Section 3
Alternatives Evaluation

3.1 Preliminary Screening

A "desktop screening" analysis was used to review preliminary wastewater management options and identify the alternatives with the potential to provide reliable, cost effective, long-term wastewater management solutions for the Town of Hingham. The alternatives surviving this preliminary screening process are subjected to a detailed analysis. The detailed analysis includes an assessment of environmental, technical, financial, and institutional considerations. Additional analysis factors include reliability, complexity, ability to implement, along with capital and operating costs. The recommended plan resulting from this evaluation is a combination of elements from more than one alternative.

3.2 Study Area Priority Ranking

The Needs Assessment revealed that many of the higher priority study areas share similar conditions. These study areas were noted to be similar by location, by environmental conditions, and by conditions resulting from developed areas (nitrogen loading and lot density).

Many of the higher scoring study areas are located in the central-south area of Hingham and as such, share common prevalence of wetlands and floodplains, water supply protection areas (Interim Wellhead Protection Areas, Zone I, Zone II, and protective buffers surrounding surface water supplies) and prevalence of nitrogen sensitive areas (relate back to water supply protection areas). These similarities played a role in developing the list of preliminary alternatives.

The Hingham Comprehensive Wastewater Master Planning Committee considers all study areas as a priority, however, the committee identified a need to further classify the study areas. The consensus of the group was to classify areas with a score of 36 to 29 as " High Priority", areas with a score of 26 to 21 as " Priority" and areas with scores below 21 as "Low Priority".

Neglecting the North Sewer District ("NSD") & Weir River Sewer District ("WRSD") study areas, and combining adjacent study areas due to relative priority and location to take advantage of economy of scale considerations, the top five needs areas (and the 7th) are located in the central portion of Hingham. These study areas are (in descending order of priority):

- Fulling Mill Brook
- Gardner Street
- Hingham Center

- Accord Pond
- Prospect Street
- McKenna Marsh, and
- Foundry Pond

These study areas are shown on Figure 2-3.

Since it is unlikely that this Comprehensive Wastewater Management Plan (CWMP) will result in a structural solution for the entire community, the screening and detailed alternatives analysis will focus on the priority needs areas (identified above) with the remainder of the study areas continuing to rely on individual Sanitary Disposal Systems (SDSs) along with a form of enhanced management. The alternatives for wastewater management include:

- No Action
- On-Site systems with enhanced management
- De-centralized Treatment and Disposal
- Centralized Treatment and Disposal

For alternatives other than the "No-Action" alternative, continued use of on-site systems is considered feasible for the study areas ranked below the "high-priority" needs areas, either with or without enhanced management. For the "high-priority" needs areas, it is likely that the recommended plan of action will include a combination of more than one management alternative due to the options that are available to the Town of Hingham. These various alternatives are applied to the high-priority needs areas as discussed with the Hingham Sewer Commission to form the basis for further evaluations.

Alternative 1 – "High Priority" Needs Areas to North Sewer District (NSD), continue current extent of WRSD, and the remainder of Town relies on continued use of on-site SDSs with enhanced management.

Alternative 2 – "High Priority" Needs Areas connected to a De-Centralized Treatment and Disposal system, continue current extent of NSD & WRSD, and the remainder of Hingham relies on continued use of on-site SDSs with enhanced wastewater management. (Same as Alternative 1 except using de-centralized treatment and disposal for high priority needs areas)

Alternative 3 – Maximize Hull Treatment Facility. Examine potential for connecting Hingham Center, Summer Street ("Worlds End") and Foundry Pond study areas

through WRSD, continue current extent of NSD, and remainder of Town relies on continued use of on-site SDSs with enhanced wastewater management.

Alternative 4 - Maximize use of Rockland Treatment Facility. Examine potential for connecting Accord Pond & Industrial study areas as part of a regional wastewater management solution. Continue current extent of NSD and WRSD. The remainder of town relies on continued use of SDSs.

Alternative 5 – Foundry Pond to be served by a De-Centralized treatment and disposal system, North Sewer District remains at its current extent, and remainder of Hingham relies on continued use of on-site SDSs w/enhanced wastewater management.

Alternative 6 – Sewer the "unsewered" portion of Hingham through expansion of the North Sewer District (MWRA).

Alternative 7 – "No Action".

As Phase II of the study concludes, cost recovery models will be prepared for the leading one or two alternatives to illustrate financial impacts to the homeowner. In other projects, cost recovery models include all betterments; and an option where 10 percent is covered by the tax base, 90 percent on betterments; and 30 percent is covered by the tax base, 70 percent on betterments. The latter options are applicable where an overriding public benefit (i.e. protection of public water supply) results from the program. Environmental and secondary growth impacts will be also be discussed to characterize the effectiveness of the alternatives during Phase II of this study.

3.3 Evaluation Criteria

This section includes a discussion of each alternative relative to the following evaluation criteria. Each alternative is evaluated based on a comparison of criteria that are consistent with DEP's Guide to Comprehensive Wastewater Management Planning:

- Environmental Impact and Mitigation Measures;
- Regulatory Compliance;
- Flexibility;
- Reliability; and
- Cost

3.3.1 Environmental Impacts and Mitigation Measures

The adverse and beneficial environmental impacts in the high priority needs areas were evaluated for each alternative. As recommended in the 1996 DEP Guide to Comprehensive Wastewater Management Planning, impacts are divided into direct and indirect categories. Direct impacts are defined as "those directly related to the construction and operation of the wastewater facilities." Indirect impacts are defined as "1.) Induced changes in the patterns of land-use and population growth, and 2.) Effects resulting from those changes in land-use and population growth". Both of these types of impacts can be adverse or beneficial.

Adverse impacts can be mitigated through modifying how an alternative is implemented, instituting a change in an existing by-law, or through coordination with impacted parties. Examples of such mitigation measures for adverse impacts are described below for each alternative.

3.3.1.1 Direct Impacts – Onsite Systems

On-Site Systems - Adverse

Systems that are not regularly inspected or maintained have a greater potential to fail than those receiving regular maintenance. Failing systems pose a threat to public health and the environment. However, implementation of an SDS management program will help to identify poorly functioning or noncompliant systems.

Regardless of a management plan, the Board of Health will need to continue consideration of waivers or variances for many upgraded systems due to lot size limitations, poor soils, and high groundwater.

Because of the high seasonal groundwater level and the required vertical separation under Title 5, many of the repaired systems will include mounded/raised on-site systems with or without retaining walls. These systems are often found to be visually displeasing. In practice, mounded systems are not prevalent in Hingham, which favors the use of I/A technology. Adverse cost impacts are likely in either case.

On-Site Systems - Beneficial

Continued use of on-site system use would continue the status quo and there would be no known direct benefits. A wastewater management program would enforce maintenance, Title 5 and local regulations, and track upgrades for all properties thereby minimizing unknown failures and reducing potential threats to public health and the environment.

3.3.1.2 Direct Impacts – Off-site with a Sewer Collection System

Off-Site with a Sewer Collection System - Adverse

If a sewer collection system is constructed, the possible temporary adverse impacts include local inconvenience and traffic detours, construction noise and dust, soil erosion during excavation, and cutting of trees and vegetation.

Wetland buffer zones could be temporarily impacted during construction if facilities are installed in areas near wetlands or waterways, areas of critical environmental concern (ACEC), and other resource areas.

Off-Site with a Sewer Collection System - Beneficial
Central collection systems will provide a single location for wastewater disposal resulting in a higher level of treatment than on-site systems. Point- and non-point source pollution from on-site systems would be eliminated.

Removing the need for mound systems and retaining walls, property views and aesthetically pleasant landscaping are preserved. Collection system piping is all underground and pumping stations will require attention to siting details.

Abandoning on-site disposal practices, sewage odors caused by poorly performing or failed on-site systems can be eliminated.

3.3.1.3 Indirect Impacts – Onsite Systems

On-Site Systems - Adverse
Soil and site limitations associated with on-site systems will prevent indirect adverse impacts due to growth and expansion of existing infrastructure.

Continued use of on-site systems will prevent growth or expansion in areas where positive growth may be desired (i.e., commercial properties and Hingham Industrial Park).

During the project lifespan additional residential lots could be constructed with current zoning laws and development rates potentially adding to Hingham's population. Commercial and industrial development could also increase. Hingham would see a commensurate increase in traffic generation from this development.

On-Site Systems - Beneficial
Consumers will continue their self imposed water conservation and management due to inherent flow limitations of existing on-site systems.

This alternative will not allow development of vacant property currently considered "unbuildable" because it cannot support a Title 5 septic system, thus preserving private open space.

3.3.1.4 Indirect Impacts – Off-site with a Sewer Collection System

Off-Site with a Sewer Collection System - Adverse
Vacant lots currently unsuitable to support Title 5 disposal systems could be developed.

There would be a loss of existing privately owned open space due to development or increased value of open space properties thus making it harder for the Town to out-bid private developers.

This option would likely encourage expansion of existing homes or even "tear down and build-up" practices thus potentially increasing population.

Additional growth could add to the amount of impervious area thus increasing stormwater runoff volumes. Water quality impacts associated with stormwater runoff would also be of concern in the study area. Furthermore, contaminants associated with automobile use and storage and lawn fertilizers would negatively impact receiving waters. Stormwater mitigation is further discussed in Section 6.

New development resulting from sewer installation would place additional demands on town services including schools and utilities (water, solid waste, electric, etc.).

Future development would also impact traffic congestion. The trip generation rate for single family homes can be as much as 10 vehicle trips per weekday each (as published in Institute of Transportation Engineers "*Trip Generation Handbook*", 7th Edition).

