Executive Summary

To: Nick Ataie, P.E. City of McKinney, Texas

From: Nathan Ante, P.E.

Kimley-Horn and Associates, Inc.

Date: July 13, 2020

Subject: SH 5 Pedestrian Crossing Feasibility Study (Project ST 2063)

In February 2020, the City engaged Kimley-Horn to provide professional services associated with investigating the feasibility of constructing a grade-separated deck park crossing State Highway 5 (SH 5 / McDonald Street) near downtown McKinney. The timing of this study coincided with effort underway by the State to improve the SH 5 corridor.

The following options were considered:

1. Full depression of SH 5 to accommodate a deck park†
   - Lower main lanes of SH 5.
   - Construct deck structure for park at existing corridor elevation.
   - Construct frontage roads at existing corridor elevation to connect to existing side streets (Virginia Street, Louisiana Street, and Davis Street)
2. Partial depression of SH 5 to accommodate a deck park†
   - Lower main lanes of SH 5.
   - Construct elevated deck structure for park.
3. Pedestrian bridge over SH 5.
   - Construct overhead pedestrian bridge beginning at SH 5 and Virginia Street and ending east of the railroad tracks near Main Street and Virginia Street.

† Deck park options were further subdivided to consider two limits: 1. between Virginia Street and Louisiana Street and 2. Virginia Street and Davis Street.

The following components were evaluated for the options outlined below:

<u>Options 1 & 2:</u>

- Roadway horizontal and vertical geometry (Exhibit A)
- Roadway typical sections (Exhibit B)
- Vehicle circulation and roadway network impacts (Exhibit C)
- Public utility impacts (Exhibit D)

<u>Option 3:</u>

- Pedestrian bridge horizontal geometry (Exhibit A)

<u>All Options:</u>

- Areas of environmental sensitivity (Exhibit E)

The following additional cost evaluation was completed for option 1:

Option 1A (Virginia to Louisiana):

- $25M - $30M – Construction cost[¥]
- $40M - $45M – Total project cost[€]
- $5.5M – TxDOT construction cost[‡]

Option 1B (Virginia to Davis):

- $45M - $50M – Construction cost[¥]
- $65M - $70M – Total project cost[€]
- $8M – TxDOT construction cost[‡]

[¥] Includes 25% construction contingency. Park improvement NOT included.
[€] Includes construction, engineer (15% of construction), agency project management (15% of construction), and ROW allowance (60-ft additional for length of impact at $50/SF)
[‡] TxDOT estimate for improvements within coincidental limits shown on Exhibit A for SH 5 based on preliminary schematic documents received in February 2020.

Considerations for implementation of Option 1 improvements are outlined below. It was understood that funding for these improvements may be staged requiring the overall costs to be divided.

Kimley-Horn has prepared the following proposed sequence for implementation:

Phase 1:

- Construct SH 5 TxDOT improvements with extra wide median to accommodate the future depression of SH 5 and deck park.
  - Construction costs for this phase should be similar to what is currently planned with the TxDOT project. However, additional ROW would be required.
  - SH 5 letting schedule would require an extension to allow time to complete redevelopment of the environmental process, ROW acquisition, and franchise utility relocations.

Phase 2:

- Convert SH 5 lanes constructed in Phase 1 to frontage/access roads. Build new SH 5 lanes in depressed section.

Phase 3:

- Deck and park[§].

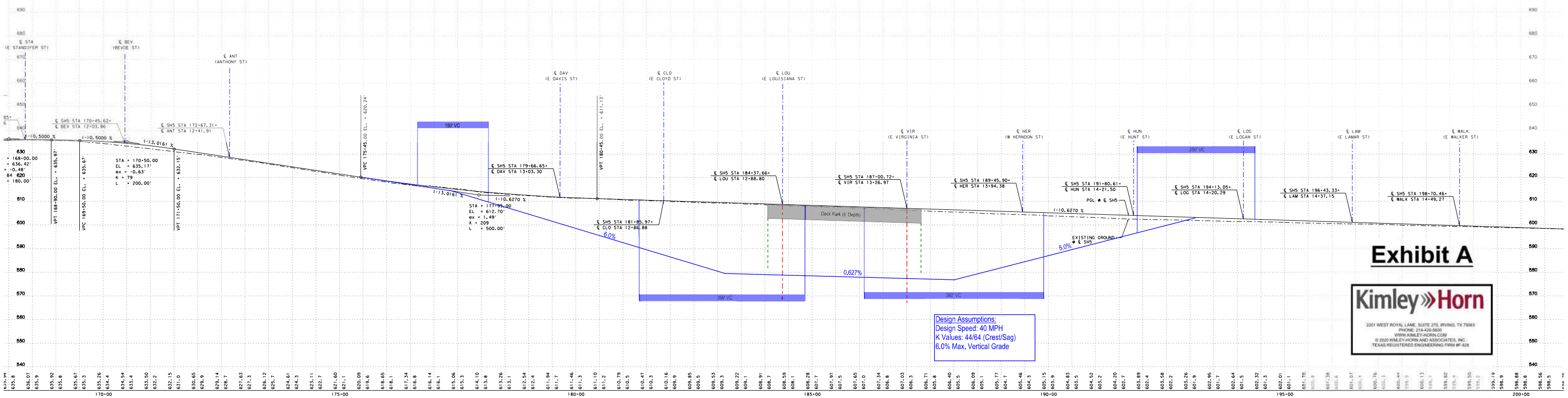
[§] Park improvement NOT included in construction cost estimates.

Initial observations revealed substantial issues pertaining to circulation and constructability with a partial depression scenario (Option 2). It was jointly decided by the design team and City staff that this option would be omitted from further evaluation.

Preliminary discussions were conducted with the City for Option 3. Due to the number of factors involved in the design of a pedestrian bridge it is difficult to generate cost for such an option at this time. Some of these factors include type, span, width, architectural features/finishes, amenities, etc. Kimley-Horn recommends further refinement of this option in order to prepare budgetary cost projections. One specific pedestrian bridge example discussed with the City was modeled after the structure in Chicago, IL along State Highway 41 near Oakwood Beach. This bridge structure was recently completed for a cost of $30M ($20,000 per linear foot).

Should you have any questions and/or comments, please contact Nathan Ante, P.E. at nathan.ante@kimley-horn.com or by phone at 214-420-5600.

E STANDIFER ST
BEVOE ST
ANTHONY ST
E DAVIS ST
E CLOYD ST
E LOUISIANA ST
N CHESTNUT ST
E VIRGINIA ST
W HERNDON ST
E HUNT ST
E LOGAN ST
E LAMAR ST
E WALKER ST
SH 5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℄ BEV (BEVOE ST)
℄ ANT (ANTHONY ST)
℄ DAV (E DAVIS ST)
℄ CLO (E CLOYD ST)
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℄ HER (W HERNDON ST)
℄ HUN (E HUNT ST)
℄ LOG (E LOGAN ST)
℄ LAM (E LAMAR ST)
℄ WALK (E WALKER ST)
℄ SH5 STA 170+45.62+
℄ BEV STA 12+03.86
℄ SH5 STA 172+67.31+
℄ ANT STA 12+41.91
150' VC
℄ SH5 STA 179+66.65+
℄ DAV STA 13+03.30
℄ SH5 STA 184+37.66+
℄ LOU STA 12+88.80
℄ SH5 STA 187+00.72+
℄ VIR STA 13+26.97
℄ SH5 STA 189+45.90+
℄ HER STA 13+94.38
℄ SH5 STA 191+80.61+
℄ HUN STA 14+21.50
℄ SH5 STA 194+13.05+
℄ LOG STA 14+20.29
℄ SH5 STA 196+43.33+
℄ LAM STA 14+37.15
℄ SH5 STA 198+70.46+
℄ WALK STA 14+49.27
250' VC
℄ SH5 STA 181+85.97+
℄ CLO STA 12+86.88
Deck Park (5' Depth)
PGL ≈ ℄ SH5
EXISTING GROUND ≈ ℄ SH5
6.0%
5.0%
0.627%
350' VC
380' VC
Design Assumptions:
Design Speed: 40 MPH
K Values: 44/64 (Crest/Sag)
6.0% Max. Vertical Grade
Exhibit A
Kimley»Horn
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170+00
175+00
180+00
185+00
190+00
195+00
200+00

