



iSWM BASICS

2024



BAIRD, HAMPTON & BROWN

building partners

FEATURED SPEAKERS



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PE, CFM
Project Manager, Civil Engineer

THE BASICS

An Overview of iSWM

- What is iSWM?
- Submittal Process
- Hydrologic Methods
- Downstream Assessment
- Streambank Protection
- Flood Mitigation
- Stormwater Conveyance Systems
- Easements, Plats, and Maintenance Agreements
- Integrated Construction Criteria
- Water Quality Protection





iSWM OVERVIEW & RESOURCES

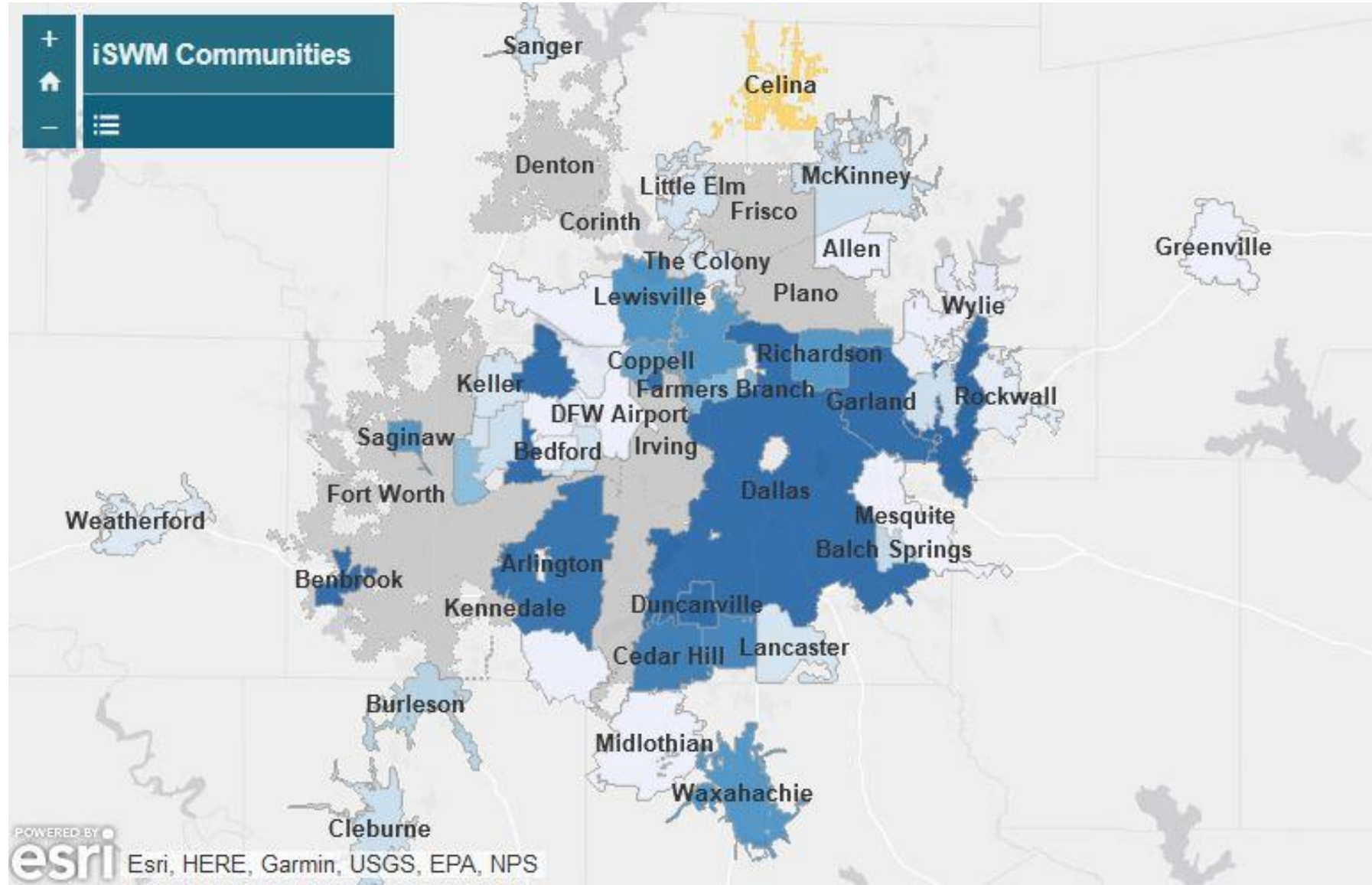
What is iSWM?

- integrated Stormwater Management (iSWM)
- Collaborative Effort of Over 60 Communities Involved in iSWM

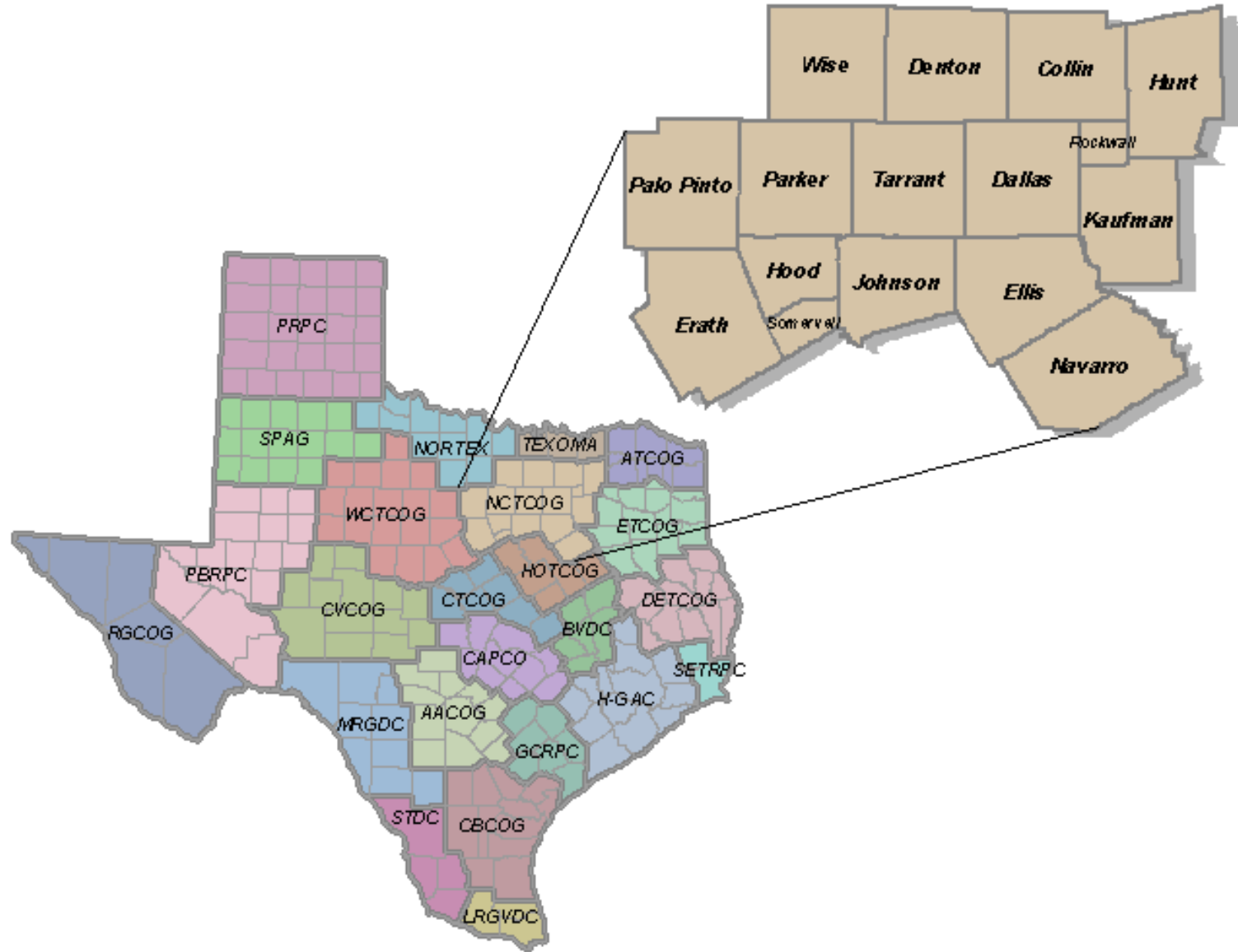
What does iSWM do?

- Aids in compliance with TCEQ MS4 permits
- Helps mitigate stormwater and environmental challenges and impacts for development
- Goes above and beyond to protect the community

iSWM COMMUNITIES



NCTCOG COUNTIES



iSWM PROGRAM TIERS

1

Bronze: applicants adopt standards with much partiality

2

Silver: applicants adopt much of the standards with partiality

3

Gold: applicants must be annual contributors to the Public Works program and adopt much of the iSWM standards with certain mandates

ISWM PROGRAM IMPLEMENTATION TIERED MEASUREMENT

SUBMITTING COMMUNITY: _____

Requirements for Implementation Levels			
Outcome Category	Gold	Silver	Bronze
Mandatory	11 full application	Items 1-10 (full or partial)	Items 1-10 (full or partial)
Recommended	7 full application	7 full or partial application	4 full or partial application
Optional	3 full or partial application		

Note: The following outcomes apply to land disturbing activities of 1 acre or more for water quality and streambank protection, and apply to all land disturbing activities for flood mitigation and conveyance.

