Welcome!

We will begin at 12 PM

HOUSTON PUBLIC WORKS

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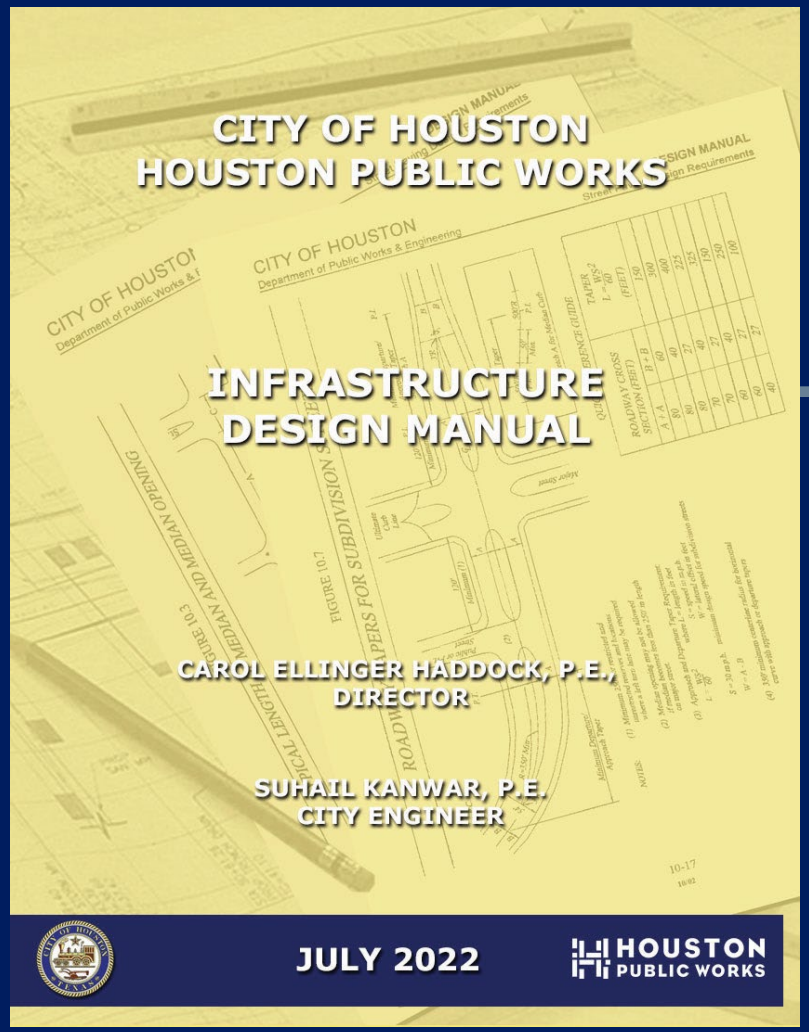
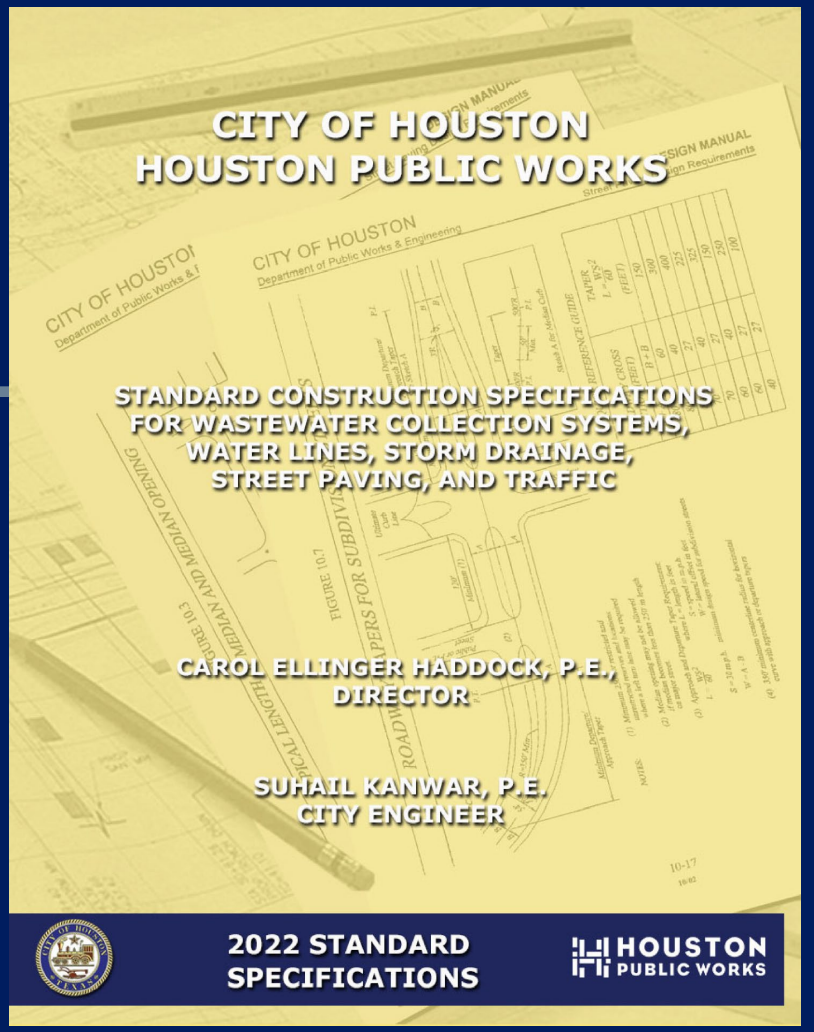
INFRASTRUCTURE DESIGN MANUAL ROLL OUT

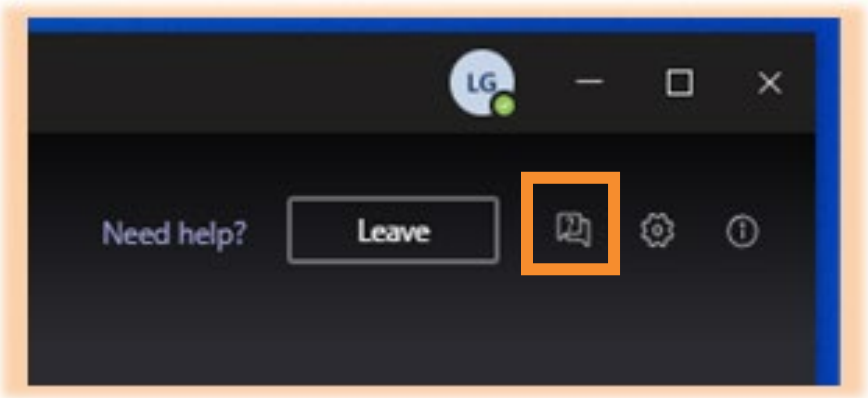
HOUSTON PUBLIC WORKS





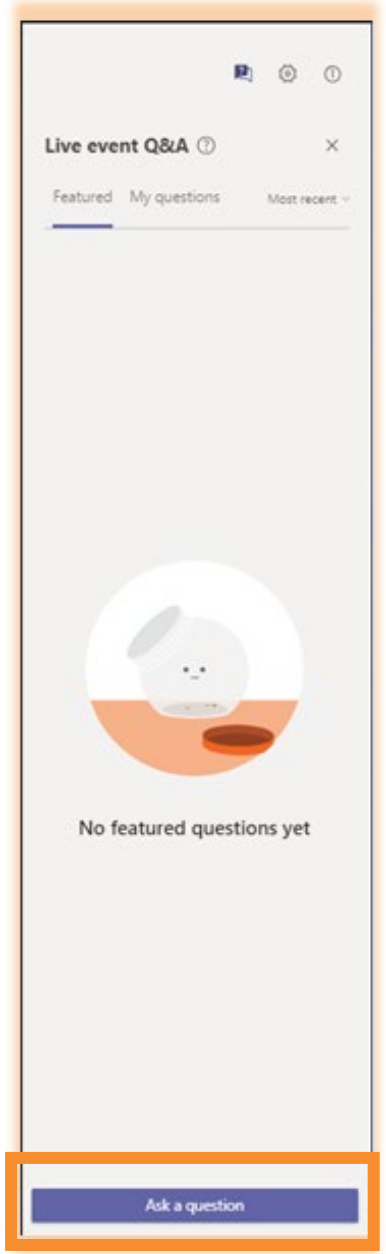
BEFORE WE BEGIN

Select **Q&A** icon on the right side of the screen.



Select **Ask a question** to reveal the text box.

Type in your question and select Send.



BEFORE WE BEGIN

Use the Q&A chat feature throughout the presentation:

- **Featured**—includes all attendee questions
- **My questions**—only lists your submitted questions

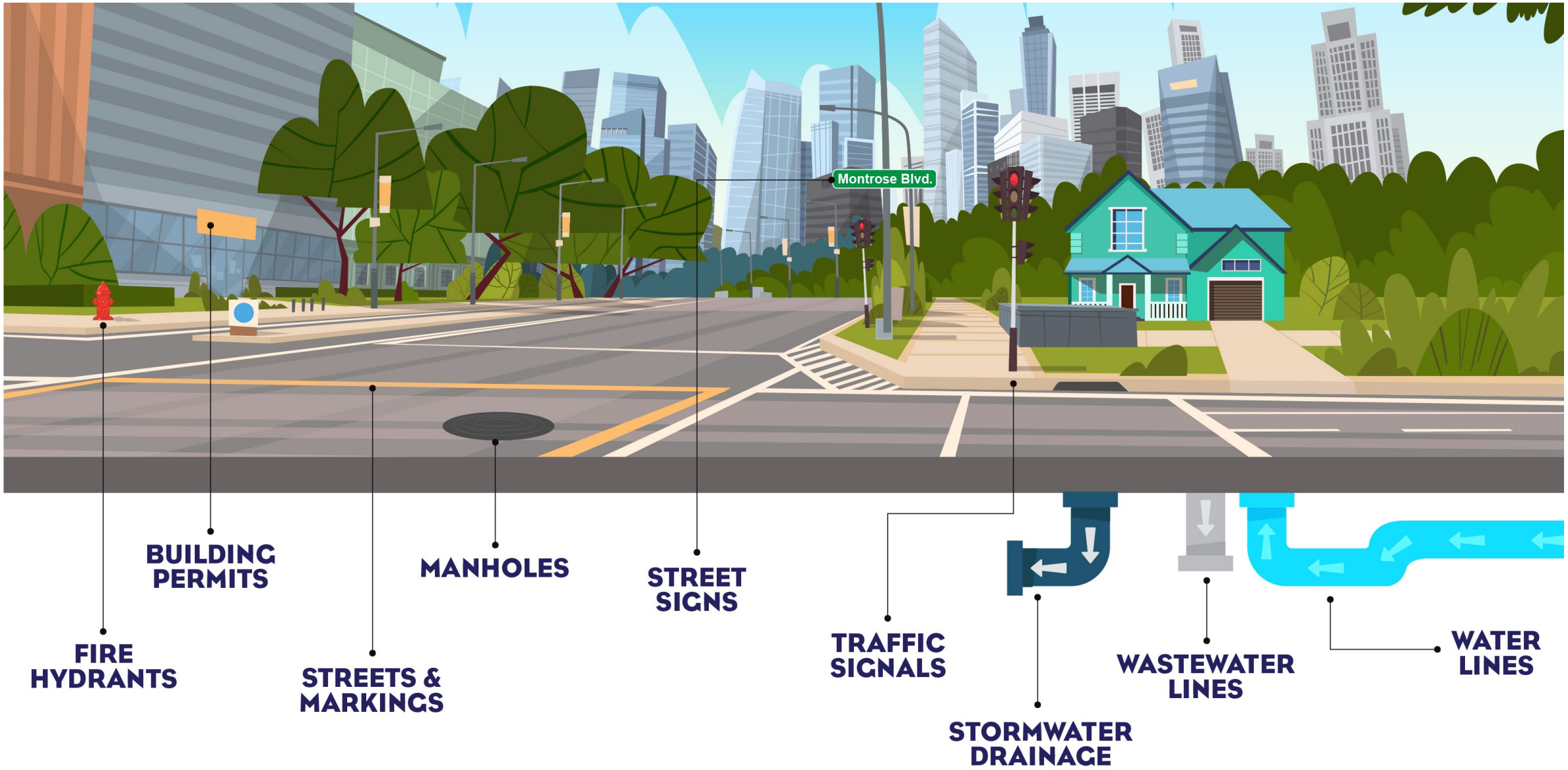
Be specific—note the chapter or topic in your question.

If we can't address your question today, we will respond to it on our website.

INTRODUCTION

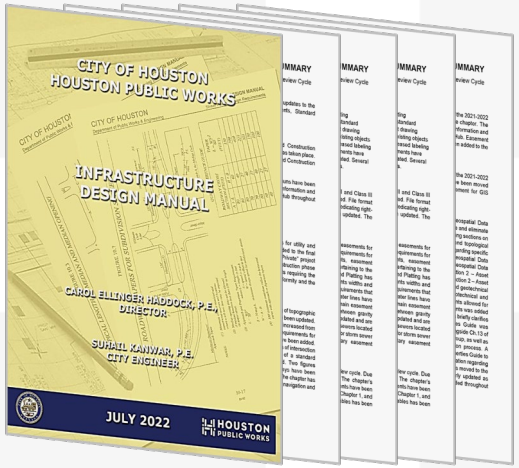
DESIGN AND CONSTRUCTION STANDARDS

PUBLIC INFRASTRUCTURE

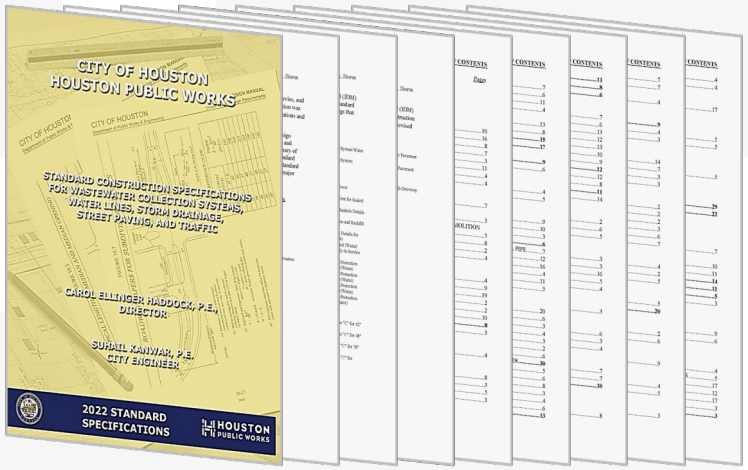


HOUSTON PUBLIC WORKS

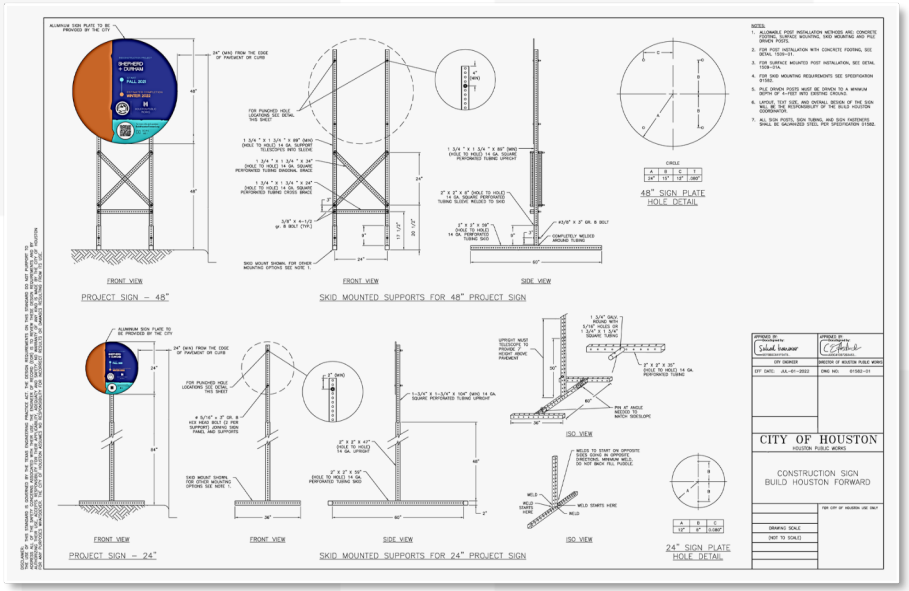
IDM



SPECIFICATIONS



STANDARD DETAILS



HOUSTON
PUBLIC WORKS

INFRASTRUCTURE DESIGN MANUAL ROLL OUT AUGUST 22, 2022

MARY BAC, P.E.

DESIGN AND CONSTRUCTION STANDARDS

AGENDA

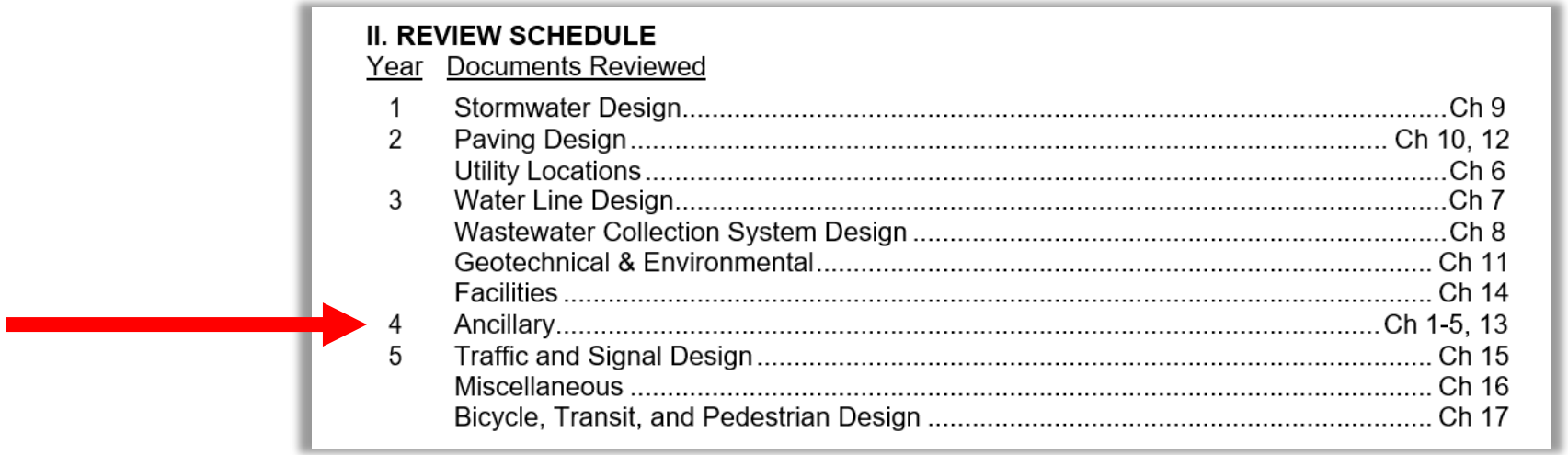
Time	Topic (Presenter)
12:00 pm – 12:10 pm	Introduction and Overview (Mary Bac)
12:10 pm – 12:20 pm	General Changes (Nassef Hanna)
12:20 pm – 12:35 pm	Chapter 3 - Graphic Requirements (Luis Garza)
12:35 pm – 12:50 pm	Chapter 1 - General Requirements (Gilbert Portillo)
12:50 pm – 1:00 pm	Chapter 2 - Survey Requirements (Summer Chandler)
1:00 pm – 1:10 pm	Chapter 4 - Platting Requirements(Addie Jackson)
1:10 pm – 1:20 pm	*Break*
1:20 pm – 1:40 pm	Chapter 5 - Easement Requirements (Luis Garza)
1:40 pm – 1:55 pm	Chapter 13 - Geospatial Data Deliverables (Anthony Powell)
1:55 pm – 2:05 pm	Chapter 9 - Stormwater Design and Water Quality Req. (Ivy Wang)
2:05 pm – 2:15 pm	Specifications (Sahar Beigzadeh)
2:15 pm – 2:30 pm	Microtunneling/Jack & Bore/Slurry Bore (Markos Mengesha)
2:30 pm – 2:40 pm	Standard Details (Sahar Beigzadeh)
2:40 pm – 2:50 pm	Closing & Next Review Cycle (Mary Bac)
2:50 pm – 3:00 pm	Additional Questions

OVERVIEW

2021 -2022 Review Cycle

OVERVIEW

2021-2022 Review Cycle



II. REVIEW SCHEDULE

Year	Documents Reviewed	
1	Stormwater Design	Ch 9
2	Paving Design	Ch 10, 12
	Utility Locations	Ch 6
3	Water Line Design	Ch 7
	Wastewater Collection System Design	Ch 8
	Geotechnical & Environmental	Ch 11
	Facilities	Ch 14
4	Ancillary	Ch 1-5, 13
5	Traffic and Signal Design	Ch 15
	Miscellaneous	Ch 16
	Bicycle, Transit, and Pedestrian Design	Ch 17

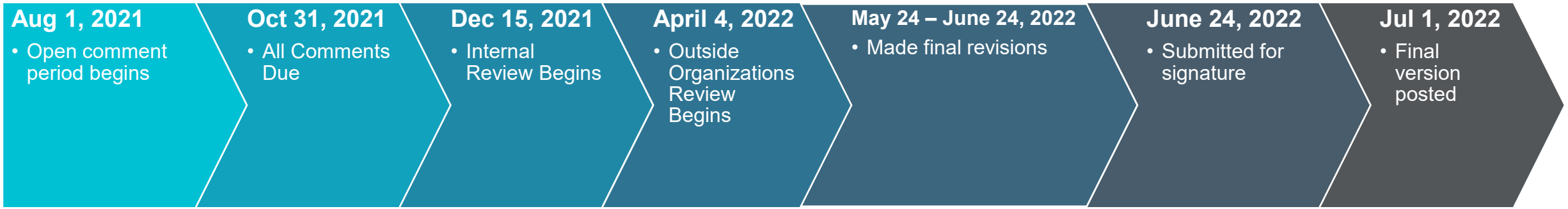
- Chapter 1 – General Requirements
- Chapter 2 – Survey Requirements
- Chapter 3 – Graphic Requirements
- Chapter 4 – Platting Requirements
- Chapter 5 – Easement Requirements
- Chapter 13 – Geospatial Data Deliverables
- Associated Construction Specifications and Details

OVERVIEW

Off-Cycle Items

- Chapter 9: Storm Water Design and Water Quality Requirements
- Spec. 01582: Build Houston Forward Project Identification Signs
- Spec. 02441: Microtunneling
- Spec. 02445: Jack and Bore/Jack and Mine/Pilot Tube Guided Boring Tunnels
- Spec. 02447: Installation of Water Lines by Slurry Bore
- Dwg. 01582-01: Build Houston Forward Project Identification Signs

2021-2022 REVIEW CYCLE TIMELINE



IMPLEMENTATION

New Requirements:

- 90-day design grace period
- Effective Date: Oct. 1, 2022
- CIP Projects:
  - Phase II final designs
- Public/Private Sector
  - Substantially complete plans
- Plats & Easements
  - Preliminary plat review

IMPLEMENTATION: MORE INFO

2022 IDM Announcement & Executive Summary

2022 Infrastructure Design Manual Announcement

Houston Public Works (HPW) has completed the 2021-2022 Review Cycle. As a result, the Infrastructure Design Manual (IDM), General Requirements, Standard Construction Specifications, and Standard Details have been updated.

A 90-day design grace period for implementation of the City of Houston IDM is instituted for the 2022 edition. For Houston Public Works capital improvement projects managed by the Capital Projects service line, Phase II final designs that have not been submitted for a required review prior to October 1, 2022, must comply with all requirements in the 2022 IDM.

For projects in the public or private sector, plans submitted for initial review after October 1, 2022, must comply with all requirements in the 2022 IDM. The City must receive substantially complete plans before October 1, 2022, to be grandfathered under the 2021 requirements.

Plats and easements submitted for preliminary plat review after October 1, 2022, must comply with the 2022 IDM requirements. Easements dedicated though separate instrument and submitted to the Houston Permitting Center (OCE & BCE) for initial review after October 1, 2022, must comply with the 2022 IDM requirements. Easements that were reviewed and approved during preliminary plat, but design drawings have not been submitted for initial review by October 1, 2022, must be resubmitted for review and comply with the new IDM requirements.

The Houston Public Works Director signed the IDM Cover Letter & Executive Summary on July 1, 2022. The executive summary provides more background on when the 2022 design requirements and standards will be implemented. It also provides a summary of updates made to all documents during the review cycle. The IDM Redlines and Construction Specifications Redlines are also available for additional background.

A public IDM Webinar will be conducted by Microsoft Teams and held in mid-August 2022. The IDM webinar will present a high-level view of the changes implemented during the 2021-2022 Review Cycle.

All of the content described here is accessible on the Design and Construction Standards webpage.

For additional questions about the changes, please contact the Office of the City Engineer at 832.394.9164 or HPWStandards@houstontx.gov.

HOUSTON PUBLIC WORKS

EXECUTIVE SUMMARY

2021-2022 Review Cycle

IDM Supplements

The City creates supplements for the IDM when there is a need to revise a current IDM chapter that is outside of its normal review cycle period. At the time when a new IDM is to be released, any active supplements are incorporated into the new IDM and those supplements subsequentially deactivated.

Prior to the completion of the 2021-2022 review cycle, there were no active IDM supplements therefore no IDM supplements have been incorporated into the IDM for the 2022 release.

Infrastructure Design Manual Implementation

- *Capital Improvement Projects*
  A 90-day design grace period will be given for Houston Public Works capital improvement projects managed by the Capital Projects service line. Phase II final designs that have not been submitted for a required review prior to October 1, 2022, will be required to completely comply with the new Infrastructure Design Manual.
- *Private Sector*
  A 90-day design grace period will be given for projects in the public/private sector. Substantially complete plans submitted for initial review after October 01, 2022, will be required to comply with the new IDM.
- *Plats and Easements*
  Plats and easements submitted for preliminary plat review after October 1, 2022, must comply with the new IDM requirements. Easements dedicated though separate instrument and submitted to the Houston Permitting Center (OCE & BCE) for initial review after October 1, 2022, must comply with the new IDM requirements. Easements that were reviewed and approved during preliminary plat, but design drawings have not been submitted for initial review by October 1, 2022, must be resubmitted for review and comply with the new IDM requirements.

CONSTRUCTION SPECIFICATIONS

Revised Specifications

Various specifications, that are associated with the IDM chapters reviewed during the 2021-2022 review cycle, were reviewed and updated. A total of twelve (12) specifications were revised and three (3) new specifications were created. The three (3) new specifications created are 01582 "Build Houston Forward Project Identification Signs", 02445 "Jack And Bore/Jack And Mine/Pilot Tube Guided Boring Tunnels" and 02447 "Installation of Water Lines by Slurry Bore". A list of all specifications created or updated is provided at the end of this executive summary.

Specification Implementation

- *Capital Improvement Projects*
  Per Document 00700 General Condition, section 1.2.4:

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INTERNAL REVIEW REPRESENTATIVES

OFFICE OF THE CITY ENGINEER

- SUHAIL KANWAR (CITY ENG.)
- GILBERT PORTILLO
- CRISTOBAL PADILLA
- KELSEY WARFORD

OCE – STANDARDS GROUP

- MARY BAC
- LUIS GARZA
- SAHAR BEIGZADEH
- NASSEF HANNA
- ROSS OZUNA

CAPITAL PROJECTS

- SUMMER CHANDLER
- ADDIE JACKSON
- JUAN RANDON

CUSTOMER ACCOUNT SERVICES

- RUDY MORENO

HOUSTON WATER

- EKATARINA FITOS
- GABRIEL MUSSIO
- DANIEL OEFNER

INFORMATION TECHNOLOGY

- ANTHONY POWELL

TRANSPORTATION & DRAINAGE OPERATIONS

- AHMAD AHADI
- MARTIN ALCALA JR.
- AASIYAH BAIG

PLANNING & DEVELOPMENT DEPT.

- MUXIAN FANG
- DORIANNE POWE-PHLEGM

EXTERNAL REVIEW MEMBERS

ACEC HOUSTON

AMERICAN PUBLIC WORKS ASSOCIATION APWA Texas Chapter

HARRIS COUNTY ENGINEERING DEPARTMENT

HOUSTON CONTRACTORS ASSOCIATION HCA Since 1956

METRO

DESIGN AND CONSTRUCTION STANDARDS WEBSITE

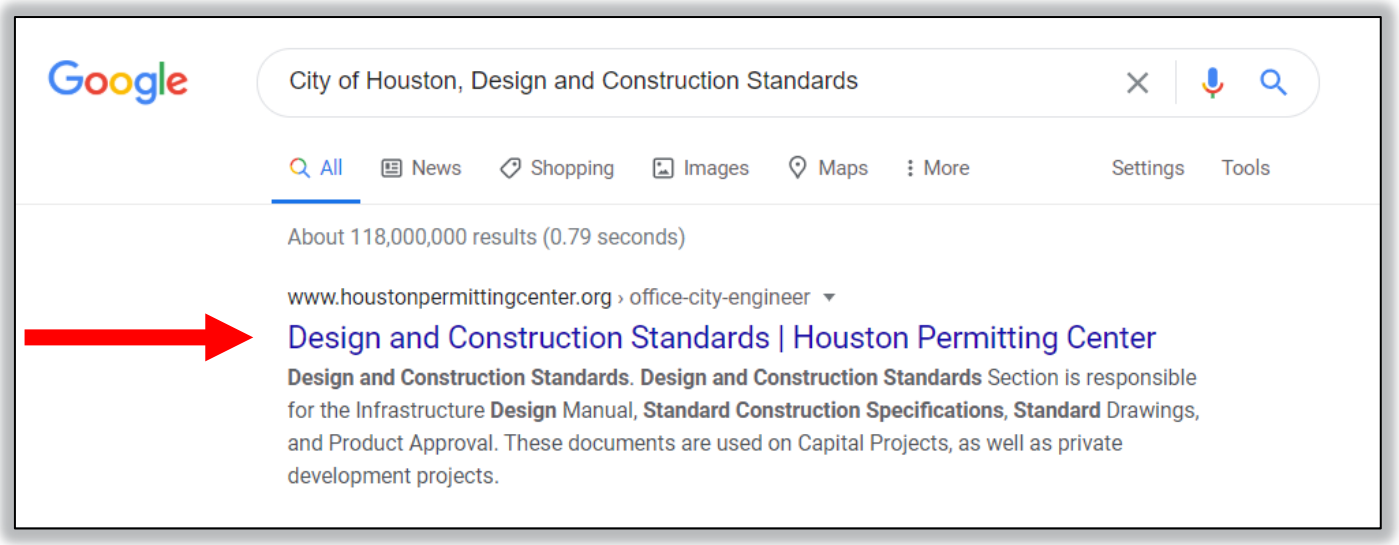
DESIGN AND CONSTRUCTION STANDARDS WEBSITE

Web Address

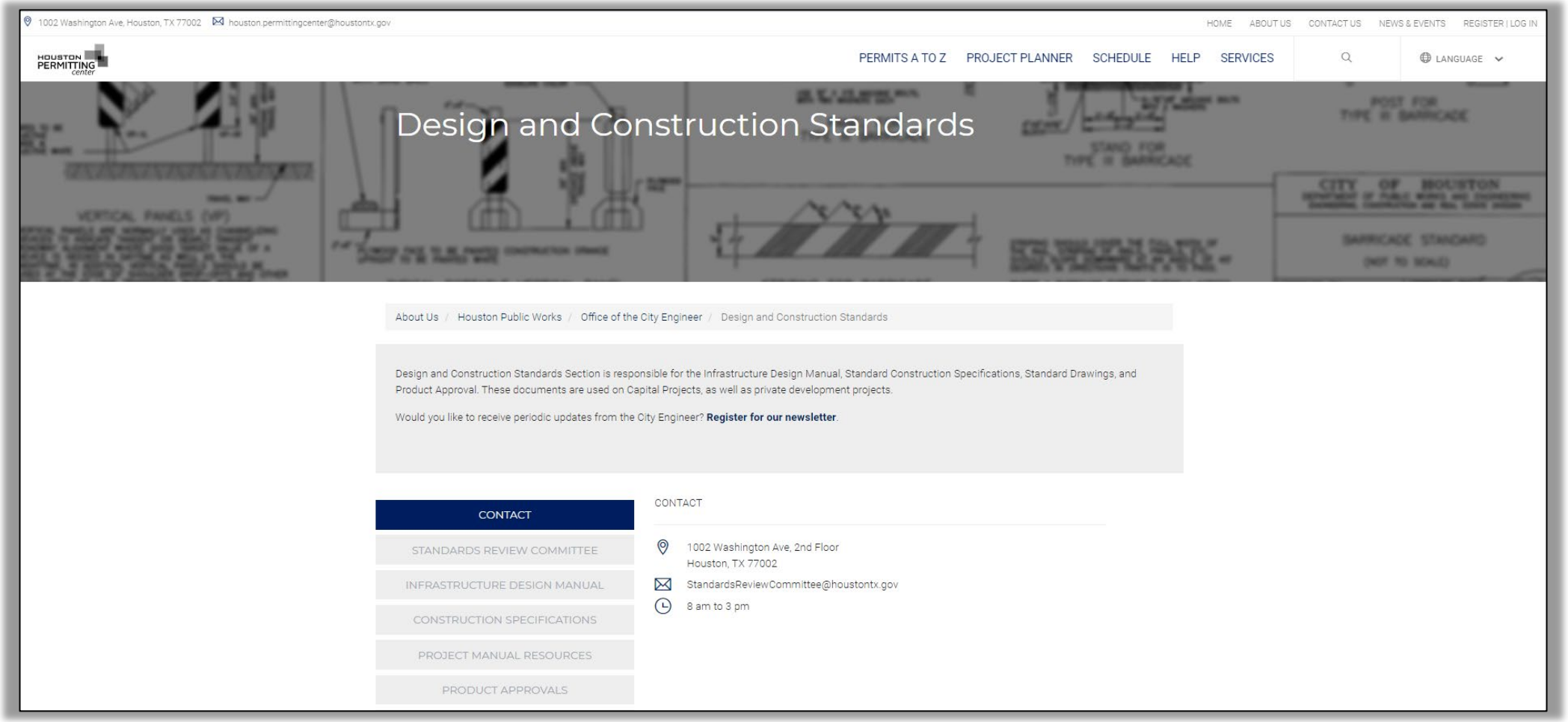
https://houstonpermittingcenter.org/office-city-engineer/design-and-construction-standards

Easy way to find:

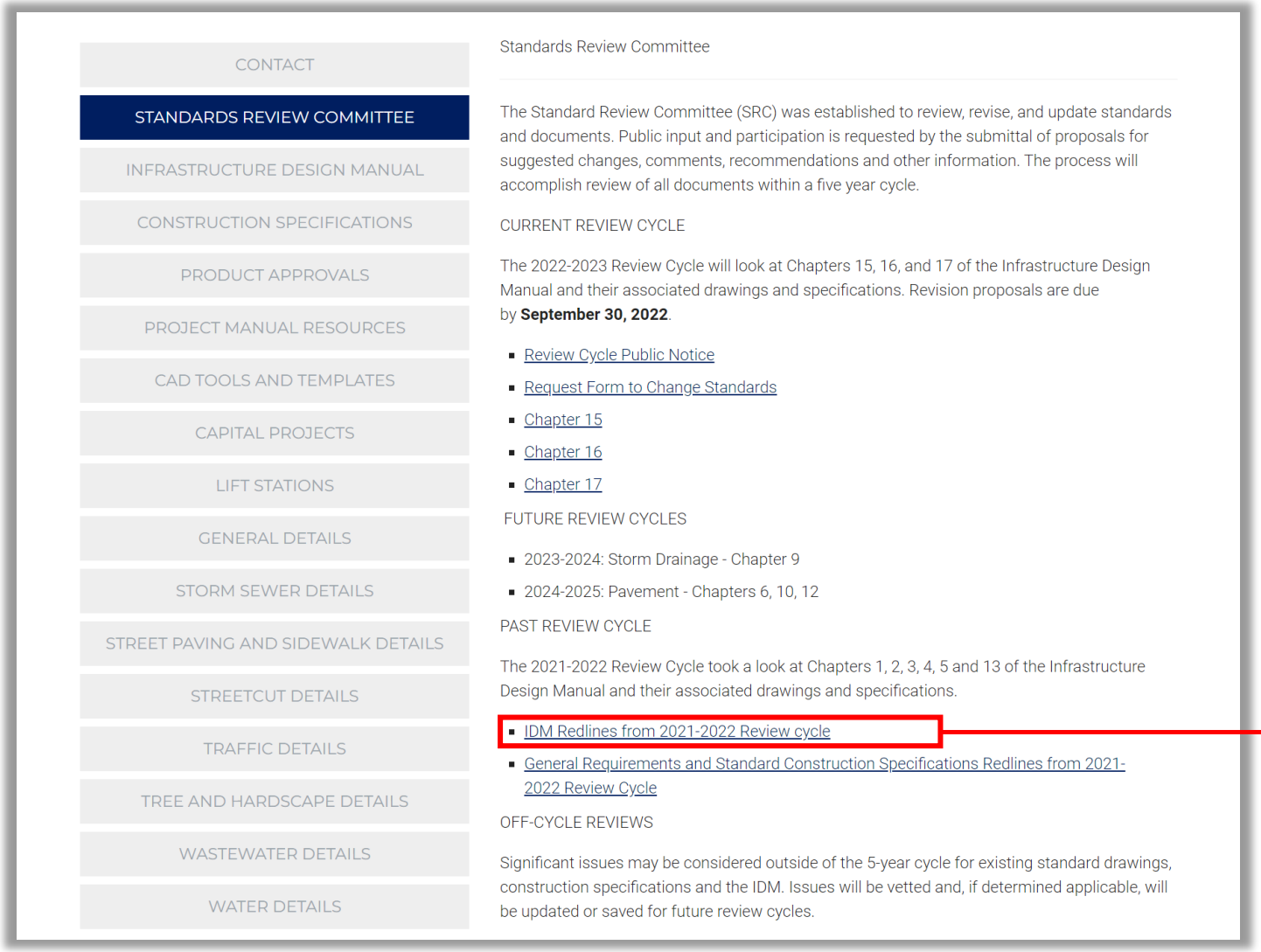
Google “City of Houston, Design and Construction Standards”

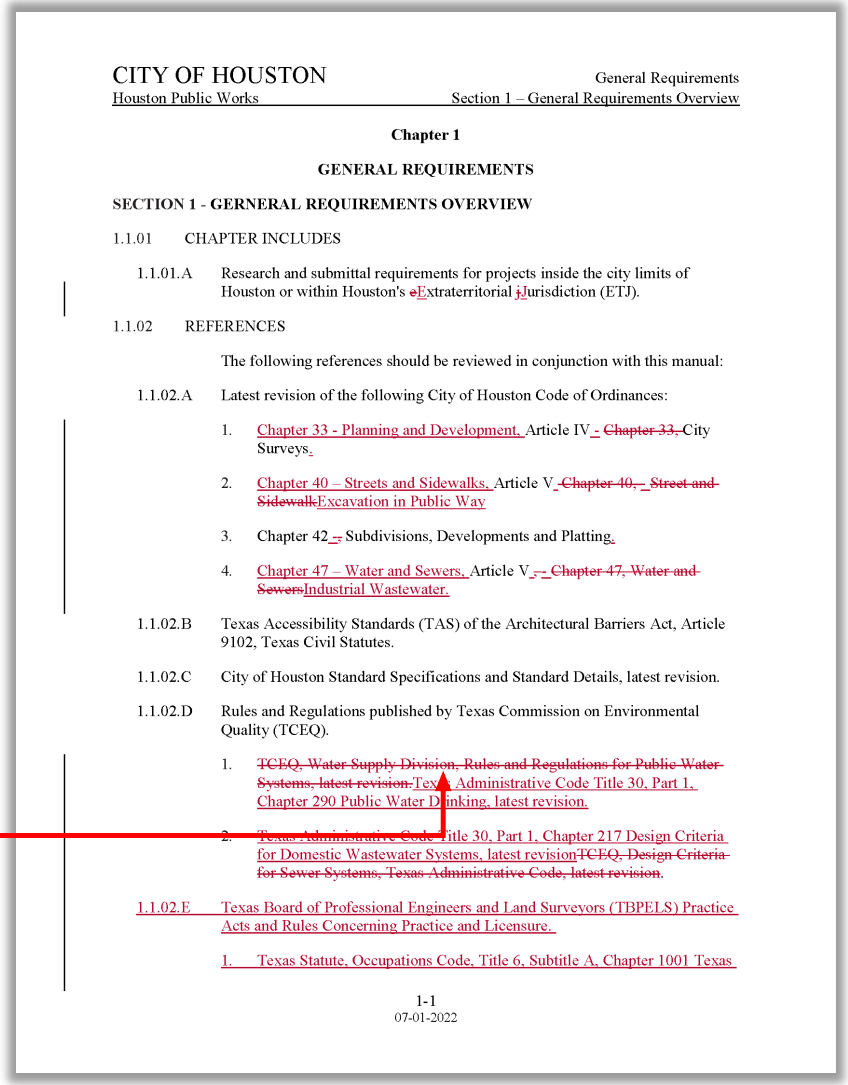


DESIGN AND CONSTRUCTION STANDARDS WEBSITE



IDM REDLINES





CITY OF HOUSTON
Houston Public Works

General Requirements
Section 1 – General Requirements Overview

Chapter 1

GENERAL REQUIREMENTS

SECTION 1 - GERNERAL REQUIREMENTS OVERVIEW

1.1.01 CHAPTER INCLUDES

1.1.01.A Research and submittal requirements for projects inside the city limits of Houston or within Houston's ~~e~~Extraterritorial ~~j~~Jurisdiction (ETJ).

