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2008
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Seminar

April 10, 2008

Central States Water Environment Association

Collection System Seminar

Facility Planning

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Facility Planning

➤ IEPA Definition

- ✓ **Facility Plan** – A plan which identifies the conditions and needs of the facility and its service area, as well as an evaluation of feasible alternatives to address those needs, a recommendation to construct the most cost effective alternative and the environmental and financial impacts as a result of constructing the project.



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➤ Needs of the Service Area

- ✓ Community's Capacity Needs
- ✓ Collection System Evaluation



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➤ History of Facility Planning

✓ Federal Water Pollution Control Amendments of 1972

- Prior to 1972 Act, Permitting was strictly state controlled
- Established NPDES Permitting
 - Provided Minimum National Water Quality Standards
 - Authority to Regulate Industrial and POTW Discharges

✓ Clean Water Act of 1977 (re-authorized in '07)

- Established Federal Grant Program
 - Facility Plan Amendment
 - Sanitary Sewer Evaluation Surveys (SSES)

✓ Water Quality Act of 1987

- Established Revolving Loan Program
 - Established on rules similar to grant program



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➤ IEPA Strategic Plan 04-07

✓ **Mission Statement**

- The mission of the Illinois EPA is to protect, restore and enhance the quality of air, land and water resources to benefit current and future generations.

➤ **Established Five Priorities**

- ✓ **Priority I – Enhanced Air Quality**
- ✓ **Priority II – Reduced contamination of land through prevention and clean-up**
- ✓ **Priority III – Clean and Safe Water**
- ✓ **Priority IV – Good Information about environmental conditions to educate the public and guide use of resources**
- ✓ **Priority V – Innovative programs that promote economic development and benefit the environment**



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- **Priority III – Clean and Safe Water (6 Initiatives)**
 - ✓ Initiative 9 – Implement programs to sustain beneficial use of streams, lakes and groundwater
 - ✓ Initiative 10 – Ensure that the public water supply systems provide water that is consistently safe to drink
 - ✓ Initiative 11 – Protect and Restore Lake Michigan
 - ✓ Initiative 12 - Reduce Mercury in the Illinois Environment
 - ✓ Initiative 13 – Move from Facility Planning to Watershed protection
 - ✓ Initiative 14 - Assist with statewide water quantity planning



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➤ Priority III – Clean and Safe Water

- ✓ **Initiative 13 – Move from Facility Planning to Watershed protection**
 - Develop 25 TMDLS for waters that fail to meet the uses for which they have been designated
 - Align IEPA program activities on a watershed basis
 - Pilot Watershed Management approach in the Kishwaukee and Green River Watersheds
 - Foster local Watershed Management Planning



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 - Align IEPA program activities on a watershed basis
 - Foster local Watershed Management Planning

➤ Watershed Planning vs. Facility Planning

- ✓ **Geographic vs. Political Boundaries**
- ✓ **Difficult to implement**
 - Designated Management Agencies (DMA)
 - Municipalities, Sanitary Districts, Utilities
 - Existing Conditions
 - Boundaries
 - Infrastructure
 - Agreements (Annexations, Recapture, Capital Investment)



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- **Watershed Planning vs. Facility Planning**
 - ✓ **Watershed Planning - Environmental Impacts**
 - Moving water from across watershed divides
 - Water Quality Standards Based on receiving stream
 - ✓ **Facility Planning - Community's Needs**
 - Wastewater is only one component of Community Planning
 - Comprehensive and/ or Land Use Plans define
 - Economic
 - Social
 - Land Use – Best and Highest Use
- **Both are necessary**



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➤ **General Notes:**

- ✓ **The Facility Planning Process is a cooperative effort between engineers and owners to produce realistic forecasts for population densities, evaluate existing facilities and assess the community's needs for the future.**
- ✓ **Planning is an important element in the development of the wastewater infrastructure, as this phase establishes the basis from which priorities are determined and all future decisions should be made.**
- ✓ **Community needs, the regulatory environment and infrastructure conditions are continuously changing, therefore the Facility Plan should be updated on a regular basis to address those changes.**



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Facility Planning

- **Practical Application of Planning**
 - ✓ **Documentation of Existing Conditions**
 - ✓ **Define Short and Long Term Needs**
 - ✓ **Identify the Alternatives to Address those Needs**
 - ✓ **Evaluate the Options based on Effectiveness**
 - Capital Cost
 - Operational Cost
 - Life Cycle Costs
 - Tangible Benefits
 - Intangible Benefits
 - ✓ **Select the Best Solution**
 - ✓ **Develop an Implementation Plan**
 - Identifying Funding
 - Outline Implementation Schedule



