

Levee Ready Columbia

Virtual Slide Show - Notes

October 2, 2015

Slide #1: Sauvie Island Drainage Improvement Company (SIDIC)

- Sauvie Island is a 25,000 acre island 10 miles from Portland and is within both Multnomah County and Columbia County.
- The primary land use on the island is 'Exclusive Farm Use' and there are around 1,300 residents on the island.
- SIDIC district is 11,000 acre surrounded by Columbia River to the East, the Willamette River to the South, the Multnomah Channel to the West and Sturgeon Lake is in the north central part of the island.
- SIDIC maintains and operates an 18 mile system of levees.
- SIDIC's levees are similar to the other four Multnomah County districts in design and history.
- The SIDIC levee system is currently accredited and is certified until 2017 and is active in the USACE Rehabilitation and Inspection Program.

Slide #2: A1 Canal

- The levee system is operated and maintained by SIDIC and consists of 18 mile of levees, one main pumping plant, 4 internal pumping stations, drainage and closure structures and over 35 miles of drainage canals and ditches.
- The levees started as berms built by the local farmers and dairymen trying to get an upper hand on the spring freshets.
- The levees are constructed mostly of sandy material dredged from the rivers.
- The USACE began work on the current levee system in the 1930's with the main pumping plant beginning operation in 1941.

Slide #3: Main Pumping Plant (MPP)

- Most of the water pumped comes from seepage into the former lake bottoms from the river but also rainfall.
- This is removed using a 35 mile network of canals and ditches.
- All the water ends up at the Main Pumping Plant.

Slide #4: Inside Main Pumping Plant

- At the MPP we operate 4 large pumps with a capacity of about 125,000 gallons per minute.

Slide #5: Inside Main Pumping Plant

- Another view of the pumps in the Main Pumping Station.

Slide #6: Sturgeon Lake

- Sturgeon Lake (3200 ac.), is owned and managed as wildlife refuge by Oregon Department of Fish and Wildlife, borders and is connected to Multnomah Channel via the Gilbert River and connected to Columbia River by Dairy Creek.
- This lake is a critical habitat for endangered salmon, sturgeon and lamprey and is an integral part of the Pacific flyway for pacific coast migratory waterfowl.
- It is one of the premier natural and biologically significant aquatic and wildlife habitats in the state.
- There is interest in restoring the current Dairy Creek channel between Sturgeon Lake and the Columbia River to increase hydrologic connection and circulation in Sturgeon Lake, and provide direct fish access from the Columbia River.

- A feasibility study and draft Environmental Assessment was completed in 2013 by USACE to propose examine existing conditions at Dairy Creek and Sturgeon Lake and propose alternatives for restoring important habitat functions.

Slide #7: Typical Levee Section

- Here is a typical SIDIC levee section.
- As you can see the levee is large with a shallow slope. It is free of encroachments and vegetation. It is covered in grass and is easy to mow.

Slide #8: Common Encroachment

- Typical types of problems the district faces are:
 - Encroachments from homes and fences near the levee.
 - There are many fences within the levee right of way as the land around the levee system is primarily agricultural use.
 - Few encroachments are permitted at this time with USACE.

Slide #9: Erosion on levee along Multnomah County

- Another issue the district has is the erosion of canal banks and outside of levee and from livestock

Slide #10: Multnomah County Drainage District No. 1 (MCDD)

- The largest of the 4 drainage districts along the Columbia.
- Around 13 miles of levees.
- Around 8,500 acres, over 1,500 land owners, and 5 pump stations.
- The levee protects over \$5 Billion in real market property value.
- The majority of the land within the drainage district is currently proposed to be zoned as 'Prime Industrial' land for the City of Portland's Employment Zone Project.
- MCDD is located within Multnomah County and within the boundaries of the following jurisdictions: City of Portland, Gresham and Fairview.
- The main property owner in the district is the Port of Portland. There are also multiple businesses and neighborhood associations.
- The MCDD levee system is currently accredited and is certified until 2017. It is also active in the USACE Rehabilitation and Inspection Program.

Slide #11: Multnomah County Drainage District No. 1 Office & Pump Station No. 1

- The MCDD Office and Pump Station No. 1 are located near the cross-levee between MCDD and PEN 2.
- Pump stations maintain the existing floodplain (Base Flood Elevation) for properties within the District.
- There is a levee at this location that separates the lower slough from the middle slough.
- In 1948, after the breach in PEN 1, the levee breached in this location as the pump station was built into the levee at the time. A large portion of the district was flooded.
- Pump Station No. 1 is the largest pump stations across the Drainage Districts.

Slide #12: Image of MCDD flooded in 1948 & Troop Work on Levee Across from Airport in 1948

- This slide shows MCDD flooding and troops reconstructing sections of the levee near the airport after the 1948 flood.
- Farmers built the initial levees in the early 1900s.
- Land use changes and development behind the levee prompted USACE to further invest in the infrastructure. In the early 1940s, with funding from the 1930 Flood Control Act, USACE invested \$1.5 M in the levees – which is nearly \$25M in today's dollars.

- After the 1948 flood, USACE invested another \$500K, (nearly \$5M in today's dollars) through the 1950 Flood Control Act, to increase the levee height, reduce the slopes, and install toe drains to strengthen the system.
- Cross-levees were also constructed at this time to compartmentalize the flooding and limit risk between the districts.
- Since all this work was done, MCDD provides the second highest level of protection out of the 4 districts MCDD manages, protecting against a 700 to 750 year event.

