



TECHNICAL PROPOSAL REPORT

Agreement: E00169	Project Specific	Active
Name: 22 Tomorrow Phase 1		Selection Process: Normal Initiating Org: Engineering District 5-0
Supplement: 3	Normal	Executed
Description: increase the level of effort required for completion of the US 0022 Section 400 project which has been broken into two projects. Part 1 is being supplemented to extend the time of completion as well as complete the work associated with the SR 0145 Interc		

Part 1 - Preliminary Engineering

Description

Preliminary engineering and environmental studies for the reconstruction / widening of U.S. Traffic Route 22 in Lehigh County between the western side of the Mickley Road (T-567) bridge, proceeding east to the western side of the Irving Street bridge.

Task 1 - Project Management/Administration

Objective:

2.1.1

Project Management involves the planning, scheduling, organizing and controlling of resources to achieve specific objectives within established schedule, budget and quality standards. The Project Manager is responsible for but not limited to the following:

1. Assemble and direct the design team, including consultants.
2. Conduct project kick-off meetings.
3. Serve as the single point of contact for project communication.
4. Represent PennDOT at public meetings.
5. Coordinate project issues with outside agencies.
6. Schedule project development activities.
7. Review product quality and assure compliance with PennDOT's QC/QA plan.
8. Monitor design team performance and project development.
9. Control project costs.
10. Promote an atmosphere of good public relations and customer satisfaction.
11. Process requests for project authorization and funding.
12. Coordinate the flow of information concerning the project.

Scope:

2.1.1

This task consists of the administrative effort required by principals, project manager, and involving personnel to complete the project on time, within budget, and provide a quality product.

Detail Task 3 - Project Management/Administration

Department Details:

Create and maintain the project schedule using Welcom Open Plan software including PennDOT developed/approved templates. The schedule and its monthly updates shall be prepared as follows:

1. The initial schedule will be developed using the most recent PennDOT approved version of Welcom Open plan software including PennDOT developed/approved templates. Schedule will include "Responsible Party", WBS and OBS field information. Schedule will be submitted to PennDOT Portfolio Manager via email in back-up (".bk3") format for loading.
2. Schedule, if accepted, will be loaded into Welcom Home by District. All future schedule updating/progressing will be handled through Welcom Home.
3. A hard copy (or electronic copy in ".pdf" format) of the schedule will be submitted to the project manager at the end of each month.
4. The submittal must contain the following three items:
 - a. The original baseline schedule from the consultant's Technical Proposal;
 - b. The updated schedule, current to that month; and
 - c. A schedule identifying all changes to the schedule in the past month.

Limit attendees at meetings to only those needed to provide input and make decisions. Verify attendees with District prior to each meeting.

Refer to SOL 431-04-01 for QA/QC guidelines.

Complete bicycle and pedestrian checklist per DM1A, community context audit, and community impact assessment per SOL 438-03-04.

Provide electronic deliverables in compatible formats (Microsoft or Microstation) for completed preliminary engineering documents.

Provide cost containment information per DM1A at the start of the preliminary engineering phase and the 30% complete (DFV) stage. Justify cost increases when PMC approved costs are exceeded by 15%.

Include consultant hierarchy for each part of the Technical Proposal.

In the technical approach, specify if the task results in any Other Costs which are not standard costs (such as special equipment), or if Other Costs will be significant (such as numerous overnight stays) so that extraneous Other Costs items can be reviewed before submitting Price Proposal.

Approach:

Benesch will complete this task with overview from URS. This task includes the additional administration time necessary to manage the project schedule and budget for the additional scope included in this supplement

Task 23 - Erosion and Sedimentation Control Study

Objective:

2.2.18

1. In conjunction with the drainage and stormwater management design the major erosion control facilities (e.g. sediment basins) will be located to

determine right-of-way requirements.

2. Perform the preliminary design to size the basins.

3. Coordinate with the County Conservation District and/or PADEP to present the conceptual E&S control approach and to determine any specific information requirements that will be needed for the E&S plan review

Scope:

2.2.18

This task includes the conceptual layout of the major E&S facilities (e.g. sediment control basins) for each project alternative. Perform the preliminary design to size the basins.

Detail Task 3 - Erosion and Sedimentation Control Study

Department Details:

Determine the location of the major E&S facilities. Coordinate with the County Conservation District and/or PADEP

Approach:

Benesch will prepare conceptual E&S Plans for the Safety Improvement Project which is not included in our current scope of work. This supplement includes the additional effort for Benesch to complete the work required for this task due to the change in scope.

Task 48 - Preliminary Drainage Design

Objective:

2.4.3

1. Develop a storm sewer drainage system layout for the selected alignment using very preliminary calculations and engineering judgement.
2. Size major culvert cross pipes by determining approximate drainage area.
3. Determine the need for top of slope and toe of slope ditches.
4. Identify existing drainage restrictions and coordinate with stormwater management strategy.
5. Identify drainage structures which will require agency permitting.

Include the following on the Design Field View Plans:

- * Minor drainage features (inlets and pipes)
- * Major drainage structures
- * Drainage ditches

Scope:

2.4.3

This task includes all elements to develop preliminary drainage design with associated hydraulic computations

Detail Task 3 - Preliminary Drainage Design

Department Details:

Approach:

Benesch will prepare the conceptual drainage design for the SR 0145, Section 001 Design/Build Safety Improvement Project which is not included in our current scope of work. Although the Safety Improvement Project is on a smaller scale than the previous widening project, more detailed design is required for a design/build project than for a typical preliminary engineering project. Since the preliminary (conceptual) information in a design/build project letting will be used for a contract bid on design and construction items, more detailed design is necessary to assure that the conceptual design is feasible. This supplement includes the additional effort for Benesch to complete the work required for this task due to the change in scope.

Task 49 - Storm Water Management Design**Objective:**

2.4.4

1. Obtain local stormwater management plan and requirements.
2. Perform preliminary stormwater management analysis.
3. Coordinate with local stormwater management plan.
4. Determine the approximate size and location of the stormwater management basin.
5. Show the stormwater management basin on the design field view plan.

Scope:

2.4.4

This task is the development of the preliminary storm water management design with associated hydraulic computations.

Detail Task 3 - Storm Water Management Design**Department Details:****Approach:**

Benesch will prepare the conceptual stormwater management (SWM) design for the Safety Improvement Project which is not included in our current scope of work. Although the Safety Improvement Project is on a smaller scale than the previous widening project, more detailed design is required for a design/build project than for a typical preliminary engineering project. Since the preliminary (conceptual) information in a design/build project letting will be used for a contract bid on design and construction items, more detailed analysis is necessary to assure that the conceptual design is feasible. In addition, the regulations governing stormwater management design have changed since the current task scope was written and now require consideration of water quality issues in SWM design. The conceptual SWM design will also include Post Construction Stormwater Management (PCSM) Best Management Practices (BMP) for the Safety Improvement Project which is not included in our current scope of work. This supplement includes the additional effort for Benesch to complete the work required for this task due to the change in scope.

Task 54 - Preliminary Pavement Design**Objective:**

2.4.9

Because the pavement design analysis is typically not completed until after the Design Field View Submission, approximate pavement and shoulder depths are shown on the typical sections in Preliminary Design.

Approximate depths are based on traffic volumes and the functional classification of the roadway.

Scope:

2.4.9

This task consists of assembling design data and determining preliminary pavement and subbase types.

Detail Task 3 - Preliminary Pavement Design

Department Details:

Based on (#) pavement designs.

Calculate CBR values based on soils data obtained from roadway borings.

Approach:

Benesch will prepare the pavement design for the Safety Improvement Project which is not included in our current scope of work. Since the project involves Federal oversight, the design will be to the level required for final design. A Pavement Design Report will be prepared for review by the appropriate agencies. Although the Safety Improvement Project is on a smaller scale than the previous widening project, more detailed design is required for a design/build project than for a typical preliminary engineering project. Since the preliminary (conceptual) information in a design/build project letting will be used for a contract bid on design and construction items, more detailed design is necessary to assure that the conceptual design is feasible. This supplement includes the additional effort for Benesch to complete the work required for this task due to the change in scope.

Task 55 - Design Field View

Objective:

2.4.10

1. Conduct design field view at the end of the preliminary engineering and within several weeks of the Design Field View Submission.
2. Evaluate the proposed alternatives under field conditions.
3. Solicit comments from review agencies for further project development.
4. Determine the preferred alternative if applicable.

Scope:

2.4.10

This task consists of the development, submission and approval of the Design Field View submission.

Detail Task 3 - Design Field View

Department Details:

The following items may require an adjustment to the length of time it takes to complete this task:

- Size of the Project
- Type of Project

The following items effect who has approval authority for the Design Field View:

- PENNDOT Oversight --> Central Office
- FHWA Oversight --> Federal Highway Administration

Preliminary sizing of sediment basins and right-of-way requirements.

Coordination is needed with the agencies on the approach and permitting.

Approach:

Benesch will prepare a Design Field View Submission for the Safety Improvement Project. Although the Safety Improvement Project is on a smaller scale than the previous widening project, more detailed design is required for a design/build project than for a typical preliminary engineering project. Since the preliminary (conceptual) information in a design/build project letting will be used for a contract bid on design and construction items, more detailed design is necessary to assure that the conceptual design is feasible. This task also includes analysis of improvement alternatives to develop the specific elements of the Safety Improvement Project. None of this work is included in our current scope of work. This supplement includes the additional effort for Benesch to complete the work required for this task due to the change in scope.

Task 62 - Preliminary Geotechnical Engineering Report

Objective:

2.5.2

The following work elements are required for the successful completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE) and the other engineering disciplines involved. Perform QA/QC on work processes and products.
2. Perform analysis and design associated with embankment and cut slope construction, stormwater management facilities, drainage conduits, pavements, unsuitable materials, special geotechnical treatments, benching and transition zones, and geotechnical instrumentation for construction control.
3. Develop recommendations for use by the design team, and draft special provisions and details for construction.
4. Identify the anticipated scope of geotechnical investigations required during Final Design.
5. Prepare the GER for Pre-Final Design, presenting the recommendations and providing supporting documentation. Follow the outline in Publication 293, including a summary of the structure-related geotechnical investigations and reports for the project. Submit both a draft (95%) and a final (100%) version of the GER to the DGE.
6. Gather the information and materials necessary to assemble a preliminary soil profile plan. Obtain plan and profile sheets for the alignment from the design team. Obtain approval of the proposed graphics layout, scales and symbology.
7. Prepare the preliminary soil profile cover sheet and index sheet. Develop graphic logs of the borings. Prepare the profile sheets, showing the graphic boring logs and test results. Assemble the cover, index and profile sheets and submit a half-size copy as an appendix to the GER.

Scope:

2.5.2

This task is the preparation of a Geotechnical Engineering Report for Pre-Final Design in accordance with Publication 10A, Design Manual Part 1A and Publication 293.

Detail Task 3 - Preliminary Geotechnical Engineering Report**Department Details:**

This task should be performed in conjunction with the other tasks under the "Geotechnical" task.

Emphasis in the preliminary (pre-final) phase is on developing roadway-related geotechnical recommendations, and providing guidance to allow design finalization.

Although Design Manual Part 3 has standards for graphic layout, scales, and symbology for the soil profile, variation is allowed upon approval by the DGE. This approval normally is given upon request and typically depends on the size and complexity of the project. The profile may also include selected cross sections if directed by the DGE.

Approach:

N&W will perform this task to complete the Foundation Design Guidance Report for the S.R. 0145/S.R. 0022 interchange. The remaining work is assumed to consist of report submission, addressing of comments, final report submission and final plan review for geotechnical portions of the project.

Task 73 - Preliminary Type, Size and Location (TS&L)**Objective:**

2.7.2

Review any previous studies or preliminary designs with respect to the selection of structure type, span arrangements, horizontal and vertical clearances, design controls and type section. Coordinate with the District on the logical selection of span arrangements, types of piers, and structure types suitable at each location.

The preliminary structure designs will be performed at a stage when the highway alignment and profile are well defined. Review structure requirements with the District prior to Design Field View (Line and Grade) submission and approval.

The work elements are required for the successful completion of this task:

1. Develop a location plan showing the feature to be crossed or retained, design controls and regulated areas
2. Identify possible pier and abutment locations
3. Evaluate geotechnical conditions to identify potential foundation types
4. Recommend locations for structure foundation borings
5. Evaluate constructability, vertical and horizontal clearances and site constraint issues in determining the most suitable structure design for the particular location
6. Prepare cost estimates for alternative structure designs
7. Prepare justification for recommended alternative
8. Prepare transmittal letter, plans and report for TS&L submission

Scope:

2.7.2

This task consists of the assembly of Type, Size and Location studies and development of recommendations for proposed structures within the project. Publication 15M, Design Manual Part 4 apply to this task.

Detail Task 3 - Preliminary Type, Size and Location (TS&L)**Department Details:**

Use BRADD-3 per SOL 437-05-01.

The Pre-TS&L should not be submitted until Line & Grade is approved and after Design Field View is submitted.

Provide QA/QC checklists.

Approach:

Benesch will prepare a conceptual TS&L Submission for the MacArthur Road (S.R. 0145) Bridge over S.R.0022 for the Safety Improvement Project. This task also includes analysis of alternative structure configurations to develop the specific elements of the Safety Improvement Project, investigation of structure design modifications to address review comments, investigation of possible stabilized slope designs and coordination with N&W regarding the Foundation Design Guidance Report. None of this work is included in our current scope of work. This supplement includes the additional effort for Benesch to complete the work required for this task due to the change in scope.

Task 75 - Preliminary Maintenance and Protection of Traffic**Objective:**

2.8.2

Prepare a preliminary Maintenance and Protection of Traffic plan for anticipated work areas involving existing roads. The plans will include a conceptual sequence of operations and identify the type of traffic control needed for each roadway impacted by the anticipated work zones.

Plans will be developed at an appropriate scale.

Drawings will show the work areas and note the traffic control requirements for each area.

A conceptual sequence of operations will be developed identifying the anticipated phases and stages of work necessary to control traffic during hours of construction and at all other times during construction. Illustration of traffic control signs and devices, temporary pavement markings, temporary roads, detours, and other necessary details will not be developed.

The plans will include a title sheet with index map and general notes, and a listing of anticipated traffic control devices without quantities. The plan will also include the sequence of operations and plans sheets depicting the work areas.

Scope:

2.8.2

This task consists of developing preliminary maintenance and protection of traffic plans in accordance with Publication 14M, Design Manual Part 3, the Manual on Uniform Traffic Control Devices and Publication 203M, Work Zone Traffic Control to maintain safe and efficient traffic operations

through the construction work zone.

Detail Task 3 - Preliminary Maintenance and Protection of Traffic

Department Details:

Evaluate alternatives for the maintenance and protection of traffic for each structure. Alternative may include, but are not limited to, a detour, runaround, or any other alternative deemed feasible by the consultant. The consultant will recommend a preferred maintenance and protection of traffic alternative and seek approval of this alternative from the District Traffic Unit.

Prepare a conceptual traffic control plan, showing all required stages, for review and approval by the Department. This plan will be based off of the approved recommendation from the alternative analysis and recommendation in Part I.1.

Adhere to all pertinent provisions of Publication 203M-Work Zone Traffic Control (converted back to English units), the M.U.T.C.D., and Chapter 204 for additional traffic control devices in highway work zones.

Plans will be prepared in accordance with the guidelines and format established by Design Manual 3, Chapter 4. The plans will depict all signs and devices necessary for the safe and efficient movement of traffic and pedestrians through or around the construction area.

Approach:

Benesch will prepare conceptual MPT plans for the Safety Improvement Project which is not included in our current scope of work. This supplement includes the additional effort for Benesch to complete the work required for this task due to the change in scope.

Task 77 - Preliminary Pavement Marking Plan

Objective:

2.8.4

Preliminary pavement marking plans will be developed depicting longitudinal lane lines and delineators on roadway sections. For interchange areas, pavement markings and delineators will be indicated for gore areas, islands, and other miscellaneous special markings. For intersections, the locations of stop bars, legends, and crosswalks will be indicated.

Plans will be prepared at an appropriate scale. The type, size, and color of pavement markings and delineators will be noted on the plans.

Specific details will not be developed.

The plan will include a title sheet with general notes and index map, blank tabulation sheets, and plan sheets for all roadway sections within the limits of work. Where roadway sections are consistent and repetitive, typical details may be developed to eliminate unnecessary and repetitive design sheets.

Scope:

2.8.4

This task consists of developing preliminary pavement marking plans in accordance with Publication 14M, Design Manual Part 3, the Manual on Uniform Traffic Control Devices, Traffic Standards (TC 7600 Series), and Publication 68 with guidance from the Pavement Marking Handbook.

Detail Task 3 - Preliminary Pavement Marking Plan

Department Details:

The pavement marking plan shall be combined with the signing plan (task 2.8.5).

Approach:

Benesch will prepare conceptual Pavement Marking Plans for the Safety Improvement Project which is not included in our current scope of work. This supplement includes the additional effort for Benesch to complete the work required for this task due to the change in scope.

Task 78 - Preliminary Signing and Sign Lighting**Objective:**

2.8.5

Preliminary signing and sign lighting plans will be developed for all roadways sections within the limits of work.

The plans will depict destination, regulatory, warning, and information, and guide signs necessary to control and maintain traffic upon completion of construction. The plans will depict the approximate locations of signs, sign types, and sign messages. The location of sign structures will be indicated and noted if sign lighting is required.

Plans will be prepared at an appropriate scale. Areas requiring more detail, (such as intersections, merges, and diverges) may require a larger scale.

The plans will consists of a title sheet with an index map and general notes, blank tabulation sheets, and plan sheets showing sign types and locations.

Sign sizes, sign structure and sign lighting details, and sign fabrication details, will not be included.

Scope:

2.8.5

This task consists of developing preliminary sign and sign lighting plans in accordance with Publication 14M, Design Manual Part 3, the Manual on Uniform Traffic Control Devices, Publication 236M, Handbook of Approved Signs, Traffic Standards (TC7600 and 8700 series), and Publication 108, Sign Foreman's Manual.

Detail Task 3 - Preliminary Signing and Sign Lighting**Department Details:**

The signing plan shall be combined with the pavement marking plan (task 2.8.4).

Approach:

Benesch will prepare conceptual Signing Plans for the Safety Improvement Project which is not included in our current scope of work. This supplement includes the additional effort for Benesch to complete the work required for this task due to the change in scope.

Task 83 - Safety Review/Audit**Objective:**

2.8.7

1. Conduct the safety review/audit as early in the design process as possible.
2. Identify all applicable items on the Safety Review Checklist (see Publication 10A, Design Manual Part 1A). Add any additional items based on engineering judgement and experience.
3. Detect safety deficiencies in the design.
4. Recommend safety enhancements.
5. Prepare the Safety Review Submission (two copies) at least two weeks before the design field view (if applicable). Include the following:
 - * Color coded plans
 - * Profiles
 - * Typical sections
 - * Project Design Criteria Report (see Design Manual 1A for details)

Scope:

2.8.7

This task consists of the time required for the Safety Review Committee to review the preliminary plans and the Project Design Criteria Report.

Detail Task 3 - Safety Review/Audit**Department Details:**

Provide full size and half size plans for the District Safety Coordinator.

Plans should indicate guiderail types and quantities.

Provide design details supporting lengths of need of roadside and median barriers.

Include cross sections showing roadside features with respect to clear zone requirements.

Review and analyze crash data within project limits.

Follow the requirements in DM1A, Appendix E.

Submit safety review submission four weeks prior to the design field view submission.

Approach:

Benesch will prepare a separate Safety Review Submission for the SR 0145, Section 001 Design/Build Safety Improvement Project. Additionally, Benesch will prepare a Design Exception Report for all required design exceptions. None of this work is included in our current scope of work. This supplement includes the additional effort for Benesch to complete a Safety Review Submission with a Design Exception Report for the Safety Improvement Project.

Task 90 - Utilities**Objective:**

2.9.1

PADOT projects which involve public utilities must include all necessary provisions for the safety and protection of both existing and any required

relocation of utilities.

Subsequent to the preparation of the existing utility location plan for the project, the plan will be submitted to each of the involved utility company for their verification of the type, size and location of the facility.

Coordination efforts will be maintained with the utility throughout the project design process to allow amicable solutions for known and potential utility/highway project conflicts.

When directed, utility relocation engineering, either by the project design consultant, or by others, shall be incorporated into the project construction contract documents.

When circumstances require, the design consultant shall provide all information and prepare application forms necessary to secure agreements and permits associated with the utility on the project, in accordance with policies and procedures outlined in Design Manual Part 5.

Once the involvements for each utility has been defined for the project, the utility clearance Form D-419 will be prepared to indicate the nature and the work, the days required to perform the work, work to be performed: prior, or concurrent, or restrictive of the highway work. This information shall be included in the contract bid proposal packages and will also serve as a tool for the development of the projects construction schedule.

Scope:

2.9.1

This task involves project specific work requirements in accordance with Publication 16M, Design Manual Part 5.

Detail Task 3 - Utilities

Department Details:

Contact the Recorder of Deeds in the respective county to obtain a copy of the list of utilities that operate within the project area. Forward a copy of a U.S.G.S. quadrangle that shows the project area and a brief narrative of the project scope of each utility listed. All firms will be required to respond as to whether or not they have facilities within the project limits.

Utilizing information received from the utility companies, map all facilities or preliminary plans and forward a copy to each utility present. Identify all possible areas of conflict.

