Amended Preliminary Master Plan - Planned Unit Developement

Somerville,
Massachusetts

Prepared for Federal Realty Investment Trust
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Introduction

1. INTRODUCTION

1.1 Report

This report is submitted in connection with the site plan submission entitled, "Amended Preliminary Master Plan, Planned Unit Development, Assembly Square Drive (APMP PUD ASD), Somerville, Massachusetts", dated May 2014 (the "Project") and the previously approved "Amended Preliminary Master Plan, Planned Unit Development, Assembly Square Drive (PMP PUD ASD), Somerville, Massachusetts", dated June 2010.

For Site Location Map refer to Figure 1.

For existing utilities referenced in this report please refer to the drawings in the Site Plans entitled:

- Utility As-Builts SV-1 thru SV-13 dated March 9, 2012

For proposed utilities referenced in this report please refer to the drawings submission entitled:

- Grading, Drainage and Utility Plans 1 thru 5 dated May 2014.

1.2 Study Description

This report confirms and updates findings in a report by Green International Affiliates, Inc., (GIA), which analyzed for the Somerville Office of Housing and Community development (OHCD), all existing utilities, and future improvements within the Assembly Square Revitalization Area (ASRA). The GIA report is entitled "Utility Analysis Report (UAR) for Assembly Square Revitalization Area Somerville, Massachusetts" and was completed in November, 2001. The report describes the locations, sizes and capacities of the following existing utility systems: sanitary sewers, water mains, storm-water surface drainage, telephone, gas, electric, cable TV, communication and fire alarms. The OHCD developed a potential build-out scenario in that report for the entire ASRA which was used as the base for the existing utility analyses and to identify the necessary improvements needed to support the potential build-out.

This report confirms the existing utility findings in the GIA Report and suggests proposed utility improvements in a similar format as was presented in the GIA report to support this Project.

This report was prepared using some of the information contained in the 2001 GIA Utility Analyses. In order to avoid repeated references to the GIA 2001 Utility Analyses, this report contains all the utility existing information, data and analyses that are valid for current conditions. Any additional information regarding existing utility information that has been recognized since the previously approved PMP PUD is also reflected in this report.

1.3 *Existing Utilities*

Existing utilities information within the PUD area were obtained from actual on the ground instrument survey preformed by Vanasse Hangen Brustlin, Inc. (VHB) in March of 2010 and March of 2012. Some underground utilities are based on field observation and information of record. They are not warranted to be exact.

1.4 Existing Utility Improvements follow-up

The master developer, Federal Realty Investment Trust, has constructed all necessary utility infrastructure for the full buildout of the Project in the proposed streets of the PUD area in 2010 and 2012.

2

Water Distribution System

Existing Conditions

2 WATER SUPPLY AND DISTRIBUTION SYSTEM

2.1 *Existing Water Supply and Distribution System*

The City of Somerville owns and maintains the public water distribution system that services the Assembly Square Revitalization Area (ASRA). The City's water distribution system supplies both domestic and fire protection water to the area. This system is part of a city-wide interconnected network that is supplied by the Massachusetts Water Resources Authority (MWRA) through seven metered connections. The City is supplied by both MWRA's high service and low service pressure systems. The water distribution system within the Assembly Square area is part of the City's low service system.

MWRA Meter 91 is located at the intersection of the Fellsway West and Middlesex Avenue and provides the closest supply of water to the Assembly Square area from a 48-inch cast iron water main located in Middlesex Fells Parkway (Fellsway). The City does not have any water storage facilities or any pumping stations that service this area.

The MWRA has preformed water main improvements to Meter 91 and the existing 48-inch water main located in Middlesex Fells Parkway. The water main improvements consisted of cleaning, cement-mortar lining, internally sealed joints, 48-inch restrained joint pipe and valving.

Information provided by the MWRA concerning Meter 91 is as follows:

The Average Hydraulic Grade Line Elevations is 184 ft. (Boston City Base Datum)
Refer to Appendix "B" for the MWRA Meter 91 water readings and Somerville's total daily water flows between 2004 and 2006.