It is possible that new residential housing allowed with the sewer option would further offset the ratio of high to low income housing in Hingham. New development could decrease the percentage of low income housing further below the 10% state threshold and continue to make Hingham more susceptible to the comprehensive permit projects associated with Massachusetts General Laws, Chapter 40b.

Off-Site with a Sewer Collection System - Beneficial
New dwellings and/or commercial and industrial development will add to the tax base and user fee collections that will be used to support facilities and utilities, although tax revenue could be offset by larger municipal expenditures required to sustain services to a larger population.

3.3.1.5 Mitigation Measures

On-Site Systems
There are no mitigation measures for the adverse impacts if the status quo is chosen. However, an SDS management plan would inventory all septic system maintenance; guarantee regular pumping, and other required maintenance activities. The program could then use the information database to identify poorly functioning systems and monitor on-site systems in general. The program would include a public education component to inform participants and encourage compliance with the management plan. Compliance with the management plan can protect the public health and local water resources, protect property values and improve groundwater conservation.

Off-Site with a Sewer Collection System
Many of the direct adverse environmental impacts of collection systems are related to construction. These inconveniences can be greatly reduced through dust reduction measures, work hour restrictions with noise level limitations, advertising and advanced scheduling of detours, and phasing construction areas. Additionally, temporary wetland impacts during construction can be mitigated through

coordination with the local Conservation Commission and the use of specific construction controls such as installation of haybales and silt fences in buffer areas and other erosion and sedimentation control activities.

One way to secure that open spaces are maintained for environmental and recreational use is to continue the Town purchase of available open space land.

Another way to ensure the growth does not exceed current rates is to modify zoning requirements regarding expansion of existing approved structures and development of vacant parcels. The Town may want to explore legal ways to modify zoning to accomplish this, such as re-zoning the open space areas for "estate lots". As an example, in the Town of Fairhaven, zoning was modified to require that no new development could connect to the sewer system unless it could be demonstrated that a Title 5 system could be approved on the parcel; however, this by-law was specifically for FEMA defined "velocity zones" (100-year coastal flood zones subject to velocity or wave action) and not for general zoning. A more liberal application of this type could be investigated for Hingham with the help of legal counsel.

An indirect adverse impact of collection systems is a possible increase in water consumption. The Town and Aquarion can continue to increase water conservation awareness through public education and participation programs and implement a water conservation program.

Increased stormwater volumes due to increased growth could be minimized because unsubdivided parcels would need to comply with MDEP stormwater standards, Conservation Commission regulations, and Planning Board requirements for stormwater detention and prevention of impacts to flood areas and receiving waters.

3.3.2 Regulatory Compliance

Each wastewater alternative will be evaluated against current regulations and standards. The ability of each alternative to meet existing or new regulatory requirements is investigated.

On-Site Systems

The viability of on-site SDSs in the study area being the long-term solution under Title 5 is heavily dependent on:

- Soils Suitability;
- Seasonal High Groundwater Conditions;
- Existing On-Site Disposal System Problems and Pump outs; and
- Required Buffer Areas.

Soils Suitability

The examination of soil types and percolation rates to predict the expected performance of on-site disposal systems is a critical element of Title 5 regulations. The

study area surficial geology and soil types were presented in the Phase I CWMP and are summarized in Section 2.

Groundwater Conditions
Areas with high groundwater conditions would potentially have problems with on-site disposal systems. Title 5 requires a minimum at least four feet between the bottom of an on-site SDS and the seasonal high groundwater level. Five feet of separation is required in locations with rapid permeability (Percolation rates of 2 minutes per inch).

Existing On-Site Disposal System Problems and Pump Outs
One failure criteria identified in Title 5 includes those systems that are pumped out more than four times per year. Based on a review of the pumping records, several systems are pumped out frequently, and some systems may meet the failure criterion.

The Executive Health Officer estimates that approximately 20-percent of existing SDSs consist of cesspools. (Cesspools are not allowed by regulation and are not considered a viable long-term option for wastewater management.

Current conditions suggest that the no-action alternative would not be an optimal solution based on resident problems and unidentified failures. Between 2000 to 2005, at least 167 SDSs have been upgraded or repaired. These repairs or upgrades include significant repairs and/or replacement of the leaching system. Minor repairs such as distribution box leveling or replacement, or piping repairs are not included in this tabulation. Therefore, keeping these systems functional and implementing a management program to identify other systems in need is a viable solution.

Required Buffer Area
Title 5 has established buffer zones for locating on-site disposal systems in the area of surface water bodies, public drinking water wells, and wetlands. The intent is to reduce the impact of on-site SDSs on these areas and, as a result, eliminate the potential for environmental pollution and contamination of drinking water supplies. The regulations require that all new disposal systems be located 50 feet or more from any surface water, and more than 400 feet from a surface water supply reservoir.

The Hingham Board of Health has required several property owners to use Innovative or Alternative ("I/A") systems when upgrading in areas where high groundwater conditions exist. Enhanced treatment protects the groundwater quality in these areas.

The number of systems within the setback limitation of wetlands is unknown.

Off-Site with a Sewer Collection System

Except for sewer use regulations, individual users of a sewer collection system will not have to meet any wastewater disposal requirements such as Title 5. However, Hingham (or other legal entity) must comply with the requirements of a groundwater discharge permit issued by the Massachusetts Department of Environmental

Protection for any De-Centralized systems designed and constructed for use as part of this program.

3.3.3 Flexibility

An alternative is considered flexible if it has the capability to facilitate future development, as well as being capable of modification to meet the needs of the user.

On-site systems, with or without a management plan, do not offer much flexibility. Capacity and flow requirements per bedroom are likely not to be reduced under Title 5. Because of this, additions to homes are difficult, if not impossible to construct without upgrading an on-site system.

Off-site disposal options are a flexible option as they would provide the ability to build additions to homes without the cost of an on-site SDS upgrade. Also, off-site disposal relieves property owners from maintenance, inspections and potential failing on-site SDSs. If regulations changed and additional treatment was needed at the treatment facility, homeowners would not each have to construct or upgrade their system, although they would incur the cost increase of any facility upgrades.

3.3.4 Reliability

On-site systems have an average of a 30-year life span according to vendors and septic system installers. Pumps used in on-site systems usually last seven to ten years before needing replacement. The reliability of on-site systems, primarily cesspools and leaching fields, to perform in poor soils and high groundwater, may be diminished and result in system replacement prior to a systems' design lifespan.

Off-site disposal and treatment is a long-term solution to wastewater disposal problems. Typical life for gravity sewer collection systems and pumping stations structures is approximately 100 plus years and mechanical pumping equipment is approximately 25 to 50 years depending on maintenance and the particular component.

Another benefit is the operation and maintenance. It is presumed that the Town of Hingham (or Sewer District or other legal entity) would be responsible for the operation of the pump stations and sewer collection systems. Homeowners would only be concerned with their connections, and not the treatment and disposal.

3.3.5 Costs

Costs elements in the evaluation of alternatives include construction costs, operation and maintenance costs, and indirect costs such as connection fees and mitigation costs. Some costs such as construction of new collection and treatment systems are readily quantifiable using standard estimating techniques. Other costs such as repair and operation and maintenance of on-site systems, and mitigation costs are more difficult to determine. This section includes information regarding assumptions used for on-site system and mitigation related costs.

On-site Systems

Currently, on-site system repairs are funded privately by each individual owner. The costs of repairs can vary significantly, based on site-specific conditions. Depending on the level of innovation required to site a Title 5 system on a particularly challenging lot, current installation costs can range from $20,000 to $60,000. This allows for significant variability of costs for upgrades, installations, and maintenance throughout the community. Furthermore, there is no cap to the frequency or cost of repairs over the life of ownership. Operational costs for an on-site system include septage pumping and electricity to run pumps (if required).

For septic system construction and repair costs we will consider the following:

New systems (construction cost $25,000)

System Replacement and repairs (construction cost $25,000)

Over the planning period, 30 percent of the new systems will be considered as requiring replacement. One half of these repairs will be considered as requiring Innovative or Alternative (I/A) technology. Tabulation of I/A systems will include construction costs of $35,000. Approximately 30 percent of the recently repaired systems (267 throughout the town over the period of record – 5 yrs.) are also expected to require repeat repairs, with one half of those requiring I/A.

O&M Costs will include pump-out and septage disposal every three years. I/A Systems will also require enhanced monitoring and maintenance, and contracts with licensed operators.

MWRA Entrance Fees and Mitigation Costs

Expansion of the current North Sewer District or connection of any other areas of town outside of the district will require approval from MWRA. The procedure for this connection is extensive and includes many requirements such as special legislation. There is also an entrance fee associated with connection. The entrance fee is intended to cover the new user's fair share of the costs of the sewer system in place at the time of the request for service. In this manner, the entrance fee recovers the proportional share of the sewer system's asset base already paid by the existing system users.

Simple formula as follows:

$$\frac{\text{New Flow}}{\text{Total System Flow}} \times \text{Sewer System Net Asset Value} \quad \text{(3-Year Average)}$$

CDM has reviewed entrance fees from recent connections to identify the likely fee for any new MWRA expansion in Hingham. The entrance fee used in this report is $4.00 per gallon per day of wastewater flow. Flow is computed based on standard DEP approved rates.

The town will also incur other indirect costs associated with connection to the MWRA system. Costs include addressing inflow removal requirements and likely requirements to offset flow transfer out of the Weir River basin.