#	Outcome	CHECK COMMUNITY'S LEVEL OF APPLICATION			Full Application	ISWM Criteria Manual Ref.	Equivalent Local Criteria/Ordinance Reference
		N/A	Partial	Full			
MANDATORY OUTCOMES							
1	Site Plan Review Applicability				Stormwater requirements discussed at a pre-development/pre-application meeting or equivalent (Concept iSWM)	Section 2.2, Step 3	
2	Land Use Conditions				Design stormwater infrastructure to fully-developed (built-out) land use conditions	Section 3.6.1	
3	Hydrologic Methods				Limit Rational Method applicability to drainage areas of 100 acres or less and utilize frequency factors (per TM HO Table 1.4); Limit Modified Rational Method applicability to drainage areas of 200 acres or less; For larger areas, require Unit Hydrograph methodology	Section 3.1 Table 3.2; TM HO Section 1.2*	
4	Open Channel Velocity Criteria/Energy Dissipation				Require maximum permissible channel velocity criteria be met and/or use erosion control measures for 1-, 25-, and 100-yr or similar storm events to protect receiving drainage element from erosion	Section 3.6.3, Table 3.10 and 3.11	
5	Detention Structure Discharge Criteria				When a detention structure is utilized, design facility for fully-developed 1-, 25-, and 100-yr or similar storm events matching pre-development peak flows and velocities; Provide emergency spillway with 6 inches of freeboard to convey fully-developed 100-yr storm event assuming outlet blockage	Section 3.6.3, Detention Structures	
6	Streambank Protection				Require downstream stabilization to prevent erosive velocities; maintain existing downstream velocity conditions with on-site controls; and/or control fully-developed 1-yr, 24-hr storm event release over 24 hours to prevent erosive velocities	Section 1.3, Table 1.3; Section 3.4	
7	Flood Mitigation				Require adequate downstream conveyance for peak discharges; maintain existing downstream peak discharge conditions with on-site controls; and/or provide detention to pre-development peak discharge conditions	Section 1.3, Table 1.3; Section 3.5.2	
8	Construction Controls				Limit erosion and the discharge of sediment and other pollutants from construction sites by adhering to the Integrated Construction Criteria or Construction General Permit	Section 4.0	
9	Operations and Maintenance				Define responsible party and requirements for operation, maintenance, frequency of inspection, and enforcement of temporary and permanent stormwater controls and drainage facilities	Section 2.2, Step 5	
10	Downstream Assessments				Confirm no negative impact or mitigate negative impacts of peak discharges and velocities for 1-, 25-, and 100-yr or similar storm events	Section 3.3, TM HO Section 2.4*	
11	Supports Regional Public Works initiatives				The community must be annual cost-share contributor to the Regional Public Works program that provides funding to sustain the iSWM program. [***Required for gold certification applicants and encouraged for bronze and silver***]		
TOTALS							

September 2014 - Amended May 2020

iSWM RESOURCES

1.

iSWM Criteria Manual

2.

iSWM Technical Manual



3.

iSWM Tools

4.

iSWM Program Guidance



iSWM Criteria Manual for Site Development and Construction

City

Date here



iSWM CRITERIA

Current Criteria

- 2015 – iSWM Criteria Manual with TriSWM Appendix

Legacy Documents

- 2006 – iSWM Design Manual for Site Development
- 2010 – iSWM Criteria Manual
- 2014 – iSWM Criteria Manual with TriSWM Appendix

iSWM Training Library

- Fundamentals of iSWM and Lessons Learned

WHY iSWM?

The Benefits

- Reduce Flooding
- Protect Property Values
- Improve Water Quality
- Meet State/Federal Regulations
- Aid in Cross Jurisdiction Coordination
- Reduce Operation Costs
- NCTCOG Technical Assistance



iSWM SUBMITTALS

The Submittal Process

1. Community-specific requirements / pre-development meetings
2. Drainage study to support Plats/Grading Permits/Construction Plans
3. Proposed work in FEMA floodplain (Flood Study, Floodplain Development Permit (FDP), CLOMR, LOMR, CDC)
4. Submittal path should be clearly laid out during a Pre-Development Conference (PDC)



HYDROLOGIC METHODS

Choosing the Right Method

Method	Size Limitations ¹	Comments
Rational	0 – 100 acres	Method can be used for estimating peak flows and the design of small site or subdivision storm sewer systems.
Modified Rational ²	0 – 200 acres	Method can be used for estimating runoff volumes for storage design.
Unit Hydrograph (SCS) ³	Any Size	Method can be used for estimating peak flows and hydrographs for all design applications.
Unit Hydrograph (Snyder's) ⁴	1 acre and larger	Method can be used for estimating peak flows and hydrographs for all design applications.
TXDOT Regression Equations	10 to 100 mi ²	Method can be used for estimating peak flows for rural design applications.
USGS Regression Equations	3 – 40 mi ²	Method can be used for estimating peak flows for urban design applications.
iSWM Water Quality Protection Volume Calculation	Limits set for each Structural Control	Method can be used for calculating the Water Quality Protection Volume (WQ _v).

¹ Size limitation refers to the drainage basin for the stormwater management facility (e.g., culvert, inlet).
² Where the Modified Rational Method is used for conceptualizing, the engineer is cautioned that the method could underestimate the storage volume.
³ This refers to SCS routing methodology included in many readily available programs (such as HEC-HMS or HEC-1) that utilize this methodology.
⁴ This refers to the Snyder's methodology included in many readily available programs (such as HEC-HMS or HEC-1) that utilize this methodology.

