MUNICIPAL BMP “SHOW & TELL”

MAY 11, 2021
MICROSOFT TEAMS
AGENDA

- Welcome & Housekeeping
- Poll Questions
- Speakers
  - Perry Harts, City of Frisco
  - Echo Rexroad, City of Plano
  - Cody Cash, City of Irving
  - Howard Redfearn, City of Mansfield
  - Amesha Morris, City of McKinney
- Q&A Roundtable
- NCTCOG Resources
- Thank You & Conclusion
WELCOME & HOUSEKEEPING

▪ Please keep your line on mute until the end of all the presentations.

▪ We will have an open Q&A session at the end of the presentations. Please type your question in the chat box or type in your request to speak.

▪ The webinar slides and recording will be posted on NCTCOG’s website under green banner called “Webinars” at the link below. Follow-up emails to come.

▪ [https://www.nctcog.org/envir/natural-resources/water-resources](https://www.nctcog.org/envir/natural-resources/water-resources)

***Information provided in this webinar and presentation regarding any specific commercial product by trade name, manufacture or otherwise does not constitute or imply its endorsement, recommendation or approval by the Regional Stormwater Management Coordinating Council (RSMCC) or NCTCOG.***
Perry L. Harts, P.E has 34 years of experience in municipal government in the north central Texas area. He has been with the City of Frisco since 1999. In 2010 he helped create the stormwater division which includes environmental compliance and infrastructure. He is currently division manager. He is a Professional Engineer and Certified Professional in Stormwater Management (CPMSM).
Best Management Practices (BMPs)

Show and Tell
5/11/21
Frisco’s Show & Tell

4 BMPs
4 BMPs
Street Sweeping
3 Types of Sweeping

- **Contract Sweeping (Regenerative)**
  - 2 times per month thoroughfares
  - 1 per month collectors
  - Sand removal

- **In House Sweeping (1 Regenerative)**
  - City yards
  - Residential as needed
  - Sand removal

- **Broom**
  - Emergency Cleanups
  - Pool broom for crews to cleanup messes
• 30 minutes training needed to operate.
• Airconditioned cab
• Crew cleanup after themselves
• Paid by stormwater.
Street Sweeping

• Waste management
  • Central location for dumping
  • The waste then hauled to landfill by stormwater crews
  • It is weighed and tickets archived
  • Sweeping after snow event- 254 tons
  • Reported on the annual report
    • 2020  523 tons
    • 2019  804 tons

5. Pollution Prevention and Good Housekeeping for Municipal Operations

| 27. Disposal of Collected Removal and disposal of debris from MS4 | 804 Tons | Yes. Pollutants are physically removed. |
Lessons Learned

- Central location for dumping debris
- Do an RFP for contract sweeping not straight bid
- Record weight and report on annual report
- Make it easy to clean up messes
- For more info on street sweeping contact plharts@friscotexas.gov
• Trash is largest pollutant by volume.
• It is in the MS4.
• It is a force multiplier.
**Approach**

- Documentation to include CY
  - 2020 - 49 CY
  - 2019 - 413 CY

<table>
<thead>
<tr>
<th>MCM(s)</th>
<th>BMP</th>
<th>Information Used</th>
<th>Quantity</th>
<th>Units</th>
<th>Does BMP Demonstrate a Direct Reduction in Pollutants?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Public Education, Outreach, and Involvement</td>
<td>7. Waste Cleanup</td>
<td>Waste collected at Environmental Collection Center.</td>
<td>4,070 Tons</td>
<td></td>
<td>Partial. This ensures potential pollutants are properly disposed and eliminates the potential of becoming an illicit discharge.</td>
</tr>
<tr>
<td>8. Adopt-a-Street</td>
<td>Pick up and disposal of debris along streets.</td>
<td>413 Cubic Yards</td>
<td>Yes. Pollutants are physically removed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lessons Learned

• Documentation
  • Spatial like Cityworks
  • Include measurements for reporting

• Contact Julianah Marie at JMarie@friscotexas.gov for more info.
Types of Construction

Civil Construction
• Infrastructure such as mass grading, roads, bridges, water and sewer systems.

