Update on the Watershed Management Ordinance (WMO)

Calumet Stormwater Collaborative
December 2, 2016

Presented by:
Dan Feltes, P.E., CFM
MWRD - WMO Presentation Agenda

• Brief Background
• Volume Control Compliance
• Permit Review Time
• Importance of Floodplain and “Runoff” Review
• WMO Results and amount of Volume Control
• WMO Draft Amendment
• Questions
Summary of MWRD Facilities:
7 Water Reclamation Plants (including one of the world’s largest)
~ 554 Miles of Interceptors
~ 109 Miles of Deep Tunnel
~ 10.6 Billion Gallons of CSO Storage
Thornton Composite Reservoir

- 7.9 BG CSO Reservoir
- Largest in the World
- 83 Acres
- 2,480 Ft X 1,580 Ft
- 300 Feet Deep
WMO Objective

Establish uniform, minimum, and comprehensive countywide stormwater management regulations

Enabling Legislation

Watershed Management Ordinance

“Stormwater management in Cook County shall be under the general supervision of the Metropolitan Water Reclamation District of Greater Chicago.”

“The District may prescribe by ordinance reasonable rules and regulations for floodplain and stormwater management . . . in Cook County.”

Public Act 093-1049
Sewer Permit Ordinance

- Sanitary Sewers
- Stormwater Detention
  - TP-40 Rainfall Data
  - Modified Rational Method
- Inflow and Infiltration (I/I)

Watershed Management Ordinance

- Sanitary Sewers
- Stormwater Detention
  - Bulletin-70 Rainfall Data
  - Flat Release Rate
  - Hydrograph Method
- Volume Control
- Erosion & Sediment
- Flood Protection Areas
  - Floodplain
  - Floodway
  - Isolated Wetlands
  - Riparian Areas
- Inflow and Infiltration (I/I)
Permit Applicability

§201, Table 1

- Development > 0.5 Disturbed Area
- Flood Protection Areas: Floodplain, Wetlands, Riparian etc.
- Qualified Sewer Construction
- District Impacts: TARP / Interceptors, Waterway Outfalls, Lake Michigan, District Property

Color Code:
- Cook County, Chicago
- District Corporate Limits, Chicago
- Cook County including Chicago
Table 2.
Summary of Site Stormwater Management Requirements

<table>
<thead>
<tr>
<th>Development Type (See Appendix A for definitions)</th>
<th>Runoff Requirements</th>
<th>Volume Control Requirements</th>
<th>Detention Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Family Home</td>
<td>Exempt</td>
<td>Exempt</td>
<td>Exempt</td>
</tr>
<tr>
<td>Residential Subdivision</td>
<td>Parcels ≥ 1 acre</td>
<td>Parcels ≥ 1 acre</td>
<td>Parcels ≥ 5 acres</td>
</tr>
<tr>
<td>Multi-Family Residential</td>
<td>Parcels ≥ 0.5 acre</td>
<td>Parcels ≥ 0.5 acre</td>
<td>Parcels ≥ 3 acres †</td>
</tr>
<tr>
<td>Non-Residential</td>
<td>Parcels ≥ 0.5 acre</td>
<td>Parcels ≥ 0.5 acre</td>
<td>Parcels ≥ 3 acres †</td>
</tr>
<tr>
<td>Right-of-Way</td>
<td>New Impervious Area ≥ 1 acre</td>
<td>New Impervious Area ≥ 1 acre †</td>
<td>New Impervious Area ≥ 1 acre †</td>
</tr>
<tr>
<td>Open Space</td>
<td>Parcels ≥ 0.5 acre</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

1 Site stormwater management requirements are not required for maintenance activities as defined in Appendix A.

2 Requirements are applicable when a Watershed Management Permit is required under §201 of this Ordinance.

† Where practicable.

