SECTION 3
SCOPE DEVELOPMENT

The purpose of Scope Development is to deliver projects to Design Development with a well defined scope of work. This will be done using the process described in this section. The completion of Scope Development will include: a recommended scheme with a preliminary cost estimate; an approved environmental document; reasonable assurance that environmental permits can be obtained; community support, or documentation explaining why such support cannot reasonably be obtained; identification of ROW needs and costs; identification of design exceptions needed; and receipt of approval of those exceptions. Scope Development will consist of two major phases: Feasibility Assessment and Final Scope Development.

Not all projects will need to go through the Feasibility Assessment phase. Projects of limited scope, which require little or no right of way, which are eligible for Programmatic environmental approvals, and which have almost no potential for community concern, will bypass Feasibility Assessment and proceed directly into Final Scope Development as described in Section 3.2. These projects will be identified by the Bureau of Capital Program Development, and approved for immediate assignment to Project Management by the Capital Program Development Committee.

3.1 Feasibility Assessment

Feasibility Assessment will be performed as part of the Initiation and Programming process of Concept Development as described in Section 2. During this stage, the Bureau of Project Scope Development (BPSD) will perform sufficient engineering to determine whether the concept submitted with the Problem Statement can be feasibly evolved into a project in light of environmental constraints and community issues. If it cannot be reasonably demonstrated that environmental approvals and community support are forthcoming, the concept will neither become a project nor pass into Final Scope Development. In essence, the Feasibility Assessment will serve as a Fatal Flaw Analysis, intended to prevent flawed concepts from entering Final Scope Development where they will escalate soft costs and cause the three year delivery process to fail.

Although Concept Development is not part of the three year project delivery process, the relevant Program Manager will designate a Project Manager to coordinate Feasibility Assessment activities with BPSD. The role of the Project Manager during the Feasibility Assessment stage will be to provide a liaison to and continuity into Final Scope Development, Design Development, and Construction. Although the Project Manager will not be accountable for the budget and schedule of Feasibility Assessment, the presence of a Project Manager will insure that the Program Manager has oversight and input during the Initiation and Programming process leading into Final Scope Development.

Step 1: Project Screening

During Project Screening, BPSD, in coordination with the Project Manager, will define the objectives of the project, establish the Project Need, and identify those special characteristics and responsibilities necessary for the successful completion of scope development. The BPSD, in consultation with the Project Manager, will assemble the Scope Team and develop a plan to direct and control the Scope Team involvement necessary for effective project

screening and scope development. At this time, the BPSD will develop a preliminary budget and schedule for all Feasibility Assessment activities.

Step 1A: Review Problem Statement Package for Completeness

The Problem Statement Package is the foundation of scope development. The BPSD will review the information supplied to determine if it is complete or requires additional data collection.

This Problem Statement Package will be provided by the unit responsible for the proposal's concept development. If that unit was Planning, this information will be developed as part of a corridor-wide study or a needs assessment. Alternatively, if the proposal to be scoped is a bridge, the baseline information will be generated as part of the Bridge Management System. If the problem statement was initiated by a local jurisdiction or elected official, the Department may need to generate the baseline information as a separate step prior to initiating the Feasibility Assessment.

The following list of items are deemed desirable for all scoping efforts and will be beneficial in the development of the Problem Statement Package described above. However, if during the review of the Problem Statement Package the information is not provided, it may need to be developed prior to advancing further scoping efforts.

- Project Need Statement.
- Initial identification or potential alternatives to be assessed.
- Identification of key "stakeholders" whose "buy-in" to the Recommended Alternative may be required for successful project implementation. Prior coordination with MPOs, County, Locals, Local Interest Groups, FHWA, Environmental Entities, etc. should be provided.
- Base plans: if plans and mapping already in existence are insufficient, additional information will be obtained, via either photogrammetry, Geographical Information System (GIS), or conventional field survey. All of the information is verified and edited in the field. This includes access points; termination points; existing drainage structures; utilities; signs; and other major topographic features. The base plans will be developed by the Division of Design Services or by a consultant. Design Services will be responsible for insuring that they are in accordance with the latest standards.
- Mailing list of local/county/municipal contacts.
- Discussion of new planned developments.
- Current tax maps of project area.
- Current land use or zoning map.
- Bicycle and pedestrian considerations.
- Traffic volumes, and any traffic survey information.
- Information on traffic signals and phasing.
- Accident data and analysis
- Preliminary environmental sensitivity information to identify "fatal flaws" in concepts.
- SIP/TIP conformity.
- MIS/CMS analysis.
- Decision as to regional vs. local significance.
- A summary of the public involvement program, including results of coordination with MPO staff, local government representatives, and the public, leading to a shared

definition of need by DOT and the host communities.

- Identification of geometric and physical deficiencies within the project area (often referred to as a deficiency analysis).
- Initial contact made with NJ TRANSIT, and other relevant agencies.
- Structural Inventory and Appraisal sheets, and identification of any additional structural needs.
- Navigation survey and coordination with the USCG regarding vertical clearance.
- "Planning level" cost estimates.
- Desired functional classification for project.
- Any available geotechnical information.
- Pavement condition (PSI) and skid numbers.
- Recommended and justification to advance scoping effort.

Step 1B: Assemble Scope Team

The Scope Team is composed of the Core Group, and other units and entities which will meet less frequently but which will still provide input into the Scoping process. The Core Group will generally consist of relevant NJDOT units and FHWA. The remaining units are those which have other responsibilities outside our Capital Program (such as elected officials, environmental groups, municipal engineers, etc.), who may find it difficult to meet more than once during this phase.

The BPSD will carefully control Scope Team Meetings. All "stakeholders" must be represented; however, care must be taken to ensure that an excessively large group is not assembled. Unnecessarily large groups inhibit effective communication and drive up soft costs. The BPSD will also need to break down the Team as soon as its usefulness has ended. The candidate units for inclusion in the Scope Team are:

- Project Manager
- Bureau of Project Scope Development
- Federal Highway Administration
- Bureau of Civil Engineering
- Bureau of Utilities and Right of Way
- Office of Major Access (except projects that have no involvement with state highways)
- Bureau of Traffic Engineering and Systems
- Bureau of Project Support and Engineering
- Bureau of Design Support Engineering
- Bureau of Structural Engineering
- Office of Geotechnical Engineering
- Office of Community Relations
- Bureau of Design Coordination
- Bureau of Quality Management Services
- Office of Landscape and Urban Design
- Office of Geometrics
- Office of Hydrology/Hydraulics
- Office of Surveying Services
- Office of Traffic Signal and Safety Engineering
- Office of Miscellaneous Structures Design

- Office of ITS Engineering
- Regional Construction
- Regional Maintenance
- Traffic Operations (north or south)
- Regional Traffic Engineer
- Bureau of Environmental Services
- Municipal Engineer
- County Engineer
- New Jersey Transit
- Local and State Police
- New Jersey Department of Environmental Protection and the SHPO
- Environmental groups
- The community
- Elected officials
- Utilities companies (if warranted by the significance of the involvement)
- Highway Authorities

Step 1C: Scope Meeting

The BPSD shall provide each member of the Scope Team with a Project Fact Sheet (see Attachment 1) and other relevant information prior to convening the scope meeting. It is the individual Scope Team member's responsibility to thoroughly analyze the project and to be fully prepared to discuss issues within their jurisdiction at the scope meeting. All Scope Team members shall utilize their individual unit's Project Scoping Checklist (see Attachment 2), and bring their checklist with written comments to the meeting.

The following is a list of items that will be discussed at the scope meeting:

- Project Need
- Potential Alternatives
- Project Limits - approximate, with mileposts
- Existing Construction Plans and Right of Way Documents
- Survey Control
- Posted/Design Speeds
- Traffic Data and operational needs
- Accident Data
- Project Category - reconstruction, 3R, etc.
- Design Standard - NJDOT Design Manuals, etc.
- Lane/Shoulder widths
- Border widths/Right of Way
- Median widths
- Cross slope/Superelevation
- Horizontal/Vertical Geometry
- Sight Distance - horizontal, vertical and intersection
- Curb (type and size)/Sidewalks
- Mobility - bikes, pedestrians, handicapped facilities, etc.

- Existing/Proposed Pavement
- Traffic Barriers
- Drainage features
- Landscaping
- Signals/Signing/Lighting/Striping
- Interchange/Intersection configurations
- ITS Facilities
- Structural clearances - horizontal, vertical
- Proposed Structural needs, including clearances (horizontal, vertical) and deck deficiencies which need to be addressed, etc.
- Bridge approaches and railings
- Structural physical condition (from inspection report)
- Advisability of acquiring a fee interest in lands beneath any proposed structures
- Structural profile/geometry
- Walls
- Waterway openings
- Environmental constraints - permit requirements, who will get the permits?, etc.
- Noise requirements - should a study be done?
- Local Commitments/Public Involvement
- Maintenance features
- Traffic Control (including night work)
- Jurisdiction
- Utilities/Railroads
- Access
- Constructability - traffic control, detours, temporary signals, etc.
- QA/QC Guidelines

Project Scoping is a TEAM effort. Therefore, it becomes critical that all scope team members thoroughly evaluate a project and fully participate in both the screening and scoping process. Post Scoping changes to the scope of work will be strictly controlled by the Project Manager. Changes to the project scope must be approved by the Change Control Board as described in Section 4.7.

At the scope meeting, supervised by the BPSD and the Project Manager, the scope team shall utilize the items listed above, along with information from the NJDOT GIS system and the most recent road and/or bridge plans and videolog, if available. If deemed necessary, the Bureau of Environmental Support Services will provide information as to the proximity of major wetlands, potential cultural resources, significant hazardous sites, Green Acres properties, etc.

Step 1D: Project Screening Products

Through input provided by the Scope Team by the end of Project Screening, the BPSD, in consultation with the Project Manager, will have identified the elements to be considered during scoping.

Also, with input from the Scope Team, the BPSD shall identify the appropriate design standards which shall be utilized throughout the project development process:

1. All Local Highway projects shall follow the standards as referenced in 23 CFR 625, Federal-Aid Policy Guide (see Attachment 3).

2. Interstate projects shall follow 23 CFR 625 or controlling design elements. Non-controlling design elements should conform to the NJDOT Design Manual Roadway and the NJDOT Design Manual Bridges and Structures (refer to Appendix for a listing of controlling design elements). An exception to the above is 23 CFR 625.4(2), where for interstate resurfacing projects the designer must utilize the currently approved design standard, not the AASHTO standard that was in effect at the time of original construction.

3. Non Interstate New Construction and Reconstruction projects shall follow the NJDOT Design Manuals.

4. Non Interstate Resurfacing, Restoration and Rehabilitation (3R) projects shall follow the NJDOT Design Manuals in conjunction with Appendix.

It is extremely important to note that design standards reflect specific criteria recommended for use in design and typically range from minimum to desirable values. The BPSD and the Project Manager should consider, when appropriate, lesser values which, when applied, will satisfy the Project Need and provide additional benefits justifying their use. It is particularly important that the Project Manager fully participate, and concur, in any decision to select design criteria which depart from the applicable Department standard.

Step 2: Development of Project Schemes

During this phase, the schemes which address the Project Need and are consistent with environmental, community and budget constraints are developed for further assessment.

Potential schemes must first be evaluated in light of community support, environmental impacts, and financial constraints. If warranted, an optimum scheme which fully meets all design criteria, and achieves Level of Service C or better, is developed. More than one scheme that fully meets the above goals may exist. If so, environmental sensitivities, access impacts, cost estimates, and other factors may be used to evaluate optimum schemes. If environmental impacts, community opposition, or other constraints obviously preclude the implementation of an optimum scheme, engineering resources invested in its development will be kept to a minimum. The elimination of all potential schemes on this basis will be documented by the BPSD for the record. This documentation will prove invaluable should it be required for the justification of a Design Exception or Alternative Analysis required during Final Scope Development.

