Storm Water Solutions  
1800 North 600 West Regional Detention Basin

Introduction

Storm Water Solutions was tasked by Logan City to design a storm water detention and treatment system that addressed the following tasks:

- Model storm events in drainage basin to determine storm water runoff volumes, especially the 90th Percentile Storm.
- Remove storm water from irrigation conveyance system through design of storm diversion structure to eliminate crop flooding and system maintenance costs.
- Determine methods to reduce phosphorous entering Cutler Reservoir through a low maintenance, sustainable process.
- Retrofit existing storm water system to meet current Logan City design standards and budgetary constraints.

Alternative Designs

Six alternatives were developed to address the tasks outlined by Logan City. These alternatives were ranked based on scores from Figure 2.

- Do Nothing - Continue to allow the stormwater to enter into canal. This would not meet any design criteria.
- Bio-Swells - The park strips in the drainage basins were analyzed to determine if the runoff could be managed closer to where the runoff is generated. Having enough storage volume was the main concern.
- Infiltration Basin - This alternative had the potential for phosphorous removal. However, the volume of water to store would be of concern.
- 600 WestParcel - By allowing water to leave the basin, the storage decreased. The size of the parcel is only .5 acres, increasing the required runoff. Detention basins have decreased phosphorous removal.
- 800 West Parcel Detention Basin - By allowing water to leave the basin, the storage decreased. The size of the parcel is only .5 acres, increasing the required runoff. Detention basins have decreased phosphorous removal.
- Piping to WP WWTP - Alternatively, the 90th percentile would create serious flooding or extremely large pipe size (approx. 6 ft in diameter).

Proposed Alternative

The final design alternative was selected based on scores from the Pugh Matrix found in Figure 2. The alternative that scored the highest overall was the detention basin located at the intersection of 1800 North 600 West.

Storm water for an approximately 80-acre section in the Northwest section of Logan City is captured and conveyed by ditches of the Northwest Fields canal until flowing to the corner of 1800 North 600 West. At this parcel a diversion structure would be installed allowing regular irrigation flows to pass through while storm water flows would be diverted into a detention pond built on site.

The detention pond will allow for contact time between the storm water and the Field Sedge growing in the detention pond. This contact time will allow for phosphorous uptake from the storm water. When large storm events occur the outlet of the detention pond would be sized and placed to allow for treated water to enter a new separate storm water system to be conveyed to the Cutler Reservoir now as treated storm water.

Conclusions

Through this design project Storm Water Solutions:
- Designed system for diversion of runoff from storm events into detention basin without affecting irrigation flows.
- Engineered detention basin for proper management of 90 acres of runoff using a .5 acre plot of land.
- Determined the efficacy of phosphorus removal from storm water via bioretention was not significantly high.
- Calculated final implementation cost of $336,000