



MEMORANDUM

DATE: June 28, 2019
TO: The Honorable Mayor Watts and Council Members
FROM: Todd Hileman, City Manager
SUBJECT: Friday Staff Report

I. Council Schedule

A. Meetings

1. **No** - City Council Luncheon on **Monday, July 1, 2019**
2. **No** - Committee on the Environment Meeting on **Monday, July 1, 2019**
3. Traffic Safety Commission Meeting on, **Monday, July 1, 2019** at **5:30 p.m.** in the City Council Work Session Room.
4. **No** - Work Session of the City Council on **Tuesday, July 2, 2019**
5. **No** - Agenda Committee Meeting **Wednesday, July 3, 2019** at **2:30 p.m.** in the City Manager's Conference Room.
6. Development Code Review Committee Meeting on **Friday, July 5, 2019** at **11:00 a.m.** in the City Council Work Session Room.

II. General Information & Status Update

- A. DME Mutual Aid Storm Assistance – Following severe storms in Greenville, Texas last week, DME responded to a request from the Mutual Aid program to assist the Greenville Electric Utility System (GEUS), in restoring power and repairing infrastructure in that area. DME dispatched two distribution line crews and one service truck (totaling 13 employees) to Greenville on Saturday, June 22. The crews worked 16-hour days to change poles, hang transformers, and respond to service calls. GEUS General Manager Alicia Price said DME's help was instrumental in restoring service to residents, and she has heard "nothing but praise" for DME crews from GEUS employees. Crews returned to Denton late on Wednesday, June 26. DME is a member of the American Public Power Association, an organization that routinely coordinates emergency storm

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restoration activities and the mutual aid program. DME is reimbursed for all costs incurred as a result of responding to mutual aid requests that positively impacts the lives of many during their time of need. Staff contact: Brent Heath, DME

- B. Use of City's Plastics for Recycled Carpet – During the June 11 City Council meeting, Mayor Pro Tem Hudspeth requested information on potential use of plastic from the City's waste stream for recycled carpet. Staff research shows that only #1 plastics (PET) are suitable for use in recycled content carpet. The PET from clear plastic bottles is processed and spun into polyester and nylon, which is tufted into new carpet. According to the 2017 National Association for PET Container Resources (NAPCOR) Report on Postconsumer PET Container Recycling Activity, 366,000 tons, or approximately 46.5% of all PET recycled in the US, was converted to fiber. This fiber is used by the carpet industry and is the largest potential use of all PET recycled in the US. The top two carpet manufacturers in the US, which accounts for approximately 70% of the market share, consume approximately 50% of the volume as recycled content in their flooring products.

As a reminder, the City of Denton's materials recycling contract with Pratt Industries states that all recyclable materials collected by Solid Waste becomes the property of Pratt upon collection. Pratt is then solely responsible for the marketing and sale of those materials. While some of the plastics sold by Pratt are likely used to manufacture recycled carpet, the contract does not provide the City with an option to independently divert its recyclable materials to a particular processor. Staff contact: Brian Boerner, Solid Waste and Recycling

- C. On-Street Parking in Longhorn Cove – On June 14, 2019, staff received a request from Mayor Pro Tem Hudspeth to evaluate on-street parking along Duchess Drive in the Longhorn Cove Development to assess roadway safety. Staff have reviewed current conditions and, because the street is only partially constructed, confirmed that on-street parking is creating a safety hazard. When the road is fully constructed, on-street parking safety issues will be significantly alleviated. Since 'No Parking' along Duchess Drive is currently recommended based on the incomplete street, staff will add an item to the August 5 Transportation Safety Commission (TSC) agenda. If approved by TSC, a proposed 'No Parking' Ordinance will be presented to the City Council for approval on August 20. If the ordinance is approved by the City Council, Capital Projects will then install the appropriate signage and/or pavement markings along Duchess Drive. Staff contact: Pritam Deshmukh, Capital Projects
- D. Accessible Parking in Downtown – Staff was recently asked if efforts such as the valet waste collection pilot, which will eliminate certain on-street dumpsters in the downtown area, could lead to the creation of additional Americans with Disabilities Act (ADA) accessible parking spaces around the Courthouse square. The Mews Streets, which are the streets one block back from the square, are currently being evaluated for traffic improvements, and staff will factor in the additional space created by removing dumpsters in their assessment. Staff have also evaluated the parking spaces around the square and in the adjacent overflow parking lot on McKinney Street (see the **attached** map). The overflow parking lot

on McKinney Street does not currently meet minimum ADA requirements and staff is proposing the addition of six accessible parking spaces to the lot. The McKinney Street lot is currently a mix of paved and gravel surfaces. Staff have identified four spaces on the north side of the lot where there is existing pavement adjacent to the crosswalk and two spaces on the south side of the lot that are most conducive to the new accessible parking. This lot is scheduled to be resurfaced in the next thirty days; staff will initially use temporary ADA markings and signage to indicate accessible spaces. After the lot is resurfaced, permanent accessible parking signs and markings will replace the temporary markings. Staff will provide an update on downtown accessible parking efforts to the Committee on Persons with Disabilities at their next regularly scheduled meeting on Thursday, July 18, 2019.

Staff was also asked to provide additional temporary accessible parking around the square for the July 27 ADA Rally. Additional details on the rally will be provided in a future Friday Report. Staff contact: Brian Jahn, Capital Projects

- E. Police Officer Staffing Levels – During the April 3, 2019 City Council Meeting, Council Member Briggs requested information on the number of additional police officer positions needed to fully staff the Police Department. Over the past two and a half years, staff have identified opportunities to increase the number of sworn police officers by transferring vacant positions to Police and by adding new positions through the budget process. Since the FY 2017-2018 budget process, the City has added 21 sworn police officers, increasing staffing from 164 to 185 total officers. As a part of the FY 2019-2020 budget development process, staff is currently working to ensure there is general fund capacity to further increase police officer staffing levels for the upcoming fiscal year. To better assess the true need in the department, the Police Department is collaborating with an outside consultant, the Matrix Consulting Group, to conduct a workload analysis. Information will be shared with the City Council in fall 2019 following the completion of the Matrix Consulting Group's analysis. Staff contact: Frank Dixon, Police
- F. Hercules Lane Construction Update – Council Member Briggs requested an update on the construction project along Hercules Lane from Sherman to Stuart Road. Hercules Lane is currently under construction due to a water main replacement. The current projected completion date is August 6, 2019, weather permitting. Residents in the impacted area were sent letters on March 4 listing an originally projected completion date of July 29. Residents will be updated with new mailers within the next week notifying them of the revised August 6 completion date. **Attached** is a copy of the March 4 letter sent to residents. Staff contact: Frank Pugsley, Utilities
- G. Housing Placements – Council Member Briggs inquired which agencies have housed the households shown through the Denton County Homelessness Leadership Team's data dashboard. United Way has helped to go back into the system and pull these numbers since January 1, 2019 through May 21, 2019 for 26 households housed:

- Denton County MHMR Permanent Supportive Housing (PSH) – 1
- Giving Hope Rapid Re-housing (RRH) – 8
- Giving Hope Permanent Supportive Housing (PSH) – 1
- Denton County Friends of the Family Transitional Housing (TH) – 6
- Catholic Charities Rapid Re-housing (RRH) – 4
- Self-Resolved – 6

The United Way will work to configure the system and add which agencies housed people to the dashboard as a data point. This will likely be completed in the next month or two and then the data will be available on the dashboard going forward. Staff contact: Sarah Kuechler, Public Affairs

- H. Pollinator Week – This year, the City of Denton celebrated Pollinator Week from June 17-23 by hosting a variety of community events. These events included pollinator story time, a volunteer event, interactive activities, and a beekeeping class designed for kids. Pollinator Week events were well attended with 167 citizens participating throughout the week. These events could not have happened without the important partnerships between: Sustainable Denton, Clear Creek Natural Heritage Center, Bee City USA, Monarch City USA, the Emily Fowler Library, the South Branch Library, Denton County Beekeepers Association, SCRAP Denton, and the Texas Master Naturalist Program. Pollinator Week encourages the community to focus on the urgent issue of declining pollinator populations. During this week, staff strives to educate members of the community about the importance of pollinators and the services they provide to the ecosystem. Staff contact: Katherine Barnett, Sustainability.



- I. Hickory Creek Widening – Staff was recently asked to provide information on the additional cost to bring the Hickory Creek widening project up to six lanes from Riverpass Drive to FM 1830. The estimate to bring Hickory Creek from four to six lanes along the segment of Riverpass Drive to FM 1830 is \$3,000,000. Capital Projects staff are currently coordinating with regional partners including the North Central Texas Council of Governments to identify project funding. Depending on funding availability at state and regional levels, the additional \$3,000,000 can be covered either by regional partners or through the available contingencies within the project budget. Staff acknowledges that there are several advantages to widening the road to six lanes with the next phase of the project including efficiencies from one-time construction costs and reducing the impact to motorists

in the future. Right-of-way acquisition is currently being performed to ensure there is adequate space to ultimately bring Hickory Creek to six lanes. Staff contact: Pritam Deshmukh, Capital Projects

I. Upcoming Community Events and Meetings

A. Events

- 1. Liberty Run 5K and 1-Mile Walk – **July 4 at 7:30 a.m.** at Denton Civic Center. \$25 per participant and gift bags include Bluetooth speakers and T-shirts. Register at www.dentonparks.com. Staff contact: Jennifer Eusse, Parks and Recreation

- 2. Fourth of July Jubilee – **July 4 from 7:30 a.m. to noon** at Denton Civic Center (321 E. McKinney St.). The Jubilee begins at 9 a.m. in the Civic Center and includes family games and fun. The Hot Dog Eating Contest is at 11:30 a.m. as part of the Jubilee. The family events are all free and open to the public. Staff contact: Jennifer Eusse, Parks and Recreation

B. Community Meetings

- 1. South Lakes Public Input Meeting – **Monday, July 22 at 6:00 p.m.** at South Lakes Park Pavilion #2 (556 Hobson Ln.); Staff contact: Gary Packan, Parks and Recreation

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March 4, 2019

RE: Hercules Lane Construction

Dear Resident or Property Owner:

We are contacting you to inform you that on March 19, the City of Denton will begin construction on Hercules Lane from Sherman Drive to Stuart Road. This construction will replace the water main and water services. Weather conditions and utility conflicts may impact the plans, but we hope to have the project completed by July 29.

During this time, there will be no parking on the street and all residents will have access to their homes. Hercules Lane will be closed to thru traffic during construction and reopened at the end of each work day. If your driveway happens to be blocked and you need access in or out, you can speak with an on-site crew member directly, or call Utilities Dispatch at (940) 349-7000 (choose option 3) to have someone notify the crews. Detours will be provided when necessary. As part of the project, replacement sod may be placed in your yard and should be watered by the home owner after it is placed. Any issues may be reported within 30 days of the project's completion.

We apologize for any inconvenience, and we hope that you will appreciate the new services when the project is completed. **If you have any questions or would like to discuss the project, please contact Chris Campbell, Water Distribution Field Service Supervisor, at (940) 349-7167, or at Chris.Campbell@cityofdenton.com.**

Visit www.improvingdenton.com for more information about the Hercules Lane project and to stay updated on current and upcoming projects from the City, sign up for email notifications, and view construction maps.



Independence Day Operating Hours and Closings

City Facilities Closed July 4

DENTON, TX, June 28, 2019 – City of Denton facilities will be closed on Thursday, July 4 in observance of the Independence Day holiday and will reopen at 8 a.m. on Friday, July 5. Please note the following with respect to specific City of Denton services and facilities.

Libraries

All libraries will be closed on Thursday, July 4 and will resume regular hours on Tuesday, July 5. Additionally, all libraries will close at 6 p.m. on Wednesday, July 3.

Animal Services and Shelter

Animal Services and the Linda McNatt Animal Care & Adoption Center will be closed on Thursday, July 4 and will resume regular hours on Friday, July 5. To report an animal-related non-emergency, call (940) 349-8181 and select option 8. In case of an emergency, dial 911.

Parks and Recreation

Denia Rec Center, MLK Jr. Rec Center, North Lakes Rec Center, Denton Senior Center, American Legion Hall, North Lakes Driving Range, and Goldfield Tennis Center will be closed on Thursday, July 4.

The Denton Civic Center will be open from 6 a.m. to noon for Independence Day festivities.

The following facilities will be open with regular operating hours on Thursday, July 4: Water Works Park, Civic Center Pool, and the Denton Natatorium.

Public Safety

Public safety personnel will be on duty during the holiday. The Denton Police Department non-emergency number is (940) 349-8181, and in case of an emergency, dial 911.

Utilities

Customer Service will be closed on Thursday, July 4. To report a utility service emergency, call utilities dispatch at (940) 349-7000.

Solid Waste and Recycling

There will be no curbside trash, recycling, home chemical collections, or yard waste collection on Thursday, July 4. The Thursday collection will occur on Friday, July 5.

The City of Denton Landfill will be open 7 a.m. to noon on July 4. Check www.dentonrecycles.com or your Residential Solid Waste & Recycling Service Calendar for current schedule information.

Airport

Airport administrative offices will be closed on Tuesday July 4. The air traffic control tower will be open from 6 a.m. to 10 p.m., and the airfield will remain open 24 hours per day. Flight services will be available from 6 a.m. to 10 p.m. throughout the holiday.

On behalf of the City of Denton, have a safe and happy holiday.

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Visit www.cityofdenton.com for more news and to stay updated.

Firework Safety

Denton Fire Department Reminds Residents Fireworks are Illegal in the City

DENTON, TX, June 28, 2019 – The Denton Fire Department would like to remind residents that it is illegal to use or possess fireworks within the Denton city limits or to use fireworks within 5,000 feet of the city limits. Offenders may be fined up to \$2,000 and fireworks will be confiscated.

If you live where fireworks are permissible, here are some tips to keep you safe when buying, using, or enjoying fireworks:

- Always buy from an established retail outlet;
- Never make your own fireworks, and be on the lookout for anyone experimenting with homemade fireworks;
- Always read and follow the directions on the label;
- Light fireworks away from homes or buildings;
- Keep a bucket of water nearby;
- The person discharging the fireworks should wear eye protection and never have any part of their body over a firework;
- Be sure other people are out of range before lighting fireworks;
- Light only one firework at a time-and never re-light a "dud" firework;
- Never discharge fireworks in metal or glass containers and do not carry them in your pocket;
- Be sure to have a responsible adult in charge; and
- Never allow children to play with fireworks.

For more information on fireworks and fire prevention, visit www.dentonfire.com and click on "Fire Prevention".

Contact: Jason Eddington, (940) 349-8848, Jason.Eddington@cityofdenton.com

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**INFORMAL STAFF
REPORT
TO MAYOR AND CITY COUNCIL**

SUBJECT:

Board of Ethics Letter of Recommended Changes to the Ethics Ordinance

BACKGROUND:

Proposition D was approved in a City of Denton Charter Election on November 7, 2017 providing for the creation of an Ethics Ordinance. The Denton City Council adopted Ethics Ordinance 18-757 on May 1, 2018 in order to increase public confidence and provide a framework to encourage ethical behavior. In July of 2018, the ten members of the Board of Ethics (Board) were appointed and sworn into office. Section 2-277 (i) authorizes the Board of Ethics to recommend amendments to the Ethics Ordinance. In recent meetings on January 16, 2019, February 20, 2019 and June 12, 2019, the Board discussed and believes that several potential amendments merit consideration and further public input.

DISCUSSION:

During the Board of Ethics meeting on June 12, 2019, the Board elected a new Chairperson and readdressed the previous recommendations made by the Board on February 20, 2019 regarding amendments to the Ethics Ordinance (Ordinance). The Board deleted one of the recommendations and added three more to the previous list of recommendations. The Board requests that Council review these recommendations and give the Board guidance as to which recommendations the City Council gives priority.

CONCLUSION:

The Board of Ethics has identified seven recommendations that they believe need to be amended or provide further clarification in order to ensure that the Ordinance functions as the City Council and citizens of Denton intended. The Board is requesting guidance from City Council on these seven recommendations. A work session presentation to further discuss the Board of Ethics' recommendations is currently scheduled for July 16.

ATTACHMENT(S):

Attachment 1 – Informal Staff Report

Attachment 2 – Letter of Recommendations

STAFF CONTACT:

Umesh Dalal

City Auditor

umesh.dalal@cityofdenton.com

REQUESTOR: Board of Ethics

PARTICIPATING DEPARTMENT: Internal Audit

STAFF TIME TO COMPLETE REPORT: 2.5 Hours



June 13, 2019

City Council Members
215 E. McKinney Street
Denton, Texas 76201
Honorable Members of the City Council,

The City of Denton Board of Ethics is charged to recommend amendments to the Ethics Ordinance to the City Council for consideration.¹ As the first anniversary of the Ordinance's enactment approaches, the Board believes that several potential amendments merit consideration and further public input. We therefore make the following general recommendations.

We ask that Council review these recommendations and give the Board guidance as to which the Council gives priority. This may include some, none, or all of our recommendations. With this guidance, the Board will draft more specific amendments for Council consideration. If the Council chooses to draft specific amendments itself, or delegates the task to the City Attorney, we strongly recommend that the Council consider provisions of the Model Ethics Code.²

Recommended Ethics Code Amendments

1. **Conflicts of Interest.** The Board recommends amendment of the conflicts of interest provisions to fall more in line with State law, and more in keeping with the general public's understanding of conflicts of interest.
2. **Respondent.** The Board recommends replacement of the term "Accused" with "Respondent" throughout the Ordinance.

¹ City of Denton Code of Ordinances, Chapter 2, Article XI, Sec. 2-277(i).

² Published by City Ethics, Inc., <https://www.cityethics.org/content/model-code-introduction>

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3. **Complaint Service.** The Board recommends the addition of the Accused to the list of those who receive a copy of an Ethics Complaint when is it deemed administratively complete.
4. **Whistleblower Protection.** The Board recommends the addition of protections for city officials or employees who report ethics violations.
5. **Candidate for City Office.** The board recommends the ordinance be amended to disallow candidates for elected City offices from serving on the board.
6. **Advisory Opinion Reconsideration.** The board recommends amending section 2-283 of the Ethics Code to include a provision to allow for reconsideration of an advisory opinion by the Board.
7. **Vacancies.** Because of the uniqueness of the timeframe in which the Board is required to operate, it is recommended that vacancies occurring on the Board be filled within 30 days.

Respectfully submitted,



Lara Tomlin
Chair, Board of Ethics

CC:

Aaron Leal, City Attorney

Todd Hileman, City Manager

**INFORMAL STAFF REPORT
TO MAYOR AND CITY COUNCIL**

SUBJECT:

Update on staff recommendations regarding next steps for the City Hall West renovation project.

BACKGROUND:

In July 2017, the City engaged the historical architectural firm, Architexas to assist with the proposed renovation of the 1927 City Hall known as City Hall West. The firm was charged with completing an assessment of the facility and to develop three preliminary conceptual designs with a cost analysis of each concept. The report produced detailed the building's current condition and originally presented these options for the scope of work.

- **Option 1:** Complete restoration of the exterior and interior to the original design as close as possible that will meet all local building codes and accessibility requirements.
 - Projected Budget: \$5,352,430
- **Option 2:** Rehabilitation of the building with the restoration of the exterior and an adaptive use strategy for the interior to accommodate complimentary new use.
 - Projected Budget: \$5,698,956
- **Option 3:** Restoration of the exterior and renovation of the interior to meet the minimum requirements of life safety and accessibility.
 - Projected Budget: \$3,775,176

During the presentation in August 2017, City Council directed staff to establish a City Hall West Steering Committee to discuss options for renovation to the building and, to present the Council with recommendations. A 24-member Committee was established in November 2017 with a charge to consider and advise City Council regarding the extent the building should be renovated, financial options, leasing options, acceptable uses, and whether to seek or apply for grant funding.

The estimated total cost of the committee's recommended renovation was \$6,630,000 and included a six-to nine-month design timeline and 15 to 18 months for construction. Major phases of the renovation include window replacement and exterior masonry veneer cleaning, auditorium restoration, creation of multipurpose room, and mechanical component upgrade or replacement. A work session was held on November 13 where City Council provided feedback on potential design aspects. Ultimately, staff direction was given to move forward with window replacement for \$320,000.

Design documents have been submitted to and reviewed by the Texas Historical Commission (THC). The THC approved the project in May 2019. Staff can begin the bid process for the window replacement by late June/early July 2019.

Overview of State Historic Preservation Incentive

In January of 2015, the State of Texas began accepting applications for its tax credit program. Utilizing the Texas Historic Preservation Tax Credit Program would require some form of agreement with a non-profit entity. The following is from the THC website:

The definition for eligible costs and expenses in IRS Section 42(c)(2) includes depreciation and tax-exempt use provisions which must be met and generally appear to preclude use of the credit by governmental bodies. Buildings owned by governmental entities may be eligible for the state and federal tax credit programs, if the building is operated by a long-term lessee (requiring a 39+ year lease), then that lessee is considered to have an ownership interest. If that lessee uses the building for an eligible business or non-profit use and incurs all project costs, then that lessee would be able to participate in the tax credit program(s) as if they were the owner of the building.

The program provides a 25% tax incentive for qualified projects and the associated work. A successful example of a preservation project completed by a non-profit is the First National Bank building in Port Arthur, Texas. The Port Arthur Economic Development Corporation bought the building from a private owner. Architexas discussed this information in their presentations. The involvement of a tax credit specialist would be essential.

DISCUSSION:

A reevaluation of the previous recommendation lead staff to reconsider commencing with the interior demolition first rather than accept it as part of the overall recommendations. The goal is to expose the original grand interior space to obtain a better visualization and understanding of potential uses. Upfront interior work should result in project savings in general conditions and contractor overhead by performing the demolition scope along with the windows scope. This should make the window construction in the auditorium area much easier and reduce the likelihood of damage to the new window units. Following demolition work, the interior will be in rough condition with exposed plaster and/or terracotta tile wall surfaces.

Next steps for the City Hall West renovation project include:

1. Complete window replacement documentation and Texas Historical Commission approvals
2. Recommended Option: Develop interior demolition documents limited only to the interior, including the removal of the intermediate floor inserted in the auditorium
3. Advance to bid stage – group as one package, demolition and window replacement phase
4. Approve cost of work to begin work

5. Window replacement to follow completion of demolition work

CONCLUSION:

The committee recommendation included a non-structural interior demolition to remove non-original interior elements and examine millwork and finishes from the facility. Staff recommends having the interior demolition phase be completed before the window replacement portion of work. The estimated demolition from the master plan was \$242,000 as a part of the original larger project. The cost breakdown is as follows:

Removal of Non-Historical Interior	\$242,000
General Contractor General Conditions, contingency, overhead / profit, bond, and liability	\$136,730
Design & Permitting Estimate (15%)	\$56,810
Total Estimated Cost	\$435,540

It should be noted that the building will not be usable as a work space or community gathering space once the interior work and window installation is complete. The recommended interior work will allow for the examination of other existing conditions.

A work session to further discuss staff recommendations and future plans for the City Hall West renovation project is currently scheduled for September 10, 2019.

STAFF CONTACT:

Sara Hensley, Assistant City Manager
Sara.Hensley@cityofdenton.com

REQUESTOR: Staff Initiated

PARTICIPATING DEPARTMENTS: Facilities Management, Development Services, Procurement & Compliance, and City Manager's Office

STAFF TIME TO COMPLETE REPORT: 10 Hours

INFORMAL STAFF REPORT TO MAYOR AND CITY COUNCIL

SUBJECT:

Provide information about the proposed Park 7 development and concerns raised by residents and neighbors.

EXECUTIVE SUMMARY:

Staff have researched the concerns raised by residents in the Scripture and Normal Street area about the Park 7 development. Council Member Armintor also expressed concerns and requested an update on the environmental and engineering aspects of the project, including an evaluation of the risks of building in an area with groundwater. Site development has commenced with an anticipated completion within the next eighteen to twenty-four months.

The concerns are related to the construction of an apartment complex and the presumed impacts from this construction. Concerns shared with staff include the construction of a multi-story below-grade parking garage; confirmation of the existence of aquifers in the area; impacts to the aquifers and existing water wells located near the construction site; potential contamination of groundwater with asbestos; and impacts to old gas lines during the construction of the below-grade parking garage.