Building Construction
• Structures especially single family.
Building Sites

Differences between Builders and Civil Contractors

- Some are mom-and-pop builders
- Most work performed by subs
- Higher turnover of management
- Management has fewer controls on trade people on the job site.
- Trash
- Concrete waste
- Track out
- Trash
Inspection for Single Family Construction

Builder’s Audit

- Narrative, Project Description – Potential pollutants, schedule of sequence of activities, total acreage.
- Amendments – Notice of change (NOC), Log of Amendments
- Certification Page
- Delegation Letters
- Notice of Intent (NOI)
- TCEQ Certificate
- BMP Specs and Details – including Track-out control, dust control
- Plans - Erosion and Sediment Control Plan, Drainage Plans, Grading Plans, Soil Testing Data
- Spill Prevention Control and Countermeasures (SPCC)
- Weekly Inspection Form
- Qualified Inspector Form
- Posted Site Notice – Primary Operator (Posted), Secondary Operator (for large constructions sites)
- Site Map - With Legend, Concrete Washout Station
- Site Map – Marked BMPs, Silt Fence, Curlex, Inlets Location
- Endangered Species
- Historical Preservation
- Construction General Permit
- Notice of Termination – Inform builder to: Submit to TCEQ within 30 days of final stabilization of all portions of site. Submit to City of Frisco at ms4@friscotexas.gov
Inspection for Single Family Construction

Concrete Washout
Inspection for Single Family Construction

Masonry Cleanup Discharge
Masonry Cleanup Discharge

Downstream kids are playing in it.
Trash Bin
Ordinance Change in 2016

• Additional requirements when right of way disturbed.
• Required the clean up of pollutants in street at end of workday
• Additional controls on stockpiles in ROW
• Prohibited inlet protection
Sand Containment
Inspection for Single Family Construction

• Lessons Learned
  • Different strategy than civil
  • Zero tolerance on concrete spills
  • Tame the wild west  (as much as possible)
  • Audit processes don’t do their inspections
  • Additional requirements in ROW.
  • For more info contact Chris Collis at Ccollis@friscotexas.gov
Prototype Trash Rack

• MS4 Phase 2 Tier 4.
• Sketch on the board
• Break away approach
  • Ensure does not back up flood waters
  • Possibly forgo a flood study
  • Simplifies the design.
• Fabricated in house
HALF ISOMETRIC VIEW

SIDE VIEW WITH HEADWALL

FIGURE X.XX TRASH GATE ISOMETRIC

TRASH GATE FRAME

MOUNTING PLATE

MOUNTING POST

WING WALL

MESH TRASH BAGS 24"x26" TYP

POST INSTALLED CONCRETE ANCHOR

ENGINEER TO VERIFY MIN. CONCRETE THICKNESS FOR STRUCTURE ANCHORAGE

PROPOSED OR EXISTING CONCRETE CHANNEL RFRAP

FLOW

HEAD WALL

WING WALL

MESH TRASH BAGS 24"x36" TYP

POST INSTALLED CONCRETE ANCHOR

ENGINEER TO VERIFY MIN. CONCRETE THICKNESS FOR STRUCTURE ANCHORAGE

PROPOSED OR EXISTING CONCRETE CHANNEL RFRAP

FLOW

HEAD WALL

WING WALL

MESH TRASH BAGS 24"x26" TYP

TRASH GATE FRAME FRONT VIEW

TRASH GATE FRAME TOP VIEW

TRASH BAG BRACKET FRONT VIEW

TRASH BAG BRACKET BACK VIEW

TRASH BAG BRACKET SIDE VIEW

TRASH BAG BRACKET TOP VIEW

NOTES:
1. ALL MATERIAL UNLESS OTHERWISE NOTED IS NUMBER 3 GAUGE PAINTED STEEL WELDED CONNECTIONS.
2. ATTACH USING 3/4"x2" THREADED BOLTS WITH 3/4" WASHERS AND NUTS.
Prototype Trash Rack

- Installed in Nov 2020
- Debris collected in Nov and Dec 2020 was 342 pounds.

| 2. Illicit Discharge Detection and Elimination (IDDE) | 9. Floatables | Floatable debris collected | 342 Pounds | Yes. Pollutants are physically removed. |
Lessons learned

• We may have more trash in the creek than imagined.
• Use hinges with steel ball bearings
• Use break away pins
• For more info contact Brandon Smith at Bsmith1@friscotexas.gov or plharts@friscotexas.gov.
Echo is the Environmental Quality Manager for the City of Plano, Texas where she oversees the City’s Municipal Separate Storm Sewer System permit with the Texas Commission on Environmental Quality. In addition, Ms. Rexroad manages programs for stormwater, vector, pretreatment, noise, light and liquid waste management and currently serves as Vice Chair for the North Central Texas Council of Governments’ Regional Stormwater Management Coordinating Council. Ms. Rexroad is a Registered Environmental Manager and received her Bachelor of Science degree from Texas A&M University and her Master of Science degree from Utah State University.
BMP Show and Tell