Schemes which fully address project goals will be overlaid on the environmental sensitivities, using existing GIS files and other baseline information gathered during Concept Development. If conflicts are identified, then a full range of design and alignment alternatives will be considered, including ones which back off desirable standards and instead meet minimum standards. Consideration of dropping below minimum standards could be warranted, and will be weighed against environmental, economic, access or other benefits. Consideration may also be given to alternatives that do not achieve one or more of the project goals identified in the Project Need.

The successful completion of this step will identify all project schemes which warrant further evaluation. The BPSD will also develop an initial matrix of benefits, costs, impacts, and other factors against which each scheme will be evaluated.

Step 2A: Environmental Support During Feasibility Assessment

The BPSD, in consultation with the Bureau of Environmental Services, will review the environmental baseline information provided with the Problem Statement Package to determine if it provides suitable information for evaluation of scoping alternatives. In some instances, the Bureau of Environmental Services will be asked to supplement this information to assist in scheme development. This could include identification of environmentally sensitive areas such as wetlands, parkland, areas with potential for containing cultural resources, and potentially contaminated properties. This is an early level of environmental screening intended to provide available background information. In general, it will be gleaned from existing sources such as GIS files, tax maps, as-built plans/ information, historic maps (i.e. Sanborn Maps, County Atlases, etc.). In certain situations where the environmental constraints are of a critical nature, it may be deemed appropriate to establish specific boundaries for historic sites, parklands or wetlands. This effort could include initiating detailed technical studies and consultation with environmental agencies.

The BPSD will then be responsible for developing specific project alternatives that best fit the constraints for each particular project site. Environmental agencies, the SHPO, the public, county and municipal officials, DOT units and FHWA may be consulted before, during and after the development of the alternatives. The BPSD will carefully monitor the project's advancement against use of available resources, the schedule and budget.

Where necessary, a Section 106 Alternative Analysis for historic bridges and other cultural resource properties may be conducted. The Bureau of Environmental Services will provide expertise on environmental issues as part of the process of balancing engineering benefits of each alternative against economic and environmental concerns in order to have sufficient information to compare alternatives. This may include the following: conducting cultural resource surveys and obtaining determination of eligibility and/or effect from the SHPO; delineating wetlands; or initiating preliminary hazardous waste sampling.

In some instances the balance may be close enough to warrant an environmental review by Bureau of Environmental Services of two or more schemes. Base input provided to environmental staff could in some instances be a box inscribed for an area in which a range of schemes could fall. In other instances, actual sketches of alternate scheme "footprints" could be provided. If this step is taken, the environmental input may be a key factor in selecting a recommended alternative from the range of options identified.

Step 2B: Community Involvement

The public is defined as local technical and elected officials, state officials, interested citizens and public interest groups. The goal of the Community Involvement process is to develop a partnership with local officials, being responsive to public concerns, in the hope of achieving local community "buy-in" for the project at the conclusion of Final Scope Development. Early involvement will enable problems and solutions to be assessed and developed with community input without extending the overall process significantly. It will also provide an early

opportunity for the NJDOT to address community issues, consider modifications to alternative solutions, or even defer or abandon feasible solutions for which no community support exists.

The first step will be to review and reaffirm the transportation needs analysis coordinated with the community during the Concept Development stage. This will be followed by the presentation of the schemes to representatives of the community. Work sessions will be established with the Host Communities by the Office of Community Relations (Bureau of Environmental Services will assist in bringing the environmental community to the table), at which times BPSD staff will describe the alternatives for the project, explain the rationale behind each, and delineate any other options that may be available. Feedback will be taken seriously, and requests for project changes will be evaluated by the BPSD. The BPSD and the Project Manager will make reasonable and appropriate changes and attempt to identify an Initially Preferred Alternative. For those changes that are not deemed reasonable and/or appropriate, documentation will be developed and presented to the public and environmental community later.

The above process will continue until NJDOT and officials of the host community have reached agreement that an Initially Preferred Alternative is ready for presentation to the community at large. The local officials will be asked to support NJDOT by acknowledging their partnership with DOT in an attempt to find a mutual solution to this shared transportation problem. Serious consideration will be given to abandoning the project if the local officials are not willing to provide such support. This is especially true for projects under local jurisdiction.

The degree of public involvement will vary with the project type, its complexity, the environmental sensitivity and the public interest. Some projects, such as those which address safety and maintenance problems, may involve a minimal public discussion. Other projects, such as widenings, include a public involvement program aimed at giving full and careful consideration of public issues and citizen concerns.

The BPSD will monitor the progress of the community involvement program carefully. Such programs have the potential to extend indefinitely, and the BPSD will need to periodically decide, in consultation with the Project Manager and Office of Community Relations, whether to continue to extend the schedule or to terminate the project. In addition to discussions with local government representatives and the host community, the Community Involvement Program will sometimes involve the MPOs, and could on occasion also involve special interest groups, such as the Department of Environmental Protection.

If the problem is one of regional significance, the NJDOT may continue discussions with MPO staff during the project programming process. The discussions could be expanded to include local government representatives, special interest groups, focus groups and the general public.

If, however, the problem is more localized, NJDOT will seek the active participation of local government in securing public input and to then provide the NJDOT with a formal resolution of support once a concept scheme is selected. This local lead process is the ideal, and while there are examples of it working well in the past, it is recognized that NJDOT may often have to take the lead in effectuating community involvement.

Step 2C: Right of Way Input

The Bureau of ROW may play a vital role during the entire Scoping process. They will generally be an active member of the Scope Team and will provide guidance in assessing the practicality and economics of proposals. During the Feasibility Assessment, they may be asked to provide comparative preliminary estimates to be utilized in the selection of the Initially Preferred Alternative. The Bureau of ROW will also provide input as to whether lands under proposed structures should be acquired in fee.

Step 2D: Resolve any Major Utility Issues

The BPSD will coordinate with the Bureau of Utilities to determine whether there are any utility issues that are of sufficient magnitude to affect the selection or rejection of a scoping alternative. The Bureau of Utilities will be responsible for establishing initial contact with the utility companies and determining whether any potentially critical utility issues exist. More extensive utilities development work will be done as a Design Service during Final Scope Development.

Step 2E: Review of Access Code Implications (Initiate Access Impacts)

The BPSD will fully coordinate development of project schemes with the Driveway Review Unit of the Bureau of Civil Engineering. The Optimum scheme will reflect maximum compliance with the Access Code. During the assessment of subsequent alternatives, the benefits of each application of the code to an existing project site will be evaluated by the Driveway Review Unit to determine when and where Access Code waivers will be warranted. Ultimately, an Access Impact Summary will be prepared which identifies how the selected alternative will alter existing access, and further identify and justify any waivers to the Access Code that will be required.

Step 2F: Coordination with Value Engineering

Value Engineering is an essential element in developing cost effective project alternatives. For that reason, the Value Engineering Unit of the Bureau of Configuration Management will have an opportunity for involvement from the outset of the Scope Development process. In this way, Value Engineering considerations may both influence the selection and development of the Initially Preferred Alternative as well as shape the Recommended Alternative ultimately used for design and construction.

The BPSD will request that the Value Engineering Unit be a part of the Scope Team on all projects. The involvement of the VE Unit will be determined in accordance with Section 3.7.1. VE Unit recommendations will consider functional analysis of engineering and economic considerations, which must be evaluated against policy, environmental, political, and community issues. In addition, all VE recommendations will include documentation indicating that they are feasible (i.e. Coast Guard clearance) before they will be incorporated into the Initially Preferred Alternative or the Recommended Scheme.

Step 2G: Determine the Initially Preferred Alternative

At the completion of this step, the Initially Preferred Alternative will be selected. This alternative will be the one that appears to provide the best balance between cost

effectiveness, community concerns, environmental issues, and transportation needs. The Project Manager and the BPSD will attempt to attain "buy-in" for the Initially Preferred Alternative from all key "stakeholders" represented on the Scope Team. It is important that in deciding upon the Initially Preferred Alternative, the BPSD, in consultation with the Project Manager, consider the original Project Need. If warranted, it may be justified to move forward with a scheme which does not fully resolve all of the transportation needs identified in the Problem Statement Package.

Although the community, NJDEP, and the SHPO will be actively involved in scoping up to this point, the selection of this preferred alternative will precede the full community and environmental acceptance. The Design Services which may be advanced at this time, such as utilities, geotechnical, etc., will be based on the Initially Preferred Alternative. The Project Manager and BPSD will need to assess the risks associated with initiating Design Services prior to the completion of Final Scope Development. It may warrant to conduct, as part of the Feasibility Assessment, the formal Community Involvement program described in Section 3.2. This may include the obtaining of the actual resolution of support from the community governing body prior to expending additional funds required to complete the environmental document.

Step 3: Presentation to the Capital Program Development Committee

At the conclusion of the Preliminary Scoping phase, the BPSD, in partnership with the Project Manager, will make a presentation to the Capital Program Development Committee regarding the potential project. If deemed a worthy project, the project will enter the Draft Project Pool to be programmed for Final Scope Development. If the project is determined to be "fatally flawed", it will be recommended for termination, or recycled for reconsideration as part of Concept Development. In some instances, it may be warranted to direct the BPSD to conduct additional scoping in order to develop a more feasible alternative to the Project Need.

Attachment 1 - Sample Project Fact Sheet

SAMPLE PROJECT FACT SHEET

TO: Those Listed Below

FROM: Project Manager

DATE:

SUBJECT: Request for Project Scoping
Route 85 (2)
M.P. 2.7 to M.P. 4.1
Townships of Chester and Mt. Olive
Morris County
Federal Project No. F-44(107)
Job Number 8710-292

Please independently field review this project prior to a scope meeting to be held on _____ in Chester Township Municipal Building, 305 Grove Street, Chester at _____.

Please refer to the attached location map. To assist your review, utilize the following:

1. AADT(1990) = 8000
   T(%) = 12
   V(posted) = 55 mph
   V(design) = 100 km/h

2. Design Standard: NJDOT Design Manuals in conjunction with the Design Procedure for 3R projects.

3. Highway Section: Highway Section Sketches (see Attachment 1)

4. Structures: Structural Inventory and Appraisal Sheets

5. Controlling Substandard Design Elements:

   a. Superelevation on three horizontal curves

HC1	HC2	HC3
MP 3.2 - 3.3	MP 3.51 - 3.62	MP 3.86 - 3.94
R = 1370 m	R = 460 m	R = 915 m
e = 0.015	e = 0.020	e = 0.015
V* = 80 mph	V* = 57 mph	V* = 71 mph

b. Insufficient length for three vertical curves:

VC1	VC2	VC3
MP 2.96 - 3.12	MP 3.53 - 3.76	MP 3.92 - 4.03
L = 250 m	L = 365 m	L = 180 m
A = 5.1	A = 6.0	A = 7.2
V* = 56 mph	V* = 58 mph	V* = 45 mph

- safe speed

6. Accident Analysis

a. The overall accident rate was less than the statewide rate.

b. Individual accident rates for controlling substandard design elements are less than the statewide rates.

(Attach all accident analyses, Accident Detail Reports, and available collision diagrams to actual Project Fact Sheets, if the overall rate is above the statewide rate).

If you have any questions, please call _____ at _____.

