



*CITY OF SAN ANTONIO
TRANSPORTATION & CAPITAL IMPROVEMENTS*

*UDC AMENDMENTS
& DRAINAGE MANUAL*

JANUARY 26, 2016

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Storm Water Changes

UDC Text Changes

- 35-504 removed and replaced with Appendix H
- 35-B119 (checklist) revised and moved to Appendix H

Conceptual Change

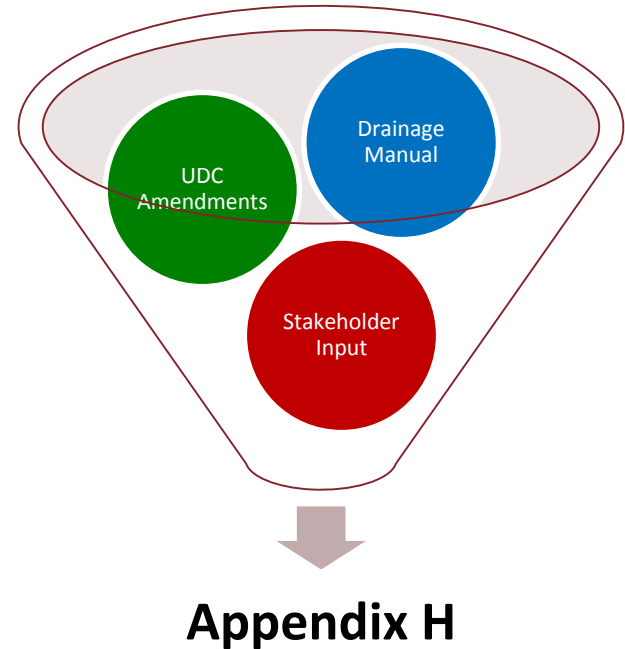
- Policy & Reference Manual
- Expanded subject matter

Design & Submittal Changes

- Rational Method up to 200 acres
- Pipe Size & Materials,
- Velocity Controls (stilling basins, dissipators)
- Easements widened for concrete channels

Other Changes

- Appendix F Revisions
- Storm Water Utility Fee
- Regional Storm Water Management Participation Form





Drainage Manual Contents

Chapter 1 Introduction

- Acronyms and abbreviations

Chapter 2 Drainage Policy

- Policy & Principles
- Technical Criteria
- Implementation

Chapter 3 Drainage Law

- Regulations & Statutes
- Rules & Ordinances



Drainage Manual Contents

Chapter 4 Planning

- Regional Storm Water Management Program
- Adverse Impact Analysis
- System Criteria
- Planning

Chapter 5 Hydrology

- Rational Method
- Hydrograph Method (SCS)

Chapter 6 Pavement Drainage

- Design Guidelines & Street Classification
- Street Capacity
- Slopes
- Unflooded Access



Drainage Manual Contents

Chapter 7 Storm Drain Systems

- Hydraulics- Partial Flow & Pressure Flow
- Energy Losses
- Pipe/Box Size & Placement
- Materials & Specifications

Chapter 8 Inlets

- Inlet Types
- Design Guidelines
- Materials & Specifications

Chapter 9 Open Channels

- Hydraulics & Flow Classification
- Hydraulic Jump
- Design Guidelines
- Maintenance & Easements



Drainage Manual Contents

Chapter 10 Culverts

- Inlet Control vs. Outlet Control
- Roadway Overtopping
- Materials & Specifications
- Velocity Protection & Control Devices (Dissipators)

Chapter 11 Bridges

- Hydraulics of Bridges
- Design Guidelines

Chapter 12 Pump Stations

- Purpose
- Components
- Design & Maintenance



Drainage Manual Contents

Chapter 13 Storage Facilities

- Detention & Retention Basins
- Inflow & Outflow Structures and Downstream Analysis
- Maintenance Considerations

Chapter 14 Drainage Easements

- Storm Drains & Open Channels
- Storage Facilities
- Maintenance Access

Chapter 15 Lots/Unflooded Access

- Lot Grading
- Unflooded Access
- Fence Crossings

Chapter 16 Vegetation

- Recommended Vegetation
- Tree Preservation



Drainage Manual Contents

Chapter 17 Software

- H&H Tools

Chapter 18 Data Sources

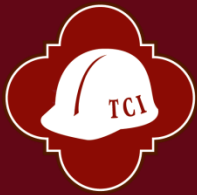
- Local/Regional/Federal

Chapter 19 Definitions

- Definitions

Appendices

- Appendix A- Storm Water Submittal Review Checklist
- Appendix B- Missouri Charts



Submittals & Resubmittals

- One (1) hard copy & one (1) digital copy
- Clarifies separate submittal packages for plats and permits

Hydrologic Methods

- Peak Flow
 - Rational < 200 acres ≤ Unit Hydrograph
- Detention
 - Modified Rational < 20 acres ≤ Unit Hydrograph
 - Multiple Ponds- Unit Hydrograph

System Design

- Pipe Material- RCP under streets
- Pipe Diameter- allows < 24" for laterals and driveway crossings with Director approval
- Velocity Controls/Energy Dissipators