Inflow reduction is part of the MWRA connection process. Currently MWRA requires a 4 for 1 reduction in inflow for each gallon of new wastewater flow that is added to the system. Depending on the scope of the alternative, the quantity of inflow reduction could be quite high and it may not be possible to completely identify and remove inflow within the town. In some cases it may be necessary to identify and remove inflow in other communities adjacent or downstream to Hingham. The cost of inflow removal is not readily quantifiable. Generally, a community must first identify sources of inflow to be removed and then estimate the cost to perform the necessary work. Hingham has completed several inflow reduction projects in recent years including elimination of sump pump connections and redirection of outdoor drains.

Any new wastewater flow tributary to MWRA from outside the North Sewer District, will be considered an interbasin transfer and will require a permit from the Water Resources Commission. Offset of this transfer is generally required as compensation of this flow. Compensation can include infiltration and inflow reduction, reduction in water use in existing properties, and groundwater recharge.

Allowances for these mitigation costs will be included with each alternative based on assumptions and experience from similar projects. For this report, inflow removal will be estimated at $5 / gallon per day and offset for interbasin transfer will be assumed to be $1/gpd. Actual costs for this mitigation may vary depending on the final outcome.

3.4 Alternatives Evaluation

This section discusses the evaluation criteria as applied to each of the wastewater management alternatives identified in Section 3.1.

3.4.1 Alternative 1 – "High-Priority" Needs Areas to North Sewer District (NSD), continue current extent of WRSD, and the remainder of Town relies on continued use of on-site SDSs with enhanced management.

This alternative is a town-wide wastewater management solution. This section discusses how the "high-priority" needs areas are to be added to the NSD. The service

area of WRSD is to remain at its current extent, and the remainder of Hingham will rely on continued use of on-site SDSs for wastewater treatment and disposal.

North Sewer District (NSD)

The NSD is located in the northwest area of Hingham and is connected to the MWRA sewer collection system through Weymouth. One of the challenges to this alternative is any proposed change to the District boundary requires legislative action and approval from the MWRA and advisory board. This alternative will increase flows to MWRA, and reduce groundwater recharge to the Aquifer.

Weir River Sewer District (WRSD)

The boundaries of the Weir River Sewer District remain at the present extent. At the end of the planning period, flows from WRSD to the Hull system are projected to be 65,000 gpd. All of the homes within the District are considered to be connected at this time, and commercial development within the boundaries of the district has been completed.

Remainder of Hingham

The remainder of Hingham will rely on continued use of on-site SDSs.

Increased development throughout the planning period will not likely compensate for the reduction in flows transferred to the NSD.

Capital costs for this alternative will include construction costs for SDS installations and repairs. Operational and maintenance (O&M) costs will also be considered for existing SDSs and for the large septic systems governed by groundwater discharge permits and DEP. The current system inspection failure rate is approximately 30 percent; this ratio will be used throughout the planning period.

"High-Priority" Needs Area Wastewater Flows

Needs Area	*# of developed residential properties*	*Length of Sewers (ft.)*	*Wastewater Flow (gpcd)*
Fulling Mill Brook	354	29,000	69,000
Gardner Street	219	14,500	49,000
Hingham Center	616	45,510	142,000
Accord Pond	281	24,700	109,000
McKenna Marsh	234	21,150	45,000
Prospect Street	364	32,400	72,000
Totals	**2,068**	**167,260**	**486,000**

Environmental Impacts and Mitigation Measures

The "high-priority" needs areas (Fulling Mill Brook, Gardner Street, Hingham Center, Accord Pond, McKenna Marsh, and Prospect Street) proposed for sewer collection and conveyance to MWRA with this alternative are located within the aquifer and hydraulically upgradient of the water supply wells used for the town's water supply. Failing and poorly functioning septic systems in this area may have potential to adversely affect the water quality within this aquifer. The lot density, small lot size, and shallow depth to groundwater within these needs area will continue to require multiple Title 5 variances for properties seeking to upgrade or repair their SDSs. The threat to the public health and environment will remain unchanged without a plan of action to address wastewater treatment and disposal. For these reasons, this alternative addresses the perceived need to sewer the "high-priority" needs areas as part of a regional solution. A sewer collection system with the enhanced wastewater treatment offered by a centralized treatment facility reduces the need for continued reliance on individual SDSs on small lots.

The sewer collection systems and "off-site" treatment included with this alternative would also reduce the contributions to groundwater recharge to the aquifer.

Regulatory Compliance Factors

The "high-priority" needs areas generally consist of soils with limitations for suitability of SDS construction, most notably the shallow depth to groundwater. The frequency of reported failures and system replacement within these needs areas underscores the recommendation of providing an off-site solution.

Flexibility

On-site systems do not offer much flexibility. With limiting factors such as poor soils, and high groundwater within these "high-priority" needs areas, Title 5 waivers and variances will continue to be required. Centralized treatment and disposal relieves the individual homeowner from inspections and maintenance of failing on-site systems.

Reliability

A centralized treatment system is an effective long-term solution to wastewater disposal problems in the "high-priority needs areas. As previously discussed, the sewer collection system lifespan exceeds the expected operational lifespan of on-site SDSs. Additionally, operation and maintenance responsibilities of the treatment and disposal systems would shift to the Sewer Commission and MWRA, and not the individual homeowner should this option be implemented.

Costs

Cost elements of this alternative include:

- Construction Cost for Sewer Collection System for "high-priority" Needs Areas
- MWRA Connection Fee

- Mitigation Costs including inflow reduction and offset from interbasin transfer
- Construction, repairs and maintenance costs for continued use of SDSs in the remainder of Hingham

The estimated construction cost to provide a sewer collection system serving the "high-priority" needs areas is presented in the table below. This estimated cost includes excavation, trenching, pipe installation and backfill, trench width paving replacement, and an allowance for ledge and rock removal expected within this needs area. A total of five submersible pumping stations (with emergency generators) are proposed in the preliminary layout. The opinion of probable cost includes allowances for engineering and contingencies consistent with planning level estimates. The projected cost to construct the sewer collection system for this alternative is approximately $85M. Sewer collection piping required for this alternative includes approximately 2,100 linear feet of force main, and approximately 167,000 linear feet of gravity sewer (between 8-in and 24-in. in diameter).

Alternative 1
Sewer Collection System – Opinion of Probable Cost

Item	*Cost (rounded)*
Fulling Mill Brook	$8,758,000
Gardner Street	$2,769,000
Hingham Center	$19,314,000
Accord Pond	$3,537,000
Prospect Street	$5,834,000
McKenna Marsh	$3,055,000
Subtotal	$43,267,000
Contractor's Overhead & Profit (20%)	$8,650,000
Subtotal	$51,917,000
Construction Contingencies (25%)	$12,979,000
Total Construction Cost	$64,896,000
Construction Cost at Mid-Point of Construction (3% per year for 3 yrs.)	$70,914,000
Engineering and Implementation Costs (20%)	$14,183,000
Land Acquisition/Easement Costs	$TBD
Opinion of Probable Cost	**$85,097,000**

Downstream impacts to the MWRA sewer system have not been reviewed at this planning level. Upgrades to the downstream sewer system must be reviewed should elements of this alternative become part of the recommended plan. The proposed sewer collection system connection point for this alternative is the existing upstream endpoint of the MWRA system at the intersection of Water and Main Streets.

Construction costs included in this alternative include all excavation & backfill, piping and bedding materials, pumping station(s) (with standby generator) trench width paving replacement, with allowances for engineering and contingencies consistent with planning level estimates. Operation & Maintenance costs for the new and existing sewer collection systems are paid through user's fees and are not included here.

MWRA Entrance Fee and Mitigation

The MWRA entrance fee for this alternative is estimated to be approximately $1,950,000. In addition to the fee, there will be an inflow reduction requirement based on 4 to 1 reduction. The estimated inflow reduction is 1,944,000 gallons per day. It is not likely that this quantity of inflow reduction is available within the Town of Hingham. The allowance for inflow mitigation is $9,700,000. A 1 to 1 offset for interbasin transfer is estimated a 486,000 gallons per day and an allowance of $490,000 has been included for this work.

SDS Construction and Repair Costs

With this alternative, the unsewered portion of Hingham will continue to rely on individual SDSs for wastewater treatment and disposal. These areas are largely residential (with the exception of the Industrial study area), and include the majority of the available undeveloped land. Using GIS information, there are approximately 2,637 existing residentially developed properties within the unsewered study areas. Residential growth (or ERUs – equivalent residential units) within these unsewered study areas will account for the growth over the planning period. Using current growth trends, 1,084 new SDSs are expected to be constructed over the planning period. These new construction sites are considered to include an individual on-site sanitary disposal system (SDS) in substantial conformance to Title 5 and local board of health regulations. For cost tabulation purposes, the construction cost for a new SDS is considered to be $20,000 each.

From interviews with Board of Health officials, the overall inspection failure rate is approximately 30 percent. Over the planning period covering the next twenty years, an equivalent rate of repairs is considered to continue (as systems will be reaching the end of their useful life) such that 791 more repairs are anticipated over the project lifespan. Of those 791, an additional 30 percent may require repeat repairs (approximately 237 more) or repairs involving more enhanced treatment. For the

repeat repairs one-half (118) will be considered as requiring enhanced treatment or Innovative or Alternative (I/A) treatment and disposal systems.

For the purpose of estimating a capital cost and O&M value, the total number of system repairs equals 1,027 on 3,721 properties. As described above, costs for these repairs are apportioned as follows:

Item	Number	Cost
I/A Technology Systems	118	$4,130,000
System Repair or Replacement	909	$18,180,000
New Construction	1,084	$21,680,000
No Repairs Required (next 20 yrs.)	1,846	$ 0
Total (rounded)		**$43,990,000**

Operation & Maintenance of On-Site Systems
Operational expenses must be considered for the maintenance of systems in the areas to continue with on-site SDSs. The on-site SDSs will require the following costs (shown in the Table below) to operate and maintain these systems.