1.1.02 REFERENCES

The following references should be reviewed in conjunction with this manual:

1.1.02.A Latest revision of the following City of Houston Code of Ordinances:

1. Chapter 33 - Planning and Development, Article IV - ~~Chapter 33, -~~City Surveys.
2. Chapter 40 – Streets and Sidewalks, Article V ~~Chapter 40, – Street and Sidewalk~~Excavation in Public Way
3. Chapter 42 ~~–~~ Subdivisions, Developments and Platting.
4. Chapter 47 – Water and Sewers, Article V ~~, – Chapter 47, Water and Sewers~~Industrial Wastewater.

1.1.02.B Texas Accessibility Standards (TAS) of the Architectural Barriers Act, Article 9102, Texas Civil Statutes.

1.1.02.C City of Houston Standard Specifications and Standard Details, latest revision.

1.1.02.D Rules and Regulations published by Texas Commission on Environmental Quality (TCEQ).

1. ~~TCEQ, Water Supply Division, Rules and Regulations for Public Water Systems, latest revision.~~Texas Administrative Code Title 30, Part 1, Chapter 290 Public Water Drinking, latest revision.
2. ~~Texas Administrative Code~~ Title 30, Part 1, Chapter 217 Design Criteria for Domestic Wastewater Systems, latest revision ~~TCEQ, Design Criteria for Sewer Systems, Texas Administrative Code, latest revision~~.

1.1.02.E Texas Board of Professional Engineers and Land Surveyors (TBPELS) Practice Acts and Rules Concerning Practice and Licensure.

1. Texas Statute, Occupations Code, Title 6, Subtitle A, Chapter 1001 Texas

1-1
07-01-2022

HOUSTON PUBLIC WORKS

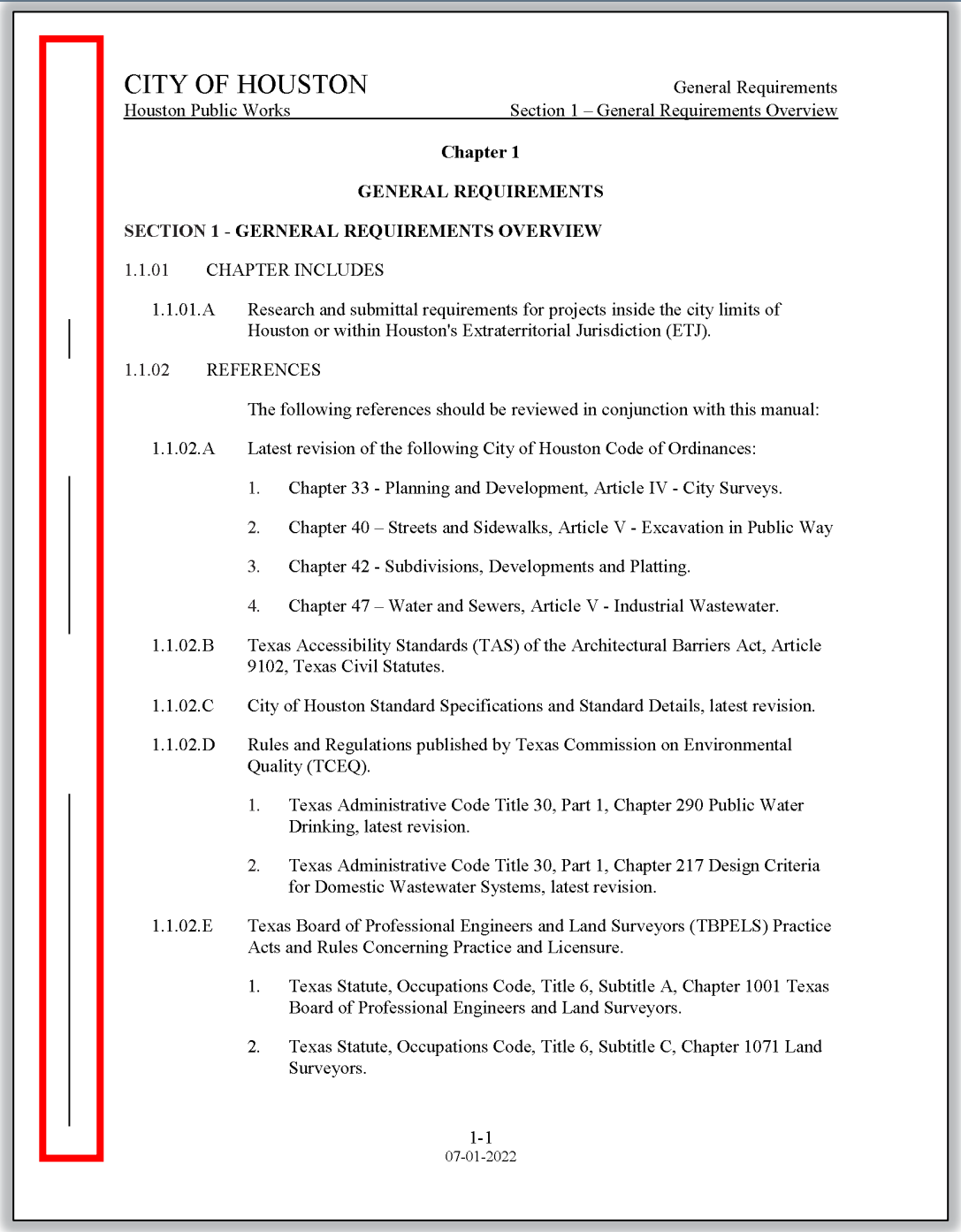
GENERAL CHANGES

Nassef Hanna, PE.

GENERAL CHANGES:

Change bars

- Change bars on the left-hand side of the revised documents indicate a change.



CITY OF HOUSTON
Houston Public Works

General Requirements
Section 1 – General Requirements Overview

Chapter 1

GENERAL REQUIREMENTS

SECTION 1 - GERNERAL REQUIREMENTS OVERVIEW

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3. Chapter 42 - Subdivisions, Developments and Platting.
4. Chapter 47 – Water and Sewers, Article V - Industrial Wastewater.

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1. Texas Statute, Occupations Code, Title 6, Subtitle A, Chapter 1001 Texas Board of Professional Engineers and Land Surveyors.
2. Texas Statute, Occupations Code, Title 6, Subtitle C, Chapter 1071 Land Surveyors.

1-1
07-01-2022

GENERAL CHANGES:

Red Lines

- Details on the changes can be found in the redlines which are provided online.
  - IDM Chapter 1, 2, 3, 4 and 5
  - Standard specifications

1.1.03.H Publicly-Funded Projects - Projects that are funded by a public entity, but do not have a design contract with the City.

1.1.03.I Professional Engineer - An engineer currently licensed and in good standing with the Texas Board of Professional Engineers and Land Surveyors (TBPELS).

1.1.03.J Project Manager - An authorized representative of the City of Houston who manages the project or the Engineer of Record for private development.

~~1.1.03.J~~1.1.03.K Record Drawings - Final revised Drawings prepared by the Engineer of Record on the original as-bid Drawings documenting significant changes in work based solely upon the marked-up As-Built Drawings, addenda, revisions, change orders and other data furnished by the contractor.

1.1.03.L Registered Professional Land Surveyor (RPLS) - A surveyor currently registered and in good standing with State of Texas Board of Professional Engineers and ~~Professional~~ Land Surveyors (TBPELS).

~~1.1.03.K~~1.1.03.M Review Authorities - The authorized representatives of City departments, divisions, branches or sections responsible for reviewing and approving calculations and ~~d~~Drawings for Publicly-Funded Projects, ~~p~~Privately-~~F~~Funded ~~p~~Projects and for design and construction contracts with the City.

~~1.1.03.L~~1.1.03.N Specifications - City of Houston Standard Specifications plus project-specific narrative descriptions of procedures, requirements, and materials for a particular project.

1.1.04 PLAT AND CONSTRUCTION DRAWING REVIEW PROCESS

1.1.04.A Review of plat and construction ~~d~~Drawings by ~~the Department of~~ Houston Public Works is a required part of the overall platting process under purview of the City Planning Commission and the Planning and Development Department of the City of Houston.[1]

1.1.04.B The process to be followed in submitting documents for review and approval of water, wastewater, storm drainage, and street paving is described by the flowchart depicted in Figure 4.1, ~~Review and Approval Process for Plats and Drawings~~Class III Preliminary Plat.

[1] Refer to weblink for City requirements: http://www.houstontx.gov/planning/Commissions/commiss_plan.html

GENERAL CHANGES:

Chapter sections

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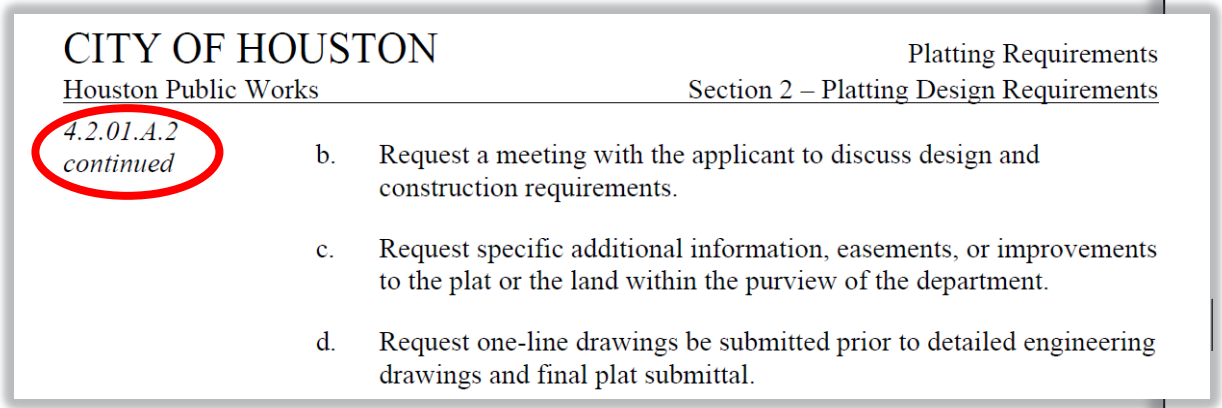
HOUSTON PUBLIC WORKS

GENERAL CHANGES:

Chapter placeholders



CITY OF HOUSTON
Houston Public Works

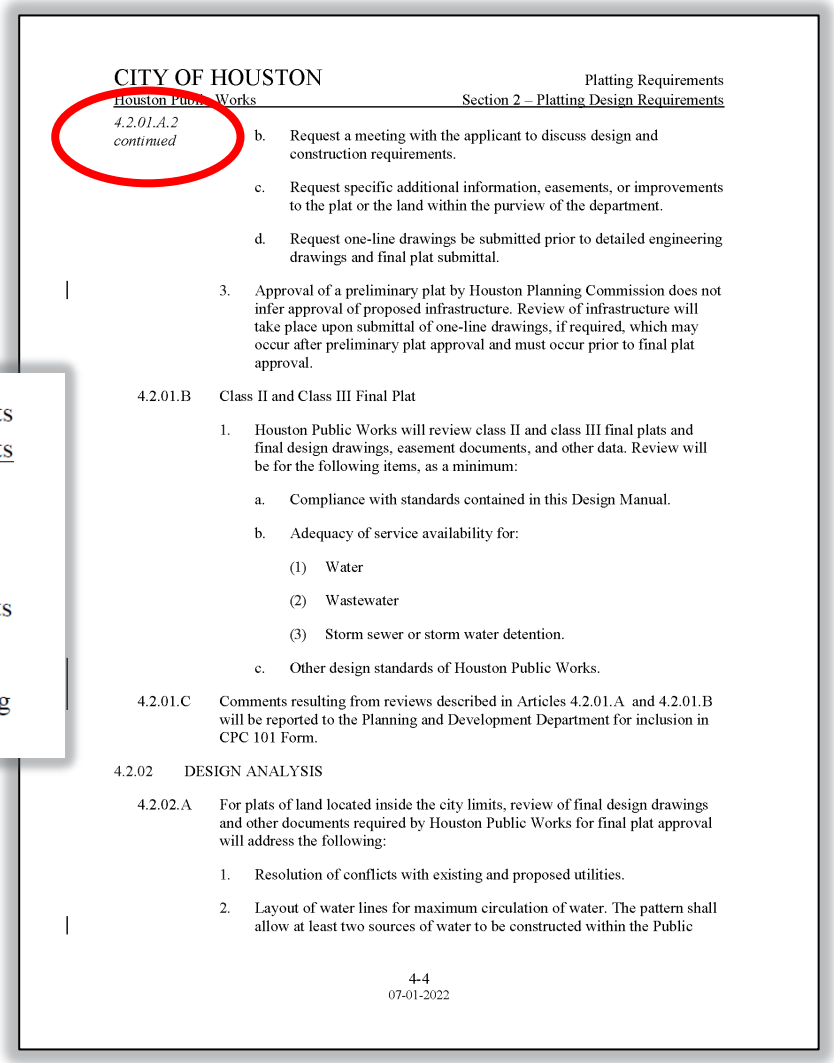
Platting Requirements
Section 2 – Platting Design Requirements

4.2.01.A.2 continued

b. Request a meeting with the applicant to discuss design and construction requirements.

c. Request specific additional information, easements, or improvements to the plat or the land within the purview of the department.

d. Request one-line drawings be submitted prior to detailed engineering drawings and final plat submittal.



CITY OF HOUSTON
Houston Public Works

Platting Requirements
Section 2 – Platting Design Requirements

4.2.01.A.2 continued

b. Request a meeting with the applicant to discuss design and construction requirements.

c. Request specific additional information, easements, or improvements to the plat or the land within the purview of the department.

d. Request one-line drawings be submitted prior to detailed engineering drawings and final plat submittal.

3. Approval of a preliminary plat by Houston Planning Commission does not infer approval of proposed infrastructure. Review of infrastructure will take place upon submittal of one-line drawings, if required, which may occur after preliminary plat approval and must occur prior to final plat approval.

4.2.01.B Class II and Class III Final Plat

1. Houston Public Works will review class II and class III final plats and final design drawings, easement documents, and other data. Review will be for the following items, as a minimum:

a. Compliance with standards contained in this Design Manual.

b. Adequacy of service availability for:

(1) Water

(2) Wastewater

(3) Storm sewer or storm water detention.

c. Other design standards of Houston Public Works.

4.2.01.C Comments resulting from reviews described in Articles 4.2.01.A and 4.2.01.B will be reported to the Planning and Development Department for inclusion in CPC 101 Form.

4.2.02 DESIGN ANALYSIS

4.2.02.A For plats of land located inside the city limits, review of final design drawings and other documents required by Houston Public Works for final plat approval will address the following:

1. Resolution of conflicts with existing and proposed utilities.

2. Layout of water lines for maximum circulation of water. The pattern shall allow at least two sources of water to be constructed within the Public

4-4
07-01-2022

HOUSTON PUBLIC WORKS

GENERAL CHANGES:

Definitions and Capitalization

- We added new definitions.
- Defined term and proper nouns were Capitalized.

4.1.03 DEFINITIONS

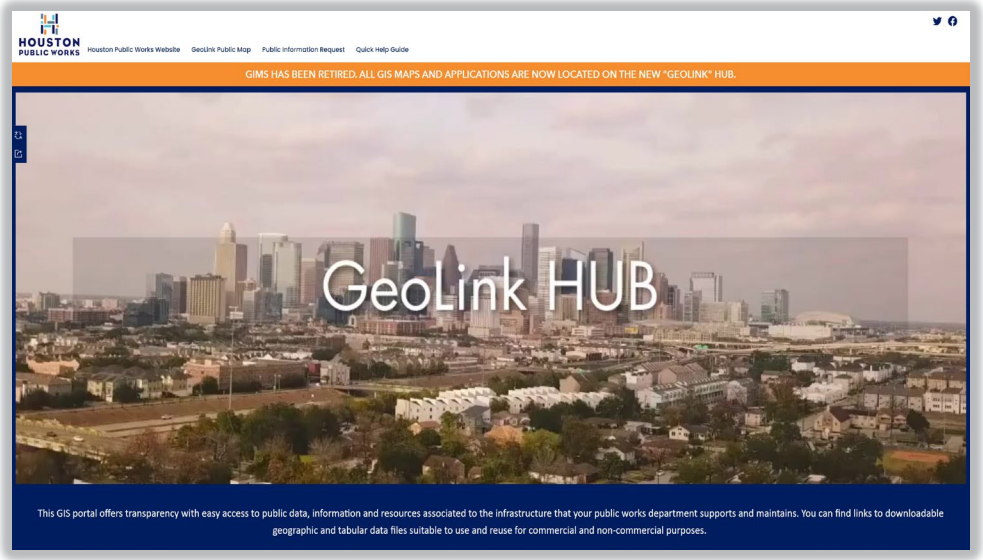
4.1.03.A Chief Surveyor - An authorized representative of the City having approval authority for privately-funded projects or having authority for administration of contracts for the City.

1. All class II & III plats located within the city limits as they existed in 1870 will be routed to the office of the Chief Surveyor for review. Review will be for the following items at a minimum:

GENERAL CHANGES:

Updates

- GIMS updated to GeoLink Hub
- Department names
- Gender-neutral language



2. Water to be drawn from public fire hydrants. Obtain transit meter from City of Houston, ~~Department of~~ Houston Public Works ~~and Engineering~~, Taps and Meters Section. Pay required deposit based on rates established by latest ordinance.

1.1.04.D For projects not requiring a subdivision plat, ~~C~~construction of utilities and paving ~~in projects not requiring a subdivision plat~~ is not permitted until final design ~~d~~Drawings are approved and signed by the Director~~, Department~~ of Houston Public Works, or ~~his~~ the Director's designee.

QUESTIONS?

Enter it into the chat.

Note the chapter or topic in your question.

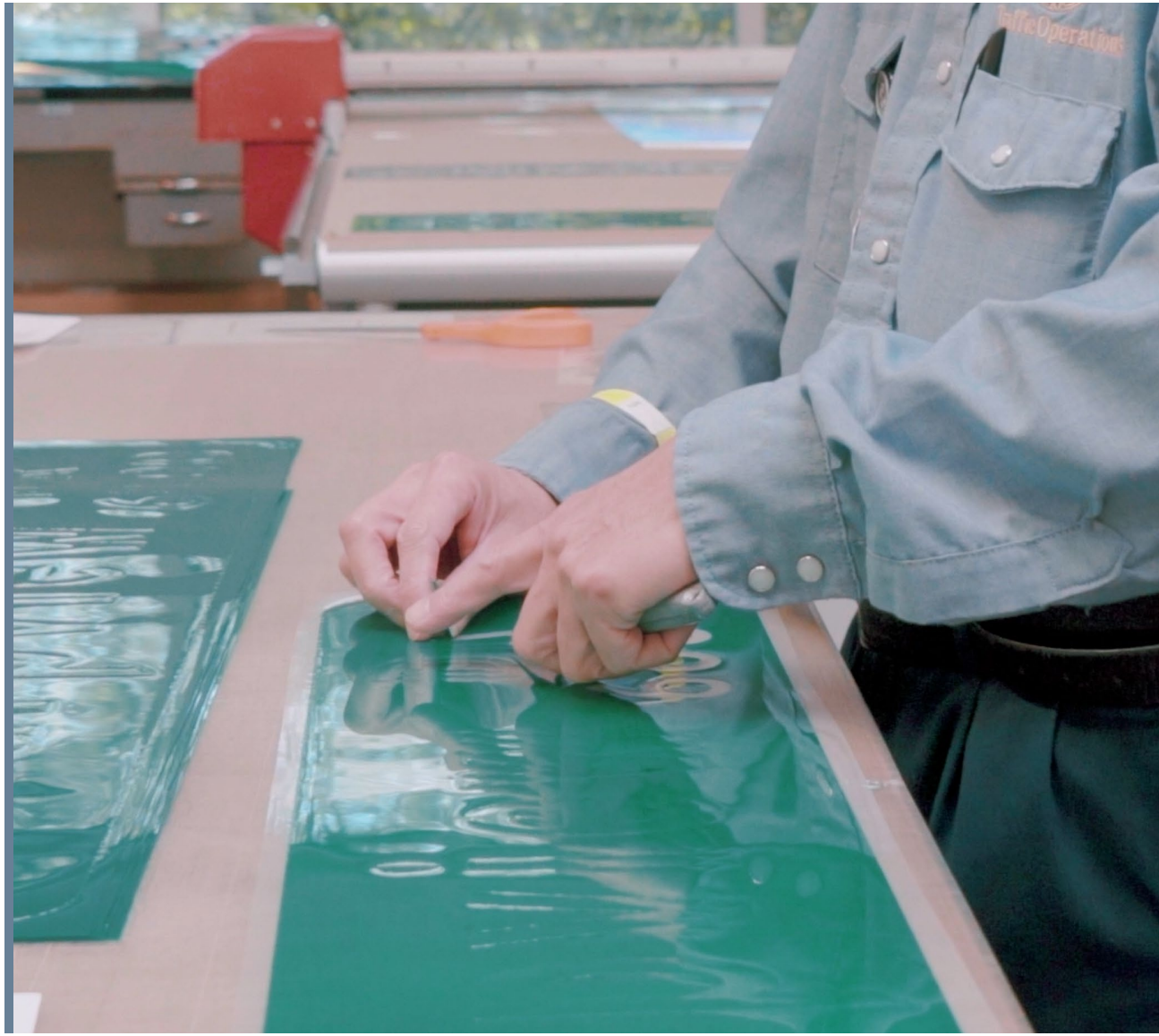
We will respond to unanswered questions on our website after this event.

CHAPTER 3 – GRAPHIC REQUIREMENTS

LUIS GARZA, PE, CDT
DESIGN AND CONSTRUCTION STANDARDS GROUP

CHAPTER 3: UPDATES OF NOTE

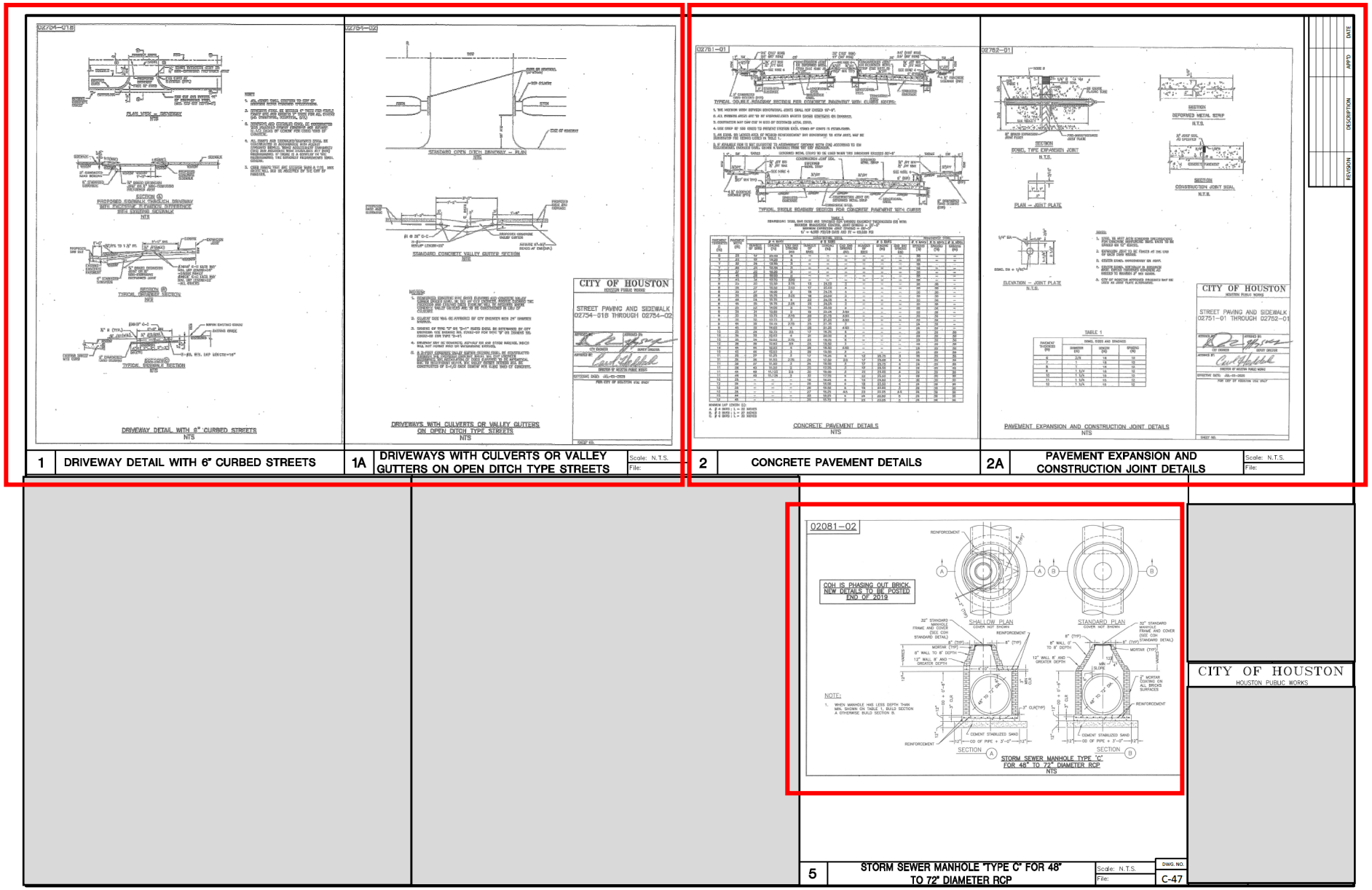
- Cross street information increased to 25 ft for proposed roadways (3.2.01.E)
- North arrow exception for LDWLs (3.2.05.C.1)
- Show swing ties on survey control or swing tie drawings. (3.2.09.A)
- Labeling requirements (3.2.10.A.3)



CHAPTER 3: MAJOR UPDATES

- Importing standard details
- Modifications to standard details
- CAD tools and templates

CHAPTER 3: IMPORTING STANDARD DETAILS



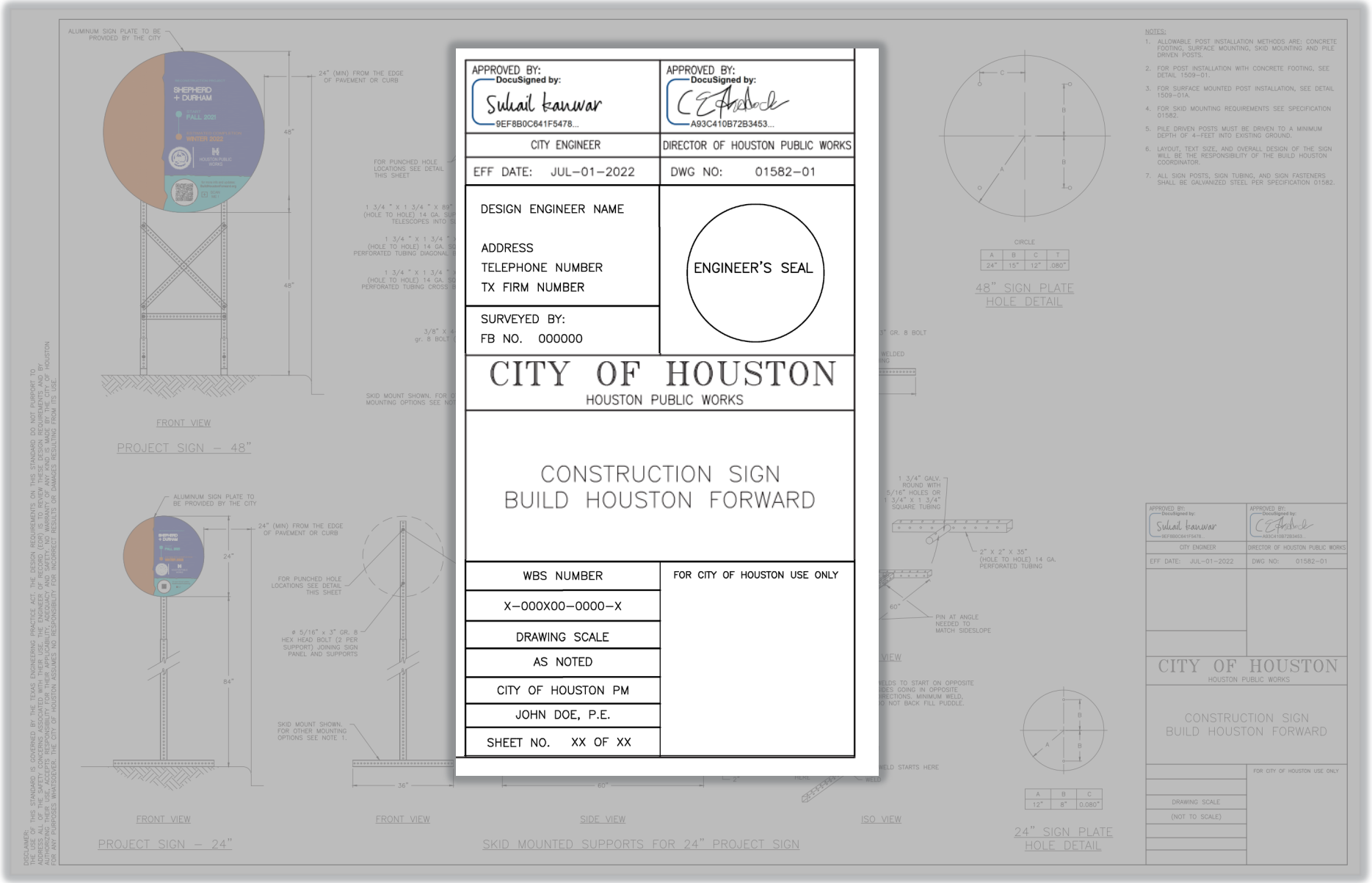
CHAPTER 3: IMPORTING STANDARD DETAILS (2022)

3.1.05 IMPORTING STANDARD DETAILS

3.1.05.A Standard details shall be imported onto the sheet files when applicable. City standard details shall not be cropped and must be included in the Drawings as the City provides them. The standard detail's entire border and title block must remain visible. For visibility each sheet shall only have up to:

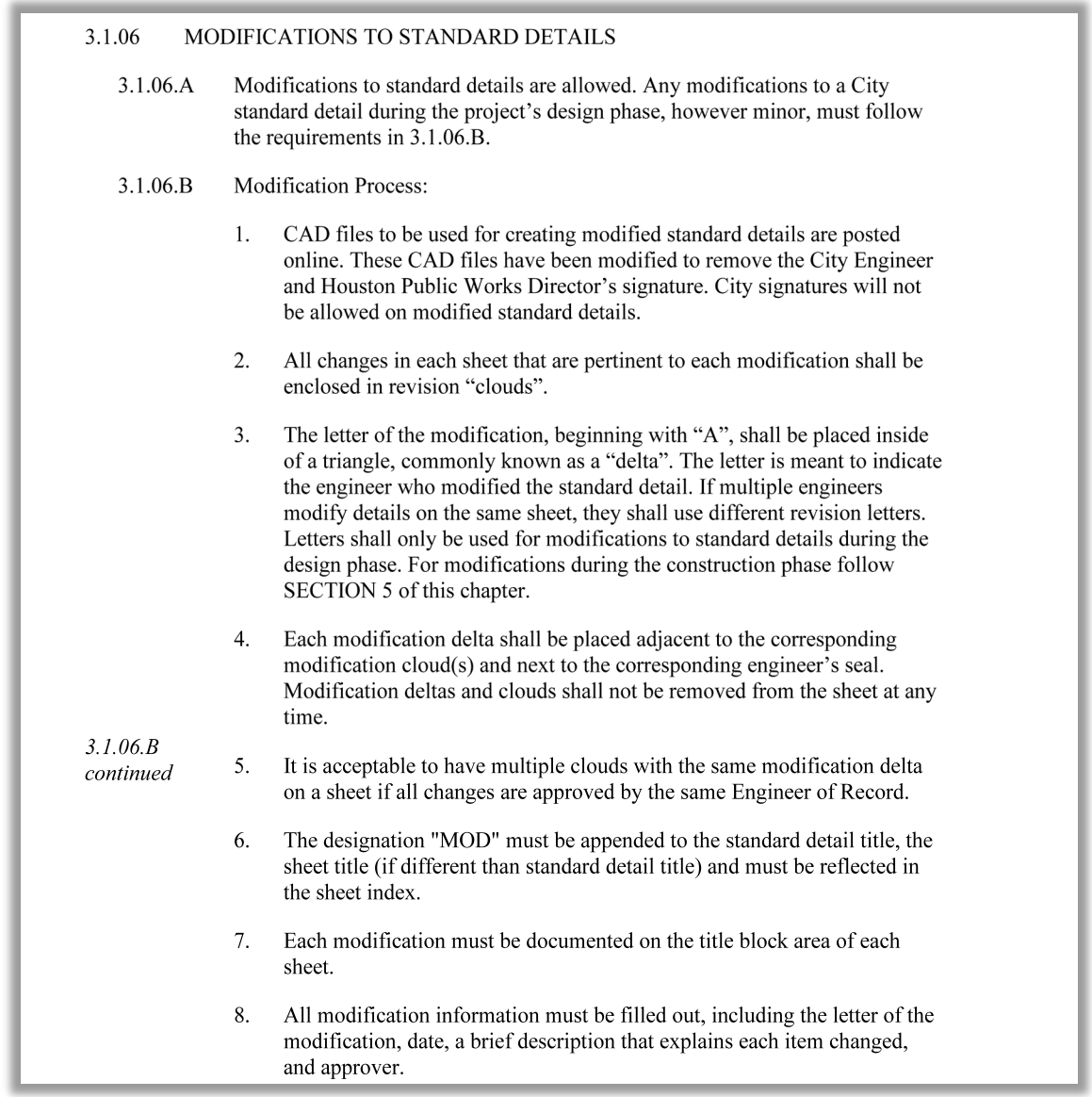
1. Six 8 ½" x 11" standard details oriented portrait.
2. Four 8 ½" x 11" standard details oriented landscape.
3. Two 11"x17" standard details oriented landscape.
4. One 22"x34" standard detail oriented landscape.

CHAPTER 3: IMPORTING STANDARD DETAILS (2022)



CHAPTER 3: STANDARD DETAIL MODIFICATIONS

- Project specific modifications to City standard details are allowed
- City CAD files will be provided on HPC website
- Mods must meet requirements of Ch. 3 “Modification to Standard Details”



3.1.06 MODIFICATIONS TO STANDARD DETAILS

3.1.06.A Modifications to standard details are allowed. Any modifications to a City standard detail during the project’s design phase, however minor, must follow the requirements in 3.1.06.B.

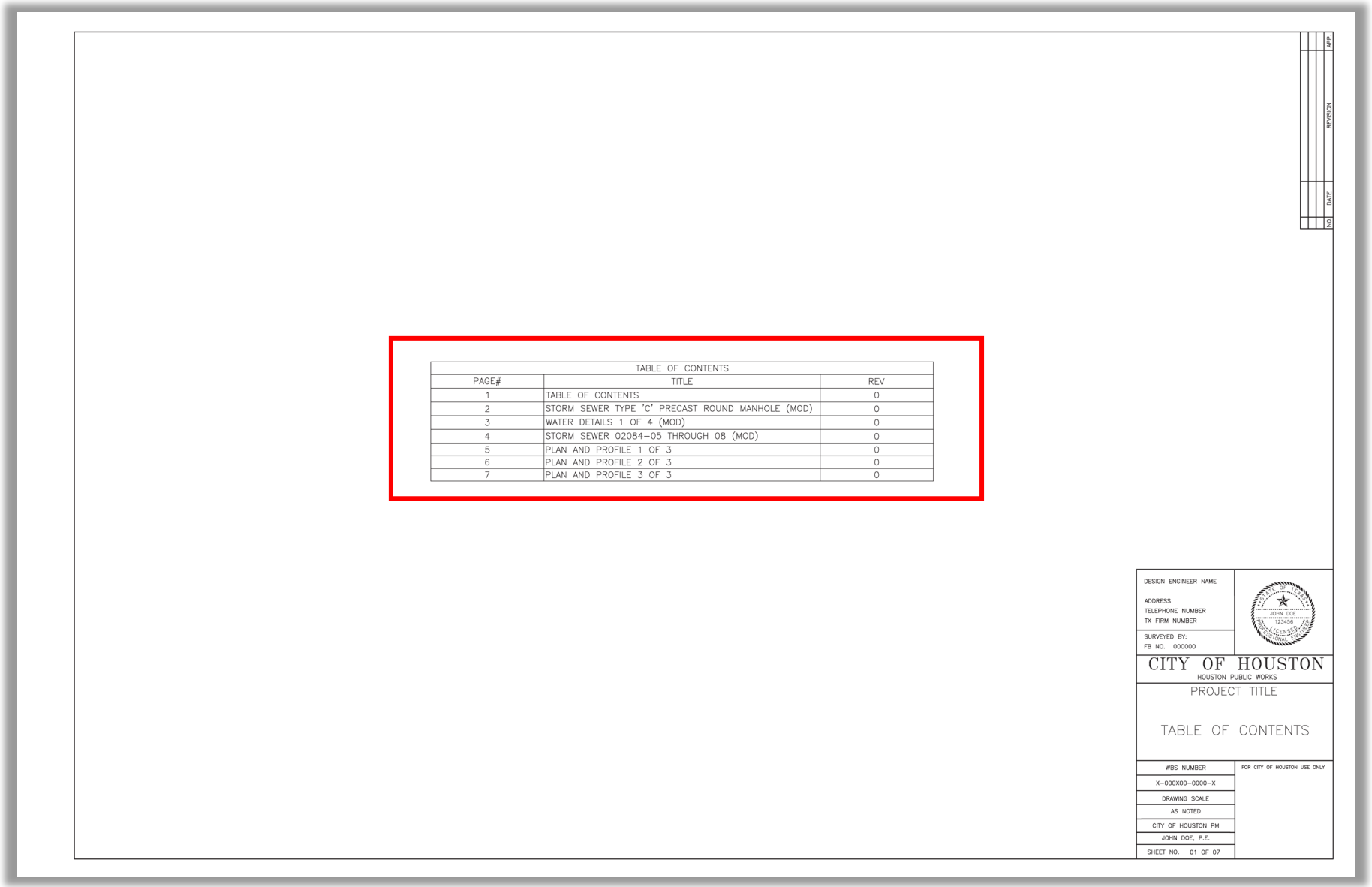
3.1.06.B Modification Process:

1. CAD files to be used for creating modified standard details are posted online. These CAD files have been modified to remove the City Engineer and Houston Public Works Director’s signature. City signatures will not be allowed on modified standard details.
2. All changes in each sheet that are pertinent to each modification shall be enclosed in revision “clouds”.
3. The letter of the modification, beginning with “A”, shall be placed inside of a triangle, commonly known as a “delta”. The letter is meant to indicate the engineer who modified the standard detail. If multiple engineers modify details on the same sheet, they shall use different revision letters. Letters shall only be used for modifications to standard details during the design phase. For modifications during the construction phase follow SECTION 5 of this chapter.
4. Each modification delta shall be placed adjacent to the corresponding modification cloud(s) and next to the corresponding engineer’s seal. Modification deltas and clouds shall not be removed from the sheet at any time.

