**ORDINANCE NO. _____**

AN ORDINANCE OF THE CITY OF PFLUGERVILLE AMENDING SECTION 2 - STREETS SUBSECTION DG2.4 PAVEMENT DESIGN OF THE 2014 ENGINEERING DESIGN MANUAL AND CONSTRUCTION STANDARDS, REPLACING ALL ENGINEERING AND CONSTRUCTION STANDARDS IN CONFLICT; CONTAINING A SAVINGS CLAUSE; CONTAINING A SEVERABILITY CLAUSE; AND PROVIDING FOR PUBLICATION AND AN EFFECTIVE DATE.

WHEREAS, the 2014 Engineering Design Manual and Construction Standards were adopted by City Council of the City of Pflugerville on February 24, 2015 by Ordinance No. 1206-15-02-24, and as amended; and

WHEREAS, the City Council recognizes the proposed amendments to Section 2 – Streets Subsection DG2.4 of the 2014 Engineering Design Manual and Construction Standards will allow for greater consistency, clarity, ease of use and administration of public infrastructure; and

WHEREAS, the City Council does find that there is a public necessity for the amendment and revision of the said Manual and Construction Standards; that the public interest clearly requires the adoption of Manual and Standards, that the Manual and Standards, as amended does not unreasonably invade the rights of those who bought or improved property with reference to the classification and development standards which existed at the time the investment was made; and

WHEREAS, the City Council does find that the adoption of the proposed amendments to the Engineering Design Manual and Construction Standards promotes the health, safety, and general welfare and facilitates the adequate provisions of transportation, water, sewage, and other public requirements.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF PFLUGERVILLE, TEXAS:

## I. Incorporation of Recitals

The foregoing recitals are hereby found to be true and correct and are hereby adopted by the City Council and made a part hereof for all purposes.

## II. Adoption

The Engineering Design Manual and Construction Standards, Section 2 – Streets Subsection DG2.4 is hereby amended as set forth in **Exhibit "A"** attached hereto and incorporated herein by reference for all purposes.

## III. Review

The City Engineer shall cause the Engineering Design Manual and Construction Standards to be reviewed from time to time and shall recommend such revisions as are necessary to account for changing conditions, updated technical standards for the development of public infrastructure, and administration of the Engineering Design Manual and Construction Standards.

## IV. Severability

If any provision of this Ordinance is illegal, invalid, or unenforceable under present or future laws, the remainder of this Ordinance will not be affected and, in lieu of each illegal, invalid, or unenforceable provision, a provision as similar in terms to the illegal, invalid, or unenforceable provision as is possible and is legal, valid, and enforceable will be added to this Ordinance.

## V. Conflicts and Savings

That all ordinances or resolutions or parts of ordinances or resolutions in conflict with the provisions of this ordinance are hereby repealed to the extent of such conflict, and that the Code of Ordinances of the City of Pflugerville, Texas, as amended, shall remain in full force and effect, save and except as amended by this ordinance.

## VI. Ongoing Projects

Any project for which a complete development application has been accepted and permitted by the City before the effective date of this Ordinance may proceed pursuant to the 2014 Engineering Design Manual and Construction Standards adopted as Ordinance No. 1206-15-02-24, and as amended. Any project for which a complete development application has not been accepted and permitted by the City on or after the effective date of this Ordinance shall adhere to the standards set forth in this Ordinance.

## VII. Publication of Engineering Manual and Construction Standards

The publishers of the City Code of Pflugerville, Texas are authorized to publish this addition to the Engineering Design Manual and Construction Standards of Pflugerville, Texas, to include the amendments to Section 2 – Streets Subsection DG2.4 and to format and number paragraphs to conform to the existing City Code.

## VIII. Effective Date.

This Ordinance will take effect upon its adoption by the City Council and publication as required by law.

PASSED AND APPROVED this _____ day of _____, 2021.