Attachment 2 - Project Scoping Checklists

PROJECT SCOPING CHECKLIST

DIVISION OF PROJECT MANAGEMENT

Project _____ Manager _____

Date _____ Weather _____

Limits: _____

Resurfacing

- pavement resurfacing with superelevation
- pavement resurfacing without superelevation
- milling
- joint replacement and/or repair
- repair/replacement of beam guiderail
- resetting beam guiderail
- access revisions
- upgrading existing drainage
- long-life pavement markings
- pavement repair (upgrading the pavement section to accommodate the widening of lanes - without widening the total pavement width)
- bridge bituminous resurfacing
- small signs
- channeling divisional and refuge islands
- bridge deck patching
- raised pavement markers
- replacement of existing impact attenuators
- new beam guide rail
- replacement of existing curb
- modification of existing sidewalks to provide for handicapped facilities
- replacement of existing sidewalks
- upgrading existing lighting systems

Restoration

- pavement widening (only to upgrade existing design elements to current standard)
- upgrading existing signals
- large signs (constructed on breakaway or non-breakaway supports)
- replacement concrete of median barriers
- channelizing, divisional and refuge islands
- underdeck, highmast, offset or conventional lighting systems
- new impact attenuators
- new curb, sidewalk and handicapped facilities

- regrading existing berm section (only to upgrade existing design elements to current standard)
- jacking of concrete slabs
- bridge deck restoration and component patching (involves Type A, B with extensive Type C repair to remove all deteriorated and contaminated concrete from the deck and reconstruction of cross slopes along with a wearing surface; also involves work to restore substructure and superstructure components)
- structural repairs (includes rehabilitation or replacement of structural components in-kind due to severe corrosion, cracking, collision damage and spalling; may be stringers, bearings, pier columns, etc.)
- access revisions
- ☐ landscape improvements
- ☐ seismic retrofit

Rehabilitation

- addition of concrete median barriers
- sections of realignment (not to exceed 20% of the total project length and which may contain new paved surfaces contiguous to existing pavement or shoulder)
- auxiliary lanes (left turn, acceleration and/or deceleration and climbing lanes only)
- bridge widening (less than 1 lane width)
- deck replacement
- rehabilitation of existing structures
- new signals
- ☐ new sign structures (sign bridge, cantilever and bridge mounted)
- ☐ seismic retrofit

Posted Speed _____ Design Speed _____

Obstructions within Clear Zone o Yes o No

Explain _____

Latest As-Built correspond with existing conditions o Yes o No

Survey required o Yes o No

Structures within project limits

- Bridge _____
- Culverts _____

DIVISION OF PROJECT MANAGEMENT (CON'T)

Walls _____

Excavation:	Minor regrading	o Yes	o No
	Moderate regrading	o Yes	o No
	Major regrading	o Yes	o No
	Are cross-sections required	o Yes	o No
	Replace existing curb	o Yes	o No
	Berm section	o Yes	o No
	Umbrella section	o Yes	o No
	Walls required	o Yes	o No
Drainage:	Flooding observed or areas determined (Check with Maintenance)	o Yes	o No
	Flooding where _____		
	Soil erosion	o Yes	o No
	Where? _____		
	Additional drainage required?	o Yes	o No
	Where? _____		
	New inlets for widening	o Yes	o No
	Reset heads	o Yes	o No
	Extension frames	o Yes	o No
	Headwalls	o Yes	o No
	End sections	o Yes	o No
	Retention basins	o Yes	o No
	Detention basins	o Yes	o No
	Slope protection	o Yes	o No
	Matting	o Yes	o No
Safety:	Grass median	o Yes	o No
	Need upgrade	o Yes	o No
	Barrier curb	o Yes	o No
	Need upgrade	o Yes	o No

PROJECT SCOPING CHECKLIST

DIVISION OF PROJECT MANAGEMENT (CON'T)

Maintenance of Traffic:	Detour	o Yes o No
	One lane operation	o Yes o No
	Permits required	o Yes o No
Right of Way:	Architectural plans required for partial building demolition and/or restoration?	o Yes o No

PROJECT SCOPING CHECKLIST

GEOMETRICS UNIT

Prior to a field trip, identify the design standard which shall be utilized throughout the project's design.

The following items shall be checked in the field by all personnel participating in the project scoping process:

- Posted/Design Speed Sections
- Horizontal Geometry
- Vertical Geometry
- Grades/Profile
- Sight Distance
  - Mainline
  - Ramps
  - Intersection
- Lane Widths
- Shoulder Widths
- Auxiliary Lane
  - Width
  - Length
  - Access
- Cross Slopes
- Superelevation
- Obstructions within Clear Zone
- Median Widths
- Adjoining Highway Sections
- Delineation (RPM's roadside)
- Tapered Concrete Terminal
- Ramp Configurations
- Constructability
- Maintenance Features
- Access

Curb

Mobility
  - Bicycles
  - Pedestrians
  - Handicapped

- Structural Clearances

Traffic Volumes

Accident Evidence

- Non-Standard Guiderail

PROJECT SCOPING CHECKLIST

OFFICE OF GEOTECHNICAL ENGINEERING

Project: _____

General Information:		**Yes**	**No**
1. Are the general location, limits of construction and existing ROW described:		____	____
2. Are scope and purpose of the project summarized?		____	____
3. Are a plan and profile of proposed improvements provided?		____	____
4. Are limits placed on profile changes?	____	____	
5. Is traffic information provided?			
a. 80 kilonewton Equivalency Factor		____	____
b. Total Truck Percentage	____	____	
c. ADT - Current and Projected	____	____	
6. Are there existing boring logs?	____	____	
7. Summary of the area's subsurface conditions from Rutgers Soil Survey: _____			

PROJECT SCOPING CHECKLIST

OFFICE OF GEOTECHNICAL ENGINEERING (CON'T)

Geotechnical Section:		**Yes**	**No**
1. Existing surface and/or subsurface drainage?	____	____	
2. Evidence of excessively wet areas or wetlands?		____	____
3. Slides, slumps, faults noted along existing slopes?	____	____	
4. Possibility of bedrock or boulders impacting drainage and subsurface structures?		____	____
5. Evidence of consolidation or stability problems	____	____	
6. Is the estimated depth to groundwater at least 1.2 meters below proposed subgrade elevation?		____	____
7. Is there sufficient ROW to allow 1:2 slide slopes? (1:3 or better is preferable)	____	____	

Comments:

_____

PROJECT SCOPING CHECKLIST

OFFICE OF GEOTECHNICAL ENGINEERING (CON'T)

Geology Section:		**Yes**	**No**
8. Is cut(s) listed on Rockfall Hazard Rating System List?	____	____	
9. Is rockfall mitigation recommended?	____	____	
10. Should effects of blast induced vibrations on adjacent structures and utilities, especially gas lines, be evaluated?		____	____
11. If Rockfall Mitigation is recommended:			
a. Is ROW needed?	____	____	
b. Are slope easements required?	____	____	
c. Is there room to assess equipment?	____	____	
d. Is a traffic plan needed?	____	____	
12. Does catchment area need to be cleaned?		____	____
13. Are there are apparent safety problems?		____	____
a. Protruding rock	____	____	
b. Sightlines	____	____	
c. Substandard existing mitigation measures		____	____
14. Are photos needed to document conditions, provide baseline data for potential problems?		____	____
15. Is there vegetation which should be removed?	____	____	

Comments: _____-
_____

PROJECT SCOPING CHECKLIST

OFFICE OF GEOTECHNICAL ENGINEERING (CON'T)

Foundations:		**Yes**	**No**
1. Are there existing boring logs?	____	____	
2. Locate Rutgers Soil Survey map of the area and summarize subsurface conditions.		____	____
3. Are As-Built Plans available?	____	____	
4. Is there an existing Foundation Report?	____	____	
5. What is the existing/proposed structure?			
Bridge		____	____
Culvert	____	____	
Wall		____	____
6. What is the existing foundation?			
Spread Footing		____	____
Piled Foundation		____	____
Type, size and length of piles:			
Pile bent		____	____
Other (list below)		____	____
7. Any visible signs of settlement?	____	____	
8. Any signs of scour or embankment erosion?	____	____	
9. If a widening is proposed, are there any obstructions to prevent the widening?		____	____

PROJECT SCOPING CHECKLIST

OFFICE OF GEOTECHNICAL ENGINEERING (CON'T)

Foundations (con't):	**Yes**	**No**
10. Area Topography:		
Stream Crossing	____	____
RR Crossing	____	____
Road Crossing	____	____
Floodplain	____	____
Wetland	____	____
Rock Outcrops	____	____

Comments:

_____
___

PROJECT SCOPING CHECKLIST

OFFICE OF GEOTECHNICAL ENGINEERING (CON'T)
PAVEMENTS

Pavements with Asphalt Concrete Surfaces:

Distress Type	Severity		
	Low	Moderate	High
Cracking:			
1. Fatigue cracking			
2. Block cracking			
3. Edge cracking			
4. Longitudinal cracking 4a. Wheel path 4b. Non-Wheel path			
5. Reflection cracking 5a. Transverse 5b. Longitudinal			
6. Transverse cracking			
Patching and Potholes:			
7. Patch/patch deterioration			
8. Potholes			
Surface Deformation:			
9. Rutting			
10. Shoving			
11. Settlement			
Surface Defects:			
12. Bleeding			
13. Polished Aggregate			
14. Raveling			
Miscellaneous Distress:			
15. Lane-To-Shoulder Dropoff			
16. Water Bleeding			
Curb Reveal:			
17. Outside _____ millimeters			
18. Inside _____ millimeters			

PROJECT SCOPING CHECKLIST

OFFICE OF GEOTECHNICAL ENGINEERING (CON'T)

Type and Shoulder Condition: _____

Pavement Section: _____

PROJECT SCOPING CHECKLIST

OFFICE OF GEOTECHNICAL ENGINEERING (CON'T)
PAVEMENTS

Pavements with Portland Concrete Surfaces:

Distress Type	Severity		
	Low	Moderate	High
Cracking:			
1. Corner breaks			
2. Longitudinal cracking			
3. Transverse cracking			
Joint Deficiencies:			
4. Transverse joint seal damage			
5. Longitudinal joint seal damage			
6. Spalling of longitudinal joints			
7. Spalling of transverse joints			
Surface Deformation:			
8. Map cracking			
9. Scaling			
10. Polished aggregate			
11. Popouts			
Surface Distress:			
12. Blowups			
13. Faulting of transverse joints and cracks			
Miscellaneous Distress:			
14. Lane-to-shoulder dropoff			
15. lane-to-shoulder separation			
16. Patch/patch deterioration			
17. Water bleeding and/or pumping			
Curb Reveal:			
18. Outside _____ millimeters			
19. Inside _____ millimeters			

PROJECT SCOPING CHECKLIST

OFFICE OF GEOTECHNICAL ENGINEERING (CON'T)

Type and Shoulder Condition:

_____

Pavement Section:

_____

PROJECT SCOPING CHECKLIST

BUREAU OF LANDSCAPE AND URBAN DESIGN

PROJECT _____ JOB CODE #

_____

DESCRIPTION _____ FAUS #

_____

OFFICE:

DATE _____

BY_____

ACID SOIL AREA (from County Soil Survey of D.E.P. State Map)

_____

PREVIOUS PLANTING COMMITMENTS _____-

_____

AVAILABLE PARCELS (ROW PLANS)

_____

FIELD:

POSTED SPEED LIMIT

_____

STRIPPING (Is material suitable?)

_____

ANY AREAS NOT SUITABLE? _____ WHERE?