Echo Rexroad, Environmental Quality Manager
erexroad@plano.gov
Overview

- Dry Weather Screening Program (IDDE)
- Auto Related Business Inspection Program
- Household Hazardous Waste Collection
- Floatables Removal
ILLICIT DISCHARGE DETECTION and ELIMINATION (IDDE)
IDDE

- 3,000 major outfalls
- Inspect 20% per year for 5 year permit term; 600/year
- 4 Environmental Quality Specialists; 150/year/Specialist
- Sample during dry weather, <0.1 inch in last 72 hours
- Palin test kit (iron, copper, nitrate, phosphate), NH$_3$, pH, DO, chlorine, and conductivity meters
AUTO RELATED BUSINESS INSPECTION

- 300 facilities inspected per year by 4 Environmental Quality Specialists
- Inspect for:
  - Chemical spills
  - Proper storage and disposal of chemicals, tires and equipment
  - Standing water issues (vector)
  - Sand/grit traps and floor drains
- Ordinances and enforcement
Household Hazardous Waste Curbside Collection

• Call or submit online requests to schedule free collection at least 24 hours prior to scheduled day
• Collect by zip code once per week
• No drop off service available
• 15-gallon limit for each collection event
• Commercial waste not accepted
HHW Contract

- $94K annual contract with “Clean Earth” (formerly Stericycle)
- Items that cannot be placed in the residents reuse center are packed in drums after collection for proper shipping
Reuse Center

- Properly labeled items collected through residential chemical collections
- Free for residents to take and use
- Usually open Wednesdays, 11 a.m. - 1 p.m. and Saturdays, 9 a.m. - 11 a.m.
- Chemical drop-off **not** accepted at the Reuse Center
Hoblitzelle Park Floatables Removal

- Type: Trash rack at riser
- Year installed: NA
- Cost to install: $1,000
- Cost to maintain: $480
- Removal frequency per year: 6
- Approximate amount removed per year: 20 cubic yards
Carpenter Park Floatables Removal

- Type: Floating trash boom
- Year installed: 2017
- Cost to install: $18,000
- Cost to maintain: $14,260/year*
- Removal frequency per year: 10
- Approximate amount removed per year: 2.25 55-gallon bags
Carpenter Floatable Boom

STA: 1+00 TRASH BARRIER
UPSTREAM FACE PROFILE VIEW
N.T.S.

*NOTE:
1. SEE STRUCTURAL PLANS PROVIDED BY HUSEMAN ENGINEERING FOR CONCRETE PIER DESIGN.
2. TUFFBOOM BARRIER FLOAT DRUMS ARE TO BE 3’ SPANS, IN FOREST GREEN COLOR, WITH NO LETTERING.
Russell Creek Park Floatables Removal

- Type: Trash rack at spillway
- Year installed: 2018
- Cost to install: ~$1,750
- Cost to maintain: Removal not required during 2019-2020
- Removal frequency per year: NA
- Approximate amount removed per year: NA
Shawnee Park Floatables Removal

- Type: Trash rack at riser
- Year installed: 2018
- Cost to install: $6,500
- Cost to maintain: $240
- Removal frequency per year: 3
- Approximate amount removed per year: 3 cubic yards
White Rock Trail Park Floatables Removal

- Type: Trash rack at spillway
- Year installed: 2018
- Cost to install: ~$1,750
- Cost to maintain: $80
- Removal frequency per year: 1
- Approximate amount removed per year: 1 cubic yard
Bob Woodruff Park Floatables Removal

- Type: Concrete spillway
- Year installed: 1987
- Cost to install: Unknown
- Cost to maintain: $1,920
- Removal frequency per year: 12
- Approximate amount removed per year: 12 cubic yards
Thank you
Echo Rexroad
Environmental Quality Manager
erexroad@plano.gov
Cody is the Drainage Programs Specialist, with the City of Irving for over a year. He has a Bachelor of Science in Geology from UT Arlington. As a Texas native who loves nature, and he’s genuinely distraught with the state of the urban natural world. Fortunately, he is in a role where he can make (somewhat limited) changes and his main objective is to try and clean up Irving's creeks and streams.
Outfall Based
Trash and Debris
Nets

A point source solution to a non-point source problem

City of Irving
Cody Cash
During /After Rain Events
Implementation Strategy

- Make a Plan
- Find a Suitable Location
- Cost Projection
- Installation and Maintenance
- Data and Tracking
Make a Plan

