 & 004 & 005
 High tide 900 mgd
 Low tide 1,270 mgd

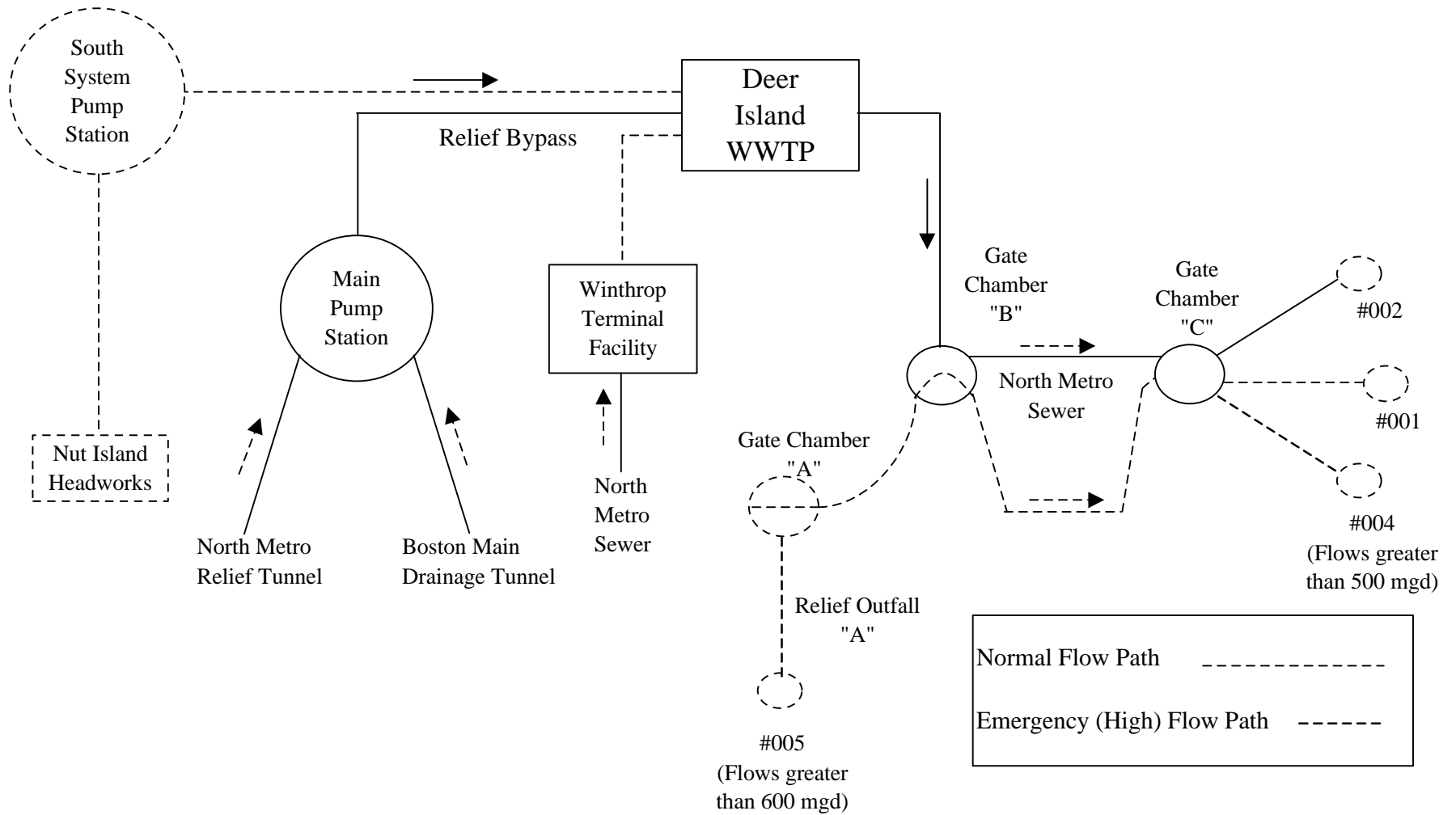
Table I-3 Deer Island Outfall Characteristics

| | Outfall Number | | | |
|-----------------------------------|--|---|---------------------------------------|---------------------------------------|
| | No. 001 | No. 002 | No. 004 | No. 005 |
| Length (ft.) | 2260 | 2565 | 500 | 135 |
| Discharge Elevation (ft.) | 54.7 | 54.7 | 97.8 | 98 |
| Number of Open Ports | 14 | 47 | 1 | 1 |
| Port Diameter (ft.) | 1.67 | 1.69 | 9 | 9 |
| Chamber Invert Elevation (ft.) | 98.1 | 98.1 | 98.1 | 103.2 |
| Chamber Overflow Elevation (ft.) | 120 | 120 | 120 | 125 |
| Pipe Size (in.) and Pipe Material | 16 x 12 concrete to 12 x 10 concrete to 10 (diameter) reinforced concrete (RC) | 6 x 6.25 to 9 (diameter) brick with concrete casing | 9 (diameter) reinforced concrete (RC) | 9 (diameter) reinforced concrete (RC) |
| Year Built | 1896 | 1959 | 1959 | 1959 |

1.3.b Nut Island Outfalls

The former Nut Island Treatment Plant discharged treated wastewater through four outfalls. Although the Nut Island Treatment Plant no longer exists, outfalls 101, 102 and 103 remain operational in case of emergency. These outfalls discharge to Boston Harbor; the new emergency spillway built concurrently with the new headworks discharges to Hingham Bay.