HYDROLOGIC METHODS

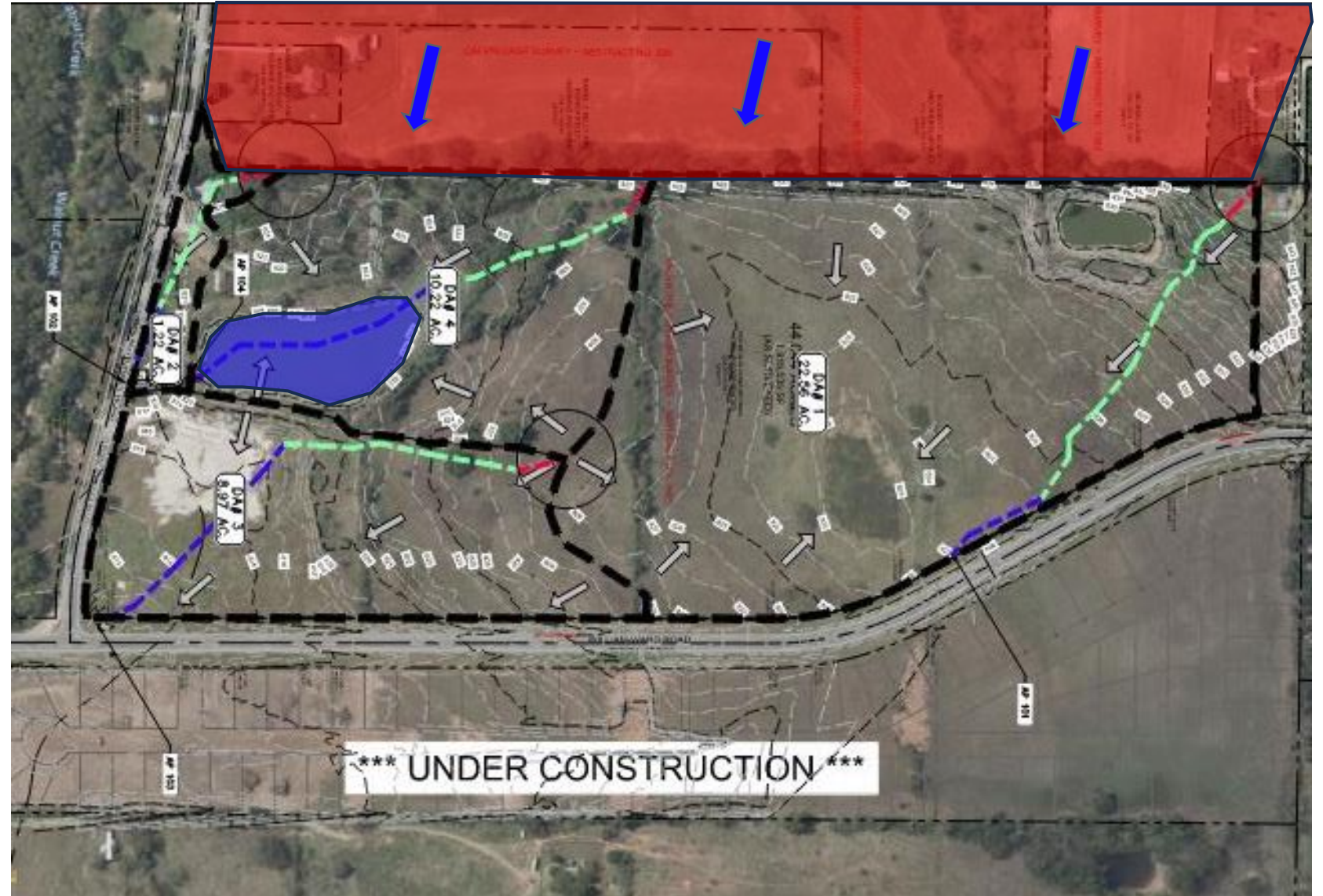
Choosing the Right Method

Method	Technical Manual Section	Rational Method	SCS Method	Modified Rational	Snyder's Unit Hydrograph	USGS / TXDOT Equations	iSWM Water Quality Volume Calculation
Water Quality Protection Volume (WQ _v)	Section 1.2 of Water Quality						✓
Streambank Protection Volume (SP _v)	Section 3.0 of Hydrology		✓		✓		
Flood Mitigation Discharge (Q _r)	Section 1.3 of Criteria Manual		✓		✓	✓	
Storage Facilities	Section 2.0 of Hydraulics		✓	✓	✓		✓
Outlet Structures	Section 2.2 of Hydraulics		✓		✓		
Gutter Flow and Inlets	Section 1.2 of Hydraulics	✓					
Storm Drain Pipes	Section 1.1 of Hydraulics	✓	✓		✓		
Culverts	Section 3.3 of Hydraulics	✓	✓		✓	✓	
Bridges	Section 3.4 of Hydraulics		✓		✓		
Small Ditches	Section 3.2 of Hydraulics	✓	✓		✓		
Open Channels	Section 3.2 of Hydraulics		✓		✓	✓	
Energy Dissipation	Section 4.0 of Hydraulics		✓		✓		

HYDROLOGIC METHODS

Lessons Learned

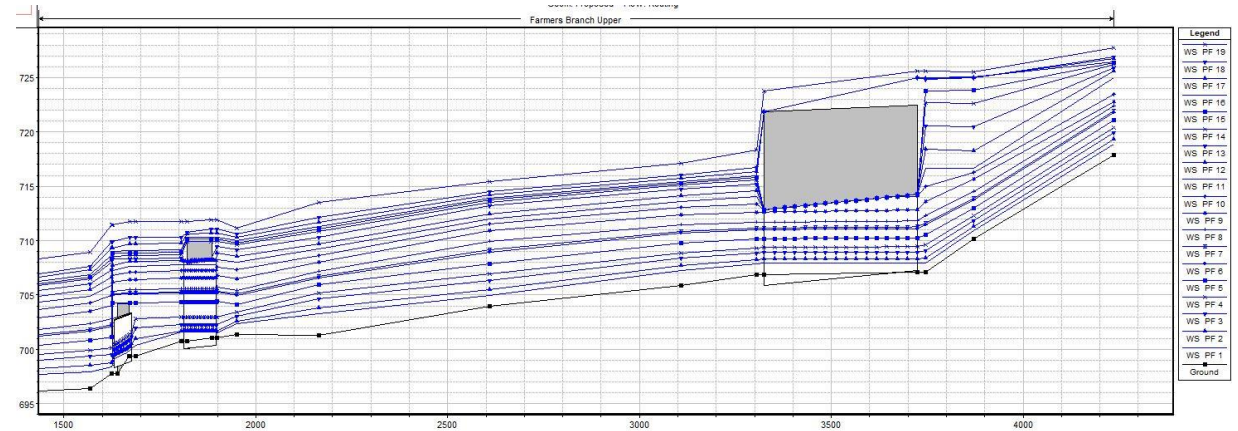
Accounting for Offsite Areas



HYDROLOGIC METHODS

Lessons Learned

Routing Methods



1. Muskingum-Cunge

- Best for Uniform Conditions
- Better for Overland Flows
- Estimated Parameters
- Does not simulate backwater

2. Modified Puls

- Hydraulic Modeling Required
- Best for Open Channel Flows
- Requires Many More Parameters
- More Accurate

3. Lag Routing

- Only used for pipe flow

HYDROLOGIC METHODS

Lessons Learned

Curve Numbers

Careful not to use Composite CN and Percent Impervious together

SCS Curve Number [Proposed]

Filter: --None-- Sorting: Watershed Explorer

Subbasin	Initial Abstraction (IN)	Curve Number	Impervious (%)
UT-A4	0.574	90	70
UT-A3	0.807	91	73
UT-A6	0.536	88	68
UT-A5	0.731	87	66
UT-A2b	0.836	90	70
UT-A2a	0.908	86	65

Compute: All Elements Calculator... **Apply** Close

Table 1.9 Runoff Curve Numbers¹

Cover Description	Average percent impervious area ²	Curve numbers for hydrologic soil groups			
		A	B	C	D
Cultivated Land:					
Without conservation treatment		72	81	88	91
With conservation treatment		62	71	78	81
Pasture or range land:					
Poor condition		68	79	86	89
Good condition		39	61	74	80
Meadow:					
Good condition		30	58	71	78
Wood or forest land:					
Thin stand, poor cover		45	66	77	83
Good cover		25	55	70	77
Open space (lawns, parks, golf courses, cemeteries, etc.)³					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved; curbs and storm drains (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Urban districts:					
Commercial and business	85%	89	92	94	95
Industrial	72%	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town house)	65%	77	85	90	92
1/4 acre	38%	61	75	83	87
1/3 acre	30%	57	72	81	86
1/2 acre	25%	54	70	80	85
1 acre	20%	51	68	79	84
2 acres	12%	46	65	77	82
Developing urban areas and newly graded areas (previous areas only, no vegetation)					
		77	86	91	94

¹ Average runoff condition, and $I_a = 0.2S$

² The average percent impervious area shown was used to develop the composite CNs. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. If the impervious area is not connected, the SCS method has an adjustment to reduce the effect.

³ CNs shown are equivalent to those of pasture. Composite CNs may be computed for other combinations of open space cover type.

HYDROLOGIC METHODS

Lessons Learned

Rational Method C-Values (Impervious Areas)

Runoff Coefficient C Values Are Not Percent
Impervious Cover

Unimproved Area

- C value 0.1 - 0.3 = 0% Impervious

Roadway, Roofs, and Water

- C value 0.95 = 100% Impervious

Table 1.6 Recommended Runoff Coefficient Values

Description of Area	Runoff Coefficients (C)
Lawns:	
Sandy soil, flat, 2%	0.10
Sandy soil, average, 2 - 7%	0.15
Sandy soil, steep, > 7%	0.20
Clay soil, flat, 2%	0.17
Clay soil, average, 2 - 7%	0.22
Clay soil, steep, > 7%	0.35
Agricultural	0.30
Forest	0.15
Streams, Lakes, Water Surfaces	1.00
Business:	
Downtown areas	0.95
Neighborhood areas	0.70
Residential:	
Single Family (1/8 acre lots)	0.65
Single Family (1/4 acre lots)	0.60
Single Family (1/2 acre lots)	0.55
Single Family (1+ acre lots)	0.45
Multi-Family Units, (Light)	0.65
Multi-Family, (Heavy)	0.85
Commercial/Industrial:	
Light areas	0.70
Heavy areas	0.80
Parks, cemeteries	0.25
Playgrounds	0.35
Railroad yard areas	0.40
Streets:	
Asphalt and Concrete	0.95
Brick	0.85
Drives, walks, and roofs	0.95
Gravel areas	0.50
Graded or no plant cover:	
Sandy soil, flat, 0 - 5%	0.30
Sandy soil, flat, 5 - 10%	0.40
Clayey soil, flat, 0 - 5%	0.50
Clayey soil, average, 5 - 10%	0.60

HYDROLOGIC METHODS

Lessons Learned

Time of Concentration / Lag Times

Proposed TC paths need to be updated to reflect proposed grade

Maximum Distances Per Flow Regime

- Sheet Flow: 100 ft Max (Pervious cover)
50 ft Max (Impervious Cover)
- Shallow Concentrated: 3,000-5,000 ft Max
- Pipe Flow: True Distance
- Open Channel: True Distance

Existing Lag Time Calculations																	
Condition	Basin	Flow	Slope	Sheet Flow			Shallow Flow (1)				Open Channel			Travel		Lag	
	I.D.	Length		Length	n	Time	Length	C*	Vel	Time	Length	Vel	Time	Time		Time	
		(ft)		(ft)		(hr)	(ft)	Value	fps	(hr)	(ft)	fps	(hr)	(hr)	(min)	(hr)	(min)
Existing	UT-A1	2883	2.96%	100	0.15	0.14	797	16.130	2.78	0.08	1986	6	0.09	0.31	18.7	0.19	11.2
Existing	UT-A2	1499	3.74%	100	0.15	0.13	753	16.130	3.12	0.07	646	6	0.03	0.23	13.8	0.14	8.3
Existing	UT-A3	1413	3.96%	100	0.15	0.13	0	16.130	3.22	0	1313	8	0.05	0.18	10.5	0.11	6.3
Existing	UT-A4	2744	1.89%	100	0.15	0.17	2251	16.130	2.23	0.29	393	6	0.02	0.48	28.7	0.29	17.2
Existing	UT-A5	2284	2.34%	100	0.15	0.15	0	16.130	2.47	0	2184	8	0.08	0.23	13.6	0.14	8.1

