Great Rivers Greenway

Construction Plans Checklist

Project Name: _____

Sub-Project Code: _____

Reviewed By: _____

Assigned CM: _____

Designer: _____

Last Field Check Date: _____

Version: February 2023

Scope and Purpose:

Great Rivers Greenway strives to produce contract ready error free plans. The key to success is good communication and documented expectations and procedures for the design of projects. The purpose of this document is to supplement design guidelines and ensure project plan design and details are prepared in a uniform and complete manner and to provide a guide for quality assurance / quality control for plans let by Great Rivers Greenway.

Design Review

Plans, Specifications and Estimate (PS&E) are expected to be submitted by the date specified in the project schedule. GRG staff will work to complete design reviews within the specified timeframe(s). The design firm will work to complete all design revisions in order to deliver an on-time project letting as determined by the schedule. If additional time is necessary to finish the revision process, a change request needs to be submitted by the design firm for a time extension.

Ultimately the design of projects shall be in accordance with GRG standards. Any deviation from the standards requires a design exception approved by the Project Manager, Senior Project Manager, and VP of Projects.

DESIGN STANDARDS USED (Most Recent Edition):

- ☐ National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide
- ☐ PROWAG
- ☐ ADAAG
- ☐ St. Louis County Highway Design Criteria
- ☐ AASHTO Roadside Design Guide
- ☐ AASHTO Policy on Geometric Design
- ☐ MoDOT EPG
- ☐ MoDOT LPA Manual
- ☐ MSD Plan Preparation Guidelines
- ☐ MUTCD

_____ Date of any Design Exception Approval (List on Title Sheet of Plans)

CHECKLIST GUIDE

Legend

___x___ Complete / OK

__->___ Needs Attention

__na___ Not Applicable

*** - To be included by Preliminary (30%) Design PS&E Submittal**

*** - To be included by Intermediate (70%) PS&E Submittal**

All other items to be included on the Pre-final (95%) and Final (100%) PS&E Submittals

Utility (Underground) Facilities

The design firm is encouraged to take early action as to the location of known and unknown underground utilities that might be encountered during construction. The use of Subsurface Utility Engineering (SUE) will be determined during scoping the project manager.

_____ Subsurface Utility Engineering has been employed *

_____ Project does not have the potential to impact subsurface utilities *

Utility Relocation Plan / Schedule of Adjustment

The design firm is required to coordinate with the utilities involved on the project and gather the utilities plan of relocation prior to bidding the project. The design firm will need to coordinate with all affected utility companies in accordance with the PMM.

Utility Relocation Plans have been received and shown on the design plans:

_____ Utility coordination has been started and the log has been provided to GRG *

_____ Utility coordination has been completed (relocation agreements received)

_____ _____ Relocation Date _____ Shown on Plans ☐

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_____ _____ Relocation Date _____ Shown on Plans ☐

_____ _____ Relocation Date _____ Shown on Plans ☐

_____ _____ Relocation Date _____ Shown on Plans ☐

Other Agency Approvals

_____ Obtain any applicable permits and approvals from other regulating agencies. This may include, but not be limited to, Local Municipalities, Counties, MoDOT, Army COE, MoDNR, etc. Approvals from other regulating agencies are required prior to improvement plan approval. Include copies of the permits acquired and/or permit forms for permits required by the contractor in the specifications.

_____ NOTE: GRG is required to pay MSD plan review and permit fees; however, GRG is NOT required to pay escrow deposits or as-built deposits. MSD plan review fees are based on the size of the project (for example, Gravois Greenway: Grant's Trail Phase 2 was approximately 1.8 miles in length and the resulting MSD plan review fee was $5,800).

DESIGN PLANS

COVER SHEET

_____ Plans shall be submitted on 22” x 34” sheets at the contract required scale. *

_____ All plan sheets shall be signed and sealed by a MO registered professional architect or engineer, or appropriately marked per Missouri State Statutes. *

_____ Provide a location map of the site with north indicated. *

_____ Indicate the benchmark used for all survey data. All survey data shall directly relate to MO State Plane East Coordinates NAVD88 Datum (with projection). *