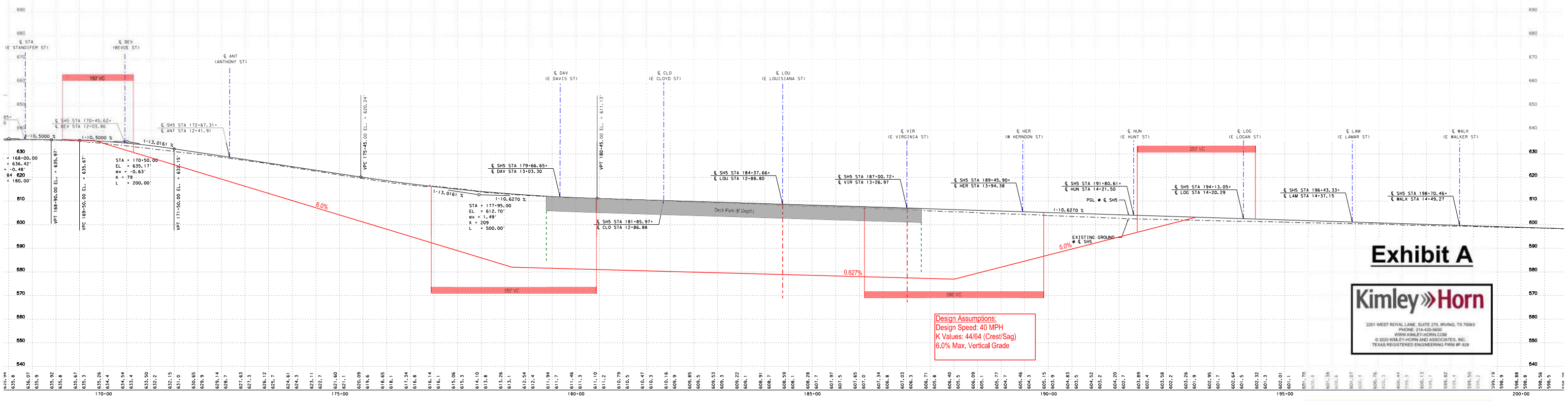

Exhibit A

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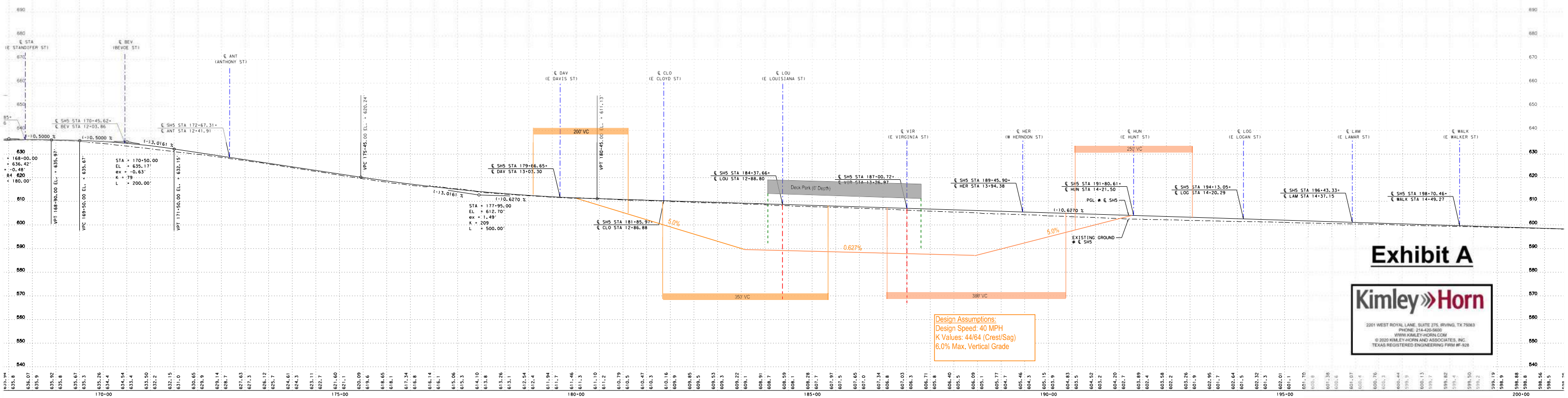

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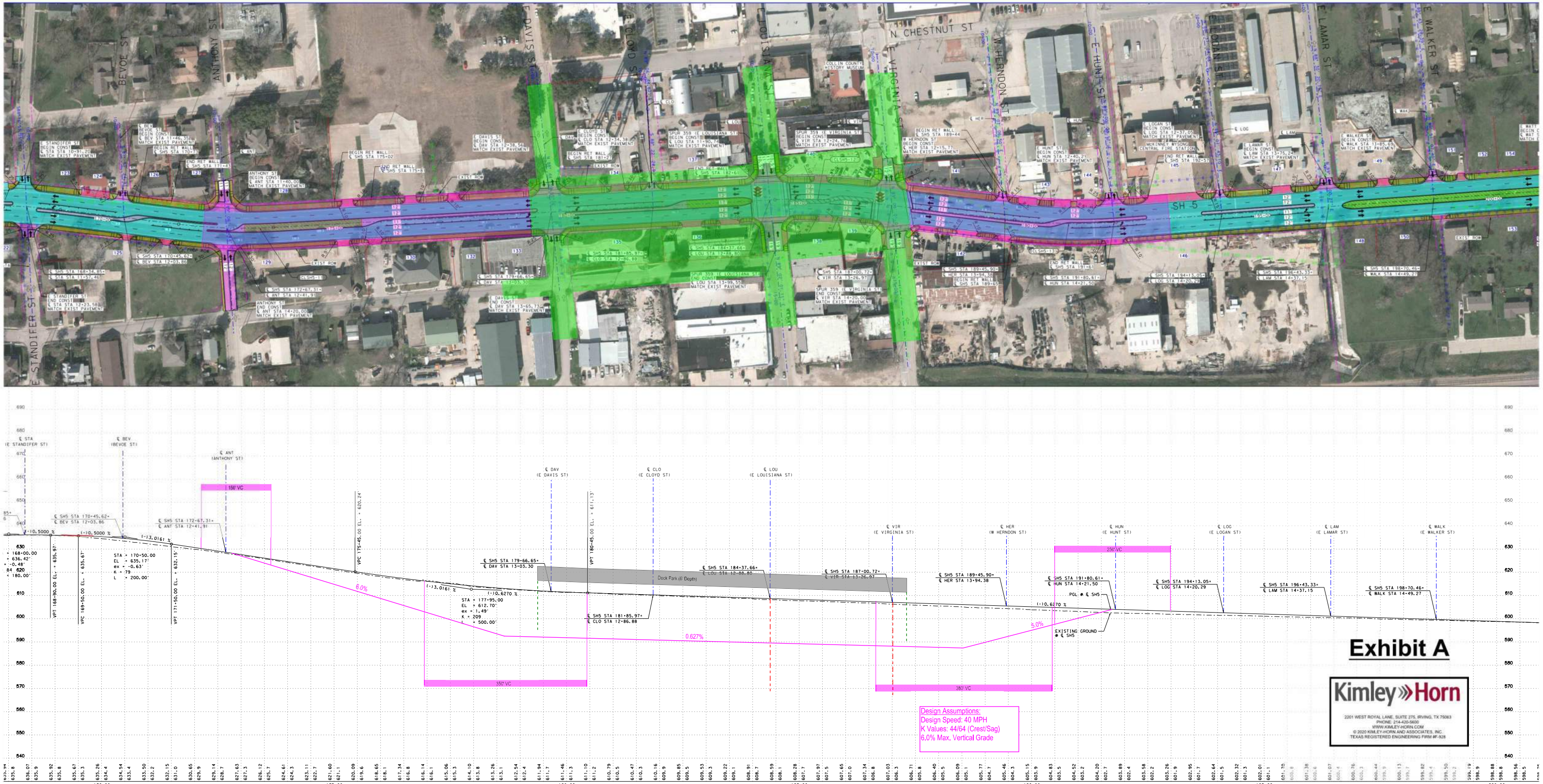
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N CHESTNUT ST
W HERNDON ST
E HUNT ST
E LOGAN ST
E LAMAR ST
E WALKER ST
SH 5
COLLIN COUNTY HISTORY MUSEUM
CENTRAL FIRE STATION
Deck Park (6' Depth)
6.0%
0.627%
5.0%
150' VC
350' VC
250' VC
Design Assumptions:
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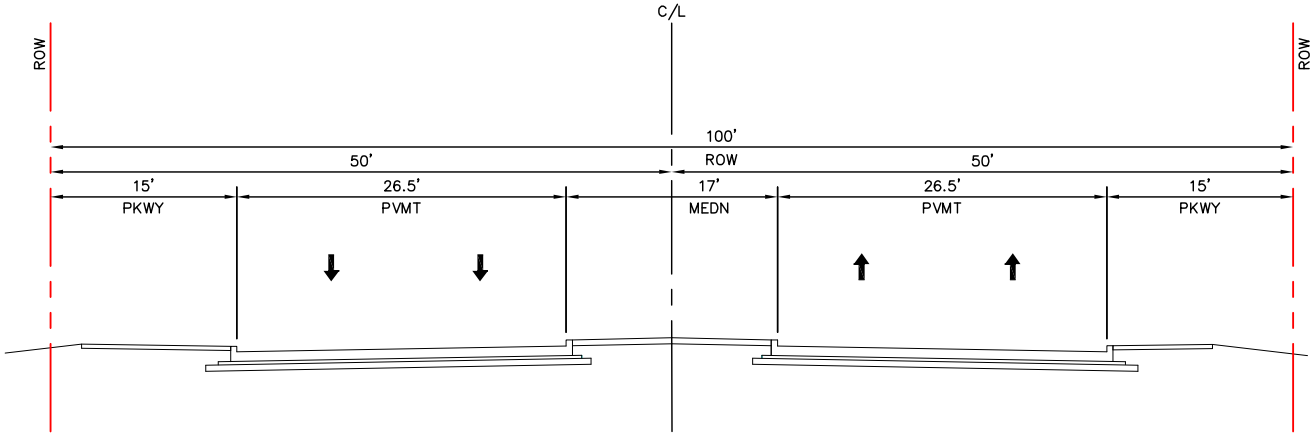

TxDOT TYPICAL
(100' ROW)

Exhibit B

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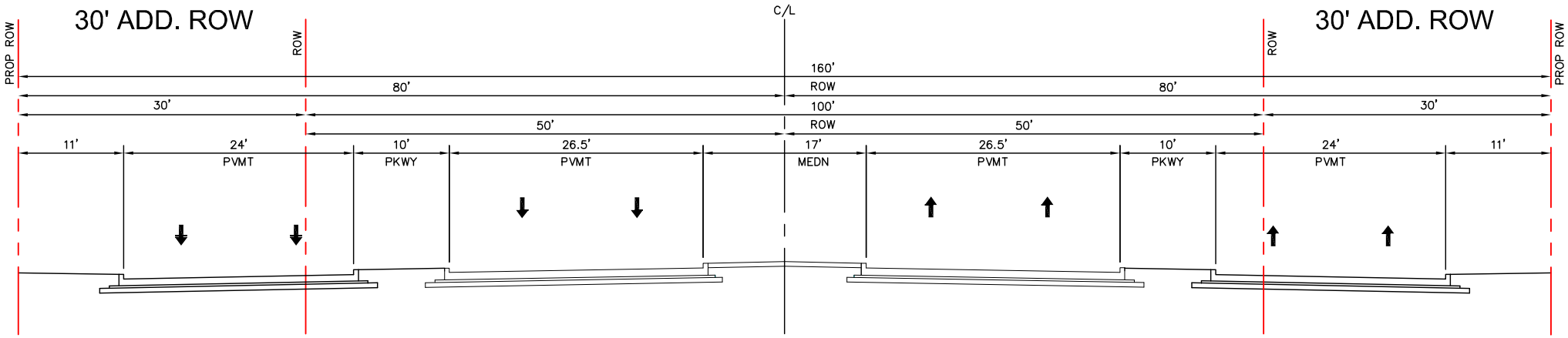

