WAC
Minutes
February 3, 2017

The Wastewater Advisory Committee to the MWRA met at MAPC, 60 Temple Pl., Boston, MA

Attendees/Contributors:

WAC: Taber Keally (chair), Craig Allen, Stephen Greene (by phone), Adriana Cillo, Karen Golmer, Karen Lachmayr, Martin Pillsbury, Zhanna Davidovitz, Wayne Chinouard

Guests: Wendy Leo, Sean Navin, Katie Ronan (MWRA), Karen Heinze (SCLF/Xyleco), Bill Copithorne (Arlington), Nick Rystrom (Revere), Jonathan Kunay (CDM Smith), Debbie Cheng, Diane Stokes (Cambridge)

Staff: Andreae Downs

FUTURE MEETING DATES/TOPICS

NEXT: Friday, March. 3, 10:30am: Pipe and Interceptor maintenance, Stephen Cullen & Kenny Bates, MWRA Director, wastewater operations & maintenance; chief, pipeline maintenance.

VOTES:

December 2016 minutes approved

CHAIRMAN'S REPORT:

Question of a possible future discussion of the Conservation Law Foundation/Charles River Watershed Association lawsuit about stormwater pollution in the Charles. The presumed goal of the suit is to make the cost of stormwater runoff and pollution transparent, and to bring private landowners into the mix to share expenses for its mitigation.

Cambridge is working on containing stormwater as part of the Kendall Square developments, and has discovered some old combined sewers in that area that they are looking to separate while also adding stormwater infrastructure to Willard St.

Cambridge is adding lots of pervious pavement to infiltrate stormwater, but running into maintenance issues. Particularly the new cycle track on Western Ave is not infiltrating the amount of water necessary to prevent ice from forming. May need more sweeping particularly with all the trees along the street dropping leaves. Contract to a vacuum truck, 3x year.

EXECUTIVE DIRECTOR'S REPORT:

See attached—main points are about the Clinton Permit and differences between old and new permit, which MWRA produced for the Board, also attached.

MWRA UPDATES:

On Deer Island—the valve and pump replacement for the 10 giant pumps in the North Main Pump Station continues. Winthrop terminal section is complete. The MWRA has figured out how to isolate half the plant and not shut down the whole north system during replacement.

Cross Harbor Cable (HEEC)—Eversource finished first phase early. Waiting until they can dredge in July, after flounder spawning season is done.

New Clinton Permit goes into effect in March. Big change is tighter phosphorus limits, but MWRA expected that, and the new phosphorus removal plant should be complete this fall.

- Final permit also removes limits for aluminum for phosphorus treatment, since the plant no longer uses alum and instead uses ferrous chloride.

- Co permittees are still in the permit, but language is crafted to make responsibilities of the communities and MWRA distinct.

No permit violations for 2016, which means Clinton gets a gold award and Deer Island gets a Platinum 10 award (10 years without a violation) from NACWA.

Public Affairs: The legislative deadline is past. MWRA will be monitoring the bills re-filed. A new bill to tax sugar-sweetened beverages and use the funds for clean drinking water is of interest. Debt service assistance of $500K is in the governor's budget, as is delegation of wastewater regulation to the Department of Environmental Protection.

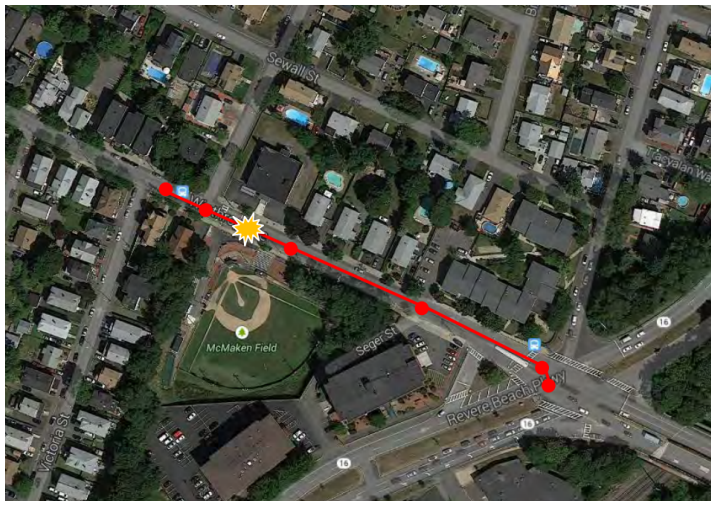
PRESENTATIONS & DISCUSSION:

Nick Rystrom & Jonathan Kunay:

A Multi-Faceted Repair Under Winthrop Avenue

Revere is under a consent decree (from state & federal court) for violations of the Clean Water Act. This means, among other things, that they had to inspect the Revere sewers to find & remove non-sewer water (sump pumps, groundwater leaks in to the pipes, and other things that might cause a sewer overflow). To do this inspection, they would clean sewer pipes and then use TV cameras to have a look.

