ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
PROJECT MANAGEMENT GROUP

DICTIONARY
OF
STANDARDIZED WORK TASKS

Fiscal Year 2023

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DICTIONARY OF STANDARDIZED WORK TASKS

LIST OF ABBREVIATIONS

ADA	Americans with Disabilities Act
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AMG	Automated Machine Guidance
BIA	Bureau of Indian Affairs
BMP	Best Management Practice
C&S	ADOT Contracts and Specifications
CADD	Computer Aided Drafting and Design
CAV	Connected and Automated Vehicle
CCTV	Closed Circuit Television
CPM	Critical Path Method
DBE	Disadvantaged Business Enterprise
DCR	Design Concept Report
DE	ADOT District Engineer
DMS	Dynamic Message Sign
DOD	Department of Defense
DSWT	Dictionary of Standardized Work Tasks
ECS	ADOT Engineering Consultant Section
FHWA	Federal Highway Administration
GAF	Ground Adjustment Factor
GPDM	Geotechnical Project Development Manual
IDO	ADOT Infrastructure Delivery & Operations Division
ITG	ADOT Information Technology Group
ITS	Intelligent Transportation Systems
LiDAR	Light Detection and Ranging
MOAS	Manual of Approved Signs
MPD	Multimodal Planning Division
NBI	National Bridge Inventory
NEPA	National Environmental Policy Act
NTP	Notice to Proceed
ORD	OpenRoads Designer
PBPD	Performance Based Practical Design

PEP	Partnering Evaluation Program
PFG	Proposed Finished Grade
PIP	Public Involvement Plan
PM	ADOT Project Manager
PMG	ADOT Project Management Group
PS&E	Plans, Specifications and Estimate
PSW	Project Scope of Work
QC	Quality Control
RE	ADOT Resident Engineer
RTE	ADOT TSMO Regional Traffic Engineer
ROW	Right of Way
RUC	Road User Cost
RWIS	Road Weather Information System
SA	Supplemental Applications
SFS	Speed Feedback Sign
SODA	Structural Overlay Design for Arizona
SUE	Subsurface Utility Evaluation
SWPPP	Storm Water Pollution and Prevention Plan
SWZ	Smart Work Zone
TA	Typical Applications
TCDP	Temporary Traffic Control Design Guidelines
TCP	Traffic Control Plan
TMP	Transportation Management Plan
TOC	ADOT TSMO Traffic Operations Center
TM	Terrain Model
TPAS	Truck Parking Availability System
TSMO	ADOT Transportation Systems Management and Operations Division
TTC	Temporary Traffic Control
U & RR	ADOT Utilities and Railroad
USFS	United States Forest Service
VE	Value Engineering
VSL	Variable Speed Limit
WIM	Weigh-in-motion Systems
WWD	Wrong Way Detection

SECTION 100 – GENERAL INFORMATION

This Dictionary of Standardized Work Tasks (DSWT) includes a detailed description of work tasks that are common to Consultant design contracts. Not all the work tasks described within are necessary on every project. Clarification of required tasks will be made in the Project Scope of Work (PSW). NOTE: For in-house projects, Consultant shall be interpreted as the in-house Prime Designer.

150 Organization

The Arizona Department of Transportation ("ADOT" or the "Department") retains design consultants to perform a variety of engineering and environmental services.

160 Length of Services

The length of services begins with the notice to proceed (NTP), and includes all reviews by the team and stakeholders through the award of the construction contract. Post design services may be included by contract modification, at the discretion of the Department.

171 Project Schedule

The Consultant shall develop a schedule for the design and pre-construction activities necessary for delivering the project in a timely manner consistent with the length of service. The schedule shall include a list of activities, estimated duration, milestones, and resources displayed in a Critical Path Method (CPM) format. The Consultant shall provide the CPM schedule no later than 10 working days following the project kickoff meeting. The schedule submitted shall be customized to reflect the exact needs of the project. Work elements for which ADOT has responsibility shall be included in the schedule. The Consultant shall establish and manage the project schedule in the Workfront platform.

172 Project Schedule Updates

The Consultant shall provide status updates for all activities in the schedule on a monthly basis, and provide the updates to the project team. The Consultant shall update the project schedule in Workfront. Changes to the schedule logic shall be submitted to the ADOT Project Manager (PM) for approval. The monthly updates shall include project detail activities and the respective dates in a bar chart or other approved format and a schedule of major project milestones concurrent with monthly invoices. If an activity or milestone falls 30 calendar days or more behind the approved schedule, a revised schedule shall be prepared within 15 calendar days showing steps to be taken to bring the project back on schedule.

173 Progress Meetings

The Consultant shall schedule, prepare materials for, attend, and participate in progress meetings during the duration of the project. These meetings include, but are not limited to, the kick-off meeting, monthly progress meetings unless otherwise specified by the PM and coordination meetings with the technical groups and other stakeholders. The Consultant shall record notes of the meetings. These notes shall be distributed to the PM and/or other team members, as specified by the PM, within 5 calendar days of the meeting.

SECTION 200 – DESIGN REFERENCES

Design references developed, adopted and published by ADOT and other agencies for use in design are listed in the latest editions of the following references:

- ADOT Project Development Process Manual
- AASHTO LRFD Bridge Design Specifications
- ADOT Bridge Design Guidelines
- ADOT Bridge Hydraulics Guidelines
- MUTCD and corresponding Arizona Supplement
- ADOT Temporary Traffic Control Design Guidelines
- ADOT Traffic Engineering Guidelines and Processes
- Signing and Marking Standards
- Traffic Signal and Lighting Standards
- Manual of Approved Signs (MOAS)
- AASHTO Standard Specifications for Structural Supports, Highway Signs, Luminaires, and Traffic Signals,
- ADOT Roadway Design Guidelines .
- Guide for Review of the AASHTO Controlling Design Criteria on Existing ADOT Roadways

The Consultant is advised that while possession of all of these documents is not necessary to successfully complete the project, the Consultant is responsible for designing in accordance with the applicable documents and current revisions and supplements. The Consultant shall verify with the ADOT technical sections and the PM for current approved references.

The Consultant is responsible to ensure the project is developed in accordance with federal, state, tribal, and local regulations, statutes, policies, procedures, and guidelines. It shall be the selected Consultant's responsibility to gather the appropriate manuals and guidelines for use on each individual project.

220 AASHTO Publications

ADOT references and publications shall control the work, and any necessary supplementation should be provided by appropriate AASHTO and/or FHWA references.

230 Online References

The following references can be found on the ADOT and FHWA websites:

Bridge Group includes links to Bridge Design, Geotechnical Services, Bulletins, and Bridge/Tunnel Inventory.

CADD Standards contains information on CADD requirements and ADOT Standard Drawings.

Contracts and Specifications includes information on construction bidding and bid results, and links to Estimating Contract Time, and Specifications and Pay Items List.

Engineering Consultant Section included links to Consultant prequalification, advertisements, selections, resources, forms and templates, policies, DBE program, local public agency procurement, and contacts.

Environmental Planning includes links to Air Quality, Noise, Biology & Clean Water Act Section 404/401, Cultural Resources, Hazardous Materials, Material Source Guidance, Water Resources, Operations, Programs, and Training.

FHWA Performance Based Practical Design (PBPD) Program ADOT is increasingly challenged with addressing system performance, mobility, and safety needs in the current era of financial limitations. This link includes general information on PBPS, case studies, information on training, and technical assistance.

Project Management Group includes links to workfront, resources, and contacts.

Right of Way/Properties includes links to Property Management, Existing Right of Way (ROW) Plans, Booklets and Manuals, and ROW CADD Standards.

Roadway Engineering Group includes links to Roadway Design, Predesign, Drainage, Roadside Development, Pavement Design, Survey, and Americans with Disabilities Act (ADA).

Standards and Guidelines includes links to standards, guidelines, and standards committee.

Traffic Group includes links to Guidelines and Processes, Manual of Approved Signs, Signing and marking, Signals and Lighting, References, CADD Standards, and Guidance Documents.

Transportation Systems Management and Operations (TSMO) includes links to Initiatives and Innovations, Operational Traffic and Safety, Systems Maintenance, System Technology, Traffic Management, and Traffic Maintenance.

Utility and Railroad Engineering includes information related to Utility and Railroad Coordination.

SECTION 300 – DESIGN CRITERIA

Design of projects shall be guided by the design criteria identified in the design standards, manuals and guidelines referenced in Section 200. **All projects shall be designed in English units of International Feet.**

301 Supplemental Design Criteria

The design criteria and the project design guidelines may be supplemented by project design memorandums provided by ADOT during the course of the project. Performance Based Practical Design (PBPD) measures shall be considered and implemented as often as applicable.

SECTION 400 – DESIGN WORK PERFORMED BY CONSULTANT

The Consultant shall be responsible for providing the engineering and environmental services required to accomplish the work. The services may include, but are not limited to, the tasks of data/document preparation and interpretation including survey and mapping, scoping documents, reports, corridor management plans, construction plans, Special Provisions, construction cost estimates, and post-design services.

401 Design Features

The Consultant shall be responsible for the design development and construction document preparation for the project. The design shall be developed on the basis of the associated technical data referenced in Section 200. The Consultant shall coordinate closely with the PM and other members of the project team to accurately identify design features and project needs.

402 Partnering Process

The Consultant and subconsultants shall participate in a Partnering Process consisting of the following items, if requested:

- Scope Clarification Meeting
- Design Partnering Kick-Off Workshop
- Participation in the Partnering Evaluation Program (PEP)
- Pre-Construction Meeting
- Construction Partnering Workshop
- Project Close-Out

403 Scoping Documents

The scoping document is a preliminary report which describes the scope of work for a project and identifies the impacts the project will have on ADOT's resources, the public, other agencies, and the environment. If a scoping document hasn't been prepared, the Consultant shall be responsible for developing the appropriate level of scoping document for the project in accordance with ADOT Scoping Guidelines located on the Roadway Predesign website.

405 AASHTO Design Criteria Report

The Consultant shall be responsible for preparing a review of the AASHTO Controlling Design Criteria in accordance with the current *Guide for Review of the AASHTO Controlling Design Criteria on Existing ADOT Roadways*. Not all project types require a review so the PM will determine the need for a formal review prior to finalizing the PSW. The AASHTO Review Guide can be found on the ADOT website.

Any deviations to the design criteria which result in the need for a design exception shall be submitted to the Roadway Design Group for approval. The request shall describe the deficiencies not previously approved which are now being corrected, and the justification for the design exception. The request shall be developed consistent with the Design Exception and Design Variance Process Guide. ADOT will forward the design exception request to FHWA, if necessary. The request shall be submitted a minimum of 15 calendar days prior to the Stage II design submittal, in accordance with Section 1060.

410 Location Surveys

The Consultant shall review data provided by ADOT. Any field surveys required shall be suitable for contract documents preparation and meet the technical requirements of ADOT and the State Board of Technical Registration. The Consultant is responsible for, but not limited to, the following:

A. All surveys and mapping for projects utilizing existing roadway(s) shall be referenced and tied directly to the existing as-built roadway centerline. The centerline shall be re-established in its original position by locating, marking, staking and referencing the PC, PT, TS, SC, CS, ST, PI (if possible), and a minimum of 50 feet station intervals along the curves and 100 feet station intervals on tangents. The use of offset baselines for re-establishing or defining the existing centerline is not permitted unless approved in advance by ADOT. The centerline stationing of the project shall be on ADOT's established field stationing.

B. Completed surveys shall be submitted electronically with the final sealed plans. The surveys shall include locations, stakes and references of control points, (including the beginning and ending points of the project), NGS datasheets, as well as any crossovers for both directions along the centerline alignments), PC's, PT's, TS's, SC's, CS's, ST's, and PI's (if possible) of curves, POT's with a maximum interval of 1,000 feet, and bench marks on alternate sides of the roadway with a maximum interval of 1,000 feet. Any survey data collected and provided must be certified by an Arizona Registered Land Surveyor. Any coordinates used shall comply with the Arizona State Plane Coordinate System.

C. Surveys may include, as applicable:

1. Baseline control.
2. Control for aerial mapping.
3. Topographic surveys.
4. Roadway drainage surveys.
5. Utility locating - set control points with coordinates and elevations at 500 ft. maximum intervals adjacent to the road and along the utility lines (See section 430).
6. Centerline staking, centerline of each roadway, as applicable for field review (lath stakes at PC, TS, SC, CS, ST, PT, and PI (if possible) at approximate 200 ft. intervals, and at selected locations if required to define the approximate limits of construction).
7. Centerline and edge elevations of existing pavement at 50 ft. intervals.
8. Suitable tied to the Arizona State Plane Coordinate System.
9. Final alignment staking.
10. Crossroads tie-ins, turnouts, and driveways.
11. Above ground utilities.

D. The Consultant shall obtain any permits that may be required prior to beginning field work (ADOT District, United States Forestry Service, Bureau of Indian Affairs, Department of Defense, Right-of-Entry, etc.). For example, surveys within the USFS boundaries require a notification in advance only. A traffic control plan may also be required. Preparation of surveys shall conform to applicable documents referenced in Section 200, including (but not necessarily limited to) procedures, record-keeping requirements, equipment use, and safety precautions. The Consultant shall secure an access permit, if required, from the appropriate agency should any work that disturbs the environment be necessary (i.e. USFS, BIA, DOD, etc.).

E. Unless otherwise directed by the PM, the Consultant shall be responsible for selecting and/or verifying a scale that results in good plan clarity. The following scales are suggested for use in the preparation of mapping, survey base maps, and construction plans:

1. 1 inch = 400 feet (Drainage map and ROW key sheet).
2. 1 inch = 50 feet (Construction Plans, Traffic Control Plans, Photogrammetric Surveys, and ROW maps).
3. 1 inch = 30 feet(Landscape and Irrigation Plans).
4. 1 inch = 20 feet (Location Surveys, Intersection plans, urban streets, and other items of considerable detail).

G. The Consultant may be responsible for delineating the ROW so that utility companies may prepare relocation plans. Delineation with strips of plastic flagging attached to lath located at intervals shall provide a clear delineation of the ROW; this work shall be completed immediately prior to the date that utility company personnel are scheduled to conduct a field survey of the project.

H. Completed surveys and maps shall be recorded in an acceptable format. Upon final approval, the electronic files, maps, and CADD files (See Section 490) shall be submitted to the PM.