TxDOT TYPICAL w/ FRONTAGE ROADS
(160' ROW)

Exhibit B

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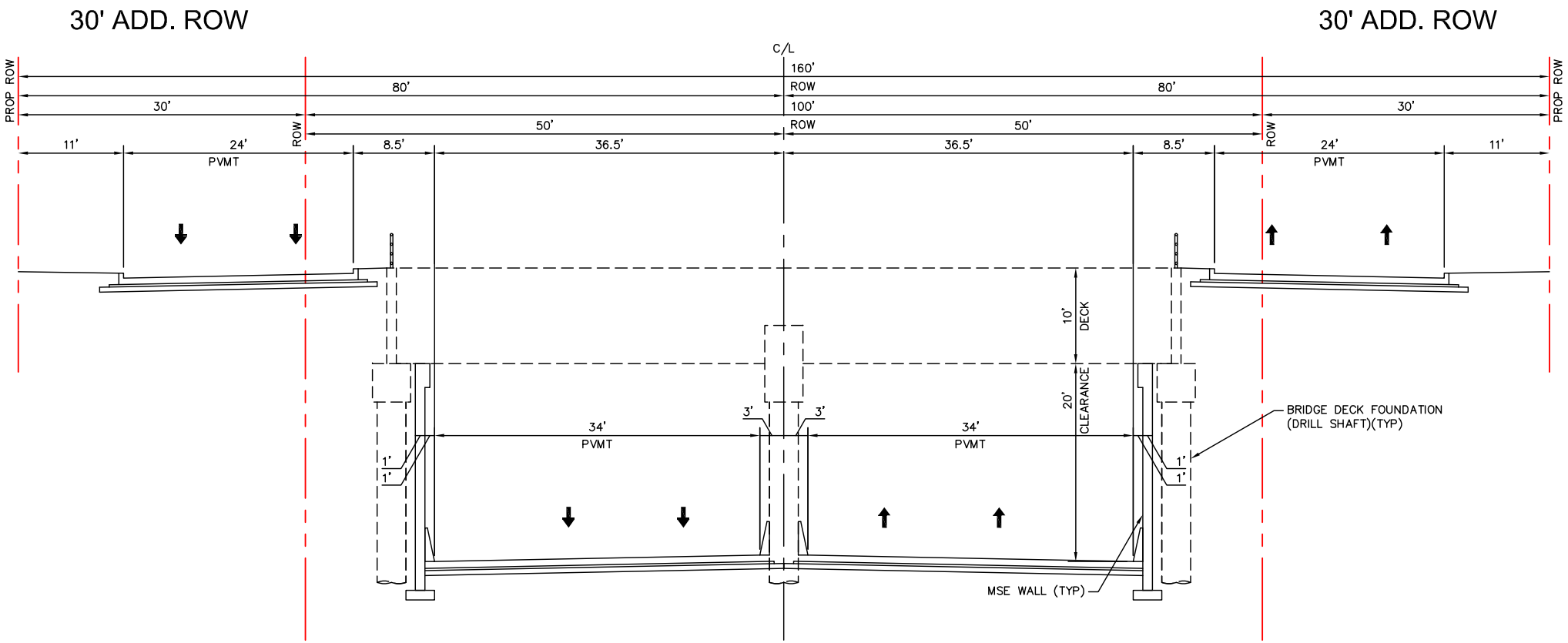

DEPRESSED SH 5 ROADWAY TYPICAL w/ FRONTAGE ROADS
(160' ROW)

Exhibit B

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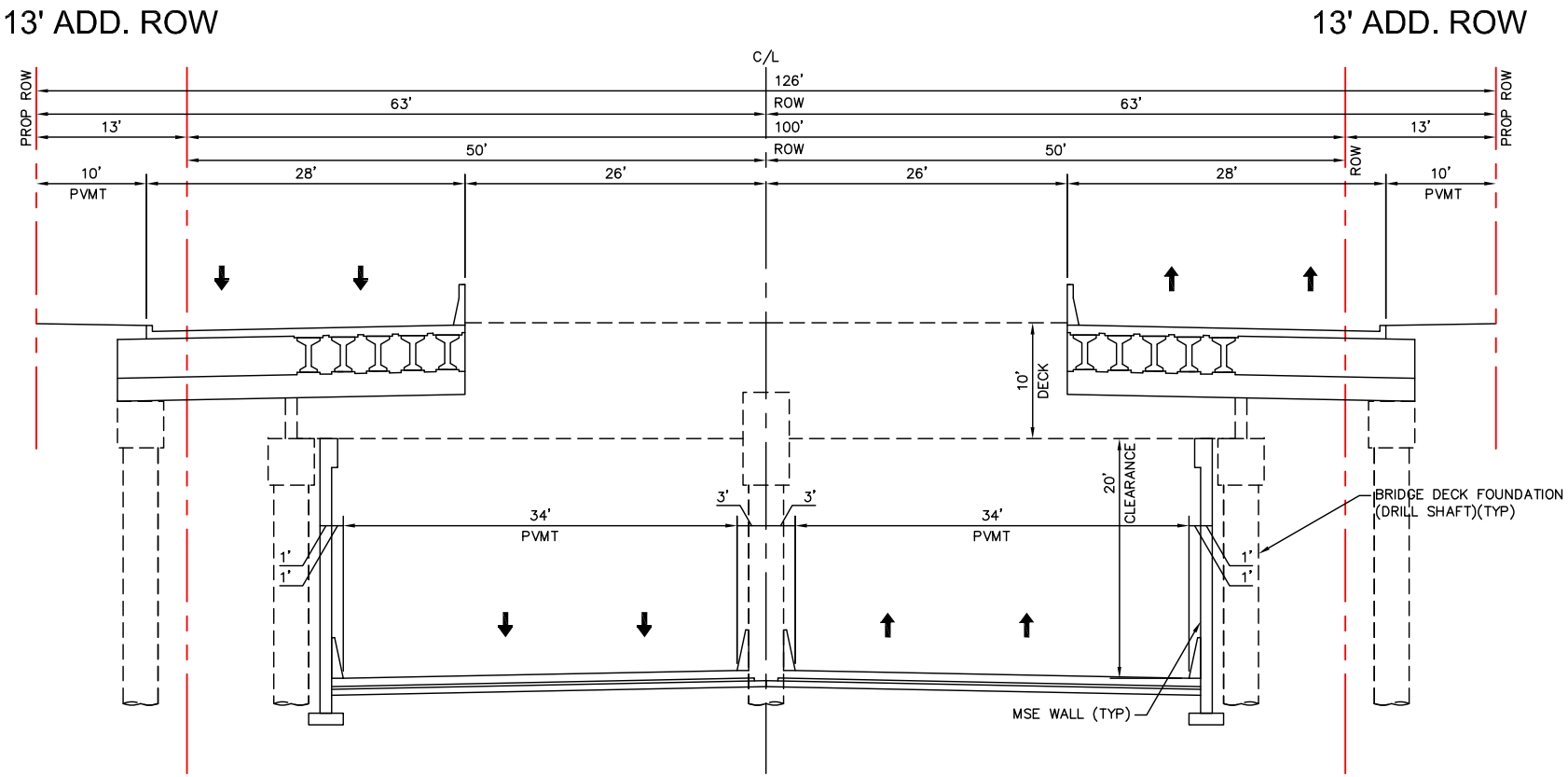

DEPRESSED SH 5 ROADWAY TYPICAL w/ FRONTAGE ROADS (CANTILEVER)
(126' ROW)

