Agenda item 3a

ITEM FOR ENVIRONMENTAL BOARD AGENDA

BOARD MEETING DATE REQUESTED:	FEB 1, 2011
NAME & NUMBER OF PROJECT:	LOOP 360 CLIMATIZED SELF-STORAGE SP-2011-0190C
NAME OF APPLICANT OR ORGANIZATION:	Riata Holdings, LTD. (CONTACT: ALEX G. CLARKE, PE 512/306-0289)
LOCATION:	2631 S CAPITAL OF TEXAS HWY
PROJECT FILING DATE:	July 11, 2011
WPDR/ENVIRONMENTAL STAFF:	JEB BROWN, 974-2709 JEB.BROWN@CI.AUSTIN.TX.US
WPDR/ CASE MANAGER:	NIKKI HOELTER, 974-2863 NHOELTER@AUSTINTX.GOV
WATERSHED:	BARTON SPRINGS ZONE (RECHARGE) DRINKING WATER PROTECTION ZONE
ORDINANCE:	LAND DEVELOPMENT CODE (CURRENT)
REQUEST:	VARIANCE REQUEST IS AS FOLLOWS: 1. TO ALLOW CUT UP TO A MAXIMUM OF 20.0 FEET (LDC 25-8-341) 2. TO ALLOW FILL UP TO A MAXIMUM OF 14.5 FEET (LDC 25-8-342) 3. (WAIVER REQUEST) TO ALLOW CUT OVER 8.0 FEET IN DEPTH DOWNHILL OF A SLOPE GREATER THAN 15% (LDC 25-2-1123(C))

STAFF RECOMMENDATION: RECOMMENDED WITH CONDITIONS.

REASONS FOR RECOMMENDATION:	FINDINGS OF FACT HAVE BEEN MET.

MEMORANDUM

TO: Betty Baker, Chairperson
Members of the Zoning and Platting Commission

FROM: Jeb Brown, Senior Environmental Reviewer
Planning and Development Review Department

DATE: February 1, 2012

SUBJECT: Loop 360 Climatized Self-Storage
Loop 360 & Walsh Tarlton Lane

Variance Request(s):

1) To allow cut up to a maximum of 20.0 Feet (LDC 25-8-341). 2) To allow fill up to a maximum of 14.5 Feet (LDC 25-8-342). 3) (Waiver Request to Land Use Commission) To allow cut over 8.0 feet in depth downhill of a slope greater than 15% (LDC 25-2-1123 (C)). The applicant is proposing to construct a commercial development consisting of two (2) 18,500 square feet footprint Climatized self storage buildings.

Description of Project Area

This 12.267 acre site (gross site area) is situated in Travis County, in the COA 2-mile ETJ. The site is in the Drinking Water Protection Zone and located within the Barton Creek Watershed over the Edwards Aquifer. The site is located approximately 700 feet north on Capital of Texas Highway of the intersection of Walsh Tarlton Lane and Capital of Texas Highway South. It is bounded by the Tarlton 360 Townhomes mixed-use project on the south, Capital of Texas Highway on the west, and existing residential development called Hill Country Estates on the east, and existing commercial development to the north. Allowable impervious cover totals are less than requirements set by LDC 25-8-514. Topographically, the site drains generally from the north to the south. Drainage from the Hill Country Estates single family subdivision sheet flows onto the site and then drains to a small drainage way at the south end of the project.

Vegetation

The site is located within the Balcones Canyonlands region of the Edwards Plateau physiographic province (Amos and Gehlbach, 1988). The vegetation in the region is classified as juniper-oak savanna and is dominated primarily by woodland and forest

vegetation. Grasslands are generally restricted to drainage divides and associated valleys (Amos and Gelbach, 1988). Mesic (moist) slopes generally support deciduous woodlands dominated by Texas oak (Quercus texasna), Plateau live oak (Q. Fusiformis), Asehe juniper (Juniperus ashei) and Texas ash (Fraximus texensis).
The vegetation types observed on the site consisted of dense cover of mixed hardwoods, including oak and juniper interspersed with native grasses and shrubs. Oak types observed included Plateau live oak and Blackjack oak (Quercus marilandica). Overall woodland canopy cover was estimated at near 100 percent. No wetlands observed on site.

Critical Environmental Features/Endangered Species

There are no critical environmental features onsite.

Water/Wastewater

There is no water/wastewater service available to this site pursuant to the Robert E Lee Study. An onsite operating permit and maintenance plan was approved by the COA on 2 November 2011.

Recommendations

Staff recommends granting the variance request(s) because the findings of fact have been met. The applicant has met or exceeded the Environmental Board Variance Request Table for the types of variances requested and meets all aspects of SOS.

Conditions

Staff recommends granting the variance with the following conditions:

1) Structural Containment (Terracing)
2) Restoration & Revegetation
3) Height Limit for proposed buildings
4) Reduced footprint of disturbance
5) 30% additional natural area set aside (70%) total
6) All plantings per ECM Appendix F
7) Enhanced ESC Controls (Pre Construction, Mid Construction, Post Construction ESC Plans)
8) Enhanced Water Quality Controls (Sed/Fil pond with a gravity fed infiltration system for native vegetation, Terracing utilizes 12" of topsoil on a 4 foot shelf between the 8 foot engineered vertical lifts, a landscape plan that exceeds all requirements and includes vines for the native rock walls to stabilize soil and further reduce runoff.)

If you have any questions or need additional information, please feel free to contact me at 974-2709.

Jeb Brown, Senior Environmental Reviewer
Planning and Development Review

Environmental Program Coordinator: _____
Ingrid McDonald

Environmental Policy Program Manager: _____
Chuck Lesniak

Similar Cases

The following projects in Barton Springs Zone had variance requests from LDC 25-8-341/342 that were approved by the EV Board, and subsequently the Zoning and Platting or Planning Commission.

1. Grace Lane Office Building (SP-2007-0552D) requested a variance from LDC 25-8-341/342 for cut/fill in excess of four feet. The EV Board recommended approval on August 20, 2008 by a vote of 6-0-0-0, with the following conditions:

Staff Conditions:
1. The applicant will stabilize and restore areas of fill with City of Austin standard 604s seeding for erosion control and provide native class I or II Hill Country species trees planted 30 feet on center
2. The applicant will provide enhanced erosion and sedimentation controls below the fill area to ensure all eroded sediments remain onsite
3. The applicant will limit cut to 11 feet and fill to 14 feet
4. All slopes created from fill material will be less than or equal to a 3:1 slope

EV Board Conditions:
1. Remove sandy loam topsoil and change to non sterile topsoil

2. Hilltop Park (SP-2007-0214C) requested a variance from LDC 25-8-341/342 for cut/fill in excess of four feet. The EV Board recommended approval on August 15, 2008 by a vote of 7-0-0-1, with the following conditions:

Staff conditions:
The applicant will plant 100% COA native and/or adaptive plants and trees.
A recorded restrictive covenant will preserve the natural area from development.
The applicant will provide a rainwater collection system for the commercial structures.
The applicant will provide staff with a signed copy of a Letter of Intent (to Austin Energy) that proposes a minimum 1 star rating for the commercial buildings.
Cut and fill is limited to a maximum of 11 feet.

EV Board conditions:
City of Austin staff will clarify condition number 2 to preserve both re-irrigation areas and natural areas to remain undisturbed.

Watershed Protection and Development Review Department
Staff Recommendations Concerning Required Findings
Water Quality Variances

Application Name:	**Loop 360 Climatized Self Storage**
Application Case No:	**SPC-2011-0190C**
Code Reference:	**LDC 25-8-341**
Variance Request:	**To allow cut up to a maximum of 20.0 Feet (LDC 25-8-341)**

JUSTIFICATION:

1. Are there special circumstances applicable to the property involved where strict application deprives such property owner of privileges or safety enjoyed by other similarly situated property with similarly timed development? **YES All the surrounding tracts have been developed with commercial or residential structures.**

2. Does the project demonstrate minimum departures from the terms of the ordinance necessary to avoid such deprivation of privileges enjoyed by such other property and to facilitate a reasonable use, and which will not create significant probabilities of harmful environmental consequences? **YES. The project meets all HCR requirements, SOS requirements, and the footprint was minimized so that it would both blend visually with the surrounding terrain and provide minimum disturbance to the site.**

3. The proposal does not provide special privileges not enjoyed by other similarly situated properties with similarly timed development, and is not based on a special or unique condition which was created as a result of the method by which a person voluntarily subdivided land. **YES. Grace Lane Office Building (SP-2007-0552D) (Up to 11 feet cut and 14 feet fill with conditions) and Hilltop Park (SP-2007-0214C) (Cut and Fill up to 11 feet with conditions) were both granted variances in the BSZ.**

4. Does the proposal demonstrate water quality equal to or better than would have resulted had development proceeded without the variance? **YES. The proposed construction will capture and provide water treatment for all disturbed areas, plus provide treatment for upstream development that is not currently being treated.**

Watershed Protection and Development Review Department
Staff Recommendations Concerning Required Findings
Water Quality Variances

Application Name:	**Loop 360 Climatized Self Storage**
Application Case No:	**SPC-2011-0190C**
Code Reference:	**LDC 25-8-342**
Variance Request:	**To allow fill up to a maximum of 14.5 Feet (LDC 25-8-342)**

JUSTIFICATION:

1. Are there special circumstances applicable to the property involved where strict application deprives such property owner of privileges or safety enjoyed by other similarly situated property with similarly timed development? **YES All the surrounding tracts have been developed with commercial or residential structures.**

2. Does the project demonstrate minimum departures from the terms of the ordinance necessary to avoid such deprivation of privileges enjoyed by such other property and to facilitate a reasonable use, and which will not create significant probabilities of harmful environmental consequences? **YES. The project meets all HCR requirements, SOS requirements, and the footprint was minimized so that it would both blend visually with the surrounding terrain and provide minimum disturbance to the site.**

3. The proposal does not provide special privileges not enjoyed by other similarly situated properties with similarly timed development, and is not based on a special or unique condition which was created as a result of the method by which a person voluntarily subdivided land. **YES. Grace Lane Office Building (SP-2007-0552D) (Up to 11 feet cut and 14 feet fill with conditions) and Hilltop Park (SP-2007-0214C) (Cut and Fill up to 11 feet with conditions) were both granted variances in the BSZ.**

4. Does the proposal demonstrate water quality equal to or better than would have resulted had development proceeded without the variance? **YES. The proposed construction will capture and provide water treatment for all disturbed areas, plus provide treatment for upstream development that is not currently being treated.**

Watershed Protection and Development Review Department
Staff Recommendations Concerning Required Findings
Water Quality Variances

Application Name:	**Loop 360 Climatized Self Storage**
Application Case No:	**SPC-2011-0190C**
Code Reference:	**LDC 25-2-1123(C)**
Waiver Request:	**To allow cut over 8.0 feet in depth downhill of a slope greater than 15% (LDC 25-2-1123 (C))**

JUSTIFICATION:

(1) The provision imposes an undue hardship on a development because of the location, topography, or peculiar configuration of the tract. **Yes. In order to meet the HCR setbacks, it is necessary to locate the proposed construction in its current location.**

(2) A proposed development incorporates the use of highly innovative architectural, site planning, or land use technique. **Yes. The current design was changed from a one building layout to a two building layout with extra floors to minimize building footprint and impervious cover on the site.**

(3) If the waiver is approved, a proposed development will equal or exceed a development that is in compliance with this article in terms of: (a) environmental protection; (b) aesthetic enhancement; (c) land use compatibility and (d) traffic considerations. **Yes. The current project is replacing a previously permitted project, Wendy's at 360. The water/wastewater loads, additional landscaping/terraced design, and greatly reduced traffic impacts make this a superior use of this tract.**

LONGARO & CLARKE
Consulting Engineers

TBPE Reg. No. F-544

7501 North Capital of Texas Highway Building A, Suite 250 Austin, Texas 78731 Tel: (512) 306-0228 Fax: (512) 306-0338

December 6, 2011

Mr. Jeb Brown
City of Austin
Planning and Development Review Department
505 Barton Springs Road, 4th Floor
Austin, Texas 78704

RE: Barton Creek at Loop 360 Climatized Self Storage, SPC-2011-0190C
Non-Administrative Variance Request to LDC §25-8-341
Longaro & Clarke, L.P. Project #352-01-40

Dear Jeb:

The purpose of this letter is to request a non-administrative variance to LDC §25-8-341, Cut Requirements. The justification for this variance generally falls along the lines of the nature of the use and the general topography of the site. The use is comprised of climatized self storage buildings. This use generally consists of a large footprint due the nature of self storage buildings. Initially, a concept of a single-building layout with a 37,000 sq. ft. footprint was considered. However, due to the topography across the building site, which is an average of 9% slope, it was determined that the cuts would be very excessive. Thus, a concept of a two-building layout with 18,500 sq. ft. footprints each was chosen to minimize the cuts. The cut areas are additionally minimized by the use of three-story buildings which compact the building site area when compared to a single-story plan that would spread the building site over a much larger area and thus increase the extent of site disturbance and cuts.

Cuts over 4' in depth, pursuant to LDC §25-8-341, are not disallowed for the area under the building footprints. However, cuts over 4' in depth outside the building footprints would require a non-administrative variance. There are two reasons the cuts were extended beyond the building footprints rather than using a vertical cut next to the building walls. One practical consideration is drainage as it is difficult to prevent 100% infiltration of ground water through the sides of the vertical construction. This is very important to prevent for a self storage development due to liability concerns regarding the stored materials. The second consideration is created by a health/safety/welfare concern that was raised by the Fire Department. To alleviate this concern a 10-foot clear area along the buildings at the first floor level for purposes of fire protection was required. To minimize the impact of these cuts they will be terraced pursuant to LDC §25-2-1123(D).

A schematic showing the extent of this variance has been attached as Exhibit B. This exhibit shows the extent of a variance from LDC §25-8-341 for cuts from 4' to 22' in depth as being 20,937 sq. ft. The scope of this variance has been minimized to the greatest extent feasible by: 1) adopting a two-building concept with three stories each, thus minimizing the depth and area of the cuts, and 2) by the use of terracing techniques.

A Land Use Commission variance is being requested pursuant to LDC §25-8-41 as follows: 1) pursuant to LDC §25-8-41(A) given the unique constraints placed upon the site from a topographic standpoint we believe that the granting of this variance should be allowed, as other commercial projects in the same proximity, i.e. Hill Country Roadway Corridors, and contemporaneously, have received similar consideration due to the same unique constraints placed upon projects by the Hill Country topography, and 2) pursuant to LDC §25-8-41(B) although the variance has been created to some extent by the nature of the development, the project is providing greater overall environmental protection than would be achieved without the variance. The improved environmental protection includes the following:

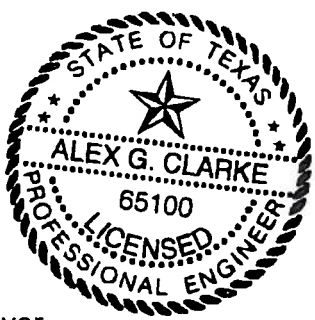
a) Enhanced water quality benefit by providing a primary sedimentation/filtration pond treatment capturing the SOS water quality volume, followed by a secondary treatment consisting of an enhanced infiltration area that disperses the discharge from the primary treatment though an area of hedge rows located approximately every 25' to improve overland sheet flow and infiltration of the runoff. The infiltration areas are sized 10-20 times the minimum required size to provide a large safety factor against runoff potentially leaving the site.

b) Enhanced Natural Area of 71% will be provided which is well above the 40% required by the HCR ordinance.

c) Terracing of the cuts will be provided pursuant to LDC §25-2-1123(D). Between the terraces, revegetation with 609S Native Species is proposed along with other native plantings pursuant to the Landscape Plan that will enhance the aesthetics in this area. In addition, 12" of increased organic mulch will be used in the area between the terraces which will increase the water quality benefit by minimizing runoff from this area and minimizing irrigation requirements.

We appreciate your review of this variance request. If you have any questions, or require any additional information, please do not hesitate to call.

Very Truly Yours,
LONGARO & CLARKE, L.P.



Alex G. Clarke, P.E.
Vice President

cc: Brendan Callahan, Endeavor
Haythem Dawlett, Legend Communities
Randy Hughes, Legend Communities
Joseph Longaro, Longaro & Clarke, L.P.

