GRW | engineering | architecture | geospatial
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November 21, 2016

Mr. Bob Bayert, PE
Engineering Section Manager
LFUCG Division of Engineering
101 East Vine Street
4th Floor
Lexington, KY 40507

RE: Polo Club Boulevard Public Improvements
Fayette County
Item No. 9-8507
GRW No. 4133

Dear Mr. Bayert:

GRW is pleased to offer this proposal for the referenced project. The Lexington Fayette Urban County Government has requested additional survey and design services to update the construction plans and incorporate recent site changes associated with the ongoing Todds Road Section 2 project (Item No. 7-225.00).

The proposed survey and engineering efforts shall include the items described in the attached Scope of Work. GRW is proposing to do the work for a lump sum fee of $38,420 based on the hourly rates and reimbursement schedule in the Civil Services and Survey Site and Boundary Master Agreements.

If you have any questions or need any additional information please let us know.

Sincerely,

Gregory S. Gabbard, PE
Project Manager

Scope Of Work
POLO CLUB BOULEVARD
PUBLIC IMPROVEMENTS
Contract Modification No. 2 – November 2016

PROJECT DESCRIPTION

In July, 1996, The Lexington-Fayette Urban County Planning Commission adopted the *Expansion Area Master Plan*, which provides principles and best practices to guide development of 5,000 + acres of previously rural land earmarked for inclusion in the Urban Service Area. The Expansion Area is comprised of three major areas, denoted 1, 2 and 3, with the largest area 2 further divided into subareas 2A, 2B and 2C. Traversing much of the length of Expansion Area 2, from Athens-Boonesboro Road to Winchester Road, a boulevard roadway system was envisioned, to provide the spine of the street network. Within Expansion Areas 2A and 2B, this boulevard has developed as Polo Club Boulevard; within 2C it is Hays Boulevard.

The portion of Polo Club Boulevard included in this Scope of Services lies within Area 2B. Issues related to the timing of development, needed property acquisitions and availability of government funding have resulted in two segments of Polo Club Boulevard remaining unbuilt. The first segment involves the intersection with Deer Haven Lane, while the second segment entails the extension of Polo Club to, and suitable connection with, Todds Road.

The project began in 2012 and was to be let in conjunction with the adjoining Section 2 of Liberty/Todds Road (KY 1927), but has been delayed. The Todds Road project has been let and construction is nearing completion. Deer Haven Lane previously connected to Polo Club, but was closed as part of the Todds Road project and a temporary connection to Polo Club was built to maintain access. Excess material from the Polo Club construction was to be used on the Todds Road project. Some of this excess material was removed to build the temporary connector and the material was instead placed in the proposed and existing Polo Club median between Todds Road and Dufane Point. The delay on Polo Club is caused by a right to take dispute over temporary and permanent easements on Parcel No. 7. Given the uncertainty as to how long it may take to clear this property, it was decided to correct the Polo Club plans based on the changed existing conditions.

SCOPE OF WORK

This scope of work includes the survey and updated final engineering design for the Polo Club alignment from Todds Road (Sta. 498+24) to Dufane Point (Sta. 510+26). Survey work includes data collection and map generation to establish current topographic and planimetric conditions. Current utility and drainage features will also be located as needed including inverts where applicable.

Additional engineering work is needed to update the mapping, dtm surface, plan sheets, profile sheets, cross section sheets, quantities, cost estimate and maintenance of traffic (MOT) plans. Production hours are based on the following estimated units and the attached Description of Production Hour Worksheet Items.

PROJECT LENGTH

Polo Club (Sta. 498+24 to Sta. 510+26)	**1,202'**
TOTAL	**1,202' = 0.23 miles**

AFFECTED SHEETS

Plan sheets:	**4**
Profile sheets:	**3**
Pipe Profile sheets:	**2**
MOT sheets:	**7**
Cross sections:	**20**

Most of the right of way and easements have been purchased, but it will be important to review and update property ownership, the right of way summaries and strip maps so the Contractor building the project will have up to date information.

Description Of Production-Hour Worksheet Items
POLO CLUB BOULEVARD
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SURVEY *(N/A)*

RECONNAISSANCE

1 Control (existing)
A field and record search for any existing control that may be utilized, including controls established for aerial photogrammetry. Sources of any existing control need to be identified.

2 Utilities (data gathering, identification & contact)
Identify all utility companies within the project corridor and maintain a valid contact list of those utility companies and their representatives. Contact utility companies, Kentucky 811, KYTC District Utilities Staff and any other sources for utility facility mapping or other information concerning the location of any utilities. Check with local governments for GIS databases and for other sources of information.

3 Drainage - (sink holes, streams, pipes, etc.)
Identify drainage features that may require consideration in design and that are necessary to be documented on the plans.

CONTROL

4 Horizontal
Re-establish horizontal coordinate control including the monumentation. All control information, including pre-established, shall be documented in a survey report and submitted to the KYTC Project Manager. All horizontal control obtained from Global Positions Systems (GPS) shall comply with the **Geometric Geodetic Accuracy Standards and Specifications for using GPS Relative Positioning Techniques** published by the Federal Geodetic Control Subcommittee dated August 1, 1989. Additional control points set shall be a minimum of 24-inch rebar (#4 or larger) with a plastic or aluminum cap.

