MEMORANDUM – DEVELOPMENT

To:	Garry Ford, PE – City of New Braunfels
From:	Trey Neal, PE – Kimley-Horn and Associates, Inc.
Date:	March 31, 2021
Subject:	Memorandum - Street Design Manual and Construction Standards – Development
	Phase

Kimley-Horn and Associates, Inc. (Kimley-Horn) was hired by the City of New Braunfels (City) to evaluate the City's current street design guide and construction standards, provide recommendations, and develop new street design requirements. The study includes five major phases: (1) Evaluation; (2) Recommendation; (3) Development; (4) Concurrence; and (5) Implementation. The following memorandum provides a summary of the Development Phase for the City's consideration. Upon City concurrence, Kimley-Horn will assist the City to provide outreach to development, engineering, and construction communities to introduce the new draft manual and standard details for review and comment.

DEVELOPMENT PHASE

Kimley-Horn has updated the Street Design Manual into a stand-alone document. The reason for separating the content is to isolate information that will be used in the planning and design phases from the information that will be used during procurement and construction.

This memorandum includes the following:

Street Design Manual; Table of Contents

• Section Summaries Standard Details

1) STREET DESIGN MANUAL

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Table of Contents

1 GENERAL

- - Establish standards for design and construction of street facilities
 - Reference documents

1.2	Interpretation
•	Minimum requirements for the design of public improvements Where other jurisdiction regulations are more restrictive, such regulations shall govern
1.3	Enforcement6
•	City Engineer shall review for conformity Process for approval of design deviations
1.4	Amendments7
•	Process for amendment of standards for consideration
1.5	Accessibility Standards and Requirements7
•	Americans with Disabilities Act (ADA), Texas Accessibility Standards (TAS), and Public Right-of-Way Accessibility Guidelines (PROWAG). More restrictive shall govern
1.6	Submittal Requirements for Construction Plans7
•	Submitted in accordance with City Code
1.7	Easement and Right-of-Way Requirements7
• • •	May be required per City Code o Sight Visibility, access, sidewalks, trails, and traffic control City has the right of ingress and egress Right-of-Way shall be provided for future throughfares Engineers responsibility to comply with public utility provider
1.8	Subsurface Utility Engineering8
•	Minimum Level C and D for any trenching and excavation Additional investigation may be required depending on complexity of the project - Level B and A
•	Responsibility of the Engineer to coordinate utility conflicts with the provider
1.9	Right-of-Way Excavation
• • •	Supplemental standards to City Code Open cuts on city streets constructed in the last 5 years will not be allowed Open cuts on city streets with pavement scores higher that 60 will not be allowed Alternate methods shall be pursued
1.10	Survey Requirements
•	Shall follow the minimum standards set by the Texas Board of Professional Engineers and Land Surveyors

 All surveys shall be referenced to the North American Datum of 1983 (NAD 83) Monument, Lot Marker and Benchmark requirements
1.11 Computer Programs9
All design files must be AutoCAD compatible
2 STREET DESIGN STANDARDS 10
2.1 General
• Streets, intersections, alleys, and access shall be designed in accordance with the <i>Street Design Manual</i> and in conformity with City Code, Thoroughfare Plan, and Comprehensive Plan
 Improvements on state highways shall follow TxDOT policies and procedures
2.2 Street Principles
 Street Classifications Interstate Expressway Parkway Principal Arterial Minor Arterial Major Collector Local Streets Alleys Street Design Manual establishes the minimum standards for the street classifications and supplements City Code The design of "context-sensitive," "complete," and "green" streets is supported and may be considered in coordination with the City Engineer Street Design Standards Establishes design standards based on street classification Right-of-Way Width, Curb and Gutter, Pavement Width, Roadside Width, Shoulder Width, Parking, Sidewalk Width, Sidewalk Buffer, Min and Max Cradea Contexting Radius and Parison Speed
 Grades, Centerline Radii, and Design Speed Additional guidance regarding payement cross slope, curb and gutter, payement widths, lane
widths, roadside widths, median widths, shoulder widths, parking and sidewalks
 2.3 Intersections