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Facility Planning

Executive Summary

- 1. Introduction and Background**
- 2. The Community's Needs**
- 3. Collection System Evaluation**
- 4. Lift Stations Evaluation**
- 5. Existing Wastewater Treatment Facility Evaluation**
- 6. Capacity, Regulatory and Rehabilitation Needs & Process Evaluation**
- 7. WWTP Upgrade & Expansion**
- 8. Anti-Degradation / Environmental Benefits**
- 9. Recommendations & Implementation**



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➤ Community Needs

✓ Consolidated Mapping

- Sanitary Sewer Atlas
- Comprehensive / Land Use Plan
- Facility Planning (Service Area) Boundary

✓ Billing and Flow Data

- Water Billing / Usage Records
- Wastewater DMR Data
- 10 Largest Users



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➤ The Community's Needs

✓ Define Existing Usage and Flows

- Establish Population of the Community
- Water Usage Records
 - Residential – Single Family and Multi-family
 - Non-Residential – Institutional, Commercial & Industrial
- Establish Water Sold per P.E.
 - Residential Usage / Population = gallons/ person
 - Non-Residential Usage / gallons/ person = Population Equivalent
- Other Uses?
 - Water Treatment Facilities Backwash
 - Internal Recycle Flows
- Estimate I/I per P.E.
 - Differential between Wastewater Received and Water Sold



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➤ The Community's Needs

✓ Predict Future Usage and Flows

- Most Communities have a Comprehensive Plan
 - Land Use/ Zoning
 - Development density
 - Growth Forecasts
- Estimate Usage
 - Density by Land Use * Acreage = P.E.
 - Estimated P.E. of a Parcel by Parcel Basis
- Develop Consensus with Planning Department
- If possible, estimate development schedule
 - 2010 Population Equivalent
 - 2020 Population Equivalent
 - Ultimate Build-out



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➤ Collection System – Evaluation

✓ Delineate and Evaluate Major Drainage Basins

- Calculate Trunk Sewer Capacities
- Estimate Current and Future Utilization
 - Peak Hourly Flow
 - Peak Wet Weather Flow
- Review Additional Data
 - Review Inspection Records
 - Illegal Connections
 - Leaky Service Laterals
 - Foundation / Sump Pump Reports
 - Identify Areas of Concern
 - Sanitary Sewer Overflows
 - Basement Back-ups



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➤ Collection System – Evaluation

✓ Typical Scenarios

- Adequate Capacity under Dry Weather Conditions
- I/I Overloads Collection System during Wet Weather
- Extension of Collection System not Practical without I/I Removal

✓ Causes of Infiltration and Inflow

- Construction Techniques
- Age and Condition of System

✓ Sources of Infiltration and Inflow

- Surface Water/ High Ground Water
- Interconnect (direct/indirect) Storm Sewers
- Private Sector Connections
 - Footing Drains
 - Sump Pumps
 - Leaky Laterals



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➤ Collection System – Recommendations

- ✓ **Basin Specific Investigation / Studies**
 - Sanitary Sewer Modeling
 - Flow Monitoring and Metering Programs
 - Inspection and Cleaning Programs
- ✓ **Reconstruction/ Rehabilitation**
 - Sewer Rehabilitation Programs
 - Spot Repair Programs
 - Sewer Lining Programs
 - Sewer Replacement Programs
 - Lateral Rehabilitation Programs
- ✓ **Service Extensions and Expansions**



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➤ **Collection System – Evaluation**

- ✓ **Basin Specific Investigation / Studies – CMOM**
 - Sanitary Sewer Modeling
 - Flow Monitoring and Metering Programs
 - Inspection and Cleaning Programs
- ✓ **Reconstruction/ Rehabilitation Programs – CMOM**
 - Sewer Rehabilitation Programs
 - Spot Repair Programs
 - Sewer Lining Programs
 - Sewer Replacement Programs
 - Lateral Rehabilitation Programs
- ✓ **Service Extensions and Expansions – Capital Improvement Programs**



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➤ **Collection System – Funding Recommendations**