• Who - Myself and Drainage Crew
• What - A trash net **A debris collector**
• When - ASAP
• Where - Good question!
• Why - Floatables and debris, water quality, future TMDL requirements, ecological impacts, etc.
The impetus of this project began with the update of the Pollution Prevention and Good Housekeeping Plan for one of our larger municipal facilities. This facility houses our fleet maintenance area, traffic and transportation, and various other entities and storage. **All of the underground storm drainage leads to one large outfall** which was perfect for a pilot project.
Find a Suitable Location
### Tool and Item List

<table>
<thead>
<tr>
<th>Name</th>
<th># of Items</th>
<th>Use</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hammer Drill + Battery + Charger</td>
<td>1</td>
<td>Drilling holes for anchoring bolts</td>
<td>$538.00</td>
</tr>
<tr>
<td>Metal Drill Bit (3/4&quot;)</td>
<td>1</td>
<td>Drilling holes through the metal clamping</td>
<td>$19.97</td>
</tr>
<tr>
<td>Masonry Drill Bit (3/4&quot;)</td>
<td>1</td>
<td>Drilling holes through concrete</td>
<td>$39.75</td>
</tr>
<tr>
<td>Stainless Steel Sheet 2&quot; x 36&quot; x 1/8&quot;</td>
<td>2</td>
<td>These 2 pieces will make the lower clamping point to hold the net</td>
<td>$24.75</td>
</tr>
<tr>
<td>Eye Bolts (1/2&quot;)</td>
<td>3</td>
<td>Used as a connection point between the top of the net and the concrete above the outfall</td>
<td>$6.10</td>
</tr>
<tr>
<td>Threaded Rod (3/4&quot;) Comes in a 10-pack</td>
<td>5</td>
<td>Anchoring the lower clamp jaws</td>
<td>$27.50</td>
</tr>
<tr>
<td>Threaded Nuts (3/4&quot;) Comes in a 10-pack</td>
<td>5</td>
<td>Anchoring all bolts into the concrete in and around the pipe</td>
<td>$5.65</td>
</tr>
<tr>
<td>Epoxy</td>
<td>1</td>
<td>Collect trash from the outfall</td>
<td>$23.47</td>
</tr>
<tr>
<td>Netting (going to keep looking for a better/cheaper net)</td>
<td>1</td>
<td>$295.00</td>
<td></td>
</tr>
<tr>
<td>3/8&quot; utility rope</td>
<td>1</td>
<td>$31.50</td>
<td></td>
</tr>
<tr>
<td>Carabiners (pack of 10)</td>
<td>1</td>
<td>$20.99</td>
<td></td>
</tr>
<tr>
<td>3/16&quot; x 50’ steel cable (nylon rope replacement)</td>
<td>1</td>
<td>$20.98</td>
<td></td>
</tr>
<tr>
<td>3/16 cable clamps [CARABINER / NYLON ROPE IMPROVEMENTS]</td>
<td>2</td>
<td>$2.98</td>
<td></td>
</tr>
<tr>
<td>3-pack Masterlock [CARABINER IMPROVEMENTS]</td>
<td>1</td>
<td>$20.00</td>
<td></td>
</tr>
</tbody>
</table>

### Tool and Materials Cost

**$1,116.57**

### Total cost for additional trash capture devices

**$426.73**

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**$6,845 (not including shipping, fasteners or install)**
Installation and Maintenance
Installation and Maintenance
Installation and Maintenance
### Debris Net #1

<table>
<thead>
<tr>
<th>Date</th>
<th>Weight</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/3/2020</td>
<td>100lb est.</td>
<td>Oily residue present, some sediment</td>
</tr>
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<td>100lb est.</td>
<td>Oily residue</td>
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<td>100lb est.</td>
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<td>80lb</td>
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<tr>
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<td>20lb</td>
<td>Not much</td>
</tr>
<tr>
<td>3/30/2021</td>
<td>200lb est.</td>
<td>10 bags</td>
</tr>
</tbody>
</table>

Total Debris Captured 7-3-20 to 3-30-21

~600lb

### Debris Net #2

<table>
<thead>
<tr>
<th>Date</th>
<th>Weight</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/25/2021</td>
<td>50lb</td>
<td></td>
</tr>
<tr>
<td>2/23/2021</td>
<td>20lb (one bag)</td>
<td></td>
</tr>
<tr>
<td>3/3/2021</td>
<td>175lb (9 bags)</td>
<td>75% leaf debris, 25% trash / floatables</td>
</tr>
<tr>
<td>3/23/2021</td>
<td>~800lb (40 bags)</td>
<td>no photos :(</td>
</tr>
</tbody>
</table>