CITY OF PFLUGERVILLE, TEXAS

By:_____
Victor Gonzales, Mayor

ATTEST:

_____
Karen Thompson, City Secretary

APPROVED AS TO FORM:

_____
Charles E. Zech, City Attorney
DENTON NAVARRO ROCHA BERNAL & ZECH, P.C.

**EXHIBIT A**

**(Amendments are reflected as underlined and deletions are reflected as ~~strikethrough~~)**

DG2.4 PAVEMENT DESIGN

DG2.401 GENERAL

A. ~~**Refer to the City of Austin Transportation Criteria Manual for pavement design procedures.**~~ The City of Pflugerville recognizes the need to revise and upgrade the pavement design section of the City's Engineering Design Manual to meet current industry standards. The City of Pflugerville acknowledges the Capital Area Pavement Engineering Council (CAPEC) study as a guiding document for civil and geotechnical engineers to reference during the design phase of all public and private streets within Pflugerville's city limits and extra-territorial jurisdiction.

All new City Streets, alleys and rehabilitation of existing streets shall be constructed in accordance with the latest editions of the City of Pflugerville Construction Standards and Specifications.

B. A soil evaluation report by a registered professional engineer shall be required. The soil evaluation report shall be submitted in connection with the plans and specifications for street improvements. ~~All soil evaluation reports shall include an analysis of sulfate levels in the soil. A pavement design which includes lime stabilization shall be included in the Geotechnical Report. An Edes Grim (lime series) test is required for all geotechnical reports recommending lime stabilization.~~

~~**Existing soil reports for an area may be utilized given the existing report is less than 10 years old from the formal submission date of the new roadway.**~~ This section references and specifies the minimum standards or guidelines for the pavement, subgrade and subsurface design for roadways, alleys and fire lanes within the City. These minimum standards or guidelines are not intended to replace the professional judgment of the Design and the Geotechnical Engineer for any specific project. The standards may need to be expanded or modified as determined necessary and appropriate by the Geotechnical Engineer and approved by the City Engineer in writing. The pavement and subgrade design for roadways shall be in accordance with CAPEC Phase 3 Report or latest version.

C. All roadways, alleys and fire lanes shall have a geotechnical investigation performed to include pavement and subgrade design. The results of the geotechnical investigation, analysis, and recommendations shall be presented in a Geotechnical Report for Roadways (GRR). The report shall recommend a pavement section or sections based on analyses using traffic inputs, service factors, and subgrade conditions at the project site. The report and any subsequent modifications or additions shall be signed and sealed by a Licensed Professional Engineer in the State of Texas trained and qualified to provide geotechnical engineering analysis for pavement and subgrade design. At the City Engineer's discretion, validity in the form of a letter from a geotechnical or civil engineer of a GRR older than 3 years may be required. All soil evaluation reports shall include an analysis of sulfate levels in the soil. A pavement design which includes lime

stabilization, shall be included in the Geotechnical Report. An Eades Grim (lime series) test is required for all geotechnical reports recommending lime stabilization. The base and lime sections shall be extended 3-feet behind the back of curb for all street sections.

~~**D. Lime stabilization shall be used unless a qualified Geotechnical Report indicates that sulfate levels in the soil prevent otherwise. Table 2.3 shall be used for determination of the use lime stabilization:**~~

| ~~**Table 2.3 LIME STABILIZATION REQUIREMENTS**~~ | | |
|---|---|---|
| ~~**Risk of**~~ | ~~**Range of Soil**~~ | ~~**Recommended Action**~~ |

| ~~**Adverse Effects**~~ | ~~**Sulfate (ppm)**~~ | |
|---|---|---|
| ~~**Minimal Risk**~~ | ~~**<3,000**~~ | ~~**Follow good mix design and construction practices. If soluble sulfates are detected, lime slurry should be used in lieu of dry lime. Adequate water (optimum for compaction plus at least 3%) should be used for mixing.**~~ |
| ~~**Moderate Risk**~~ | ~~**3,000-5,000**~~ | ~~**Follow good mix design and construction practices explicitly. Mixing water should be at least 3% to 5% above optimum for compaction. Lime slurry should be used in lieu of dry quicklime or hydrated lime.**~~ |
| ~~**Moderate to High Risk**~~ | ~~**5,000-8,000**~~ | ~~**Follow same guidelines as recommended for soils of moderate risk. Before treating, laboratory tests shall be performed to determine swell potential.**~~ |
| ~~**High to Unacceptable Risk**~~ | ~~**>8,000**~~ | ~~**Not recommended for lime stabilization**~~ |