Staff found that these concerns can be addressed by providing information about the layout and design of the parking garage, the geological characteristics of the aquifers in Denton, the findings of the project's geotechnical report and measures taken during the removal of building material containing asbestos. The Texas Water Development Board (TWDB), the North Texas Groundwater Conservation District, and a hydrogeologist were consulted in the preparation of this report.

BACKGROUND:

Aquifers and water wells in Denton

In general, an aquifer is a rock layer that contains water and releases it in appreciable amounts. The rock contains water-filled pore spaces, and when the spaces are connected, the water is able to flow through the matrix of the rock. An aquifer may also be called a water-bearing stratum, lens, or zone. Aquifers are further classified as confined or unconfined aquifers. The Trinity Aquifer, a major aquifer, extends across much of central and northeastern parts of Texas. It is composed of several smaller (minor) aquifers contained within the Trinity Group. Although referred to differently across the state, they include the Antlers, Glen Rose, Paluxy, Twin Mountains, Travis Peak, Hensell, and Hosston aquifers. These aquifers consist of limestones, sands, clays, gravels, and conglomerates. Their combined freshwater saturated thickness averages about 600 feet in North Texas and about 1,900 feet in Central Texas (US Geological Survey).

The Paluxy, Antlers, Twin Mountains, and Woodbine aquifers run through Denton County at different elevations (Attachment 1). The Washita Group formation lays on top of the Paluxy aquifer, serving as a cap or barrier along the top of the aquifer, making the two formations hydrologically disconnected from each other (Attachment 2). In other words, any water percolating through the Washita Group formation would not enter into the Paluxy aquifer. Water enters an aquifer in an area known as the recharge zone. The recharge zones for the Antler, Paluxy, and the Twin Mountain aquifers are located in Wise County (Bridgeport –Decatur area) (Attachment 3). Many of the water wells drilled in Denton tap into the Paluxy aquifer.

In contrast with surface water, landowners own the groundwater beneath the land, pursuant to Tex. Water Code §36.002(a). The Texas Water Development Board and regional groundwater conservation districts (GCDs) oversee the use and management of groundwater in the state. Denton is part of the North Texas GCD.

Parking garage layout and design

As proposed, the Park 7 site will be developed with a multi-story structure and parking garage with two levels of subsurface parking in accordance with the Denton Development Code. According to the September 14, 2018 Geotechnical Report (Attachment 4), construction requires excavating from two to 24 feet across the footprint of the main building pad and the parking garage. The site is currently at an elevation of 706 feet above sea level and the lowest point of the excavation would reach approximately elevation 672 feet. The Paluxy Aquifer upper boundary is located at an elevation of 500 feet. Therefore, there is an approximately 172 foot separation between the lowest excavation point and the upper boundary of the Paluxy Aquifer. It is also important to note that the excavation will take place in the Washita Group, a geological formation located above the Paluxy Aquifer that is hydrologically disconnected from the aquifer underneath. Any water percolating through the ground at the site would not enter into the Paluxy Aquifer, nor would the excavation change the flow patterns within the Paluxy Aquifer formation or affect any existing water wells.

Groundwater contamination by asbestos

Even though the human digestive system can be exposed to asbestos fibers from drinking water and mucous cleared from the lungs, breathing asbestos-containing air into the lungs is the most concerning type of asbestos exposure. In Texas, the Department of State Health Services requires performing a survey to determine the presence of asbestos before conducting a building renovation or demolition. If confirmed, abatement of asbestos must be conducted by a licensed asbestos contractor. As a part of the City building permit process, the City requires certification that these procedures have been followed. Demolition permits for 1401 and 1519 Scripture indicated that asbestos was found in the adhesive of floor tiles and joint compound used on dry walls. The applicant provided a copy of the asbestos abatement report from a licensed asbestos contractor. The report documented the process of removing the construction materials containing asbestos and

adherence to the proper protocol. Based on this information, there is no evidence of potential groundwater contamination with asbestos associated with demolition work and subsequent construction of the Park 7 apartments.

Impacts to gas lines

The replat for the Park 7 apartments was approved in August 2017. The plat shows no existing gas easements on the property (Attachment 5). Staff has notified Atmos about the proposed development and have requested information concerning any gas lines on the site. Atmos has also stated that they will examine their infrastructure in the area.

CONCLUSION:

Staff finds no evidence that the excavation for the below-grade parking garage would negatively impact the Paluxy Aquifer. The depth information provided in the Geotechnical Report combined with the isolation provided by the Washita Group indicates that the proposed activity does not pose a risk to the underlying aquifer. Denton staff discussed the issue with staff at the North Texas Groundwater Conservation District, which is the regulatory entity for groundwater protection in this area, and staff at the District agreed with this finding. Proper procedures were followed during the abatement of asbestos prior to building demolition on the site. Site information did not indicate any gas line easements on the property, and Atmos staff has been informed of the development and will assess infrastructure in the area.

ATTACHMENT(S):

1. Geologic Cross Section of the Trinity Aquifer for Wise, Denton, and Collin Counties
2. Geologic Cross Section of the Paluxy Aquifer for Decatur – Denton Corridor
3. Paluxy Recharge and Aquifer Zones Map
4. September 14, 2018 Geotechnical Report
5. Park 7 Final Replat

STAFF CONTACT:

Deborah Viera
Assistant Director of Environmental Services
940.349.7162
Deborah.Viera@cityofdenton.com

REQUESTOR: Council Member Armintor

PARTICIPATING DEPARTMENTS: Environmental Services, Utilities Administration, Development Service, City Attorney's Office, and City Manager's Office

STAFF TIME TO COMPLETE REPORT: 40 Hours

ATTACHMENT 1 Geologic Cross Section of the Trinity Aquifer for Wise, Denton, and Collin Counties

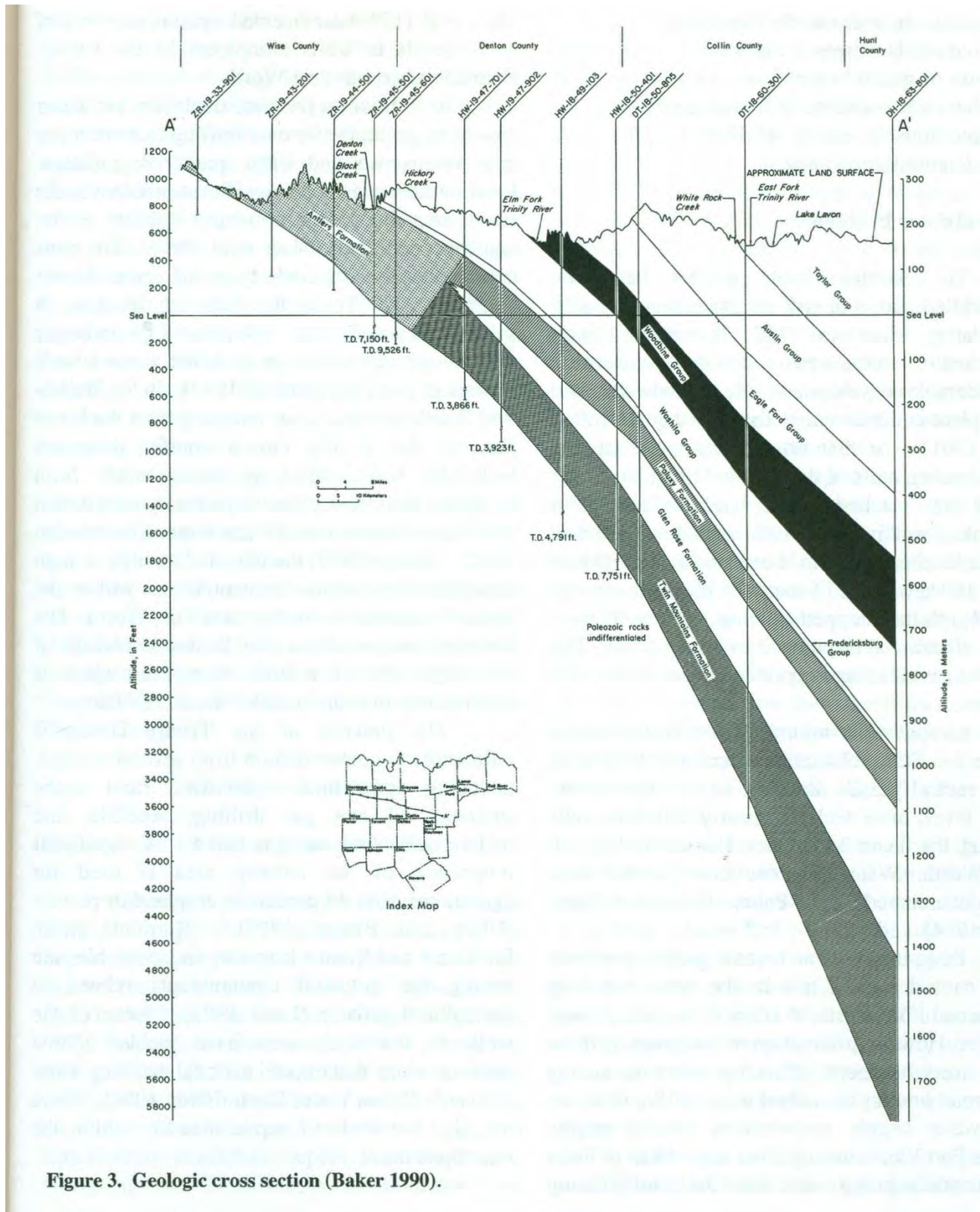
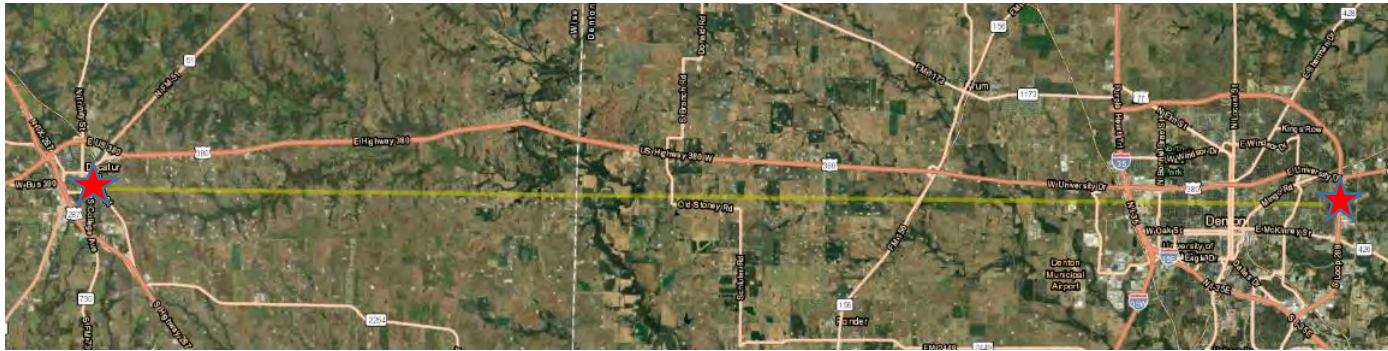


Figure 3. Geologic cross section (Baker 1990).

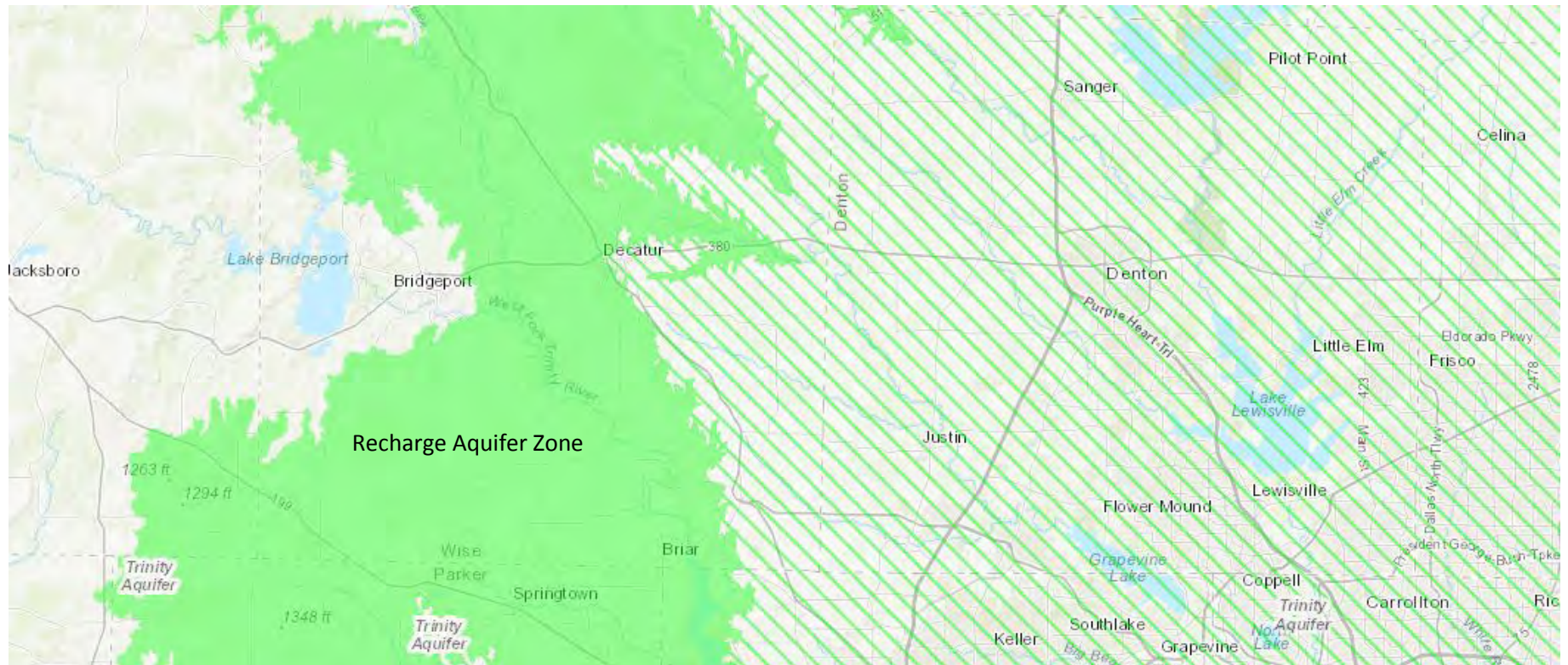
ATTACHMENT 2

Geologic Cross Section of the Paluxy Aquifer for Decatur – Denton Corridor



ATTACHMENT 3

Paluxy Aquifer



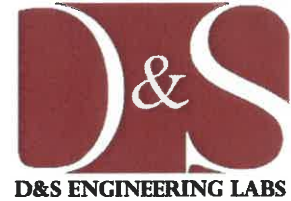
Geotechnical Engineering Report

Park Place Denton, Texas

September 14, 2018



September 14, 2018



Michael Stimpson
Construction Manager
Park7 Group
461 Park Ave S, Floor 4
New York, New York 10016

**GEOTECHNICAL INVESTIGATION
D&S ENGINEERING #G18-2196
PARK PLACE DENTON
SCRIPTURE STREET
DENTON, TEXAS**

Mr. Stimpson,

As requested, D&S Engineering Labs, LLC has completed the Geotechnical Investigation for the above-referenced project. This investigation was conducted in accordance with Proposal No. GP18-2196 dated July 30, 2018. Authorization to proceed was received on August 2, 2018.

We appreciate the opportunity to provide professional geotechnical engineering services to you. We are available to discuss any questions which may arise regarding this report. Please do not hesitate to call when we can provide any additional services.

Sincerely,

D&S Engineering Labs, LLC

A handwritten signature in blue ink, appearing to read 'J. Shields', written over a circular blue ink stamp.

Jennifer Shields, P.G.
Senior Engineering Geologist

A circular blue ink stamp for the State of Texas, containing a star and the text 'STATE OF TEXAS', 'MARK G. THOMAS', '103791', and 'PROFESSIONAL ENGINEER'. A handwritten signature in blue ink, 'Mark G. Thomas', is written across the stamp.

Mark G. Thomas, P.E., P.G.
Principal Geotechnical Engineer

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APPENDIX A – BORING LOGS AND SUPPORTING DATA
APPENDIX B – GENERAL DESCRIPTION OF PROCEDURES

GEOTECHNICAL INVESTIGATION PARK PLACE DENTON DENTON, TEXAS

1.0 PROJECT DESCRIPTION

This report presents the results of the geotechnical investigation for the proposed Park Place Denton, a student housing facility. The new facility will be located on the southeast corner of the intersection of Scripture Street and Normal Street in Denton, Texas. The new development will be a podium style structure with the residential units partially wrapping around a new parking garage. The north portion of the site will be developed with one below grade parking garage level, and 5 stories of apartments above it. A courtyard will be constructed on the ground floor level above the parking garage with the residential units wrapping around it. The south portion of the site will be developed with a six-story parking garage, including two below-grade levels, an outdoor pool area on the upper level, and four stories of apartments on the west side of the parking garage. The overall development will have a footprint of about 77,000 square feet.

The site is currently developed with several commercial and residential structures and associated pavements. The structures were not razed prior to the geotechnical investigation. Based on the NCTCOG dfwmaps.com and available structural site and layout plan, Park7 Group, dated March 9, 2018, the overall site slopes from the northeast corner down to the southwest corner, with an overall topographic relief on the order of 10 feet. The overall site requires cuts on the order of 2 to 24 feet to accommodate below grade stories, and fills on the order of 2 to 6 feet to reach final finished floor elevations at other portions of the site. Photographs showing the recent site condition are presented below.





2.0 PURPOSE AND SCOPE

The purpose of this investigation was to:

- Identify the subsurface stratigraphy present at the site.
- Evaluate the physical and engineering properties of the subsurface soil and bedrock strata for use in the geotechnical analyses.
- Provide geotechnical recommendations for use in the design of foundations, pavements and below grade walls for the new facility.

The scope of this investigation consisted of:

- Drilling and sampling a total of nine (9) borings, advanced within the building footprint to depths of 50 to 70 feet.
- Laboratory testing of selected soil and bedrock samples obtained during the field investigation.
- Preparation of a Geotechnical Report that includes the following:
 - o Evaluation of Potential Vertical Movement (PVM)
 - o Recommendations for the design of foundations
 - o Recommendations for earthwork
 - o Recommendations for pavement design
 - o Recommendations for below grade walls

3.0 FIELD AND LABORATORY INVESTIGATION

3.1 General

The borings were advanced utilizing a truck-mounted drilling equipment outfitted with hollow stem flight augers. Undisturbed samples of cohesive soils and weathered bedrock strata were obtained using 3-inch diameter tube samplers, which were advanced into the soils in 1-foot increments by the continuous thrust of a hydraulic ram located on the drilling equipment. After sample extrusion, a hand penetrometer measurement was performed on each cohesive soil sample to provide an estimate of soil stiffness.

Soil and bedrock materials were also intermittently tested in-situ using cone penetration tests in order to determine their resistance to penetration. For this test, a 3-inch diameter steel cone is driven by the energy equivalent of a 170-pound hammer falling freely from a height of 24 inches and striking an anvil located at the top of the drill string. Depending on the resistance of the soil and bedrock materials, either the number of blows of the hammer required to provide 12 inches of penetration is recorded (as two increments of 6 inches each), or the inches of penetration of the cone resulting from 100 blows of the hammer are recorded (as two increments of 50 blows each).

Soils and bedrock materials were sampled in general accordance with the Standard Penetration Test (ASTM D1586). During this test, a disturbed sample of subsurface material is recovered using a nominal 2-inch O.D. split-barrel sampler. The sampler is driven into the soil strata utilizing the energy equivalent of a 140-pound hammer falling freely from a height of 30 inches and striking an anvil located at the top of the drill string. The number of blows required to advance the sampler in three consecutive 6-inch increments is recorded, and the number of blows required for the final 12 inches is noted as the "N"-value. The test is terminated at the first occurrence of either of the following: 1) when sampler has advanced a total of 18 inches; 2) When the sampler has advanced less than one complete 6-inch increment after 50 blows of the hammer; 3) when the total number of blows reaches 100; or 4) if there is no advancement of the sampler in any 10-blow interval.

Bedrock strata in four of the structure borings were near-continuously cored using a double-tube core barrel fitted with a tungsten-carbide, saw-tooth bit. The length of core recovered (REC), expressed as a percentage of the coring interval, along with the Rock Quality Designation (RQD), is tabulated at the appropriate depths on the Log of Boring illustrations. The RQD is the sum of all core pieces longer than four inches divided by the total length of the cored interval. Core pieces shorter than four inches which were determined to be broken by drilling or by handling were fitted together and considered as one piece.

All samples obtained were extruded in the field, placed in plastic bags to minimize changes in the natural moisture condition, labeled according to the appropriate boring

number and depth, and placed in protective cardboard boxes for transportation to the laboratory. The approximate locations of the borings performed at the site are shown on the boring location map that is included in Appendix A. Existing ground elevation of boreholes are included in the boring logs using available topographic maps in dfwmaps.com. The specific depths, thicknesses and descriptions of the strata encountered are presented on the individual Boring Log illustrations, which are also included in Appendix A. Strata boundaries shown on the boring logs are approximate.

3.2 Laboratory Testing

Laboratory tests were performed to identify the relevant engineering characteristics of the subsurface materials encountered and to provide data for developing engineering design parameters. The subsurface materials recovered during the field exploration were initially logged by the drill crew and were later described by a Geotechnical Engineer in the laboratory. These descriptions were later refined by a Geotechnical Engineer based on results of the laboratory tests performed. All recovered soil samples were classified and described in part using the Unified Soil Classification System (USCS) and other accepted procedures. Bedrock strata were described using standard geologic nomenclature.

In order to determine soil characteristics and to aid in classifying the soils, index property and classification testing were performed on selected soil samples as requested by the Geotechnical Engineer. These index property and classification tests were performed in general accordance with the following ASTM testing standards:

- Moisture Content ASTM D2216
- Atterberg Limits ASTM D4318
- Percentage of Particles Finer than No. 200 Sieve ASTM D1140

Additional tests were performed to aid in evaluating strength and volume change which consisted of the following:

- Unconfined Compressive Strength of Soil ASTM D2166
- Unconfined Compressive Strength of Rock Cores ASTM D7012
- Direct Shear ASTM D3080
- Overburden Swell Testing

The results of index property, strength, and swell tests are presented at the corresponding sample depths on the appropriate Boring Log illustrations. The index property and classification testing procedures are described in more detail in Appendix B.

3.2.1 Unconfined Compression Tests

Unconfined compressive strength testing was performed on selected soil samples and sections of intact bedrock cores. These tests were performed in general accordance with ASTM D2166 Method for soil samples and ASTM D7012 Method C for selected bedrock core samples. During each test, a cylindrical specimen is subjected to an axial load that is applied at a constant rate of strain until either failure or a large strain (i.e., greater than 15 percent) occurs. Once the test is completed, the unit weight of the sample is determined based on the moisture content.

3.2.2 Overburden Swell Tests

Selected samples of the near-surface soil were subjected to overburden swell testing. For this test, a sample is placed in a consolidometer and subjected to the estimated overburden pressure. The sample is then inundated with water and is allowed to swell. The moisture content of the sample is determined both before and after completion of the test. Test results are recorded, including the percent swell and the initial and final moisture contents.

3.2.3 Direct Shear

Direct shear tests were performed on selected soil samples. Those tests were performed in general accordance with ASTM D3080. The test consists of placing a sample of relatively undisturbed soil and subjecting it to full saturation and consolidation. A shear force is then applied on the sample at a rate appropriate to maintain drained soil conditions. Test results are recorded and plotted in a shear stress vs. horizontal deformation graph, from where peak stress is calculated. A graph of shear stress vs. normal stress allows computation of cohesion and friction angle values.

4.0 SITE CONDITIONS

4.1 Stratigraphy

Based upon a review of the recovered samples, as well as the Geologic Atlas of Texas, Sherman Sheet, this site is characterized by soil and bedrock strata associated with both the Woodbine Formation, and the undivided Grayson Marl and Main Street Limestone Formation.

At the surface within Borings B1 through B5 and B9, 4 to 8 inches thick asphalt pavements sections were observed.

Beneath the asphalt layer within Borings B3 and B5 and at the ground surface within Borings B6 and B7, clay fill soils are present. The fill soils are stiff to very stiff in

consistency, are various shades of brown and gray in color, and contain variable amounts of aggregate fragments and sand.

