Village of Mundelein Waste Water Treatment Plant Wetland Mitigation Site

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Project Purpose:

The Village of Mundelein Waste Water Treatment Plant expanded their existing facilities which impacted Waters of the United States. As a result, the Village was required to provide wetland mitigation to compensate for the resulting

impacts.



Existing Waste Water Treatment Plant



Project Purpose cont'd.:

- The Village utilized an existing compensatory stormwater storage area for the location of the wetland mitigation area.
- The compensatory stormwater storage area was designed to receive Des Plaines River backwater.



Existing Compensatory Stormwater Storage Area



Project Description:

• The goal of the project was to create 1.10 acres of wet prairie and mesic prairie within the compensatory storage

area.



Proposed Wetland Mitigation Area



Hydrologic and Hydraulic Design:

- The plan seeks to re-grade a portion of the WWTP site and install a low flow diversion structure to divert flows up to and including the 2-year storm to the newly established wetland area in the southern portion of the site.
- Diverting the 2-year discharge into the wetland provides the wetland hydrology essential for the proper wetland plantings to grow
- Current flow path runs through the central portion of the WWTP site through a series of 24" CMP culverts and a 36" RCP culvert, which eventually outlets into the Des Plaines River, just east of the site.



Hydrologic and Hydraulic Design cont'd.:

- The design 2-year discharge, which was based upon a critical duration analysis, was found to be 18 cfs.
- Once the 2-year design discharge was determined, the next step in design process was to design the diversion cast-inplace weir structure, which would function to divert low flows (storms having frequencies up to and including 2-years) through a 30" RCP storm sewer pipe to the newly established wetland area
- Flows in excess of the 2-year frequency storm will overtop the weir and flow in its current path through the WWTP site and into the Des Plaines River.



Hydrologic and Hydraulic Design cont'd.:

- The weir was designed to convey the critical duration 100-year discharge of 93 cfs and is set at an elevation corresponding to the 2-year hydraulic gradeline elevation of the 30" pipe at the weir location.
- A weir length of 14' and a flow depth of 1.6' were required to pass the 100-year discharge.
- The low flow outlet (30" RCP storm sewer) was designed to convey the 2-year design discharge of 18 cfs.
- The 30" RCP pipe extends southward out of the weir structure to the proposed wetland area and provides the low flow wetland hydrology necessary for the wetland plantings to grow.



Concrete Weir Structure (Plan View):



NOT TO SCALE



Concrete Weir Structure (Section A-A):



Profile View (Looking North)



Concrete Weir Structure (Section B-B):



Profile View (Looking West)



Construction of Wetland

 Construction of the wetland mitigation site started in October 2006.





The project site was then graded and planted with emergent, wet-prairie, and mesic prairie vegetation.



Erosion Control:

- Silt fence was used to control erosion and silt displacement until grass was established.
- The wetland area also assisted in the settling of silts and fine materials included in the low flow runoff.
- Rip-rap was utilized to reduce erosion at the outlet of the proposed 30" storm sewer.



Wetland Mitigation Design

- 0.49 acres of emergent and wet prairie vegetation, and 0.60 acres of mesic prairie vegetation were installed after the installation of the storm sewer and the weir structure.
- Native seed and plant plugs were used to vegetate the wetland mitigation area.



Plant Communities Zones



Wetland Mitigation Design cont'd.:

- The wetland was designed to have two (2) meandering streams/channels, which will outlet to the Des Plaines River.
- These meandering streams add aesthetic appeal and will allow the wetland to retain sufficient moisture conducive to the growth of the wetland plants.





Maintenance and Monitoring

- A Three Year Maintenance and Monitoring plan was implemented to ensure that the wetland mitigation site achieved the desired performance standards put forth by the US Army Corps of Engineers.
- Vegetation, soils, and hydrology were sampled monthly during the growing season.
- Maintenance activities included installation of additional plant plugs and hand-wick herbicide applications to non-native plant species.



2007 Additional Plant Plugs Installation



First Growing Season: 2007

- A native Mean C-value of 3.5 and a Native FQI of 17.7 was achieved during the first growing season.
- A wetland with a Native Mean C-value of 3.5 and/or a Native FQI greater than 20.00 may be considered a High Quality Aquatic Resource.



First Growing Season (2007)



First Growing Season: 2007 cont'd.:

Maintenance activities consisted of herbicide application to control undesirable species and installation of additional plant plugs.



First Growing Season (2007)



First Growing Season: 2007 cont'd.:

- A total of 0.40 acres of wet-prairie and 0.60 acres mesic prairie were successfully created.
- After the first growing season a total of 39 species were identified within the wetland.



2007 Aerial



Second Growing Season: 2008

- Native Mean C of 3.8 and a Native FQI of 22.8 was achieved during the second growing season.
- Maintenance activities consisted of herbicide application to control undesired species. The maintenance was conducted on a monthly basis throughout the growing season.



Second Growing Season (2008)



Second Growing Season: 2008 cont'd.:

- A total of **0.49** acres of wet-prairie and 0.60 acres mesic prairie were successfully created.
- After the first growing season a total of 45 species were identified within the wetland.



2008 Aerial



Third Growing Season (2009)

• Native Mean C of 3.9 and a Native FQI of 23.3 was achieved during the third growing season.





Third Growing Season (2009) cont'd.:

- A total of 0.50 acres of wet-prairie and 0.60 acres mesic prairie were successfully created.
- After the first growing season a total of 48 species were identified within the wetland.



2009 Aerial



Performance Standards Summary:

Year	Mean C-Value	FQI	Number of Species	Wet-Mesic Prairie Size (Acres)	Mesic Prairie Size (Acres)	Total Acreage
2006	0.0	0.0	0	0.0	0.0	0.00
2007	3.5	17.7	39	0.40	0.60	1.00
2008	3.8	22.8	45	0.49	0.60	1.09
2009	3.9	23.3	48	0.50	0.60	1.10

• An area is considered a High Quality Aquatic Resource with Mean C-value of 3.5 and/or a Native FQI greater than 20.00.



Fourth Growing Season (2010)

 The dominant plant species within the wetland are: Dark Green Bulrush (*Scirpus atrovirens*), Swamp Tickseed (*Bidens cernua*), and Water Plantain (*Alisma subcordatum*).





Fourth Growing Season (2010)



Fourth Growing Season (2010) cont'd.:

 The wetland mitigation acreage goal was achieved by the third growing season.





Fourth Growing Season (2010)



Accomplishments

- Stormwater flows were diverted through a low flow cast-in-place concrete weir structure, which functioned to provide the necessary wetland hydrology conducive to the growth of the wetland plants
- 1.10 acres of wet prairie and mesic prairie were successfully created.
- Utilized existing compensatory stormwater storage area for wetland creation, which now provides wildlife habitat and is aesthetically pleasing.
- A high quality aquatic resource was achieved.





Questions?

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