In August, the sewer pipe under Winthrop Street collapsed during such a pre-TV cleaning (along with the usual debris, a 2x4 was in the pipe). It was 100 years old, clay, about 20 feet under a very busy street. It served 1/3 of the city, carrying 2.3 million gallons of waste water a day.

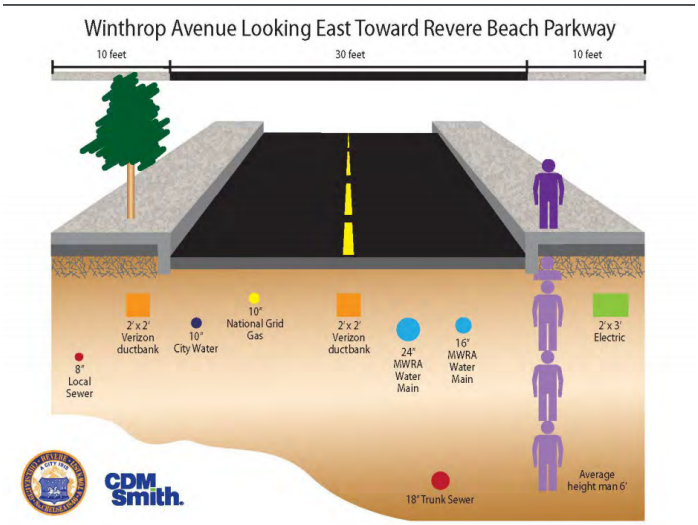


Among the challenges to getting to and fixing this pipe: a day care &

senior center on the street, several big utilities in the roadway, including three MWRA water mains, a gas main, the city water main (also 100 years old), the collection system for the sewer and the storm drain. Also shallow duct banks for the phone and cable companies.

All of these sat above the broken sewer.

The biggest challenge were the pressurized water mains sitting directly above the sewer line. They provide about 4.5 million gallons of water a day to about 100,000 people. That's about half of Revere, all of Winthrop, some of East Boston and Deer Island.



MWRA told Revere two of the three pipes had to be in service all the time.

Other challenges: Revere had to coordinate with were DCR and the state, which own the Revere Beach Parkway—which intersected Winthrop St. to the south, police details from state and local, get state permits, restrict work hours, and not interfere with two buses that go down Winthrop. And traffic.

To top that, right in the middle of repairs, the "polar vortex" hit—bringing unusually cold temperatures to the work site.

Finding the money to do the repair was also challenging, since this was unexpected.

Looking at Alternatives:

Digging up the whole street wasn't practical with all the utilities on top of the line.

Construction didn't start until winter because the team first wanted to be sure they had the right approach and all the permits and other issues resolved.

First thought was—don't dig. Looked at "pipe bursting", which allows you to put a new pipe through the old pipe and collapse. Involves ramming a new pipe through the collapse. That would increase the capacity of the line and repair the collapse. MWRA nixed this option because the vibrations might have hurt the water mains.

2. Microtunneling—put in a parallel pipe next to the old pipe. Eliminates the collapse and can add capacity. Problem—need a large access pit in the middle of Revere Beach Parkway. This is on the way to many people's commute. DCR said no way. It's also very expensive

3. Now—out of trenchless options. You now are looking at digging to get to the collapse. But we know the entire pipe is 100-year-old clay. Upstream and downstream of the collapse is equally

fragile pipe. So decided to line the pipe upstream and downstream of the collapse to strengthen the rest of the pipe.

These liners go through existing manholes and don't require digging. But you can't line a collapse.
4. Have to open cut—will fix the line, but have to deal with the depth, coordinating the other utilities above it, complicated.

Plan—line the unbroken sewer pipe, set up water main bypasses for the two MWRA water mains, temporarily remove those mains, dig to the sewer, repair the sewer, back fill and install new water mains above.