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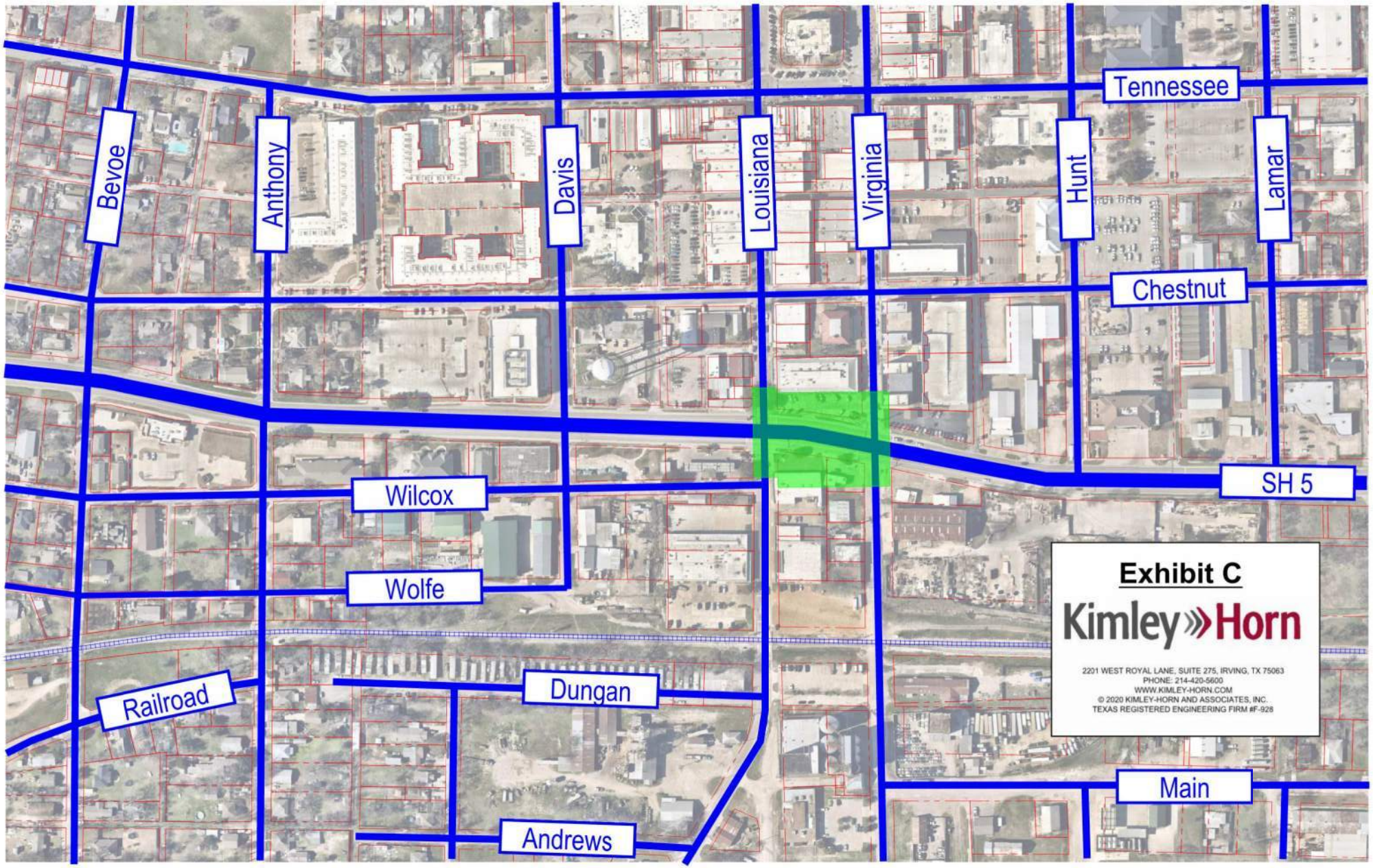
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Lamar
Chestnut
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Wolfe
Railroad
Dungan
Andrews
Main
Exhibit C
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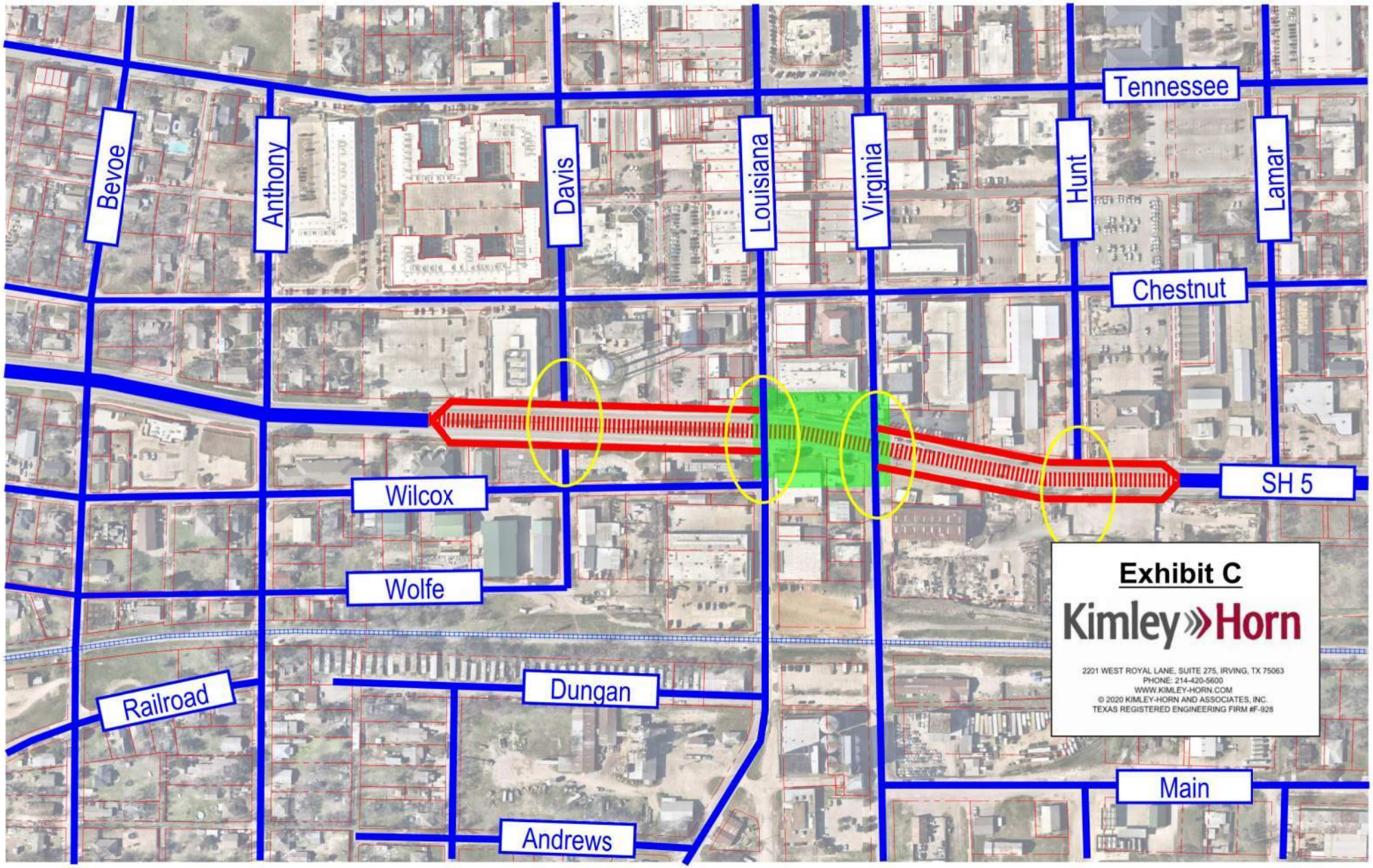
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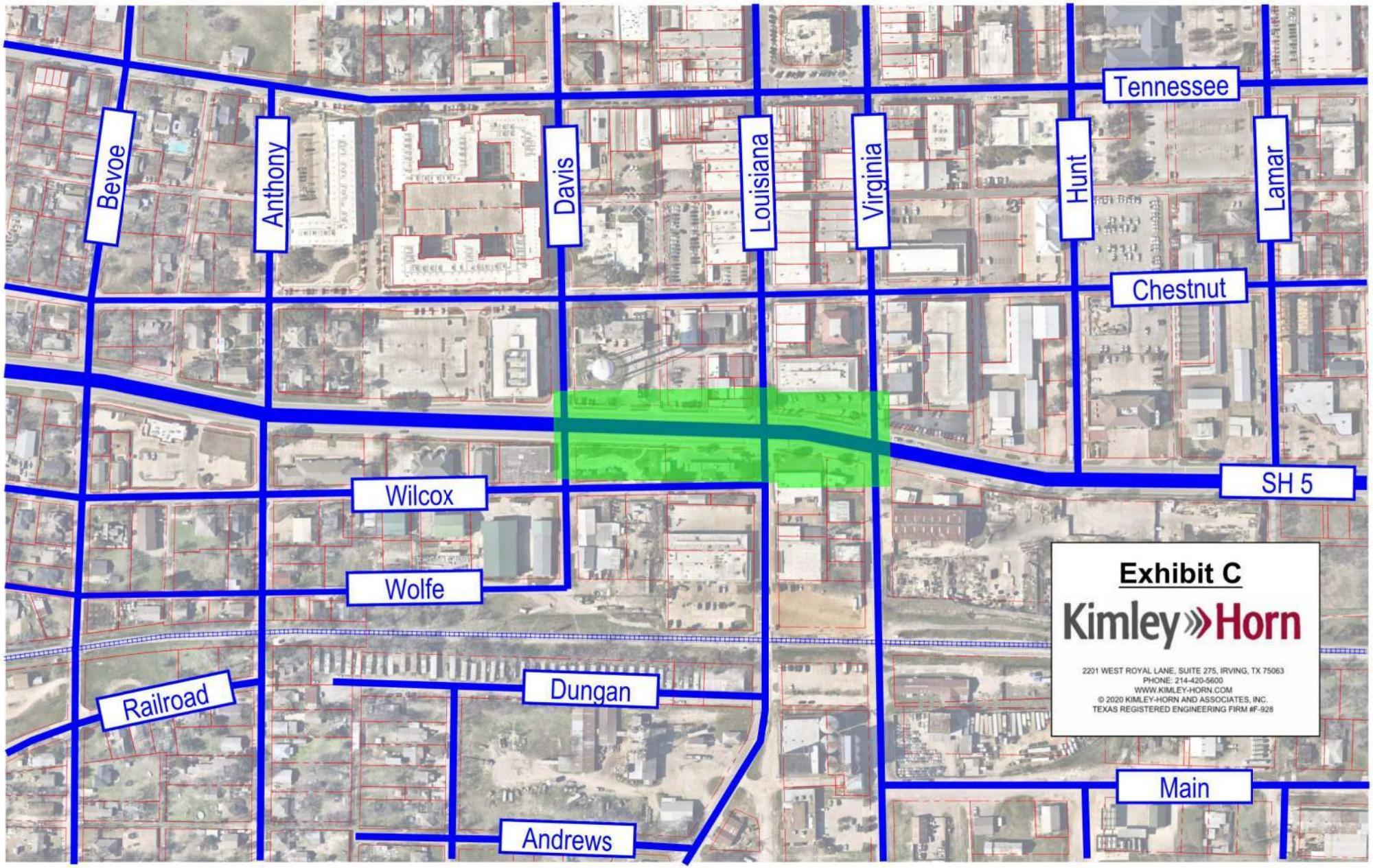
