Town of Manchester-by-the-Sea

Sewer Task Force
Final Report

September 10, 2009

This is the report of the Sewer Task Force that was appointed by the Selectmen in the Spring of 2009. Most of the work of the Task Force has been in gathering information from available sources and Town employees, studying it, discussing its implications for future public policy, and finally in making recommendations.

We are grateful for the inputs we have received from Wayne Melville, Town Administrator, Steve Kenney, Department of Public Works Director, Charlie Lane, Town Accountant, and Ellen Lufkin, Board of Health Administrator. The content of this report is in large part due to their efforts. All assumptions and conclusions made in this report were based on the information available to the Sewer Task Force. There may have been more information available that the Task Force did not discover.

Background of Task Force

When the Board of Selectmen held the Special Town Meeting in the Fall of 2008 to seek funding for emergency sewer repairs on Beach Street, they were concerned that the users were once again having to bear a very large share of the expense. This is a result of the policy established by the Board in 1994 for the allocation of bonded sewer capital costs with 75% being paid by the sewer users and 25% being paid by the taxpayers as a whole.[1] The Selectmen thought that, given that the sewer users are taxpayers too, this places an even larger share of the costs on the users.

At the time of the that Town Meeting, the Selectmen felt that, if the users absorbed the costs for the Beach Street repair under the existing allocation formula, it would mitigate any displeasure if a Task Force were formed to review all of the parameters for sewer user/non-user participation in costs. Further, they wanted to assure users that they were looking for ways to expand the user base and possibly share more costs between users and taxpayers being mindful that there are practical and regulatory limitations to expanding the system. It was in this context that the Selectmen established the Task Force.

The Charge from the Selectmen

"The charge of the Sewer Task Force is to review and evaluate the town's municipal sewer system and to recommend to the Board of Selectmen any actions or policies that result from the study. Targeted subjects are not prioritized and include but are not limited to:

Determine current geographical layout of sewer system and number of users.

Review the number of non-users who could tie into the present system.

Assess feasibility and costs of possible expansion to non-sewered areas.

Determine costs related to replacement/repair of current sewer infrastructure

[1] The same policy allocates 100% of the operational cost of the sewer system to the users

Evaluate the apportionment formulas for operational and capital improvement costs.

Review status of current "cap" at the treatment plant as determined by the Ocean Sanctuaries Act.

Meet with DPW Director, Board of Health, Town Accountant, Town Administrator, and others as necessary for input to all the above.

Prepare a preliminary report to be presented in mid-May to the Board of Selectmen with a final report by June 30."

Task Force Composition and Activities

Task force members were appointed by the Selectmen. They were John Bennett, Shep Brown, John Graves, Sam Martin, Lee Spence, Sue Thorne, and Lynn Warnock. Lee Spence served as chair.

Meetings were held on

March 12 and 25,
April 9 and 23,
May 7, 18 (Interim report to Selectmen), and 28,
June 11 and 25,
July 23, and
September 10, 2009.

The Current Situation

Sewer construction in Manchester-by-the-Sea began in the early 1900's and gradually evolved as the needs and population of the Town grew. Growth was in the areas of additional lines as the Town grew, lift stations for areas where gravity feed was not an option, and construction of and improvements to the treatment plant.

At the present time the Town has over 23 miles of municipal sewers. The maps on the Town website show the layout of the system. They are, however, too detailed to be meaningfully reproduced in this report.

From time to time parts of the system have had video inspections, but there does not seem to have been a complete inspection of the entire system or even all of the major parts of the system. We have been advised that some major lines have been degraded by sediment buildup and/or corrosion over the years to where some 12" lines now have a capacity more or less of 6" lines.