HYDROLOGIC METHODS

Lessons Learned

Time of Concentration / Lag Times

- Time of Concentration (TC)
 - Summation of total travel time
- Lag Time
 - 60% (0.6) of the TC
- TC min and max should only be for Rational Method

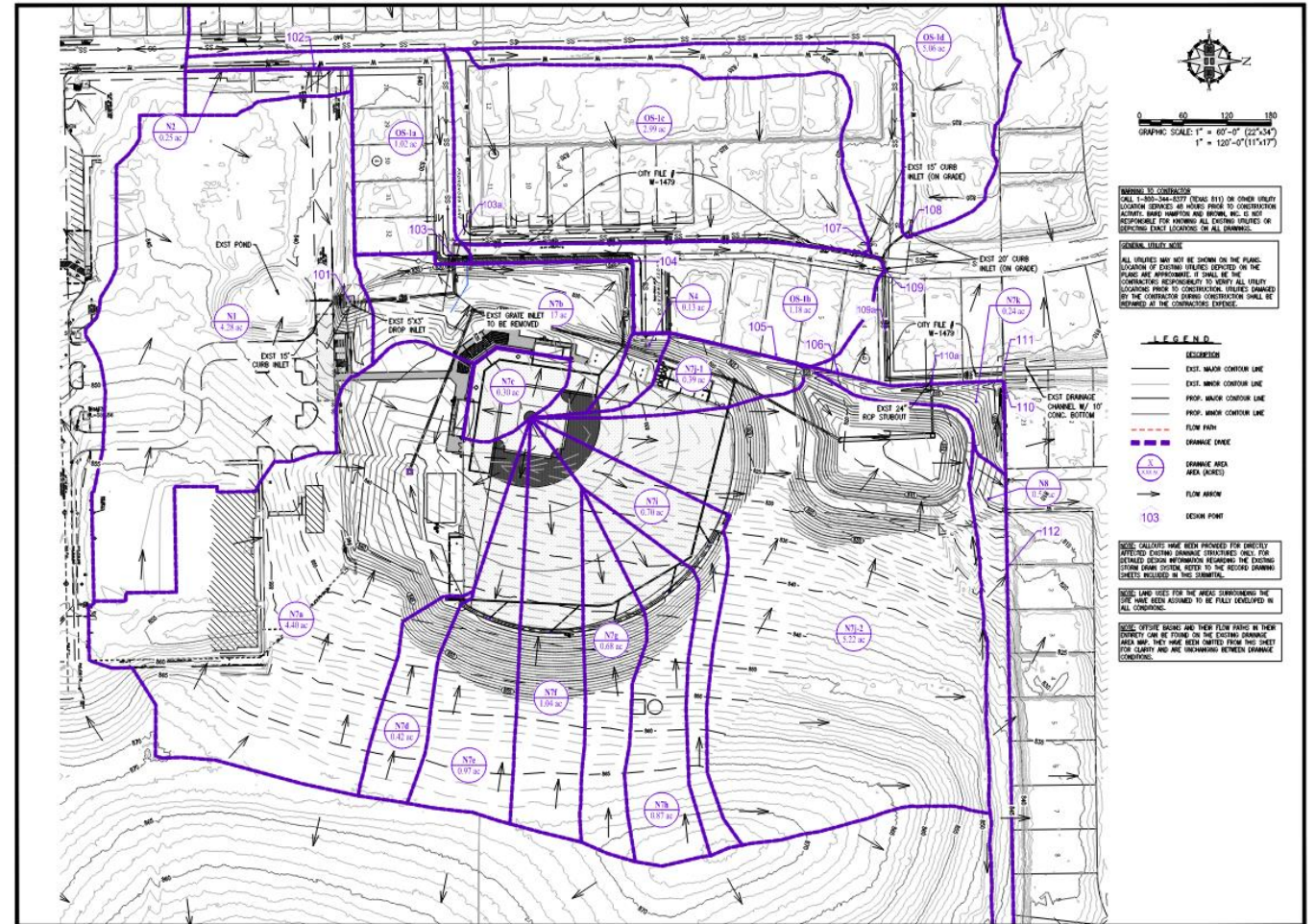
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	I.D.	Length		Length	n	Time	Length	C*	Vel	Time	Length	Vel	Time	Time	Time	Time	Time
		(ft)		(ft)		(hr)	(ft)	Value	fps	(hr)	(ft)	fps	(hr)	(hr)	(min)	(hr)	(min)
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HYDROLOGIC METHODS

Lessons Learned

Discrepancies between proposed plans and the HMS models

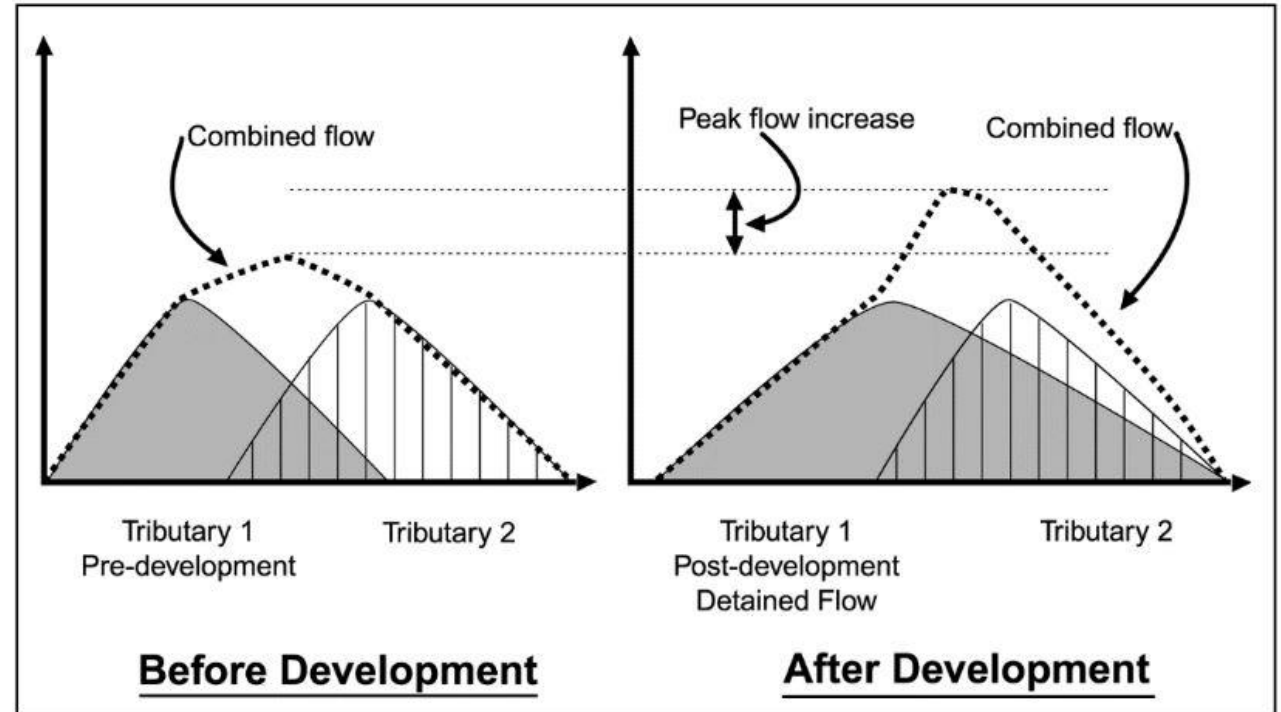
- On-Site drainage using the Rational Method will always yield different results from the Unit Hydrograph Method of downstream assessment
- Check for area and drainage pattern differences