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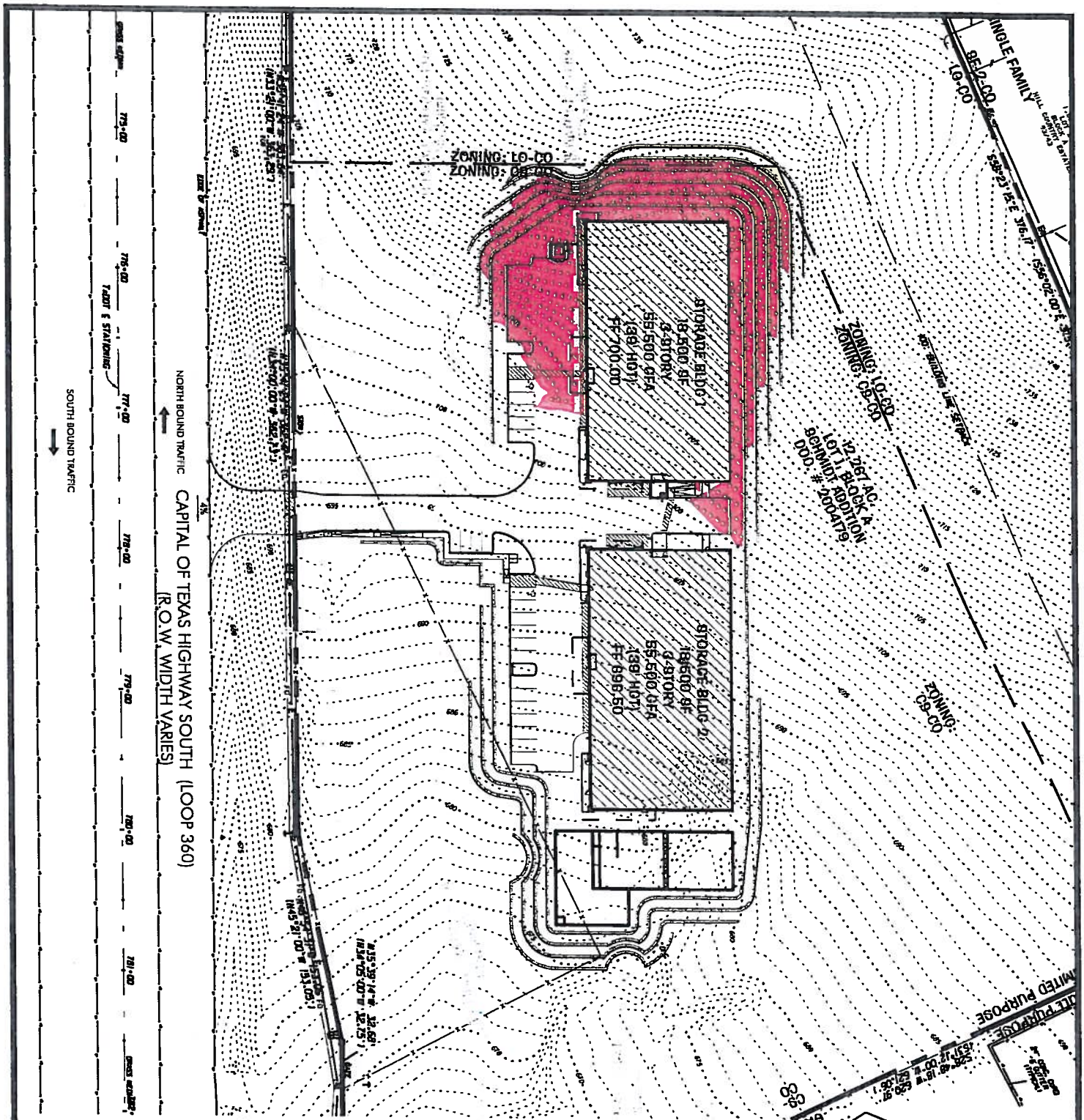

VARIANCE EXHIBIT B FOR CUT IN EXCESS OF 4 FT FOR AREA OUTSIDE OF WQ/DET PONDS (LDC-25-8-341)

LONGARO & CLARKE
Consulting Engineers
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7501 North Capital of Texas Highway • Building A • Suite 250 Austin, Texas 78731
(512) 306-0228 ~ www.LongaroClarke.com ~ TBPE Reg. No. F-544

20,937 SF CUT 4'-22'

0 100 200

LONGARO & CLARKE
Consulting Engineers

7501 North Capital of Texas Highway Building A, Suite 250 Austin, Texas 78731 Tel: (512) 306-0228 Fax: (512) 306-0338

TBPE Reg. No. F-544

December 6, 2011

Mr. Jeb Brown
City of Austin
Planning and Development Review Department
505 Barton Springs Road, 4th Floor
Austin, Texas 78704

RE: Barton Creek at Loop 360 Climatized Self Storage, SPC-2011-0190C
Non-Administrative Variance Request to LDC §25-8-342
Longaro & Clarke, L.P. Project #352-01-40

Dear Jeb:

The purpose of this letter is to request a non-administrative variance from fill requirements pursuant to LDC §25-8-342, Fill Requirements. The justification for this variance generally falls along the lines of the nature of the use and the general topography of the site. The use is comprised of climatized self storage buildings. This use generally consists of a large footprint due the nature of self storage buildings. Initially, a concept of a single-building layout with a 37,000 sq. ft. footprint was considered. However, due to the topography across the building site, which is an average of 9% slope, it was determined that the fills would be very excessive. Thus, a concept of a two-building layout with 18,500 sq. ft. footprints each was chosen to minimize the fills. The fill areas are additionally minimized by the use of three-story buildings which compact the building site area when compared to a single-story plan that would spread the building site over a much larger area and thus increase the extent of site disturbance and fills.

Fills over 4' in depth, pursuant to LDC §25-8-342, are not disallowed for the area under the building footprints. However, fills over 4' in depth outside the building footprints would require a non-administrative variance. There are two reasons the fills were extended beyond the building footprints rather than using a vertical fill next to the building walls. One practical consideration is drainage as it is difficult to prevent 100% infiltration of ground water through the sides of the vertical construction. This is very important to prevent for a self storage development due to liability concerns regarding the stored materials. The second consideration is created by a health/safety/welfare concern that was raised by the Fire Department. To alleviate this concern a 10-foot clear area along the buildings at the first floor level for purposes of fire protection was required. To minimize the impact of these fills they will be terraced pursuant to LDC §25-2-1123(D).

A schematic showing the extent of this variance has been attached as Exhibit C. This exhibit shows the extent of a variance from LDC §25-8-342 for fills from 4' to 15' in depth as being 21,277 sq. ft. The scope of this variance has been minimized to the greatest extent feasible by: 1) adopting a two-building concept with three stories each, thus minimizing the depth and area of the fills, and 2) by the use of terracing techniques.

A Land Use Commission variance is being requested pursuant to LDC §25-8-41as follows: 1) pursuant to LDC §25-8-41(A) given the unique constraints placed upon the site from a topographic standpoint we believe that the granting of this variance should be allowed, as other commercial projects in the same proximity, i.e. Hill Country Roadway Corridors, and contemporaneously, have received similar consideration due to the same unique constraints placed upon projects by the Hill Country topography, and 2) pursuant to LDC §25-8-41(B) and although the variance has been created to some extent by the nature of the development, the project is providing greater overall environmental protection than would be achieved without the variance. The improved environmental protection includes the following:

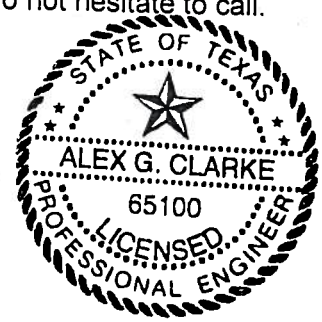
a) Enhanced water quality benefit by providing a primary sedimentation/filtration pond treatment capturing the SOS water quality volume, followed by a secondary treatment consisting of an enhanced infiltration area that disperses the discharge from the primary treatment though an area of hedge rows located approximately every 25' to improve overland sheet flow and infiltration of the runoff. The infiltration areas are sized 10-20 times the minimum required size to provide a large safety factor against runoff potentially leaving the site.

b) Enhanced Natural Area of 71% will be provided which is well above the 40% required by the HCR ordinance.

c) Terracing of the fills will be provided pursuant to LDC §25-2-1123(D). Between the terraces, revegetation with 609S Native Species is proposed along with other native plantings pursuant to the Landscape Plan that will enhance the aesthetics in this area. In addition, 12" of increased organic mulch will be used in the area between the terraces, which will increase the water quality benefit by minimizing runoff from this area and minimizing irrigation requirements.

We appreciate your review of this variance request. If you have any questions, or require any additional information, please do not hesitate to call.

Very Truly Yours,
LONGARO & CLARKE, L.P.



Alex G. Clarke, P.E.
Vice President

cc: Brendan Callahan, Endeavor
Haythem Dawlett, Legend Communities
Randy Hughes, Legend Communities
Joseph Longaro, Longaro & Clarke, L.P.

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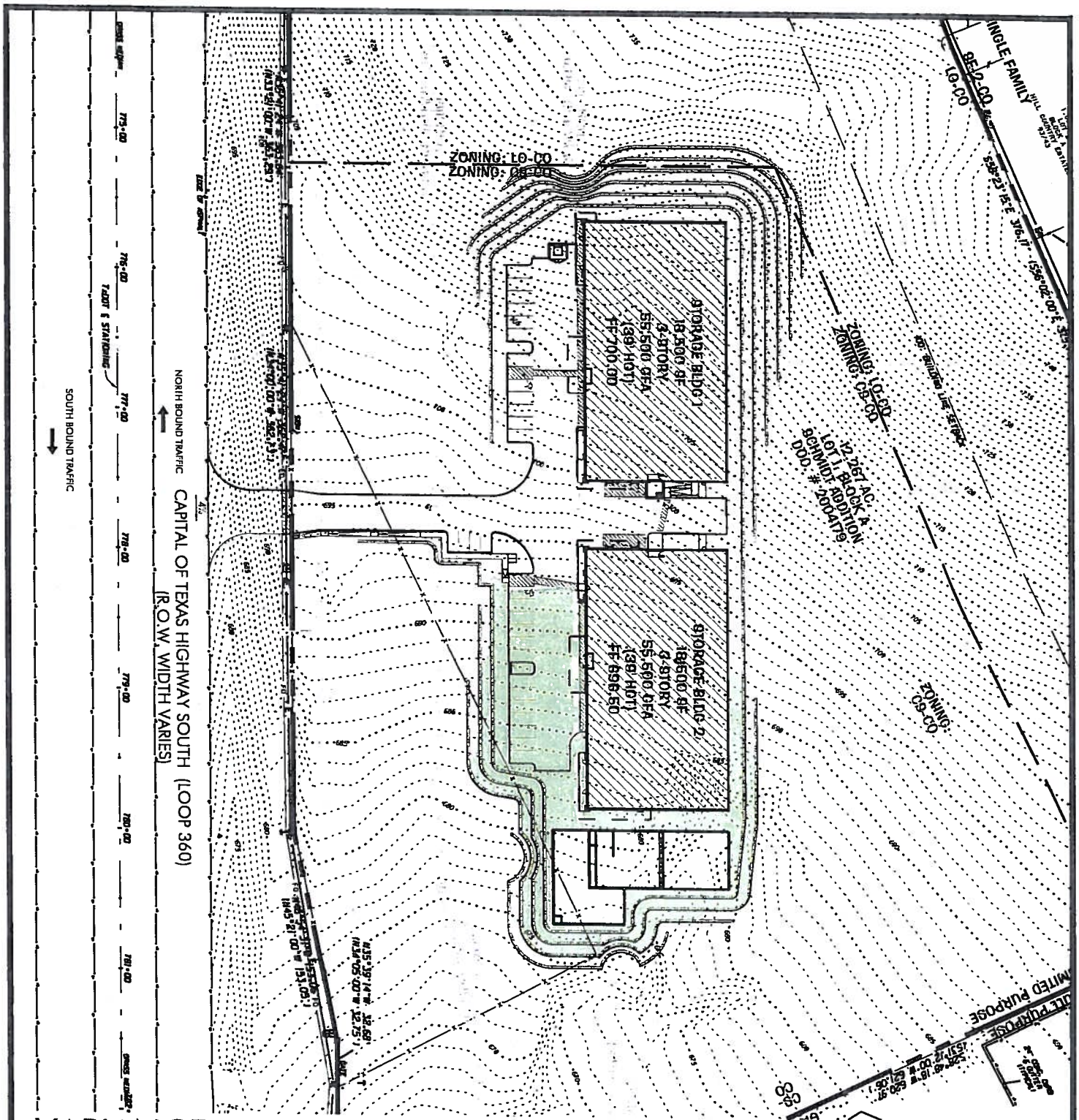

VARIANCE EXHIBIT C FOR FILL IN EXCESS OF 4 FT FOR AREA OUTSIDE OF WQ/DET PONDS (LDC-25-8-342)

LONGARO & CLARKE
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7501 North Capital of Texas Highway • Building A • Suite 250 Austin, Texas 78731
(512) 306-0228 ~ www.LongaroClarke.com ~ TBPE Reg. No. F-544

21,277 SF FILL 4'-15'

0 100 200

LONGARO & CLARKE
Consulting Engineers

TBPE Reg. No. F-544

7501 North Capital of Texas Highway Building A, Suite 250 Austin, Texas 78731 Tel: (512) 306-0228 Fax: (512) 306-0338

December 6, 2011

Mr. Jeb Brown
City of Austin
Planning and Development Review Department
505 Barton Springs Road, 4th Floor
Austin, Texas 78704

RE: Barton Creek at Loop 360 Climatized Self Storage, SPC-2011-0190C
Non-Administrative Variance Request to LDC §25-2-1123(C)
Longaro & Clarke, L.P. Project #352-01-40

Dear Jeb:

The purpose of this letter is to request a non-administrative variance from cut requirements pursuant to LDC §25-2-1123(C), Construction on Slopes. The justification for this variance generally falls along the lines of the nature of the use and the general topography of the site. The use is comprised of climatized self storage buildings. This use generally consists of a large footprint due the nature of self storage buildings. Initially, a concept of a single-building layout with a 37,000 sq. ft. footprint was considered. However, due to the topography across the building site, which is an average of 9% slope, it was determined that the cuts would be very excessive. Thus, a concept of a two-building layout with 18,500 sq. ft. footprints each was chosen to minimize the cuts. The cut areas are additionally minimized by the use of three-story buildings which compact the building site area when compared to a single-story plan that would spread the building site over a much larger area and thus increase the extent of site disturbance and cuts.

Cuts over 8' in depth, pursuant to LDC §25-2-1123(C), are disallowed for the structures that are located downhill of a slope in excess of 15% gradient, requiring a non-administrative variance. There are two reasons the cuts were extended beyond the building footprints rather than using a vertical cut next to the building walls. One practical consideration is drainage as it is difficult to prevent 100% infiltration of ground water through the sides of the vertical construction. This is very important to prevent for a self storage development due to liability concerns regarding the stored materials. The second consideration is created by a health/safety/welfare concern that was raised by the Fire Department. To alleviate this concern a 10-foot clear area along the buildings at the first floor level for purposes of fire protection was required. To minimize the impact of these cuts they will be terraced pursuant to LDC §25-2-1123(D).

A schematic showing the extent of this variance has been attached as Exhibit A. This exhibit shows the extent of a variance from LDC §25-2-1123(C) for cut from 8' to 22' in depth as being 22,276 sq. ft.. The scope of this variance has been minimized to the greatest extent feasible by: 1) adopting a two-building concept with three stories each, thus minimizing the depth and area of the cuts and 2) by the use of terracing techniques.

A Land Use Commission variance is being requested pursuant to LDC §25-2-1105 as follows: 1) pursuant to LDC §25-2-1105(A)(1) given the unique constraints placed upon the site from a topographic standpoint we believe that the granting of these variances should be allowed, as other commercial projects in the same proximity, i.e. Hill Country Roadway Corridors, and

contemporaneously, have received similar consideration due to the same unique constraints placed upon projects by the Hill Country topography, 2) pursuant to LDC §25-2-1105(A)(2) the storage units are utilizing architectural elements that will help the buildings fit into the surrounding Hill Country landscape, and 3) pursuant to LDC §25-2-1105(A)(3) provide improved environmental protection and enhanced aesthetics including the following:

a) Enhanced water quality benefit by providing a primary sedimentation/filtration pond treatment capturing the SOS water quality volume, followed by a secondary treatment consisting of an enhanced infiltration area that disperses the discharge from the primary treatment though an area of hedge rows located approximately every 25' to improve overland sheet flow and infiltration of the runoff. The infiltration areas are sized 10-20 times the minimum required size to provide a large safety factor against runoff potentially leaving the site.

