

Triple Bypass Aids in Restoration After Aging Infrastructure Failure



PROJECT SCOPE

Failed infrastructure emergency required a system to bypass collapsed 30-inch pipeline adjacent to sinkhole caused by old pipeline failure in environmentally sensitive, residential area.

CLIENT

Municipality

INDUSTRY SEGMENT

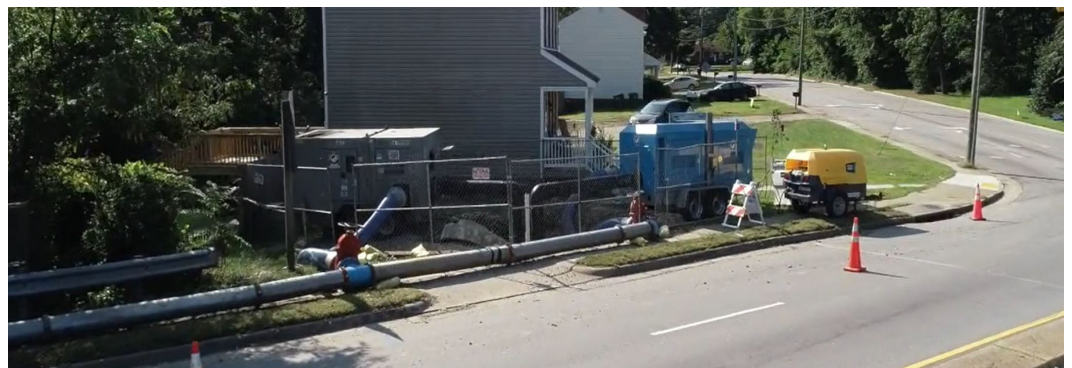
Municipal, Environmental, and Emergency Response

BACKGROUND

Central Virginia - Originally built in the 1950's, a section of ductile iron and concrete pipeline was overworked and failing. Because of the consistently high flow in the pipe, a TV-inspection could not be performed and eventually the 30-inch pipe began to collapse. As the line deteriorated, it slipped off its manhole, breaking the structure and resulting in a sinkhole. Located 5-feet from a creek, the sinkhole and line became flooded by the creek's overflow each time rain occurred; and with each rainstorm, the downstream pump station, rated for 15 MGD, saw an increase in flow from 8 MGD to 25 MGD.

OUTCOME

After site inspections and discussions with the Municipality's project management team, Rain for Rent engineered a scope of work that utilized a system of three temporary bypass pumping stations. At pump station number one, the first bypass used three suction lines tied into 12-inch Sound Attenuated pumps (due to proximity to residential homes) that pulled flow up through the broken manhole (which first had to be cut to create safe access for the three lines). Together the lines pumped 8 MGD through a discharge line that spanned the nearby creek and snaked through a culvert under the adjacent major road, before joining a manifold with the two lines from the other bypass systems. Pump station number two was located at a manhole in a citizen's garden 10-feet from their home. Here, 8-inch sound attenuated pumps managed a 4 MGD flow.



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EQUIPMENT

- 3 – 12” DV300i SA Pumps
- 2 – 8” DV200c SA Pumps
- 1 – 6” DV150c SA Pump
- 2 – 6” DV150i SA Pumps
- 500-gal Trans Cube
- 24”x18” Manifold
- Instrumentation incl:
Pressure Transducers,
RiteFlo®, Alarm Agents
- Victaulic Galvanized Steel
Pipe
- HDPE – lengths of 12”-24”
- PVC Suction Hose – 6”
- Spiral Dock Hose – 8”-12”
- 500-gal Steel Tank
- 12” Valves
- 24” Gate Valves
- PipeStax®
- Fencing around equipment
- 2 Fusion Machines

OUTCOME CONT.

There were two main risks to mitigate at this staging area: the first was the safety of the family and pets living at the home and was resolved by a fence erected around the equipment; the second regarded the content of the sewage which included an assortment of trash and heavy solids from the Federal prison upstream and created many ragging events that were continually handled with thorough safety precautions. The 4 MGD flow from this station was pumped through 12-inch steel victaulic pipe that ran along the sidewalk of the adjacent road, then across a creek and down to the aforementioned manifold meeting point. At pump station number three, the challenge overcome was with regard to the manhole here being only 4-feet deep; at 4 MGD there was not much surcharge, and the manhole cone couldn't be pulled due to the need for extra footage. Six-inch pumps moved the flow through a 12-inch victaulic pipeline into the woods and out to a main road where the line ran parallel to pump station number two's discharge line, and into the manifold. From this manifold, where the lines from the three pump stations met, a 24-inch line routed the flow underground to allow for construction vehicle right-of-way on site, then back above ground and onto swamp mats (per EPA requirements) for a run of 1000-feet, before reaching the final discharge point.

HIGHLIGHTS

- Multiple suction locations required installation in challenging terrains that included swampy, Federally protected wetland, a homeowners yard, and close proximity to electric transmission towers with underground high voltage lines.
- In case of flooding from rainstorms, the pumps were staged on dunnage so that a crane could lift them 3-feet into the air, if necessary.
- Robust pumping systems ensured that the ever-changing flow rates would be sufficiently met.

CUSTOMER FEEDBACK

The customer shared, “We were very pleased with the installation, operation and management of the system during the project.”