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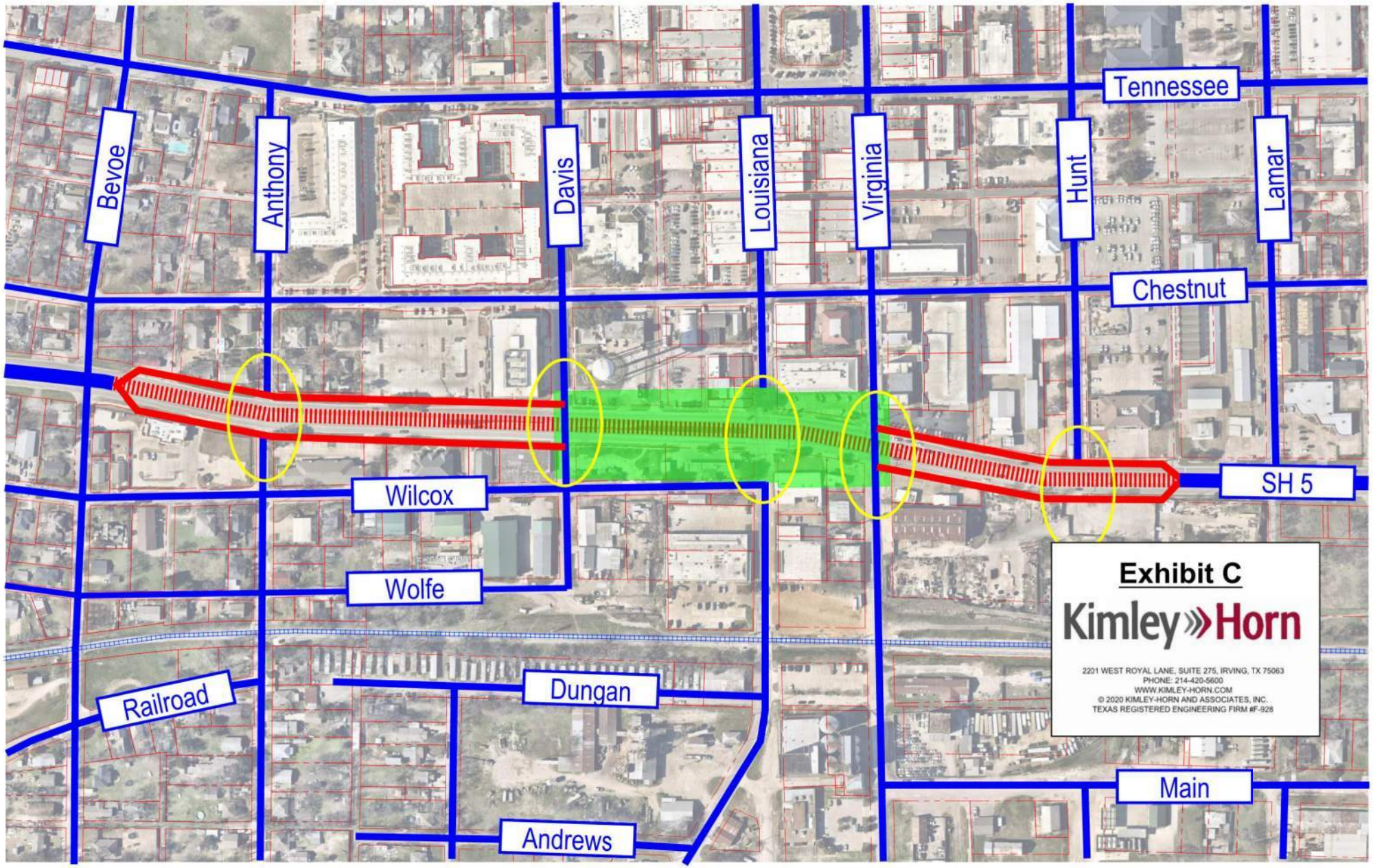
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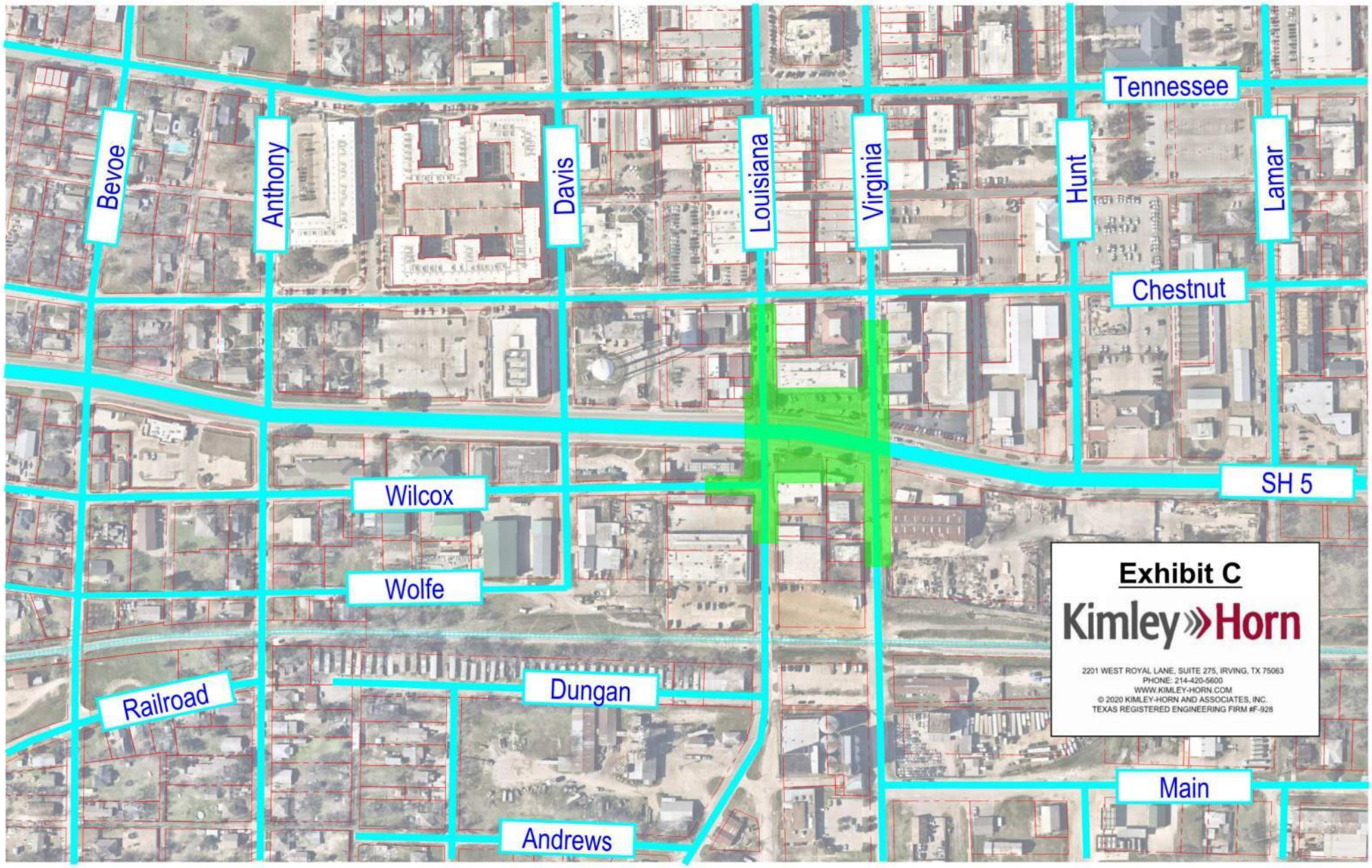
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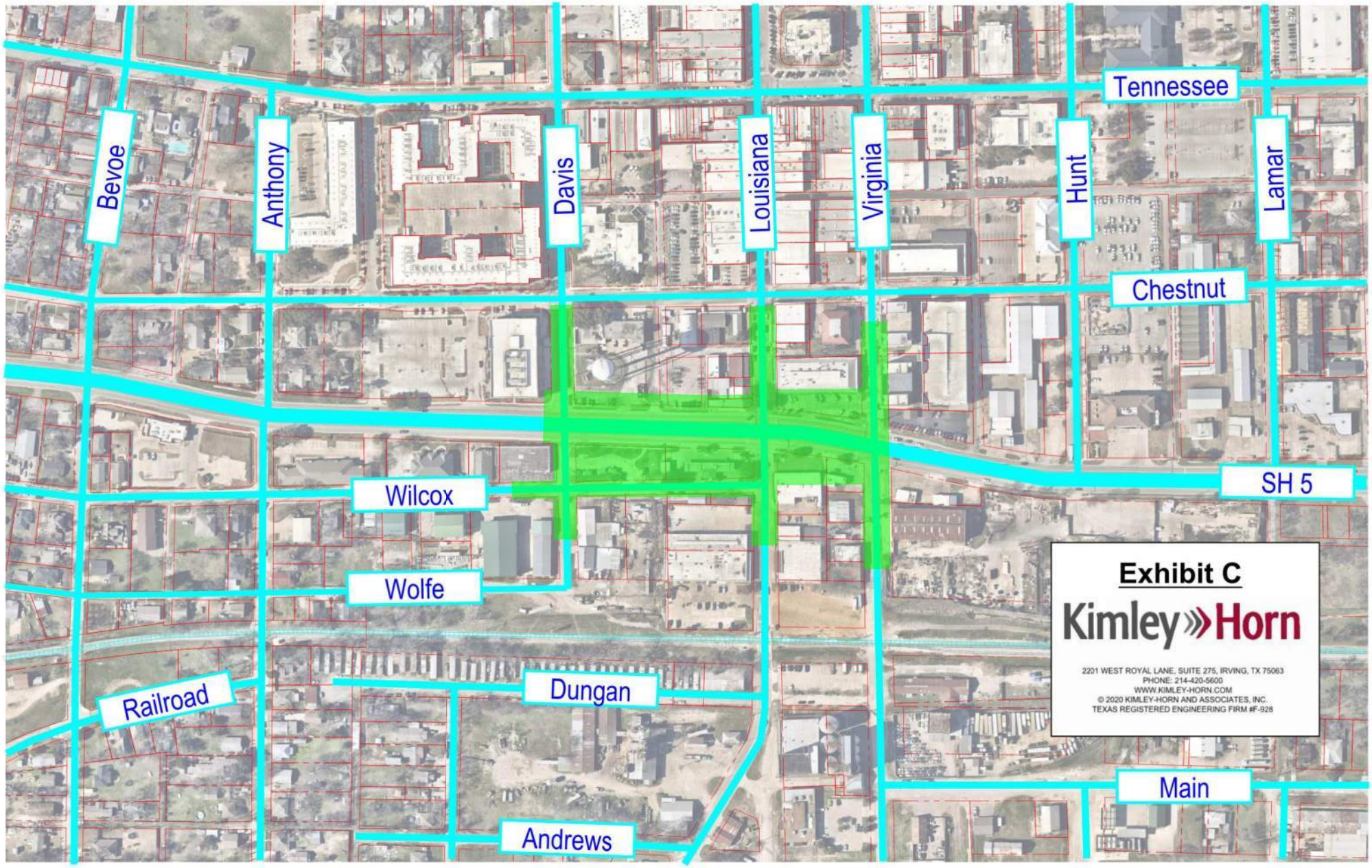
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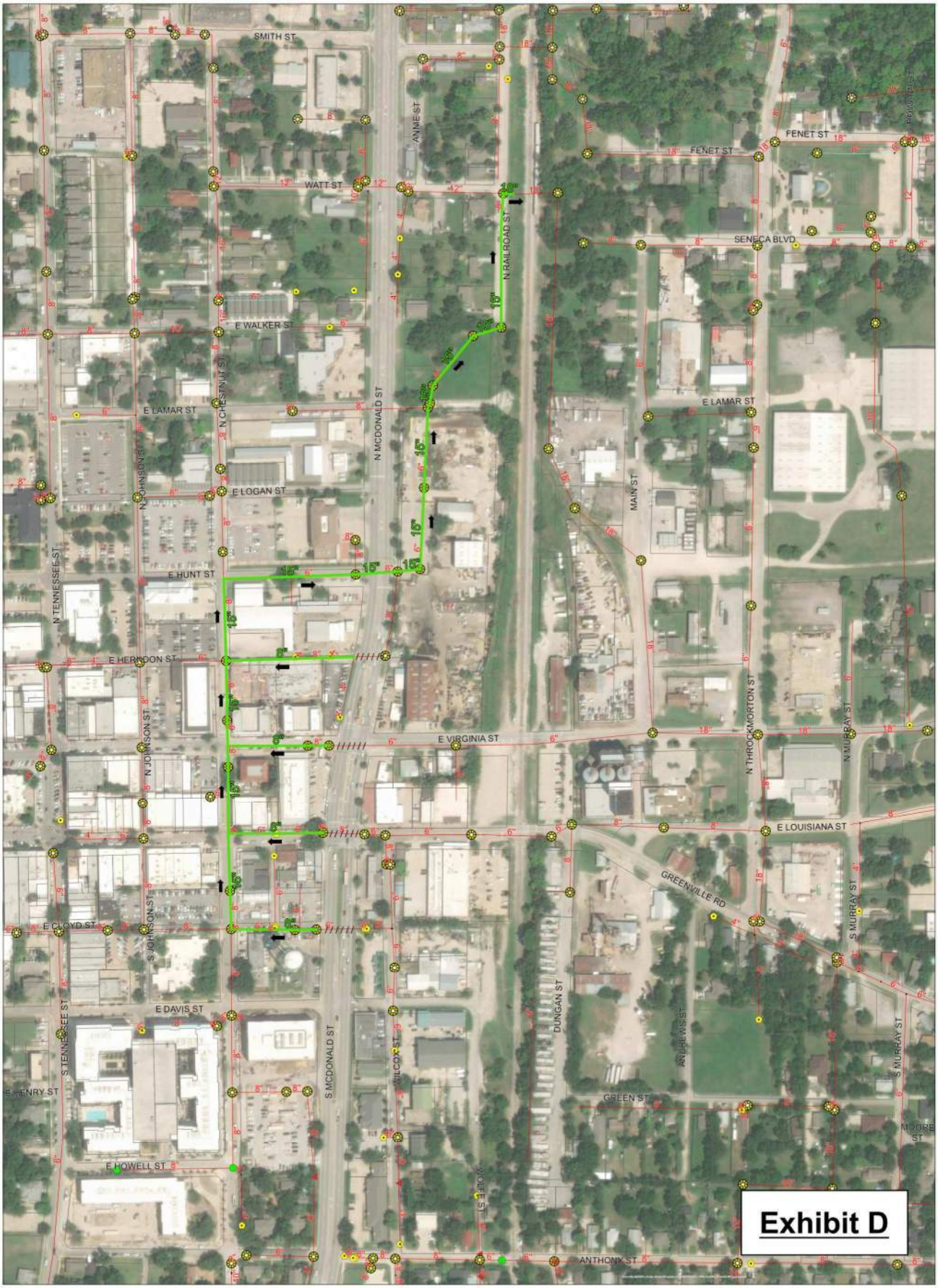