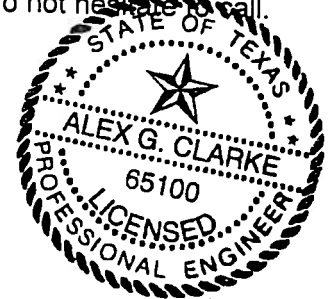
b) Enhanced Natural Area of 71% will be provided which is well above the 40% required by the HCR ordinance.

c) Terracing of the cuts will be provided pursuant to LDC §25-2-1123(D). Between the terraces, revegetation with 609S Native Species is proposed along with other native plantings pursuant to the Landscape Plan that will enhance the aesthetics in this area. In addition, 12" of increased organic mulch will be used in the area between the terraces, which will increase the water quality benefit by minimizing runoff from this area and minimizing irrigation requirements.

d) In addition, the land use in compatible with the other existing land uses in the vicinity and located adjacent to Loop 360 such as the office space to the north and the recently approved Tarlton 360 Townhomes mixed use project to the south. Traffic is limited to less than 4,000 trips per day (tpd) by zoning, but the actual estimated tpd for the 55,000 sq. ft. of convenience storage is approximately 133, significantly less than allowed and should not have a significant impact on the surrounding transportation infrastructure.

We appreciate your review of this variance request. If you have any questions, or require any additional information, please do not hesitate to call.

Very Truly Yours,
LONGARO & CLARKE, L.P.



Alex G. Clarke, P.E.
Vice President

cc: Brendan Callahan, Endeavor
Haythem Dawlett, Legend Communities
Randy Hughes, Legend Communities
Joseph Longaro, Longaro & Clarke, L.P.

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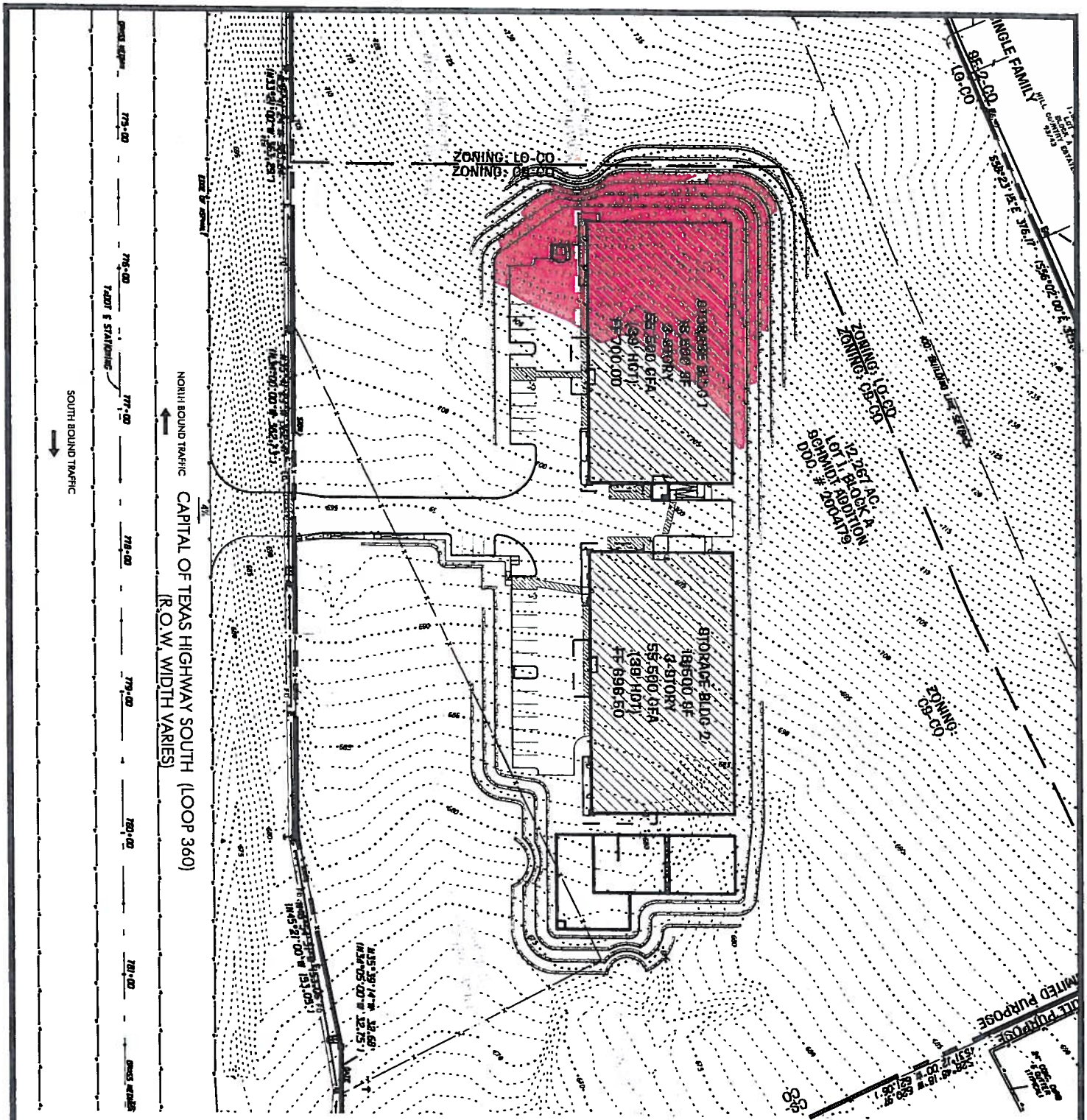

VARIANCE EXHIBIT A FOR STRUCTURAL EXCAVATION (CUT) IN EXCESS OF 8 FT (LDC-25-2-1123C)

LONGARO & CLARKE
Consulting Engineers
Land Development ◆ Stormwater Management ◆ Water Resources
7501 North Capital of Texas Highway • Building A • Suite 250 Austin, Texas 78731
(512) 306-0228 ~ www.LongaroClarke.com ~ TBPE Reg. No. F-544

22,276 SF CUT 8'-22'

0 100 200

Geotechnical Engineering Report

Tarlton 360 Storage

2631 South Capitol of Texas Highway

Austin, Texas

August 22, 2011

Terracon Project No. 96115093

Prepared for:

Legend Communities, Inc.

Austin, Texas

Prepared by:

Terracon Consultants, Inc.

Austin, Texas

August 22, 2011

Terracon

Legend Communities, Inc.
2101 Lakeway Boulevard, Suite 205
Lakeway, Texas 78734

Attention: Mr. Randy Hughes
P: 512-610-0510
M: 512-848-2702
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E: rhughes@legendcommunitiesinc.com

Regarding: Geotechnical Engineering Report
Tarlton 360 Storage
2631 South Capitol of Texas Highway
Austin, Texas
Terracon Project No. 96115093

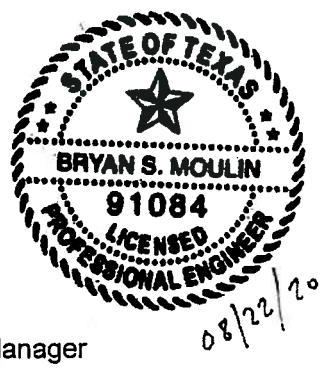
Dear Mr. Hughes:

Terracon Consultants, Inc. (Terracon) is pleased to submit our Geotechnical Engineering Report for the proposed Tarlton 360 Storage in Austin, Texas. We trust that this report is responsive to your project needs. Please contact us if you have any questions or if we can be of further assistance.

We appreciate the opportunity to work with you on this project and look forward to providing additional Geotechnical Engineering and Construction Materials Testing services in the future.

Sincerely,
Terracon Consultants, Inc.
(TBPE Firm Registration: TX F3272)

Jeffrey A. Kuhn, Ph.D., E.I.T.
Staff Geotechnical Engineer



Bryan S. Moulin, P.E.
Principal, Geotechnical Department Manager

Copies Submitted: Addressee: (2) Bound & (1) Electronic

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EXECUTIVE SUMMARY

A geotechnical investigation has been performed for the proposed Tarlton 360 Storage in Austin, Texas. Ten borings, designated B-1 through B-10, were performed to depths of approximately 6 to 40 feet below the existing grade.

Based on the information obtained from our subsurface exploration, the site can be developed for the proposed project. The following geotechnical considerations were identified:

- Stripping should include surface vegetation, trees, loose topsoil, or other unsuitable materials, as well as the over-excavation required in the building area.
- Proofrolling should be performed to detect weak areas. Weak areas should be removed and replaced with select fill or soils exhibiting similar characteristics as the adjacent in-situ soils.
- The on-site Stratum I and II soils are moisture sensitive expansive clays.
- The recommended/preferred foundation for the building is a structurally suspended floor slab on drilled piers. The drilled piers are to penetrate 20 feet below finished floor elevation and 20 feet below existing grade (whichever is deeper) and may utilize a bearing pressure of 16,000 psf and a side friction of 500 psf for pier portions embedded beyond 5 feet of depth below the respective finished floor elevation.
- As requested, recommendations are provided for a monolithic slab-on-grade foundation system. The use of a monolithic slab-on-grade foundation system will require extensive subgrade preparation and will require the use of a horizontal moisture barrier in order to minimize the migration of water from the select fill to the Stratum II fat clay soils.
- Pavements in parking spaces should be designed with 5 inches of reinforce concrete over 6 inches of moisture conditioned subgrade. As an alternative, 2 inches of asphalt over 8 inches of base material over 6 inches of lime-treated subgrade may be used.
- Pavements in minor driveways should be designed with 6 inches of concrete over 6 inches of moisture conditioned subgrade. As an alternative, 2.5 inches of asphalt over 9 inches of crushed limestone base over 6 inches of lime-treated subgrade may be used.
- Pavements in main driveways should be designed with 7 inches of concrete over 6 inches of moisture conditioned subgrade. As an alternative, 3 inches of asphalt over 10 inches of crushed limestone base over 6 inches of lime-treated subgrade may be used.
- This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of the report limitations.

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GEOTECHNICAL ENGINEERING REPORT
TARLTON 360 STORAGE
2631 SOUTH CAPITOL OF TEXAS HIGHWAY
AUSTIN, TEXAS

Project No. 96115093
August 22, 2011

1.0 INTRODUCTION

Terracon is pleased to submit our Geotechnical Engineering Report for the proposed construction of the Tarlton 360 Storage project in Austin, Texas. This project was authorized by Mr. Randall E. Hughes with Legend Communities, Inc., through signature of our "Agreement for Services" on June 13, 2011. Additional services were authorized by Mr. Hughes on July 18, 2011 through signature of a letter for additional services. The project scope was performed in general accordance with Terracon Proposal No. P96110554, dated June 10, 2011 and the letter for additional services dated July 17, 2011.

The purpose of this report is to describe the subsurface conditions observed at the ten (10) borings drilled for this study, analyze and evaluate the test data, and provide recommendations with respect to:

- Foundation design and construction for the buildings;
- Seismic site classification according to IBC 2009;
- Lateral earth pressures for site retaining walls;
- Pavement design and construction; and
- Site, subgrade, and fill preparation.

Since the two self-storage buildings at the site are oriented in such a manner that they do not align with a principal compass direction, we have chosen to use the same nomenclature as the structural engineer when referring to the two proposed storage buildings. Accordingly, the building to the northwest with a proposed finished floor elevation of 700.0 feet will be referred to as the "North Building" and the building to the southeast with a proposed finished floor elevation of 696.5 feet will be referred to as the "South Building."

2.0 PROJECT INFORMATION

2.1 Site Location and Description

ITEM	DESCRIPTION
Location	This project will be located northwest of the intersection of Loop 360 and Walsh Tarlton Lane in Austin, Texas. The legal description of the property is "Lot 1 Block A Schmidt Addition a Plat of record in Document number 200400179 of the Official Public Records of Travis County, Texas." In accordance to the City of Austin's addressing department, this plat corresponds to the physical address of 2631 South Capital of Texas Highway.
Existing improvements	The site is currently unoccupied and heavily wooded. There is an existing building located towards the south end of the proposed development.
Current ground cover	Heavily wooded, trees, grass cover.
Existing topography	Based on the plans provided to Terracon by the Longaro and Clarke Consulting Engineers (Civil Engineer), the site slopes to the south-east, with a drop of approximately 76 feet across the existing site.

2.2 Project Description

ITEM	DESCRIPTION*
Site layout	See Exhibit 2, Project Layout, in Appendix A.
Structures	The project will include the construction of two self-storage buildings. The buildings will be three-storied with an approximate footprint of 18,500 square feet/floor (100 ft x 185 ft).
Building construction	"The proposed framing utilizes light gauge metal building components with concrete on metal deck for the second floor. The loadbearing interior walls are composed of widely spaced metal studs that function as columns with girts for bracing. The exterior walls will be [light steel] with variations of stone and plaster veneer." (Danysh & Associates, May 5, 2011).
Maximum loads	Columns Dead Load: 4,500 lbs (max) Live Load: 10,875 lbs (max) Walls Dead Load: 900 plf (max) Live Load: 2,175 plf (max)

ITEM	DESCRIPTION*
Maximum allowable movement	Columns: 1-inch (assumed) Walls: ¾-inch over 40 feet (assumed) Slabs: Recommendations were requested for movement criteria of 1-inch, 1½ inches, and 2 inches.
Finished Floor Elevations	Based on the plans provided to Terracon by the Civil Engineer, the North Building is estimated to have a finished floor elevation (FFE) of 700.0 feet MSL. The South Building is estimated to have a FFE of 696.5 feet MSL.
Estimated Cuts and Fills	Based on the Civil Engineer's plans, a cut is planned for the North Building. The cut is anticipated to range from negligible at the southeast corner to about 20 feet at the northwest corner. The South Building is planned to have minor cuts of up to about 3 feet in the northwest corner with fills ranging from about ½ foot in the southwest corner to about 14 feet along the eastern perimeter.
Retaining Walls	A structural retaining wall is planned to retain the cut slope along the northwest corner of the proposed development. The maximum wall height is estimated to be 12 feet.
Re-Irrigation Areas	The Civil Engineer (Longaro & Clarke) requested a total of three infiltration tests at three specific locations.
Below-grade areas	None to our knowledge.

3.0 SUBSURFACE CONDITIONS

3.1 Geology

Based on our review of available geological information[i] and the recovered samples, the site lies within an area that contains significant faulting. The approximate extents of the site are shown on the Geologic Map of Austin outlined in red in Figure 1. The locations of mapped faults are shown on the geologic map as black lines, several of which are shown to cross the site. Accordingly, this area is characterized by each of the following four formations: (1) the Eagle Ford Formation of Upper Cretaceous; (2) the Buda Formation of Lower Cretaceous; (3) the Del Rio Formation of Lower Cretaceous; and (4) the Georgetown Formation of Lower Cretaceous.

[i] Garner, L.E. and Young, K.P., "Environmental Geology of the Austin Area: An Aid to Urban Planning", Bureau of Economic Geology, The University of Texas at Austin, 1976.

The Eagle Ford Formation is characterized by gray to dark gray clayey shale, which weather into highly plastic and expansive fat clay soils. Within the Austin Area, the Eagle Ford comprises four members: the South Bosque, the Bouldin flags, the Cloice shale, and the Pepper shale, from top to bottom. Within the Bouldin flags member, the Eagle Ford is interbedded with limestone flags, seams, and layers. The Pepper shale member is clayey in nature and typically exhibits significantly decreased strength characteristics as compared to the upper members.

Located beneath the Eagle Ford, the Buda Formation limestone is typically comprised of moderately hard to hard light gray limestone which can contain sandy weathered lenses. The upper portion of the Buda Formation is characterized by hard, fine grained, resistant limestone and the lower portion consists of marly limestone.

The Del Rio Formation, which underlies the Buda Formation, largely consists of dark gray clay shale. The Georgetown Formation, which underlies the Del Rio Formation, is typically comprised of tan to gray fine-grained limestone, marly limestone, and marl. The Georgetown Formation is commonly overlain by a variable thickness of moderate to high plasticity clayey soils.