3.1.06.B continued

5. It is acceptable to have multiple clouds with the same modification delta on a sheet if all changes are approved by the same Engineer of Record.
6. The designation "MOD" must be appended to the standard detail title, the sheet title (if different than standard detail title) and must be reflected in the sheet index.
7. Each modification must be documented on the title block area of each sheet.
8. All modification information must be filled out, including the letter of the modification, date, a brief description that explains each item changed, and approver.

CHAPTER 3: MODIFIED STD. DETAIL EXAMPLES



NO. | DATE | REVISION | APP

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3	WATER DETAILS 1 OF 4 (MOD)	0
4	STORM SEWER 02084-05 THROUGH 08 (MOD)	0
5	PLAN AND PROFILE 1 OF 3	0
6	PLAN AND PROFILE 2 OF 3	0
7	PLAN AND PROFILE 3 OF 3	0

DESIGN ENGINEER NAME
ADDRESS
TELEPHONE NUMBER
TX FIRM NUMBER

SURVEYED BY:
FB NO. 000000

JOHN DOE
123456
LICENSED

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

PROJECT TITLE

TABLE OF CONTENTS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
X-000X00-0000-X	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
JOHN DOE, P.E.	
SHEET NO. 01 OF 07	

CHAPTER 3: MODIFIED STD. DETAIL EXAMPLES

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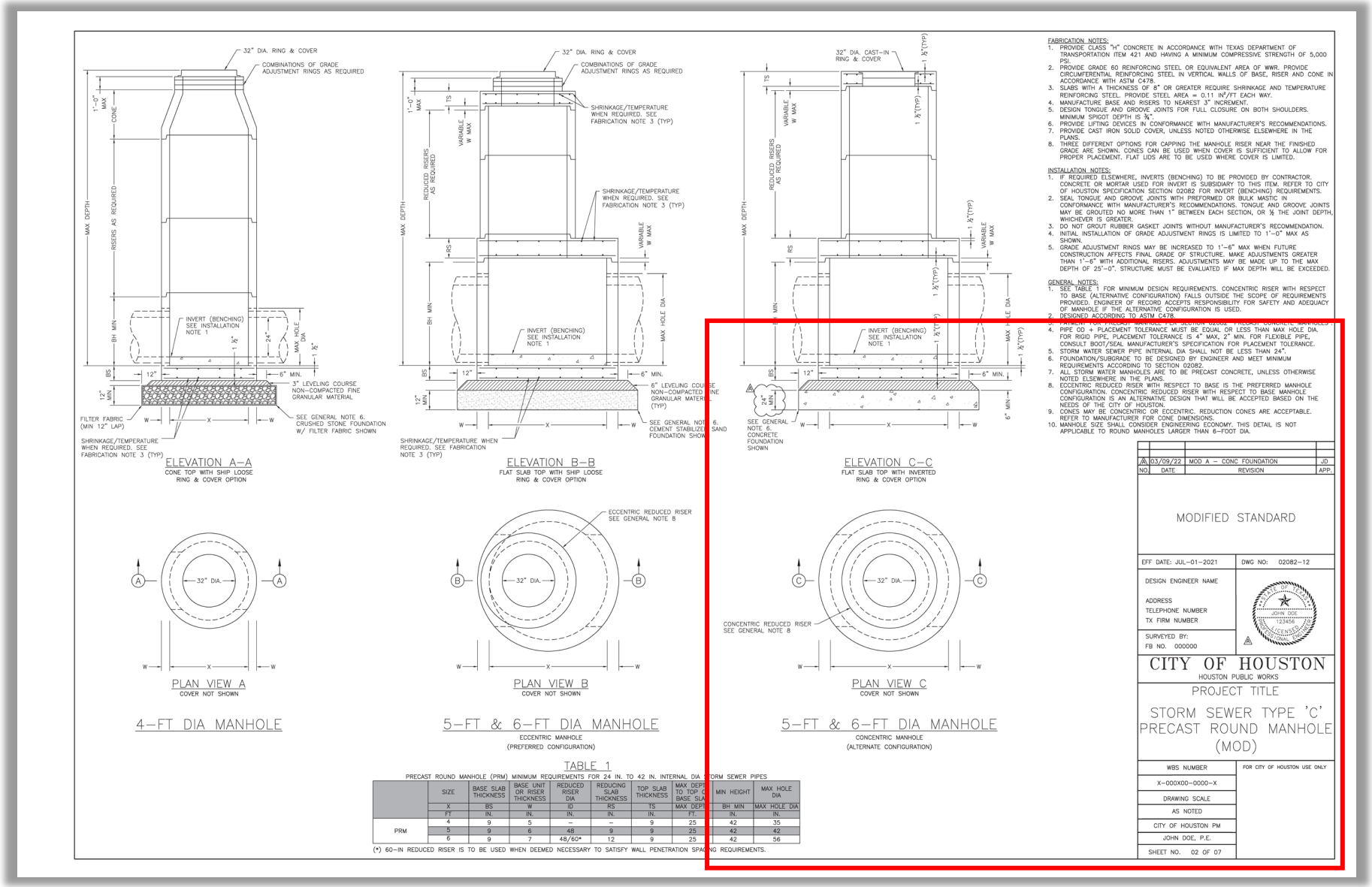
CHAPTER 3: MODIFIED STD. DETAIL EXAMPLES



FABRICATION NOTES:
1. PROVIDE CLASS "H" CONCRETE IN ACCORDANCE WITH TEXAS DEPARTMENT OF TRANSPORTATION ITEM 421 AND HAVING A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI.
2. PROVIDE GRADE 60 REINFORCING STEEL OR EQUIVALENT AREA OF WWR. PROVIDE CIRCUMFERENTIAL REINFORCING STEEL IN VERTICAL WALLS OF BASE, RISER AND CONE IN ACCORDANCE WITH ASTM C478.
3. SLABS WITH A THICKNESS OF 8" OR GREATER REQUIRE SHRINKAGE AND TEMPERATURE REINFORCING STEEL. PROVIDE STEEL AREA = 0.11 IN²/FT EACH WAY.
4. MANUFACTURE BASE AND RISERS TO NEAREST 3" INCREMENT.
5. DESIGN TONGUE AND GROOVE JOINTS FOR FULL CLOSURE ON BOTH SHOULDERS. MINIMUM SPIGOT DEPTH IS ¾".
6. PROVIDE LIFTING DEVICES IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS.
7. PROVIDE CAST IRON SOLID COVER, UNLESS NOTED OTHERWISE ELSEWHERE IN THE PLANS.
8. THREE DIFFERENT OPTIONS FOR CAPPING THE MANHOLE RISER NEAR THE FINISHED GRADE ARE SHOWN. CONES CAN BE USED WHEN COVER IS SUFFICIENT TO ALLOW FOR PROPER PLACEMENT. FLAT LIDS ARE TO BE USED WHERE COVER IS LIMITED.

INSTALLATION NOTES:
1. IF REQUIRED ELSEWHERE, INVERTS (BENCHING) TO BE PROVIDED BY CONTRACTOR. CONCRETE OR MORTAR USED FOR INVERT IS SUBSIDIARY TO THIS ITEM. REFER TO CITY OF HOUSTON SPECIFICATION SECTION 02082 FOR INVERT (BENCHING) REQUIREMENTS.
2. SEAL TONGUE AND GROOVE JOINTS WITH PREFORMED OR BULK MASTIC IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS. TONGUE AND GROOVE JOINTS MAY BE GROUTED NO MORE THAN 1" BETWEEN EACH SECTION, OR ½ THE JOINT DEPTH, WHICHEVER IS GREATER.
3. DO NOT GROUT RUBBER GASKET JOINTS WITHOUT MANUFACTURER'S RECOMMENDATION.
4. INITIAL INSTALLATION OF GRADE ADJUSTMENT RINGS IS LIMITED TO 1'–0" MAX AS SHOWN.
5. GRADE ADJUSTMENT RINGS MAY BE INCREASED TO 1'–6" MAX WHEN FUTURE CONSTRUCTION AFFECTS FINAL GRADE OF STRUCTURE. MAKE ADJUSTMENTS GREATER THAN 1'–6" WITH ADDITIONAL RISERS. ADJUSTMENTS MAY BE MADE UP TO THE MAX DEPTH OF 25'–0". STRUCTURE MUST BE EVALUATED IF MAX DEPTH WILL BE EXCEEDED.

GENERAL NOTES:
1. SEE TABLE 1 FOR MINIMUM DESIGN REQUIREMENTS. CONCENTRIC RISER WITH RESPECT TO BASE (ALTERNATIVE CONFIGURATION) FALLS OUTSIDE THE SCOPE OF REQUIREMENTS PROVIDED. ENGINEER OF RECORD ACCEPTS RESPONSIBILITY FOR SAFETY AND ADEQUACY OF MANHOLE IF THE ALTERNATIVE CONFIGURATION IS USED.
2. DESIGNED ACCORDING TO ASTM C478.
3. PAYMENT FOR PRECAST MANHOLE PER SECTION 02082 "PRECAST CONCRETE MANHOLES"
4. PIPE OD + PLACEMENT TOLERANCE MUST BE EQUAL OR LESS THAN MAX HOLE DIA. FOR RIGID PIPE, PLACEMENT TOLERANCE IS 4" MAX, 2" MIN. FOR FLEXIBLE PIPE, CONSULT BOOT/SEAL MANUFACTURER'S SPECIFICATION FOR PLACEMENT TOLERANCE.
5. STORM WATER SEWER PIPE INTERNAL DIA SHALL NOT BE LESS THAN 24".
6. FOUNDATION/SUBGRADE TO BE DESIGNED BY ENGINEER AND MEET MINIMUM REQUIREMENTS ACCORDING TO SECTION 02082.
7. ALL STORM WATER MANHOLES ARE TO BE PRECAST CONCRETE, UNLESS OTHERWISE NOTED ELSEWHERE IN THE PLANS.
8. ECCENTRIC REDUCED RISER WITH RESPECT TO BASE IS THE PREFERRED MANHOLE CONFIGURATION. CONCENTRIC REDUCED RISER WITH RESPECT TO BASE MANHOLE CONFIGURATION IS AN ALTERNATIVE DESIGN THAT WILL BE ACCEPTED BASED ON THE NEEDS OF THE CITY OF HOUSTON.
9. CONES MAY BE CONCENTRIC OR ECCENTRIC. REDUCTION CONES ARE ACCEPTABLE. REFER TO MANUFACTURER FOR CONE DIMENSIONS.
10. MANHOLE SIZE SHALL CONSIDER ENGINEERING ECONOMY. THIS DETAIL IS NOT APPLICABLE TO ROUND MANHOLES LARGER THAN 6-FOOT DIA.

TABLE 1
PRECAST ROUND MANHOLE (PRM) MINIMUM REQUIREMENTS FOR 24 IN. TO 42 IN. INTERNAL DIA STORM SEWER PIPES

	SIZE	BASE SLAB THICKNESS	BASE UNIT OR RISER THICKNESS	REDUCED RISER DIA	REDUCING SLAB THICKNESS	TOP SLAB THICKNESS	MAX DEPTH TO TOP OF BASE SLAB	MIN HEIGHT	MAX HOLE DIA
	X	BS	W	ID	RS	TS	MAX DEPTH	BH MIN	MAX HOLE DIA
	FT	IN.	IN.	IN.	IN.	IN.	FT.	IN.	IN.
PRM	4	9	5	–	–	9	25	42	35
	5	9	6	48	9	9	25	42	42
	6	9	7	48/60*	12	9	25	42	56

(*) 60–IN REDUCED RISER IS TO BE USED WHEN DEEMED NECESSARY TO SATISFY WALL PENETRATION SPACING REQUIREMENTS.

NO.	DATE	REVISION	APP.
3	03/09/22	MOD A – CONC FOUNDATION	JD

MODIFIED STANDARD

EFF DATE: JUL–01–2021 | DWG NO: 02082–12

DESIGN ENGINEER NAME
ADDRESS
TELEPHONE NUMBER
TX FIRM NUMBER

SURVEYED BY:
FB NO. 000000

JOHN DOE 123456 LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

PROJECT TITLE
STORM SEWER TYPE 'C' PRECAST ROUND MANHOLE (MOD)

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X–000X00–0000–X	
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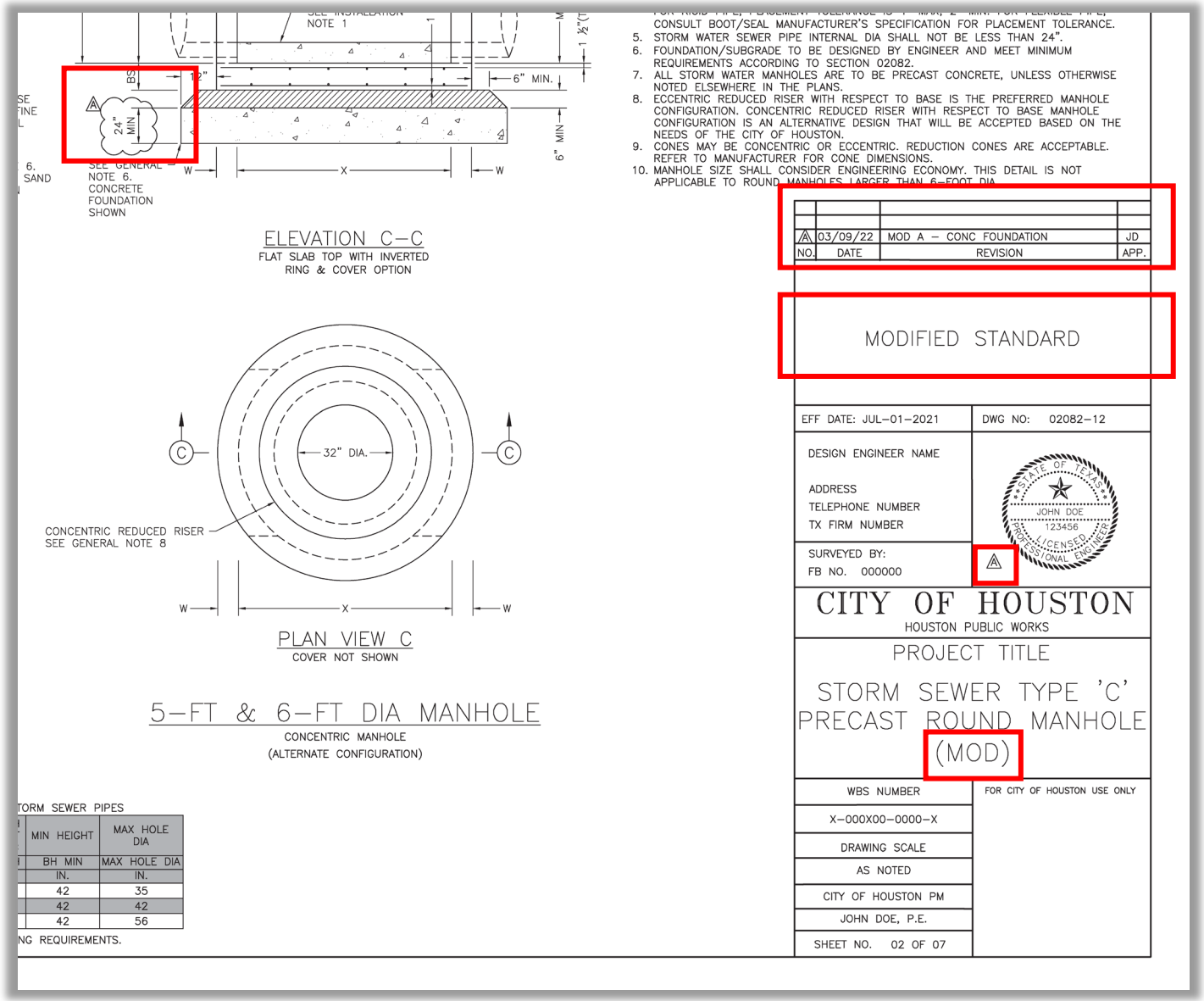
AS NOTED	
CITY OF HOUSTON PM	
JOHN DOE, P.E.	
SHEET NO. 02 OF 07	

CHAPTER 3: MODIFIED STD. DETAIL EXAMPLES



NOTE 1

6" MIN.

24" MIN

SEE GENERAL NOTE 6. CONCRETE FOUNDATION SHOWN

W X W

6" MIN.

ELEVATION C–C
FLAT SLAB TOP WITH INVERTED RING & COVER OPTION

CONCENTRIC REDUCED RISER SEE GENERAL NOTE 8

32" DIA.

W X W

PLAN VIEW C
COVER NOT SHOWN

5–FT & 6–FT DIA MANHOLE
CONCENTRIC MANHOLE
(ALTERNATE CONFIGURATION)

CONSULT BOOT/SEAL MANUFACTURER'S SPECIFICATION FOR PLACEMENT TOLERANCE.
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A	03/09/22	MOD A – CONC FOUNDATION	JD

MODIFIED STANDARD

EFF DATE: JUL–01–2021 | DWG NO: 02082–12

DESIGN ENGINEER NAME
ADDRESS
TELEPHONE NUMBER
TX FIRM NUMBER

STATE OF TEXAS
JOHN DOE
123456
LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
FB NO. 000000

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

PROJECT TITLE
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DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
JOHN DOE, P.E.	
SHEET NO. 02 OF 07	

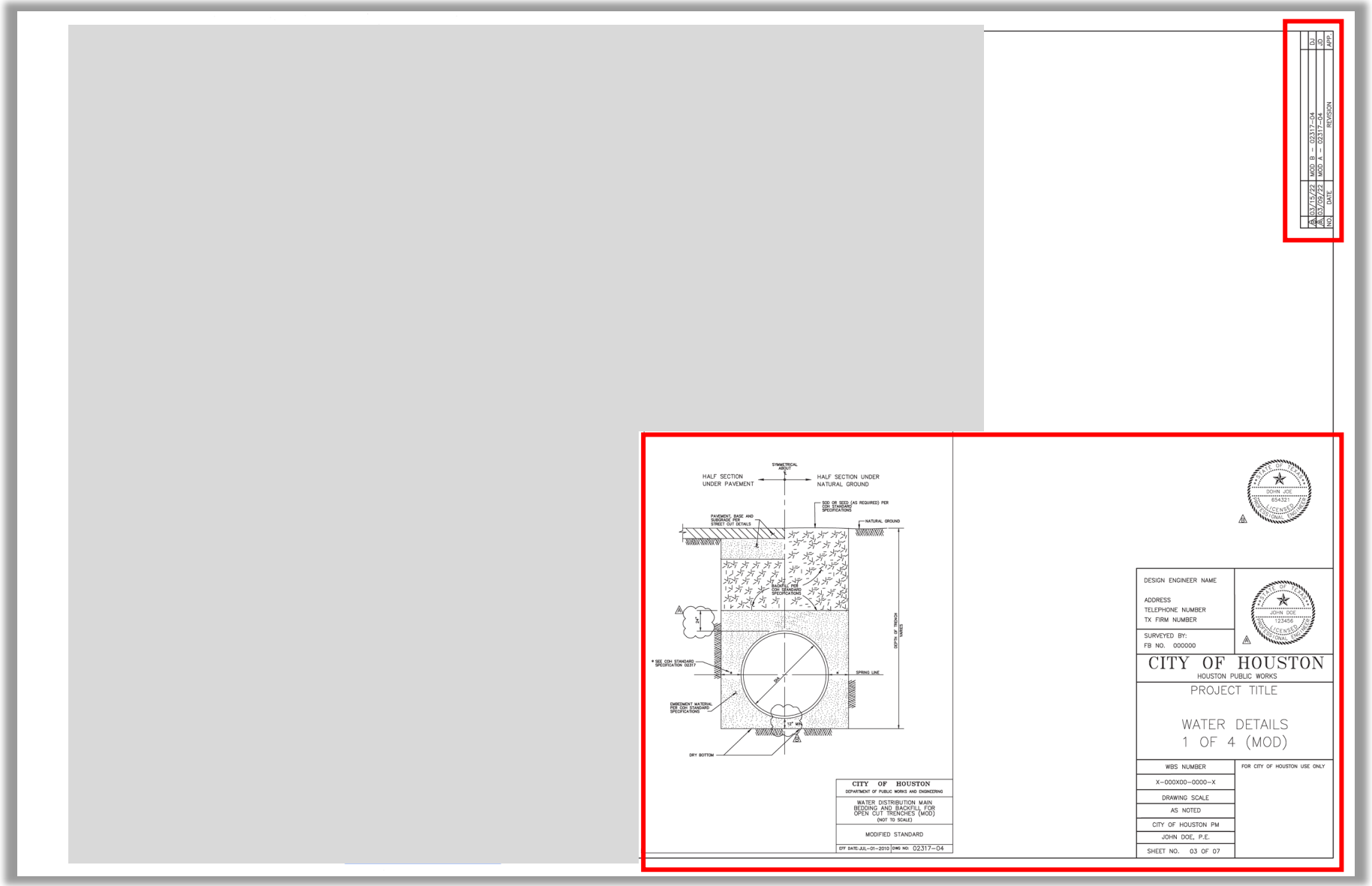
TORM SEWER PIPES

MIN HEIGHT	MAX HOLE DIA
BH MIN	MAX HOLE DIA
IN.	IN.
42	35
42	42
42	56

NG REQUIREMENTS.

HOUSTON PUBLIC WORKS

CHAPTER 3: MODIFIED STD. DETAIL EXAMPLES



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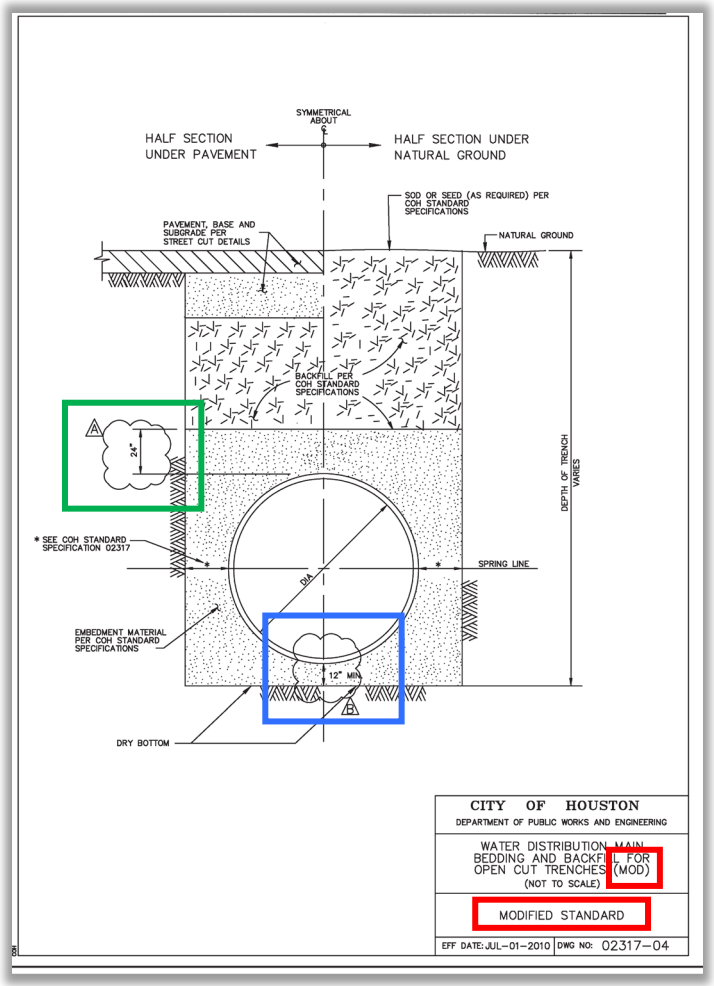
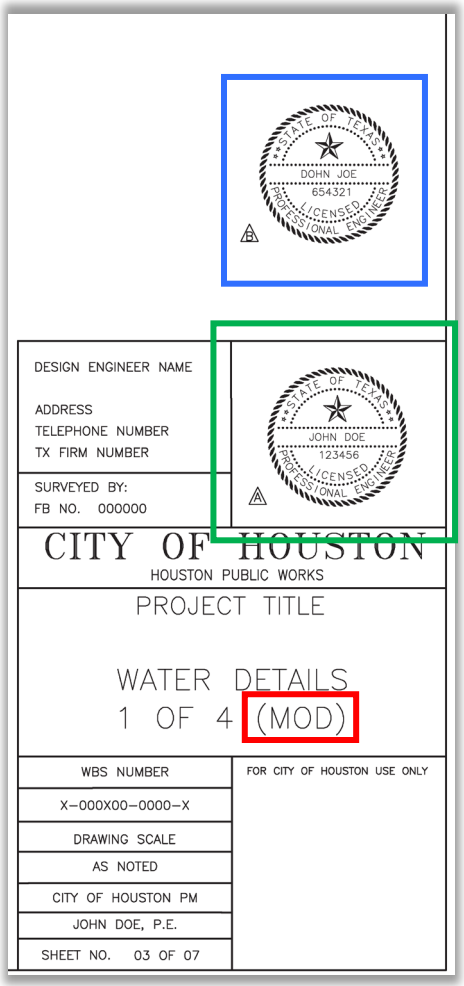
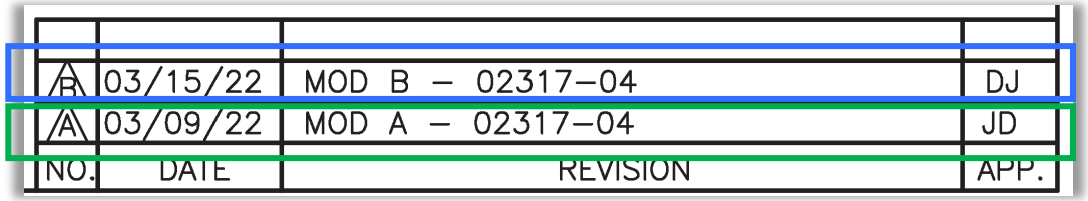
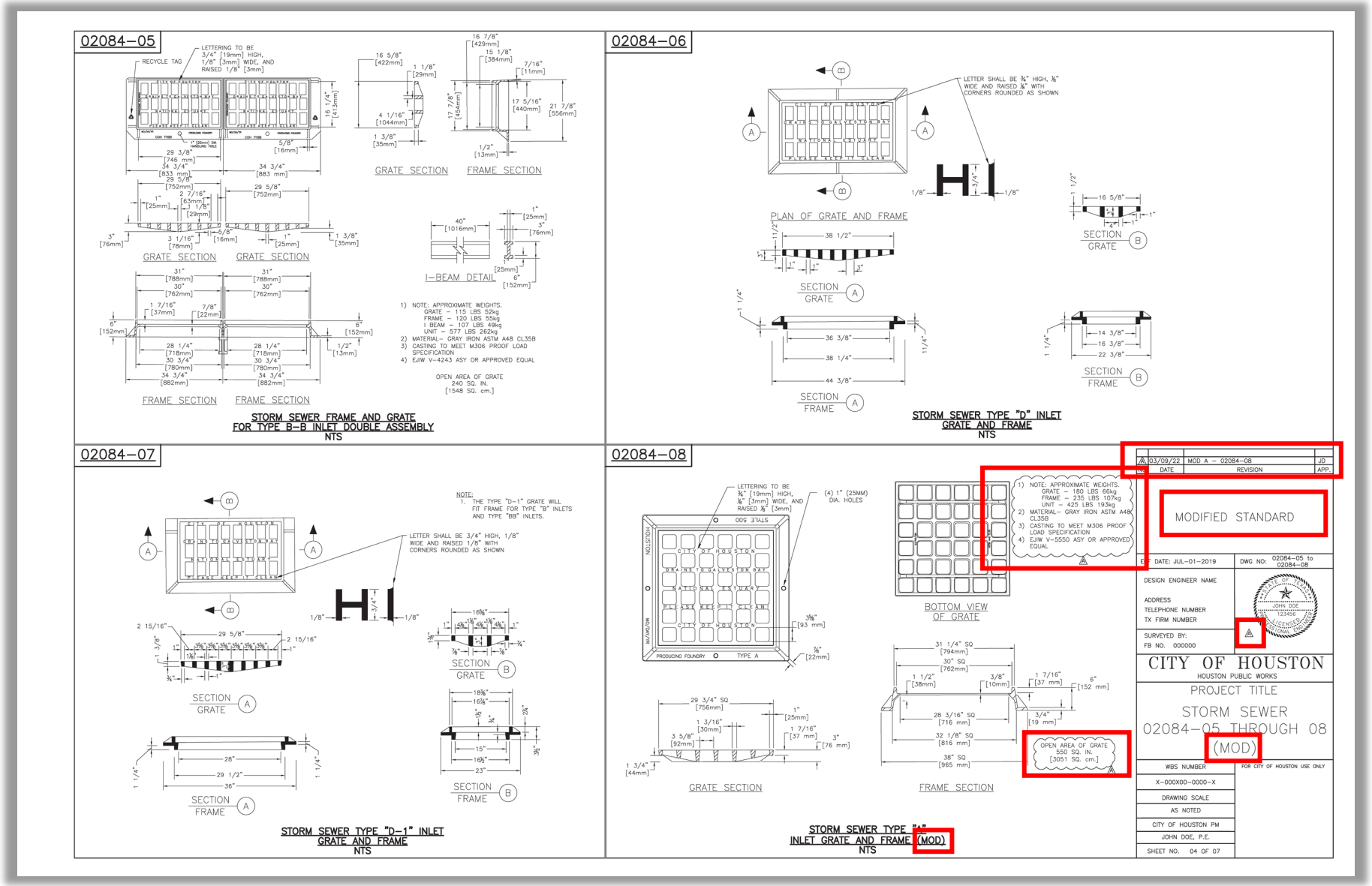






HOUSTON PUBLIC WORKS

CHAPTER 3: MODIFIED STD. DETAIL EXAMPLES



CHAPTER 3: LINE WEIGHT, COLOR & TYPE

Line Color

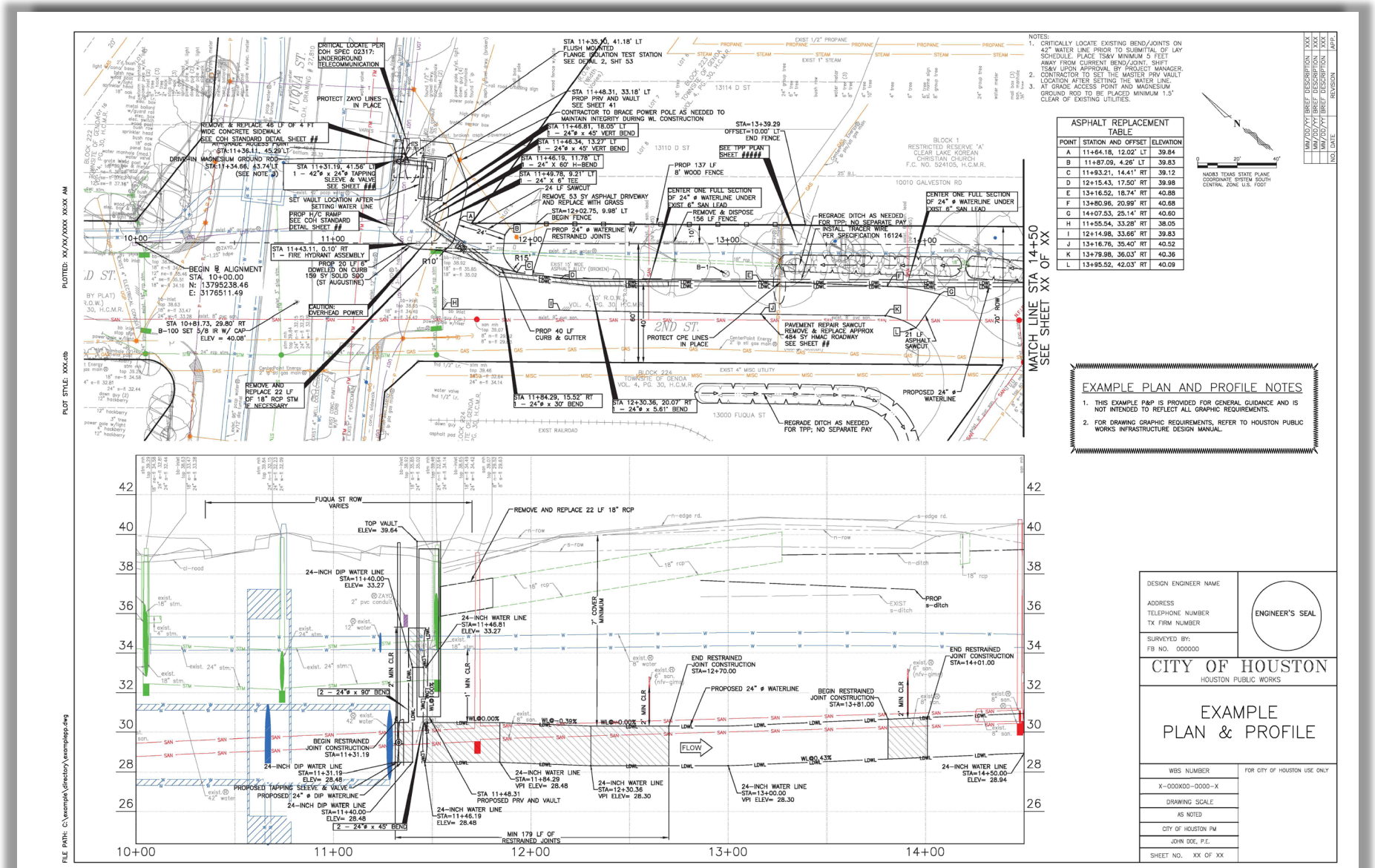
- Existing objects grey
- Existing utilities color

Line Weight

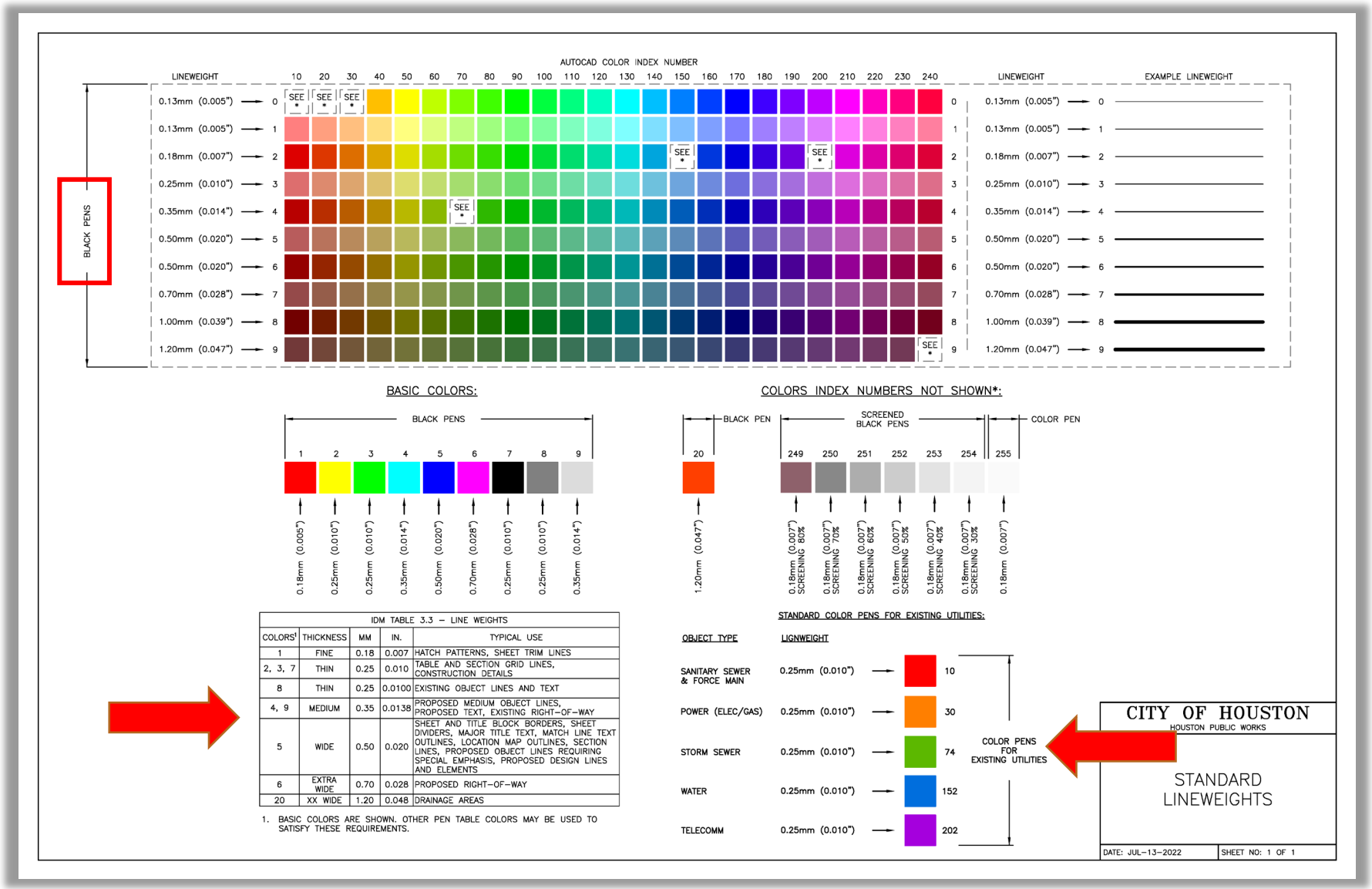
- Extra Fine (.10-mm) removed
- Existing objects increase to 0.25-mm