_____

TOPSOIL STORAGE AREAS

_____

SUBSURFACE CONDITIONS

_____

ACID PRODUCING SOIL (From Soil Samples)

_____

EXISTING VEGETATION (Types)

_____

TO BE PRESERVED (location & quality)

_____

TREE REMOVAL _____ TREE TRIMMING

_____

CLEAR ZONE _____ SIGHT DISTANCE

_____

SELECTIVE THINNING

_____

UTILITIES

_____

PREPARATION OF EXISTING SOIL AREAS

SEED TYPE

PLANTING (Brief Description)

ROW X-PARCELS TO BE RETAINED

WILDFLOWER LOCATIONS

NON-VEGETATIVE SURFACES

WETLANDS

NOISE BARRIERS

EROSION CONTROL MEASURES

TURF REPAIR STRIP

REGRADE BERM

AREAS FOR GLOBAL WARMING PLANTING

PROJECT SCOPING CHECKLIST

BUREAU OF LANDSCAPE AND URBAN DESIGN (CON'T)

Comments:

_____

_____

PROJECT SCOPING CHECKLIST

BUREAU UTILITIES AND RIGHT OF WAY
UTILITIES DESIGN

1. Review memorandum provided by the lead unit giving background information on project.

2. Familiarize yourself with location of project and utility companies which service that area.

3. If there is a railroad within limits of project, know who operates on that section of tracks.

4. Arrive at project site early enough to walk through site or drive through if project is extremely long.

5. Look up! What facilities are on utility poles?

    (a. Electric (Distribution and Transmission)
    (b. Cable TV
    (c. Fire Alarm (look for boxes on utility poles)
    (d. Riser poles (underground feeds)

6. Look down for evidence of underground facilities.

    (a. Water (valve boxes or hydrants)
    (b. Gas (valve boxes, cathodic protection, marker, vents)
    (c. Sanitary Sewer (manholes)
    (d. Telephone or long lines (manholes)
    (e. Electric (manholes)
    (f. Pipeline (marks)

PROJECT SCOPING CHECKLIST

BUREAU OF UTILITIES AND RIGHT OF WAY (CON'T)
UTILITIES DESIGN

7. If railroad is involved, note if line is active and if it is electrified. Note condition of at grade crossing. Evaluate the need for a Diagnostic Team meeting.

8. Will electric facilities interfere with construction equipment necessitating temporary relocations?

9. If a bridge is involved, note what utility facilities are through the structure or hanging off the side of the structure. This would be a good time to recommend provisions be made for all underground utilities through the structure.

10. If removal of superstructure and substructure is involved, check:

    (a. Clearance with aerial facilities
    (b. Underground facilities in close proximity to footings
    (c. How will existing facilities be supported.

11. Will longer poles be needed because of signalization at intersections.

12. Should subsurface utility mapping be done?

13. Relay this information to Designer and confirm that the Designer is familiar with the Bureau's Steps of Procedure.

14. Use your best judgement to rough out a cost estimate for utility and railroad involvement.

PROJECT SCOPING CHECKLIST

BUREAU OF ENVIRONMENTAL SUPPORT SERVICES

Prior to conducting a field trip, the Project Manager will identify, using in-house reference materials, the following:

- Known historic sites and districts
- Parks
- Delineated wetland areas
- Sole Source Aquifers
- Known and suspected hazardous waste sites

The following items shall be checked in the field by BEA personnel participating in the project scoping process:

- **Historic Sites**
  - 50+ year old structures
  - Potential Historic Districts
  - Old foundations or building rubble

- **Section 4(f) Properties**
  - Recreational facilities
  - Publicly owned open space
  - Wildlife refuges

- **Air and Noise**
  - Sensitive receptors
  - Significant SOV capacity
  - Need for CO Analysis (intersection)

- **Ecological Resources**
  - Wetlands
  - Floodplains
  - Stream crossings
  - Wildlife habitat

PROJECT SCOPING CHECKLIST

BUREAU OF ENVIRONMENTAL SUPPORT SERVICES (CON'T)

- **Socioeconomics**
  - Relocations
  - Farmland
  - Community facilities
  - Unique aesthetic features

- **Hazardous Waste**
  - Landfills
  - Active industry
  - Abandoned industry
  - Evidence of potential contamination (asbestos, etc.)
  - Railroad or railyards

PROJECT SCOPING CHECKLIST

NJDOT BICYCLE AND PEDESTRIAN

Project or Study Title

Location and Limits

Description

PLANNING CONSIDERATIONS

Regional Considerations

The highway or study area is identified for bicycling and/or walking in an MPO or county bicycle or pedestrian master plan.	___Yes	___No
The highway or study area is identified in a regional recreational bicycling plan or provides access to trail facilities.	___Yes	___No
The need to improve bicycle compatibility of the highway is identified on NJDOT's Bicycle Compatible Roadway Map.	___Yes	___No

Community and Land Use Considerations

The highway or study area passes through a city, town, village or other mixed use community, or area with high density residential land use.	___Yes	___No
The highway is identified for bicycling and/or walking in an MPO or county bicycle and pedestrian master plan.	___Yes	___No
A transit station and adjacent residential area exists within the study area or within 4.8 kilometers of the highway.	___Yes	___No
A university or college exists within the study area or 4.8 kilometers of the highway.	___Yes	___No
An elementary school or high school and adjacent residential area exists within the study area or within 1.6 kilometers of the highway.	___Yes	___No
A major employment center and adjacent residential area exists within the study area or within 4.8 kilometers of the highway.	___Yes	___No

___Yes

PROJECT SCOPING CHECKLIST

NJDOT BICYCLE AND PEDESTRIAN (CON'T)

Transportation Corridor Considerations

The highway will provide continuity with or between existing bicycle and pedestrian facilities.	___Yes	___No
The highway is part of a mapped bike route or utilized regularly by local bicycle clubs.	___Yes	___No
The highway provides access to a transit station, school, college, public recreational facility, or major employment center.	___Yes	___No
The highway serves a bus route.	___Yes	___No
Shopping, office buildings, public buildings, parking lots and other generators of pedestrian traffic are located on both sides of the highway or within the study area.	___Yes	___No
There is a worn path, indicating regular pedestrian use adjacent to the highway.	___Yes	___No

Right-of-Way Considerations

The right-of-way is sufficient to allocate the required space for a bikeway or walkway.	___Yes	___No
Additional right-of-way is available or can be obtained to accommodate a bikeway or walkway.	___Yes	___No
Physical impediments or restrictions can be avoided or removed to allow the required pavement and pedestrian space to provide a bikeway and/or walkway.	___Yes	___No
Bridges allow for bicycle and pedestrian access in accordance with bikeway or walkway design guidelines.	___Yes	___No
Additional right-of-way for bicycle/pedestrian facilities would require:		
Reduction or narrowing of travel lanes or turning lanes	___Yes	___No
Elimination or reduction of parking		___No

	___Yes	
Opportunities exist for trail development that would parallel the highway.	___Yes	___No

PROJECT SCOPING CHECKLIST

NJDOT BICYCLE AND PEDESTRIAN (CON'T)

Bikeway and Walkway Considerations

A bikeway and/or walkway should be recommended for the following situations:

Would the facility or improvement connect bicycle traffic generators within 6.4 kilometers of each other?	___Yes	___No
Would the proposed facility or improvement connect pedestrian traffic generators within 0.8 kilometers of each other?	___Yes	___No
Would the facility help to provide continuity with existing bicycle and pedestrian facilities?	___Yes	___No
Does the Planning/Preliminary Engineering Scoping Checklist indicate that striped and/or signed bicycle lanes or routes would address the needs of area bicyclists?	___Yes	___No
Does the Planning/Preliminary Engineering Scoping Checklist indicate that sidewalks or other types of walkways would address the needs of area pedestrians?	___Yes	___No
Would inclusion of a grade separated pedestrian structure resolve a significant pedestrian or bicycle crossing problem?	___Yes	___No
Would a separate bicycle and/or pedestrian trail resolve an obstacle to non-motorized traffic or provide an opportunity for walking or bicycling that would otherwise not exist?	___Yes	___No

Roadway and Traffic Operation Considerations for Compatible Roadways

Can parking be restricted or removed to allow for a bicycle compatible roadway?	___Yes	___No
Can lane widths and turn lanes be modified to allow bicycle compatibility?	___Yes	___No
The cross section incorporates a paved shoulder for pedestrian use on a rural roadway that does not have a sidewalk.	___Yes	___No
The right-of-way could accommodate the provision of sidewalks when adjacent land use, pedestrian volumes and motor vehicle volumes indicate a need.	___Yes	___No
Marked crosswalks are provided at intersections and mid-block crossings where land use, pedestrian volumes, traffic volumes or local	___Yes	___No

PROJECT SCOPING CHECKLIST

NJDOT BICYCLE AND PEDESTRIAN (CON'T)

conditions indicate a need.

Pedestrian refuge islands are provided for multi-lane crossings.	___Yes	___No
Medians are provided on multi-lane highways.	___Yes	___No
Traffic signals provide adequate crossing time for pedestrians and bicyclists.	___Yes	___No
Traffic signals installed as part of the project accommodate bicycle traffic, including visibility of the signal, sensitivity and placement of the detectors for traffic actuated signals and consideration of signal timing.	___Yes	___No
The project will provide for the installation of drainage grates that prevent the catching of bicycle wheels.	___Yes	___No
Guide beams, sign posts, lighting standards, utility poles and other posts and signs are adequately set back from the roadway edge.	___Yes	___No
Intersecting streets, driveways, curb cuts and railroad grade crossings are examined for hazards to bicycle and pedestrian travel and corrected if possible.	___Yes	___No
TSM projects do not degrade the highway's accommodation of bicycle and pedestrian travel by narrowing the curb lane or replacing the shoulder with an additional travel lane.	___Yes	___No

Routine Maintenance Considerations for Compatible Roadways

Have Bicycle Compatible Roadways and Bikeways and Pedestrian Compatible Planning and Design Guidelines been consulted for compatibility design guidelines for repaving, re-striping and shoulder paving projects?	___Yes	___No
Have lane widths, shoulder widths and signing been determined according to Bicycle Compatible Roadways and Bikeways guidance?	___Yes	___No
The curb side travel lane and shoulder are maintained to the same (or a higher) standard as the rest of the highway.	___Yes	___No
Bicycle and pedestrian facility signs and pavement markings are regularly inspected and repaired.	___Yes	___No

PROJECT SCOPING CHECKLIST

NJDOT BICYCLE AND PEDESTRIAN (CON'T)

Site lines are maintained, especially at corners, intersections, curves on highways and separate bicycle and pedestrian facilities.	___Yes	___No
Shoulder surfaces are smooth and provide adequate space for bicycle and pedestrian road sharing.	___Yes	___No
Drainage grate replacements are bicycle safe.	___Yes	___No
Patching is as seam free and flush with the pavement as possible.	___Yes	___No

PROJECT SCOPING CHECKLIST

BUREAU OF STRUCTURAL ENGINEERING

General information (bring to scoping meeting)

		Available	Unavailable
1	Latest Inspection Report		
2	Latest Structural Inventory & Appraisal Sheet		
3	Latest Deck Condition Survey Report		
4	Latest Scour Report		
5	Problem Statement		
6	Plans/As-Builts of Existing Structures		
7	Sample Agreement (if new Consultant and Str. Proj. Mgt. Lead)		
8	Other Known Structure Reports or Info		
9	List of other Structures or Known Projects in the Vicinity		
10	Manhour Estimate Disk		
11	Assessment of current use of lands located beneath proposed overhead structures		
12	Other		

PROJECT SCOPING CHECKLIST

BUREAU OF STRUCTURAL ENGINEERING (CON'T)

Structural Scope:

		No Work Req.	Remove	Repair	Replace	Modify/Widen	New
1	Parapet/Railing						
2	Sidewalk						
3	Deck						
4	Deck Joints						
5	Deck Overlay						
6	Cathodic Protection						
7	Superstructure						
8	Bearings						
9	Abutments						
10	Pier						
11	Wingwalls						
12	Footings						
13	Piles						
14	Embankment/Slope Protection						
15	Electrical						
16	Str. Drainage						
17	Utility Supports						
18	Bridge Mtd. Signs						
19	Chain Link Fence						
20	Safety and Substandard Roadway Features near the Bridge (i.e. Guide Rail Attachments)						
21	Other						
22	Retaining Walls						
23	Culverts						
24	OHSS or Cantilevers						
25	Sound Barriers						
26	Deck Patching Guidelines						
27	Approach Roadway						

PROJECT SCOPING CHECKLIST

BUREAU OF STRUCTURAL ENGINEERING (CON'T)

Comments:

_____

_____

_____

_____

_____

_____

_____

1. Project Procedure: 3R 100% State Full Oversight
   Alternate Procedures

2. Proposed Bridge Cross-Section: _____

3. Min. Req. Vertical Underclearance: _____

4. Min. Req. Horizontal Underclearance: _____

5. Project Limits:
   _____

6. Potential Structural vs. Utility Conflicts (describe):

   _____

7. Potential R.O.W. or Easements required for Structural Work and determination of need to acquire fee interest in lands beneath overhead structure will be made by Structural Engineering and Bureau of Right of Way:

   _____

   _____

8. Environmental Constraints:

PROJECT SCOPING CHECKLIST

BUREAU OF STRUCTURAL ENGINEERING (CON'T)

9. Structural Work Compatibility with Traffic Staging:

_____

_____

10. Constructability/Accessibility:

_____

_____

11. Other Concerns:

_____

_____

_____

PROJECT SCOPING CHECKLIST

BUREAU OF UTILITIES AND RIGHT OF WAY
RIGHT OF WAY ENGINEERING

1) Right of Way Plans
   - Are existing plans available, including tax maps?
   - Will new right of way plans be required?
   - Identify list of current owners.
   - Identify county, municipal and private roads.
   - Identify municipal and county engineer contacts.