The existing system is comprised of water mains ranging in age from 1917 to 1982 and in varying conditions. The water distribution system is described as follows:

- More that half of the system was installed in the 1920's while most of the remaining mains were installed during the 1970's and 1980's.
- The City's water mains sizes are all 8-inch diameter and larger which meets the minimum recommended size for adequate fire flows.
- The primary connection to the MWRA meter is a 20-inch diameter cast iron main installed in 1925 by the City within and along Middlesex Avenue.
- Several branch lines of varying diameter feed off the 20-inch main between Middlesex Avenue and the Fellsway.
- The remainder of the system along Foley Street, Assembly Square Drive and Mystic Avenue consist of a 12-inch diameter pipe interconnected to create several loops.

- The piping network in this area, for the most part, was installed to create a looped system around buildings sites and is interconnected to the city-wide network at several locations.
- The piping has generally been installed within the limits of the City's roadway system and has sufficient valving at most intersections to facilitate isolation and redirection of the flow during emergency or maintenances situations.
- As part of the ongoing approved work a portion of the existing 12-inch water main within Assembly Square Drive was replaced due to its poor condition. Also, a 20-inch water main has been constructed within Foley Street and the future extension of Assembly Square Drive in order to service the future development.

2.1.2 ***Existing Water System Demands***

Average Day and Maximum Day Demands

Currently, the ASRA is primarily being used for retail, office and industrial purposes. Existing water demand was calculated for the average day and the maximum day demand based on the existing uses that make up the ASRA. Based on existing information the flow rates calculated for the existing uses for the average day demand and maximum day demand were 64 GPM and 115 GPM, respectively.

Needed Fire Flow

The water system within the Project area provides both domestic and fire flow water supply. The City's existing water distribution network within this area has, on average, fire hydrants located 300 feet apart throughout the entire area. This spacing meets the typical maximum recommended distance between hydrants in an urban setting.

The minimum Needed Fire Flow (NFF) for MWRA Meter 91 and maximum Insurance Services Office (ISO) requirements for a Community are:

	Fire Flowrate
Estimated minimum NFF requirements to be supplied by MWRA for meter 91:	2,000 gpm
Maximum requirements a community is required to supply according to the ISO:	3,500 gpm

The required minimum residual pressure at any location within the distribution system during a fire flow situation is 20 psi.

2.1.3 ***Existing Water System Analysis***

Computer hydraulic analysis was performed by GIA, and confirmed by VHB, for the existing ASRA area water distribution system to determine system capacity and to provide a baseline for comparison of future system demands. The analysis included a limited computer network model on order to simulate several scenarios including:

1. Existing Average Day Demand
2. Existing Maximum Day Demand
3. Existing Maximum Day Demand Plus 2,000 gpm Fire Flow

The computer hydraulic analysis has indicated that the existing system has sufficient capacity for all scenarios.

Proposed Conditions

2.2 PROPOSED WATER SYSTEM

2.2.1 Proposed System Demands

The full build out of Amended Preliminary Master Plan within the Project area will result in an increase in the water demands on the existing system. The future average day flowrates and maximum day flowrates were developed by utilizing proposed land use areas as shown in Figure 3.2.

2.2.2 Proposed System Analysis

VHB performed a preliminary computer hydraulic analysis of the proposed conditions utilizing information obtained from the MWRA and hydrant flow test information to further explore the availability of water flow at the higher flow rate set by the ISO. The computer model was calibrated based on a hydrant flow test performed by VHB on September 13, 2006, at the intersections of McGrath Highway and Kensington Avenue with Middlesex Avenue. This hydrant is connected to the 20-inch water main in Middlesex Avenue. The hydrant flow test computation converted to a base of 20 psi resulted in a flow of 5,645 gpm. VHB performed additional hydrant flow tests on March 14, 2007 and August 18, 2011, September 12, 2014 and November, 2015 in order to further refine and confirm the computer model. Refer to Appendix "A" for hydrant flow test computations.