Below the fill soils within Borings B3, B5, B6, and B7, beneath the asphalt sections within Borings B1, B2, and B4, and at the ground surface within Borings B8 and B9, clay, sand and silt soils mixed at variable composition were encountered. The cohesive clay and silt soils are stiff to very stiff in consistency, are various shades of brown and gray, and red in color, and contain variable amounts of calcareous nodules, iron oxide stains, and iron oxide nodules. The granular (sand) soils are medium dense to very dense in condition, are various shades of brown and gray in color and contain variable amounts of iron oxide stains. The overburden soils extend to depths of about 13 to 20 feet.

Below the overburden soils within Borings B1 through B5, sandstone bedrock strata are present, which extend to depths of about 20 to 34 feet. The sandstone bedrock strata are very weakly cemented, are very soft to soft in rock hardness, are various shades of brown and gray in color and contain variable amounts of very thin shale seams.

The overburden soils within Borings B6 through B9, and the sandstone bedrock strata within Borings B3 through B5, are underlain by weathered shale bedrock strata. The weathered shale are very soft to medium hard in rock hardness, are various shades of brown and gray in color and possess fissile structure. The weathered shale strata extend to depths of about 23 to 36 feet.

Below the sandstone strata within Borings B1 and B2, and beneath the weathered shale strata within Borings B3 through B9, fresh shale bedrock strata are present. The fresh shale are soft to medium hard in rock hardness, are gray and dark gray in color, contain variable amounts of very thin limestone seams and possess fissile structure. The fresh shale extends to depths of about 40 to 60 feet within Borings B2, B3, and B5 through B8 and to the maximum depth explored of about 50 to 60 feet within Borings B1, B4 and B9.

The fresh shale strata are underlain by fresh limestone bedrock strata within Borings B2, B3, and B5 through B8 and extend to the maximum depths explored of about 60 to 70 feet. The limestone bedrock strata are moderately hard to hard in rock hardness, are gray and dark gray in color and contain variable amounts of very thin to thin shale seams.

Subsurface stratigraphy of the borings is provided in Table 1. Table 2 lists the approximate boring elevations for existing and final grades with estimated cut depths near the adjacent boreholes for below grade stories by borehole location.

Table 1. Subsurface Stratigraphy (Building Borings B1 through B9)

Boring No.	Approximate Top of Sandstone Elevations (MSL)	Approximate Top of Fresh Gray Shale Elevations (MSL)	Approximate Top of Fresh Gray Limestone Elevations (MSL)	Depth of Boring (ft.)
B1	EL 691	EL 672	NE	50
B2	EL 689	EL 679	EL 659	60
B3	EL 687	EL 679	EL 642	70
B4	EL 688	EL 678	EL 669	60
B5	EL 687	EL 679	EL 657	70
B6	NE	EL 670	EL 661	60
B7	NE	EL 664	EL 645	60
B8	NE	EL 661	EL 651	70
B9	NE	EL 669	NE	60

* NE = Not Encountered

Table 2. Estimated Existing and Final Grade

Boring ID	Estimated Existing Grade Elevation (MSL)	Estimated Final Grade Elevation (MSL)	Approx. Cut Depth (ft.)
B1	706	704	2
B2	702	690	12
B3	702	690	12
B4	702	690	12
B5	702	690	12
B6	701	690	11
B7	700	690	10
B8	696	672	24
B9	698	675	21

4.2 Groundwater

Groundwater seepage was observed during drilling operations within Borings B1, B2, B4, B5, B8 and B9 at depths of about 14 to 26 feet. Upon completion of drilling operations, groundwater was observed within Boring B9 at a depth of about 14 feet. Borings B3 and B6 was observed to be dry prior to the introduction of drilling fluids at 20 feet. However, groundwater is often contained within the joints, fractures and other rock mass defects present in bedrock strata. When intercepted, these defects can produce appreciable amounts of water for a period of time, especially if those defects are extensive and well inter-connected.

5.0 ENGINEERING ANALYSIS

5.1 Estimated Potential Vertical Movement (PVM)

Potential Vertical Movement (PVM) was evaluated utilizing different methods for predicting movement, as described in Appendix B, and based on our experience and professional opinion.

At the time of our field investigation, the overburden soils were generally found to be dry in moisture condition. Based upon the results of our analysis, the surficial soils of the site to depths of about 13 to 20 feet are estimated to possess a PVM on the order of 1-inch at the soil moisture conditions existing at the time of the field investigation. However, where cuts extend to or encroach on weathered shale materials, PVM values can approach 2 inches at the soil moisture conditions existing at the time of the field investigation. Dry, average and wet are relative terms based on moisture content and plasticity.

In the areas of anticipated fill, PVM will be limited to 1-inch or less when the earthwork recommendations presented herein are adhered to.

Settlements for structural elements supported on subgrade soils prepared as outlined in this report should be less than ½-inch.

6.0 FOUNDATION RECOMMENDATIONS

The near-surface soils present at the site have a low potential for post-construction vertical movement with changes in soil moisture content. Considering the extent of cuts and fills across the site, the types of structures, estimated loading intensities, and the anticipated subsurface soil conditions, we recommend that the building be supported on a drilled shaft foundation system using a soil supported floor slab system. If potential movements noted herein cannot be tolerated, consideration should be given to a structurally supported floor slab.

Please note that due to the proximity of bedrock after proposed site grading, portions of certain structural elements will require some measure of rock excavation to install those elements.

6.1 Straight-sided Drilled Shafts

We recommend that structural loads for the new building and other movement-sensitive structures be supported on auger-excavated, straight-sided, reinforced concrete drilled shafts. Depending on loading requirements, these shafts should be founded in bedrock strata suitable to the required loading. We recommend that straight-sided drilled piers for structural loads be a minimum of 18 inches in diameter and should be proportioned as outlined in Table 3.

Straight-sided drilled shafts may be designed to transfer imposed loads into the bearing stratum using a combination of end-bearing and skin friction. Drilled shafts should be designed for an allowable end bearing and side friction as outlined in Table 3 below for the new facility. Due to strain incompatibility, for shafts penetrating sandstone materials and terminating into shale strata, the lower skin friction value for shale should be used for both the sandstone and shale. Also due to strain incompatibility, where shafts penetrate and terminate into limestone strata, the allowable skin friction in any overlying sandstone or shale strata should be reduced to 1,500 psf for design purposes.

The allowable side frictions noted in Table 3 may be taken from the top of the bedrock or from the bottom of any temporary casing used, whichever is deeper, to resist both axial loading and uplift.

Table 3. Drilled Shaft Allowable Bearing Parameters

Bearing Material	Approx. Elevation Range	Allowable Skin Friction (psf)	Allowable End Bearing (psf)
Sandstone	687 to 691	4,500	40,000
Fresh Shale	661 to 679	3,000	25,000
Fresh Limestone	642 to 661	6,500	60,000

The shafts should be provided with sufficient steel reinforcement throughout their length to resist potential uplift pressures that will be exerted. For the near-surface soils at their current moisture condition, these pressures are estimated to be approximately 750 psf over an average depth of 10 feet where fills are less than 3 feet. Where fills exceed 3 feet and are placed in accordance with the recommendations contained herein, these pressures reduce to 500 psf for the fill. In areas of deep cuts, these pressures reduce to 100 psf when cuts extend to within 2-feet of or into bedrock strata. Typically, one-half ($\frac{1}{2}$) of a percent of steel by cross-sectional area is sufficient for this purpose (ACI 318). However, the final amount of reinforcement required should be determined based on the information provided herein and should be the greater of that determination, or ACI 318. Uplift forces acting on individual shafts will be resisted by the dead weight of the structure, plus the bearing stratum-to-concrete adhesion acting on that portion of the shaft that is in contact with the limestone strata.

There is no reduction in allowable capacities for shafts in proximity to each other. However, for a two-shaft system, there is an 18 percent reduction in the available perimeter area for side friction capacity for shafts in contact (tangent). The area reduction can be extrapolated linearly to zero at one shaft diameter clear spacing. Please contact this office if other close proximity geometries need to be considered.

We anticipate that a straight-sided drilled pier foundation system designed and constructed in accordance with the information provided in this report will have a factor of safety in excess of 2.5 against shear failure and may experience settlements of small fractions of an inch.

6.1.1 Lateral Load Parameters

The subsurface stratigraphy across the site is variable. Because of this topographic variation and the resultant cuts and fills, a single “representative stratigraphy” is not provided. Instead of a range strata thicknesses based on anticipated top of shaft elevations are provided in the tables below, together with appropriate LPILE™ material parameters for each type of material. These parameters were selected to conservatively approximate the subsurface conditions across the site.

Table 4. Subsurface Material – LPILE™ Designations

Stratum	Thickness (ft)	Software Material Designation	Unit Weight (pcf)
CLAY, various shades of brown (native and grade-raise fill)	4 - 20	Stiff Clay w/o Free Water	115
SAND, various shades of brown	3.5 - 15	Sand	110
SANDSTONE, very weakly cemented, gray	20 - 34	Weak Rock	125
SHALE, weathered, various shades of brown and gray	3 – 22	Weak Rock	120
SHALE, fresh, gray, dark gray	9 – 40+	Weak Rock	125
LIMESTONE, fresh, gray	10 – 25+	Strong Rock	135

Table 5. Recommended Geotechnical Lateral Load Parameters

Depth Range (ft.)	Software Material Designation	Friction Angle (degrees)	Soil Modulus (pci)
2 - 5	Sand	27	120
5 – 10+	Sand	33	110

Table 6. Recommended Geotechnical Lateral Load Parameters

Software Material Designation	Undrained Cohesion (psf)	Unconfined Compressive Strength – Rock (psi)	Modulus (psi)	RQD	Strain Factor ϵ_{50}
Stiff Clay w/o Free Water	1,000	NA	NA	NA	0.015
Weak Rock	NA	150	10,000	90	0.003
Strong Rock	NA	750	NA	NA	NA

6.1.2 Drilled Shaft Construction Considerations

Groundwater seepage was encountered within Borings B1, B2, B4, B5, B8 and B9 during drilling operations or at the completion of drilling. However, groundwater may be encountered when rock mass defects are intercepted during excavations. The amount of water present in rock mass defects may fluctuate over time. Temporary casing will likely be necessary at many shaft locations, and should be locally available on site in the event that excessive groundwater seepage is encountered that cannot be controlled with conventional pumps, sumps, or other means, or in the event that excessive sidewall sloughing occurs.

A licensed Engineer should be present on the first day of drilled shaft installations to verify compliance with design assumptions including 1) verticality of the shaft excavation, 2) identification of the bearing stratum, 3) minimum pier diameter and depth, 4) correct amount of reinforcement, 5) proper removal of loose material, and 6) that groundwater seepage, if present, is properly controlled. Subsequent installations of all other drilled shafts should be observed by experienced technical personnel under the direction of a licensed geotechnical engineer to verify compliance of the same. D&S would be pleased to provide these services.

During construction of the drilled shafts, care should be taken to avoid creating an oversized cap ("mushroom") near the ground surface that is larger than the shaft diameter. These "mushrooms" provide a resistance surface that near-surface soils can heave against. If near-surface soils are prone to sloughing, (a condition which can result in "mushrooming"), the tops of the shafts should be formed in the sloughing soils using cardboard or other circular forms equal to the diameter of the shaft.

Concrete used for the shafts should have a slump of 8 inches $\pm$ 1 inch. Individual shafts should be excavated in a continuous operation and concrete should be placed as soon after completion of the drilling as is practical. All pier holes should be filled with concrete within 8 hours after completion of drilling.

In the event of equipment breakdown, any uncompleted open shaft should be backfilled with soil to be redrilled at a later date. This office should be contacted when shafts have reached the target depth but cannot be completed.

6.1.3 Pier-Supported Grade Beams

In fill areas, or areas constructed near existing grades, structural cardboard carton forms (void boxes) should be used to provide a minimum 4-inch void beneath the grade beams; however, trapezoidal void boxes should not be used. Where grade beams extend into bedrock, void boxes and side retainers should not be required. Care should be taken to assure that the void boxes are not allowed to become wet or crushed prior to or during concrete placement and finishing operations. We recommend that masonite or other protective material be placed on top of the carton forms per carton form manufacturer recommendations to reduce the risk of crushing the cardboard forms during concrete placement and finishing operations. We recommend using side retainers along grade beams constructed in clay materials to prevent soil from infiltrating the void space after the carton forms deteriorate. The bottoms of all grade beam excavations should be essentially free of any loose or soft material prior to the placement of concrete.

Due to the depth of bedrock, the proposed Finished Floor Elevations and site grading planned at the new facility, large segments of grade beams for that structure are likely to require some depth of shale or sandstone bedrock excavation to achieve design grades. Grade beams in these areas, if utilized, may bear directly on the bedrock or on a thin (less than 3-inch thick) bed of leveling material. In either case a bond breaker such as poly sheeting or other suitable material should be placed between the bearing surface and the grade beam.

Grade beams in soil materials should be formed. Grade beams in the bedrock may be neat cut and placed without forming. The exterior side of the grade beams around the structure should be carefully backfilled with on-site clayey soils. The backfill soils should be compacted to at least 95 percent of the maximum dry density, as determined by ASTM D698 (standard Proctor), and should be placed at a moisture content that is either at or above the optimum moisture, as determined by the same test. This fill should extend the full depth of the grade beam plus void space and should extend a minimum distance of 2 feet away from the exterior grade beam perimeter. All grade beams and floor slabs should be adequately reinforced to minimize cracking as normal movements occur in the foundation soils.

6.2 Soil-Supported Floor Slab

A soil-supported floor system that is placed directly on the subgrade will be subjected to potential vertical movement where elements are constructed near existing grades. The majority of such movement is expected to occur in the perimeter 10 feet of the building. We recommend that the subgrade be prepared according to the Earthwork Recommendations section of this report in order to reduce the potential for post-construction movement. The floor slab should be doweled to the beams at the locations of the doors in order to prevent vertical steps from forming at these high-traffic areas. We also recommend placing a moisture barrier, such as plastic sheeting, under the soil supported floor slab to mitigate the infiltration of moisture through the concrete slab.

We anticipate for soil supported floor slab, reinforcement and concrete likely cannot be placed the same day final excavation grades are achieved, the base of the excavation may be deepened slightly and covered by a thin seal slab of lean concrete or flowable fill to protect the integrity of the bearing material. The bottom of all excavations should be free of any loose or soft material prior to the placement of concrete. We recommend that an experienced technical personnel under the direction of a licensed geotechnical engineer observe all excavations prior to placing concrete to verify the excavation depth, cleanliness, and integrity of the mat bearing surface. D&S would be pleased to provide these services.

6.3 Floor Slab Sub-Drain System

We recommend that below grade lowest level floor slabs may be designed for drainage to resist hydrostatic uplift pressures and with a sub-drain system to release hydrostatic uplift pressures by removing the water below the floor. The need to design the floor to resist hydrostatic pressures depends on the effectiveness of the floor drain. The floor sub-drains should be imbedded in permeable material with a minimum 12-inch thickness. Collector pipes should drain the collected water to a sump from which the water would be pumped to a suitable discharge facility. Consideration should be given to the installation of a backup pump to promote continuity of service in the event the primary pump breaks down.

7.0 EARTHWORK RECOMMENDATIONS

Based on plans provided by Park7 Group (dated March 9, 2018), fills on the order of 6 feet are expected near the west portion of the main building pad in order to reach a finished pad elevation of about EL 704 feet. The amount of fill required decreases to the east. As shown, the new facility will also require cuts ranging from about 2 to 24 feet across the footprint of the main building pad and the parking garage. Soil and sandstone or limestone bedrock excavated during grading may be used as grade-raise fill within the new building footprint, provided that those bedrock materials are reduced to a maximum particle size of 6-inches (no shale bedrock materials). However, these materials should not be placed

within 3-feet of final grade elevation where sidewalks or pavements are planned unless they are reduced in size to 1-inch or less.

Earthwork recommendations for subgrade preparation for possible parking lots and grade-supported floor slabs are presented below.

7.1 Soil Preparation for Grade-supported Floor Slabs

- Strip the site of all vegetation, demolition debris, pavement materials and remove any remaining organic or deleterious material including root balls, and matted roots. Typically, 6 inches is sufficient for this purpose.
- After stripping, perform any necessary cuts and fills. Prior to the placement of any grade-raise fill, scarify the exposed soils to a depth of 12-inch and recompact to at least 95% of the maximum dry density as determined by ASTM D698, and to a moisture content that is at or above the optimum moisture content as determined by that same test.
- Where the excavations extend into weathered shale materials scarify, rework, and recompact the exposed stripped subgrade to a depth of 12 inches. The scarified and reworked soils should be compacted to between 92 to 96 percent of the maximum dry density, as determined by ASTM D698 (standard Proctor), and placed at a moisture content that is at least three (3) percent above the optimum moisture content, as determined by the same test.
- Grade-raise fill may consist of on-site or imported soils having a liquid limit less than 40 and a plasticity index less than 25.
- Place grade-raise fill to the bottom of floor slab elevation. Grade-raise fill should be placed in maximum 8-inch thick compacted lifts and should be compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D698 (standard Proctor) and be placed at a moisture content that is at least one (1) percent above the optimum moisture content, as determined by that same test.
- Water should not be allowed to pond on any prepared subgrade either during fill placement, or after reaching final subgrade elevation. To that end, the subgrade surfaces should be shaped to shed water to the edges of the respective pads.
- Place a minimum 15-mil thick vapor barrier beneath all grade-supported floor slabs.
- Each lift of fill should be tested for moisture content and degree of compaction by a testing laboratory at a minimum rate of one test per 5,000 square feet per lift for the building. D&S would be pleased to provide these services in support of this project.

7.2 Additional Considerations

The following are considered to be best practices to minimize the potential for post-construction vertical movement.

- Where possible, trees or shrubbery with a mature height greater than 6 feet and/or that require excessive amounts of water should not be planted near structures or flatwork.
- We anticipate that local code may require tree plantings that may encroach on pavements. To the extent possible, trees should not be planted closer than the mature tree's height from structures or flatwork.
- Water should not be allowed to pond next to structure foundations, pavements or other flatwork. Rainfall roof runoff should be collected and conveyed to downspouts. Downspouts should be directed to discharge at least 5 feet away from the foundations.
- The moisture content of subgrade soils that are in proximity to the structures should be maintained as close as possible to a consistent level throughout the year. We strongly recommend that excessive watering near foundations be avoided.

8.0 BASEMENT RECOMMENDATIONS

8.1 Below Grade Walls

Current plans provide for below grade walls for the basement parking garages. We anticipate that the height of the below-grade walls will range from about 12 to 24 feet. If open excavations are advanced to depths greater than 5 feet below grade, the excavations should conform to applicable OSHA excavation safety requirements using shoring or benching.

The temporary support of excavations and basement wall backfill requirements will influence below grade wall design. Below grade walls should be designed as restrained walls. The walls must be designed to resist both lateral earth pressures and any additional lateral loads caused by live load. As the walls are below grade, at-rest pressures will develop under long-term lateral loading. For temporary excavation support, active, braced loading lateral pressure may be used. If practical, temporary excavation support may be incorporated in the final basement wall design. Lateral pressure on the walls must also consider hydrostatic forces, or a drainage system should be provided. Lateral pressure calculations should assume a level backfill. A minimum surcharge area load of 250 psf should be used for traffic loading adjacent to the restrained walls.

The design lateral earth pressures recommended herein assume at-rest conditions, do not include a Factor of Safety, and do not provide for dynamic pressures on the walls. Because of the hydraulic properties of non-free draining materials, the “Drained” pressures provided below should only be used if there is no possibility of water entering into the subgrade soils from whatever means. If that possibility cannot be ruled out, then the “undrained” values should be used, at least for some height of the backfill. Lateral loads due to surcharge should be calculated as shown in Table 7. These loads need to be considered where appropriate.

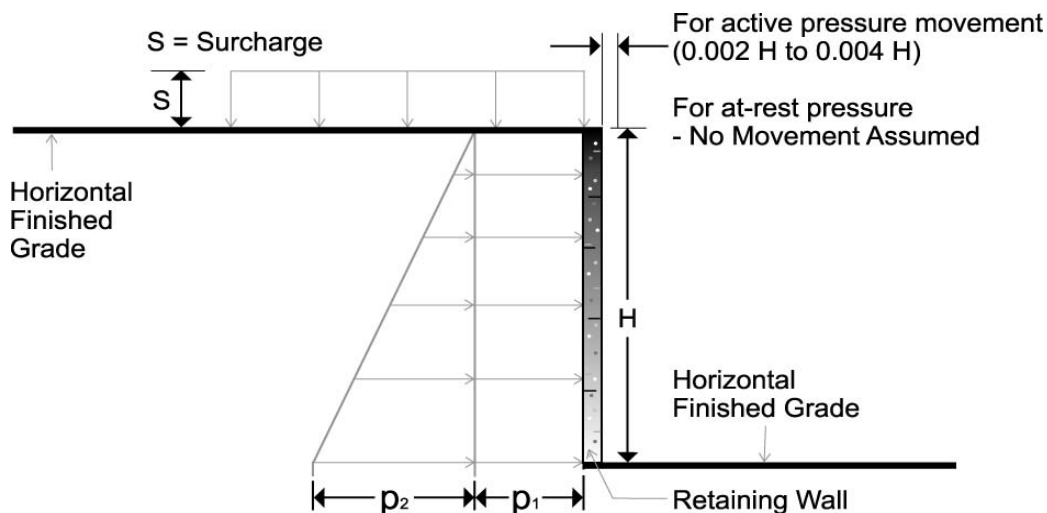


Figure 1: Lateral Earth Pressure

Table 7. Earth Pressure Recommendations

Earth Pressure Conditions	Coefficient for Backfill Type	Drained Equivalent Fluid Density (pcf)	Undrained Equivalent Fluid Density (pcf)	Surcharge Pressure (psf)	Earth Pressure (psf)
At-Rest (K_0)	Free Draining Aggregate - 0.44	55	NA	$(0.44)S$	$(EFD)H$
	Select Fill Soil – 0.58	72	99	$(0.58)S$	$(EFD)H$
	Common Fill/ On-site Soil – 0.69	86	106	$(0.69)S$	$(EFD)H$

Applicable conditions to Table 7 above include:

- Uniform surcharge, where S is surcharge pressure
- EFD is Equivalent Fluid Density (drained or undrained as appropriate)

- Wall height (H) should be taken from the base of any unbalanced soil.
- Soil backfill total unit weight with a maximum of 125 pounds per cubic foot (pcf)
- Horizontal backfill, compacted a minimum of 95 percent of Standard Proctor maximum dry density, or to a minimum of 70 percent relative density
- Positive drainage is provided behind all below-grade walls to preclude development of hydrostatic pressures in free draining backfill.
- No loading contribution from compaction equipment

8.2 Wall Drainage

Positive drainage should be provided behind below grade walls to preclude development of hydrostatic pressure behind the walls, and to prevent saturation of backfill and foundation materials. We recommend using a vertical wall drainage layer immediately behind the wall to control groundwater when fine-grained soils are used as backfill. If free-draining sand or gravel is utilized as backfill behind the wall, a vertical drainage layer is not required. Free-draining backfill should meet the requirements of ASTM C-33, size numbers 57, 6, 67, 7, 8, 89 or 9. Filter fabric should be placed between free-draining backfill and on-site retained or backfill soils.

We recommend that a perimeter drain, such as a perforated pipe drain, be installed along the base of the fill behind the walls to rapidly remove water from behind the wall. The perimeter drain should discharge collected water to a sump. Design of perimeter drainage systems placed in areas where weathered shale materials are present should consider the potential for movement due to expansive nature of these materials.

8.3 Wall Backfill

Free-draining backfill materials should be placed in maximum 2-foot thick loose layers and be consolidated by use of vibrating plates or sleds, light hand operated compactors, or other appropriate methods to adequately consolidate the backfill. Heavy compactors and grading equipment should not be allowed to operate within 5 feet of the walls during backfilling to avoid developing excessive temporary or long-term lateral soil pressures. Select fill or on-site soil backfill materials should be placed in six (6) inch thick compacted layers and be compacted to between 92 and 95 percent of the maximum dry density as determined from the Standard Proctor test (ASTM D698).

For the granular earth pressure values to be valid, the granular backfill must extend out from a point 2 feet from the back of the wall, then up at an angle of at least 0.6H: 1V or flatter.

A qualified geotechnical engineer or geotechnical representative should be present to monitor all foundation excavations and fill placement. D&S would be pleased to provide these services in support of this project.