- ✓ **Capacity Management, Operation and Maintenance programs are Annual Expenses**
 - Funded through User Fees
 - Based on GASB34 Values
 - Depreciation Calculations
 - $\text{GASB34 Value} / \text{Service Life} = \text{Annual Depreciation}$
 - $\text{Annual Depreciation} / \# \text{ Units Sold} = \text{Cost per unit}$
 - Collection System Budget divided support several Initiatives
- ✓ **Capital Improvements (Expansion)**
 - Funded through Annexation Fees & Connection Fees
 - Annexation Fees
 - Regional Infrastructure – Interceptors & Lift Stations
 - Rehabilitation/ Reconstruction of Existing for I/I Removal
 - Connection Fees
 - Cost of Constructing additional Treatment Capacity



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➤ Collection System – Funding Recommendations

✓ Capital Improvements

- Localized Improvements – Developer Funded
- Regional Infrastructure– Cost Sharing Necessary
 - Interceptor Sewers
 - Regional Lift Stations
- Regionalization Policy Matrix Criteria
 - On-Site vs Off-Site Improvements
 - Minimum Capacity Requirements
 - Percentage of Capacity Utilized by Developer
 - Cost Share Based on Percentage
 - Cost Share Based on Oversizing



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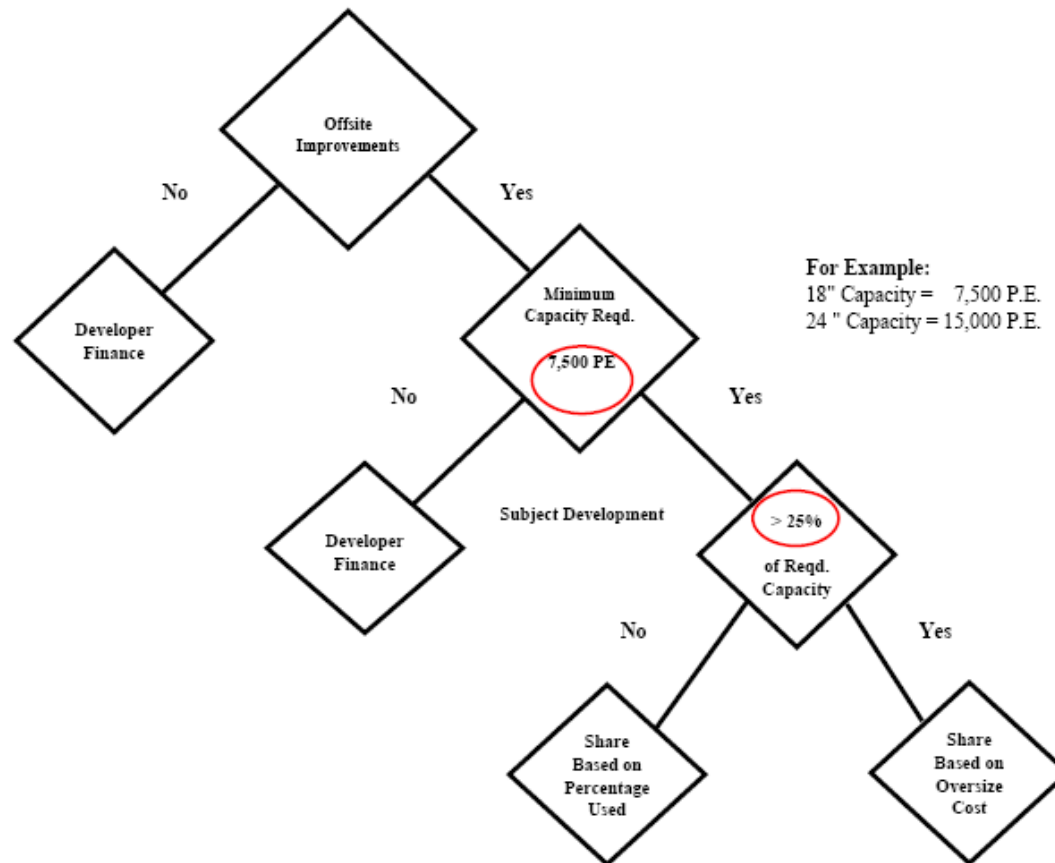
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➤ Collection System – Funding Recommendations

✓ Capital Improvements

▪ Regionalization Policy Matrix Criteria





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Summary

- **Facility Plan is a Comprehensive Document**
 - ✓ **Capacity Needs Identification**
 - ✓ **Collection System Needs Analysis**
- **Facility Plan should be used as a Master Plan**
 - ✓ **Identify and Explain the Community's Needs**
 - ✓ **Identify Alternatives or Programs to Address the Needs**
 - ✓ **Provide Recommendations**
 - ✓ **Establish Funding Mechanisms for Implementation**



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Questions or Discussion?