As more detailed roadway and right-of-way plans are developed, forward them to utility companies upon request. In addition, maintain close contact with the affected company, through the District's Utility Unit, to ensure accuracy of plans.

The above work will consist of fulfilling the requirements of Act 38, plotting of existing utilities on plans, cross-sections, profiles and other drawings, attending all necessary meetings and performing design functions necessary to accommodate existing and re-located utilities.

If required, utilize the services of an underground locating firm to designate and locate subsurface utilities. The selected firm will be required to provide professional utility mapping services at all utility "quality levels" as defined in FHWA Publication No. FHWA-PD-96-004 (Subsurface Utility Engineering Handbook) and in accordance with the standard of care of the subsurface utility engineering profession.

Quality Level "A" is required for locating services and Quality Level "B" is required for designating services. "Designate" means to indicate by

marking, the presence and approximate horizontal location of a subsurface utility using geophysical prospecting techniques and "Locate" means to obtain the accurate horizontal and vertical location of a subsurface utility by excavating a test hole.

IF PROJECT DOES NOT INCLUDE BRIDGE

Under scope for 2.9.1 disregard paragraphs five and six concerning permits and agreements application forms and utility clearance form D-419.

Under scope for 2.9.1.5 disregard numbers five (5), seven (7), fourteen (14), fifteen (15), and sixteen (16) concerning form D4181X, authorizations to provide utility relocation engineering, form D-419, utility related permits, and soliciting utility representative attendance respectively.

Approach:

Benesch will prepare conceptual utility verification plans for the Safety Improvement Project which is not included in our current scope of work. Although the Safety Improvement Project is on a smaller scale than the previous widening project, more detailed utility investigation is required for a design/build project than for a typical preliminary engineering project. Since the preliminary (conceptual) information in a design/build project letting will be used for a contract bid on design and construction items, more detailed investigation is necessary to assure that the conceptual design is feasible. This supplement includes the additional effort for Benesch to complete the work required for this task due to the change in scope.

Task 96 - Roadway

Objective:

2.10.2 - Roadway

This task includes survey, roadway, pavement and drainage design, plans, cross sections, soil profile, final design office meeting, draft special provisions and final design field view.

2.10.2.1 - Final Drainage Design

This task includes the design of roadway drainage items. Publication 13M, Design Manual Part 2 applies to this task.

2.10.2.2 - Final Pavement Design

This task is the preparation of the final pavement design.

2.10.2.3 - Roadway Plan

This task includes the preparation of the final roadway plans and profiles in accordance with Publication 10A, Design Manual Part 1A.

2.10.2.4 - Final Design Office Meeting

This task is the review of the final roadway plans and draft special provisions in accordance with Publication 10A, Design Manual 1A.

2.10.2.4.1 - Plans

This task is the review of the final roadway plans in accordance with Publication 10A, Design Manual Part 1A.

2.10.2.4.2 - Draft Special Provisions

This task is the review of the draft special provisions in accordance with Publication 10A, Design Manual 1A.

Scope:

2.10.2 - Roadway
Needs completed.

2.10.2.1 - Final Drainage Design

One copy of the plan depicting the drainage design and the hydraulic design computations for roadway drainage structures shall be submitted to the appropriate District Office for review and comment by the Project Manager or designated drainage engineer. As directed by the District, one additional copy of the drainage submission shall be sent to Central Office, Bureau of Design for quality assurance review.

The following work elements are required for the successful completion of this task:

1. Develop a drainage design that provides the proper capacity, spacing, size and type of drainage facility (existing and proposed) for each drainage area, location, fill height, roadway type and environmental condition including all inlets, pipes, culverts, ditches and base drains.
2. Prepare hydraulic design computations using appropriate methodologies for all roadway drainage structures. Include energy grade line and hydraulic grade line computations for existing and proposed systems.
3. Develop alternate pipe designs as required with corresponding hydraulic computations for each alternate. Provide "For Information Only" quantities for each pipe type and alternate as well as minimum and maximum fill heights as required.
4. Verify that downstream drainage capacity is sufficient for the proposed design. Conform to local municipal storm water requirements, if a local storm water ordinance exists.
5. Show all existing and proposed drainage facilities on construction cross sections and profiles.
6. Prepare transmittal letter to include, plans showing drainage design and hydraulic design computations. Provide PE seal on all plans and computations.

2.10.2.2 - Final Pavement Design

Follow Publication 13M, Design Manual Part 2, which refers to Publication 242, Pavement Policy Manual for the preparation of final pavement design.

2.10.2.3 - Roadway Plan

The submission will include the completion of the following work items:

1. Interchange Design
2. Intersection Design - Prepare pavement elevation plans to describe the horizontal and vertical geometry that cross sections cannot describe.
3. Airport Clearances - Review Part 77 of the Federal Aviation Regulations and adjust the design accordingly when the project is within 2 (3.2 km) miles of an operating airport. If the project is within 2 (3.2 km) miles of an operating airport, an Airport Clearance Submission to the FAA is required.

Prepare all the following work elements:

(Note: Plans listed below are highway design plans only and do not include also plans.)

1. Title sheet
2. Index/General Note Sheet
3. Typical Section Sheet (Location Map and General Notes)
4. Summary of Quantities Sheets
5. Tabulation of Quantities Sheets
6. Detail Plan Sheets
7. Profile Sheets
8. Contour, Grading, and Drainage Plans
9. Landscaping Plans
10. Cross Sections
11. Special Detail Sheets
12. Required Forms, Special Provisions and Estimates

2.10.2.4 - Final Design Office Meeting

1. Conduct the Final Design Office Meeting as early as possible and always prior to the final construction plan check.

2. The Final Design Office Meeting should be held when the following conditions are met:

- * Approvals are obtained as indicated in Design Manual Part 1A
- * Planning and coordination is completed for all major utility relocations as defined in Publication 16M, Design Manual Part 5.
- * TS&L drawings are approved according to Design Manual Part 1A.
- * A draft of all major special provisions describing their intended purpose.

3. A report on required agreements with municipalities or other local political subdivisions is required for the Final Design Office Meeting.

4. Two (2) sets of prints are required showing all corrections made based on comments received with appropriate approvals from the project's Safety Review and indicating FHWA's participation limits, if applicable.

5. District transmits copies of meeting minutes to those in attendance.

6. Bureau of Design transmits the official meeting minutes to FHWA, if applicable.

2.10.2.4.1 - Plans

The Engineer will submit 90% plans and specifications for review by the District, Central Office and FHWA. The final design office review must be performed prior to the final plan check.

The Final Design Office Meeting is held to review project development after the following design issues are approved and the plan has been developed to a 90% level of completion:

- Typical sections
- Pavement design
- Service road justification
- Interchange geometrics
- Hydraulic computations
- Addenda (if required) to the draft Soils and Geological Engineering Report
- Final Traffic Control Plan (TCP)
- Erosion and Sedimentation (E&S) Control Plan
- Hydraulic design of structures
- Final Lighting Plans
- Final Signing Plans
- Final Traffic Signal Plans
- Special Provisions
- Planning and coordination of all major utility relocations
- Structural drawings

2.10.2.4.2 - Draft Special Provisions

1. If changes are necessary to a standard special provision then write an individual special provision.
2. Obtain review and approval of proprietary and experimental items in special provisions.
3. Make special provisions available for review by Department offices, municipalities, utilities and others in authority as appropriate.
4. All reviews and issues are to be resolved prior to the PS&E

Detail Task 3 - Roadway

Department Details:

The following items may require an adjustment to the length of time it takes to complete final design drainage:

- Local municipal stormwater management requirements
- Specific environmental commitments relating to stormwater described in the environmental documents

The following items may require an adjustment to the length of time it takes to complete final pavement design, plans, draft special provisions and final design field view.

1. Size of the project.
2. Type of the project

The type and extent of environmental impacts will determine the Level of NEPA document required for clearance.

Coordination with the U.S. Coast Guard is required to determine the navigable status of waterway and to determine specific permit requirements, if needed. This task may also include the preparation of a permit application to obtain the Section 10 Permit.

The required permits will vary from project to project depending on the improvements being made. The following items may require an adjustment to the length of time it takes to complete this task:

- Local municipal stormwater management requirements
 - Specific environmental commitments relating to stormwater described in the environmental documents
- The following items may require an adjustment to the length of time it takes to complete this task.

1. Size of the project.
 2. Type of the project
- The following items may require an adjustment to the length of time it takes to complete this task:

1. Size of the project.
 2. Type of project.
- The following items may require an adjustment to the length of time it takes to complete this task.

1. Size of project.
2. Type of project.

Approach:

The current contract does not include this task. In order to prepare a design/build package for letting of the SR 0145, Section 001 Safety Improvement Project, Benesch will prepare Specifications/Special Provisions for the design and construction of the various bid items required to complete the project. This supplement includes the additional effort for Benesch to complete the Specifications/Special Provisions for the Safety Improvement Project.

Additionally, Benesch will prepare for and attend a Final Design Office Meeting (FDOM) for the project. This task includes addressing comments from the Final Plans Check. Three Benesch personnel will attend the FDOM. This supplement includes the additional effort for Benesch to prepare for and attend FDOM for the Safety Improvement Project.

Task 97 - Final Plan Checks

Objective:

2.10.28 - Final Plan Checks

This task is the time required to attend/perform all final plan checks.

Scope:

2.10.28 - Final Plan Checks

The Final Plan Check is performed by representatives of: Bureau of Design - Field Liaison Engineer, District Engineer/Administrator, and Consultant.

The Field Liaison Engineer is in charge of the Final Plan Check and prepares a Plan Review Report on any items which are not correct at the time of the Final Plan Check.

The District Engineer/Administrator provides qualified personnel to perform all required design review; prepares Form 407, Form D-444D and a list of Structural Special Provisions, and notifies the Field Liaison Engineer when the plans will be ready for the Final Plan Check.

The Consultant is required to have the plans adequately checked prior to the Final Plan Check, and will have the Project Engineer and adequate design personnel to make any required corrections, present at the Final Plan Check. It is expected that all required corrections will be made by the Consultant prior to leaving the Final Plan Check.

Detail Task 3 - Final Plan Checks

Department Details:

Anticipate one final plan review meeting. Submit three sets of full size and half size plans along with special provisions.

Following plan review meeting, submit revised plans and special provisions for back-checking prior to final PS&E submission. Be sure to check all work for QA/QC compliance.

Approach:

The current contract does not include this task. In order to prepare a design/build package for letting of the SR 0145, Section 001 Safety Improvement Project, Benesch will prepare for and attend a Final Plans Check for the project. This task includes addressing comments from the Design Field View and "Also Plan" submissions. Two Benesch personnel will attend the Final Plans Check. This supplement includes the additional effort for Benesch to prepare for and attend a Final Plans Check for the Safety Improvement Project.

Task 98 - Assemble Final Project Documents for Contract Management

Objective:

2.10.29 - Assemble Final Project Documents for Contract Management

This task is the preparation of the PS&E submission to District contract management.

2.10.29.2 - Finalize Pre-Bid Construction Schedule/Special Provisions

This task is to prepare the final pre-bid construction schedule/special provisions.

2.10.29.3 - Final Pre-Bid Constructability Review

This task is to perform the final constructability review.

2.10.29.6 - Engineer's Estimate

This task is the preparation of the engineer's estimate.

2.10.29.7 - Construction Schedule

This task is the preparation of the final construction schedule.

2.10.29.8 - Enter Project into CMS

This task consists of entering the data into CMS.

2.10.29.9 - QA Items of Work

This task consists of the final items of work quality assurance review.

Scope:

2.10.29 - Assemble Final Project Documents for Contract Management

Before any attempt is made to develop and submit a proposal, it is very important to obtain all required documents, contract drawings, design estimates and supporting data. Supporting documents such as environmental clearances and re-evaluations, funding authorizations, PMC approvals, DEP and Corps of Engineer permits, utility and right-of-way clearances, agreements and related administrative requirements must be resolved. Missing supporting documents complicate the PS&E process, and may affect project advancement to letting.

Assemble all available information on the project from the designers, such as plans or sketches, permits, non-standard special provisions, agreements, construction trainee requirements, Utility Form D-419 clearance and right-of-way certification.

Contract proposals should appear as uniform as possible on a State-wide basis to assist prospective bidders as well as Department personnel who use the proposal. All proposals are to be prepared by utilizing the Contract Management System (CMS) automated bid proposal development software, in accordance with the principles in the current "CMS Users Manual."

Assemble project documents in accordance with requirements of Publication 51M, "Contract Proposal Preparation Guide."

2.10.29.2 - Finalize Pre-Bid Construction Schedule/Special Provisions

Provide provisions, requirements, or directions applying to the project, as set forth in the proposal, that are not contained in Publication 408M or its supplements. Generally, the design engineer will submit draft special provisions to be reviewed, finalized and incorporated into the Bid proposal by Contract Management.

2.10.29.3 - Final Pre-Bid Constructability Review

Submit plans to the District Construction Unit for review and comment prior to submission of PS&E to Contract Management.

2.10.29.6 - Engineer's Estimate

Prepare a detailed estimate, which will be used to verify funding requirements and to determine acceptability of bids, and submit with the PS&E to Contract Management.

2.10.29.7 - Construction Schedule

Prepare Form D476 & D476A, or CPM schedule, for construction of the project.

2.10.29.8 - Enter Project into CMS

Upon assembly of the bid proposal at the District, enter into CMS all pertinent project information (i.e.. Project identification numbers, special provisions, pay items, quantities, estimate, etc..)

2.10.29.9 - QA Items of Work

Identify and prepare form work as it relates to items that will require subsequent QA involvement.

Detail Task 3 - Assemble Final Project Documents for Contract Management

Department Details:

Submit complete PS&E to District Project Manager showing that all back checking of plans and special provisions is complete.

Complete ECMS data entry so that bid proposal can be created with minimal warnings and/or errors.

Consultant responsibilities are:

- ensures that all issues related to Construction Plan Review (checklist items) have been resolved and that all back-checking of the plans and special provisions is complete.
- enters all items into ECMS via AUTOTAB, spreadsheet, or manually
- enters unit prices w/ fund codes for items and plan stations into ECMS
- enters project specific special provisions and links to appropriate items
- develops construction CPM and submits it via email so that a hard copy can be signed by ADE and ACE for scanning into ECMS.
- completes plans and submits it on a CD with proper indexing
- submits all documents, approvals, and permits for final scanning into ECMS by the District.

Provide electronic copies of the final project deliverables.

2.10.29.5

* Project Schedule - Must be completed using the Welcom/Open Plan software.

* Bid Submission Forms - Disregard this component.

* Bidder Signature Pages - Disregard this component.

* Index - Disregard this component.

2.10.29.7

The forms D476 and D476A are no longer applicable.

Provide ten (10) full size and ten (10) half-size copies of all final signed plans and cross sections after award for use by the Department's Construction Unit and contractors at the pre-construction conference.

Attend the pre-bid meeting (if needed), and provide input regarding design details, answer contractor questions, and take minutes.

Assist the District Contract Management Unit with preparing addenda if needed.

Assist with review and justification of bids.

Review and approve alternative design drawings as needed per DM1A.

Participate in the pre-construction conference as needed.

Submit final project cross sections on cd-rom for scanning into ECMS by Central Office.

Approach:

The current contract does not include this task. In order to prepare a design/build package for letting of the SR 0145, Section 001 Safety Improvement Project, Benesch will:

- Address comments from the FDOM and prepare a PS&E package.
- Enter project information into ECMS.
- Coordinate the Constructability Review.
- Develop the pre-bid construction schedule.
- Prepare a pre-bid construction cost estimate including cost driver analysis.

This supplement includes the additional effort for Benesch to complete the work required for this task due to the change in scope for the Safety Improvement Project.

Consultant Hierarchy

Business Partner

	DBE Type	Supervising BP
URS Corporation	No	
Alfred Benesch and Company	No	URS Corporation
Navarro & Wright Consulting Engineers, Inc.	Yes	URS Corporation

Attachments

No records found.

Part 2 - Services During Construction - SR 0145 Interchange

Description

Services During Construction for the Design / Build - SR 0145 Interchange Project

Task 1 - Project Management/Administration

Objective:

2.1.1 - Project Management/Administration

This task consists of the administrative effort required by principals, project manager, and involved personnel to complete the project on time and within budget, and to provide a quality product.

2.1.1.1 - Meetings

This task includes meeting preparation, attendance and documentation in the form of minutes. This includes Project Status, Design Review and Special Purpose Meetings.

Scope:

2.1.1 - Project Management/Administration

Project Management involves the planning, scheduling, organizing and controlling of resources to achieve specific objectives within established

schedule, budget and quality standards. The Project Manager is responsible for the tasks outlined in the Department Detail.

2.1.1.1 - Meetings

Attend all project meetings as necessary, including meeting preparation and minutes. Meetings will include but will not be limited to:

Project Status Meetings

Design Review Meetings

Special Purpose Meetings (e.g., Kick-off Meeting, Design Field View, etc.)

Public Meetings

Preparation for the meetings will include an agenda and any visuals necessary to conduct the meeting.

Meeting minutes will be prepared in a timely and accurate manner.

Detail Task 1 - Project Management/Administration

Department Details:

Manage consultation services during construction in a cost effective manner. Attend project meetings as needed, and document consultation activities to control quality and track decisions made.

Consultation invoices will be routed through District Construction Project Manager to improve construction cost control.

Approach:

Benesch and N&W will complete this task with overview from URS. This task includes the additional administration time necessary to manage the project schedule and budget for the additional scope included in this supplement.

Task 2 - Construction Consultation

Objective:

2.11.3 - Construction Consultation

This task is coordination with the contractor prior to issuance of the notice to proceed.

Scope:

2.11.3 - Construction Consultation

Upon contract execution, issue a Notice-to-Proceed letter and coordinate the scheduling of a pre-construction meeting.

Detail Task 1 - Construction Consultation

Department Details:

The District will issue the NTP letter and schedule the pre-construction conference.

The consultant will provide consultation services as required during the construction period. This service will include time as required at the

beginning of the construction to review construction plans with the contractor and the Construction Project Engineer.

In order to improve plan quality for future Department projects completed by the consultant, we recommend that the consultant participate in periodic after action reviews (AAR's) with Department inspection staff to discuss work orders made necessary due to design omissions. We would anticipate that attendance at these AAR's be at no billable cost to the Department. Participate in After Action Reviews (AAR) if requested by the District. The final AAR meeting will be used to discuss what went right, what went wrong, and what can be done better. This meeting may be held on the same date as the semi-final inspection.

Approach:

The current contract does not include this task. As the preliminary design consultant for the SR 0145, Section 001 Safety Improvement Project, Benesch and N&W will provide construction consultation for the project. This supplement includes the additional effort for Benesch and N&W to perform Construction Consultation for the Safety Improvement Project.

Additionally, Bergmaier Communications will provide the District assistance with updates and advisories of construction activities for the duration of the construction project. A website is not included.

Task 3 - Review for Design-Build

Objective:

2.11.4 - Review for Design-Build

This task is to perform a detailed review of the design-build team's design consultant's submissions including the plan set for meeting the project's approved design criteria.

Scope:

2.11.4 - Review for Design-Build

Guidance:

- Publication 448, Innovative Bidding Toolkit

Scope:

The review process applies to design-build projects with tight timeframes and can enable the design-build team to meet the schedule and associated project requirements. Review can also apply to projects needing specialized expertise to review the design.

The scope of work will include the following activities:

1. Evaluate the design methods and design assumptions for compliance with Department criteria and standards, as applicable.
2. Evaluate the computer program used in design (or check of design using a different computer program acceptable to the Department).
3. Check manual calculations.
4. Check construction methods, including applicable safety regulations, when required, to ensure that the intent of the design can be realized.
5. Check of erection stresses, where applicable.
6. Check plans to ensure that design information is adequately and correctly presented.
7. Meet the design-build team's review times as stated in the design-build contract.

Scope Deliverables:

1. Provide comments regarding whether the specified plan set meets the project's approved design criteria to be submitted to both the Design-Build

Team's designer and PennDOT.

2. Provide letter recommending approval as applicable of submissions including, but not limited to type, size and location, foundation submissions, and final plans.

2. Sign and seal the detailed review of the specified plan set and calculations in relation to the project's approved design criteria by the lead review engineer for the design-build team's peer review consultant.

Detail Task 1 - Review of Design-Build Submissions

Department Details:

Review of all Design Build Elements listed in the PS&E Package in accordance with the latest Design Manuals and Publications. Review duration for each review submission are outlined in the Project's Special Provisions and should be meet or reduced if possible depending on the project schedule. Once the detailed review is completed it should be submitted to the Department for Owner's Perspective Review. You are to incorporate all comments into a final review submission which will be transmitted back to the Contractor's Designer.

Approach:

The current contract does not include this task. As the preliminary design consultant for the SR 0145, Section 001 Safety Improvement Project, Benesch and N&W will review the Design/Build Team's designs for the project. This supplement includes the additional effort for Benesch and N&W to perform reviews of the Design/Build Team's designs for the Safety Improvement Project

Consultant Hierarchy

Business Partner	DBE Type	Supervising BP
URS Corporation	No	
Alfred Benesch and Company	No	URS Corporation
Bergmaier Communications, Inc.	No	URS Corporation
Navarro & Wright Consulting Engineers, Inc.	Yes	URS Corporation

Attachments

No records found.