5 Vertical
Re-establish vertical control, including benchmarks, and including the monumentation. All control information, including pre-established, shall be documented in a survey report and submitted to the KYTC Project Manager. All vertical control obtained from Global Positions Systems (GPS) shall comply with the **Geometric Geodetic Accuracy Standards and Specifications for using GPS Relative Positioning Techniques** published by the Federal Geodetic Control Subcommittee dated August 1, 1989.

6 Process data
Process data obtained from field survey and check for accuracy and closure. Preparation of survey report of coordinate controls and bench marks.

PLANIMETRIC SURVEY

7 Planimetric location

Locate and/or identify all necessary planimetric features. On projects with aerial photogrammetry available this would require only identification of planimetric features and pick-up of areas not covered by the available photogrammetry, if required. For Phase 2 design this would be for the update of the topography due to new or changed planimetric features since the original survey or aerial photogrammetry was obtained. It should be noted on the production-hour form the extent of work required, for example, complete, pick-up or update.

8 Utilities location

Locate, identify, and provide elevations (when necessary) of all utility items (underground, overhead, etc.). GRW shall obtain verification of utility locations from the appropriate utility company, arranging to have utilities uncovered and located when necessary. Includes surveying flags and markings placed by the individual utility companies.

*Note: This item of work does **not** include vacuum excavation. If vacuum excavation or location of underground utilities is required it will be paid for as a "direct cost" and production hours for the survey crew under the surveying as a miscellaneous item.*

9 Process data

Process all necessary data to produce a planimetric map and submit electronic files to the designer.

TERRAIN SURVEY

10 DTM data collection ***– 1,202' x 200' (width) = 5.5 acres***

Collect general terrain data for project (when general terrain data is not already available).

Note: Items 11-18 should not be required if general terrain data is to be collected.

11 Verify terrain model accuracy

Check for accuracy of breaklines, random points, contours, etc., including terrain model obtained from aerial photogrammetry.

Note: The density of points taken in the field to check the DTM will be determined at the Predesign Conference.

12 Tie-ins

Field verification of all field data necessary for tying of project to existing features pavements etc. Include all road approaches. Entrances are not generally required and will only be performed if specifically directed by the KYTC Project Manager.

13 Drainage situation survey (Bridge)

Obtain all necessary field data to represent situation survey for bridges, including stream profile and necessary terrain data to merge into the existing terrain model.

14 Drainage situation survey (Culvert)

Obtain all necessary field data to represent situation survey for culverts.

15 Drainage pipe section (non-situation size)

Obtain all necessary field data to define the accuracy of the existing flowlines and inlet and outlet location and elevations of cross drains.

*Note: Does **not** include entrance pipes.*

16 Flood plain data

Collect field data necessary for flood plain analysis.

17 Railroad Surveys

Obtain all necessary terrain data to represent railroad survey (top of rail, ballast, ditches, fills, cuts, RR milepost, etc.).

18 Additional necessary DTM data

Collect other necessary data to produce an accurate digital terrain model (obscured areas, field checked areas, areas needing greater accuracy, etc.).

19 Process data

Process all pertinent data necessary to generate digital terrain models and submit electronic files to the designer.

ESTABLISH PROPERTY LINES & OWNERSHIP

20 Contact & Interview Property Owners

Contact property owners requesting permission for access and discuss general scope of project, locations of property lines, septic system, drainage and any other pertinent information. A report is to be generated with a copy of the contact letter and all completed contact information forms from property owners, upon request.

Note: The contact letter and information form is to be reviewed and approved by the KYTC Project Manager prior to contacting the property owners. The contact letter shall include the name of a person from the consultant that may be contacted in case of problems and the KYTC Project Manager.

21 Field tie property lines/corners

Locate all monuments (rebars, pins, etc.) and other evidence of property lines (fences, tree lines, drains, etc.).

STAKING

22 Stake centerlines, approaches, detours

Accurately stake centerline at intervals determined at the Predesign Conference and process data.

23 Stake core holes - structures

Stake or locate all geotechnical borings required for structural design and process data.

NOTE: The unit is per individual structure, NOT per hole.

24 Stake core holes - roadway
Stake or locate all geotechnical borings required for geotechnical soil/rock analysis and process data.
NOTE: The unit is per individual core hole.

SURVEY MISCELLANEOUS

25 Determine Roadway Elevations (Crown and EP)
This would be necessary on widening and overlay projects where the terrain model is developed from aerial photogrammetry and accurate pavement elevations are required and includes processing data.
NOTE: Unit is per mile of individual roadway sections.

26 Environmental areas
Locate and identify areas and feature that may be considered environmental issues and includes processing data.

27-29 Reserved for additional miscellaneous survey items required

PRELIMINARY LINE AND GRADE *(N/A)*

30-59 Phase I design

RIGHT OF WAY

60 Deed research
Research of all documents necessary to determine property lines, existing easements, encumbrances and ownership including a copy of the deed with deed book and page number and available plats.