Total Debris Captured 1-18-21 to 3-23-21

~1,045lb

Total Debris Captured

~1645lb
Debris Net #2

- Make a Plan
- Find a Suitable Location
- Cost Projection
- Installation and Maintenance
- Data and Tracking

Flow diagram:
1. Make a Plan
2. Find a Suitable Location
3. Cost Projection
4. Installation and Maintenance
5. Data and Tracking
6. Return to Make a Plan
Make a Plan

Find a Suitable Location
<table>
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<tr>
<th>Name</th>
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<td>2</td>
<td>These 2 pieces will make the lower clamping point to hold the net</td>
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<td>Eye Bolts (1/2”)</td>
<td>3</td>
<td>Used as a connection point between the top of the net and the concrete above the outfall</td>
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</tr>
<tr>
<td>Epoxy</td>
<td>1</td>
<td>Anchoring all bolts into the concrete in and around the pipe</td>
<td>$23.47</td>
</tr>
<tr>
<td>3/16” x 50’ steel cable (nylon rope replacement)IMPROVEMENTS]</td>
<td>1</td>
<td>connecting net to eye bolts</td>
<td>$20.98</td>
</tr>
<tr>
<td>3/16 cable clamps [CARABINER / NYLON ROPE IMPROVEMENTS]</td>
<td>3</td>
<td>connecting net to eye bolts</td>
<td>$2.98</td>
</tr>
<tr>
<td>Carabiner</td>
<td>3</td>
<td>connecting cable to eye bolts</td>
<td>$4.00</td>
</tr>
<tr>
<td>Fence posts for gate support</td>
<td>2</td>
<td>attaching and securing the gate</td>
<td>$15.73</td>
</tr>
<tr>
<td>4’ length of chain / bailing wire</td>
<td>1</td>
<td>attaching gate to posts</td>
<td>$21.96</td>
</tr>
<tr>
<td>12’ fence gate</td>
<td>1</td>
<td>Opening and closing for accessing the net through the fence.</td>
<td>$134.99</td>
</tr>
</tbody>
</table>

**Materials Cost**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$379.99</td>
</tr>
</tbody>
</table>

**Hours Involved [ESTIMATE]**

<table>
<thead>
<tr>
<th>Project Phase</th>
<th>man hours</th>
<th>cost @ 20/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installing posts and swinging access gate</td>
<td>8</td>
<td>$160.00</td>
</tr>
<tr>
<td>Vegetation Clearing for outfall access</td>
<td>24</td>
<td>$480.00</td>
</tr>
<tr>
<td>Drilling Holes in Concrete and Metal and epoxy anchoring all bolts into place</td>
<td>3</td>
<td>$60.00</td>
</tr>
<tr>
<td>Net and steel cable fabrication/adjustments</td>
<td>1</td>
<td>$20.00</td>
</tr>
<tr>
<td>installation of steel sheet, net, and cables</td>
<td>3</td>
<td>$60.00</td>
</tr>
</tbody>
</table>

**Total**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>$780.00</td>
</tr>
</tbody>
</table>

**Total Project Cost (Materials and Labor) [ESTIMATE]**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$1,147.00</td>
</tr>
</tbody>
</table>

**ACTUAL TOTAL (MATERIALS AND LABOR)**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$1,219.99</td>
</tr>
</tbody>
</table>

Compared to the debris net #1 which required $1116.57 in tools and materials.
Debris Net #2 – Pre-Construction
Debris Net #1

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Total Debris Captured 7-3-20 to 3-30-21
~600lb

Debris Net #2

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Total Debris Captured 1-18-21 to 3-23-21
~1,045lb

Total Debris Captured
~1645lb
Why Debris Nets?

• Why is my conviction so high?
• The cost of these installations is incredibly inexpensive (looking at you stormwatersolutions.)
• Ease of customization, this system can be made to fit any outfall. Net #1 vs Net#2 differences. Incord.com plug
• This operation can be scaled almost indefinitely large as long as they are maintained.
• Installation (and maintenance) are very simple operations that don’t require much specialized equipment.
• Net and hardware can be easily moved if the initial location is not giving bountiful harvest
• They simply work!
• Future permit regulations

Why Not?

• Possible negative environmental impacts, fish and animals could become trapped.
• It is literally just one more thing to maintain.
• Flooding, siltation, general safety and hazard implications. What “could” happen.
Moving Forward / What Next?!

• Approval for 2 new sites in 2021
• Currently looking for suitable locations.
• Small modification needed on the debris net #2 due to low-flow floatable bypass.
• Working on a less labor-intensive method for net cleaning.
• More data collection and analysis.
Thanks!

