



Pending Owner Approval
PR-53 Cost to Remediate the Subsurface Grades Below the Paving Subgrade at the Life Lane Entry Drive per Proposal Request No. 40 - Revision #1

Cost to Remediate the Subsurface Grades Below the Paving Subgrade at the Life Lane Entry Drive	Quantity	Units	Hr.	Rate	Labor	UP	Materials	Subcontractor	Total
Separate and Export Existing Asphalt for Recycling - Croucher Excavating	1	ls						2,800	
#2 and #57 Stone In-Place - Unit Cost Prices	582	tn						14,550	
Excavation of Unsuitable Soils - Unit Cost Prices	351	cy						3,159	
Off-Site Disposal/Haul-off of Undercut Soils - Unit Cost Prices	351	cy						2,457	
Mirafl HP570 High-Tenacity Polypropylene Yarn Geotextile Fabric (Assume 15% Lap Factor) - U.C. Price	583	sy						2,798	
Tensar Biaxial BX1200 Geogrid (Assume 15% Lap Factor) - Unit Cost Prices	583	sy						1,895	
8" Perforated Subdrain - Croucher Excavating	175	lf						2,800	
Construction of a Temporary Construction Entrance at the Fire Lane - Croucher Excavating	1	ls						3,500	
Steel Plates (Rental, Delivery and Return) at the New Temporary Construction Entrance	1	ls						900	
Credit for Open Graded Asphalt Bond Breaker - ATS Construction	1	ls						(7,897)	
Construction Review Services and Observation - Thelen Associates	1	ls						1,696	
Contingency for Additional Thelen Associates Inspections Fees as a Result of Potential Weather Delays	24	hr						960	
Additional Parking Lot Construction Staking - Endris Engineering	1	ls						650	
Marrillia Out-of-Pocket Expenses for Additional General Conditions (11/2/15 - 11/25/15*)	23	day						5,175	
*Projected Delay Assumes a Double Reading at the 11/19/15 LFUCG Council Meeting									
				0			0	35,443	35,443

Cost of In-Place Construction (Labor, Materials and Equipment) =	35,443	35,443
Marrillia Design and Construction Overhead Percentage =	10.0%	
Overhead - Marrillia Design and Construction =	3,544	
Marrillia Design and Construction Profit Percentage =	5.0%	
Profit - Marrillia Design and Construction =	1,772	
General Liability Insurance (Construction) =	57	
Builder's Risk Insurance =	57	
Performance and Payment Bond (Rate of \$9.40 per \$1000 of Cost for \$0 - \$2,500,000) =	N/A	
Performance and Payment Bond (Rate of \$8.15 per \$1000 of Cost for \$2,500,000 - \$5,000,000) =	N/A	
Performance and Payment Bond (Rate of \$7.20 per \$1000 of Cost for \$5,000,000 and up) =	294	
KY Surcharge on Project Bonds (1.8% of Bond Cost) =	5	
Local Municipality Tax on Project Bonds (5% of Bond Cost) =	15	
Total Construction Cost =	41,188	



Proposal Request Transmittal

EOP Architects | 201 W Short St Suite 700 Lexington KY 40507 United States

PROJECT	LFUCG Senior Citizens' Center 201333	DATE SENT	10/27/2015
SUBJECT	Entry Drive Subsurface Remediation	PROPOSAL REQUEST ID	PR-040
TYPE	Proposal Request	TRANSMITTAL ID	00713
PURPOSE	For Review and Response	VIA	Info Exchange

FROM

NAME	COMPANY	EMAIL	PHONE
Harding Dowell	EOP Architects	hdowell@eopa.com	(859) 231-7538

TO

NAME	COMPANY	EMAIL	PHONE
Travis Harris	Marrillia Design and Construction	tharris@marrillia.com	

REMARKS:

Created by: Harding Dowell
Description:

Please provide pricing to remediate the subsurface grades below paving subgrade at the Life Lane entry drive, per recommendations by the geotechnical engineer. Site observation has shown the entire entry drive area designated for heavy duty pavement (per sheet L4.1) is unstable under construction traffic, and the recommendation is as follows:

- undercut below pavement subgrade by 24 inches
- install an 8" perforated pipe at the base of undercut as shown on attached sketch L10.0, drain to structure CI-6
- install stone and geotextile per PR-018 recommendations (similar to those used in main parking areas, see attached sketch)