61 Re-establish property and ownership ***– 17 parcels***
Revisit research documentation to confirm property lines, existing R/W, existing easements, owner names, lessee names, and parcel numbers. Document on plans.

62 Calculate R/W
Calculate lines and areas of all proposed right of way and easement takings for each parcel. Depict all right of way and easements, including metes and bounds, on plans.

63 Prepare legal descriptions
Prepare and check legal descriptions for each area of taking.

64 Update R/W summary sheet
Update right of way summary sheet including all affected parcels for the whole project.

65 Update right of way strip map
Update right of way strip map sheets with current property ownership.

66 Prepare R/W Plans Submittal
Generate the computer files of the R/W Plans, plot the original mylars, prepare electronic submittal of plans and deeds and submit plans, computer files, source deeds and proposed deed descriptions to the District Office. Detour runarounds or other maintenance of traffic plans that have impacts to the right of way or utilities shall be included in the Right of Way Plans. A set of prints of drainage and cross sections may also be required to be included in the submittal.

Note: A set of prints is to be submitted to the LFUCG Project Manager for review prior to submittal of R/W Plans, if requested.

67 R/W revisions after R/W submittal
Prepare R/W plan revisions as necessary. Post R/W Plan submittal and prior to the final construction plan submittal. Includes re-submittal of revised plans (mylars), 1 set of prints with changes marked in red, plats, deed descriptions and electronic files.

68-72 Reserved for additional miscellaneous R/W items required

FINAL PLAN PREPARATION

80 Computer setup
Load and organize electronic data files (manuscripts, centerline data, coordinates data, terrain models etc.).

81 Update existing topography and terrain model
Using updated field data, modify and update the existing topography and terrain model.

82 Refine alignments (horizontal & vertical)
Refine, adjust, and document the preferred horizontal and vertical alignments accommodating greater detail in tie-down points, approaches, detours, etc.

83 Develop pavement design
Analyze, document and submit for review and approval the proposed pavement design folder for each roadway, including pavement calculations, life cycle costs, typical sections and pavement details.

84 Finalize templates & transitions
Finalize necessary templates and template transitions for all roadways. This includes each instance of a horizontal change in roadway edge of pavement with respect to the centerline.

85 Update final roadway model
Modify the roadway model to incorporate the proposed design into the revised terrain model, including cut/fill slopes, roadside ditches, etc. as necessary to define ditches and disturbed limits and enable the generation of cross-sections.

86 **Update proposed design**
Revise affected proposed construction details and graphics, including pavement, drainage, construction notes, etc.

87 **Generate plan sheets** ***– 4 sheets at 20 scale***
Perform necessary work to update individual plan sheets, including dropping of sheet cells, masking, manipulation of text and notes, etc.

88 **Generate profile sheets** ***– same as Item 87***
Perform necessary work to update individual profile sheets, including dropping profile, annotation of profile, drainage, ditches, notes, etc.

89 **Detail cross sections** ***– 20 cross sections***
Update affected cross sections, revise add yardage quantities, details, notes, etc.

90 **Design entrances** ***– 1 entrance***
Determine location, grade, type of entrance, width and quantities and depict on the plans.

91 **Revise roadway plans from soils report**
Modify the roadway model incorporating geotechnical report recommendations.
Note: Length is based on expected area requiring changes due to geotechnical report, not entire project length.

DRAINAGE

92 **Update pipe sections (< 54")** ***– 2 storm sewer pipes***
Create and design pipe sections including quantities, notes and depicting them in the plans.
Note: Includes cross drains, storm sewer, etc.

93 **Develop drainage system map**
Create map describing the proposed drainage system and delineating drainage areas. Includes generating the individual sheets.

94 **Develop drainage situation (bridge)**
Develop and prepare drawing of alignment, profiles, sections, and plan to represent bridge situation survey.

95 **Develop drainage situation (culvert)**
Develop and prepare drawing of alignment, profiles, sections, and plan to represent culvert situation survey.

96 **Develop blue line stream channel changes (=> 200')**
Develop and prepare drawing of alignment, profiles, sections, and plan to represent channel change, including stream mitigation requirements.

97 **Drainage analysis (Entrance pipes)**

Conduct and document drainage analysis to determine frequency flows and required structure size of entrance pipes. Includes completion of forms.

98 Drainage analysis (A <= 200 acres)
Conduct and document drainage analysis to determine frequency flows and required structure size. Includes completion of forms.

99 Drainage analysis (200 acres < A < 1.0 sq. mile)
Conduct and document drainage analysis to determine frequency flows and required structure size. Includes completion of forms.

100-102 Drainage analysis (A => 1.0 sq. mile) -- Levels 1, 2, & 3 Analysis
Conduct and document drainage analysis to determine frequency flows, required structure size, location, and risk assessment. Includes completion of forms.

103 Special drainage studies
Conduct special drainage studies, which may include HEC-1, TR-20, TR-55, Unsteady Flow Models, FESWMS-2DH, Detention Basin Design, Energy Dissipater Design, Dynamic Culvert Design or other Hydrologic/Hydraulic design as deemed appropriate.