Refer to Sec. 3.3.03 “Line Weights” & 3.3.04 “Line Type” for Info

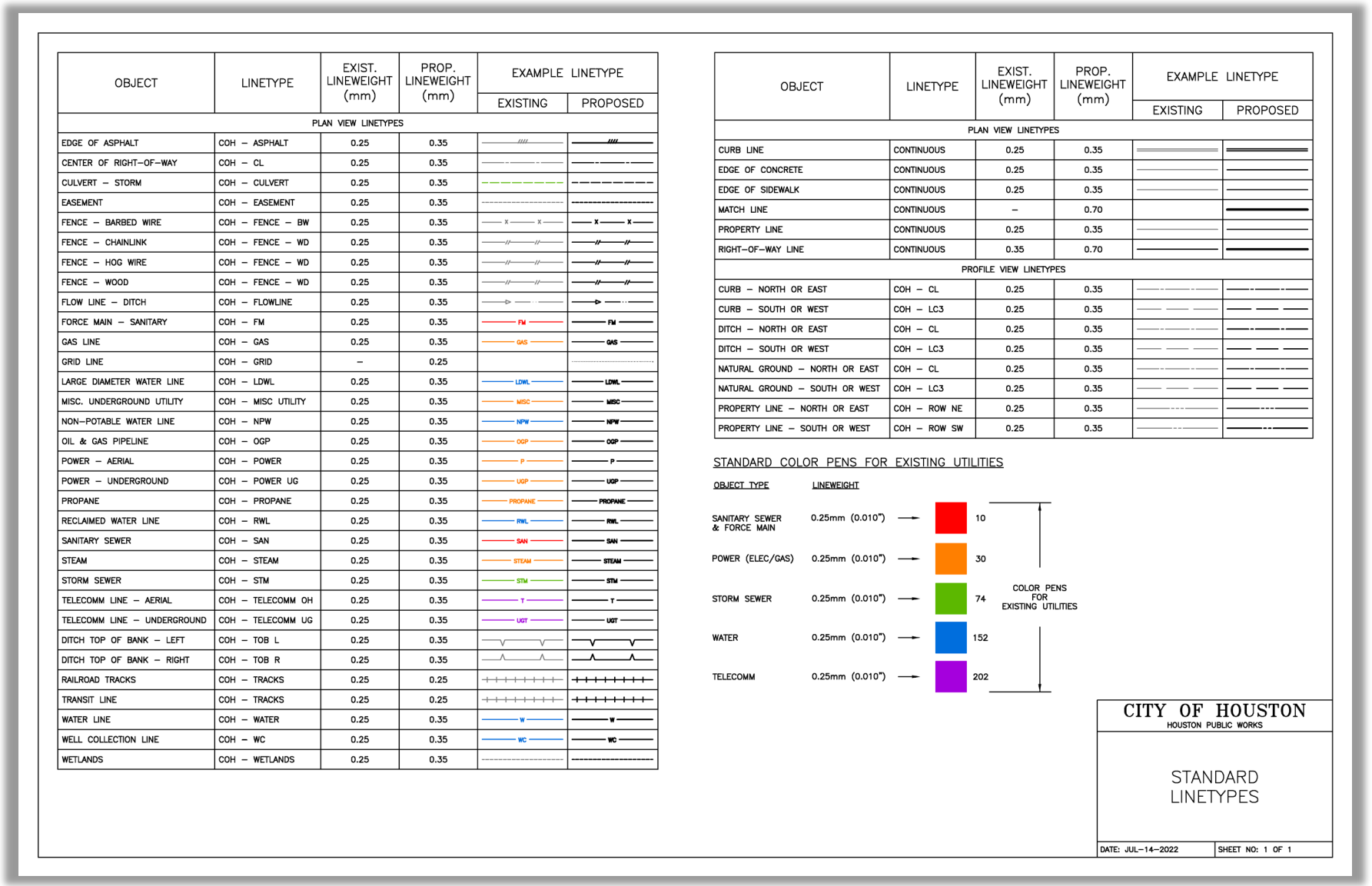
CHAPTER 3: CAD REQUIREMENTS UPDATES



CHAPTER 3: CAD TOOLS (STANDARD LINEWEIGHTS)



CHAPTER 3: CAD TOOLS (STANDARD LINETYPES)



OBJECT	LINETYPE	EXIST. LINEWEIGHT (mm)	PROP. LINEWEIGHT (mm)	EXAMPLE LINETYPE	
				EXISTING	PROPOSED
PLAN VIEW LINETYPES					
EDGE OF ASPHALT	COH – ASPHALT	0.25	0.35		
CENTER OF RIGHT–OF–WAY	COH – CL	0.25	0.35		
CULVERT – STORM	COH – CULVERT	0.25	0.35		
EASEMENT	COH – EASEMENT	0.25	0.35		
FENCE – BARBED WIRE	COH – FENCE – BW	0.25	0.35		
FENCE – CHAINLINK	COH – FENCE – WD	0.25	0.35		
FENCE – HOG WIRE	COH – FENCE – WD	0.25	0.35		
FENCE – WOOD	COH – FENCE – WD	0.25	0.35		
FLOW LINE – DITCH	COH – FLOWLINE	0.25	0.35		
FORCE MAIN – SANITARY	COH – FM	0.25	0.35	FM	FM
GAS LINE	COH – GAS	0.25	0.35	GAS	GAS
GRID LINE	COH – GRID	–	0.25		
LARGE DIAMETER WATER LINE	COH – LDWL	0.25	0.35	LDWL	LDWL
MISC. UNDERGROUND UTILITY	COH – MISC UTILITY	0.25	0.35	MISC	MISC
NON–POTABLE WATER LINE	COH – NPW	0.25	0.35	NPW	NPW
OIL & GAS PIPELINE	COH – OGP	0.25	0.35	OGP	OGP
POWER – AERIAL	COH – POWER	0.25	0.35	P	P
POWER – UNDERGROUND	COH – POWER UG	0.25	0.35	UGP	UGP
PROPANE	COH – PROPANE	0.25	0.35	PROPANE	PROPANE
RECLAIMED WATER LINE	COH – RWL	0.25	0.35	RWL	RWL
SANITARY SEWER	COH – SAN	0.25	0.35	SAN	SAN
STEAM	COH – STEAM	0.25	0.35	STEAM	STEAM
STORM SEWER	COH – STM	0.25	0.35	STM	STM
TELECOMM LINE – AERIAL	COH – TELECOMM OH	0.25	0.35	T	T
TELECOMM LINE – UNDERGROUND	COH – TELECOMM UG	0.25	0.35	UGT	UGT
DITCH TOP OF BANK – LEFT	COH – TOB L	0.25	0.35		
DITCH TOP OF BANK – RIGHT	COH – TOB R	0.25	0.35		
RAILROAD TRACKS	COH – TRACKS	0.25	0.25		
TRANSIT LINE	COH – TRACKS	0.25	0.25		
WATER LINE	COH – WATER	0.25	0.35	W	W
WELL COLLECTION LINE	COH – WC	0.25	0.35	WC	WC
WETLANDS	COH – WETLANDS	0.25	0.35		

OBJECT	LINETYPE	EXIST. LINEWEIGHT (mm)	PROP. LINEWEIGHT (mm)	EXAMPLE LINETYPE	
				EXISTING	PROPOSED
PLAN VIEW LINETYPES					
CURB LINE	CONTINUOUS	0.25	0.35		
EDGE OF CONCRETE	CONTINUOUS	0.25	0.35		
EDGE OF SIDEWALK	CONTINUOUS	0.25	0.35		
MATCH LINE	CONTINUOUS	–	0.70		
PROPERTY LINE	CONTINUOUS	0.25	0.35		
RIGHT–OF–WAY LINE	CONTINUOUS	0.35	0.70		
PROFILE VIEW LINETYPES					
CURB – NORTH OR EAST	COH – CL	0.25	0.35		
CURB – SOUTH OR WEST	COH – LC3	0.25	0.35		
DITCH – NORTH OR EAST	COH – CL	0.25	0.35		
DITCH – SOUTH OR WEST	COH – LC3	0.25	0.35		
NATURAL GROUND – NORTH OR EAST	COH – CL	0.25	0.35		
NATURAL GROUND – SOUTH OR WEST	COH – LC3	0.25	0.35		
PROPERTY LINE – NORTH OR EAST	COH – ROW NE	0.25	0.35		
PROPERTY LINE – SOUTH OR WEST	COH – ROW SW	0.25	0.35		

STANDARD COLOR PENS FOR EXISTING UTILITIES

OBJECT TYPE	LINEWEIGHT	
SANITARY SEWER & FORCE MAIN	0.25mm (0.010")	10
POWER (ELEC/GAS)	0.25mm (0.010")	30
STORM SEWER	0.25mm (0.010")	74
WATER	0.25mm (0.010")	152
TELECOMM	0.25mm (0.010")	202

COLOR PENS FOR EXISTING UTILITIES

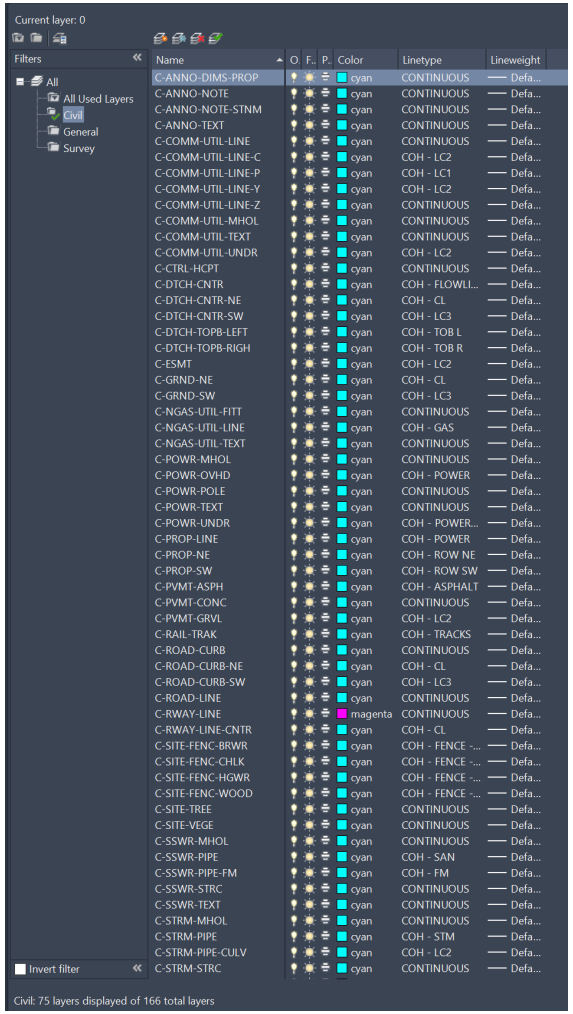
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

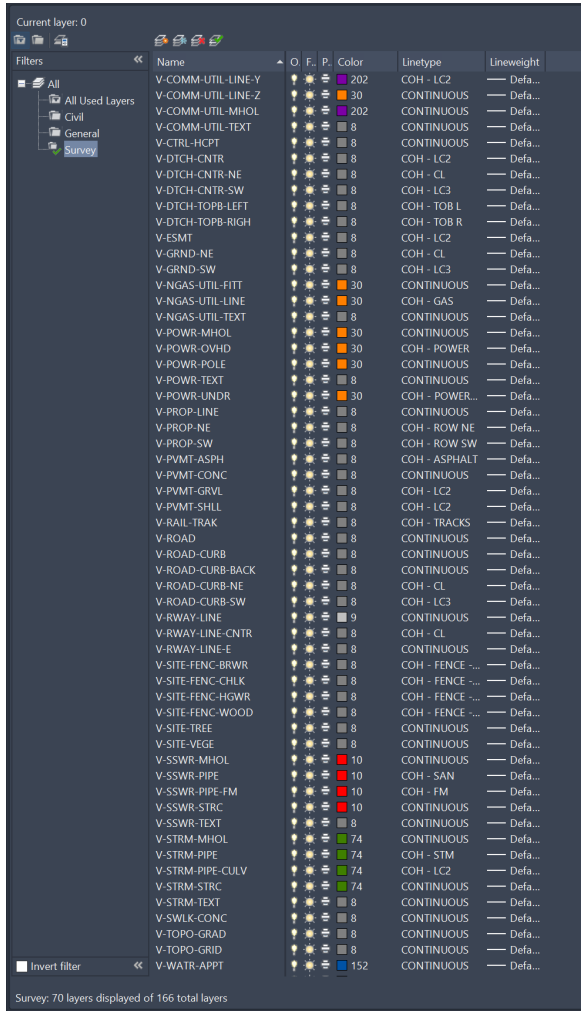
STANDARD LINETYPES

DATE: JUL–14–2022 | SHEET NO: 1 OF 1

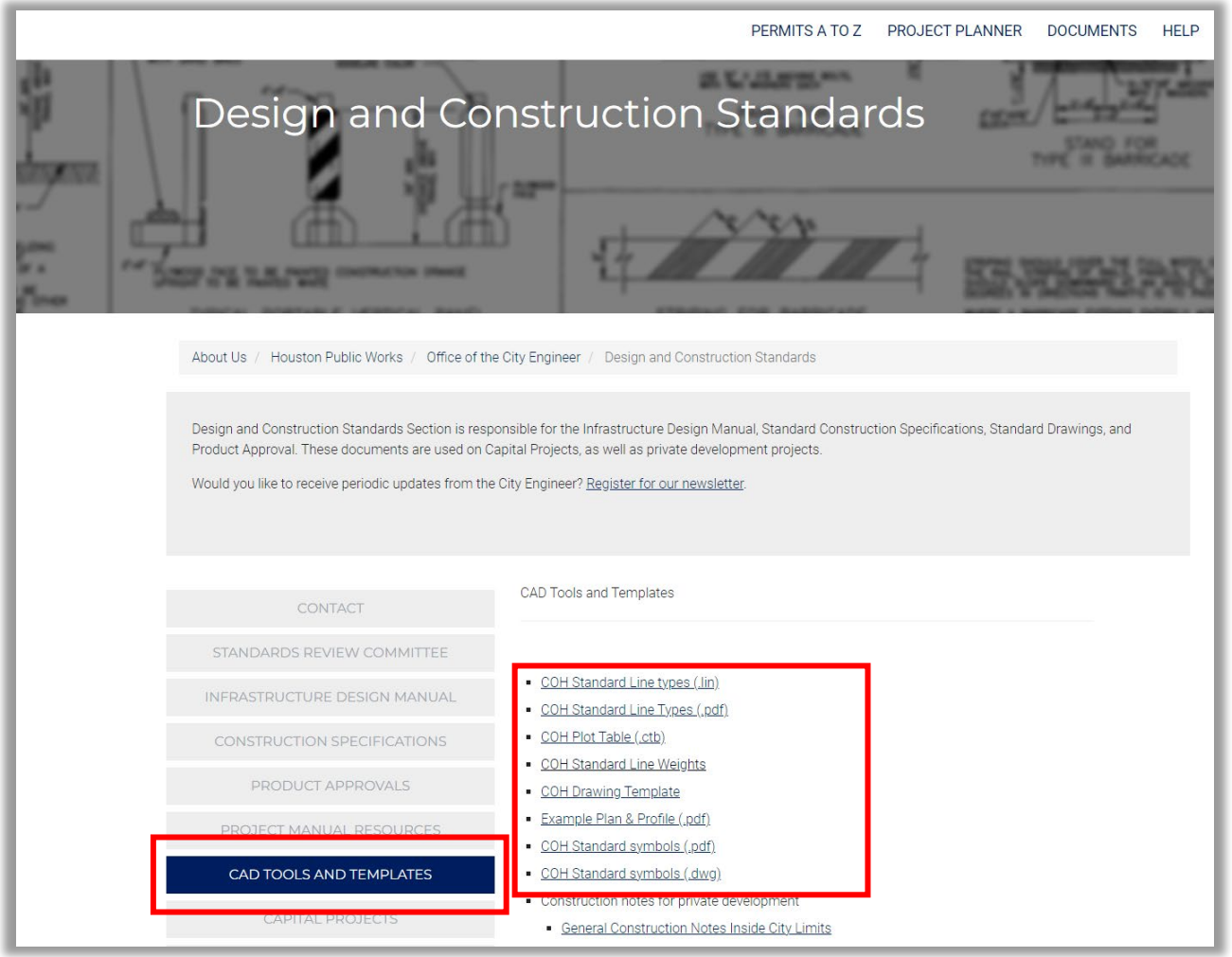
CHAPTER 3: CAD TEMPLATE

- .DWT file
  - New line types
  - New layers
  - Updated layer colors





CHAPTER 3: CAD TOOLS & TEMPLATES



https://www.houstonpermittingcenter.org/office-city-engineer/design-and-construction-standards

QUESTIONS?

Enter it into the chat.

Note the chapter or topic in your question.

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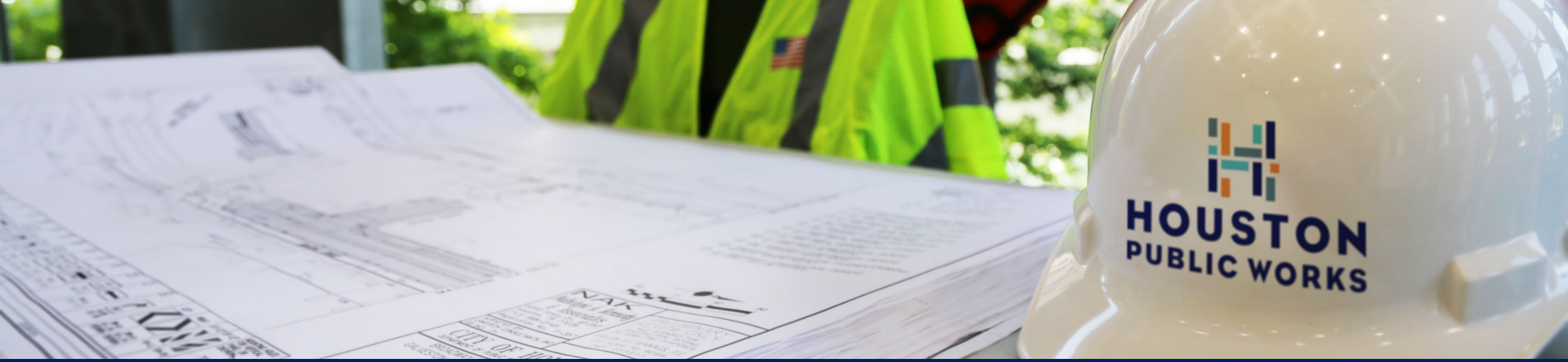

CHAPTER 1 – GENERAL REQUIREMENTS

GILBERT PORTILLO, P.E., CFM
OFFICE OF THE CITY ENGINEER
PUBLIC UTILITIES AND PERMITS GROUP

CHAPTER 1 – GENERAL REQUIREMENTS

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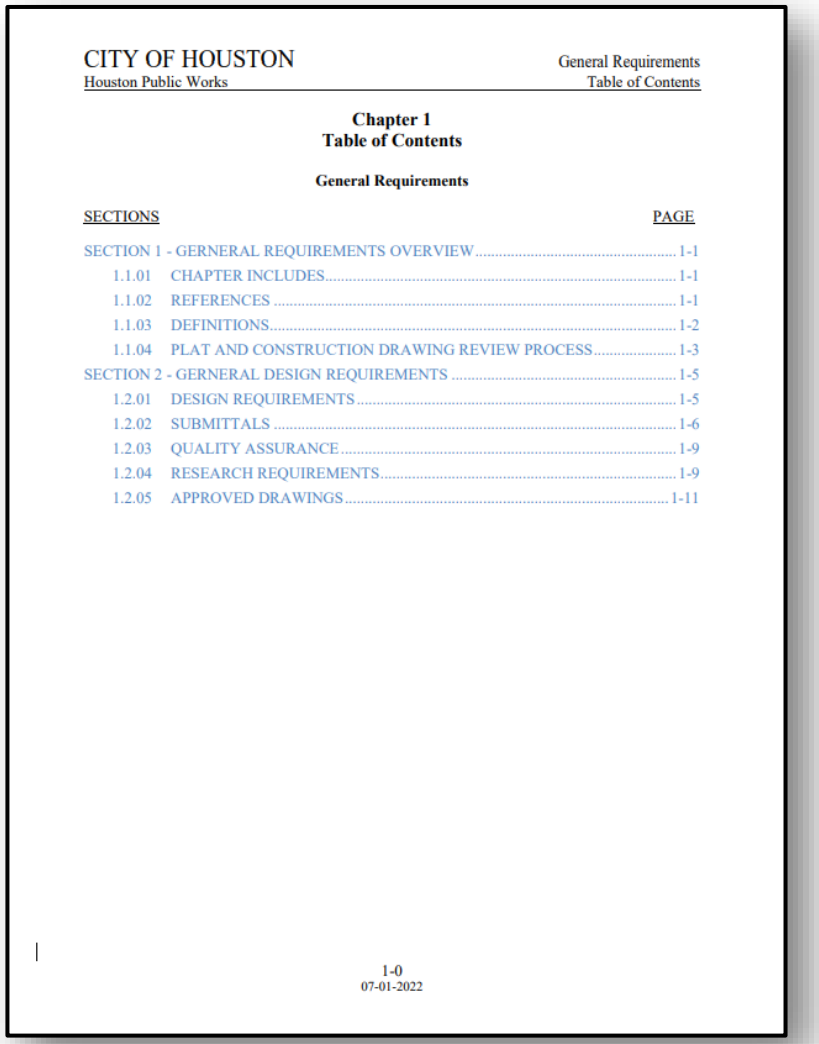

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General Requirements

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CHAPTER 1 – GENERAL REQUIREMENTS

Summary of changes and updates:

- Article References
- Definitions
- Plat and Construction Drawing Review Process
- Submittal Procedure to Office of the City Engineer
- Construction Stage Requirements
  - Requirement for submittal of GIS data
- Conflict Verification Requirement for Capital Projects

CHAPTER 1 – GENERAL REQUIREMENTS
Article References

Latest revision of the following City of Houston Code of Ordinances:

1. Chapter 33 - Planning and Development, Article IV - ~~Chapter 33,~~ City Surveys.

2. Chapter 40 – Streets and Sidewalks, Article V ~~Chapter 40, - Street and Sidewalk~~Excavation in Public Way

3. Chapter 42 ~~-~~, Subdivisions, Developments and Platting.

4. Chapter 47 – Water and Sewers, Article V ~~, - Chapter 47, Water and Sewers~~Industrial Wastewater.

1.1.02.D Rules and Regulations published by Texas Commission on Environmental Quality (TCEQ).

1. ~~TCEQ, Water Supply Division, Rules and Regulations for Public Water Systems, latest revision.~~Texas Administrative Code Title 30, Part 1, Chapter 290 Public Water Drinking, latest revision.

2. Texas Administrative Code Title 30, Part 1, Chapter 217 Design Criteria for Domestic Wastewater Systems, latest revision~~TCEQ, Design Criteria for Sewer Systems, Texas Administrative Code, latest revision~~.

CHAPTER 1 – GENERAL REQUIREMENTS
Article References

1.1.02.E Texas Board of Professional Engineers and Land Surveyors (TBPELS) Practice Acts and Rules Concerning Practice and Licensure.

1. Texas Statute, Occupations Code, Title 6, Subtitle A, Chapter 1001 Texas Board of Professional Engineers and Land Surveyors.

2. Texas Statute, Occupations Code, Title 6, Subtitle C, Chapter 1071 Land Surveyors.

—— Texas Administrative Code, Title 22, Part 6 Texas Board of Professional Engineers and Land Surveyors. ~~State of Texas Engineering Practice Act.~~ ~~State of Texas Professional Land Surveying Practices Act.~~

1.1.02.F Texas Local Government Code, Title 2, Subtitle C, Chapter 42 Extraterritorial Jurisdiction of Municipalities.

CHAPTER 1 – GENERAL REQUIREMENTS

Definitions

1.1.03.A	As-Built Drawings - Final revised Drawings at completion of the project, submitted by the contractor to the Engineer of Record and City, that captures all changes in work during the construction process shown as revisions on the as-bid Drawings.
1.1.03.B	City Engineer - The authorized representative of the City, or the City's designee, having approval authority for Publicly-Funded Projects, Privately-Funded Projects, or having authority for administration of design and construction contracts for the City.
1.1.03.C	Conflict Verification - For capital improvement projects requiring the acquisition of fee or easement interest in real property, verification that all existing easements that lie across, along, under, over, through and within the parcel to be acquired will not prevent the construction of the utility or infrastructure or the intended use of the easement.
1.1.03.D	Drawings - Plan, profile, details, and other graphic sheets to be used in a construction contract which define character and scope of the project.
1.1.03.E	Engineer of Record - A Professional Engineer who seals Drawings, reports or documents for a project.
1.1.03.F	Extraterritorial Jurisdiction (ETJ) - The unincorporated territory extending beyond the corporate boundaries of the City established pursuant to Chapter 42 of the Texas Local Government Code, as may be amended from time to time.
1.1.03.G	Privately-Funded Projects - Projects that are funded by an individual or private entity and do not have a design contract with the City.

CHAPTER 1 – GENERAL REQUIREMENTS

Definitions

1.1.03.H	Publicly-Funded Projects - Projects that are funded by a public entity, but do not have a design contract with the City.
1.1.03.I	Professional Engineer - An engineer currently licensed and in good standing with the Texas Board of Professional Engineers and Land Surveyors (TBPELS).
1.1.03.J	Project Manager - An authorized representative of the City of Houston who manages the project or the Engineer of Record for private development.
1.1.03.K	Record Drawings - Final revised Drawings prepared by the Engineer of Record on the original as-bid Drawings documenting significant changes in work based solely upon the marked-up As-Built Drawings, addenda, revisions, change orders and other data furnished by the contractor.
1.1.03.L	Registered Professional Land Surveyor (RPLS) - A surveyor currently registered and in good standing with State of Texas Board of Professional Engineers and Land Surveyors (TBPELS).
1.1.03.M	Review Authorities - The authorized representatives of City departments, divisions, branches or sections responsible for reviewing and approving calculations and Drawings for Publicly-Funded Projects, Privately-Funded Projects and for design and construction contracts with the City.
1.1.03.N	Specifications - City of Houston Standard Specifications plus project-specific narrative descriptions of procedures, requirements, and materials for a particular project.

CHAPTER 1 – GENERAL REQUIREMENTS
Plat and Construction Drawing Review Process

1.1.04 PLAT AND CONSTRUCTION DRAWING REVIEW PROCESS

1.1.04.A Review of plat and construction ~~d~~Drawings by ~~the Department of~~ Houston Public Works is a required part of the overall platting process under purview of the City Planning Commission and the Planning and Development Department of the City of Houston.[1]

1.1.04.B The process to be followed in submitting documents for review and approval of water, wastewater, storm drainage, and street paving is described by the flowchart depicted in Figure 4.1, ~~Review and Approval Process for Plats and Drawings~~Class III Preliminary Plat.

~~1.1.04.C Utility and paving construction in~~For projects requiring a subdivision plat~~s~~, construction of utilities and paving is not permitted until the ~~final~~ plat has been ~~released~~recorded. ~~Plat release by Department of Houston Public Works is authorized by signature of the Director, or his designee, on final design drawings.~~

1.1.04.D For projects not requiring a subdivision plat, ~~C~~construction of utilities and paving ~~in projects not requiring a subdivision plat~~ is not permitted until final design ~~d~~Drawings are approved and signed by the Director~~, Department~~ of Houston Public Works, or ~~his~~ the Director's designee.

1.1.04.E Signature of the Director ~~, Department~~ of Houston Public Works, or ~~his~~ the Director's designee, on final design ~~d~~Drawings for utilities which are intended to remain private, does not ~~infer~~ indicate acceptance of the City for ownership or maintenance or operation of facilities indicated on the ~~d~~Drawings.

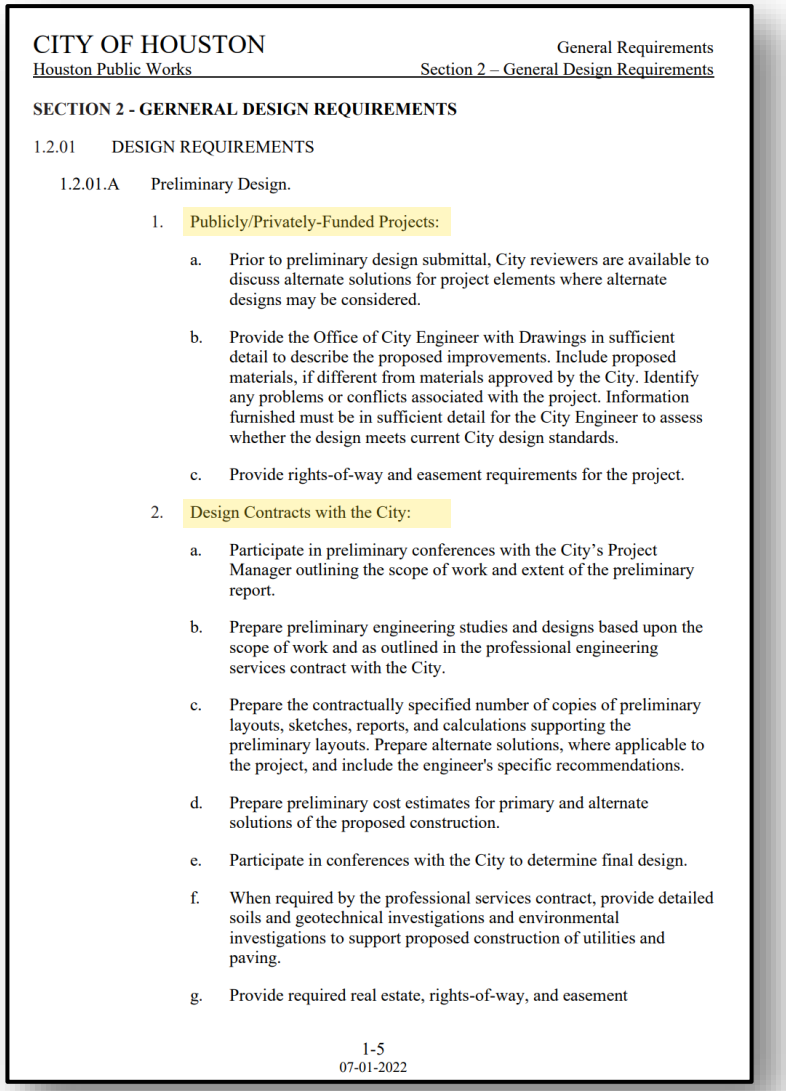
[1] Refer to weblink for City requirements: http://www.houstontx.gov/planning/Commissions/commiss_plan.html

HOUSTON PUBLIC WORKS

CHAPTER 1 – GENERAL REQUIREMENTS

Design Requirements

- Requirements are spilt into <u>two</u> sections:
  - ➢ Publicly/Privately-Funded Projects
  - ➢ Design Contracts with the City



CITY OF HOUSTON
Houston Public Works

General Requirements
Section 2 – General Design Requirements

SECTION 2 - GERNERAL DESIGN REQUIREMENTS

1.2.01 DESIGN REQUIREMENTS

1.2.01.A Preliminary Design.

1. Publicly/Privately-Funded Projects:

a. Prior to preliminary design submittal, City reviewers are available to discuss alternate solutions for project elements where alternate designs may be considered.

b. Provide the Office of City Engineer with Drawings in sufficient detail to describe the proposed improvements. Include proposed materials, if different from materials approved by the City. Identify any problems or conflicts associated with the project. Information furnished must be in sufficient detail for the City Engineer to assess whether the design meets current City design standards.

c. Provide rights-of-way and easement requirements for the project.

2. Design Contracts with the City:

a. Participate in preliminary conferences with the City's Project Manager outlining the scope of work and extent of the preliminary report.

b. Prepare preliminary engineering studies and designs based upon the scope of work and as outlined in the professional engineering services contract with the City.

c. Prepare the contractually specified number of copies of preliminary layouts, sketches, reports, and calculations supporting the preliminary layouts. Prepare alternate solutions, where applicable to the project, and include the engineer's specific recommendations.

d. Prepare preliminary cost estimates for primary and alternate solutions of the proposed construction.

e. Participate in conferences with the City to determine final design.

f. When required by the professional services contract, provide detailed soils and geotechnical investigations and environmental investigations to support proposed construction of utilities and paving.

g. Provide required real estate, rights-of-way, and easement

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07-01-2022

CHAPTER 1 – GENERAL REQUIREMENTS

Submittal Procedure to Office of the City Engineer

1.2.02 SUBMITTALS

1.2.02.A Submittal Procedures.

1. For Publicly/Privately-~~F~~Funded Projects:

   a. To obtain review of final design ~~d~~Drawings for both ~~p~~Publicly-~~F~~Funded and ~~p~~Privately-~~F~~Funded ~~p~~Projects, first submit ~~d~~Drawings to the Houston Public Works, ~~Plan Review Center~~ Office of the City Engineer for assignment of a ~~log~~ project number before review will commence. The ~~log~~ project number will remain in effect for one year.

   ~~1.~~b. Once a ~~log~~ project number is assigned, reference the number in all correspondence relating to that project.

   ~~2.~~c. Obtain and complete ~~plan review application forms for each review phase when the project is logged in~~electronic plan review assigned tasks for each phase of the review process. The same ~~log~~ project number will be used for all review phases of each project unless review of a subsequent phase is delayed by over one year.

   ~~3.~~d. ~~Plan Review Center personnel~~ Office of the City Engineer personnel will process reviews through appropriate review teams in ~~the Department of~~ Houston Public Works.

   ~~4.~~e. If a project has begun the review process but becomes inactive for a period of 12 months from the date of the last correspondence, the project will be considered stopped~~,~~ and the ~~log~~ project number inactivated.

   ~~5.~~f. The City has a weekly one-day walk-through procedure for the signature ~~stage of small projects.~~ of revisions and updates of plans approved through the hard copy review. Instruction sheets for this procedure may be obtained ~~in the Plan Review Center~~ from the Office of the City Engineer.

   ~~6.~~g. Projects involving construction of privately owned facilities require review and approval of any connection to a public water line, sanitary sewer, or storm sewer or to a public street, using the process defined in this manual.

2. For Design Contracts with the City:

   a. Submit documents in accordance with requirements of the professional engineering services contract.

1.2.02.B Preliminary Design.

1. Publicly-Funded and Privately-~~F~~Funded Projects: Submit ~~one~~ set of the design Drawings and supporting documents through the electronic plan review system. ~~preliminary overall design concept with~~ Provide supporting evidence as described in ~~Paragraph~~Article ~~1.07~~1.2.01~~1.2.01~~ and ~~Paragraph~~Article ~~1.1.08~~1.2.04~~1.2.04~~. All Drawings submitted through the electronic plan review system to the Office of the City Engineer are considered to be in the final design stage and ready for signature.

2. Design ~~C~~contracts with the City: Submit documents in accordance with requirements of the professional engineering services contract.

1.2.02.B Preliminary Design.

1. Publicly-Funded and Privately-Funded Projects: Submit set of the design Drawings and supporting documents through the electronic plan review system. Provide supporting evidence as described in Article 1.2.01 and Article 1.2.04. All Drawings submitted through the electronic plan review system to the Office of the City Engineer are considered to be in the final design stage and ready for signature.

HOUSTON PUBLIC WORKS

CHAPTER 1 – GENERAL REQUIREMENTS

Construction Stage Requirements

1.2.02.E Construction.

1. For design contracts with the City, refer to construction submittal requirements in the professional engineering services contract.

2. Record Drawings:

   a. Provide Record Drawings in the format requested by the City.

   b. For design contracts with the City, submit Record Drawings in accordance with requirements of the professional engineering services contract.

   c. For Publicly-Funded and Privately-Funded Projects, submit Record Drawings to the Office of the City Engineer no later than two weeks following final acceptance of the project.

   d. For projects involving waterlines, refer to Chapter 7 for specific requirements.

3. Geospatial Data Deliverables: Provide GIS datasets in accordance with Chapter 13 – Geospatial Data Deliverables for projects that are proposing or modifying assets identified in Chapter 13 that are or will be operated and/or maintained by the City.

CHAPTER 7 – WATER LINE DESIGN REQUIREMENTS

Record Drawing Requirements

7.2.02.F ~~As-Built~~Record Drawings

1. ~~Engineer shall monitor the up-keep of the As-Builts so that they are a true representation of existing conditions in the field. If Engineer has reason to believe that the As-Builts are not being meticulously and appropriately maintained by the construction team, Engineer shall notify City Project Manager.~~After the completion of construction, Engineer of Record shall prepare and submit Record Drawings in accordance with Chapter 1 – General Requirements. Use revision clouds to document significant changes in work based solely upon the marked-up As-Built Drawings, addenda, revisions, change orders and other data furnished by the contractor. In addition, include the following:

   a. ~~As-Builts must also contain a~~Any materials that were left in place by the Contractor such as shoring, or other elements ~~not expressly shown in the Drawings~~.

   b. ~~Engineer shall add the w~~Water line pipe material(s) including the type of lining and coating.~~, in the As-Builts by any of~~Document ~~the~~using either of the following methods:

      (1) Add the pipe material on the project Layout Sheet, in a tabular format, separated by station number when there is a change in pipe material.

      (2) If there is no project Layout Sheet, add the pipe material on the Notes Sheet, in a tabular format, separated by station number

QUESTIONS?

Enter it into the chat.

Note the chapter or topic in your question.

We will respond to unanswered questions on our website after this event.

CHAPTER 2 – SURVEY REQUIREMENTS

SUMMER CHANDLER, R.P.L.S.
CAPITAL PROJECTS – REAL ESTATE

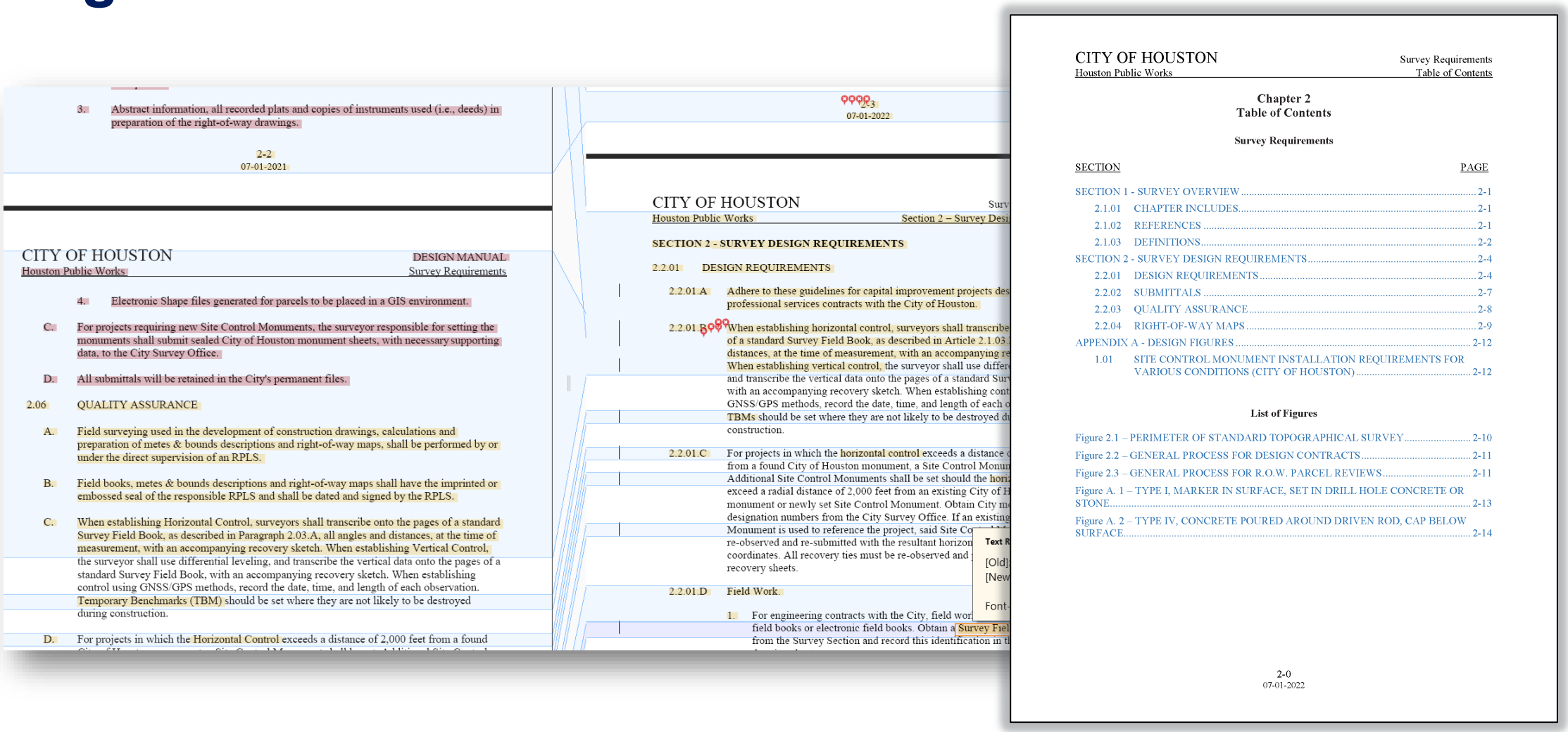
CHAPTER 2 – SURVEY REQUIREMENTS

Summary of changes:

- Reorganized
- Updated references & definitions
- New coverage requirements with updated Figure
- New submittal requirements
- Added Appendix

CHAPTER 2 – SURVEY REQUIREMENTS

Reorganized



3. Abstract information, all recorded plats and copies of instruments used (i.e., deeds) in preparation of the right-of-way drawings.