Annual Operation and Maintenance for Individual On-Site Systems

Item	Number	Cost
I/A Technology Systems[(1)]	118	$70,800
All Other Systems[(2)]	3,603	$360,300
Total (rounded)	**3,721**	**$431,000**

[(1)]$600/yr for treatment and septage disposal every two years.
[(2)]Septage disposal every two years at $200 per pump out and disposal.

Repairs of new construction systems are not included in the repairs tabulation. The on-site SDS O&M cost ($431,000) has a present worth cost of $5.37M (rounded).

Advantages

- WRSD boundaries are not expanded and no new IMAs with Hull and or Cohasset will be required.
- Areas within the Aquifer Protection Zones will have a reliable method of wastewater treatment and disposal.

Disadvantages

- Continued reliance on SDSs will increase potential for increased loads within aquifer of water supply.

- Poorly functioning or substandard SDSs will continue to deteriorate groundwater quality due to lack of treatment and increased nitrogen loading from densely developed properties.
- Removal of SDSs will reduce groundwater recharge to the Aquifer.
- Any proposed change to the NSD boundary requires legislative action for changes to the MWRA system. Additionally, MWRA requires a 4:1 ratio of inflow reduction prior to admittance.
- Interbasin transfer offsets must be considered.

Opinion of Probable Cost

Cost Item	Cost
Sewer Collection System	$85.1M
MWRA Entrance Fee & Mitigation	$12.16M
Individual SDS Construction & Repairs	$43.99M
Individual SDS O&M (Present Worth)	$5.37M
Alternative 1 – Opinion of Probable Cost (rounded)	$146.62M

3.4.2 Alternative 2 – "High Priority" Needs Areas connected to a De-Centralized Treatment and Disposal system, continue current extent of NSD & WRSD, and the remainder of Hingham relies on continued use of on-site SDSs with enhanced wastewater management

This alternative is a town-wide wastewater management solution. This alternative is similar to Alternative 1, however, the "high-priority" needs areas for this alternative will use de-centralized treatment and disposal for wastewater management. This alternative provides for a structural solution for the "high-priority" needs areas". This option includes sewer collection and conveyance, with treatment and effluent disposal at a beneficial site (to be determined). The service areas of NSD & WRSD remains at the current extent, and the remainder of Hingham will rely on continued use of on-site SDSs for wastewater treatment and disposal.

North Sewer District (NSD)

The NSD is located in the northwest area of Hingham and is connected to the MWRA sewer collection system through Weymouth. The boundaries of the North Sewer District remain at the present extent. At the end of the planning period, flows from NSD to the MWRA system are projected to be 757,000 gpcd. All of the homes within

the District are considered to be connected at this time, and commercial development within the boundaries of the district has been completed.

Weir River Sewer District (WRSD)

The boundaries of the Weir River Sewer District remain at the present extent. At the end of the planning period, flows from WRSD to the Hull system are projected to be 65,000 gpd. All of the homes within the District are considered to be connected at this time, and commercial development within the boundaries of the district has been completed.

"High-Priority Needs Areas"

A sewer collection and conveyance system will be provided for the "high- priority needs areas" with this alternative. Suitable site(s) will be evaluated to allow for effective treatment and groundwater disposal of effluent to provide groundwater recharge. It is assumed that the Town of Hingham will be responsible for operation and maintenance of the proposed sewer collection and treatment facilities.

Capital costs for this alternative will include construction costs for sewer collection and conveyance; and treatment and disposal systems. O&M costs will include expenses for operating the treatment facility and collection systems.

Remainder of Hingham

The remainder of Hingham will rely on continued use of on-site SDSs.

Capital costs for this alternative will include construction costs for SDS installations and repairs. Operational and maintenance (O&M) costs will also be considered for existing SDSs and for the large septic systems governed by groundwater discharge permits and DEP. The current system inspection failure rate is approximately 30 percent; this ratio will be used throughout the planning period.

Needs Area	*# of developed residential properties*	*Length of sewer collection System Piping (ft.)*	*# of Pumping Stations*	*Wastewater Flow (gpcd)*
Fulling Mill Brook	354	26,600	2	69,000
Gardner Street	219	14,900	0	49,000
Hingham Center	616	45,800	3	142,000
Accord Pond	281	24,900	0	109,000
McKenna Marsh	234	21,000	0	45,000
Prospect Street	364	30,850	1	72,000
Totals	**2,068**	**164,050**	**6**	**486,000**

The length of the sewer collection system for this alternative differs slightly from the Sewer Collection system for Alternative 1, even though the piping network serves identical areas. For this de-centralized approach, the sewer collection system is designed to collect and convey wastewater to a location within or adjacent to a particular study area. Therefore, the number of pumping stations may differ, and the overall length of the sewer collection system network may also differ from those presented in Alternative 1. This difference will also be reflected in the opinion of probable construction cost.

De-centralized Systems

Potential de-centralized treatment and disposal sites were selected based on three main criteria.

Each needs area was reviewed for likely candidate sites based on whether it was undeveloped, property size, and location. GIS data was used during this screening process. Initial screening criteria used a minimum lot size of 3 acres. This area was chosen based on the estimates for required size of the disposal system, an allowance for the treatment building and reserving buffer areas. Substantially undeveloped properties were also considered meaning a large parcel with either an accessory structure or a building located in the outer periphery of the property. Treatment and disposal is desirable on or proximal to each other for cost purposes.

Using the above criteria, potential sites were reduced to approximately one to three per study area. Secondary screening included more refined criteria for selection as a treatment and disposal site. These criteria include:

- Topographic setting
- Expected soil conditions (suitability of soils and groundwater conditions)
- Proximity to environmental or water supply resources

Topographic setting refers to a site location that allows wastewater conveyance by gravity. Sites located along ridges are likely to be discarded from consideration. Preference is given to sites where sewer collection system(s) convey wastewater by gravity rather than pumping.

Potential disposal sites were compared on the general soil conditions map prepared during Phase 1.

Preference was given to sites further from environmental or water supply resources. For instance, sites within water supply Zone 1 were excluded from further consideration, and preference was given to potential sites that are farther hydraulically from a receiving waterway, wetlands or water supply.

This pcreening process for potential effluent disposal sites resulted in five potential locations. Four of these are used for this alternative, namely in Fulling Mill Brook, Gardner Street, Hingham Center, and Prospect Street.

De-Centralized Treatment & Disposal Site Location	Needs Areas Served	Design Flow (MGD)*
Fulling Mill Brook	Fulling Mill Brook	0.095
Gardner Street	Accord Pond, Gardner Street, and a portion of McKenna Marsh	0.24
Hingham Center	Hingham Center	0.18
Prospect Street	Prospect Street and remainder of McKenna Marsh (not already served in Gardner Street)	0.10

Environmental Impacts and Mitigation Measures

An off-site system is an effective long-term solution to wastewater disposal problems in the study area.

De-Centralized systems can provide effective treatment and replenish the aquifer.

Regulatory Compliance Factors

Permits for the De-Centralized treatment and disposal systems will be administered through DEP.

Flexibility

Continued use of on-site systems is not a flexible alternative.

Reliability

As previously discussed, the sewer collection system lifespan exceeds the expected operational duration of on-site systems. Additionally, operation and maintenance responsibilities of the treatment and disposal systems would shift to the Town of Hingham and not the individual homeowner should the off–site option be implemented.

Costs

Cost elements of this alternative include:

- Construction Cost for Sewer Collection System for the "high-priority" Needs Areas
- Construction Cost for De-centralized Treatment and Disposal Facilities
- Construction, repairs and maintenance costs for continued use of SDSs in the remainder of Hingham

Sewer Collection System Costs

Construction costs included in this alternative include all excavation & backfill, piping and bedding materials, pumping station(s) (with standby generator) trench width paving replacement, with allowances for engineering and contingencies consistent with planning level estimates. The projected cost to construct the sewer collection system for this alternative is approximately $79.3M.

Alternative 2
Sewer Collection System – Opinion of Probable Cost

Item	*Cost (rounded)*
Fulling Mill Brook	$9,805,000
Gardner Street	$2,097,000
Hingham Center	$15,614,000
Accord Pond	$3,401,000
Prospect Street	$6,595,000
McKenna Marsh	$2,801,000
Subtotal	$40,313,000
Contractor's Overhead & Profit (20%)	$8,063,000
Subtotal	$48,376,000
Construction Contingencies (25%)	$12,094,000
Total Construction Cost	$60,470,000
Construction Cost at Mid-Point of Construction (3% per year for 3 yrs)	$66,077,000
Engineering and Implementation Costs (20%)	$13,215,000
Land Acquisition/Easement Costs	TBD
Opinion of Probable Cost	**$79,292,000**

De-Centralized System Construction Costs

De-centralized treatment alternatives include systems or technologies that serve areas or groups of homes where the total flow is in excess of 10,000 gpd. These systems are not within the jurisdiction of Title 5, and are administered by the Massachusetts

Department of Environmental Protection (DEP) Groundwater Discharge Permit Program, that requires a high level of treatment (e.g. nitrogen removal) and therefore requires approval of the treatment system. Issues that must be addressed when looking at de-centralized treatment systems include siting, operation and maintenance, effluent discharge, level of treatment required, environmental effects, and permitting.