104 Roadway ditches and channels
Determine hydraulic capacity (ditch size) and necessary channel lining of all ditches and channels. Includes documentation of design calculations and completion of forms.

Note: Left and right sides are independent to each other and should be added for a combined total.

105 Develop erosion control plan
Determination of required erosion control items and depiction in the plans, including required calculations and generating the individual sheets. Includes documentation of design calculations and completion of forms.

Note: Specific scope of work and level of effort is to be discussed at the Predesign Conference

106 Inlet spacing calculations
Conduct necessary calculations to determine structure types, and inlet spacing for the layout and design of storm sewer systems. Includes documentation of design calculations and completion of forms.

107 Storm sewers calculations
Conduct necessary calculations to determine pipe size, storage volumes, etc. for the layout and design of storm sewer systems. Includes documentation of design calculations and completion of forms.

108 Perform scour analysis
Perform scour analysis as referenced in the FHWA HEC-18 and HEC-20 and the current Drainage Manual. Includes documentation of design calculations and completion of forms.

109 Assemble preliminary and final drainage folders
Assemble and submit electronic files of the drainage evaluation results.

110 Prepare advanced situation folder - bridge
Prepare required documentation, copy, fold, bind, and assemble the folder.
Note: Folder contents are to conform to requirements outlined in the Drainage and Bridge Manuals.

111 Prepare advanced situation folder – culvert
Assemble and submit electronic files of the drainage situation evaluation results.

112-115 Reserved for additional miscellaneous Drainage items required

FINAL PLAN CONTINUATION

116 Prepare layout sheet
Prepare layout sheet for the Construction Plans.

117 Prepare typical sections
Prepare all typical sections including the proposed pavement design and other necessary details for each roadway, detour, and entrance.

118 Prepare interchange geometric approval sheet
Prepare geometric approval sheet, including all required alignments, curve data, coordinates, etc. for requesting approval of the interchange geometrics.

119 Prepare intersection geometric approval sheet
Prepare geometric approval sheet, including all required alignments, curve data, coordinates, etc., for requesting approval of the intersection geometrics.

120 Prepare coordinate control sheet
Develop all coordinate control information, including proposed centerlines, event points, control points, and benchmarks with appropriate descriptions, and place into the plans in tabular form and generate individual sheets.

121 Prepare elevation developments sheet
Prepare elevation development sheets including all geometric data and elevation data necessary.

122 Prepare striping plan
Prepare details for striping plans including the portions of Polo Club already built.

123 Calculate final quantities
Calculate and document all quantities required for the construction of the final roadway and maintenance of traffic during construction, including permanent and temporary items.

124 Complete general summary

125 Complete paving summary

126 Complete drainage summary

127 Complete pavement under-drain summary

128 Prepare cost estimate
Prepare and document cost estimates including bid prices for each item, using best engineering judgement, for inspections, meetings and final plan submittal.

129 Plot/Print copies of plans
Plot/print copies of plans including the necessary copies of plans for distribution at project milestones (inspections, meetings, etc.).

130 Plan revisions
Complete any necessary and unexpected plan revisions that arise during the project that are beyond the control of GRW, including revisions to plans required due to R/W Revisions that are not directly shown on the R/W Plans.

131 Prepare final construction plans submittal
Generate the computer files of the final plans, plot the original mylars, prepare electronic submittal of plans and required files and submit plans, computer files and a list of General Notes to the District Office. Also includes submittal of a set of Review Plans and making any necessary changes identified by the roadway plan review.

MAINTAINENCE OF TRAFFIC

132 Write maintenance of traffic notes (TCP)
Write and submit the required Traffic Control Plan, including the construction phasing for the project.

133 Update construction phasing plans
Update plans for maintenance of traffic, construction phasing and/or detours necessary for the construction of the project, including all phasing, special notes, signs, temporary pavement markings and quantities

134 Develop diversion plan sheets

135 Develop diversion profile sheets

136 Develop diversion cross sections

137 Develop temporary drainage

FINAL PLANS MISCELLANEOUS

138 Document available rock quantities

139 Construction administration assistance
Respond to technical questions during the bid period, prepare addenda, approve alternates and review and approve initial submittals or shop drawings. Advise in matters of intent during construction.

140 Prepare bid specifications
Prepare the project bid specifications in accordance with LFUCG standards and guidance.

141 Review erosion control plan
Review and determine appropriateness of the Erosion and Sediment Control Plan prepared by the Contractor integrating the non-structural and structural practices and procedures of the LFUCG Stormwater Manual.

142 Prepare lighting plan
Prepare lighting plans in coordination with LFUCG Traffic Engineering. LFUCG will provide street light spacing for incorporation into the plans.

143 Utility company coordination
Meet and coordinate with all affected utility companies, as necessary to minimize disturbance to underground lines and to facilitate the Project.

144 Prepare Project Development Checklist (PDC)

145 Culvert design at Deer Haven
Review, development and coordination of potential pre-cast solutions. Coordination and presentation of culvert plans including: foundation, barrel and wingwall design.