_____ Show a north arrow on all plan sheets. North should never face the bottom of the page.*

_____ List all utility companies serving or possibly impacted within the project area *

_____ Add bolded utility notes stating: *

- UNDERGROUND FACILITIES, STRUCTURES, AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDS. THEREFORE, THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY.
- THERE MAY BE OTHER UTILITIES OR IRRIGATION LINES, THE EXISTENCE OF WHICH IS PRESENTLY NOT KNOWN OR FACILITATED BY THE "MO1CALL" SYSTEM. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND UTILITIES AND IRRIGATION LINES LOCATED IN THE FIELD PRIOR TO EXCAVATION OR CONSTRUCTION.
- COMPENSATION TO UTILITY COMPANIES FOR RELOCATION OF THEIR UTILITY FACILITIES WILL BE MANAGED ACCORDING TO APPLICABLE UTILITY RELOCATION AGREEMENTS.
- CONTRACTOR TO CALL 1-800-DIG-RITE TO HAVE ALL UTILITIES LOCATED ON THE GROUND IN ALL AREAS AFFECTED BY CONSTRUCTION, PRIOR TO BEGINNING CONSTRUCTION. CONTRACTOR SHALL ALSO CONTACT APPLICABLE STATE, COUNTY, OR MUNICIPAL STREET AGENCIES IF WORK IS PROPOSED IN, OR ADJACENT TO, THEIR RIGHT OF WAY. CONTRACTOR SHALL ALSO CONTACT ANY MUNICIPAL OR OTHER UTILITIES THAT MAY NOT PARTICIPATE IN THE MO1CALL SYSTEM.
- THE ST. LOUIS COUNTY HIGHWAY DEPARTMENT MAY NOT CURRENTLY USE THE MO1CALL SYSTEM – CONTRACTOR TO CONTACT ST. LOUIS COUNTY HIGHWAY DEPARTMENT AND CONFIRM LOCATES ARE COMPLETE.

_____ List applicable General Notes on the cover sheet *

_____ Indicate how the project will be served by utilities *

_____ Indicate on the plans any permits that have already been approved for this project *

_____ Index of Sheets listing all plan sheets *

_____ New Greenway Mileage *

_____ New On-Street Mileage *

_____ Existing/Retrofit/Betterment Greenway Mileage *

_____ Existing/Retrofit/Betterment On-Street Mileage *

_____ Amenity Areas (Non-Greenway) Acreage *

_____ Sustainability Metrics (see PCS standards) *

_____ Length of Project (feet) *

_____ Township and Range location *

_____ Brief project scope description (single paragraph; Ex: “New greenway segment with park improvements, parking lot, bridge,…”) *

_____ Signature line for VP of Planning and Projects

_____ List the Design Standards utilized in the development of the plans. *

Typical Section Sheet

_____ Typical Section Sheet x of x labeled *

_____ Post the asphalt materials application rates on the first typical section sheet. Display the entire mix description.

_____ Show base rock under all applicable areas. *

_____ Show composition and thickness of existing pavements and bases using borings or paving history, preferably with dates (including beneath medians). *

_____ Show the location of full and partial depth sawcuts. *

_____ Existing pavement conditions have been evaluated for sufficient stability of the pavement after sawcutting and repour as well as any pavement rehabilitations which should be considered and included. *

_____ Show the station limits for each typical section. Station Limits include the entire project limits. *

_____ Show any bypass typical sections. *

_____ Show the pay-limits for materials.

_____ Show and note guard rails, various barriers, rumble strips, etc. - location and types.

_____ Label the centerline or baseline and show the location of the profile grade. *

_____ Provide a joint layout with bar locations for non-typical areas.

_____ Show lane and shoulder widths and max cross slope for each typical. *

_____ Show typical fill and cut slopes. *

_____ Show proper jointing plan for pavement.

_____ Label the type of pavement, curb, and other section elements. *

_____ Show right-of-way and/or easement limits/needs. *

Summary of Quantities Sheets

_____ Quantity sheets to be numbered 2.

_____ Sheet x of x posted on each sheet.

_____ Summary of Quantities sheet (2A) matches the bid item sheets.

_____ Summary of Quantities sheets (2A) list the bid item number.

_____ Quantities should be 3 dimensional calculations where applicable.

_____ Check all quantities against items shown on the plan sheets. Show enough detail on the summary quantities to verify quantities, ie – Station, Location, Length, and Average Widths. Note locations of items for easy reference.

_____ Refrain from pre-filling pay item amounts on the quantity sheets.

_____ Removal of Improvements = 1 LS. Show enough detail including amounts and locations of all removals (consider special plans, such as landscaping, in removals). List all full depth sawcut for removal locations within the detail.

_____ Make sure to list Mobilization = 1 LS.

_____ Earthwork, show tabular results of the cut and fill for the project. List all shrink and swell factors used in the calculation of earthwork.

_____ Embankment in Place includes compaction.

_____ Compaction paid for in the cut areas.

_____ Erosion control items listed.

_____ Buffer quantities based on degrees of uncertainty.

_____ Temporary seeding should be incidental to the project unless there is specific phasing that requires temporary seeding.

_____ Pavement Repairs – Detail length, width, and location of repaired slabs. Tie bars are incidental to the pavement cost

_____ Decide upon pay for reestablishing property corners or right-of-way markers that will be removed by the project.

_____ Round all quantities to the pay item level of accuracy.

_____ Split out quantities by stages if the project is occurring in more than one phase.

_____ Add Contractor Furnished Surveying and Staking. Make sure to include a JSP that a registered land surveyor is required to do all layout.

_____ Include Clearing and Grubbing by Lump Sum (but assure JSPs identify tree size considered "clearing" vs. individual removal).