It is estimated, based on information from the Department of Public Works and the Board of Health, that the Town has about 1250 sewer users and over 700 septic system users.[2] Insight into how this might evolve in the future is afforded by the 2008 Update to the Wastewater Needs Assessment Report[3] which counts parcels – presumably built up or buildable lots not just existing buildings. According to this report, the number of parcels currently on the sewer is 1220, which compares well with the 1250 estimate of sewer users above, and the number of parcels not on sewer is 1227 – see the Areas for Expansion section below for a breakout of areas. The report's number of estimated septic users is much greater than the Board of Health estimate because many of these parcels are conservation land or un-built parcels beyond the existing sewer system

All but approximately 13 homes in Town that have access to the municipal sewer are connected to the system. For one reason or another, these homes choose not to connect to inthe sewers, but they have been assessed betterment charges and they can connect if and when they wish, provided that the Town is not under a sewer moratorium when they wish to connect.

In a similar vein there are homes on Long Hill, at the end of Walker Road, and at the end of Crooked Lane that could have potentially tied into the sewer system when they were built but they were required to have septic systems due to the sewer connection moratorium that was in place when they were built.

According to the Town's website Manchester-by-the-Sea underwent a major upgrading and expansion of its wastewater treatment plant from 1997 through 1999 and it currently operates under the following EPA permitted flow limits:

> 1.20 million gallons per day monthly average December through May
> 0.67 million gallons per day monthly average June through November
> 0.67 million gallons per day annual average (Ocean Sanctuaries Act Limit – see below).

The upgraded plant was designed to deal with the flows that have been have historically observed and are in excess of these limits. The plant is designed for an average daily flow of 1.2 million gallons, a maximum daily flow of 3.0 million gallons and an instantaneous flow of 5.0 million gallons. It is regulatory requirements, not plant capacity, that are currently limiting expansion of the system.

During the period of time when the task force was meeting, the treatment plant was operating under an Administrative Consent Order from the Executive Office of Environmental Affairs that tightly controls new user hookups and imposes strict reporting requirements on the Town. This order, AP-BO-92-101, dates back to late 1992. In early September 2009 the Town accepted a new consent order, ACO-NE-09-1N006, that

[2] Some of these users have shared systems so that the total number of actual systems is probably something in excess of 650.
[3] "2008 GIS Data Update to the Wastewater Needs Assessment Report", prepared by Woodard & Curran for the Town of Manchester-by-the-Sea, September 26, 2008.

imposes more simplified reporting requirements on the Town and directs the Town to plan for and implement a Comprehensive Wastewater Management Plan. New sewer connections are strictly limited by the Order, although exceptions are identified for cases where imminent hazards exist and no other alternatives are possible. It is expected that many of the issues identified below will be addressed by that plan.

The Ocean Sanctuaries Act

The Ocean Sanctuaries Act mentioned above is defined in MGL Chapter 132A; Section 12A as including "Sections twelve B to sixteen E, inclusive, and section 18 of Chapter 132A. Section 12B which defines the boundaries of the sanctuaries clearly includes Manchester Bay, Salem Sound and parts of Massachusetts Bay near us. There is no question that our treatment plant discharge pipe terminates within an ocean sanctuary defined by this Act.

Other sections of the Act address among other things the discharge of municipal waste. It is through this legislation that our treatment plant discharge is limited by permit to the 0.67 million gallons per day as described above. As described below, Manchester has a significant amount of leakage into the system and we believe that until this is corrected the case for more permitted flow, to the extent that it can be shown to be needed, will be difficult, if not impossible, to make.

Infiltration and Inflow

Infiltration and Inflow (I&I) is leakage into the system. Sources of leakage include broken or damaged sewer lines and feeds, leaky manhole covers, root intrusion, illegally connected sump pumps and down spouts, etc. While the Town has made diligent efforts to eliminate the illegal connections, due to the age of the system and general wear and tear, the other sources still exist.