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07-01-2021

CITY OF HOUSTON
Houston Public Works
DESIGN MANUAL
Survey Requirements

4. Electronic Shape files generated for parcels to be placed in a GIS environment.

C. For projects requiring new Site Control Monuments, the surveyor responsible for setting the monuments shall submit sealed City of Houston monument sheets, with necessary supporting data, to the City Survey Office.

D. All submittals will be retained in the City's permanent files.

2.06 QUALITY ASSURANCE

A. Field surveying used in the development of construction drawings, calculations and preparation of metes & bounds descriptions and right-of-way maps, shall be performed by or under the direct supervision of an RPLS.

B. Field books, metes & bounds descriptions and right-of-way maps shall have the imprinted or embossed seal of the responsible RPLS and shall be dated and signed by the RPLS.

C. When establishing Horizontal Control, surveyors shall transcribe onto the pages of a standard Survey Field Book, as described in Paragraph 2.03.A, all angles and distances, at the time of measurement, with an accompanying recovery sketch. When establishing Vertical Control, the surveyor shall use differential leveling, and transcribe the vertical data onto the pages of a standard Survey Field Book, with an accompanying recovery sketch. When establishing control using GNSS/GPS methods, record the date, time, and length of each observation. Temporary Benchmarks (TBM) should be set where they are not likely to be destroyed during construction.

D. For projects in which the Horizontal Control exceeds a distance of 2,000 feet from a found

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07-01-2022

CITY OF HOUSTON
Houston Public Works
Section 2 – Survey Desi

SECTION 2 - SURVEY DESIGN REQUIREMENTS

2.2.01 DESIGN REQUIREMENTS

2.2.01.A Adhere to these guidelines for capital improvement projects des professional services contracts with the City of Houston.

2.2.01.B When establishing horizontal control, surveyors shall transcribe of a standard Survey Field Book, as described in Article 2.1.03. distances, at the time of measurement, with an accompanying re When establishing vertical control, the surveyor shall use differ and transcribe the vertical data onto the pages of a standard Surv with an accompanying recovery sketch. When establishing cont GNSS/GPS methods, record the date, time, and length of each o TBMs should be set where they are not likely to be destroyed d construction.

2.2.01.C For projects in which the horizontal control exceeds a distance from a found City of Houston monument, a Site Control Monun Additional Site Control Monuments shall be set should the hori exceed a radial distance of 2,000 feet from an existing City of H monument or newly set Site Control Monument. Obtain City m designation numbers from the City Survey Office. If an existing Monument is used to reference the project, said Site Co re-observed and re-submitted with the resultant horizon coordinates. All recovery ties must be re-observed and recovery sheets.

2.2.01.D Field Work.

1. For engineering contracts with the City, field wor field books or electronic field books. Obtain a Survey Fiel from the Survey Section and record this identification in t

CITY OF HOUSTON
Houston Public Works
Survey Requirements
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Chapter 2
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Survey Requirements

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Figure A. 2 – TYPE IV, CONCRETE POURED AROUND DRIVEN ROD, CAP BELOW SURFACE 2-14

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07-01-2022

CHAPTER 2 – SURVEY REQUIREMENTS

Sect 2.1.02 – References

- Highlights:
  - Grouped by source
  - Updated from Texas Board of Professional Land Surveyors to Texas Board of Professional Land Surveyors and Engineers
  - Added reference to Texas Local Government Code regarding Extraterritorial Jurisdiction

Sect 2.1.03 – Definitions

Added 10 Definitions:

- Central Business District
- Closure
- Computer Aided Design (CAD)
- Control Point
- Extraterritorial Jurisdiction (ETJ)
- Engineer of Record (EOR)
- Official Coordinate system
- Raw Data File
- Registered Professional Land Surveyor
- Temporary Benchmark

CHAPTER 2 – SURVEY REQUIREMENTS

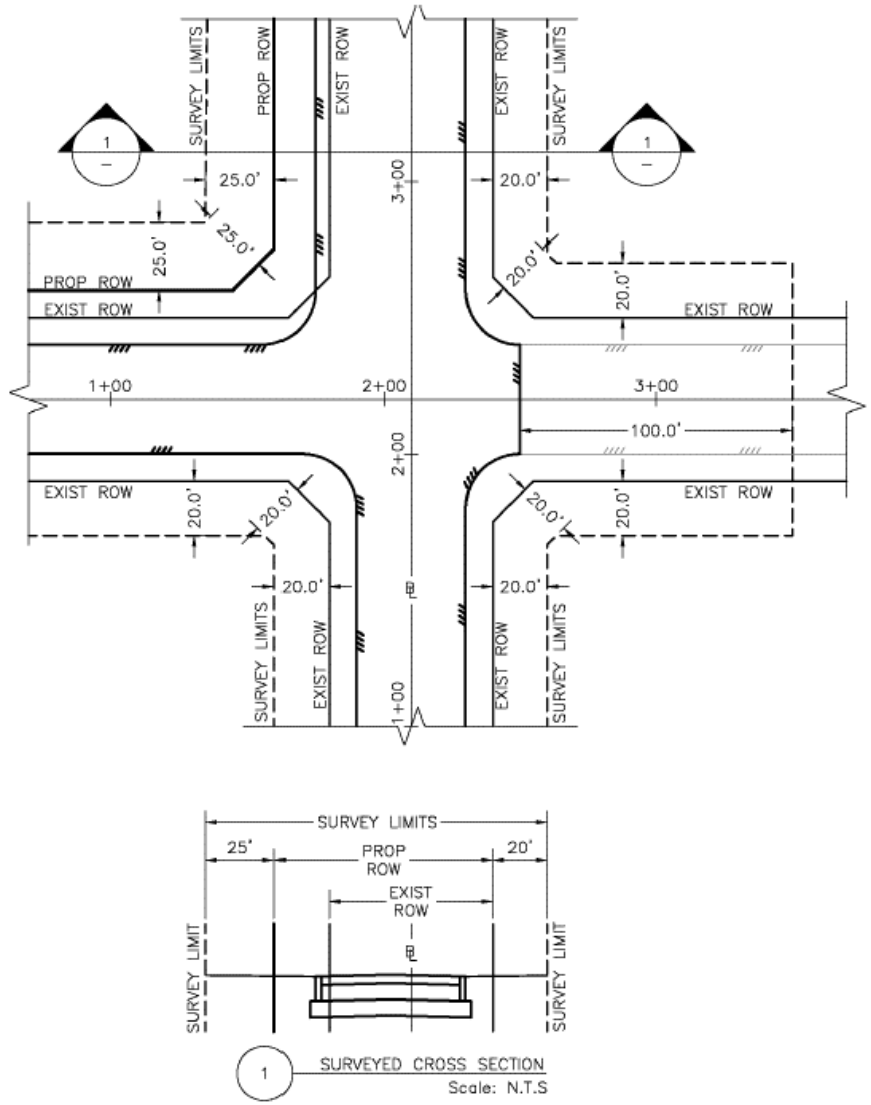

Figure 2.1 – PERIMETER OF STANDARD TOPOGRAPHICAL SURVEY

Section 2.2.01

- Collect survey information 20 feet beyond existing Right-of-Way (no change)
- Collect survey information 25 feet beyond proposed Right-of-Way. (previously 10 feet)
- Where accessible – right of entry may be required
- Updated Figure 2.1

CHAPTER 2 – SURVEY REQUIREMENTS

Section 2.2.02 - Submittals

- Electronic submittal now allowed for
  - Field Books (scanned)
  - Survey Maps
  - Metes and Bounds descriptions.
- CAD files
  - All the CAD files submitted to the EOR
  - Parcel drawings matching the template provided on our website

CHAPTER 2 – SURVEY REQUIREMENTS

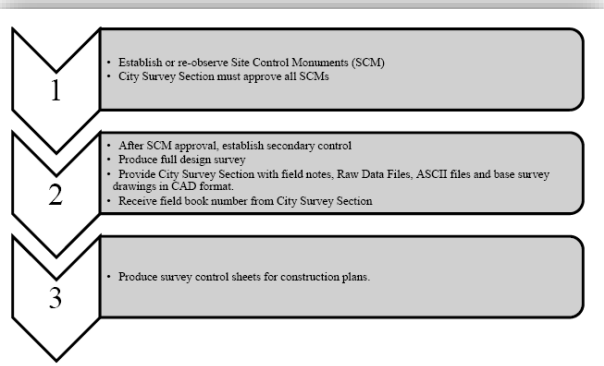

Figure 2.2 – GENERAL PROCESS FOR DESIGN CONTRACTS

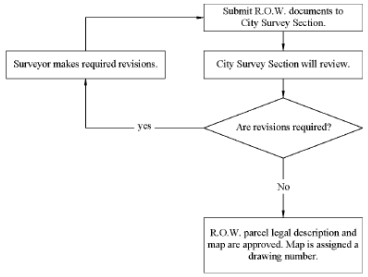

Figure 2.3 – GENERAL PROCESS FOR R.O.W. PARCEL REVIEWS

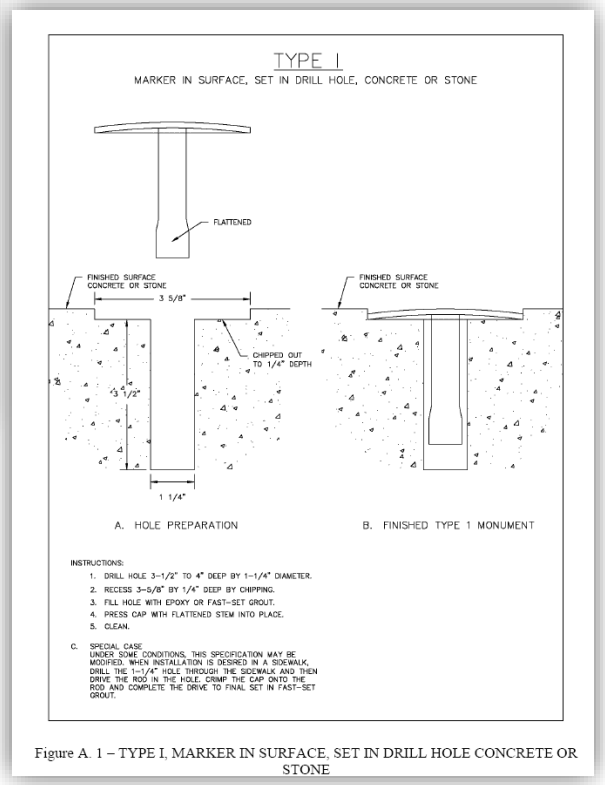

Figure A. 1 – TYPE I, MARKER IN SURFACE, SET IN DRILL HOLE CONCRETE OR STONE

Appendix

- Updated Figure 2.1
- New figures explaining typical process flows
  - CIP Project
  - Parcel review and approval
- Includes information on construction of Site Control Monuments

QUESTIONS?

Enter it into the chat.

Note the chapter or topic in your question.

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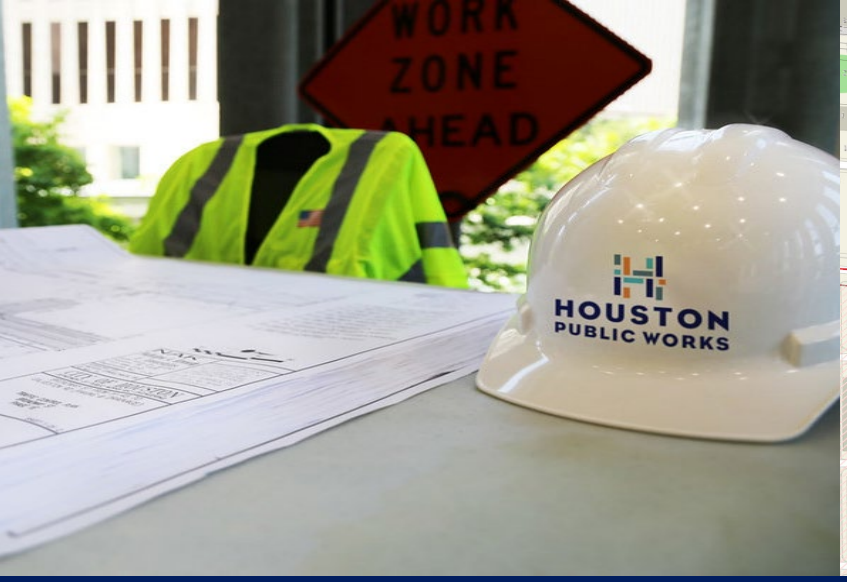

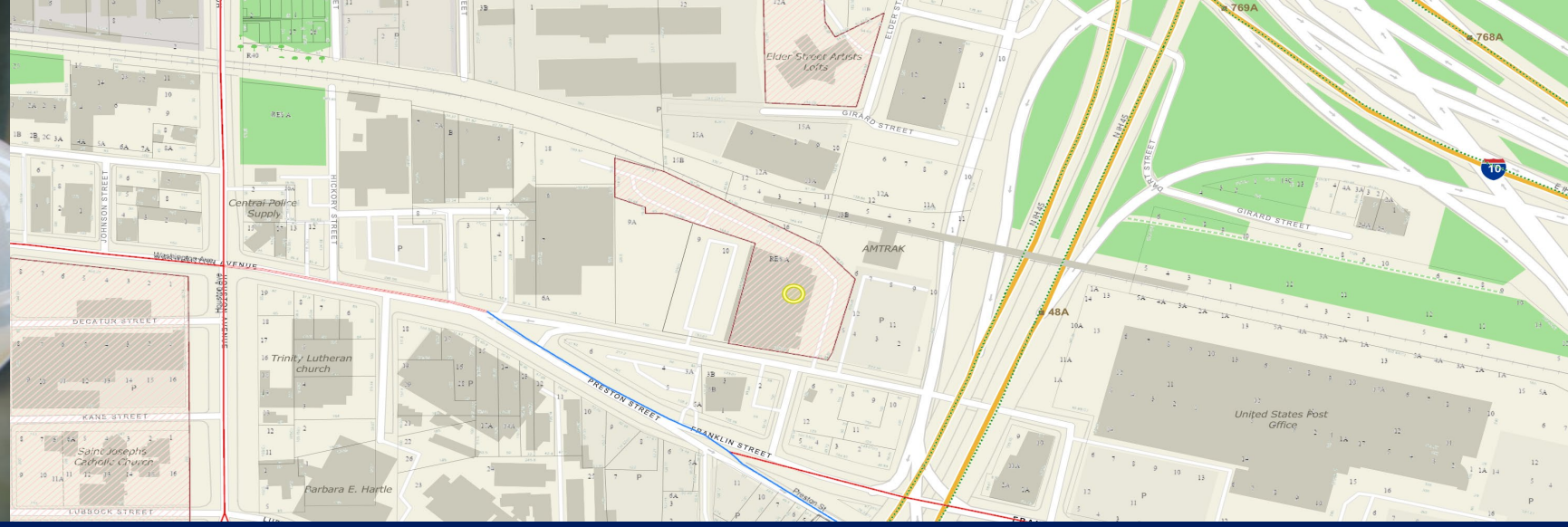

CHAPTER 4 - PLATTING REQUIREMENTS

ADDIE JACKSON, ESQ.,
CAPITAL PROJECTS
MUXIAN FANG, AICP
PLANNING & DEVELOPMENT

HOUSTON PUBLIC WORKS

CHAPTER 4 – PLATTING REQUIREMENTS
SECTION 1 - PLATTING OVERVIEW

SUMMARY OF CHANGES:

Organized into sections for easier navigation

New Section

New Section

PLATTING REQUIREMENTS

SECTION 1 – PLATTING OVERVIEW

4.1.01 CHAPTER INCLUDES

4.1.01.A Coordination of platting requirements with the preparation of project drawings and specifications and their review and approval processing.

4.1.02 REFERENCES

4.1.02.A Chapter 42 – Subdivisions, Developments and Platting, Article II – Requirements and Procedures, latest revision.

4.1.02.B Texas Administrative Code, Title 22, Part 6 Texas Board of Professional Engineers and Land Surveyors.

4.1.03 DEFINITIONS

4.1.03.A Chief Surveyor - An authorized representative of the City having approval authority for privately-funded projects or having authority for administration of contracts for the City.

4.1.03.B Public Right-of-Way - Property dedicated or deeded for the purpose of public use.

CHAPTER 4 – PLATTING REQUIREMENTS
SECTION 1 - PLATTING OVERVIEW (CONT.)

SUMMARY OF CHANGES:

4.1.04.C All class II and class III plats submitted to the Planning and Development Department will be routed to Houston Public Works for review.

New Requirement

1. All class II & III plats located within the city limits as they existed in 1870 will be routed to the office of the Chief Surveyor for review. Review will be for the following items at a minimum:

   a. Compliance with standards contained in this design manual.

   b. Compliance with 22 Tex. Admin. Code § 138 (2021) and any amendments or recodifications to that statute thereafter.

New Requirement

4.1.04.D Design drawings (when required) shall be submitted to Houston Public Works with the name of the proposed plat clearly identified on the cover sheet. Design drawings shall be delivered in digital format as computer aided drafting file (.DWG) in accordance with Chapter 3 requirements.

New Section

4.1.04.E When the dedication of 20 feet in width or less of street Public Right-of-Way and/or sidewalk is required by separate instrument for plat approval, that dedication can be made through the submission of an easement dedication form (Form 584).

New Section

4.1.04.F When the dedication of more than 20 feet in width of street Public Right-of-Way and/or sidewalk is required by separate instrument for plat approval, the Real Estate section within Houston Public Works will oversee the dedication pursuant to the process established for such dedications.

CHAPTER 4 – PLATTING REQUIREMENTS
SECTION 2 - PLATTING DESIGN REQUIREMENTS

SUMMARY OF CHANGES:

Section 4.2.01.A.1.b.(1) changes "right-of-way" to "Public Right-of-Way"

b. Wastewater Collection System:

(1) Inadequate Public Right-of-Way or wastewater easements.

(2) Limited wastewater service capacity for the area.

(3) Future plans for construction of major City facilities that will impact the site.

Section 4.2.01.A.3 changes "Houston Public Works" to "Houston Planning Commission"

3. Approval of a preliminary plat by Houston Planning Commission does not infer approval of proposed infrastructure. Review of infrastructure will take place upon submittal of one-line drawings, if required, which may occur after preliminary plat approval and must occur prior to final plat approval.

Section 4.2.01.C changes the Article to reflect the new organization of the sections

4.2.01.C Comments resulting from reviews described in Articles 4.2.01.A and 4.2.01.B will be reported to the Planning and Development Department for inclusion in CPC 101 Form.

Section 4.2.02.A.2 capitalizes "Public Right-of-Way"

2. Layout of water lines for maximum circulation of water. The pattern shall allow at least two sources of water to be constructed within the Public Right-of-Way or permanent easement. Side lot easements shall meet the requirements of Chapter 5, Easement Requirements, and Chapter 7, Water Line Design Requirements.

CHAPTER 4 – PLATTING REQUIREMENTS
SECTION 2 - PLATTING DESIGN REQUIREMENTS (CONT.)

SUMMARY OF CHANGES:

Section 4.2.02.B changes the Article to reflect the new organization of the sections

Section 4.2.02.B.2 capitalizes "Public Rights-of-Way"

4.2.02.B For plats of land located outside the city limits, review of final design drawings and other documents required by Houston Public Works for final plat approval will address all items in Article 4.2.02.A plus the following:

1. When appropriate, a letter from the municipal utility district's president or board or from the property owner stating that all off-site easements that are not immediately obtainable (for example: those crossing fee strips, rail roads, or other areas under eminent domain) are in progress and that it is the intention of the municipal utility district or property owner to complete the acquisition of such easements. The letter will be accompanied by a certified survey plat and legal description of such easements.

2. That separately platted tracts requiring service are or will be directly served by public utilities located in or abutting Public Rights-of-Way or permanent access easements with overlapping public utility easements.

CHAPTER 4 – PLATTING REQUIREMENTS

SECTION 2 - PLATTING DESIGN REQUIREMENTS (CONT.)

SUMMARY OF CHANGES:

Figures 4.1 and 4.2 are identified at the bottom of page rather than the top

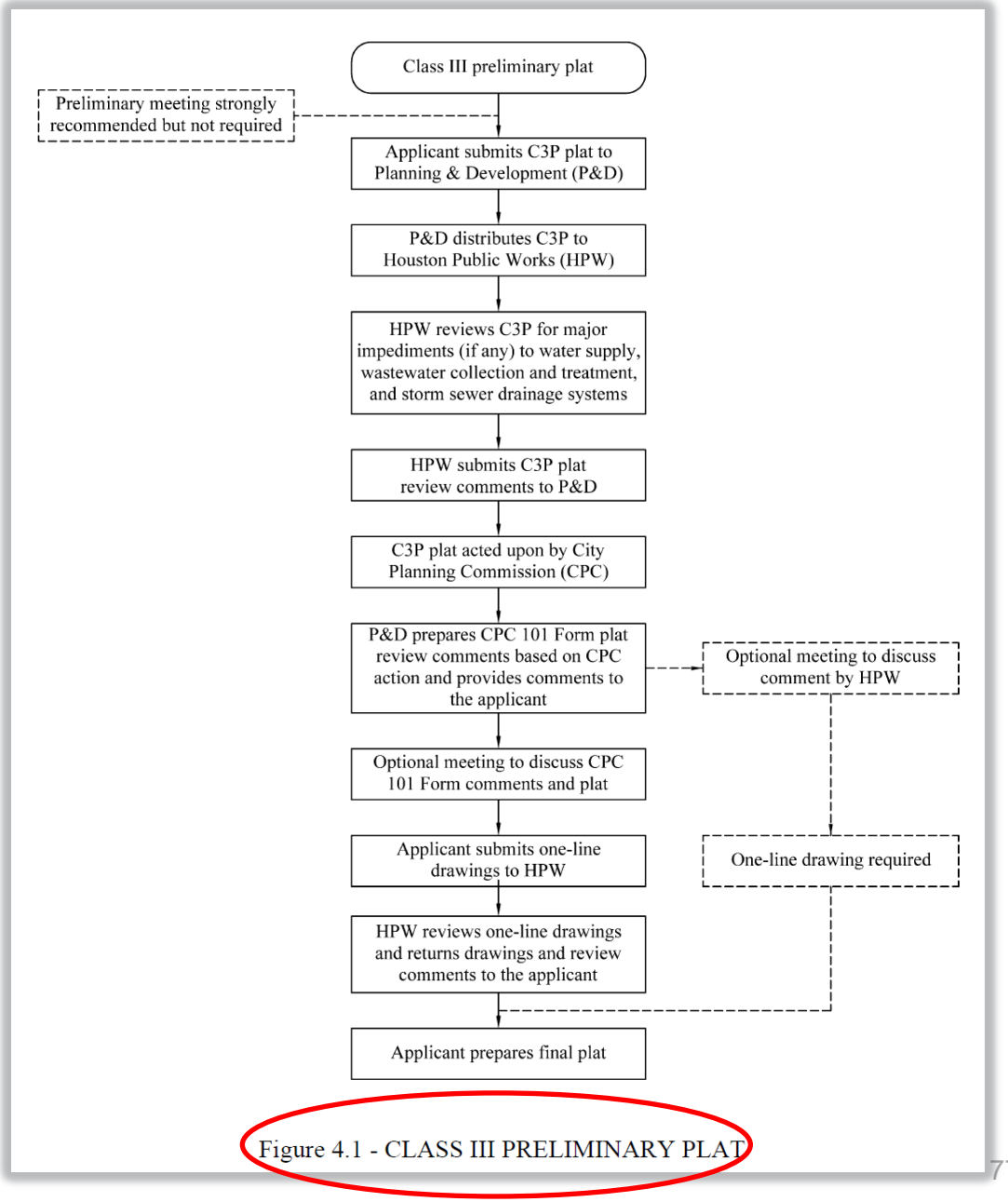

Figure 4.1 - CLASS III PRELIMINARY PLAT

THANK YOU!

QUESTIONS?

Enter it into the chat.

Note the chapter or topic in your question.

We will respond to unanswered questions on our website after this event.

10 minute break!

We will resume at 1:20 PM

HOUSTON PUBLIC WORKS

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CHAPTER 5:
EASEMENT REQUIREMENTS

LUIS GARZA, PE, CDT
DESIGN AND CONSTRUCTION STANDARDS GROUP

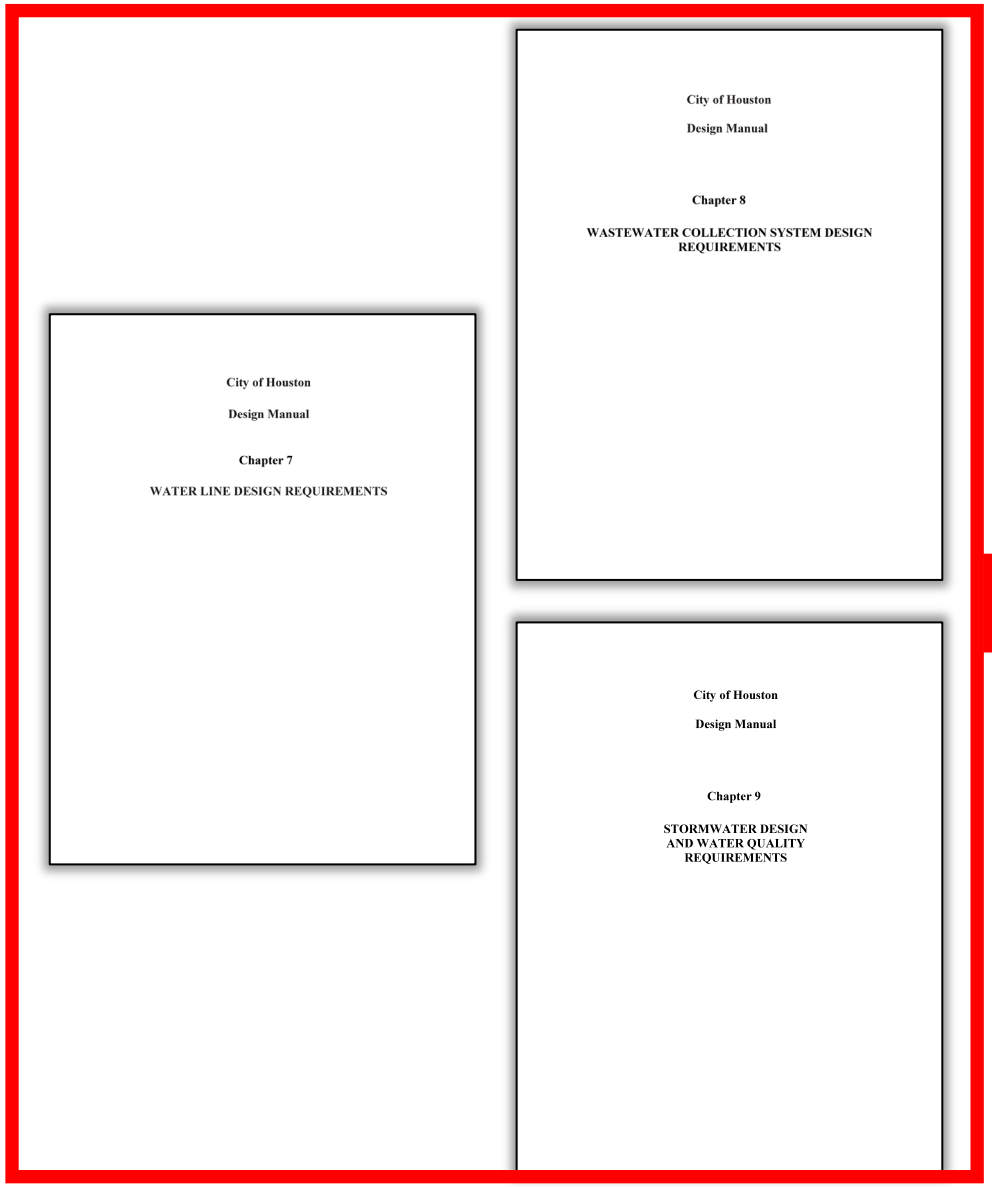
CHAPTER 5: EASEMENT REQUIREMENTS OVERVIEW

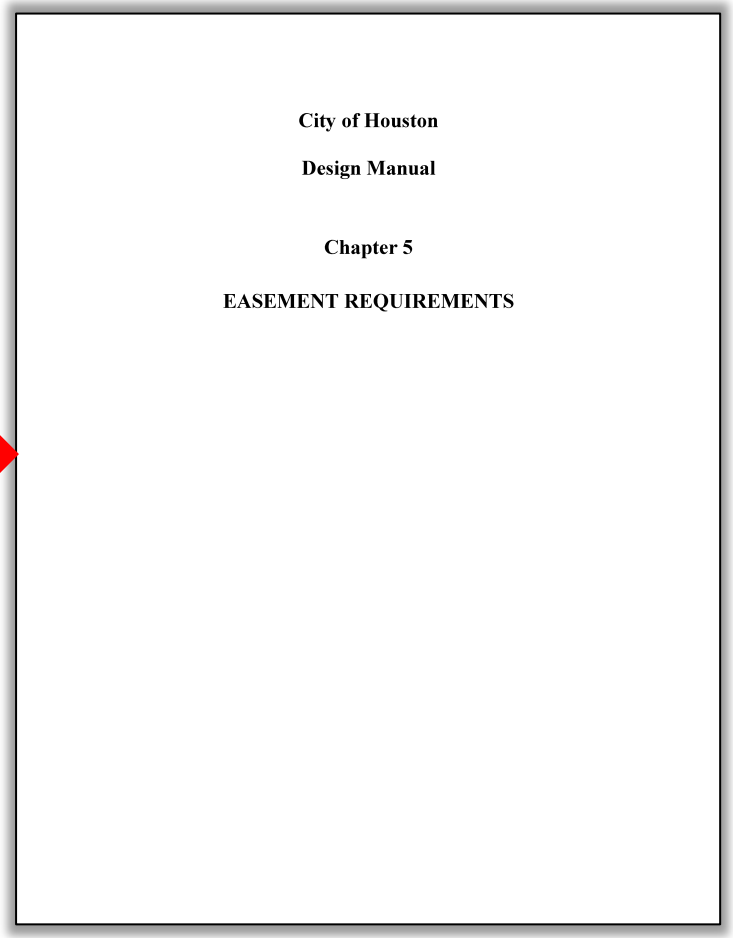
- Chapter Includes
- Easement requirement Consolidation (Ch. 7,8,9)
- Restrictive reserve easements
- Water line easements
- Sanitary sewer easements
- Storm sewer easement
- Combined storm and sanitary sewer easements

CHAPTER 5: CHAPTER INCLUDES

- Easement for electrical and gas lines are not covered under this design manual (5.1.01.B)
- Utility Coordination Committee (UCC) dissolved in 2007
  - References to UCC are removed from Chapter 5

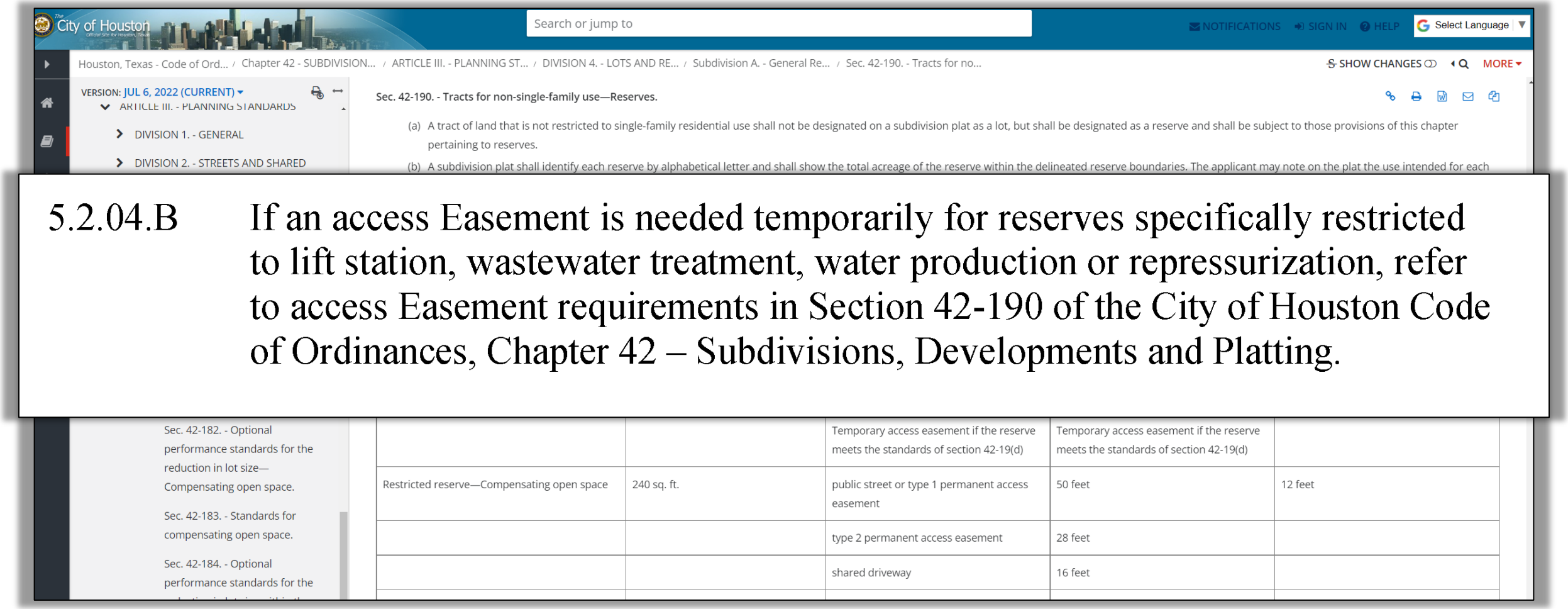
CHAPTER 5: EASEMENT REQ. CONSOLIDATION





HOUSTON PUBLIC WORKS

CHAPTER 5: RESTRICTED RESERVE EASEMENTS



5.2.04.B If an access Easement is needed temporarily for reserves specifically restricted to lift station, wastewater treatment, water production or repressurization, refer to access Easement requirements in Section 42-190 of the City of Houston Code of Ordinances, Chapter 42 – Subdivisions, Developments and Platting.

CHAPTER 5: WATER LINE EASEMENTS

Table 5.1 – MINIMUM EASEMENT WIDTH FOR LDWLs

SIZE OF WATERLINE	EASEMENT WIDTH (2)
24” through 36” (1)(3)	20 ft
42” through 54” (4)	30 ft
60” through 72” (4)	40 ft
84” and Larger (4)	50 ft

Notes:

(1) Water lines shall be centered in 20-foot Easements.

(2) For Easements 30-foot and larger, provide at least 10-foot clearance between water line centerline and Easement Boundary.

(3) For water lines at depths greater than 15-feet, add an additional 10-feet to the permanent Easement. Depth shall be measured to the bottom of the water line from natural ground or final ground elevation, whichever is greater.

(4) For water lines at depths greater than 15-feet, add a 10-foot temporary construction Easement. Depth shall be measured to the bottom of the water line from natural ground or final ground elevation, whichever is greater.

CHAPTER 5: WATER LINE EASEMENTS

Not Contiguous with Public ROW:

5.2.04.C.1 continued

c. Water line Easements that cannot be contiguous with Public Right-of-Way shall meet all of the following criteria:

(1) Minimum Easement width shall be equal to twice the water line diameter plus the depth to the bottom of the water line from natural ground or final ground elevation, whichever is greater;

(2) Easement width shall be rounded up to the nearest 5-foot increment; and

(3) Minimum Easement width shall not be less than 20-feet or as required by Table 5.1 for large diameter water lines.

CHAPTER 5: WATER LINE EASEMENTS

Contiguous with Public ROW:

e. Proposed water lines located within an Easement contiguous with the street Public Right-of-Way or Public Utility Easement that is contiguous with street Public Right of Way:

(1) Small Diameter Water Lines.

(a) For lines 12-inches in diameter and smaller, the minimum Easement width shall be 15-feet. The centerline of the pipe shall be located 5-feet from either Easement Boundary.

(b) For lines 16-inches to 20-inches in diameter, the minimum Easement width shall be 20-feet. The centerline of the pipe shall be located 7-feet from either Easement Boundary.

(2) Large Diameter Water Lines (LDWL).

(a) The minimum Easement width required to install, operate, and maintain water lines are summarized in Table 5.1.

CHAPTER 5: WATER LINE EASEMENTS

Water Lines within 5-feet of ROW:

f. Water line Easements are required for proposed water lines located inside of Public Right-of-Way if the exterior of the water line pipe is located within 5-feet of the Public Right-of-Way. The Easement shall be contiguous with the Public Right-of-Way and the Outer-Easement Boundary shall be located the following distance from the Public Right-of-Way:

(1) 12-inch diameter and smaller - minimum 5-feet.

(2) 16-inch to 20-inch in diameter - minimum 10-feet.

(3) 24-inch and larger, use Easement widths defined in Table 5.1.

CHAPTER 5: WATER LINE EASEMENTS

Water Line Location within Easements:

- Paragraph 5.2.04.C.1.i
- Side-lot easements only allowed if they eliminate dead-end water lines
- Side-lot easements must be accessible for maintenance

CHAPTER 5 : WATER LINE EASEMENTS

Water Line Location within Easements:

- WL16-inches and greater are not allowed in side-lots (5.2.04.C.1.j)
- Side-lot easements centered btw. two lots; WL must be centered btw. lot line & easement. [i.e. 20 ft easement, WL 5 ft from easement] (5.2.04.C.1.k)

CHAPTER 5 : WATER LINE EASEMENTS

Noteworthy Changes:

- Unless one already exists, provide All-Weather Access required for WL easements (5.2.04.C.1.d)
- Do not locate fire hydrants in WL easements (5.2.04.C.2.b)
- Min. 5ft x 5ft flushing valve easements when valve outside ROW. (5.2.04.C.2.d)

CHAPTER 5 : WASTEWATER LINE EASEMENTS

General Changes:

- Distinction made between gravity sanitary sewer lines vs force mains
- Consolidated WW easement requirements
- New reference to articles to clarify intent

CHAPTER 5: WASTEWATER LINE EASEMENTS

Gravity Sanitary Sewers or Other Combined Easements:

b. Gravity sanitary sewer Easements or other combined Easements for sanitary sewers which meet the conditions below shall have a minimum width equal to twice the sewer's diameter plus the flow line depth of the sewer from natural ground, proposed fill elevation, or 100-year floodplain fill elevation, whichever is greater; but not less than 25-feet. The qualifying conditions are:

(1) Runs through commercial reserves or across open country (acreage);

(2) Serves other existing or proposed platted commercial reserves or non-platted acreage tracts; or

(3) Is not immediately adjacent to Public Rights-of-Way, Easements, or fee strips, including those owned by Harris County Flood Control District, CenterPoint Energy, and pipeline companies.

CHAPTER 5: STORM WATER LINE EASEMENTS

Minimum Easement Width:

Table 5.2 – MINIMUM EASEMENT WIDTH FOR STORM SEWERS

SIZE OF STORM SEWER	MINIMUM EASEMENT WIDTH
24” through 36” (1)(3)	20 ft
42” through 72” (2)(3)	25 ft
84” and Larger (2)(3)	30 ft

Notes:

(1) Unless the storm sewer is located within a combined storm and sanitary sewer Easement, storm sewers shall be centered in 20-foot Easements.

(2) Unless the storm sewer is located within a combined storm and sanitary sewer Easement, storm sewers should be centered in the Easement. If the sewer cannot be centered, the horizontal clearance between the exterior of the storm sewer and the Easement Boundary shall be a minimum of 8-feet for sewers that are less than or equal to 15-feet in depth. For storm sewers greater than 15-feet in depth that cannot be centered within the Easement, the horizontal clearance between the exterior of the storm sewer and the Easement Boundary shall be a minimum of 16-feet.

(3) For storm sewers at depths greater than 15-feet, add an additional 15-feet to the permanent Easement. Depths shall be measured to the bottom of the storm sewer from natural ground or final ground elevation, whichever is greater.