9.0 PAVEMENT RECOMMENDATIONS

9.1 General

The pavement design recommendations provided herein are derived from the subgrade information that was obtained from our geotechnical investigation, design assumptions based on project information, our experience with similar projects in this area, and on the guidelines and recommendations of the American Concrete Pavement Association (ACPA). It is ultimately the responsibility of the Civil Engineer of Record and/or other design professionals who are responsible for pavement design to provide the final pavement design and associated specifications for this project.

9.2 Behavior Characteristics of Expansive Soils Beneath Pavement

Near-surface soils at this site are considered to generally have low potential for volume change with changes in soil moisture content. The moisture content can be stabilized to some degree in these soils by covering them with an impermeable surface, such as pavement. However, if moisture is introduced as a result of surface water percolation or poor drainage, the soils can heave and/or soften, causing distress to pavements in contact with the soil in the form of cracks.

The edges of pavement are particularly prone to moisture variations, and so, therefore, these areas often experience the most distress. When cracks appear on the surface of the pavement, these openings can allow moisture to enter the pavement subgrade, which can lead to further weakening of the pavement section as well as the accelerated failure of the pavement surface.

In order to minimize the potential impacts of expansive soil on paved areas constructed near current grades and to improve the long-term performance of the pavement, we have the following recommendations:

- Subgrade treatments should be extended at least 18 inches beyond the back of curbs or edges of pavements constructed at the surface near current grades.
- Avoid long areas of low-sloping roadway and adjust adjacent slopes to provide maximum drainage away from pavement edges.

9.3 Subgrade Strength Characteristics

We recommend for the native soils that a California Bearing Ratio (CBR) value of 3 be used in the design with a corresponding resilient modulus of 4,500 psi. For either lime treated subgrade or compacted aggregate base, we recommend using a resilient

modulus of 30,000 psi. We recommend using a Modulus of Subgrade Reaction (k) of 195 pci for the completed subgrade prepared in accordance with the recommendations in this report.

9.4 Pavement Subgrade Preparation Recommendations

The anticipated subgrade soils will generally be clay soils in the proposed paving areas which can become weak and pump with appreciable increases in moisture content. A commonly used method for clay soils to reduce the potential for pumping, improve the strength properties of the subgrade soils, and provide a working platform which will provide a uniform subgrade for the aggregate base. Due to the relatively small areas of at grade pavements planned at the site, we recommend using aggregate base beneath the pavements. To that end, we have the following recommendations:

- Remove all pavements, surface vegetation, including tree root balls and root mats, construction debris and similar unsuitable materials from within the limits of the project. We anticipate a typical stripping depth of about 6 to 12 inches.
- Perform any cut operations as-needed.
- We anticipate that excavation of overburden soils can be accomplished with conventional earthwork equipment and methods.
- In areas to receive fill, the fill may be derived from on-site or may be imported. The fill should be placed in maximum 8-inch compacted lifts, compacted to at least 95 percent of the maximum dry density, as determined by ASTM D698 (standard Proctor), and placed at a moisture content that is at or above the optimum moisture content, as determined by the same test. Prior to compaction, each lift of fill should first be processed throughout its thickness to break up and reduce clod sizes and blended to achieve a material of uniform density and moisture content. Once blended, compaction should be performed with a heavy tamping foot roller. Once compacted, if the surface of the embankment is too smooth, it may not bond properly with the succeeding layer. If this occurs, the surface of the compacted lift should be roughened and loosened by dicing before the succeeding layer is placed.
- Water required to bring the fill material to the proper moisture content should be applied evenly through each layer. Any layers that become significantly altered by weather conditions should be reprocessed in order to meet the recommended requirements. On hot or windy days, the use of water spraying methods may be required in order to keep each lift moist prior to placement of the subsequent lift. Furthermore, the subsurface soils should

be kept moist prior to placing the pavement by water sprinkling or spraying methods.

- Fill materials should be placed on a properly prepared subgrade as outlined above. The combined excavation, placement, and spreading operation should be performed in such a manner as to obtain blending of the material, and to assure that, once compacted, the materials, will have the most practicable degree of compaction and stability. Materials obtained from on-site should be mixed and not segregated.
- Soil imported from off-site sources should be tested for compliance with the recommendations herein and approved by the project geotechnical engineer prior to being used as fill. Imported materials should consist of lean clays (maximum Plasticity Index of 25) that are essentially free of organic materials and particles larger than 4 inches in their maximum dimension.
- Field density and moisture content testing should be performed at the rate of one test per 10,000 square feet in pavement areas.

9.4.1 Aggregate Base

Based upon current grading plans provided by Park7 Group (dated March 9, 2018), the cut and fill operations for pavement subgrade across the site are variable. We anticipate that cut materials will be used as grade-raise fill at other parts of the project. However, excavated shale bedrock materials should not be used as grade-raise fill. A six (6) inch thick layer of aggregate base should be placed beneath pavements with clay subgrades. If used, aggregate base should be placed in accordance with the following recommendations.

- After proof rolling, and prior to the placement of aggregate base, the exposed subgrade beneath pavement areas should be scarified and reworked to a depth of 12 inches, moisture added or removed as required, and the subgrade soils recompacted to a minimum of 95 percent of the maximum dry density of the materials obtained in accordance with ASTM D698 (standard Proctor test) and that is at or above the material's optimum moisture content, as determined by the same test. The rework and aggregate base should extend to at least 18-inches beyond the outside edges of curbs for pavements placed at the ground surface.
- Aggregate base, should be TxDOT Type A or D and meet the gradation, durability and plasticity requirements of TxDOT Item 247 Grade 1-2 or better (2014). Aggregate base material should be uniformly compacted in maximum 6-inch compacted lifts to a minimum of 95% of the maximum standard Proctor dry density (ASTM

D698) and be placed at a moisture content that is sufficient to achieve density.

- Field density and moisture content testing should be performed at the rate of one test per 10,000 square feet in pavement areas.

9.5 Rigid Pavement

We recommend that Portland Cement Concrete Pavement for this site have a minimum thickness of 5 inches for light-duty automobile parking over 6-inches of aggregate base). Concrete thickness should be increased to 6 inches for fire lanes, and to 7-inches for dumpster pads and heavy-duty traffic areas. Actual traffic loading, frequency, and intensity may require an increase in these minimum recommendations.

- Recommended minimum design compressive strength: 3,500 psi with nominal aggregate size no greater than 1 inch.
- 15 to 20 percent fly ash may be used with the approval of the Civil Engineer of record.
- Curing compound should be applied within one hour of finishing operations.

9.6 Pavement Joints and Cutting

The performance of concrete pavement depends to a large degree on the design, construction, and long-term maintenance of concrete joints. The following recommendations and observations are offered for consideration by the Civil Engineer and/or pavement Designer-of-Record.

The concrete pavements should have adequately-spaced contraction joints to control shrinkage cracking. Experience indicates that reinforced concrete pavements with sealed contraction joints on a 12 to 15-foot spacing, cut to a depth of one-quarter to one-third of the pavement thickness, have generally exhibited less uncontrolled post-construction cracking than pavements with wider spacing. The contraction joint pattern should divide the pavement into panels that are approximately square where the panel length should not exceed 25 percent more than the panel width. Saw cut, post placement formed contraction joints should be saw cut as soon as the concrete can support the saw cutting equipment and personnel and before shrinkage cracks appear, on the order of 4 to 6 hours after concrete placement.

Isolation joints should be used wherever the pavement will abut a structural element subject to a different magnitude of movement, e.g., light poles, retaining walls, existing pavement, stairways, entryway piers, building walls, or manholes.

In order to minimize the potential differential movement across the pavement areas, all joints including contraction, isolation and construction joints should be sealed to

minimize the potential for infiltration of surface water. Rubberized asphalt, silicone or another suitable flexible sealant may be used to seal the joints. Maintenance should include periodic inspection of these joints and the joints resealed as necessary.

9.7 Pavement Reinforcing Steel

We recommend that a minimum of 0.1 percent of steel be used for all concrete pavements. For a 6-inch thick concrete pavement section, this reinforcement ratio is approximately equivalent to No. 3 bars spaced at 18-inches on center each way. Reinforcement requirements may increase depending on specific traffic loading and design life parameters.

10.0 OTHER CONSTRUCTION

10.1 Utility and Service Lines

Backfill for utility lines should consist of on-site material so that they will be stable. If the backfill is too dense or too dry, swelling may form a mound along the ditch line. If the backfill is too loose or too wet, settlement may result along the ditch line. It is not uncommon to realize some settlement along the trench backfill. The on-site fill soil should be placed in maximum 6-inch compacted lifts, compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D698 (standard Proctor), and placed at a moisture content that is at least the optimum moisture content, as determined by that same test. It is also recommended that the utility ditches be visually inspected during the excavation process to ensure that undesirable fill that was not detected by the test borings does not exist at the site. This office should be notified immediately if any such fill is detected.

Utility lines connected to the structure may experience differential movement in response to changing moisture conditions in expansive soil. These movements may result in damage to the lines, especially at connections to the rigid building structure. Flexible connections or oversized sleeves may be considered are recommended to account for potential differential movement between the building and utilities.

Utility excavations should be sloped so that water within excavations will flow to a low point away from the buildings where it can be removed before backfilling. Compaction of bedding material should not be water-jetted. Compacted backfill above the utilities should be on-site clays to limit the percolation of surface water. Utility trenches extending under structures should include fat clay or concrete cut-off collars at the perimeter/edge to prevent the transmission of water along trench lines.

10.2 Exterior Flatwork

Concrete flatwork should include high tensile steel reinforcement to reduce the formation and size of cracks. Flatwork should also include frequent and regularly spaced expansion/control joints and dowels to limit vertical offsets between

neighboring flatwork slabs. Structure entrances should either be part of the structure or designed to tolerate vertical movement without inhibiting access. The moisture content of the subgrade should be maintained up to the time of concrete placement. If subgrade soils are allowed to dry below the levels recommended herein, additional moisture conditioning of the soils may be required. These recommendations are intended to reduce possible distress to exterior flatwork but will not prevent movement and/or vertical offsets between slabs.

10.3 Surface Drainage

Proper drainage is critical to the performance and condition of the building foundation, pavements, and flatwork. Positive surface drainage should be provided that directs surface water away from the building, pavements, and flatwork. We recommend that the exterior grades slope away from foundations at the rate of five (5) percent in the first ten (10) feet away in accordance with IBC Chapter 18 requirements. The slopes should direct water away from structures and flatwork, and these grades should be maintained throughout construction and the life of the structure.

The location of gutter downspouts and other features should be designed such that these items will not create moisture concentrations at or beneath the structure or flatwork. Downspouts should discharge well away from the structure and should not be allowed to erode surface soil.

The potential for moisture-induced distress in structures with grade-supported foundations and/or floor slabs can be positively addressed by constructing continuous exterior flatwork that extends to the building line. Where this occurs, the joints created at the interface of the flatwork and building line should be sealed with a flexible joint sealer to prevent the infiltration of water. Open cracks that may develop in the flatwork should also be sealed. The joint and any cracks that develop should be resealed as they become apparent and should be part of a periodic inspection and maintenance program.

However, we understand that sidewalks are not always practical or desired around the full perimeters of some facilities. Where landscaping will be present adjacent to building perimeters, diligent post-construction maintenance should be employed to prevent excessive wetting or drying of those adjacent soils.

10.4 Landscaping

Landscaping against and around the exterior of the structure can adversely affect subgrade moisture resulting in localized differential movements if not properly maintained. If used, landscaping should be kept as far away from the foundation as possible, and positive drainage away from the structure should be designed, constructed, and maintained. Landscaping elements (such as edging) should not prohibit or slow the drainage of water that could result in water ponding next to foundations or edges of flatwork. When feasible, irrigation lines and heads should not

be placed in close proximity to the foundation to prevent the collection of water near the foundation or flatwork, particularly in the event of leaking lines or sprinkler heads.

Trees (if planned) should not be placed in proximity to the structure or movement sensitive flatwork, as trees are known to cause in localized soil shrinkage due to desiccation of the soil by the root system, possibly leading to differential movements of the structure. The desiccation zone varies by a tree, but trees should not be planted closer to structures than the mature tree height, and in no case, should the drip-line of the mature tree extend closer than 10-feet of rooflines. To the extent practical, it is recommended that trees scheduled for removal (where required) in the vicinity of the proposed structure and pavements be removed as far in advance of slab construction as possible, ideally by several months or longer. This will tend to restore a more favorable soil moisture equilibrium which will, in turn, tend to minimize the potential for greater than anticipated post-construction ground movements. A moist but not overly wet soil condition should be maintained at all times in all landscaped areas near the building after construction to minimize soil volume changes caused by changing soil moisture conditions.

10.5 Site Grading

Expansive clay cut, and fill slopes should be gentle and preferably should not exceed 4 horizontal to 1 vertical (4H: 1V).

Excess water ponding on and beside roadways, sidewalks, and ground-supported slabs can cause unacceptable heave of these structures. To reduce this potential heave, good surface drainage should be established. In addition, final grades in the vicinity of structures, pavements, and flatwork should provide for positive drainage away from these elements.

10.6 Excavations

Excavations greater than 5 feet in height/depth should be in accordance with OSHA 29CFR 1926, Subpart P. Temporary construction slopes should incorporate excavation protection systems or should be sloped back. Where the excavation does not extend close to building lines, these areas may be laid back. Where space allows, temporary slopes should be sloped at 1.5 horizontal to 1 vertical (1.5H: 1V) or flatter.

Where excavation slopes greater than five (5) feet in height cannot be laid back, these areas will require the installation of a temporary retention system or shoring to protect the existing construction, restrain the subsurface soils and maintain the integrity of the excavation. We recommend that monitoring points be established around the retention system and that these locations be monitored during and after the excavation activities to confirm the integrity of the retention system.

The slopes and temporary retention system should be designed and verified by the contractor's engineer and should not be surcharged by traffic, construction

equipment, or permanent structures. The slopes and temporary retention system should be adequately maintained and periodically inspected to ensure the safety of the excavation and surrounding property.

11.0 SEISMIC CONSIDERATION

North Central Texas is generally regarded as an area of low seismic activity. The 2012 International Building Code (IBC) requires certain geotechnical seismic design criteria to aid the Structural Engineer in their analysis to develop an appropriate structure design to accommodate earthquake loading. The Spectral Acceleration values were determined using publicly available information from the United States Geological Survey (USGS). Seismic Site Class was determined using ASCE 7-10 Table 20.3-1 based on the average blow counts and unconfined compressive strength in the top 100 feet.

Based on experience, the boring log data, and general geologic information gathered, we recommend that Soil Site Class "C" be used at this site, even though the shear wave velocity of the near-surface limestone strata is estimated to be in excess of 2,000 feet per second. The criteria pertaining to this classification are shown in Table 8 below. The other information shown was determined using USGS US Seismic Design Maps based on 2012/2015 IBC.

Table 8. Seismic Design Parameters

<u>Design Parameters</u>	<u>Values</u>
Site Class	C
Spectral Acceleration for 0.2 sec Period, $S_s(g)$	0.111
Spectral Acceleration for 1.0 sec Period, $S_1(g)$	0.054
Site Coefficient for 0.2 sec Period, F_a	1.2
Site Coefficient for 1.0 sec Period, F_v	1.7

12.0 LIMITATIONS

The professional geotechnical engineering services performed for this project, the findings obtained, and the recommendations prepared were accomplished in accordance with currently accepted geotechnical engineering principles and practices.

Variations in the subsurface conditions are noted at the specific boring locations for this study. As such, all users of this report should be aware that differences in depths and thicknesses of strata encountered can vary between the boring locations. Statements in the report regarding subsurface conditions across the site are extrapolated from the data obtained at the specific boring locations. The number and spacing of the exploration borings were chosen to obtain geotechnical information for the design and construction of moderately to heavily loaded multi-storied residential structure foundations. If there are any conditions differing significantly from those described herein, D&S should be notified to re-evaluate the recommendations contained in this report.

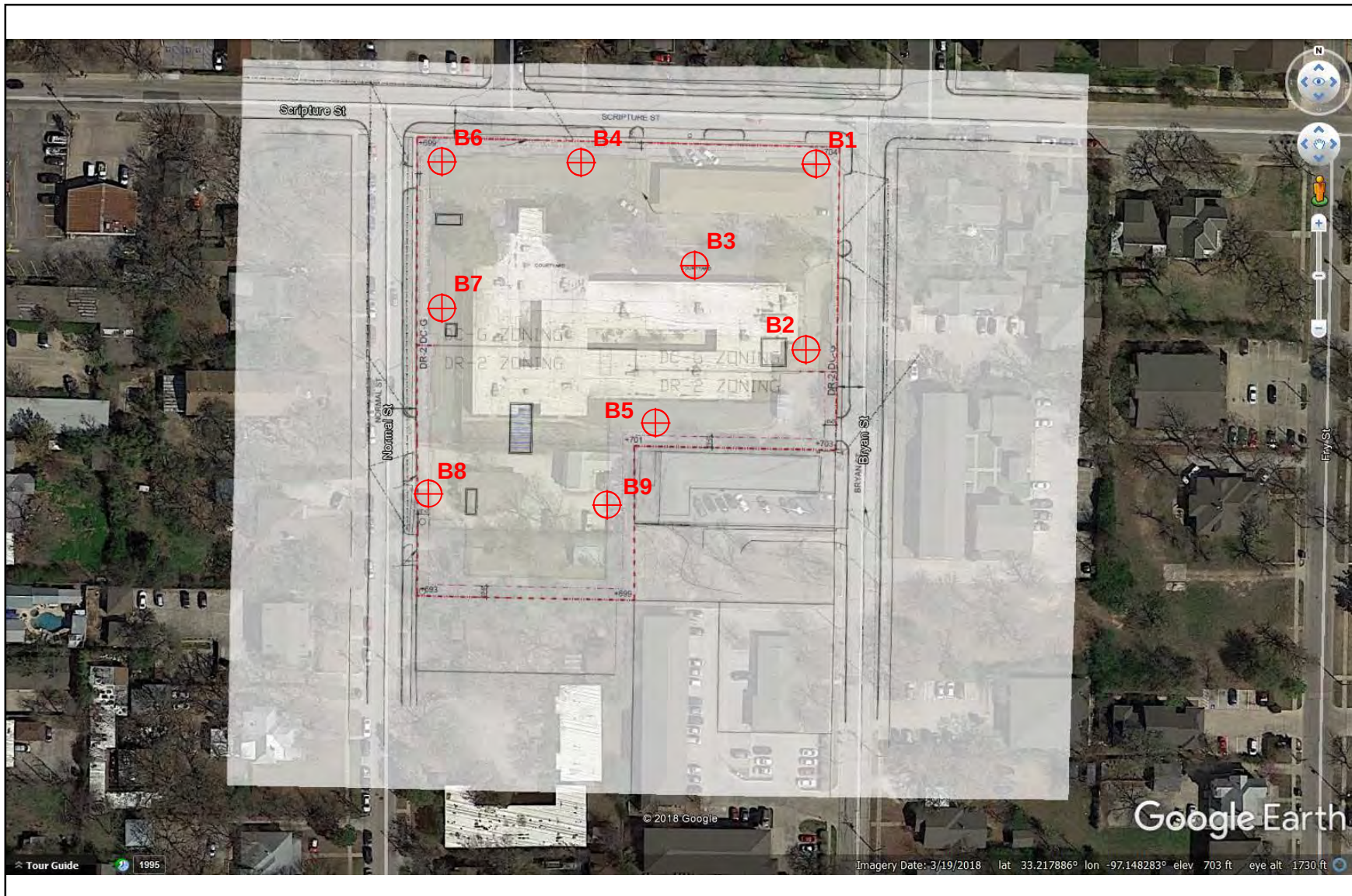
Recommendations contained herein are not considered applicable for an indefinite period of time. Our office must be contacted to re-evaluate the contents of this report if construction does not begin within a one-year period after completion of this report.

The scope of services provided herein does not include an environmental assessment of the site or investigation for the presence or absence of hazardous materials in the soil, surface water, or groundwater.

All contractors referring to this geotechnical report should draw their own conclusions regarding excavations, construction, etc. for bidding purposes. D&S is not responsible for conclusions, opinions or recommendations made by others based on these data. The report is intended to guide the preparation of project specifications and should not be used as a substitute for the project specifications.

Recommendations provided in this report are based on our understanding of the information provided by the Client to us regarding the scope of work for this project. If the Client notes any differences, our office should be contacted immediately since this may materially alter the recommendations.

APPENDIX A - BORING LOGS AND SUPPORTING DATA



****BORING LOCATIONS ARE INTENDED FOR GRAPHICAL REFERENCE ONLY****



DENTON

PLAN OF BORINGS

PARK PLACE

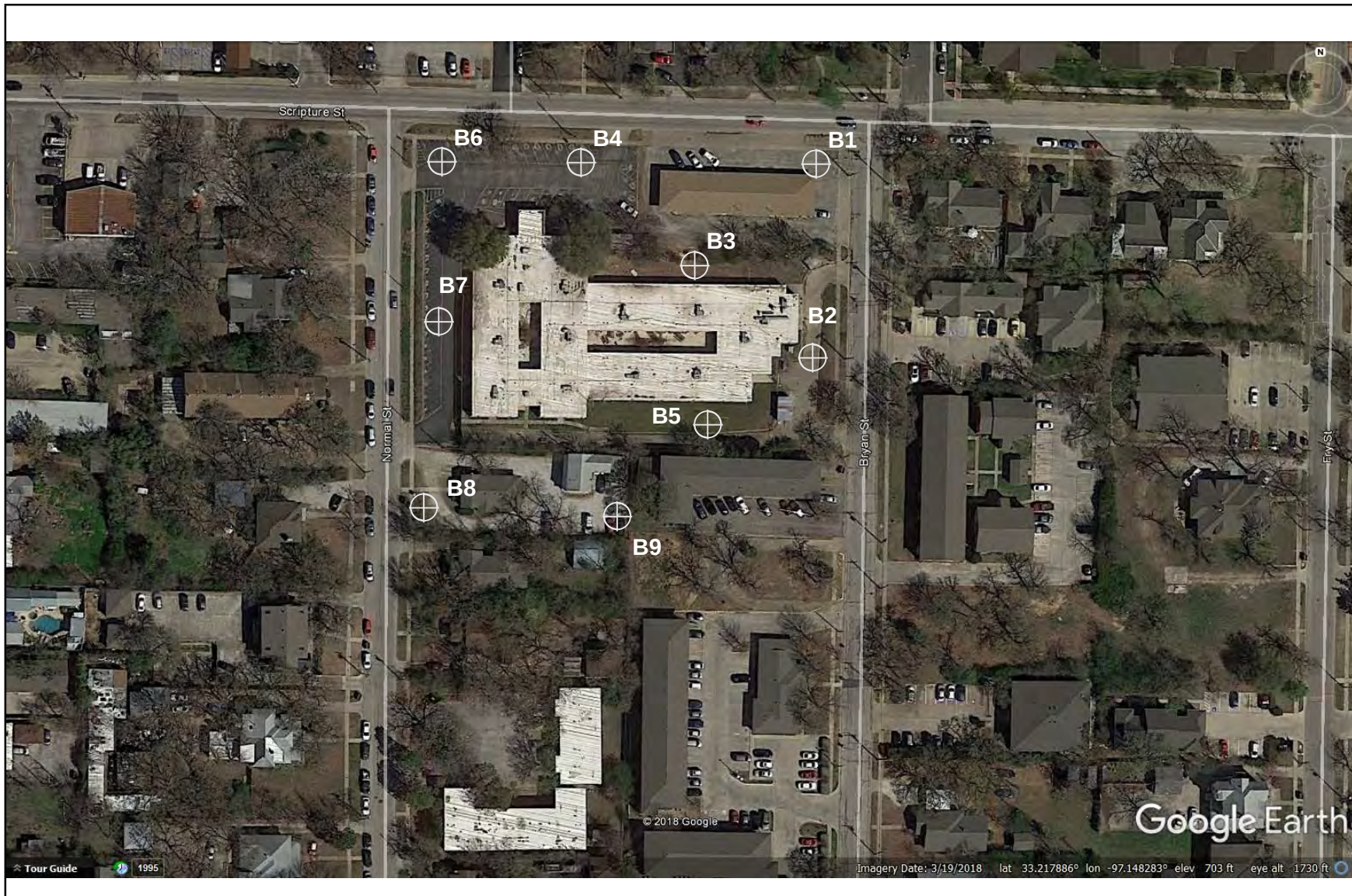
TEXAS

SHEET NO.