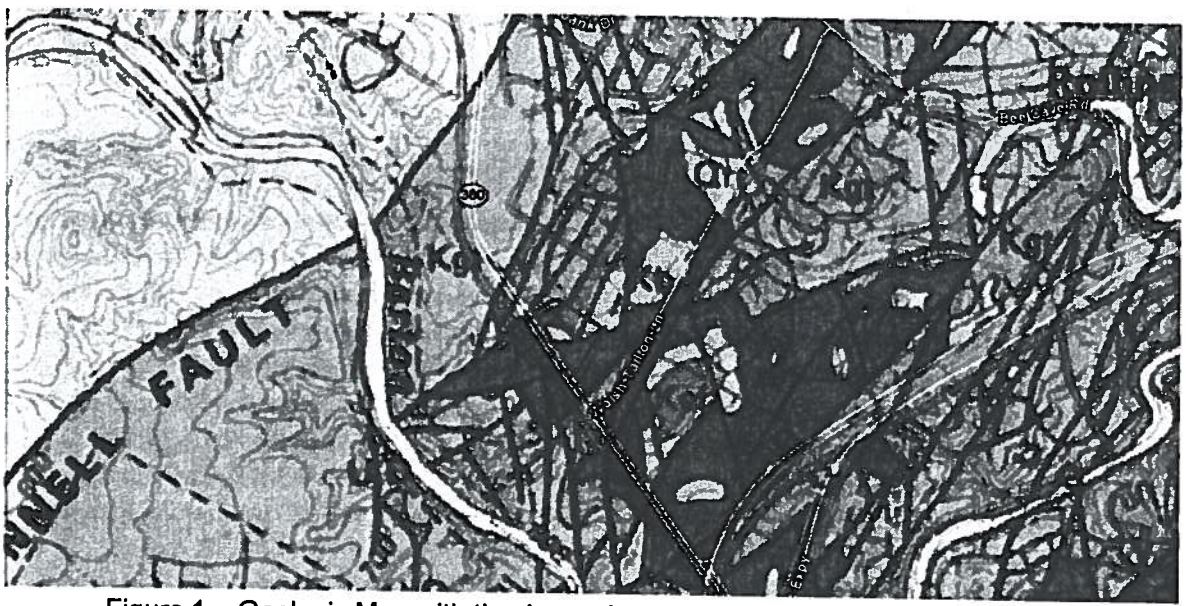


Figure 1 – Geologic Map with the Approximate Site Boundaries Outlined in Red

3.2 Typical Profile

Based on the results of the borings, subsurface conditions on the project site can be generalized as below.

Description	Approximate Depth Range of Stratum (feet)	Material Encountered	Consistency/Density
Stratum I [1]	0 to 11	Clayey Sand (SC) to Sandy Lean Clay (CL) to Lean Clay with Sand (CL)	Stiff to Hard / Medium Dense to Dense
Stratum II [2]	0 to 45	Fat Clay with Sand (CH) to Sandy Fat Clay (CH)	Hard
Stratum III [3]	0 to 45	Limestone	Moderately Hard

1. The Stratum I soils exhibited moderate to very high shrink/swell potential as indicated by measured plasticity indices (PI's) ranging from about 12 to 39, with a median value of 31, along with a measured fines content (percent passing the No. 200 sieve) of 17 to 78 percent, with a median value of 45 percent. The in-situ moisture content of the Stratum I soils ranged from 2 to 15 percent and was, on average, 9 percent dry of the measured plastic limit. Standard penetration test (SPT) blow counts for the Stratum I soils were found to vary from 14 blows per foot (bpf) to 50 blows per 5 inches of penetration. Pocket penetrometer readings on Stratum I soils were found to be 4.5 tons per square foot (tsf).
2. The Stratum II soils exhibited very high shrink/swell potential as indicated by measured PI's ranging from 35 to 53, with a median value of 48, along with a measured fines content of 58 to 75 percent, with a median value of 70 percent. The in-situ moisture content of the Stratum II soils ranged from 8 to 23 percent and was, on average, 1 percent dry of the measured plastic limit. An SPT blow counts of 50 blows per 3 inches of penetration was measured at a depth of 24 feet boring location B-5. Pocket penetrometer readings on the Stratum II soils were found to vary from 4.5 tsf to over 4.5 tsf. The Stratum II soils were typically found underlying the Stratum I soils. The exceptions were fat clay encountered at boring location B-7 to a depth of 2 feet and sandy fat clay soil encountered at boring location B-10 to a depth of 6 feet. Using approximate post-construction overburden pressures after cut and fill operations have been performed, three adsorption swell tests yielded swells ranging from 6.6 to 14.2 percent for the Stratum II soils.
3. The Stratum III limestone was encountered at boring locations B-6 and B-7 at depths of 10 and 11 feet, respectively. The measured values of unconfined compressive strength of the Stratum III limestone were found to vary from approximately 116 to 584 kips per square foot (ksf) with a median value of 258 ksf and an average value of 332 ksf. The measured values of recovery for the Stratum III limestone ranged from 40 to 100 percent with a median value of 93 percent and an average value of 84 percent. The measured values of rock quality designation (RQD) ranged from 0 to 72 percent with a median and average value of 43 percent. Lower values of recovery and RQD were generally the result of variable secondary features in the rock mass in the form of weathering, fracturing, and solution activity.

Conditions encountered at each boring location are indicated on the individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Details for each of the borings can be found on the boring logs in Exhibits A-3 through A-12 of Appendix A. A cross-section profile of the logs illustrating the different strata, FFE's, and the potential horizontal moisture barrier (HMB) is included in Exhibit A-13.

3.3 Groundwater

The borings were dry-augered to depths of about 6 to 45 feet below existing grade. Groundwater was not observed during dry augering of the borings. At boring locations B-6 and B-7, limestone was encountered at depths of 10 and 11 feet below existing grade, respectively. Once limestone was encountered at these boring locations, the borings were drilled to completion depths using wet rotary drilling techniques to facilitate rock coring. The use of wet rotary coring makes subsequent groundwater readings difficult to obtain.

Although not observed during our field exploration, groundwater seepage is possible at the site, particularly in the form of seepage traveling along pervious seams/fissures in the soil, along the soil/limestone interface, and/or in fissures/fractures in the limestone. During periods of wet weather, zones of seepage may appear and isolated zones of "perched water" may become trapped (or confined) by zones possessing a low permeability. Groundwater conditions at the site could fluctuate as a result of seasonal and climatic variations. Please note that it often takes several hours/days for water to accumulate in a borehole, and geotechnical borings are relatively fast, short-term boreholes that are backfilled the same day. Long-term groundwater readings can more accurately be achieved using monitoring wells. Please contact us if this is desired. Groundwater conditions should be evaluated immediately prior to construction.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

The following recommendations are based upon the data obtained in our field and laboratory programs, project information provided to us, and on our experience with similar subsurface and site conditions.

4.1 Geotechnical Considerations

Based on our test borings, expansive soils (Stratum I and II) that exhibit a high to very high potential for volumetric change during moisture variations are present near the ground surface. The subgrade soils at this site may experience expansion and contraction due to changes in moisture content. Beneath the footprint of the North Building and the uphill portion of the South Building, the Stratum II clays extend to the termination of our exploratory borings. For these locations, the Potential Vertical Rise (PVR) is on the order of 5 to 8 inches, as estimated by the

Texas Department of Transportation (TxDOT) Method TEX-124-E and the following absorption swell test results.

Absorption swell tests were performed in accordance with ASTM D4546 on three soil samples from the borings and the results are presented in the following table. After surcharge pressures were applied that represent the approximate post-construction overburden pressure after cut and fill operations have been performed, the samples were inundated with water while measurements were taken of vertical displacement. The magnitude of swell is recorded as a function of the change in thickness during the test in relation to the initial thickness of the sample.

Boring	Sampling Depth, Feet*	Approximate Cut/Fill	Surcharge Pressure, psf	Swell, %
B-1	18 to 20	19 Foot Cut	240	10.6
B-3	8 to 10	5 Foot Cut	360	14.2
B-5	8 to 10	2 Foot Fill	1,200	6.6

* Approximate depth below ground surface at the time of soil sampling.

Please note that a measured swell of greater than 1.5 percent is considered to represent a high swell potential. The three samples all tested above exhibited very high swell potential and are capable of significant shrink/swell movements during seasonal wet-dry cycles typical of Central Texas weather patterns. In addition to natural moisture changes related to weather, these highly plastic clays can exhibit significant expansion if subjected to moisture inundations from landscape irrigation, roof drainage, surface water runoff and/or infiltration, and water-bearing utility leaks.

4.2 Earthwork

Construction areas should be stripped of vegetation, trees, topsoil, debris, and other unsuitable material. Site stripping could loosen surficial/large rocks and boulders which should be removed from the construction area. Once final subgrade elevations have been achieved (including the over-excavation required for building pads), the exposed subgrade should be carefully proofrolled with a 20-ton pneumatic roller or a fully loaded dump truck to detect weak zones in the subgrade. Weak areas detected during proofrolling, as well as zones containing debris or organics and voids resulting from removal of tree roots, boulders, etc. should be removed and replaced with soils exhibiting similar classification, moisture content, and density as the adjacent in-situ soils. Proper site drainage should be maintained during construction so that ponding of surface runoff does not occur and causes construction delays and/or inhibit site access.

Subsequent to proofrolling, and just prior to placement of fill, exposed soil subgrade areas within the construction areas should be evaluated for moisture and density. If the moisture and/or

density requirements do not meet the criteria described in the table below, the subgrade should be scarified to a minimum depth of 6 inches, moisture adjusted, and compacted to at least 95 percent of the Standard Proctor (ASTM D 698) maximum dry density. Select fill and on-site soils should meet the following criteria.

FILL TYPE [1]	USCS CLASSIFICATION	ACCEPTABLE LOCATION FOR PLACEMENT
Imported Select Fill [2,3]	CL, SC, and/or GC (5≤PI≤20)	Select fill material should be used for all grade adjustments within the building limits. Below the chosen select fill depth within each building, on-site soils ("General Fill") may be used as fill.
General Fill	CL, CH, SC	General fill is for use within other non-structural areas of the site.

1. Prior to any filling operations, samples of proposed borrow and/or on-site materials should be obtained for laboratory testing. The tests will provide a basis for evaluation of fill compaction by in-place density testing. A qualified soil technician should perform sufficient in-place density tests during the filling operations to evaluate that proper levels of compaction, including dry unit weight and moisture content, are being attained.
2. Imported select fill should consist of crushed limestone base material meeting the requirements of the Texas Department of Transportation (TxDOT) 2004 Standard Specifications Item 247, Type A, Grade 3, or a low-plasticity clayey soil with a plasticity index between 5 and 20 percent, a maximum gravel content (percentage retained on No. 4 sieve) of 40 percent, and rocks no larger than 4 inches in their largest dimension. As an alternative, a low-plasticity granular fill material which does not meet these specifications may be utilized only if approved by Terracon.
3. Based on the laboratory testing performed during this exploration, the on-site Stratum I and Stratum II soils are not suitable for re-use as select fill.

4.2.1 Compaction Requirements

ITEM	DESCRIPTION
Fill Lift Thickness	The fill soils should be placed on prepared surfaces in lifts not to exceed 8 inches loose measure, with compacted thickness not to exceed 6 inches.
Moisture/Density Control	All fill less than 5 feet in depth should be placed in uniform lifts compacted to at least 95 percent of the Standard Proctor (ASTM D 698) maximum dry density. Stratum II fat clay soils should be moisture conditioned to between optimum and +4 of optimum moisture content. Select fill and Stratum I soils should be moisture conditioned to between -3 and +3 of optimum moisture content. For fills in the proposed structure areas greater than 5 feet in depth, the compaction should be increased to at least 100 percent of the ASTM D 698 maximum dry density.

4.2.2 Grading and Drainage

The performance of the foundation systems for the proposed structures will not only be dependent upon the quality of construction, but also upon the stability of the moisture content of the near-surface soils. Therefore, we highly recommend that site drainage be developed so that ponding of surface runoff near the structures does not occur. Accumulation of water near building foundations may cause significant moisture variations in the soils adjacent to the foundations, thus increasing the potential for structural distress.

Positive drainage away from the structures must be provided during construction and maintained through the life of the proposed project. Infiltration of water into excavations should be prevented during construction. It is important that foundation soils are not allowed to become wetted. All grades must provide effective drainage away from the buildings during and after construction. Exposed (unpaved) ground should be sloped at a minimum 5 percent away from the buildings for at least 10 feet beyond the perimeter of the buildings. Water permitted to pond next to the buildings can result in greater soil movements than those discussed in this report. Estimated movements described in this report are based on effective drainage for the life of the structures and cannot be relied upon if effective drainage is not maintained.

Roof runoff and surface drainage should be collected and discharged away from the structures to prevent wetting of the foundation soils. Roof gutters should be installed and connected to downspouts and pipes directing roof runoff at least 10 feet away from the buildings, or discharged on to positively sloped pavements. Planters located within 10 feet of the structures should be self-contained (or lined with impermeable barriers) to prevent water accessing the building subgrade soils. Sprinkler mains and spray heads should be located at least 5 feet away from the buildings such that they cannot become a potential point source of water directly adjacent to the buildings. In addition, the owner and/or builder should be made aware that placing large bushes and trees adjacent to the structures may cause significant moisture variations in the soils underlying the structures. Watering of vegetation should be performed in a timely and controlled manner and prolonged watering should be avoided. Landscaped irrigation adjacent to the foundation units should be minimized or eliminated. Special care should be taken such that underground utilities do not develop leaks with time.

4.2.2.1 Interceptor Drains

The geologic/topographic setting of this site creates a concern for possible infiltration of groundwater seepage into the building and pavement areas. In cut areas, installation of perimeter interceptor trenches/drains (French drains) should be implemented at the base of the cuts and retaining walls to intercept and remove groundwater before it has an opportunity to infiltrate into the adjacent building pads, pavement base material, and/or underlying subgrade at these locations. In addition, we also recommend surficial interceptor drains along the north and east sides (uphill directions) of the North Building and the east side of the South Building, as we understand pavement will cover the entire area between the two buildings. Other groundwater encountered at the site may possibly be diverted with interceptor trenches/drains along the uphill sides of the proposed improvements.

In general, surficial interceptor drains should extend at least 18 inches below the adjacent floor slab elevation. The drain system should be designed to gravity flow and outlet downhill and away from the building and/or pavement areas. The drains should consist of a clean, washed gravel section (at least 18 inches wide) meeting the gradation requirements of ASTM C 33, Grade 57, continuously wrapped in filter fabric (Mirafi 140 N or equivalent). Perforated collector pipes with a minimum diameter of 4 inches should be provided for all sections of the wall drains. For drains installed along walls, the granular drainage backfill should extend over the entire height of the wall, not just at the base of the wall. If groundwater is observed during or after construction, Terracon would be pleased to review the actual location, depth, and cross-section of the drains prior to construction.

4.2.2.2 Moisture Barrier Placement Under Select Fill

At both the North and South Buildings there is a concern that sub-surface moisture migration /water flow from higher elevations to the north of the buildings could potentially lead to swelling of the Stratum II clay soils. Additionally, there are concerns that water entering the select fill building pad could potentially migrate downward into the Stratum II fat clay and cause swelling (sometimes called the "bathtub" effect). In order to minimize the potential for water migration from the select fill building pad materials to the Stratum II fat clay, we recommend that a horizontal moisture barrier (HMB) is placed at the base of the select fill material, above the fat clay subgrade (The potential location of the HMB is conceptually illustrated on Exhibit A-13 for a PVR of 1 inch). Based on the provided grading plan for the site, we would envision the cut, and thus the lay of the HMB, to be established such that any collected water is channeled beneath the buildings within a minimum 6-inch thick gravel bedding layer atop the HMB and daylighted on the southeastern side of the South Building. The HMB is not necessary if the structurally suspended floor slab option is selected for the foundation system.

Prior to installation of the HMB, the bottom of the excavation should be free of debris and loose or soft soil prior to placing a minimum 30-mil polyethylene, PVC, HDPE, or EPDM moisture

barrier upon it. The moisture barrier should meet the requirements of ASTM E 1745. The horizontal barrier should be overlapped at least 2 feet at each adjacent sheet and then taped to prevent loosening or pealing during subsequent fill placement and compaction. Care should be exercised to prevent rips and tears in the moisture barrier. The HMB, and the select fill, should extend outward at least 5 feet beyond all building limits.