‡ Starting the effective date of this Ordinance, any new development on the parcel that totals either individually or in the aggregate to more than one-half (0.5) of an acre.
Watershed Management Ordinance

Effective
May 1, 2014
As amended
July 10, 2014


August 2015

- Ordinance
- Technical Guidance Manual
- Permit Forms
- Flow Charts
- Checklists
Examples of GI (from EPA)

• Bioswales
  
  Source: Geosyntech, Aaron Volkening

• Green Roofs
  
  Source: City of Chicago

Permeable Pavements

Source: MWRD, JRW

Water Harvesting

Source: Aditya Rainwater Harvesters
Root Systems:
Turf Grass vs Deep Rooted Vegetation
WMO Volume Control Summary

• One inch of volume over total proposed impervious area

• Can be provided in several ways:
  – Infiltration Trenches
  – Infiltration Basins
  – Porous Pavement (storage in the voids below the pavement)
  – Bio-Retention Systems
  – Dry Wells
  – Cisterns
  – Open Channel Practices Fitted With Check Dams
  – Storage Below the Outlet of a Site Detention Facility

• Credit toward required detention volume (CN reduction)
WMO Volume Control Summary

- When providing storage in void space of aggregate, stone must be angular cut and cleaned/washed free of fines. Different aggregate sizes are acceptable.

- Underdrains are required, and must be offset at least 2” above bottom of volume control storage.

- Bottom of storage must be above groundwater level
  - 2 feet in separate sewer areas
  - 3.5 ft in combined sewer areas
  - Highest seasonal groundwater level established through soil borings

- One monitoring well per 40,000 ft² of area
Cross Section - Typical Volume Control System
VEGETATED FILTER STRIP/OTHER BMPS (SEE NOTE 9)

18" SOIL MEDIA MIX, 50% SAND 30% COMPOST 20% TOPSOIL (OR DISTRICT MIX)

WOVEN GEOTEXTILE FABRIC, NOT TO COVER ENTIRE BOTTOM OF EXCAVATION (OR CHOKING STONE PER ENGINEER APPROVAL)

DEEP ROOTED NATIVE PLANTS, INSTALLED AS SPECIFIED ON PLANS. USE VEGETATION TOLERANT OF WET AND DRY CYCLES.

20% MAX. SLOPE

12" DEPTH MAXIMUM DRAINS IN 24-48 HOURS

V_{B}

18" 10" MIN.

V_{A}

VEGETATED FILTER STRIP/OTHER BMPS (SEE NOTE 9)

OBSERVATION WELL, 6" PVC PIPE WITH OVERFLOW GRATE. NON PERFORATED ABOVE SOIL MEDIA MIX 6" - 12" ABOVE GROUND.

20% MAX. SLOPE

SHREDDED HARDWOOD MULCH LAYER (3") (SEE NOTE 8)

PERFORATED 6" PVC PIPE WITH NYLON SOCK.

V_{C} (ABOVE INVERT OF UNDERDRAIN)

V_{D} (BELOW INVERT OF UNDERDRAIN)

CA-7 COARSE AGGREGATE STORAGE BED WITH 4" UNDERDRAIN PERFORATED PIPE (SEE NOTE 6)

SEASONALLY HIGH GROUNDWATER LEVEL (_____.____ NAVD 88)

2" TO 12" STONE BEDDING (SEE NOTE 7)

<table>
<thead>
<tr>
<th>VOLUME TYPE</th>
<th>POROSITY</th>
<th>MEDIA VOLUME</th>
<th>STORAGE VOLUME</th>
<th>VOLUME PROVIDED</th>
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</thead>
<tbody>
<tr>
<td>SURFACE STORAGE</td>
<td>1.00</td>
<td>V_{A}</td>
<td>1.00 \times V_{A}</td>
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<tr>
<td>SOIL MEDIA MIX</td>
<td>0.25</td>
<td>V_{B}</td>
<td>0.5 \times 0.25 \times V_{B}</td>
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<tr>
<td>COARSE AGG. (ABOVE INVERT)</td>
<td>0.36</td>
<td>V_{C}</td>
<td>0.5 \times 0.36 \times V_{C}</td>
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<tr>
<td>COARSE AGG. (BELOW INVERT)</td>
<td>0.36</td>
<td>V_{D}</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td></td>
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</tr>
</tbody>
</table>
**VEGETATED FILTER STRIP/OTHER BMPS (SEE NOTE 9)**

- Deep rooted native plants, installed as specified on plans. Use vegetation tolerant of wet and dry cycles.

**12" DEPTH MAXIMUM DRAINS IN 24-48 HOURS**

**18" SOIL MEDIA MIX, 50% SAND 30% COMPOST 20% TOPSOIL (OR DISTRICT MIX)**

- Woven geotextile fabric, not to cover entire bottom of excavation (or choking stone per engineer approval).

