VOLGA STORMWATER IMPROVEMENTS

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Project Scope

The city of Volga is a small town that experiences flooding during the rainy summer months. The City has a limited storm sewer system and there were many locations in the community that suffer during heavy rains. Our team worked with the City's staff and found that there were three specific sites that needed to be focused on. This includes two low-lying areas that retain water and cause flooding issues for residents, identified as the north and south regions. The other concern is a surface runoff problem on Volga Street.

Figure 1.1 - Overview of sites

Pumping of Northern Region

One of the main concerns expressed for the design was helping to eliminate the problem of excess water build up in the low area north of Sacred Heart Church. This was leading to flooding and standing water in the basements of residents surrounding the ditch. To help solve this problem, our team designed a pumping system to help remove the excess water and discharge it into a nearby culvert. A manhole will be placed at a low point to collect water with a connected pipe network and store it until a mobile pump, such as a fire truck, is connected for removal. A tile drainage pipe was also proposed to rid the area of additional groundwater seepage.

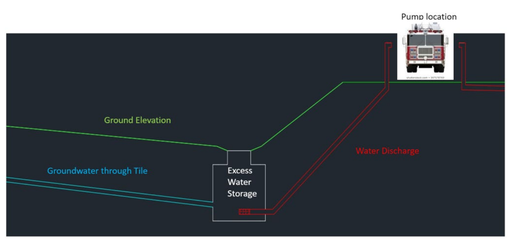

Figure 2.1 - Schematic for Pumping Method

Figure 2.2 - Firetruck Pump Setup

Figure 2.3 - Satellite View of Site Area

Volga Street Storm Sewer Implementation

The proposed storm sewer on Volga Street servers the dual-purpose of helping get water out of an area that ponds in the town, while also diverting runoff from around 3 acres of property away from the two existing floodgates that serve the town currently. The design consists of two stormwater intakes and around 415 feet of concrete pipe. The Sewer was designed at a higher flood event than normal, so the city has the option to expand their system and as an extra factor of safety during the large events that Volga is prone to. This design works with another City of Volga team who are proposing to build a pedestrian bridge by the system's outlet.

Figure 3.1 - Aerial of Site Location and proposed system

Figure 3.2 - What the Proposed Outlet will Look Like

Constructed Wetland in Southern Region

A constructed wetland is proposed as a solution to there possibly being a wetland on site. We proposed it in the southern region because the standing water does not cause any significant problems for residents. The wetland provides the residents more aesthetic appeal and bat houses are to be implemented to help with the mosquito problem. The wetland was oversized to account for sediment accumulation.

Figure 4.1 - Site Location of Constructed Wetland.

Figure 4.2 - Example of a constructed wetland.

Conclusions

It is recommended to break up construction into 3 phases to ease the financial strain on the city. We proposed the wetland first for regulation purposes, then the pumping of the northern swamp to be installed, and lastly, the storm sewer should be implemented at the time of the bridge construction. The total cost estimate of this project is $131,500.

References

Concrete Pipe Design Manual
Iowa DOT Section 4A-5
Iowa SUDAS Design Manuals