2) Involvement
   - Is there railroad right of way involved?
   - Will riparian grants to be required?
   - Is there wetland involvement?

3) Driveways
   - Internal circulation, aisle widths.
   - Parking spaces, replacement if necessary in contract.
   - Light fixtures and signs.
   - Building location, zoning, building corner or overhang, access.
   - Existing and proposed clearly defined.

4) Grade Changes

5) Drainage
   - Before and after.
   - Change in internal drainage system, surface and subsurface.

6) Sewers or Septic
   - If septic, where located, replacement?

7) Landscape Replacement
   - Headlight glare.
   - Site improvement.

8) Sight Triangles
   - Safety of access.

PROJECT SCOPING CHECKLIST

BUREAU OF RESEARCH

JURISDICTION	YES	NO
Is there an existing Agreement		
If yes, is it still valid		
Will a new Map and Agreement be required		

Comments

PROJECT SCOPING CHECKLIST

BUREAU OF TRAFFIC SYSTEMS ENGINEERING

To: _____

_____

From: _____

_____

Date: _____

Phone: _____

Subject: _____

Items

1. Background from Bureau's files

   _____ None or insignificant _____ Yes - see comment 1 below

2. Adjacent projects

   _____ None _____ Yes - see comment 2 below

3. Proposed development or other issues within limits of project

   _____ None _____ Yes - see comment 3 below

4. Was accident analysis prepared by Safety Section?

   _____ No _____ Yes comments _____ none _____ Yes - see comment 4 below

5. Capacity - issues, recommendations, problems

   _____ No _____ Yes - see comment 5 below

6. Safety - issues, recommendations, problems

   _____ No _____ Yes - see comment 6 below

PROJECT SCOPING CHECKLIST

BUREAU OF TRAFFIC SYSTEMS ENGINEERING (CON'T)

7. Other comments

_____ No _____ Yes - see comment 7 below

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

PROJECT SCOPING CHECKLIST

BUREAU OF TRAFFIC SYSTEMS ENGINEERING (CON'T)
ELECTRICAL ENGINEERING

A.	Signal Project	Yes	N/A	No*
1.	The project is properly described as to the type of signalization proposed (i.e. new, reconstruction, closed loop)	( )	( )	( )
2.	The Roadways, Municipalities and Counties are correctly identified	( )	( )	( )
3.	Reference is made to full conformance of the Electrical Engineering Traffic Signal design manual	( )	( )	( )
4.	All appropriate authorities which may be involved are noted (i.e. Turnpike, Parkway, Coast Guard, etc.)	( )	( )	( )
5.	Considerations are noted for determination of inclusion of appropriate ITS components (e.g. VMS, fiber optic conduits, etc.)	( )	( )	( )
6.	Investigation of utility conflicts, service availability, and inclusion on plan sheets has been mentioned	( )	( )	( )
7.	Right of Way limits and investigations of such have been included	( )	( )	( )
8.	Catalog cut review in a timely manner by the consultant is noted	( )	( )	( )
9.	Attendance requirements at phase review meetings, public inquiries and field meetings is included	( )	( )	( )
10.	Plans are being prepared in the format required by the Bureau of Electrical Engineering	( )	( )	( )
11.	Lighting investigations at intersections is addressed	( )	( )	( )

***** Explain reasons on an attached sheet

PROJECT SCOPING CHECKLIST

BUREAU OF TRAFFIC SYSTEMS ENGINEERING (CON'T)

B.	Lighting Project		Yes	N/A	No*
1.	The project is properly identified as to roadways, municipality, and county	( )	( )	( )	
2.	The project is properly described as to the extent of the lighting system proposed ( )	( )	( )		
3.	Reference is made to full conformance to the current Electrical Engineering Lighting Design Manual	( )	( )	( )	
4.	All appropriate authorities which may be involved are noted (i.e. Turnpike, Parkway, Coast Guard, etc.)	( )	( )	( )	
5.	Considerations are noted for determination of inclusion of appropriate ITS components (e.g. VMS, fiber optic conduits, etc.)	( )	( )	( )	
6.	Investigation of utility conflicts, service availability, and inclusion on plan sheets has been mentioned	( )	( )	( )	
7.	Right of Way limits and investigations of such have been included	( )	( )	( )	
8.	Catalog cut review in a timely manner by the consultant is noted	( )	( )	( )	
9.	Attendance requirements at phase review meetings, public inquiries and field meetings is included	( )	( )	( )	
10.	Plans are being prepared in the format required by the Bureau of Electrical Engineering	( )	( )	( )	
11.	Study will be made to determine where any glare problems or light pollution might be anticipated	( )	( )	( )	

***** Explain reasons on an attached sheet

PROJECT SCOPING CHECKLIST

BUREAU OF TRAFFIC SYSTEMS ENGINEERING (CON'T)

C.	Resurf. Bridge and Special Projects	Yes	N/A	No*
1.	The project is properly described as to the type of signalization proposed	( )	( )	( )
2.	The roadway, structures, municipalities, counties, and limits are properly identified	( )	( )	( )
3.	Any traffic signals, lighting systems counting stations, WIM installations, etc. are identified and included	( )	( )	( )
4.	All appropriate authorities which may be involved are noted (i.e. Turnpike, Parkway, Coast Guard, etc.)	( )	( )	( )
5.	Considerations are noted for determination of inclusion of appropriate ITS components (e.g. VMS, fiber optic conduits, etc.)	( )	( )	( )
6.	Investigation of utility conflicts, service availability, and inclusion on plan sheets has been mentioned	( )	( )	( )
7.	Right of Way limits and investigations of such have been included	( )	( )	( )
8.	Catalog cut review in a timely manner by the consultant is noted	( )	( )	( )
9.	Attendance requirements at phase review meetings, public inquiries and field meetings is included	( )	( )	( )
10.	Plans are being prepared in the format required by the Bureau of Electrical Engineering	( )	( )	( )
11.	Consideration has been made for electrical conduits, fiber optic conduits, and junction boxes on/in bridges	( )	( )	( )

***** Explain reasons on an attached sheet

PROJECT SCOPING CHECKLIST

BUREAU OF TRAFFIC SYSTEMS ENGINEERING (CON'T)

	Yes	N/A	No*
12. Lighting design calculations according to Electrical Engineer Lighting design manual has been made to locate bridge bosses for lighting units proposed or for future installations	( )	( )	( )
13. The appropriate Electrical Engineering design manuals are referenced for the type of project proposed	( )	( )	( )
14. Review of any other applicable check list (traffic signal or lighting) has been completed	( )	( )	( )

***** Explain reasons on an attached sheet.

PROJECT SCOPING CHECKLIST

BUREAU OF UTILITIES AND RIGHT OF WAY
MAJOR ACCESS

Prior to the field scoping trip, do the following:

1. Obtain copies of the tax maps along the project limits.

2. Obtain the Desirable Typical Section (DTS)*, Access Level (AL)* and Spacing Distance from the Access Code.

3. Review the project Highway Section. Is the project Highway Section $\leq$ the DTS? If not, the two must be reconciled.

4. Determine if the DTS AL is practical given the project Highway Section. If not, determine what turning movements are appropriate given the Highway Section (refer to N.J.A.C. 16:47-3.1(c)).

In the field, make note of lots that:

a) have multiple driveways
b) have shared access
c) have alternative access
d) may have substandard edge clearance
e) may have substandard corner clearance
f) may have substandard/nonstandard driveway geometrics
g) may be along full width acceleration, deceleration, left turn or right turn lanes
h) may require its own left turn and/or right turn lane (AL 4 highways)
I) may be affected by significant grade changes
j) may have sight distance problems
k) may have their access revoked or modified
l) may have impediments to providing reasonable alternative access

***** "Desirable Typical Section" means that Department's long range plan for State Highway configurations, as shown in N.J.A.C. 16:47 Appendix B. Each desirable typical section shows the number of through lanes.

***** "Access Level" means the allowable turning movements to and from access points on a State Highway segment based on highway access classification.

PROJECT SCOPING CHECKLIST

INTELLIGENT TRANSPORTATION SYSTEMS ENGINEERING UNIT

ITS Project		Yes	N/A	No
1.	Objectives are defined (Closed Loop, Incident Management)	( )	( )	( )
2.	Traffic signals, arterial highways, and areas of congestion are identified to determine project limits. ( )	( )	( )	
3.	Operational needs regarding traffic signal control, CCTV, VMS, HAR, WIM, etc. are identified.	( )	( )	( )
4.	Evaluation of existing systems by field checks to local sites and Traffic Operations Center survey of system equipment is included.	( )	( )	( )
5.	Development of ITS facility conceptual design plans with facility locations is included.	( )	( )	( )
6.	Field investigation to verify existing utilities to avoid conflicts and determine service availability is included.	( )	( )	( )
7.	Geotechnical borings and subsurface review of existing plans is included.	( )	( )	( )
8.	Structural analysis for structure locations determined in the conceptual design is included.	( )	( )	( )
9.	Other agencies are identified and determination of impacts on local municipalities is included.	( )	( )	( )
10.	Development of plans to design the systems and subsystems, update traffic signals to current standards, use Microstation.dgn format, estimate of number of plan sheets and details is included.	( )	( )	( )
11.	Determination of required permits is included.	( )	( )	( )

PROJECT SCOPING CHECKLIST

INTELLIGENT TRANSPORTATION SYSTEMS ENGINEERING UNIT (CON'T)

	Yes	N/A	No
12. Construction services by designer is included.	( )	( )	( )

PROJECT SCOPING CHECKLIST

DIVISION OF CONSTRUCTION SERVICES AND MATERIALS

1. CONSTRUCTIBILITY ISSUES

A. How should the project be staged? Will temporary overlays or patching be needed for staging?
B. Should detours be used? Will detour routes need upgrades, if implemented? Is any signing needed?
C. Should work be done during day or night? If performed at night, will the intended work conflict with existing local noise ordinances?
D. Should the project be closed to traffic? If so, how do we handle locals? Are special signs needed? What about impact to school bus routes and/or emergency vehicles? Pedestrian considerations?
E. Will there be access problems for private driveways? How will staging affect access? Are special signs needed?
F. Will there be a need for variable message boards and/or highway advisory radio? Could any other extraordinary traffic mitigation efforts (i.e. acceleration) be applicable on this project?
G. Will timing of project interfere with local events like shore traffic, county fairs, race tracks, sporting events, high volume traffic generators, etc.?
H. When should the project start/finish? What do you think is the optimum month to bid the project for construction efficiency and to reduce CE costs (avoiding winter layovers, seasonal restraints, etc.)?
I. Should the project use flaggers, local police and/or State Police for Traffic Safety Services?
J. Are adequate size work zones and storage space available at the site for the proposed work?
K. Could Quickchange Moveable Barrier expedite or improve productivity in the construction work zone, thereby shortening the construction duration?
L. Are there adjacent projects which may pose a conflict with traffic management during construction, including on parallel routes?
M. What special snow removal concerns are applicable in this area?