REQUEST FOR CONDITIONAL LETTER OF MAP REVISION (CLOMR)

146 Complete application forms
Complete and submit DHS-FEMA (Department of Homeland Security – Federal Emergency Management Agency) Forms 1 through 3 for a new bridge or culvert. Attach revision narrative, hydrologic computations, hydraulic computations, topographic map and plans.

146a Prepare narrative
Develop narrative including project background, request purpose and reason(s) for revision.

146b Prepare existing conditions topographic map
Includes office and CAD work necessary to prepare a surveyor certified topographic map of the *existing* conditions. 3D scan and topo work by GRWAS will provide the information needed to prepare the map. Map to include *existing* floodplain and floodway elevation delineations.

146c Prepare annotated FIRM (Flood Insurance Rate Map)
Annotate DHS-FEMA FIRM to reflect changes due to the project. Also includes creation of a proposed floodplain and floodway elevation delineations plan based on the certified topographic map.

146d Coordination with NFIP (National Flood Insurance Program) participating community
Coordinate and include any project related items required to satisfy NFIP regulatory requirements. Includes coordination with LFUCG Division of Water Quality.

146e Review fee payment
Consult DHS-FEMA's fee schedule for the reviewing and processing of a CLOMR and complete the Payment Information Form.

REQUEST FOR LETTER OF MAP REVISION (LOMR)

147 Verify CLOMR floodplain
Verfity floodplain analysis (HEC-RAS) based on as built conditions.

147a Complete application forms
Complete and submit DHS-FEMA (Department of Homeland Security – Federal Emergency Management Agency) Forms 1 through 3 for a new bridge or culvert. Attach revision narrative, hydrologic computations, hydraulic computations, topographic map and plans.

147b Coordination with NFIP (National Flood Insurance Program) participating community
Coordinate and include any project related items required to satisfy NFIP regulatory requirements. Includes coordination with LFUCG Division of Water Quality.

WATER QUALITY PERMITS

148 Water related impacts
Field review and prepare report to present project water related impacts to the USACE District Office for jurisdictional determination. Report includes discussions of project background, proposed improvements, available environmental information and project impacts.

149 USACE jurisdictional determination – *assumed as USACE jurisdictional*
Coordinate with the USACE District Office to determine the impacts to waters of the United States and the project permitting requirements.

149a Nationwide Permit notification
Coordinate permit requirements with the LFUCG Division of Engineering and the Contractor. Prepare and submit a Nationwide Permit No. 14 pre-construction notification to the USACE District Engineer prior to commencing project activities.

149b KY Individual Water Quality Certification

Prepare and submit permit application to Water Quality Branch for coverage under an individual Water Quality Certification. Report prepared for Item 149 can be used for this task.

146c KY Division of Water permit
Prepare and submit permit application to the Surface Water Permits Branch, Floodplain Management Section for construction across or along a stream. Application must include location map, proposed plans and a public notice.

MEETINGS *(N/A)*

150-159 Meetings

PUBLIC INVOLVEMENT *(N/A)*

160-169 Public Involvement

QA/QC *(N/A)*

Note: This section is generally ONLY required with large projects that have multiple sections and consultants.

180-185 QA/QC

Scope Of Work
POLO CLUB BOULEVARD
PUBLIC IMPROVEMENTS
Contract Modification No. 2 – November 2016

PROJECT DESCRIPTION

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ESTABLISH PROPERTY LINES & OWNERSHIP

20 Contact & Interview Property Owners

Contact property owners requesting permission for access and discuss general scope of project, locations of property lines, septic system, drainage and any other pertinent information. A report is to be generated with a copy of the contact letter and all completed contact information forms from property owners, upon request.

Note: The contact letter and information form is to be reviewed and approved by the KYTC Project Manager prior to contacting the property owners. The contact letter shall include the name of a person from the consultant that may be contacted in case of problems and the KYTC Project Manager.

21 Field tie property lines/corners

Locate all monuments (rebars, pins, etc.) and other evidence of property lines (fences, tree lines, drains, etc.).

STAKING

22 Stake centerlines, approaches, detours

Accurately stake centerline at intervals determined at the Predesign Conference and process data.

23 Stake core holes - structures

Stake or locate all geotechnical borings required for structural design and process data.

NOTE: The unit is per individual structure, NOT per hole.

24 Stake core holes - roadway
Stake or locate all geotechnical borings required for geotechnical soil/rock analysis and process data.
NOTE: The unit is per individual core hole.

SURVEY MISCELLANEOUS

25 Determine Roadway Elevations (Crown and EP)
This would be necessary on widening and overlay projects where the terrain model is developed from aerial photogrammetry and accurate pavement elevations are required and includes processing data.
NOTE: Unit is per mile of individual roadway sections.

26 Environmental areas
Locate and identify areas and feature that may be considered environmental issues and includes processing data.

27-29 Reserved for additional miscellaneous survey items required

PRELIMINARY LINE AND GRADE *(N/A)*

30-59 Phase I design

RIGHT OF WAY

60 Deed research
Research of all documents necessary to determine property lines, existing easements, encumbrances and ownership including a copy of the deed with deed book and page number and available plats.