SH 5 Deck Park Feasibility
Sewer Relocation Option 1
April 10, 2020

Legend
Sewer Mains: MCKINNEY, PRIVATE
DROP, AccessDevice, Reducer
Manholes: STANDARD, CLEANOUT
Sewer Relocation: Option #1

McKINNEY TEXAS
Unique by nature.

0 125 250 Feet

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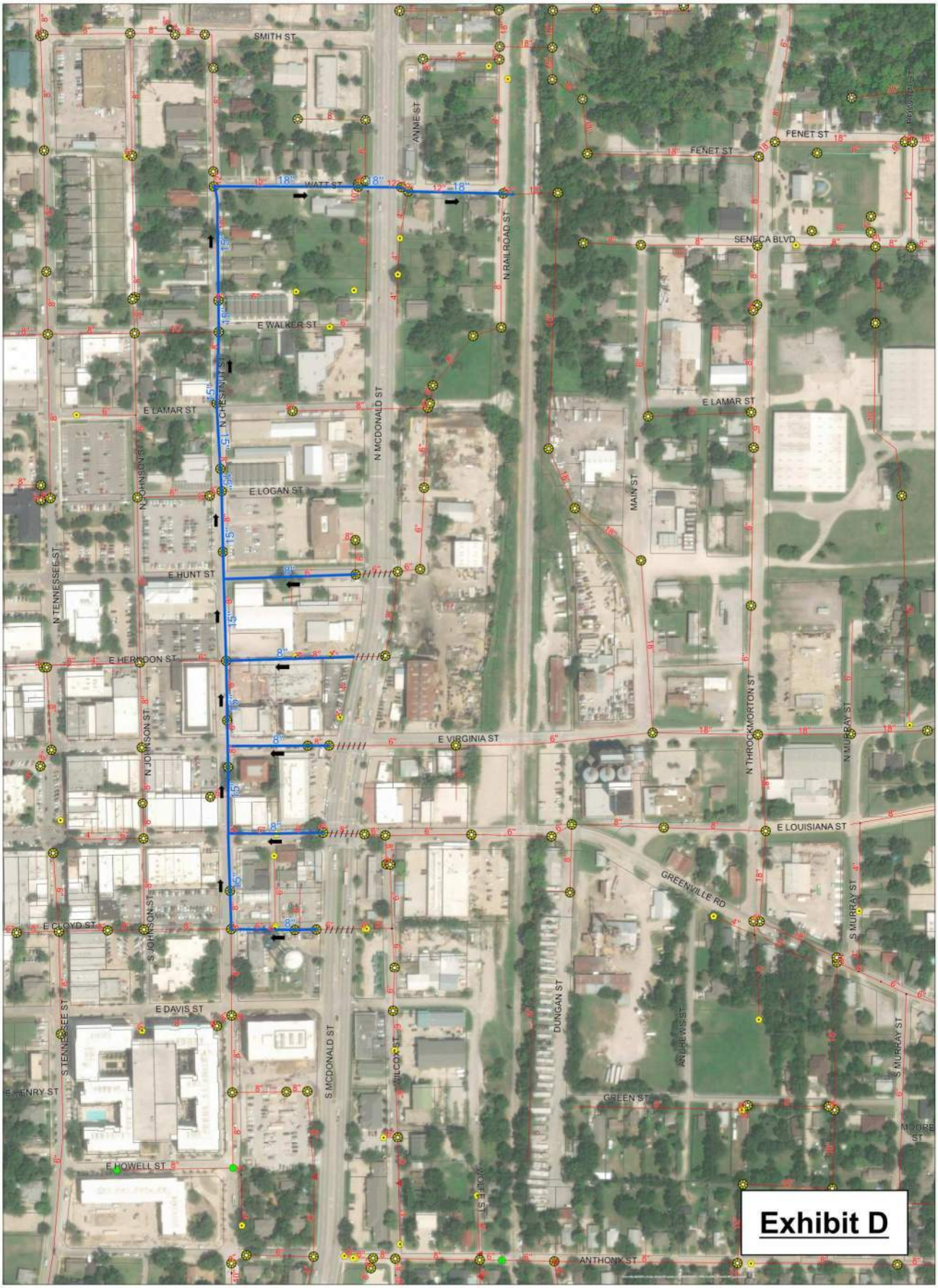

SH 5 Deck Park Feasibility
Sewer Relocation Option 2
April 10, 2020

Legend
Sewer Mains: MCKINNEY, PRIVATE
DROP, AccessDevice, Reducer
Manholes: STANDARD, CLEANOUT
Sewer Relocation: Option #2

McKINNEY TEXAS
Unique by nature.