A preliminary hydraulic analysis was preformed for future demands on the existing/proposed water distribution systems. The analysis includes utilizing the Future conditions model and performing several scenarios including:

1.	Future Average Day Demand	704 gpm
2.	Future Maximum Day Demand	1,060 gpm
3.	Future Maximum Day Demand Plus 2,000 gpm Fire Flow	3,060 gpm
4.	Future Maximum Day Demand Plus 3,500 gpm Fire Flow	4,560 gpm

A fire flow of 3,500 gpm is the maximum requirement a community is required to supply according to the ISO standards.

Based on VHB analysis the Future Maximum Day Demand and 3,500 gpm fire flow can be achieved within the Project area after the proposed water improvements are constructed.

2.3 Proposed Water System Improvements

The following proposed water mains will be installed or have already been constructed as part of the ongoing approved work in order to provide loop connections throughout the Assembly Square PUD area.

- Connected a new 20-inch water main from the existing 20-inch water main in Middlesex Avenue, continued along the future extension of Assembly Square drive to Foley Street then continued west along Foley Street to Middlesex Avenue where the new 20-inch water main was connected back into the existing 20-inch water main in Middlesex Avenue. The newly constructed 20-inch main in Foley Street replaced the existing 12-inch water main installed in 1928.

- Extended water mains, ranging in size from 8 to 20-inch, from the newly constructed 20-inch water main in Grand Union Boulevard along Artisan Way, Great River Road, Canal Street, Foley Street and Revolution Drive where they are interconnected in order to create multiple looped systems.

- Loop a proposed 12-inch water main on the Parcel 11A site from the recently replaced 12-inch water main in Grand Union Boulevard to Revolution Drive.

3

Sanitary Sewer

Existing Conditions

3.1 *Existing Sewer System*

The City of Somerville owns and maintains the sanitary sewer system in the ASRA area. The sanitary sewer system within the area is a separated system with storm drainage collected in an independent system.

All of the master planned sanitary sewer mains have been installed in the ASRA. The pipe starts as an 8" at the north end of the Site. The pipe sizes increase to an 18" as they discharge towards the southern end of the Site. The reconfigured and reconstructed sewer system in N. Union Street connects to a 24" pipe prior to discharging to the City of Somerville Regulator Manhole, which is the connection to the MWRA system.

Proposed Conditions

3.2.1 Proposed Sewer System

All of the sewer mains in the ASRA have been constructed as part of the previous construction phases of the project. All of the improvements have been consistent with the Preliminary Master Plan and PUD approval processes. The total amout of sewer flow from the project is essentially unchanged. The distribution of the sewer flow to the system is also basically unchanged. The sewer system has adequate capacity to handle the sewer flows from the project as proposed.

3.2.2 Proposed Sewer System Analysis

The average daily wastewater flows rates used in the analysis are based on Commonwealth of Massachusetts, Sewer System Extension and Connection, regulation 314 CMR 7. Wastewater peak flows rates were determined by multiplying the average daily flow by a peaking factor of four. The proposed land use areas and calculated flow rates are shown on Figure 3.2. The proposed development in the PUD-ASD area will increase wastewater flows to the MWRA interceptor sewer.

3.2.2 Proposed System Improvements

Based on the sewerage flows generated by the proposed development it was necessary to replace the existing 12-inch sewer lines within Assembly Square Drive with proposed 18-inch and 12-inch sewer trunk lines. These improvements have already been made as part of the ongoing approved work. The total peak sewer flows from the proposed development will generate 3.11 +/- mgd. The 18-inch sewer trunk line has a design capacity of 5.1 +/- mgd at a slope of 0.003 +/- with an average velocity of 5 ft per second. The 18-inch sewer trunk line

will have the capacity to handle all peak sewer demands of the Proposed Development with an excess capacity of 2.0 +/- mgd.

To address existing sewer configuration issues at the intersection of Assembly Square Drive and North Union Street, the following new sewer alignment and connections were constructed and are shown on the submitted PUD drawings:

- The new 18-inch trunk line within North Union Street will pick up the sewer flows from the existing 12-inch sewer, which collects sewer discharge from the Home Depot and Circuit City at SMH 32.

- The installation of a Special Drop Sewer Manhole will be constructed over the existing 24-inch sewer and 18-inch metal sewer at the existing drop connection of the existing 12-inch sewer. The new 18-inch trunk line connects into the Special Drop Sewer Manhole.