The major obstacle to efficient operation of the treatment plant, to say nothing of potential expansion, is the amount of I&I that the system experiences. The I&I problem is exacerbated in wet weather when it constitutes the majority of the flow through the system. On dry days the treatment plant will typically pump 0.25-0.3 million gallons per day while on wet days the number is more like 1.1-1.3 million gallons per day[4]. Since these observations have been made repeatedly over time, it is unlikely that variations in the amount of waste deliberately added to the system could account for the difference[5]. The DPW estimates that I&I is 50-70% of our system flow and they believe the Town could be able to achieve something in the 30-40% range with improvements to the sewer system.

[4] While these numbers are well beyond the 0.67 million gallons per day limit of the Ocean Sanctuaries Act, one needs to keep in mind that long term averages, not peak values, are the relevant compliance numbers.

[5] By way of comparison the Town's water mains appear to be much tighter. All but 3-4% of the water that is pumped is accounted for by meters.

It should also be noted that I&I due to seawater is particularly troubling to the system. Even relatively small amounts of it can severely disrupt the balance of the treatment plant. Fortunately, the recent repairs on the Beach Street sewer near the end of the harbor have eliminated much of the seawater infiltration that has been observed to-date. The planned improvements to the harbor loop (approved at the 2009 Town Meeting), which runs near the harbor on the east side of Ashland Avenue, are expected to eliminate more of the additional sea water infiltration.

I&I has several implications:

> The excess flow contributes to the average flow that is subject to regulation thereby limiting opportunities for any significant expansion of the system.
>
> Even without expansion, the I&I presents an additional burden on the treatment plant in terms of power consumption, wear on machinery, and chemical additives. To the extent I&I is eliminated and the extra capacity possibly taken up by sewer user expansion these savings would likely be negligible.
>
> It is suspected that on dry days some of the leakage in the system may be allowing reverse flow from the sewers (exfiltration) to the environment, although the Board of Health is not aware of any specific issues of this sort.
>
> To the extent that I&I occurs, it can have the effect of draining groundwater from the areas near the sewers. This is potentially of concern to all residents since such drainage can impact the Town water supply.

We believe that I&I is a major issue that has to be addressed first before expansion is possible. However, we also believe the Town should look into hiring consultants to advise the Town of the costs and benefits in connection with the feasibility of expansion after the I&I has been dealt with as described below.

Potential Expansion

While it seems premature from both a permit and practical standpoint to consider expansion until a substantial decrease in I&I is accomplished, one of the items that the Task Force was directed to consider was "Assess feasibility and costs of possible expansion to non-sewered areas". In response to that directive this section considers areas for expansion, potential compelling reasons for expansion, and a recommended approach to determining costs for expansion.

The study areas in the 2008 GIS Data Update seem to be a useful means of specifying the major areas for sewer expansion. They are shown on Table 1. Note that the Area Designations are quite broad and beyond what one may normally think of these areas but we chose to use them to facilitate discussion. See the map at the end of this report for a more complete definition of the areas.

Area Designation	Total Parcels	Parcels on Sewer	Not on sewer
1. West Manchester	252	47	205
2. Smith's Point	241	58	183
3. Coolidge Point	141	0	141
4. Raymond Street	100	0	100
5. Hickory Hill	91	0	91
6. Remainder of Town	1622	1115	507
Totals	2447	1220	1227

Table 1: Study Areas with Sewer/Non-Sewer Estimates

As can be seen from the table, there are a number of areas that have significant numbers of parcels that are not on sewer and that could be candidates for expansion. While selecting any specific areas will require extensive study, including detailed cost and feasibility estimates, there are some general remarks that seem applicable.