~~**F, Lime may be placed dry or in slurry form. Application shall be as outlined in Items 260 and 263 of TxDOT's Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, latest edition. The application of lime shall be such that the following criteria are achieved:**~~

1. ~~**Subgrade shall have a pH of 12.4 or higher prior to compaction.**~~
2. ~~**The compressive strength of the subgrade shall be 150 psi or higher.**~~
3. ~~**The subgrade shall have less than 1% swell.**~~

~~**G. At a minimum, all streets shall be paved with :**~~

1. ~~**A minimum of eight (8) inches of flexible base compacted to one- hundred (100%) percent maximum density in accordance with Test 99 of the American Association of State Highway and Transportation Officials, latest revision, or as recommended by the soil evaluation report, and two (2) inches of compacted hot mix asphaltic concrete (HMAC) in accordance with City of Pflugerville and Texas Department of Transportation specifications.**~~
2. ~~**Type D HMAC is required for use on all local roadways and minor arterials.**~~

~~**H. Prime coat is required, and shall comply with City of Pflugerville and Texas Department of Transportation specifications.**~~

D. Based on the road classification type and as directed by the City Engineer, the submission of a pavement design may require a Life Cycle Cost Analysis (LCCA) as defined in Section 6 of the CAPEC Phase 3 Final Report or latest version. The LCCA summary output shall provide similar format to Figure 6.1 of CAPEC study, including graphical information. The analysis period should be long enough to capture reconstruction activities for all pavement options, which shall be no less than 30 years or as determined by the roadway classification and pavement type.

E. The geotechnical investigation and recommendations report shall address all items listed in the GRR checklist. The checklist shall be filled out completely and submitted with the report. Any "N/A" response on the checklist shall include a written explanation and adequate justification as deemed necessary by the City Engineer. Refer to Exhibit 1 at the end of the DG2.4 for GRR checklist and Section 1.4 of CAPEC Phase 3 Report or latest version.

F. The City review of the GRR will be conducted as a means to verify that the pavement and subgrade design recommendations are performed in general conformance to the City requirements and shall not be considered a detailed technical review of the pavement and subgrade design. The Geotechnical Engineer shall remain responsible for the technical adequacy, accuracy, and completeness of the pavement and subgrade design and shall not be relieved of any responsibility for such as a result of the City's review.

## DG2.402 SUBSURFACE INVESTIGATION

A. Borings shall be drilled at the discretion of the geotechnical engineer for the proposed roadway within proposed right-of-way depending upon access and existing utilities. A Boring plan shall be submitted to the City for approval as included with the Right-of-Way permit, prior to commencing field investigations. Borings shall be spaced at 500 feet or less; boring shall also be drilled for culverts, retaining walls, bridges or other structures associated with the proposed roadway. A minimum of three (3) borings should be performed on each project regardless of roadway length. Pavement borings shall be drilled a depth of 15 feet. High plasticity clay shale (siltstone, mudstone, claystone) of the Navarro-Taylor Groups undivided are not considered competent intact rock for the purposes of roadway design due to the shrink/swell potential of these units.

B. Laboratory testing shall include

1. Moisture content tests
2. Soil classification tests – Atterberg Limits (ASTM D4318), Percent Passing No. 200-mesh sieve (ASTM D1140), grain size distribution if granular materials were encountered
3. Unconfined compression tests or other shear strength tests as appropriate (ASTM D2166)
4. Swell tests (ASTM D4546)
5. Lime Series test by pH-Lime (Eads Grimm) or by Atterberg Limits at varying percentages of lime (ASTM D6276)
6. Soluble Sulfate testing, TEX 145-E or alternate
7. Modified Texas Triaxial Classification (Tex-117-E "Triaxial Compression for Disturbed Soils and Base Materials"

C. Additional testing may be determined to be appropriate dependent upon subsurface conditions and project requirements.

DG2.403 SUBSURFACE DESIGN BELOW THE PAVEMENT SUGRADE

A. Ranges in various subsurface soil properties are provided in Table 2.3 to convey a means in which the City relates plasticity index to swell. Site specific soil testing is required. Refer to Pflugerville's USGS PI map (Exhibit 2 at the end of DG2.4) and Section 5.3 of the CAPEC Phase 3 Final Report or latest version. High swell potential is detrimental to pavement. City of Pflugerville anticipates roadway design within high swell areas to include measures to aid in the mitigation of these potential movements.