411 Photogrammetry and Mapping

Unless described otherwise in the PSW, the Consultant shall review data provided by ADOT. The Consultant is responsible for, but not limited to, the following:

A. Mapping projects shall adhere to the ADOT CADD Standards and the General Specifications for Photogrammetric Mapping. Miscellaneous reports and studies done by ADOT or other Consultants for particular projects may also be available and will be provided by ADOT. Any necessary supplementation should be provided by the appropriate AASHTO and/or FHWA references.

B. In addition to the current ADOT archiving methods, the Consultant shall submit pertinent project metadata to the ADOT Engineering Survey Section/Photogrammetry and Mapping. The metadata can be submitted in text (.txt) or similar file.

Metadata content should include, as a minimum:

1. Complete Project No.
2. Route Number and/or Name.
3. Project Description.
4. Beginning and Ending Mileposts.
5. Project Datum.
6. Ground Adjustment Factor (GAF).
7. Arizona State Plane Coordinate System Zone.
8. Map Scale.
9. Aerial Photography Date and Scale.
10. Contour Interval.

C. The Consultant shall be responsible for the accuracy and completeness of the mapping project. Map contents shall include but not be limited to:

1. Terrain Model (TM) features (i.e. breaklines and mass points).
2. Roadway features (e.g. edge of pavement, centerline, etc.).

3. Horizontal and Vertical control points.
4. Planimetric features (e.g. buildings, signs, utilities, bridges, canals, fence lines, etc.).
5. Contours and contour labels.
6. Relief features.
7. Spot elevations.
8. Drainage features.
9. Grid ticks.
10. Match lines.

Unless otherwise directed by the PM, photogrammetric mapping will be completed at either 1"=50' for Design Level Mapping, or 1"=100' for Design Concept Report (DCR) mapping.

D. Map accuracy shall conform to the standards set forth by the *Geospatial Positioning Accuracy Standards Part 3: National Standards for Spatial Data Accuracy (NSSDA).* The standards can also be found in the current edition of the General Specifications for Photogrammetric Mapping.

E. To ensure mapping standards are met, the Consultant shall have a Quality Control (QC) plan in effect. The plan shall review ground control accuracy, flight alignments, photographic quality, aero triangulation results, stereo compilation, map accuracy, and map completeness. Final deliverables shall have a neat appearance, be well organized, accurate, complete, and technically correct. Additional testing shall be made by the Consultant if there is reason to be suspect of the map quality in general or at any specific location.

All photogrammetry mapping projects shall be submitted to the PM for archiving purposes. Additionally, a copy of the project metadata shall be submitted to the ADOT Engineering Survey Section/Photogrammetry and Mapping.

416 Geotechnical Design

Geotechnical requirements contained in the 2021 ADOT Geotechnical Project Development Manual (GPDM), shall be considered as minimum requirements for Subsurface Investigations. These requirements are not intended to preclude innovative methods of geotechnical investigations and testing the Consultant may propose. Laboratories selected by the Consultant to perform construction materials testing and analyses must meet the requirements of ADOT's "System for the Evaluation of Testing Laboratories". The Geotechnical Design process shall include appropriate reports, as required, for roadway and/or structure foundation designs.

Prior to submitting a proposal for geotechnical services, the PM may schedule a meeting with the Consultant, the geotechnical consultant, and the ADOT Geotechnical Design Services project team member. Project geotechnical issues will be discussed at this meeting and a geotechnical work plan will be developed. Any subsequent changes due to access limitations, environmental restrictions, etc., will be reviewed and approved by the ADOT Geotechnical Design Services team member prior to the work being performed.

The Consultant Geotechnical Engineer is responsible for, but not limited to, the following:

A. The Consultant shall perform a geotechnical investigation of the project in accordance with the requirements of the GPDM.

B. The Consultant shall secure an access permit and all necessary clearances and permits for work from the appropriate agency, if required, which may at a minimum require the preparation of an equipment access plan, description of equipment types, a plan of the test hole locations, etc.

   1. The Consultant shall adhere to all traffic control requirements when taking samples on existing roadways. A traffic control plan may be required.
   2. A SWPPP and ADEQ approval may also be required. When a SWPPP is not required, good housekeeping using BMPs shall be followed.
   3. When an Arizona Department of Water Resources (ADWR) Well Registration or Variance is required, ADOT Right of Way Section information and notification requirements on NOI and abandonment shall be followed (See section 430D).

C. Geotechnical investigations may be included in the project environmental clearance or done as a separate geotechnical clearance in advance of the project clearance.

D. Geotechnical investigations shall include all necessary sampling, laboratory testing, and analyses of materials. Any core samples obtained shall be photographed and stored by the Consultant or subconsultant until construction is complete or until the ADOT Geotechnical Design Services project team member and the PM concur that there is no longer a need to do so.

   Upon completion of the geotechnical investigations, the Consultant may proceed with the preparation of the roadway and/or foundation designs, and the Geotechnical Design Reports, and/or Foundation Data Sheets.

E. The Consultant's Geotechnical Design Reports shall follow the guidelines of the GPDM - Chapter 6.

F. The Special Provisions shall include all notes related to materials found on the final construction plans and not already covered by the Specifications. When an ADWR registered well is to remain until the construction contract is awarded, the Consultant shall include a Special Provision in the contract to abandon this well per ADWR requirements and report its abandonment per ADOT ROW Section reporting requirements (See section 430 D).

G. The Consultant’s Geotechnical Engineer shall review and ensure all geotechnical design elements are properly addressed in the final plans and Special Provisions.

H. The Consultant’s Geotechnical Engineer shall submit electronic copies of the final sealed and signed Geotechnical Design Report and Foundation Data sheets (11"x17" format) to ADOT Bridge Group, Geotechnical Design Services.

417 Earthwork

The Consultant shall attempt to achieve an approximate earthwork balance for the project consistent with good engineering practice based upon the type of material and with consideration given to environmental mitigation measures unless otherwise directed; this may be accomplished by: a) refining roadway geometry (alignment and/or profile) utilizing ADOT Standard Drawings C-02 for slopes; b) adjustment of ditch widths and/or back slope rates to obtain excavation of additional suitable material; c) flattening of embankment slopes or creation of ‘false cuts’ to dispose of excess material; or combinations of a), b) and c). Adjustments shall not adversely affect water quality and must be coordinated with the project team, including the USFS

coordinator, if applicable. Cost of additional right-of-way and environmental concerns must be weighed in determining the most feasible solution for the project.

When a project requires borrow or waste sites, the Consultant shall investigate and propose sites per requirements as outlined under paragraphs A, B, C and/or D below:

A. ADOT-licensed Materials Sources:
The investigation shall begin with a review of material source information available in the ADOT Geotechnical Operations Section. ADOT may have information regarding active or historically used sources that may be proposed for use by the contractor The results of the investigation shall be included in the applicable Consultant's Geotechnical Design Report (See section 416) and shall use the assigned Material Source (MS) number.

B. Contractor-furnished Materials Sources:
Contractor-furnished materials sources are an acceptable alternative to ADOT-licensed material sources. The analysis and test results of the material available at the commercial source shall be included in the Consultant's Geotechnical Design Report (See section 416) and shall be identified using current tracking number on file with ADOT Environmental Planning.

C. New Materials Sources:
The licensing of new material sources for ADOT use is a lengthy process and should be considered only in the absence of sources identified in A and B. If the location, testing, and environmental analysis of any new materials source is required to complete the design of the project, this work will be added to the contract by contract modification. The analysis and test results shall be contained in a separate report submitted by the Consultant not later than the Stage III submittal.

D. Waste Sites:
If it is determined that a waste disposal site is required, the Consultant shall investigate and recommend the nearest site where material can be wasted. (See section 450)

418 Special Materials

In the case where a special material(s) (i.e. a material with characteristics and design values out of the normal range), is required to meet exacting design requirements, the Consultant shall coordinate with the PM, Construction and Materials Group, Pavement Design Section, Geotechnical Design Section, and/or the Construction District before changing the design or researching the location of such material(s).

419 Pavement Design

The ADOT Roadway Engineering Group requires the following on paving projects:

A. The Consultant shall prepare a pavement design in accordance with the requirements of the ADOT Pavement Design Manual.

B. New pavement design shall conform to the approved 1993 AASHTO method for both Flexible and Rigid Pavements. Structural overlay design shall conform to the Structural Overlay Design for Arizona (SODA) method for rehabilitation of existing Flexible Pavements. In addition to design standards, the Consultant shall employ PBPD. The ADOT “Guiding Principles for Performance Based Practical Design, 2019” shall be used for guidance.

C. The Consultant's proposed pavement design recommendation shall be included in the Pavement Design Summary as described in the ADOT Pavement Design Manual, Sections 5.1 & 5.2. The Roadway Engineering Group, Pavement Design Report Standard Items shall be used in the preparation of the Materials Design Report.

D. The Material Design Report shall contain the Consultant's final recommendations for the proposed pavement design, including recommendations for Special Provisions and construction procedures, as described in the ADOT Pavement Design Manual.

420 Environmental Studies

The Consultant shall develop all supporting environmental technical studies and reports needed to document the impacts, if any, of the recommended action and the necessary mitigation measures. The Consultant shall coordinate with ADOT Environmental Planning (EP) throughout the development process and ADOT EP will provide final approval for ADOT on all environmental documentation and procedures. The Consultant shall refer to ADOT EP standard guidance found on the ADOT EP website for preparing technical reports, agency and public coordination letters, and other quality control guidelines for environmental clearances.

Activities that require soil and/or vegetation disturbance such as geotechnical investigations, surveys, etc. may not begin until the appropriate environmental analysis (i.e., geotechnical clearance, cultural resources, hazardous materials, biological evaluations, etc.) is completed.

The project's environmental footprint shall consider all utility relocation work or ROW demolition required for the project. At a minimum, the project footprint shalll be provided to the Environmental Planner in a .KMZ file format, or similar, as agreed upon by the Planner. The information shall show the extent of limits of the disturbance for all work activities associated with the project. Project footprint definition is applicable for overall project improvements as well as for any testing or clearance needs.

The list below depicts typical resource categories for which an environmental study may include analysis. The Consultant shall obtain further clarification from ADOT EP on the needs of each project and prepare the required technical resource evaluations for review and approval.

1. Natural Environment (Biological Resources)
2. Floodplains
3. Section 404 (Clean Water Act): Jurisdictional Delineation
4. Section 404 (Clean Water Act), 401 and 408: Permit
5. Section 4(f) analysis (federal funds only)
6. Land Use
7. Visual Impacts
8. Prime or Unique Farmland
9. Wild & Scenic Rivers
10. Sole Source Aquifer (Fed: Tucson/Bisbee)
11. Noise
12. Air Quality (federal funds only)
13. Construction-Related Impacts
14. Utility Impacts
15. Hazardous Material Evaluation
16. NPDES/AZPDES or Clean Water Act Section 402

17. Socioeconomic
18. Cultural (if survey, testing or data recovery are needed, submit a separate scope and budget)
19. Public or Agency Scoping
20. Title VI and Environmental Justice
21. General Actions

ADOT EP, in coordination with the affected federal, state and local agencies and jurisdictions, will issue any required clearance. Upon completion of the environmental document, identified mitigation measures will not be subject to change without prior written approval from ADOT EP. The Consultant shall be responsible for incorporating appropriate mitigation measures into the final design and Special Provisions of the project.

425 Public Involvement Plan and Community Assessment

ADOT Communications and Public Involvement oversees all agency outreach efforts. The Office of Community Relations within ADOT Communications leads public involvement efforts for the agency. All public Involvement must occur in accordance with the ADOT Public Involvement Plan (PIP), which has been approved by FHWA.

If scoped to do so, the Consultant shall develop a project-or study-specific public involvement plan in compliance with the ADOT PIP and obtain approval from ADOT Community Relations and the ADOT Civil Rights Office prior to beginning any formal public-involvement activities.

This project- or study-specific PIP shall:

A. Include a community assessment outlining demographics of the affected community in the project area, based on current census data (including a Limited English Proficiency Four-Factor Analysis) to inform the public outreach approach and determine if the project meets the Safe Harbor Threshold for translation of project materials in LEP languages.
B. Outline the objectives of the PIP during the current study or project phase (e.g. to inform of project purpose, need and schedule, and seek public input on design alternatives) and the various strategies and tactics the Consultant will employ to inform and/or involve all members of the public during all phases of the project or study.
C. *Specifically* identify how public information and public involvement efforts align with the ADOT PIP as it relates to Title VI of the Civil Rights Act; the Americans with Disabilities Act; and Presidential executive orders required for Environmental Justice and LEP populations.

Public Meetings/Hearings

Public meetings are one way to inform and involve the public. If the Consultant identifies the need for public information meetings as one of the outreach tactics in the PIP – or if a formal public hearing(s) is required pursuant to the National Environmental Policy Act (NEPA) – the Consultant shall provide the services noted below, as well as adequate staffing and materials if conducting a public meeting or hearing is included in the PSW:

A. Complete a project assessment to determine demographics of the project/study area as well as the language or ADA accommodations that are required; demographic data shall be used to determine the most appropriate day, date, and time for public meeting(s) and/or hearing(s) to occur. Specific to LEP populations, the community assessment *must include* a Four-Factor Analysis to determine if LEP populations are impacted and whether translation or interpretation services are necessary.

B. Consult with the ADOT project team and ADOT Community Relations to select the appropriate meeting format, days, dates, times, and locations for the public meeting(s) and/or hearing(s). Advance consultation is required to negate possible conflicts with other ADOT or agency public meetings; religious or other holidays; seasonal population changes; timing of NEPA documentation public review period; and other community or special events.

C. Identify and secure a venue that satisfies the requirements of the ADOT PIP relative to project/study area proximity; opportunities for public transit; and ADA compliance.

D. Provide required liability insurance and pay any room-rental fees.

E. Arrange for any needed meeting room setup and equipment (e.g., podium, microphones, sound system, chairs, tables, laptops, projector, TV/video player, easels, signage, etc.).

F. If a public meeting will be conducted virtually, provide use of meeting platform software that allows a sufficient level of admin controls for participants (e.g. WebEx Events or similar platforms to allow the meeting admin to mute and unmute participants), set up the meeting invitations for panelists and general participants and provide meeting access/login information, conduct rehearsals to ensure meeting panelists are familiar with the technology, provide sufficient staff at the meeting to troubleshoot and facilitate Q&A sessions, and accommodate any required LEP language translation requirements. This could be accomplished through simultaneous verbal translation via a separate LEP phone line or channel , a separate meeting in the required LEP language, or other method approved by Community Relations and the Civil Rights Office.