2. Should the limits of construction be extended based on field conditions at the proposed end limits?

3. Are the appropriate types of repairs provided for bridge rehabilitation projects? Should decks be patched or overlaid with latex? What protection is required for the roadway or water course under the structure?

4. Are there any apparent major environmental concerns (buried tanks, landfills, wetlands, asbestos, contaminated areas, etc.)?

PROJECT SCOPING CHECKLIST

DIVISION OF CONSTRUCTION SERVICES AND MATERIALS (CON'T)

5. PAVEMENT ISSUES

A. Is full depth pavement box needed, or will milling and resurfacing of existing pavement be sufficient?
B. Is full depth shoulder reconstruction needed? Can the shoulder be used to carry traffic for staging operations?
C. Are there any distressed areas where joint repair or bituminous patch is needed?
D. Will sawing and sealing of joints be required?
E. What types of pavement should be used? Is this a good location for experimental pavement?
F. What type of subbase should be used? Is material available locally?
G. Will the proposed pavement widths and milling depths be constructable within equipment limitations?
H. Will rutting require special milling treatments to achieve new cross slope or typical section?
I. Will RPM's have to be removed and replaced?

6. DRAINAGE ISSUES

A. Is the current drainage sufficient? If not, identify locations.
B. Do existing inlets and drainage structures need to be cleaned out? If so, identify locations.
C. Do existing inlets and/or manholes need to be reconstructed or have castings replaced? If so, identify locations.
D. Can you foresee any drainage problems with adjacent properties?
E. Will any existing underdrains, roof drains, septic systems, or outlet drains be affected?
F. Are existing inlet grates acceptable, or should bicycle safe grates be used?
G. Are new curb pieces needed? If so, specify what height is required.
H. If staged, will the project be drainable in all stages? Will castings have to be reset to allow winter plowing?

7. GUIDERAIL ISSUES

A. Are there any areas where guiderail should be extended, removed or upgraded?
B. Does existing guiderail need to be reset? If so, are extra posts needed to provide for replacements?
C. Is new rail element needed to replace damaged rail? If so, identify locations.
D. Will staging require resetting of guiderail?
E. Do end treatments need to be upgraded? Is there space for upgrade?
F. Will additional areas need to be cleared for guiderail placement?
G. Where existing guiderail ties into structures, are any upgrades needed? Conditions of parapets and sidewalks should be noted.

PROJECT SCOPING CHECKLIST

DIVISION OF CONSTRUCTION SERVICES AND MATERIALS (CON'T)

8. ELECTRICAL ISSUES

A. Should any electrical services be upgraded or relocated?
B. Do any traffic signals or highway lighting fixtures need to be upgraded or relocated?
C. Will temporary signals or highway lighting be required for staging?
D. Are there any existing loop detectors?

9. MAINTENANCE OF RIGHT-OF-WAY ISSUES

A. What driveways need to be reviewed for access compliance?
B. Check the condition of curbs, sidewalks and driveways. Are any replacements required?
C. Handicap ramps (new or upgraded) should be addressed?
D. When designing concrete islands, consider where grass is used very carefully, since this can be a maintenance problem after construction?
E. Does existing highway signing need refurbishing or replacement?
F. Are there any privately owned signs, fencing, lighting, or sprinklers in our R.O.W. that do not belong and should be removed on this project?
G. Will this project require changes to, or a new, jurisdictional agreement?

10. UTILITY ISSUES

A. Do any power lines or other utilities, including above and below ground property services, need to be relocated? If so, can they be moved before construction?
B. Does the area require predesign underground utility locations verification? Should test pits be dug? Is there a need to relocate underground utilities?
C. Is there any evidence of buried fiber optic lines?
D. Can utility relocations be done under master agreement or will a specific project agreement be required before relocation work can be done?
E. Is the project in proximity to railroad property - active or exempt?
F. Will utility betterments be incorporated into this project?

PROJECT SCOPING CHECKLIST

DIVISION OF OPERATIONS

A. MAINTENANCE

1. Will sawing and sealing of joints be required?
2. Are there any joints that need to be repaired or replaced?
3. Does guiderail need to be upgraded?
4. Should curb be replaced?
5. Should all areas of distress (alligator cracking, raveling, etc.) be stabilized prior to resurfacing (including shoulders and ramps)?
6. Will all driveways be accessed?
7. Check inlets and manholes to see if reconstruction is needed?
8. Do drainage pipes and structures need to be cleaned?
9. Can drought resistant plantings be used?
10. Can low maintenance grasses be used?
11. Are slopes flat enough to resist erosion?
12. Can sound walls be placed on right-of-way to eliminate maintenance behind the walls? If not, is access provided?
13. Is access provided to mow behind guiderails? What about vegetation under guiderail?
14. Check out where existing guiderail ties into structures, any upgrades or changes should be addressed!
15. Will RPM's be constructed and/or replaced?
16. Do any cross slopes need to be corrected?
17. Can snow be removed from bridge decks and sidewalks easily?
18. Are shoulders wide enough to accommodate maintenance equipment (snooper trucks, mowers, etc.) without impeding traffic?

PROJECT SCOPING CHECKLIST

DIVISION OF OPERATIONS (CON'T)

19. Do cross drain pipes need to be extended? What about end treatments? Will the extension of cross drain pipes eliminate the need for guiderail?

20. All drainage pipes should be upgraded to the minimum 375 millimeter diameter as required?

21. Longlife traffic stripes should be used or thermoplastic to reduce maintenance.

22. Will all non-standard inlets be replaced?

23. Will 75 millimeters or more curb face be maintained?

24. Will intersection areas receive handicap ramps?

25. Is there a fill area or other area where accumulated sweeping or other solid waste can be disposed?

26. Check all maintenance of grass area for future mowing problems, including those surrounded by guiderail.

27. How will maintenance clean oil/separators?

28. If this could be a widening project determine if any utilities reside in a live lane and if so could they be relocated?

29. Examine and review current SI&A sheets and bridge reports on all structures.

30. Close all median openings where left hand turn slots cannot be employed.

31. All roadways with flat profiles should be considered as candidates for open-graded surface treatments to reduce hydroplaning.

32. When possible incorporate automated road and weather systems in the project.

33. Is guiderail back far enough to allow snow plowing - not at curb face?

34. Should fencing be removed/relocated when sound walls are erected? (no confined areas between)

35. Is there access behind sound walls?

36. Can we sell in fee ($1.00) the area between the sound walls and the adjacent property line? This will eliminate a big future maintenance cleanup problem. Retain easement for repairs, etc.

PROJECT SCOPING CHECKLIST

DIVISION OF OPERATIONS (CON'T)

37. Are underdrains needed?

38. Exercise all adjacent area improvements so as to eliminate need for guiderail?

39. Do not obstruct moveable areas with delineators, mile markers, etc. Move them back as far as possible.

40. Identify any slope erosion!

41. Employ methods so vegetation will not grow under guiderail, such as plastic panels, I-5 mix, etc.

42. Where mowing is required on islands or bowls, construct depressed curb for mower entry!

43. Keep signs off points where ramps, etc. exit off mainline. This is a snow storage area!

44. Consider increasing scupper drain pipe size from 150 millimeters to 200 millimeters with no 90 degree bends, using all 135 degree bends with cleanouts!

45. Include bridge deck repairs if within limits of contract!

46. Plant ivy or climbing vegetation at sound wall to deter graffiti!

47. Include jurisdictional agreements, existing or proposed, perhaps with upgrades. Some responsibilities can be relinquished to local authorities!

48. Consider installing living snow fence when applicable!

49. Look at the possibility of upgrading signing or to eliminate non-essential signs!

50. Add an item for sound wall placement so that wall heights will not shade travel way during the winter months!

51. Consider using trench drains where water seepage problems are occurring!

52. Are all drainage problems addressed?

53. If pavement grade is raised, are driveways reconstructed to prevent water from flowing into them?

54. Consider agreements with farmers to have them leave the last three rows of corn for a natural snow fence.

PROJECT SCOPING CHECKLIST

DIVISION OF OPERATIONS (CON'T)

55. Look to include fertilizing and seeding for areas within the R.O.W. where there is no existing grass/vegetation?

56 Other?

B. COMMUNITY INVOLVEMENT

1. Will a public hearing be needed?

2. Are there any complaints filed concerning this area?

3. Are there any requests from the public (jughandles, lighting, traffic signals, sidewalks, etc.)?

4. Are there any requests from politicians or special interest groups?

5. Are there any requests from the County or Municipal Engineer?

6. Is there any provisions to improve bicycle access or other recreation facilities?

7. Will any intended work conflict with local noise ordinances?

8. Are there any sensitive impacts within the project area such as schools, emergency response units, hospitals, loss of property, trees, sidewalks, driveways, access, etc.?

9. Check to ensure if a detour is required?

10. Contact M.P.O. or Planning Bureau!

11. Other?

C. PERMITS

1. Driveway alignment and contour?

2. Driveway offsets, centerline and property line?

3. Number of driveways to a property? Driveway width?

4. Check with property owner with no access point to see if owner would like to file for access?

5. Make sure landscaping will not affect the project?

6. Will all driveways be accessed?

PROJECT SCOPING CHECKLIST

DIVISION OF OPERATIONS (CON'T)

7. Any encroachments?

8. Check edge clearance 3.6 meter minimum?

9. Corner clearance?

10. Conditions of shoulders and width for proposed accel/decel lanes?

11. Are there any modifications that may be needed to municipal streets?

12. What is the status of utility work and other pertinent highway occupancy permits in the project area?

13. Other?

D. REGIONAL ELECTRICAL

1. Do any overhead wires need to be relocated?

2. Should any loop detectors be upgraded?

3. Will new traffic signals be adequately protected from traffic?

4. Should any traffic signals be upgraded?

5. Can any wiring be upgraded?

6. Does conduit size need to be increased or additional conduit included?

7. Check to see if any 508 millimeter JB's should be replaced with 457 by 914 millimeter JB's?

8. Any signal phase on one pole should be changed?

9. Should detection areas (roadway surface) be upgraded?

10. Pedestrians right-of-way should be considered if possible!

11. Can forewarning devices be used where needed?

12. Will synchronization of other signals be of concern?

13. Are the as-built plans on file accurate?

PROJECT SCOPING CHECKLIST

DIVISION OF OPERATIONS (CON'T)

14. Is a temporary traffic signal system needed while re-wiring the traffic signal or for staged construction?

15. Will the existing controller accommodate the proposed traffic signal upgrades, or will a new controller be needed?

16. Are there any outstanding temporary and/or regular traffic signal directives?

17. Contact the local municipality for their input.

18. Other?

E. TRAFFIC ENGINEERING

1. ITS options should be addressed!

2. Are integrated signal systems needed?

3. Are variable message signs or highway advisory radio needed?

4. Should HOV lanes be considered?

5. Check all nearby design and construction projects for possible conflicts or traffic flow problems?

6. What is the schedule of allowable closures?

7. How should this project be staged?

8. Impact to mass transit?

9. Special signs needed for traffic flow, control, information, etc.?

10. Special signs needed for businesses and safety of pedestrians as well as customers?

11. If ramps are involved, do we need to ball bank ramps to determine advisory speed?

12. Any special regulations needed for speed limits, turn prohibitions, parking prohibitions, one-way designations, etc.?

13. Other?

PROJECT SCOPING CHECKLIST

DIVISION OF OPERATIONS (CON'T)

F. TRAFFIC OPERATIONS

1. ITS options should be addressed!
2. Is an integrated signal system, with incident management capabilities, warranted?
3. Are variable message signs or highway advisory radio needed? Temporary or permanent?
4. Should HOV lanes be considered?
5. Check all nearby design and construction projects for possible conflicts or traffic flow problems?
6. What is the schedule of allowable closures?
7. How should this project be staged?
8. Impact to mass transit?
9. Special signs needed for traffic flow, control, information, etc.?
10. Special signs needed for businesses and safety of pedestrians as well as customers?
11. Consider all evacuation routes if a detour is anticipated?
12. What is the appropriate communications backbone (telephone, fiber optic, microwave, cellular, none)?
13. Should video surveillance, traffic speed and/or weather detection systems be included?
14. Other?