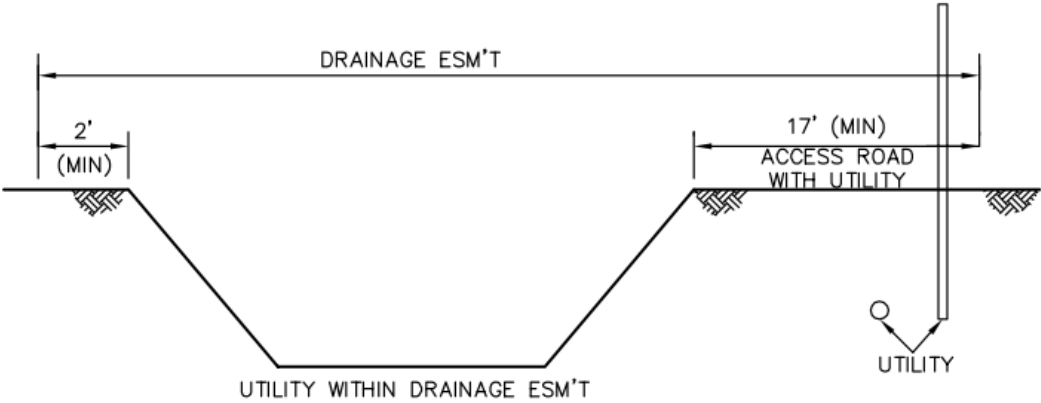
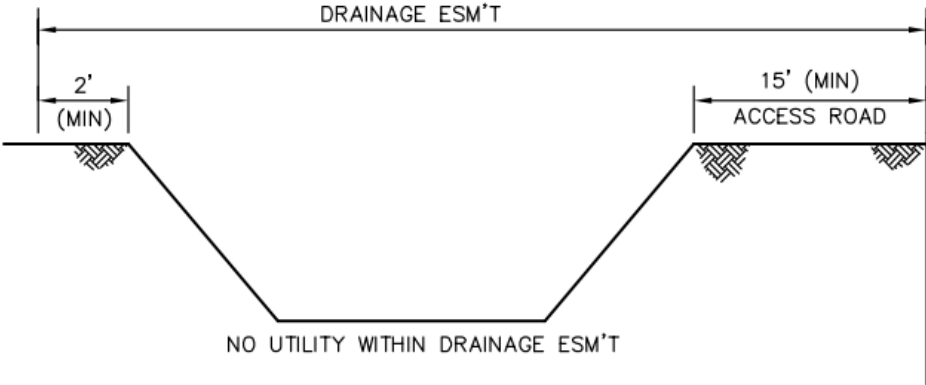


Channel Easements

- Public vs. Private Easements
 - Public:
 - Drainage Area \geq 100 acres;
 - Contains regulatory floodplain; or
 - Conveys runoff from public property or right-of-way
 - Private
 - Drainage Area $<$ 100 acres;
 - No regulatory floodplain; and
 - No runoff from public property or right-of-way (except for some side-lot flumes)
- Natural Channels & Vegetated Channels
 - No change
- Concrete Channels
 - 15' access easements
- Side-Lot Flumes
 - 10' access easements
 - Exception- private easements