4.3 Foundation Systems

Based upon the subsurface conditions observed during this exploration and size/anticipated loading for each building, we highly recommend a structurally suspended floor slab on drilled piers. However, as requested, recommendations are presented for a monolithic slab-on-grade foundation system (either conventionally reinforced or post-tensioned).

4.3.1 Structurally Suspended Floor Slab on Drilled Piers

Due to the highly plastic fat clay soils observed at this site, it addition to significant cuts planned in some areas of the site, the most positive means of reducing the effects of floor slab movements due to volume change and/or settlement of the subsurface soils would be to use structurally suspended floor slabs above grade on drilled piers (either underreamed or straight-sided). For structurally suspended floor slab systems at the site, we recommend a minimum 18-inch void space (or crawl space) be provided beneath the floor slabs and the drilled pier foundation systems be designed to carry the additional loads. This option eliminates the need for the extensive earthwork (including the HMB and drainage gravel layer) associated with a monolithic slab-on-grade foundation and described subsequently in **Section 4.3.2 — Monolitic Slab-On-Grade Foundations**.

If the subgrade elevation beneath the floor slab is lower than that of the exterior ground surface in any areas, we recommend that a series of surface drains be placed such that if any water accumulates in the void space beneath the slab, then the water can be properly collected and removed. Sloping the subgrade toward these drains in a manner where water cannot accumulate adjacent to any of the foundation units is recommended. The above can also be accomplished by slope the subgrade beneath the outside of the building to provided positive drainage away from foundation units. In addition, proper ventilation should be provided to reduce the possibility that a high humidity environment could develop in the void space areas.

Description	Drilled Pier Design Parameter
Minimum pier depth[1]	20 feet below finished floor elevation and 20 feet below existing grade, whichever is deeper
Minimum embedment into bearing stratum[1]	5 feet
Minimum pier diameter	18 inches
Bearing pressure (net allowable)	16,000 psf
Side Friction (net allowable)[2]	For pier portions embedded beyond 5 feet of depth below finished floor elevation: 500 psf
Ratio of Underream Diameter to Shaft diameter [3]	2:1 to 3:1
Estimated Uplift Force[4,5,6]	140*D
Minimum percentage of steel[7]	0.5 percent
Approximate total settlement[8]	¾ inch
Estimated differential settlement[9]	Approximately ½ to ¾ of total settlement

1. To bear within the Stratum II soils. If the Stratum III limestone is encountered, as it may be on the downhill portion of the South Building, then the piers can be set on the Stratum III limestone without further penetration.

   Bearing depths will depend upon final grading at the site. In cut areas where final grades are lower than existing grades, the pier depths should be at least equal to the minimum pier depth below grade. In fill areas where final grades are higher than existing grades, pier depths should be greater than the minimum pier depth by an amount equal to the thickness of fill above existing grades at the time of our drilling.

   In cases where an underream cannot be properly constructed due to blocky/clays or cave-ins, straight-sided piers may be used. Please note that if a straight-sided pier detail (indicating diameter, depth, and reinforcing steel) is not shown on the Structural plans, the General Contractor must contact the Structural Engineer for construction details prior to switching from underreamed to straight-sided piers. Neither the geotechnical engineer nor the construction testing firm can approve pier detail changes in the field without the Structural Engineer's authorization.

2. Side friction should be neglected in the upper 5 feet of the pier and the lower portion of the pier equal to one underream diameter above the bottom of the pier. For straight-sided piers, side friction may be used from a depth of 5 feet to the bottom of the pier itself.

3. In addition to having an adequate bearing area to support compressive loads, the diameter of the underream should be large enough to overcome uplift forces on the pier without causing a local foil failure to the overlying soils. We recommend that the ratio of the underream diameter be larger than 2:1 to withstand uplift forces due to soil expansion. However, in no case should this ratio exceed 3:1.

4. The amount of reinforcing steel required can be computed by assuming that the dead load of the structure surcharges the pier, that the above estimated tensile force acts vertically on the shaft, and that the minimum pier shaft length and/or embedment is sufficient in withstanding the uplift on the pier itself. The amount of required steel, as calculated by the structural engineer, should extend the entire pier length and in no case should the percentage of steel be less than 0.5 percent. The equation for uplift force includes a factor of safety of 1.5.

5. Uplift force (in kips) is used to calculate pier reinforcing steel. The term "D" is the pier diameter in feet.

6. The recommended minimum embedment depth of the piers should be sufficient in withstanding soil uplift forces. Please note that the uplift force equation given above is intended for calculating the required reinforcing steel and is not intended for calculating required pier embedment to overcome soil uplift forces. Additional reinforcing steel may be needed to resist external structural uplift forces.

7. If subgrade preparation as outlined in **Section 4.3.1** is followed, soil-related uplift does not appear to be a concern at this site, assuming proper site preparation and building pad construction. However, we do

recommend that the minimum percentage of reinforcing steel be no less than ½ percent of the gross shaft area and extend over the full length of the pier.

8 Provided proper construction practices are followed. For adjacent piers, we recommend a minimum edge-to-edge spacing of at least 2 pier diameter (or 3 pier diameters center-to-center) based on the larger diameter of the two adjacent piers. In locations where this minimum spacing criterion cannot be accomplished, Terracon should be contacted to evaluate the locations on a case-by-case basis.

9. Will result from variances in subsurface conditions, loading conditions and construction procedures, such as cleanliness of the bearing area or flowing water in the shaft.

We recommend that on-site clayey soils (at least 18 inches deep) be utilized for backfill adjacent beams at the exterior of the building (to reduce potential infiltration of surface water into the subgrade in these areas). The exterior clayey backfill should be compacted to at least 95 percent of the ASTM D 698 dry density at a moisture content at or above optimum moisture. On the interior sides of the perimeter grade beams, backfill should consist of properly compacted select fill or flowable backfill (COA Item 402 or TxDOT Item 401), not sand or gravel.

4.3.2 Monolithic Slab-On-Grade Foundations

As requested, monolithic slab-on-grade foundation system (either conventionally reinforced or post-tensioned) could potentially be used, provided the extensive subgrade preparation described in this section is follows.

Moderately high to highly expansive near-surface soils (Stratum I and Stratum II) were observed within the proposed building areas. Results of the Atterberg Limits tests indicate that these soils generally exhibit a moderate to high plasticity and may experience expansion and contraction due to changes in moisture content. Based upon the Texas Department of Transportation (TxDOT) Method TEX-124-E and the absorption swell tests, we estimate that the in-situ soils in the proposed building areas could exhibit a Potential Vertical Rise (PVR) of up to about 5 to 8 inches based on in-situ soil conditions for the natural soils at natural grade. The depth of these highly expansive near-surface soils was, however, found to be variable across the site.

As requested, subgrade preparation options for anticipated post-construction floor slab movements of 1 inch, 1.5 inches, and 2 inches have been evaluated and are presented in the following table. The depths to which soils are to be removed and replaced with properly compacted select fill soils were found to vary between 6 and 13 feet for the range of post-construction floor slab movements evaluated at the North and South Buildings.

Anticipated Post-Construction Floor Slab Movements*	Depth of Removal and Replacement with Properly Compacted Select Fill	
	South Building	North Building
1 inch	10 feet	13 feet
1.5 inches	8 feet	11 feet
2 inches	6 feet	9 feet

* Whichever option is chosen , the select fill should be underlain by the HMB and gravel drainage layer outlined in **Section 4.2.2.2 – Moisture Barrier Placement Under Select Fill**.

Fill placed in the building pad areas should meet our select fill specifications, as noted in "**Section 4.2 – Earthwork**". Material and placement requirements for select fill are provided in "**Section 4.2 - Earthwork**". We suggest the use of crushed limestone base in the upper 6 inches of the fill pad from a standpoint of construction access during wet weather, as well as from a standpoint of floor slab support. This suggestion is primarily to provide a better working surface for construction workers, equipment, and traffic on the building pad, especially during and after periods of wet weather, and is not intended to function as a capillary break or moisture barrier for the slab.

A subgrade reaction modulus of 150 psi/inch may be utilized for subgrade prepared as discussed above. The building pad should extend at least 5 feet beyond the building slab limits to reduce differential movements directly adjacent to doorways. In unpaved areas, the upper 18 inches of backfill adjacent to the grade beams (on the exterior side) should be moisture conditioned and compacted Stratum I fat clay soils to reduce surface water infiltration. For any flatwork (sidewalks, ramps, etc.) outside of the building areas which will be sensitive to movement, subgrade preparation as discussed above is strongly recommended as it will help to reduce differential movements between the flatwork and the adjacent buildings. If subgrade preparation as given above for building areas is not implemented in the exterior flatwork areas, those areas will be susceptible to post-construction movements in excess of that given above, which may then result in reversed surface drainage/runoff towards the structure.

The buildings should be constructed to be as tolerable to movement as possible. Although the indicated preparation is anticipated to reduce cracking in the floor slab, differential movements at entryways may cause difficulty in opening and closing doors. If the floor slabs are doweled into the perimeter grade beams to control movement, the resulting soil pressures may cause cracks to develop inside of the dowel bars, adjacent to the exterior walls. However, if the floor is not doweled at these locations, a "trip hazard" could result due to the resulting differential movements at entryways, and difficulty in opening and closing doors could develop.

We should also note that the potential movement values indicated are based upon moisture variations in the subgrade due to circumstances such as moisture increases due to rainfall and loss of evapotranspiration. In circumstances where significant water infiltration beneath the floor slab occurs (such as a leaking utility line or water seepage from outside the building resulting from poor drainage), movements in isolated floor slab areas could potentially be in excess of those indicated in this report. Several factors that could influence the level of moisture in the subgrade soils and consequently induce volumetric changes resulting in movements which are in excess of those estimated by the PVR are listed below.

- Poor drainage: All grades must provide effective drainage away from the buildings during and after construction. Water permitted to pond next to the building can result in greater soil movements than those discussed in this report. These greater movements can result in unacceptable differential floor slab movements, cracked slabs and walls, and roof leaks. Estimated movements described in this report are based on effective drainage for the life of the structure and cannot be relied upon if effective drainage is not maintained. Exposed (unpaved) ground should be sloped at a minimum 5 percent away from the building for at least 10 feet beyond the perimeter of the building. After building construction and landscaping, we recommend verifying final grades to document that effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted as necessary, as part of the structure's maintenance program.

- Leakage of utilities: Leaking pipes underneath and/or near the foundation will increase the moisture content of the surrounding subgrade soils and will likely result in a PVR greater than discussed above for these soils. Utilities entering the buildings should include flexible connections to account for potential post-construction soil movements. Utility trenches are a common source of water infiltration and migration. All utility trenches that penetrate beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches that could migrate below the building. We recommend constructing an effective clay "trench plug" that extends at least 2 feet out from the face of the building exterior. The plug material should consist of on-site highly plastic clay compacted at a water content at or above the optimum water content. The clay fill should be placed to completely surround the utility line and be compacted in accordance with recommendations in this report.

- Landscaping: Landscaping and irrigation should be minimized as much as possible around the structure. Planters located within 10 feet of the structure should be self-contained (or lined with impermeable barriers) to prevent water accessing the building and pavement subgrade soils. Locate sprinkler mains and spray heads a minimum of 5 feet away from the building lines. Low-volume, drip style landscaped irrigation should not be used near the building. Collect roof runoff in drains or gutters. Discharge roof drains and downspouts onto pavements which slope away from the building or extend downspouts a minimum of 10 feet away from structures. In highly expansive clay soils, joints in drain

pipes can separate. For this reason, surface drainage on a concrete flume or pavement would be preferred over below-grade piping and drainage.

- Significant cuts: Although significant cuts in the proposed building areas will not adversely affect the level of moisture within the subgrade soils, permanent significant cuts below current existing grades release a great deal of overburden pressure in the remaining underlying clay soils. This overburden pressure, while in place, reduces or inhibits the swell potential of these underlying clay soils. With this pressure removed due to a significant cut, these soils are now free to swell and may result in heave magnitudes well in excess of those discussed above.

The post-construction performance of the foundation will likely be influenced more by post-construction volumetric changes of the subgrade due to in-situ moisture variations than upon settlement due to foundation loads. Settlement response of surface slabs will be influenced as much by the quality of construction and fill placement as by soil-structure interaction.

Due to the significant probability of surface/subsurface water seepage in this geologic/topographic setting, we recommend that interceptor drains be placed along the uphill perimeters of the buildings to decrease the potential for moisture infiltration from groundwater seepage into the subgrade and/or fill. Requirements for interceptor drains were discussed earlier in **Section 4.2.2.1 Interceptor Drains**.

The above subgrade preparation recommendations should be applied to an area extending a minimum of 5 feet outside of the building limits, and should be extended further to include attached sidewalks and ramps needed for ADA access. This should be implemented to reduce differential movements between the flatwork and the adjacent building. In unpaved/landscaped areas surrounding the building, this could result in more pervious select fill materials being exposed at the surface immediately surrounding the building. If this case occurs, we suggest that the upper 24 inches of soils below final grades in unpaved/landscaped areas consist of compacted on-site clayey soils to a distance of at least 5 feet beyond the building limits.

If the above clayey soil cap cannot be performed or is not feasible, then one option to achieve a similar outcome includes deepening the perimeter grade beams to extend through the select fill soils and into the underlying clayey soils to create a vertical moisture barrier. Another option would be to construct a horizontal moisture barrier by attaching a minimum 30-mil polyethylene, PVC, or EPDM liner to the perimeter grade beams and extending the liner outward at least 5 feet from the building perimeters at a depth of at least 24 inches below final grades. If desired, please contact us for further details on either of the above options.

Grade beams should bear on compacted select fill. Parameters for the Slab and Beam system are as follows:

Description		Slab and Beam System
Minimum embedment of grade beams[1]		24 inches
Bearing Pressures (allowable)[2]	**Select fill**	Net dead plus sustained live load – 1,700 psf Net total load – 2,500 psf
Approximate Potential Vertical Rise (PVR)		About 5 to 8 inches (About 1 to 2 inches)[3]

1. Embedment is to reduce surface water migration below the foundation elements and to develop proper end bearing and is not based on structural considerations. The grade beam width and depth should be properly evaluated by the structural engineer. Grade beams may be thickened and widened at interior column locations to serve as spread footings at these concentrated load areas.
2. Differential settlements may result from variances in subsurface conditions, loading conditions and construction procedures. The settlement response of the footings will be more dependent upon the quality of construction than upon the response of the subgrade to the foundation loads. We recommend that measures be taken whenever practical to increase the tolerance of the building to post-construction foundation movements. An example of such measures would be to provide frequent control joints for exterior masonry veneers and interior sheetrock walls (particularly near doors and windows) to control cracking across such walls and concentrate movement along the joints.
3. We recommend that the building subgrade be properly prepared to reduce the PVR of the subgrade to more tolerable levels. The values in parenthesis may be used provided subgrade preparation is implemented as described previously in this section.

Post Tensioning Institute (PTI) Parameters[4]		Slab and Beam System		
Depth of Removal and Replacement with Properly Compacted Select fill		**10 to 13 feet**	**8 to 11 feet**	**6 to 9 feet**
Anticipated Post-Construction Floor Slab Movements		**1 inch**	**1.5 inches**	**2 inches**
Depth of Seasonal Moisture Change[5]		15 feet		
Effective Plasticity Index[6]	**Select Fill**	20		
Percent Finer than 2 Microns[6]	**Select Fill**	15		
Soil Fabric Factor		1.0		
Approximate Thornthwaite Moisture Index		-12		
Estimated Constant Soil Suction		3.5 pF		

Range of Soil Suction	1.5 pF		
Edge Moisture Variation Distance, e_m (Center Lift) [7, 8]	9.0 feet		
Edge Moisture Variation Distance, e_m (Edge Lift) [7, 8]	4.8 feet		
Differential Soil Movement, y_m (Center Lift) [8]	1 inch	1.5 inches	2 inches
Differential Soil Movement, y_m (Edge Lift) [8]	1 inch	1.5 inches	2 inches

4. Based on our analysis of the field and laboratory data, design parameters were computed using the Addendum to the 2004 Post-Tensioning Institute (PTI) method[ii] for slab-on-grade design and the subsequent Errata to the Addendum approved by the PTI Slab-on-Grade Committee on February 7, 2008.
5. The moisture beneath a shallow foundation will change in response to wetting and drying conditions around the foundation perimeter. The moisture condition has a significant effect on slab behavior and is highly variable with time, changing seasonally, with annual climate conditions, drainage patterns, ground cover, and vegetation (trees and shrubs).
6. The plasticity index and the clay mineral percentage are values of the soil that can be estimated by laboratory tests, and, although variable from location to location, remain relatively constant with time.
7. The maximum moisture variation distance is termed the edge moisture variation distance, e_m, and is an important factor governing the design of post-tensioned floor slabs. The e_m is related to percent fine clay and climatic conditions as well as other parameters, such as soil fabric factor and unsaturated diffusion coefficient.
8. The differential movements, y_m, and edge moisture variation distances, e_m, were calculated by modeling soil profiles using the commercial software program VOLFLO as recommended by the PTI manual.