61 Re-establish property and ownership ***– 17 parcels***
Revisit research documentation to confirm property lines, existing R/W, existing easements, owner names, lessee names, and parcel numbers. Document on plans.

62 Calculate R/W
Calculate lines and areas of all proposed right of way and easement takings for each parcel. Depict all right of way and easements, including metes and bounds, on plans.

63 Prepare legal descriptions
Prepare and check legal descriptions for each area of taking.

64 Update R/W summary sheet
Update right of way summary sheet including all affected parcels for the whole project.

65 Update right of way strip map
Update right of way strip map sheets with current property ownership.

66 Prepare R/W Plans Submittal
Generate the computer files of the R/W Plans, plot the original mylars, prepare electronic submittal of plans and deeds and submit plans, computer files, source deeds and proposed deed descriptions to the District Office. Detour runarounds or other maintenance of traffic plans that have impacts to the right of way or utilities shall be included in the Right of Way Plans. A set of prints of drainage and cross sections may also be required to be included in the submittal.

Note: A set of prints is to be submitted to the LFUCG Project Manager for review prior to submittal of R/W Plans, if requested.

67 R/W revisions after R/W submittal
Prepare R/W plan revisions as necessary. Post R/W Plan submittal and prior to the final construction plan submittal. Includes re-submittal of revised plans (mylars), 1 set of prints with changes marked in red, plats, deed descriptions and electronic files.

68-72 Reserved for additional miscellaneous R/W items required

FINAL PLAN PREPARATION

80 Computer setup
Load and organize electronic data files (manuscripts, centerline data, coordinates data, terrain models etc.).

81 Update existing topography and terrain model
Using updated field data, modify and update the existing topography and terrain model.

82 Refine alignments (horizontal & vertical)
Refine, adjust, and document the preferred horizontal and vertical alignments accommodating greater detail in tie-down points, approaches, detours, etc.

83 Develop pavement design
Analyze, document and submit for review and approval the proposed pavement design folder for each roadway, including pavement calculations, life cycle costs, typical sections and pavement details.

84 Finalize templates & transitions
Finalize necessary templates and template transitions for all roadways. This includes each instance of a horizontal change in roadway edge of pavement with respect to the centerline.

85 Update final roadway model
Modify the roadway model to incorporate the proposed design into the revised terrain model, including cut/fill slopes, roadside ditches, etc. as necessary to define ditches and disturbed limits and enable the generation of cross-sections.

86 **Update proposed design**
Revise affected proposed construction details and graphics, including pavement, drainage, construction notes, etc.

87 **Generate plan sheets** ***– 4 sheets at 20 scale***
Perform necessary work to update individual plan sheets, including dropping of sheet cells, masking, manipulation of text and notes, etc.

88 **Generate profile sheets** ***– same as Item 87***
Perform necessary work to update individual profile sheets, including dropping profile, annotation of profile, drainage, ditches, notes, etc.

89 **Detail cross sections** ***– 20 cross sections***
Update affected cross sections, revise add yardage quantities, details, notes, etc.

90 **Design entrances** ***– 1 entrance***
Determine location, grade, type of entrance, width and quantities and depict on the plans.

91 **Revise roadway plans from soils report**
Modify the roadway model incorporating geotechnical report recommendations.
Note: Length is based on expected area requiring changes due to geotechnical report, not entire project length.

DRAINAGE

92 **Update pipe sections (< 54")** ***– 2 storm sewer pipes***
Create and design pipe sections including quantities, notes and depicting them in the plans.
Note: Includes cross drains, storm sewer, etc.

93 **Develop drainage system map**
Create map describing the proposed drainage system and delineating drainage areas. Includes generating the individual sheets.

94 **Develop drainage situation (bridge)**
Develop and prepare drawing of alignment, profiles, sections, and plan to represent bridge situation survey.

95 **Develop drainage situation (culvert)**
Develop and prepare drawing of alignment, profiles, sections, and plan to represent culvert situation survey.

96 **Develop blue line stream channel changes (=> 200')**
Develop and prepare drawing of alignment, profiles, sections, and plan to represent channel change, including stream mitigation requirements.

97 **Drainage analysis (Entrance pipes)**

Conduct and document drainage analysis to determine frequency flows and required structure size of entrance pipes. Includes completion of forms.

98 Drainage analysis (A <= 200 acres)
Conduct and document drainage analysis to determine frequency flows and required structure size. Includes completion of forms.

99 Drainage analysis (200 acres < A < 1.0 sq. mile)
Conduct and document drainage analysis to determine frequency flows and required structure size. Includes completion of forms.

100-102 Drainage analysis (A => 1.0 sq. mile) -- Levels 1, 2, & 3 Analysis
Conduct and document drainage analysis to determine frequency flows, required structure size, location, and risk assessment. Includes completion of forms.

103 Special drainage studies
Conduct special drainage studies, which may include HEC-1, TR-20, TR-55, Unsteady Flow Models, FESWMS-2DH, Detention Basin Design, Energy Dissipater Design, Dynamic Culvert Design or other Hydrologic/Hydraulic design as deemed appropriate.