CHAPTER 5: STORM WATER LINE EASEMENTS

Minimum Easement Width SWL < 5ft from ROW:

f. Storm sewer Easements are required for proposed storm sewers located inside of Public Right-of-Way if the exterior of the storm sewer pipe is located within 5-feet of the Public Right-of-Way. The Easement shall be contiguous with the Public Right-of-Way and the Easement width shall be as follows:

(1) Minimum of 5-foot width when the storm sewer pipe outer wall is located between 3-feet to 5-feet from the Public Right-of-Way.

(2) Minimum of 10-foot width when the storm sewer pipe outer wall is located less than 3-feet from the Public Right-of-Way.

(3) For storm sewers at depths greater than 15-feet, add an additional 10-foot wide permanent Easement to the Easement width required by 5.2.04.E.1.f.(1) or 5.2.04.E.1.f.(2). Depths shall be measured to the bottom of the storm sewer from natural ground or final ground elevation, whichever is greater.

CHAPTER 5: COMBINED STORM & SANITARY SEWER LINE EASEMENTS

Easement Not Contiguous with ROW:

5.2.04.F Combined Storm and Sanitary Sewer Easements:

1. Total combined Easement width shall be rounded up to the nearest multiple of 5-feet.

2. For combined storm and sanitary sewer Easement not contiguous to the Public Right-of-Way or Semi-Public Right-of-Way:

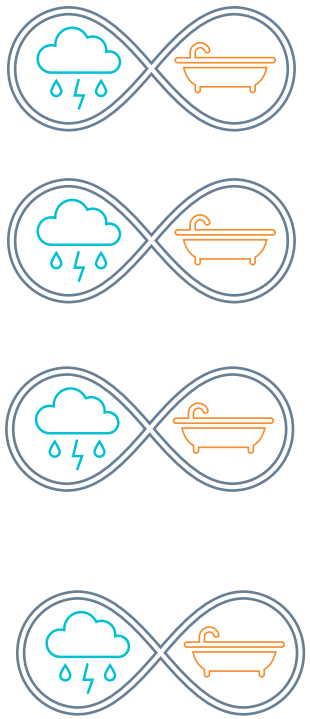
   a. Combined Easement width shall be as specified in Article 5.2.04.D.2.b and Article 5.2.04.E.1.b, whichever is greater.

   b. The centerline of sanitary sewer lines or force mains shall be located not less than 10-feet from the edge of the Easement Boundary.

   c. Minimum horizontal clearance between the exterior of any storm sewer and either Easement Boundary shall be as required by Table 5.2, Note 2.

CHAPTER 5: COMBINED STORM & SANITARY SEWER LINE EASEMENTS

Easement Contiguous with ROW:



3. For combined storm and sanitary sewer Easements contiguous to Public or Semi-Public Right-of-Way:

   a. Combined Easement width shall be as specified in Article 5.2.04.E.1.b or a minimum width equal to the depth of the proposed sanitary sewer line, whichever is greater.

   b. When storm sewers are placed nearest to the Outer-Easement Boundary of combined Easements, the minimum horizontal clearance between the exterior of any storm sewer and the Outer-Easement Boundary shall be as required by Table 5.2, Note 2.

   c. See Figure 5.1 for an example to be used as a visual aid for these requirements. Figure 5.1 is not a substitute for the requirements in this section.

CHAPTER 3: COMBINED STORM & SANITARY SEWER LINE EASEMENTS

Figure 5.1 – Case A

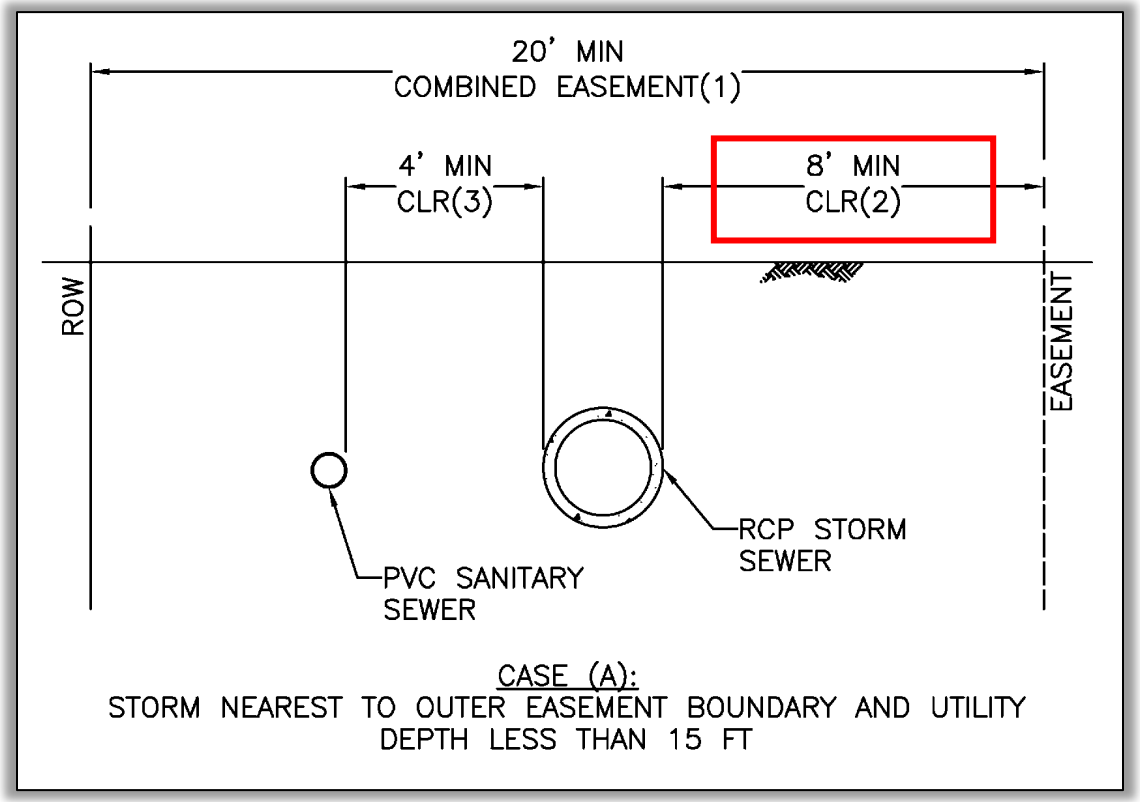
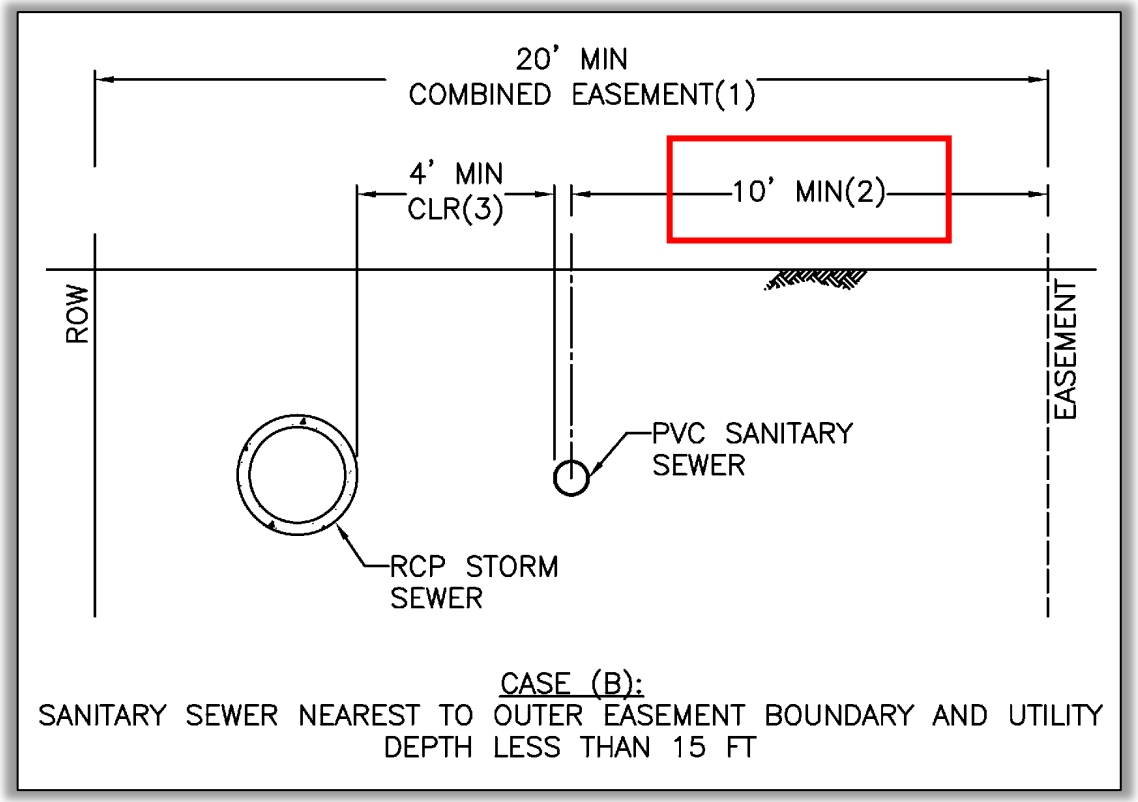


Figure 5.1 – Case B



QUESTIONS?

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CHAPTER 13 – GEOSPATIAL DATA DELIVERABLES

ANTHONY POWELL
GEOSPATIAL SERVICES GROUP

INFRASTRUCTURE DESIGN MANUAL CHAPTER 13

General Changes

- Name of chapter changed *“Geospatial Data Deliverables”*
- Reformatted to consolidate similar sections
  - Data collection methods
  - Data accuracy
  - Asset specifics
  - Data quality and topological checks
  - Electronic deliverable submission requirements

INFRASTRUCTURE DESIGN MANUAL CHAPTER 13

General Changes Cont.

- References added
- Definitions expanded

13.1.03 REFERENCES

13.1.03.A City of Houston Code of Ordinances, Chapter 33 – Planning and Development, Article IV – City Surveys.

13.1.03.B City of Houston, Geospatial Data Deliverables Properties Guide, Current Edition.

13.1.04 DEFINITIONS

13.1.04.A Computer Aided Design (CAD) – Preparation of drawings, plans, prints, and other related documents through the use of computer equipment and software programs.

13.1.04.B Database Management System (DBMS) – A set of software applications used create and maintain databases according to a Schema. They provide tools for adding storing, changing, deleting, and retrieving data.

13.1.04.C Engineer of Record – A professional engineer who seals drawings, reports or documents for a project.

13.1.04.D Feature Class – Homogeneous collections of features with a common spatial representation and set of attributes stored in a database table.

INFRASTRUCTURE DESIGN MANUAL CHAPTER 13

Changes to Storm Water Asset Standards

- Asset descriptions added
- Specific feature class information moved to Appendix A
- Information Required for Storm Water Assets table added

Table 13.1– INFORMATION REQUIRED FOR STORMWATER ASSETS

Information	Asset													
	Abandoned Gravity Main	Abandoned Open Drain	Abandoned Point	Detention	Discharge Point	Easement	Fitting	Gravity Main	Inlet	Manhole	Network Structure	Open Drain	Underpass	Virtual Drainline
Abandon Status	X	X	X											
Active Flag			X	X	X		X	X	X	X				
Address		X	X		X				X	X	X	X	X	
Bank Material				X										
Bed Material		X		X								X		
Channel Name		X										X		
Comments				X										
Company	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Construction Material									X					

INFRASTRUCTURE DESIGN MANUAL CHAPTER 13

Changes to Water and Wastewater Asset Standards

- Clarified language by modifying heading to denote the section as Wastewater/Water Asset Descriptions, and removed specific feature class names along with subtypes
- Removed projected coordinate system and consolidated to beginning of the Chapter Section 2
- Wastewater and Water Asset Requirements are now captured as tables showing the asset and associated required information

INFRASTRUCTURE DESIGN MANUAL CHAPTER 13

Table 13.3- INFORMATION REQUIRED FOR WATER ASSETS

Information	Asset									
	Casing	Control Valve	Fitting	Hydrant	Lateral Service	Meter	Pressure Reducing Station	Pump Pressure Main	Sampling Station	System Valve
Creation Source	*	*	*	*	*	*	*	*	*	
Data Source Type	X	X	X	X	X	X	X	X	X	X
Diameter	X				X	X		X		X
Fiscal Year	X	X	X	X	X	X	X	X	X	X
GFS or WBS Number	*	*	*	*	*	*	*	*	*	*
GFS or WBS Number	*	*	*	*	*	*	*	*	*	*
Ground Cover								X		
Hydrant Lead Diameter				X						
ILMS Number	*	*	*	*	*	*	*	*	*	*
In Service Date	X	X	X	X	X	X	X	X	X	X
Large Main Diameter			*				*			
Length	X				X			X		
Life Cycle Status	X	X	X	X	X	X	X	X	X	X
Material	X				X			X		
Main Diameter				X		X				
Notes	*	*	*	*	*	*	*	*	*	
Owner	X	X	X	X	X	X	X	X	X	X
Plan Date	X	X	X	X	X	X	X	X	X	X
Plan Number	X	X	X	X	X	X	X	X	X	X
Plan Type	X	X	X	X	X	X	X	X	X	X
Project Number	*	*	*	*	*	*	*	*	*	*
Project Type	*	*	*	*	*	*	*	*	*	*
Record Drawing Number	**	**	**	**	**	**	**	**	**	**
Service Address						X				
Small Main Diameter			*				*			
Subtype Code	X	X	X	X	X	X	X	X	X	X

*If applicable

**For public/private projects only

Table 13.2- INFORMATION REQUIRED FOR WASTEWATER ASSETS

Information	Asset								
	Casing	Cleanout	Fitting	Force Main	Gravity Main	Manhole	Network Structure	Service Lead	Valve
Buried Depth		x				x			
Creation Source	*	*	*	*	*	*	*	*	*
Data Source Type	X	X	X	X	X	X	X	X	X
Datum	X	X	X	X	X	X	X	X	X
Datum Year	X	X	X	X	X	X	X	X	X
Diameter	X		X	X	X	X		X	X
Distance to Downstream Manhole		X	*			X		X	
Downstream Direction		X	*			X			
Downstream Invert					X				
Fiscal Year	X	X	X	X	X	X	X	X	X
Flow Elevation		X				X			
GFS Or WBS	*	*	*	*	*	*	*	*	*
GFS or WBS	*	*	*	*	*	*	*	*	*

Information	Asset								
	Casing	Cleanout	Fitting	Force Main	Gravity Main	Manhole	Network Structure	Service Lead	Valve
Number									
ILMS Number	*	*	*	*	*	*	*	*	*
Inlet Elevation						*	X		
Inlet Elevation 2						*			
Inlet Elevation 3						*			
In Service Date	X	X	X	X	X	X	X	X	X
Length	X			X	X			X	
Life Cycle Status	X	X	X	X	X	X	X	X	X
Material	X		X	X	X	X		X	
Notes	*	*	*	*	*	*	*	*	*
Owner	X	X	X	X	X	X	X	X	X
Percent Slope					X			X	
Plan Date	X	X	X	X	X	X	X	X	X
Plan Number	X	X	X	X	X	X	X	X	X
Plan Type	X	X	X	X	X	X	X	X	X

HOUSTON PUBLIC WORKS

INFRASTRUCTURE DESIGN MANUAL CHAPTER 13

Changes to Geotechnical/Environmental Asset Standards

- Removed projected coordinate system
- Information Required table updated
- Clarified the alternative tabular deliverable requirements for boring and boring test result data

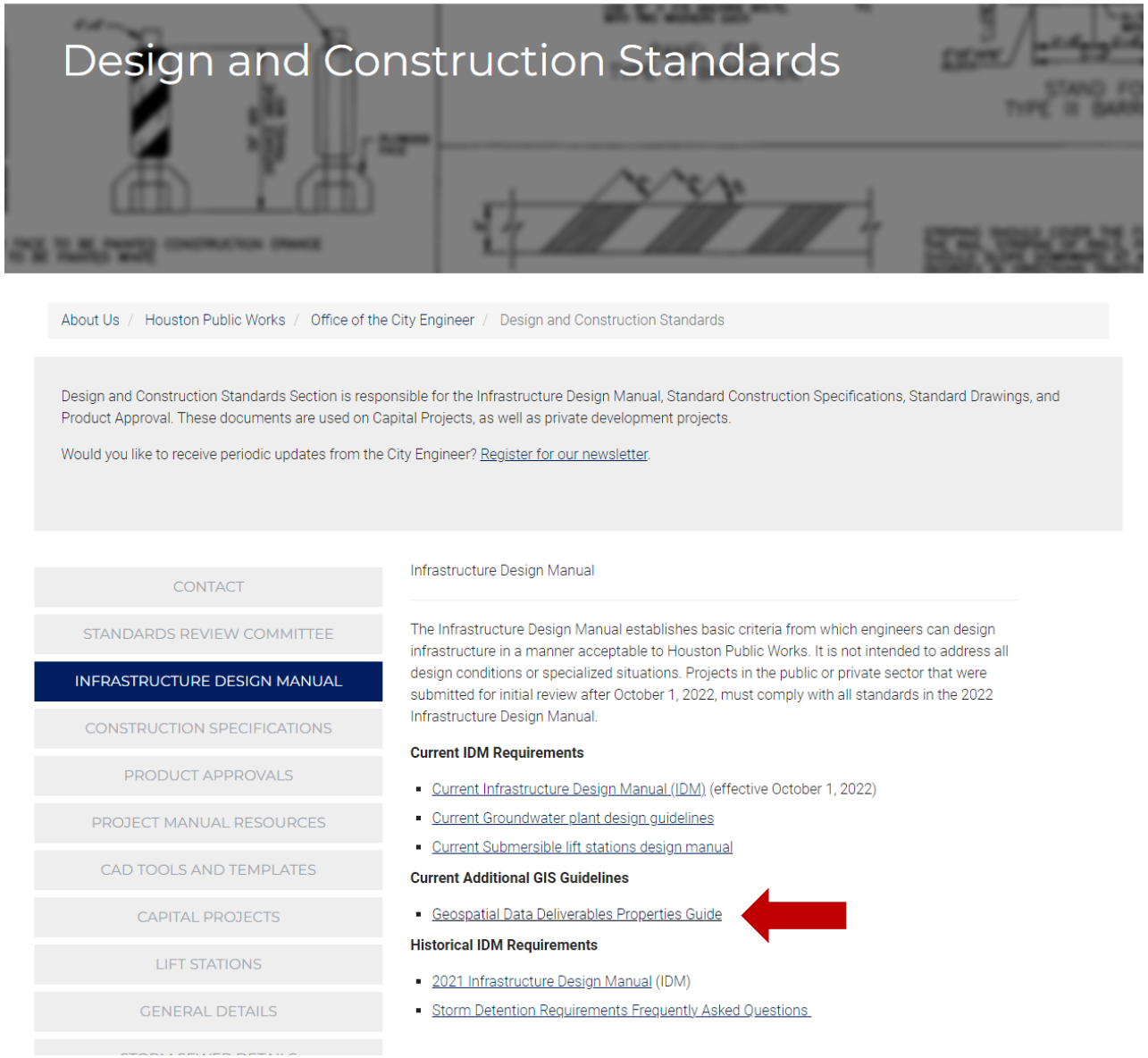
Table 13.4- INFORMATION REQUIRED FOR GEOTECHNICAL AND ENVIRONMENTAL FEATURE CLASSES

FIELD	Feature Class	
	geoBoring	geoBoringTestResults
PROJECTID	X	X
WBSNUMBER	X	
PROJECTNAME	X	
REPORTTYPE	X	
CONSULTANTPROJECTNO		X
REPORTSIGNEDDATE	X	
CONSULTANTNAME	X	
BOREID	X	
X*	X	
Y*	X	
LATITUDE**	X	
LONGITUDE**	X	
SURFACEELEV	X	
DEPTH	X	
WATERENCOUNTERED	X	
WATERLEVEL	X	
READINGDATE	X	
WATERLEVELREADING	X	
CONTAMINATION	X	
DRILLEDDATE	X	
SAMPLENO		X
SAMPLEDEPTHTOP		X
SAMPLEDEPTHBTM		X
SAMPLETYPE		X
SPT		X
WATERCONTENT		X
DRYDENSITY		X

INFRASTRUCTURE DESIGN MANUAL CHAPTER 13

Geospatial Data Deliverables Properties Guide

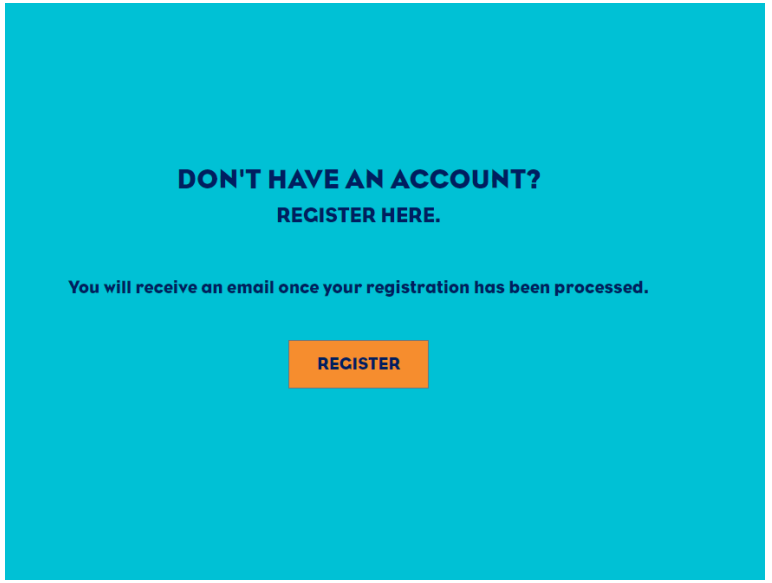
- General asset information
- Feature class field properties
- Domain Codes
- Subtypes
- Electronic deliverable submission process and metadata guidelines



INFRASTRUCTURE DESIGN MANUAL CHAPTER 13

New Electronic GIS Deliverables Submission Process

- Submit an ESRI file geodatabase
- Shapefiles will not be accepted
- https://hpwgisapps.houstontx.gov/edeliverables



QUESTIONS?

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CHAPTER 9 – STORM WATER DESIGN AND WATER QUALITY REQUIREMENTS

IVY WANG, P.E., CFM
HOUSTON PERMITTING CENTER
OFFICE OF CITY ENGINEER

DETENTION VOLUME CALCULATION FOR SHARED/COMMON DRIVEWAYS FOR SFR 15,000 SF OR LESS

- Paragraph 9.2.01.H.3 (b)(1) & (c):

DETENTION VOLUME CALCULATION FOR SHARED/COMMON DRIVEWAYS FOR SFR 15,000 SF OR LESS

- **Paragraph 9.2.01.H.3.b.(1):**

OLD

b. Single family residential (SFR) lots of 15,000 square feet in area or less: SFR Lots are not required to provide detention if the impervious area is less than or equal to 65%. Detention volume of 0.75 acre-feet per acre is required for impervious area in excess of 65% of the lot. SFR lot, which is a new development and a part of the subdivision where there is no detention provided, no 65% reduction will be allowed.

(1) Detention Requirement = 0.75 acre-feet per acre of impervious cover (including all disturbed area that results in impervious surface) surface exceeding over 65% of the project area.

DETENTION VOLUME CALCULATION FOR SHARED/COMMON DRIVEWAYS FOR SFR 15,000 SF OR LESS

- **Paragraph 9.2.01.H.3.c:**

OLD

c. SFR lots of 15,000 square feet or less utilizing a shared driveway are required to provide detention at a volume of 0.75 acre-feet per acre. The individual lots will be required to detain based on area in excess of 65% impervious. The entire shared driveway (access road, permanent access easement (28' PAE), private alley, public alley, or common driveway) will be required detention; no 65% reduction will be allowed. The total detention for the development will be a combination of these two volumes. Sharing storm outfall with others, a point of connection shall be at the storm sewer system not through a curb.

(1) Detention Requirement =

[0.75 acre feet per acre of impervious cover surface (including all disturbed area that results in impervious surface) in excess of 65%]

+

[0.75 acre feet per acre] x [The area of the common or shared driveway, the access easement, a permanent access easement (28'PAE) access road, private alley or public alley, or similar access way by any other name, must be included in the calculation of the project area.]

DETENTION VOLUME CALCULATION FOR SHARED/COMMON DRIVEWAYS FOR SFR 15,000 SF OR LESS

- **Paragraph 9.2.01.H.3.b.(1):**

REVISED

b. Single family residential (SFR) lots of 15,000 square feet in area or less: SFR Lots are not required to provide detention if the impervious area is less than or equal to 65%. Detention volume of 0.75 acre-feet per acre is required for impervious area in excess of 65% of the lot. SFR lot, which is a new development and a part of the subdivision where there is no detention provided, no 65% reduction will be allowed.

(1) Detention Requirement = 0.75 acre-feet per acre of impervious cover (including all disturbed area that results in impervious surface) surface exceeding over 65% of the project area. The impervious area for any shared drive or common drives will be divided equally among all lots within the SFR development.

DETENTION VOLUME CALCULATION FOR SHARED/COMMON DRIVEWAYS FOR SFR 15,000 SF OR LESS

- **Paragraph 9.2.01.H.3.c:**

OLD

c. SFR lots of 15,000 square feet or less utilizing a shared driveway are required to provide detention at a volume of 0.75 acre-feet per acre. The individual lots will be required to detain based on area in excess of 65% impervious. The entire shared driveway (access road, permanent access easement (28' PAE), private alley, public alley, or common driveway) will be required detention; no 65% reduction will be allowed. The total detention for the development will be a combination of these two volumes. Sharing storm outfall with others, a point of connection shall be at the storm sewer system not through a curb.

(1) Detention Requirement =

[0.75 acre feet per acre of impervious cover surface (including all disturbed area that results in impervious surface) in excess of 65%]

+

[0.75 acre feet per acre] x [The area of the common or shared driveway, the access easement, a permanent access easement (28'PAE) access road, private alley or public alley, or similar access way by any other name, must be included in the calculation of the project area.]

DETENTION VOLUME CALCULATION FOR SHARED/COMMON DRIVEWAYS FOR SFR 15,000 SF OR LESS

- **Paragraph 9.2.01.H.3.c:**

REVISED

c. SFR lots of 15,000 square feet or less utilizing an access road, permanent access easement (28' PAE), private alley or public alley: The individual lots will be required to detain based on the impervious area in excess of 65% at a volume of 0.75 acre-feet per acre. The entire access road, permanent access easement (28' PAE), private alley, or public alley will require detention at a volume of 0.75 acre-feet per acre; no 65% reduction will be allowed. The total detention for the development will be a combination of these two volumes. Sharing storm outfall with others, a point of connection shall be at the storm sewer system not through a curb.

(1) Detention Requirement =

[0.75 acre feet per acre of impervious cover surface (including all disturbed area that results in impervious surface) in excess of 65%]

+

[0.75 acre feet per acre] x [The area of the access easement, a permanent access easement (28'PAE), access road, private alley or public alley, or similar access way by any other name, must be included in the calculation of the project area.]

thank you!

HOUSTON PUBLIC WORKS

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QUESTIONS?

Enter it into the chat.

Note the chapter or topic in your question.

We will respond to unanswered questions on our website after this event.

CONSTRUCTION SPECIFICATIONS

SAHAR BEIGZADEH, P.E.

OFFICE OF THE CITY ENGINEER

DESIGN AND CONSTRUCTION STANDARDS GROUP

SPECIFICATION REDLINES

- CONTACT
- STANDARDS REVIEW COMMITTEE
- INFRASTRUCTURE DESIGN MANUAL
- CONSTRUCTION SPECIFICATIONS
- PRODUCT APPROVALS
- PROJECT MANUAL RESOURCES
- CAD TOOLS AND TEMPLATES
- CAPITAL PROJECTS
- LIFT STATIONS
- GENERAL DETAILS
- STORM SEWER DETAILS
- STREET PAVING AND SIDEWALK DETAILS
- STREETCUT DETAILS
- TRAFFIC DETAILS
- TREE AND HARDSCAPE DETAILS
- WASTEWATER DETAILS
- WATER DETAILS

Standards Review Committee

The Standard Review Committee (SRC) was established to review, revise, and update standards and documents. Public input and participation is requested by the submittal of proposals for suggested changes, comments, recommendations and other information. The process will accomplish review of all documents within a five year cycle.

CURRENT REVIEW CYCLE

The 2022-2023 Review Cycle will look at Chapters 15, 16, and 17 of the Infrastructure Design Manual and their associated drawings and specifications. Revision proposals are due by **September 30, 2022**.

- Review Cycle Public Notice
- Request Form to Change Standards
- Chapter 15
- Chapter 16
- Chapter 17

FUTURE REVIEW CYCLES

- 2023-2024: Storm Drainage - Chapter 9
- 2024-2025: Pavement - Chapters 6, 10, 12

PAST REVIEW CYCLE

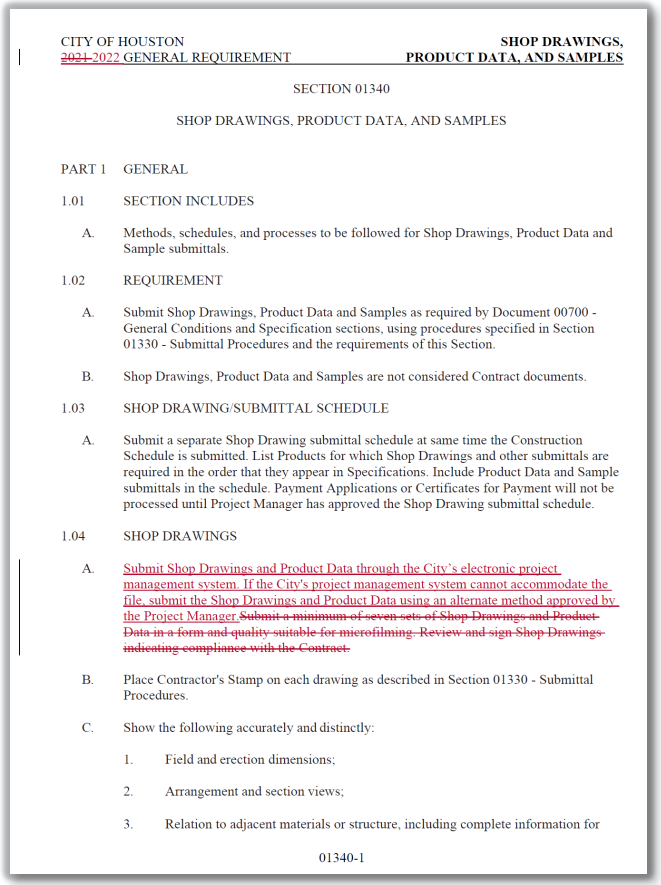
The 2021-2022 Review Cycle took a look at Chapters 1, 2, 3, 4, 5 and 13 of the Infrastructure Design Manual and their associated drawings and specifications.

- IDM Redlines from 2021-2022 Review cycle
- General Requirements and Standard Construction Specifications Redlines from 2021-2022 Review Cycle

OFF-CYCLE REVIEWS

Significant issues may be considered outside of the 5-year cycle for existing standard drawings, construction specifications and the IDM. Issues will be vetted and, if determined applicable, will be updated or saved for future review cycles.

If you would like to request changes, please fill out the Document/Detail Change Request Form and email to the SRC at HPWStandards@houstontx.gov



CITY OF HOUSTON
~~2021~~-2022 GENERAL REQUIREMENT

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

SECTION 01340

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Methods, schedules, and processes to be followed for Shop Drawings, Product Data and Sample submittals.

1.02 REQUIREMENT

A. Submit Shop Drawings, Product Data and Samples as required by Document 00700 - General Conditions and Specification sections, using procedures specified in Section 01330 - Submittal Procedures and the requirements of this Section.

B. Shop Drawings, Product Data and Samples are not considered Contract documents.

1.03 SHOP DRAWING/SUBMITTAL SCHEDULE

A. Submit a separate Shop Drawing submittal schedule at same time the Construction Schedule is submitted. List Products for which Shop Drawings and other submittals are required in the order that they appear in Specifications. Include Product Data and Sample submittals in the schedule. Payment Applications or Certificates for Payment will not be processed until Project Manager has approved the Shop Drawing submittal schedule.

1.04 SHOP DRAWINGS

A. Submit Shop Drawings and Product Data through the City's electronic project management system. If the City's project management system cannot accommodate the file, submit the Shop Drawings and Product Data using an alternate method approved by the Project Manager. ~~Submit a minimum of seven sets of Shop Drawings and Product Data in a form and quality suitable for microfilming. Review and sign Shop Drawings indicating compliance with the Contract.~~

B. Place Contractor's Stamp on each drawing as described in Section 01330 - Submittal Procedures.

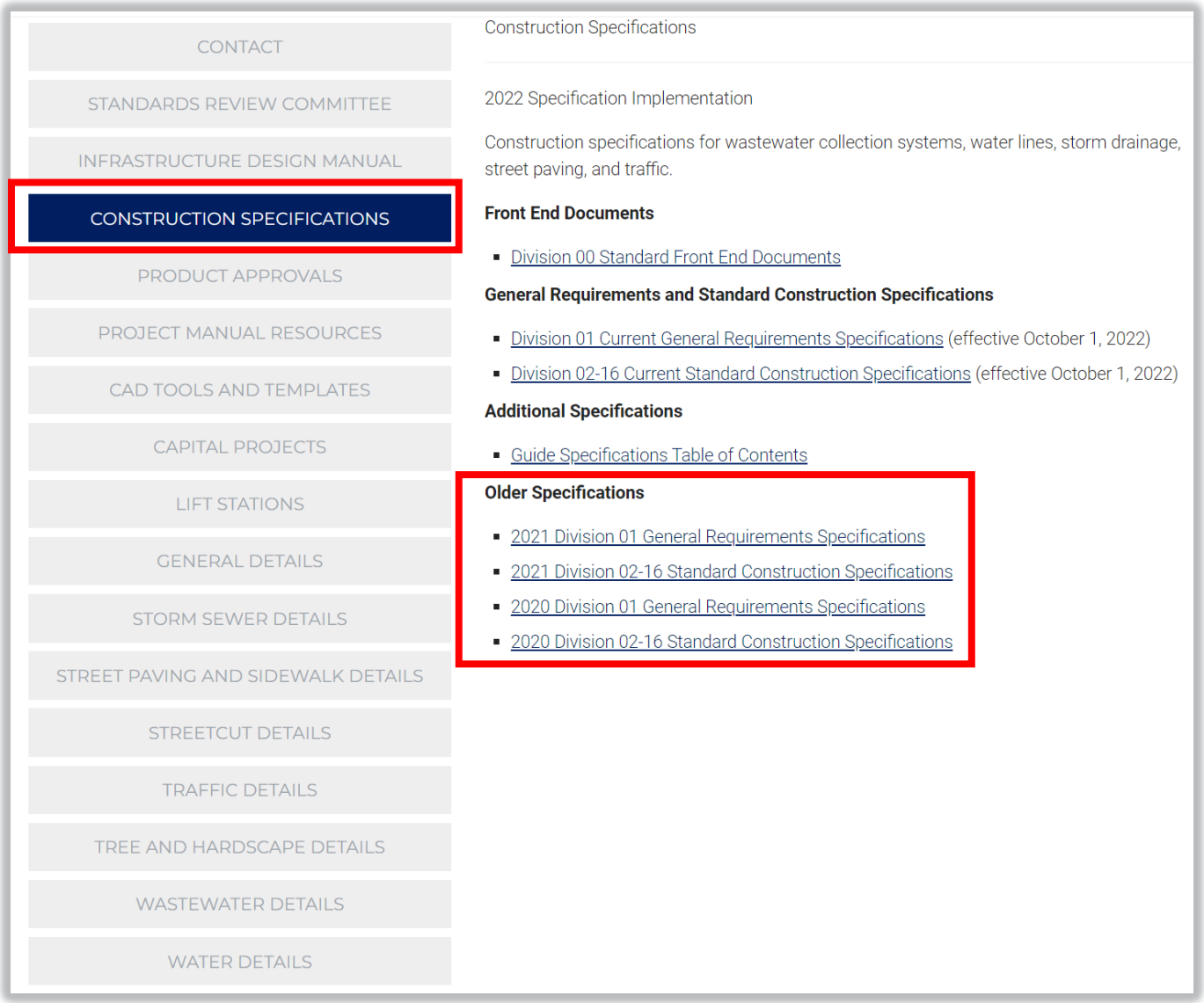
C. Show the following accurately and distinctly:

1. Field and erection dimensions;
2. Arrangement and section views;
3. Relation to adjacent materials or structure, including complete information for

01340-1

HOUSTON PUBLIC WORKS

SPECIFICATION REDLINES



HOUSTON PUBLIC WORKS

STANDARD SPECIFICATIONS

NEW IN THE 2022 REVISION

Standard Construction Specifications for Wastewater Collection Systems, Water Lines, Storm Drainage, Street Paving, and Traffic – 2022 Revisions to the 2021 Edition

The City of Houston Standards Review Committee (SRC) was established to review, revise, and update documents and standards for Houston Public Works. Public input and participation was requested by the submittal of proposals for suggested changes, comments, recommendations and other information.

The 2021-2022 City of Houston Review Cycle Committee reviewed Infrastructure Design Manual (IDM) chapters 1-5, 7-9, and 13 along with their associated standard drawings and standard construction specifications. Refer to the IDM Executive Summary for a summary of major updates to the design requirements made this review cycle. Below is a list of standard specifications and standard drawings that were revised during this review cycle. The Standard Construction Specifications have change bars on the left side of the page to indicate a major revision has taken place.

New Specifications:

- 01582 – Build Houston Forward Project Identification Signs
- 02445 – Jack and Bore/Jack and Mine/Pilot Tube Guided Boring Tunnels
- 02447 – Installation of Water Lines by Slurry Bore

Specifications with major updates:

- 01145 – Use of Premises
- 01340 – Shop Drawings, Product Data, and Samples
- 01422 – Reference Standards
- 01450 – Contractors Quality Control
- 01502 – Mobilization
- 01725 – Field Surveying
- 01770 – Closeout Procedures
- 01782 – Operations and Maintenance Data
- 02441 – Microtunneling
- 02501 – Ductile Iron Pipe and Fittings

Specifications with major updates (Continued):

- 02504 – Fiberglass Reinforced Pipe
- 02526 – Water Meters

Specifications Retired/Deleted:

- 02447 – Augering Pipe and Conduit

New Standard Details:

- 01582-01 – Construction Sign, Build Houston Forward

Standard Details with major updates:

- None

Standard Details Retired/Deleted:

- None

RS-1

CHANGES MADE IN THE 2021 REVISION

Standard Construction Specifications for Wastewater Collection Systems, Water Lines, Storm Drainage, Street Paving, and Traffic – 2021 Revisions to the 2020 Edition

The 2020-2021 City of Houston Review Cycle reviewed Infrastructure Design Manual (IDM) chapters 3, 6-9, 11, 13, 14 and 17 along with their associated standard drawings and standard construction specifications. Below are the standard specifications and standard drawings that were revised during 2020-2021 review cycle.