The term "De-centralized" (or Package) refers to the assembly of various individual treatment process components such as; settling tanks, aerators, and disinfection methods, into a compact sometimes pre-assembled and pre-packaged system. Package plants involve installation of pre-assembled equipment in buried tanks or small buildings. These plants can achieve a high degree of treatment provided their operation and maintenance is monitored effectively. The major differences between package plants and municipal Wastewater Treatment Facilities (WWTFs) are capacities and treatment processes. Package plants cover a typical range of wastewater flow from 10,000 to 200,000 gpd capacity. Municipal WWTF flows can range up to several millions of gallons per day. Package plants may use pre-manufactured process equipment (often patented) whereas a WWTF may involve more conventional treatment processes and is custom-designed. Also, package plants are usually automated so an operator only checks performance and conducts maintenance periodically, unlike municipal facilities that have greater staffing requirements. Package plants are often referred to as de-centralized facilities reflecting their smaller size versus a larger, centralized facility.

A major consideration for the feasibility of package plants is finding a permittable disposal site for the treated effluent. Typically, either open infiltration beds, or subsurface leaching fields are used. These require appropriate, permeable subsurface soils and adequate depth to groundwater, as well as distance from environmentally sensitive features such as wetlands.

Cost for package plants vary considerably depending on whether the plant is constructed above or below ground, the type of process, degree of automation, treatment level, and effluent disposal method.

The following table summarizes De-Centralized Treatment System Costs for this alternative:

Alternative 2
De-Centralized Treatment & Disposal System – Opinion of Probable Cost

Item	*Cost*
De-Centralized Treatment System Equipment	
Fulling Mill Brook (95,000 gpcd)	$1,806,000
Gardner Street (240,000 gpcd)	$4,526,000
Hingham Center (180,000 gpcd)	$3,400,000
Prospect Street (100,000 gpcd)	$1,900,000
(incl. Installation)	
Subtotal	$11,630,000
Allowance for Support Equipment, Tanks, Enclosure, etc.	$6,979,000
Emergency Generators	$120,000
Equipment Subtotal	$30,363,000
Allowance for Electrical (15%)	$4,555,000
Allowance for Site Work (10%)	$3,036,000
Allowance for Yard and Piping Work (10%)	$3,036,000
Allowance for Instrumentation & Controls (5%)	$1,518,000
Subsurface Disposal Systems	
Fulling Mill Brook	$164,000
Gardner Street	$413,000
Hingham Center	$310,000
Prospect Street	$172,000
Subtotal	$43,567,000
Contractor's Overhead & Profit (20%)	$8,713,000
Subtotal	$52,280,000
Construction Contingencies (25%)	$13,070,000
Total Construction Cost	$65,350,000
Construction Cost at Mid-Point of Construction (3% per year for 3 yrs)	$71,410,000
Engineering and Implementation Costs (20%)	$14,282,000
Land Acquisition/Easement Costs	
Fulling Mill Brook	$548,000
Gardner Street	$1,375,000
Hingham Center	$1,033,000
Prospect Street	$573,000
Opinion of Probable Cost (rounded)	**$89,221,000**

SDS Construction and Repair Costs

With this alternative, the unsewered portion of Hingham will continue to rely on individual SDSs for wastewater treatment and disposal. These areas are largely residential (with the exception of the Industrial study area), and include the majority of the available undeveloped land. Using GIS information, there are approximately 2,637 existing residentially developed properties within the unsewered study areas. Residential growth (or ERUs – equivalent residential units) within these unsewered study areas will account for the growth over the planning period. Using current growth trends, 1084 new SDSs are expected to be constructed over the planning period. These new construction sites are considered to include an individual on-site sanitary disposal system (SDS) in substantial conformance to Title 5 and local board of health regulations. For cost tabulation purposes, the construction cost for a new SDS is considered to be $20,000 each.

From interviews with Board of Health officials, the overall inspection failure rate is approximately 30 percent. Over the planning period covering the next twenty years, an equivalent rate of repairs is considered to continue (as systems will be reaching the end of their useful life) such that 791 more repairs are anticipated over the project lifespan. Of those 791, an additional 30 percent may require repeat repairs (approximately 237 more) or repairs involving more enhanced treatment. For the repeat repairs one-half (118) will be considered as requiring enhanced treatment or Innovative or Alternative (I/A) treatment and disposal systems.

For the purpose of estimating a capital cost and O&M value, the total number of system repairs equals 1027 on 3721 properties. As described above, costs for these repairs are apportioned as follows:

SDS Construction and Repair Costs

Item	Number	Cost
I/A Technology Systems	118	$4,130,000
System Repair or Replacement	909	$18,180,000
New Construction	1,084	$21,680,000
No Repairs Required (next 20 yrs.)	1,846	$ 0
Total (rounded)		**$43,990,000**

De-Centralized System Operation & Maintenance Costs

Annual operation and maintenance costs for the proposed package treatment facility include:

- Labor;

- Power;
- Major Maintenance;
- Chemicals (e.g., NaOH, and chemicals needed for cleaning); and
- Sludge removal & disposal.

Labor costs include a licensed operator estimated at approximately $60,000 per year. Sludge removal includes costs of $670 per dry ton for disposal. The present worth calculations for annual O&M and major maintenance are based on a 20-year planning period and a 5 percent discount rate. Because this is a planning-level estimate, a 25 percent miscellaneous contingency is included in the annual operation and maintenance costs.

The O&M costs for the De-Centralized system are shown in the Table below:

O&M Costs for De-Centralized Systems

Cost Category	*O&M Cost*
Labor	$240,000
Power	$4,900
Chemicals	$14,000
Sludge Disposal	$138,000
Subtotal	$396,900
Miscellaneous	$99,000
Total (rounded)	**$495,000**

The annual De-Centralized treatment system O&M cost for this revised option has a present worth (rounded) of $6.17M.

Total Project Costs for implementation of the De-Centralized Treatment system are shown in the Table below;

Project Costs for De-Centralized Systems

Item	*De-Centralized Treatment Cost*
Hingham High Priority Needs Areas Treatment Facilities (Total 620,000 gpcd)	
Construction (Total)	$89.2M
Present Worth of O&M*	$6.17M
Total Present Worth (rounded)	**$95.37M**

Note: Present Worth Calculations Assume a 20 – Year Planning Period and 5 percent Interest.

Opinion of Probable Cost

Cost Item	Cost
Sewer Collection System	$79.3M
De-centralized Treatment and Disposal Systems	$89.2M
De-centralized Treatment and Disposal O&M (Present Worth)	$6.17M
Individual SDS Construction & Repairs	$43.99M
Individual SDS O&M (Present Worth)	$5.37M
Alternative 2 – Opinion of Probable Cost (rounded)	$ 224.03M

Advantages

- WRSD boundaries are not expanded and no new IMAs with Hull and or Cohasset will be required.
- NSD boundaries are not expanded and no legislative action will be required.
- Areas within the Aquifer Protection Zones will have a reliable method of wastewater treatment and disposal.
- De-Centralized Treatment and effluent disposal allows for groundwater recharge.

Disadvantages

- Continued reliance on SDSs will increase potential for nutrient loading within aquifer of water supply.
- Poorly functioning or substandard SDSs will continue to deteriorate groundwater quality due to lack of treatment and increased nitrogen loading.
- Potential difficulty siting treatment facilities and disposal area.

3.4.3 Alternative 3– Maximize Hull Treatment Facility (Foundry Pond), continue current extent of NSD, and the remainder of Town relies on continued use of on-site SDSs with enhanced wastewater management.

This alternative is a town-wide wastewater management solution. This alternative includes maximization of regional wastewater facilities in Hull to accommodate a priority needs area in Hingham that is adjacent to the Weir River Sewer District (WRSD). This maximization of resources is part of an overall regional wastewater management strategy that benefits from existing infrastructure adjacent to Hingham. Areas served by the North Sewer District (NSD) through MWRA remains unchanged from the present condition, and the remainder of Hingham will continue to rely on

on-site SDSs for wastewater treatment and disposal along with an enhanced management program.

The Hull WPCF is a secondary treatment facility designed to accommodate Hull's population of 12,000, an average daily flow of 3.07 million gallons per day (mgd). Disinfection is provided through chlorination. Effluent is discharged through a diffuser located 2,700 feet offshore at a depth of 35 feet below mean sea level.

Hull has Inter-Municipal Agreements (IMAs) with the communities of Hingham and Cohasset to accept and treat wastewater from these communities. (Wastewater generated from a portion of Cohasset is also conveyed through the WRSD to the Hull sewer collection system). The contractual flow limits for these IMAs are defined below:

Hingham's flow limit

Average Daily Flow: 65,000 gallons per day (gpd)
Peak Flow Rate: 173,000 gpd

Cohasset's flow limit

Average Daily Flow: 80,000 gpd
Peak Flow Rate: 213,000 gpd

Limited flow capacity exists from WRSD for expansion of the district over the planning period without exceeding the contractual limit. The possibility exists where the flow limit could be increased through negotiation with Hull (and Cohasset) officials.

North Sewer District (NSD)

The NSD is located in the northwest area of Hingham and is connected to the MWRA sewer collection system through Weymouth. The boundaries of the North Sewer District remain at the present extent. At the end of the planning period, flows from NSD to the MWRA system are projected to be 757,000 gpcd. All of the homes within the District are considered to be connected at this time, and commercial development within the boundaries of the district has been completed.

Remainder of Hingham

The remainder of Hingham will rely on continued use of on-site SDSs.

Capital costs for this alternative will include construction costs for SDS installations and repairs. Operation and maintenance (O&M) costs will also be considered for existing SDSs and for the large septic systems governed by groundwater discharge permits and DEP. The current system inspection failure rate is approximately 30 percent; this ratio will be used throughout the planning period.