Funding: City worked with MassDEP to find funding. Got $2m from the Clean Water (SRF) Fund. The remaining $800,000 came from contingencies on several other sewer projects around Revere that were under budget.

Once every one had bought into the plan, then they created a detailed design.

Besides fixing the collapse, the project had two main goals: Minimize disruption, preserve the integrity of the MWRA water mains that provide water to much of Revere.

There are three mains: a 16", a 24" and a 10" on the other side of the street. Two of the three had to remain in service throughout the project. The 10" wasn't in the way; they chose to keep the 16" running because it was smaller and cheaper. That line was insulated to prevent freezing.

Plan to set up for the 16" bypass, cut and cap the two mains, and dig down.

Second part was trenchless—reinforce the pipe upstream and downstream.

Already by passing the sewer, which was emptied to allow for the cleaning. Already lining all the sewers in the area—lining the lines and the first 24 inches of the sewer laterals, so idea was to do the whole sewer lines while in the area, not come back later and disturb residents again.

So the plan was to line the sewers, not just the line with the collapse, but some smaller lines that feed into it and the laterals from homes, daycares and senior centers.

Q: Does the lining affect capacity?

A: It's about 12 mm. It's a felt lining impregnated with a resin. Cured with heat, and the final result is very smooth. It does slightly reduce capacity, but nothing snags. Technically, you usually get more capacity after lining.

Q: What's the life cycle of the material?

A: first ever liner was put in about 70 years ago, and is still in service. Design life is 50 years. Service life is longer.

Third part of design to replace the collapse, dig down to the pipe and remove 165 feet of sewer manhole to manhole with new 18" PVC pipe.

First step was to install the sewer bypass—which was done before we started. Had to protect the pumps and monitor them 24 hours. Only way to get into the sewer was to trench under the Revere Beach Parkway.

Winthrop Road had to go down the curbing of a narrow street—only 2 lanes of traffic, and now there is only one. There are buses that take Winthrop, so now we had to coordinate with the MBTA.

Also had to trench under side streets for the bypass.

First, we lined upstream and downstream—it involves inserting the liner and then heating it with steam. You unfurl the liner into the pipe like a sock, fill it with water, heat the water to 180 degrees, which starts the curing. Takes about 6 hours, cures the liner, then you dewater, and have a pipe within a pipe.

BUT then came the Polar Vortex.

First day of lining it was 40 degrees. Temperature drops throughout the day. Starting the cooking process it drops to 7 degrees. Whole process takes 18-20 hours and the water needs to cool slowly. Then the temperature drops to -4. The boilers literally couldn't keep up. The boiler failed, the curing didn't happen properly, cold groundwater is coming in, and the pipe is irregular. Next day they brought in another boiler, re-cured the whole line and it worked out—but this was supposed to be the easiest part of the job.

Next part was doing the laterals. But one of them was gushing infiltration so much that you could not line this lateral. Only real way around this was to seal off this lateral. Then we had to re-route the house service downstream. Service lateral is 20' deep. Had to go through a whole lot of utilities to get from house to manhole—gas, drain, electricity, water—and that's just one part of this excavation. To do this excavation, you have to have everyone on site, and before you dig everyone has to sign off.

When we were evaluating our options, we talked about putting a parallel sewer line down the other side of the street. But that's the line with the gas. We got in touch early with National Grid, and they came in and replaced the whole main there. They left their old main in.

Q: How did you get them to do that?
A; We begged, a lot. We got in touch early in the project. Because it was an emergency and had such an impact on the region as a whole, they were able to accommodate us.

Bigger part that was most difficult was the water main. We had to remove both of them, bypass one, and do our work. Actual construction work was more like weeks-although the planning was months.

Water and sewer bypasses went up on the sidewalk. So we cut & capped both water mains, bypassed the smaller one, and then dug down to the sewer line, repaired the break, filled everything back up, and then reinstalled each water main again. That didn't take that long, but the reason is that we coordinated weekly with everyone involved for months in advance. Those meetings ranged from 5-15 people.

Then we lined the manholes and added drop connections.

Stats for this project: 7 months between when break occurred and when we were off the road. $2.5 million dollars, 2 different contractors, one consultant. Collaboration of more than 10 different entities.