_____ Culvert Cleanout – pipe diameter, length, location, per each.

_____ Temporary Shoring – incidental to the project.

_____ Pay item units and quantities match the bid form and estimate units and quantities.

_____ Show the type of pavement marking used on the project

_____ Note any items that are incidental to the pay items. i.e. – excavation, backfill, dewatering and compaction for pipe installation.

_____ Quantities have been re-checked and re-calculated after permitting or compliance reviews (particularly ADA reviews).

Plan Sheets

_____ Section, Township and Range is shown for all projects where new property rights have been acquired. *

_____ North arrow and scale on all plan sheets. Plan sheets shall be drawn to a standard scale that shows enough detail to be easily read. Plan sheets should be

a standard scale (1:20 suggested) as required by the contract and should be uniform. The north arrow should never point to the bottom of the page. *

_____ Apply appropriate notes labeling all work outside what is shown is incidental to the construction of the project. Add a note describing the limits of the right of way / easement. *

_____ Note stating all utility information is shown for information only and the contractor will be required to determine the location of all utilities prior to commencing work. *

_____ Legend for any shaded or hatched areas. Make sure hatches/shading is unique and easily distinguished. *

_____ Label beginning and end of the project limits. *

_____ Avoid unnecessary lines on the plan sheets. Do not show contours unless necessary. *

_____ All new features should be solid, heavier, and dark and easily recognizable. Existing features should be dashed and lighter. *

_____ Label slope cut lines as SLC, and slope fill limits as SLF. *

_____ Show all centerline skews and intersections. *

_____ Note all field located property corners. *

_____ Show existing and new locations of mailboxes. *

_____ Items to be removed and relocated need to show the new installed locations. *

_____ Show all existing and new right of way and easement dimensions and labels. *

_____ Relocated utilities shown with symbols on the title sheet legend. *

_____ Utility conflicts and/or relocations have been checked (on plan reviews and in field checks) for vertical clearances in addition to their plan conflict (i.e. the utility conflict is resolved in all three dimensions).

_____ Horizontal Curve info – include PIs, PCs, PTs. Check design speed and superelevation tables. Assure coordinates, stationing, and lengths reconcile. Provide a table for any superelevated curves. If plan sheets become cluttered, create a special geometrics sheet. *

_____ Horizontal Alignment ties match points and coordinates listed on the coordinate point sheet. Reference Points match reference points sheet.

_____ Show all crossing drainage structures. Analyze and label all overtopping flood frequencies and discharges for all existing and proposed drainage conveyance improvements/structures. *

_____ Driveway and entrance notes include: Station, Width, Grade, Type, Pipe info, Surfacing, Skew angle. Notes match cross section and profile sheets. *

_____ Driveway and entrance designs have compliant sight distances and angles; and ease of use for the driver has been evaluated. *

_____ NACTO standards have been considered for design of pedestrian refuge islands: https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/crosswalks-and-crossings/pedestrian-safety-islands/ *

_____ Label all connection radii. A warping plan should be included to show all intersections or irregular areas. *

_____ Drainage structures labeled and stationed. (Size, Type, Skew, Class) *

_____ Underdrains at all new areas of low pavement, unsuitable material, or relevant rain gardens/BMPs/etc.

_____ Green Infrastructure (BMPs/rain gardens/bio-swales/planted basins/etc.) are located outside of easements or other land rights which would not restore the infrastructure upon use of the easement/rights.

_____ BMPs are labeled as “rain gardens”, “bio-swales”, “planted basins”, etc. (i.e. not as “BMP”) in areas where MSD does not own or operate the underlying drainage systems.

_____ Match line stations match the next sheets station. Match lines should reference the adjoining sheet number. *

_____ Bridge and retaining wall notes. (stations, design high water, storm frequency, flow lines, removal notes, connection details)

_____ Bridge decks do not extend beneath structural members to prevent staining from weathering steel.

_____ Drain basins at bridges and walls. *

_____ Show signals and lighting (including conduits) on plan sheets. *

_____ Dimension and label all site furnishings. *

_____ Dimension and label all existing individual or grouped trees to receive protection. *

_____ Dimension all non-typical features. *

_____ Guardrails and fencing placed with sufficient lateral clearance and meet standard plans and type of guardrail is appropriate for the guardrail location. *

_____ Note the flood hazard zone from the FIRM map with the panel number and date. *

_____ Indicate the floodway and floodplain limits on the plan sheets. *

_____ If constructed in the floodplain, label the 100 yr flood elevation, low floor elevation and low sill elevation with compliant elevations. *

_____ Obtain a floodplain development permit and provide approvals for any work within a floodway or floodplain.

_____ Linework for structures and piping reflect the physical dimensions of the improvements. *

_____ Show the existing and proposed grades on structures that are labeled as ATG.

_____ Structures labeled as ATG requiring more than adding a riser ring will be a separate bid item.

_____ Electrical service, conduit, wire, accessories, and appurtenances are shown in layout, particularly for new facilities (pavilions, restrooms, etc.) and properly quantified.