Proposal Request Transmittal

DATE: 10/27/2015
ID: 00713

- install heavy duty asphalt paving (6" DGA, 5 1/2" base course, 1 1/2" surface course) over compacted sub-grade stone per A/L6.1

Please provide the following price breakdown for owner and architect review:

- Quantity and cost of excavation and hauling (include observation by Thelen) per project unit costs
- Quantity and cost of stone per project unit costs
- Quantity and cost of geotextile per unit costs
- Additional or revised staking as needed (hours and unit costs)
- Quantity and cost of drainage piping per unit costs
- Overhead and profit claimed by subcontractors

Thanks,

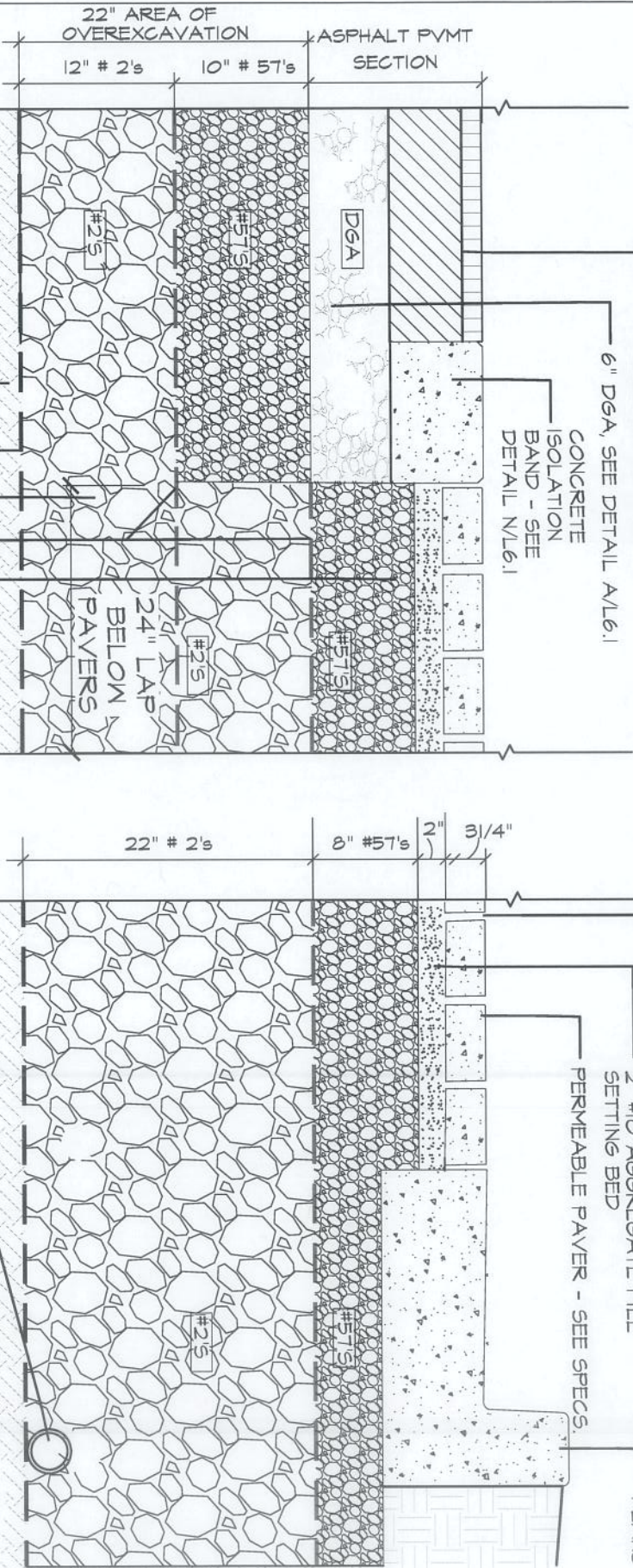
Harding

DESCRIPTION OF CONTENTS

QTY	DATED	TITLE	NUMBER	SCALE	SIZE	NOTES
1	6/11/2015	150611-PR018-Profile.pdf				
1	5/29/2015	Pavement Subgrade Letter-LSC-Stamped.pdf				
1	10/27/2015	L10.0-subdrain.pdf				

COPIES:

Brian Gravitt	(Marrillia Design and Construction)
Jim Hayes	(Marrillia Design and Construction)
Jim Martin	(Marrillia Design and Construction)
Josh Marrillia	(Marrillia Design and Construction)
Rob Price	(Marrillia Design and Construction)
Jessica Walker	(LFUCG)
Joyce Thomas	(LFUCG)
Martin Woodford	(LFUCG)
Ramona Fry	(Element Design)
Vaughan Adkins	(Element Design)



ASPHALT SURFACE & BINDER
SEE DETAIL A/L6.1

CONCRETE ISOLATION BAND - SEE DETAIL N/L6.1

6" DGA, SEE DETAIL A/L6.1

#11 AGGREGATE FILL TO 1/2" BELOW TOP OF GRID
2" #10 AGGREGATE FILL SETTING BED
PERMEABLE PAVER - SEE SPECS.