**Table 2.3 Range of Subsurface Soil Properties**

| | Low Swell | Moderate Swell | High Swell | Very High Swell |
|---|---|---|---|---|
| Soil Classification | Rock, Gravel, Sands, Silt | Lean Clay, Clayey Sands, Sandy Clays | Lean Clay, Fat Clay, Shale | Fat Clay, Shale |
| Range in PI (%) | NP < PI < 20 | 20 < PI < 35 | 35 < PI < 45 | PI > 45 |
| Range in LL (%) | 0 – 45 | 45 – 60 | 60 – 70 | > 70 |
| Range in -200 sieve (%) | 0 – 100 | 30 – 100 | 50 – 100 | 80 - 100 |

B. Laboratory test results as well as the core boring information shall be incorporated into the determination of swell characteristics and movement potential using the swell test results and the calculated Potential Vertical Rise (PVR) TxDOT Tex-124-E method. The results of the tests and the calculations shall be included in the GRR. A sample output for the Tex-124 is included in Figure 5.3 of the CAPEC Phase 3 Final Report or latest version.

1. For calculated Potential Vertical Rise (PVR) of 2 inches or less, standard subgrade treatment will be incorporated. For PVR greater than 2 inches, the GRR should include subgrade treatment options for reducing the amount of expansive soil movement.

2. Horizontal or vertical moisture barriers to reduce moisture fluctuations within clays underlying the roadway section may be presented as options for the City's review.

C. All subsurface improvements shall be in accordance with the Pflugerville Technical Specifications unless otherwise approved by the City Engineer.

DG2.404 SUBGRADE DESIGN:

A. Treatment of the pavement subgrade soils is important for pavement support and to provide a working platform for construction of the overlying pavement. Lime stabilization shall be used with a minimum thickness of 8 inches unless the GRR prepared by the design or geotechnical engineer indicates that sulfate levels in the soil prevent the effective use of lime stabilization.

B. Lime treatment of clay subgrade will be used beneath the pavement layers. Lime series for each soil type expected to be in the upper 12 inches of the subgrade should be performed in accordance with the Eades & Grimm pH testing and this value shall be used as the beginning value under consideration for lime treatment. Lime may be placed dry or in slurry form. Applications shall be as outlined in Items 260 and 263 of TxDOT's Standard Specifications for

Construction and Maintenance of Highways, Streets, and Bridges, latest edition. Minimum design criteria as follows:

1. A pH of 12.4 or greater prior to compaction (ASTM D2976).

2. The minimum compressive strength of the treated subgrade shall be 150 psi

3. The treated subgrade shall have less than 1% swell.

4. Lime content shall be by percent of hydrated lime compared to the dry unit weight of soil as determined by the pH lime series. The minimum percent lime shall be 5 percent but in most cases 6 to 8 percent lime should be anticipated.

5. Lime treatment should extend 3 or more feet beyond the back of curb for all street sections.

6. Test for sulfates in the upper 3 feet of subgrade. If the roadway has cut and fill, the anticipated fill soil or exposed cut grade should be tested. Subgrade soils testing over 5,000 ppm sulfates shall be lime treated using a double application method (see Table 2.4*). Soils testing over 8,000 ppm should not be lime treated and alternate approaches for subgrade preparation should be considered, subject to approval by the City Engineer. The sulfate content should be confirmed by additional tests at the time of construction when the roadway grades have been formed, after utility construction (within the pavement area) and grading.