DOWNSTREAM ASSESSMENT

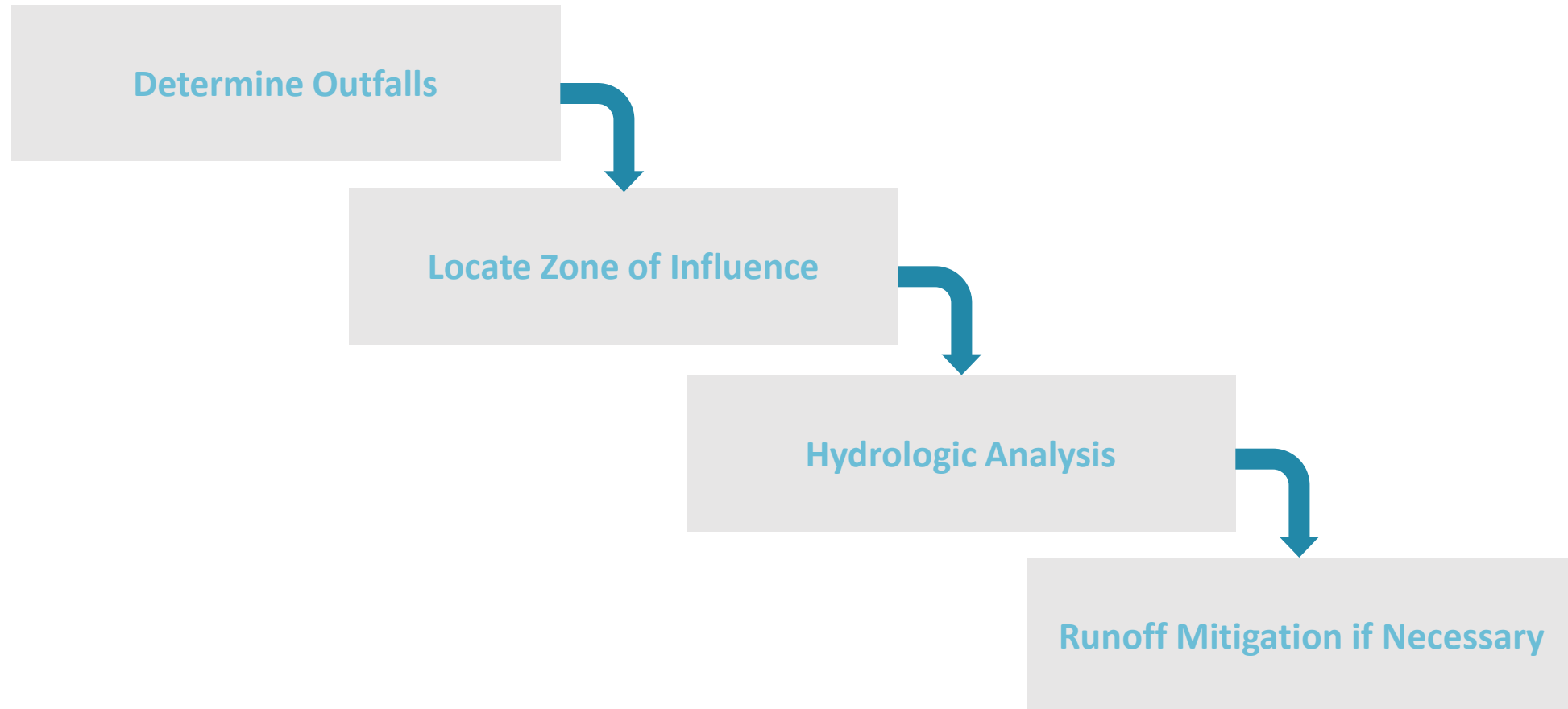
Purpose & Concept

- To protect downstream properties from increased flooding
- Assessment should extend downstream where discharge no longer has a significant impact
- Separate analysis for each major outfall



DOWNSTREAM ASSESSMENT

Process



DOWNSTREAM ASSESSMENT

Methods

Zone of Influence

Point at which the proposed site is 10% or less of the contributing watershed

Adequate Outfall

Location of acceptable outfall in which adverse impacts are not created

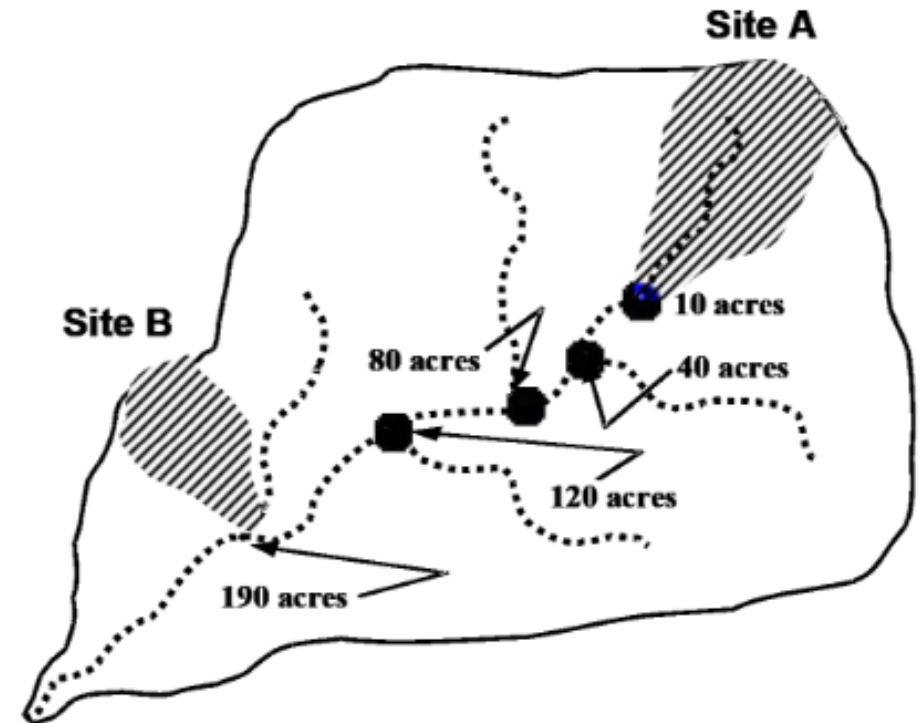


Figure 2.3 Example of the Ten-Percent Rule

DOWNSTREAM ASSESSMENT

Lessons Learned

Zone of Influence Location: The 10 percent Rule & Adequate Outfall

Regardless of the preferred method by the jurisdiction, it is important to be consistent

Analysis for Common Plans (Concept Plans, Multi-Phase Preliminary Plats)

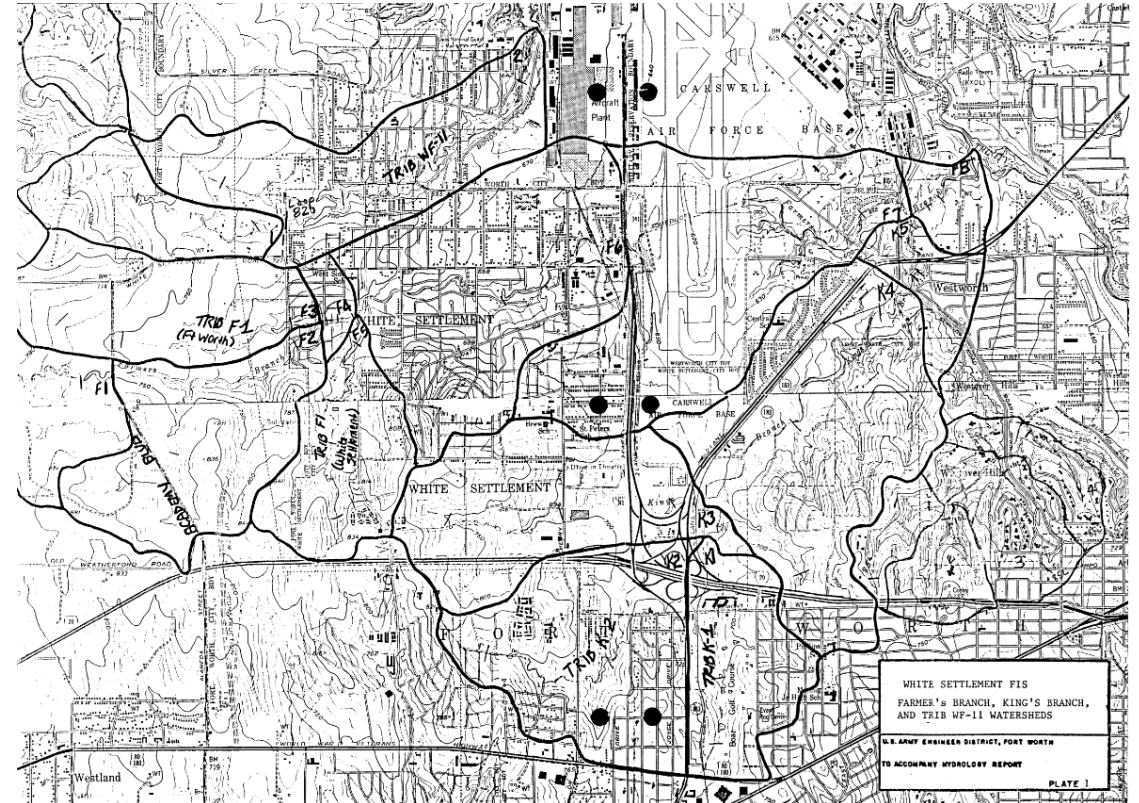
- Concept Plan
 - Typically, no drainage study is required
 - Should provide drainage pattern intent
- Multi-Phase Preliminary Plats
 - Preliminary Drainage Study which should include a separate analysis for each phase scenario
 - Should be updated if future phases are significantly updated

DOWNSTREAM ASSESSMENT

Lessons Learned

When Relying on Old Plans

Updated analysis needed using current iSWM standards. Don't assume old plans are accurate.