_____ Public Access/Ownership rights are confirmed for existing streets/sidewalks/trails proposed to be connected to the project greenway – i.e. connections to privately controlled streets/sidewalks/trails are not proposed without permission. *

_____ Areas adjacent to sections of existing trail or other pavement to be removed and replaced have been evaluated and designed (if needed) for adequate drainage. *

_____ Connections to existing private building walks/access (carriage walks) are shown in layout, with land rights confirmed, are ADA compliant, and properly quantified.

_____ Items to be rehabilitated (repainted, replanted, treated, etc.) have considered existing partner maintenance obligations – i.e. GRG is not performing work beyond its obligations.

_____ All vendor-provided designs have been reviewed and are appropriately designed/sized for the specific application by the Design Engineer.

_____ Complex structural elements (pedestrian bridges, large walls, etc.) structural designs have been evaluated for a balance of total quantities and fabrication efficiency (i.e. consistent dimensioning may increase quantities, but make fabrication easier and less costly).

Profile Sheets

_____ Begin and End Project notes on all profiles. All equations, and exceptions shown in the plan and profile. *

_____ Label all vertical curve info show VPIs, VPCs, VPTs, Ks and SSDs. Reconcile coordinates, stationing, linear, and curve data. *

_____ Label max crowns with station range, crown section, and transition in the profile view. *

_____ Show all crossroad drainage structures with flowline elevations and utility crossings. *

_____ Earthwork balance point shown on the profile along with volumes, borrow, and excess.

_____ Show benchmark information *

Reference Points

_____ Show survey ties with coordinates. At least 3 ties are required.

_____ Type of reference point is specifically identified.

Missouri Coordinate Sheet

_____ Coordinates for Beginning and End of Project points.

_____ Coordinates for intersection points.

_____ Coordinates for curve data (PC, PI, PT)

_____ Grid Factor and Convergence (Must show MO State Plane Coordinates, Not Modified State Plane Coordinates)

Work Zone Traffic Management Plan Sheets

_____ Existing greenway, sidewalks, and/or walkway interruptions or closures have been identified.

_____ Alternative non-vehicular routes are properly planned, signed, and/or signalized and are MUTCD compliant.

_____ Address signal location staging.

_____ Note pavement edge treatment where needed.

_____ Check detour directional signage.

_____ Use Directional Indicator Barricades through limits of tapers in which traffic is merging together, do not use them for lane shifts. Use DIBs with lights for nighttime work (Arterials and Collectors).

_____ Reduce Speed Ahead signs used only where speed is being reduced by 15 mph or more.

_____ Changeable message signs should be contractor furnished.

_____ Label all buffer spaces, taper lengths, device spacing, barrier stationing.

_____ Label all signs UIP, RELOC, or COVER after the first usage.

_____ Specify barrier taper length and attenuator barrels setup. Add quantity buffers for barrel replacement to the attenuators.

_____ Any detour specified will carry the traffic loading?

_____ Staging plan shows temporary / permanent lane closures as well as any existing pavement marking to be obliterated and temporary pavement markings (include removal of temporary pavement markings if necessary).

_____ Check if temporary traffic signals are needed at intersections.

_____ Check if remaining pavement space outside of closures/removals is sufficient and/or whether temporary striping is needed for the proposed traffic flow (two-way, one-way, # lanes, etc.).

_____ Address time or duration restrictions on plans and in JSPs.

_____ Address delivery and solid waste collection services during construction.

_____ Pre- and post-construction traffic impact studies are scheduled if the project is proposing to modify sizes or configurations of existing streets.

Erosion Control Plan Sheets

_____ Erosion control is shown on separate plan sheets.

_____ Legend depicts the typical erosion control devices.

_____ Sediment removal calculated for erosion control items (1 cy / 100 lf of silt fence, 1 cy / ditch check).

_____ All ditch checks should be type II.

_____ Silt fence should not be used as an inlet protection.

_____ Consider using more permanent erosion control versus temporary.

_____ Plan depicts a 25 x 50 temporary gravel washdown area located near the construction entrance and water source.

_____ All low places are graded to drain.

_____ Show any interim or staged grading.

_____ A SWPPP report has been prepared in accordance with MDNR regulations.

_____ A Contractor provided SWPPP has been planned and communicated in JSPs.

Lighting, Signal, and Landscape Sheets

_____ Power supply is the correct type for signals, lighting or signals and lighting and shown in the correct location. *