Attachment 3 - Federal Aid Policy Guide

FEDERAL AID POLICY GUIDE
23 CFR 625
DESIGN STANDARDS FOR HIGHWAYS

SUBCHAPTER G - ENGINEERING AND TRAFFIC OPERATIONS

PART 625 - DESIGN STANDARDS FOR HIGHWAYS

Sec.

Authority: 23 U.S.C. 109, 315, and 402; Sec. 1073 of Pub. L. 102-240, 105 Stat. 1914, 2012; 49 CFR 1.48(b) and (n).

[58 FR 38293, July 16, 1993]

Source: 51 FR 16832, May 7, 1986, unless otherwise noted.
Editorial Note: For document cited by bracketed numbers, see Appendix A.

Sec. 625.1 Purpose.

To designate those standards, specifications, policies, guides and references that are acceptable to the Federal Highway Administration (FHWA) for application in the geometric and structural design of highways.

Sec. 625.2 Policy.

(a) Plans and specifications for proposed Federal-aid highway projects shall provide for a facility that will:

(1) Adequately meet the existing and probable future traffic needs and conditions in a manner conducive to safety, durability, and economy of maintenance; and

(2) Be designed and constructed in accordance with standards best suited to accomplish the foregoing objectives and to conform to the particular needs of each locality.

(b) The development and overall management of highway facilities must be considered as a continuing program. This process of highway management commences with planning and extends through design, construction, maintenance, and operation. To assure a continuing acceptable level of safe traffic service, it is essential to provide for adequate maintenance and periodic resurfacing, restoration, and rehabilitation (RRR) throughout the life of the highway. The RRR work is defined as work undertaken to

extend the service life of an existing highway and enhance highway safety. This includes placement of additional surface material and/or other work necessary to return an existing roadway, including shoulders, bridges, the roadside, and appurtenances to a condition of structural or functional adequacy. The RRR work may include upgrading of geometric features, such as minor roadway widening, flattening curves, or improving sight distances. The RRR work is an essential part of any highway program, and each State and local agency should provide for these types of improvements in each annual highway program.

(c) An important goal of the FHWA is to provide the highest practical and feasible level of safety for people and property associated with the Nation's highway transportation systems and to reduce highway hazards and the resulting number and severity of accidents on all the Nation's highways. Accordingly, the only constraint on the application of Federal-aid funds to RRR work is that they must be used to provide a facility that adequately meets existing and probable future traffic needs and conditions in a manner conducive to safety, durability, and economy of maintenance, and acceptable levels of community and environmental impact. The RRR projects shall be designed and constructed in a manner that will enhance highway safety and accomplish the foregoing objectives according to the particular needs of each State and locality.

[51 FR 16832, May 7, 1986, as amended at 54 FR 281, Jan. 5, 1989]

Sec. 625.3 Application

(a) The standards, policies, and standard specifications contain specific criteria and controls for the design of highways. Deviations from specific minimum values therein are to be handled in accordance with procedures in paragraph (f) of this section.

If there is a conflict between criteria in the documents enumerated in Sec. 625.4 of this part, the latest listed standard, policy, or standard specification will govern.

(b) The guides and references (handbooks, reports, etc.) include information and general controls that are valuable in attaining good design and in promoting uniformity. They are intended to provide general program direction. Project-by-project deviations from the criteria in guides and references do not require handling as exceptions under paragraph (f) of this section.

(c) Application of FHWA regulations, although cited in Sec. 625.4 of this part as standards, policies, and standard specifications, shall be as set forth therein.

(d) This regulation does not establish Federal standards for work that is not federally funded; however, the safety related criteria of the referenced documents are established as goals for developing State and local safety programs for all public highways as required by Highway Safety Program Standard 12, 23 CFR 1204.4.

(e) The Division Administrator shall determine the applicability of the roadway geometric design standards to traffic engineering and safety projects for signing, marking, signal installation, and traffic barriers which include very minor or no roadway work. Formal

findings of applicability are expected only as needed to resolve controversies.

(f) Exceptions.

(1) Approval within the delegated authority provided by FHWA Order 1-1 [2] may be given on a project basis to designs which do not conform to the minimum criteria as set forth in the standards, policies, and standard specifications for:

(I) Experimental features on projects; and

(ii) Projects where conditions warrant that exceptions be made.

(2) The determination to approve a project design that does not conform to the minimum criteria is to be made only after due consideration is given to all project conditions such as maximum service and safety benefits for the dollar invested, compatibility with adjacent sections of roadway and the probable time before reconstruction of the section due to increased traffic demands or changed conditions.

Sec. 625.4 Standards, policies and standard specifications

The documents listed in this section are incorporated by reference in accordance with 5 U.S.C. 552(a) and are on file at the Office of the Federal Register in Washington, DC. They are available for inspection as noted in footnote numbers 1 and 2 in the Appendix to this Part.

(a) Roadway and appurtenances.

(1) A Policy on Geometric Design of Highways and Streets, AASHTO 1990. [3]

(2) A Policy on Design Standards-Interstate System, AASHTO, 1991. [3]

(3) Interim Selected Metric Values for Geometric Design, AASHTO, 1993, [3]

(4) The geometric design standards for resurfacing, restoration, and rehabilitation (RRR) projects on highways other than freeways shall be the procedures and the design or design criteria established for individual projects, groups of projects, or all nonfreeway RRR projects in a State, and as approved by the FHWA. The other geometric design standards in this section do not apply to RRR projects on highways other than freeways, except as adopted on an individual State basis. The RRR design standards shall reflect the consideration of the traffic, safety, economic, physical, community, and environmental needs of the projects.

(5) A Policy on U-Turn Median Openings on Freeways, AASHTO 1960. [3]

(6) A Policy on Access Between Adjacent Railroads and Interstate Highways, AASHTO 1960. [3]

(7) Erosion and Sediment Control on Highway Construction Projects, FHWA, 23 CFR Part 650, Subpart B.

(8) Location and Hydraulic Design of Encroachments on Flood Plains, FHWA, 23 CFR Part 650, Subpart A.

(9) Water Supply and Sewage Treatment at Safety Rest Areas, FHWA, 23 CFR Part 650, Subpart E.

(10) Procedures for Abatement of Highway Traffic Noise and Construction Noise, FHWA, 23 CFR Part 772.

(11) Accommodation of Utilities, FHWA, 23 CFR Part 645, Subpart B.

(12) Pavement Design, FHWA, 23 CFR Part 626.

(b) Bridges and Structures.

(1) Standard Specifications for Highway Bridges, Sixteenth Edition, AASHTO 1996, and Interim Specifications, Bridges, AASHTO, [3]

(2) Standard Specifications for Movable Highway Bridges, AASHTO 1988. [3]

(3) Bridge Welding Code (D1.5-95), AASHTO/AWS 1995. [3,4]

(4) Reinforcing Steel Welding Code AWS D 1.4-79. [4]

(5) Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals, AASHTO 1994, and Interim Specifications, Bridges, AASHTO. For use on Federal-aid highway projects, the requirement for maximum change in velocity in Section 7, Breakaway Supports, may be 4.9 meters per second in lieu of the 4.6 meters per second contained in the AASHTO specifications. [3]

(6) Navigational Clearances for Bridges, FHWA, 23 CFR Part 650, Subpart H.

(c) Materials

(1) General Materials Requirements, FHWA, 23 CFR Part 635, Subpart D.

(2) Standard Specifications for Transportation Materials and Methods of Sampling and Testing, Part I and Part II, AASHTO 1986. [3]

(3) Sampling and Testing of Materials and Construction, FHWA, 23 CFR part 637, Subpart B.

[51 FR 16832, May 7, 1986, as amended at 52 FR 36247, Sept. 28, 1987; 54 FR 281, Jan. 5, 1989; 58 FR 25934, April 29, 1993; FR 25939 April 29, 1993]

Sec. 625.5 Guides and references.

The following area citations to publications which are primarily informational or guidance in character and serve to assist the public in knowing those materials which are considered by FHWA to provide valuable information in attaining good design.

(a) Roadway and appurtenances.

(1) An Informational Guide for Roadway Lighting, AASHTO 1984. [3]

(2) Highway Design and Operational Practices Related to Highway Safety, Report of the Special AASHTO Traffic Safety Committee, AASHTO 1974. [3]

(3) Guide for Selecting, Locating and Designing Traffic Barriers, AASHTO 1977. [3] Barriers classified as either operational or experimental, except Type MB 1 median barriers, are acceptable for Federal-aid projects.

(4) An Informational Guide on Fencing Controlled Access Highways, AASHTO 1967. [3]

(5) An Informational Guide for Preparing Private Driveway Regulations for Major Highways, AASHTO 1960. [3]

(6) Highway Capacity Special Report 209, Highway Capacity Manual, Transportation Research Board, 1985. [5]

(7) Guidelines on Pavement Management, AASHTO 1985. [3]

(8) Handbook of Highway Safety Design and Operating Practices, FHWA 1978. [2]

(9) Skid Accident Reduction Program, T 5040.17, FHWA December 23, 1980. [2]

(10) Guidelines for Skid Resistant Pavement Design, AASHTO 1976. [3]

(11) Special Report 214, Designing Safer Roads, Practices for Resurfacing, Restoration, and Rehabilitation, TRB 1987. [5]

(12) AASHTO Guide for Design of Pavement Structures, AASHTO 1986. [3]

(13) National Cooperative Highway Research Program Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features, TRB 1993. [5]

(b) Bridges and Structures

(1) A Guide for Protective Screening of Overpass Structures, AASHTO 1990. [3]

(2) Manual for Maintenance Inspection of Bridges, AASHTO 1983, and Interim Specifications, Bridges, AASHTO 1986 through 1988. [3]

(3) Guide Specifications for Fracture Critical Non-Redundant Steel Bridge Members, AASHTO 1978, and amending Interim Specifications, Bridges, AASHTO 1981 through 1987. [3]

(4) Guide Specifications for Horizontally Curved Highway Bridges, AASHTO 1993.

(5) Guide Specifications for Seismic Design of Highway Bridges, AASHTO 1983, and amending Interim Specifications, Bridges, AASHTO 1985 through 1988. [3]

(6) Highway Drainage Guidelines, Volumes I through VIII, AASHTO 1987. [3]

(7) Manual on Subsurface Investigations, AASHTO, 1988. [3]

(8) Guide Specifications for Bridge Railings, AASHTO 1989. [3]

(c) Other

(1) Transportation Glossary, AASHTO 1983. [3]

(2) A Guide for Erecting Mailboxes on Highways, AASHTO 1984. [3]

(3) A Guide on Safety Rest Areas for the National System of Interstate and Defense Highways, AASHTO 1968. [3]

(4) Guide for Development of New Bicycle Facilities, AASHTO 1981. [3]

(5) Guide Specifications for Highway Construction AASHTO 1985. [3]

[51 FR 16832, May 7, 1986, as amended at 53 FR 15671, May 3, 1988; 54 FR 281, Jan. 3 1989; 54 FR 1844, Jan. 17, 1989; 54 FR 25117, June 13, 9189; 58 FR 38293, July 16, 1993]

Appendix A - Documents Cited in Part 625

1. The design standards listed in Sec. 625.4 are incorporated by reference and are on file at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC.

2. These documents may be reviewed at the Department of Transportation Library, 400 7th Street, SW, Washington, DC 20590 in room 2200. These documents are also available for inspection and copying as provided in 49 CFR Part 7, Appendix D.

3. American Association of State Highway and Transportation Officials, Suite 225, 444 North Capitol Street, NW, Washington, DC 20001.