G. For NEPA studies (Environmental Assessments, Environmental Impact Statements), the Consultant shall establish and monitor the study-specific email address; a project information telephone line that accommodates all identified non-English languages; and a mailing address for written comments to be received and is responsible for tracking and documenting all public comments received for the study record. The Consultant, project team, and ADOT Community Relations will determine, in advance, the responsibility for these tasks for non-NEPA studies and other projects.

H. Develop and produce or print *meeting materials*[1] including but not limited to: name tags, sign-in sheets, comment forms, question cards if applicable, informational fliers for distribution to meeting attendees, display boards and other displays or exhibits, maps, and PowerPoint presentation. The Civil Rights Office shall be invited to attend and shall provide the required notices, language cards, Self-Identification Survey, and other materials for the Consultant if the Civil Rights Office staff will not be in attendance. All materials must be reviewed and approved in advance by the ADOT project team, and ADOT Community Relations, and the Civil Rights Office.

I. Translate or have all meeting materials, including the presentation, translated into identified non-English languages if required per the Four-Factor analysis.

J. Procure a minimum of one interpreter if required per the Four-Factor Analysis; in the case of a formal public hearing, procure a minimum of two court reporters, including at least one who is bilingual in the identified non-English language(s) if required per the Four-Factor Analysis

K. Procure, if necessary, other translation services or interpretation services if requested for non-English languages and American Sign Language to meet requirements of Title VI. Provide the ADA Non-Discrimination Notice at the public meeting - either the poster if in person or a slide if a virtual meeting - and assist in fulfilling any requests for ADA accommodations.

L. Procure newspaper advertising, if necessary. This includes contacting publications and placing the advertisements on ADOT's behalf in alignment with mandatory lead times and required content as prescribed by the ADOT PIP and/or by NEPA. Selected publications should meet the requirement to be "newspapers of record" for the area specific to the public meeting or proposed action. If warranted per the Four-Factor Analysis, translated advertisements must be placed in newspapers published in identified non-English languages. Ads shall follow the format established in the ADOT PIP and include required Title VI accommodation/non-discrimination language. All ads shall be reviewed and approved by ADOT Community Relations and the Civil Rights Office.

M. Identify publically available locations such as libraries or communities centers within project study areas that can serve as a repository for documents that are made available for public review for the purposes of NEPA if required.

N. Coordinate and assist ADOT on updates to project website to upload meeting materials, establish online surveys during comment periods, and other project website services.

O. If warranted by the project PIP, develop, print and mail postcard/other notices to residents and businesses in the affected project area. Postcards should include the required Title VI accommodation/non-discrimination language and be translated into any required LEP language based on the LEP Four-Factor analysis.

P. No food and beverage is required at ADOT public meetings. If the consultant wishes to be reimbursed for the purchase of bottled water, procurement must occur in accordance with *FIN-13.01 Guidelines for Providing Food/Beverages at ADOT Sponsored Functions* which includes advance approval of the completed "Request to Provide Food/Beverages" form by the ADOT Controller/CFO.

Q. Provide adequate staffing for the meeting(s) or hearing(s) including staff to set up and tear down prior to and after the meeting(s) or hearing(s), staff to troubleshoot technical issues with a virtual meeting, as well as subject-matter experts who can assist with presentations and/or answer questions from the public.

R. Provide a meeting summary that encapsulates pre-meeting notification efforts, information on the audience (number and type of attendees including results of the self-ID survey for those who completed it), the purpose of the meeting, summary of the information provided at the meeting, input sought and comment methods, comments received and responses provided, and needed follow up from the meeting. Meeting notices, materials shared at the meeting, sign-in sheets/logs, comment logs and other applicable materials documenting the meeting shall be appended to the meeting summary.

[1] *Meeting materials:* This requirement varies from project to project based on the project or study-specific public involvement plan. When the public involvement plan is developed and approved, any material costs not covered in the existing PSW will be added through a contract modification.

Other Public Involvement Services

If a public meeting is not required in accordance with NEPA, the Consultant may be required to provide other services including but not limited to:

A. Completing a Four-Factor Analysis to determine if LEP populations are impacted.

B. Developing project or study collateral materials in English and other languages as identified by the Four-Factor Analysis.

C. Developing project graphics, photo simulations and animations.

D. Developing survey instruments to seek public input/comments, analyzing and reporting on survey data.

E. Procuring interpretation of project collateral materials into non-English languages upon request.

F. Procuring printing and postage for project or study-related mass mailings.

G. Procuring newspaper or other advertising to raise awareness about the project or study.

H. Providing a subject-matter expert(s) to share information with key stakeholders at community meetings not hosted by ADOT; at city council or other local-government meetings; or via other opportunities or local events.

I. Reviewing project collateral materials, web site text, graphics and other materials created by ADOT for accuracy.

J. Responding to, or assisting with responses to, questions or comments from the public and key stakeholders.

K. Tracking and summarizing questions or comments from the public and key stakeholders.

L. Coordinate with ADOT Communications to upload information or required materials to the ADOT project website.

In-house Public Involvement Services

Only ADOT Communications (Offices of Community Relations, Creative Services and Public Information) shall supply the four outreach tools listed below; however, coordination with the Consultant may be required to ensure accuracy.

1. Email alerts via the GovDelivery system
2. News releases

3. Social media
4. Web pages

Reasonable and sufficient advance coordination with the assigned ADOT Community Relations project manager is required to ensure availability of resources and compliance with lead times for public notification as specified in the ADOT PIP or by NEPA.

430 Utilities and Railroads

All work shall be performed in accordance with ADOT's *Guideline for Accommodating Utilities on Highway Rights-of-Way*, the *Utility Coordination Guide for Design Consultants* and the *Stage Deliverables Checklist*.

The Consultant shall utilize, and modify if necessary after discussion with Utility and Railroad (U & RR) Group, the letter formats provided in the *Utility Coordination Guide for Design Consultants* when communicating with the utilities. Copies of all correspondences and responses shall be copied to U & RR.

A. Definitions:

Utility – A facility which transmits or distributes communication, cable television, electricity, heat, gas, petroleum products, water, and sewer or any other similar commodity which directly or indirectly serves the public.

Utility Company – A municipality, public service corporation, utility district, etc., which owns and operates utilities that serve the general public. Unless otherwise noted, the procedures to be used with railroad companies shall be the same as those used with utility companies.

Prior Rights Documentation – Documentation showing rights associated with one party's use or occupancy of land, or with the facilities located on such land, that are, because of priority in time or other reasons, superior to the rights of the other party. Such documents provide verification if the State is obligated to compensate the utility company for the cost of relocations or adjustments required to accommodate the highway project.

U & RR – Utilities and Railroad Engineering Section of the Arizona Department of Transportation.

B. Previous Information:

The Consultant shall use all available utility location information including any information obtained during the scoping phase. This information, and additional information gathered later, shall be shown on the plans prior to submittal to the utility companies for review.

C. Identification of Utilities:

Existing utility horizontal locations must be shown on the Stage II Plans to facilitate review and identification of potential utility conflicts. Additional information (vertical location from pothole efforts, utility condition from utility records, etc.) may be required to be shown on the Stage III Plans to determine the disposition of utility conflicts; whether such measures to protect-in-place or provide additional protection are reasonable alternatives to relocation.

1. By Consultant – The Consultant shall contact, and coordinate with, all of the utility companies within or serving the project area to obtain utility facility location records and as-built

information. Dependent upon the needs of the project, U & RR may reduce the required research efforts.

2. By Locating Consultant – Designating and Locating (Potholing) is not required on all projects and is based on the needs of individual projects. The need for this service is to be discussed with, and approved by, U & RR.

    a. The SUE Phase I Checklist shall be prepared and submitted to the Utility Coordinator when requesting horizontal utility locations (designating). The information in the SUE Phase I Checklist shall be used by the Locating Consultant for the purpose of identifying and horizontally locating utilities. This phase shall be accomplished prior to the completion of Stage II Plans.
    b. The SUE Phase II Checklist shall be prepared and submitted to the Utility Coordinator to request utility potholes. The information in the SUE Phase II Checklist shall be used by the Locating Consultant for the purpose of obtaining utility elevation information at selected locations. This pothole data shall be obtained prior to the completion of Stage III plans.

    Any exception to the above must be approved by U & RR.

D. Right of Way
The Consultant shall also assist in the development of exhibits for transfer of ROW if requested by ADOT Right of Way.

The Consultant shall assist in the development of exhibits for transfer of ROW to utility companies with prior rights.

431 Utility Conflicts and Adjustments

For utility conflicts and adjustments, the Consultant shall:

A. Identify project potential impacts on utilities within the Utility Report submitted for the Stage II Plan and advise the impacted utility.

B. After design mitigation efforts are exhausted, shall determine all project impacts on utilities based on conflict criteria which require the utility to be relocated or adjusted and shall advise U & RR and the utility company. The Consultant shall delineate the extent of utility conflicts with the project within the Utility Report submitted with the Stage III Plan and advise the impacted utilities.

C. Advise U & RR if upgrades or betterments are requested by utility companies.

D. Coordinate with the ADOT Right of Way Coordinator and the PM when property is acquired for a highway project, or when private utility issues related to those parcels are resolved as part of the ROW acquisition.

E. Arrange and conduct utility coordination meetings to facilitate identification and resolution of potential impacts on utilities or eventual utility conflicts based on project needs as requested by the PM and U & RR.

F. Solicit submittal of prior rights documentation from the utility companies if requested to do so by the U & RR coordinator upon identification of potential impacts on utilities. The Consultant shall verify that the prior rights documentation submitted by utility companies represents the areas of the project where utility relocations are anticipated. The Consultant shall submit this reviewed documentation n to the U & RR coordinator. The request for prior rights shall take place after the Stage II submittal. Complete prior rights documentation shall be submitted to U & RR no later than the Stage III submittal.

Prior Rights documentation should only be requested for that portion of the project where utility conflicts are expected. The Consultant shall not discuss opinions of prior rights validity with the utility company. Only U & RR has the authority to verify prior rights status.

G. Upon determination of utility conflicts per subparagraph "431 B" above, request relocation plans and schedules from all utilities that must relocate, regardless of prior rights and receive completed relocation plans prior to Stage IV submittal.

H. Only U & RR will authorize utility companies to start design and/or construction; this applies to prior rights and non-prior rights situations. Authorizations shall be given in writing; if a verbal authorization is given, it shall be followed up with a written one. In all cases, the authorizations shall be dated and signed with copies sent to the appropriate individuals. Upon U & RR authorization for the utility to start design, the Consultant shall facilitate the request by providing the utility company with available project data to facilitate their design of each delineated conflict.

I. The Consultant shall be responsible for reviewing relocation plans produced by utility companies to ensure that all anticipated utility conflicts with project plans and with planned utility relocations are mitigated. The Consultant shall also ensure that proposed utility installations conform to ADOT's *Guide for Accommodating Utilities on Highway Right-of-Way* and that the plans meet ADOT permit requirements.

1. Any facilities to be permitted by ADOT will comply with the Guideline for Accommodating Utilities on Highway Right of Way.
2. The relocation plans do not conflict with the project improvements or other proposed utility relocations.
3. Any facilities to be permitted are not in conflict or impair the planned future expansion of the highway.

If the relocation work is within ADOT's right of way, the ADOT permit office will need a letter or email regarding the review to facilitate permitting.Stage Submittal Checklist

J. The Consultant shall prepare draft utility Special Provisions and submit them to U & RR for comment. This includes section 107.15, Force Accounts and Line Item Specifications. Special Provisions shall be drafted starting at Stage III and progress with the project to the final PS&E Stage.

K. With each stage submittal listed below, the Consultant shall submit a Utility Report. The Report shall document and update the utility coordination process at each stage. The coordination process shall be conducted in accordance with the appropriate responsibility chart matrix established in the *Utility Coordination Guide for Design Consultants* and the *Stage Deliverables Checklist*.

1. Within the first 30 days after NTP the Consultant shall prepare a Utility Report for submittal to U & RR containing:
    a. Utility Tracking Matrix
    b. A list of all utility companies in the project area.
    c. Each utility company contact and contact information.

2. At Stage II the Utility Report shall contain an update of the listing provided in item "1" above as well as:
    a. Identify the quality of utility information shown on the Stage II Plan per ASCE 3802.
    b. Identify any construction work utilities desire for ADOT's contractor to perform.
    c. Identify any windows of time affecting either the utility design, utility relocation work, or utility service.
    d. Identify anticipated utility relocation costs to establish the budget necessary to implement all anticipated utility relocation agreements.
    e. Identify possible additional right of way necessary for utility relocation work.
    f. Identify if any utilities are planning relocation work outside of areas of the project planned environmental footprint.
    g. Identify anticipated time needed by utilities to prepare their relocation plans.
    h. Identify anticipated time needed by utilities to perform their relocation work.

3. At Stage III, the Utility Report shall contain all of the above as well as:
    a. Any changes to what was previously presented.
    b. Identify any additional project right of way necessary for utility relocation work.
    c. Verify that all proposed prior right utility relocation work is within the project's environmental footprint or that the utility has been advised they are responsible for and must provide during their relocation effort compliance to all environmental requirements.
    d. A list of utilities responsible for payment of their relocation work.
    e. A list of the mitigation measures by utility, a summary of the meetings held with each utility company - what was discussed and when, and what actions were taken to arrive at the selected mitigation measure.
    f. A list of pothole data requested and obtained.
    g. A copy of all correspondence between the Consultant and each utility company.
    h. A preliminary estimate of ADOT's cost for utility relocations, and betterment requests by a utility company for work to be included into the ADOT project.
    i. Provide an estimate of the utility cost to relocate prior right facilities in conflict with the project.

4. At Stage IV the Utility Report shall contain all of the above as well as:
    a. Any changes to what was previously presented.
    b. A list of permits issued for utility relocation plans.
    c. A list of utility permits to be issued that are necessary for project utility clearance.

d. A construction schedule for each utility.
e. A final cost estimate for each utility with approved prior rights.
f. Provide a bid item cost estimate for all work to be accomplished by ADOT's contractor for utilities, distinguishing between prior right and non-prior right facilities.

The final Utility Report shall be included with the project design and the final utility clearance letter package.

L. The Consultant shall work closely with the utility company and the U & RR coordinator to determine the relocation and access requirements of the utility facility. The Consultant shall inform ADOT Right of Way on or before the Stage III submittal if new ROW is required which exceeds what is needed for the highway improvements.