**OBSERVATION WELL, 6" PVC PIPE WITH OVERFLOW GRATE. NON PERFORATED ABOVE SOIL MEDIA MIX 6" - 12" ABOVE GROUND.**

**SHREDDED HARDWOOD MULCH LAYER (3") (SEE NOTE 8)**

**PERFORATED 6" PVC PIPE WITH NYLONSock.**

**VEGETATED FILTER STRIP/OTHER BMPS (SEE NOTE 9)**

**2' - 3.5' OFFSET**

**CA-7 COARSE AGGREGATE STORAGE BED WITH 4" UNDERDRAIN PERFORATED PIPE (SEE NOTE 6)**

**SEASONALLY HIGH GROUNDWATER LEVEL (___:___ NAVD 88)**

**2" TO 12" STONE BEDDING (SEE NOTE 7)**

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</table>
Permit Review Time

• **Per Ordinance § 1401:2**
  – 15 working days outside FPA
  – 30 working days inside FPA
  – 10 working days for resubmittal

• **3 year approved permit life**
  – 1 year to start construction
  – Extensions to construction start may be granted upon request
  – 3 years total to finish

• **Stagnant permits now canceled quarterly**
  – Applications cannot remain open indefinitely
  – 90 days no resubmittal = 30 day deadline to respond with schedule
  – MWRD is reasonable, but be certain to respond in a letter
When to Apply
Early coordination needed with new regulations

<table>
<thead>
<tr>
<th>Design Project</th>
<th>Apply for MWRD Permit</th>
<th>Obtain Permit</th>
<th>Mobilize</th>
<th>Sewer Work</th>
<th>Substantial Completion</th>
<th>Occupancy</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>• MWRD Erosion Inspection</td>
<td>• MWRD Inspect</td>
<td>• MWRD Inspect</td>
<td>$$</td>
</tr>
</tbody>
</table>

When to Apply Early coordination needed with new regulations
Floodplain

• **Flood Protection Elevation**
  – $\text{FPE} = \text{BFE} + 2$ feet
Runoff Requirements

A. DEVELOPMENT INFORMATION
1) Total parcel area: ____________ acres
2) Total development area on the parcel: ____________ acres

B. SITE RUNOFF REQUIREMENTS
1) On-site development area tributary to overland conveyance system: ____________ acres
2) Upstream off-site tributary drainage area: ____________ acres
3) Total tributary drainage area to conveyance system (B.1 + B.2): ____________ acres
   A. Ratio of upstream area to on-site development area: ____________
   B. Composite CN for total tributary area: ____________
   C. Time of concentration for total tributary area: ____________ minutes
4) Design 100-year peak flowrate for total tributary area: ____________ cfs
5) Overland conveyance capacity (actual flowrate provided): ____________ cfs
6) Describe overland conveyance system type/location: Depressed curb
   (including pond overflow weir)
   Weir length: ____________ ft
   Weir crest HGL elevation: ____________ ft (NAVD88)
   Weir elev: ____________ ft (NAVD88)
   Lowest structure entry elev: ____________ ft (NAVD88)

Other (describe): ____________
Revised Schedule D

- **Site Runoff**
  - Replaces Upstream and Bypass
  - Includes weir information (emergency overflow for entire site)
  - Moved to the top of the form

- **Volume Control**
  - Requires explanation for site constraints
  - Describe type of volume control

- **Detention**
  - Open-ended detention facility type
  - Start with unrestricted area and types
  - Calculate release rate reduction to find MWRD require release rate
  - Volume calculation unchanged
  - Move weir information under Site Runoff
  - Add drawdown time (hours)
A. DEVELOPMENT INFORMATION
1) Total parcel area: ____________ acres
2) Total development area on the parcel: ____________ acres

B. SITE RUNOFF REQUIREMENTS
1) On-site development area tributary to overland conveyance system: ____________ acres
2) Upstream off-site tributary drainage area: ____________ acres
3) Total tributary drainage area to conveyance system (B.1 + B.2): ____________ acres
   A. Ratio of upstream tributary area to on-site development area: ____________
   B. Composite CN for total tributary area: ____________
   C. Time of concentration for total tributary area: ____________ minutes
4) Design 100-year peak flowrate for total tributary area: ____________ cfs
5) Overland conveyance capacity (actual flowrate provided): ____________ cfs
6) Describe overland conveyance system type/location: ____________
   (including pond overflow weir)
   Weir length: ____________ ft
   Weir crest HGL elevation: ____________ ft (NAVD88)
   Weir elev.: ____________ ft (NAVD88)
   Lowest structure entry elev.: ____________ ft (NAVD88)
   Other (describe): ____________