New Specifications:

- 02614 – Large Diameter Line Stop
- 02615 – Insertion Valves and Line Stops
- 16124 – Conductive Trace Wire for Non-Metallic Water Line Pipes

Specifications with major updates:

- 02082 – Precast Concrete Manholes
- 02400 – Tunnel Shafts
- 02431 – Tunnel Grout
- 02501 – Ductile Iron Pipe and Fittings
- 02506 – Polyvinyl Chloride Pipe
- 02507 – Prestressed Concrete Cylinder Pipe
- 02511 – Water Lines
- 02512 – Water Tap and Service Line Installation
- 02513 – Wet Connections
- 02514 – Disinfection of Water Lines
- 02517 – Water Line in Tunnels
- 02518 – Steel Pipe and Fittings for Large Diameter Water Lines
- 02520 – Fire Hydrants
- 02524 – Air Release and Vacuum Relief Valves
- 02527 – Polyurethane Coatings on Steel or Ductile Iron Pipe
- 02528 - Polyethylene Encasement/Wrap
- 02613 - Bar-Wrapped Steel Cylinder Pipe

Specifications Retired/Deleted:

- 16717 - Programmable Vehicle Signal Head

New Standard Details:

- 02082-12 – Storm Sewer Precast Box Manhole (Storm Water)
- 02082-13 – Storm Sewer Type 'C' Precast Round Manhole (Storm Water)
- 16124-01 – Complete Utility Locating System Sample Plan (Water)

New Standard Details (Continued):

- 16124-02 – Complete Utility Locating System Water Service Detail (Water)
- 16124-03 – Complete Utility Locating System Hydrant Detail (Water)

Standard Details with major updates:

- 02091-01 – Non-Metallic Frame and Cover (Wastewater)
- 02082-06 – Sanitary Sewer Manhole Vent for Sealed Manhole (Wastewater)
- 02082-10 – Standard LDWL Access Manhole Details (Water)
- 02317-09 – Standard LDWL Excavation and Backfill Detail (Water)
- 02517-01 – LDWL Tunnel and Casing Details for Water Lines 24-Inch and Larger (Water)
- 02520-01 – Standard Fire Hydrant Detail (Water)
- 02524-03 – LDWL Air Valve Assembly in Service Manhole Detail (Water)
- 15641-01 – Standard LDWL Cathodic Protection Details for Test Stations (Sheet 1 of 3) (Water)
- 15641-02 – Standard LDWL Cathodic Protection Details for Test Stations (Sheet 2 of 3) (Water)
- 15641-03 – Standard LDWL Cathodic Protection Details for Test Stations (Sheet 3 of 3) (Water)
- 16640-01 – Standard LDWL Cathodic Protection Details for Test Stations & Anodes (Water)

Standard Details Retired/Deleted:

- 02081-01 - Storm Sewer Manhole Type "C" for 42" Diameter RCP and Smaller
- 02081-02 - Storm Sewer Manhole Type "C" for 48" to 72" Diameter RCP
- 02081-03 Storm Sewer Manhole Type "C" for 78" Diameter RCP and Greater
- 02081-04 Storm Sewer Manhole Type "C" for Proposed Concrete Box Sewer

RS-2

CHANGES MADE IN THE 2020 REVISION

Standard Construction Specifications for Wastewater Collection Systems, Water Lines, Storm Drainage, Street Paving, and Traffic – 2020 Revisions to the 2019 Edition

The 2019-2020 City of Houston Review Cycle reviewed Infrastructure Design Manual (IDM) chapters 6, 10, and 12 along with their associated standard drawings and standard construction specifications. Below are the standard specifications and standard drawings that were revised during the 2019-2020 review cycle.

Specifications with major updates:

- 02751 - Concrete Paving
- 02752 - Concrete Paving Joints

Standard Details with major updates:

- 02741-01 - Hot-Mix Asphaltic Concrete Pavement Details
- 02741-04 - Hot-Mix Asphalt Concrete Pavement Details for Alleys (DELETED)
- 02751-01 - Concrete Pavement Details
- 02754-03 - Proposed Sidewalk Through Driveway with Excessive Elevation Difference

RS-3

STANDARD SPECIFICATIONS

New Specifications:

- 01582 – Build Houston Forward Project Identification Signs
- 02445 – Jack and Bore/Jack and Mine/Pilot Tube Guided Boring Tunnels
- 02447 – Installation of Water Lines by Slurry Bore

Specifications with major updates:

- 01145 – Use of Premises
- 01340 – Shop Drawings, Product Data, and Samples
- 01422 – Reference Standards
- 01450 – Contractors Quality Control
- 01502 – Mobilization
- 01725 – Field Surveying
- 01770 – Closeout Procedures
- 01782 – Operations and Maintenance Data
- 02441 – Microtunneling
- 02501 – Ductile Iron Pipe and Fittings

Specifications with major updates (Continued):

- 02504 – Fiberglass Reinforced Pipe
- 02526 – Water Meters

Specifications Retired/Deleted:

- 02447 – Augering Pipe and Conduit

New Standard Details:

- 01582-01 – Construction Sign, Build Houston Forward

Standard Details with major updates:

- None

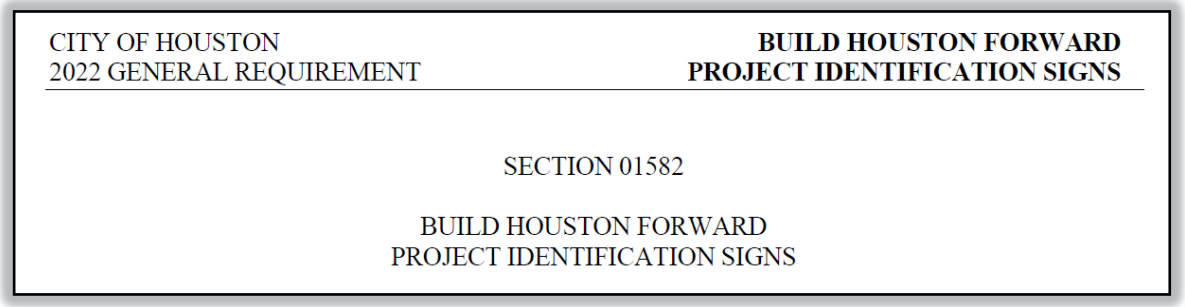
Standard Details Retired/Deleted:

- None

STANDARD SPECIFICATIONS

NEW SPECIFICATIONS:

01582 – Build Houston Forward Project Identification Signs



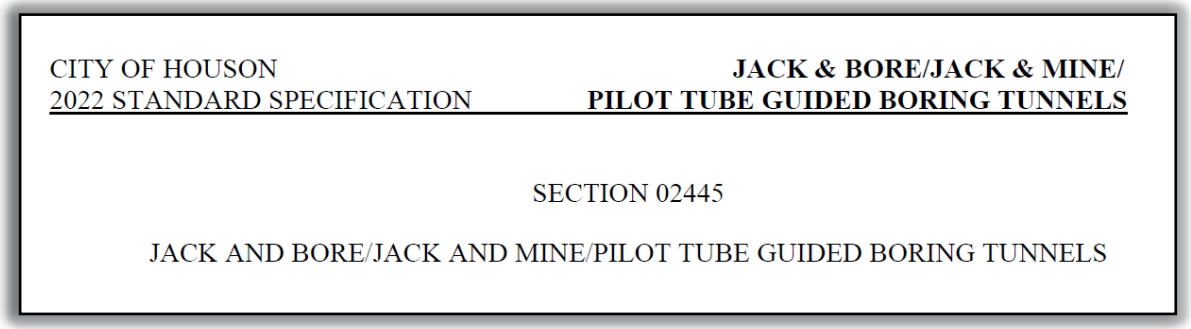
CITY OF HOUSTON
2022 GENERAL REQUIREMENT

BUILD HOUSTON FORWARD PROJECT IDENTIFICATION SIGNS

SECTION 01582

BUILD HOUSTON FORWARD
PROJECT IDENTIFICATION SIGNS

02445 - Jack and Bore/ Jack and Mine/ Pilot Tube



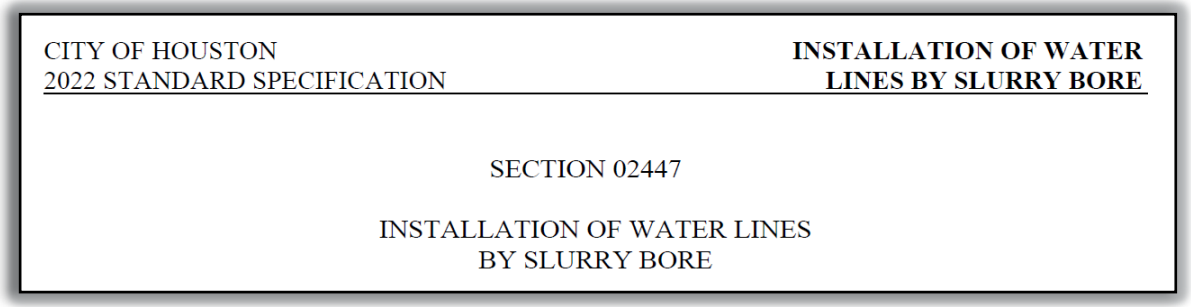
CITY OF HOUSON
2022 STANDARD SPECIFICATION

JACK & BORE/JACK & MINE/ PILOT TUBE GUIDED BORING TUNNELS

SECTION 02445

JACK AND BORE/JACK AND MINE/PILOT TUBE GUIDED BORING TUNNELS

02447 – Installation of Water Lines by Slurry Bore



CITY OF HOUSTON
2022 STANDARD SPECIFICATION

INSTALLATION OF WATER LINES BY SLURRY BORE

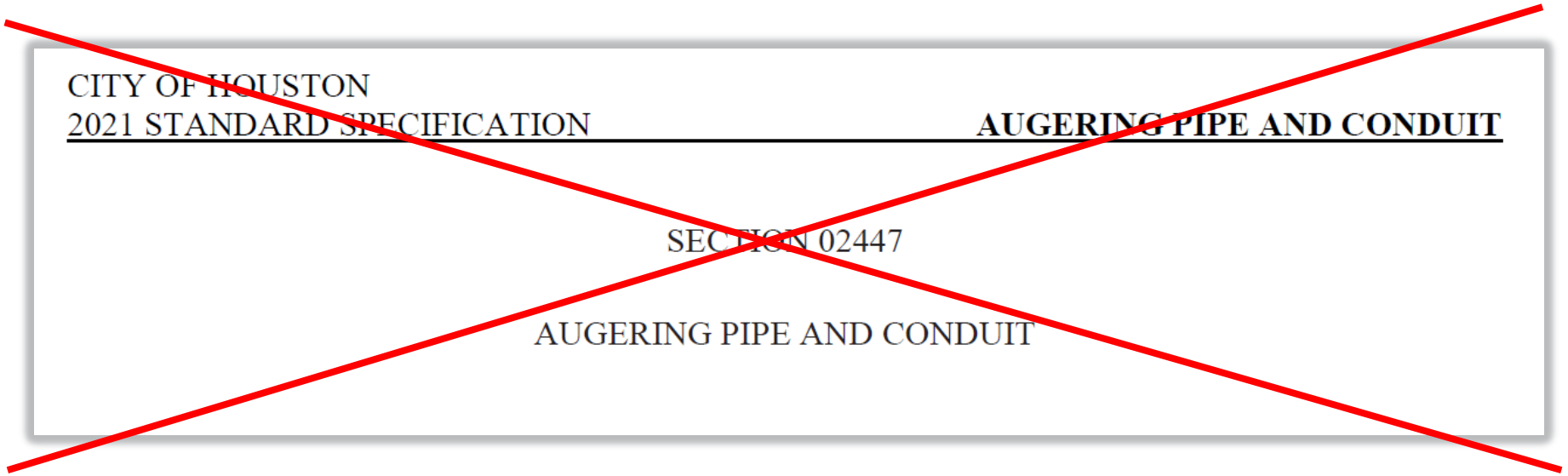
SECTION 02447

INSTALLATION OF WATER LINES
BY SLURRY BORE

STANDARD SPECIFICATIONS

RETIRED SPECIFICATIONS:

02447 – Augering Pipe and Conduit



CITY OF HOUSTON
2021 STANDARD SPECIFICATION **AUGERING PIPE AND CONDUIT**

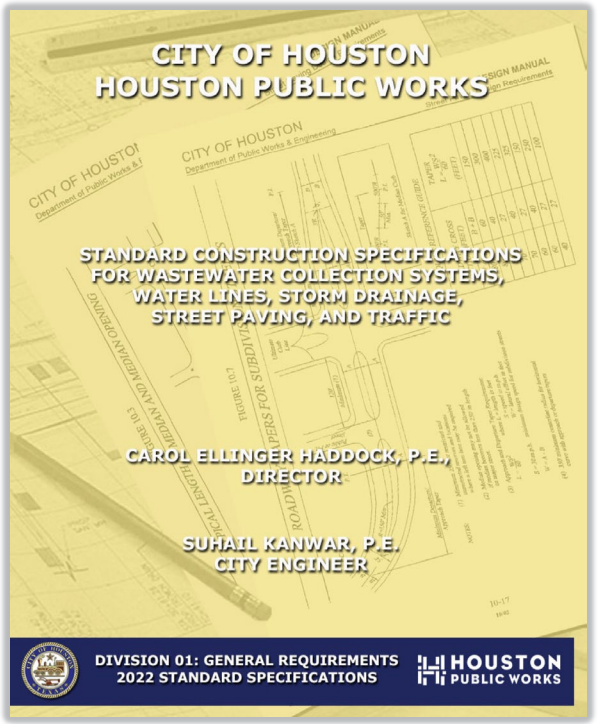
SECTION 02447

AUGERING PIPE AND CONDUIT

STANDARD SPECIFICATIONS

DIVISION 1 SPECIFICATIONS WITH MAJOR UPDATES:

- 01145 – Use of Premises
- 01340 – Shop Drawings, Product Data, and Samples
- 01725 – Field Surveying
- 01770 – Close Out Procedures
- 01782 – Operations & Maintenance Data



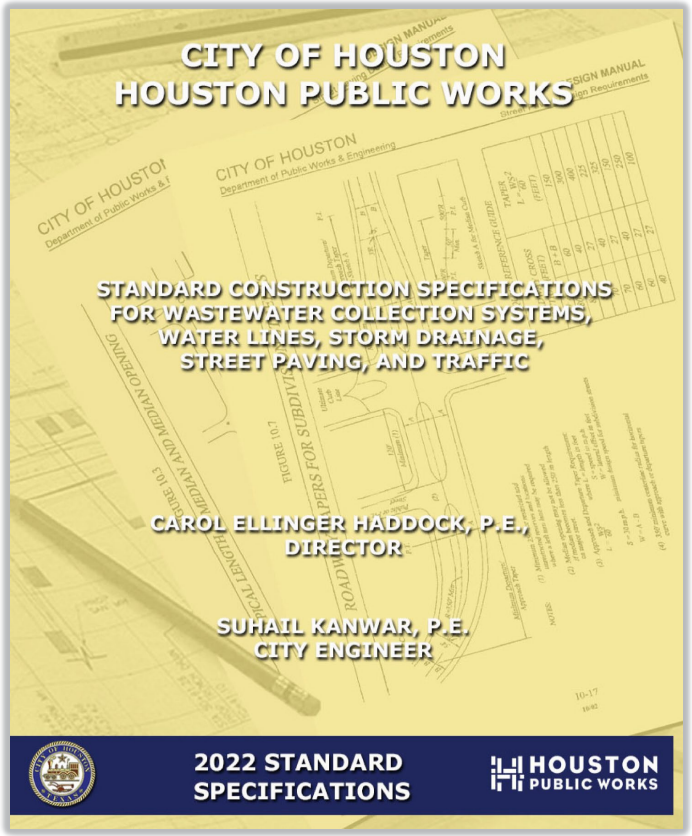
STANDARD SPECIFICATIONS

DIVISION 2-16 SPECIFICATIONS WITH MAJOR UPDATES:

02441 – Microtunneling

02501 – Ductile Iron Pipe & Fittings

02526 – Water Meters



QUESTIONS?

Enter it into the chat.

Note the chapter or topic in your question.

We will respond to unanswered questions on our website after this event.

MICROTUNNELING, JACK AND BORE AND SLURRY BORE SPECIFICATIONS

MARKOS MENGESHA, P.E.,
CAPITAL PROJECTS

02441- MICROTUNNELING AND PIPE-JACKED TUNNELS

- Microtunneling
- Pilot Tube Guided Boring
- Jack and bore
- Jack and mine

CITY OF HOUSTON
~~2021~~2022 STANDARD SPECIFICATION **MICROTUNNELING ~~AND PIPE-JACKED TUNNELS~~**

Section 02441

MICROTUNNELING ~~AND PIPE-JACKED TUNNELS~~

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tunnel construction of ~~sewers~~ pipes by M~~m~~icrotunneling~~one-pass methods with or without man entry~~. Construction method~~s~~ involves jacking pipe following ~~hand shield excavation or tunnel boring machine (TBM) or~~a micro-tunnel boring machine (MTBM), with jacking pipe serving as ~~both~~ tunnel liner~~during construction and sewer pipe after completion of construction~~.

~~A. Tunnel construction of casing pipes for water lines by Microtunneling methods.~~

~~Select fiberglass reinforced pipe (FRP), vitrified clay pipe (VCP), reinforced concrete pipe (RCP) for storm or sanitary sewers and reinforced concrete box (RCB) for storm sewers. Use plastic lined RCP for sanitary sewers. Unlined RCP or RCP lined with liner other than that specified in Section 02427 – Plastic Liner for Large Diameter Concrete Sewers and Structures will not be allowed for sanitary sewers.~~

1.02 RELATED SECTIONS

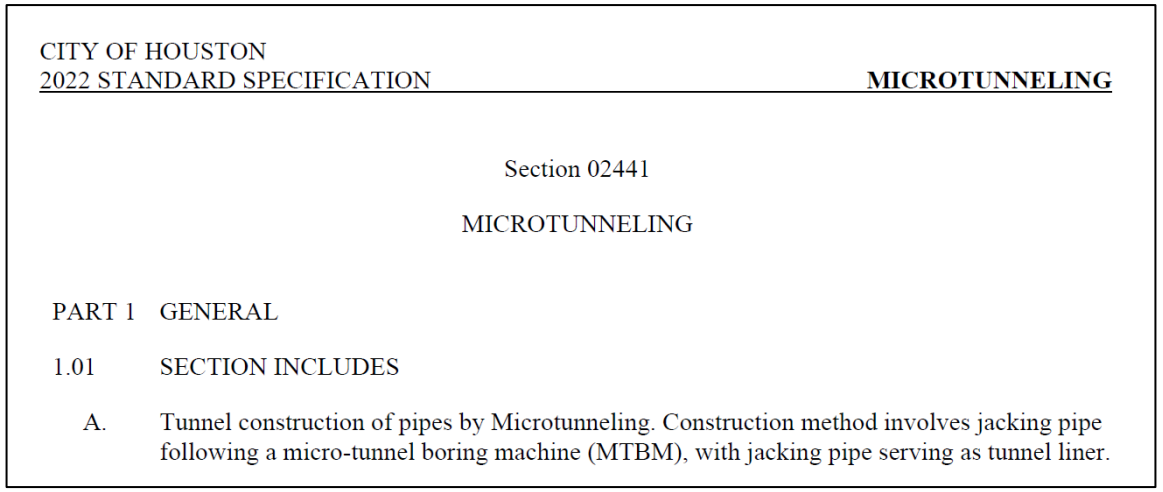
A. Section 01330 – Submittal Procedures

B. Section 01576 – Waste Material Disposal

PROPOSED RECOMMENDATIONS

1. **02441 – MICROTUNNELING**
   - Installation of sewers or casing pipes by microtunneling

2. **02445 - JACK AND BORE/JACK AND MINE/PILOT TUBE GUIDED BORING TUNNELS**
   - Installation of sewers or casing pipes by Jack and Bore, Jack and Mine or Pilot Tube Guided Boring



CITY OF HOUSTON
2022 STANDARD SPECIFICATION **MICROTUNNELING**

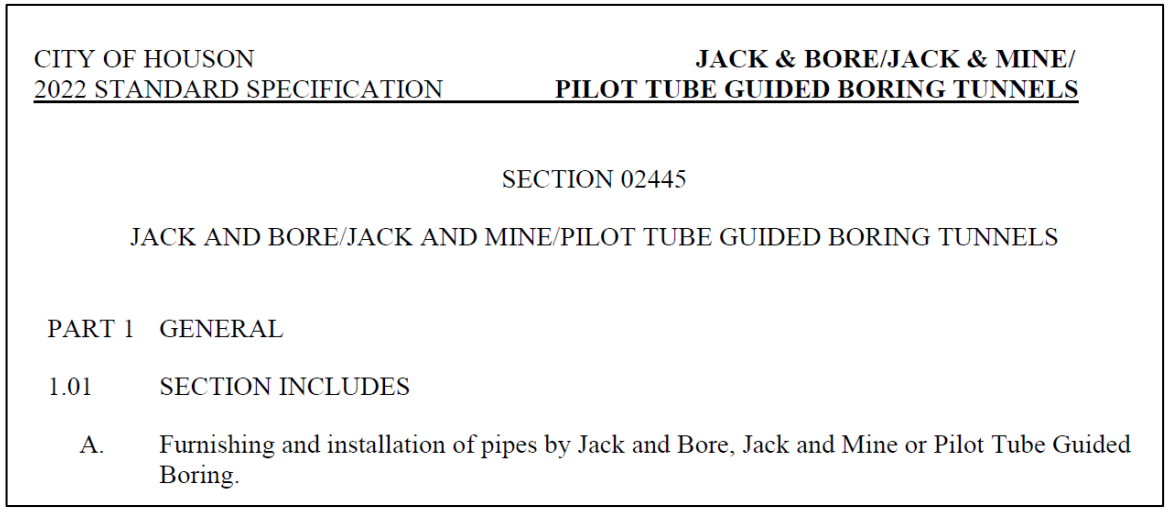
Section 02441

MICROTUNNELING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tunnel construction of pipes by Microtunneling. Construction method involves jacking pipe following a micro-tunnel boring machine (MTBM), with jacking pipe serving as tunnel liner.



CITY OF HOUSON
2022 STANDARD SPECIFICATION **JACK & BORE/JACK & MINE/ PILOT TUBE GUIDED BORING TUNNELS**

SECTION 02445

JACK AND BORE/JACK AND MINE/PILOT TUBE GUIDED BORING TUNNELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing and installation of pipes by Jack and Bore, Jack and Mine or Pilot Tube Guided Boring.

02441 – MICROTUNNELING

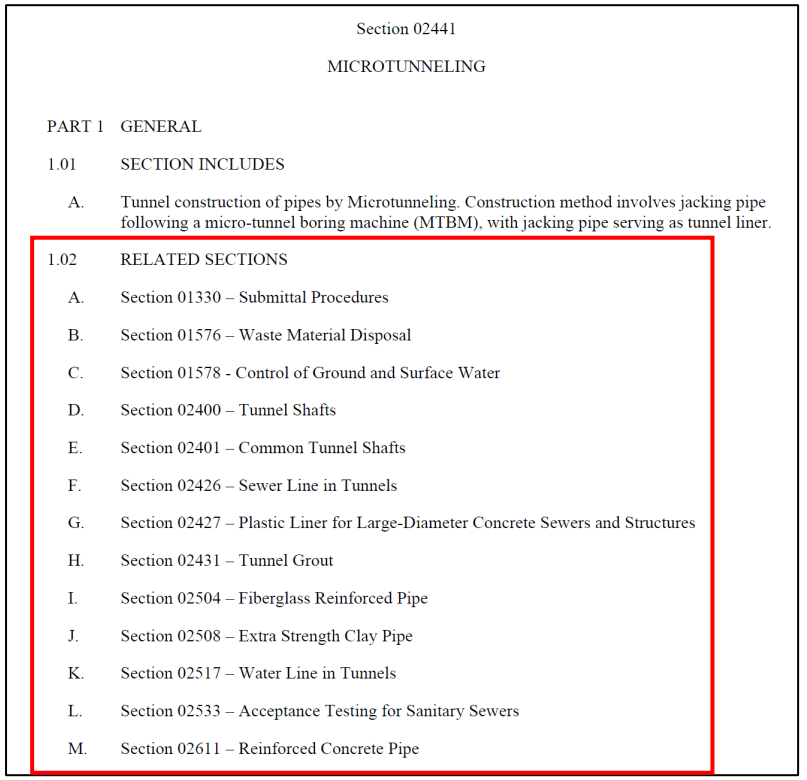
UPDATES TO PART 1 – GENERAL

1.02 - Related Sections

1.05 - Definitions

1.06 - Submittals

- Work Plan (for record purposes)
- Drawings and Calculations (for record purposes)
- Qualifications of key personnel



Section 02441

MICROTUNNELING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tunnel construction of pipes by Microtunneling. Construction method involves jacking pipe following a micro-tunnel boring machine (MTBM), with jacking pipe serving as tunnel liner.

1.02 RELATED SECTIONS

A. Section 01330 – Submittal Procedures

B. Section 01576 – Waste Material Disposal

C. Section 01578 - Control of Ground and Surface Water

D. Section 02400 – Tunnel Shafts

E. Section 02401 – Common Tunnel Shafts

F. Section 02426 – Sewer Line in Tunnels

G. Section 02427 – Plastic Liner for Large-Diameter Concrete Sewers and Structures

H. Section 02431 – Tunnel Grout

I. Section 02504 – Fiberglass Reinforced Pipe

J. Section 02508 – Extra Strength Clay Pipe

K. Section 02517 – Water Line in Tunnels

L. Section 02533 – Acceptance Testing for Sanitary Sewers

M. Section 02611 – Reinforced Concrete Pipe

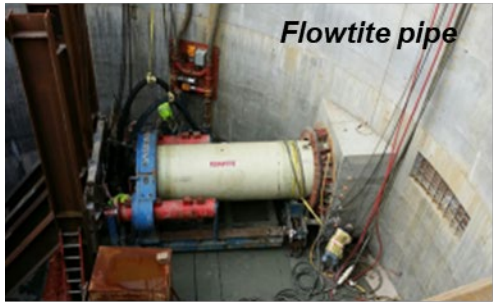
02441 – MICROTUNNELING

UPDATES TO PART 2 – PRODUCTS

2.01 – Jacking Pipe

- **Existing Pipe Materials:**
  - Fiberglass reinforced pipe (ww)
  - Vitrified clay pipe (ww)
  - Plastic-lined reinforced concrete pipe (ww)
  - Reinforced concrete pipe (sw)

- **Added Materials**
  - Steel casing pipe requirements
  - Grout
  - Lubrication
  - Water



02441 – MICROTUNNELING

UPDATES TO PART 3 – EXECUTION

3.02 – Equipment

- Slurry Pressure Balance
- Earth Pressure Microtunneling
- Remote Control System
- Pipe Jacking Equipment
- Slurry separation equipment

3.07 – Monitoring

- Monitoring readings to be submitted in digital format
- Clarify monitoring frequency required
- Referenced AREMA standards for monitoring of RR crossings

02441 – MICROTUNNELING

UPDATES TO PART 3 – EXECUTION

3.06 – Acceptance Criteria:

Acceptance criteria	Horizontal	Vertical
OLD	Plus or minus 6-inches theoretical at any point between manholes	Plus or minus 1 1/2-inches in elevation from theoretical
NEW	Plus or minus 6 percent of the MTBM diameter or 2 inches	Plus or minus 3 percent of the MTBM diameter or 1 inch, whichever is greater

02445 – JACK & BORE/JACK & MINE/ PILOT TUBE GUIDED BORING TUNNELS

MAJOR HIGHLIGHTS:

- New Specification
  - Installation of pipes by Jack and Bore, Jack and Mine or Pilot Tube Guided Boring

    - **Part 1 - General Section**
    - **Part 2 - Products**
    - **Part 3 - Execution**

02441 & 02445 - SIMILARITY AND DIFFERENCES

Specific to 02445:

- **Part 1 – General**
  - Submittals
  - Work Plan
  - Drawings and Calculations
- **Part 3 – Execution**
  - Construction Operations Criteria
  - Equipment
  - Excavation and Jacking Systems

Similar with 02441:

- **Part 1 – General**
  - Payment terms
- **Part 2 – Products**
  - Jacking Pipe
- **Part 3 - Execution**
  - Tunneling Data
  - Control Of Line And Grade
  - Monitoring

02447 – INSTALLATION OF WATER LINES BY SLURRY BORE

MAJOR HIGHLIGHTS:

- Replacement Of “02447 - Augering Pipe And Conduit”
- Newly introduced for Waterline installation
- Communications Conduit installation is covered under Specification 16709

- **PART 1- G E N E R A L**
  - Installing water line up to 20-inches in diameter or
  - Installing casing pipe up to 24-inch diameter by methods of slurry bore
  - Submittal Requirment (Work Plan, Contengency Plan)
- **PART 2- P R O D U C T S**
  - Carrier Pipe: Pipes used as a carrier pipe shall conform Section 02511 – Water Lines.
  - Steel Casing Pipe: Steel Casing to serve as continuous Casing for Carrier Pipe
  - Spacer requirements
- **PART 3- E X E C U T I O N**
  - Specific to Surry Bore Instllation
  - Bore Pits
  - Jacking Operations
  - Slurry Bore Method
  - Control of Line and grade

QUESTIONS?

Enter it into the chat.

Note the chapter or topic in your question.

We will respond to unanswered questions on our website after this event.

STANDARD DETAIL UPDATES

SAHAR BEIGZADEH, P.E.
OFFICE OF THE CITY ENGINEER, STANDARDS AND SPECIFICATIONS

STANDARD SPECIFICATIONS

New Specifications:

- 01582 – Build Houston Forward Project Identification Signs
- 02445 – Jack and Bore/Jack and Mine/Pilot Tube Guided Boring Tunnels
- 02447 – Installation of Water Lines by Slurry Bore

Specifications with major updates:

- 01145 – Use of Premises
- 01340 – Shop Drawings, Product Data, and Samples
- 01422 – Reference Standards
- 01450 – Contractors Quality Control
- 01502 – Mobilization
- 01725 – Field Surveying
- 01770 – Closeout Procedures
- 01782 – Operations and Maintenance Data
- 02441 – Microtunneling
- 02501 – Ductile Iron Pipe and Fittings

Specifications with major updates (Continued):

- 02504 – Fiberglass Reinforced Pipe
- 02526 – Water Meters

Specifications Retired/Deleted:

- 02447 – Augering Pipe and Conduit

New Standard Details:

- 01582-01 – Construction Sign, Build Houston Forward

Standard Details with major updates:

- None

Standard Details Retired/Deleted:

- None

GENERAL STANDARD DETAILS

- Specification 01582 – Build Houston Forward Project Identification Signs

- General Detail 01582-01 – Build Houston Forward Project Identification Signs

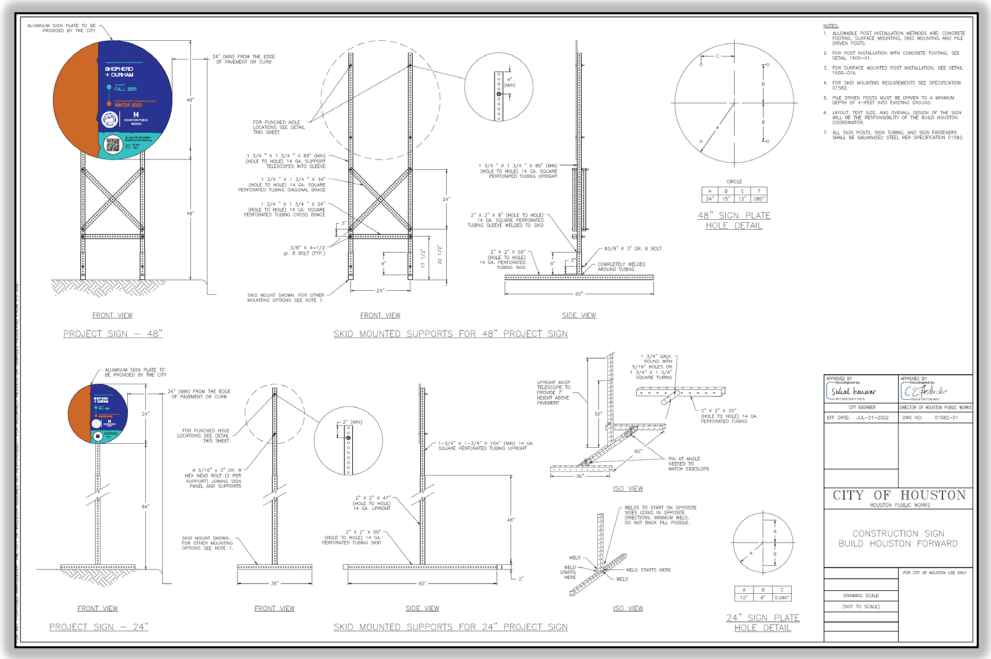
GENERAL STANDARD DETAILS

- CONTACT
- STANDARDS REVIEW COMMITTEE
- INFRASTRUCTURE DESIGN MANUAL
- CONSTRUCTION SPECIFICATIONS
- PRODUCT APPROVALS
- PROJECT MANUAL RESOURCES
- CAD TOOLS AND TEMPLATES
- CAPITAL PROJECTS
- LIFT STATIONS
- **GENERAL DETAILS**
- STORM SEWER DETAILS
- STREET PAVING AND SIDEWALK DETAILS
- STREETCUT DETAILS
- TRAFFIC DETAILS
- TREE AND HARDSCAPE DETAILS
- WASTEWATER DETAILS
- WATER DETAILS

General Details

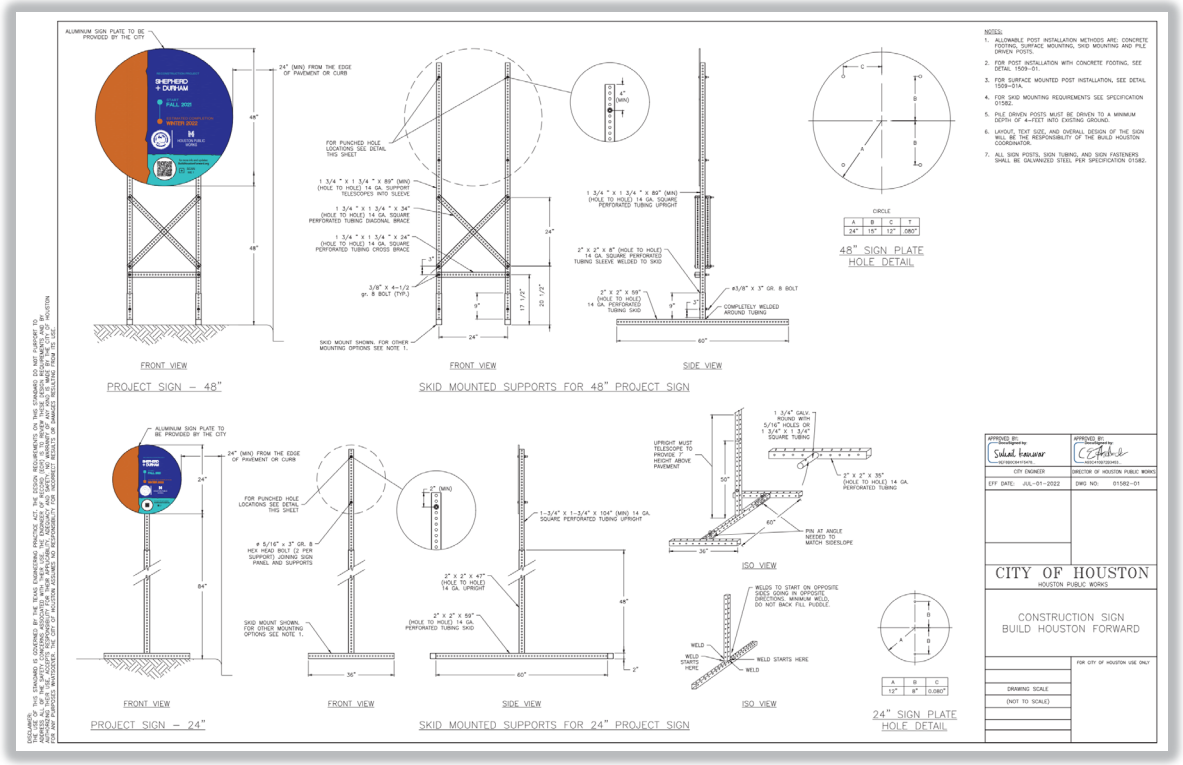
General standard details.