3.2.4 Sewer Mitigation

The Project has received two Sewer Extension and Connection Permits from DEP for discharging into the municipal and MWRA collection system. The first permit was approved on October 8, 2009 (Permit No. X229252) and included details of the sewer mitigation plan. Mitigation to offset flows is required to be implemented as part of the conditions for granting the connection. The mitigation program has been approved by the reviewing agencies. The second permit dated November 10, 2011 (Permit No. X239330) was for the connection of additional flow from a new phase of the development consistent with the master plan. A sewer permit application for the remaining flows from the entire project has been reviewed and approved by the City of Somerville Engineering and DPW departments. The proposed mitigation for the entire project has remained unchanged.

The mitigation took measures to reduce and/or eliminate non-sanitary sewerage flows, including the completed sewer improvements in Assembly Square Drive, the completed improvements in Foley Street and Mystic Avenue, off-site improvements completed in the Ten Hills neighborhood, removal of illicitly-connected catch basins on Mystic Avenue, Lombardi Street and Broadway, reduction of flows into the Somerville Marginal Conduit and a financial contribution to the City of Somerville in the form of funds specifically designated for I/I improvements.

The specific inflows and infiltration to be removed from the system are as follows:

Total Build Out (District A-1 and B-1 minus Yacht Club)

Proposed Project Added Total Sewer Flows =	777,116 gpd
Minus Existing Redeveloped Areas within District B-1 =	30,361 gpd
Proposed Net Increase in Sewer Flows=	746,755 gpd
Required DEP 4:1 Mitigation=	2,987,020 gpd

Proposed Mitigation @4:1 (Completed)

- The proponent has constructed improvements in the Ten Hills Area including sewer main replacement, sewer manhole replacement and pipe lining to complete the Sewer Inflow and Infiltration mitigation requirements for 610,000 gallons.

- Infiltration into the existing vitrified clay sewer pipes within the entire PUD area has been eliminated with the installation of approximately 1,800 feet of new 18-inch sewer pipes and 3,400 feet of 12-inch sewer pipes. Flow metering of existing pipes determined the potential for elimination of 78,000 gallons per day. The conditions of the sewer extension permit require future flow monitoring to determine if this volume reduction has been achieved.

- Disconnection of illicitly-connected catch basins on Mystic Avenue, Lombardi Street and Broadway that will remove approximately 294,000 gallons per day has been completed.

- Approximately 1,200,000 gallons per day will be removed from the Somerville Marginal Conduit by stormwater improvements in the PUD.

- The proponent has made a financial contribution to the City of Somerville specifically designated for Infiltration/Inflow removal projects, offsetting 810,000 gpd of new sewer flows.

Summary:

- Proposed Project Total Sewer Flows = 777,116 gpd

- Required Mitigation = 2,987,020 gpd

- Mitigation Description — Sewer Flows

Mitigation Description	Sewer Flows
Ten Hills Area =	610,000 gpd
I/I reduction from existing PUD sewers =	56,000 gpd
Illicitly Connected CB disconnection =	73,553 gpd
Removal of flows from SMC =	1,200,000 gpd
Financial Contribution offset =	1,047,467 gpd
	Total = 2,987,020 gpd

4

Stormwater Drainage System

Pre-Existing Conditions

4.1 Pre-Existing Drainage System

In 2001 Green International Affiliates, Inc. (GIA) prepared a Utility Analysis Report (UAR) of the Assembly Square Revitalization Area for the City of Somerville, Office of Housing and Community Development (OHCD). This report contains an inventory and analysis of the existing stormwater drainage infrastructure as well as some recommendations for drainage improvements during future development of the area. The GIA Report was used in conjunction with field survey information to analyze the existing stormwater drainage system for this Amended Preliminary Master Plan, Planned Unit Development (PUD) submission.