This is a project that could have gone disastrously bad, and went very very smoothly. A lot of that is a result of our ability to plan ahead of construction and make sure we were in contact with all parties involved. Important that every stakeholder has a voice, and that we are constantly following up with various parties.

Q: What made you decide to replace the line manhole to manhole rather than trenching and fixing a smaller section?

A: We worried that in fixing the break, the vibration might break the line somewhere else, extending the time we were in the street. We knew the whole line was in bad shape, and this way we were done with it.

Q: How long did it take to get the bypass up and running?

A: Getting it set up was fairly quick. Took 2-3 days to bypass into the downstream, but then we had to extend it into the construction a little further. Taking it down was also pretty fast. We didn't have any issues except during the cold, when we had some pumps freeze—and of course they don't freeze during the afternoon, they freeze at 3 am. So we had a couple issues. We monitored the whole time. Luckily, in the middle of the night you don't see a lot of flow.

Q: How much of your cost was just in bypass pumping?

A; Not sure. Will get back to you. Part of it we were able to cover with some of the contracts we already had in place. So we were able to use that without procurement, and with good pricing because we were purchasing so much bypassing anyway.

Q: Isn't there a way to set up a relationship between all the utilities sharing this road outside of emergency repair situations?

A: that would be good. Some cities already have these ongoing relationships. Problem is that personnel leaves and you have to start a new relationship. In some cases we do, and in others we don't. Worth looking into.

Diane: Last year, the Department of Public Utilities (DPU) chaired a special utility coordination commission, which I was on. The commission submitted a report to the Massachusetts General Court that recommended best management practices. The DPU is planning to distribute the report more widely through their Interconnection efforts between municipalities and energy utility companies.

The DPU is trying to improve the interconnection process—with the ongoing development in Cambridge and other communities, new connections for gas and electric services are needed, it is just so tough for municipalities with different bidding timelines and communications. There's just so much coordination.

> Below is a link to the Special Utility Commission report to the General Court that was provided by email after the meeting. The Department of Public Utilities is planning to get the report to the municipalities through the agency's ongoing efforts to improve interconnection coordination between energy utilities and municipalities. The next interconnection meeting is in March.
>
> http://www.mass.gov/eea/docs/dpu/sp-util-comm-report.pdf
>
> On August 6, 2014, An Act Improving Drinking Water and Wastewater Infrastructure, Chapter 259 of the Acts of 2014, was signed into law. Chapter 259, Section 61 ("Section 61") established the Special Commission on Utility & Municipal Coordination ("Special Commission") to investigate and study ways to improve coordination among utility providers and municipalities to reduce unnecessary or duplicative roadway construction related to underground utilities.)

Newton is now sitting down monthly with the gas utility to beg them to replace cast iron gas mains under streets they have on their paving program.

Revere coordinates like that for work we have planned out for many years. There's another group that coordinates on an emergency basis, which is what this was. Part of it is that while I have a road that has a gas main that needs replacement, but you probably do, too. Some of those aren't going to get done this year.

In Cambridge, on top of the big sewer separation projects, we have smaller sewer lines with locations at risk of collapse, and coordinating all the utilities is just tough. It's gotten easier with the gas company, but it's tough.

In Revere, it's not just that the sewer is old and we have to replace that, but the water mains are equally old, and the gas lines are probably about the same age. So there's just a lot to consider before we start paving. It doesn't look good with city council when you are paving and then digging up the next year.

Cambridge has been doing more and more lining, and while it's disruptive, it's much less disruptive.

Revere has done nearly 40-45 percent of the city. Still have to do spot repairs.

In Cambridge we do trenchless rehab along with our remedial contracts. We did about 12,000 feet last year and are ramping up again—we try to target winter, when there's less construction in general.

Q: did you have to bid this out?
A: no, we looked at this as an emergency, and we already had a good relationship with the contractor, so we didn't have to bid.

Q: did you change anything going forward to try to avoid a similar catastrophic break?
A: Yes. We have an idea of where the more fragile parts of the system are, and have instructed the contractor to be more careful there. Also, early on we targeted the big, important pieces of the system. For instance, there's a big interceptor that's shaped like a question mark. We made sure to rehab those first, because we knew they would be a problem.

Q: This is a great poster child for preventative work. At $2.5 million a pop, this is very expensive. Have you gone back to say what this would have cost if you had gotten there earlier for normal maintenance?
A: $60 a foot? I do that a lot. I say, "we need to do this work." If I get pushback, I say "you don't want it to be another Winthrop Ave" It's actually very helpful.