Through lanes shall line upSight distance requirements

•	Conduit shall be installed for all future irrigation, signals, and communications Divided arterial shall be built with conduits in the median - no more than 500' between ground boxes		
٠	Conduit for residential street lighting typically by electric provider		
2.9 T	2.9 Traffic Calming		
•	Practice employed to help reduce speeds Median islands, Pinchpoints, Bulb-out, Lane shifts, and Traffic circles		
2.10	Pedestrian and Hike & Bike Facilities		
•	Pedestrian facilities shall be designed to promote pedestrian safety and efficiency, minimize conflicts with motorized and non-motorized vehicle traffic, minimize tripping hazards and protruding objects, and accommodate accessibility needs of all pedestrians Design guidance for pedestrian and hike and bike facilities		
2.11	Street Lighting		
•	Collectors and residential local roadways lighting at intersections, cul-de-sacs, and throughout subdivision is required and shall be in accordance with New Braunfels Utilities standards Lighting plans required for all new and modified street lighting		
2.12	Utilities		
•	Preference for new utilities to be outside of pavement in ROW or Easement Designed in accordance with utility owner's requirements and submitted to City for approval		
2.13	Railroad Crossings		
•	Early coordination/communication Existing Railroad Quiet Zones (RRQZ) are established - no access will be granted within 100 ft of an existing or future crossing		
2.14	Existing Street Modifications		
• • •	Developer responsible for reconstructing and/or widening Limits of improvements based on TIA Required improvements base on the Overall Condition Index (OCI) and Geotechnical report Minimum removal of 2' of existing pavement in widened sections Level up required if break in cross slope is greater than 1%		
2.15	Alley Design		
•	Requirements per City Code		

3 ACCESS MANAGEMENT 44

 Systematic control of the number, location, design, and construction of intersections, driveways, medians, and median openings Supplements requirements in City Code
3.1 Administration
City has the right to inspect all access improvments
3.2 Driveways
• Design requirements - Width, Location, Spacing, Shared Access, Throat Length and Grades
3.3 Medians
 Design requirements - Desirable on streets with four or more lanes and should be provided on Major Collectors, Arterials, and Parkways Raised or depressed Tree placement
Opening requirements
4 PAVEMENT AND SUBGRADE DESIGN REQUIREMENTS 49
4.1 General
 Flexible pavements - 20 year design Rigid pavements - 30 year design Standard sections established
4.2 Geotechnical Investigation and Report51
 All Capital Improvement Projects (CIP) and Development roadways shall have a geotechnical investigation If soil and subgrade parameters meet the established input parameters then standard pavement sections can be specified, if not a custom pavement design is required If soil and subgrade parameters exceed the established input parameters a pavement design can be done to reduce the section Traffic Impact Analysis (TIA) required to determine traffic volumes All findings shall be summarized in a Geotechnical Report - Signed and sealed Geotechnical Report for Roadways Checklist and Summary of Pavement Design Form to be completed Geotechnical Test Procedures
4.3 Existing Surface/Subsurface Investigation
 Field investigations - Borings and Sampling Laboratory investigations - Potential Vertical Rise (PVR), California Bearing Ratio (CBR), Liquid Limit (LL), Plasticity Index (PI), Resilient Modulus (Mr)