Part 3 - Preliminary Engineering for US 0022 Section 400

Description

Preliminary Engineering for US 0022 Section 400

Task 1 - Project Management/Administration

Objective:

2.1.1 - Project Management/Administration

This task consists of the administrative effort required by principals, project manager, and involved personnel to complete the project on time and

within budget, and to provide a quality product.

2.1.1.1 - Meetings

This task includes meeting preparation, attendance and documentation in the form of minutes. This includes Project Status, Design Review and Special Purpose Meetings.

2.1.1.3 - Quality Control/Quality Assurance

This task consists of the effort to administer the QC/QA policies and procedures.

2.1.1.4 - Preliminary Cost Estimates/PMC Approvals

This task involves the preparation of preliminary cost estimates for the project and all steps necessary to obtain PMC approval.

2.1.1.5 - Project Schedule Development and Maintenance

The purpose of this task is to prepare and maintain a design schedule that ranges from Scoping Field View to Contract Award.

2.1.1.7 - Project Reporting

This task consists of periodically reporting project schedule and budget progress.

Scope:

2.1.1 - Project Management/Administration

Project Management involves the planning, scheduling, organizing and controlling of resources to achieve specific objectives within established schedule, budget and quality standards. The Project Manager is responsible for the tasks outlined in the Department Detail.

2.1.1.1 - Meetings

Attend all project meetings as necessary, including meeting preparation and minutes. Meetings will include but will not be limited to:

Project Status Meetings

Design Review Meetings

Special Purpose Meetings (e.g., Kick-off Meeting, Design Field View, etc.)

Public Meetings

Preparation for the meetings will include an agenda and any visuals necessary to conduct the meeting.

Meeting minutes will be prepared in a timely and accurate manner.

2.1.1.3 - Quality Control/Quality Assurance

Quality Control and Quality Assurance practices and procedures need to be incorporated and administered.

PennDOT has implemented procedures to place additional responsibilities on consultants for quality of work. The consultants will be required to submit a corporate quality plan and submit job specific Quality Development plans for PennDOT approval. As part of quality reviews, process reviews, and IAPs, these plans and the consultants' conformance to them will be monitored, evaluated and documented.

Design Manual Part 1A can be used as a source of information to develop QC/QA policies and procedures.

2.1.1.4 - Preliminary Cost Estimates/PMC Approvals

Develop a preliminary cost estimate based on the best available information. The cost estimate should include all anticipated costs including design, right-of-way acquisition, utilities, construction, etc.

2.1.1.5 - Project Schedule Development and Maintenance

Guidance:

- Publication 615, Scheduling Manual
- All applicable strike-off-letters
- ECMS (Project Management Homepage)

Scope:

1. Develop a design schedule utilizing Deltek's Open Plan software. The design schedule will be developed in accordance with Publication 615 using the Department's PDSRPRJ and PDSMASTER templates.
2. Maintain the design schedule utilizing Deltek's WelcomHome software.
3. Document all schedule issues to ensure that the project is let on time.

Scope Subtasks:

1. Coordinate the schedule development with the entire project team. The project team includes but is not limited to the District Portfolio Manager, the District Project Manager, various District functional units, the Bureau of Design, the Federal Highways Administration and various environmental agencies. Development of the schedule will consist of reviewing the schedule to ensure it contains the appropriate activities. There may be the need to add or delete activities to make the schedule specific to a given project. The review and modification of durations or relationships should also be performed to ensure that the schedule is setup to meet the desired completion date.
2. Prepare a draft of the design schedule that will be reviewed by the project team either in conjunction with a project status meeting or offline depending on the frequency of these meetings. The draft will, if approved, become the initial project schedule and be maintained through the remainder of the project.
3. Monthly progress of the design schedule activities will be input into Deltek's WelcomHome software. The schedule update day of the month will be specified by the District Project Manager to ensure that they have appropriate time to review proposed schedule changes prior to acceptance.
4. In the event that a major change in schedule occurs the Department will provide an Open Plan backup file (bk3) so that revisions can be made and resubmitted to the Department. Re-submittal shall follow the same process as the initial schedule development.

Scope Deliverables:

1. Provide the project team a draft design schedule in portable document format (PDF) and/or hard copy. The draft will contain relationships and durations so that they can be reviewed along with the activities that are included in the schedule. Schedules provided in portable document format (PDF) shall be submitted either by email or CD-ROM.
2. Upon acceptance of the schedule by the project team an Open Plan backup file (bk3) shall be provided to the District Project Manager either by

email or CD-ROM.

3. Resubmit major revisions to the design schedule, as an Open Plan backup file (bk3), to the District Project Manager either by email or CD-ROM.

4. All schedule documentation shall be provided in MS Word compatible format to the District Project Manager either by email or CD-ROM.

2.1.1.7 - Project Reporting

On a regular basis (i.e., monthly or as necessary) prepare a project status report of which should address the current status of the project schedule and budget. Note any areas of concern such as delays in the project schedule or potential cost overruns.

Detail Task 3 - Project Management/Administration

Department Details:

As part of the Project Management Scope of Work, the consultant will be responsible for creating and maintaining the project schedule by way of a monthly schedule update. The project schedule shall be prepared in Welcom Open Plan format. The schedule and its monthly updates shall be prepared as follows:

1. A hard copy of the schedule will be submitted along with an electronic copy (on disk or CD-ROM) at the end of each month.
2. A responsible party will be assigned to each task on the schedule.
3. The submittal must contain the following three items:
 - a. The original baseline schedule from the consultant's Technical Proposal;
 - b. The updated schedule, current to that month; and
 - c. A schedule identifying all changes to the schedule in the past month.

Reference for all meetings:

Limit participants to individuals that will contribute to discussions.

2.1.1

1. Monitor design team performance and project development.
2. Control project costs.
3. Coordinate the flow of information concerning the project.

2.1.1.1

The number of meetings necessary will be a function of the duration and complexity of the project.

2.1.1.10

Conduct status meetings to identify project and scope.

2.1.1.13

Conduct regular status meetings.

2.1.1.6

Successful design project management depends on the effective use of the Design Team concept. The effectiveness of the team concept depends on the relationships between team members, their level of expertise, and their ability to communicate and commit to project objectives.

Approach:

URS is the prime consultant and will be responsible for managing and administering the project. Subconsultants on the project will be responsible for managing and administering their work tasks. URS

Design Team members are responsible for their schedule, budget, quality standards, meeting preparation, meeting attendance and meeting minutes. URS has established companywide policies and procedures for quality control. Specifically, senior engineers on this project will complete "Independent Technical Reviews".

A WELCOM Open Plan Schedule with monthly updates will be maintained throughout the project.

All administrative records, reports, drawings and project related information will be placed onto CDs and submitted to the District at the completion of this project.

Task 2 - Public Involvement

Objective:

2.1.3 - Public Involvement

This task includes the attendance and preparation of informational materials to be viewed and/or distributed to the general public at public meetings. This task may also include the preparation of newsletters, public announcements and all other aspects of public involvement as outlined in Publication 295.

Scope:

2.1.3 - Public Involvement

1. Obtain approval from PMC to proceed with public involvement activities.
2. Prepare announcement for public meeting.
3. Prepare visual materials and/or flyers for general public meetings.
4. Attend all public meetings and address comments made at the meeting.
5. Prepare minutes to the meeting and submit to the Project Manager for review. Revise if necessary.

Detail Task 3 - Public Involvement

Department Details:

Assume (1) public meetings and (1) public officials meetings.

Include costs for advertising and for facility rental.

Approach:

Bergmaier Communications, with assistance from URS, will continue to provide guidance and support in the Public Involvement program for SR 22 that were initiated in Part 1 the project by operating and maintaining the project web site and by providing the District with the necessary editorial and public relations support for the duration of the project.

Task 3 - Flood Plains**Objective:****2.2.7 - Flood Plains**

This task is the identification and quantification of regulatory floodplains and potential encroachments for each project alternative and preparation of the Floodplain Finding pursuant to Executive Order 11988.

2.2.7.1 - Identification/Delineation

This task includes the coordination with the appropriate agencies to identify and delineate the regulatory floodplains for a project.

2.2.7.2 - Impact Assessment

This task includes the quantification of impacts to regulatory floodplains by project alternatives.

Scope:**2.2.7 - Flood Plains****2.2.7.1 Identification/Delineation**

Identify major drainage divides and courses using available mapping and limited field reconnaissance.

Existing 100-year floodplain and floodway boundaries for watercourses within the project study area will be identified and delineated on project mapping using available Federal Insurance Rate Maps (FIRMs) and Flood Hazard Boundary Maps (FHBM) prepared by the Federal Emergency Management Agency (FEMA).

Additionally, coordination with the local municipalities located within the project study area is required to obtain local floodplain ordinances and any information on existing and proposed modifications to the FEMA

2.2.7.2 Impact Assessment

Perform an analysis of the encroachments to the regulatory floodplains and/or floodways for each project alternative. The analysis will contain avoidance measures and when avoidance is not feasible, minimization measures. The avoidance and/or minimization measures are to be documented.

Quantify the aerial extent of floodplain/floodway encroachments for all transverse and longitudinal encroachments pursuant to Executive Order 11988, U.S. DOT Order 5650.2, and PennDOT's current Strike-Off Letters and Publication 13M, Design Manual Part 2.

Prepare a tabulation of the impacts by watercourse and by type of impact and a discussion of the avoidance and minimization measures for each floodplain. This information will form the basis of the Floodplain Finding.

2.2.7.1 - Identification/Delineation

Identify major drainage divides and courses using available mapping and limited field reconnaissance. Existing 100-year floodplain and floodway boundaries for watercourses within the project study area will be identified and delineated on project mapping using available Federal Insurance Rate Maps (FIRMs) and Flood Hazard Boundary Maps (FHBMs) prepared by the Federal Emergency Management Agency (FEMA).

Additionally, coordination with the local municipalities located within the project study area is required to obtain local floodplain ordinances and any information on existing and proposed modifications to the FEMA mapping.

2.2.7.2 - Impact Assessment

Perform an analysis of the encroachments to the regulatory floodplains and/or floodways for each project alternative. The analysis will contain avoidance measures and when avoidance is not feasible, minimization measures. The avoidance and/or minimization measures are to be documented.

Quantify the aerial extent of floodplain/floodway encroachments for all transverse and longitudinal encroachments pursuant to Executive Order 11988, U.S. DOT Order 5650.2, and PennDOT's current Strike-Off Letters and Publication 13M, Design Manual Part 2.

Prepare a tabulation of the impacts by watercourse and by type of impact and a discussion of the avoidance and minimization measures for each floodplain. This information will form the basis of the Floodplain Finding.

Detail Task 3 - Flood Plains

Department Details:

Approach:

Chilton Engineering, with assistance from URS, will complete this task. This task will involve the continuation of ongoing Lehigh River floodplain studies initiated during Part 1 of the project. Given the new bridge design and adjusted pier locations, Skelly and Loy will work with the project design engineers to identify and evaluate proposed floodplain encroachments as being either "significant" or "non-significant" in accordance with the definition found in 23 CFR 650A – Location and Hydraulic Design of Encroachments on Floodplains. All project-related floodplain encroachments will be identified physically as a direct fill impact and/or numerically as an increase in the Base Flood Elevation (BFE). Numerical floodplain encroachments will be identified within the project's Hydrologic and Hydraulic Analysis. The results of this ongoing evaluation will be summarized, as appropriate, within the project's environmental clearance document. Technical files containing regulatory mapping, hydraulic calculations, and design graphics will support the conclusions reached in the project's environmental clearance document.

Task 4 - Streams and Waterways

Objective:

2.2.13 - Streams and Waterways

This task is the identification, inventory, classification and analysis of the physical and biological elements of streams and waterways within the project study area and the quantification of potential stream impacts.

2.2.13.1 - Investigation/Inventory/Classification

This task includes the field studies required to investigate, inventory, and classify streams and waterways.

2.2.13.5 - Restoration

This task includes the environmental agency coordination, planning and conceptual design of stream restoration projects.

2.2.13.6 - Restrictions/Conditions

This task includes the coordination with environmental agencies to determine specific restriction and/or permit conditions to be incorporated into design.

Scope:

2.2.13 - Streams and Waterways

Needs completed.

2.2.13.1 - Investigation/Inventory/Classification

Use available mapping of the project study area to identify the streams and waterways within the project study area. Baseline conditions of water quality data (biochemical, chemical and physical parameters) will be compiled from existing data and field analysis. A representative from the PA Fish and Boat Commission may accompany the field analysis team.

The biotic and abiotic qualities of surface water resources will include, but not be limited to, a qualitative analysis of macroinvertebrate and fin fish species, presence of reptiles and amphibians, dominant aquatic vegetation, stream depth, width, riffle:pool ratios, flow, substrate type, bank conditions, etc.

In addition, identify any pollution indicators present within the watercourses from both point and non-point sources. Water samples will be collected at pre-determined locations for field and laboratory analysis.

The following chemical parameters will be tested:

- pH (lab and field)
- Total Manganese
- Alkalinity
- Acidity
- Specific Conductance
- Suspended Solids
- Total Aluminum
- Sulfates
- Total Iron

Prepare a composite summary for each surface water resource. Also, prepare a tabulation of impacts to each surface water resource by alternative. The analysis will include a discussion of avoidance and/or minimization measures.

The analysis will also include a comparative qualitative analysis of the baseline water quality (chemical and biological) data and preliminary engineering data to predict potential impacts. Impacts to be addressed will include direct loss of aquatic habitat, recreational opportunities, water supply, biotic organisms, and construction and operation.

2.2.13.5 - Restoration

The stream mitigation plan will include an investigation of restoration of existing streams recommended by the agencies. Coordination with the agencies is required to determine suitable candidate streams and potential restoration techniques.

2.2.13.6 - Restrictions/Conditions

Coordination with the agencies is required to determine any restrictions and/or special conditions associated with existing streams to be included in the mitigation plan. Restrictions and/or special conditions that affect the design or construction of the stream mitigation will be discussed in a stream mitigation summary report.

Detail Task 3 - Streams and Waterways

Department Details:

Approach:

Skelly and Loy will complete this task. This task will involve the continuation of ongoing streams and watercourses studies initiated during Part 1 of the project. Specifically, this task will involve an assessment of the proposed new pier location within the Lehigh River, and a corresponding evaluation of the accompanying watercourse impacts. To complete this task, Skelly and Loy will use the data contained in the Wetland Identification/Delineation Report and the Streams/Watercourses Report prepared by URS for this project. The results of this task will be incorporated into the project's environmental clearance document.

Task 5 - Threatened and Endangered Species

Objective:

2.2.16 - Threatened and Endangered Species

This task includes the coordination with the U.S. Fish and Wildlife Service, PA Game Commission, PA Fish and Boat Commission, PNDI, PADEP and DCNR to determine the presence or absence of state or federally listed threatened and endangered species in the project area. This information will be used to determine if the proposed alternatives will impact the life requisites of threatened, endangered species, biological resources and species of special concern in the project area.

2.2.16.1 - PNDI Search

This task includes the coordination with the PADEP and/or DCNR to perform a PNDI search to identify the state listed threatened and endangered species within a project area.

2.2.16.2 - U.S Fish and Wildlife Section 7 Consultation

This task includes the necessary coordination, engineering, analysis and documentation to satisfy the informal and formal Section 7 Consultation process with the US Fish and Wildlife Service.

2.2.16.3 - Pennsylvania Fish and Boat Commission

This task includes the coordination with the Pennsylvania Fish and Boat Commission to determine the presence of state listed threatened and endangered species within a project area.

2.2.16.4 - Pennsylvania Game Commission

This task includes the coordination with the Pennsylvania Game Commission to determine the presence of state listed threatened and endangered species within a project area.

Scope:

2.2.16 - Threatened and Endangered Species

Needs completed.

2.2.16.1 - PNDI Search

Request a database search of the project area for records of threatened or endangered species within or surrounding the project area. These results will be made available to the appropriate natural resource agencies and will be used as one of many tools to assess the habitat of the project area.

2.2.16.2 - U.S Fish and Wildlife Section 7 Consultation

The informal process includes the evaluation of various alternatives to the proposed action. This can be accomplished with direct consultation with the Federal Action Agency or the designated non-federal agency. Documentation may include a Construction Options Report that details the consideration of alternatives and the overall impact on the Threatened & Endangered (T & E) Species.

A Biological Assessment (BA) Report must be provided to the responsible Federal Agency. The BA should document the proposed action, the impact on the T & E Species, and methods to avoid/minimize stated impacts. The responsible Federal Agency will review the documentation and request consideration of the BA by the USFWS. This request will initiate the formal Section 7 Consultation process.

The USFWS will review the BA and issue a Biological Opinion (BO) based on the coordination effort and the stated documentation. A "non-jeopardy" opinion, with mitigation terms and conditions to minimize harm to the species, allows the project to move forward. A "jeopardy" opinion indicates that the project will contribute to the extinction of the species or critical habitat. Major reconsideration of the project will be required.

2.2.16.3 - Pennsylvania Fish and Boat Commission

Coordinate with the PA Fish and Boat Commission to identify state listed threatened or endangered fish, amphibians, and reptiles, including their associated habitats. This will be accomplished through agency field-views and coordination meetings. This information will be used in preparation of the environmental documentation and in analysis of the project alternative impacts.

2.2.16.4 - Pennsylvania Game Commission

Coordinate with the PA Game Commission to identify state listed threatened or endangered terrestrial wildlife species, wildlife management areas, and habitats of concern. This will be accomplished through agency field-views and coordination meetings. This information will be used in preparation of the environmental documentation and in analysis of the project alternative impacts.

Detail Task 3 - Threatened and Endangered Species

Department Details:

NoneThe intended environmental documentation should be known in order to adjust the scope to the level of detail necessary to complete the project. The USFWS has 135 calendar days to issue a Biological Opinion after initiation of the formal consultation process (i.e. the receipt of the BA) by the Federal Action Agency.

Informal Consultation is used to facilitate an open dialogue between the USFWS and the Federal Action Agency. The discussions and necessary engineering and/or investigations are used to review alternatives to the proposed actions that avoid impacts to the listed species or critical habitat. If this can be accomplished, the process is complete and no BA or subsequent BO is required.

Formal Consultation is required for any proposed action that "may affect" listed species or critical habitat. The Federal Action Agency is required to provide the USFWS with the relevant engineering, scientific, and commercial data regarding the listed species and the project impacts to enable the USFWS to render an opinion. This format is called the Biological Assessment. The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary to complete the project. The intended environmental documentation should be known in order to adjust the scope to the level of detail necessary to complete the project.

Approach:

Skelly and Loy will complete this task. This task involves ongoing coordination with the threatened and endangered species resource agencies to maintain current project clearance letters. At this point in time, written correspondence is required for this project with the PA DCNR, PGC, and USFWS relative to specific hits identified on the project's PNDI receipt. These agency letters must be kept current, with the most recent versions included as attachments to the project's environmental clearance document. For the purposes of this proposal, a maximum of three annual updates is assumed to be adequate.

Task 7 - Level 2 CE

Objective:

2.3.3 - Level 2 CE

This task consists of the assembly and approval of the Level 2 Categorical Exclusion

Scope:

2.3.3 - Level 2 CE

Complete Part A and B, of the Categorical Exclusion Evaluation (CEE) form (Publication 294), which includes: Additional narrative will be included, as appropriate. Supplemental information will be attached to the CEE form or placed in the technical file, as appropriate.

Conduct secondary document research and review, and project site walkovers in order to complete an environmental evaluation.

Determine the level of Public and Agency Involvement required. Work items for Public Involvement have been defined in task 2.1.6.

Determine the need for permits required for all project resultant temporary and permanent actions. Work items for permit activities are defined under other work tasks.

Determine what if any supporting documents are required for the CEE. Work items to complete these supporting documents are defined under other work tasks.

Specify and define mitigation measures for impacted environmental issues listed under Section A, Environmental Evaluation Areas, listed above. Provide the general description and the location of any resources within or adjacent to the project work limits that are to be avoided during construction. Also provide measures to mitigate impacts to resources that can not be avoided.

Sheet C-2 will also require completion.

Submit the completed CEE form and pertinent supporting documents for review, concurrence, and approval to the District Office (Step 4 of the CE Process). If necessary, the consultant will revise the CEE form and or supporting documentation as directed. The District will submit the CEE to the Bureau of Design and FHWA for approval.

Detail Task 3 - Level 2 CE

Department Details:

The following items may effect this task:

- Severity of Environmental Impacts
- Availability of reports and studies of the proposed project or surrounding area
- Special interest groups

Federal Highway Administration approves this level of Categorical Exclusion
Central Office and FHWA should be involved in field view.

Approach:

This task will involve the preparation of a Level 2 Categorical Exclusion Evaluation (CEE) for the replacement of the 5 th Street Bridge over Route 22, which was removed from the larger Route 22 Project NEPA clearance document.

As such, Skelly and Loy will complete background data collection, secondary source information review, field investigations, and agency coordination necessary to obtain CEE-level environmental clearance for the 5th Street project. Skelly and Loy will conduct the appropriate level of study to assess and determine potential project impacts on the natural, cultural, and social environments within the project study area for documentation in the CEE. The CEE will be generated using the Department's ECMS-based CE Expert System and will be authored in accordance with the content and format requirements as outlined in the new DM-1 guidance. Technical files containing detailed data, calculations, agency correspondence, technical memorandums and other supplementary materials will support the CEE. Detailed evaluations and support documentation will be required for the following environmental subject areas.