_____ Battery backup is addressed by maintaining agency. *

_____ Signals and lighting plan shows the existing signals and lighting equipment and all underground conduit. *

_____ Signal heads are laid out in the correct location, with supplemental heads where needed. *

_____ Signal post and base information is clearly labeled, including black mast arms and post requirement. *

_____ Pull box locations are clearly labeled. *

_____ Conduit is depicted as bored or open cut. Symbology matches the legend displayed on the plans. *

_____ All detection zones are shown on the plans. *

_____ Plans show all necessary signal signing. Signal signing matches the maintaining agency‘s(ies’) standards.

_____ New signals are not blocking other heads during construction. *

_____ Mast arms are standard lengths with a 55 ft maximum. Are existing mast arms adequate for any pavement widening projects. *

_____ Signals plans include any pedestrian signals and push buttons. Pedestrian signals and buttons are ADA compliant. *

_____ Signals and lighting plans show all existing utilities. Bases are not through utilities or posts are not within 10 feet of overhead power lines. *

_____ Lighting provides consistent coverage and is either stand alone or signal mounted. *

_____ Controller doors open away from traffic. *

_____ Is advance detection needed. *

_____ 2 conduits between controller and 1st pull box. *

_____ Conduits are sized for the number of cables needed. *

_____ Signal and Lighting quantity sheets show all the quantities from the plan sheets.

_____ A wiring diagram is included for the signalized intersection. Diagram includes the street names and a north arrow.

_____ Pull boxes sized for conductors. Class 1 – 22 or less. Class 2 23-69. Class 3 more than 69. *

_____ Signal heads, visors, louvers, and backplates are all detailed. Signal heads depict mast arm or upright location.

_____ Conduit is 3 inch from source to power supply and power supply to controller. 2-3" from controller to 1st pull box. All conduit is a minimum of 3 inches. From pull boxes to loopes 1" conduit is used. Conduit for fiber is 2". *

_____ Conduit lengths include +4 ft at controller, +4 ft at power supply, +4 ft at type a signal base, +2 ft at type c or type f signal base, -1 ft at pull box.

_____ Cable sized correctly. 2 AWG power source to supply. 8 AWG minimum power supply to controller.

_____ Signal breakers are sized for the signal loading.

_____ 7c#16 for vehicular signal heads, 5c#16 for pedestrian signal heads, 2c#16 for pedestrian push buttons. 1c#14 in duct for detector. Video uses power and coaxial cable.

_____ Lighting is 2c#12 from controller to pull box. 1c#10 pull box to luminaire. Fiber is usually 24 strand single mode fiber.

_____ Cable lengths account for +35 at power source, +8 at power supply, +8 at controller, +6 at each pull box, +3 at each pull box for spliced cables, +13 for top or side mounted vehicular heads, +10 for pedestrian heads, +9 for push buttons, +21 for mast arm signals, +30 for bracket arm cameras or luminaires + length of bracket arm+length to turn up the post, +60 fiber at class 5 pull box near cabinet, +10 of fiber cable at intermediate pull boxes.

_____ Jumpers noted where two signals are together. Calculate the length to the furthest then jump back.

_____ Auxiliary breaker shown as 15 amp.

_____ Signal load switch assignments are shown.

_____ Signals Ring diagrams are shown.

_____ Controller type is detailed.

_____ Use of pavers accounts for locations where side knobs may need to be removed to assure proper spacing against poured concrete.

_____ Landscape, specifically tree, installations proposed near a billboard in State ROW have been evaluated against the billboard companies' rights to remove vegetation per http://revisor.mo.gov/main/OneSection.aspx?section=226.585&bid=12050&hl

_____ Landscape, specifically tree, installations proposed near utilities and/or overhead lines have been evaluated against future impacts to and from utilities.

_____ Where art will be installed for the project, appropriate labeling, interpretation, and artist credit is incorporated and identified within the site improvements.

Retaining Wall Sheets

_____ Retaining wall profile shows the existing ground, footing, and top of wall elevation and proposed contours. *

_____ Retaining wall plan view is included on the retaining wall sheets. *

_____ Design standards for contractor-designed retaining walls is specified and definitions of maximum or minimum loading, reinforcement lengths, and other wall components is clear and unambiguous. *

_____ Retaining wall facades are properly accounted for in distances/measurements for quantities, plan views, typical sections, wall plans/profiles, and cross-sections.

_____ Retaining walls have proper fall protection for height and application. *

_____ Retaining walls should be labeled with quantity (sf) and require a JSP noting that the exposed face of the wall is all that is measured for payment. *

_____ Interfaces between retaining wall caps and surrounding improvements (edgers, gutters, steps, fences, etc.) have been carefully planned, both horizontally and vertically.

_____ GRG Lessons Learned Log has been reviewed for multiple design considerations in the use of "Green" or "Living" retaining walls.

Signing and/or Wayfinding Plan Sheets

_____ Verify the signing quantities from the signing plans and estimate.

_____ Inventory existing wayfinding signage and document locations of existing signs and need for adjustments. *

_____ A wayfinding and interpretive signage placement plan (SPP) illustrating for all new signs, existing signs to remain in place, and existing signs to be modified: locations, types (i.e. KX-1), direction facing, type of footing (i.e. surface mount or direct bury), proposed text, and proposed site control needs for physical placement (e.g., land rights, easements, floodplain permits, etc.). *

_____ Wayfinding and interpretive signage standard details included or modified due to unique site-specific conditions exceeding parameters of standard details.