4.3.4 Foundation Construction Considerations

4.3.4.1 Grade Beams

Grade beams associated with monolithic slab and grade beam foundations should be neat excavated if possible. If neat excavation is not possible, the foundation should be properly formed. If a toothed bucket is used, excavation with this bucket should be stopped approximately 6 inches above final grade and the grade beam/footing excavation completed with a smooth-mouthed bucket or by hand labor. Debris in the bottom of the excavation should be removed prior to steel placement. The foundation excavation should be sloped sufficiently to create internal sumps for runoff collection and removal. If surface runoff water or groundwater seepage in excess of one inch accumulates at the bottom of the foundation excavation, it should be collected, removed, and not allowed to adversely affect the quality of the bearing surface.

ii. Post-Tensioning Institute, "Addendum No. 1 to the 3rd Edition of the Design of Post-Tensioned Slabs-on-Ground", Post-Tensioning Institute, Phoenix, AZ, May 2007.

If utilized, the post-tensioned slab-on-grade construction technique should be carefully monitored by qualified personnel. The sophistication of this construction procedure requires careful attention to details such as concrete integrity and anchorages, along with tendon spacing, support, covering, and stressing. Poor construction could result in a non-functional slab foundation system.

4.3.4.2 Drilled Piers

Drilled pier foundations should be augered and constructed in a continuous manner. Concrete should be placed in the pier excavations following drilling and evaluation for proper bearing stratum, embedment, and cleanliness. The piers should not be allowed to remain open overnight before concrete placement. Surface runoff or groundwater seepage accumulating in the excavation should be pumped out and the condition of the bearing surface should be evaluated immediately prior to placing concrete. The drilling equipment utilized should be readily capable of excavating the limestone observed at this site. Drilling equipment with insufficient torque and/or augers/bits/core barrels that are not suited for variable and/or hard rock conditions will likely result in poor production rates.

Although not encountered in the borings, zones of groundwater inflow and/or sloughing soils are possible during pier construction at this site. Therefore provisions should be incorporated into the plans and specifications to utilize casing to control sloughing and/or groundwater seepage during pier construction. Removal of the casing should be performed with extreme care and under proper supervision to minimize mixing of the surrounding soil and water with the fresh concrete. If water infiltration becomes excessive, slurry drilling techniques (or other drilling means) could be necessary. Concrete should exhibit a six-inch slump with a ± one inch tolerance. Under no circumstances should loose soil be placed in the space between the casing and the pier sidewalls. The concrete should be placed using a rigid tremie or by the free-fall method provided the concrete falls to its final position through air without striking the sides of the hole, the reinforcing steel cage or any other obstruction. A drop chute should be used for this free-fall method.

The use of casing should help to minimize groundwater inflow into the pier excavation. If seepage persists even after casing installation, the water should be pumped out of the excavation immediately prior to placing concrete. If groundwater inflow is too severe to be controlled by pumping, the concrete should be tremied to the full depth of the excavation to effectively displace the water. In this case, a "clean-out" bucket should be utilized to remove loose soil and/or rock fragments from the pier bottom before placing steel and concrete.

4.3.4.3 Foundation Construction Monitoring

The performance of the selected foundation system for the proposed structures will be highly dependent upon the quality of construction. Thus, we recommend that the foundation installation be monitored by Terracon to identify the proper bearing strata and depths and to help evaluate foundation construction. We would be pleased to develop a plan for foundation monitoring to be incorporated in the overall quality control program.

4.4 Excavation

4.4.1 Unloading of Cut Areas

Although we do not know the construction schedule for the Earthwork Contractor, we highly recommend that the construction schedule be required to make all proposed major cuts to approximate final grades (or even lower in elevation) as early as possible after earthwork operations commence. Once the initial cuts are performed, the soils have the opportunity to rebound, even if the Contractor is working and placing fills in those areas, since the planned final grades will be lower than the current natural grades. If the areas can be left undisturbed for any amount of time (several weeks, months, years, etc.), an initial survey of the exposed subgrade (after cutting) should be conducted, along with subsequent surveys (depending upon length of time it can be left undisturbed), prior to additional earthwork in these areas to evaluate the magnitude and rate of heave. While these cut areas remain relatively undisturbed, the subgrade should be periodically wetted, such that the cut does not excessively dry or desiccate. While construction proceeds in other areas (i.e. the South Building which will be built largely over fill), these cut areas would have the opportunity to heave due to the relief of overburden pressure, until the time arrives for actual construction operations in that area. This concept is similar to surcharge loading that is sometimes placed on proposed deep fill areas in an attempt to promote initial settlement prior to construction. However in this case, we are more concerned about excessive heave in these cut areas and this concept would attempt to allow the clays to heave during the time from initial cutting to construction of the building foundation.

4.4.2 Considerations for Excavation in Limestone

If excavation operations at the site penetrate into the Stratum III Georgetown limestone (possible, but not expected due to the depth of limestone and planned fills), it should be observed that our past experience with the Georgetown limestone, along with the data obtained during our field and laboratory programs, indicates that zones of resistant limestone which could require sawcutting, jackhammering, hoe-ramming, milling, or similar techniques to excavate should be expected.

Our comments on excavation are based on our experience with the rock formation. Rock excavation depends on not only the rock hardness, weathering, and fracture frequency, but also

the contractor's equipment, capabilities, and experience. Therefore, it should be the contractor's responsibility to determine the most effective methods for excavation. The above comments are intended for informational purposes for the design team only and may be used for planning purposes.

4.6 Seismic Design Information

Code Used	Seismic Design Category	Site Class Designation
2009 International Building Code (IBC)	A[1]	C[2]

1 Per Section 1613.5.1.

2 Per Table 1613.5.2. The 2009 IBC requires a site soil profile determination extending a depth of 100 feet for seismic site classification. The current scope requested does not include the required 100 foot soil profile determination. Borings extended to a maximum depth of approximately 45 feet and this seismic site class definition assumes that limestone and/or materials with similar characteristics are below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration. Alternatively, a geophysical exploration could be utilized in order to attempt to justify a higher seismic class.

4.7 Lateral Earth Pressure

It is our understanding that two principal retaining walls are planned at the site. The first will be located along the eastern and northern edges of the North Building (FFE = 700.0 feet) and will act to support a cut into the natural slope. It is our understanding (and recommendation) that this retaining wall will be situated a minimum distance of 10 feet away from the building structure and not connected to the building structure. The second principal retaining wall on the site will be located along the eastern edge of the South Building (FFE = 696.5 feet) and will act to support the fill material that will be placed

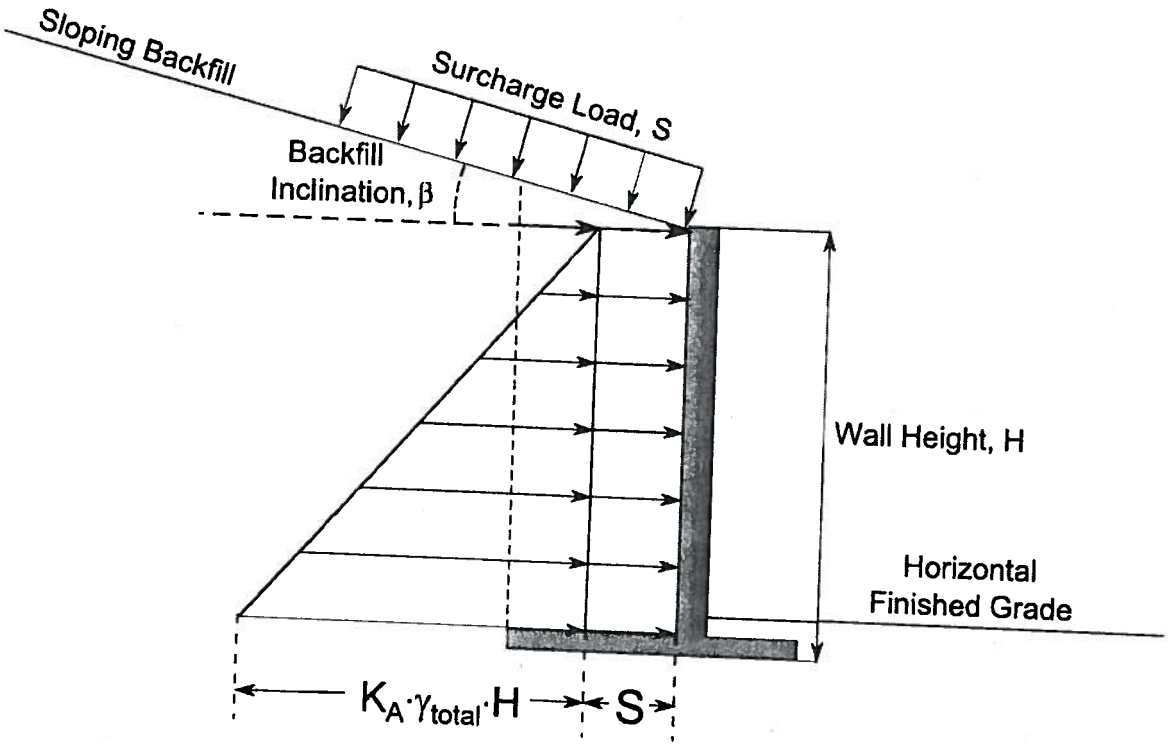
Presented below are general at-rest, active, and passive earth pressure coefficients for various backfill types adjacent to below-grade walls or site retaining walls. The recommendations in this section apply to those walls which are installed in open cut or embankment fill areas such that the backfill extends out from the base of the wall at an angle of at least 45 degrees from vertical for the entire height and length of the wall.

Reinforced concrete walls with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to those indicated in the following tables. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained.

Two wall conditions are shown in the figure below. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and may be utilized in cases where the walls

can exhibit a certain degree of horizontal movement (such as cantilevered retaining walls). At-rest earth pressures are recommended in cases where little wall yield is expected (such as structural below-grade walls). The recommended design lateral earth pressures do not include a factor of safety.

The tabular values for earth pressures do not include a hydrostatic or ground-level surcharge component. To prevent hydrostatic pressure build-up, retaining walls should incorporate functional drainage (via free-draining aggregate or manufactured drainage mats) within the backfill zone. The effect of surcharge loads, where applicable, should be incorporated into wall pressure diagrams by adding a uniform horizontal pressure component equal to the applicable lateral earth pressure coefficient times the surcharge load, applied to the full height of the wall. Heavy equipment should not operate within a distance closer than the exposed height of retaining walls to prevent lateral pressures more than those provided.



Backfill Type	Estimated Total Unit Weight, pcf	Lateral Earth Pressure Coefficients for Horizontal Backfill (β = 0 degrees)*		
		At Rest (K_O)	Active (K_A)	Passive (K_P)
Crushed Limestone Base	140	0.45	0.30	3.5
Clean Gravel (ASTM C33, Grade 57 or 67)	120			
Clean Sand	120	0.50	0.35	3.0

(ASTM C33 Fine Aggregate)				
Moisture-Conditioned Clay	120	0.75	0.60	1.7

* Coefficients represent ultimate values. Appropriate safety factors should be applied.

We anticipate that the north and east retaining walls around the North Building may have inclined/sloped backfill. If so, we recommend no steeper than 4 (Horizontal) to 1 (Vertical) sloping downwards towards the top of the wall (corresponding to β of approximately 14 degrees). The lateral earth pressure coefficients for a backfill that is sloped at 4H:1V are provided below.

Backfill Type	Estimated Total Unit Weight, pcf	Lateral Earth Pressure Coefficients with a 4H:1V Inclined Backfill Surface (β ≈ 14 degrees)*		
		At Rest (K_O)	Active (K_A)	Passive (K_P)
Crushed Limestone Base	140	0.45	0.31	3.1
Clean Gravel (ASTM C33, Grade 57 or 67)	120			
Clean Sand (ASTM C33 Fine Aggregate)	120	0.50	0.37	2.6
Moisture-Conditioned Clay	120	0.75	0.80	1.2

* Coefficients represent ultimate values. Appropriate safety factors should be applied.

Applicable conditions to the above include:

- For active earth pressure, wall must rotate about base, with top lateral movements of about 0.002 **H** to 0.004 **H**, where **H** is wall height
- For passive earth pressure to develop, wall must move horizontally to mobilize resistance
- Uniform surcharge, where S is surcharge pressure, should be applied over the full height of the wall using a rectangular pressure distribution
- Backfill compacted between 95 and 100 percent of standard Proctor maximum dry density
- Loading from heavy compaction equipment not included
- No hydrostatic pressures acting on wall (i.e. wall drains must be included)
- No dynamic loading
- No safety factor included in soil parameters
- Ignore passive pressure in frost zone (estimated at 6 inches)

For the values to be valid, the backfill must extend out from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively. The compactive effort should be controlled during backfill operations adjacent to walls. Overcompaction can produce lateral earth pressures in excess of at-rest magnitudes. Compaction levels adjacent to walls should be maintained between 95 and 100 percent of Standard Proctor (ASTM D 698) maximum dry density.

For retaining walls bearing on on-site fat clay soils, we recommend a coefficient of sliding resistance of 0.4 (maximum allowable sliding resistance of 500 psf) and a maximum footing bearing capacity of 2,500 psf. All retaining walls should be checked against failure due to overturning, sliding, and overall slope stability. Such an analysis can only be performed once the dimensions of the wall and cut/fill scenarios are known. Retaining walls placed to bear upon the highly expansive fat clay soils observed on this site will be subject to the potential movements described previously for natural soils.

We recommend that a buffer area of at least 5 feet for all pavement areas be placed between retaining walls (with a minimum height of 4 feet or more) and the adjacent construction. In building areas, this buffer zone from retaining walls should be increased to at least 10 feet. These recommended buffer zones are to reduce the potential of distress from any long-term ("creep") movements of the wall and backfill. Pedestrian sidewalks may be exempted from the above criteria; however, some distress could still be observed in the sidewalks due to movements of the retaining walls and backfill.

To control possible hydrostatic pressure behind the wall, we recommend that a drain (consisting of freely-draining aggregate or manufactured drainage mat, along with outlet piping) be installed at the base of the wall with a collection pipe leading to a reliable discharge. For below-grade walls, the freely-draining backfill material should extend over the full height and length of the wall such that water does not become trapped or perched behind the wall. If this is not possible, then combined hydrostatic and lateral earth pressures should be used in design. Proper control of surface water percolation will help to prevent buildup of higher wall pressures. In unpaved areas, the final 24 inches of backfill should preferably consist of clayey soils to help to reduce percolation of surface water into the backfill.

At this time, we understand the type of retaining wall planned for the site is a conventional cantilevered retaining wall (L-shaped or T-shaped). The lateral earth pressure recommendations given in the following sections are applicable to the design of rigid retaining walls subject to slight rotation, such as cantilever, or gravity type concrete walls. We have not included recommendations for design of modular block-geogrid reinforced backfill walls, also known as Mechanically Stabilized Earth (MSE) or Reinforced Earth (RE) walls. These walls are typically subcontracted as design-build structures, since design details are often manufacturer specific.

4.8 Cut Slope Recommendations

Due to the topography of the site, we anticipate the need for temporary and/or permanent slopes. The following information is provided for cuts and/or embankment fills that may be required to achieve planned grades in some areas of the site.