104 Roadway ditches and channels
Determine hydraulic capacity (ditch size) and necessary channel lining of all ditches and channels. Includes documentation of design calculations and completion of forms.

Note: Left and right sides are independent to each other and should be added for a combined total.

105 Develop erosion control plan
Determination of required erosion control items and depiction in the plans, including required calculations and generating the individual sheets. Includes documentation of design calculations and completion of forms.

Note: Specific scope of work and level of effort is to be discussed at the Predesign Conference

106 Inlet spacing calculations
Conduct necessary calculations to determine structure types, and inlet spacing for the layout and design of storm sewer systems. Includes documentation of design calculations and completion of forms.

107 Storm sewers calculations
Conduct necessary calculations to determine pipe size, storage volumes, etc. for the layout and design of storm sewer systems. Includes documentation of design calculations and completion of forms.

108 Perform scour analysis
Perform scour analysis as referenced in the FHWA HEC-18 and HEC-20 and the current Drainage Manual. Includes documentation of design calculations and completion of forms.

109 Assemble preliminary and final drainage folders
Assemble and submit electronic files of the drainage evaluation results.

110 Prepare advanced situation folder - bridge
Prepare required documentation, copy, fold, bind, and assemble the folder.
Note: Folder contents are to conform to requirements outlined in the Drainage and Bridge Manuals.

111 Prepare advanced situation folder – culvert
Assemble and submit electronic files of the drainage situation evaluation results.

112-115 Reserved for additional miscellaneous Drainage items required

FINAL PLAN CONTINUATION

116 Prepare layout sheet
Prepare layout sheet for the Construction Plans.

117 Prepare typical sections
Prepare all typical sections including the proposed pavement design and other necessary details for each roadway, detour, and entrance.

118 Prepare interchange geometric approval sheet
Prepare geometric approval sheet, including all required alignments, curve data, coordinates, etc. for requesting approval of the interchange geometrics.

119 Prepare intersection geometric approval sheet
Prepare geometric approval sheet, including all required alignments, curve data, coordinates, etc., for requesting approval of the intersection geometrics.

120 Prepare coordinate control sheet
Develop all coordinate control information, including proposed centerlines, event points, control points, and benchmarks with appropriate descriptions, and place into the plans in tabular form and generate individual sheets.

121 Prepare elevation developments sheet
Prepare elevation development sheets including all geometric data and elevation data necessary.

122 Prepare striping plan
Prepare details for striping plans including the portions of Polo Club already built.

123 Calculate final quantities
Calculate and document all quantities required for the construction of the final roadway and maintenance of traffic during construction, including permanent and temporary items.

124 Complete general summary

125 Complete paving summary

126 Complete drainage summary

127 Complete pavement under-drain summary

128 Prepare cost estimate
Prepare and document cost estimates including bid prices for each item, using best engineering judgement, for inspections, meetings and final plan submittal.

129 Plot/Print copies of plans
Plot/print copies of plans including the necessary copies of plans for distribution at project milestones (inspections, meetings, etc.).

130 Plan revisions
Complete any necessary and unexpected plan revisions that arise during the project that are beyond the control of GRW, including revisions to plans required due to R/W Revisions that are not directly shown on the R/W Plans.

131 Prepare final construction plans submittal
Generate the computer files of the final plans, plot the original mylars, prepare electronic submittal of plans and required files and submit plans, computer files and a list of General Notes to the District Office. Also includes submittal of a set of Review Plans and making any necessary changes identified by the roadway plan review.

MAINTAINENCE OF TRAFFIC

132 Write maintenance of traffic notes (TCP)
Write and submit the required Traffic Control Plan, including the construction phasing for the project.

133 Update construction phasing plans
Update plans for maintenance of traffic, construction phasing and/or detours necessary for the construction of the project, including all phasing, special notes, signs, temporary pavement markings and quantities

134 Develop diversion plan sheets

135 Develop diversion profile sheets

136 Develop diversion cross sections

137 Develop temporary drainage

FINAL PLANS MISCELLANEOUS

138 Document available rock quantities

139 Construction administration assistance
Respond to technical questions during the bid period, prepare addenda, approve alternates and review and approve initial submittals or shop drawings. Advise in matters of intent during construction.

140 Prepare bid specifications
Prepare the project bid specifications in accordance with LFUCG standards and guidance.

141 Review erosion control plan
Review and determine appropriateness of the Erosion and Sediment Control Plan prepared by the Contractor integrating the non-structural and structural practices and procedures of the LFUCG Stormwater Manual.

142 Prepare lighting plan
Prepare lighting plans in coordination with LFUCG Traffic Engineering. LFUCG will provide street light spacing for incorporation into the plans.

143 Utility company coordination
Meet and coordinate with all affected utility companies, as necessary to minimize disturbance to underground lines and to facilitate the Project.

144 Prepare Project Development Checklist (PDC)

145 Culvert design at Deer Haven
Review, development and coordination of potential pre-cast solutions. Coordination and presentation of culvert plans including: foundation, barrel and wingwall design.