Please contact me if you want plans, materials lists and prices, or contacts. The purpose of this presentation is to inform everyone of a relatively inexpensive solution to areas that are prone to trash and debris/trash accumulation.

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City of Irving | Capital Improvement Program
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ccash@cityofirving.org | CityofIrving.org
Howard is the Environmental Manager with the City of Mansfield and has been with the City since November 2005. He oversees the City’s stormwater management plan, floodplain development, mosquito control program, and drainage capital program. In addition, he oversees and coordinates the City’s household hazardous waste, and solid waste and recycling collection programs. He is active in the local stormwater community through the Regional Stormwater Management Coordinating Council at the North Central Texas Council of Governments. He graduated with a Bachelor of Science in Kinesiology from the University of North Texas in 2001 and received his Master of Science in Environmental Science from UNT in 2005.
Mansfield BMP Show & Tell

Howard Redfearn
Environmental Manager
City of Mansfield
About Mansfield

- Roughly located roughly the same distance from downtown Fort Worth and Dallas
- About 37 square miles covering 3 counties
- Population roughly 76,000
  - Right at 40,000 when I started in 2005
- Level III Phase 2 Community
  - No dry weather program
  - No industrial inspection program
  - No floatables controls
  - Do utilize MCM 7 for construction projects
  - Do conduct inspections on post construction measures
  - Rush Creek TMDL - 300 acres
  - Joe Pool Lake Watershed Protection Plan participant
### Mansfield HHW Collection Program

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Mobile</th>
<th>Take to FW per month</th>
<th>% At Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>52</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>112</td>
<td>77(1)</td>
<td>2.92</td>
<td>68.75%</td>
</tr>
<tr>
<td>2004</td>
<td>152</td>
<td>64(1)</td>
<td>7.33</td>
<td>42.11%</td>
</tr>
<tr>
<td>2005</td>
<td>189</td>
<td>40(1)</td>
<td>12.42</td>
<td>21.16%</td>
</tr>
<tr>
<td>2006</td>
<td>169</td>
<td>58(1)</td>
<td>9.25</td>
<td>34.32%</td>
</tr>
<tr>
<td>2007</td>
<td>281</td>
<td>125(1)</td>
<td>13.00</td>
<td>44.48%</td>
</tr>
<tr>
<td>2008</td>
<td>468</td>
<td>266(2)</td>
<td>16.83</td>
<td>56.84%</td>
</tr>
<tr>
<td>2009</td>
<td>350</td>
<td>139(2)</td>
<td>17.58</td>
<td>39.71%</td>
</tr>
<tr>
<td>2010</td>
<td>452</td>
<td>250(3)</td>
<td>16.83</td>
<td>55.31%</td>
</tr>
<tr>
<td>2011</td>
<td>500</td>
<td>251(2)</td>
<td>20.75</td>
<td>50.20%</td>
</tr>
<tr>
<td>2012</td>
<td>575</td>
<td>301(3)</td>
<td>22.83</td>
<td>52.35%</td>
</tr>
<tr>
<td>2013</td>
<td>661</td>
<td>375(3)</td>
<td>19.50</td>
<td>56.73%</td>
</tr>
<tr>
<td>2014</td>
<td>653</td>
<td>283(3)</td>
<td>30.83</td>
<td>43.34%</td>
</tr>
<tr>
<td>2015</td>
<td>426</td>
<td>112(1)</td>
<td>26.17</td>
<td>26.29%</td>
</tr>
</tbody>
</table>

- Table shows historical use of mobile vs. Fort Worth dropoff
- Used to justify need to construct a permanent dropoff facility

[https://www.mansfieldtexas.gov/201/Collection-Center](https://www.mansfieldtexas.gov/201/Collection-Center)
Mansfield Environmental Collection Center

- Permanent facility significantly increased participation
- Started just 2\textsuperscript{nd} Saturday 10-3
- 2018 Added Thursday & Friday before 2\textsuperscript{nd} Saturday 3-7
- One full time HHW Coordinator
- Helpers are overtime from other depts.
- Accepted Cedar Hill in 2020

<table>
<thead>
<tr>
<th>Year</th>
<th>Participants</th>
<th>Weight Disposed</th>
<th>Weight Recycled</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1,393</td>
<td>24,590</td>
<td>57,276</td>
</tr>
<tr>
<td>2017</td>
<td>1,924</td>
<td>51,045</td>
<td>61,528</td>
</tr>
<tr>
<td>2018</td>
<td>2,091</td>
<td>40,441</td>
<td>120,816</td>
</tr>
<tr>
<td>2019</td>
<td>2,369</td>
<td>77,520</td>
<td>149,560</td>
</tr>
<tr>
<td>2020*</td>
<td>2,729</td>
<td>34,840</td>
<td>172,020</td>
</tr>
</tbody>
</table>
How much does it cost???