4.8.1 Cut Slopes

For any cut slopes into the natural on-site Stratum I and Stratum II soils, we recommend that permanent slopes be cut no steeper than 3(H):1(V), while temporary cuts during construction may use 1.5(H):1(V). Although we do not expect the Stratum III limestone to be encountered during any excavations, permanent cut slopes in the Stratum III limestone should be no steeper than 1(H):1(V) due to the presence of weathered seams/layers and its tendency to undergo further weathering and erosion when exposed. In our opinion, cut slopes at the inclinations discussed above should be stable against a large-scale slide, although the potential for sloughing of loose soil zones exists.

Exposed cut slopes will also be susceptible to further erosion due to the nature of the on-site limestone. Installation of erosion control measures in such areas would be beneficial in reducing potential slope instability which could result from excessive erosion. In addition to initial erosion control measures, the cut slopes should be periodically checked for erosion (particularly after heavy rainfall events) and maintenance performed on areas exhibiting erosion.

In regards to worker safety, Occupational Safety and Health Administration (OSHA) Safety and Health Standards require the protection of workers adjacent to excavations. The OSHA guidelines and directives should be adhered to by the Contractor during construction to provide a safe working environment.

4.8.2 Buffer Zones

To allow for some sloughing to occur, we recommend that a "buffer zone" at least 5 feet wide adjacent to pavement and other general areas be provided between the proposed construction and the cut slopes (both at the toe and at the crest). If buildings are planned near these areas, the buffer zone should be increased to at least 10 feet. This should help reduce the possibility of sloughing soils/rock from contacting the adjacent improvements on the downhill side and from undermining the improvements on the uphill side.

4.9 Pavements

Both flexible and rigid pavement systems may be considered for site pavement applications. These two types of pavement are not considered equal. Over the life of the pavement, concrete pavements would be expected to exhibit better performance and require less maintenance. We strongly suggest concrete pavements in entry drives, loading/unloading areas, and dumpster areas.

Detailed traffic loads and frequencies were not available for the above mentioned pavements. However, we anticipate that traffic will consist primarily of passenger vehicles in the parking areas (assumed as the light duty pavements) and passenger vehicles combined with occasional garbage and delivery trucks in driveways (assumed as light-medium duty pavements). We are also providing pavement thicknesses for heavy duty driveways, loading areas, and dumpster

enclosures. If the heavy duty pavements do not match the above criteria, or heavier traffic loading is expected or other traffic information is available, Terracon should be provided with the information and allowed to review the pavement sections provided herein. Tabulated below are the assumed traffic frequencies and loads used to design pavement sections for this project.

Pavement Type	Traffic Design Index	Description
Parking Spaces (Passenger Vehicles Only):	DI-1	Light traffic – Few vehicles heavier than passenger cars, panel, and pick-up trucks; no regular use by heavily loaded two-axle trucks or lightly loaded larger vehicles. (EAL* < 5)
Minor Driveways (Light-Medium Duty):	DI-2	Light to medium traffic – Similar to DI-1, including not over 50 heavily loaded two-axle trucks or lightly loaded larger vehicles per day. No regular use by heavily loaded trucks with three or more axles. (EAL = 6 – 20)
Main Driveways (Medium-Heavy Duty); Loading Areas and Dumpster Enclosures:	DI-3	Medium to heavy traffic – Including not over 300 heavily loaded two-axle trucks plus lightly loaded trucks with three or more axles and no more than 30 heavily loaded trucks with more than three axles per day. (EAL = 21 – 75)

* Equivalent daily 18-kip single axle load applications.

Listed below are pavement component thicknesses which may be used as a guide for pavement systems at the site assuming that the Stratum I and Stratum II soils will generally act as the pavement subgrade, and that the pavement subgrade is prepared as outlined in the "Moisture Conditioned Subgrade/Lime-Treated Subgrade" portions of this section and in accordance with our general recommendations for site preparation in the **"Section 4.2 – Earthwork"**. We should note that these systems were derived based on general characterization of the subgrade. No specific testing (such as CBR, resilient modulus tests, etc.) was performed for this project to evaluate the support characteristics of the subgrade. Since highly expansive soils are present on the site, the choice between flexible and rigid pavement section considerations should be given to the ability of the pavement section to withstand movements and the ease by which the pavement section can be repaired. Flexible pavements tend to crack more easily, and are in more frequent need of repair/rehabilitation; however, they are comparatively easier and cheaper to repair. Rigid pavements are more resistant to distress, but once cracked, they can be harder and more costly to repair.

Lime treatment of the Stratum I and II soils is highly recommended (particularly for flexible pavements) to enhance the workability and support characteristics of the subgrade as well as to provide a barrier to reduce moisture infiltration into the underlying clay subgrade. The lime treatment also helps to reduce the shrink/swell potential of the lime-treated layer. We should not

that if lime treatment of the subgrade is planned, we recommend that the subgrade soils be investigated for the presence of sulfates. Excessive concentrations of sulfates in the soils can result in poor performance of lime-treated subgrade. Although lime treatment of the subgrade will likely reduce differential movement and heave in the new pavement system, some differential movement will likely occur. Cracking of the asphalt in the flexible pavement systems due to differential movements should be expected.

FLEXIBLE PAVEMENT SYSTEM

Component	Material Thickness (Inches)		
	DI-1	DI-2	DI-3
Asphaltic Concrete (HMAC)	2.0	2.5	3.0
Crushed Limestone Base	8.0	9.0	10.0
Lime-Treated Subgrade[1]	6.0	6.0	6.0

1. If the clay subgrade is not lime-treated, the subgrade should be moisture conditioned to a depth of 6 inches, and the base thickness should be increased by 2 inches.

On sites where highly expansive soils are prevalent (such as this one), rigid pavement sections result in better long-term performance and less maintenance than flexible asphaltic pavement sections; however, there is a higher initial cost. The following rigid pavement sections may be considered for this project.

RIGID PAVEMENT SYSTEM

Component	Material Thickness (Inches)		
	DI-1	DI-2	DI-3
Reinforced Concrete	5.0	6.0	7.0
Moisture Conditioned Subgrade[1]	6.0	6.0	6.0

1. If lime treatment is preferred, the subgrade should be lime-treated to a depth of 6 inches and the DI-2/Di-3 concrete sections may be decreased by ½-inch.

Reinforcing Steel: #3 bars spaced at 18 inches on centers in both directions.

Control Joint Spacing: In accordance with ACI 330R-08, control joints should be spaced no greater than 12.5 feet for 5-inch thick concrete and no greater than 15 feet for 6-inch thick or greater concrete. If sawcut, control joints should be cut within 6 to 12 hours of concrete placement. Sawcut joints should be at least ¼ of the slab thickness.

Expansion Joint Spacing: ACI 330R-08 indicates that regularly spaced expansion joints may be deleted from concrete pavements. Therefore, the installation of expansion joints is optional and should be evaluated by the design/construction team. Expansion joints, if not sealed and maintained, can allow infiltration of surface water into the subgrade.

Dowels at Expansion Joints: ¾-inch smooth bars, 18 inches in length, with one end treated to slip, spaced at 12 inches on centers at each joint.

Presented below are our recommended material requirements for the various pavement sections.

Hot Mix Asphaltic Concrete (HMAC) – The asphaltic concrete surface course should be plant mixed, hot laid Type D (Fine-Graded Surface Course) meeting the master specification requirements in TxDOT Item 340 or City of Austin (COA) Item 340. For acceptance and payment evaluation purposes, we suggest considering the use of the provisions in COA Item 340.

Reinforced Portland Cement Concrete (PCC) – Concrete should be designed to exhibit a flexural strength (third-point loading) of at least 500 psi at 28 days. As an option, a 28-day compressive strength of 3,500 psi may be utilized.

Crushed Limestone Base – Base material should be composed of crushed limestone meeting the requirements of TxDOT Item 247, Type A, Grade 1 or COA Item 210. The base should be compacted to a minimum of 95 percent of the maximum density as determined by the modified moisture/density relation (ASTM D 1557) at -3 to +3 percent of optimum moisture content. (As an option, compaction to at least 100 percent of the TEX-113-E maximum dry density may also be considered.) Each lift of base should be thoroughly proofrolled just prior to placement of subsequent lifts and/or asphalt. Particular attention should be paid to areas along curbs and adjacent to landscape islands and storm drain inlets. Placement of the base material should extend at least 18 inches behind curbs.

Moisture Conditioned Subgrade – The soil subgrade should be scarified to a depth of 6 inches, moisture conditioned, and recompacted to at least 95 percent of the maximum dry density as determined by ASTM D 698 (For fill depths in excess of 5 feet, the compaction criteria should be increased to 100 percent of ASTM D698 maximum dry density for those soils below 5 feet). The Stratum II fat clay soils should be moisture conditioned to between optimum and +4 percent of optimum moisture content. The Stratum I soils should be moisture conditioned to between -3 and +3 percent of optimum moisture content. Care should be taken such that the subgrade does not dry out or become saturated prior to pavement construction. Moisture conditioning is not necessary in intact limestone subgrade areas. The pavement subgrade should be thoroughly proofrolled with a rubber-tired vehicle (fully loaded water or dump truck) immediately prior placement of base material. Particular attention should be paid to areas along curbs and adjacent to landscape islands and storm drain inlets. Placement of the moisture conditioned subgrade should extend at least 18 inches behind curbs.

Lime-Treated Subgrade – If used, the subgrade should be treated with lime meeting the requirements of TxDOT 2004 Standard Specifications Item 260. Lime treatment may be accomplished by either the dry placement or slurry placement process.
We anticipate that approximate 6 to 10 percent hydrated lime will be required to treat the subgrade soils. Prior to the application of lime to the subgrade, the optimum percentage of lime to be added should be determined based on Plasticity Index (TEX-112E) and/or pH (ASTM D 6276) laboratory tests conducted on mixtures of the subgrade soils with lime. Subgrade soil samples should be obtained from the pavement area at the proposed final subgrade elevation.

The lime should initially be blended with a mixing device such as a Pulvermixer, sufficient water added, and allowed to cure for at least 48 hours. After curing, mixing should continue until the gradation requirements of TxDOT 2004 Standard Specifications Item 260.4 or COA Item 203 are met. The mixture should then be moisture adjusted and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D 698. Placement of the lime-treated subgrade should extend at least 18 inches behind curbs.

Pavement design methods are intended to provide structural sections with adequate thickness over a particular subgrade such that wheel loads are reduced to a level the subgrade can support. The support characteristics of the subgrade for pavement design do not account for shrink/swell movements of an expansive clay subgrade such as the fat clay soils encountered on this project. Thus, the pavement may be adequate from a structural standpoint, yet still experience cracking and deformation due to shrink/swell related movement of the subgrade. It is, therefore, important to minimize moisture changes in the subgrade to reduce shrink/swell movements. Proper perimeter drainage should be provided so that infiltration of surface water from unpaved areas surrounding the pavement is minimized.

On most projects, rough site grading is accomplished relatively early in the construction phase. Fills are placed and compacted in a uniform manner. However, as construction proceeds, excavations are made into these areas; dry weather may desiccate some areas; rainfall and surface water saturates some areas; heavy traffic from concrete and other delivery vehicles disturbs the subgrade; and many surface irregularities are filled in with loose soils to temporarily improve subgrade conditions. As a result, the pavement subgrade should be carefully evaluated as the time for pavement construction approaches. This is particularly important in and around utility trench cuts. All pavement areas should be moisture conditioned and properly compacted to the recommendations in this report immediately prior to paving. Thorough proofrolling of pavement areas using a fully-loaded water truck or dump truck (rubber-wheeled vehicle that can impart point wheel loads) should be performed no more than 36 hours prior to surface paving. Any problematic areas should be reworked and compacted at that time.

Openings in pavement, such as landscape islands, are sources for water infiltration into surrounding pavements. Water collects in the islands and migrates into the surrounding base material and subgrade soils thereby degrading support of the pavement. The civil design for the pavements should include features to restrict or to collect and discharge excess water from the islands. Examples of features are self-contained planters, edge drains connected to the storm water collection system or other suitable outlet, and impermeable barriers preventing lateral migration of water such as a cutoff wall installed to a depth below the pavement structure.

Long-term pavement performance will be dependent upon several factors, including maintaining subgrade moisture levels and providing for preventive maintenance. The following recommendations should be considered at a minimum:

- Adjacent site grading at a minimum 2% grade away from the pavements;
- A minimum ¼ inch per foot slope on the pavement surface to promote proper surface drainage;
- Install joint sealant and seal cracks immediately;
- Placing compacted, low permeability clay backfill against the exterior side of curb and gutter; and,
- Placing curb and gutters through any base material and directly on subgrade soils.

Preventive maintenance should be planned and provided for through an on-going pavement management program. These activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Preventive maintenance consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance. This is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements. Prior to implementing any maintenance, additional engineering observation is recommended to determine the type and extent of preventive maintenance.

4.9 Re-Irrigation Area Evaluation

Terracon field personnel performed three (3) field tests in the proposed re-irrigation areas using a double-ring infiltrometer. This test is used to determine a field measurement of the rate of infiltration of water into surficial soils and was performed in general accordance with ASTM D3385[iii]. The measured "steady-state" infiltration rates were found to be variable across the site. The measured infiltration rates at each of the three tested locations were as follows:

Location	Measured Infiltration Rate (in/hr)	Soil Properties at Test Location*		
		Moisture Content (%)	Plasticity Index	Fines Content (%)
B-8	1.3	12	39	17
B-9	0.1	11	34	26
B-10	1.1	19	50	70
Average	**0.8**	-	-	-

***The reported values of moisture content are for the upper 2 feet of soil. The plasticity index and fines content for location B-8, B-9, and B-10 are for depth of 0-2 feet, 2-4 feet, and 4-6 feet respectively.**

The infiltration rate at boring location B-9 was found to be approximately one order of magnitude less than the infiltration rate measured at locations B-8 and B-10 despite the close proximity of boring locations B-8 and B-9. Laboratory test data on soil samples taken during the field exploration portion of this investigation showed a significant variation in moisture content, plasticity index, and the fraction of fines at the site. Additionally, observations during field testing exhibited secondary features in the form of tree roots and soil cracking which could have led to preferential flow pathways. Given the variability of the measured infiltration rate of the Stratum I soils, the use of an average value of about 0.8 inches per hour for the infiltration rate into the soil should be reasonable.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide testing and observation during excavation, grading, foundation installation, and other construction phases of the project.

iii ASTM D3385. *Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer.* The American Society for Testing and Materials. West Conshohoken, PA.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include, either specifically or by implication, any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials, or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

For any excavation construction activities at this site, all Occupational Safety and Health Administration (OSHA) guidelines and directives should be followed by the Contractor during construction to provide a safe working environment. In regards to worker safety, OSHA Safety and Health Standards require the protection of workers from excavation instability in trench situations.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A

FIELD EXPLORATION

City of Austin Map

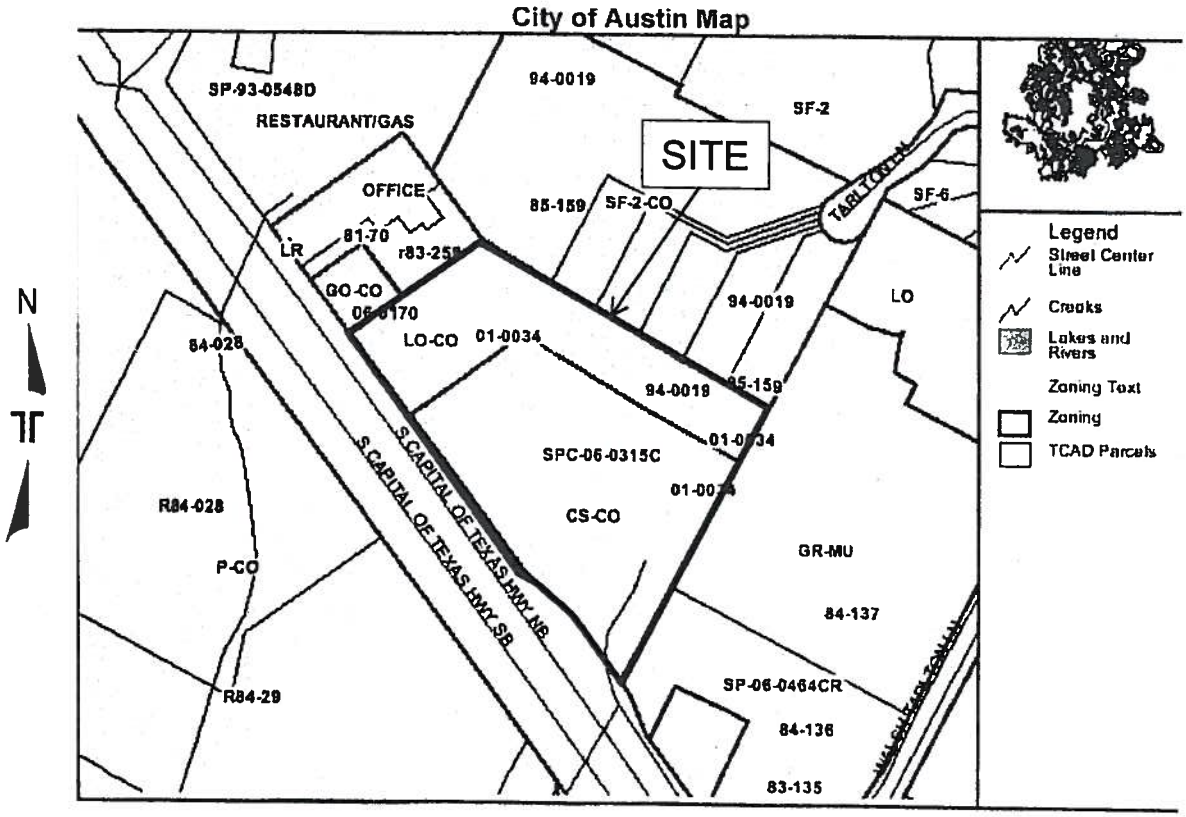


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mgr: JAK	Project No. 96115093
Drawn By: L&C	Scale: NTS
Checked By: BSM	File Name: 96115093
Approved By: BSM	Date: 08-18-2011

Terracon
Consulting Engineers & Scientists
5307 Industrial Oaks Blvd. Suite 160, Austin, Texas 78735
PH (512) 442-1122 FAX (512) 442-1181

SITE LOCATION MAP

TARLTON 360 STORAGE
2631 SOUTH CAPITOL OF TEXAS HIGHWAY
AUSTIN, TEXAS

EXHIBIT

A-1

draft

Case No. SPC-2011-0190C

RESTRICTIVE COVENANT

OWNER: Uplifting Properties, LP

MAILING ADDRESS: 1101 Havre Lafitte Drive, Austin, Texas 78746

CONSIDERATION: Ten and No/100 Dollars ($10.00) and other good and valuable consideration paid by City Of Austin to the Owner, the receipt and sufficiency of which is acknowledged.