- Parks and Recreation Facilities
- Displacements
- Hazardous/Residual Waste Sites

The CEE will be authored to capture the latest engineering revisions to the project, while documenting important environmental components of the 8-year project development history. This task also includes attendance at project status and/or project design team meetings relative to the ongoing preliminary engineering phase of the project. For the purpose of this proposal, a maximum of five project meetings is assumed.

Task 8 - Navigable Waterways

Objective:

2.2.22 - Navigable Waterways

This work is the coordination with the U.S. Coast Guard to determine the presence of navigable waterways, any impacts to navigable waterways,

and preparing a Section 10 Permit, if navigable waterways will be impacted

2.2.22.1 - Identification/Delineation

This task includes the coordination with the appropriate agencies to identify the navigable waterways for a project.

2.2.22.2 - Impact Assessment

This task includes the quantification of impacts to navigable waterways by project alternatives.

Scope:

2.2.22 - Navigable Waterways

Needs completed.

2.2.22.1 - Identification/Delineation

Coordinate with the U.S. Coast Guard to determine the navigable status of a waterway. Determine if the project will require a permit under Section 10 of the Rivers and Harbors Act of 1899

2.2.22.2 - Impact Assessment

1. Determine the impact to the navigable water and the specific information requirements for the Section 10 Permit.

2. Prepare Section 10 Application package. The application will include, but not be limited to, the following information: name and address of the applicant, the waterway and location of the bridge, citation to the act of Congress or the State legislature authorizing the bridge, a map of the location and plans of the bridge showing the features which affect navigation, and papers to establish the identity of the applicant. Four sets of plans must be submitted with the application.

3. Submit application to PennDOT for review. Revise if necessary. Submit permit application with plans to the U.S. Coast Guard.

4. Attend public hearing, if applicable. A public hearing will only be held when there are substantial issues concerning the effect that the proposed bridge will have on the reasonable needs of navigation.

Detail Task 3 - Navigable Waterways

Department Details:

None This task requires coordination with the U.S. Coast Guard to determine the navigable status of a waterway. Determine specific permit requirements, if needed. This task may also include the preparation of a permit application to obtain the Section 10 Permit.

Approach:

Skelly and Loy, with assistance from URS, will complete this task. This task involves re-doing the "Advance Approval" coordination with the U.S. Coast Guard relative to the proposed replacement of the Lehigh River Bridge and its impact upon the navigability of the Lehigh River. Specifically, the existing "Advance Approval" letter from the U.S. Coast Guard will be updated based on the proposed new locations of the bridge piers. All correspondence from the U.S. Coast Guard relative to these ongoing studies will be incorporated into the project's environmental clearance document.

Task 9 - Section 4(f) Evaluations

Objective:

2.3.7 - Section 4(f) Evaluations

To determine if a transportation project will use a resource protected by Section 4(f) by documenting the impact, assuming there are no feasible and prudent total Section 4(f) avoidance alternatives, in a Section 4(f) Evaluation.

2.3.7.1 - Inventory Section 4(f) Resources

This task includes the background research required to identify Section 4(f) resources within the project area. This task may include the coordination with local and state agencies.

Scope:

2.3.7 - Section 4(f) Evaluations

Needs completed.

2.3.7.1 - Inventory Section 4(f) Resources

1. A file search is conducted at the PHMC to determine (a) historic and archaeological properties listed in the National Register of Historic Places and (b) historic sites previously determined to be eligible for the National Register located in the project area.

2. Complete identification and effect assessment (Section 106) process for historic properties.

3. Contact the local municipalities, local park authorities, the PGC, USFWS, NPS, DOI, DCNR among other agencies for information regarding the existence of public parks, recreation areas, and wildlife and waterfowl refuges in the study area.

Detail Task 3 - Section 4(f) Evaluations

Department Details:

A questionnaire could be used to begin gathering information on potential Section 4(f) resources.

- The project area is geographically large enough to include all Section 4(f) resources which may be used directly or constructively by the project. The programmatic section 4(f) must be applicable.

Federal Highways Administration must approve this document.

PA Act 120 Compliance must also be performed.

The Individual Section 4(f) must be circulated.

For EIS's, the Draft Section 4(f) Evaluation is typically circulated as a separate section bound with the DEIS.

The Final Section 4(f) Evaluation is typically included with the FEIS and approval of the Section 4(f) Evaluation is documented in the ROD.

For EA's, the Draft Section 4(f) Evaluation is typically circulated as a separate section bound with the EA. Comments on the Draft Section 4(f) Evaluation are typically addressed with the revised EA or in an attachment to the EA, and the conclusions of the Section 4(f) and the Section 4(f)

approval are typically included in the FONSI.

For CEE's, the Draft Section 4(f) Evaluation is typically circulated as a separate document. The conclusions and approval are typically issued in a separate approval letter.

The Final Section 4(f) Evaluation will need to undergo a legal sufficiency review at the FHWA Region Office.- A questionnaire could be used to begin gathering information on potential Section 4(f) resources.

- The project area is geographically large enough to include all Section 4(f) resources which may be used directly or constructively by the project.

Approach:

Skelly and Loy, with assistance from URS will complete this task. This task will involve the completion of the project's Section 4(f) documentation. At this point in time, this task is anticipated to involve the preparation of three separate De Minimis Use forms to address the proposed project's use of the Lehigh Canal, Wood Street Playground/Whitehall Bird Sanctuary, and Lehigh River Water Trail. Completion of these De Minimis Use forms is contingent upon the successful attainment of a Section 106 "No Adverse Effect" finding. If the PHMC does not concur with the Section 106 "No Adverse Effect" finding, an Individual Section 4(f) Evaluation will need to be prepared. If necessary, this task includes completion of an Individual Section 4(f) Evaluation.

Task 10 - Surveys

Objective:

2.4.1 - Surveys

This task consists of providing the survey requirements associated with specific PennDOT projects designated for studies, reports, design and construction.

2.4.1.1 - Horizontal Control (Preliminary Design)

This task consists of providing the horizontal control survey data as required for preliminary design.

2.4.1.2 - Vertical Control (Preliminary Design)

This task consists of providing the vertical control survey data as required for preliminary design.

2.4.1.3 - Survey Data Collection

This task consists of collecting the survey data as required for preliminary design.

2.4.1.4 - Structure Survey Data Collection

This task consists of collecting the bridge and hydrologic survey data as required for preliminary design.

Scope:

2.4.1 - Surveys

Guidance:

- Publication 122M, Surveying and Mapping Manual
- Strike Off Letter 430-99-20, QA/QC Control checklist for Right-of-Way and Construction Plans
- Publication 213, Work Zone Traffic Control Manual
- Form D-428, Field Book

- Design Manual 3, Plans Presentation
- Referencing alignments should be in agreement with Pub 122M, Ch. 3.1 and DM3 Figure 3.214

Scope:

Surveys may consist of either conventional data collection, Three-Dimensional data collection, or a combination, as directed by the District. Obtain published horizontal and vertical control data for project use.

The Quality Assurance/Quality Control Checklist will be completed and discussed with the District Chief of Survey for all preliminary design survey work.

Prior to initiating surveys, develop a Traffic Control Plan in accordance with Publication 213 for implementation during surveys within existing transportation facilities.

2.4.1.1 - Horizontal Control (Preliminary Design)

Guidance:

- Publication 122M, Surveying and Mapping Manual
- Strike Off Letter 430-99-20, QA/QC Control Checklist for Right-of-Way and Construction Plans
- Form D-428, Field Book

Scope Deliverables:

1. Provide horizontal control.
2. Horizontal control network will be established and records completed. Horizontal control network design and requirements will be discussed with District Chief of Surveys.
3. Establish and stake horizontal alignment.
4. Provide line book in Form D-428.
5. Reference alignment (preferred method is by angle and distance see DM3 Fig. 3.2.14).

2.4.1.2 - Vertical Control (Preliminary Design)

Guidance:

- Publication 122M, Surveying and Mapping Manual
- Strike Off Letter 430-99-20, QA/QC Control Checklist for Right-of-Way and Construction Plans
- Form D-428, Field Book

Scope Deliverables:

1. Provide vertical datum and note initial benchmarks.
2. Provide leveling notes in Form D-428, field book.
3. Establish a vertical control network by setting benchmarks within the project area by differential leveling, unless directed by the department to use trigonometric methods.
4. Traverse or mapping control points will be turned through on differential level runs before mapping is begun for the purpose of creating Digital Terrain Models along existing roadways, unless otherwise directed by the Department.

5. Benchmarks set will be no greater than one half mile apart and will be set on permanent objects not subject to movement.

2.4.1.3 - Survey Data Collection

Guidance:

- Publication 122M, Surveying and Mapping Manual
- Strike Off Letter 430-99-20, QA/QC Control Checklist for Right-of-Way and Construction Plans
- Form D-428, Field Book

Scope:

Provide survey data at intervals and widths necessary for the proper design for highways and structures.

Scope Deliverables:

1. Provide Survey data of items listed in Publication 122M for preliminary surveys including, but not limited to, utility facilities, roadway features, structures, topography features, obvious property corners, driveways, and buildings.
2. Provide survey data sufficient to establish geometry of intersecting streets and railroad crossings.
3. Establish control traverse and/or GPS Control Network.
4. Establish stations, bench levels, and references at proper intervals.
5. Record cross sectional information at proper intervals.
6. Reference control points as required.

2.4.1.4 - Structure Survey Data Collection

Guidance:

- Publication 122M, Surveying and Mapping Manual
- Strike Off Letter 430-99-20, QA/QC Control Checklist for Right-of-Way and Construction Plans
- Form D-428, Field Book

Scope Deliverables:

Provide survey data as required in Publication 122M at the required intervals and as defined in the department details for this task.

Detail Task 3 - Surveys

Department Details:

The selected consultant will be required to provide all (or some) of the surveying services for this project.

Field survey will be within the limits of work, which are specified in the project description section of this Scope of Work.

Follow current Department procedures regarding Notice of Intent to Enter letters, SOL 430-91-94. In addition, notify each property owner of intent at least 48 hours prior to each entry.

All work will be accordance with Form No. 442 Specification for Consultant Engineering Agreements and Pub 122 Department Survey Manual.

Perform the following survey tasks on this project:

Survey and stake the construction centerline and other baselines. Establish all control points (PI's, PC's, and PT's). The centerline will be stationed at 50-foot intervals on tangent and 25-foot intervals on curves.

Obtain stream cross-sections at 50-foot intervals extending 500 feet upstream and downstream of the existing structure (along the waterway).

Survey will locate all existing features pertinent to the design of the project, including roads, bridges, streams, utilities, pavement markings, drainage structures, buildings, underground facilities, and signs.

Obtain field elevations of existing features pertinent to the design of the project such as pavement, drainage facilities, manholes, floor elevations, etc.

Topographic features will be located on properties involved in the right-of-way take, sufficient to enable preparation of the Right-of-Way plans.

Locate the boundaries of all wetlands identified within the project area. The boundaries will be established and marked in the field.

Establish permanent benchmarks along the proposed alignment, but placed outside the limits of construction. The benches will be based on USC&GS vertical datum.

The plan scale will be 1" = 50' on 22" x 34" plan sheets. The plan will show all topographic features such as pavement edges, inlets, headwalls, pipes, utilities, guide rail, fences, buildings, signs, sidewalks, trees and property corners, which would affect the proposed design or the estimating of quantities. Apparent property lines will be shown together with property owners names where right-of-way takes are anticipated. The plan will be consistent with the requirements of Design Manual, Part 3.

All survey plans and associated data will adhere to the Quality Assurance/Quality Control Procedures and Guidelines as outlined in Strike-Off Letter 430-99-20, dated March 16, 1999. Attached hereto and incorporated into this Scope of Work are the Quality Assurance/Quality Control Procedures and Guidelines Checklist. All survey plans and data must adhere to all guidelines and procedures contained therein except those specifically removed from the Checklist for this project by the District Chief of Survey.

Furnish a hard copy and electronic files for all traverse points used to produce alignments in compliance with Strike-Off Letter 430-98-12.

Furnish electronic files on CD-ROM with the original 3 dimensional terrain and proposed alignments in accordance with Strike-Off Letter 430-98-12.

Approach:

Chilton Engineering will provide survey services as required and in accordance with the Department's scope of work for the eastern portion of Section 400 from Station 780+00 to Station 850+00.

As improvement alternatives are refined and the study progresses into the design field view stages, more accurate survey data will be needed at intersection/interchange locations, streams, roadway crossings, railroad crossings, and other areas that must be accurately defined. Chilton will provide field survey services and cross section information necessary to develop the designs and cost estimates in accordance with the Department scope of work for the project.

URS will perform courthouse and/or municipal research to obtain a list of all adjacent landowners for the purpose of sending out Notice of Intent to Enter letters. URS will then forward a copy of the Notice of Intent letter to the District for approval and signature before forwarding to property owners. URS will provide Chilton with copies of Notice of Intent Letters.

Chilton will provide our survey crews with signed copies of Notice of Intent to Enter letters so that any property owner whose property we enter can be furnished with a letter describing the reasons or need to be on their property.

Chilton will consult with the prime consultant URS and prepare a traffic control plan depicting lane closures, traffic shifts and apparatus required so we may accomplish any detailed survey work. This plan will be submitted to the Department for approval. All traffic control devices for work zone traffic control required for field survey work will be furnished, erected, and maintained by a firm specializing in MPT. All traffic control devices will be installed prior to the start of the work and will be properly maintained while they are in place. Coordination for time periods of closure or lane shifts will be made with the District. Lane closures on SR 22 will not be utilized. Chilton will advise the District's Press Office prior to any lane closures or encroachments necessary to perform the survey in a safe and timely manner.

All work will be designed and depicted in the English units of measure. Surveys will be performed in accordance with Strike-Off Letter 430-94-95 dated December 29, 1994 entitled Centerline and Right-of-way Surveys and related standards. All field surveys will be performed with modern total station instruments equipped with electronic data collectors. As part of the survey process, standard field books will be maintained according to District requirements, including indexing.

Horizontal and Vertical Controls

Chilton will recover or reestablish the vertical field survey controls established for the existing mapping and extend the existing control network as necessary. Chilton will run bench levels through all recovered benchmarks to verify the accuracy of the elevations, as well as perform spot checks of the recovered horizontal control monuments. All subsequent surveys will be based on these controls. Chilton forces will establish additional control using traverse and bench run procedures. All control points will be referenced for re-establishment at a later date if necessary. References will be set so that they will not be disturbed or destroyed during the construction process.

Chilton will field edit the latest edition of the mapping provided by URS. The field survey/mapping updates will be limited to the project limits previously described. All edit data will be field plotted on prints of the project mapping. Copies of the edited mapping sheets will be provided to URS for their use in performing the drafting operations to update the plans. All field notes will be marked in red on the edited mapping sheets. Where the volume of data may cause confusion, data may be plotted in field books and copies of same will be provided.

In areas of major reconstruction, obscured areas or in areas where additional detailing is necessary for design, Chilton will perform a complete topographic survey. The survey will locate all planimetric features, as well as obtain sufficient vertical information to allow development of profiles and cross sections. All major terrain features will be located and identified such as inlets, manholes, headwalls, utility poles, fences, types and limits of pavements, curbs sidewalks, property corners, and other elements within the project area. Existing rims, top of grate, and invert elevations will be obtained for all storm drainage structures. Existing pipe type and size will also be determined. This data will be plotted and submitted to URS in electronic file format for their use.

Stakeout Core Boring Hole Locations

Chilton will stakeout the proposed boring hole locations provided by others. This work will be accomplished prior to the contractors field walk. Depending upon the location of the boring, they will be located with stake and identifying lath in soil surfaces and a painted cross with identifying station, offset and number on hard surfaces. Existing ground elevations will be obtained at each boring.

If we have any borings that occur in the Lehigh River we will establish a line with stakes on each bank and provide an offset distance out into the river for the location of the boring.

We estimate that we will have to locate twelve (12) roadway borings and fifty two (52) structural borings. The six (6) borings in the Lehigh River will not be staked.

Establish and Provide Final Benchmark Record

We will establish benchmarks throughout the project area at a minimum of 500-foot intervals. Each benchmark will be set on a permanent physical feature that is not expected to shift or be impacted by construction operations. A detailed description of its location shall be provided on the plans. An estimated station and offset will be included for ease of area location relative to the control centerline or baseline.

Field Survey Notebook Compilations

We will update the survey book log for the project. The log will identify the book number and general nature of the work included in the book. For example Book 1 might be control traverse, Book 2 bench run, and Book 3 roadway cross section. All books will be carefully indexed as work is added to them. Each assignment will document the date, components of the party that day, the equipment used, the weather and location of the work being performed. At the conclusion of the project, all field books will be submitted to the Department through URS.

Miscellaneous Surveys

We are including in the cost proposal one (1) week of miscellaneous survey time to cover any unanticipated Field Surveys which may be necessary to complete the project.

Task 11 - Preliminary Drainage Design

Objective:

2.4.3 - Preliminary Drainage Design

This task includes all elements to develop preliminary drainage design with associated hydraulic computations

Scope:

2.4.3 - Preliminary Drainage Design

1. Develop a storm sewer drainage system layout for the selected alignment using very preliminary calculations and engineering judgement.
2. Size major culvert cross pipes by determining approximate drainage area.
3. Determine the need for top of slope and toe of slope ditches.
4. Identify existing drainage restrictions and coordinate with stormwater management strategy.
5. Identify drainage structures which will require agency permitting.

Include the following on the Design Field View Plans:

- * Minor drainage features (inlets and pipes)
- * Major drainage structures
- * Drainage ditches

Detail Task 3 - Preliminary Drainage Design

Department Details:

Approach:

URS will perform this task in accordance with the Department's Scope of Work. Preliminary drainage features, including inlet and pipe locations will be shown on the Design Field View plans.

Since right-of-way plans will be prepared in preliminary design, additional effort is needed for this Task. Following the Design Field View submission, URS will progress design to ensure that there is an accurate roadway drainage system for right-of-way purposes. This includes identifying features, such as: areas for accessibility for future maintenance, scour protection for outflow locations and verifying capacity of existing systems to remain. Permits, reports, calculations and narratives are not included in this Task.

Task 12 - Storm Water Management Design

Objective:

2.4.4 - Storm Water Management Design

This task is the development of the preliminary storm water management design with associated hydraulic computations.

Scope:

2.4.4 - Storm Water Management Design

1. Obtain local stormwater management plan and requirements.
2. Perform preliminary stormwater management analysis.
3. Coordinate with local stormwater management plan.
4. Determine the approximate size and location of the stormwater management basin.
5. Show the stormwater management basin on the design field view plan.

Detail Task 3 - Storm Water Management Design

Department Details:

Approach:

URS will perform this task in accordance with Design Manual 2, Chapter 10, Municipal Stormwater Management requirements and the 2006 Lehigh County Act 167 Stormwater Management Plan – Water Quality Update. Based on information in the Act 167 Plan, no detention controls are necessary for the 10-, 25-, or 100-Year storms provided that adequate downstream capacity can be shown for increased peak flows. However, the allowable 2-year storm post development peak flows are 30% of the corresponding pre development peak flows. In addition, the Act 167 Plan includes new regulations that require Best Management Practices (BMPs) to treat stormwater discharge protecting water quality.

URS will perform a preliminary stormwater management analysis to determine the approximate size and location of the BMPs required to meet the

peak flow release rate and water quality treatment requirements of the Act 167 Plan and will show the BMPs on the Design Field View Plans. BMP locations will be chosen with consideration given to factors such as: available right-of-way, accessibility for maintenance, and outflow locations.

Since right-of-way plans will be prepared in preliminary design, additional effort is needed for this Task. Following the Design Field View submission, URS will further design and refine these features to ensure that there is an accurate footprint for right-of-way purposes. Permits, reports, calculations and narratives are not included in this Task.

Task 14 - Preliminary Pavement Design

Objective:

2.4.9 - Preliminary Pavement Design

This task consists of assembling design data and determining preliminary pavement and subbase types.

Scope:

2.4.9 - Preliminary Pavement Design

Because the pavement design analysis is typically not completed until after the Design Field View Submission, approximate pavement and shoulder depths are shown on the typical sections in Preliminary Design.

Approximate depths are based on traffic volumes and the functional classification of the roadway.

Detail Task 3 - Preliminary Pavement Design

Department Details:

Based on (#) pavement designs.

Approach:

N&W will perform this task in accordance with the Department's Scope of Work. A Preliminary Pavement Design Report for S.R. 0022, SR 1015 and SR 1029 roadways will be prepared in accordance with the Department's scope of work and their Pavement Policy Manual. NW will utilize the Darwin Software Program for analyses. N&W will coordinate efforts with the District's Pavement Engineer to determine the appropriate level of analysis and any special considerations. Truck classification and traffic data obtained under the data collected and analysis performed in Part 1 will be utilized for the pavement design. N&W will estimate the resilient modulus based on available soil borings and CBRs conducted under other tasks.

The preliminary pavement design will be submitted prior to the Design Field View Submission. The design will be updated based on review comments, and the revised preliminary pavement design will be provided with the Design View submission.

Task 15 - Design Field View

Objective:

2.4.10 - Design Field View

This task consists of the development, submission and approval of the Design Field View submission.

2.4.10.1 - Submission Development

This task consists of the assembly of the Design Field View submission. Reference Publication 10/10A, Design Manual Part 1/1A.