C. SITE VOLUME CONTROL (VC) REQUIREMENTS
1) Existing impervious area of development: ____________ acres
2) Proposed impervious area of development: ____________ acres
3) Gross VC storage required (0.083 x Line C.2): ____________ ac-ft
4) Site constraints preclude the use of retention-based practices in full? □ Yes □ No
   If yes, provide a brief rationale: ____________
   In lieu of complete volume control, compliance provided via:
   A. VC reduced impervious area allowance (25%/(C.3)(C.1 - C.2)/(C.1 x 5%)): ____________ ac-ft
   B. Area treated by a flow through practice: ____________ acres
5) Net VC required (C.3 - C.4.A): ____________ ac-ft
6) VC storage provided (must be greater than line C.5): ____________ ac-ft
7) VC description and location: ____________

D. SITE DETENTION REQUIREMENTS
1) Type of stormwater detention facility: ____________
2) Total Unrestricted Area: ____________ acres
   A. Native Plantings: ____________ acres
   B. On-site trade-off (C_{trade-off} x A_{trade-off})/(C_{trade-off}) = ____________ acres
   C. Net Development Area (Submit calculations): ____________ acres
3) Release Rate
   A. Allowable release rate (0.30 x D.2.C): ____________ cfs
   B. Release rate deduction (Submit calculations)
     1. Unrestricted release rate deduction (100-year, 24-hour storm): ____________ cfs
     2. Depressional storage deduction: ____________ cfs
4) Detention Volume
   (Submit calculations for items D.3.A through D.3.H)
   A. Methodology: □ Nomograph □ Hydrologic model
   B. Composite CN for the development: ____________
   C. Adjusted CN for the development, based on volume control: ____________
   D. Time of concentration for the development: ____________ minutes
   E. Required detention volume at MWRD required release rate: ____________ acre-feet
   F. Actual volume provided at MWRD required release rate: ____________ acre-feet
   G. Detention restrictor/outlet conveyance structure (provide details and calculations)
     1. Release rate at MWRD required volume (must be ≤ MWRD required release rate): ____________ cfs at HWL ____________ ft (NAVD88)
     2. Type: ____________
     3. Discharge coefficient: ____________
     4. Diameter: ____________ in
     5. Orifice invert elevation ____________ ft (NAVD 88)
     6. Drawdown time: ____________ hours

Name: ____________
Title: ____________
Signature: ____________
Date: ____________
Engineering Firm: ____________

6/16  WMO SCHEDULE D – WATERSHED MANAGEMENT FACILITIES PAGE 1 OF 2

6/16  WMO SCHEDULE D – WATERSHED MANAGEMENT FACILITIES PAGE 2 OF 2
7.9 MG of Required Volume Control = 90 Miles of Rain Barrels Chicago to Milwaukee

Projected in 2016: 9.7 MG of Required VC

Total VC so far ('14 thru '16): 17.5 MG
200 Miles of Rain Barrels Chicago to Springfield

102 MG of Required Detention = 1,200 Miles of Rain Barrels Chicago to Disney World

30.5 MG of Required Compensatory Storage = 350 Miles of Rain Barrels Chicago to Cleveland

2015 WMO Volume Results
The TCR will be able to store 7.9 billion gallons of CSO or the equivalent to 144 million rain barrels… enough to circle the earth 3.64 times when laid end to end!
Draft Changes (for 2017):

Top Ten Changes to the WMO

1) Delete reference to the EDPL
2) New fee for Earthwork/Foundation Limited Permit ($2,100)
3) Input from other agencies (i.e. Forest Preserve District)
4) Allow IDNR determination or approval to stand for specific FPA project decisions
5) Revise unincorporated responsibility from “township” to “Cook County”
6) New maintenance section for unincorporated stormwater projects with no Permittee
7) Consolidate and clarify flood protection fill elevation requirements
8) Provide direction for off-site wetlands not delineated by the Corps
9) Exempt first 0.10 acre of riparian impact to align with wetland procedures
10) Volume control trading and build-out for anticipated development
Suggested Ordinance Changes