DOWNSTREAM ASSESSMENT

Analysis for Flooded Roadways

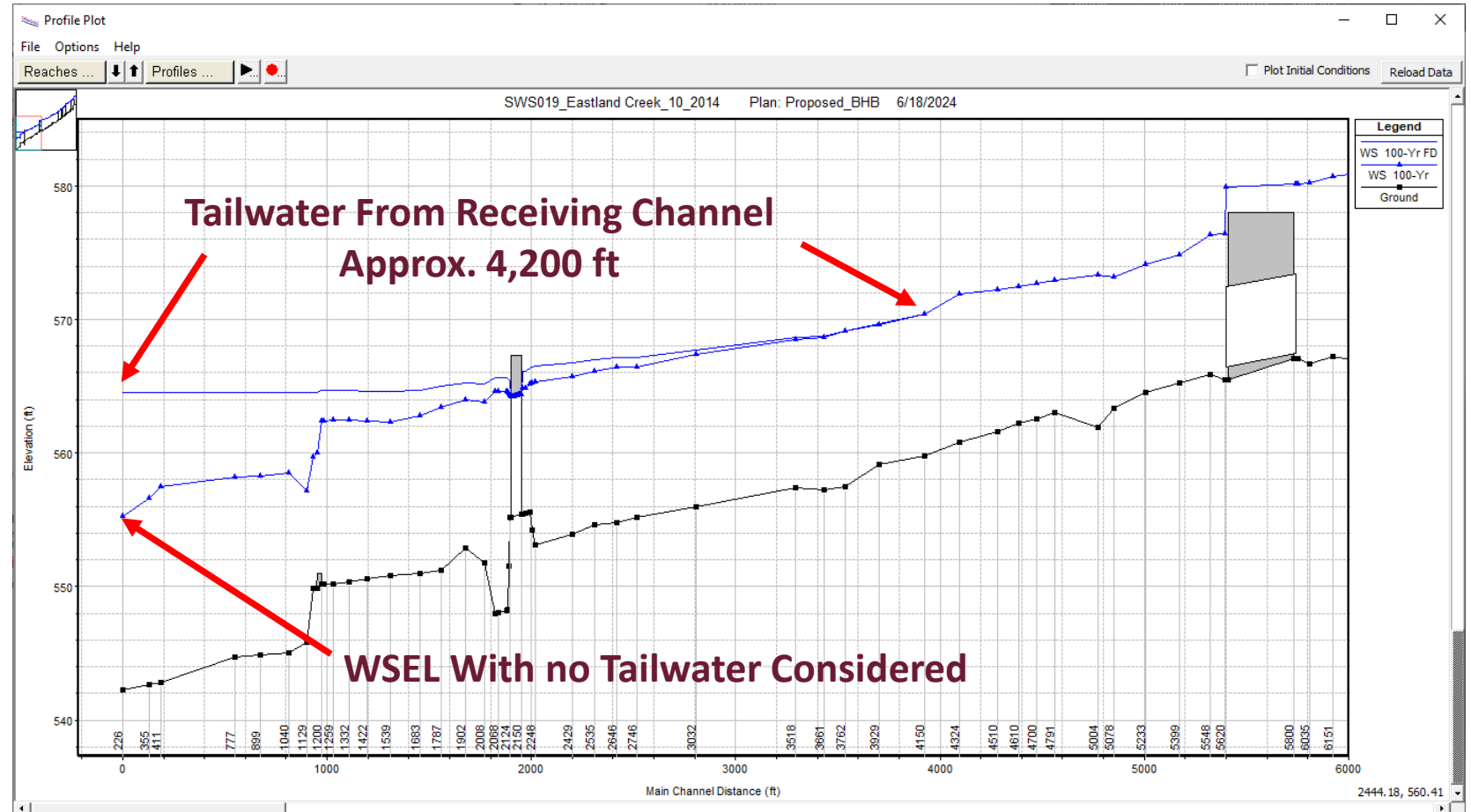
- Current Level of Service
- No Increase in Water Surface Elevations
- Dry lane will need to be maintained and not made worse

DOWNSTREAM ASSESSMENT

Lessons Learned

Tailwater Accounting

Be sure to account for all receiving storm systems.





FLOOD MITIGATION

No Adverse Impacts

STREAMBANK PROTECTION

1.

Reinforce/Stabilize Downstream
Conditions

2.

Stormwater Controls to Maintain
Existing Downstream Conditions

3.

Control Release of Storm Event

4.

What is Erosive?



FLOOD MITIGATION

Confirm Adequate Downstream Conveyance Systems (Downstream Assessment)

1.

Ensure no adverse
impacts

2.

Proposed conditions
should mimic existing
conditions

3.

Use on-site drainage
controls for mitigation



FLOOD MITIGATION

Provide On-Site Stormwater Controls (Detention)

1. NCTCOG Volume Estimation
2. Modified Rational Method
3. Unit Hydrograph Method



FLOOD MITIGATION

NCTCOG Volume Estimation

- Typically has higher calculated volume
- Better suited for preliminary sizing
- Best for basins under 200 Ac

MODIFIED RATIONAL METHOD DETENTION CALCULATIONS

(Per iSWM 2.1.7 on pages 2.1-38 to 2.1-41)

		2 - YEAR	10 - YEAR	100 - YEAR
County		Tarrant	Tarrant	Tarrant
<u>EXISTING CONDITIONS</u>				
Area	acres	20	20	20
c		0.5	0.5	0.5
Tc	min	21	21	21
<u>DEVELOPED / PROPOSED</u>				
Area	acres	20	20	20
c		0.8	0.8	0.8
Tc	min	15	15	15
Q(allowable) (EQ. 2.1.26)	cfs	33	47	69
Q(developed) (EQ. 2.1.26)	cfs	62	88	128
Td (EQ. 2.1.27)	min	28	33	36
V(max) EQ. 2.1.28b)	cf	56,563	88,270	137,104
V(max)	ac-ft	1.30	2.03	3.15

FLOOD MITIGATION

Modified Rational Method

- Should be used for the design of small detention facilities
- Typically under predicts the required detention volume
- Best for basins under 200 Ac

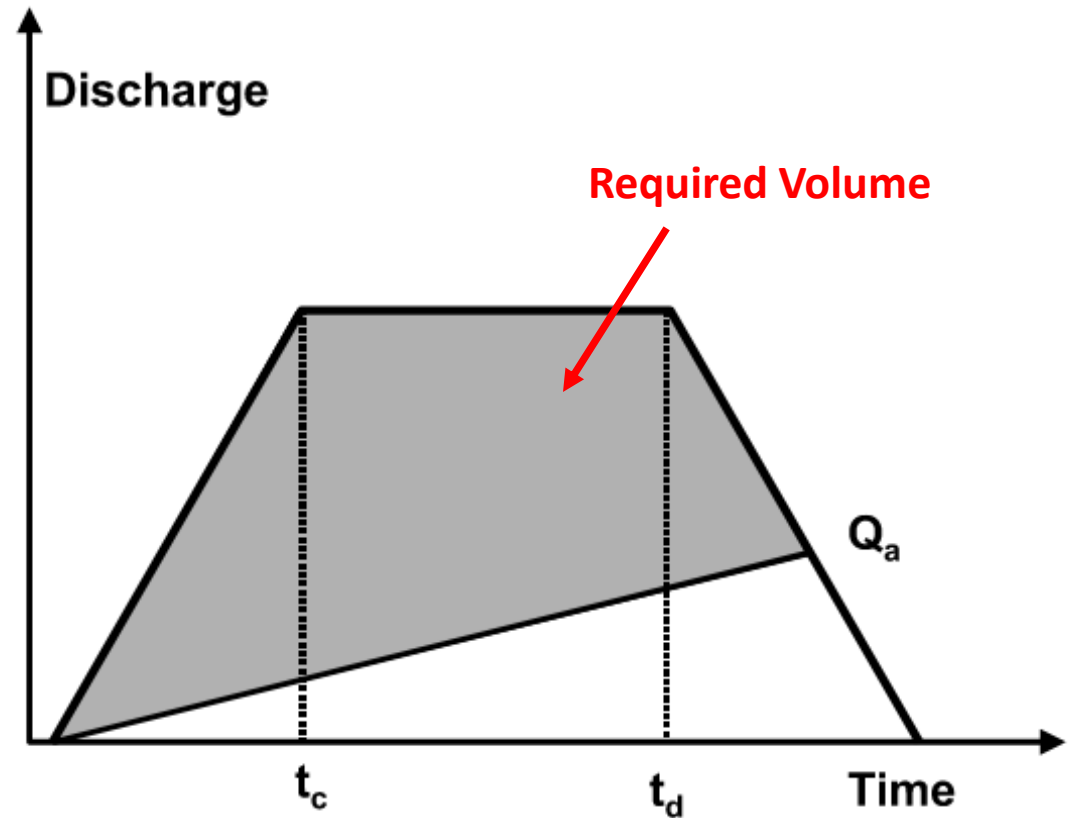
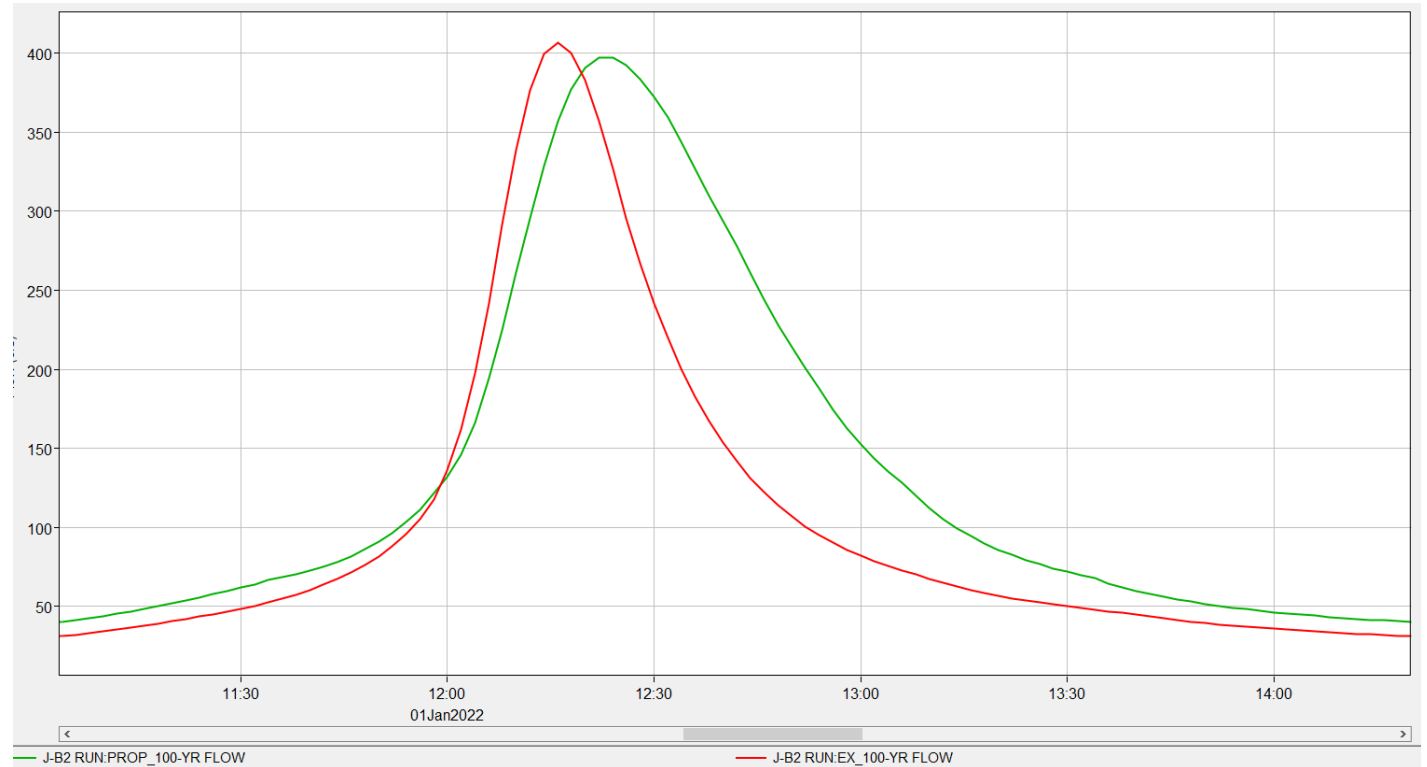