_____ The use of breakaway posts, due to MoDOT ROW or vehicular clear zones, has been identified on the plans.

_____ InDesign Documents (INDD) provided for all final wayfinding sign designs include all final detail on wayfinding such as mileage, directional arrows, amenity icons, etc. Note: GRG's Team Promote will always handle: Maps, Content of interpretive signs, and Locator codes.

_____ Traffic signs conform to the MUTCD standard. *

_____ Signing quantities include all appurtenances or clearly state the cost of all hardware is included in the cost of the sign. This should include mounting type for all signs (breakaway, standard, etc.).

_____ Signing plans shall clearly detail any electronic signs (speed limit, crosswalk, etc.) and should note on the detail which items are included in the cost of the sign.

_____ All signs are labeled with station and offset and note that the contractor shall install maintaining agency supplied tags.

_____ Trail counters and their locations are identified. Trail counter specifications have been added. The total number of trail counters are included in the quantities. (NOTE: If trail counters are to be omitted from the project, justification must be provided to the VPPP.)

Pavement Marking Plan Sheets

_____ Intermittent striping calculated as station to station divided by 4.

_____ Include Pavement Marking Removal quantities where required.

_____ Pavement markings shall follow MUTCD standards.

_____ Provide details on reflective markers on raised islands. Reflective markers should be included on all raised islands.

_____ Stop bars, crosswalks, and arrows are compliant type for the maintain agency.

_____ Plans detail color and width of all markings. Provide dimensions/stations for all pavement markings.

Culvert / Storm Sewer Plan Sheets

_____ Show existing and proposed grade lines on profiles and sections. *

_____ Label the pipe size, length, slope, class, and material on the profile sheets. Pipe backfill should be incidental to the cost of the pipe. *

_____ Inlets and manholes are paid for by the depth of structure. *

_____ Box culverts labeled with skew, size, barrel width x height x length. Check the DHW is the same on the road profile as the culvert section. *

_____ Inlet details the type of inlet or grate to be used. *

_____ Rock lining or other permanent erosion control is installed at channel changes. It is required to have geotextile material under rock lining. *

_____ Design meets MSD standards for construction. MoDOT standards only when on MoDOT right-of-way. *

_____ Pipes do not decrease in size in the direction of flow. *

_____ Sewers shall be aligned: *

1. To be in a straight line between structures, such as manholes, inlets, inlet manholes and junction chambers, for all pipe sewers thirty (30) inches in diameter and smaller.
2. To be parallel with or perpendicular to the centerlines of straight streets unless otherwise unavoidable.
3. To avoid meandering, off-setting and unnecessary angular changes.
4. To make angular changes in alignment for sewers thirty (30) inches in diameter or smaller in a manhole located at the angle point, and for sewers thirty- six (36) inches in diameter or larger, by a uniform curve between two tangents. Curves shall have a minimum radius of ten times the pipe diameter.
5. To avoid angular changes in direction greater than necessary and any exceeding ninety (90) degrees. Structures should be designed to accommodate

A-loks or Z-loks.

6. Avoid long runs underneath the pavement.

_____ Storm sewers shall be located: *

1. To serve all property conveniently and to best advantage.
2. In public streets, roads, alleys, rights-of-way, or in sewer easements dedicated to the maintaining agency.
3. On private property along property lines or immediately adjacent to public streets, avoiding diagonal crossings through the central areas of the property.
4. At a sufficient distance from existing and proposed buildings including footings, and underground utilities or other sewers to avoid encroachments and reduce construction hazards.
5. To avoid interference between other stormwater sewers and house connections to foulwater or sanitary sewers**.**
6. In unpaved or unimproved areas whenever possible.
7. To avoid, whenever possible, any locations known to be or probably to be beneath curbs, paving or other improvements particularly when laid parallel to centerlines.
8. Drainage to sinkholes is not permitted.
9. Crossing perpendicular to street, unless otherwise unavoidable.

_____ The flowline of storm sewers shall meet the following requirements: *

1. The flowline shall be straight or without gradient change between the inner walls of connected structures; that is, from manhole to manhole, manhole to junction chamber, inlet to manhole, or inlet to inlet.
2. Gradient changes in successive reaches normally shall be consistent and regular. Gradient designations less than the nearest 0.001 foot per foot, except under special circumstances and for larger sewers, shall be avoided.
3. Sewer depths shall be determined primarily by the requirements of pipe or conduit size, utility obstructions, required connections, future extensions and adequate cover.
4. Stormwater pipes discharging into lakes shall have the discharge flowline a minimum of three (3) feet above the lake bottom at the discharge point or no higher than the normal water line.
5. A concrete cradle is required when the grade of a sewer is twenty (20) percent or greater. A special design and specification is required for grades exceeding fifty percent (50%).
6. For sewers with a design grade less than one percent (1%), field verification of the sewer grade will be required for each installed reach of sewer, <u>prior to any surface restoration or installation of any surface improvements.</u>
7. The maintaining agency may require the submittal of revised hydraulic calculations for any sewer reach having an as-built grade flatter than the design grade by more than 0.1%. Based on a review of this hydraulic information, the

maintaining agency may require the removal and replacement of any portion of the sewer required to ensure sufficient hydraulic capacity of the system.