- Nearly 100 edits to formatting, footer dates, and typographical errors
- Ten corrections to references
- Clarifications to align with administrative procedures
  - § 200.4.A; Move agriculture exemption to cover all cases (delete from 201.1)
  - § 200.4.H; Flood control projects still require permit for 201.2 activities
  - § 200.4.G/I; Separate “Development undertaken by the District” exemption
  - § 201 (Table 1); “Disturbance” becomes “Development disturbing”
  - § 201.1.B and Table 1; Clarify both direct and indirect wetland impacts
  - § 201.1.C and Table 1; “existing building” becomes “single-family home”
  - § 201.1.D.3; Remove utility work… “not part of other development”
  - And other minor changes…
Draft Concept
“Foundation / Earthwork Only Permit”

Example #1
• Total Site: 4.5 acres
• Two buildings, parking lot, detention pond
• Permit to start grading and foundation work (yellow area)
• Temporary detention required for impervious area (blue area)
• Volume Control design provided in later permit (green dashed area)
Draft Concept
“Foundation / Earthwork Only Permit”

Example #2 (w/ floodplain)
- Total Site: 4.5 acres
- Two buildings, parking lot, detention pond
- Permit to start grading and foundation work (yellow area)
- No foundation work allowed in floodplain
- Temporary detention – cut only – allowed in floodplain (blue area)
Volume Control Trading

Conceptualize

- Allowing a municipality to create an exchange within their community to trade constructed volume control credits towards new development that would otherwise need onsite volume control.
Volume Control Trading

Draft Guidelines:

• Provide for 1-inch over all proposed impervious area
• VC Trading facility must be permitted and inspected by MWRD
• VC Trading facility must exist or be permitted before development is approved
• VC Trading only allowed within boundaries of the sub-watershed
• Site seeking credits must provide flow through device for water quality
• To implement, will require an Ordinance Change
Volume Control Trading (Draft Change)

- Example of a Subwatershed:
Public Comment Period

Public Comment period through March 31, 2017
– Draft Amendment is posted on WMO website (wmo.mwrd.org)
– Comment to WMOComments@mwrdd.org or mail to:

    Metropolitan Water Reclamation District of Greater Chicago
    Local Sewer System Section
    111 East Erie Street
    Chicago, Illinois  60611

Technical Guidance Manual update to follow
Dedicated WMO Website

WMO.mwrd.org
## Public Comment Period

<table>
<thead>
<tr>
<th>Date</th>
<th>Meeting</th>
<th>Time</th>
<th>Location</th>
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<tbody>
<tr>
<td>Jan. 18, 2017</td>
<td>Poplar Creek and Upper Salt Creek WPC</td>
<td>10:30am</td>
<td>Prairie Center for the Arts</td>
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<tr>
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<td>201 Schaumburg Court 201 Schaumburg, IL</td>
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<tr>
<td>Jan. 31, 2017</td>
<td>Cal-Sag Channel WPC</td>
<td>6:00pm</td>
<td>Bedford Park Village Hall</td>
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<tr>
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<td>6701 South Archer Road Bedford Park, IL</td>
</tr>
<tr>
<td>Feb. 9, 2017</td>
<td>Little Calumet River WPC</td>
<td>6:00pm</td>
<td>South Suburban Mayors and Managers Office</td>
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<td>1904 W. 174th Street East Hazel Crest, IL</td>
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<td>Feb. 16, 2017</td>
<td>Lower Des Plaines River Tributaries WPC</td>
<td>10:00am</td>
<td>Northlake City Hall</td>
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<td>55 E. North Avenue Northlake, IL</td>
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<td>Mar. 7, 2017</td>
<td>North Branch of the Chicago River WPC</td>
<td>10:00am</td>
<td>Lincolnwood Village Hall</td>
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<tr>
<td></td>
<td></td>
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<td>6900 N. Lincoln Avenue Lincolnwood, IL</td>
</tr>
</tbody>
</table>
Thank you
Questions?

Dan Feltes, P.E., CFM
feltesd@mwrld.org
312.751.3247

Metropolitan Water Reclamation District of Greater Chicago
100 E. Erie Street
Chicago, Illinois