The proposed Project Site is located on Assembly Square Drive in the City of Somerville, Massachusetts. The majority of the Project Site was previously covered with existing buildings, roadways, and parking lots or areas that were previously developed and demolished. The Project Site is generally flat, ranging from approximate elevation 9 feet (NGVD) to 12 feet (NGVD) with the exception of a portion of Assembly Square Drive that slopes rapidly to reach an elevation of 30 feet (NGVD) at its connection to Mystic Avenue. The majority of the Project Site is covered by impervious or near-impervious surfaces. NRCS Soil Maps for Middlesex County (NRCS Web Soil Survey, 4-13-95) show the existing soils to be Urban land with wet substratum (603) and Udorthents with wet substratum (655). Geotechnical information available at the time of this report classifies the soils as hydrologic soils group D, which has low infiltration potential. Detailed soils information and a soils map are included in Appendix C. The cover condition and soils present in the Project Site result in minimal infiltration of stormwater under existing conditions. Areas at the north and east of the Project Site that were historically occupied with railroad and manufacturing facilities are currently vacant or unmaintained. Under pre-existing conditions, much of the stormwater collected in the Project Site discharges untreated to the existing Massachusetts Water Resources Authority (MWRA) 84-inch Somerville Marginal Conduit (SMC) or to the Mystic River as overland flow or via pipe upstream of the Amelia Earhart Dam. The MWRA 84-inch SMC discharges downstream of the Amelia Earhart Dam to the tidally influenced portion of the Mystic River. Stormwater runoff discharging to the MWRA 84-inch SMC has been an ongoing area of concern for the MWRA as the SMC currently acts as a combined sewer overflow (CSO) during some large storm events and high tide conditions at the outfall.

Under current conditions, a new dedicated 72-inch drainage outfall discharges downstream of the Amelia Earhart Dam to redirect stormwater flows and to help alleviate the potential for CSOs into the Mystic River. This is consistent with the goals for improving water quality in the Mystic River.

Proposed Conditions

4.2 Proposed Stormwater Management System

The Project was designed to comply fully with the Massachusetts Stormwater Management Regulations for a re-development project and the applicable City of Somerville requirements. The Proponent constructed improvements to existing roadways, construction of new roadways and drives, expansion of the DCR waterfront park and the expansion and upgrade of underground utility infrastructure. The proposed design includes LID and water quality measures that will protect the surrounding natural resources, as described in this report, from degradation as a result of stormwater runoff.

The design options for the storm drain system required close consideration of the adjacent properties, including the MBTA Orange Line, the existing DCR waterfront park and existing commercial uses. Another key consideration of the storm drain system in the Assembly Square area is the existing 36-inch connection to the MWRA 84-inch SMC. As previously mentioned, during large storm events and high tide conditions at the SMC outfall, the SMC has historically experienced combined sewer overflows into the non-tidal portion of the Mystic River, upstream of the Amelia Earhart Dam. In order to avoid any increased impacts to the MWRA 84-inch SMC, it is proposed to abandon the existing 36-inch connection to the MWRA 84-inch SMC and construct a new 72-inch storm drain trunk line that will discharge at a new outfall downstream of the Amelia Earhart Dam, in the tidal portion of the Mystic River. The MWRA has analyzed the benefits that the disconnection of the 36-inch pipe will have on the MWRA 84-inch SMC. This new storm drain trunk line includes a tide-gate near the outfall to prevent tidal waters from entering and surcharging the new drainage system during periods of high tide.

The new trunk line proposed for the Project was constructed within the extension of Foley Street, and then continued under the MBTA tracks and through property owned by the Commonwealth of Massachusetts. A portion of this pipe was constructed in 2009 as part of the infrastructure necessary for the approved Phase 1-AA. See attached plans for the location of the 72-inch storm drain outfall. This design will significantly decrease stormwater runoff to the Mystic River above the Amelia Earhart Dam, and eliminate stormwater flows from the Project Site to the MWRA 84-inch SMC. As a result, the design would help alleviate backups within the MWRA 84-inch SMC and decrease the amount of combined sewer overflows (CSOs) above the Amelia Earhart Dam.