8. Drops greater than 5 feet require reinforced concrete bottoms.

_____ Manholes shall be designed to: *

1. For sewers thirty (30) inches in diameter or smaller, manholes shall be located at changes in direction; changes in size of pipe; changes in flowline gradient of pipes, and at junction points with sewers and inlet lines. For sewers thirty-three (33) inches in diameter and larger, manholes shall be located on special structures at junction points with other sewers and at changes of size, alignment change and gradient. A manhole shall be located at one end of a short curve and at each end of a long curve.
2. Spacing of manholes shall not exceed four hundred (400) feet for pipe sewers thirty-six (36) inches in diameter and smaller; five hundred (500) feet for pipe sewers forty-two (42) inches in diameter and larger, except under special approved conditions. Spacing shall be approximately equal, whenever possible.
3. When large volumes of stormwater are permitted to drop into a manhole from lines twenty-one (21) inches or larger, the manhole bottom and walls below the top of such lines shall be of reinforced concrete. Special structural design may be required for large pipes and/or large drops.
4. Manholes shall be avoided in driveways, crosswalks or sidewalks.
5. Connections to existing structures may require rehabilitation or reconstruction of the structure being utilized. This work will be considered part of the project being proposed.
6. When a project requires a manhole to be adjusted to grade a maximum of twelve (12) inches of rise is allowed if not previously adjusted. When adjustments to raise or lower a manhole is required, the method of adjustment must be stated on the project plans and approved by the maintaining agency.

_____ The Hydraulic Grade Line shall be designed to: *

1. The hydraulic grade line at any inlet or storm manhole shall not be higher than two (2) feet below the inlet sill or top of manhole.
2. Storm sewers shall not flow with greater than three (3) feet of head.
3. The beginning point for the hydraulic grade line computations shall be the higher (i.e. more conservative) elevation as determined below:

a. For connection to existing pipe system:
    (1) Top of pipe intrados of at least two reaches downstream of the connection point of the existing system; or
    (2) The hydraulic grade line computed for the existing system.

b. For connection to channels or ditches:

(1) Top of pipe intrados of the proposed pipe, or
(2) The hydraulic grade line computed for the channel or ditch as approved by the maintaining agency.

c. For upstream system pipe connection to dry and wet detention basins:
(1) The starting hydraulic grade line for all incoming pipes shall be the 100 year-24 hour blocked low flow water surface elevation, where maintaining agency maintained streets are located adjacent to or upstream of the basins.
(2) The starting HGL for all other situations may be the 100 year – 24 hour unblocked low flow water surface elevation, unless the local road authority requires something higher.

4. When storm sewers are designed to convey 100 year flows, effusion at low lying inlets is not allowed, unless 100 year ponding easements are so delineated, granted, and recorded. Those associated temporary "ponding" easements however, should not be confused with 100 year overland flow paths, for which no conveyance area easements are presently required. Also, such intentional effusive designs may be prohibited for publicly maintained streets or highways.

_____ Structures are sequentially numbered in both the plan and profiles. *

_____ Show all utilities in storm sewer profiles. If SUE work was completed show accurate elevations on the profiles. *

_____ Provide a typical pipe cross section view of the sewer, backfill and trench width. All pipes are to be bedded in MSD type 1 or 2 bedding unless otherwise directed by the Engineer.

_____ Protect all culvert end obstructions outside the clear zone.

Cross Section Sheets

_____ Show all utilities in cross sections. *

_____ Cross sections show the existing and proposed grades at least 10 feet beyond the improvements. *

_____ Note any abrupt or special sections. All driveways, intersections/side roads must have a section to at least 10 foot beyond improvements.*

_____ End areas labeled for cut and fill shown in square footages for each section.

_____ Volumes in cubic yards for cut and fill between each section labeled.

_____ Proposed and existing right-of-way and easements shown on cross sections *

_____ Dimension and label all non-typical features. *

_____ Cut and fill slopes labeled, are the slopes recoverable, has protection been given to non-recoverable slopes. *

_____ Offset, slopes and elevations labeled for proposed improvements and grades. *

_____ Show the baseline/centerline of the street with elevation. *

DESIGN SPECIFICATIONS AND BID BOOK

_____ Table of Contents included.

_____ Bid package follows the GRG Boilerplate. Bid # and bid opening date is correctly written and contains the proper wording.