PROPERTY: 12.267 acre tract of land known as "Lot 1, Block A, Schmidt Addition", a subdivision of record in Document No. 200400179 of the Official Public Records of Travis County, Texas.

WHEREAS, the Owner of the Property and the City Of Austin have agreed that the Property should be impressed with certain covenants and restrictions;

NOW, THEREFORE, it is declared that the Owner of Property, for the consideration, shall hold, sell and convey the Property, subject to the following covenants and restrictions impressed upon the Property by this restrictive covenant. These covenants and restrictions shall run with the land, and shall be binding on the Owner of the Property, its heirs, successors and assigns.

1. The owner shall comply with the Integrated Pest Management (IPM) Plan or record, as approved by the Planning and Development Review Department (PDRD) for Site Plan Case No. SPC-2011-0190C as may be amended from time to time by the Owner upon approval by the PDRD, said IPM Plan being available for review and inspection in the Office of the PDRD in Site Plan Case No. SPC-2011-0190C.

2. The maximum portion of lot established as turf or landscaped is 15 percent. Undisturbed natural areas or areas restored to natural conditions shall not be considered landscaping or turf. All natural areas or areas restored to natural conditions shall be shown on each site plan.

3. If any person or entity shall violate or attempt to violate this agreement and covenant, it shall be lawful for the City of Austin to prosecute proceedings at law or in equity against such person or entity violating or attempting to violate such agreement or covenant, to prevent the person or entity from such actions, and to collect damages for such actions.

4. If any part of this agreement or covenant is declared invalid, by judgment or court order, the same shall in no way affect any of the other provisions of this agreement, and such remaining portion of this agreement shall remain in full effect.

5. If at any time the City of Austin fails to enforce this agreement, whether or not any violations of it are known, such failure shall not constitute a waiver or estoppel of the right to enforce it.

6. This agreement may be modified, amended, or terminated only by joint action of the (a) DIRECTOR OF PDRD OF THE CITY OF AUSTIN, and (b) by the owner(s) of the property subject to the modification, amendment or termination at the time of such modification, amendment or termination.

All citations to the Austin City Code shall refer to the Austin City Code of 2011, as amended from time to time, unless otherwise specified. When the context requires, singular nouns and pronouns include the plural.

UPLIFTING PROPERTIES, LP

BY: _____

NAME: Steve Goldstein

DATE: _____, 2011

THE STATE OF TEXAS
COUNTY OF TRAVIS

This instrument was acknowledged before me on this the ____ day of _____, 2011 by _____.

_____
Notary Public, State of Texas

After recording, please return to:

Alex G. Clarke, P.E.
LONGARO & CLARKE, L.P.
7501 N. Capital of Texas Highway
Building A, Suite 250
Austin, Texas 78731

WATERSHED PROTECTION

Integrated Pest Management (IPM)

This document/submission will serve as your IPM plan. It must be printed and distributed to the owner of the property and to any person or company who is given responsibility for on site pest management, landscaping, or facility maintenance (i.e. homeowners, property managers, maintenance companies). Per the restrictive covenant that accompanies this IPM plan, the owner of the property and their assignees are legally required to comply with this plan.

PLEASE PRINT OR SAVE FOR YOUR RECORDS

Project Information

Project Name:	Barton Creek at Loop 360 Climatized Self Storage
Case Number:	SPC-2011-0190C
Project Type:	Commercial
Project Address:	2631
Project Street Name:	S. Capital of Texas HWY NB
Project Zip Code	78746
Email:	aclarke@longaroclarke.com
	Project Developer
Company	Legend Communities, Inc.
Contact Person	Haythem Dawlett
Address	2101 Lakeway Blvd., Austin Texas, 78734
Phone #	512-306-1444
Fax#	512-306-0338
Reviewer	Benny Ho
Plat on File?	YES

Reason for IPM Plan

Ordinance Requirement

Land is being developed under the SOS ordinance (LDC 25-8-511) per ECM 1.6.9.2 (D)
NO - Not required as per Section 25-8-261 (B) of the Land Development Code

Environmental Criteria Manual Requirement

Wet Ponds: NO
Rainharvest: NO
Retention/Irrigation: YES
Disconnection of Impervious Cover: NO
Vegetative Filter Strip: YES
Non-required Vegetation: NO
Biofiltration: NO
Rain Garden: NO

Plan Submitted: 28-Sep-11

WATERSHED PROTECTION

Integrated Pest Management (IPM)

Exibit 3

1 | 2

Site Plan Review Process Requirement

Variance Request	YES	**A unique requirement other than that previously described**	No
PUD Agreement	No	**City of Austin Green Resolution (LID)**	No
On site structural water quality control	No		
Other			

Landscape Area

Landscape Area	**Total Project Area**	**Total % of Landscape Area**
21,710 Sq Ft	534,481 Sq Ft	4.0 %
Built Area		
37,000 Sq Ft		

Critical Environmental Feature and Buffers

Cave: No **Rimrock:** No **Sinkhole:** No **Streambank:** No

Wetland: No **Other:**

If any environmental Criteria Manual Requirements are YES Please download the IPM for Innovative Water Quality Controls document

Plan Components

The City of Austin & Texas Agrilife Extension's Grow Green fact sheets serve as the most current guide to earth-wise landscaping information for the Austin area and are the basis of your IPM plan. You are required to start with the least toxic options before using the more toxic chemical options in order to protect our water resources

Gardening Basics

The City of Austin & Texas Agrilife Extension's Grow Green fact sheets serve as the most current guide to earth-wise landscaping information for the Austin area and are the basis of your IPM plan. You are required to start with the least toxic options before using the more toxic chemical options in order to protect our water resources

Anticipated Landscape Pests and Solutions

Aphids
Beetles
Caterpillars
Chinch Bugs
Fire Ants
Fleas
Galls
Grubs
Mosquito's
Scale
Snail and Slugs
Spider Mites
Stink Bugs
Thrips

Diseases
Lawn Problems
Bacterial Leaf Spot
Brown Patch
Cotton Root/Root Rot
Fire Blight
Fungal Leaf Spot
Oak Wilt
Powdery Mildew
Take All Patch
Viruses

Lawn Problems
Lawn Care
Weed and Feed
Chinch Bugs
Grubs
Brown Patch Take All Patch
Drought Stress
Iron Chlorosis
Shade Stress

Miscellaneous
Diagnostics
Poison Ivy
Take All Patch
Weeds

Indoor Pest
Ants
Cockroaches
Rodents
Termites

Vehicle and Household Chemical Concerns

The owner of the property agrees to:

- Maintain Vehicle to prevent leaks
- For small fluid leaks or chemical spills, add using kitty litter and disposing of waste in the garbage can
- Wash cars at a commercial car wash or wash water drains to vegetated area
- Dispose of household chemical at the Home Chemical Facility
- Dispose of used motor oil, oil filters, car batteries and tires at an appropriate facility

Developer agrees to distribute Grow Green Fact Sheets and inform the owner(s) of the property that they are required to abide by the least toxic options on the grow green fact sheets. (If the owner(s) of the property have access to the internet, the current materials and requirements can be found at http://www.ci.austin.tx.us/growgreen/ipm.htm . If they do not, are available through the City of Austin or sample fact sheets can be provided so that copies can be made).

As the person preparing the IPM Plan, I am aware that a restrictive covenant is required to be filed. The restrictive covenant is the legal document requiring the use of IPM on this site.

You may be contacted for more information. Maintain this for your records.

Plan Submitted: 28-Sep-11

Generic Project
PUBLIC EDUCATION and IPM PLAN

1.0 INTRODUCTION

This document is intended to provide citizens with the information necessary to follow an environmentally sensitive approach to lawn care, pest management, and to other aspects of urban living. To maintain a healthy environment and avoid polluting, it is important that each individual employ the following recommended measures. If a service company is employed by the property owner, then the owner must ensure that the company:

- Is aware of the covenants and restrictions on the property
- Is given a copy of this guide
- Use the practices recommended in this guide

2.0 DEFINITION of IPM

Integrated pest management (IPM) is a system of controlling pests (weeds, diseases, insects or others) in which pests are identified, action thresholds are considered, all possible control options are evaluated and selected control(s) are implemented. Control options--which include biological, cultural, manual, mechanical and chemical methods--are used to prevent or remedy unacceptable pest activity or damage. Choice of control option(s) is based on effectiveness, environmental impact, site characteristics, public health and safety, and economics. IPM takes advantage of all appropriate pest management options.

3.0 GROW GREEN PROGRAM

The Grow Green program is a partnership of the City of Austin Watershed Protection and Development Review Department and the Cooperative Extension Service of Travis County. This program is a community-wide environmental education program intended to preserve and protect our water resources. The Grow Green partnering agencies distribute educational materials, such as the earth-wise guides included in this document, to the Austin-area nurseries and home improvement stores that have elected to participate in the program.

4.0 EARTH-WISE GUIDES

The earth-wise guides in this document were developed as an educational component of the Grow Green program. The Grow Green earth-wise guides are available for free at each participating retailer. This information is meant to assist individuals in identifying a pest of concern and describe a least-toxic approach to managing the pest. So that you may choose a least toxic control measure, various products labeled for the control of that pest are rated according to toxicity and persistence. These guides are updated on an occasional basis as new products and treatment options become available. Additional copies may be available upon request by either picking them up at a participating retailer, or by contacting the City of Austin at (512) 974-2550 or the Cooperative Extension Service at (512) 854-9600.

5.0 VEHICLE MAINTENANCE

Used motor oil, oil filters, car batteries, and tires should be dropped off at an appropriate facility. Many automotive shops, lubrication centers, and some recycling centers will accept these materials. For more information on proper disposal and recycling, refer to the next item, 6.0 Disposal and Recycling. When cleaning your vehicle, it is important that the wastewater from the cleaning process not enter the storm drain system. Approved car

washing facilities direct the wastewater to a treatment facility. When washing a vehicle at home, drain the wash water to a landscape area. Thus the landscaping can use the water, and the dirt and cleaning agents can be degraded.

6.0 DISPOSAL and RECYCLING

It is important to recycle any material that is recyclable, and to properly dispose of items that cannot be recycled. Residents of the City of Austin or of Travis County have access to the Home Chemical Collection facility located at 2514 Business Center Drive, south of the Ben White/Burleson intersection. It is open Tuesday and Wednesday from 12 to 7 p.m. The phone number for the facility is (512) 974-4343. If you reside outside Travis county, contact your local county government or the Texas Commission on Environmental Quality (TCEQ) to find out if there is a disposal site or recycling program for your area. The TCEQ offers citizens two easy ways to access this information. One method is to use the toll-free phone number (1-800-CLEAN-UP), that allows you to enter your five-digit ZIP code to find information specific to your locale. Web surfers can find the same information on the Internet at www.1800cleanup.org.

MEMORANDUM

TO: Benny Ho
Alex Clarke

FROM: Schuyler Schwarting

DATE: November 2, 2011

SUBJECT: Barton Springs Zone Operating Permit

I have received the Operating Permit application and Maintenance Plan for the:

Barton Creek at Loop 360 Climatized Self Storage
2631 S. Cap of Texas Hwy
SPC-2011-0190C

The new Barton Springs Zone Operating Permit number is #OP-11-1102A

This number needs to be placed in the Barton Springs Zone Operating Permit title block.
The permit will be good for 1 year after the project is approved and constructed.
Let me know if you have any questions.

Thanks,

Schuyler Schwarting
Environmental Program Coordinator
Planning and Development Review Department
City of Austin
PO Box 1088
Aus., Tx. 78767
512-974-2715
schuyler.schwarting@ci.austin.tx.us

Exhibit 4

LONGARO & CLARKE
Consulting Engineers

TBPE Reg. No. F-544

7501 North Capital of Texas Highway Building A, Suite 250 Austin, Texas 78731 Tel: (512) 306-0228 Fax: (512) 306-0338

January 19, 2012

Mr. Jeb Brown
City of Austin
Planning and Development Review Department
505 Barton Springs Road, 4th Floor
Austin, Texas 78704

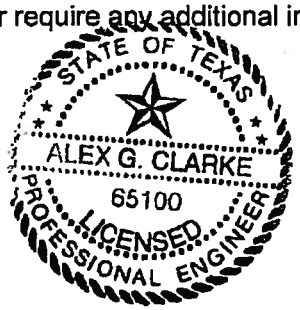
RE: Loop 360 Climatized Self Storage (SPC-2011-0190C)
Additional Information Regarding Wastewater Service
Longaro & Clarke, L.P. Project #352-01-40

Dear Jeb:

Thank you for meeting with Paul and me to discuss the variances for the above-referenced project on January 9, 2012. As a result of that meeting, you requested information to address a question that some of the ERB members had regarding the wastewater service for this tract. Currently, we are proposing an On-Site Sewage Facility (OSSF). The reason for this is that pursuant to the Robert E. Lee Study, the Schmidt tract (Loop 360 Climatized Self Storage site) is located outside of the City's Retail Service Area, thus precluding it from obtaining wastewater service through a lift station, force main and gravity mains into the City's public collective wastewater system. Therefore, the project is proposing a small OSSF commensurate with the low wastewater generation, which is approximately equivalent to the wastewater flow that a single family residence would generate. A similar project in terms of location and being outside the City's Retail Service Area is the Rudy's Country Store and BBQ, which was also subject to requirements of the Robert E. Lee Agreement. Copies of two Robert E. Lee Interceptor Study Area maps are attached for your reference showing the project location and also indicating that this site is in an area that is considered an existing septic area.

If you have any questions, or require any additional information, please do not hesitate to call.

Very Truly Yours,
LONGARO & CLARKE, L.P.



Alex G. Clarke, P.E.
Vice President

cc: Haythem Dawlett, Legend Communities
Randy Hughes, Legend Communities
Matt Mathias, Mathias & Company
Brendan Callahan, Endeavor
Joseph Longaro, Longaro & Clarke, L.P.

G:\352-01\DOCS\REL letter to Jeb.DOC

Exhibit 5