CONCRETE CURB & GUTTER - SEE PLANS

22" AREA OF OVEREXCAVATION
SECTION

12" # 2's 10" # 57's

22" # 2's 8" # 57's 2" # 2.5's

24" LAP BELOW PAVERS

INSITU SOIL

8" PERFORATED PIPE IN STONE, SLOPE 1/8"/FT

#57 STONE, PLACE IN SINGLE LIFT

GEOTEXTILE, TENSAR BX1200 OR APPROVED EQUAL, CONTINUOUS BETWEEN #2'S AND #57'S

#2 STONE - PLACE IN SINGLE LIFT
NOVEN HIGH PERFORMANCE GEOSYNTHETIC FABRIC, MIRAFI HP570 OR APPROVED EQUAL, CONTINUOUS

SLOPE SUBGRADE 1/8" / FT MINIMUM TO 6" PERFORATED DRAIN TILE AND BEYOND

LEXINGTON SENIOR CENTER
elementdesign
landscape architect-urban planning

SHEET L6.1 R-1



195 LIFE LANE
LEXINGTON, KY 40502

Proj. No. 201333	Date June 10, 2015
Drawn by RF	Checked by RF
No. REVISION	DATE
1 pavement section - undercut	06/10/15

May 28, 2015

Mr. Harding Dowell
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**Subject: Limited Exploration and Pavement Subgrade Recommendations
Lexington Senior Citizens Center – Idle Hour
St. Ann Drive
Lexington, Kentucky**

Dear Mr. Dowell:

Cardno has provided geotechnical consulting services in support of the referenced project. In particular, a *Report of Geotechnical Exploration* dated May 29, 2014 and a letter titled *Revised Subgrade Conditions and Recommendations* dated October 28, 2014, have been provided. Based on additional information provided to us and a recent limited exploration at the site, we provide the following summary of conditions with recommendations for remediation of unstable subgrade soils in the proposed pavement areas.

Information provided in the geotechnical report prepared by Cardno and logs of borings drilled on site indicated that underlying soils were suitable for the proposed construction at the time of exploration considering the site was prepared and foundations were designed and constructed as recommended in the report. However, during site development, the contractor and site inspection team noted that actual site subgrade conditions encountered outside of exploratory locations varied in both composition and consistency. Cardno visited the site as requested during initial foundation construction activities near the southeast corner of the building where unsuitable subgrade soils were encountered. A vein of unsuitable subgrade soils consisting of dark brown and gray lean clay containing intermixed organic debris overlain with variable soil fill was encountered near design subgrade elevation. The vein was observed to diminish as the excavation approached the southeast building corner where boring B-5 was advanced during the previous exploration. The unsuitable soils were observed to be outside of the advanced boring location and inconsistent with the materials encountered in the boring. Based on the unsuitable subgrade soils encountered in some foundation areas, the foundations were over excavated as determined and directed by Thelen Associates according to the undercutting recommendations provided by Cardno. The recommendation included overexcavating to either suitable bearing materials or to a specified depth below the footing and backfilled with flowable fill up to design footing subgrade elevation.

Cardno personnel were not present to observe and document the conditions encountered during further building construction activities; therefore, Cardno was not able to determine if conditions reported during construction varied from those encountered during the geotechnical exploration. However, it is our

understanding that unanticipated conditions were reported to the design team by the contracted testing agency, Thelen Associates, Inc. It should be reiterated as stated in the geotechnical report that regardless of the thoroughness of a geotechnical exploration, there is always a possibility that conditions between borings will be different from those at specific boring locations and that conditions may not be as anticipated by the designers or contractors. In addition, the construction process may itself alter soil conditions.