**Table 2.4 LIME STABILIZATION REQUIREMENTS**

| Risk of Adverse Effects | Range of Soil Sulfate (ppm) | Recommended Action |
|---|---|---|
| Minimal Risk | < 3,000 | Follow mix design and good construction practices explicitly. If soluble sulfates are detected, lime slurry should be used in lieu of dry lime. Adequate water (optimum for compaction plus at least 3%) should be used for mixing. |
| Moderate Risk | 3,000 – 5,000 | Follow mix design and good construction practices explicitly. Mixing of soil-lime treatment should be at moisture content of at least 3% to 5% above optimum for compaction. Lime slurry should be used in lieu of dry quicklime or hydrated lime. |
| Moderate to High Risk | 5,000 – 8,000 | Follow same guidelines as recommended for soils of moderate risk. Before treating, laboratory tests shall be performed to determine swell potential. * |
| High to Unacceptable Risk | > 8,000 | Not recommended for lime stabilization. |

*Double application method is a process that adds one-half pf the optimum lime content, allowing it to react with the soil components for a specified time period (~ 7 days) and then adding the other one-half of the lime before compacting to final density.

7. If crushed limestone is to be used as base material or as an alternate to treated subgrade, the base material should have a minimum depth of 8 inches and extend 3 or more feet beyond the back of curb. City Engineer may consider a different subgrade thickness when specified and recommended in the geotechnical report by the engineer. Flexible base shall be in accordance with the Pflugerville Technical Specifications unless otherwise approved by the City Engineer

8. Geogrid Applications: For flexible pavement sections (base and subgrade), the designer may consider a layer of geogrid between the flexible base material and the underlying subgrade. An appropriate gain in strength and resulting reduction in base material thickness may be proposed but must be accompanied with substantiating pavement thickness calculations. Geogrid should be a triaxial material. Refer to Section 5.6.5 of CAPEC Phase 3 Final Report or latest version for recommended design approach.

9. The geotechnical engineer is responsible for identifying when subgrade improvement is required, and which improvement alternative should be considered. Alternative subgrade options may be considered and presented to the City Engineer and approved in writing. Refer to Sections 5.4, 5.5, and 5.6 of the CAPEC Phase 3 Final Report or latest version for selection of subgrade improvement methods strategies.

C. All subgrade improvements shall be in accordance with the Pflugerville Technical Specifications unless otherwise approved by the City Engineer.

DG2.405 PAVEMENT DESIGN

A. All rigid and flexible pavement sections shall be in accordance with Pflugerville Technical Specifications, unless otherwise approved by the City Engineer. Table 2.5 provides an assigned roadway type based on road classifications per Pflugerville's Engineering Design Manual (EDM) and Transportation Master Plan (TMP). The roadway type letters assigned are used to identify the pavement design input values in Table 2.6.

**TABLE 2.5 ROADWAY TYPE**

| Classification | Roadway Type |
|---|---|
| Major/Principal Arterials / Industrial Streets | A |
| Minor Arterials / Industrial Streets | B |
| Major Collectors | C |
| Minor Collectors / Rural Collector | D |
| Local Streets / Typical Rural / Alley | E |
| Urban Main Street | D |
| Urban 3-Lane | C |

**Table 2.6 PAVEMENT DESIGN INPUT VALUES**

| Criteria | Type A | Type B | Type C | Type D | Type E |
|---|---|---|---|---|---|
| Design Period (1) Flexible | 20 years | 20 years | 20 years | 20 years | 20 years |
| Initial Serviceability (Pi) – Rigid/Asphalt (2) | 4.5 – 4.2 | 4.5 – 4.2 | 4.5 – 4.2 | 4.5 – 4.2 | 4.5 – 4.2 |
| Terminal Serviceability (Pt) – Rigid/Asphalt (3) | 2.5 | 2.5 | 2.0 | 2.0 | 2.0 |
| Reliability (%) (4) | 95 | 95 | 90 | 90 | 85 |
| Conc Flex strength | 620 psi | 620 psi | 620 psi | 620 psi | 620 psi |
| Modulus of Subgrade | Site Specific | Site Specific | Site Specific | Site Specific | Site Specific |

| | | | | | |
|---|---|---|---|---|---|
| Reaction | | | | | |

(1) Refer to CAPEC Table 1.1 for guidance on Design Life values for flexible and rigid pavement
(2) Refer to CAPEC Table 1.3 & 3.2 for guidance on Initial Serviceability Index Range
(3) Refer to CAPEC Table 1.3, 3.3, & 4.1 for guidance on Terminal Serviceability Index Range
(4) Refer to CAPEC Table 3.1 and 4.2 for guidance on Design Confidence and Reliability Levels (%)