Figure 1.12 Modified Rational Definitions

FLOOD MITIGATION

Unit Hydrograph Method

- Typically has higher runoff values but less delta from existing to proposed
- For larger drainage areas and more complex hydrologic conditions



HYDRAULICS: STORMWATER CONVEYANCE SYSTEMS

General Considerations

- Site Assessment and Location
 - Detention or retention pond
 - Tailwater from receiving storm system
 - Erosion protection
-
- Freeboard (1-ft), bank slopes (4:1)
 - Access ramp (min 10-ft, 15% max slope)
 - Pond bottom minimum slope (1%)
 - Pond berm top-width (10-ft).
 - Emergency Spillway design for fully developed conditions, 6-inch freeboard
 - Geotechnical investigation/slope stability analysis needed for ponds deeper than 12-ft prior to Grading Permit acceptance.

STORMWATER CONVEYANCE SYSTEMS

Hydraulic Design of Open Channels

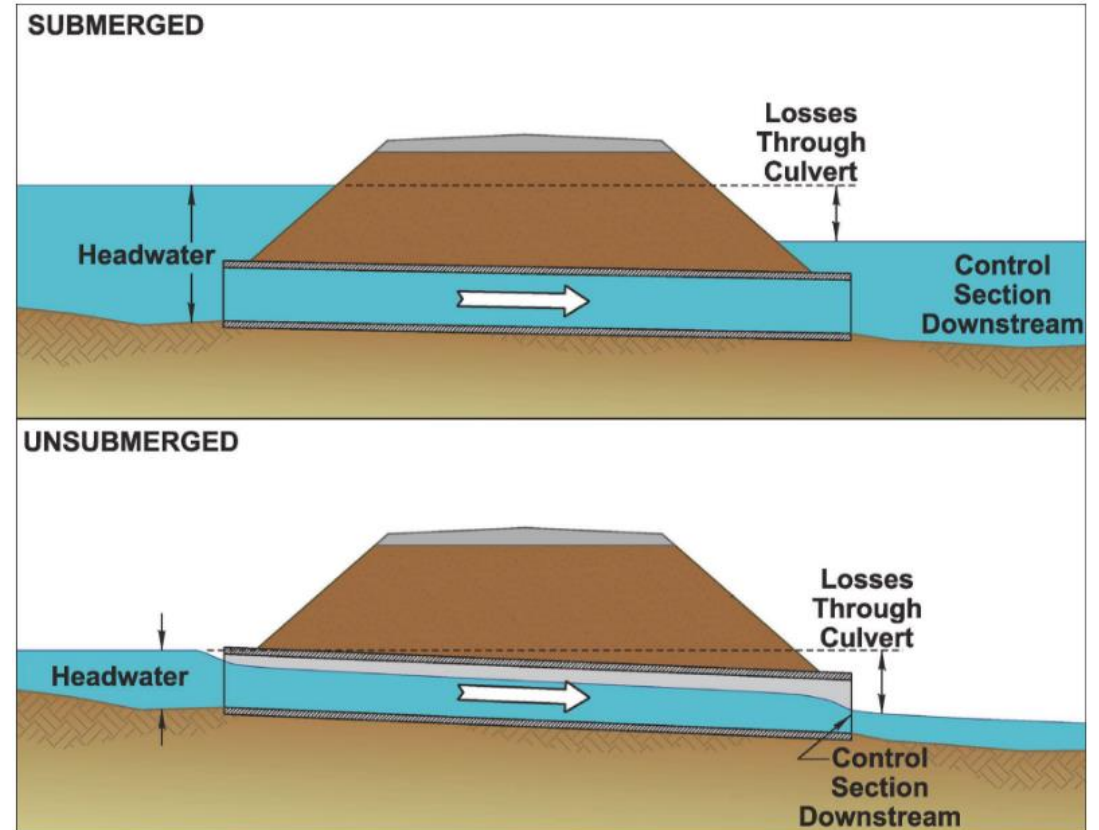
- Natural or Engineered
- Earthen or Lined
- Channel roughness coefficient



STORMWATER CONVEYANCE SYSTEMS

Hydraulic Design Culverts/Bridges

- Submerged or Unsubmerged
- Material – RCP, CMP, HDPE
- Entrance/Exit Coefficient
- Culvert or Bridge?



STORMWATER CONVEYANCE SYSTEMS

Outfall Design



STORMWATER CONVEYANCE SYSTEMS

Lessons Learned

Erosion Protection

- To prevent erosion due to high velocity
- Doesn't reduce velocity, just protects from it.

Energy Dissipation

- Reduce energy to prevent erosion
- Usually installed at outfall location

STORMWATER CONVEYANCE SYSTEMS

Lessons Learned

Concentrated Outfalls & Flow Over Channel Banks

- Concentrated outfall should be at channel flowline
- Avoid concentrated discharge overland

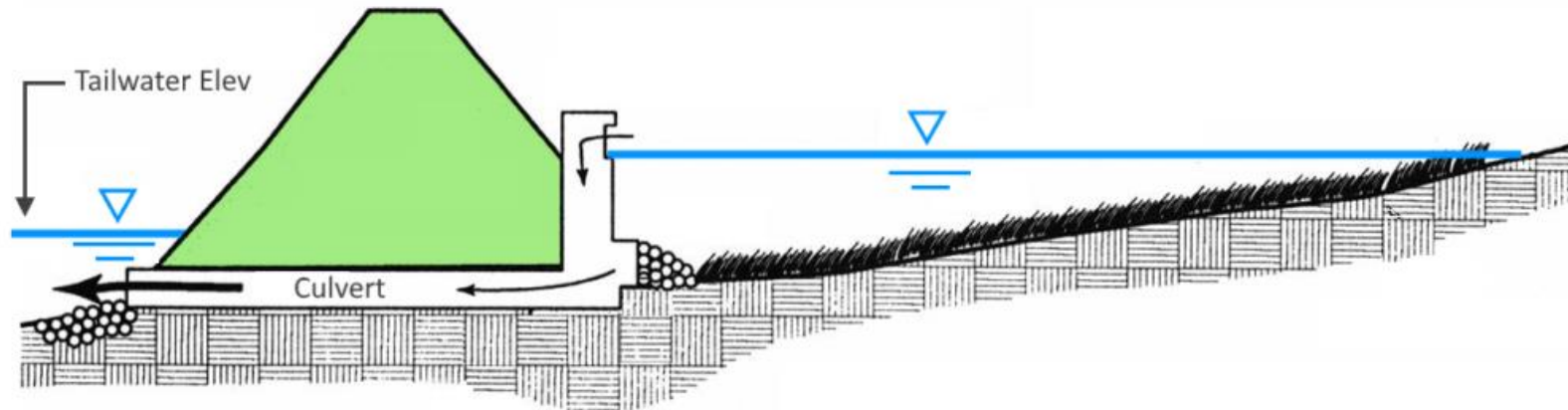


STORMWATER CONVEYANCE SYSTEMS

Lessons Learned

Concentration of Flows from Ponds to Roads/Offsite

- Existing Conditions
 - Runoff spread out overland
- Proposed Conditions
 - Concentrated flow