_____ Insurance requirements reviewed and adjusted accordingly.

_____ Bid package follows the MoDOT LPA Boilerplate (if applicable) with supplemental information from the GRG Boilerplate (I/A).

_____ A list of required submittals and submittal timing has been included.

_____ Allowances have been evaluated and/or included for items which are challenging to quantify, such as: unsuitable soils, Contractor-secured permits, required labor On-The-Job training, traffic control, etc.

_____ Relevance of Asphalt Price Adjustments covered in GRG Special Conditions has been determined.

_____ GRG standard specifications/JSPs have been incorporated into the Construction Contract Specifications.

_____ JSPs are provided for all bid items not listed on the Standard Bid Item List.

_____ JSPs describe the work, method, measurement, payment and materials to be used and specifically call out any incidental work to be done.

_____ JSP Table of Contents reflects all the JSPs used on the project. Include page numbers for the JSPs in the table of contents.*

_____ Referenced specifications or JSPs have been reviewed and confirmed for relevance and to be free of conflicts with the project manual/bid book.

_____ Project Manual cover sheet signed and sealed by a professional engineer.

_____ Work Zone Traffic Management Plan is specific to the project, covers the work to be done, and includes bicycle and pedestrian users.

_____ Contains emergency provisions and incident management specification.

_____ Specifications identify that any changes or additions to concrete pavement areas will require a jointing submittal to the Engineer.

_____ Specifications are clear on the process and requirements for approvals of colored items.

_____ Contains project contact for questions provision. Specification states that all questions to be submitted in writing by a given deadline one week prior to the bid opening.

_____ Contains project cooperation with other contractors if necessary to coordinate with other contractors in the area.

_____ If the project contains seeding, use the GRG seeding and sodding specification.

_____ "Order of Work" JSP considered to coordinate simultaneous construction activities within the project site.

_____ Disposition of salvaged materials JSP included.

_____ Anti-graffiti coating JSP meets GRG performance expectations.

_____ Utility service leads or lateral JSP. Identify who is responsible (Disconnect, Relocate, Protect, Etc.)

_____ Utility JSP is specific to the project and includes the scope and timeframe for all utility relocations on the project. Time and coordination with dependent relocations shall be incidental to the contract.

_____ Prevailing Wage Rate information included.

_____ Alternate Bid specification included describing how the bid will be awarded.

_____ Routine cleaning and final job cleaning JSP included.

_____ Any permits acquired / blank copies of necessary permits.

_____ Specialty sign details included (if applicable).

_____ Current ADA specifications and LPA checklist included (if applicable).

_____ For federally funded projects, make certain specified improvements or components made of steel, or which may contain steel (such as fire hydrants), are also identified for compliance with "Buy America" requirements, or that a Public Interest Finding (PIF) is approved by MoDOT prior to Final PS&E approval.

_____ If workforce tracking is proposed for the construction, a JSP must specify that certified payroll documents must identify minorities and women.

_____ Proper service agreements are in place, in GRG's name, for CCTV/communications related to security and surveillance.

ENGINEER'S ESTIMATE

_____ Pay items match the 2B and Bid book items and quantities.

_____ Estimate has project name, project number, project limits and the seal of the engineer of record. *

_____ Estimate contains mobilization = 1 lump sum. *

_____ All signals and lighting quantities are included. *

_____ Resetting property corners is listed when right of way has been purchased.

_____ All signal signs are included.

_____ Optional Items are included for Optional pieces of work. Options to be selected are detailed in the JSPs.

_____ Alternate bid items are grouped together so it is clear that it is either / or.

_____ As built plans included in design estimate.

_____ Contractor furnished surveying and staking is included.

_____ Consider the use of High Early Concrete for special areas where access is an issue.

_____ Include Right-of-way Estimate. *

_____ Risk assessment has been performed for contractor supplied designs (particularly retaining walls) and contingencies are appropriately planned (Contractor performed geotechnical analysis and/or basic excavation may reveal changed conditions which result in necessary cost increases). *

DESIGN PLANS, SPECIFICATIONS AND ESTIMATE REVIEWED BY:

Designer:_____

Project Manager:_____

Construction Manager:_____

Other:_____

Great Rivers Greenway

Design Guidelines Deviation Form

Project Name: _____ Sub-Project Code: _____

PM1: _____ PM2: _____

Designer: _____ Current Project Stage: Charter

List Proposed Design Deviations:

Related Section:	Proposed Deviation:	Rationale:
Choose an item.		
Choose an item.		
Choose an item.		
Choose an item.		
Choose an item.		

Describe potential drawbacks or negative consequences of the Proposed Deviations:

Click or tap here to enter text.

Proposed-Reviewed-Approved By:

Proposed – Designer: _____ **Date:** _____

Reviewed – Project Manager: _____ **Date:** _____

Approved – Build Team Director: _____ **Date:** _____

Approved – Sustain Team Director: _____ **Date:** _____

Approved – Promote Team Director: _____ **Date:** _____