M. ADOT's Roadside Development Section (for landscape and irrigation), Multimodal Planning Division (for traffic counter systems), and Transportation Systems Operations and Maintenance (for signals, lighting, and freeway management system) shall be consulted about their needs during the project development process. Other appropriate ADOT sections shall be contacted for facilities present at pump stations, inspection stations, rest areas, etc. New electric service drops and water connections for any of these shall be included in the scope of the project (See Section 435 Establishing Utility Service Connections).

432 Utility Plans

The Consultant shall:

A. Indicate all existing utilities in plan view on the Stage II plans; this may include utility poles and lines, pedestals and other above ground appurtenances, all underground utilities, and drainage facilities. A legend key for any symbols used to depict utilities shall be provided.

B. Indicate potential areas of conflict between utility facilities and project improvements. The Consultant shall work with the utility companies to mitigate conflicts. Project plans are to be adjusted as much as possible to avoid utility conflicts without negatively affecting the needs of the project or public safety. Pothole data shall be made available to utility companies no later than Stage III plans.

C. Furnish copies of the Stage II, III, IV and PS&E project plans to U & RR and each utility which has facilities in the area. The Consultant shall furnish copies of cross sections to U & RR and, upon request, to the utility companies. Cross section plans will be required when existing utility facilities have been installed parallel to the roadway centerline within ADOT's right of way. Cross section plans shall show the location and depth of utilities running parallel to the roadway centerline. The size of the plans, 1/2 size or full size, shall be as requested by the utilities. In all cases, the plans, full size or true half-size, shall relate to standard drafting scales. The Consultant shall send plans to the utility companies, receive the comments and responses, and provide U & RR copies of all correspondence to and from the utility companies. Utility comments and their resolutions shall be included on the appropriate Stage Comment Resolution Form and distributed to all team members and utility companies within 10 working days after the comment resolution meeting. Any plans or right of way changes that may affect existing utilities, or their relocation, are to be specifically

brought to the attention of the utility company. This shall include any slope adjustments, curb locations, cut/fill changes, etc.

D. Include utility relocation plans no later than the Stage IV submittal.

433 Utility Relocations and Adjustments

Where a utility relocation or adjustment may be required:

A. The Consultant shall identify possible alternatives (including joint use of trenches) to minimize the number of utility conflicts and minimize the cost of mitigating conflicts.

B. The Consultant shall notify U & RR promptly upon determination that relocation of a utility company facility is required. Where a non-prior rights utility relocation is to be included as part of the project, and the ADOT contractor will perform the work, the Consultant shall provide U & RR with design cost details, drawings and a summary of the construction costs for the work to be charged to the utility company. The Consultant shall use input and drawings supplied by the utility company to the fullest extent possible.

C. U & RR will determine, by examination of prior rights documentation provided by the utility company, the utility's rights to occupy the area of conflict. U & RR will also determine who is responsible for the cost of relocation. U & RR will either notify the utility company to relocate at its own expense, or will prepare a utility agreement to allow for payment of utility when it is at ADOT expense.

D. At the request of the utility company, and with the concurrence of the U & RR coordinator, utility adjustments or installations may be included in the plans and specifications for work to be performed by ADOT's contractor. This may require a JPA, prepared by the PM, or a utility agreement, prepared by U & RR. The decision to include this work shall be determined no later than the Stage III submittal date. Initial cost estimates shall be provided with the Stage III submittal to assist programming and budgeting efforts.

1. Utilities with prior rights: ADOT is responsible for costs incurred. Additions and betterments are the responsibility of the utility company.
2. Utilities without prior rights: Utilities are responsible for costs incurred.
3. Consultant shall advise U & RR of utility company's request, and shall advise the utility company that approval of its request is subject to concurrence by ADOT.
4. Consultant shall provide an estimate of the cost, or review and comment on cost estimates provided by the utility company.
5. Consultant shall coordinate with the utility company to ensure that adequate information is included in the bid package.
6. The Consultant, with input from utility, shall provide U & RR and the PM the actual cost of design and expenses for utility relocation, adjustments, or betterments for inclusion in the JPA or Utility Agreement.

434 Utility Special Provisions and Clearance Letter

Special Provisions and the Utility Clearance letter shall include:

A. Special Provisions

The Consultant shall prepare Special Provisions and submit them to U & RR for comment at Stage III, IV and PS&E. The utility Special Provisions shall include all communications with ADOT's contractor stipulating how to coordinate with utilities during the progress of his work and shall include the following:

1. List of utility companies in the area, and contact person's name, address, and telephone number.
2. A statement that there are no utility conflicts and/or a list of utilities that are in conflict.
3. Work to be performed by utility companies concurrent with the project construction.
4. Completion date or schedule for each utility conflict as provided by each utility company.
5. Work to be performed for each utility by the Contractor and any communication requirements between the utility and the contractor.
6. Utility license, permit, insurance, or right of entry requirements.
7. Indicate special conditions, locations or clarifications related to utility facilities or work that might affect a contractor's bid or schedule.

The Consultant's final submittal of section 107.15 or other Special Provisions related to utility work shall be submitted at Stage IV.

B. Clearance Letter

The Consultant shall submit a final Utility Clearance Letter, in a U & RR approved format, as part of Stage IV deliverables, together with copies of correspondence from utility companies verifying the information, to U & RR for review and concurrence. Exceptions to the above must be approved by U & RR.

<u>If there are no conflicts and no adjustments needed</u>

A statement that there are no utility conflicts with the project shall be used only when there are no utility facilities needing adjustment or when all adjustments have been completed prior to writing the Clearance Letter. A list of utilities is to be provided as stated in Section 434 A.

<u>If adjustments are needed</u>

The Clearance Letter shall list each utility company separately, showing:

1. The name of the company, address, contact name and phone number.
2. The nature of required adjustment.
3. The status of Agreements and applicable permits. (City, County, Forest, State Land, etc.).
4. The status of the utility adjustment(s):
8. Completed.
9. To be done by the contractor during construction.
10. To be done by the utility company concurrent with construction, with estimated completion date or number of working days required following milestone achievement.
11. In progress, with estimated completion date.

Railroad Presence

1. The utility clearance letter shall state if there is railroad presence within or adjacent or in close proximity (within ½ mile radius at maximum) to the project area and shall include the related Special Provisions provided by the Railroad Liaison.
2. The utility clearance letter shall state if there is NO railroad presence within or adjacent or in close proximity (within ½ mile radius at maximum) to the project area.

435 Establishing Utility Service Connection

The Consultant shall be responsible for securing establishment of service connections prior to construction. The following are steps for securing utility service:

A. Utility service connections are required to facilitate operation of lighting, signals, FMS systems, irrigation controllers, pump stations, rest areas and inspection stations, etc. The Consultant shall determine service connection requirements, including the design, schedule, construction and payment arrangements. The service agreement provided by the utility, utilizing design information from the project designer, will be reviewed, approved, and signed by the user of the services (ADOT traffic signals, maintenance, etc.).

B. The Consultant shall prepare a service request letter on ADOT letterhead for signature of the PM or ADOT Traffic Engineering Group representative. The request letter shall contain the project name, and project number to which it applies, as well as the following, dependent upon type of service:

   1. Number of electrical (or other) services required.
   2. The address of each service.
   3. The required voltage/volume/pressure of each service.
   4. The load breakdown for each service.
   5. A brief description of the work required.
   6. Who is responsible for signing the utility's service agreement and who is to pay for connection charges (also known as "service connection"). If a line extension is required to provide the service connection, the consultant shall work with the utility coordinator. The line extension only, shall be completed by utility agreement.
   7. Who is responsible for paying the utility bills and to whom and where to send the monthly billings. These billings are typically paid for by the ADOT section that also provides maintenance.

C. The Consultant shall include the name and phone number of the utility contact person responsible for arranging the new service connection in the Special Provisions with instruction to the Resident Engineer to contact the utility for scheduling the work when service is desired.

D. Consultant shall place the service address on the plans adjacent to the appropriate load center and/or meter.

E. Consultant shall show the location of the utility service source so the contractor knows where to excavate to/from.

436 Railroad Coordination

If a railroad is present in, or adjacent to, or in close proximity (within ½ mile radius) to the project area, the ADOT Railroad Liaison shall be contacted and will handle all initial and follow-up contact and coordination with the affected railroad, and railroad related regulatory agencies. This will include kickoff invitation, authorization for the railroad to design/ review plans, plan review, agreement execution, etc.

The Railroad Liaison will provide the project team and Consultant railroad location information for the project site that shall be referenced in all plan submittals.

Railroad right of entry approval is required before the Consultant or their sub consultants can enter railroad property. The ADOT Right of Way Group and the Utility Coordinator will coordinate with the affected railroad for this approval.

A hard copy and electronic copy of all plan sets shall be provided to the Railroad Liaison who will then forward them to the affected railroad for their review and approval. Individual railroad companies prefer one contact for all projects impacting their ROW and have individual, specific submittal requirements.

For Grade separated projects including new bridges and modification to existing bridges, the major railroads have a design guideline that is available from the Railroad Liaison.

If a Construction & Maintenance agreement is needed, the Railroad Liaison will initiate the agreement with the affected railroad and will submit information to, and get approval from the Arizona Corporation Commission. The Consultant shall assist the Railroad Liaison in providing plan sheets or other technical information for inclusion into the Construction & Maintenance agreement or the Arizona Corporation Commission documents.

The Railroad Liaison will provide railroad related Special Provisions to the Consultant for inclusion into the Special Provisions and copy the U & RR Utility Coordinator.

Once all railroad issues are met, the Railroad Liaison will then issue a railroad clearance to the U & RR Utility Coordinator. This railroad clearance will be incorporated into the project utility clearance.

440 Roadway Design

The Consultant shall prepare design plans on ADOT standard sheets and construction documents for the roadway improvements including, but not limited to, the following:

A. Face sheet (ADOT will provide for incorporation into the design plans).
B. List of Standard Drawings
C. General notes (available on the Roadway Design website).
D. Design sheet and index.
E. Typical roadway and detour sections.
F. Roadway and detour plans and profiles.
G. Intersection plans and profiles including staking plans and joint layouts.
H. Cross road and frontage road plans and profiles.
I. Retaining wall and sound barrier, wall plans, profiles and wall section reports.
J. Earthwork quantities.
K. Details.
L. Special Provisions.

M. Annotated cross sections.
N. Arizona State Plane Coordinate Ties.
O. Summary sheets
P. Quantities and cost estimates
Q. Survey Control

NOTES:

1. Standard plan sheet size is 22" x 34" (ANSI “D” Size) with borders as specified by ADOT. All plan sheets shall be suitable for plotting at half scale.
2. Refer to section 709.2 Earthwork Documentation, number 3) Plotted Cross Sections in the Roadway Design Guidelines
3. All designs shall conform to the latest Americans with Disabilities Act Accessibility Guidelines Title I and II.
4. The Consultant shall provide the various ADOT Technical Sections involved in the design of the project with roadway base sheets as required.

Americans with Disabilities Act (ADA) Features

The Americans with Disabilities Act (ADA) provides minimum standards for roadway construction and can be found in the US Department of Transportation ADA Standards for Transportation Facilities, 2006 (which is based on ADAAG). All new or updated features are to be designed in compliance with these Standards. The Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way, 2011, commonly referred to as PROWAG, is not a standard but is considered best practice, and should be considered for use when practical.

An ADA Compliance and Feasibility Report shall be prepared for all state highway projects that contain ADA features. The ADA Compliance and Feasibility Report shall address all ADA features within ADOT Right-of-Way throughout the project area. The Consultant shall prepare the Compliance and Feasibility Report as well as all associated design plans, at the direction of the PM.

Where programmed projects that include ADA barriers meet the definition of an "alteration", project completion must address ADA improvements (where/when feasible) within the work limits of the "alteration". When barriers exist at an intersection where one or more of the existing barriers are within the limits of the "alteration" or "new construction" project, all barriers at the intersection must be updated (where/when feasible) to meet current ADA standards to ensure continuity of accessible routes/ramps.

445 Roadway Drainage

446 Roadway Drainage Reports

Roadway drainage reports shall comply to the below:

A. The Consultant shall be responsible for preparing the Initial and Final Drainage Reports.

B. The Consultant shall conduct hydrologic and hydraulic analysis and/or obtain available public information to identify flood-plains and probable flood-plain impacts. The Consultant shall determine existing and developed conditions, discharges for all pertinent drainage systems, and existing flow patterns; assess possible drainage problems, identify possible solutions, and propose tentative hydraulic improvements.

Part A of the Initial Drainage Report, hydrologic information, may be submitted and informally discussed with the ADOT Drainage Section - Roadway Engineering Group prior to detailed hydraulic analysis in order to facilitate proper progress of the study. The Drainage Report may require additional data as it relates to NPDES/AZPDES or Clean Water Act Section 402, i.e., flow analysis in ditches, intersecting drainages, etc., in order to adequately design temporary erosion control structures.

Following Part A, Hydrologic Information Review, the Consultant shall conduct one dimensional hydraulic analyses, or two dimensional analysis as warranted, of the floodway inclusive of the channel and adjacent overbank areas necessary to effectively convey floodwaters, and the flood plain modifications, hydraulic structures, and drainage-related improvements which are proposed. The Consultant shall then prepare an Initial Drainage Report consisting of both Part A, Hydrologic, and Part B, Hydraulic, studies and their supporting documentation. The hydraulic study can be a standalone report with hydrologic information represented at the opening section of the report.

C. The Consultant shall prepare a Final Drainage Report, pursuant to comments and approval of the Initial Drainage Report, based on refined hydraulic structure selections and sizing. The report shall provide analysis of changes to existing flow patterns and the design of channels, culverts and other drainage structures.

D. The Consultant shall submit to ADOT Drainage Section - Roadway Engineering Group one sealed and dated electronic copy containing all final drainage reports of the project in digital format (PDF). The reports shall include not only the analytical data and computations, but the entire report, including but not limited to, texts and graphics. Electronic files of hydraulic or hydrologic models prepared for a project shall be provided to ADOT Drainage Section - Roadway Engineering Group (in their native format) upon request.

E. The Final Drainage Report shall be submitted concurrent with the Stage III Design submittal unless other arrangements are made with the PM.

447 Roadway Drainage Designs

The Consultant shall prepare designs and construction documents for drainage features including, but not limited to:

A. Drainage culverts and underpass structures for cattle/game crossings.
B. Catch basins, manholes and connector pipes.
C. Drainage Pipe and Concrete Box Culvert Summary Sheets.
D. Drainage details.
E. Drainage culvert profiles.
F. Retention/Detention Basins.
G. Channel Design details.
H. Erosion Protection details.