Goals for the design of the proposed drainage system for the Project include the following:

- Reduce discharge to the MWRA 84-inch SMC.
- Incorporate LID techniques into the design to the maximum extent practicable.
- Design systems for long-term efficiency by providing concise operation and maintenance requirements.
- Upgrade existing drainage system components to ensure adequate capacity is provided for a 10-year storm event at a minimum.
- Improve the water quality of runoff for the proposed redevelopment areas.

These goals are fulfilled through many design components as described below.

The full-build drainage system follows the Stormwater Management Regulations and Best Management Practices as outlined in this report in order to provide long-term protection of natural resources in and around the Project.

Stormwater runoff from the Project will be collected in deep-sump catch basins with oil/debris traps and treated in off-line water quality units before discharging to the new 72-inch stormwater outfall. Regular sweeping programs for roads, parking and loading areas and a scheduled catch basin cleaning program are proposed for

pollutant source reduction. LID stormwater management techniques have been incorporated into the design as much as possible for stormwater quality and temperature control and are further described in this report.

Water Quantity and Quality Control

The proposed stormwater management system includes a number of proprietary structural and non-structural Best Management Practices (BMPs) to provide water quality mitigation for land uses with higher potential pollutant loads (LUHPPL) due to high intensity use. It should be noted that in the full build out condition the majority of the proposed parking spaces that attribute to the high intensity use of the Project will be in underground or structured garages rather than large surface parking lots. Any oil and grit in the runoff from the garages will be captured in structured separators prior to discharge to the sanitary sewer system rather than the stormwater closed pipe drainage system. Proposed surface parking facilities utilized during interim phases will discharge to the stormwater closed pipe drainage system and will be in compliance with the Massachusetts Stormwater Management Regulations. Additionally, upon completion of the MBTA Orange Line Station the number of vehicle trips to the Project Site will be significantly reduced further reducing the impacts of oil and grit. Stormwater runoff from the small percentage of proposed on-street parking, in addition to street sweeping and deep sump catch basins, will be treated by specific structural stormwater BMPs that are suitable for such an application. Although the 72-inch stormwater outfall will discharge into the tidal portion of the Mystic River which is currently a "Prohibited" shellfish growing area, the first inch of runoff has been designed to be treated consistent with the DEP requirement for treatment of one inch for critical areas. Water quality BMPs are designed to provide at least 80 percent total suspended solids (TSS) removal in accordance with the Massachusetts Stormwater Management Regulations. Source control, an operation and maintenance program, snow management, and spill prevention BMPs will be implemented within the Project. Other BMPs that may be used throughout the Project include water quality units, bioretention basins, biofiltration islands, green roofs, tree filter boxes, rainwater recovery, permeable asphalt and permeable pavers. Specific BMPs will be evaluated and reviewed for each future individual phase by the Somerville Conservation Commission (SCC).

4.2.1 Analysis of Stormwater Management Revisions

The proposed changes to the hydrology of the Site since the Amended Preliminary Master Plan revision dated June 2010 to the present application includes a reduction in impervious material cover type that will result in a reduction in stormwater runoff. The revisions to the Project areas are summarized in the following :

- The revisions to Block 6 include a larger roof area and a removal of the small rain garden. The rain garden was provided for water quality purposes only and did not provide detention volume. Water quality treatment will be provided with a suitable structure for parking deck rooftop.
- The revisions to both Block 7 and 8 include a reduction in block area to account for the additional area located in the median (Median Park) of Assembly Row. For the purposes of the closed pipe calculations this additional park area was analyzed as entirely impervious as a conservative assumption.
- The revisions to Parcel 11A consist of a large increase in landscaped area as compared to the previous designs and submissions.

The peak discharge from the project site has been reduced from the previously approved discharge rates. See following table of closed pipe calculations for the peak discharge rates using StormCAD and the high tide elevation for a tailwater condition.

Closed Pipe Calculations - Peak Discharge Rates (cubic feet per second)

	10-year	25-year	100-year
72" Stormwater Outfall			
Previous Design	108.9	156.7	221.2
Current Design	104.2	139.4	181.1

4.2.2 Proposed Stormwater Management System Improvements

The purpose of the Stormwater Management Plan (the Plan) is to provide long-term protection of natural resources in and around the Project Site. This is achieved by implementing water quality and quantity control measures designed to decrease the amount of pollutants discharged from the Project Site, increase the quality of stormwater recharged on the Project Site, and control discharge rates. A final stormwater management plan for each future individual phase will be locally reviewed and approved by the Somerville Conservation Commission.