 Subgrade verification letter following rough cuts to determine if soil conditions match the report
Re-evaluation requirements
4.4 Subsurface Design
 Arterial and Major Collector Effective Plasticity Index (Pleff) ≤ 30 Minor Collector/Commercial Street/Residential Street Effective Plasticity Index (Pleff) ≤ 40 Arterial and Major Collector Potential for Vertical Rise (PVR) ≤ 2.0 Minor Collector/Commercial Street/Residential Street Potential for Vertical Rise (PVR) ≤ 3.0
4.5 Subgrade Design
 Subgrade design - Lime Treatment, Cement Treatment, Remove and Replace, Moisture Treatment and Geogrid
4.6 Flexible Pavement Design
FPS21 software used to design based on established input valuesOptions for full depth hotmix
4.7 Rigid Pavement Design
StreetPave 12 software used to design based on established input values
5 STRUCTURAL DESIGN REQUIREMENTS 61
5.1 Purpose and Scope
 Establish design guidance for bridges, foundations, retaining walls, screening walls, headwalls and wingwalls, culverts, embankments, creek and channel structures, aerial crossing, and other civil structures Permitting requirements per City Code Inspection requirements Use of TxDOT standard sheets Use of aesthetic treatments must be approved Structural plan requirements
5.2 Code Requirements
 At a minimum, all structures shall be designed using the current standards as adopted by the City and shall meet all applicable local, state, and federal standards Reference documents
5.3 Excavation Support

•	Trench support or temporary special shoring required on excavations greater than 5 ft
5.4 0	Geotechnical Performance Specifications
•	Field investigation, geotechnical testing, and geotechnical engineering shall be performed in accordance with the standard of care taking into account local experience and conditions. The geotechnical recommendations shall establish the minimum design criteria upon which the Engineer can rely. Minimum boring requirements
5.5 B	Bridge Design
• • •	General design requirements Foundation design Railing Pedestrian bridges
5.6 R	Retaining Wall Design
•	General design requirements Engineered design for all wall greater than 3 ft.
5.7 S	lope Stability Design Criteria
•	All slopes exceeding 8 ft. in height with a steepness of 4H:1V or greater, regardless of soil type, cut, or fill, shall be evaluated for global stability for both the short-term and the long-term conditions
5.8 H	leadwalls and Wingwalls
•	TxDOT Standard Details
5.9 C	Culverts
•	TxDOT Standard Details
5.10	Drop Structures
•	Reference City of New Braunfels Drainage and Erosion Control Design Manual
5.11	Aerial Crossing
•	Aerial crossings for mains should be avoided Options for aerial crossings - Attached to roadway bridge or on separate structure
5.12	Non-Bridge Construction Inspection and Certification
•	Establish minimum inspection requirements
5.13	Bridge Construction Inspection and Certification

• Inspector shall Inspector shall certify bridge construction inspections were performed at the prescribed stages of construction in accordance with the Bridge Construction Inspection and Certification checklist

5.14 National Bridge Inventory (NBI) Request	70

• TxDOT procedure for NBI request

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2) STANDARD DETAILS

- Trails Detail (3)
- Concrete Collar
- Reinforced Concrete Pipe Installation
- Pavement Surface Replacement/Repair Limits
- Trench Repair Details (3)
- Type 4 Object Marker
- Street Sign Detail 9" Ground Mount
- Street Sign Detail 9" Ground Mount W/ Logo
- Street Sign Detail 9" Ground Mount Historic District
- Street Sign Detail 9" Ground Mount Historic District W/ Logo
- Sidewalk Repair
- Curb Transition
- Elevated Sidewalk & Drop Curb for Drainage Channels
- Median Nose Type 1
- Median Nose Type 2
- Flashing Beacon (3)
- Cross Gutter
- Curb, Gutter & Gutter, Ribbon, Header and Mountable Curb
- Concrete Retaining Wall Combination Type
- Concrete Sidewalk at Utility Pole
- Concrete Sidewalk Abutting Curb/Curb and Gutter Section
- Concrete Sidewalk Drain
- Concrete Steps

NEXT STEPS

Upon City concurrence, Kimley-Horn will assist the City in providing outreach to the development, engineering, and construction communities to introduce the new draft standard for their review and comments.

If you have additional comments or questions, please do not hesitate to contact me at 512-418-4507 or <u>trey.neal@kimley-horn.com</u>.