Slide #13: Levee across from Portland Airport

- This slide is an image of the levees across from the Portland airport.
- You can see the Marine Drive multi-use path to the north and Marine Drive to the south.
- The levee is large and robust in this section with gradual slopes and low to few encroachments.

Slide #14: Portland International Airport

- The District and the Port have a close relationship and have several IGA's to preform various maintenance activities within the District.
- The Port's development restrictions also benefit the District as it helps restrict or curb development on the levees. Thus, the levees along the airport are ideal. They are easy to maintain with moderate slopes, few to no encroachments, and minimal vegetation.

Slide #15: 1996 High Water Event

- However, the levees in MCDD are still vulnerable.
- In 1996, the high water event caused erosion on the levees along Marine Drive.
- Here you can see erosion being controlled along the levee using plastic sheeting.

Slide #16: Marine Drive Bike Path is a Regional Recreational Asset

- MCDD also has multiple regional recreational assets, including the Marine Drive multi-use path that is a component of the region's 40 Mile Loop.
- The multi-use path is used by cyclists, walkers, joggers, and families alike.
- The path actually helps MCDD perform maintenance activities, such as mowing and access for inspections.

Slide #17: Structural Encroachments

- While much of MCDD is clear of encroachments thanks to the airport, there are still structural encroachments that will need to be evaluated.
- For example, these homes along Marine Drive, on the waterward side of the levee will need to be evaluated, similar to the encroachment process that is ongoing in PEN 2.

Slide #18: West side of 142nd Cross Levee

- Looking downward from the levee crest at the Columbia Slough.
- There are culverts that travel through the levee at this location to connect each side of the Columbia Slough. The culverts have closure gates in case of a levee breach.

Slide #19: Blue Lake Regional Park – Metro

- Blue Lake Park is managed by Metro and is another regional recreational asset.
- To the south of Blue Lake, is Fairview Lake.
- The District works with the City of Fairview and neighborhood association to manage the lake water elevation and maintain stormwater storage capacity.
- Between the Port and Blue Lake Park is the Columbia South Shore Well Field – this is a backup drinking water supply for Bull Run service area, which serves Portland, Gresham, Beaverton, Tigard, and more. It is the second largest water source in Oregon.
- There is also a lot of industrial development occurring in this area to the west of Blue Lake Park. The District works in partnership with permitting jurisdictions and developers, to ensure the levee is protected from encroachments.

Slide #20: Beaver Dams Across from Chinook Landing Along Levee Toe

- There are a number of beaver dams located on the waterward toe of the levee near Chinook Landing.
- Animal burrows compromise the integrity of the levee by providing a seepage path for water.
- There is also substantial erosion around the dens and tree roots as well as issues gaining access to the levee for flood fighting purposes.

Slide #21: Sandy Drainage Improvement Company (SDIC)

- Levees protect the district along the Columbia and Sandy Rivers.
- SDIC is located within Multnomah County and within the boundaries of the following jurisdictions: City of Fairview and Troutdale.
- Around 3.5 miles of levees.
- The levee protects over \$400 million in real estate property value.
- Around 1,500 acres, over 95 land owners, and 1 pump station.
- The SDIC levee system is currently accredited and certified until 2017 and is active in the USACE Rehabilitation and Inspection Program.
- Primarily large property owners
 - Fed Ex
 - Port of Portland - Troutdale Airport & Troutdale Reynolds Industrial Park
 - BPA substation

Slide #22: Sandy Drainage Improvement Company Pump Station

- SDIC has 1 pump station that manages all of the stormwater in the district.
- The pump station was constructed in the 1950s and will most likely need to be repaired or reconstructed in the near future.
- MCDD is in the process of working with the Port on an application to the US Economic Development Administration to fund part of a new pump station, as it will manage the stormwater from future development projects (increasing employment in the area).

Slide #23: SDIC Pump Station Pumps

- A view of the pumps within the pump station

Slide #24: Troutdale Reynolds Industrial Park

- The Troutdale Reynolds Industrial Park project is led by the Port of Portland.
- 9 new lots are being prepared for sale.
- FedEx Ground was the first tenant, constructing a facility of 441,000 square feet and has over 800 employees.
- Without accreditation, lots will be more challenging to sell – lots will be mapped into the special flood hazard area so property owners will need to purchase flood insurance and develop under floodplain management ordinances.
- The Port is creating a large mitigation wetland as a component to this project. MCDD has been working in partnership with the Port to ensure the wetland has some flood storage capacity.

Slide #25: Northeast side of SDIC levee

- Similar to MCDD, SDIC was initially constructed in the early 1900s and then reinforced and strengthened in the 1930s and 1950s.
- SDIC provides the highest level of protection – close to an 800 year event on the Columbia River.
- Much of the district levees, and associated elements like toe drains, were designed by USACE but constructed by private property owners. Thus, the District has good records of design plans but is lacking in as-built records.
- Many of the levees in SDIC are very large and have a very gradual slope.

- There are few encroachments on this levee as development has been limited to large property owners outside of the levee right of way.

Slide #26: Northeast side of SDIC levee – covered in bricks

- When the Reynolds Aluminum Plant was removed, bricks from the structure were placed along the levee near Company Lake.
- We will have to have discussions with USACE regarding the impact of the bricks.

Slide #27: Toe Drain Locations

- SDIC has about 50 toe drains that go off of a lateral that parallels the levee.
- Many of these toe drains have been buried under sediment and vegetation.
- The District is working to locate the toe drains using ground penetrating radar and will need to unearth the toe drains so that they can properly function in the future.

Slide #28: Eastern end of SDIC levee

- The few encroachments that the district has are less concerning than those found in the other districts.
- Here is another view of the levee and its wide sloping profile.