G1

55
DATE DRILLED

August 9 to 15, 2018



****BORING LOCATIONS ARE INTENDED FOR GRAPHICAL REFERENCE ONLY****



DENTON

PLAN OF BORINGS
PARK PLACE

TEXAS

SHEET NO.

G2

56
DATE DRILLED

August 9 to 15, 2018

LITHOLOGIC SYMBOLS

ARTIFICIAL		Asphalt
		Aggregate Base
		Concrete
		Fill
SOIL		CH: High Plasticity Clay
		CL: Low Plasticity Clay
		GP: Poorly-graded Gravel
		GW: Well-graded Gravel
		SC: Clayey Sand
		SP: Poorly-graded Sand
ROCK		SW: Well-graded Sand
		Limestone
		Mudstone
		Shale
		Sandstone
		Weathered Limestone
		Weathered Shale
		Weathered Sandstone

CONSISTENCY OF SOILS

CONSISTENCY: FINE GRAINED SOILS		
Consistency	SPT (# blows/ft)	UCS (tsf)
Very Soft	0 - 2	< 0.25
Soft	3 - 4	0.25 - 0.5
Medium Stiff	5 - 8	0.5 - 1.0
Stiff	9 - 15	1.0 - 2.0
Very Stiff	16 - 30	2.0 - 4.0
Hard	> 30	> 4.0

CONDITION OF SOILS

CONDITION: COARSE GRAINED SOILS			
Condition	SPT (# blows/ft)	TCP (#blows/ft)	Relative Density (%)
Very Loose	0 - 4	< 8	0 - 15
Loose	5 - 10	8 - 20	15 - 35
Medium Dense	11 - 30	20 - 60	35 - 65
Dense	31 - 50	60 - 100	65 - 85
Very Dense	> 50	> 100	85 - 100

SECONDARY COMPONENTS

QUANTITY DESCRIPTORS	
Trace	< 5% of sample
Few	5% to 10%
Little	10% to 25%
Some	25% to 35%
With	> 35%

RELATIVE HARDNESS OF ROCK MASS

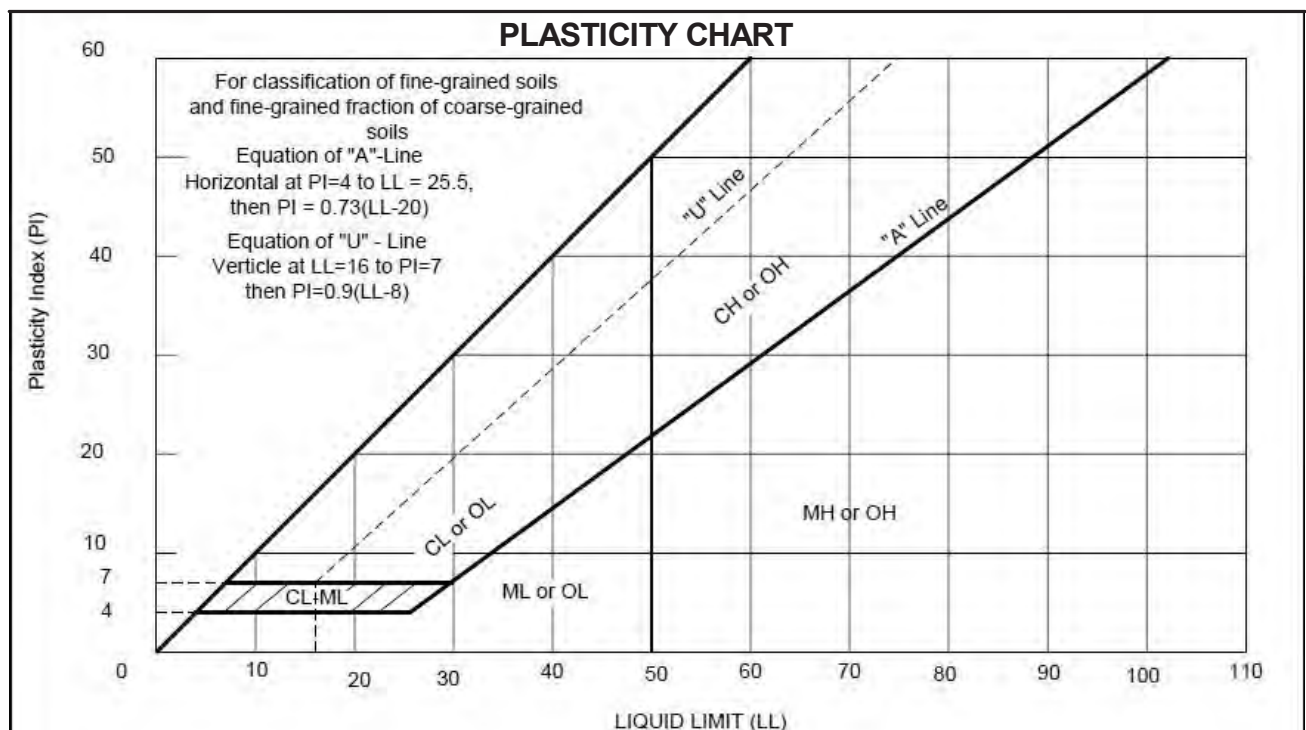
Designation	Description
Very Soft	Can be carved with a knife. Can be excavated readily with point of pick. Pieces 1" or more in thickness can be broken by finger pressure. Readily scratched with fingernail.
Soft	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows with the pick point. Small, thin pieces can be broken by finger pressure.
Medium Hard	Can be grooved or gouged 1/4" deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1" maximum size by hard blows with the point of a pick.
Moderately Hard	Can be scratched with knife or pick. Gouges or grooves 1/4" deep can be excavated by hard blow of the point of a pick. Hand specimens can be detached by a moderate blow.
Hard	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach a hand specimen.
Very Hard	Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows from a hammer or pick.

WEATHERING OF ROCK MASS

Designation	Description
Fresh	No visible sign of weathering
Slightly weathered	Penetrative weathering on open discontinuity surfaces, but only slight weathering of rock material
Moderately weathered	Weathering extends throughout rock mass, but the rock material is not friable
Highly weathered	Weathering extends throughout rock mass, and the rock material is partly friable
Completely weathered	Rock is wholly decomposed and in a friable condition but the rock texture and structure are preserved
Residual Soil	A soil material with the original texture, structure, and mineralogy of the rock completely destroyed

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS				GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS RETAINED ON THE NO. 200 SIEVE	GRAVELS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS	$Cu \geq 4$ and $1 \leq Cc \leq 3$	GW	WELL-GRADED GRAVEL
		(LESS THAN 5% FINES)	$Cu < 4$ and/or $[Cc < 1$ or $Cc > 3]$	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES	Fines classify as ML or MH	GM	SILTY GRAVEL
		(MORE THAN 12% FINES)	Fines classify as CL or CH	GC	CLAYEY GRAVEL
	SANDS MORE THAN 50% OF COARSE FRACTION PASSING THE NO. 4 SIEVE	CLEAN SANDS	$Cu \geq 6$ and $1 \leq Cc \leq 3$	SW	WELL-GRADED SAND
		(LESS THAN 5% FINES)	$Cu < 6$ and/or $[Cc < 1$ or $Cc > 3]$	SP	POORLY-GRADED SAND
		SANDS WITH FINES	Fines classify as ML or MH	SM	SILTY SAND
		(MORE THAN 12% FINES)	Fines classify as CL or CH	SC	CLAYEY SAND
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL PASSES THROUGH THE NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50	INORGANIC	PI > 7 and plots on or above "A" line	CL	LEAN CLAY
			PI < 4 or plots below "A" line	ML	SILT
		ORGANIC	$\frac{Liquid\ limit - oven\ dried}{Liquid\ limit - not\ dried} < 0.75$	OL	ORGANIC CLAY ORGANIC SILT
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50	INORGANIC	PI plots on or above "A" line	CH	FAT CLAY
			PI plots below "A" line	MH	ELASTIC SILT
		ORGANIC	$\frac{Liquid\ limit - oven\ dried}{Liquid\ limit - not\ dried} < 0.75$	OH	ORGANIC CLAY ORGANIC SILT
HIGHLY ORGANIC SOILS	PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR			PT	PEAT





BORING LOG

B1

PAGE 2 OF 2

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/14/2018

FINISH DATE: 8/14/2018

LOGGED BY: Mohammad Faysal (D&S)

LOCATION: Denton, Texas

GPS COORDINATES: N33.218569, W97.147888

GROUND ELEVATION: Approx. 706 feet

DRILL METHOD: Hollow Stem Flight Auger

DRILLED BY: Charles Ray Stephens (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ☒ N-Standard Penetration ☒ T-Texas Cone Penetration ▮ C-Core ▮ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
35	T	50=0.5" 50=0.25"		SHALE ; fresh; soft to medium hard; dark gray											
40	B T	50=2.75" 50=1.75"													
45	B T	50=2.5" 50=1.5"													
50	B T	50=2.75" 50=0.5"													
				End of boring at 50.3'	50.3 ft										
				Notes: -seepage at 23 feet during drilling	655.7 ft										
55															
60															
65															
70															



BORING LOG

B2

PAGE 1 OF 2

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/16/2018

FINISH DATE: 8/16/2018

LOGGED BY: Sandip Adhikari (D&S)

LOCATION: Denton, Texas

GPS COORDINATES: N33.218016, W97.147931

GROUND ELEVATION: Approx. 702 feet

DRILL METHOD: Hollow Stem Flight Auger

DRILLED BY: Daniel Earl (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ⊠ N-Standard Penetration ⊡ T-Texas Cone Penetration ▨ C-Core ▧ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
0															
	AU			ASPHALT; 6 inches											
	S	4.5+		SILTY SAND (SM); medium dense to very dense; brown, yellowish brown											
	S	3.0				5.7	NP	NP	NP	30			0.3	117.5	
	T	50=3.5"													
	T	50=2.0"													
5	B			SANDY LEAN CLAY (CL); very stiff; brown, reddish brown											
	T	34,46				7.1									
	B														
	T	50=4.25"													
	T	50=4.25"													
	B					7.9				58					
10	N	8,18,18													
	T	20,31													
				-estimated cut depth 12 feet											
	N	18,34,48		SANDSTONE; very weakly cemented; very soft to soft; yellowish brown, gray; few very thin shale seams		14.8				61					
15	T	22,50=5.25"													
	N	18,20,38													
20	T	50=2.75"													
	T	50=1.0"													
	N	28,50=4.0"		SHALE; fresh; soft to medium hard; dark gray; few very thin limestone seams											
25	T	50=3.75"													
	T	50=1.0"													
	N	22,50=5.25"													
30	T	50=4.75"													
	T	50=0.0"													
35	B														



BORING LOG

B2

PAGE 2 OF 2

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/16/2018

FINISH DATE: 8/16/2018

LOGGED BY: Sandip Adhikari (D&S)

LOCATION: Denton, Texas

GPS COORDINATES: N33.218016, W97.147931

GROUND ELEVATION: Approx. 702 feet

DRILL METHOD: Hollow Stem Flight Auger

DRILLED BY: Daniel Earl (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ⊠ N-Standard Penetration ⊡ T-Texas Cone Penetration ▨ C-Core ▩ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
35	T	50=3.75" 50=0.0"		SHALE ; fresh; soft to medium hard; dark gray; few very thin limestone seams											
40	B T	50=5.0" 50=2.25"													
				43.0 ft											
				LIMESTONE ; fresh; moderately hard to hard; gray; few thin shale seams											
45	B T	50=2.0" 50=0.0"													
50	B T	50=5.0" 50=1.0"													
55	B T	50=2.0" 50=0.5"													
60	B T	50=1.0" 50=1.75"													
				End of boring at 60.3'											
				Notes: -seepage at 26 feet during drilling											
65															
70															



BORING LOG

B3

PAGE 1 OF 3

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/16/2018

FINISH DATE: 8/16/2018

LOGGED BY: Sandip Adhikari (D&S)

LOCATION: Denton, Texas

GPS COORDINATES: N33.218329, W97.148248

GROUND ELEVATION: Approx. 702 feet

DRILL METHOD: HSA/Core

DRILLED BY: Kevin Kavadas (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend:	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
0				Legend: ■ S-Shelby Tube □ N-Standard Penetration ▽ T-Texas Cone Penetration ▮ C-Core ▮ B-Bag Sample ∇ - Water Encountered											
	AU			ASPHALT; 4 inches											
	S	2.75		FILL: LEAN CLAY (CL); stiff; brown, gray; few aggregate fragments and sand		7.7									
	S	3.0				17.1	30	16	14	61					
	T	5.4		SANDY LEAN CLAY (CL); stiff to very stiff; brown, trace calcareous nodules and iron oxide stains											
5	S	3.5													
	T	19,20				10.0	40	17	23						
	S	4.5+													
	T	19,20				12.9									
	S	3.25													
10	S	4.5+													
	T	50=5.75" 50=3.5"		CLAYEY SAND (SC); very dense; brown, gray; trace iron oxide stains											
				-estimated cut depth 12 feet		14.1	22	14	8	48			0.7	120.1	
15	S	4.5+													
	T	50=3.5" 50=0.5"		SANDSTONE; very weakly cemented; very soft to soft; yellowish brown, gray; trace very thin shale seams											
						13.2	23	17	6				0.0	109.2	
20	S	4.5+													
	T	50=1.75" 50=0.75"		SHALE; moderately weathered; soft; yellow brown, gray; fissile											
	C					89									
				SHALE; fresh; soft to medium hard; gray, dark gray; fissile; calcareous		89									
25															
	T	18,20													
	C					95								138.4	26.7
						95									
30															
	T	50=2.5" 50=0.125"													
	C					92									
						92									
35															



BORING LOG

B3

PAGE 2 OF 3

PROJECT: Park Place	LOCATION: Denton, Texas
CLIENT: Park7 Group	GPS COORDINATES: N33.218329, W97.148248
PROJECT NUMBER: G18-2196	GROUND ELEVATION: Approx. 702 feet
START DATE: 8/16/2018 FINISH DATE: 8/16/2018	DRILL METHOD: HSA/Core
LOGGED BY: Sandip Adhikari (D&S)	DRILLED BY: Kevin Kavadas (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ☒ N-Standard Penetration ☒ T-Texas Cone Penetration ▮ C-Core ▮ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
35	T	50=1.0" 50=0.0"		SHALE ; fresh; soft to medium hard; gray, dark gray; fissile; calcareous	80 80	14.0								120.1	14.6
	C														
40	T	50=1.25" 50=0.0"			100 100										
	C														
45	C				87 87	12.9								125.2	27.8
50	C				100 100										
55	C				100 100	9.4								133.3	26.1
60	C				90 90	11.6								127.0	23.7
65	C				100 100	6.7								136.6	52.0
70															



BORING LOG

B3

PAGE 3 OF 3

PROJECT: Park Place

LOCATION: Denton, Texas

CLIENT: Park7 Group

GPS COORDINATES: N33.218329, W97.148248

PROJECT NUMBER: G18-2196

GROUND ELEVATION: Approx. 702 feet

START DATE: 8/16/2018

FINISH DATE: 8/16/2018

DRILL METHOD: HSA/Core

LOGGED BY: Sandip Adhikari (D&S)

DRILLED BY: Kevin Kavadas (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ☒ N-Standard Penetration ☒ T-Texas Cone Penetration ▢ C-Core ▣ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
70	T	50=0.75" 50=0.0"		End of boring at 70.1'											
75															
80															
85															
90															
95															
100															
105															

Notes:
-dry prior to introduction of water at 20
feet for coring purposes



BORING LOG

B4

PAGE 1 OF 2

PROJECT: Park Place CLIENT: Park7 Group PROJECT NUMBER: G18-2196 START DATE: 8/10/2018 FINISH DATE: 8/10/2018 LOGGED BY: Sandip Adhikari (D&S)	LOCATION: Denton, Texas GPS COORDINATES: N33.218577, W97.148558 GROUND ELEVATION: Approx. 703 feet DRILL METHOD: Hollow Stem Flight Auger DRILLED BY: Charles Ray Stephens (D&S)
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Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ⊠ N-Standard Penetration ⊡ T-Texas Cone Penetration ▨ C-Core ▩ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
0															
	AU			ASPHALT; 4 inches	6.3 ft										
	S	2.5		FAT CLAY (CH); stiff, brown, olive	702.7 ft	27.0									
	S	2.75		brown, yellow; little iron oxide											
				concretions and ferrous nodules		25.7	60	22	38						
	T	8.13		SANDY LEAN CLAY (CL); stiff to	700.0 ft										
5	S	3.75		very stiff; brown, light brown, gray;		14.7	28	16	12	65					
				little iron oxide nodules											
	T	34,24													
	S	4.0				12.7	25	16	9				0.8	107.6	
	T	11,50=5.5"													
	S	2.5													
10	N	13,17,24			10.0 ft	13.9				57					
	T	7,12		CLAYEY SAND (SC); loose to	693.0 ft										
				dense; brown, gray; trace iron oxide											
				nodules; fine grained sand											
				-estimated cut depth 12 feet											
	T	50=5.75"			14.0 ft										
15	N	50=1.25"		SANDSTONE; very weakly	689.0 ft	19.0				48					
		50=6.0"		cemented; very soft to soft; gray; trace											
				very thin shale seams											
20	B				20.0 ft	17.5	28	13	15						
	T	28,14		SHALE; highly to completely	683.0 ft										
				weathered; very soft; yellow brown,											
				gray; slightly fissile											
					23.0 ft										
25	B	50=1.0"		SHALE; moderately weathered; soft;	680.0 ft										
	T	50=0.75"		gray, dark gray											
30	B	50=2.25"													
	T	50=1.25"													
35	B			SHALE; fresh; soft to medium hard;	33.0 ft										
				gray, dark gray	670.0 ft										



BORING LOG

B4

PAGE 2 OF 2

PROJECT: Park Place	LOCATION: Denton, Texas
CLIENT: Park7 Group	GPS COORDINATES: N33.218577, W97.148558
PROJECT NUMBER: G18-2196	GROUND ELEVATION: Approx. 703 feet
START DATE: 8/10/2018 FINISH DATE: 8/10/2018	DRILL METHOD: Hollow Stem Flight Auger
LOGGED BY: Sandip Adhikari (D&S)	DRILLED BY: Charles Ray Stephens (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ⊠ N-Standard Penetration ⊡ T-Texas Cone Penetration ▧ C-Core ▩ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
35	▽ T	50=2.75" 50=3.5"		SHALE ; fresh; soft to medium hard; gray, dark gray											
40	B ▽ T	50=4.0" 50=3.25"													
45	B ▽ T	50=1.25" 50=0.5"													
50	B ▽ T	50=1.0" 50=0.75"													
55	B ▽ T	50=0.75" 50=0.5"													
				End of boring at 55.1'	55.1 ft 647.9 ft										
60				Notes: -seepage at 15 feet during drilling											
65															
70															

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BORING LOG

B5

PAGE 2 OF 3

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/17/2018

FINISH DATE: 8/17/2018

LOGGED BY: Mohammad Faysal (D&S)

LOCATION: Denton, Texas

GPS COORDINATES: N33.217927, W97.148377

GROUND ELEVATION: Approx. 702 feet

DRILL METHOD: HSA/Core

DRILLED BY: Kevin Kavadas (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ☒ N-Standard Penetration ☒ T-Texas Cone Penetration ▮ C-Core ▮ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
35															
	C			SHALE; fresh; medium hard; gray, dark gray; fissile; calcareous	78 78										
40															
	C				96 96										
45															
	C			LIMESTONE; fresh; moderately hard to hard; gray, dark gray; few to some very thin shale seams	100 100	10.4								133.5	18.5
50															
	C				94 94										
55															
	C				100 100	12.0								127.0	26.5
60															
	C				100 100										
65															
	C				100 100	5.9								143.3	70.6
70															



BORING LOG

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PAGE 3 OF 3

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/17/2018

FINISH DATE: 8/17/2018

LOGGED BY: Mohammad Faysal (D&S)

LOCATION: Denton, Texas

GPS COORDINATES: N33.217927, W97.148377

GROUND ELEVATION: Approx. 702 feet

DRILL METHOD: HSA/Core

DRILLED BY: Kevin Kavadas (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ☒ N-Standard Penetration ☒ T-Texas Cone Penetration ▮ C-Core ▮ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
70	T	50=0.75" 50=0.125"		End of boring at 70.1'	70.1 ft										
75				Notes: -seepage at 14 feet during drilling -introduction of water at 25 feet for coring purposes											
80															
85															
90															
95															
100															
105															



BORING LOG

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PAGE 1 OF 2

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/10/2018

FINISH DATE: 8/10/2018

LOGGED BY: Mohammad Faysal (D&S)

LOCATION: Denton, Texas

GPS COORDINATES: N33.218573, W97.148965

GROUND ELEVATION: Approx. 701 feet

DRILL METHOD: HSA/Core

DRILLED BY: Kevin Kavadas (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ⊠ N-Standard Penetration ⊡ T-Texas Cone Penetration ▨ C-Core ▩ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
0															
	S	2.0		FILL: LEAN CLAY (CL); stiff; brown, gray; few aggregate fragments; trace sand		22.5									
	S	4.5+													
	S	4.5+		SANDY LEAN CLAY (CL); very stiff; brown, trace calcareous nodules and iron oxide stains		16.6	33	16	17	53			0.0	105.6	
	T	6.7													
5	S	4.5+				15.1									
	T	9.9													
	S	4.5				14.2								118.0	4.8
	T	11.6													
	S	4.0													
10	S	4.5+				13.4	29	16	13	60			0.0	105.1	
	T	12,14													
				-estimated cut depth 12 feet											
15	S	4.5+													
	T	10,11													
20	B					13.3	44	16	28						
	T	50=3.0" 50=0.5"													
				SHALE; moderately to highly weathered; very soft; yellow brown, gray; slightly fissile											
	C				93	12.8								121.2	5.5
25					93										
	T	36,40													
	C				58										
					58										
30															
	T	15,18													
				SHALE; fresh; medium hard; gray, dark gray; fissile; calcereous											
	C				80	15.2								115.7	14.5
					80										
35															



BORING LOG

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PAGE 2 OF 2

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/10/2018

FINISH DATE: 8/10/2018

LOGGED BY: Mohammad Faysal (D&S)

LOCATION: Denton, Texas

GPS COORDINATES: N33.218573, W97.148965

GROUND ELEVATION: Approx. 701 feet

DRILL METHOD: HSA/Core

DRILLED BY: Kevin Kavadas (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ☒ N-Standard Penetration ☒ T-Texas Cone Penetration ▮ C-Core ▮ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
35	T	50=2.0" 50=1.5"		SHALE ; fresh; medium hard; gray, dark gray; fissile; calcereous											
	C				78 78										
40	T	50=0.13" 50=0.0"		LIMESTONE ; fresh; moderately hard to hard; gray											
	C				100 100	10.4								131.3	54.2
45	T	50=1.0" 50=0.0"													
	C				87 87										
50	T	50=0.5" 50=0.0"													
	C				92 92										
55	T	50=3.25" 50=0.0"													
	C				100 100	8.1								136.1	67.1
60	T	50=0.0" 50=0.0"		End of boring at 60.0'	60.0 ft 641.0 ft										
				Notes: -dry prior to introduction of water at 20 feet for coring purposes											
65															
70															



BORING LOG

B7

PAGE 1 OF 2

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/20/2018

FINISH DATE: 8/20/2018

LOGGED BY: Mohammad Faysal (D&S)

LOCATION: Denton, Texas

GPS COORDINATES: N33.218227, W97.148968

GROUND ELEVATION: Approx. 700 feet

DRILL METHOD: Hollow Stem Flight Auger

DRILLED BY: Charles Ray Stephens (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend:	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
0				Legend: ■ S-Shelby Tube □ N-Standard Penetration ▨ T-Texas Cone Penetration ▩ C-Core ▤ B-Bag Sample ∇ - Water Encountered											
	S	4.5+		ASPHALT 4 inches											
	S	2.5		FILL: LEAN CLAY WITH SAND (CL);		17.4									
	S	2.0		stiff to very stiff; dark brown; trace to		14.6	29	17	12						
	T	4.4		little aggregate fragments											
5	S	2.5		LEAN CLAY (CL); stiff to very stiff;											
	T	5.5		brown, reddish brown, gray; trace to		18.8									
	S	4.5		little ferrous nodules											
	T	7.6				15.5									
	S	2.5													
10	T	7,11													
				-estimated cut depth 12 feet											
15	S	4.5+				13.3	29	15	14				0.0	121.9	
	T	10,6													
20	S	4.5+				11.7	44	20	24				0.9	116.8	
	T	30,50=2.75"		SHALE; highly to completely											
				weathered; very soft; yellowish brown,											
				light gray											
25	B														
	T	30,50=3.75"													
30	T	20,25													
35	B			SHALE; slightly to moderately											
				weathered; very soft; olive green,											
				yellowish brown; fissile											