Throughout the period of building construction, the pavement subgrade areas were not addressed. The proposed pavement areas were stripped of topsoil during initial site preparation operations in Fall of 2014 and remained exposed through the winter and early spring of 2015 except for a narrow gravel lined construction access road adjacent to the south side of the building. The exposed subgrade in the proposed pavement areas has been subjected to repetitive passes of heavily loaded construction and excavation vehicles and equipment, freeze/thaw and wetting/drying cycles, and utility installation trenching and backfilling. No apparent protective measures were or are in place to protect the subgrades in these locations from destabilization as was recommended in section 5.1 of the geotechnical report.

Cardno recently performed a limited subsurface exploration in the proposed pavement areas. Travis Andres, Cardno Senior Geotechnical Engineer, visited the site on May 27, 2015 to observe the excavation of test pit excavations at select locations in the proposed pavement areas, particularly in the west central portion of the parking lot area where no previous borings had been located. A total of two test pit excavations were advanced. Test pit TP-1 was performed approximately 65 feet south of the south wall of the newly constructed building and just west of the geothermal well field. Test pit TP-2 was performed approximately 50 feet south of TP-1. Additional test pit excavations were preferred, but due to site utilities and the location of the geothermal well field, test pits were only advanced where no subsurface utilities, structures, or obstructions were expected. In general, subsurface conditions encountered in the test pits consisted of fill to depths of approximately 7.0 feet in test pits TP-1 and TP-2. The fill soils were observed to consist mostly of orange brown clay with intermixed crushed limestone, and occasional limestone cobbles and boulders. A layer of shot rock fill was encountered at the base of the fill in test pit TP-2. Layers of dark gray and brown silty clay with trace organic debris was encountered beneath the fill materials and extended to test pit termination depth of approximately 8.0 feet in both test pits. Based on available information pertaining to the site, it is likely that the presence of the dark gray and brown clay indicates the transition from fill to undisturbed soil. A dynamic cone penetrometer and steel probe rod was used to explore the consistency of encountered materials at the ground surface and at 2 foot depth intervals to excavation termination. In general, the observed and measured subgrade soil consistencies varied from soft to stiff with blow count "N-values" in the range of 2 to 10 blows per 1 ¾ inches. In addition, the excavation sidewalls were observed to be relatively unstable.

Samples of excavated soil were sampled and delivered to the Cardno laboratory for moisture content determination. Moisture content values in the range of 24.6 to 27.9 percent were measured. For reference, available results of standard proctor testing for site soils indicate optimum moisture content values in the range of 18.7 to 19.2 percent.

While on-site the Cardno representative walked proposed pavement areas of the site in an attempt to further identify conditions which could influence site preparation techniques and/or pavement design. The majority of exposed pavement subgrade areas exhibited signs of instability such as rutting, heaving, tension cracking, and pumping from construction traffic. Several areas of ponded water were also observed on the ground surface.

Cardno has reviewed available information including our experience with site and subsurface conditions and recent field observations. Since near surface subgrade soils throughout the proposed pavement areas are well above optimum moisture condition and consist of highly variable fill, considerable undercutting and moisture conditioning and replacement as controlled fill would be required to provide suitable subgrade bearing conditions for designed pavement sections. Therefore, subgrade improvement by undercut of unsuitable soils and filling with an improved aggregate section using one of the replacement options outlined below is recommended.

Undercutting

As indicated by the site contractor, as much as 1 to 2 feet of cut is planned to reach design pavement subgrades. The material proposed as cut should remain in place and be included in the undercut operation to help prevent further destabilization of the underlying subgrade during undercutting and hauling operations. Undercutting should be performed in subgrade areas deemed unsuitable by proofroll as recommended in the geotechnical report and project specifications. Additional undercutting considerations and recommendations follow.

- Perform undercut operations using a track-hoe excavator working from the rear of the site (northeast) to the site entrance (southwest)
- Undercut a minimum of 24 inches below design subgrade elevation for Option 1 outlined below. Undercut a minimum of 36 inches below design subgrade elevation for Option 2 below.
- The undercut subgrade should be leveled and graded smooth with the track-hoe bucket only. Grading and leveling of undercut subgrade areas with tracks of the excavator or dozer or by roller should not be performed to help prevent further destabilization of the subgrade.
- All excavator and haul truck traffic should be prohibited from undercut subgrade areas. All traffic should remain on subgrade materials yet to be undercut and routed to avoid undercut areas where possible to prevent further destabilization. Traffic should remain removed from the stabilized section until the complete pavement section can be installed.
- The limits of undercutting should extend beyond the pavement limits at least 2 feet to assure adequate support of associated curbing and guttering and minimize differential settlement between these structures and adjacent pavements.