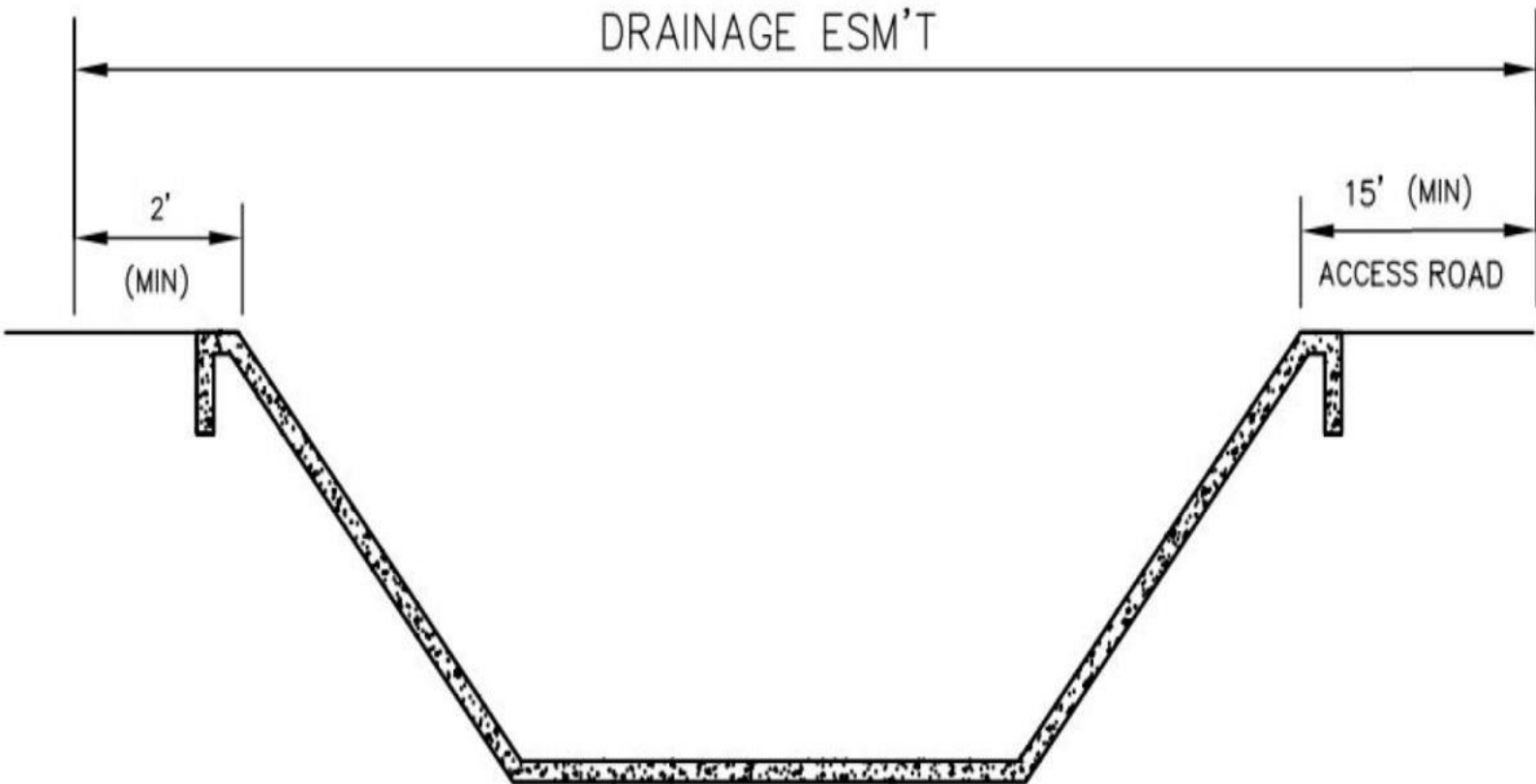


Earthen Channel





Concrete Channel





14.3.1.4 Concrete Flumes

Side-lot flumes are concrete-lined channels that convey storm water runoff between residential lots from street to street or from a street to a storm drain, drainage channel, natural creekway, or floodplain. Easements for side-lot flumes shall extend a minimum of two (2) feet on one (1) side and ten (10) feet for access on the opposite side.

Private side-lot flumes shall have appropriate easement widths as determined by the developer's engineer.



Appendix F (Floodplain) Revisions

Sec. 35-F124. - Allowable Development Within the Regulatory Floodplain

(e) Demonstrate that the development will not increase the regulatory 1% annual chance floodplain velocities above six (6) fps. No increase in velocity will be permitted if predevelopment velocities in the floodplain exceed six (6) fps unless proven that the existing channel/creek is stable (i.e. rocky bottom channel/creek) and no signs of erosion or scour are occurring in predevelopment conditions.

(f) (12) Wetland reestablishment, ~~or~~ mitigation, or environmentally friendly design criteria (i.e. Natural channel design, Low-Impact Development, etc set forth by the San Antonio River Authority and/or U.S. Army Corps of Engineers).



Appendix F (Floodplain) Revisions

Sec. 35-F124. - Allowable Development Within the Regulatory Floodplain

(f) (18) 1% annual chance floodplain reclamation where the watershed drainage area is less than three hundred twenty (320) acres when the floodplain storage volume lost due to fill is offset by comparable excavation within the same floodplain (see subsections 35-F124(d) and 35-F124(f)(27). In addition, all federal, state, or local permits shall be obtained, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334 (see subsections 35-F122 (a)(3)).

(f) (21) 1% annual chance floodplain reclamation in overbank areas subject to extensive shallow (0'-3') flooding where velocities in the overbank area are less than three (3) fps and where floodplain storage volume lost to reclamation is offset by comparable excavation within the same creek floodplain (see subsections 35-F124(d) and 35-F124(f)(27).) Where a maximum amount of fill allowed in the overbank areas is no more than 3 feet with engineered slope stability calculations.



Appendix F (Floodplain) Revisions

Sec. 35-F142. – Specific Standards

(a) (1) Construction of habitable structures within the regulatory floodplain (base flood) is not allowed. New construction and substantial improvement of any residential structure shall have the lowest floor (including basement) elevated one (1) foot above the regulatory floodplain with the lowest adjacent grade at or above the regulatory floodplain. A registered professional engineer, architect, or land surveyor shall submit a certification to the floodplain administrator that the standard of this ordinance [reference Section 35-F132 (b)], is satisfied.



LID and RIO Reviews

- Low Impact Development (LID)
 - Voluntary
 - Ordinance pending
 - Credit and Fee-based Incentives
- River Improvement Overlay (RIO) District
 - LID Mandatory in some areas (approx. 600 acres total)
- San Antonio River Authority (SARA)
 - SARA to serve as staff augmentation for TCI
 - Comments sent with drainage/flood reviews



Questions?

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