448 Section 404 / 408 Permit (Clean Water Act)

ADOT with the Consultant, as appropriate, in consultation with the Corps of Engineers, will determine the need for a Section 404 / 408 permit. If a permit is required, the ADOT EP will process the permit application. The Consultant shall be responsible for providing ADOT with technical data in GIS format (CADD Files or KMZ Layer)

for the roadway cross drainage-ways (i.e. typical sections, location of work, approximate areas of cut and fill within each drainage way, and access needed into areas of washes and/or waterways) to support the determination of need for a permit and/or the permit application. See section 420 for more information.

449 Evaluation of Alternative Pipe Culvert Materials

The Consultant shall be responsible for evaluating all forms of ADOT approved pipe culverts. Evaluation documentation shall be included with the design calculations per section 1040. Valid designs shall be indicated on the Pipe Summary Sheet.

450 Landscape Architectural Practice and Design

A. The Landscape Architect shall be responsible for performance of professional services such as investigation, reconnaissance, research, planning, design or responsible supervision in connection with the development of land and incidental water areas where the dominant purpose of such services is the preservation, landscape ecological restoration, enhancement of proper land uses, natural land features ground cover and planting, naturalistic and aesthetic values, the settings and approaches to building, structures, facilities or other improvements, natural drainage and the consideration and the determination of inherent problems of the land relating to erosion wear and tear, light or other hazards.

B. Landscape Architecture services to accomplish the above mentioned may result in the preparation of the following work products including: Reports for Site Analysis and Planning; Visual Analysis; Resource Planning Inventory and Evaluation; Research Information and Documentation; Design and Construction Documents, Specifications, Constructability Reviews, Post Design Services, and Responsible Construction Supervision.

C. Investigation, Reconnaissance Research, Planning, Design and Responsible Supervision. Work may include but is not be limited to: Aesthetic evaluation, Visual Quality and Impact Analysis to determine appropriate mitigation measures; Design of Structure and Wall Aesthetic Treatments; Landscape and Irrigation Systems design and when possible Sustainable Landscape design; Landform Grading and Graphic design; Water Conservation design, Irrigation Audits and Water Harvesting design; Landscape Ecological planning including Resource Conservation and Protection; Habitat Mitigation Restoration; Reclamation and Revegetation; Native Plant Inventory, Salvage, Replanting and Establishment; Noxious Weed Control; application of Best Management Practices (BMPs) for Erosion and Sediment Control, Water Quality Protection; Storm Water Pollution Prevention Plan (SWPPP) Index Sheet, Erosion and Sediment Control Plans; preparation of Design Construction Documents including plans, Specifications, and Estimates.

D. The Landscape Architect Consultant shall be responsible for coordination of work with Roadside Development Section during all design phases. Work shall be in accordance with AASHTO, ADOT Design Manuals, Guidelines and Policies.

E. The Consultant shall complete and Seal Project Plans, Specifications and Estimates necessary for project design development for use by other team members and for bidding and construction as required for Arizona Public Works projects. The Consultant may be required to provide Construction Administration Services including Construction Observation.

455 Bridge Design

The Consultant shall prepare design and construction documents for structural design including, but not necessarily limited to:

A. General plan.
B. General notes and quantities.
C. Foundation sheets.
D. Abutment details.
E. Pier details.
F. Superstructure sheets.
G. Screed elevations.
H. Special details (if applicable).
I. Stage construction sequencing details (if applicable).
J. Pile records (if applicable).
K. Special Provisions and cost estimates.

The final structural plans shall reflect the most current design standards, specifications, and ADOT Guidelines. The Consultant shall be responsible for studying revisions to the plans made during the development of the project and ascertaining how the structural design will be affected. The Consultant shall work with Bridge Group and the PM, who will give the final authorization, in determining the propriety of modifying the design to accommodate the revised standards, specifications and ADOT Guidelines. The Consultant shall be compensated by Contract Modification for any significant redesign resulting from this requirement. A final review of the applicable standards and specifications shall be conducted by the Consultant at Stage III.

All new bridges and culverts meeting the definition of a bridge under the National Bridge Inspection Standards shall be assigned a structure number by the ADOT Bridge Group. The consultant shall contact Bridge Group for the necessary structure number application and assignment of the new structure number.

456 Bridge Selection Report

During Stage II, prior to preparation of final design and construction documents, the Consultant shall submit a Bridge Selection Report for the new bridge and/or for renovation of the existing bridge. The report shall be prepared in accordance with the ADOT Bridge Design Guidelines. The selected new structure and/or modification must be approved by ADOT Bridge Group prior to the Consultant beginning the final design of the bridge.

457 Bridge Hydraulics Report

For structures in the National Bridge Inventory (NBI) or structures proposed to be in the NBI, the ADOT Drainage Section - Roadway Engineering Group will be responsible for the Bridge Hydraulics Report review. For the waterway structure, an individual Bridge Hydraulics Report is required. The deck design shall consider the effects of hydroplaning and deck drainage. For design details, the designer is required to refer and follow the Bridge Hydraulics Guidelines and Section 446 of this document.

460 Traffic Engineering Design

461 Traffic Engineering Study

The Consultant shall perform a Traffic Engineering Study or “Traffic Analysis Report”, which addresses those concerns that are appropriate for the project. The study shall provide all necessary data and analysis not

already furnished by the Department. The Consultant shall coordinate with the Transportation Systems Management and Operations Division (TSMO) Operational Traffic and Safety Group Manager and the appropriate Regional Traffic Engineer. The Consultant shall make one or more visits to the project site to familiarize themselves with any issues that may have any bearing on the success of the project.

The Traffic Study should also address the items listed below. The items listed are intended only as a guide and are not meant to necessarily limit the scope of the study:

A. Average Daily Traffic
B. Turning movements at each intersection
C. Crash Data and Analysis
D. Access Control
E. Signing
F. Pavement Markings.
G. Passing / No Passing Zones
H. Speed Zones
I. Signal Warrants
J. Left and Right Turn Warrants
K. 30th Hour Design Hour Volume
L. Peak Hour Volume
M. Bicycle Activity/Lanes and other accommodations
N. Pedestrian Activity (ADA and sidewalk Requirements)
O. Parking
P. School Zones and crossings
Q. Appurtenances (guardrail, barriers, etc.)
R. Channelization, Turning Templates
S. Signal Phasing & Timing
T. Operations and Capacity - Study intersections and site access location(s)
U. Roadway Lighting
V. Sight Distance
W. Pedestrian Crossing crosswalks/HAWK warrants
X. Drive-thru queue impacts to the roadway operations
Y. Impacts to adjacent intersections/driveways
Z. Merging/weaving impacts
AA. Mitigation measures
BB. Intelligent Transportation Systems (Consider continuity and future deployment of ITS systems)

Note: The need for these items will vary depending on the nature and locale of the work. If Synchro files are produced, they shall be provided to TSMO.

462 Temporary Traffic Control Plans

All projects with temporary traffic control devices shall have a Transportation Management Plan (TMP) in accordance with 23 CFR 630 Subpart J and ADOT Policy ENG 07-3.

When required by the complexity of the project, the Consultant shall prepare an appropriate phasing plan for the project. The plan shall be consistent with good constructability, taking into account the contractor's probable approach to the work and the cost and inconvenience to local businesses and residents. Phasing and

project duration should be coordinated through the PM, the Construction District, Regional Traffic, District Maintenance, and the Contracts & Specifications (C&S) Section.

Once the project phasing has been determined, the Consultant shall prepare a TMP. At a minimum, the TMP shall consist of a temporary traffic control (TTC) and emergency vehicle access plans, which may be as simple as a few paragraphs in the Special Provisions outlining which setups in Part VI of the MUTCD and/or the ADOT Temporary Traffic Control Design Guidelines (TCDG) are to be used or may be a set of detailed plans showing exact configurations of traffic control devices for the project and accounting for emergency vehicle access. The use of Typical Applications (TA) or Supplemental Applications (SA) for Traffic Control Plans (TCPs) may be appropriate; however, the context of the construction area may include complexities that necessitate a detailed project specific TCP be included. A summary of TTC devices, quantities, and durations along with an estimate of costs and any Special Provisions shall be provided by the Consultant at each stage of the project beginning with Stage II, and prior to starting Stage III.

For projects that are determined to be Significant, according to ADOT Policy ENG 07-3 and as outlined in ADOT's Implementation Guidelines for Work Zone Safety & Mobility, the Consultant shall develop a Transportation Management Plan (TMP). The TMP should consist of TTC plans, a transportation operations component, a public information component, and provisions for emergency vehicle access. The Implementation Guidelines and TMP Template, along with other WZSM resources are located on the ADOT WZSM website.

New construction, reconstruction, pavement rehabilitation, overlays, bridge widening or repairs and other similar work generally have a considerable impact on traffic operations and may qualify as Significant. Significant projects require a TMP and also include TTC device types, quantities, durations, unit prices, and Special Provisions.

All projects shall complete the ADOT Smart Work Zone Criteria Worksheet. If a smart queue management system is required the Consultant shall complete the Work Zone Queue Analysis Review Module. Other Smart Work Zone (SWZ) resources are located on ADOT's SWZ website.

The following categories of projects generally have a low impact on traffic operations and do not qualify as Significant:

A. Landscaping projects of short duration
B. Signal projects, depends on the location, could require site specific TCP
C. Scour protection projects
D. Fencing projects
E. Sound wall projects, depends on the proximity to the shoulder, volumes along the highway, and proximity to residential uses
F. Signing projects (except overhead installations)
G. Lighting and other electrical projects
H. Sidewalk and ADA ramp projects
I. Bike lane projects, depends on the amount of pavement, curb, gutter and other associated improvements
J. Rest area construction projects, depends on the proximity to the shoulder, volumes along the highway, and other factors
K. Minor surface treatments (Chip Seals), depends on the number of cross roads and turnouts

Upon final design approval for any and all work that involves Traffic Engineering or Design, the Traffic Engineering Group requires that the following CADD related deliverables be submitted to the PM as indicated in the General Specifications for adherence to ADOT's CADD Standards:

A. All "SignCAD" files shall be submitted in ADOT's current version of "SignCAD (.SGN)".

B. All design CADD files associated with Traffic Design, including Traffic Signals, Roadway Lighting, Signing, Pavement Marking, TTC, SWZs, Pre-Design, HES Projects, and Permit Designs, shall be submitted in ADOT's current version of MicroStation (.dgn).

In addition, a copy of the Letter of Transmittal indicating all Traffic related deliverables have been submitted to ADOT shall be forwarded to the Traffic Engineering Technical Lead for approval.

463 Intersection Signalization and Roadway Lighting

The designer shall prepare construction documents for installation of traffic signals. Installations for future signals may require only conduits and pull boxes. Intersection signalization may sometime be changed to construction of a roundabout instead of a traffic signal; in that case, the Consultant may do traffic modeling/simulation using appropriate software, such as VISSIM or Rodel, as well as perform comparison of present day estimated cost and life cycle estimated cost of the two alternates (namely traffic signal and/or roundabout).

The designer shall comply with ADOT's current lighting policy and provide a complete set of roadway lighting construction documents that are predicated on a needs study and design parameter report that includes, but is not limited to:

A. Complete freeway lighting including mainline, entrance and exit gore areas, ramps, and crossroads, or other highway facilities per ADOT Traffic Engineering Group TGP 700.

B. Underdeck and Tunnel Lighting.

The designer shall, in accordance with Section 430 and the PSW, coordinate with the local electric utility to provide electric service, including an electrical service, including preparation of the service request letter. If warranted, the designer shall advise the PM of the need for an IGA with the local jurisdiction for funding, maintenance, and energy costs.

464 Signing Plans

The Consultant shall prepare designs for signing that are consistent with current signing practice and in conformance with the MUTCD, the MOAS, TGPs, and ADOT Signing and Marking Standard Drawings. All projects shall reference the most recent information related to signing plans for that location.

A sign summary shall be provided in the project plans. All existing signs shall be noted on the project plans. Non-standard signs shall be detailed on the project plans following the formats given in the above referenced documents. Dynamic Message Signs shall be included in the signing design. A detailed cost estimate and Special Provisions shall be included with each submittal beginning with Stage II, and prior to starting Stage III.

465 Pavement Marking Plans

The Consultant shall prepare permanent pavement marking designs for the roadways within the project limits to show center, edge and lane line striping, stop lines, crosswalks, arrows, legends, and symbols, raised pavement markers, object markers, delineation or other markings as may be consistent with the needs of the project and in conformance to the requirements of the MUTCD, Arizona Supplement to the MUTCD, TGPs, and Signing and Marking Standard Drawings. The Consultant shall confer with the District and TSMO representatives, Regional Traffic Engineer, and Traffic Engineering Group to determine which types of marking or delineation materials are appropriate for the project. The summary of quantities, a detailed estimate of costs, and any Special Provisions shall be included with each submittal beginning with Stage II.

466 Intelligent Transportation Systems (ITS) Infrastructure

The Consultant shall prepare design plans and construction documents for the ITS elements on the project in accordance with the most current ADOT ITS Design Guidelines. ITS elements may include, but are not limited to the following:

A. Conduits
B. Pull boxes
C. Node buildings
D. Fiber and wireless communication networks
E. Detection systems
F. Sensors
G. Video surveillance systems
H. Closed circuit TV (CCTV)
I. Dynamic message signs (DMS)
J. Variable speed limits (VSL)
K. Speed feedback signs (SFS)
L. Traffic count stations
M. Truck escape ramp systems
N. Weigh-in-motion systems (WIM)
O. Wrong way detection (WWD)
P. Road weather information systems (RWIS)
Q. Truck parking availability systems (TPAS)
R. Traveler information systems
S. Connected and automated vehicle (CAV) systems
T. Other emerging technology

ITS infrastructure and systems support the statewide operations at the Traffic Operations Center (TOC) and serve to improve safety, mobility, and operation of the transportation system. The Consultant shall collaborate with personnel from the TSMO Systems Technology Group on the ITS infrastructure and systems elements, and collaborate with the TOC, Systems Maintenance, Traffic Management, Information Technology Group (ITG), Multimodal Planning Division (MPD), District personnel, and other end users to gain consensus on the ITS elements, develop appropriate data collection and analysis, and ensure interoperability and compatibility with current systems.