Filling

We recommended the undercut volume be filled by one of the methods presented below. Fill placement should be performed working from the site entrance (southwest) to the rear of the site (northeast). Fill material should be end dumped and pushed out into the undercut fill area. Only small dozer traffic should be subjected to the fill layers during installation. No haul traffic should be subjected to the stabilized section until the full depth of stabilization section and aggregate base course has been installed to help prevent further destabilization of the subgrade.

Option 1 – Geogrid Reinforced Aggregate Section (undercut 22 inches minimum)

- Line exposed undercut subgrade with a needle-punched non-woven geosynthetic filter fabric such as Propex 701 or Mirafi 170N. Provide lap of at least 12 inches to adjacent sides and ends.
- Overlie geosynthetic filter fabric with Tensar BX1300. Provide lap of at least 24 inches to adjacent sides and ends. Installation should be performed according to manufacturer and supplier recommendations
- Place 12 inches of KYTC #2 or #3 stone in single lift. Grade level and track-in place using a small dozer. No roller or vibratory compaction should be used to help minimize further destabilization of the subgrade.
- Line surface of KYTC #2 or #3 stone with layer of Tensar BX1200. Provide lap length of at least 18 inches to adjacent sides and ends.
- Place 10 inches of KYTC #57 stone in a single lift to finish the stabilized section. Grade level and track-in place using a small dozer. No roller or vibratory compaction should be used to help minimize further destabilization of the subgrade.

Option 2 – Shot Rock with Stone Choke (Undercut 36 inches minimum)

- Line exposed undercut subgrade with a needle-punched non-woven geosynthetic filter fabric such as Propex 701 or Mirafi 170N. Provide lap of at least 12 inches to adjacent sides and ends.
- Place 24 inches of shot-rock in single lift and track-in with small dozer.
- Place 6 inches of KYTC #57 stone over the placed shot-rock. Grade level and track-in place with dozer to help choke voids in the shot-rock surface.
- Place additional 6 inches of KYTC #57 stone and compact with a smooth-drum roller to finish the improved section.

Asphalt and concrete pavement sections should be constructed as designed overlying the stabilized subgrade section. Stone base placed as part of the design pavement section should be compacted using a smooth-drum vibratory roller to attain minimum compaction requirements. The permeable paver design section is noted to include similar aggregate and geosynthetic materials and dimensions. These design sections may include the stabilized section as part of the constructed section per the approval of the Civil Engineer and Landscape Architect.

All material recommendations provided herein should be installed per manufacturer and/or supplier recommendations. Contractor selection of equivalent materials should be approved by the engineer prior to installation.

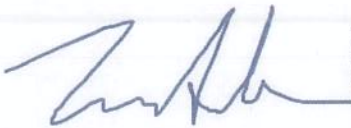
Logistics during subgrade stabilization is extremely important. Any excessive loading to the exposed undercut subgrades or incomplete stabilization sections could compromise the installed section or any stable subgrade support conditions that may exist. Undercutting and filling should be performed as outlined above and construction and paving traffic should be routed to avoid traversing unimproved subgrade areas. Following installation of the improved sections, repetitive passes of construction traffic should be kept to a minimum until site paving is completed.

Minimizing infiltration of water into the subgrade and rapid removal of subsurface water are essential to successful long-term pavement performance. Both subgrade and pavement surfaces should have minimum slopes of one-quarter inch per foot to promote drainage. Pavement edges should be provided a means of water outlet by extending the aggregate stabilization layers and base course through to daylight or to surface drainage features such as storm inlets. Drop inlets and other stormwater management structures should be provided weep holes in order to keep subsurface water from accumulating against their outside walls.

Although not retained to provide construction materials testing and special inspection services, the project geotechnical consultant should be present to observe the implementation of the recommendations provided herein to judge suitability of site preparation, undercutting, filling, and pavement construction. Actual subgrade conditions may differ from the expected conditions. Therefore, the engineer should be on site to confirm the recommendations provided herein are applicable and sufficient for the actual conditions encountered.

Cardno ATC appreciates the opportunity to have provided this service and we look forward to serving as your geotechnical consultant throughout project execution. Please contact us if you have any questions regarding the information presented.

Sincerely,
CARDNO



Travis Andres, P.E.
Senior Geotechnical Engineer



Mark Edmonson, P.E.
Branch Manager