Low Impact Development (LID) Features

Low impact development techniques combine functional site design with pollution prevention in order to reduce impacts to nearby water resources. LID can be very effective for new and ultra urban areas, where space is a limiting factor, by selecting LID practices that focus on decentralizing stormwater management at the Project Site and incorporating vegetated stormwater management techniques into the design as much as possible to reduce peak runoff rates and provide treatment to improve water quality. The practices that may be implemented include: green roofs, bioretention basins (rain gardens), biofiltration islands, tree box filters, porous pavements, and rainwater recovery. In addition to improving water quality, these LID practices will also reduce the temperature of the stormwater discharging at the proposed 72-inch outfall.

Mitigation Measures

The Project will include mitigation measures to safely protect surrounding resource areas from the discharge of runoff. The stormwater management system has been designed to meet or exceed the standards contained in the DEP Stormwater Management Regulations.

After being collected in the Project's closed pipe drainage system, the Project's stormwater runoff will be treated and then discharged via the proposed 72-inch stormwater outfall that was constructed by the Proponent for the City of Somerville. The outfall pipe was included in those activities and granted a waiver from further review under MEPA in the Final Record of Decision on this Project. The proposed 72-inch storm drain will be operational prior to the opening of the first building constructed as part of the mixed use development.
In addition to the proposed 72-inch stormwater outfall, the Project Site will feature multiple LID measures and over two and half miles of brand new stormwater drainage infrastructure including the replacement of aged existing drainage systems where necessary.

Over 3 million gallons of combined sewer overflows from the MWRA 84-inch SMC entered the Mystic River during wet weather events in 2006. Stormwater runoff entering the MWRA 84-inch SMC from the Project Site will be redirected to the proposed 72-inch outfall and will therefore reduce the amount of combined sewer overflows to the Mystic River. The MWRA has performed an analysis of the benefits of removing the flows from the SMC. The analysis shows that removal of flows will reduce the average annual treated combined sewer overflow volume at Outfall MWR205A located near the Fellsway by Wellington Bridge from 2.35 million gallons to 1.70 million gallons, a 28% reduction in annual discharge volume. Outfall MWR205A

discharges treated combined sewer flows to the upstream portion of the Mystic River during high tide and extreme wet weather events. A reduction of discharges in this location will present a direct environmental benefit by improving the water quality of the Mystic River.

Long-Term Maintenance Program

The Proponent has entered into a long term maintenance agreement with the City of Somerville to provide for the Proponent's commitments to the City in order to maintain sidewalks within the Project and to maintain the non-standard stormwater quality structures. The City will be responsible for the maintenance of the streets, sewer, water and standard drainage structures (e.g. catch basins, manholes, pipes). The Proponent will maintain the streetscape and plaza landscaping within the Project as part of its responsibilities under the long-term maintenance agreement. A sample Long-Term BMP Maintenance/Evaluation Checklist is included in Appendix C.

5

Gas

Existing Conditions

5.1 ***Existing Gas Distribution System***

NationalGrid, formerly the Keyspan Company, is the provider of the gas to the Project area. The closest gas source to the area is a low pressure 16-inch to 20-inch welded steel gas line located in an easement which runs across the MBTA tracks near Assembly Square Drive and North Union Street. Other gas lines within the Project area branch off of the 20-inch line.

Proposed Conditions

5.2 Proposed Gas System Requirements

In past communications between VHB and NationalGrid, NationalGrid has stated that the findings in the GIA report are not relevant today. VHB has provided information to NationalGrid regarding the building program and approximate loads in order for NationalGrid to estimate and identify the size, sources and costs for their gas system improvements. NationalGrid ran an analysis of the existing and proposed systems and determined that due to the size of the development that a higher pressure gas system than is currently available will be required to service the Project.