Figure I-5
Deer Island Outfall System Schematic



1.3.c Outfall Tunnel

Once the new outfall tunnel goes on-line, there will no longer be discharge of treated wastewater from the Deer Island Treatment Plant into Boston Harbor. All effluent flows will be sent via the new 9.5-mile outfall tunnel to Massachusetts Bay.

I.4 Collection and Transport System

An issue of concern in both the North System and the South System is the occurrence of Sanitary Sewer Overflows (SSOs). These occur during extreme rainfall events, when inflow and infiltration from heavy rains exceeds the capacity of the pipes, causing certain areas to become inundated. As a matter of course, whenever there is a high amount of rainfall, a crew from the Transport Department investigates a number of critical areas to visually monitor overflows. While some of these critical areas are the MWRA's responsibility, most of them are the responsibility of the local communities. A list of these areas and who is responsible for them is included in Table I-4. Not all of these areas are checked during every rainfall, and some are monitored by the MWRA only during extreme storm events.

Table I-4
MWRA Sewer System Overflow Locations

| <u>Number</u> | <u>Owner</u> | <u>Location and Description</u> |
|---------------|---------------------|--|
| 1 | MWRA ^{1,3} | Section 107 (Overflow Relief Point) Medford, On Median Strip of On Ramp to Rt. 16 |
| 2 | MWRA ¹ | Section C (Overflow Relief Point) Medford, Auburn St. at Rt. 16 |
| 3 | MWRA ¹ | Section 91B (Siphon) Medford, Lakeview Ter. At Mystic Valley Pkwy |
| 4 | MWRA ^{1,3} | Section 91B (Manhole) Medford, Lakeview Ter. |
| 5 | MWRA ^{2,3} | Section 126 (Siphon) Braintree, Easement between Commercial St. & Quincy Ave. |
| 6 | MWRA ^{2,3} | Section 126 (Manhole) Braintree, Idlewell Blvd. |
| 7 | MWRA ² | Section 128 (Siphon) Braintree, Pearl St. |
| 8 | MWRA ² | Norwood, Manhole |
| 9 | MWRA ² | Weymouth, Manhole, Regina Rd. |
| 10 | Newton | Manhole, 100 Peregrine Rd. |
| 11A | Roslindale | Manhole, Florence St. Sycamore St. |
| 11B | Roslindale | Manhole, Sammett Ave. Mt. Hope Rd. Holly St. |
| 11C | Roslindale | Manhole, Archdale St. |
| 12 | Everett | Manhole, Preston St. |
| 13 | Malden | Manhole, Taylor St. |
| 14 | Medford | Manhole, Roosevelt St. |
| 15 | Medford | Manhole, Mystic Ave. |
| 16 | Arlington | Manhole, Kimball Rd. |
| 17 | Arlington | Manhole, Summer St. |
| 18 | Quincy | Manhole, 40 Willard St. |
| 19 | W. Roxbury | Manhole, 307 V.F.W. Parkway |
| 20 | Hyde Park | Manhole, Clark Ave. American Legion Hwy. |
| 21 | Arlington | Manhole, 22 Grove St. |
| 22 | Weymouth | Manhole, 159 Spring Way |
| 23 | Hyde Park | Manhole, 46 Collins St. |
| 24 | Hyde Park | Manhole, 45 Sierra St. |
| 25 | Braintree | Manhole, 16 Allen St. |
| 26 | Newton | Manhole, 183 Old Farm Rd. |

Table I-4 [cont.]

| <u>Number</u> | <u>Owner</u> | <u>Location and Description</u> |
|---------------|--------------|---|
| 27 | Arlington | Section 80 (Overflow Relief Point) Behind Brattle Court Pumping Station |
| 28 | Arlington | Section 80 (Overflow Relief Point) Hobbs Court Plug- Temporary |
| 29 | Medford | Section 43.5 (Overflow Relief Point) Boston Ave. At Rt. 16 |
| 30 | Cambridge | Section B (Overflow Relief Point) Alewife Brook at T-Station |
| 31 | Malden | Section 19 (Overflow Relief Point) Off Commercial Street at Malden River |
| 32 | Winchester | Section 113 (Siphon) Wedgemere Siphon |
| 33 | Natick | Section 132 (Siphon) Eliot St. |
| 34 | Norwood | Section 117 (Siphon and Manhole) Wooded Area at Neponset River |
| 35 | Canton | Section 121 (Manhole) Wooded Area at Steep Hill Brook Neponset River |
| 36 | Norwood | Manhole, New Walpole Extension Sewer Behind Overlook Dr. |

¹ North System

² South System

³ Active during severe storms in conjunction with high ground water and limited capacity