



CITY OF  
**SOUTH  
PORTLAND**

**M E M O R A N D U M**  
**Water Resource Protection**

**TO: Scott Morelli**

**Cc:**

**DATE: March 7, 2024**

**FROM: Brad Weeks, Director**

**PROJECT: Willard Beach Storm/Sewer  
Infrastructure**

**RE: Questions to Address**

Scott I have compiled all the questions I believe are being asked.

**Question 1:** *As a result of recent storms and damaging high tides, what plans are being made by South Portland to address the problem of Willard Beach erosion impacting the pump station, sewer and storm water lines?*

**Response:** Starting with the pump station. We didn't see any erosion impacts affecting the pump station during the recent storms. Keep in mind the bottom of the foundation of the pump station where the pumps and wetwell are located is 24 feet below the first floor elevation. This is something we will watch and if need be a typical solution is to install barrier walls around the pump station. The new force was designed and installed taking beach erosion into consideration. Typically a force main is buried 3-5 feet deep. In this case we are currently running approximately 6-8 feet deep after the recent storms. The gravity sewer line is buried approximately 5 feet deep which is a typical depth. As a reminder, we lined this entire section running along the beach last year which gives us the structural integrity of a new pipe. We will watch this and if need be a typical solution would be to install an anchoring system with potentially riprap over the top of it. Last, for the storm water lines, everything looks to be fine for the time being. If the beach continues to erode, the end of the discharge pipe will be cut back accordingly.

Long term we are working with the Sustainability Department and the Planning Department where we are involved with the Climate Resiliency Plan and the Comprehensive Plan as to our infrastructure.

**Question 2:** *Recap the emergency nature of the work and why there was not time to look at the larger, more planning intensive option of removing and relocating the infrastructure.*

**Response:** See below response in Question 3.

**Question 3:** *Decision-making around the replacement of the force main at Willard. Too many residents the process seems to have been short-sighted and its planning poorly coordinated, particularly in light of city's expressed commitment to prepare for climate change. Were all*

*relevant departments afforded a voice, especially considering how rising waters and battering storms are likely to affect our waterfront?*

**Response:** The emergency nature of this work stemmed from three breaks in the force main that occurred in the last three years resulting in emergency repairs, discharge of untreated sewerage, closure of Willard Beach, and disturbance of the dune vegetation. The overall cost for each event ranged from 30-50 thousand dollars each. Evidence from the most recent breaks indicates that the existing force main has deteriorated inside and out due to age and saltwater impacts. Time was of the essence in the last break because we were having trouble trying to find enough solid pipe to connect onto. When you have a break like this you cut out the bad section, install a new piece of pipe, and the connection from the old pipe to the new pipe is done with solid sleeve couplings that are mechanically restrained because it is a pressurized pipe. Therein lies the problem of restraint. The existing pipe was so thin we didn't want to risk the chance of torquing down the restraint nuts in fear of breaking the existing pipe which would have caused us to chase the pipe even further if in fact we could find any existing pipe at all we felt comfortable using the restraint system for a more permanent installation. Hence the critical nature to get a new force main in ASAP to avoid these joints from coming apart or another break happening elsewhere that we might not be able to actually fix. This situation can be called a ticking time bomb.

The planning portion of the emergency replacement involved two consulting firms working together who had expertise in different areas. Sebago Technics and Woodard & Curran dropped what they were doing to help us work out the solution to this during our emergency. We have a [Technical Memo dated June 28, 2023](#) from Woodard & Curran addressing Willard Beach Emergency Force Main Project Trenchless Rehabilitation/Replacement Alternatives. Sebago Technics provided their [Technical Memo dated September 8, 2023](#) addressing Willard Beach Force Main Replacement Summary of Work. In fact we looked at ALL the options for replacement and relocation. This was a tremendous amount of work done in a very short time that could not have happened without everyone working together putting in long hours. Climate change was considered during the design process and in making the final decision which is reflected in the design and installation. During the design/installation the Parks/Recreation Department was fully involved with dune and plant restoration as well as coordinating the beach shutdown during construction. Public Works was involved where we were working at the end of Myrtle Avenue. Code, DEP, and the Army Corp of Engineers were all kept informed of our proceedings. The relocation of the force main further up into the dunes on the beach fixed our immediate emergency needs, was a long term solution, could be installed within months, met the issues of climate change, and was fiscally responsible. All of this information was also presented to a full room of people from the neighborhood in a public meeting at City Hall.

**Question 4:** *Cost to relocate pump house off Willard?*

**Response:** There is no cost to relocate the pump station because the pump station cannot be moved. The reason for this comes down to simple hydraulics. All of the wastewater in the Willard Beach sewer district flows downhill by gravity to the pump station. A pump station is always at the lowest point in any gravity wastewater drainage system. There is an alternative to a gravity wastewater drainage system though called a low pressure system. This would allow you to eliminate the existing pump station all together along with the piping in the beach. Something like this is very complex to design and construct that could easily cost in the tens of millions of dollars and take years to design and build. In brevity, a low pressure system consists of a small pump station, typically called an E1 Station, located at every home that then connects to a low pressure force main in the street which ultimately discharges to the same location as the current pump station forcemain. Every home would own and operate their own pump station. We have a few of

these low pressure type of systems albeit small consisting of maybe 2 to 6 stations located in small developments throughout the City.

**Question 5:** *What happened in Ferry Village, in particular where the commenter said the City's drainage system failed and sewer system failed and backed up in his home?*

**Response:** To my knowledge the storm drainage system did not fail. The storm drainage system is a gravity system that discharges to the ocean. As long the water surface level of the ocean is lower than the discharge level of the storm drainage system then stormwater will flow out into the ocean. However, if the water surface level of the ocean is higher than the water surface level of the stormdrain system then the stormdrain system will back up into the stormwater collection system to a point where the water surface level of the ocean equals the water surface level of the stormdrain system at that point. All of the stormdrain system above this point will continue to drain. As the ocean water surface level recedes so does the normal operations of the gravity stormdrain system. We have no control over this. For homes that are located in these low lying areas that have a stormdrain service they typically have a check valve so stormdrain water doesn't back up into their homes.

Again, to my knowledge the sewer system did not fail and we had no failures or operational issues at the Front Street Pump Station either. What happens in the sewer system during these heavy rainfall events is rain water and groundwater find their way into the sewer collection system by combined catchbasins, cracks in the pipe, illicit connections, etc. The pump station has a storm pump that can only handle a certain amount of flow which in this case is 7 MGD. What doesn't get pumped initially backs up into the sewer collection system which is common. The sewer collection system acts as a temporary storage tank. The sewer system is still fully functional. For homes that are located in these low lying areas that have a sewer service they typically have a check valve so the wastewater doesn't back up into their homes.