$ Construction, ops, maintenance paid through drainage utility fees

$ Construction over $800,000

$ Tracked ops cost as separate since 2018

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$56,780.00</td>
</tr>
<tr>
<td>2019</td>
<td>$66,693.00</td>
</tr>
<tr>
<td>2020</td>
<td>$61,855.00</td>
</tr>
</tbody>
</table>
Mansfield Street Sweeping

- Street sweeping originally through staff in house and rent equipment
- In 2009 was moved to contractor

<table>
<thead>
<tr>
<th>Year</th>
<th>ResMiles</th>
<th>ComMiles</th>
<th>Results</th>
<th>Results/mi</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>36.6</td>
<td>151.2</td>
<td>150</td>
<td>0.80 tons</td>
</tr>
<tr>
<td>2010</td>
<td>99.35</td>
<td>148.63</td>
<td>UA</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>99.35</td>
<td>295.29</td>
<td>UA</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>311</td>
<td>656</td>
<td>UA</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>325.29</td>
<td>598.6</td>
<td>UA</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>644.37</td>
<td>1263.5</td>
<td>503</td>
<td>0.26 cy</td>
</tr>
<tr>
<td>2015</td>
<td>624</td>
<td>1317</td>
<td>276</td>
<td>0.14 cy</td>
</tr>
<tr>
<td>2016</td>
<td>627.9</td>
<td>1643</td>
<td>244</td>
<td>0.11 cy</td>
</tr>
<tr>
<td>2017</td>
<td>634</td>
<td>1456</td>
<td>320.5</td>
<td>0.15 cy</td>
</tr>
<tr>
<td>2018</td>
<td>648</td>
<td>1674</td>
<td>406.5</td>
<td>0.18 cy</td>
</tr>
<tr>
<td>2019</td>
<td>663</td>
<td>1721</td>
<td>1036.5</td>
<td>0.43 cy</td>
</tr>
<tr>
<td>2020</td>
<td>694.79</td>
<td>1602.79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
New Sweeping Program

- For most of the bids - only one bidder submitted
- Purchased street sweeper - $240,000
- Hired 2 person crew
  - Taking over mowing of drainage areas
  - Assist in HHW consolidation
  - Minor drainage maintenance and preventive maintenance inspection of drainage infrastructure
- Do not have results yet
- Better ability to respond on the fly
Challenges and other considerations:

- Where/how to dump
- Testing for disposal
  - Going with our contract waste disposal company
  - Annual testing
  - Waste has to be manifested
- Narrow streets and on street parking
  - Once program becomes establish expect to be able to schedule and advertise when/where sweeper will be in areas
- Better delivery of service before/after special events
Mansfield Drainage Maintenance

- Huge challenge of managing expectations
  - What a resident thinks is excessive erosion or unacceptable ponding level

- Trash can lids
  - Inspections of limited residential areas identified up to 40% of inlets have some sort of potential blockage in them

- Mosquitoes
  - I hate mosquitoes

- Historically completed between a mix of other department staff and contractors

- No preventative maintenance/inspection program
Work Orders

- Use MyGov to track work order status
- Inventory

<table>
<thead>
<tr>
<th>114 acres of land to mow/maintain</th>
<th>131 miles storm drain pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.67 miles of box culvert</td>
<td>3,609 inlets 893 headwalls</td>
</tr>
<tr>
<td>195 miles of open channel</td>
<td></td>
</tr>
</tbody>
</table>

- 51 WO Completions FY2019

<table>
<thead>
<tr>
<th>1 bridge/culvert clearing</th>
<th>2 outfalls</th>
</tr>
</thead>
<tbody>
<tr>
<td>150’ channel regrading</td>
<td>19 misc repairs</td>
</tr>
<tr>
<td>7 inlets</td>
<td>61 days average</td>
</tr>
</tbody>
</table>
Contracts

Costs and number of projects bid vary year to year

2021 - $75,350 paid to contractors
2020 - $52,500
2019 - $46,300
2018 - $91,390

- Solicit bids from variety of utility contractors
- Scope and scale makes it difficult to find vendors
- Try to bundle several projects together
- Larger scale projects become part of Drainage CIP
- Delays impact home owner opinion
Mansfield Post Construction Water Quality Requirements