Environmental Impacts and Mitigation Measures

Providing sewer service to a "priority" needs area (Foundry Pond) and conveyance to the Hull WPCF has potential to help protect public health. This needs area is located outside of the aquifer for the water supply wells used for the town's (Hull and Hingham) water supply. Failing and poorly functioning septic systems in this area may have potential to adversely affect the water quality within this aquifer. The lot density, small lot size, and shallow depth to groundwater within these needs area will continue to require multiple Title 5 variances for properties seeking to upgrade or repair their SDSs. The threat to the public health and environment will remain unchanged without a plan of action to address wastewater treatment and disposal. For these reasons, this alternative addresses the perceived need to sewer the "priority" needs areas as part of a regional solution. A sewer collection system with the enhanced wastewater treatment offered by a centralized treatment facility reduces the need for continued reliance on individual SDSs on small lots.

An enhanced wastewater management plan for those areas remaining on SDSs will preserve groundwater recharge to the aquifer, and has potential to improve groundwater quality.

Needs Area	*# of developed residential properties*	*Length of sewer collection System Piping (ft.)*	*# of Pumping Stations*	*Wastewater Flow (gpcd)*
Foundry Pond	215	24,900	2	42,000
Totals	**215**	**24,900**	**2**	**42,000**

Regulatory Compliance Factors

The "priority" needs areas generally consist of soils with limitations for suitability of SDS construction, most notably the shallow depth to groundwater. The frequency of reported failures and system replacement within this needs area underscores the recommendation of providing an off-site solution.

Flexibility

On-site systems do not offer much flexibility. With limiting factors such as poor soils, and high groundwater within these "priority" needs areas, Title 5 waivers and variances will continue to be required. Centralized treatment and disposal relieves the individual homeowner from inspections and maintenance of failing on-site systems.

Reliability

A centralized treatment system is an effective long-term solution to wastewater disposal problems in the "priority" needs areas. As previously discussed, the sewer collection system lifespan exceeds the expected operational lifespan of on-site SDSs. Additionally, operation and maintenance responsibilities within the Foundry Pond

needs area for the treatment and disposal systems would shift to the Sewer Commission as part of the WRSD, and not the individual homeowner should this option be implemented.

Costs

Cost elements of this alternative include:

- Construction Cost for the Foundry Pond Sewer Collection System.
- Entrance Fee to WRSD
- Construction, repairs and maintenance costs for continued use of SDSs in the remainder of Hingham.

Sewer Collection System Costs

Construction costs included in this alternative include all excavation & backfill, piping and bedding materials, pumping station(s) (with standby generator) trench width paving replacement, with allowances for engineering and contingencies consistent with planning level estimates. The projected cost to construct the sewer collection system for this alternative is approximately $13.7M. These costs are shown in the Table below:

Alternative 3
Sewer Collection System – Opinion of Probable Cost

Item	*Cost*
Foundry Pond	$6,970,000
Subtotal	$6,970,000
Contractor's Overhead & Profit (20%)	$1,394,000
Subtotal	$8,364,000
Construction Contingencies (25%)	$2,091,000
Total Construction Cost	$10,455,000
Construction Cost at Mid-Point of Construction (3% per year for 3 yrs)	$11,424,000
Engineering and Implementation Costs (20%)	$2,285,000
Land Acquisition/Easement Costs	$TBD
Opinion of Probable Cost	**$13,709,000**

Hull/WRSD Entrance Fee

The Town of Hingham will have to buy additional capacity at the Hull wastewater treatment facility. The cost of this additional capacity is not fully known and should be negotiated with the Town of Hull. The previous cost for capacity as part of the Weir River Sewer District was approximately $7.22 per gpd. Preliminary discussions with Hull have indicated that this number will be considerable larger than the previous cost. For this analysis, we have included an allowance based on $30/gpd.

SDS Construction and Repair Costs

With this alternative, the unsewered portion of Hingham will continue to rely on individual SDSs for wastewater treatment and disposal. These areas are largely residential (with the exception of the Industrial study area), and include the majority of the available undeveloped land. Using GIS information, there are approximately 2,464 existing residentially developed properties within the unsewered study areas. Residential growth (or ERUs – equivalent residential units) within these unsewered study areas will account for the growth over the planning period. Using current growth trends, 1,066 new SDSs are expected to be constructed over the planning period. These new construction sites are considered to include an individual on-site sanitary disposal system (SDS) in substantial conformance to Title 5 and local board of health regulations. For cost tabulation purposes, the construction cost for a new SDS is considered to be $20,000 each.

From interviews with Board of Health officials, the overall inspection failure rate is approximately 30 percent. Over the planning period covering the next twenty years, an equivalent rate of repairs is considered to continue (as systems will be reaching the end of their useful life) such that 1287 more repairs are anticipated over the project lifespan. Of those 1287, an additional 30 percent may require repeat repairs (approximately 374 more) or repairs involving more enhanced treatment. For the repeat repairs one-half (187) will be considered as requiring enhanced treatment or Innovative or Alternative (I/A) treatment and disposal systems.

For the purpose of estimating a capital cost and O&M value, the total number of system repairs equals 1,621 on 4,161 properties. As described above, costs for these repairs are apportioned as follows:

SDS Construction and Repair Costs

Item	*Number*	*Cost*
I/A Technology Systems	187	$6,545,000
System Repair or Replacement	1,434	$28,680,000
New Construction	1,066	$21,320,000
No Repairs Required (next 20 yrs.)	1,661	$ 0
Total (rounded)		**$56,545,000**

Operation & Maintenance of On-Site Systems

Operational expenses must be considered for the maintenance of systems in the areas to continue with on-site SDSs. The on-site SDSs will require the following costs (shown in the Table below) to operate and maintain these systems.

Annual Operation and Maintenance for Individual On-Site Systems

Item	Number	Cost
I/A Technology Systems[1]	187	$112,000
All Other Systems[2]	3,974	$397,400
Total (rounded)	**4,161**	**$509,400**

[1]$600/yr for treatment and septage disposal every two years.
[2]Septage disposal every two years at $200 per pump out and disposal.

Repairs of new construction systems are not included in the repairs tabulation. The on-site SDS O&M cost ($509,400) has a present worth cost of $6.35M (rounded).

Advantages

- IMAs already exist between Hingham and the receiving community for wastewater treatment and disposal.
- Optimizes available existing infrastructure as part of a regional wastewater management approach.
- Expansion of sewer collection systems (reduced groundwater recharge) occurs outside of the aquifer zones.

Disadvantages

- Limited treatment capacity is available from Hull sources without re-negotiation of IMAs. Costly connection fees may also be prohibitive.
- Continued reliance on SDSs will increase potential for increased loads within aquifer of water supply.
- Poorly functioning or substandard SDSs will continue to deteriorate groundwater quality due to lack of treatment and increased nitrogen loading from densely developed properties.
- Slight reduction in groundwater recharge through expansion of sewer collection systems.

Opinion of Probable Cost

Cost Item	Cost
Foundry Pond Sewer Collection System	$13.7M
WRSD/Hull Entrance Fee	$1.3M
Individual SDS Construction & Repairs	$56.5M
Individual SDS O&M (Present Worth)	$6.35M
Alternative 3 – Opinion of Probable Cost (rounded)	$ 86.25M

3.4.4 Alternative 4 - Maximize Rockland Wastewater Treatment Options

This alternative includes maximization of regional wastewater treatment facilities in Rockland to accommodate needs areas adjacent to that community as part of an overall regional wastewater treatment strategy. Remaining needs areas in Hingham would be served through continued use of individual on-site SDSs.

The Town of Rockland is located at the southwest corner of Hingham adjacent to the commercially and industrially zoned areas along the Rtes. 3/53/228 corridor. Rockland is served by a municipal treatment facility located off Summer Street at the southern end of Concord Street. Rockland has a population of approximately 18,000 people and is nearly 100 percent sewered.

The Rockland Wastewater Treatment Plant (WWTP) was designed as a secondary treatment facility using a 2-stage suspended growth activated sludge system. It was designed to accommodate an average daily flow of 2.5 million gallons per day (mgd) with a peak flow of 6.0 mgd. The WWTP has been in operation since 1980 and receives wastewater from a variety of industrial, commercial and residential sources. Since 1985 the first stage process tanks have been by-passed and the facility employs a single stage activated sludge/nitrification process with nitrification and phosphorous removal is performed seasonally. Disinfection is provided through chlorination (with dechlorination). Effluent is re-aerated over a cascade and then flows to a man-made channel into the French Stream, then to the Indian Head River, and eventually into Massachusetts Bay.

An interview with the plant operator, Mr. Tony Olivadesa, revealed that the plant is currently receiving 2.5 mgd and has no capacity to make available to Hingham. Mr. Olivadesa also reports that there is an EPA order prohibiting out-of-town connections to the system.

Other Options in Rockland

A portion of Rockland is sewered to Brockton's Advanced Water Reclamation Facility through an Inter-Municipal Agreement (IMA) with the Town of Abington. This IMA

includes an allotment of up 100,000 gallons per day (gpd) to be discharged to the sewer collection system in Abington, and then conveyed to Brockton as allowed by an IMA between those communities. This allotment is currently maximized.

The former South Weymouth Naval Air Station (NAS) is undergoing redevelopment and is located partially in Rockland (Weymouth, Rockland, and Abington). The headwaters of the Rockland WWTP receiving waterway (French Stream) are located at this redevelopment site. The NAS sewer collection system is connected to Weymouth's sewer system and is conveyed to MWRA.