0 125 250 Feet

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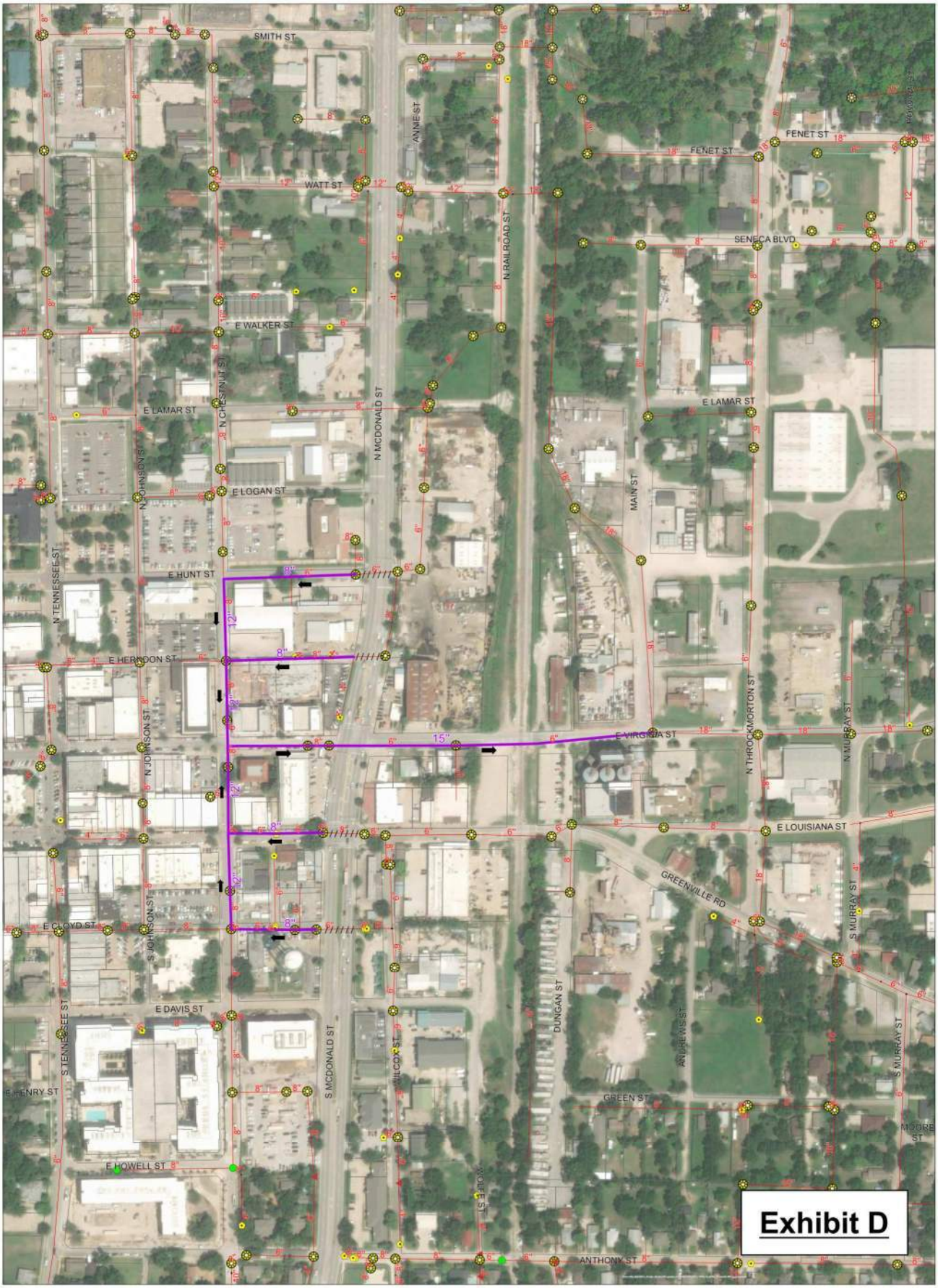

SH 5 Deck Park Feasibility
Sewer Relocation Option 3
April 10, 2020

Legend
Sewer Mains: MCKINNEY, PRIVATE
DROP, AccessDevice, Reducer
Manholes: STANDARD, CLEANOUT
Sewer Relocation: Option #3

McKINNEY TEXAS
Unique by nature.

0 125 250 Feet

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Exhibit D

SH 5 Deck Park Feasibility
Water Relocation Option
April 10, 2020

Legend
Water Mains
- MCKINNEY
- PRIVATE
- Water Relocation Option

McKINNEY TEXAS
Unique by nature.

0 125 250 Feet

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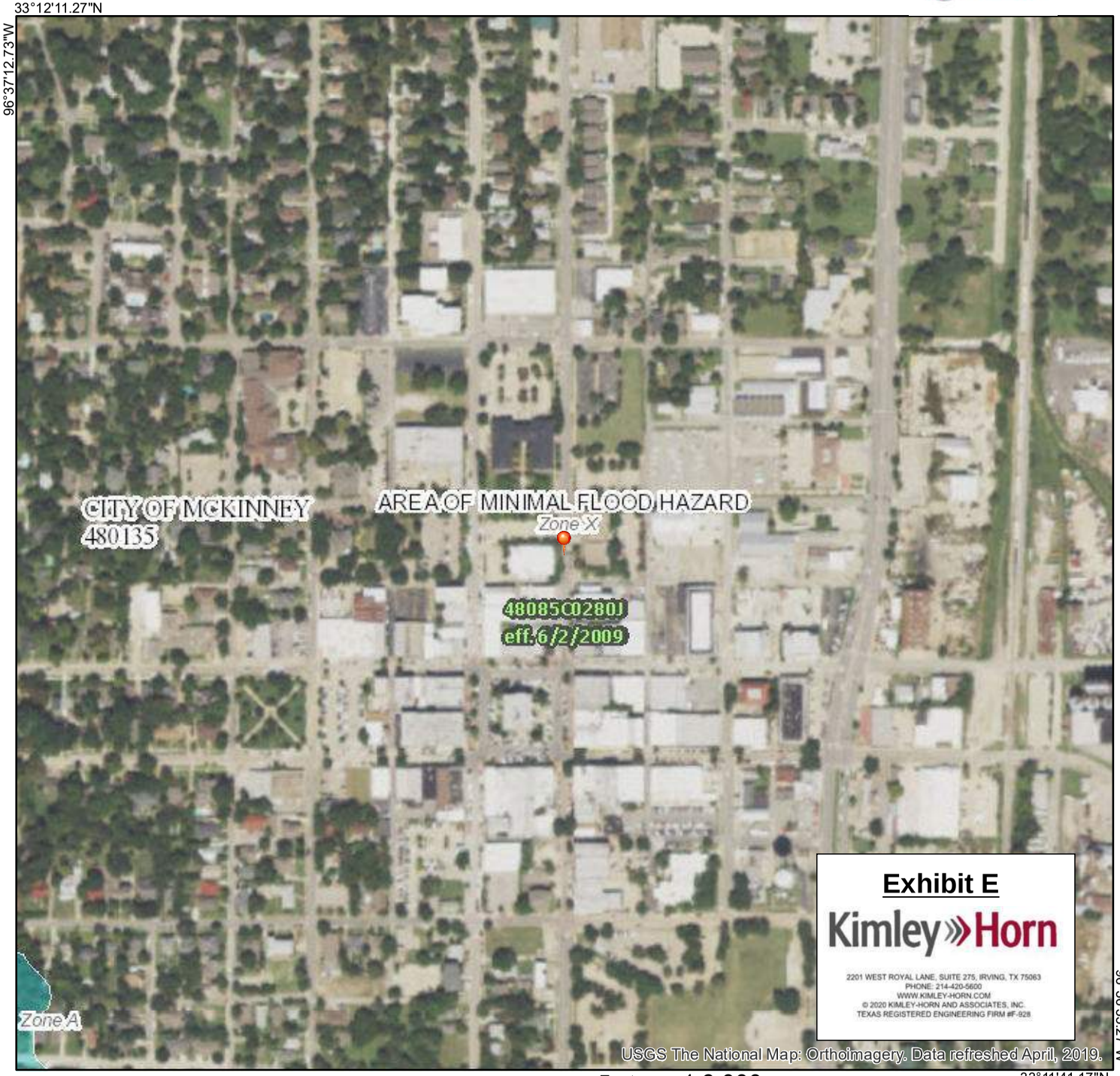
National Flood Hazard Layer FIRMette

FEMA

33°12'11.27"N

96°37'12.73"W



96°36'35.27"W

33°11'41.17"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- B 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