West Manchester	Parcels with sewer are essentially in the Ashland Ave/Bennett St area. Substantial number of parcels that could be served, but not sure how this translates into actual number of existing homes. Believed to be construction issues regarding ledge in the Tucks Point and Boardman Avenue areas
Smith's Point	Parcels with sewer are essentially in the Beach, Tappan, and Sea Streets areas. Substantial number of parcels that could be served, but not sure how this translates into actual number of existing homes. A municipal benefit of expansion into this area would be providing sewer service to the Singing Beach bathhouse. The Eaglehead area is believed to be have particular difficulties with septic systems that might make expansion there particularly attractive

Coolidge Point	Substantial number of parcels that could be served. Would probably not be considered until, or as part of, the extension of the service to the Hickory Hill area.
Raymond Street	The septic difficulties that homeowners in this area face have been the subject for much discussion and attention from the Board of Health and others for many years. However this area is the most distant from the existing system. Possibly should be considered for special treatment like a groundwater recharge system somewhere like Surf Park, or, if at all feasible, tie in to Gloucester.
Hickory Hill	Includes parts of Summer and Ocean Streets. This area and Smith's Point seemed to the Task Force to be the most logical candidates for the next expansion.
Remainder of Town	With the exception of the Atwater Ave area across Route 128, most of the homes and businesses in the remainder of the Town have sewer. The relatively large number listed above without sewer would seem to relate to parcels that could potentially be built.

The Board of Health reports that there has been a significant amount of activity in upgrading septic systems in Town in the last 10 years or so. Furthermore, many of these upgrades have used significantly better treatment technology Periodic inspections of all septic systems will help to identify those systems which are likely to pose a health risk. The Board of Health is not aware of any specific public health concerns that would be a major driver for sewer extension at this time. It should be noted, however, that at the Town Meeting in 2009 the Town requested that the Board of Health develop "… a plan for the testing, in accordance with Title V, of such septic systems as have not been tested under Title V, and that said Board report its determination as to the timing and estimated expense to the homeowner of its plan in the public press six months from this date." The results of this report may impact the recommendations below.

Determining specific areas for expansion and costs for expansion seem to the Task Force to require detailed surveys and professional studies that are beyond our means. The areas of possible expansion are very different in subsurface conditions and layout so how the extension might be implemented and the cost would vary from area to area. Some people estimate a cost of $1 million dollars per mile of expansion, however based on the recent experience with the Beach Street repairs, this number could be significantly more.

It is worth noting that under the current policy, which was adopted by the Selectmen in 1994, "All extensions to the water and sewer system shall be funded by those who will

benefit from the extension in accordance with the Town's betterment procedures". Thus, it is likely that under this policy an expansion could result in increased flow for which additional revenue is collected, although obtaining a good estimate of this also requires further professional study.

Cost Apportionment

Another item that the Task Force was asked to address was "Evaluate the apportionment formulas for operational and capital improvement costs." As mentioned above, the current policy, established by the Selectmen in 1994, allocates all operational costs to the users and 75% of the "bonded" capital costs (paid through the issuance of debt) to the users. The remaining 25% of the bonded capital costs are borne by the taxpayers, so users, being taxpayers, share in this too.

The Task Force discussed the current 75/25 split in bonded capital costs repeatedly. Clearly some split between users and non-users is needed to reflect municipal, school and business use of the system, and, given that the users are taxpayers, too, the present split is more like 85/15[6]. The Task Force decided that the major capital items that benefit the Town as a whole seem to merit being shared more evenly between the user and non-user. These major capital items that would require bonding include correcting I&I and/or major upgrade/replacement of the treatment plant. These major capital items would benefit the Town as a whole by:

> Allowing for additional connections to the system in the future;
>
> Avoiding potential problems to all citizen's water supplies by insuring that the system neither leaks into ground water supply areas nor drains those areas; and
>
> Maintaining and improving the overall quality of life by allowing major portions of the Town, its businesses, and the school system to have a properly functioning sewer system.

The Task Force recommends that these benefits be recognized and funded as follows:

> Continue the present 75/25 user/non-user split for bonded capital costs related to operations and exclusive of I&I. This practice will help compensate for municipal use of the system. It also recognizes that those who use the system should pay for it and that septic users have costs of their own that also contribute to the quality of life in the Town.
>
> Fund all future I&I remediation 100% by taxes. This reflects the fact that the Town as a whole will benefit from having capacity for future expansion and from avoiding possible administrative penalties for having excessive I&I.