2.4.10.2 - Design Field View Approval

This task is the preparation of the design field view submission based on the selected alignments, attendance at the design field view, preparing meeting minutes and responding to District's comments.

2.4.10.4 - Design Exceptions

This task consists of preparing a draft design exception report in accordance with Strike-off-Letter 430-93-40 and Publication 10A, Design Manual Part 1A.

2.4.10.5 - Preliminary Erosion and Sedimentation Pollution Control Plan/NPDES Permit

This task is the preparation of preliminary erosion and sedimentation control plans and application for all NPDES permits (Chapter 102, Earth Disturbance Permits).

2.4.10.7 - Preliminary Interchange/Intersection Design

This task includes developing three conceptual interchange schematics, with comparisons and cost estimates for each, for all interchanges/intersections.

Scope:

2.4.10 - Design Field View

1. Conduct design field view at the end of the preliminary engineering and within several weeks of the Design Field View Submission.
2. Evaluate the proposed alternatives under field conditions.
3. Solicit comments from review agencies for further project development.
4. Determine the preferred alternative if applicable.

2.4.10.1 - Submission Development

Upon receipt of NEPA Clearance/Design Approval, the drawings will be further refined and developed to prepare a submission for the Design Field View.

The submission will include the following:

1. Line and Grade
2. Alternate Interchange Schematics
3. Rough preliminary signing layout including the type of sign supports, paint markings, and other traffic control devices to determine if the project is operational and can be signed.
4. Typical sections
5. Structure locations
6. Approximate pavement depth
7. Mass diagrams of grading quantities
8. Draft of Soils and Geological Engineering Report and Profile.
9. Traffic Control Plan

10. Drainage and Preliminary Hydraulic studies
11. Service road justification
12. Utilities
13. Preliminary traffic signals plan
14. Comments from the District Safety Review Committee
15. Agreements with Cities and other Political Subdivisions

2.4.10.2 - Design Field View Approval

1. Secure design field view approval for the preferred alternative developed during preliminary engineering.
2. Obtain written approval from the agency of authority to advance to final design.

2.4.10.4 - Design Exceptions

Prepare the Design Exception Submission after the approval of the proposed design exception(s) by the District Safety Review Committee. Include this report in the Design Field View Submission. Address the following items as applicable:

- * Provide project identification information
- * Describe proposed work, design criteria, include typical sections
- * Provide traffic information
- * Identify substandard design elements
- * Provide cost information with and without design exception
- * Provide justification for retention of the design exception
- * Evaluate accident history
- * Describe remediation
- * Provide collision diagrams and/or accident cluster diagrams
- * Compare accident rates to statewide averages
- * Describe mitigation measures
- * Describe date and type of future upgrades
- * Describe advantages and disadvantages of meeting full criteria

Complete the "Design Exception Data Checklist" Design Manual 1A. Include the following in the submission:

- * Project location map
- * Scoping field view minutes
- * Accident analysis with collision diagrams
- * Letter of recommendation from Safety Review Committee
- * Plan, profiles, cross sections, typical sections if not previously included in the Design Field View Submission
- * Bridge sufficiency rating and letter from District Bridge Engineer (if applicable)
- * Ramp design sheet (Publication 13M, Design Manual Part 2), if applicable
- * Photographs of existing conditions, if applicable

2.4.10.5 - Preliminary Erosion and Sedimentation Pollution Control Plan/NPDES Permit

Preliminary Erosion and Sedimentation Control Plan includes the preliminary sizing and placement of major sediment control facilities (e.g.

sediment basins). This effort must correspond with the stormwater management design to use the stormwater basins for erosion and sediment control during construction. Right-of-way requirements must be considered for sediment traps, collection ditches and drainage easements.

This task also includes the coordination with the County Conservation Districts and/or PADEP to review the conceptual approach to the erosion and sediment control design and permitting.

2.4.10.7 - Preliminary Interchange/Intersection Design

Interchange schematics are to be prepared in accordance with Publication 10A, Design Manual Part 1A. These schematics are to be used to determine and evaluate the following factors:

1. System continuity
2. Traffic capacity and operational characteristics
3. Alternate structure types
4. Constructibility and safety
5. Preliminary construction cost estimates
6. Approximate right-of-way requirements
7. Environmental impacts

The number of alternate schematics will be determined, based on specific considerations of the project. From the evaluation of the alternates, a preferred interchange will be identified and then refined during development of the Design Field View Submission.

Detail Task 3 - Design Field View

Department Details:

The following items may require an adjustment to the length of time it takes to complete this task:

- Size of the Project
- Type of Project

The following items effect who has approval authority for the Design Field View:

- PENNDOT Oversight --> Central Office
- FHWA Oversight --> Federal Highway Administration

Preliminary sizing of sediment basins and right-of-way requirements.

Coordination is needed with the agencies on the approach and permitting. The following items may require an adjustment to the length of time it takes to complete this task:

- Size of the Project
 - Type of Project
- The following items effect who has approval authority for the Design Field View:

- PENNDOT Oversight --> Central Office
 - FHWA Oversight --> Federal Highway Administration
- Preliminary sizing of sediment basins and right-of-way requirements.

Coordination is needed with the agencies on the approach and permitting.

Approach:

URS will develop the Design Field View plans and report, Design Exception Report (if necessary) and conduct the field view for this project.

Skelly and Loy will attend the Design Field View to discuss the environmental features/factors that are significant to the design of the project. Skelly and Loy will also prepare all environmental-related handouts and/or visualization materials to be presented and/or discussed at the Design Field View. A Design Field View meeting will be conducted with all key Department, Federal and local representative in attendance.

This task also includes preliminary E&S design. Since right-of-way plans will be prepared in preliminary design, additional effort is needed to identify a project limit of disturbance, any necessary E&S measures and determine their size, if applicable. Preliminary E&S features will be shown on the appropriate stage of the Traffic Control Plan, as necessary. E&S related permits, reports, calculations and narratives are not included in this Task.

Task 16 - Roadway Borings

Objective:

2.5.1 - Roadway Borings

This task is the performance of roadway test borings by an approved test boring contractor in accordance with Publication 10A, Design Manual Part 1A, Publication 293, and Publication 222M.

Scope:

2.5.1 - Roadway Borings

The following work elements are required for completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE) and the other engineering disciplines involved. Perform QA/QC on work processes and products.
2. Advertise and receive bids on a contract for performance of the test borings in accordance with Publication 222M, based on the approved PSDEP for preliminary (pre-final) design.
3. Submit a summary of the bids to the District for approval to award the contract and proceed with the work.
4. Upon notice to proceed, notify the affected public, and award and administer the test boring contract in accordance with Publication 222M.
5. Provide PennDOT-certified inspectors to oversee the field operations and log the borings as they are drilled.
6. Upon completion of the field work, verify contract terms have been met, close out the subcontract, and prepare and submit the subcontractor evaluation form.
7. Prepare a record copy of the engineer's logs for the borings for submission with the GER for Pre-Final Design.

Detail Task 3 - Roadway Borings

Department Details:

Assume ## Borings (### feet) based on (#) pavement designs.

All references to Publication 222M shall be replaced to reference Publication 222.

All boring locations will be surveyed and staked out.

The core boring contract will include the following:

- Preparation and coordination of boring contract documents in accordance with Pub. 222 and Pub. 293. Soil Erosion and Sedimentation Control Plans and documentation for the core borings needs to be prepared and submitted to the local Soil Conservation District for approval.
- The consultant will prepare the necessary documents for the letting of a core boring contract in accordance with Pub. 222 and Pub. 293. Copies of this package will be submitted to the District Engineer for review and approval.
- Subsequent to the approval of the bid package, the consultant will solicit bids from all the firms on the Department's listing of approved core boring contractors. To the interested bidders, the consultant will transmit the following data: the proposal for test borings; the location map of the project; the plans indicating the test boring locations; and any additional specifications necessary to fulfill the objectives of the foundation exploration.
- The bids received will be opened on the prescribed date in the District office. The proceedings at this meeting will be conducted by consultant's personnel.
- After reviewing the bids received, the District Engineer will approve the acceptable low bid. The consultant will then procure the necessary contract documentation, i.e., bonds, certificates of insurance's, etc., from the low bidder and finally grant notice to proceed with the work after being notified to proceed from the Department.
- In accordance with Pub. 222, the consultant will assign full-time supervision of the drilling program with PADOT certified/approved Level II inspectors to ensure that the contract requirements and specifications are met. A member of the consultant's Geotechnical staff will check all the soils and rock samples. Soil classification will be in accordance with Publication 293, BC-795, and the procedures of ASTM D2488-96. Rock descriptions will be made in accordance with Publication 293 and BC-795. The core samples will be retained and delivered to a District facility prior to completion of this engineering agreement.
- The consultant will be responsible for the preparation of typed boring logs and structure boring tracings in accordance with Design Manual, Part 4 and Publication 222 guidelines. Both will be submitted to the Department's District 5-0 Office for review.

Approach:

N&W, with assistance from URS, will complete this task. The task assumes eighteen (18) roadway borings at 10 LF each will be conducted. The roadway and structure borings will be drilled under one (1) contract. Hence, all other related expenses have been placed under Task 18.3 – Structure Borings. This task will include the drilling inspection time (including travel time).

Task 17 - Preliminary Geotechnical Engineering Report

Objective:

2.5.2 - Preliminary Geotechnical Engineering Report

This task is the preparation of a Geotechnical Engineering Report for Pre-Final Design in accordance with Publication 10A, Design Manual Part 1A and Publication 293.

2.5.2.1 - Reconnaissance Soils and Geological Engineering Report

This task is the preparation of a Reconnaissance Soils and Geological Engineering Report in accordance with Publication 15M, Design Manual Part 4.

Scope:

2.5.2 - Preliminary Geotechnical Engineering Report

The following work elements are required for the successful completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE) and the other engineering disciplines involved. Perform QA/QC on work processes and products.
2. Perform analysis and design associated with embankment and cut slope construction, stormwater management facilities, drainage conduits, pavements, unsuitable materials, special geotechnical treatments, benching and transition zones, and geotechnical instrumentation for construction control.
3. Develop recommendations for use by the design team, and draft special provisions and details for construction.
4. Identify the anticipated scope of geotechnical investigations required during Final Design.
5. Prepare the GER for Pre-Final Design, presenting the recommendations and providing supporting documentation. Follow the outline in Publication 293, including a summary of the structure-related geotechnical investigations and reports for the project. Submit both a draft (95%) and a final (100%) version of the GER to the DGE.
6. Gather the information and materials necessary to assemble a preliminary soil profile plan. Obtain plan and profile sheets for the alignment from the design team. Obtain approval of the proposed graphics layout, scales and symbology.
7. Prepare the preliminary soil profile cover sheet and index sheet. Develop graphic logs of the borings. Prepare the profile sheets, showing the graphic boring logs and test results. Assemble the cover, index and profile sheets and submit a half-size copy as an appendix to the GER.

2.5.2.1 - Reconnaissance Soils and Geological Engineering Report

The following work elements are required for completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE), District Bridge Engineer, BOD Bridge Quality Assurance Division (BQAD), and the other engineering disciplines involved. Perform QA/QC on work processes and products.

2. Perform an office investigation. Review background geological information and maps, boring logs, project files and reports, environmental documents, and right-of-way plans to describe the soil/rock/hydrologic setting. Contact Federal and State agencies with access to soils and geologic data. Review previous geotechnical work performed in the vicinity of the structure.
3. Visit the site, interviewing local residents and engineers. Perform a detailed field reconnaissance and refine the soil/rock/hydrologic setting description.
4. Determine the important site characteristics and evaluate their impact on the proposed construction.
5. Develop a plan for core boring and testing, based on the requirements of Design Manual Part 4. Prepare a tabular summary of the proposed drilling following the format of Publication 222M.
6. Prepare the RSGER, presenting the information required in Design Manual Part 4, with the boring and testing plan as an appendix. Submit the report for approval.

Detail Task 3 - Preliminary Geotechnical Engineering Report

Department Details:

This task should be performed in conjunction with the other tasks under the "Geotechnical" task.

Emphasis in the preliminary (pre-final) phase is on developing roadway-related geotechnical recommendations, and providing guidance to allow design finalization.

Although Design Manual Part 3 has standards for graphic layout, scales, and symbology for the soil profile, variation is allowed upon approval by the DGE. This approval normally is given upon request and typically depends on the size and complexity of the project. The profile may also include selected cross sections if directed by the DGE. The RSGER is a required part of the TS&L submission for each structure on the project.

Preliminary structure core borings may be performed prior to the RSGER if roadway borings are taken or if the complexity of structure or site conditions warrant.

Approach:

N&W, with assistance from URS, will complete this task. N&W's current understanding of the project is that structure PGERs [formerly titled Reconnaissance, Soils and Geological Engineering Report (RSGER)] will be required for four (4) bridges - 5th Street, Fullerton Avenue Interchange and two (2) at the S.R. 0022/Lehigh River; three (3) retaining walls at approximately 200 LF each in length; and, five (5) sign structures. The bridge and retaining wall foundations are not known at this time and are likely to vary. The sign structures will likely be either spread footings or caissons. Structure foundation reports will not be included in this part. A roadway PGER will also be required for the affected project roadways, but no soil profiles will be included.

It is assumed that separate structure PGERs will be required for each of the seven (7) bridges and retaining walls. No structure PGERs are required for the sign structures.

N&W will prepare the structure PGER for each proposed bridge replacement or retaining wall, unless the District Geotechnical Engineer (DGE) specifies otherwise. The structure PGERs and the roadway PGER will be in accordance with the requirements of Publication 293, Publication 222, and Design Manual 4 – Chapter 6.

Each report will include figures and the appendices. This report will be submitted together with the TS&L for approval. The structure PGER will summarize the most pertinent “Search of Published and Unpublished Information”. N&W will compile information including preliminary design documents, environmental documents, reports, project files, and right-of-way plans; existing structure; topographic and geologic maps; mining directories; previous geotechnical investigations; water well information; geology; surficial materials; and soils. The report will summarize the “Visual Site Inspection” at the site. This may include, but not be limited to, the existing structure information, existing pavements, surface soils, topography and vegetation, drainage features, rock outcrops, problem areas, subsidence and sinkhole activity, and utilities. Each structure PGER will summarize the subsurface investigation requirements, laboratory testing program and project-specific recommendations. The “Plan and Location of Borings”, Attachment I, and any other pertinent information that would detrimentally affect the structure will be included in the attachments. No geophysical testing is anticipated or included. Each structure PGER will be signed and sealed by a Geotechnical Engineer or Professional Geologist. Five (5) draft and final versions will be submitted to URS for distribution.

N&W will prepare the roadway PGER in accordance with PennDOT Publication 10A, Design Manual Part 1A, and Publication 293. The roadway PGER will identify both favorable and objectionable geotechnical features of the project site. This report will emphasize the roadway-related geotechnical recommendations. The intent is to have this report and the profile as complete as possible for the Design Field View. This report may be revised as necessary to correct deficiencies or to add information required due to a change in conditions. The roadway PGER will address the following topics: purpose and scope; location of the project and location maps; recommendations for embankment construction recommendations, stormwater management facilities, existing slopes and excavated slope construction, culvert and conduit construction, removal of unsuitable materials, special treatments, transition zones and construction benches, special provisions for contract documents, special construction procedures, and additional testing or study needed; conclusions; physiographic setting; environmental concerns; economic considerations; site investigation; soil, rock, and hydrologic setting. The report will not detail the conditions at the affected structures in order to prevent redundancy.

N&W will provide five (5) copies of the draft version of the roadway PGER (when 95% is completed) and five (5) copies of the final version of the PGER (100%) to URS for submission to the DGE.

Task 18 - Structure Boring

Objective:

2.5.4 - Structure Boring

This task is the performance of core borings for structures by an approved test boring contractor in accordance with Publication 15M, Design Manual Part 4, Publication 293 and Publication 222M.

Scope:

2.5.4 - Structure Boring

The following work elements are required for completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE), District Bridge Engineer, BOD Bridge Quality Assurance Division (BQAD), and the other engineering disciplines involved. Perform QA/QC on work processes and products. Verify that roadway alignment and structure TS&L have not changed since approval of the Reconnaissance Soils and Geological Engineering Report (RSGER).

2. Advertise and receive bids on a contract for performance of the test borings in accordance with Publication 222M, based on the boring program in the approved TS&L for the structure.
3. Submit a summary of the bids to the District for approval to award the contract and proceed with the work.
4. Upon notice to proceed, notify the affected public, and award and administer the test boring contract in accordance with Publication 222M.
5. Provide PennDOT-certified inspectors to oversee the field operations and to prepare the field logs of the borings as they are drilled.
6. Prepare water testing required to allow analysis of foundation conditions. Tabulate the results of the testing
7. Upon completion of the field work, verify contract terms have been met, close out the subcontract, and prepare and submit the subcontractor evaluation form.
8. Prepare a record copy of the engineer's logs for the borings for submission with the Foundation Report for the structure.

Detail Task 3 - Structure Boring

Department Details:

Assume ## Borings (### feet) based on
(number of structures including overhead signs)

All references to Publication 15M shall be replaced to reference Publication 15.
All references to Publication 222M shall be replaced to reference Publication 222.

Scope of Work bullet point 6 shall be amended to change "water testing" to "soil/rock/water testing".

All boring locations will be surveyed and staked out.

The core boring contract will include the following:

- Preparation and coordination of boring contract documents in accordance with Pub. 222 and Pub. 293. Soil Erosion and Sedimentation Control Plans and documentation for the core borings needs to be prepared and submitted to the local Soil Conservation District for approval.
- The consultant will prepare the necessary documents for the letting of a core boring contract in accordance with Pub. 222 and Pub. 293. Copies of this package will be submitted to the District Engineer for review and approval.
- Subsequent to the approval of the bid package, the consultant will solicit bids from all the firms on the Department's listing of approved core boring contractors. To the interested bidders, the consultant will transmit the following data: the proposal for test borings; the location map of the project; the plans indicating the test boring locations; and any additional specifications necessary to fulfill the objectives of the foundation exploration.

- The bids received will be opened on the prescribed date in the District office. Consultant's personnel will conduct the proceedings at this meeting.
- After reviewing the bids received, the District Engineer will approve the acceptable low bid. The consultant will then procure the necessary contract documentation, i.e., bonds, certificates of insurance's, etc., from the low bidder and finally grant notice to proceed with the work after being notified to proceed from the Department.
- In accordance with Pub. 222, the consultant will assign full-time supervision of the drilling program with PADOT certified/approved Level II inspectors to ensure that the contract requirements and specifications are met. A member of the consultant's Geotechnical staff will check all the soils and rock samples. Soil classification will be in accordance with Publication 293, BC-795, and the procedures of ASTM D2488-96. Rock descriptions will be made in accordance with Publication 293 and BC-795. The core samples will be retained and delivered to a District facility prior to completion of this engineering agreement.
- The consultant will be responsible for the preparation of typed boring logs and structure boring tracings in accordance with Design Manual, Part 4 and Publication 222 guidelines. Both will be submitted to the Department's District 5-0 Office for review.

Approach:

N&W will perform structure and roadway borings in accordance with PennDOT Publication 15, Design Manual Part 4, Publication 293, and Publication 222. The work will be coordinated with the N&W Project Manager, the URS Project Manager, the Skelly & Loy Environmental Project Manager, and the Chilton Survey Manager. Direct communication and coordination with the DGE, the District Bridge Engineer, the BOD Bridge Quality Assurance Division, or other involved District 5-0 personnel will be at URS' request.

We recommend that one (1) drilling contract be utilized for all of the structure and roadway borings. A Contractor Recall will be included in the event that TS&Ls are approved at various time periods. Coordination with the District's Traffic Unit and the Lehigh County Conservation Service is included in the drilling contract administration.

N&W will email Letters-of-Interest (LOI) to all state approved PennDOT drilling contractors. The LOI will include the number and lineal footage of borings, a location map of the project, and any other pertinent information. Five (5) copies of the draft version of the Publication 222 Contract Documents will be prepared and submitted to URS and the District for review and approval. After approval, N&W will coordinate the dates and times of the pre-bid field meeting and the bid opening. Five (5) copies of the final version will be submitted to URS for distribution. Interested bidders will receive Contract Documents via certified mail from N&W once the documents are reviewed and approved by URS and the DGE.

It is assumed that this project will not involve hazardous waste. If hazardous waste is identified, the District may defer drilling these areas until Final Design. Otherwise, N&W will provide 40-hour OSHA Hazardous Waste trained drilling inspectors. N&W will provide the necessary monitoring equipment, calibrated and operated by our inspector(s). N&W will deliver the hazardous waste samples to an accredited laboratory for analyses.

Chilton Engineering, Inc. (Chilton) will stake the borings with white flagging or white paint, and obtain surface elevations for all the borings. A pre-bid field meeting will be held. Due to the many overhead lines, traffic lights, drainage facilities, underground utilities, access issues, and traffic congestion, some boring locations may need to be offset. Minutes of the meeting will be compiled and submitted electronically to the attendees at least five (5) work days prior to the bid opening.

Maintenance and protection of traffic will be a major concern, therefore, as many borings as possible will be placed behind guiderails or more than 15 feet from the edge of the roadways. N&W inspectors will vigilantly check that any utilized traffic patterns conform to PennDOT Publication 213 PATA figures, and that the flow of traffic continues at a practical rate. Additional traffic controls, such as signboards, may be needed if the flow of

traffic is impeded. A formal Traffic Control Plan, including suggested PATA figures, will be submitted to and approved by URS and the District Traffic Unit prior to Contract Document approval. The Traffic Control Plan will be appended to the Contract Documents.