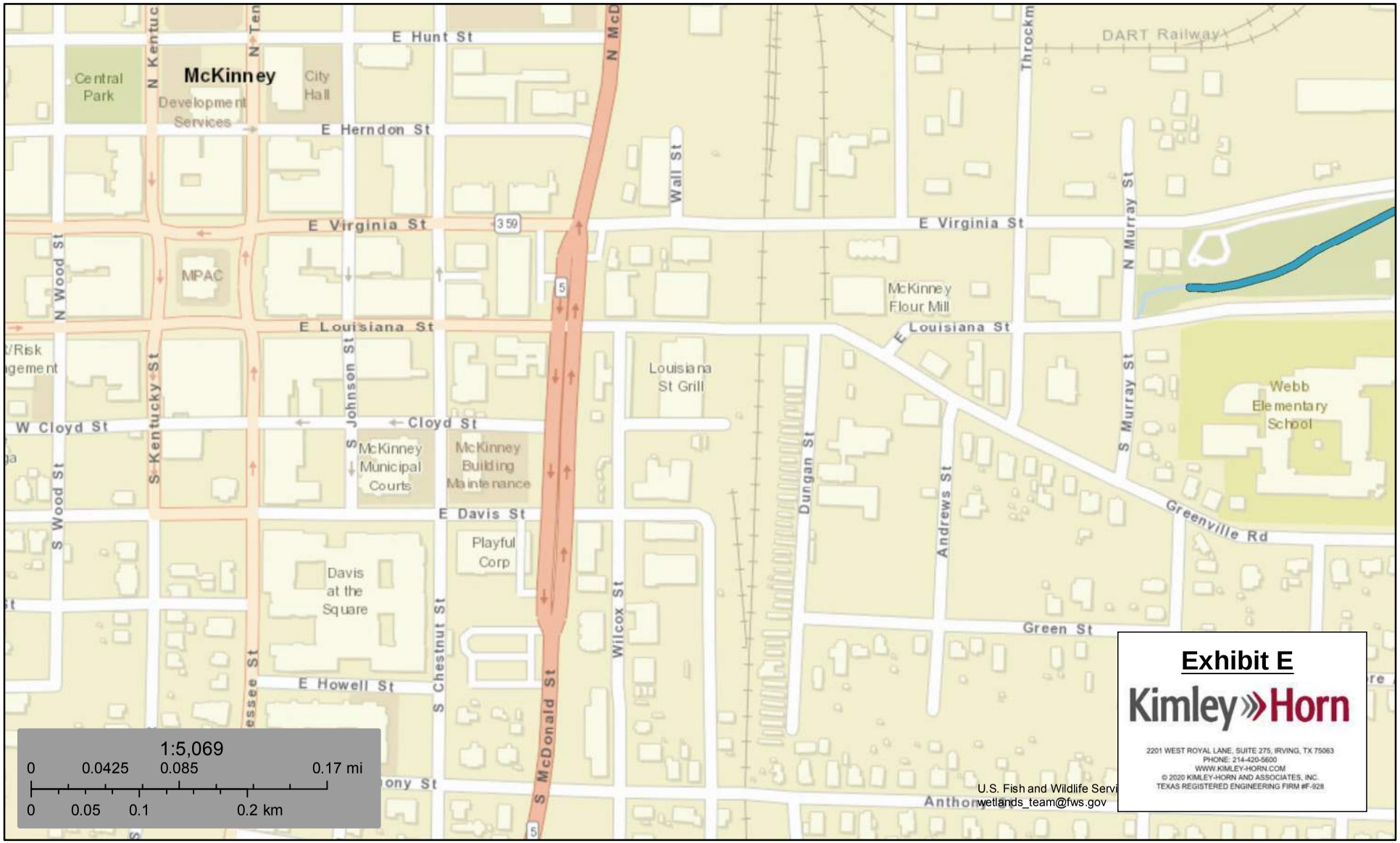
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/16/2020 at 4:21:02 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

U.S. Fish and Wildlife Service
National Wetlands Inventory

SH 5 Deck Park



April 16, 2020

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

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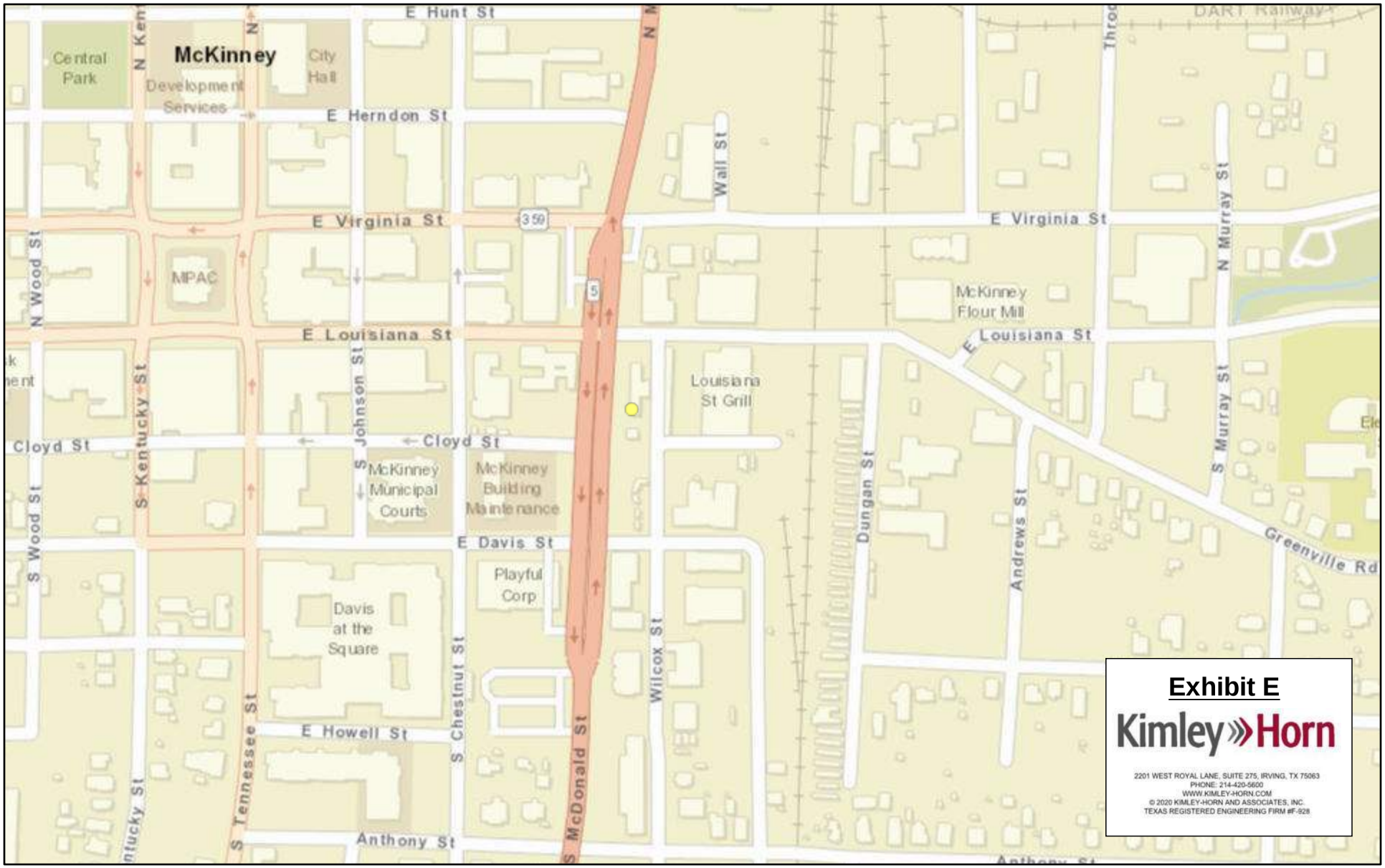
6H"FN 3DUN



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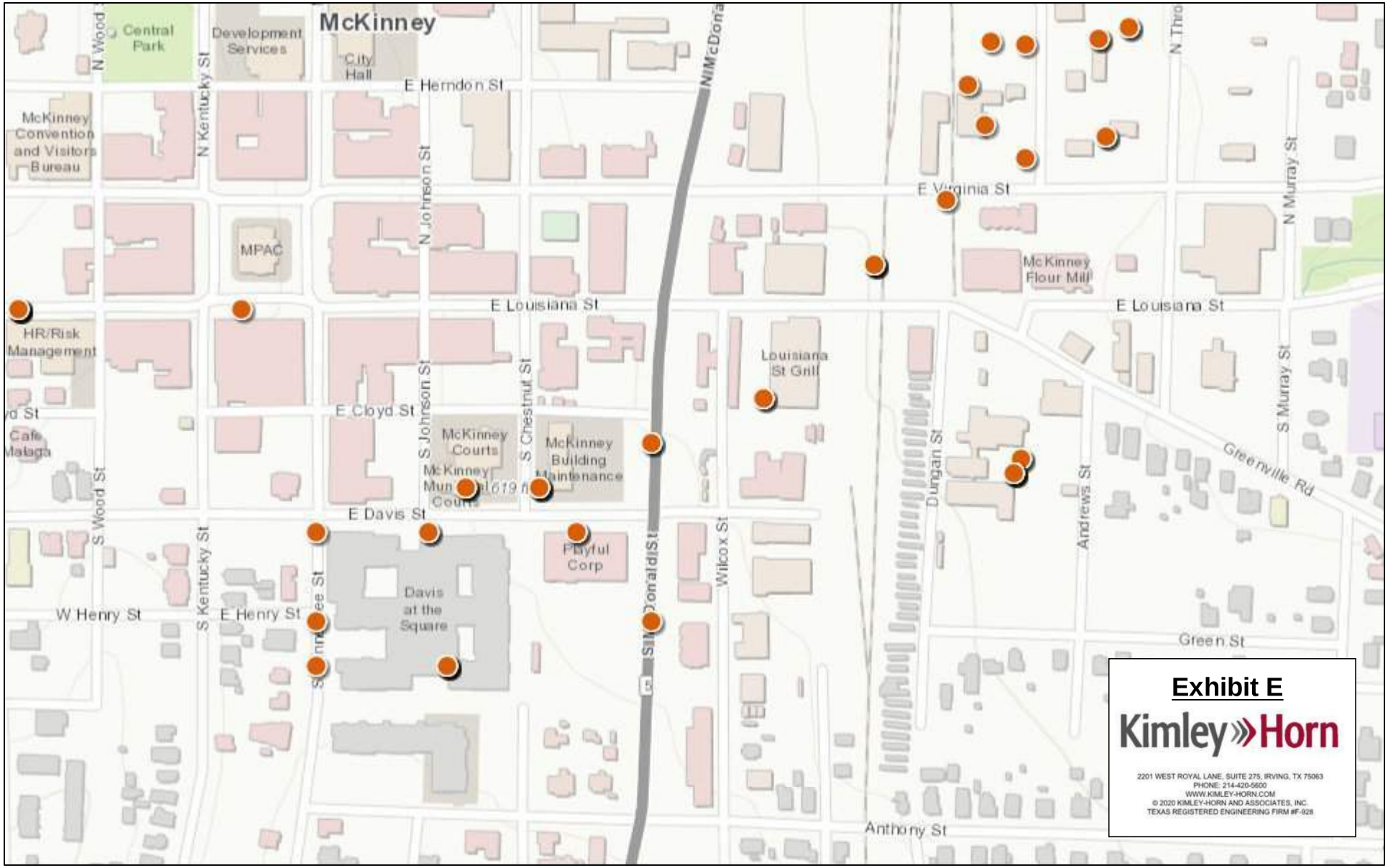
Groundwater Data, Texas



Texas Water Development Board

Well Reports

0 0.0375 0.075 0.15 mi

0 0.05 0.1 0.2 km

1:4,514

April 16, 2020

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

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