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BORING LOG

B8

PAGE 2 OF 3

PROJECT: Park Place	LOCATION: Denton, Texas
CLIENT: Park7 Group	GPS COORDINATES: N33.217783, W97.149044
PROJECT NUMBER: G18-2196	GROUND ELEVATION: Approx. 696 feet
START DATE: 8/20/2018 FINISH DATE: 8/20/2018	DRILL METHOD: HSA/Core
LOGGED BY: Mohammad Faysal (D&S)	DRILLED BY: Kevin Kavadas (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ☒ N-Standard Penetration ☒ T-Texas Cone Penetration ▮ C-Core ▮ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
35															
	C			SHALE ; fresh; gray, dark gray; calcareous; fossiliferous; fissile	98	18.1									
40	C				98										
	C				100	15.8								117.4	18.9
45	C				100										
	C			LIMESTONE ; fresh; hard; gray, dark gray; few very thin shale seams	100	10.7								129.2	15.4
50	C				100										
	C				100	10.0								135.6	37.6
55	C				100										
60	C				100										
65	C				100										
70	C				100										



BORING LOG

B8

PAGE 3 OF 3

PROJECT: Park Place

LOCATION: Denton, Texas

CLIENT: Park7 Group

GPS COORDINATES: N33.217783, W97.149044

PROJECT NUMBER: G18-2196

GROUND ELEVATION: Approx. 696 feet

START DATE: 8/20/2018

FINISH DATE: 8/20/2018

DRILL METHOD: HSA/Core

LOGGED BY: Mohammad Faysal (D&S)

DRILLED BY: Kevin Kavadas (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ☒ N-Standard Penetration ☒ T-Texas Cone Penetration ▮ C-Core ▮ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
70															
				End of boring at 70.1'	70.1'										
				Notes: -seepage at 14 feet during drilling -introduction of water at 25 feet for coring purposes											
75															
80															
85															
90															
95															
100															
105															



BORING LOG

B9

PAGE 1 OF 2

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/21/2018

FINISH DATE: 8/21/2018

LOGGED BY: Mohammad Faysal (D&S)

LOCATION: Denton, Texas

GPS COORDINATES: N33.217791, W97.148687

GROUND ELEVATION: Approx. 698 feet

DRILL METHOD: Hollow Stem Flight Auger

DRILLED BY: Kevin Kavadas (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ⊠ N-Standard Penetration ⊡ T-Texas Cone Penetration ▮ C-Core ▮ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)	
							LL (%)	PL (%)	PI							
0																
	S	4.5+		CLAYEY SAND (SC); dense to very dense; yellowish brown, gray; trace iron oxide nodules		5.6										
	S	4.5+														
	S	4.5+				10.5				47						
	T	35,41														
5	S	4.5+				7.9	31	13	18	41			2.0	118.9		
	T	49,50=5.0"														
	S	4.5+				7.0										
	T	50=5.0"														
	T	50=4.0"														
	S	2.0														
10	S	4.5+				7.3	26	16	10	28						
	T	50=6.0"														
	T	50=2.5"														
15				LEAN CLAY WITH SAND (CL); very stiff; brown, gray, red; trace to few calcareous nodules; iron oxide stains and charcoal fragments												
	T	34,42														
	N	18,17,15				11.6				72						
20	S	4.5+		SHALE; moderately to highly weathered; soft; yellow brown, gray; slightly fissile -estimated cut depth 21 feet		12.8	48	16	32				5.3	124.0	8.5	
	T	50=4.75"														
		36														
25	B	50=2.0"		SHALE; slightly weathered; medium hard; gray, dark gray; fissile												
	T	50=0.5"														
30				SHALE; fresh; medium hard; dark gray; with frequent very thin limestone seams												
	T	50=3.5"														
		50=2.0"														
35	B															



BORING LOG

B9

PAGE 2 OF 2

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/21/2018

FINISH DATE: 8/21/2018

LOGGED BY: Mohammad Faysal (D&S)

LOCATION: Denton, Texas

GPS COORDINATES: N33.217791, W97.148687

GROUND ELEVATION: Approx. 698 feet

DRILL METHOD: Hollow Stem Flight Auger

DRILLED BY: Kevin Kavadas (D&S)

Depth (ft)	Sample Type	Hand Pen. (tsf) or SPT or TCP	Graphic Log	Legend: ■ S-Shelby Tube ☒ N-Standard Penetration ☒ T-Texas Cone Penetration ▮ C-Core ▮ B-Bag Sample ▽ - Water Encountered	REC (%) RQD (%)	MC (%)	Atterberg Limits			Passing #200 Sieve (%)	Total Suction (pF)	Clay (%)	Swell (%)	DUW (pcf)	Unconf. Compr. Str (ksf)
							LL (%)	PL (%)	PI						
35	▽ T	50=4.0" 50=2.0"		SHALE ; fresh; medium hard; dark gray; with frequent very thin limestone seams											
40	B T	50=3.25" 50=2.25"													
45	B T	50=1.25" 50=0.5"													
50	B T	50=1.0" 50=0.5"													
55	B T	50=1.0" 50=0.25"													
60	B T	50=1.0" 50=1.0"													
				End of boring at 60.2'	60.2 ft 637.8 ft										
65				Notes: -seepage at 14 feet during drilling -water at 14 feet upon completion											
70															



GRAIN SIZE DISTRIBUTION

ASTM D1140

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

START DATE: 8/16/2018

FINISH DATE: 8/16/2018

LOGGED BY: Sandip Adhikari (D&S)

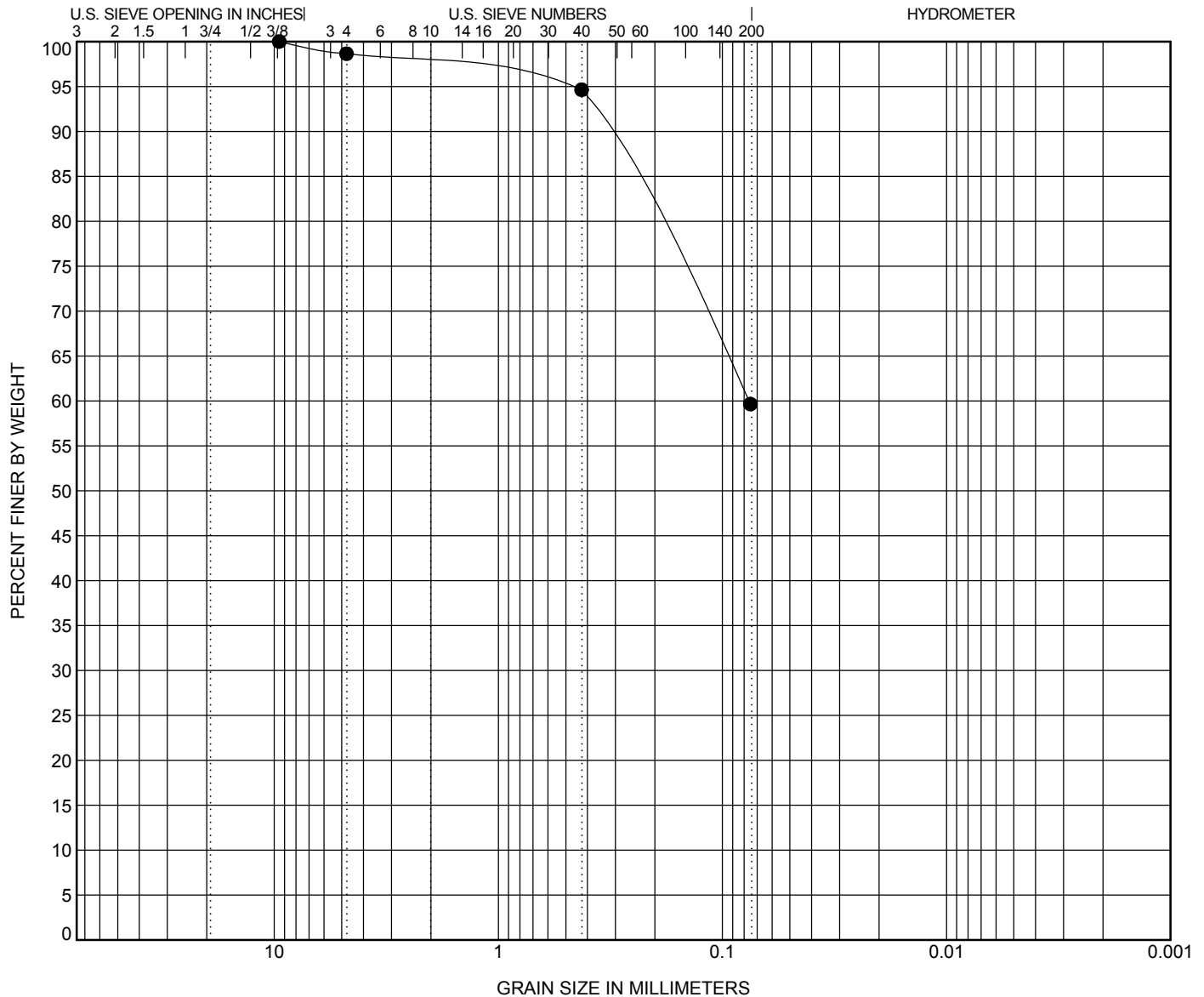
LOCATION: Denton, Texas

GPS COORDINATES: N33.218016, W97.147931

GROUND ELEVATION: Approx. 702 feet

DRILL METHOD: Hollow Stem Flight Auger

DRILLED BY: Daniel Earl (D&S)



GRAVEL		SAND			SILT OR CLAY
coarse	fine	coarse	medium	fine	

Description							LL	PL	PI	Cc	Cu
CLAYEY SAND (SC);											
BOREHOLE	DEPTH	D100	D50	D30	D10	%Gravel	%Sand	%Silt		%Clay	
B2	8.0	9.51				1.4	39.0	59.6			



SWELL TEST RESULTS

PROJECT: Park Place

CLIENT: Park7 Group

PROJECT NUMBER: G18-2196

LOCATION: Denton, Texas

Boring Number	Depth feet	Initial Moisture Content, %	Final Moisture Content, %	Applied Pressure, psf	Vertical Swell, %
B1	1-2	17.4	23.2	132	0.2
B2	2-3	5.7	20.4	261	0.3
B3	13-14	14.1	18.9	263	0.7
B3	19-20	13.2	19.1	263	0.0
B4	6-7	12.7	19.4	652	0.8
B5	14-15	17.2	19.8	395	0.1
B6	2-3	16.6	20.0	132	0.0
B6	9-10	13.4	14.9	1053	0.0
B7	14-15	13.3	14.7	265	0.0
B7	19-20	11.7	17.6	1042	0.9
B8	20-21	18.9	20.7	393	1.2
B8	25-26	20.1	22.3	912	0.3
B9	4-5	7.9	16.0	520	2.0
B9	19-20	12.8	17.2	263	5.3



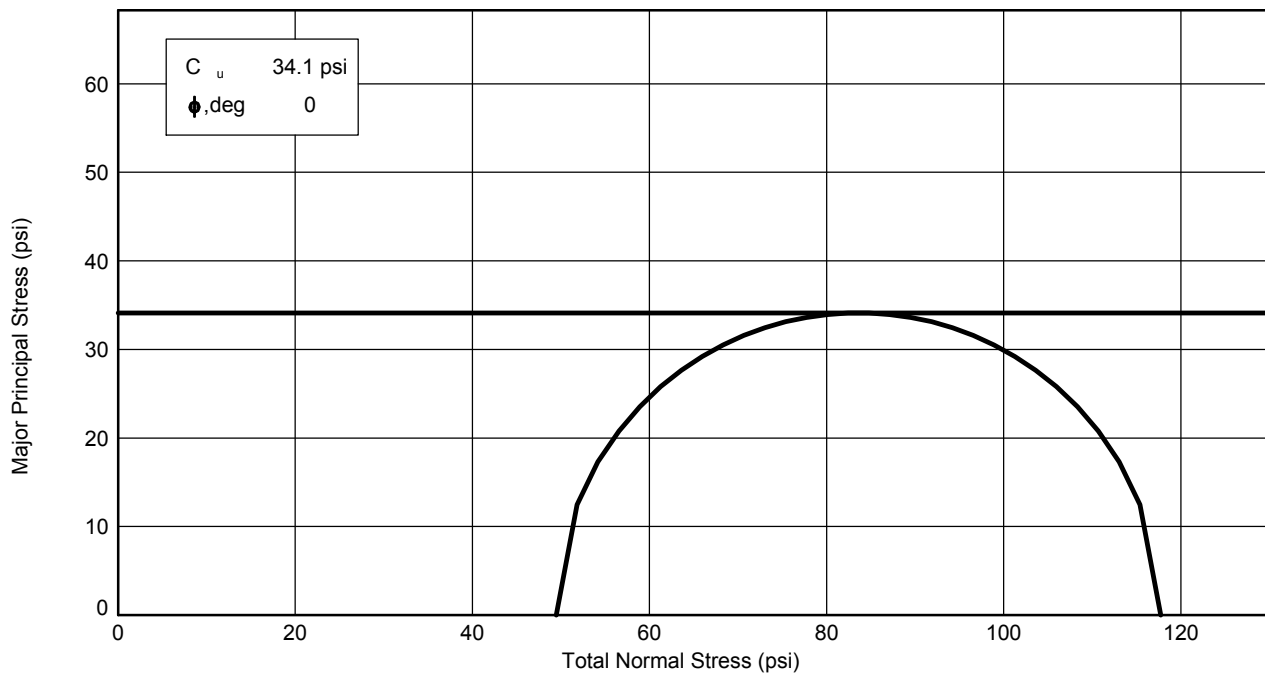
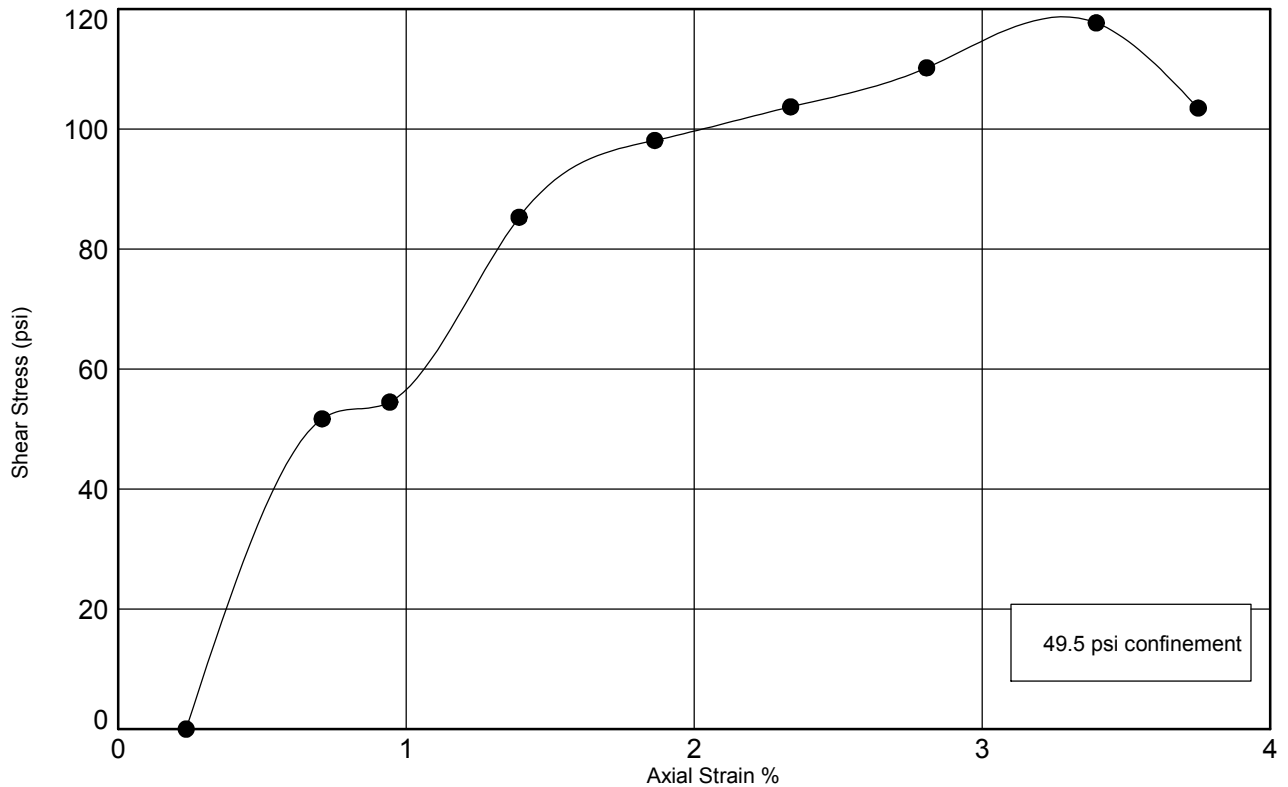
UNCONSOLIDATED-UNDRAINED TRIAXIAL TEST ASTM D2850

PROJECT: Park Place

PROJECT NUMBER: G18-2196

CLIENT: Park7 Group

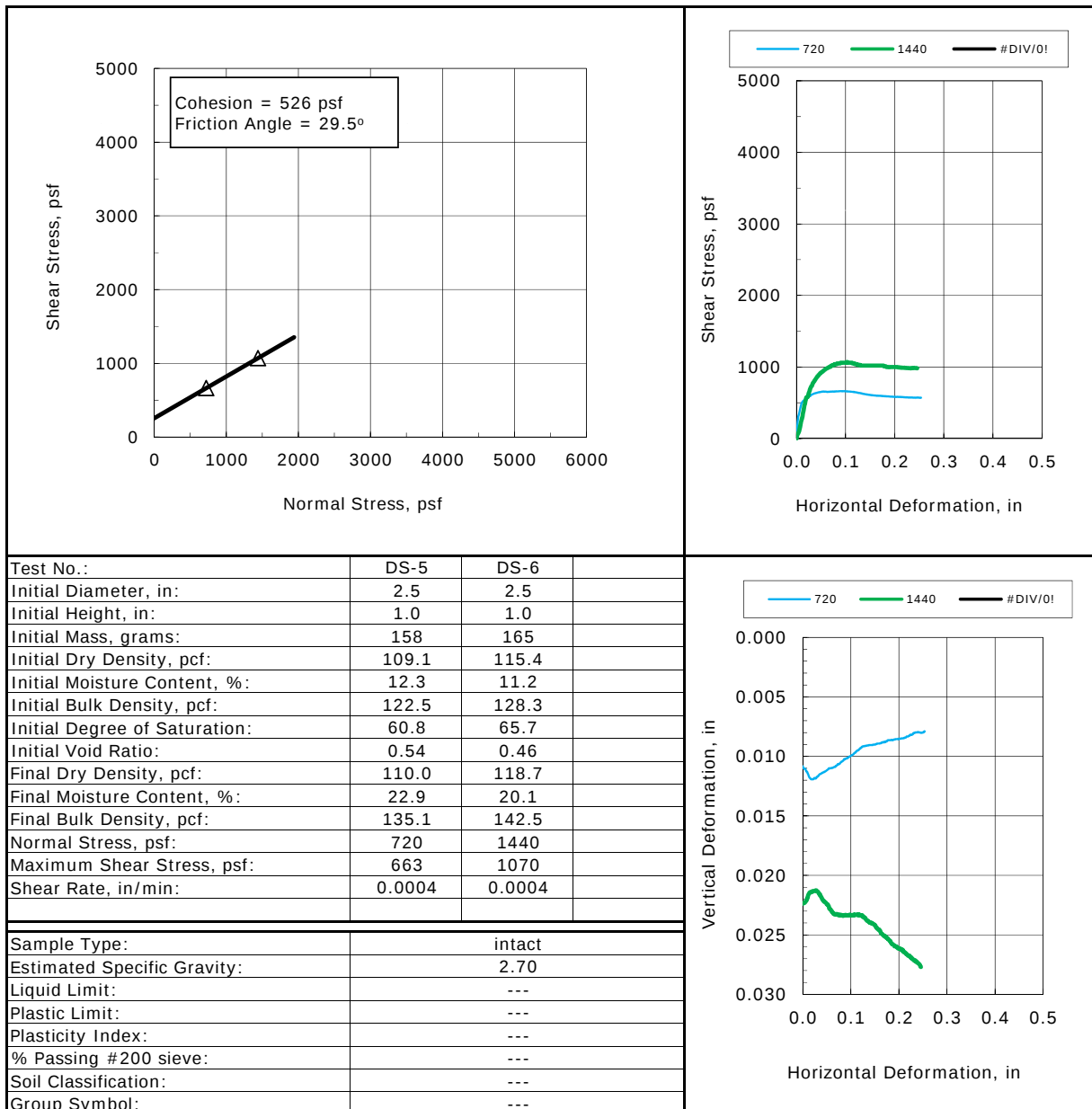
LOCATION: Denton, Texas



Borehole	Depth	Description			
● B8	36.0	SHALE; fresh; gray, dark gray			
Major Principal Stress (psi) σ_1		Minor Principal Stress (psi) σ_3	Deviator Stress (psi) $\Delta\sigma_f$	γ_d	MC%
117.7		49.5	68.3	117.3	18.1

Client:	D&S Engineering Labs
Project Name:	Park Place
Project Location:	Denton, TX
GTX #:	308690
Test Date:	08/28/18
Tested By:	md
Checked By:	njh
Boring ID:	B8
Sample ID:	---
Depth, ft:	6-7
Visual Description:	Sandy Lean Clay (CL); brown, yellowish brown, light gray

Direct Shear Test of Soils Under Consolidated Drained Conditions by ASTM D3080



Notes:

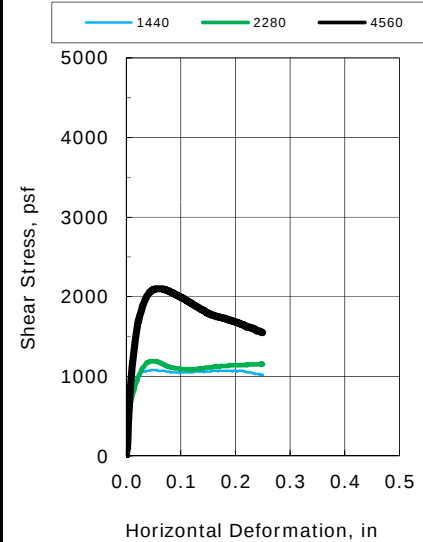
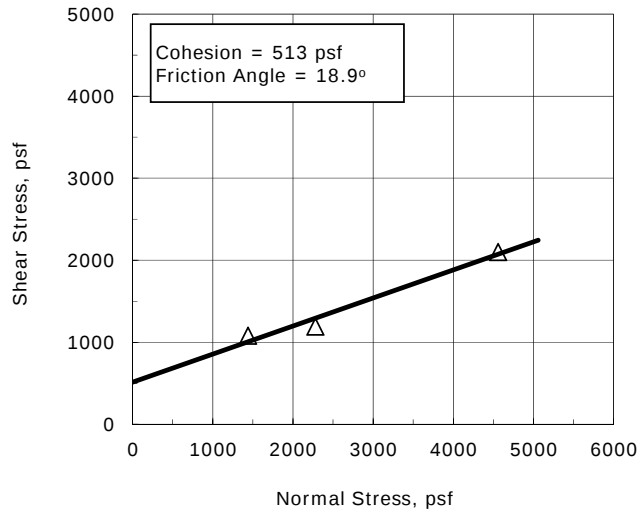
Moisture content obtained before shear from sample trimmings
 Moisture Content determined by ASTM D2216
 Extruded from tube, cut, trimmed and placed into apparatus at the as-received density and moisture content

Values for cohesion and friction angle determined from best-fit straight line to the data for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

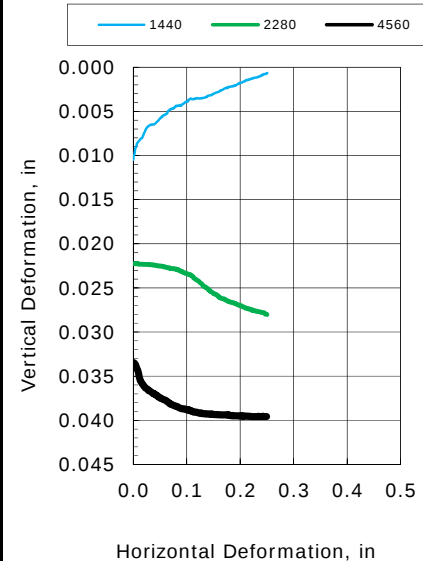
"---" indicates testing required to determine these values was not requested.