The Public Press Office will be notified prior to drilling when traffic controls are utilized at specific locations. Due to the extreme traffic congestion in the area, it is anticipated that drilling along the S.R. 0022 roadway and adjacent roadways will only be performed from 9:00 AM to 3:00 PM from Monday to Friday, and excludes holidays and Mondays following holidays. Drilling during night-time hours may be a consideration. The Lehigh County Conservation District requires notification and an application approval for all drilling projects within county limits. The Lehigh County Conservation District will be notified during the compilation of the Contract Documents. Erosion and Sedimentation Pollution Control (ESPC) plans and a narrative will be submitted to the conservation district for approval. The Pennsylvania Fish and Boat Commission Waterways Patrol Officer will also be notified during the compilation of the Contract Documents. N&W notified these agencies to ascertain their requirements for drilling operations. Both agencies require that all drilling wash water must be recycled or diverted away from all waterways and drainage culverts, otherwise ESPC measures will need to be submitted and approved prior to drilling.

Most borings along the alignment will be accessed using a truck-mounted rig. Some roadway borings will require a skid rig for access and for environmentally sensitive areas. Attachment II of the Contract Documents will include special provisions for environmentally sensitive areas. URS will obtain all permits and permission for access onto private property. The drilling contractor will be responsible for notifying the PA One Call System with three (3) days notice prior to commencing the drilling operations as required by law. The Driller will be responsible for locating all utilities including sewer lines prior to drilling.

The bid opening will be held at the District 5-0 office, conducted by N&W personnel. After receiving approval by the District, N&W will award the contract to the lowest bidder. URS and Chilton will provide utility information, property maps, and copies of Letters of Intent-to-Enter for property owners to N&W prior to commencing drilling operations. Upon submission of the driller's bonds, Certificates of Insurance, PA One Call information, and related paperwork, N&W will obtain approval from the District and issue a Notice-to-Proceed to the drilling contractor.

It is assumed that the subsurface explorations will be required for four (4) bridges - 5th Street, Fullerton Avenue Interchange and two at the S.R. 0022/Lehigh River; five (5) retaining walls – two (2) walls at approximately 300 LF in length and three (3) walls at approximately 200 LF in length; and, five (5) sign structures. The contract will also include twelve (12) roadway borings. A summary of the number of borings and the anticipated depths follows.

5th Street Bridge – 4 borings at 100 LF each = 400 LF

Fullerton Avenue Bridge – 4 borings at 100 LF each = 400 LF

Lehigh River Bridges – 12 land borings at 100 LF each/15 land borings and 6 water borings at 60 LF each = 2460 LF

Retaining Walls 1, 2, and 3 (200 LF length each) – 2 borings per retaining wall at 40 LF each total = 240 LF

Sign Structures – 5 borings at 40 LF each = 200 LF

Roadway Borings – 18 borings at 10 LF each = 180 LF

Previous drilling experience regarding drilling in the Allentown Formation for the adjacent Airport Road bridge over S.R. 0022, the S.R. 0378 bridge over S.R. 0022, and Schoenersville Road over S.R. 0022 bridge, indicates that anticipated drilling footages were greatly exceeded due to voids and severe weathering in the limestone bedrock (100 to 180 LF depths). Therefore, the recommended footages are more than anticipated in the original proposal and the stated boring depths are conservative.

N&W will provide full-time, PennDOT approved Level 2 Drilling Inspectors who will ensure that the contract requirements and specifications are

met. Utilizing PennDOT Engineer's Logs, the Inspectors will document soil and rock types, blow counts, recoveries, moisture content, and compressive strength when applicable. Field logs will be faxed to URS (and the DGE, if requested) each Monday from the previous week. Each inspector will be directed to call the N&W TD Geotechnical Task Manager on a daily basis, and immediately if conditions warrant. The inspectors will each maintain a field diary, the original of which will be submitted to the District after drilling is completed. The N&W Project Engineer will visit the site periodically during drilling operations.

All soil and rock samples will be verified with the logs by the N&W Project Geologist. Soils classifications will be in accordance with Publication 293, BC-795, and the procedures of ASTM D 2488-96. Rock descriptions will be made in accordance with Publication 293 and the BC-795. Core boxes will be delivered to the designated District Maintenance Facility (Cedar Crest Boulevard) at the end of the project. N&W personnel will accompany the drilling contractor to the facility to verify delivery and to sign Form TR-440.

N&W will prepare typed Engineer's Logs using the gINT software program, and structure boring profiles/roadway boring tracings in accordance with Design Manual Part 4, BC-795, and Publication 293 guidelines. Both will be submitted to URS for approval prior to submission to the District.

Non-hazardous waste testing will be performed by N&W's AMRL-accredited laboratory. Soil, rock, and water testing data resulting from the subsurface investigation will be compiled into a set of tables for use in the structure and roadway PGERs. This task includes the following assumed laboratory tests:

CBRs – 18 tests

Standard Compaction – 18 tests

USCS Classifications – 44 tests

Direct Shears – 18 tests

Full Chemical Testing – 12 tests

Rock Breaks – 60 tests

Task 19 - Preliminary ROW Activities

Objective:

2.6.1 - Preliminary ROW Activities

This task includes the requirements as stipulated under Publication 14M, Design Manual Part 3.

2.6.1.1 - Right-of-Way and Deed Research

This task involves the determination of legal right-of-way widths in accordance with the Publication 14M, Design Manual Part 3, and research of property owner records in County Deed Recorder's office.

2.6.1.2 - Property Plats

This task is the preparation of individual property plats in accordance with Publication 14M, Design Manual Part 3.

Scope:

2.6.1 - Preliminary ROW Activities

A preliminary right-of-way plan will be prepared for all Department projects where the construction activities require property acquisition beyond the footprint of existing Department of transportation property. The right-of-way plan shall be prepared in accordance with the requirements and contents as stipulated in Design Manual Part 3.

The right-of-way plan(s) is(are) subject to a plan check review by the District Right-of Way Unit, Chief of Surveys and the Central Office Bureau of Design, Field Liaison Engineer, Highway Quality Control Division. The plan and all supporting data shall be submitted to the District in advance of the scheduled plan check review meeting. The person(s) responsible for the plan preparation will attend the review meeting. Departments and comments stemming from the plan review shall be addressed and incorporated in the subsequent right-of-way plan submission.

The right-of-way plan will be prepared on mylar with appropriate Pennsylvania professional engineer and surveyor seals affixed.

Until NEPA clearance has been obtained, the Department may not perform final negotiations and acquisitions of property.

A right-of-way certificate is issued when the Department has adequately acquired right-of-way to allow project construction.

2.6.1.1 - Right-of-Way and Deed Research

All public legal right-of-way and private right-of-way within the project area shall be determined from plans and documents recorded in the County Courthouse, or on file in the offices of: PennDOT District, Municipality and involved agency. Copies of all right-of-way record data will be obtained, where available, and included with the R/W plan submission to the District.

The existing public and private right-of-way corridors shall be delineated and labeled on the highway plans. A description of, and the establishment record data for right-of-way, shall be included in the project General Notes for all involved public highways. When recorded subdivision plans exhibit public right-of-way corridors, determinations must include whether the local municipality has, or has not, adopted them.

Property owner research is generally initiated by reviewing the tax maps and records at the County Tax Assessors' Office. Once the highway project location is identified on the tax map(s), the anticipated property involvement's can be listed by tax map and parcel numbers. With this information, the tax assessment files can be researched to provide: Owners name and address, Deed Book and Page Number, parcel area, list of property improvements, and the assessed value of the property. Copies of the tax maps and assessment records may be purchased for subsequent use by the designer, and inclusion as backup data to the R/W plan submissions.

Based on the obtained tax record information, the records in the Recorder of Deeds office shall be researched to verify, or update, the involved property(s) ownership, deed book and page number. Upon verification of property ownership, property investigation shall continue to ascertain if any exceptions, adverse conveyances, easement rights, sale agreements, or subdivision plans associated with property are recorded. When the property research reaches a point that exhibits the best available records available, copies of the involved deeds will be purchased from the Recorder of Deeds for plotting and project property matrix map compilation.

When metes and bounds descriptions of the deed are vague, or lacking information, prior chain of title deed descriptions shall be reviewed and copied when their descriptions provided better clarification for boundary plotting purposes. If overlaps, or gaps, result on the property matrix map due to deed metes and bounds descriptions plots, the District Right-of-Way Administrator should be notified of these conditions, and to solicit his/her direction in resolving these issues.

2.6.1.2 - Property Plats

Individual property plats will be prepared for all parcels with takes on highway projects, unless otherwise directed by the District.

The property plat shall contain all information necessary to provide a clear understanding, by all parties, of the existing conditions and the highway's taking requirements for the parcel, in accordance with Design Manual Part 3, Guidelines and Stipulations.

The proposed highway affects on the individual property plat must be consistent with those shown on the highway right-of-way plan sheet, however, the showing of details and labels beyond the boundary lines of parcel shall be avoided when practical.

Detail Task 3 - Preliminary ROW Activities

Department Details:

Two Right-of-Way Plan checks are anticipated for this project.

Research tax maps, property owners and deed information. All easements must be shown on the plan. Right-of-Way and property lines will be assembled from the deed descriptions and plotted on the plan sheets.

Research and contact municipalities to determine ROW dedication through subdivision approvals.

The preliminary Right-of-Way plan for the project will be prepared in accordance with PADOT's Design Manual, Part 3. The preliminary Right-of-Way plan should be 95% complete under this work order. Prepare preliminary property plats for all parcels involved in a take. Plats should show all buildings and other structures or shrubbery, which may affect the value of the property. All items of construction that may affect right-of-way damages should be shown on the plans, in particular, traffic control, utility adjustments, erosion control, drainage facilities, bridge structures, retaining walls, and changes to existing drainage patterns that may impact properties.

As soon as practical, the Preliminary Right-of-Way Plans will be prepared and submitted for District review; including a title sheet, index sheet, general notes, typical sections, right-of-way take and easement take information, plan sheets, profiles, and property plats. Preliminary Right-of-Way plans will be prepared on 1"=25' scale plan sheets. A Professional Land Surveyor will review and approve the preliminary Right-of-Way plans.

One (1) full size set and three (3) half size sets of Right-of-Way plans will be submitted to the District for a plan check.

Approach:

URS will perform this task in accordance with the Department's scope of work, with the following clarifications and details:

- The intent of this task is to prepare a "95%" right-of-way plan to expedite the right-of-way process during Final Design. Under this task, URS will prepare and submit the right-of-way plan for a plan review.
- One plan revision is included. Future plan revisions will be completed during Final Design
- 30 right-of-way parcels, including 2 relocations are anticipated
- URS will update the property mosaic and owner's list, verify the legal right-of-way lines.

Task 20 - Hydrologic and Hydraulic Report

Objective:

2.7.1 - Hydrologic and Hydraulic Report

This task consists of the preparation of Hydrologic and Hydraulic reports for all bridges, culverts and longitudinal encroachments to size waterway openings properly and to satisfy permitting requirements. Publication 13M, Design Manual Part 2, Publication 15M, Design Manual Part 4; and PADEP Chapter 105 apply to this task.

Scope:**2.7.1 - Hydrologic and Hydraulic Report**

A separate Hydrologic and Hydraulic Report is required for each hydraulic structure. However, dual structures or structures located within the same hydraulic system should be combined into one report.

The following work elements are required for the successful completion of this task:

1. Gather existing information to be used in the development of the hydrologic and hydraulic analyses and in the preparation of the H&H Report.
2. Perform a hydrologic analysis of the watershed at each proposed crossing using one or more of the Department approved methodologies. The use of a particular model shall be justified as valid for the situation in which it is being used. All assumptions and/or limitations of each model shall be clearly identified and referenced. Multiple hydrologic models are recommended to assist in validating the selected approach. An analysis of the flood history according to the guidelines contained in Design Manual Part 2 should also be considered.
3. Perform a hydraulic analysis for each proposed crossing including alternatives, if necessary, using one or more of the Department approved hydraulic models. The use of a particular model shall be justified as valid for the situation in which it is being used. All assumptions and/or limitations of each model shall be clearly identified and referenced. Where a Flood Insurance Study has been established by FEMA, the hydraulic data included in the study should be utilized to the maximum extent deemed appropriate. Each proposed alternative shall be modeled to assist in the justification for the selected alternative. The hydraulic model shall extend a sufficient distance upstream and downstream to adequately evaluate the potential impacts due to the proposed construction. The hydraulic model should be used to compare existing and proposed conditions with respect to water surface elevations and channel velocities for the design discharge rate(s), including the 500-year event for the scour evaluation and the "overtopping event" for the risk assessment.
4. Evaluate the scour potential at bridge abutments and piers in accordance with Design Manual Part 4. Evaluate the erosion potential at culvert outlets in accordance with HEC-14.
5. Evaluate the channel stability and design countermeasures, if needed.
6. Perform a risk assessment or analysis for each applicable waterway structure or encroachment alternative.
7. Evaluate the hydraulic impacts as a result of temporary encroachments and/or permanent bank protection, if applicable.
8. Prepare the Hydrologic and Hydraulic Report following the general outline described in Design Manual Part 2.
9. If applicable, prepare a Conditional Letter of Map Revision (CLOMR) in accordance with FEMA regulations. The scope of work for the preparation of the CLOMR is not included herein and should be developed prior to initiating the work.

Detail Task 3 - Hydrologic and Hydraulic Report**Department Details:**

Perform the following hydraulic and hydrologic tasks in order to determine the appropriate size, location, and dimensions of any proposed new structure across a waterway:

- a) Development of waterway and existing structure cross-sections for use in hydrologic and hydraulic analyses;
- b) Research of existing FEMA studies to determine design discharge (If no FEMA studies exist for this waterway, the selected consultant will use any other appropriate hydrologic analysis method acceptable to the Department to determine the design discharge);
- c) Check for existing nearby gauging stations and incorporate data in hydrology if applicable.
- d) Development of cross-sections for proposed structure;
- e) Performance of HEC-RAS backwater calculations for the 10-, 25-, 50-, and 100-year storm events for existing and proposed conditions; and
- f) Determination of the required proposed bridge opening dimensions to maintain existing 100-year storm event flood elevations and pass the design year discharge.

All hydrologic and hydraulic computations shall be in accordance with Strike-Off Letter 431-99-11 (“Criteria for Applicability of Hydrologic and Hydraulic Methodologies”) dated April 21, 1999.

The selected consultant will develop several alternatives for the hydraulic opening of the proposed structure. Location hydraulic studies will be completed for each alternative and a design hydraulic study will be completed for the selected alternative. This work will be performed in accordance with Design Manual 2, Chapter 10 and Strike-Off Letter 431-99-11. The report will be included as part of the Chapter 105, Section 404 “Joint Permit Application.” The selected consultant will be required to supply the reviewing agencies any additional information and/or clarifications necessary in order to obtain the Chapter 105, Section 404 permit. The selected consultant will also be required to file for any permit time extensions to prevent any permit from expiring before the construction work is let.

Submit one hard copy for Bridge Unit review – no additional hard copies are required for JPA/H&H Expert System submissions.

Approach:

Chilton Engineering, with assistance from URS, will perform a hydrologic and hydraulic analysis for the SR 22 structures over the Lehigh River and Canal and prepare a Hydrologic and Hydraulic report.

FEMA Flood studies for the project site have been obtained. Hydraulic input data contained in that study will be reviewed and verified. Using HEC-RAS, Chilton will verify the computer model to be in agreement with FEMA data.

A field reconnaissance will be performed to determine changed conditions, if any, as well as to establish “n” values for channel and overbank conditions.

River and existing structure cross sections will be finalized for use in the hydrologic and hydraulic analysis. For the purpose of this analysis, cross sections of the Lehigh River and Canal taken at intervals of 50 feet from 1000 feet upstream to 1000 feet downstream of the SR 22 structure will be utilized.

Chilton will check for existing nearby gaging station records and incorporate data in hydrologic analysis if applicable.

Chilton will research presence of any ACT 167 Stormwater Management Plan to determine applicability of the Act on this project. (Note that the peak flows in any ACT 167 report may not be used for design purposes.

HEC-RAS backwater calculations will be performed for the 10, 25, 50, and 100-year storm events for existing and proposed conditions on the Lehigh River for each structure alternate.

Required proposed bridge opening dimensions to maintain existing 100-year storm event flood elevations and pass the design year discharge for this structure will be determined. This may require analyzing several different design options proposed by the bridge designer.

A scour discussion for this structure will be performed (noting existing scour problems). The scour potential at bridge abutments and piers will be evaluated in accordance with Design Manual Part 4. Scour computations will be performed, along with any remedies for identified scour problems.

A risk assessment or analysis for the proposed waterway structure will be performed.

Any hydraulic impacts as a result of temporary encroachments and/or permanent bank protection, if applicable, will be evaluated.

A hydrologic and hydraulic report following the general outline described in PADOT Design Manual Part 2 will be prepared.

All hydrologic and hydraulic computations shall be in accordance with Strike-Off Letter 431-99-11 ("Criteria for Applicability of Hydrologic and Hydraulic Methodologies") dated April 21, 1999. The design storm for each structure will be, at a minimum, the design flood specified in Strike-Off Letter 431-99-11.

We will coordinate with PADOT District 5-0 and PADEP in the preparation of this hydrologic and hydraulic report.

The objective of this task is the preparation of final hydrologic and hydraulic report for this site for concurrence by PADOT.

Task 21 - Preliminary Type, Size and Location (TS&L)

Objective:

2.7.2 - Preliminary Type, Size and Location (TS&L)

This task consists of the assembly of Type, Size and Location studies and development of recommendations for proposed structures within the project. Publication 15M, Design Manual Part 4 apply to this task.

Scope:

2.7.2 - Preliminary Type, Size and Location (TS&L)

Review any previous studies or preliminary designs with respect to the selection of structure type, span arrangements, horizontal and vertical clearances, design controls and type section. Coordinate with the District on the logical selection of span arrangements, types of piers, and structure types suitable at each location.

The preliminary structure designs will be performed at a stage when the highway alignment and profile are well defined. Review structure requirements with the District prior to Design Field View (Line and Grade) submission and approval.

The work elements are required for the successful completion of this task:

1. Develop a location plan showing the feature to be crossed or retained, design controls and regulated areas
2. Identify possible pier and abutment locations
3. Evaluate geotechnical conditions to identify potential foundation types

4. Recommend locations for structure foundation borings
5. Evaluate constructability, vertical and horizontal clearances and site constraint issues in determining the most suitable structure design for the particular location
6. Prepare cost estimates for alternative structure designs
7. Prepare justification for recommended alternative
8. Prepare transmittal letter, plans and report for TS&L submission

Detail Task 3 - Preliminary Type, Size and Location (TS&L)

Department Details:

The following items may require an amendment to the standard statement of work:

- Request for Pre-TS&L submission(s)
- Number of Bridges, Culverts, Retaining Walls, Sound Walls, etc., in the project
- Number of alternatives to be studied for each structure

Approach:

URS will complete this task. This task consists of responding to any comments for the three bridge TS&L's performed in Part 1 scope of work.

Additionally, this task consists of the assembly of Type, Size and Location studies and development of recommendations for proposed retaining walls and sign structures within the project. The sign structures will be evaluated using PennDOT's current sign structure standards. We have assumed that the following structures will be required:

- Retaining Wall 1 (200 LF length)
- Retaining Wall 2 (200 LF length)
- Retaining Wall 3 (200 LF length)
- Five (5) Sign Structures

Task 22 - Final Type, Size & Location (TS&L) Report

Objective:

2.7.3 - Final Type, Size & Location (TS&L) Report

This task consists of the assembly of Type, Size and Location studies and development of recommendations for proposed structures within the project. Publication 15M, Design Manual Part 4 apply to this task.

Scope:

2.7.3 - Final Type, Size & Location (TS&L) Report

Review any previous studies or preliminary designs with respect to the selection of structure type, span arrangements, horizontal and vertical clearances, design controls and typical section. Coordinate with the District on the logical selection of span arrangements, types of piers, and structure types suitable at each location.

The preliminary structure designs will be performed at a stage when the highway alignment and profile are well defined. Review structure requirements with the District prior to Design Field View (Line and Grade) submission and approval.

The following work elements are required for the successful completion of this task:

1. Develop a location plan showing the feature to be crossed or retained, design controls and regulated areas
2. Identify possible pier and abutment locations
3. Evaluate geotechnical conditions to identify potential foundation types
4. Recommend locations for structure foundation borings
5. Evaluate constructibility, vertical and horizontal clearances and site constraint issues in determining the most suitable structure design for the particular location
6. Prepare cost estimates for alternative structure designs
7. Prepare justification for recommended alternative
8. Prepare transmittal letter, plans and report for TS&L Submission

Detail Task 3 - Final Type, Size & Location (TS&L) Report

Department Details:

Suggested Items:

- Number of Bridges, Culverts, Retaining Walls, Sound Walls, etc. in the project
- Number of alternatives to be studied for each structure

Approach:

Final TS&L's will be prepared from the approved preliminary TS&L's for the retaining walls and sign structures. Final TS&L's will not be developed for sign structures that can utilize PennDOT's standards to design all elements for both super and substructures.