During the environmental review process, the South Shore Tri-Town Development Corporation (SSTTDC) evaluated numerous wastewater treatment and disposal options. Three regional options included connections to:

- Rockland WWTP,
- Direct dedicated line to Massachusetts Water Resources Authority (MWRA),
- MWRA through Weymouth collection system,

Other Options included

- New advanced wastewater reclamation facility,
- Combination of regional and treatment at advanced wastewater reclamation facility.

The SSTTDC chose to pursue construction of an on-site wastewater reclamation facility to take advantage of water re-use and promote "smart growth" for the redevelopment project.

The on-site system is designed to accommodate flows from the project only and will have no additional capacity for other projects.

Advantages

- None.

Disadvantages

- No treatment capacity is available from Rockland sources. Expansion of the WWTP is possible, but not without significant time delays and costly expansion.

Finding/Conclusion

Connection to Rockland as a regional alternative is not a viable option for Hingham.

3.4.5 Alternative 5 – Foundry Pond to be served by a De-Centralized treatment and disposal system, North Sewer District (NSD) remains at its current extent, and the remainder of Hingham relies on continued use of on-site SDSs with enhanced wastewater management

This alternative serves as a test case to evaluate using one or more de-centralized treatment and disposal systems as part of a local strategy for town-wide wastewater management in Hingham. The remainder of Hingham relies on the continued use of SDSs with enhanced wastewater management.

Foundry Pond

Foundry Pond will be served through a de-centralized treatment and disposal system.

North Sewer District (NSD)

The NSD is located in the northwest area of Hingham and is connected to the MWRA sewer collection system through Weymouth.

Remainder of Hingham

The remainder of Hingham will rely on continued use of on-site SDSs.

Capital costs for this alternative will include construction costs for SDS installations and repairs. Operational and maintenance (O&M) costs will also be considered for existing SDSs and for the large septic systems governed by groundwater discharge permits and DEP. The current system inspection failure rate is approximately 30 percent; this ratio will be used throughout the planning period.

De-Centralized Treatment & Disposal Site Location	*Needs Areas Served*	*Design Flow (MGD)**
Foundry Pond	Foundry Pond	0.068

Environmental Impacts and Mitigation Measures

An off-site system is an effective long-term solution to wastewater disposal problems in the study area.

De-Centralized systems can provide effective treatment and replenish the aquifer.

The Foundry Pond needs area is not particularly distinctive in any one particular category of environmental conditions, soil suitability or poor system performance, but does rate consistently high enough across all areas of the needs evaluation matrix to be considered a "priority" needs area.

Regulatory Compliance Factors

Permits for the De-Centralized treatment and disposal systems will be administered through DEP.

Flexibility

Continued use of on-site systems is not a flexible alternative.

Reliability

As previously discussed, the sewer collection system lifespan exceeds the expected operational duration of on-site systems. Additionally, operation and maintenance responsibilities of the treatment and disposal systems would shift to the Town of Hingham, and not the individual homeowner should the off–site option be implemented.

Costs

Cost elements of this alternative include:

- Construction Cost for Sewer Collection System for the Foundry Pond Needs Area
- Construction Cost for De-centralized Treatment and Disposal Facilities
- Construction, repairs and maintenance costs for continued use of SDSs in the remainder of Hingham

Sewer Collection System Costs

Construction costs included in this alternative include all excavation & backfill, piping and bedding materials, pumping station(s) (with standby generator) trench width paving replacement, with allowances for engineering and contingencies consistent with planning level estimates. The projected cost to construct the sewer collection system for this alternative is approximately $10.5M.

Alternative 5
Sewer Collection System – Opinion of Probable Cost

Item	*Cost*
Foundry Pond	$5,370,000
Subtotal	$5,370,000
Contractor's Overhead & Profit (20%)	$1,074,000
Subtotal	$6,444,000
Construction Contingencies (25%)	$1,611,000
Total Construction Cost	$8,055,000
Construction Cost at Mid-Point of Construction (3% per year for 3 yrs)	$8,800,000
Engineering and Implementation Costs (20%)	$1,760,000
Land Acquisition/Easement Costs	$TBD
Opinion of Probable Cost	**$10,560,000**

De-Centralized System Construction Costs

Cost for package plants vary considerably depending on whether the plant is constructed above or below ground, the type of process, degree of automation, treatment level, and effluent disposal method.

The following table summarizes De-Centralized Treatment System Costs for this alternative:

Alternative 5
De-Centralized Treatment & Disposal System – Opinion of Probable Cost

Item	*Cost*
De-Centralized Treatment System Equipment	
Foundry Pond (68,000 gpcd)	$1,300,000
(incl. Installation)	
Subtotal	$1,300,000
Allowance for Support Equipment, Tanks, Enclosure, etc.	$780,000
Emergency Generators	$30,000
Equipment Subtotal	$3,410,000
Allowance for Electrical (15%)	$511,500
Allowance for Site Work (10%)	$341,000
Allowance for Yard and Piping Work (10%)	$341,000
Allowance for Instrumentation & Controls (5%)	$170,500
Subsurface Disposal Systems	
Foundry Pond	$117,000
Subtotal	$4,891,000
Contractor's Overhead & Profit (15%)	$978,000
Subtotal	$5,869,000
Construction Contingencies (25%)	$1,467,000
Total Construction Cost	$7,340,000
Construction Cost at Mid-Point of Construction (3% per year)	$8,020,000
Engineering and Implementation Costs (20%)	$1,604,000
Land Acquisition/Easement Costs	
Foundry Pond	$390,000
Opinion of Probable Cost (rounded)	**$10,014,000**

SDS Construction and Repair Costs

Identical to the methodology described in Alternative 3, the following paragraph and tables summarize construction and repair costs.

For the purpose of estimating a capital cost and O&M value, the total number of system repairs equals 1,621 on 4,161 properties. As described above, costs for these repairs are apportioned as follows:

SDS Construction and Repair Costs

Item	Number	Cost
I/A Technology Systems	187	$6,545,000
System Repair or Replacement	1,434	$28,680,000
New Construction	1,066	$21,320,000
No Repairs Required (next 20 yrs.)	1,661	$ 0
Total (rounded)		**$56,545,000**

Operation & Maintenance of On-Site Systems

Operational expenses must be considered for the maintenance of systems in the areas to continue with on-site SDSs. The on-site SDSs will require the following costs (shown in the Table below) to operate and maintain these systems.

Annual Operation and Maintenance for Individual On-Site Systems

Item	Number	Cost
I/A Technology Systems[(1)]	187	$112,200
All Other Systems[(2)]	3,794	$397,400
Total (rounded)	**4,161**	**$509,600**

[(1)]$600/yr for treatment and septage disposal every two years.
[(2)]Septage disposal every two years at $200 per pump out and disposal.

Repairs of new construction systems are not included in the repairs tabulation. The on-site SDS O&M cost ($509,600) has a present worth cost of $6.35M (rounded).

De-Centralized System Operation & Maintenance Costs

Annual operation and maintenance costs for the proposed package treatment facility include:

- Labor;
- Power;
- Major Maintenance;
- Chemicals (e.g., NaOH, and chemicals needed for cleaning); and
- Sludge removal & disposal.

Labor costs include a licensed operator estimated at approximately $60,000 per year. Sludge removal includes costs of $670 per dry ton for disposal. The present worth calculations for annual O&M and major maintenance are based on a 20-year planning

period and a 5 percent discount rate. Because this is a planning-level estimate, a 25 percent miscellaneous contingency is included in the annual operation and maintenance costs.

The O&M costs for the De-Centralized system are shown in the Table below:

O&M Costs for De-Centralized Systems

Cost Category	*O&M Cost*
Labor	$60,000
Power	$600
Chemicals	$1,800
Sludge Disposal	$15,000
Subtotal	$77,400
Miscellaneous	$19,400
Total (rounded)	**$97,000**

The annual De-Centralized treatment system O&M cost for this revised option has a present worth (rounded) of $1.2M.

Total Project Costs for implementation of the De-Centralized Treatment system are shown in the Table below;

Project Costs for De-Centralized Systems

Item	*De-Centralized Treatment Cost*
Foundry Pond Needs Area Treatment Facilities (Total 68,000 gpcd)	
Construction (Total)	$9.1M
Present Worth of O&M*	$1.2M
Total Present Worth (rounded)	**$10.3M**

Note: Present Worth Calculations Assume a 20 – Year Planning Period and 5 percent Interest.

Advantages

- De-Centralized treatment and effluent disposal allows for groundwater recharge.

Disadvantages

- Continued reliance on SDSs will increase potential for increased loads within aquifer of water supply.
- Poorly functioning or substandard SDSs will continue to deteriorate groundwater quality due to lack of treatment and increased nitrogen loading from densely developed properties.
- Potential difficulty siting treatment facilities and disposal area.

Opinion of Probable Cost

Cost Item	Cost
Foundry Pond Sewer Collection System	$10.6M
De-centralized Treatment and Disposal Systems	$10.0M
De-centralized Treatment and Disposal O&M (Present Worth)	$1.2M
Individual SDS Construction & Repairs	$56.5M
Individual SDS O&M (Present Worth)	$6.35M
Alternative 5– Opinion of Probable Cost (rounded)	$ 84.65M

3.4.6 Alternative 6 – Sewer the "Unsewered" Portion of Hingham through expansion of the North Sewer District

This alternative provides for sewer collection and treatment for the entire Town of Hingham through expansion of the North Sewer District (NSD). The Weir River Sewer District (WRSD) is considered to remain unchanged as part of this alternative.