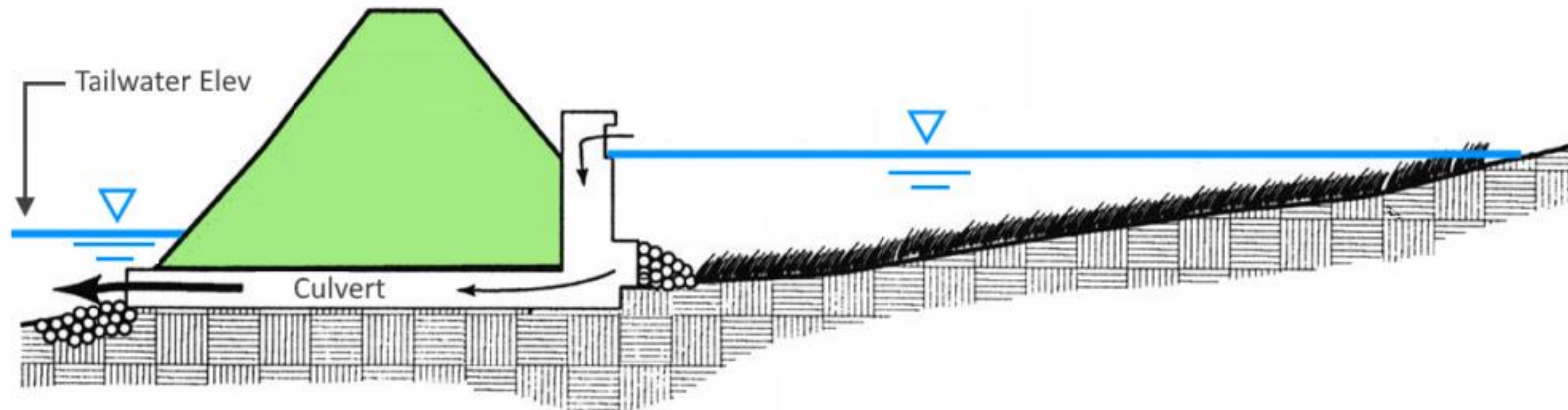


STORMWATER CONVEYANCE SYSTEMS

Lessons Learned

Tailwater Accounting for Detention Ponds

- Account for tailwater from receiving channels and existing storm systems



STORMWATER CONVEYANCE SYSTEMS

Lessons Learned

Detention Storage Spillway Design

- Labyrinth Weir provides additional length in a small space



STORMWATER CONVEYANCE SYSTEMS

Lessons Learned

Location of Emergency Spillway

- Emergency Spillway should be designed for fully developed flows into the pond
- Emergency Spillway should outfall to an existing storm system



EASEMENTS, PLATS & MAINTENANCE AGREEMENTS

Easements

1.

Provide entitled land access for drainage systems.

2.

Various types of easements are applicable to drainage systems – drainage, flood plain, slope, etc.

3.

Sizing of easements is dependent on the easement type.



EASEMENTS, PLATS & MAINTENANCE AGREEMENTS

Preliminary Plats

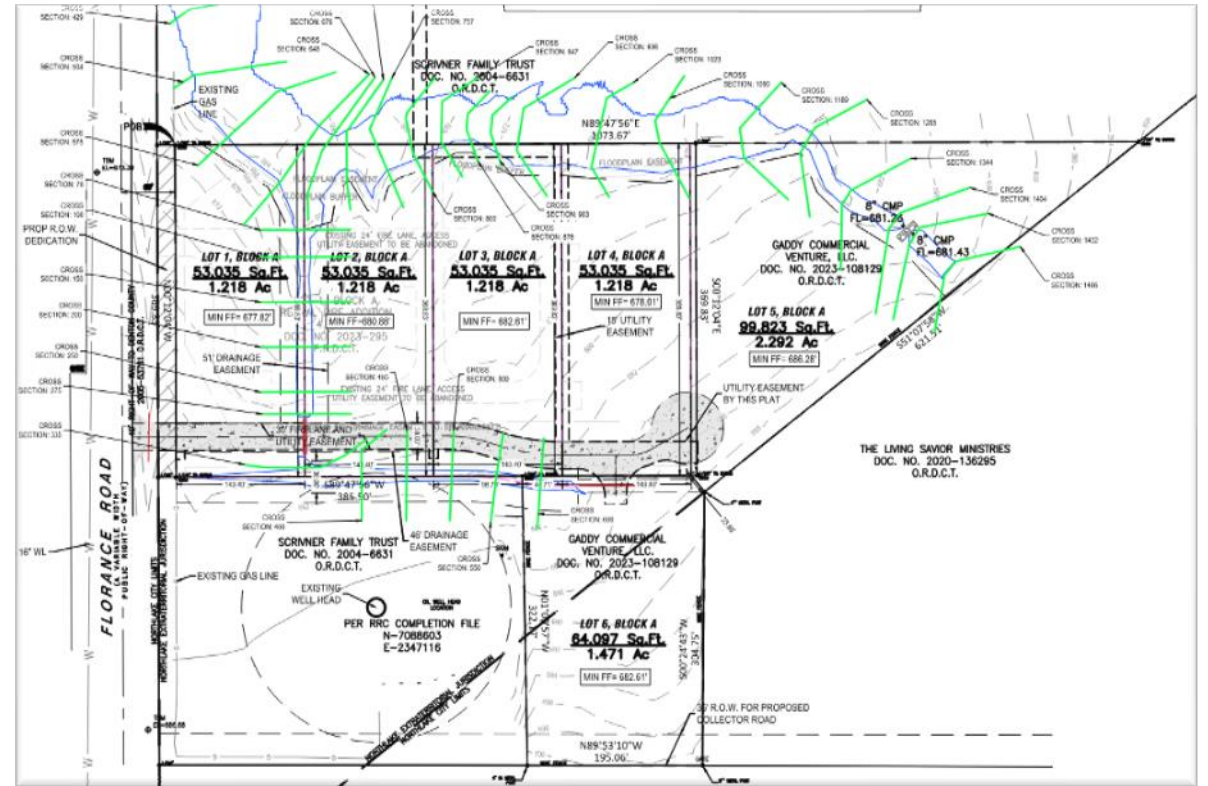
- A plat demonstrating the intent of the project limits, easements, and boundaries.
- Required when subdividing an existing property into smaller lots
- Usually includes preliminary grading, drainage, and utility layout.
 - Could be approximately 50% submittal
- Drainage study typically required for preliminary plat approval
- Check for land use discrepancy between plat and drainage study

EASEMENTS, PLATS & MAINTENANCE AGREEMENTS

Final Platting

Easements: Drainage, Utility, Fire Lanes, ROW

- Should show all pertinent linework with legal description
- Flow from one property to another typically requires a drainage easement



EASEMENTS, PLATS & MAINTENANCE AGREEMENTS

Maintenance Agreements

- Publicly owned items maintained by a private entity
- Purpose is to ensure the upkeep, repair, and serviceability of agreed upon items
- Agreement should clearly define what is to be maintained and to what extent
- Can include amenity ponds, paving, fountains, lights, signs, etc.
- Stormwater Facilities Maintenance Agreement (SWFMA)

INTEGRATED CONSTRUCTION CRITERIA

- Construction Phasing
- Erosion/Sediment Controls
- Construction Entrances



WATER QUALITY PROTECTION

Purpose

To remove pollutants from high frequency storms

<u>Practice</u>	<u>Description</u>
Natural area conservation	Undisturbed natural areas are conserved on a site, thereby retaining their pre-development hydrologic and water quality characteristics.
Stream buffers	Stormwater runoff is treated by directing sheet flow runoff through a naturally vegetated or forested buffer as overland flow.
Use of vegetated channels	Vegetated channels are used to provide stormwater treatment.
Overland flow filtration/infiltration zones	Overland flow filtration/infiltration zones are incorporated into the site design to receive runoff from rooftops and other small impervious areas.
Environmentally sensitive large lot subdivisions	A group of site design techniques are applied to low and very low density residential development.



$$R_v = 0.05 + 0.009(I) \quad (1.1)$$

where:

I = percent of impervious cover (%)

For North Central Texas, the average 85th percentile annual rainfall event is 1.5 inches. Therefore, WQ_v is calculated using the following formula:

$$WQ_v = \frac{1.5 R_v A}{12} \quad (1.2)$$

where:

WQ_v = water quality protection volume (acre-feet)

R_v = volumetric runoff coefficient

A = total drainage area (acres)

WQ_v can be expressed in inches (Q_{wv}) using the following formula:

$$Q_{wv} = 1.5(R_v) \quad (1.3)$$

where:

Q_{wv} = water quality protection volume (inches)

WATER QUALITY PROTECTION

Ponds

Ponds should be designed not to discharge 1.5-inch rainfall in under 24 hours.

WATER QUALITY PROTECTION

Trash Controls

- Trash racks should be placed at key discharge points including that of the water quality pond
- Inline stormwater interceptors can collect and reduce waste through the system



QUESTIONS?