Task 23 - Final Geotechnical Engineering Report

Objective:

2.5.3 - Final Geotechnical Engineering Report

This task is the preparation of the Final Geotechnical Engineering Report in accordance with Publication 10A, Design Manual Part 1A.

Scope:

2.5.3 - Final Geotechnical Engineering Report

This task consists of the development of the Final Geotechnical Engineering Report (GER) presenting final geotechnical design and construction recommendations for the project, along with supporting documentation, based on the subsurface conditions determined from the Final Design roadway investigations and any previous project geotechnical investigations. It also includes preparation of geotechnical reports for Structure TS&L Submissions (Reconnaissance Soils and Geological Engineering Reports) and Structure Foundation Submissions (Geotechnical Engineering Reports for Structures). Previous geotechnical investigations may include: Phase I Preliminary Design GER (prepared during EIS Step 4), Phase II Preliminary Design GER (prepared during EIS Step 5 or EA alternatives analysis), and Pre-Final Design GER (prepared for the Design Field View Submission).

The following work elements are required for the successful completion of this task:

1. Coordinate the geotechnical effort in Final Design. Coordinate with the District Geotechnical Engineer (DGE), BOCM Chief Geotechnical Engineer (CGE), District Bridge Engineer (DBE), BOD Bridge Quality Assurance Division (BQAD), and other disciplines involved in design. Attend meetings necessary for the design process. Perform QA/QC on all subtasks and deliverables.
2. Perform an office investigation. Review background geological information and maps, boring logs, project files and reports, environmental documents, and R/W plans to describe the soil/rock/hydrologic setting.
3. Visit the site, interviewing local residents and engineers. Perform a detailed field reconnaissance and refine the soil/rock/hydrologic setting description.
4. Prepare the Problem Statement and Draft Exploration Plan (PSDEP) for the project in accordance with Publication 293. Determine the field and laboratory investigation needs. Assemble a soil/rock boring and testing plan, water/soil-sediment sampling and testing plan, a field instrument plan and a geophysical investigation plan based on project needs.
5. Prepare a Reconnaissance Soils and Geological Engineering Report (RSGER) for each TS&L submission, in accordance with Publication 15M, Design Manual Part 4.
6. Perform the soil/rock boring investigation. Notify the affected public. Locate the borings in the field. Assemble, advertise, award and administer the test boring contract in accordance with Publication 222M.
7. Administer the soil/rock testing program. Perform the water/soil sediment sampling and testing.
8. Collect readings and present reduced data from field instruments. Perform the geophysical investigation.
9. Perform analysis and design associated with embankment and cut slope construction, storm water management facilities, culverts and conduits, retaining structures, bridges, other structures, pavements, unsuitable materials, special geotechnical treatments, benching and transition zones, and geotechnical instrumentation for construction control. Develop recommendations for use by the design team and special provisions and details for construction.
10. Prepare a Geotechnical Engineering Report for foundations at each structure in accordance with Design Manual Part 4.
11. Prepare the GER for Final Design, presenting the recommendations and providing supporting documentation and following the outline in Publication 293. Prepare the "Subsurface Profile" in accordance with the requirements of Publication 14M, Design Manual Part 3. Submit both a draft (95%) and a final (100%) version of the GER to the DGE and CGE.
12. Review the plans, specifications and estimates for construction of the project, to verify proper implementation of the geotechnical recommendations and incorporation of the special provisions and details.

Detail Task 3 - Final Geotechnical Engineering Report

Department Details:

Borings must be performed by an approved drilling contractor. Installation of field instrumentation may be included with that contract. The engineer should review the environmental documents to determine if a Health and Safety Plan (HASP) is required as part of the drilling contract. The District should alert the engineer if other environmental constraints potentially could impact field operations.

Maintenance and protection of traffic for the drilling program should be in accordance with Publication 203M. The District should determine if a formal Traffic Control Plan (TCP) is required, if it is necessary to notify the affected public prior to performing the work, or any other special requirements are necessary.

The amount of boring in the drilling contract often varies from that assumed during earlier phases of design. The District should verify the adequacy of committed funds prior to approval of the contract.

Laboratory soil testing must be performed by an AMRL-accredited facility, and should not be a part of the drilling subcontract.

Emphasis is on modifications to geotechnical roadway recommendations resulting from changes during final design, implementation of design guidance, and finalization of special provisions and details for construction.

The Soil Profile is an appendix to this report.

All references to Publication 14M shall be replaced to reference Publication 14.

All references to Publication 15M shall be replaced to reference Publication 15.

All references to Publication 222M shall be replaced to reference Publication 222.

The objective of this task shall be amended to change "Publication 10A, Design Manual Part 1A" to "Publication 10, Design Manual Part 1A and Publication 293".

Approach:

N&W will prepare the roadway PGER in accordance with PennDOT Publication 10A, Design Manual Part 1A, and Publication 293. The roadway Final GER will identify both favorable and objectionable geotechnical features of the project site. This report will emphasize the roadway-related geotechnical recommendations. This report may be revised as necessary to correct deficiencies or to add information required due to a change in conditions. The roadway FGER will address the following topics: purpose and scope; location of the project and location maps; recommendations for embankment construction recommendations, stormwater management facilities, existing slopes and excavated slope construction, culvert and conduit construction, removal of unsuitable materials, special treatments, transition zones and construction benches, special provisions for contract documents, special construction procedures, and additional testing or study needed; conclusions; physiographic setting; environmental concerns; economic considerations; site investigation; soil, rock, and hydrologic setting. The report will not detail the conditions at the affected structures in order to prevent redundancy.

The Final GER will include the subsurface investigation, laboratory testing results, subsurface conditions at roadway locations; analyses and interpretation of data; acknowledgements; references; figures, tables, and appendices with supporting documentation.

N&W will provide five (5) copies of the draft version of the roadway Final GER (when 95% is completed) and five (5) copies of the final version of the Final GER (100%) to URS for submission to the DGE.

Task 24 - Final Structure Foundation Report

Objective:

2.5.5 - Final Structure Foundation Report

This task includes all items necessary to prepare the Final Structure Foundation Report in accordance with Publication 15M, Design Manual Part 4.

Scope:

2.5.5 - Final Structure Foundation Report

This task consists of the development of a Final Structure Foundation Report for each structure in the project. The report presents recommendations for design and construction of the structure foundations, and provides geotechnical data in support of the recommendations.

The following work elements are required for completion of this task:

1. Coordinate the effort with the District Geotechnical Engineer (DGE), District Bridge Engineer, BOD Bridge Quality Assurance Division (BQAD), and the other engineering disciplines involved. Perform QA/QC on work processes and products.
2. Perform an office investigation, reviewing available geotechnical reports for the project including the Reconnaissance Soils and Geological Engineering Report (RSGER) for the specific structure. Review the Preliminary Foundation Report. Obtain the record copy of the engineers logs for the borings drilled for the structure.
3. Perform the soil, rock, and water testing required to allow analysis of foundation conditions. Tabulate the results of the testing.
4. Perform analyses to determine the preferred foundation for the structure, and document the rationale for the preference. Include cost comparisons for foundation alternatives. Prepare a tabular summary of the site conditions and foundation recommendations at each substructure location.
5. Identify and address special site conditions through appropriate design. Develop foundation notes, construction details, and special provisions as warranted.
6. Prepare plotted boring log sheets for the core borings used in foundation analysis and design.
7. Prepare the Final Foundation Report for the structure, presenting the information required in Design Manual Part 4, with the tabular summary of foundation recommendations, foundation notes, construction details, special provisions, and plotted boring log sheets appended. Submit the report, with the other documentation required by Design Manual Part 4, for approval.
8. Prepare quality assurance (QA) form for foundations.

Detail Task 3 - Final Structure Foundation Report**Department Details:**

All references to Publication 15M shall be replaced to reference Publication 15.

Upon completion of the drilling operations, the Geotechnical Engineer will prepare and provide the following items in the foundation submission.

- Typewritten Engineer's Field Logs, including the photographs and Structure Test Boring tracings.
- Brief description of each site including history, surface features, geological formation, and items identified during the final exploration plan meeting.
- Recommended soil and rock parameters to be used in design.
- Results of the professional engineer AMRL certified laboratory tests.
- Discussions of the applicability of various foundation types and cost comparisons, and recommendations for foundation substrata improvements.
- Other geotechnical information deemed necessary to help justify the foundation type selected.

"Foundation Submission and Approval" as per Design Manual 4.

A foundation report will be prepared for the TS&L approved structures in accordance with Design Manual, Part 1 and Part 4 guidelines.

Coordinate activity with the District Geotechnical Engineer and the District Bridge Engineer during the preparation of the foundation report to ensure the District's agreement with the foundation design approach. Anticipate at least one meeting with the District to review the foundation submissions.

The following is recommended AMRL certified laboratory testing to determine the foundation pressure and a copy of their certification should be attached:

Lab Testing Program is to be discussed with District Geotechnical Engineer/District Bridge Engineer before being performed.

Soil: Consolidation tests; classification with Atterberg limit and natural moisture content tests; and direct shear tests.

Rock: Unconfined compression tests.

Approach:

N&W will prepare the Final Structure Foundation Reports for four (4) bridges, three (3) retaining walls, and five (5) sign structures. Rationale for the preferred structure type will be documented. A tabular summary of the site conditions and foundation recommendations for each substructure unit will be included. Results of the laboratory testing will be tabulated. All available environmental reports, boring logs, site information, and the structure PGRs (RSGERs) will be reviewed. Following the completion of structure test boring procurement, N&W will compile a report detailing the subsurface conditions encountered, engineering evaluations, and subsequent design recommendations for the structure. It will be prepared in accordance with Publication 15M, Design Manual 4, Volume 1, Part A, Chapter 1.9.4.

Each Final Structure Foundation Report will include the general soil and bedrock conditions; advantages and disadvantages of each structure type; evaluation of applicable design alternatives – spread footings; reinforced or retained earth fill and/or cuts; LRFD resistance factors for use in structure design; rock RQD and bearing capacities; coefficients of sliding friction; settlement analyses; pile foundation type, size, and allowable Loads, if recommended; recommendations regarding unsuitable materials, if encountered; and Construction Details, Foundation Notes, and Special Provisions.

If removal of bedrock becomes necessary, either due to foundation or excavation design, N&W will evaluate each project site for Acid-Bearing

Mineral (ABR) potential, if present. This work will be completed in accordance with SOL 421-09-04 dated 9/30/09. Calculations and recommendations will be included in each report.

Each report will identify and address special site conditions through the appropriate design criteria. A tabular summary of foundation recommendations, foundation notes, construction details, special provisions, and plotted boring log profile sheets will be appended. The plotted structure boring log sheets will become part of the structure plans after approval. It is anticipated that N&W will attend a maximum of four (4) meetings with the District and four (4) meeting with URS to review the foundation submissions.

N&W will also provide the following information to URS for each structure: plots of the boring logs (boring profiles), statement from a qualified member of N&W's professional staff indicating that drilling operations were conducted in accordance with the specifications and that subsurface materials encountered have been accurately identified, Foundation Q/A Form, and Foundation Submission Letter.

Task 25 - Preliminary Maintenance and Protection of Traffic

Objective:

2.8.2 - Preliminary Maintenance and Protection of Traffic

This task consists of developing preliminary maintenance and protection of traffic plans in accordance with Publication 14M, Design Manual Part 3, the Manual on Uniform Traffic Control Devices and Publication 213, Work Zone Traffic Control to maintain safe and efficient traffic operations through the construction work zone.

Scope:

2.8.2 - Preliminary Maintenance and Protection of Traffic

Prepare a preliminary Maintenance and Protection of Traffic plan for anticipated work areas involving existing roads. The plans will include a conceptual sequence of operations and identify the type of traffic control needed for each roadway impacted by the anticipated work zones.

Plans will be developed at an appropriate scale.

Drawings will show the work areas and note the traffic control requirements for each area.

A conceptual sequence of operations will be developed identifying the anticipated phases and stages of work necessary to control traffic during hours of construction and at all other times during construction. Illustration of traffic control signs and devices, temporary pavement markings, temporary roads, detours, and other necessary details will not be developed.

The plans will include a title sheet with index map and general notes, and a listing of anticipated traffic control devices without quantities. The plan will also include the sequence of operations and plans sheets depicting the work areas.

Detail Task 3 - Preliminary Maintenance and Protection of Traffic

Department Details:

Evaluate alternatives for the maintenance and protection of traffic for each structure. Alternative may include, but are not limited to, a detour, runaround, or any other alternative deemed feasible by the consultant. The consultant will recommend a preferred maintenance and protection of

traffic alternative and seek approval of this alternative from the District Traffic Unit.

Prepare a conceptual traffic control plan, showing all required stages, for review and approval by the Department. This plan will be based off of the approved recommendation from the alternative analysis and recommendation in Part I.1.

Adhere to all pertinent provisions of Publication 203M-Work Zone Traffic Control (converted back to English units), the M.U.T.C.D., and Chapter 204 for additional traffic control devices in highway work zones.

Plans will be prepared in accordance with the guidelines and format established by Design Manual 3, Chapter 4. The plans will depict all signs and devices necessary for the safe and efficient movement of traffic and pedestrians through or around the construction area.

Approach:

This task will be performed by URS and involves the preparation of preliminary traffic control plans to depict the necessary phasing, signing and traffic control to allow the safe, efficient, and controlled movement of traffic through and around the proposed construction site. Due to the existing traffic volumes, maintaining four lane of traffic on SR 22 at all times during construction is mandatory. Likewise, maintaining acceptable levels of service on Fullerton Avenue will be an important measure of the projects success. However, it is anticipated that a detour will be required for the 5th Street Bridge replacement.

The Preliminary Traffic Control Plan along with an associated narrative will be forwarded to the District Traffic Unit for their approval. Detailed signing and pavement markings will not be included. Signing and pavement marketing will be done using typical Publication 203 sketches.

Task 26 - Preliminary Traffic Signal Design

Objective:

2.8.3 - Preliminary Traffic Signal Design

This task consists of developing preliminary traffic signal designs in accordance with Publication 10A, Design Manual Part 1A, Publication 14M, Design Manual Part 3, Traffic Standards (TC 7800 Series) and Publication 149, Traffic Signal Design Handbook.

Scope:

2.8.3 - Preliminary Traffic Signal Design

Conceptual signal plans will be developed for those intersections meeting signal warrants. The plans will illustrate the signal layout including type of signal supports (strain pole or mast arm) and location of signal equipment including signal heads, controller, detector types and locations, signing requirements, and pedestrian accommodations as required. The traffic signal plans will include complimentary pavement markings such as stop bars, crosswalks, and lane lines which will be coordinated with the pavement marking and delineator plans.

Plans will be developed at an appropriate scale.

Phasing diagrams will be developed depicting the proposed operation of the traffic signal. No timings or other controller settings will be determined.

Electrical details such as wiring diagrams, conduit and junction box locations, will not be included.

The plan will consist of the signal plan layout, signing table, depiction of the number and types of signal heads, and a phasing diagram.

Detail Task 3 - Preliminary Traffic Signal Design

Department Details:

Assume (#) new signals at
, (#) revised signal at intersection of

The District prefers mast arms rather than strain poles.

Approach:

Under this task, URS will develop preliminary traffic signal designs for the existing signalized intersections of Fullerton Avenue with the SR 22 ramps. It is anticipated that only minor modifications will be required due to grade changes, sidewalk and curb radii modifications. Hence, we do not anticipate signal phasing or timing changes.

The traffic signal designs will be in accordance with the applicable criteria, standards and preferences of PennDOT and/or the local municipality. Plans will be created that will include a signal plan layout, signing table, depiction of the number and types of signal heads, phasing diagram and any required documentation.

The signal plan layout will show proposed locations of traffic signal hardware and supports, intersection geometry and roadway layout, pedestrian accommodations, pavement markings and roadway signage. The plans will include a phasing diagram depicting the proposed operation of the traffic signals. Preliminary signal plans will not show electrical details, such as wiring diagrams, conduit and junction box locations. Preliminary Traffic Signal plans will be submitted on full size sheets.

Task 27 - Preliminary Pavement Marking Plan

Objective:

2.8.4 - Preliminary Pavement Marking Plan

This task consists of developing preliminary pavement marking plans in accordance with Publication 14M, Design Manual Part 3, the Manual on Uniform Traffic Control Devices, Traffic Standards (TC 7600 Series), and Publication 68 with guidance from the Pavement Marking Handbook.

Scope:

2.8.4 - Preliminary Pavement Marking Plan

Preliminary pavement marking plans will be developed depicting longitudinal lane lines and delineators on roadway sections. For interchange areas, pavement markings and delineators will be indicated for gore areas, islands, and other miscellaneous special markings. For intersections, the locations of stop bars, legends, and crosswalks will be indicated.

Plans will be prepared at an appropriate scale. The type, size, and color of pavement markings and delineators will be noted on the plans.

Specific details will not be developed.

The plan will include a title sheet with general notes and index map, blank tabulation sheets, and plan sheets for all roadway sections within the

limits of work. Where roadway sections are consistent and repetitive, typical details may be developed to eliminate unnecessary and repetitive design sheets.

Detail Task 3 - Preliminary Pavement Marking Plan

Department Details:

The pavement marking plan shall be combined with the signing plan (task 2.8.5).

Approach:

Preliminary pavement marking plans will be developed by Chilton and will depict longitudinal lines and delineators on roadway sections. For interchange areas, pavement markings and delineators will be indicated for gore areas, islands and other miscellaneous special markings. For intersections, the locations of stop bars, legends, and crosswalks will be indicated.

Plans will be prepared at an appropriate scale. When required, enlargements at a scale of 1" = 25' or a suitable scale will be prepared to show future pavement marking detail. Such areas would include modifications to the existing signalized intersections on Fullerton Avenue where dimensions and spacing at 1" = 50" scale may not be clear. The type, size, and color of pavement markings and delineators will be noted on the plans.

Specific details will not be developed.

The plan will include a title sheet with general notes and index map and plan sheets for all roadway sections within the limits of work. Where roadway sections are consistent and repetitive, typical details may be developed to eliminate unnecessary and repetitive plan sheets.

The plans will be developed in accordance with Publication 14M, Design Manual Part 3, the Manual on Uniform Traffic Control Devices, Traffic Standards (TC 7600 Series), and Publication 68 with guidance from the MUTCD

Task 28 - Preliminary Signing and Sign Lighting

Objective:

2.8.5 - Preliminary Signing and Sign Lighting

This task consists of developing preliminary sign and sign lighting plans in accordance with Publication 14M, Design Manual Part 3, the Manual 212, 2006 Official Traffic Control Devices, Traffic Standards (TC7600 and 8700 series), and Publication 108, Sign Foreman's Manual.

Scope:

2.8.5 - Preliminary Signing and Sign Lighting

Preliminary signing and sign lighting plans will be developed for all roadway sections within the limits of work.

The plans will depict destination, regulatory, warning, and information, and guide signs necessary to control and maintain traffic upon completion of construction. The plans will depict the approximate locations of signs, sign types, and sign messages. The location of sign structures will be indicated and noted if sign lighting is required.

Plans will be prepared at an appropriate scale. Areas requiring more detail, (such as intersections, merges, and diverges) may require a larger scale.

The plans will consists of a title sheet with an index map and general notes, blank tabulation sheets, and plan sheets showing sign types and locations.

Sign sizes, sign structure and sign lighting details, and sign fabrication details, will not be included.

Detail Task 3 - Preliminary Signing and Sign Lighting

Department Details:

The signing plan shall be combined with the pavement marking plan (task 2.8.4).

Approach:

Preliminary signing and sign lighting plans will be developed by Chilton for all roadway sections within the limits of work.

The plans will depict destination, regulatory, warning and information and guide signs necessary to control and maintain traffic upon completion of construction. The plans will depict the approximate locations of signs, sign types and sign messages.

The placement of overhead sign structures for the widening SR 22 will be reviewed with the District Traffic Unit. Sign lighting will also be provided where there is less than 1200-feet of clear tangent sight distance (no obstructions) to any overhead sign that is proposed. The wiring for sign lighting will be coordinated with the highway lighting circuits but can be metered separately if the highway lighting costs are shared with local municipalities. URS will prepare the electrical design, details and/or plans necessary.

Plans will be prepared at 1" = 50" scale. Areas requiring more detail (such as intersections, merges, and diverges) may require a larger scale.

The plans will consist of a title sheet with an index map and general notes, and plan sheets showing sign types and locations.

Sign sizes, sign structure and sign lighting details, and sign fabrication details will not be included.

The plan will be developed in accordance with Publication 14M, Design Manual Part 3, the Manual of Uniform Traffic Control Devices, Publication 236M, Handbook of Approved Signs, Traffic Standards (TC7600 and 8700 series), and Publication 108, Sign Foreman's Manual.

Task 30 - Transportation Management Plan (TMP)

Objective:

2.8.8 - Transportation Management Plan (TMP)

The purpose of this task is to develop the Transportation Management Plan

Scope:

2.8.8 - Transportation Management Plan (TMP)

Guidance:

- Publication 46 (Traffic Engineering Manual, Chapter 6.3) also see SOL 470-07-06

The scope of work will include the following activities:

1. Determine work zone traffic impacts by performing capacity analysis of each conceptual traffic control alternative. The following methods and/or software programs to perform the traffic analysis are considered acceptable: Simple graphical and comparative methods (volume to capacity comparisons used to calculate queue length and expected delay not using traffic analysis software) and Quickzone, Synchro/SimTraffic, HCS (software programs). More information is provided in the Details Section.