467 Road User Cost

The Consultant shall assist in preparing the Road User Cost (RUC). Questionnaires listing the required information for the calculation of the RUC is available on the ADOT Construction Value Engineering page. The Consultant shall complete the Questionnaire and provide the information to the ADOT Construction Group to calculate the RUC. The RUC shall be listed as liquidated damage in the project Special Provisions (Maintenance of Traffic Section).

468 Average User Delay

The Consultant shall assist in preparing the Average User Delay Calculation(s). The Average User Delay value(s) shall be calculated based on the User Delay Calculation guidance on the ADOT website. The value shall be sent to the Construction Quality Assurance Engineer for review and concurrence and be presented in the general notes section on the plans.

471 Right of Way Requirements Determination

The Consultant shall determine the requirements for new ROW and easements and ADOT will acquire the appropriate land right.

The Consultant shall submit to ADOT, in electronic form, the preliminary ROW requirements on or before the Stage II design submittal, and the final ROW requirements on or before the Stage III design submittal. No revisions or additions to the ROW requirements will be allowed after the Stage III submittal without the approval of the PM.

The new ROW requirements shall be submitted to ADOT for review and shall include the following as a minimum:

A. A letter indicating the project name, contract number, project location, originator of report (Firm's Name), submittal date and submittal type (Stage II or III).

B. A plan of sufficient scale and detail to show the existing and proposed roadway ROW and proposed easements.

C. Type of acquisition required:
   1. At the Stage II submittal, the new requirements may be estimates of the final ROW with enough definition to identify all ownership's that will be affected. The preliminary requirements should be large enough to cover all possible ROW needs.
   2. At the Stage III submittal, the new requirements shall be accurately defined with widths, lengths, stations, offsets, etc.

Well Registration or Variance

The Consultant shall provide the following information to ADOT Right of Way Section (Water and Well Rights Unit) and ADOT Geotechnical Operations Section (Manager) when an ADWR Well Registration or Variance is required:

A. ADWR Well Number
B. ADOT project name and full TRACS Number
C. ADOT parcel number
D. Longitude and latitude (degrees, minutes, seconds) of every bore hole under this well number

E. Contact name, address and phone number of the well driller
F. Status of well.

472 Right of Way Acquisition

If new ROW is required for the project, ADOT will acquire all necessary ROW and easements. Based on the requirements provided by the Consultant, ADOT will:

A. Prepare final ROW plans and associated documents necessary for ROW acquisition (Final plans may be prepared by others).
B. Acquire all necessary ROW and Easements associated with the project.
C. Prepare the necessary data for Transportation Board resolutions and project clearance letters.

473 Temporary Entry Documents

For most private property, consultants shall enter under the authority of ARS 12-1115. Any Temporary Entry required for ground-disturbing activities requires Temporary Entry as negotiated between ADOT and a private property owner. Any Temporary Entry on Private lands, including Tribal, will be negotiated between ADOT and the respective Agency.

475 Bid Advertising

The Consultant shall provide information as necessary to assist ADOT in preparation of the draft and final advertisement for bids.

480 Cost Estimates

The Consultant shall prepare combined and detailed estimates (cost estimates) in the format recommended by the C&S Group. The cost estimate shall include a recapitulation sheet concurrent with each review submittal. Computer generated estimate forms may be used, provided the format is approved by the C&S Group. The Consultant shall prepare a bid schedule at the stage II review, and concurrently with each review submittal thereafter. ADOT will provide the necessary format.

The budgeted cost for the project is indicated in Section 140 of the PSW. The Consultant shall immediately advise ADOT, in writing, if there is any reason to believe the project cannot be constructed within the allocated budget. The Consultant shall identify options to maintain the project within budget, including reducing the project scope, revising criteria, or changing the project phasing.

Upon request from the Department, the Consultant shall provide backup information for all item unit prices including, but not limited t, force account items, lump sum items etc., in the cost estimate. Historical prices will not be considered as the basis of the unit prices.

485 Specifications

The Consultant shall be responsible for identifying in the General Requirements, critical elements of construction, including, but not limited to, construction limits, access requirements, potential night construction, coordination with affected local agencies (police, fire, USFS, etc.), lane closures or restrictions, scheduling of work time (bar chart format illustrating estimated construction time), utility trench close ups, incentives and liquidated damages, State-furnished materials, critical materials requiring pre-bid purchase, and limitations specifically addressed in the environmental, ROW, and utility clearances.

486 Special Provisions

In addition to assembling the Stored Specifications applicable to the given contract, the Consultant shall also prepare Special Provisions for items, details, and procedures not adequately covered by ADOT's Standard Specifications for Road and Bridge Construction and its associated Stored Specifications. Requirements necessary for obtaining permits for hauling materials shall also be included under the respective sections/subsections. Special Provisions shall be submitted at the Stage III and Stage IV project reviews. Final Special Provisions shall be sealed by the Professional Engineer in responsible charge. The Consultant shall be responsible for incorporating any specifications provided by ADOT technical sections and groups into the draft and final Special Provisions. ADOT shall review all submittals of Special Provisions and the Consultant shall prepare the final Special Provisions. Stored specifications are available on the C&S website.

The Special Provisions shall be project specific and shall be prepared using the Specification Tips document which is available through the Contracts & Specifications Group upon request.

487 Contract and Specifications Process

The Consultant shall, under the direction of ADOT, support the Contracts and Specifications Group during the bidding and award process as follows:

A. Promptly answer questions relative to the Project.
B. Make any necessary corrections to the plans Special Provisions, Bid Schedule, etc. as required.
C. Prepare any addenda required to clarify the work included in the contract documents in a timely manner as requested by the C&S Group.
D. The Consultant shall be prepared to assist in the C&S analysis of bids, including but not limited to: determination of reasonableness and justification of cost variances, quantity verifications, analysis of original cost estimate compared to contractor bid costs.

490 Computer Aided Design and Drafting (CADD) Requirements

ADOT shall retain all rights and ownership of all Electronic Files and Hardcopy Deliverables throughout the Design Phases. All files to be archived shall conform to ADOT drafting and CADD standards General Specifications.

The PM and Design Team shall determine who will assemble and submit the CADD files to ADOT. This is typically the same person that assembled the PDF deliverables of as-bid plans. The final CADD file deliverable shall be submitted as a zip file and contain all of the CADD files. The zip file size must be under 100MB and if it is not the files need to be split into multiple files. All final electronic CADD data files shall be uploaded to the appropriate location in Workfront https://azdot.my.workfront.com/login. All deliverables shall follow the file naming convention setup by each discipline. Filenames for ADOT Standard sheets will remain the same with exceptions, if OpenRoads File Naming System overrides. The file name for the final zip file deliverable shall be the TRACS number and identifying the file as CADD files (i.e. H123401C_CADD-Files).

The current ADOT approved version of the Bentley CONNECT Edition software packages shall be used. All graphic files shall be provided in the Bentley native design file format (.dgn). The use of non-native vector format and subsequent translation of graphic files to the .dgn format shall not be accepted. All reference files shall be delivered, and are not to be copied into the plan sheet files. All electronic “sheets” shall include the border information. ADOT cells and custom line styles are not to be modified unless approved by ADOT.

In addition to the requirements stated above in the General Specifications, all designers of ADOT projects shall provide the following information requested by the individual areas. If unclear about items needed for your project, please contact the PM.

Bridge:

Identification Label

1. Structure Number (5 digit number)
2. Structure Name (i.e. Apprentice Wash Bridge)
3. Type of Work:
4. Major Structure – New Bridge
5. Bridge Replacement
6. Minor Structure
7. Deck Rehabilitation
8. Hinge, Deck or Joint Repair
9. Barrier Replacement
10. Bridge Widening
11. Scour Protection
12. Seismic Retrofit
13. Bridge Painting
14. Deck Overlay
15. Other (Please specify)

Materials and Geotechnical:

In addition to the CADD requirements stated in the General Specifications, one electronic half-size (11”x17”) copy of the final Geotechnical Design Foundation Data shall be provided to ADOT Geotechnical Design Services.

Roadway Engineering:

See General Specifications.

Right of Way:

All ROW surveys, ROW plans and ROW monumentation surveys are to conform to current ROW Plans Standards and Manual.

Acceptance Submittal for ROW Survey, ROW Plans and ROW Monumentation Survey

When all comments have been addressed and the ROW Plans Section is ready to accept any of the above products, the designers or Consultants of ADOT ROW projects shall submit the following items:

1. Final CADD Files in a version that is currently acceptable to the ROW Plans Section, and the electronic ASCII file. The files shall be transmitted to the ADOT Right of Way Plans Section electronically. Unless the Consultant uses an approved digital signature per ARS 41-132, the seal block on the electronic files shall be left blank.
2. Full-size set of plans sealed and signed by an Arizona Registered Land Surveyor.

Traffic Engineering:

Upon **Final Design Approval** for any and all work that involves Traffic Engineering/Design, the Traffic Engineering Group requires that the following CADD related deliverables be submitted to the PM.

1. All Design files associated with Traffic Design, including Traffic Signal, Signing, Pavement Marking, Traffic Control, macro and/or micro Traffic modeling files, Pre-Design, HES Projects, and Permit Designs, shall be submitted in ADOT's current version of MicroStation 2D format (.dgn).
2. All sign designs/formats shall be submitted in ADOT's current version of SignCAD (.sgn).
3. All sign summary Excel spreadsheets used to import sign summary data into MicroStation shall be submitted in ADOT's current version of Excel (.xls).

Engineering Survey Section (Location Surveys):

In addition to the CADD requirements stated in the General Specifications, all designers of ADOT projects shall provide the following information, if applicable to the project, to the PM:

1. GAF
2. Contour Interval (C.I.)
3. Project Scale
4. Horizontal and Vertical Datum
5. Arizona State Plane Coordinate System Zone
6. Hard copy of reports including any plots

Based on the PSW, select the items to be delivered:

1. Hard Copies shall consist of the following:
    a. Field notes
    b. Sketches
    c. Plots
    d. Reports
2. (.dgn) file containing graphical representation of the project (i.e. planimetrics and contours).
3. (.3d) file containing graphical representation (i.e. breaklines and random points) to produce the DTM.
4. (.dtm) containing terrain models.
5. (.alg) file containing the project geometries. (.rpt) file including curve data from the alignment.
6. ASCII (.csv) files shall contain the following:
    a. File Header Information:
        i) Project GAF
        ii) Project Datum
        iii) Arizona State Plane Coordinate System Zone
        iv) Basis of Alignment
        v) Basis of Stationing
        vi) Basis of Horizontal Control
        vii) Basis of Elevation
        viii) Basis of Bearing
    b. All Project Control
    c. Section Corners
    d. R/W Monumentation

e. Structures
f. Edge of pavement
g. Centerline and driving stripes
h. Other features as requested

7. Record of Survey: When requested, the Record of Survey will be in electronic format (.dgn or .pdf), with a stamped original.
8. Pictures: Upon request, pictures will be taken for all structures including ends of pipes, headwalls, pipe caps, and any unnatural terrain feature in a .jpg or .bmp file format (check PSW).

Note: Two (.CSV) files shall be submitted, one containing the RAW survey data and another containing the edited survey data.

The Consultant shall submit project metadata to ADOT Engineering Survey Section/Location Surveys. The metadata can be submitted in a text (.txt) or similar file.

Metadata content should include as a minimum:

1. Complete project No.
2. Route number and/or name
3. Project description
4. Beginning and ending mileposts
5. Project datum
6. GAF
7. Arizona State Plane Coordinate System Zone

If unclear about items needed for your project, please contact the Engineering Survey Section/Location Surveys.

All survey projects shall be submitted to the PM for archiving purposes. Additionally, a copy of the project metadata shall be submitted to the Engineering Survey Section/Location Surveys.

Engineering Survey Section (Photogrammetry and Mapping):

In addition to the CADD requirements, all designers of ADOT projects shall provide the following information to the PM:

1. Scanned images
2. Aerotriangulation files
3. Orthophotographs produced.
4. DGN files containing graphical representation of the project (i.e. planimetrics and contours).
5. 3D file containing graphical representation (i.e. breaklines and random points) to produce the DTM.
6. ASCII (.cvs) files shall contain the following:
    a. File Header Information:
        i) Project GAF
        ii) Project Datum
        iii) Arizona State Plane Coordinate System Zone
        iv) Basis of Horizontal Control
        v) Basis of Elevation

b. All Project Control
c. Section Corners
d. ROW Monumentation
e. Structures
f. Edge of pavement
g. Centerline and driving stripes
h. Other features as requested

The Consultant shall submit project metadata to Engineering Surveys Section/Photogrammetry and Mapping. The metadata can be submitted in a text (.txt) or similar file.

Metadata content should include as a minimum:

1. Complete project No.
2. Route Number and/or Name
3. Project Description
4. Beginning and Ending Mileposts
5. Project Datum
6. GAF
7. Arizona State Plane Coordinate System Zone
8. Map Scale
9. Aerial Photography Date and Scale
10. Contour interval

If unclear about items needed for your project, please contact the Engineering Survey Section Photogrammetry and Mapping Advisor/Coordinator.

All photogrammetry and mapping projects shall be submitted to the PM for archiving purposes. Additionally, a copy of the project metadata shall be submitted to ADOT Engineering Survey Section/Photogrammetry and Mapping.

495 Electronic Design Data Delivery

The intent of this section is to establish criteria to utilize the electronic design data and its delivery to the Contractors who use equipment that has Automated Machine Guidance (AMG) systems such as earth moving equipment outfitted with GPS. The use of high quality design data to control the earthmoving equipment eliminates the need for tedious layout, saving time and money.

Specifications of Electronic Design of Contract Plans for AMG when identified as part of the PSW and in addition to the designer providing a complete contract bid set of engineering plans, estimate, and specifications for the construction of the project, the following data shall be submitted as part of the electronic data delivery:

A. Existing OpenRoads Designer (ORD) Terrain Model .dgn Files
B. OpenRoads Designer .dgn Files

Existing ORD Terrain Model Files:

Terrain Model files shall be produced with Bentley's ORD compatible file formats, and is the existing topography and Terrain Model (TM) prior to the start of the project. TMs should be verified for accuracy

through field procedures of locating well- defined and random checkpoints (not included in the creation of the TM) systematically dispersed throughout the project site and compared to the TM. Refer to the Engineering Survey website for general guidance in creating TMs.

Create an integrated-model of the existing condition utilizing 3-D methodologies and techniques. The existing condition model shall include existing ground terrain and certain subsurface elements (including, at a minimum: drainage structures, below ground utilities, bridge, and wall foundations), features utilizing data from light detection and ranging (LiDAR), subsurface Utility evaluation (SUE), field surveys, and existing plans data collection including currently available LiDAR or other existing ground terrain data provided by ADOT. The existing ground model shall be submitted in .dgn format for the Department's use.