- Adopted in 2015 to comply with TXR400000
- Included in Drainage Criteria Manual
  - Adopted by P&Z, not Council
- Based on iSWM Water Quality Volume calculations
  - Recommend treatment measures from iSWM but open to other submissions
  - Separators and other devices need to convert volume to flow rate
- Typical residential measures are ponds with multi-stage outfall
  - Several recent subdivisions have proposed inlet screens
- Commercial/Industrial develop mostly using separators
### Post Construction Water Quality Measures

<table>
<thead>
<tr>
<th>Year</th>
<th>Devices</th>
<th>Treated Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-2017</td>
<td>8</td>
<td>41.96</td>
</tr>
<tr>
<td>2017</td>
<td>21</td>
<td>252.53</td>
</tr>
<tr>
<td>2018</td>
<td>42</td>
<td>134.14</td>
</tr>
<tr>
<td>2019</td>
<td>11</td>
<td>67.95</td>
</tr>
<tr>
<td>2020</td>
<td>23</td>
<td>358.87</td>
</tr>
<tr>
<td>2021</td>
<td>52</td>
<td>256.66</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>157</strong></td>
<td><strong>1,112.11</strong></td>
</tr>
</tbody>
</table>

Have not used projected removal and life of device to estimate amount of material collected.
Inlet Screens
Water Quality Pond
Detention Pond

3” Water Quality Opening
Post Construction Notes

- There is a steep learning curve
  - In house staff, developer groups, development design staff
- Build in flexibility, especially in the beginning
- Apply equitably
  - Municipal facility construction also has complied
  - Industrial/commercial create more runoff per acre, so they will need to treat more
- Create tracking system early
  - Spreadsheet that is editable by Environmental staff, linked to GIS shapefile that is locked
- Maintenance enforcement??
Amesha is currently the Stormwater Administrator for the City of McKinney. She started with the City of McKinney in 2019 and is currently serving as the chairperson for the Regional Stormwater Management Coordinating Council. Amesha began as an intern with the City of Denton, and a Stormwater Inspector for the City of Lewisville before joining McKinney.
City of McKinney Floatable BMPs

Amesha Morris M.S.
Stormwater Administrator
Netting Trash Trap:
- Requires a weir configuration
- At least two men or truck crane required for maintenance
- Captures material as small as 5mm, good for nutrient reduction
- Various sizes available

Curb Inlet Filtration Inlets:
- Monthly maintenance
- Replace entire unit after the each rain season and autumn leave-fall
- Vac-truck or manual maintenance
- Biodegradable

Band-a Long Litter Trap:
- Municipalities can add educational outreach signage
- Trash is contained between the floatable berms, lack of netting allows for wildlife to move freely
- Rises and falls with water levels,
- Requires manual or truck crane maintenance
Downtown McKinney
Honestly We Got Lucky

Curb Inlet Basket
- Baskets are removeable, so we can have a smaller number in stock and move them to impacted areas as necessary.
- Requires minimal hardware
- Allows us to use existing infrastructure
- Contractor will handle routine monthly maintenance at a low cost
- Contractor will weigh trash removed and supply monthly reports
- Easily replicable in other impacted areas.
Inspector Committee

Combined Issues:

- Many issues cross departmental lines
- Address issues that are becoming more prevalent - homeless
- Clear understanding of what each department can and can’t enforce
- Central touch point and leadership where leadership is needed
Q&A ROUNDTABLE

- Have a question? Please unmute your line or place your question in the chat.
NCTCOG RESOURCES

Stormwater BMP Library

- Organized by general topics
- Easy to search for specific items for your individual situation
NCTCOG RESOURCES

Integrated Stormwater Management (iSWM) Resources
NCTCOG RESOURCES

Go to Water for North Texas Online Library

- Contains resources on water topics on the regional, state, and national level.
  - Social media toolkits
  - Case studies from NCTCOG region
  - Educational pamphlets, videos, etc. to share
NCTCOG RESOURCES

  - Available for purchase here:
    - https://www.nctcog.org/envir/public-works/construction-standards

- Sustainable Public Rights of Way Subcommittee (SPROW)
  - SPROW Best Management Practices Guidebook, under development!

For more information, please contact Olivia Kale at okale@nctcog.org
WEBINAR RECORDING AND PRESENTATION SLIDES

▪ Presentation Slides and Recording will be posted on NCTCOG’s website here:

https://www.nctcog.org/envir/natural-resources/water-resources

▪ Follow-up emails to come to all registrants.
  ▪ Email Elena Berg, eberg@nctcog.org if you did not register, but would like to be added to follow-up emails.
Contact

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THANK YOU!

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