Client:	D&S Engineering Labs
Project Name:	Park Place
Project Location:	Denton, TX
GTX #:	308690
Test Date:	08/28/18
Tested By:	md
Checked By:	njh
Boring ID:	B8
Sample ID:	---
Depth, ft:	19-20
Visual Description:	Shale; gray, yellowish brown

Direct Shear Test of Soils Under Consolidated Drained Conditions by ASTM D3080



Test No.:	DS-1	DS-2	DS-3
Initial Diameter, in:	2.5	2.5	2.5
Initial Height, in:	1.0	1.0	1.0
Initial Mass, grams:	150	147	152
Initial Dry Density, pcf:	90.4	86.7	96.0
Initial Moisture Content, %:	29.2	31.8	22.9
Initial Bulk Density, pcf:	116.8	114.2	118.0
Initial Degree of Saturation:	91.2	90.8	81.8
Initial Void Ratio:	0.87	0.94	0.76
Final Dry Density, pcf:	90.4	89.2	100.0
Final Moisture Content, %:	34.0	37.4	29.8
Final Bulk Density, pcf:	121.2	122.5	129.8
Normal Stress, psf:	1440	2280	4560
Maximum Shear Stress, psf:	1080	1190	2100
Shear Rate, in/min:	0.0003	0.0003	0.0003



Sample Type:	intact
Estimated Specific Gravity:	2.70
Liquid Limit:	---
Plastic Limit:	---
Plasticity Index:	---
% Passing #200 sieve:	---
Soil Classification:	---
Group Symbol:	---

Notes:

Moisture content obtained before shear from sample trimmings
 Moisture Content determined by ASTM D2216
 Extruded from tube, cut, trimmed and placed into apparatus at the as-received density and moisture content

Values for cohesion and friction angle determined from best-fit straight line to the data for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site-specific conditions.

"---" indicates testing required to determine these values was not requested.

APPENDIX B - GENERAL DESCRIPTION OF PROCEDURES

ANALYTICAL METHODS TO PREDICT MOVEMENT

INDEX PROPERTY AND CLASSIFICATION TESTS

Index property and classification testing is perhaps the most basic, yet fundamental tool available for predicting potential movements of clay soils. Index property testing typically consists of moisture content, Atterberg Limits, and Grain-size distribution determinations. From these results, a general assessment of a soil's propensity for volume change with changes in soil moisture content can be made.

Moisture Content

By studying the moisture content of the soils at varying depths and comparing them with the results of Atterberg Limits, one can estimate a rough order of magnitude of potential soil movement at various moisture contents, as well as movements with moisture changes. These tests are typically performed in accordance with ASTM D2216.

Atterberg Limits

Atterberg limits determine the liquid limit (LL), plastic limit (PL), and plasticity index (PI) of a soil. The liquid limit is the moisture content at which a soil begins to behave as a viscous fluid. The plastic limit is the moisture content at which a soil becomes workable like putty, and at which a clay soil begins to crumble when rolled into a thin thread (1/8" diameter). The PI is the numerical difference between the moisture constants at the liquid limit and the plastic limit. This test is typically performed in accordance with ASTM D4318.

Clay mineralogy and the particle size influence the Atterberg Limits values, with certain minerals (e.g., montmorillonite) and smaller particle sizes having higher PI values, and therefore higher movement potential.

A soil with a PI below about 15 to 18 is considered to be generally stable and should not experience significant movement with changes in moisture content. Soils with a PI above about 30 to 35 are considered to be highly active and may exhibit considerable movement with changes in moisture content.

Fat clays with very high liquid limits weakly cemented sandy clays, or silty clays are examples of soils in which it can be difficult to predict movement from index property testing alone.

Grain-size Distribution

The simplest grain-size distribution test involves washing a soil specimen over the No. 200 mesh sieve with an opening size of 0.075 mm (ASTM D1140). This particle size has been defined by the engineering community as the demarcation between coarse-grained and fine-grained soils. Particles smaller than this size can be further distinguished between silt-size and clay-size particles by use of a Hydrometer test (ASTM D422). A more complete grain-size distribution test that uses sieves to the relative number of particles according is the Sieve Gradation Analysis of Soils (ASTM D6913). Once the characteristics of the soil are determined through classification testing, a number of movement prediction techniques are available to predict the potential movement of the soils. Some of these are discussed in general below.

POTENTIAL VERTICAL MOVEMENT

A general index for movement is known as the Potential Vertical Rise (PVR). The actual term PVR refers to the TxDOT Method 124-E mentioned above. For the purpose of this report, the term Potential Vertical Movement (PVM) will be used since PVM estimates are derived using multiple analytical techniques, not just TxDOT methods.

It should be noted that all slabs and foundations constructed on clay or clayey soils have at least some risk of potential vertical movement due to changes in soil moisture contents. To eliminate that risk, slabs and foundation elements (e.g., grade beams) should be designed as structural elements physically separated by some distance from the subgrade soils (usually 6 to 12 inches).

Since the new building will be constructed with drilled shaft supported grade beams and structurally supported floor slabs, the risk of post-construction PVM should be minimal.

SPECIAL COMMENTARY ON CONCRETE AND EARTHWORK

RESTRAINT TO SHRINKAGE CRACKS

One of the characteristics of concrete is that during the curing process shrinkage occurs and if there are any restraints to prevent the concrete from shrinking, cracks can form. In a typical slab on grade or structurally suspended foundation, there will be cracks due to interior beams and piers that restrict shrinkage. Similar restraint can occur when pavements are cast directly against rigid bedrock materials. This restriction is called Restraint to Shrinkage (RTS). These RTS cracks do not normally adversely affect the overall performance of foundations or pavements. It should be noted that for exposed floors, especially those that will be painted, stained or stamped, these cracks may be aesthetically unacceptable. Any tile which is applied directly to concrete or over a mortar bed over concrete has a high probability of minor cracks occurring in the tile due to RTS. It is recommended if the tile is used to install expansion joints in appropriate locations to minimize these cracks.

UTILITY TRENCH EXCAVATION

Trench excavation for utilities should be sloped or braced in the interest of safety. Attention is drawn to OSHA Safety and Health Standards (29 CFR 1926/1910), Subpart P, regarding trench excavations greater than 5 feet in depth.

FIELD SUPERVISION AND DENSITY TESTING

Field density and moisture content determinations should be made on each lift of fill with a minimum of one (1) test performed per lift in the building pad area for every 7,500 square feet, one (1) test per lift per 3,000 square feet in other fill areas, one test per lift in parking areas for every 10,000 square feet, one (1) test lift per 300 linear feet of roadways and drives, and one (1) test lift per 100 linear feet of utility trench backfill. Supervision by the field technician and the project engineer is required. Some adjustments in the test frequencies may be required based upon the general fill types and soil conditions at the time of fill placement.

It is recommended that all site and subgrade preparation, proof rolling, and pavement construction be monitored by a qualified engineering firm. Density tests should be performed to verify proper compaction and moisture content of any earthwork. The inspection should be performed prior to and during concrete placement operations. D&S would be pleased to perform these services in support of this project.

14805 Trinity Boulevard, Fort Worth, Texas 76155
Geotechnical 817.529.8464 Corporate 940.735.3733
www.dsenglabs.com

Texas Engineering Firm Registration # F-12796
Oklahoma Engineering Firm Certificate of Authorization CA 7181



Council Meeting Requests for Information

	Request	Request Date	Staff Responsible	Department	Status	Requested By
1	ISR on requirements to survey property owners adjacent to the PEC-4 project regarding their willingness to allow use of right-of-way easements for bicycle and pedestrian paths?	02/26/19	Estes	Capital Projects	Information will be provided in a future Friday report.	Meltzer
2	Staff Report on additional costs for bringing the Hickory Creek widening project to six lanes.	05/06/19	Deshmukh	Capital Projects	Information is provided in the June 28 Friday report.	Ryan
3	Document the current state of properties that will be upgraded and altered through the PEC 4 Drainage Improvements Project for historical records.	05/21/19	Estes	Capital Projects	Information will be provided in a future Friday report.	Davis
4	Information on what can be done to address the appearance that City projects start and then stall once the land is cleared or initial work is done.	06/18/19	Estes	Capital Projects	Information will be provided in a future Friday report.	Meltzer
5	Rules for relocation and financial assistance during property acquisition.	06/18/19	Cody	Capital Projects	Information will be provided in a future Friday report.	Briggs
6	What land will be left after the Bonnie Brae project and what are the plans for that left over land?	06/18/19	Estes	Capital Projects	Information will be provided in a future Friday report.	Hudspeth
7	Information on sidewalks near MKOC and the feasibility of adding a DCTA stop at the facility.	05/21/19	Estes/Canizares	Capital Projects/City Manager's Office	Information regarding DCTA access was provided in the June 14 Friday report. Information regarding sidewalks will be provided in a future Friday report.	Armintor
8	Design and purchase a "slow-kids at play" sign with the City logo that could be made available to residents for placement in their yards.	05/21/19	Estes/Kuechler	Capital Projects/Public Affairs	Information will be provided in a future Friday report.	Hudspeth
9	Work Session on options to enhance City's partnership with DCTA under the new governance structure.	05/21/19	Canizares	City Manager's Office	A work session has been scheduled for August 6.	Davis
10	Resolution from City Council to ask the County to wait on their redistricting until the 2020 Census	05/21/19	Wood	City Manager's Office	This will be prioritized with other requests during the July 23 Strategy Session.	Armintor
11	Discussion on addressing elected officials referencing emails in an open forum without providing copies of the emails referenced as back-up material for the record.	06/18/19	Wood	City Manager's Office	Information will be provided in a future Friday report.	Hudspeth
12	Work Session on comprehensive process for low-income housing strategy that includes housing bonds, density bonuses, grants for low income rentals, land swaps and other tactics to maximize the availability of affordable housing.	03/20/19	Kuechler/Shaw	Community Development	This process will be discussed during a future work session.	Meltzer
13	Can CDBG allocations be required to be located in specific areas around the City? How many lots/homes is Habitat for Humanity planning to purchase and build?	05/07/19	Kuechler/Shaw	Community Development	Information will be provided in a future Friday report.	Hudspeth
14	Information on ways to incentivize the inclusion of Habitat for Humanity homes to new developments.	05/21/19	Kuechler/Shaw	Community Development	Information will be provided in a future Friday report.	Briggs
15	Report on candidate properties for a Basic Services Center? Consider Ruddell property	06/18/19	Kuechler/Shaw	Community Development	Information will be provided in a future Friday report.	Meltzer
16	Work session on basic services center, include an update on the shelter workgroup and discuss 501(c)3 status, history, and ability to deliver.	06/18/19	Kuechler/Shaw	Community Development	Information will be provided in a future Friday report.	Watts
17	Provide an update on land available for a tiny house village and if it could be collocated on property for a Basic Services Center.	06/18/19	Kuechler/Shaw	Community Development	Information will be provided in a future Friday report.	Hudspeth/Davis
18	Information on the policy options for a development fee waiver or City administered grant program for non-profit agencies.	06/04/19	Kuechler/Shaw/McDonald	Community Development/Development Services	Information will be provided in a future Friday report.	Briggs/Armintor/Davis
19	How much of Customer Services' bad debt is a result of late fees and penalties?	06/04/19	Thomson/Foster	Customer Service	A work session is planned for August 20 where this information will be discussed.	Briggs
20	Work session on credit and collections follow up for Council to provide policy feedback on percentage versus flat late fees. Provide comparative data from peer cities related to handling of account deposits and balances on transfers of service.	06/04/19	Thomson/Foster	Customer Service	A work session is planned for August 20 where this information will be discussed.	Briggs
21	Impact of potential fee increase to average residential and commercial accounts to recoup previous revenue received from online and phone payment fees.	06/04/19	Thomson/Foster	Customer Service	Information will be provided in a future Friday report.	Briggs
22	Landlord incentives provided by the City for reduced taxes for those making units available for transitional housing.	05/21/19	McDonald	Development Services	Information will be provided in a future Friday report.	Briggs
23	Information on how industrial sites could be added to noise ordinance.	05/21/19	McDonald	Development Services	Information will be provided in a future Friday report.	Briggs
24	ISR on Rayzor Ranch Town Center change of ownership, information on the land overlays and the process to amend overlays, and information related to the incentives.	04/03/19	McDonald/Rogers	Economic Development/Development Services	Information will be provided in a future Friday report.	Watts
25	Information on the number of part-time City of Denton employees making less than \$10 per hour.	06/03/19	Romine	Human Resources	Information will be provided in a future Friday report.	Briggs
26	Work session on incentive policies or employment policies to address City of Denton employees living in the City limits.	06/04/19	Romine	Human Resources	Information will be provided in a future Friday report.	Briggs
27	Staff report on the City's use of artificial turf and the viability of using it in parks and sports fields.	05/07/19	Packan/Behrens	Parks and Recreation	Information will be provided in a future Friday report.	Armintor
28	Staff report on what it would take to support miracle league baseball.	05/21/19	Packan	Parks and Recreation	Information will be provided in a future Friday report.	Meltzer

Council Meeting Requests for Information

	Request	Request Date	Staff Responsible	Department	Status	Requested By
29	Information on the ability to add plots or tree banking on abandoned ROW at Oakwood Cemetery.	05/21/19	Packan	Parks and Recreation	Information will be provided in a future Friday report.	Meltzer
30	Comparison of cost for the City to conduct mowing in-house compared to contracting locally for this service.	06/03/19	Packan	Parks and Recreation	Information will be provided in a future Friday report.	Armintor
31	Information on the number of police officer positions that are needed by the city and our plan address any gaps.	04/03/19	Dixon	Police	Information is provided in the June 28 Friday report.	Briggs
32	Information on steps required to establish a County-wide crime lab.	06/04/19	Dixon/Gaines	Police/Finance	Information will be provided in a future Friday report.	Ryan
33	Options to incentivize current City contractors to pay a living wage and projections on associated cost increases incurred by the City.	06/03/19	Ogden	Procurement	Information will be provided in a future Friday report.	Hudspeth
34	Revise contractor evaluation criteria to require that bidders provide a list of employee salaries as a part of their submissions.	06/03/19	Ogden	Procurement	Information will be provided in a future Friday report.	Briggs/Davis
35	Budget impact to make minimum starting pay for all City employees (full time, part time, and seasonal) incremental increases leading to \$15 per hour (\$10, \$12, and \$15). Data on how many seasonal employees are in high school or college. Provide additional description of the seasonal and part time positions that are currently making less than \$15 per hour.	06/03/19	Ogden/Romine	Procurement/Human Resources	Information will be provided in a future Friday report.	Armintor/Ryan
36	Information on the addition of a City position to support all non-profit agencies.	04/09/19	Kuechler/Rogers	Public Affairs/Community Developm	Information will be provided in a future Friday report.	Hudspeth
37	Information on use of CDBG or other funding to install sidewalks along Ruddell to support Solutions of North Texas project.	06/04/19	Kremer	Public Works	Information will be provided in a future Friday report.	Armintor/Briggs
38	Staff report on ways to reduce recycling contamination rates, including alternative bin designs and what cities with low contamination rates have done to educate the public.	05/21/19	Boerner/Cox	Solid Waste	Information will be provided in a future Friday report.	Armintor/Meltzer
39	Fully value solid waste wholesale taking into consideration the cost of service and loss of landfill space. What would be required for stabilization of the fund? What would the impact be on the landfill permit expansion?	06/11/19	Boerner	Solid Waste	Information will be provided in a future Friday report.	Meltzer
40	Information on a more comprehensive waste reduction strategy to manage landfill space.	06/11/19	Boerner	Solid Waste	Information will be provided in a future Friday report.	Davis
41	Information on potential use of plastic from the City's waste stream for recycled carpet.	06/11/19	Boerner	Solid Waste	Information is provided in the June 28 Friday report.	Hudspeth
42	Information on the amount of energy used at City water and waste water facilities and the feasibility of adding solar panels to reduce energy costs.	06/04/19	Banks/Puente	Water/Wastewater/DME	Information will be provided in a future Friday report.	Briggs

Other Council Requests for Information

	Request	Request Date	Staff Responsible	Department	Status	Requested By
1	Prepare a list of contractors who were found to have done faulty compaction work leading to street failures.	04/02/19	Estes	Capital Projects	Information will be provided in a future Friday report.	Meltzer
2	Information on strategies to alleviate congestion on Locust and Elm particularly in light of staff's recommendation not to re-open Taliaferro Street.	06/03/19	Estes	Capital Projects	Information will be provided in a future Friday report.	Briggs
3	Follow-up requested regarding the date the construction berm was in place and for the City to conduct a water sample at the conclusion of construction project to confirm that the water is clean enough to serve as a TCA-certified wildlife habitat.	06/11/19	Estes	Capital Projects	Information will be provided in a future Friday report.	Armintor/Briggs
4	The public parking at Oakland and McKinney needs handicapped parking near the Oakland-McKinney corner accessible to the new McKinney crosswalk.	06/12/19	Deshmukh/Oliphant	Capital Projects	Information will be provided in a future Friday report.	Watts
5	Provide data collected used to describe the two year warranties for roadways.	06/15/19	Estes	Capital Projects	Information will be provided in a future Friday report.	Meltzer
6	Can temporary ADA parking be added around the courthouse for the July 27 ADA Rally?	06/18/19	Oliphant/Deshmukh	Capital Projects	Information is provided in the June 28 Friday report.	Armintor
7	Assess traffic patterns and signage for the construction near Ave C and Hickory	06/19/19	Estes	Capital Projects	Information will be provided in a future Friday report.	Ryan
8	Assess whether a stop sign or yield sign is supported in the Villages of Carmel	06/19/19	Deshmukh	Capital Projects	Information will be provided in a future Friday report.	Hudspeth
9	Provide information on the operational impact associated with the train, church hours on Sundays, staff recommendations for access/exits, and a potential community meeting to discuss traffic impacts with the community.	06/26/19	Deshmukh	Capital Projects	Information will be provided in a future Friday report.	Hudspeth
10	Evaluate on-street parking along Duchess Drive in the Longhorn Cove development and look into the fence that is in disrepair.	06/14/19	Estes/Deshmukh/Hedges	Capital Projects/CIS	Information is provided in the June 28 Friday report.	Hudspeth
11	How many additional parking spaces will the removal of dumpsters via the valet trash and recycling pilot program fee up along Industrial? Could those new parking spaces warrant additional ADA parking along the square?	06/18/19	Oliphant/Deshmukh/Boerner	Capital Projects/Solid Waste	Information is provided in the June 28 Friday report.	Armintor
12	Please prepare a Legal Status Report on the requirements for existing gas wells and/or pad sites. Additionally, have staff prepare maps of all gas well plats together with various setback radii that identifies the applicable setback setback for each pad site and the conditions required to make new gas well development subject to new codes. If most sites are vested, what is left that would be impacted by the new regulations?	05/17/19	McDonald/Leal/Banks	City Attorney's Office/Development	Information will be included in the July 15 work session and a separate Legal Status Report.	Watts
13	Specifics regarding the previously stated State pre-emption concerns for gas wells. Need more specific information on who is grandfathered in and why.	05/14/19	Leal/Banks	City Attorney's Office/Utilities	Information will be provided during the July 15 Luncheon. A separate Legal Status Report will also be distributed related to this issue.	Davis
14	Workshop on the potentially altering current City requirements for elected officials to serve on community board such as the Economic Development Partnership Board.	06/18/19	Wood/Rios	City Secretary's Office	This will be prioritized with other requests during the July 23 Strategy Session.	Hudspeth
15	Which organizations listed on the dashboard our housing are housing individuals each month? This will help Council understand where grants are needed most.	04/16/19	Kuechler	Community Development	Information is provided in the June 28 Friday report.	Briggs
16	Provide an outline of past two years homeless initiatives and include items that will be discussed during this budget cycle	06/20/19	Kuechler/Shaw	Community Development	Information will be provided in a future Friday report.	Briggs
17	How much does it cost taxpayers for someone to stay one night in jail and how does that compare to the daily rate for the Monsignor King enhanced shelter?	05/19/19	Kuechler/Dixon	Community Development/Police	Information will be provided in a future Friday report.	Briggs
18	Provide logistical and operational details of how the following may apply in Denton: Grand Prairie's rate structure, income based discounts, senior programs and discounts, Veteran's deposit waivers. Can DHA's voucher list be used to determine needs?	06/04/19	Thomson/Foster	Customer Service	Information will be provided in a future Friday report.	Armintor
19	Does the zoning on US 377 next to Smokehouse allow for the new proposed business?	06/16/19	McDonald	Development Services	Information will be provided in a future Friday report.	Watts
20	Provide a report to include the facts and what the City can and cannot legally require for the underground parking that is proposed on the corner of Scripture and Normal.	06/24/19	McDonald/Banks/Estes	Development Services/Environmen	Information is provided in the June 28 Friday report.	Armintor
21	Update on the Verizon pole attachment debt.	12/03/18	Puente/Morrow/Adams	DME	Information will be provided in a future Legal Status Report.	Meltzer
22	Staff Report on the City's relative economic impact as an employer in terms of the number of jobs the city of Denton contributes to our local economy, at each of the various pay and employment levels (broken down by pay level) versus other major employers in the area (the universities, Peterbilt, Tetrapak, Target, Walmart, etc.) and recent and future 380 agreements like Buc-ees, the Convention Center, and Tyson.	06/04/19	Rogers	Economic Development	Information will be provided in a future Friday report.	Armintor

Other Council Requests for Information

	Request	Request Date	Staff Responsible	Department	Status	Requested By
23	Is there any interest from grocery companies in the Brookshire's property? Are there any factors that are inhibiting new grocery stores from coming into that area?	06/22/19	Rogers	Economic Development	Information will be provided in a future Friday report.	Meltzer
24	Clarification on property value increase patterns for the Oak Street property. Have there been similar trends with other properties or were there other factors at play specific to this property?	05/28/19	Puente/Gaines	Finance	Staff is working with the Denton County Appraisal District to prepare a response. Information will be provided in a future Friday report.	Briggs
25	Staff report on City funds provided to outside entities including partnerships where real estate is provided (cash or in-kind), or funding for salaries is provided and the requirements placed on those entities.	05/14/19	Gaines/Wood	Finance/City Manager's Office	Information will be provided in a future Friday report.	Davis
26	Staff report on turnover rates by department at all pay levels (part time, full time, and seasonal) including which department have the highest turnover rates and at what pay grades the turnover occurs, costs associated with turnover to the department, and known reasons for turnover.	06/04/19	Romine	Human Resources	Information will be provided in a future Friday report.	Armintor
27	Is HR staff available to meet regarding a living wage policy for city staff and a paid family leave policy?	06/18/19	Romine	Human Resources	Information will be provided in a future Friday report.	Armintor
28	When will the new partial fence around the soccer field at North Lakes Park?	06/18/19	Packan	Parks and Recreation	Information will be provided in a future Friday report.	Armintor
29	Cross-departmental strategy and budget to sunset use of Roundup citywide.	06/02/19	Packan	Parks and Recreation, Utilities, Stre	Information will be provided in a future Friday report.	Briggs
30	Request for meeting with Chief Dixon regarding legal caged entrapment of nuisance wildlife vs. post-entrapment additional confinement and treatment of the caged animal	06/16/19	Dixon	Police	A meeting will be scheduled and information will be provided in a future Friday report.	Armintor
31	Information on several issues associated with women's safety in Denton: -Pedestrian lighting on Mulberry to Carroll due to recent sexual assaults in the area -Map of reported sexual assaults that have occurred in Denton over the past 5 years and an assessment of the pedestrian lighting needs in those areas -Staff report on adding DPD Victims' Services Counselors to follow-up with victims who have reported assaults and to serve as their primary liaison. Include information on ways to ensure diversity with Victims' Services Counselors and data on the number of sexual assaults reported over the past five years and associated staffing needs to support any increases in activity.	05/28/19	Dixon/Estes	Police (Primary)Capital Projects (A	Information will be provided in a future Friday report. Staff is scheduled to meet on Monday, June 3 to prepare the response.	Armintor
32	Prepare a single document responding to the questions raised by City Council during the June 3 Living Wage for City Contractors presentation.	06/03/19	Ogden	Procurement	Staff is compiling the requested information and will include responses in a future Friday report.	Armintor
33	Is staff available to meet with staff regarding issues with homeless near their downtown properties	06/19/19	Kuechler/Dixon	Public Affairs/Police	A meeting will be scheduled and information will be provided in a future Friday report.	Briggs
34	Staff update on Choctaw natural preservation project.	06/04/19	Kremer/Cox	Public Works	Information will be provided in a future Friday report.	Davis
35	What are the plans to address the street condition on Mistywood?	06/20/19	Kremer	Public Works	Information will be provided in a future Friday report.	Briggs
36	Update on the project on Hercules from Sherman and Stuart Road.	06/27/19	Kremer	Public Works	Information is provided in the June 28 Friday report.	Briggs
37	Residents have reported several missed trash pick-ups on Thursday, June 27.	06/28/19	Boerner/Cox	Solid Waste	Information will be provided in a future Friday report.	Briggs
38	Is there an automated notification service available to notify residents about loss of water when a water main break occurs?	06/15/19	Banks/Thomson	Utilities Admin	Information will be provided in a future Friday report.	Briggs