B. Refer to Sections 3.8 (Tables 3.7) and Section 4.6 (Table 4.3) of CAPEC Phase 3 Final Report or latest version for flexible and rigid pavement thicknesses guidance. It is the Design/Geotechnical Engineer's responsibility to verify the Traffic Loading Input Values are applicable to specific sites and locations. In no case shall the pavement sections be less than the CAPEC's representative pavement design sections. Pavement design shall be based on American Association of State Highway and Transportation Officials (AASHTO) current edition of Guide for Design of Pavement Structures utilizing PavementDesigner found at PavementDesigner.org. This is a free web-based pavement design tool for streets, local road, parking lots and intermodal/industrial facilities, and it the latest available software from American Concrete Pavement Association, ACPA) for Portland Cement Concrete (PCC) pavement design and FPS-21 (TxDOT) for Hot Mix Asphalt Concrete (HMAC) flexible pavement design.

C. Alleys subject to public access for garbage collection and fire-fighting equipment shall have a minimum 6-inch concrete section with 6 inches of lime treated subgrade. The geotechnical or civil engineer shall recommend a pavement section if alley serves a commercial use. Access drives and private alleys shall be designed to support the weight of a 75,000 pound live-load under all weather conditions.

D. Prime coat is required and shall comply with City of Pflugerville Technical Specifications unless otherwise approved by the City Engineer.

E. Fire lane pavement design will include support of a 12,500 pound-wheel load for fire lanes outside City roadways. Fire lane pavement needs to support 75,000 pound live-load under all weather conditions. Fire truck and construction traffic loads must be considered in the pavement design sections for fire stations and phased development, respectively.

F. Traffic Parameters

1. The average daily traffic (ADT) in Table 2.7 provides an acceptable level of service capacity value per the City of Pflugerville Transportation Master Plan (TMP) adopted by the City in November 2019. The design engineer is responsible for obtaining or validating the data for average daily traffic (ADT) calculations, growth rate percentage, and truck traffic mix and percentages. If the design engineer cannot obtain the traffic parameter information, the City Engineer may allow the use of Table 2.7. The design engineer should explain the assumptions for City approval prior to design of the pavement section. The required traffic shall be in accordance with Section 2.1 of the CAPEC Phase 3 Final Report or latest version.

| Table 2.7 TRAFFIC LOADING DESIGN INPUT VALUES | | | | | |
|---|---|---|---|---|---|
| Input | Thoroughfare Classification | | | | |
| | Type A | Type B | Type C | Type D | Type E |
| Design Period – Years (Flexible) | 20 | 20 | 20 | 20 | 20 |
| ADT (1) | 32,760 | 21,840 | 17,160 | 8,320 | 4,000 |
| Growth Rate - % (2) | 4.0 | 4.0 | 4.0 | 3.5 | 3.0 |
| Percent Trucks (%) | 4.5 | 4.5 | 4.0 | 3.5 | 3.0 |

(1) LOS ADT value from Transportation Master Plan (TMP)
(2) Growth rate is not applicable to alley section. Refer to City's GIS information for all other roadway types
Note: All the values in Input Data Table must be applicable to StreetPave 12 (American Concrete Pavement Association, ACPA) and FPS-21 (TxDOT). Refer to Table 2.1.3 of CAPEC Phase 1 Final Report for design software

2. Traffic data must be developed for new roadways or existing roadways to be widened for added capacity.

3. Traffic data must address the variety of factors usually depicted with Traffic Impact Analysis (TIA) that predict the type and volume of future traffic.

4. Traffic projections will consider complete build-out of subdivisions and any future development that will be served by a specific street.

5. The traffic growth rate for design in Table 2.7 represents the annual traffic growth rate for a designated street classification. This rate should be used to calculate ending ADT (if maximum capacity values from TMP are omitted), unless the results of a TIA or traffic study indicate a higher value.

G. Design Life:

1. The design life and performance criteria for ride quality and distresses should be in accordance with Section 1.2.1 of the CAPEC Phase 3 Final Report or latest version.

2. Flexible pavement to be constructed in public right-of-way (ROW) shall be designed for a minimum 20-year design life.

**3.** Rigid pavements to be constructed in public right-of-way (ROW) shall be designed for a minimum 30-year design life.