Q: How much inconvenience was there? Were people without water?
A; No. There was a day or so when people's sewage wasn't going anywhere, but they didn't notice it. And where we had to put in the new service, we put those people up in a hotel overnight.

In some cases, we knew we had to do those laterals anyway. So afterwards, they had fewer issues. In the end, people were happy.

Q: If your liner had gone through, would you have found the lateral gusher?
A: Yes—there were other defects in the mainline pipe, those were sealed up. So we would have seen the service gusher anyway.

Q: so are there now soggy front lawns?
A: No, but earlier work along with this means that the ball field now has a water line in right field. Now the field isn't useable, and has ducks and all. It's privately owned, and will need drainage.

Q: do you have a lateral program and do you pay for lateral replacement?
A: The full length of the lateral is the homeowner's. When we are doing a big rehab, we talk to homeowners when we are lining part of the lateral, and where it's significant, we are lining all the way up. At this point we don't have a program for any homes that are not part of a bigger project. We don't own it, and could ask for private payment, but the consent decree overrides that. There is so much flow that has to be removed, and the city is responsible. Trying to get the homeowner to pay will stymie the pace of flow removal.

Plus, Revere is so dense, now imagine having to negotiate with all the homeowners affected by a project. Imagine the legal fees. It's not even financially feasible.

Revere is technically not responsible for the lateral or the water main. The homeowner owns the connection even under the roadway. So the difficulties are immense.

Q: has Revere thought about a betterment fee?
A: for other types of work, we have. As yet, nothing has been implemented. At some point, I think we'll see that—x percent on your water bill.

Q: I thought there was a community looking to tie lateral inspections to property sales.
A: Newton is still exploring the language, but is looking at it. Also looking at inspecting water lines as part of the same thing—so if there's a problem, it's one dig and two replacements. It's consumer protection, like a home inspection, and becomes part of the negotiation.

That's analogous to septic systems.

The City of Oakland is the poster child for this. You buy a home; East Bay MUD requires an inspection before you can close. The implementation of fixing it is in the negotiations. But they are having trouble making that happen.

Revere has talked about something like that. But nothing in place. I advise people to look at their service before selling. We may have just done it, and that's a selling point.

Q: so how far is Revere into its consent decree?
A: Technically, the decree was for 10 years. We are 7 years in. We are trying to negotiate that, because the financial burden on the city is absurd. We've done about 45 percent rehab of the sewer system. But the consent decree is for sanitary and stormwater. We are trying to stretch it beyond the 10 years, because that timeline is impossible. The first four phases were huge. We spent $16-18million, and this task one, which is the biggest, was $19 million. We've spent upwards of $200m, which is mostly borrowing. But this is a huge thing. Granted, whoever was watching the store wasn't fixing pipes. But they agreed to get to zero SSOs, and we are surrounded by water. A hurricane and we're done.

Q: are you seeing an effect on water quality at the beaches?
A: we only close when Lynn has an overflow.

Q: how will sea level rise affect you?
A: that's where we think lining up service laterals all the way to houses. But just cost and sanity-wise, that's not something we want to do. But can line from house down, and that is a good and growing market. Cheaper than digging.

Lateral lining runs from $14-1800, more like $4K if you do the whole lateral. That's the city's price, which is lower than a homeowner would get. And we are looking at 12,000 connections.

Q: What effect has the work had on number of SSOs?
A: gone down dramatically. We have 99 miles of sewers, 12 pump stations. We had gone through to rehab those stations and get monitoring on when they go off. A lot of SSOs were from when the pumps went off. We went from about 200 SSOs/year to 30-40. And some of them end up being a private responsibility—someone flushed fats or wipes down.

Flow is down 50 percent or more where Revere has done major rehab projects. But now talk about inflow. Revere homes tend to be low, with high groundwater. Lots of the city built years ago were built as summer homes and in the flood plain. They are pumping all the time just to dewater their basements.

Q: Any local regulation?
A: We have a sewer ordinance. We have an amnesty program so folks would let us know if they have a sump. Also looking at a fats, oils and grease education.

Another part of it is education, and getting it in enough languages. Doing flyers, a little YouTube video, community meetings. We also educated many about the difference between the sewer and the storm drain.