July 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 No Luncheon Meeting 1:30pm Committee on the Environment Cancelled 5:30 pm Traffic Safety Commission	2 No Council Meeting	3 NO - 2:30pm Agenda Committee	4	5 11:00 am DCRC	6
7	8 9:00am Public Utilities Board	9 No Council Meeting	10 11:00am EDP	11 HOT & S 9-11 4:00 Public Art Committee	12	13
14	15 11:30 am Council Luncheon 5:30pm HLC	16 9am Mobility 2:00 pm CC Work Session 6:30 pm CC Regular Session	17 5:00pm P&Z Work Session 6:30pm P&Z Regular Session	18 4:00pm HaBSCo Meeting 6:00pm Committee on Persons with Disabilities	19	20
21	22 6:00pm Public Utilities Board	23 2:00 pm 4th Tuesday Session	24 11:00am TIF Board (TIRZ # 1)	25	26	27
28	29 4:00pm ZBA	30 No Council Meeting	31			

August 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 4:00pm Public Art Committee	2	3
4	5 11:30 am Council Luncheon 1:30pm Committee on the Environment 5:30 pm Traffic Safety Commission	6 2:00 pm CC Work Session 6:30 pm CC Regular Session	7 5:00pm P&Z Work Session 6:30pm P&Z Regular Session	8	9	10
11	12 9:00am Public Utilities Board 5:30pm HLC	13 9:00 am Mobility Committee 2:00 pm 2nd Tuesday Session	14 11:00am EDP	15 4:00pm HaBSCo Meeting 5:00pm Committee on Persons with Disabilities	16	17
18	19	20 2:00 pm CC Work Session 6:30 pm CC Regular Session	21 5:00pm P&Z Work Session 6:30pm P&Z Regular Session	22	23	24
25	26 6:00pm Public Utilities Board 4:00pm ZBA	27 2:00 pm 4th Tuesday Session	28	29	30	31

September 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2 No Luncheon Meeting 5:30 pm Traffic Safety Commission	3 No Council Meeting	4 5:00pm P&Z Work Session 6:30pm P&Z Regular Session	5 4:00pm Public Art Committee	6	7
8	9 9:00am Public Utilities Board 11:30 am Joint Meeting w/EDP Board	10 9:00 am Mobility Committee 2:00 pm CC Work Session 6:30 pm CC Regular Session	11 11:00am EDP	12	13	14
15	16 5:30pm HLC	17 2:00 pm CC Work Session 6:30 pm CC Regular Session	18 5:00pm P&Z Work Session 6:30pm P&Z Regular Session	19 4:00pm HaBSCo Meeting 5:00pm Committee on Persons with Disabilities	20	21
22	23 6:00pm Public Utilities Board	24 2:00 pm 4th Tuesday Session	25 11:00 TIF Board (TIRZ)	26	27	28
29	30 4:00pm ZBA					

More Calendars from WinCalendar: [Word Calendar](#), [Excel Calendar](#), [Online Calendar](#)

Meeting Date	Currently Slated Work Session Items				
15-July Lunch	Gas Well Setback and Distance Study			Gas Well Notification Disclosure Requirements	
16-Jul	Pecan Creek Broadband	Charity Care	Impacts of 2019 State Legislation	Board of Ethics	2nd Preliminary Budget Discussion/ Departmental Presentations including DME
23-Jul	2019 DDC Update and Status	Denton Police Department Overview	Work Session Strategy Session	Departmental Budget Presentations	Audit Work Plan
1-Aug (Occurs on a Thursday)	Budget Workshop/2019 Recommendation from Bond Advisory Committee/Bond Funded Facilities				
5-Aug Lunch	Joint DISD/City Council Luncheon				
6-Aug	Utility Street Cuts Audit (IA)	Tiny Home Development	Economic Development Corridor Plan/Reinvestment Grant	Pay-As-You-Go Program Overview	Outdoor Music Venues and Noise Ordinance
13-Aug	Atmos Energy Update	Rayzor Ranch PID	Procurement Audit (IA)	P-Card Audit (IA)	Chamber Contract
20-Aug	Signage and Design Standards	Credit Collections Policy	DCTA Update	Mosley Road Landfill	Manufactured Home Financial Risk Disclosure
27-Aug	Development Services Certified Mailings	Construction Code Review	Inspection Program Update	Real Estate Policy	Council & Committee Rules of Procedure
9-Sep	Joint EDPB/City Council Luncheon				
10-Sep	Commercial Food Diversion (September)	Employee Ethics Policy	Municipal Broadband	City Hall West	Non-Profit Development Fee Grant Program

Date TBD	Affordable Housing/ Housing Assistance	Scooter Share	City Facility Naming Policy	Accounts Payable Audit (IA)	
	Police Overtime (IA)	Accounts Payable Audit (IA)	Right of Way Ordinance Follow-up		
	Sobering Centers	Group Home Code Amendment	Waste Reduction Strategies		
	Mews Streets	Roadway Quality Audit (IA)	Purchasing Manual Update		

Top priorities from 3/4 Work Session	Top Priorities from 4/23 Work Session
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Street Closures Report

Week of July 1-7, 2019

For general inquiries and questions, please contact the Project Management Office at (940) 349-8989

The Construction Projects Report is updated weekly and reflects most City planned construction projects that impact traffic for a minimum of 5 days. Construction projects not listed on this report may not meet this criteria, or are not a City of Denton managed improvement or construction project.



Street/Intersection	From	To	Date of Construction	Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:	Updated Information / Notes
CURRENT PROJECTS See Yellow Highlighted for Major Closures										
Bell Ave.	Intersection of	McKinney	5/28/19	7/5/19	Intersection Improvements (No Street Closure)	Engineering	2/22/19	Website & Letters	(940) 349-8910	
Blagg Rd.	Mayhill	Geesling	3/18/19	10/31/19	Mayhill Project Bridge (Temporary Street Closure)	Engineering		Website & Nextdoor Notification	(940) 208-4318	Part of Mayhill Rd. Widening Capital Project
Bonnie Brae St.	Roselawn	North of Vintage	7/1/17	10/1/19	Street Widening (No Street Closures)	Engineering	6/14/18		(940) 349-8910	Part of Bonnie Brae Ph. I Capital Project
Bonnie Brae St.	Highland Park	Willowwood	5/13/19	7/19/19	Water Main Replacement North South Water Main Ph. II (Temporary Street Closure)	Engineering		Website, Nextdoor Notification	(940) 349-8910	Part of North South Water Main Ph. II Capital Project (Bonnie Brae from Roselawn to I35E);
Bonnie Brae St.	Intersection of	Scripture	6/13/19	8/31/19	Roundabout Bonnie Brae Ph. IV (Intersection Closure)	Engineering	5/25/19	Website, Nextdoor Notification	(940) 349-8910	Part of Bonnie Brae Ph. IV Capital Project (I35E to Scripture); Overall intersection completion is 11/13/19
Cordell St.	Fulton	Alice	7/1/19	8/2/19	Curb, Gutter, and Base Failure Repair (Temporary Lane Closure; Street will open after 5 pm)	Streets	6/20/19		(940) 349-7160	New Project
Eagle Dr.	Elm	Carroll	1/31/19	7/9/19	Eagle Drainage Improvements (Temporary Street Closure)	Engineering		Website	(940) 268-9726	Completion extended from 6/28/19; Part of Eagle Dr. Dainage Capital Project

Street/Intersection	From	To	Date of Construction	Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:	Updated Information / Notes
Edgewood Pl.	Northwood Terrace	Crestwood	5/9/19	7/16/19	Wastewater and Water Main Replacement (Temporary, Intermittent Road Closure; Reopen at 6 pm each day)	Wastewater and Water	5/2/19		(940) 349-7300	
Egan St.	Lovell	Malone	6/17/19	9/20/19	Street Reconstruction (Full Street Closure; Reopen at 5 pm daily)	Streets	6/11/19		(940) 349-7160	
Glenn Falls Ln.	Blue Sky Lane	Cul de Sac	7/1/19	8/2/19	Sidewalk Repair (Temporary Lane Closure, Street will open after 5 pm)	Streets	6/21/19		(940) 349-7160	New Project
Hercules Ln.	Sherman	Stuart	3/25/19	8/6/19	Water Main Replacement (Temporary Lane Closure)	Water	3/4/19		(940) 349-7167	Part of Hercules Water Project
Hickory St.	Ave B	Fry	6/12/19	8/3/19	Drainage and Street Improvements (Street Closure)	Streets	5/30/19	Website, Nextdoor Notification	(940) 349-7160	Street Repairs to follow on Hickroy from Fry to Carroll
Hickory St.	Intersection of	Fry	6/12/19	8/3/19	Drainage and Street Improvements (Street Closure)	Wastewater	5/30/19	Website, Nextdoor Notification	(940) 349-7300	
Highland St.	Carroll	IOOF	5/20/19	8/1/19	Highland Street Fence (Intermittent Closures)	Parks		Website	(940) 349-7464	
Highview Cir.	Forrest Ridge	Forrest Ridge	6/10/19	10/28/19	Street Reconstruction (Full Street Closure; Reopen at 6 pm daily)	Streets	5/6/19		(940) 349-7160	
Hinkle Dr.	US 380	Headlee	5/23/19	9/1/19	Street and Drainage Improvements Magnolia Drainage Ph. II (Street Closure)	Engineering	11/13/18		(940) 349-8910	Part of Magnolia Drainage Capital Project (Hinkle from University to Windsor and Windsor from Hinkle to Elm)
Hinkle Rd.	Headlee	Windsor	7/3/19	9/1/19	Street and Drainage Improvements Magnolia Drainage Ph. II (Street Closure)	Engineering				Part of Magnolia Drainage Capital Project (Hinkle from University to Windsor and Windsor from Hinkle to Elm)
Huntington Dr.	Hercules	Sun Valley	6/17/19	8/6/19	Water Main Replacement (Temporary Lane Closure)	Water	3/24/19		(940) 349-7167	Part of Hercules Water Project

Street/Intersection	From	To	Date of Construction	Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:	Updated Information / Notes
Johnson St.	E. Collins	E. Daugherty	5/29/19	7/15/19	Water Main Replacement (Temporary Street Closure; will open at 6:00 pm daily)	Water	5/6/10		(940) 349-7167	
Kendoph Ln.	Underwood	Willowwood	6/11/19	7/24/19	Street Resurfacing, Curb and Gutter (Temporary Street Closure; will reopen at end of each day)	Streets	5/6/19	Website, Nextdoor Notification	(940) 349-7160	
Kerley St.	Duncan	Shady Oaks	4/25/19	8/17/19	Wastewater Main Replacement (Temporary Street Closure, will reopen at end of each work day)	Wastewater		Website, Nextdoor Notification	(940) 349-7300	
Kings Row	Yellowstone	Sherman	5/6/19	7/14/19	Street Reconstruction (Temporary Lane Closure)	Streets	12/7/18		(940) 349-7160	Completion extended from 6/28/2019
Kings Row	Yellowstone	Stuart	5/29/19	7/14/19	Street Reconstruction (Temporary Lane Closure)	Streets	4/9/19	Website, Nextdoor Notification	(940) 349-7160	Completion accelerated from 7/31/2019
Locust St.	Collins	Daugherty	6/13/19	7/13/19	Locust Substation Construction (Temporary, Intermittent Closures)	DME			(940) 349-7669	
Mayhill Rd.	US 380	Edwards	9/1/17	2/1/20	Street Widening (Temporary Lane Closures)	Engineering	1/3/18, 1/24/18	Door Hangers	(940) 208-4318	Part of Mayhill Rd. Widening Capital Project
E. McKinney St.	Grissom	S. Fork	3/11/19	12/1/19	Storm Drain Installation and Street Widening (Temporary, Intermittent Closures)	Engineering	3/7/19		(940) 349-8910	Part of McKinney Rd. Widening Capital Project
Mills Rd.	Mayhill	Cunningham	6/3/19	8/1/19	Storm Drain Inlet and Repave (Temporary Street Closure)	Engineering	5/15/19	Website , Nextdoor Notification	(940) 208-4318	Part of Mayhill Rd. Widening Capital Project
Myrtle St.	Eagle	Maple	1/31/19	7/9/19	Eagle Drainage Improvements (Street Closure)	Engineering	8/21/18	Contacted DCTA	(940) 349-8910	Completion extended from 6/28/19; Part of Eagle Dr. Drainage Capital Project
Northwood Terrace	Cul de sac	Edgewood Place	5/9/19	7/16/19	Wastewater and Water Main Replacement (Temporary, Intermittent Road Closure; Reopen at 6 pm each day)	Wastewater and water	5/2/19		(940) 349-7300	Part of Northwood/Edgewood Project

Street/Intersection	From	To	Date of Construction	Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:	Updated Information / Notes
Sheraton Rd.	Hercules	350 ft north	6/17/19	8/6/19	Water Main Replacement <i>(Temporary Lane Closure)</i>	Water	3/24/19		(940) 349-7167	Part of Hercules Water Project
Sherman Dr.	Monterey	Stuart	5/7/19	7/12/19	Wastewater Main Replacement <i>(Temporary Lane Closure)</i>	Wastewater		Website	(940) 349-7167	
Stuart Rd.	Long	Keystone	1/30/19	7/30/19	Street Reconstruction <i>(Street Closure)</i>	CM Construction		Nextdoor Notification	(940) 231-9963	Completion extended from 6/30/19
Sweetgum Dr.	Daisy	Lantana	6/24/19	8/5/19	Street Panel/Sidewalk Repair <i>(Temporary Lane Closure)</i>	Streets	6/12/19		(940) 349-7160	
Timber Ridge Cir.	Intersection of	Fox Hollow	7/1/19	7/12/19	Valley Gutter Installation <i>(Street Closure)</i>	Streets	6/21/19		(940) 349-7160	
University Dr. (US 380)	1200 ft west of Mayhill	1200 ft east of Mayhill	6/3/19	6/28/19	Street Repair <i>(Temporary, Intermittent Lane Closures)</i>	TxDOT		Website	(940) 387-1414	Part of Mayhill Rd. Widening Capital Project
Ft. Worth Dr. (US 377)	IH 35E	0.26 mi south of FM 1830	12/3/18	12/12/20	Street Widening <i>(Temporary Lane Closures during non-peak traffic)</i>	TxDOT	9/25/18	Public Meeting 10/8	(940) 387-1414	
Wainwright St.	Sycamore	Bell	6/24/19	7/24/19	Atmos Utility Relocation <i>(Temporary, Intermittent Street Closure)</i>	Atmos	6/20/19			
Wainwright St.	Prairie	Highland	7/1/19	8/1/19	Drainage Improvements Pec 4 Ph. I & II <i>(Street Closure)</i>	Engineering	6/20/19		(940) 268-9726	New Project; Part of Pec 4 Ph. I & II Capital Project
Yellowstone Pl.	Hercules	350 ft north	6/12/19	8/6/19	Water Main Replacement <i>(Temporary Lane Closure)</i>	Water	3/24/19		(940) 349-7167	Part of Hercules Water Project
Yellowstone Pl.	Kings Row	Sun Valley	7/1/19	7/26/19	Sidewalk Repair <i>(Temporary Lane Closure; Reopen at 5 pm daily)</i>	Streets			(940) 349-7160	New Project

Street/Intersection	From	To	Date of Construction	Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:	Updated Information / Notes
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COMPLETED PROJECTS										
Acorn Bend Rd.	Field Bend	Cule de Sac	6/3/19	6/28/19	Street Panel and Sidewalk Repair <i>(Temporary Lane Closures)</i>	Streets	5/14/19		(940) 349-7160	New Completion
Bonnie Brae St.	University	Linden	6/3/19	6/14/19	Private Development <i>(Temporary Lane Closure)</i>	Engineering		Website	(940) 349-8910	
Daisy Dr.	Boxwood	Sweet Gum	4/29/19	6/19/19	Concrete Panel Repair <i>(One Way Lane Closure)</i>	Streets	4/15/19		(940) 349-7160	
Dallas Dr.	Intersection of	Teasley	11/12/18	6/28/19	Turn Lane Upgrade <i>(Temporary Lane Closure)</i>	Streets	11/5/18		(940) 349-7160	
Forrestridge Dr.	Highview Cr.	Highview Cr.	5/20/19	6/4/19	Atmos Utility Relocations <i>(Westbound Lane Closure)</i>	Atmos		Community Meeting	(940) 293-7039	
Hann St.	Locust	Austin	5/6/19	6/4/19	Water Line Improvements <i>(Street Closure)</i>	PWI	4/11/19		(940) 268-9726	
Heritage Tr.	South of University	Linden	3/28/19	6/18/19	Turn Lane Installation <i>(One lane both directions closed)</i>	PWI		Website	(940) 268-9842	
Highview Ct.	Highview Cr.	Dead End	4/29/19	6/7/19	Street Reconstruction <i>(Street Closure)</i>	Streets	4/18/19		(940) 349-7160	
Mercedes Rd.	Oakwood	Willowwood	5/15/19	6/12/19	Street Construction <i>(Street Closure)</i>	Streets	4/23/19		(940) 349-7160	
Paco Tr.	Ruddell	Cul de sac	5/6/19	6/11/19	Sidewalk Repair <i>(Lane Closure)</i>	Streets	4/26/19		(940) 349-7167	
Peak St.	Greenlee	Fannin	5/15/19	6/11/19	Street Construction <i>(Street Closure)</i>	Streets	4/23/19		(940) 349-7160	
Pennsylvania Dr.	Intersection of	Hollyhill	5/28/18	6/19/19	Valley Gutter Installation <i>(Temporary Lane Closures)</i>	Streets	5/15/19		(940) 349-7160	
Teal Dr.	Poinsettia	Cyrus	5/28/19	6/7/19	Sidewalk Repair <i>(Temporary Lane Closure)</i>	Streets	5/14/19		(940) 349-7160	

Street/Intersection	From	To	Date of Construction	Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:	Updated Information / Notes
UPCOMING PROJECTS										
Bushey St.	Morse	Wilson	7/8/19	7/15/19	Street Improvements <i>(Temporary Street Closure)</i>	Streets			(940) 349-7160	
FM 2181	City of Denton/Corinth City limits	Lillian Miller	TBD	TBD	Street Widening	TxDOT			(940)-387-1414	TxDOT Project - currently on hold
Greenwood Dr.	Intersection of	Robin Wood	7/8/19	7/19/19	Valley Gutter Installation <i>(Street Closure)</i>	Streets			(940) 349-7160	
Hickory Creek Rd.	Teasley	Riverpass	TBD	TBD	Street Widening <i>(Temporary Lane Closures)</i>	Engineering	11/26/18		(940) 349-8910	
I35E northbound service road	located	500 ft west of Bonnie Brae	9/12/19	10/23/19	Wastewater Improvements <i>(Temporary Lane Closure)</i>	Wastewater			(940) 349-7300	Start date extended from 7/17/19
Kirby Dr.	San Felipe	Memorial	7/15/19	8/16/19	Street Panel/Sidewalk Repair <i>(Temporary Lane Closure)</i>	Streets			(940) 349-7160	
Lipizzan Dr.	Tennessee	Rocky Mountain	7/8/19	8/2/19	Street Panel/Sidewalk Repair <i>(Temporary Lane Closure)</i>	Streets			(940) 349-7160	
Massey St.	Hwy 377	200' West	TBD	TBD	Street Boring <i>(Street Closure)</i>	TxDot		Email Notifications	(940) 387-1414	
Mistywood Ln.	Woodhaven	Jamestown	8/7/19	12/4/19	Water Main Replacement, Street Repairs <i>(Intermittent Street Closure)</i>	Water	12/17/18		(940) 349-7167	Part of Mistywood Water Project
Orr St.	Bolivar	Locust	7/16/19	8/12/19	Water Improvements <i>(Temporay Lane Closure; Reopen at end of each day)</i>	Water			(940) 349-7167	Wastewater and Streets to follow
Orr St.	Elm	Locust	8/14/19	9/11/19	Wastewater Improvements <i>(Temporary Lane Closure; Reopen at end of each day)</i>	Wastewater			(940) 349-7300	Streets to follow

Street/Intersection	From	To	Date of Construction	Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:	Updated Information / Notes
Parkway St.	Carroll	Denton	7/15/19	8/16/19	Sidewalk Repair (Temporary Lane Closure)	Streets			(940) 349-7160	
Prairie St.	Bell	Locust	TBD	TBD	Drainage Improvements Pec 4 Ph. I & II (Street Closure)	Engineering			(940) 268-9726	Part of Pec 4 Ph. I & II Capital Project
Roselawn Dr.	Bonnie Brae	Kansas City Southern RR	TBD	TBD	Drainage and Roadway Construction Bonnie Brae Phase 1 (One Lane traffic control)	Engineering	N/A		(940) 349-8910	
Rockwood Ln.	Royal	Mistywood	10/28/19	TBD	Street Repairs (Road Closure)	Streets	11/23/18	Door Hangers	(940) 349-7160	
Rockwood Ln.	Royal	Mistywood	8/7/19	12/4/19	Water Improvements (Temporary Lane Closure)	Water			(940) 349-7167	Part of Mistywood Water Project
Royal Ln.	Royal	Rockwood	10/28/19	TBD	Street Reconstruction (Road Closure)	Streets	11/23/18		(940) 349-7160	
Royal Ln.	Mistywood	Rockwood	8/7/19	12/4/19	Water Improvements (Temporary lane Closure)	Water			(940) 349-7167	Part of Mistywood Water Project
Sandy Creek Dr.	Angelina Bend	Angelina Bend	7/17/19	8/13/19	Wastewater Improvements (Temporary Lane Closure, Will reopen at 6 pm each day)	Wastewater			(940) 349-7300	Start dated accelerated from 8/26/19
Shady Oaks Dr.	Teasley	Woodrow	TBD	TBD	Base Repairs (Temporary Lane Closure)	Streets	Electronic Signs	Meet with business owners	(940) 349-7160	Crews will move here after work on Kerley St. is complete
Smith St.	Johnson	Dallas	8/19/19	9/17/19	Wastewater Improvements (Temporary Lane Closure)	Wastewater			(940) 349-7300	
Thomas St.	Panhandle	Oak	TBD	TBD	Streets Construction	Streets			(940) 349-7160	Part of 2019 Street Bundle
Vintage Blvd.	US 377	I35W	10/1/19	10/1/21	Street Widening Bonnie Brae Phase 2	Engineering			(940) 349-8910	

Street/Intersection	From	To	Date of Construction	Date of Completion	Brief Description of Construction	Department	Letters	Other Communication	Department Contact:	Updated Information / Notes
Wayne St.	Boyd	Mozingo	8/13/19	9/17/19	Water Improvements <i>(Temporary Lane Closure)</i>	Water			(940) 349-7167	
William St.	Oak	Hickory	7/15/19	8/12/19	Street Improvements <i>(Temporary Street Closure)</i>	Streets			(940) 349-7160	