REQUEST FOR CONDITIONAL LETTER OF MAP REVISION (CLOMR)

146 Complete application forms
Complete and submit DHS-FEMA (Department of Homeland Security – Federal Emergency Management Agency) Forms 1 through 3 for a new bridge or culvert. Attach revision narrative, hydrologic computations, hydraulic computations, topographic map and plans.

146a Prepare narrative
Develop narrative including project background, request purpose and reason(s) for revision.

146b Prepare existing conditions topographic map
Includes office and CAD work necessary to prepare a surveyor certified topographic map of the *existing* conditions. 3D scan and topo work by GRWAS will provide the information needed to prepare the map. Map to include *existing* floodplain and floodway elevation delineations.

146c Prepare annotated FIRM (Flood Insurance Rate Map)
Annotate DHS-FEMA FIRM to reflect changes due to the project. Also includes creation of a proposed floodplain and floodway elevation delineations plan based on the certified topographic map.

146d Coordination with NFIP (National Flood Insurance Program) participating community
Coordinate and include any project related items required to satisfy NFIP regulatory requirements. Includes coordination with LFUCG Division of Water Quality.

146e Review fee payment
Consult DHS-FEMA's fee schedule for the reviewing and processing of a CLOMR and complete the Payment Information Form.

REQUEST FOR LETTER OF MAP REVISION (LOMR)

147 Verify CLOMR floodplain
Verfity floodplain analysis (HEC-RAS) based on as built conditions.

147a Complete application forms
Complete and submit DHS-FEMA (Department of Homeland Security – Federal Emergency Management Agency) Forms 1 through 3 for a new bridge or culvert. Attach revision narrative, hydrologic computations, hydraulic computations, topographic map and plans.

147b Coordination with NFIP (National Flood Insurance Program) participating community
Coordinate and include any project related items required to satisfy NFIP regulatory requirements. Includes coordination with LFUCG Division of Water Quality.

WATER QUALITY PERMITS

148 Water related impacts
Field review and prepare report to present project water related impacts to the USACE District Office for jurisdictional determination. Report includes discussions of project background, proposed improvements, available environmental information and project impacts.

149 USACE jurisdictional determination – *assumed as USACE jurisdictional*
Coordinate with the USACE District Office to determine the impacts to waters of the United States and the project permitting requirements.

149a Nationwide Permit notification
Coordinate permit requirements with the LFUCG Division of Engineering and the Contractor. Prepare and submit a Nationwide Permit No. 14 pre-construction notification to the USACE District Engineer prior to commencing project activities.

149b KY Individual Water Quality Certification

Prepare and submit permit application to Water Quality Branch for coverage under an individual Water Quality Certification. Report prepared for Item 149 can be used for this task.

146c KY Division of Water permit
Prepare and submit permit application to the Surface Water Permits Branch, Floodplain Management Section for construction across or along a stream. Application must include location map, proposed plans and a public notice.

MEETINGS *(N/A)*

150-159 Meetings

PUBLIC INVOLVEMENT *(N/A)*

160-169 Public Involvement

QA/QC *(N/A)*

Note: This section is generally ONLY required with large projects that have multiple sections and consultants.

180-185 QA/QC

PROFESSIONAL SERVICES WORKSHEET Date: 11/21/2016

CIVIL ENGINEERING SERVICES

GRW ENGINEERS, INC.

CIVIL MASTER AGREEMENT NO.: 1700000080

Project: Polo Club CM2

SERVICES	Hours	Rate	Total
Principal of Firm / Professional	72	$125.00	$9,000.00
Project Engineer (other than Principal)	144	$100.00	$14,400.00
Sr. Project Manager		$75.00	$0.00
Graduate Engineer (or EIT)		$60.00	$0.00
CAD Technician / Draftperson	24	$60.00	$1,440.00
Technician / Inspector		$50.00	$0.00
Word Processing / Clerical		$40.00	$0.00
	Subtotal:		$24,840.00

Expenses

Not Applicable	$0.00
Subtotal	$0.00
Total Cost	**$24,840.00**

PROFESSIONAL SERVICES WORKSHEET Date: 11/21/2016

SURVEY SERVICES

GRW AERIAL SURVEYS, INC.

SITE AND BOUNDARY MASTER AGREEMENT NO.: 1700000210

Project: Polo Club CM2

SERVICES	Hours	Rate	Total
Principal of Firm / Professional Land Surveyor	28	$125.00	$3,500.00
Project Manager Surveyor (other than Principal)		$100.00	$0.00
Surveyor (Or Land Surveyor-in-Training)	112	$75.00	$8,400.00
Party Chief (as operator of robotic total station or GPS)		$75.00	$0.00
CAD Technician/Draftsperson	28	$60.00	$1,680.00
Party Chief (as operator of conventional total station)		$40.00	$0.00
Word Processing/Clerical		$40.00	$0.00
Surveyor Technical (as rodman for conventional total station)	112	$33.00	
Engineering Technician		$50.00	$0.00
Subtotal:			$13,580.00

Expenses

Not Applicable	$0.00
Subtotal	$0.00
Total Cost	**$13,580.00**