- 01571-01 Storm water pollution prevention plan detail
- 01580-01 Barricade standards
- 01580-02 End of street sign
- 01580-03 Construction sign
- 01580-04 Construction Sign ReBuild Houston Project Drainage Utility Fee Funding
- 01580-05 Construction Sign Rebuild Houston Project
- 01580-06 Construction Sign Thumbs Up for Progress ReBuild Houston Project
- 01582-01 Construction Sign Build Houston Forward

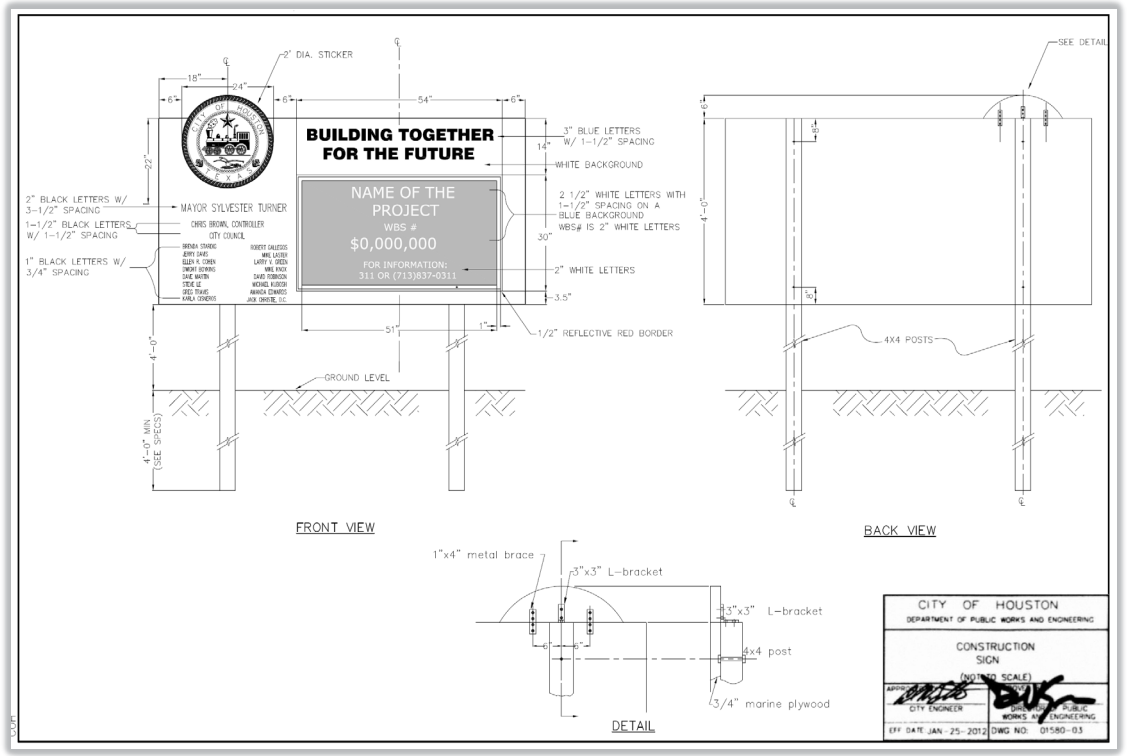


CONSTRUCTION SIGN BUILD HOUSTON FORWARD

Build Houston Forward Project Identification Sign

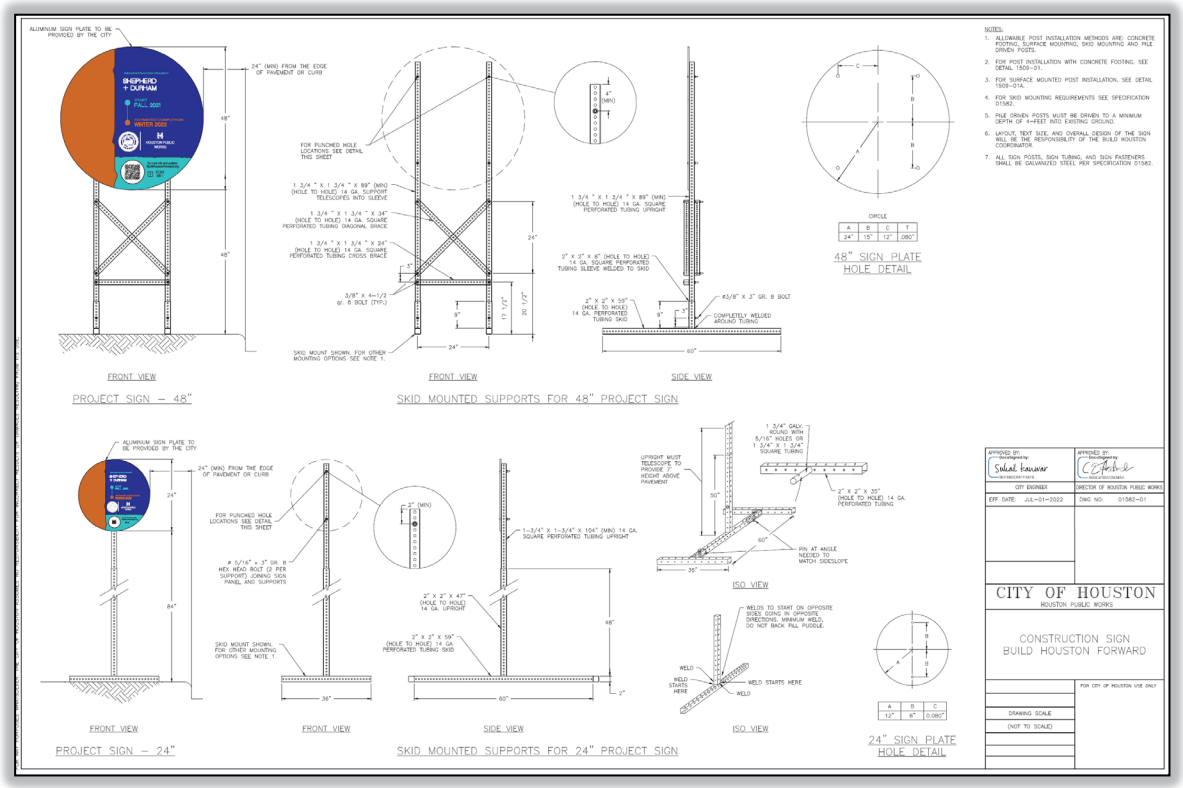


All Other Projects Construction Sign

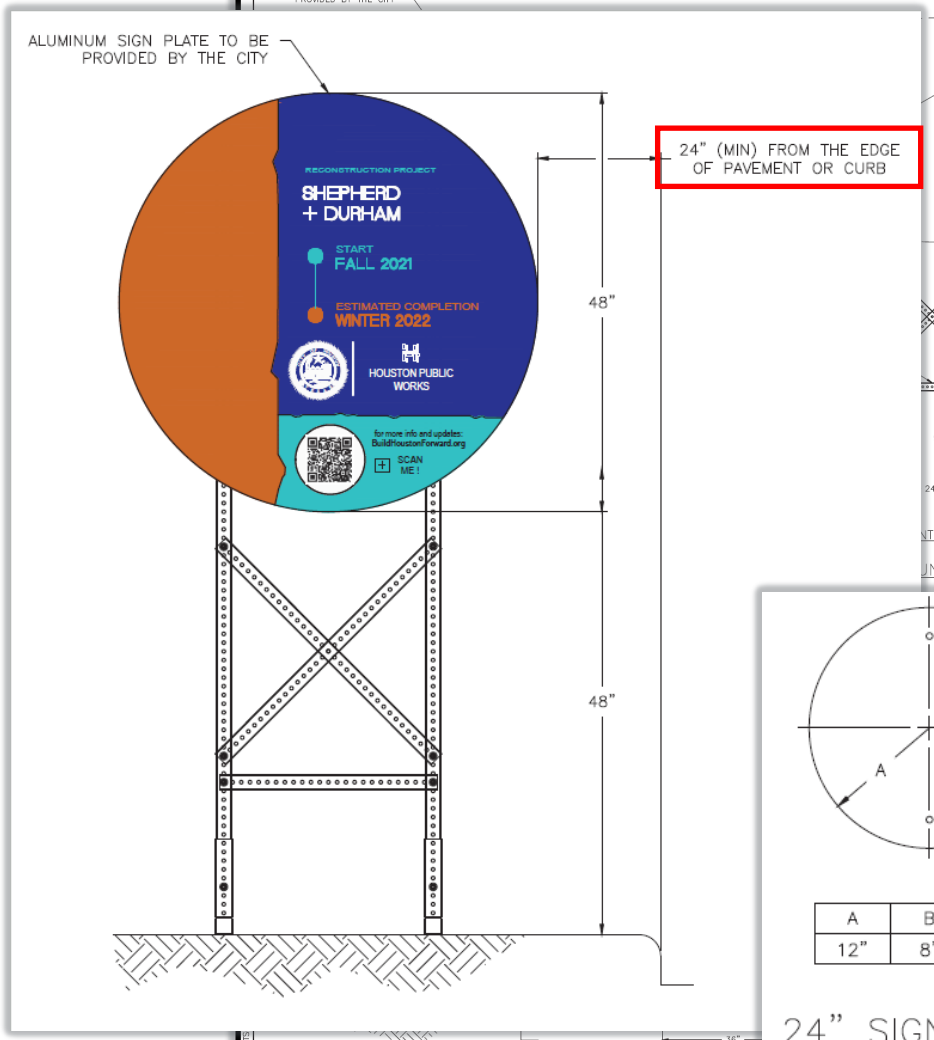


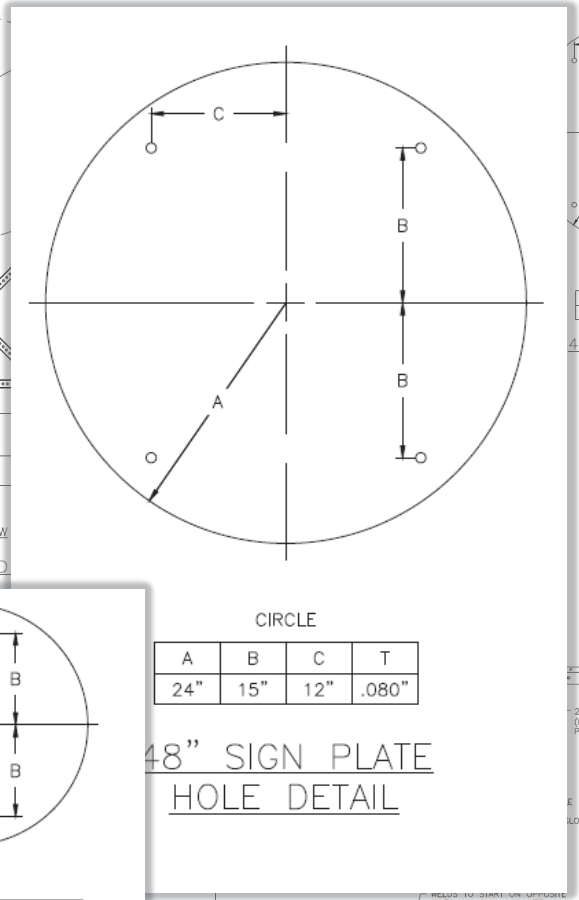
SPECIFICATION 01582 HIGHLIGHTS:

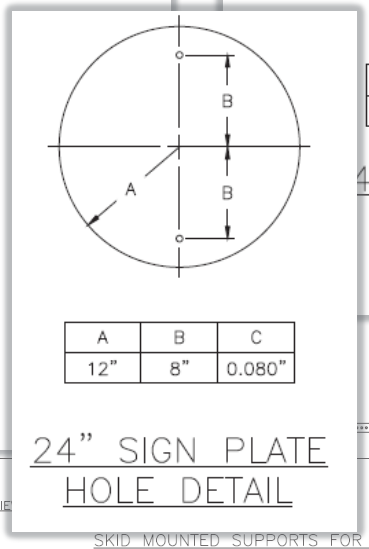
- Sign Shape is Circular 24” and 48” dia.
- Different Installation methods.
- Payment will be measured by each sign installed.
- Sign coordinator is responsible for the sign content.



CONSTRUCTION SIGN BUILD HOUSTON FORWARD





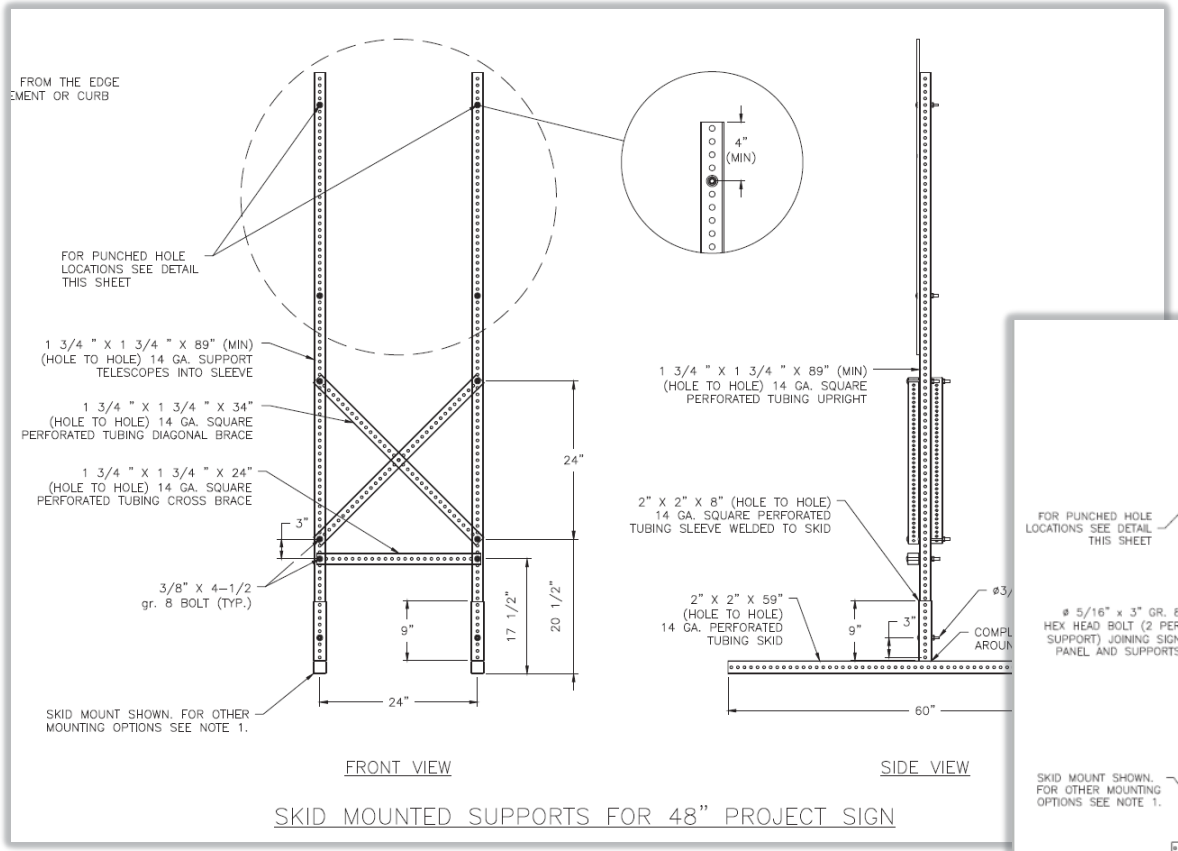


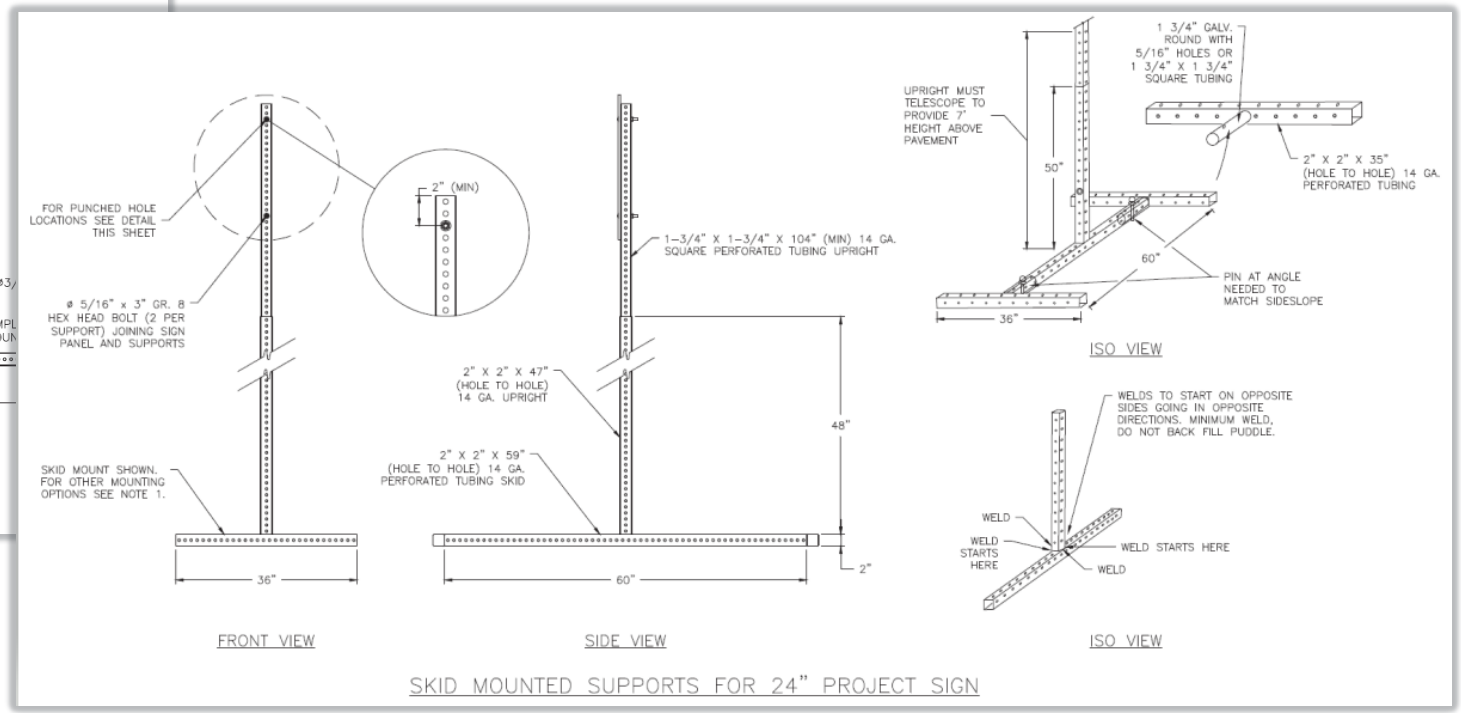
NOTES:

1. ALLOWABLE POST INSTALLATION METHODS ARE: CONCRETE FOOTING, SURFACE MOUNTING, SKID MOUNTING AND PILE DRIVEN POSTS.
2. FOR POST INSTALLATION WITH CONCRETE FOOTING, SEE DETAIL 1509–01.
3. FOR SURFACE MOUNTED POST INSTALLATION, SEE DETAIL 1509–01A.
4. FOR SKID MOUNTING REQUIREMENTS SEE SPECIFICATION 01582.
5. PILE DRIVEN POSTS MUST BE DRIVEN TO A MINIMUM DEPTH OF 4–FEET INTO EXISTING GROUND.
6. LAYOUT, TEXT SIZE, AND OVERALL DESIGN OF THE SIGN WILL BE THE RESPONSIBILITY OF THE BUILD HOUSTON COORDINATOR.
7. ALL SIGN POSTS, SIGN TUBING, AND SIGN FASTENERS SHALL BE GALVANIZED STEEL PER SPECIFICATION 01582.

CONSTRUCTION SIGN BUILD HOUSTON FORWARD

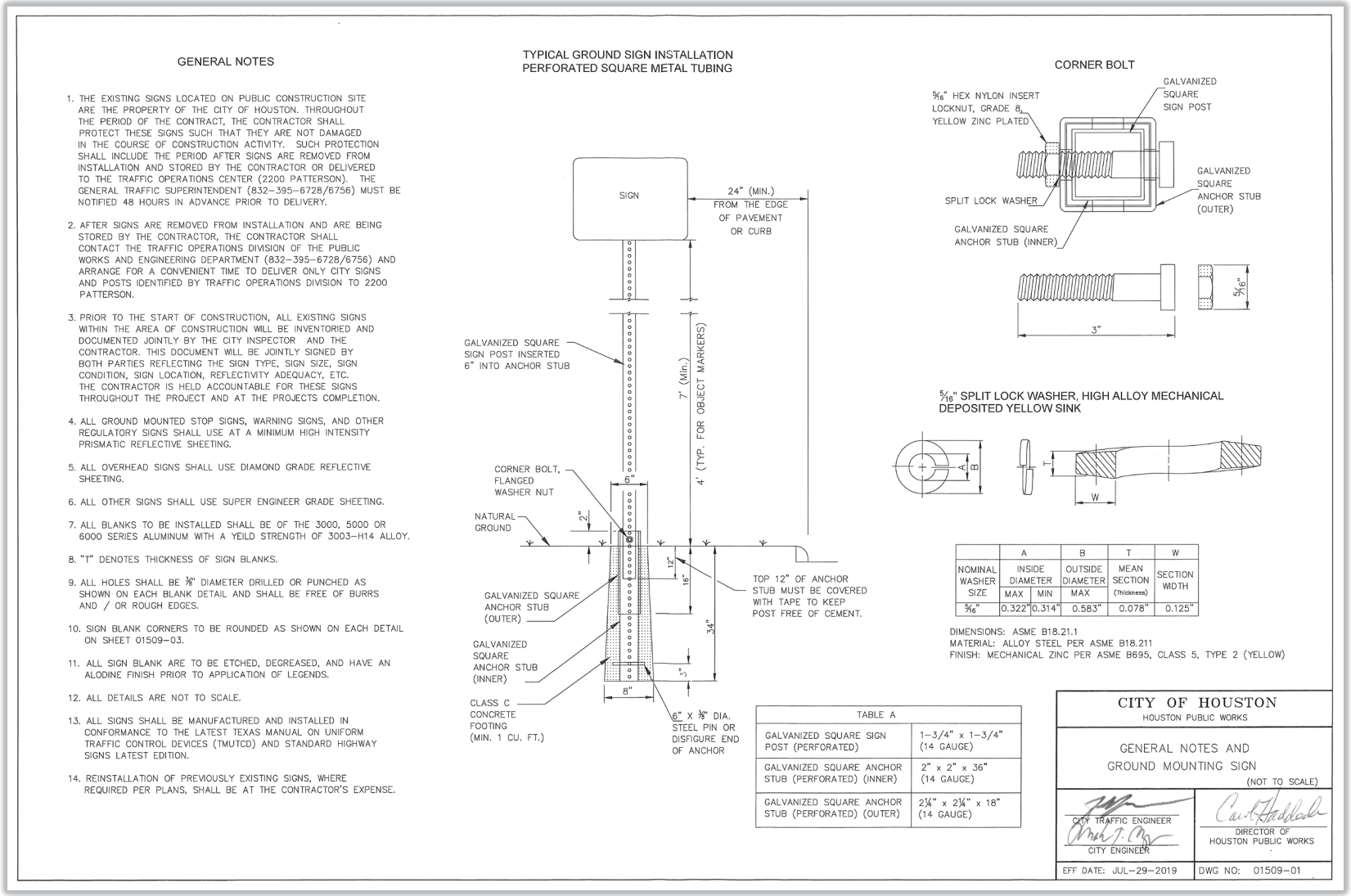
Skid Mounted Installation:





CONSTRUCTION SIGN BUILD HOUSTON FORWARD

Installation with concrete footing:



GENERAL NOTES

1. THE EXISTING SIGNS LOCATED ON PUBLIC CONSTRUCTION SITE ARE THE PROPERTY OF THE CITY OF HOUSTON. THROUGHOUT THE PERIOD OF THE CONTRACT, THE CONTRACTOR SHALL PROTECT THESE SIGNS SUCH THAT THEY ARE NOT DAMAGED IN THE COURSE OF CONSTRUCTION ACTIVITY. SUCH PROTECTION SHALL INCLUDE THE PERIOD AFTER SIGNS ARE REMOVED FROM INSTALLATION AND STORED BY THE CONTRACTOR OR DELIVERED TO THE TRAFFIC OPERATIONS CENTER (2200 PATTERSON). THE GENERAL TRAFFIC SUPERINTENDENT (832-395-6728/6756) MUST BE NOTIFIED 48 HOURS IN ADVANCE PRIOR TO DELIVERY.
2. AFTER SIGNS ARE REMOVED FROM INSTALLATION AND ARE BEING STORED BY THE CONTRACTOR, THE CONTRACTOR SHALL CONTACT THE TRAFFIC OPERATIONS DIVISION OF THE PUBLIC WORKS AND ENGINEERING DEPARTMENT (832-395-6728/6756) AND ARRANGE FOR A CONVENIENT TIME TO DELIVER ONLY CITY SIGNS AND POSTS IDENTIFIED BY TRAFFIC OPERATIONS DIVISION TO 2200 PATTERSON.
3. PRIOR TO THE START OF CONSTRUCTION, ALL EXISTING SIGNS WITHIN THE AREA OF CONSTRUCTION WILL BE INVENTORIED AND DOCUMENTED JOINTLY BY THE CITY INSPECTOR AND THE CONTRACTOR. THIS DOCUMENT WILL BE JOINTLY SIGNED BY BOTH PARTIES REFLECTING THE SIGN TYPE, SIGN SIZE, SIGN CONDITION, SIGN LOCATION, REFLECTIVITY ADEQUACY, ETC. THE CONTRACTOR IS HELD ACCOUNTABLE FOR THESE SIGNS THROUGHOUT THE PROJECT AND AT THE PROJECTS COMPLETION.
4. ALL GROUND MOUNTED STOP SIGNS, WARNING SIGNS, AND OTHER REGULATORY SIGNS SHALL USE AT A MINIMUM HIGH INTENSITY PRISMATIC REFLECTIVE SHEETING.
5. ALL OVERHEAD SIGNS SHALL USE DIAMOND GRADE REFLECTIVE SHEETING.
6. ALL OTHER SIGNS SHALL USE SUPER ENGINEER GRADE SHEETING.
7. ALL BLANKS TO BE INSTALLED SHALL BE OF THE 3000, 5000 OR 6000 SERIES ALUMINUM WITH A YEILD STRENGTH OF 3003-H14 ALLOY.
8. "T" DENOTES THICKNESS OF SIGN BLANKS.
9. ALL HOLES SHALL BE ⅜" DIAMETER DRILLED OR PUNCHED AS SHOWN ON EACH BLANK DETAIL AND SHALL BE FREE OF BURRS AND / OR ROUGH EDGES.
10. SIGN BLANK CORNERS TO BE ROUNDED AS SHOWN ON EACH DETAIL ON SHEET 01509-03.
11. ALL SIGN BLANK ARE TO BE ETCHED, DEGREASED, AND HAVE AN ALODINE FINISH PRIOR TO APPLICATION OF LEGENDS.
12. ALL DETAILS ARE NOT TO SCALE.
13. ALL SIGNS SHALL BE MANUFACTURED AND INSTALLED IN CONFORMANCE TO THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND STANDARD HIGHWAY SIGNS LATEST EDITION.
14. REINSTALLATION OF PREVIOUSLY EXISTING SIGNS, WHERE REQUIRED PER PLANS, SHALL BE AT THE CONTRACTOR'S EXPENSE.

TYPICAL GROUND SIGN INSTALLATION
PERFORATED SQUARE METAL TUBING

TABLE A	
GALVANIZED SQUARE SIGN POST (PERFORATED)	1-3/4" x 1-3/4" (14 GAUGE)
GALVANIZED SQUARE ANCHOR STUB (PERFORATED) (INNER)	2" x 2" x 36" (14 GAUGE)
GALVANIZED SQUARE ANCHOR STUB (PERFORATED) (OUTER)	2¼" x 2¼" x 18" (14 GAUGE)

CORNER BOLT

5/16" SPLIT LOCK WASHER, HIGH ALLOY MECHANICAL DEPOSITED YELLOW SINK

NOMINAL WASHER SIZE	A INSIDE DIAMETER MAX	A INSIDE DIAMETER MIN	B OUTSIDE DIAMETER MAX	T MEAN SECTION (Thickness)	W SECTION WIDTH
5/16"	0.322"	0.314"	0.583"	0.078"	0.125"

DIMENSIONS: ASME B18.21.1
MATERIAL: ALLOY STEEL PER ASME B18.211
FINISH: MECHANICAL ZINC PER ASME B695, CLASS 5, TYPE 2 (YELLOW)

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HOUSTON PUBLIC WORKS

GENERAL NOTES AND
GROUND MOUNTING SIGN
(NOT TO SCALE)

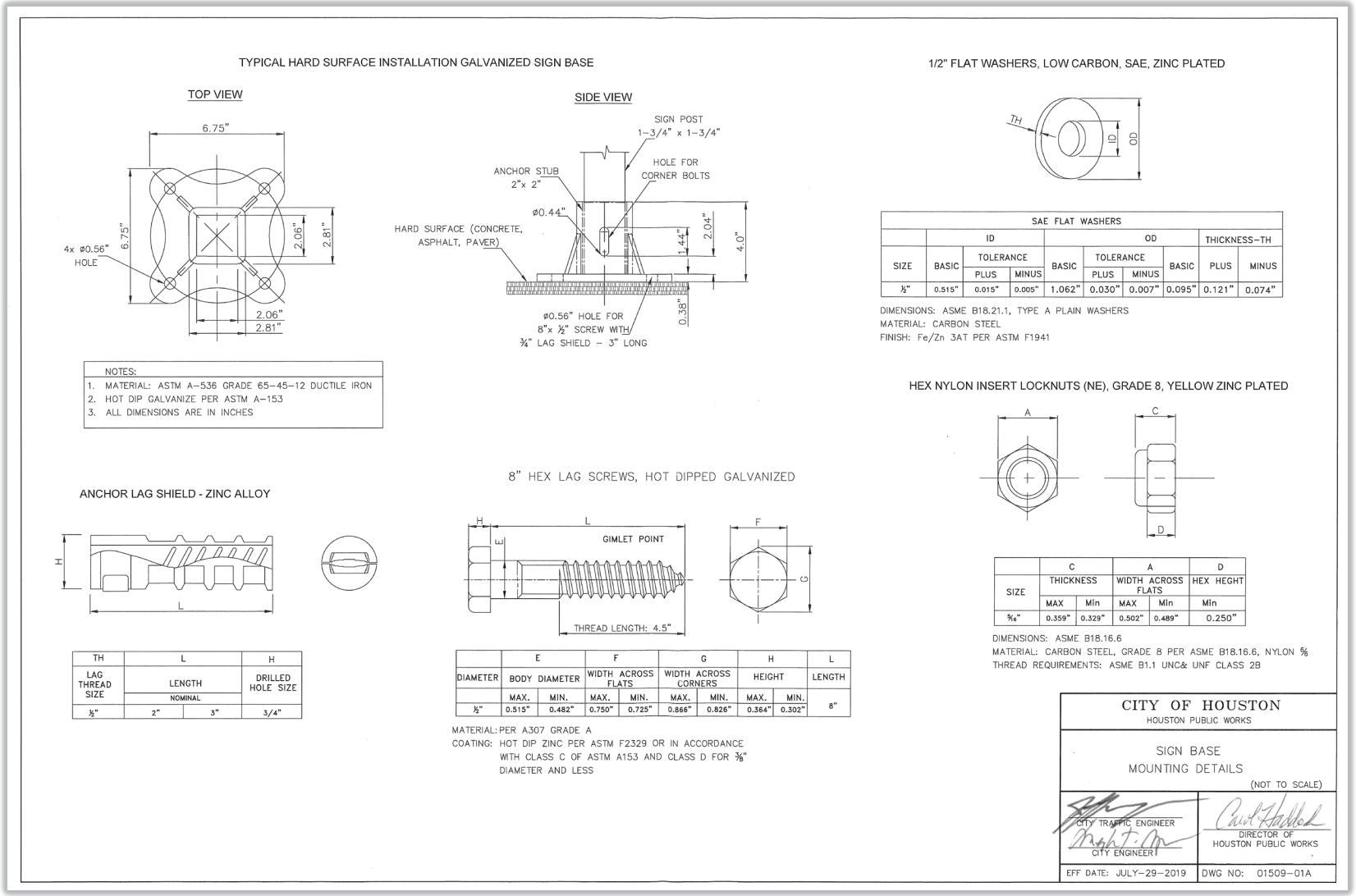
CITY TRAFFIC ENGINEER
CITY ENGINEER
DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: JUL-29-2019
DWG NO: 01509-01

HOUSTON PUBLIC WORKS

CONSTRUCTION SIGN BUILD HOUSTON FORWARD

Surface Mounted Installation:



TYPICAL HARD SURFACE INSTALLATION GALVANIZED SIGN BASE

TOP VIEW

SIDE VIEW

NOTES:
1. MATERIAL: ASTM A-536 GRADE 65-45-12 DUCTILE IRON
2. HOT DIP GALVANIZE PER ASTM A-153
3. ALL DIMENSIONS ARE IN INCHES

1/2" FLAT WASHERS, LOW CARBON, SAE, ZINC PLATED

SAE FLAT WASHERS									
	ID			OD			THICKNESS-TH		
SIZE	BASIC	TOLERANCE		BASIC	TOLERANCE		BASIC	PLUS	MINUS
		PLUS	MINUS		PLUS	MINUS			
½"	0.515"	0.015"	0.005"	1.062"	0.030"	0.007"	0.095"	0.121"	0.074"

DIMENSIONS: ASME B18.21.1, TYPE A PLAIN WASHERS
MATERIAL: CARBON STEEL
FINISH: Fe/Zn 3AT PER ASTM F1941

HEX NYLON INSERT LOCKNUTS (NE), GRADE 8, YELLOW ZINC PLATED

	C		A		D
SIZE	THICKNESS		WIDTH ACROSS FLATS		HEX HEGHT
	MAX	Min	MAX	Min	Min
5/16"	0.359"	0.329"	0.502"	0.489"	0.250"

DIMENSIONS: ASME B18.16.6
MATERIAL: CARBON STEEL, GRADE 8 PER ASME B18.16.6, NYLON 6/6
THREAD REQUIREMENTS: ASME B1.1 UNC& UNF CLASS 2B

ANCHOR LAG SHIELD - ZINC ALLOY

TH	L		H
LAG THREAD SIZE	LENGTH		DRILLED HOLE SIZE
	NOMINAL		
½"	2"	3"	3/4"

8" HEX LAG SCREWS, HOT DIPPED GALVANIZED

	E		F		G		H		L
DIAMETER	BODY DIAMETER		WIDTH ACROSS FLATS		WIDTH ACROSS CORNERS		HEIGHT		LENGTH
	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	
½"	0.515"	0.482"	0.750"	0.725"	0.866"	0.826"	0.364"	0.302"	8"

MATERIAL: PER A307 GRADE A
COATING: HOT DIP ZINC PER ASTM F2329 OR IN ACCORDANCE WITH CLASS C OF ASTM A153 AND CLASS D FOR 3/8" DIAMETER AND LESS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

SIGN BASE
MOUNTING DETAILS
(NOT TO SCALE)

CITY TRAFFIC ENGINEER
CITY ENGINEER

DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: JULY-29-2019 | DWG NO: 01509-01A

HOUSTON PUBLIC WORKS

QUESTIONS?

Enter it into the chat.

Note the chapter or topic in your question.

We will respond to unanswered questions on our website after this event.

CLOSING

MARY BAC, P.E.
OFFICE OF THE CITY ENGINEER
DESIGN AND CONSTRUCTION STANDARDS

CHANGES ARE EFFECTIVE OCTOBER 1, 2022

IMPLEMENTATION: MORE INFO

2022 IDM Announcement & Executive Summary

2022 Infrastructure Design Manual Announcement

Houston Public Works (HPW) has completed the 2021-2022 Review Cycle. As a result, the Infrastructure Design Manual (IDM), General Requirements, Standard Construction Specifications, and Standard Details have been updated.

A 90-day design grace period for implementation of the City of Houston IDM is instituted for the 2022 edition. For Houston Public Works capital improvement projects managed by the Capital Projects service line, Phase II final designs that have not been submitted for a required review prior to October 1, 2022, must comply with all requirements in the 2022 IDM.

For projects in the public or private sector, plans submitted for initial review after October 1, 2022, must comply with all requirements in the 2022 IDM. The City must receive substantially complete plans before October 1, 2022, to be grandfathered under the 2021 requirements.

Plats and easements submitted for preliminary plat review after October 1, 2022, must comply with the 2022 IDM requirements. Easements dedicated though separate instrument and submitted to the Houston Permitting Center (OCE & BCE) for initial review after October 1, 2022, must comply with the 2022 IDM requirements. Easements that were reviewed and approved during preliminary plat, but design drawings have not been submitted for initial review by October 1, 2022, must be resubmitted for review and comply with the new IDM requirements.

The Houston Public Works Director signed the IDM Cover Letter & Executive Summary on July 1, 2022. The executive summary provides more background on when the 2022 design requirements and standards will be implemented. It also provides a summary of updates made to all documents during the review cycle. The IDM Redlines and Construction Specifications Redlines are also available for additional background.

A public IDM Webinar will be conducted by Microsoft Teams and held in mid-August 2022. The IDM webinar will present a high-level view of the changes implemented during the 2021-2022 Review Cycle.

All of the content described here is accessible on the Design and Construction Standards webpage.

For additional questions about the changes, please contact the Office of the City Engineer at 832.394.9164 or HPWStandards@houstontx.gov.

HOUSTON PUBLIC WORKS

EXECUTIVE SUMMARY

2021-2022 Review Cycle

IDM Supplements

The City creates supplements for the IDM when there is a need to revise a current IDM chapter that is outside of its normal review cycle period. At the time when a new IDM is to be released, any active supplements are incorporated into the new IDM and those supplements subsequentially deactivated.

Prior to the completion of the 2021-2022 review cycle, there were no active IDM supplements therefore no IDM supplements have been incorporated into the IDM for the 2022 release.

Infrastructure Design Manual Implementation

- *Capital Improvement Projects*
  A 90-day design grace period will be given for Houston Public Works capital improvement projects managed by the Capital Projects service line. Phase II final designs that have not been submitted for a required review prior to October 1, 2022, will be required to completely comply with the new Infrastructure Design Manual.
- *Private Sector*
  A 90-day design grace period will be given for projects in the public/private sector. Substantially complete plans submitted for initial review after October 01, 2022, will be required to comply with the new IDM.
- *Plats and Easements*
  Plats and easements submitted for preliminary plat review after October 1, 2022, must comply with the new IDM requirements. Easements dedicated though separate instrument and submitted to the Houston Permitting Center (OCE & BCE) for initial review after October 1, 2022, must comply with the new IDM requirements. Easements that were reviewed and approved during preliminary plat, but design drawings have not been submitted for initial review by October 1, 2022, must be resubmitted for review and comply with the new IDM requirements.

CONSTRUCTION SPECIFICATIONS

Revised Specifications

Various specifications, that are associated with the IDM chapters reviewed during the 2021-2022 review cycle, were reviewed and updated. A total of twelve (12) specifications were revised and three (3) new specifications were created. The three (3) new specifications created are 01582 "Build Houston Forward Project Identification Signs", 02445 "Jack And Bore/Jack And Mine/Pilot Tube Guided Boring Tunnels" and 02447 "Installation of Water Lines by Slurry Bore". A list of all specifications created or updated is provided at the end of this executive summary.

Specification Implementation

- *Capital Improvement Projects*
  Per Document 00700 General Condition, section 1.2.4:

Page 4 of 6

UPCOMING REVIEW CYCLE

2022 – 2023 REVIEW CYCLE

TRAFFIC, MISC. & PEDESTRIAN IDM CHAPTERS:

- Chapter 15 – Traffic & Signal Design
- Chapter 16 – Miscellaneous
- Chapter 17 – Bicycle, Transit and Pedestrian Design

ASSOCIATED CONSTRUCTION SPECIFICATIONS & DETAILS

2022 – 2023 REVIEW CYCLE

Public Notice has been posted

Comment Period:

August 1, 2022 – September 30, 2022

2023 IDM Publication: Estimated July 1, 2023

QUESTIONS ON TODAY'S WEBINAR?

Enter it into the chat.

Note the chapter or topic in your question.

We will respond to unanswered questions on our website after this event.

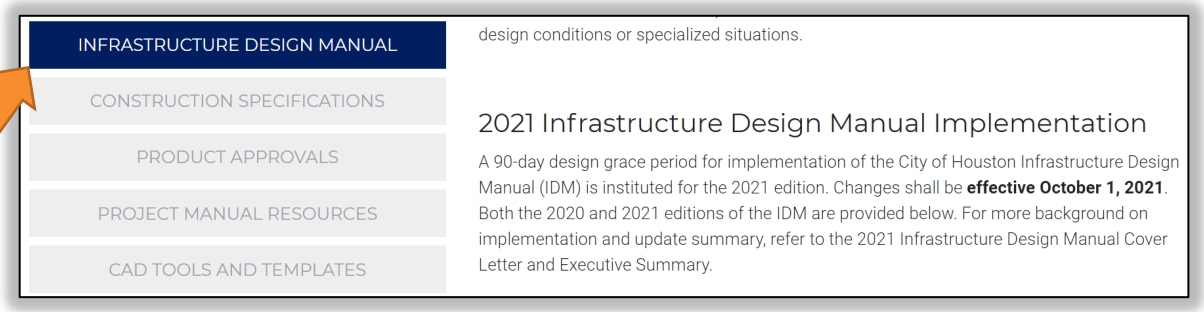
ADDITIONAL QUESTIONS?

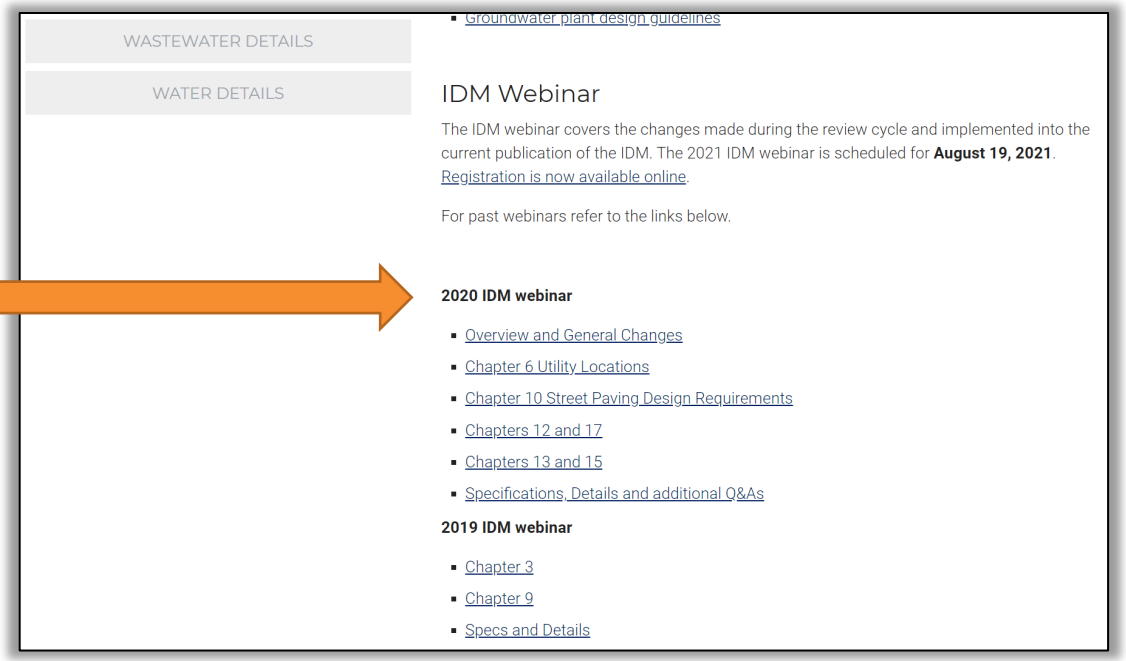
SEND THEM TO:

HPWSTANDARDS@HOUSTONTX.GOV

WEBINAR AND FAQ'S AFTER THIS EVENT

1. Go to https://houstonpermittingcenter.org/office-city-engineer/design-and-construction-standards
2. Select "Infrastructure Design Manual" tab.
3. This webinar presentation and FAQ's will be posted under "IDM Webinar"





Thank you!

HOUSTON PUBLIC WORKS

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