PFLUGERVILLE TEXAS

## EXHIBIT 1

## Geotechnical Roadway Report Checklist

Project Name: _____

Geotechnical Engineer/Firm: _____

Report Date: _____ Date Received: _____

*Note: Any N/A response shall include a written explanation with adequate justification, as deemed necessary by the City Engineer.*

| COMPLETE | N/A | 1. SECTION DG2.401 GENERAL |
|---|---|---|
| ☐ | ☐ | A. Executive summary |
| ☐ | ☐ | B. Description of Project |
| ☐ | ☐ | C. Location of Project |
| ☐ | ☐ | D. Roadway type and classification |
| ☐ | ☐ | E. Grading plan summary |
| ☐ | ☐ | F. Discussion of underground utilities |

| COMPLETE | N/A | 2. SECTION DG2.402 SUBSURFACE |
|---|---|---|
| ☐ | ☐ | A. Discussion of existing subsurface conditions that may affect subgrade and pavement design or performance (i.e. vegetation, terrain, existing structures, existing pavement, etc.) |
| ☐ | ☐ | B. Discussion of geological conditions that may impact subgrade and pavement design or performance. Specify formation. |
| ☐ | ☐ | C. Subsurface conditions with logs<br>• Sampling techniques<br>• Description of soil and rock encountered,<br>• Laboratory test results<br>• Discussion of water and groundwater conditions<br>• Discussion of seasonal variations in moisture content |
| ☐ | ☐ | D. Identify any deviations to standard procedures |

| COMPLETE | N/A | 3. SECTION DG2.403 SUBSURFACE RECOMMENDATIONS |
|---|---|---|
| ☐ | ☐ | A. Expansive Soils Evaluation<br>• Percent swell calculation and test results<br>• Effect of cut/fills (i.e. long-term soil uplift in cut areas; settlement overburden pressure effects in fill areas)<br>• Provide soil movement estimates |
| ☐ | ☐ | B. Soil Moisture Conditioning – Discuss documented details |

| COMPLETE | N/A | 4. SECTION DG2.404 SUBSGRADE RECOMMENDATIONS |
|---|---|---|
| ☐ | ☐ | A. Subgrade Treatment<br>• Typical subgrade type<br>• Explanation of anomalous soil conditions anticipated and discussion of potential variations to consider<br>• Construction techniques to implement<br>• Effects of rock/rock fragments encountered during construction and recommendations to abate |
| ☐ | ☐ | B. Soluble Sulfates Testing<br>• Identify soluble sulfate test results; summarize results and discuss variations |

- Discussion of techniques during construction to mitigate sulfate-induced heaving
- Sulfate retesting and management during construction

☐ ☐ C. Geogrid Applications - Flexible Pavement
- Provide specifications
- Materials product

| COMPLETE | N/A | 5. SECTION DG2.405 PAVEMENT RECOMMENDATIONS |
|---|---|---|
| ☐ | ☐ | A. Identify roadway type(s) and classifications(s) |
| ☐ | ☐ | B. Identify deviations from Pavement Design Input Values (Table 2.6) |
| ☐ | ☐ | C. Identify recommended pavement section |

| COMPLETE | N/A | 6. APPENDIX |
|---|---|---|
| ☐ | ☐ | A. Geological Map |
| ☐ | ☐ | B. Boring Locations |
| ☐ | ☐ | C. Boring Logs |
| ☐ | ☐ | D. Printout from pavement design software program |

**Geotechnical Engineer Signature:**_____ **Date**:

EXHIBIT 2



# CITY OF PFLUGERVILLE

## NRCS Soils - Plasticity Index

LEGEND

- City of Pflugerville City Limits
- City of Pflugerville ETJ

**Representative Plasticity Index (12 to 36 in)**

- 0
- 1 - 25
- 26 - 29
- 30 - 32
- 33 - 36
- 37 - 40
- 41 - 44
- 45 - 48
- 49 - 52
- 53 - 55

Section DG2.4 (Aproved 3/23/2021)

STREETS

0 1 Miles



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Location: H:\ENVIRONMENTAL\Final_Exhibits\1_Plasticity_11x17_V2.mxd
Updated: Tuesday, December 15, 2020, 8:46:35 AM