OpenRoads Designer (ORD) Files:
The ORD files shall include the Template Library (*.itl). Utilize 3-D methodologies and techniques to incorporate the Schematic Design into Project integrated design files. The final alignment files shall be submitted in .dgn and LandXML format. New Design Surfaces must have the feature definition set to final not design in .dgn and exported to LandXML.

The files shall contain all proposed plans as would be delivered in a normal set of engineering plans to include items such as cross sections, details and any other drawings that would normally make up a bid package.

Utilize 3-D methodologies and techniques to develop the geometric design and the 3-D Design model for each proposed roadway and incorporate it into the Project's integrated design models.

- Integrated design model deliverables shall consist of MicroStation file(s) containing 3-D graphical elements (components, both horizontal and vertical alignments, contours, superelevation transitions limits, existing and proposed finish grade triangles) representative of the design model, and terrain model files.
    - Subgrade surface – A surface representing the top of the new subgrade (both sides should tie to the Existing Terrain Model.)
    - Finish Grade surface – A surface representing the new proposed finished grade (PFG) which includes the pavement structure

Key existing and proposed Design features shall include the following:

- Roadway (including, at a minimum, intersections, turnouts, driveways, curb and gutter, barrier, sidewalks, guardrail and pads, etc.)
- Drainage (including, at a minimum, box culverts, pipes, catch basins, manholes, and junction structures)
- Structures (including, at a minimum, pier, abutment and retaining wall foundations, and locations)
- Utilities (including zones of protection)
- Signing (including all signs locations and foundations)
- Lighting (including, at a minimum, pull boxes, conductor runs, pole and foundation locations)
- Signals (including, at a minimum, pull boxes, conductor runs, controller, pole and foundation locations)
- Foundations, including at a minimum, all ground penetration to be shown to scale of width, length and depth.
- Existing structures to remain within the Project ROW.
- Elements as applicable

Visualization

The study shall provide a visualization, or simulation, of the preferred alternative or project design, as appropriate. An aerial should be draped over the project model, and project features assigned suitable colors for the purpose of visualizing the completed project. The proposed ROW should be shown. The visualization shall include 360 degree views from any point within the model and a bird's eye fly-through.

SECTION 600 – POST DESIGN SERVICES

ADOT will coordinate all post-design services and will act as the principal initial contact for post-design questions. The Consultant shall be responsible for the post-design services described below. Post-design services will be added to the contract by contract modification, at the discretion of the Department.

A. The Consultant shall be available to attend the project hand-off meeting with the PM and the ADOT Resident Engineer to discuss the plans and details, prior to the pre-bid conference, if held.

B. The Consultant shall be prepared to attend the pre-bid conference, if one is scheduled, and present an appropriately-sized display showing the project layout, proposed traffic control and construction phasing, and shall be prepared to discuss other constraints so that the potential bidders will be better able to relate to the intent of the construction of the project. The Consultant shall respond to questions related to the plans, details and Special Provisions.

C. The Consultant shall be available, within 24 hours of notification, to respond to questions in the field that may arise relative to the plans, details, or Special Provisions during construction.

D. The Consultant shall review and approve shop drawings, erection procedure plans, and formwork details, review proposals for substitutions or "approved alternates," assist the Resident Engineer in developing change orders, and provide other engineering services required to facilitate construction of the project.

E. The Consultant shall appoint a responsible member of the firm to be the contact person for all post-design services; this person shall be continually available during the course of construction for review and updating of design plans.

F. The Consultant shall make every reasonable effort to process any material presented for review in a prompt manner.

G. The Consultant may be required to attend the Pre-Construction Partnering Workshop and/or utility coordination meetings.

H. Construction modifications (e.g. Revisions) produced during construction shall be properly sealed and signed by a Professional Engineer, Landscape Architect, or Architect, registered in the State of Arizona, and shall be submitted to the PM to be added as part of the record set of plans. The Consultant shall submit these properly sealed revisions, of the original design, in a hard copy as well as in electronic format as stated in section 1040.

I. The Consultant shall professionally prepare the record drawing plans for the project based on redlined construction plans provided by the ADOT Resident Engineer. The Record Drawing submittal shall also include electronic files consistent with ADOT's electronic Record Drawing process. The Consultant shall follow the steps described in the ADOT Record Drawing Guidelines and provide the deliverables described within the document in the prescribed time. Additional Record Drawing resources are located on the Record Drawing guidelines webpage.

SECTION 700 – MATERIALS FURNISHED BY ADOT

710 Surveys

ADOT will provide the following materials, as available:

A. Previous survey (e.g. control points, DTM, DGN, ALG, etc.).
B. Vicinity Map(s).
C. Descriptions and values for ground control monuments.
D. ADOT State Plane Coordinates Ground Adjustment Factor(s).
E. Control for aerial maps.
F. Aerial photographs
G. ADOT Publications:
    1. CADD Standards.
    2. Manual for Field Surveys.
    3. Manual on Uniform Traffic Control Devices (FHWA).

711 Photogrammetry and Mapping

ADOT will provide the following:

A. Previous photogrammetric mapping.
B. Existing aerial photography.
C. ADOT Photogrammetry and Mapping Manual.

720 Materials Investigation

Upon request by the Consultant, ADOT will provide the following materials:

A. Geotechnical Report, if applicable.
B. Pavement Design Summary & Cost Estimate, if applicable.
C. Pavement Design Report, if applicable.
D. Review of all submitted reports prepared by others for the project.

730 Record Documents

The Consultant shall obtain the following ADOT plans/drawings:

A. Available Record Drawings plans through the ADOT website ROAD portal
B. Available ROW plans of existing conditions through the Right of Way Group Existing Right of Way Plans Index website.
C. Available Mapping/Aerial photography.

740 Traffic Data

The Consultant shall obtain from ADOT MPD the current and design year ADT and the K, D, and T factors.

750 Environmental Studies

In addition to the Final Environmental documents, ADOT will provide, at the Consultant's request, any available environmental data prepared for the project (such as previous surveys, technical reports, agency coordination documentation, investigations, etc.).

760 Base Sheets

ADOT will provide the Consultant an electronic file of each of the following base sheets as required for completion of the project plans.

A. Roadway Design Section sheet.

B. Bridge Group sheet.
C. New Pipe Summary sheet.
D. Barrier Summary sheet.
E. Reinforced Concrete Box Culvert Summary sheet.
F. Roadside Development Section sheet.
G. Corrugated Aluminum Pipe Extensions Summary sheet.
H. Corrugated Steel Pipe Extensions Summary sheet.
I. Combination Barrier and Pipe Summary sheet.
J. Cell Libraries (CADD only).
K. Font Libraries (CADD only).
L. Face sheet.
M. List of Standard Drawings sheets.
N. Traffic Design Section sheets.
O. ROW Plans Section sheets.

770 Scoping Documents

The Design Concept Report (DCR), Project Assessment, Scoping Letter, or other related scoping documents will be provided to the Consultant, as applicable.

SECTION 1000 – CONTRACT ADMINISTRATION

Contract Administration includes activities that are common in the administration of a contract; these activities include but are not limited to Contract Proposal, Initial Cost Estimate Negotiation, Project Control, Subcontract Services, Project Related Correspondence, and Quality Control.

1010 Arizona Department of Transportation

The PM will:

A. Conduct ongoing reviews of the Consultant's progress in performing the work and ensure timely comments from the technical units.

B. Direct design consensus status and team building meetings with all appropriate partners at the start and on a monthly basis during the project development period.

C. Review the Consultant's billings.

D. Review and evaluate the Consultant's requests for extension of time and supplemental agreements.

E. Review all correspondence with public agencies prior to the Consultant's mailing of any correspondence.

F. Coordinate the distribution of public information with the Communications Group.

G. Provide a focal-point contact for all questions, requests, and submittals.

H. Coordinate project scheduling with the Consultant, ADOT technical sections, and ADOT Project Management Group (PMG) .

1020 Consultant

The Consultant shall:

A. Establish, furnish and maintain suitable office facilities to serve as the project office for the duration of the project in the location specified in the Consultant's technical proposal.

B. Maintain an adequate staff of qualified support personnel to perform the work necessary to complete the project.

C. Establish internal accounting methods and procedures for documenting and monitoring project costs.

D. Establish and maintain contract administration procedures, which will include supplemental agreements, time extensions and subcontracts.

E. Include the complete project number and project name on all correspondence related to the contract.

F. Participate in design consensus, status and team building meetings with all appropriate partners at the start, on a monthly basis during the project development period, and as needed to maintain the design schedule. If requested by PM, the Consultant shall act as the lead.

G. The Consultant is responsible for the accuracy and completeness of contract documents and related design prepared under the project. The plans shall be reviewed by the project team including representatives of ADOT technical sections for conformity with ADOT procedures and the terms of the contract. **Review by ADOT does not include detailed review or checking of major component designs and related details or the accuracy with which such designs are depicted on the plans.**

1021 Project Control

The Consultant shall provide data, in the format specified by ADOT, upon request to monitor costs and manpower and to report progress. A Project Control system should include all activities necessary for the management of the project as shown below.

The project control system may include features to:

A. Determine and highlight a schedule using a critical path method from initial to final plans and as work progresses.

B. Identify progress against schedule for each identified work item.

C. Forecast completion dates from current progress.

D. Highlight rescheduled work in any area which is out of the required sequence.

E. Determine any physical area that requires more resources than originally allocated.

F. Forecast future conflicts in any area.

G. Provide estimates of time, manpower, and dollars (billing and cost management) required at the lowest work element tracked, based upon current expenditures versus schedule.

H. Provide the capability of random inquiry concerning the status of any work element in terms of schedule, manpower, and dollars.

1022 Subcontract Services

Due to the nature and scope of the required services, it may be desirable for the Consultant to subcontract portions of the work. However, the subcontracting firms must be approved in writing prior to initiation of any work. The volume of work performed by the subcontractors shall not exceed 49% of the total contract value.

1023 Project Related Correspondence

The Consultant shall furnish written documentation of communications between the Consultant and any party, pertaining specifically to the project, to ADOT for record keeping within one week of the communication. The Consultant is responsible for recording and distributing to the participants the notes of all meetings pertaining to the project within one week of the meeting.

1024 Quality Control

The Consultant is responsible for the accuracy and completeness of the plans and related design documents prepared under the contract and shall check all such material accordingly. The Consultant shall have a quality control plan in effect during the entire time work is being performed under the contract. The plan shall

establish a process whereby plans, calculations and documents submitted for review shall be clearly marked as being fully checked by a qualified individual other than the originator. Non-compliance will be sufficient cause for rejection of submittal. Periodic Quality Control audits may be performed by the PM.

The Consultant shall submit the quality control plan to ADOT for approval within 15 working days of receipt of written NTP. The plan shall comply with the requirements of Section 1025. The plan shall address as a minimum: checking procedures, training of employees in quality requirements, and methods of monitoring and documenting quality control activities including reviewing all documents for conformance and providing comments.

1025 QC Plan Requirements

QC requirements include:

A. Identification of key personnel and definition of specific responsibilities:
The plan will identify, by name, the specific project personnel and their individual responsibilities relative to the project and the Quality Control process.

B. Technical review process:
Technical review shall be distinguished from checking. Checking is for verification of the accuracy of the documents; technical review is for the verification of the overall design concept of the project. As a minimum, technical review will do the following:
1. Determine the adequacy of the design process to achieve the desired goals.
2. Evaluate the general selection and sizing of materials and equipment.
3. Determine if all viable alternatives have been considered.
4. Determine the practicality of the design concept.
5. Determine if legal and physical restraints were considered.
6. Determine if the design theory, concepts, and project layout are logical.
7. Determine applicability of computer programs used.
8. Determine if the technical specifications are sufficiently comprehensive.
9. Determine the constructability of the selected design.

C. Checking procedures:
The checking process should assure that all documents produced, including, but not limited to, plans, reports, calculations, specifications, Special Provisions, estimates, and schedules, are thoroughly checked by an individual equally competent to the originator of the document to verify accuracy. The process will address resolution of conflict and assure agreement of computer programs and procedures for checking computer input and output. Checking shall not only confirm the accuracy of calculations, but shall include a thorough review of the proper use of Standard Drawings, Drafting Guide, Project Design Guidelines, and other manuals and documents referenced under Section 200.

D. Program to train employees in the Quality Control requirements:
The training program should provide an opportunity for all project staff to become familiar with the design and the Quality Control process that is required on the project. Particular attention should be directed to defining specific individual responsibilities and assuring their understanding.

E. Process to monitor and document quality control activities:
A method for monitoring and documenting the required processes is essential to achieve desired results; this process should easily and quickly verify the entire Quality Control process. The Stage Deliverables Checklist should be developed and coordinated with the PM to develop a quick reference and periodic review of the submittals by the Consultant and ADOT.

1026 Consultant Personnel

The Consultant's work shall be performed and/or directed by the key personnel identified in the technical/fee proposal. Any changes in the indicated key personnel or the Consultant's officer-in-charge of the work, as identified in the Consultant's proposal, shall be subject to review and approval by ADOT.

1027 Site Visits

The Consultant shall make arrangements to visit the project site, with agency representatives as appropriate (ADOT, FHWA, USFS, and other interested persons), at least two weeks prior to the visit. The visit will be held within 30 working days of the receipt of written NTP, or as otherwise instructed by the PM. At a minimum, a second visit should be scheduled after team members have reviewed the Stage III submittal and before submission of the Stage IV submittal.

Within seven calendar days of the site visit, the Consultant shall issue to ADOT a brief written report including observations, discussions, and any questions pertaining to the project. The site acquaints key personnel with the details and features of the project to facilitate the design process.

Other visits to the site may be necessary to gather specific information required for the design and/or clearance purposes.

1030 Acceptability of the Work

The plans, design, requested calculations, reports, and other documents furnished under the PSW shall conform to "standards-of-the-industry" quality. Criteria for acceptance shall be a product of neat appearance, well organized, accurate and complete, technically and grammatically correct, checked in accordance with the approved Quality Control program, and with the designer, maker and checker identified.

Review of submittals may result in significant additional work by the Consultant depending on the quality of the initial submittal. If a submittal is deemed incomplete or of poor quality by the reviewer(s), the submittal shall be revised and resubmitted. Submittals deemed incomplete or of poor quality shall not entitle the Consultant to any additional design fees.