The work zone traffic impacts analysis will be used to determine the level of impacts and "significant project" status for the selected traffic control concepts prior to the Design Field View submission. Should the resultant traffic analysis consider the work zone impacts "unacceptable", additional effort required for the submission to FHWA or PennDOT, as detailed in Pub 46 - Section 6.3.2.4 (c), shall be considered an additional service.

Materials are anticipated to be submitted for review/comment by Bureau of Design (BOD) and the Federal Highway Administration (FHWA) for Federal Oversight Projects and by the PennDOT District for PennDOT oversight projects. Comments received at this level will be carried into the (final) version of the reports for Final Design.

For the purpose of estimating man-hours commensurate with the size of this project, the following assumptions are made:

Traffic analysis of work zone impacts:

- Source of traffic volume data used in the analysis is provided in the Details Section.
- This project will be considered a "significant project"
- Analysis will be performed to a "basic" level of detail to determine expected delays.
- Analysis of interchanges, side roads, intersections, and analysis to accommodate concurrent projects in the area will be considered an additional service.
- Analysis for traffic control alternatives is anticipated. The number of traffic control alternatives to be analyzed is provided in the Details Section.
- Analysis of traffic control alternatives from historical experience of similar types of roadways.
- Analysis of additional alternatives recommended by FHWA, BOD, and the District during their review will be considered an additional service.

2. Develop the Draft Transportation Management Plan (TMP), which will include the preliminary Traffic Control Plan (TCP), the draft Transportation Operations Plan (TOP) and the Draft Public Information Plan (PIP).

As described in Exhibit 6.3-E in Chapter 6.3 of Publication 46, in addition to the draft TOP and PIP, the Draft TMP will also include sections on: the project's TMP roles and responsibilities; project description, traffic conditions description; the Work Zone Impacts Assessment; Work Zone Impacts Management Strategies; TMP performance; Contingency Plans; and preliminary costs to implement the TMP. Items in the TMP, such as the TCP, should be included by reference to other documents/plans wherever possible.

Items to be included in the Draft Transportation Operations Plan (TOP) are provided in the Details Section.

Items to be included in the Draft Public Information Plan (PIP) are provided in the Details Section.

The Draft Transportation Management Plan is to be included with the Design Field View submission. The anticipated length of the Draft Transportation Management Plan is provided in the details.

3. Final design: Develop Final Transportation Management Plan by utilizing the draft TMP created during preliminary engineering. The draft TMP will be refined for a more detailed assessment of the work zone impacts and more detail in the TOP and PIP. Design refinements will be carried into the (Final) versions of the TOP, PIP, and TMP. Minimal effort is anticipated.

Copies of the final TMP will be provided for the Final Design Office Meeting and PS&E submissions. It will be necessary to remove costs and other information that is not needed for the project's bid package from the TMP that is included with the PS&E submission. To achieve this, items in the TMP should be included by reference to other documents/plans wherever possible.

The PS&E provisions that are included from the TMP will be those that are necessary for implementing the TMP as part of the construction contract.

Scope Deliverables:

1. Work Zone Impact Assessment: Documentation of expected work zone impacts used to determine significant project status. This will be completed prior to the Design Field View Submission.
2. Draft Transportation Management Plan (TMP) (includes Transportation Operations Plan (TOP) and Public Information Plan (PIP)). This will be included with the Design Field View Submission.
3. Final Transportation Management Plan (TMP) (includes final Transportation Operations Plan (TOP) and Public Information Plan (PIP)). This will be included with the FDOM and PS&E submission.

Detail Task 3 - Transportation Management Plan (TMP)

Department Details:

{EDIT THE FOLLOWING AND DELETE ANY INFORMATION NOT SPECIFIC TO THIS PROJECT.

ITEMS INCLUDED IN THE SCOPE TO DEVELOP A TRANSPORTATION MANAGEMENT PLAN WILL VARY WIDELY AND IS COMPLETELY DEPENDENT ON THE SIZE AND COMPLEXITY OF THE PROJECT. TASKS FOR A TYPICAL LARGE, COMPLEX PROJECT ARE SHOWN HERE; FOR LESS COMPLEX PROJECTS, ITEMS THAT WOULD NOT BE NEEDED SHOULD BE DELETED FROM THE SCOPE AS APPROPRIATE.}

{1. Determine work zone traffic impacts:

Prior to - or in lieu of - utilizing traffic analysis software to determine work zone traffic impacts, a simple comparison of the expected peak period traffic volumes to the capacity of each traffic control alternative should be performed (graphical and comparative methods described in Statement of Work). At this point, it will be decided whether further analysis (with the traffic analysis software programs) is required to determine the work zone traffic impacts and 'significant project' status.

Traffic volumes used for this analysis can be generated from actual count data for the project or from the Departments traffic volumes in RMS using hourly factors from the Bureau of Planning and Research. Assume the District will provide the necessary traffic volume information.

{OR}

Collect 24-hour vehicle classification count data at {INSERT NUMBER OF LOCATIONS} locations for a period of {INSERT NUMBER OF DAYS}

days. Manually collect turning movement traffic volumes at {INSERT NUMBER OF LOCATIONS} locations during the following time periods {INSERT TIME PERIODS}.

Analysis for each of the {INSERT NUMBER OF ANALYSES} traffic control alternatives is anticipated.

Materials are anticipated to be submitted for review/comment by Bureau of Design (BOD) and the Federal Highway Administration (FHWA) for Federal Oversight Projects. For PennDOT oversight projects, all reviews and approvals will take place at the District level.

2. Development of draft Transportation Management Plan (TMP): Note that the required traffic control plan (TCP) is included by reference in the TMP, but the TCP will be developed under the TCP task, not under this TMP task. Refer to sections 6.3.6, 6.3.7, 6.3.8, and 6.3.9 of Publication 46 for further detail.

The Draft Transportation Management Plan is expected to consist of approximately {INSERT NUMBER OF PAGES} pages.

Required Elements of Draft Transportation Operations Plan (TOP) {PLEASE TAILOR AND ENHANCE THE TEXT IMMEDIATELY BELOW TO FIT THE PROJECT'S NEEDS}:

- Traffic Demand Mitigation Strategies
- Corridor/Network Management Strategies
- Work Zone Safety Management Strategies
- Traffic/Incident Management and Enforcement Strategies (or the project's incident management plan). This will require coordination with local emergency response providers and other authorities to develop appropriate detour plans, detour plans for routes used to divert traffic, and development of a reference manual (with 24/7 emergency contacts, responsibility breakdown, traffic flow plans, media relations contacts, use of ITS/VMS) in the event of full road closure due to an incident.

Required Elements of Draft Public Information Plan (PIP) {PLEASE TAILOR AND ENHANCE THE TEXT IMMEDIATELY BELOW TO FIT THE PROJECT'S NEEDS}:

- Project Summary
- Affected Stakeholders
- Communications Plan and Timeline
- Determine Milestone Points for Updates
- Means of evaluation of Communication Plan

3. Development of Final Transportation Management Plan (TMP): Copies of the final TMP will be provided for the Final Design Office Meeting and PS&E submissions. It will be necessary to remove costs and other information that is not needed for the project's bid package from the TMP that is included with the PS&E submission. To achieve this, items in the TMP should be included by reference to other documents/plans wherever possible.

The PS&E provisions that are included from the TMP will be those that are necessary for implementing the TMP as part of the construction contract.}

Approach:

Under this task URS will prepare and coordinate the draft Transportation Management Plan (TMP) for this project. The TMP will consider the project construction impacts and identify actions to minimize construction related congestion and address traffic incidents. The TMP will provide guidance for system maintenance and agency coordination following completion of construction. Coordination with community leaders, local

municipal agencies, PennDOT, FHWA, transportation management agencies, transit agencies and emergency management providers will be required to develop the most appropriate mitigation measures. For this supplement, it is assumed that one (1) meeting will be held with these stakeholders.

Extensive traffic data has already been acquired as a part of the Point of Access Study and the Fifth Street Bridge Closure Analysis. We are assuming that any traffic data needed to perform preliminary analyses as part of the draft TMP can be obtained from these studies or can be provided by PennDOT, therefore we are assuming that no additional traffic counts will be needed at this time.

Five (5) anticipated construction stages will be analyzed to determine work zone impacts. Work zones will be analyzed using PennDOT Delay Analysis Workbook (DAWB) spreadsheets to calculate delay and determine "significant project" status. Analysis of interchanges, sideroads, intersections and/or analyses to accommodate concurrent projects in the area will not be performed as part of the preliminary analysis.

URS will develop the draft TMP in accordance with the most recent PennDOT and FHWA guidelines. URS will coordinate all aspects of the TMP with PennDOT, FHWA and the local municipality. The draft TMP will include the preliminary Traffic Control Plan (TCP), the draft Transportation Operation Plan (TOP) and the draft Public Information Plan (PIP).

Task 31 - Utilities

Objective:

2.9.1 - Utilities

This task involves project specific work requirements for utility relocation engineering activities.

2.9.1.1 - Utility Location Verification

This task is the verification of existing aerial and underground utility locations.

2.9.1.2 - One Call

This task is the compliance with the PA One-Call System design call requirements.

2.9.1.3 - Existing Utility Location Plan

This task is the compilation of the existing utility location plan for design/coordination purposes.

2.9.1.4 - Preliminary Utility Impact Assessment

This task is the assessments of potential conflicts by the project designs with existing utilities, and preliminary determination for utility relocations requirements.

Scope:

2.9.1 - Utilities

Guidance:

- Publication 16M, Design Manual Part 5, Utility Relocation

PennDOT projects which involve public utilities must include all necessary provisions for the safety and protection of both existing and any required relocation of utilities.

Coordination efforts will be maintained with the utility throughout the project design process to allow amicable solutions for known and potential utility/highway project conflicts.

2.9.1.1 - Utility Location Verification

The scope of work will include the following activities:

1. Invite District Utility Unit representatives to the project Design Field View meeting.
2. Initiate contact with all utilities in the vicinity of project by project notification letter.
3. Formally solicit copies of existing facility location records for underground installations from the utility company.
4. Subsequent to plotting the existing utility locations on the Department's right-of-way plan, submit plan copies to each company and request their verification, or revision, of the type, size, and location of their facilities.

Scope Deliverables:

1. It is the responsibility of the designer to prepare project base mapping showing all existing utility facilities.
 - a. Aerial and surface utility data will be obtained by conventional survey.
 - b. Underground utility data may be obtained from utility owner as-built plans and maps and/or test pits or non-destructive probe methods.
2. The existing utility location plan compilation will include the appropriate label and number, as applicable, for each facility.
 - For all existing underground utility installations, the locations will be supplemented with profiles and/or cross sections.
3. Once the utility location plan is compiled, the designer will submit copies of the plan to each utility owner on the project with a formal request for their verification of the facilities data depicted.
 - The designer will incorporate all revisions, additions, or deletions resulting from the verification comments received from the owners.

2.9.1.2 - One Call

Guidance:

- PA Act 287 of 1974, as amended (73 P.S. § 176, et seq.)

The scope of work will include the following activities:

1. The project designer, and/or survey party chief shall contact the PA One-Call System for the design call not less than 10 working days and no more than 90 working days prior to the final P.S. & E. submission to the District.
2. The project designer, and/or survey party chief must request underground utility line delineations by the utility owner prior to making field survey acquisitions of utility locations.

Scope Deliverable:

The design firm will add the one call serial numbers and the 1-800-242-1776 number to the plan prior to forwarding the plan to facility owners.

2.9.1.3 - Existing Utility Location Plan**Scope:**

Preparation of this plan is based on project mapping including field data and the verified facility location as received from the utility companies.

The scope of work will include the following activity:

After a response from the facility owner, the designer will add their existing facility information to the drawing prior to the final P.S. & E. submission to the District.

Scope Deliverables:

The design engineer will prepare a master Existing Utility Location Plan using as a base the construction plan sheets.

2.9.1.4 - Preliminary Utility Impact Assessment**Scope:**

When the existing utility location plan has been developed and verified, the proposed project preliminary designs will be investigated for utility impact potentials.

Scope Deliverables:

Conduct a preliminary impact assessment study and provide a report listing known and potential utility conflicts.

a. The project designer will complete a preliminary impact assessment study and report with coordination efforts from the utility owner. This information shall be presented in text and to clearly indicate the location and nature of the conflicts along with the preliminary cost comparisons and conclusions and recommendations for the relocation of the utility facility versus possible project design modifications that would allow the facility to remain at its existing location.

Where utility conflicts are discovered, or other utility problems are anticipated on the project, a preliminary impact assessment study and report will be completed by the project designer, with coordination efforts from the utility owner.

b. The preliminary utility impact assessment report will be submitted to the Department for review, approval and/or conflict resolution decision.

Detail Task 3 - Utilities

Department Details:

Contact the Recorder of Deeds in the respective county to obtain a copy of the list of utilities that operate within the project area. Forward a copy of a U.S.G.S. quadrangle that shows the project area and a brief narrative of the project scope of each utility listed. All firms will be required to respond as to whether or not they have facilities within the project limits.

Utilizing information received from the utility companies, map all facilities or preliminary plans and forward a copy to each utility present. Identify all possible areas of conflict.

As more detailed roadway and right-of-way plans are developed, forward them to utility companies upon request. In addition, maintain close contact with the affected company, through the District's Utility Unit, to ensure accuracy of plans.

The above work will consist of fulfilling the requirements of Act 38, plotting of existing utilities on plans, cross-sections, profiles and other drawings, attending all necessary meetings and performing design functions necessary to accommodate existing and re-located utilities.

If required, utilize the services of an underground locating firm to designate and locate subsurface utilities. The selected firm will be required to provide professional utility mapping services at all utility "quality levels" as defined in FHWA Publication No. FHWA-PD-96-004 (Subsurface Utility Engineering Handbook) and in accordance with the standard of care of the subsurface utility engineering profession.

Quality Level "A" is required for locating services and Quality Level "B" is required for designating services. "Designate" means to indicate by marking, the presence and approximate horizontal location of a subsurface utility using geophysical prospecting techniques and "Locate" means to obtain the accurate horizontal and vertical location of a subsurface utility by excavating a test hole.

IF PROJECT DOES NOT INCLUDE BRIDGE

Under scope for 2.9.1 disregard paragraphs five and six concerning permits and agreements application forms and utility clearance form D-419.

Under scope for 2.9.1.5 disregard numbers five (5), seven (7), fourteen (14), fifteen (15), and sixteen (16) concerning form D4181X, authorizations to provide utility relocation engineering, form D-419, utility related permits, and soliciting utility representative attendance respectively.

Approach:

URS, with assistance from So-DEEP will be responsible for this task. As the preliminary plans, profiles and cross-sections for the project are generated, copies will be forwarded to firms with facilities within the work limits.

As soon as the Design Field View Plans are developed, each affected utility will receive copies of the plans in order to verify utility locations.

Once the TS&L drawings have been approved, the affected utilities will receive the Form 4181X along with the TS&L drawings for submission of bridge attachment requests. As meetings arise to resolve utility conflicts, the team will provide engineering personnel familiar with the project to attend and coordinate.

Task 32 - Grade Crossing Activities

Objective:**2.9.2 - Grade Crossing Activities**

This task includes the coordination, procurement of information and the preparation of plans and data for highway/railroad crossings, in accordance with Publication 10A, Design Manual Part 1A.

2.9.2.1 - RR Coordination

This task includes all railroad company coordination requirements necessary to satisfy project and/or PUC needs.

2.9.2.3 - Field Conference

This task includes the preparation and submission of materials, attendance, and meeting dispositions minute taking at the PUC field conference.

Scope:**2.9.2 - Grade Crossing Activities**

Grade crossing activities will be implemented on a project when a railroad crosses the highway, above grade, at grade, or below grade.

When a railroad is involved in the project, the owner shall be issued a formal project notification letter, with a project location map attached.

Copies of existing railroad track and valuation maps that will show the railroad and right-of-way within the project area may be obtained from the railroad company, when available.

Form D-4279, Railroad Crossing Data for Design, and Form D-4279A, Railroad Crossing Data for Contractor will be submitted to the railroad with the request for the completion, and return of the forms to the project designer.

Copies of all forms, correspondence, etc. relating to railroad grade crossing activities will be distributed, and made part of applicable submissions to the District.

2.9.2.1 - RR Coordination

On projects involving railroad activities it is important to maintain close coordination with the railroad company representatives to assure that the railroad's safety policies are adhered to and the railroad's standard design requirements are followed.

The railroad company shall be contacted as early as possible in the project design process, and advised of the potential involvements of their facilities.

Preliminary design plans for the project shall be submitted to the railroad for their information and review, and railroad representative should be invited to attend the Design Field View meeting to allow their input, relative to the railroad/highway designs proposed.

Meetings shall be conducted with the railroad representatives to resolve design issues such as: horizontal and vertical clearances, traffic control, both during and after project construction, traffic signal pre-emption systems, at grade crossing improvements and controls, temporary at-grade crossings, ability of the railroad to provide flagmen and inspectors, in house work force, material supplies, and schedule to perform railroad related work.

All railroad coordination efforts shall be documented and distributed for project record filing.

2.9.2.3 - Field Conference

Once the PUC submission is made, the PUC will schedule a field conference. This conference is held to acquaint the interested parties and the PUC with the actual field conditions as they exist and to provide an opportunity for all parties concerned to make comments regarding the proposed crossing or railroad involvement .

Plan requirements and their content are described in Publication 10M, Design Manual Part 1A.

Detail Task 3 - Grade Crossing Activities

Department Details:

Assume (# or "no") PUC hearings
Estimate # of grade crossing(s)
Keep "name" rail line traffic flow

This project, at a minimum, will potentially involve (#) separated crossing(s) with (name of RR).

General Notes:

- PUC application to be completed and submitted by the District to the PUC.
- All submissions to the PUC will be done by the District.
- All coordination with the PUC will be done by the District.
- Completion of the D-4279 and D-4279A forms will be done by the Railroad, the District will provide the forms to the Railroad.
- Any reimbursement agreements between the Department and the Railroad for incurred costs will be completed and executed by the Department. This does not include railroad flagman costs as deemed necessary by the design consultant while performing field investigations during preliminary engineering phase. Any necessary railroad flagman costs are to be accounted for in direct costs other than payroll. The Department estimates that a flagman will be required for five (5) working days at an estimated cost of \$500.00 per 8 hour day.
- It is the design consultant's responsibility to obtain the necessary insurance and or training required by the railroad before being permitted to enter onto their property.
- Any railroad flagman costs associated with obtaining structures borings shall be included within the structure boring contract.

The PUC has jurisdiction over public highway railroad crossing. Therefore, application will be made to the PUC for approval of the proposed construction and the appropriation of property within the crossing.

A request shall be made of the railroad to provide its requirements for entrance on railroad property during the project design process for surveys, borings, etc. and their requirements regarding insurance permits, etc. will be met. The railroad shall be notified prior to entrance on the railroad property by members of the project design team.

Approach:

URS will perform this task as indicated in the Department's Scope of Work, with the following clarifications and details:

Two active railroads operate within the project limits, Lehigh Valley Railroad (R.J. Corman Railroad) located on the western side of the Lehigh River and Susquehanna Railroad (Norfolk Southern Railroad) located on the eastern side of the Lehigh River.

URS assumes PUC Stage 1 and Stage 2 submissions will be necessary for this project. URS will also prepare PUC submissions, deed descriptions necessary for right-of-way acquisition by the PUC and attend a PUC field view, if necessary. PUC submissions will be prepared in accordance with PennDOT D.M. 5, Chapter 13. All PUC submissions will be made through the District

Task 33 - Cross Sections

Objective:

2.4.5 - Cross Sections

This task consists of preparing representative cross sections on all alignments considered in previous environmental studies at intervals such that approximate right-of-way limits can be defined. Earthwork calculations are included in this task.

Scope:

2.4.5 - Cross Sections

This task is the preparation of cross sections during preliminary engineering to assist in evaluating alternate alignments. It includes development of sections at critical locations to assess impacts on right-of-way limits, earthwork, existing structures, drainage controls, environmentally sensitive areas and other features that could be impacted by the alignment.

Following identification of the preferred alternate, the designer will prepare critical cross sections as part of the Design Field View Submission in accordance with Design Manual Part 1A.

Detail Task 3 - Cross Sections

Department Details:

The following items may necessitate an adjustment to the time to complete this task:

- * Number of alternatives and roadways
- * Extent of interchanges
- * Restrictions on available right-of-way

Approach:

URS will prepare cross sections at 100 feet intervals where required to assess the impacts. These preliminary sections will indicate the grade of the existing topography, the roadway template, roadway cut and fill slopes, roadway centerline, profile grade point, storm drainage, utilities, guide rail and right-of-way limits. The sections will be utilized to develop earthwork quantities and will be included with the Design Field View submission.

Consultant Hierarchy

Business Partner	DBE Type	Supervising BP
URS Corporation	No	
Advanced Technology Solutions Inc.	Yes	URS Corporation

Bergmaier Communications, Inc.	No	URS Corporation
Chilton Engineering, Inc.	Yes	URS Corporation
Navarro & Wright Consulting Engineers, Inc.	Yes	URS Corporation
Skelly and Loy, Inc.	No	URS Corporation
So-Deep, Inc.	No	URS Corporation

Attachments

No records found.

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Release: 19.1
Session size: 0.1k

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