5.3 Proposed Gas System Improvements

The nearest source of the higher pressure gas to the Project is located in Pinckney Street in East Somerville. A 12-inch steel gas line was installed from Pinckney Street to the Project along Pearl Street, Mt. Vernon Street, Lombardi, and Assembly Square Drive. The gas line mains have been installed into the project area for connection to the future development blocks.

6

Electrical Distribution System

Existing Conditions

6.1 *Existing Electrical Distribution System*

Eversource supplies electricity to the Assembly Square area with four 13.8 kV electrical services lines in the Assembly Square Revitalization Area. The four 13.8 kV service lines serve the following

- Assembly Square Marketplace
- Foley Street
- Office Building/Vacant Theater
- Back-up

Proposed Conditions

6.2 Proposed Electrical Distribution System Requirements

In past communications between VHB and NStar, Nstar has stated that the findings in the GIA report are not relevant today. VHB has provided information to NStar regarding the building program and approximate loads in order for NStar to estimate and identify the size, sources and costs for their electrical system improvements. VHB will design the conduit and manhole system in conjunction with NStar in order to accommodate the required electrical infrastructure.

6.3 Proposed Electrical Distribution System Improvements

The electrical infrastructure, including ductbanks and manholes, have been constructed by the Proponent in the ASRA for the future electrical system improvements.

7

Telephone Distribution System

Existing Conditions

Existing Telephone Distribution System

Verizon supplies telephone service to the Project area. The system consists of underground lines and overhead telephone wires between poles.

Proposed Conditions

7.2 Proposed Telephone Distribution System Requirements

In past communications between VHB and Verizon, Verizon stated the findings in the GIA report are not relevant today. VHB has provided information to Verizon regarding the building program and approximate loads in order for NStar to estimate and identify the size, sources and costs for their telephone system improvements. VHB will design the conduit and manhole system in conjunction with Verizon in order to accommodate the required telephone infrastructure.

7.3 Proposed Telephone Distribution System Improvements

The telephone infrastructure, including ductbanks and manholes, have been constructed by the Proponent in the ASRA for the future telecommunications system improvements.

8

Fire Alarm System

Existing Conditions

8.1 *Existing Fire Alarm System*

The City of Somerville's Electric Lines and Light Department has jurisdictions over the fire alarm systems within the City. The fire alarm system consists of manholes and fire boxes within the Project area.

Proposed Conditions

8.2 Proposed Fire Alarm system Requirements and Improvements

The City of Somerville has requested that a wireless radio frequency fire alarm system be used to serve the Project area. In order to provide sufficient coverage and equipment for the wireless system VHB has coordinated final locations of the fire boxes with the City's Fire Chief.

9

Cable TV

Existing Conditions

9. **Cable TV**

9.1 **Existing Cable Television System**

The only location that is serviced by Comcast/RCN cable within the Project area is along Middlesex Avenue near Foley Street and the Assembly Square Marketplace.

Proposed Conditions

9.2 Proposed Cable Television System Requirements and Improvements

VHB contacted the current suppliers of cable and telecommunications who service the Project area to determine the level of services offered and the magnitude of the improvements. Sufficient conduit and manholes have been provided to support future cable and telecommunications providers.

10

Summary

10. SUMMARY

The proposed buildings and utilities within the Project area will be constructed in multiple phases over the course of the project. All necessary infrastructure for the full build out of the Project has been constructed in the streets of the PUD area. The construction of the utility infrastructure began in 2009. Coordination with private utilities is ongoing and will continue throughout the construction of the Project. The water system adequately provides water during the average day demand and peak fire flow conditions. The sewer system is sized to carry all flows from the proposed development and adjacent properties to the Medford-Somerville branch sewer. The sewer flows generated will be mitigated at a 4:1 ratio. The stormwater management system has been sufficiently designed to meet all applicable local and state regulations. All future phases of the Project will be reviewed by the City of Somerville as part of the Special Permit with Site Plan Review (SPSR) process.

List of Figures

Figure 1. Site Location Map

Figure 2. Existing Water Demand

Figure 3.1. Existing Sewer Generation

Figure 3.2. Estimated Proposed Sewer Generation and Water Demand