1040 Design Documentation

Design documentation shall include the following:

A. If requested, the Consultant shall submit any design notes, sketches, worksheets, and computations to document the design conclusions reached during the development of the contract documents to ADOT for review.

B. Structural calculations shall be submitted when requested by the Bridge Group and for specific elements.

C. At the project completion (immediately prior to the bid advertisement), a final set of project documentation sheets, sealed by a Professional Engineer, Landscape Architect, or Architect,

registered in the State of Arizona, shall be submitted to ADOT **without exception** as part of the record set of plans.

D. Project documentation shall include, but are not necessarily limited to, the following data:
   1. Design criteria used for the project.
   2. ROW calculations (including easements).
   3. Geotechnical reports for the pavement roadway and/or bridge design.
   4. Documentation of decisions reached resulting from meetings, telephone conversations or site visits.
   5. Drainage reports.
   6. Field survey notes and computations.
   7. Calculation of quantities.
   8. Backup documentation of construction estimate unit prices, if requested.

E. CADD Standards shall be used for all projects deliverables. ADOT shall retain all rights and ownership of all Electronic Files and Hardcopy Deliverables.

F. During project construction, and as part of the post-design services rendered by the Consultant, any modification(s) (Revisions, addendums, field red-lines, change orders, etc.) shall be prepared by the designer to complement the changes of work condition that occurred. The plans prepared for these modifications shall be prepared in accordance with the ADOT Record Drawing Guidelines. ADOT will retain all rights and ownership of the Electronic Files and Hardcopy Deliverables throughout the Construction Phase.

1050 Value Engineering

Value Engineering (VE) consists of those tasks performed by a VE Team in accordance with the Value Engineering Program Guidelines. A VE is required for projects located on the National Highway System (NHS) with an estimated total programmed cost of $50 Million or more and for bridge projects located on the NHS with an estimated total programmed cost of $40 Million or more. A VE study consists of those tasks performed by a VE Team in accordance with the Value Engineering Program Guidelines.

1051 Value Engineering Team

The VE study will be performed by a VE team consisting of ADOT personnel, personnel from consultants or outside agencies, or some combination of these sources. The design team shall cooperate fully with the VE team, providing necessary background information for the study. At the discretion of the PM, the design team may be requested to assign one of its representatives to the VE team.

1052 Design Team Responsibilities

To assist in facilitating the VE study, the design team shall:

A. Compile appropriate data for analysis and make a presentation to the VE team, in accordance with the Study Plan prepared by the VE facilitator. The design team shall communicate and cooperate fully with ADOT's VE Section and the VE team.

B. Deliver elements necessary for the VE study in approximately four working days. The design team will be allowed to budget 32 man-hours for data compilation, the presentation, and study response, if appropriate. If the design team is requested to furnish a representative to participate as a member of the VE team, additional hours may be necessary. Although costs for VE activities are

not identified as a separate expense item for accounting purposes, the design team shall report the hours expended and estimated costs of labor and materials to the ADOT VE Section for cost tracking and VE program evaluation purposes.

C. Provide input to the findings and recommendations of the VE study and implement the approved recommendations of the VE study. If significant effort is required, the additional work will be added to the PSW by contract modification.

1060 Reviews and Submittals

Reviews and submittals shall include the following:

A. Review and coordination of the Consultant's work by ADOT will continue through the project development process. The Consultant may continue the design work while design submittals are being reviewed by ADOT. Doing so however in no way relieves the Consultant of the responsibility to ensure the incorporation of review comments into the design, nor does it entitle the Consultant to any additional design fees as a result of making changes due to review comments.

B. Partnering Workshops:
   1. If requested by ADOT, the Consultant shall participate in joint progress meetings and consensus sessions with other designers on the corridor.
   2. The Consultant shall participate in a Construction Partnering Workshop after the project has been awarded and prior to the start of construction.

C. Submittals for review shall be made when the studies and/or plans have been developed to the following levels of completion:
   1. Stage I design.
   2. Stage II design.
   3. Stage III design.
   4. Stage IV design.

   Stage V design shall be bid-ready and sealed. No reviews will be performed.

D. All submittals shall include the items listed, as applicable, in each Stage Deliverables Checklist. The applicable checklist shall be submitted as part of each submittal and signed by the designer, quality control plan auditor, and PM. For clarity on the requirements regarding if and when an item is to be signed and/or sealed refer to Required Signed/Sealed Documents.

E. The project may be subject to a constructability review. The Resident Engineer or other assigned District representative will be the leader of the constructability review, which would normally occur after the Stage III submittal and before the Stage IV submittal.

F. Copies of review submittals and finalized documents shall be distributed by the Consultant as per the PM's instructions. The appropriate name for each position may be obtained from the PM upon request one week prior to any submittal deadline. All deliveries shall be electronic or as directed by the PM.

G. All plans and cross sections shall be half-size sheets. Design files used to develop the plan sheets, will be required to be submitted with the final set of plans using a file transfer application or other electronic medium.

Review of submittals may result in significant additional work by the Consultant depending on the quality of the initial submittal. If a submittal is deemed incomplete or of poor quality by the reviewer(s), the submittal shall be revised and resubmitted. Submittals deemed incomplete or of poor quality shall not entitle the Consultant to any additional design fees.

1061 Stage I Design Submittal

An informal review and discussion of the project shall be held prior to the Stage I review submittal. The meeting shall take place as soon as the Consultant has established pre-initial roadway alignment, typical roadway sections, and a tentative plans layout for the project. The attendees shall consist of the Consultant, the assigned design team including ADOT staff involved in the project design, the PM and other concerned personnel invited by the PM. This design submittal is included with the scoping document submittal.

The following material shall be developed and submitted to the PM for review:

1. Stage I Deliverables Checklist
2. Initial typical roadway sections.
3. Initial roadway plan and profile sheets at the scales set in Section 410.
4. Tentative plans layout.
5. Initial environmental mitigation measures (for major projects).
6. Preliminary Traffic Engineering Study or “Traffic Analysis Report”.
7. Request for utility designation services.
8. All plans and cross sections in PDF format or as directed by the PM.

1062 Stage II Design Submittal

The Geotechnical Report, if applicable, shall be submitted to ADOT for review and approval a minimum of 15 calendar days prior to the Stage II Design Submittal.

In addition, the following material shall be developed and submitted for review:

1. Stage II Deliverables Checklist
2. Typical roadway and detour sections.
3. Final roadway geometry and preliminary roadway and detour plan and profile sheets.
4. Location of existing utilities and identification of initial utility conflicts.
5. Utility report.
6. Final ROW and easement requirements.
7. Preliminary roadway drainage plans and details and Initial Roadway Drainage Report.
8. Bridge Hydraulics Report.
9. Bridge Selection Report.
10. If required preliminary input for Section 404 permits, base CADD Files or GIS/KMZ Layer
11. Any significant change in engineering data supporting previous environmental decisions or applications.
12. Preliminary summary of required environmental mitigation measures.
13. Preliminary Landscape Architectural plans with proposed sources of power and water.
14. Preliminary development of intersection plans including basic geometry and channelization.
15. Preliminary layouts for proposed retaining and sound barrier walls.

16. Final Traffic Analysis Report.
17. Preliminary construction sequencing plans.
18. Preliminary evaluation of significance of temporary traffic control impact.
19. Draft Geotechnical Report.
20. Pavement Design Summary and Initial Materials Design Report.
21. Final survey information.
22. Initial quantities and cost estimate.
23. Preliminary roadway cross sections at 100 ft. intervals, as a minimum, with additional sections at breaks in the terrain. See Section 440, Roadway Design.
24. Preliminary summary of earthwork quantities.
25. All plans and cross sections in PDF format or as directed by the PM.

1063 Stage III Design Submittal

An office review and field review will be held following submittal of the Stage III plans to review the proposed project site. See Section 410 of this document for field review staking requirements.

In addition, the following material shall be developed and submitted for review:

1. Stage III Deliverables Checklist
2. Final typical roadway and detour sections.
3. Pre-final roadway and detour plan and profile sheets.
4. Identification of final utility conflicts and preliminary plans of utility installations and/or re-locations to be included in project construction.
5. Pothole data made available to utility companies.
6. Utility report.
7. Final ROW and easement requirements.
8. Pre-final roadway drainage plans and details and Final Roadway Drainage Report.
9. Draft applications for environmental permits including input for Section 404 permit.
10. Any significant change in engineering data supporting previous environmental decisions or applications.
11. Updated summary of required environmental mitigation measures.
12. Pre-final intersection plan sheets.
13. Final construction sequencing plans.
14. Final Geotechnical Report
15. Final Materials Design Report.
16. Pre-final layouts for retaining and sound barrier walls.
17. Preliminary landscape architectural plans, summaries and details, and proposed sources of water and power.
18. Preliminary design sheet with index and general notes, summary sheets and special details.
19. Preliminary summary sheets.
20. Preliminary special details.
21. Preliminary bridge structure plans.
22. Preliminary retaining wall and sound barrier wall design plans.
23. Preliminary traffic control plans or transportation management plan; whichever is appropriate.
24. Preliminary pavement marking and signing plans.
25. Preliminary traffic signal plans.
26. Preliminary lighting plans.
27. Preliminary erosion control plans, summaries and details.

28. Preliminary Special Provisions including ADOT Stored Specifications.
29. Preliminary quantities, cost estimate item number description, unit of measurement, quantity and unit price.
30. Preliminary construction schedule in bar chart format.
31. Preliminary roadway cross sections at one hundred (100) ft. intervals, as a minimum, with additional sections at breaks in the terrain. See Section 440, Roadway Design.
32. Preliminary summary of earthwork quantities.
33. Preliminary Utility Special Provisions.
34. Two copies of all plans and cross sections; one set shall be half-size black and white sheets and the other set in PDF format, unless otherwise directed by the PM.

1064 Stage IV Design Submittal

Submittals at this level are required to verify compliance with the PSW or ADOT's review comments; any work necessary to meet compliance with the scope, including comments, shall not entitle the Consultant to any additional design fees.

The Consultant shall prepare and submit to U & RR Section, a Utility Clearance Letter in the style and manner as outlined in the *Utility Coordination Guide for Design Consultants*. The clearance letter shall be sent before the Final Submittal is made.

In addition, the following draft final material shall be completed, checked and submitted for review:

1. Stage IV Deliverables Checklist
2. Design sheet(s) with index and general notes.
3. Summary sheets.
4. Special details.
5. Typical roadway and detour sections.
6. Roadway and detour plan and profile sheets.
7. Drainage plans and details.
8. Intersection plans and details.
9. Construction sequencing plans.
10. Traffic control plans.
11. Traffic signal plans including transportation management plan, when appropriate.
12. Signing and pavement marking plans.
13. Lighting plans.
14. Bridge plans.
15. Retaining wall and sound barrier wall design plans.
16. Landscape Architectural plans and details.
17. Utility installation/relocation plans and details to be included in project construction.
18. Utility report.
19. Utility Special Provisions.
20. Utility relocation schedule and costs.
21. Erosion control plans.
22. Roadway cross sections .
23. Final summary of earthwork quantities.
24. Quantities and, detailed and combined cost estimates electronically in spreadsheet and PDF formats.
25. Back-ups for the cost of major items.

26. Special Provisions (provide electronic version in PDF and Microsoft Word formats).
27. CPM Construction schedule (schedule) including estimate of project time in either calendar or working days. The schedule shall include a list of activities, estimated duration and milestones and other information as appropriate. Consultant should be able to justify the total construction duration based upon the given scope of the project. The schedule logic should demonstrate that the project work can be completed within the contract time.
28. Final environmental commitments including mitigation measures and approved environmental permits, if required.
29. Final design calculations.
30. Final survey computations and results of survey.
31. All Plans and cross sections in electronic format (PDF 11” x 17”).

ADOT's review will include technical content, incorporation of previous comments, and completion of design and details. In addition, ADOT may review conformance with ADOT requirements, completeness of the contract documents, compatibility of plans, specifications, cost estimate, and Special Provisions, coordination between disciplines, phases, and outside parties, clarity of the contract documents, and consistency of presentation.

This review may result in significant additional work by the Consultant depending on the quality of the initial submittal. Any work deemed necessary by the reviewer(s) to ready the contract documents for bid advertisement shall be completed by the Consultant and shall not entitle the Consultant to any additional design fees.

Note: Any documents and/or materials provided for use on the project shall be returned to ADOT at this time.

1065 Stage V/Bid Ready Design Submittal

Once all revisions to Stage IV are complete and the C&S representative indicates the project is ready to advertise, the following shall be submitted to the PM:

1. Stage V Deliverables Checklist
2. A complete, full-size, original source PDF of sealed and signed contract plans (22” x 34”) necessary to construct the road and/or bridge improvements identified in the contract.
3. A complete, original source PDF of sealed and signed Special Provisions, including stored specifications, to cover design items not identified in the ADOT Standard Specifications for Road and Bridge Construction, current edition.
4. A complete, original source PDF of the Final Geotechnical Report (if applicable).
5. A complete, original source PDF of the Final Bridge Selection Report (if applicable).
6. A complete, original source PDF of earthwork cross sections by station showing the plotted roadway template superimposed on the plotted natural terrain (see Section 440, Roadway Design).
7. A complete, original source PDF of final earthwork quantities, calculations and overall summaries.
8. Other reports and materials as requested by the PM.

For all projects with geometrics, provide all files in ORD .dgn format. Exceptions to this could be minor pavement preservation projects that have only a few typical section sheets or local projects where the design does not affect a state facility.

For all projects with cross sections and earthwork, provide the following:

- Existing ORD TM .dgn and LandXML files
- New Design Surfaces TM .dgn and LandXML files

If revisions were made to the information submitted with the Bid Ready submittal, provide a complete electronic copy of the design files used to create all plan sheets as specified in Sections 1040 and 490 (these files shall not contain the Registered Engineer seal and/or electronic signature.)

Plans shall be clearly stamped "**PRELIMINARY - NOT FOR CONSTRUCTION**" for all review submittals. The percentage of completion and date submitted should be clearly evident. Failure to comply may be cause for rejection of a submittal. Only **the final approved Bid Ready plans shall be properly sealed and signed by an Arizona Registered Professional Engineer** and issued without the above stamped notation.

Following completion of the bid advertisement period, the Consultant shall provide original source signed and sealed PDFs of the As-Bid set of plans, including any addendums. File names shall conform to the format provided by ADOT in Section 490 or as required by ADOT technical sections. The Consultant is advised to retain a copy of the PDF files for use when preparing the Record Drawings.