[6] The exact percentage is difficult to accurately determine since it is also dependent on things like the schools, via taxes, pay sewer bills.

As a practical matter, the Task Force noted that some minor non-bonded capital costs have been allocated 75/25 over the years. The Task Force recommends that the existing policy which relates to only bonded capital items be followed and that all non-bonded capital costs be 100% allocated to the user.

In addition the Task Force noted that salaries, benefits (insurance, pensions, FICA, etc), and non-payroll related expenses that are directly related to operating the current system are paid 100% by the users, and the Task Force recommends that this continue. However, these costs include 25% of the DPW Director's salary and indirect costs. The allocation of the Director's salary and indirect costs to sewer, and likewise water rates, is inconsistent with the way the salaries of other revenue producing department heads are handled and the Task Force recommends that the DPW Director's salary and benefits be funded entirely from taxation.

Recommendations

Based on the above facts and discussion, we make the following major recommendations subject to the condition that, if the treatment plant Administrative Consent Order is rescinded or substantially modified, these recommendations should be reviewed.

System Survey and Repair

As a first step in a prioritized plan, it is important that a survey of the complete system or at least the major parts of it should be conducted so that the Town can have confidence that what needs to be done is understood. This survey would involve revisiting previous surveys, flow measurements, video inspection, capturing institutional knowledge, and other tools as appropriate. Results of the survey should be captured in the Town's GIS database.

On the basis of this survey develop a capital plan for Major Capital Items including the repair and replacement of the system as necessary, beginning with the sections found to have the greatest deterioration and/or I&I. To minimize the burden on the taxpayers and users, this work could hopefully be phased in as the wastewater treatment plant debt is paid down. This debt is scheduled to be retired in 2017. However this is done, the Selectmen need to be proactive in advocating system improvements.

System Expansion

When the I&I problems begin to be controlled, hire professionals to study the feasibility and costs of expanding sewer service into new areas. This study should include recommendations as to where to best extend it and estimates of potential increased revenue.

Fiscal Considerations

Continue the allocation for bonded capital costs relating to operations and exclusive of I&I with users paying 75% of the cost and non-users paying 25%.

Fund all future I&I efforts 100% from taxes.

All non-bonded capital costs should be 100% paid by users.

Discontinue the present practice of splitting the DPW Director's salary and indirect costs between taxes and user rates and fund these entirely from taxes.

Some other recommendations that that we arrived at during our deliberations but are not discussed in this report are as follows:

The Town needs to have a written policy for the approval, maintenance, and opportunities for expansion of private sewer lines which connect to the municipal system. This should include how to treat ownership, maintenance and cost sharing of privately sponsored sewers in public ways.

Establish a policy (with DEP approval and in cooperation with the Board of Health) relative to requiring property owners who have a new and improved onsite sewage disposal system to hook up to any expanded municipal system that becomes available to the property. The property might be subject to a betterment fee but not a hookup fee.

It is not clear to us that the Town has a policy as to how new/replacement sewer construction is inspected and certified. The Town needs such a policy.

Potential Benefits to Users

As mentioned at the beginning of this report, one of the motivations that the Selectmen had in establishing the Task Force was to see if there are ways that the system could be expanded so that the burden to users could be mitigated. The recommendations in this report that have the potential to relieve some user burden as reiterated here:

To the extent that the recommended I&I reductions lead to additional expansion opportunities there may be significant opportunities for more users hence more cost sharing among the users.

All costs for I&I expenses that benefit the Town as a whole will be entirely from taxes thus achieving some relief for the user while not unduly burdening the non-user.

Funding DPW Director’s salary and direct costs entirely from tax rate also reduces user share although this is only a small factor.

Woodward and Curran Figure 1