The NSD is located in the northwest area of Hingham and is connected to the MWRA sewer collection system through Weymouth. This alternative is expected to be cost-prohibitive, but does represent the extreme end of the spectrum from a cost standpoint. One of the challenges to this alternative is any proposed change to the District boundary requires legislative action and MWRA approval. This alternative will increase flows to MWRA, and reduce groundwater recharge to the Aquifer.

Environmental Impacts and Mitigation Measures

The proposed area for sewer collection and conveyance to MWRA with this alternative includes the entire Town of Hingham, part of which is located within the aquifer and hydraulically upgradient of the water supply wells used for the town's water supply. Failing and poorly functioning septic systems in this area may have potential to adversely affect the water quality within this aquifer. The lot density, small lot size, and shallow depth to groundwater within these needs area will continue to require multiple Title 5 variances for properties seeking to upgrade or repair their SDSs. The threat to the public health and environment will remain unchanged without a plan of action to address wastewater treatment and disposal. For these reasons, this alternative addresses the perceived need by construction of a collection system. A sewer collection system with the enhanced wastewater treatment offered by a centralized treatment facility eliminates the need for continued reliance on individual SDSs on small lots.

The sewer collection systems and "off-site" treatment included with this alternative would also reduce the contributions to groundwater recharge to the aquifer.

Flexibility

Centralized treatment and disposal relieves the individual homeowner from inspections and maintenance of failing on-site systems. Continued use of on-site systems is not a flexible alternative.

Reliability

A centralized treatment system is an effective long-term solution to wastewater disposal. As previously discussed, the sewer collection system lifespan exceeds the expected operational lifespan of on-site SDSs. Additionally, operation and maintenance responsibilities of the treatment and disposal systems would shift to the Sewer Commission and MWRA, and not the individual homeowner should this option be implemented.

Sewer Collection System Costs

This is a baseline alternative and costs are presented for discussion only at this time. Construction costs included in this alternative include all excavation & backfill, piping and bedding materials, pumping station(s) (with standby generator) trench width paving replacement, with allowances for engineering and contingencies consistent with planning level estimates.

Advantages

- WRSD boundaries are not expanded and no new IMAs with Hull and/or Cohasset will be required.
- Areas within the Aquifer Protection Zones will have a reliable method of wastewater treatment and disposal.

Disadvantages

- Any proposed change to the NSD boundary requires legislative action for changes to the MWRA system. Additionally, MWRA requires a 4:1 ratio of inflow reduction prior to admittance.
- Interbasin transfer offsets must be considered
- Capital costs are expected to be prohibitive with this alternative.
- Removal of SDSs will reduce groundwater recharge to the Aquifer.

Alternative 6
Sewer Collection System – Opinion of Probable Cost

Item	*Cost*
Fulling Mill Brook	$8,229,000
Gardner Street	$1,847,000
Hingham Center	$8,880,000
Accord Pond	$3,188,000
Prospect Street	$5,241,000
McKenna Marsh	$2,809,000
Foundry Pond	$5,962,000
Cushing Pond	$4,233,000
Whiting Street	$4,303,000
Liberty Pole	$7,848,000
Summer Street	$9,480,000
Industrial	$10,711,000
Plymouth River	$2,299,000
Accord Brook	$6,693,000
Bouve Pond	$6,295,000
Brewer Pond	$3,346,000
Subtotal	$91,364,000
Contractor's Overhead & Profit (20%)	$18,272,800
Subtotal	$110,000,000
Construction Contingencies (25%)	$27,500,000
Total Construction Cost	$137,500,000
Construction Cost at Mid-Point of Construction (3% per year for 3 yrs)	$150,250,000
Engineering and Implementation Costs (20%)	$30,050,000
MWRA Entrance Fee and Mitigation Allowance	$14,900,000
Land Acquisition/Easement Costs	$TBD
Opinion of Probable Cost	**$195,200,000**

3.4.7 Alternative 7 – "No Action"

This alternative serves as the baseline condition to compare other alternatives and measure their relative effectiveness. This alternative considers growth throughout the town but leaves existing wastewater management systems and service boundaries intact.

North Sewer District (NSD)

The boundaries of the North Sewer District remain intact. At the end of the planning horizon in 2025, the NSD contribution to MWRA is 0.76 mgd. This projected flow includes the following:

- Shipyard project is complete,
- Some presently unsewered residences have connected to the system,
- Development of a limited number of vacant residential property,
- Re-development of existing commercial/industrial property,
- Re-development of residential properties to multi-family use.

Weir River Sewer District (WRSD)

The boundaries of the Weir River Sewer District remain at the present extent. At the end of the planning period, flows from WRSD to the Hull system are projected to be 65,000 gpcd. All of the homes within the District will be considered to be connected at this time, and commercial development within the boundaries of the district will be completed.

Remainder of Hingham

Increased development throughout the planning period is expected to increase wastewater flows by approximately 207,000 gpcd (or converting to dwelling units is equivalent to 1066 residences). The increase in the remainder of Hingham is expected to be due largely to residential growth. This represents approximately 30% of available developable residential land.

Capital costs for this alternative will include construction costs for SDS installations and repairs. Operational and maintenance (O&M) costs will also be considered for existing SDSs and for the large septic systems governed by groundwater discharge permits and DEP. The current system inspection failure rate is approximately 30 percent; this ratio will be used throughout the planning period.

Environmental Impacts and Mitigation Measures

This alternative includes the entire Town of Hingham part of which is located within the aquifer and hydraulically upgradient of the water supply wells used for the town's water supply. Failing and poorly functioning septic systems in this area may have potential to adversely affect the water quality within this aquifer. The lot density, small lot size, and shallow depth to groundwater within these needs area will continue to require multiple Title 5 variances for properties seeking to upgrade or repair their SDSs. The threat to the public health and environment will remain unchanged without a plan of action to address wastewater treatment and disposal. For these reasons, this alternative will not address the perceived need.

Flexibility

Continued use of on-site systems is not a flexible alternative.

Reliability

This no-action alternative will not significantly improve the long term reliability of wastewater disposal in these needs areas since there will be a continued reliance on SDS throughout the project area, although enhanced management of on-site systems may have a slight improvement in SDS reliability.

Costs

Identical to the methodology described earlier, the following paragraph and tables summarize construction and repair costs. This is a baseline alternative and costs are presented for discussion only at this time.

From interviews with Board of Health officials, the overall inspection failure rate is approximately 30 percent. Over the planning period covering the next twenty years, an equivalent rate of repairs is considered to continue (as systems will be reaching the end of their useful life) such that 1313 more repairs are anticipated over the project lifespan. Of those 1313, an additional 30 percent may require repeat repairs (approximately 394 more) or repairs involving more enhanced treatment. For the repeat repairs one-half (197) will be considered as requiring enhanced treatment or Innovative or Alternative (I/A) treatment and disposal systems.

For the purpose of estimating a capital cost and O&M value, the total number of system repairs equals 1707 on 4376 properties. As described above, costs for these repairs are apportioned as follows:

SDS Construction and Repair Costs

Item	*Number*	*Cost*
I/A Technology Systems	197	$6,895,000
System Repair or Replacement	1510	$30,200,000
New Construction	1066	$21,320,000
No Repairs Required (next 20 yrs.)	3063	$ 0
Total (rounded)		**$58,415,000**

Operation & Maintenance of On-Site Systems

Operational expenses must be considered for the maintenance of systems in the areas to continue with on-site SDSs. The on-site SDSs will require the following costs (shown in the Table below) to operate and maintain these systems.

Annual Operation and Maintenance for Individual On-Site Systems

Item	Number	Cost
I/A Technology Systems[1]	197	$118,200
All Other Systems[2]	4179	$417,900
Total (rounded)	**4376**	**536,000**

[1]$600/yr for treatment and septage disposal every two years.
[2]Septage disposal every two years at $200 per pump out and disposal.

Repairs of new construction systems are not included in the repairs tabulation. The on-site SDS O&M cost ($536,000) has a present worth cost of $6.68M (rounded).

Advantages

- NSD boundaries are not extended, therefore no action of legislature is required.
- WRSD boundaries are not expanded and no new IMAs with Hull and or Cohasset will be required.

Disadvantages

- Continued reliance on SDSs will increase potential for increased loads within aquifer of water supply.
- Poorly functioning or substandard SDSs will continue to deteriorate groundwater quality due to lack of treatment and increased nitrogen loading from densely developed properties.

Alternative 7
No-Action Alternative Opinion of Probable Cost

Cost Item	Cost
Individual SDS Construction & Repairs	$58.4M
Individual SDS O&M (Present Worth)	$6.86M
Alternative 7 – Opinion of Probable Cost (rounded)	$ 65.08M

3.5 Summary of Costs

The following table presents a summary of the costs of each of the alternatives evaluated in this section. Costs range from a low of $65.08M to a high of $224.03M.

Alternatives

No.	*Description*	*Opinion of Probable Cost*
1	Sewer High-Priority Needs Areas through MWRA, WRSD remains at current extent, and remainder of Hingham uses on-site SDSs with enhanced wastewater management	$146.62M
2	De-Centralized Treatment and Disposal for High-Priority Needs Areas, WRSD remains at current extent, and remainder of Hingham uses on-site SDSs with enhanced wastewater management	$224.03M
3	Expand WRSD to include Foundry Pond Needs Area, and remainder of Hingham uses on-site SDSs with enhanced wastewater management	$86.25M
4	No Further Review	-----
5	De-Centralized Treatment and Disposal for Foundry Pond Needs Area, and remainder of Hingham uses on-site SDSs with enhanced wastewater management	$85.65M
6	Expand NSD and Sewer all of Hingham through MWRA	$195.2M
7	No-Action (continued use of on-site SDSs.	$65.08M