4. American Welding Society, 2501 Northwest 7th Street, Miami, Florida 33125.

5. Transportation Research Board, 2101 Constitution Avenue, NW, Washington, DC 20418.

[51 FR 16832, May 7, 1986, as amended at 54FR 282, Jan. 5, 1989; 58 FR 25939, April 29, 1993]

Attachment 4 - Highway Sections

A set of Highway Section sketches shall be prepared on 210 by 297 millimeter, 210 by 360 millimeter, or half scale contract plan sheets (ISO A3 sheets), whichever is most appropriate for the specific project conditions (see Figure 1 for an example of a Highway Section sketch). The Highway Section sketch is intended to be a sketch that indicates the basic information necessary for the preparation of the Scope Summary and ultimately contract plan typical sections.

General Notes

A. Highway Sections for pavement transition widths and superelevation transition areas are not required.

B. Highway Sections for projects of approximately 300 meters or less are not required.

C. Highway Sections for resurfacing projects are not required when the existing cross slopes, lane widths and shoulder widths conform to the appropriate design standard and no modifications to these design elements are proposed.

D. Scales for Highway Section sketches are not required.

E. Identification of the proposed pavement design is not required.

Highway Section sketches shall include the following:

1. **Normal Section**

   A. Both existing and proposed Highway Section conditions shall be shown. These conditions may be shown as two (2) separate sketches, if they can be referenced to each other (baseline, centerline, etc.). Dimensions shall be labeled as existing or proposed.

   B. Identify existing and proposed lane widths and their corresponding cross slopes and label each "Lane", "Left-turn lane" or "Two-way left-turn lane" as applicable.

   C. Identify existing and proposed shoulder widths and their corresponding cross slopes and label each "Shoulder". If the existing shoulder width varies, indicate the maximum and minimum width.

   D. Show existing pavement width and type. If concrete pavement exists, indicate the location of all longitudinal joints.

   E. Indicate the direction of travel (NB, SB, etc.).

   F. Identify the following roadside details:

      - roadside or border dimensions and cross slopes
      - existing and proposed guiderail with offset dimensions
      - existing and proposed right of way lines
      - existing and proposed sidewalk location and cross slope

- cut and fill slopes
- curb height and existing and proposed face reveal
- berm height and width

G. Where applicable, show and dimension the median area and label "Median". If the median width varies, indicate the maximum and minimum width. If median barrier is proposed, identify median barrier location and dimension. For resurfacing projects, indicate remaining median barrier reveal.

H. An inset shall be used for auxiliary lanes, showing the lane width and cross slope, and labeled "Auxiliary Lane". If a shoulder is to be used adjacent to the auxiliary lane, the shoulder width and cross slope should be indicated and labeled "Shoulder".

I. Where applicable, show and dimension all Collector-Distributor "C-D Roads", including cross slopes, and label "C-D Road". If multi-lane, identify each lane width and cross slope and label each accordingly.

2. **Superelevated Section**

A. Same as 1. above.

B. Indicate the specific maximum superelevation (4% or 6% maximum) which will be used to determine the rate of superelevation on the project. The actual superelevation should not be mentioned. A separate sketch for each curve is not required.

C. Indicate the maximum rollover between lane and shoulder on the high side of the superelevated section (7% to 8% maximum).

3. **Ramp Section**

A. Show a minimum and maximum ramp cross slope, minimum width and roadside treatment (see 1.F. above).

B. If a two (2) lane ramp, identify minimum lane widths, cross slopes and label each "Lane".

4. **Relocated Local Road, Service Roads, Connectors, etc.**

Highway sections for those roadways that will be under NJDOT jurisdiction shall conform to 1. and 2. above. For those roadways not under NJDOT jurisdiction, the proposed Highway Section should be coordinated with the appropriate local or county officials.

Analysis of Tapered Concrete Terminal Sections

1. **New Concrete Barrier Curb Locations**

   All new locations of concrete barrier curb, where concrete barrier curb never existed before, that terminate within the clear zone on any roadway segment where the posted speed will exceed 40 mph shall have the exposed approach concrete barrier curb end protected by a crash cushion.

2. **Existing Concrete Barrier Curb Locations**

   On Reconstruction projects, all existing concrete barrier curb locations that terminate within the clear zone on any roadway segment where the posted speed exceeds 40 mph should have the exposed concrete barrier curb end protected by a crash cushion, or justification provided in the Project Report.

Accidental/Controlling Substandard Design Element Analysis

Only those highway elements that are identified as "controlling design elements" and do not conform to a specified design value are categorized as "controlling substandard design elements" (refer to Section 3.8, Design Exceptions, for a discussion of controlling design elements).

1. **Overall Analysis**

   A. Request an overall accident analysis of the project limits from the Bureau of Traffic Signal and Safety Engineering (see Figure 2 for a sample memorandum). This will compare over-represented accidents against the accident rate occurring on highways of similar section.

   B. If the overall analysis accident rate is greater than the statewide rate, identify any potential areas where there may be an increased incidence of accidents and request Traffic Signal and Safety Engineering to evaluate each location separately. Otherwise, proceed to Part 2.

2. For Non-Interstate resurfacing projects (all other project types, proceed to Part 3), if the overall rate is less than the statewide rate, proceed to Step 6, unless it is concluded that there is a serious potential for accidents. If the overall rate is greater than the statewide average, the Bureau of Traffic Signal and Safety Engineering will contact the project manager to discuss individual categories.

   A. **Wet Weather**

      If wet weather accidents are over-represented, it is likely that a reduction to the accident rate will occur based on the proposed resurfacing.

B. **Accident Records**

If over-represented accidents have occurred (other than Wet Weather) analyze individual accident reports to determine if a controlling substandard design element is involved.

C. **Mitigating Measures**

Determine if mitigating measures can be included in the scope of the project to reduce over-represented accidents.

If A and B are determined to be acceptable, or C can be incorporated into the project, proceed to Step 6, otherwise go to Part 3 or submit a Problem Statement.

3. Identify all controlling substandard design elements.

4. Request an individual accident analysis of all controlling substandard design elements from the Bureau of Traffic Signal and Safety Engineering.

5. On existing highways, where the utility pole offset does not meet Department standards, request an accident analysis of existing utility pole locations from the Bureau of Traffic Signal and Safety Engineering (refer to Section 8 of the Design Manual Roadway).

6. Incorporate the results in the Project Fact Sheet.

FIGURE 2

NEW JERSEY DEPARTMENT OF TRANSPORTATION
MEMORANDUM

To: _____
Manager
Traffic Signal and Safety Engineering

From: _____
Project Manager

Date:

Phone:

Subject: Overall Accident Analysis

Please provide my office with the actual accident rate, and the statewide accident rate for highways of similar cross section, for the following project(s):

Route	Milepost	Cross-Section	Job #
157	0.0-0.91	2 Lane - No shoulder	0116501
68	3.2-7.0	4 Lane - Grass Median with shoulders	0306501
68	7.0-7.2	4 Lane - Grass Median with shoulders (intersection)	0306501
68	7.2-8.0	4 Lane - Grass Median with shoulders	0306501
68	0.0-3.2	2 Lane - with shoulders	0306501

It is our understanding that the data requested will encompass both directions of travel on a divided highway. Also, please provide a copy of the Accident Detail Report printout for each project. If you prepare a collision diagram, or recommend that a collision diagram be prepared, please include that also.

3.2 Final Scope Development

Final Scope Development produces a Recommended Alternative which sets the Scope for Design Development and Construction. This effort includes advancing preliminary engineering necessary to complete the environmental document, obtaining formal community input, receiving approved design exceptions, and advancing those Design Services critical to the Design Development schedule. At the beginning of Final Scope Development, the Project Manager assigned to oversee the Feasibility Assessment process, will assume full control of the Project.

Some projects will have been assigned directly to a Program Manager by the Capital Program Development Committee. These will be projects which the Bureau of Capital Program Development identified as being of limited scope and for which the solution to the problem is apparent. The potential project will, in such instances, be advanced without having gone through the Feasibility Assessment phase. Although the solution to the problem is apparent, the Project Screening, Step 1 (1A - 1D) of Section 3.1, will be implemented by the Project Manager to allow the Scope Team to offer input into the project. It is possible that this input could ultimately lead to a decision to recommend the project be remanded back to the Feasibility Assessment process.

Project Screening conducted for this type of project is considered to be part of the project development process and as such will be conducted under the management of a Project Manager.

Step 1. Initiate Formal Community Involvement and Environmental processes:

Step 1A. Obtain Formal Community Involvement Buy-In:

A public meeting will be generally arranged. Although the Initially Preferred Alternative will be based on early involvement by local officials and environmental agencies, this may be the first time the public at large will be presented with the project's impacts clearly delineated on paper. This may lead to some minor modifications to the Initially Preferred Alternative. The Bureau of Environmental Services will be advised of any changes so that they can be reflected in the environmental document. If major changes are requested by the public during this phase, the project may be reassigned to BPSD for additional Feasibility Assessment.

At the end of the community involvement process, the Office of Community Relations will ask the local officials to provide a resolution of support endorsing the project. The scheme is finalized once comments have been received and evaluated, and the appropriate adjustments are made, and combined with input from the environmental process, will be used to produce the Recommended Alternative.

Step 1B. Initiate Environmental Review of the Initially Preferred Alternative:

Environmental input is solicited from the Bureau of Environmental Services, NJDEP (including the SHPO), FHWA, and other environmental agencies. This will essentially provide an opportunity for formal participation in the Scope Development process.

The Bureau of Environmental Services will start the process of obtaining approval of the appropriate environmental document based on the Initially Preferred Alternative. Close consultation will need to be maintained with the Project Manager to ensure coordination with other concurrent activities.

Step 2. Advanced Design Services Coordination:

A number of Design Services will be initiated during Final Scope Development. These Design Services may not be needed to set the scope of the project, but will serve to advance later design activities. Most will be initiated by the Project Manager supplying either a consultant, or functional units within the Division of Design Services, the Initially Preferred Alternative. Design Services will use the Initially Preferred Alternative, as well as the Base Plans and other information provided with the Problem Statement Package, to begin their various sub processes. These initial design activities will need to be completed prior to start of Design Development, and summarized into reports attached to the Scope Development Package.

It should be noted that many of these activities involve the gathering of existing data which will be unaffected by the finalization of the Recommended Alternative. However, since these services are not essential to scoping, and are labor intensive, the Project Manager will need to carefully assess the risks associated with starting these Design Services against the potential for minor changes which may occur because of environmental and/or community issues. Potential adverse effects to the Design Development schedule must also be assessed. If the risk of changes is deemed high, the Project Manager may decide to hold off initiation of these Design Services until the actual resolution of community support and environmental approvals are received. Such a decision will have to be carefully weighed because the extra process will delay start of the Final Scope Development, but will minimize the need to discard work later if the community involvement or environmental processes results in significant scope changes after Design Services are started.

Step 2A. Utilities:

Upon receipt of the Initially Preferred Alternative, the BPSD, Bureau of Utilities or the Department's consultant will determine the locations of existing utilities and have them plotted on the base plans. These Utilities mark ups will be submitted to the utility companies for location verification when needed. The Bureau of Utilities will also develop Master Utility Agreements at this time. A preliminary relocation cost estimate will be prepared.

Step 2B. Geotechnical:

Upon receipt of the Initially Preferred Alternative, the Geotechnical Unit or the Department's consultant will undertake a preliminary boring program, for all projects that involve structures, or as otherwise deemed relevant by the Project Manager.

Step 2C. Drainage:

Upon receipt of the Initially Preferred Alternative, the Hydraulics Section of the Bureau of Civil Engineering or the Department's consultant will locate the existing drainage system and have it plotted on the base plans. The Hydraulics Section will then determine whether that system needs to be upgraded to handle current flows, and if so, determine preliminary ROW needs and drainage costs. The BPSD will only perform drainage engineering if the flooding or inadequate drainage issues which require major scoping are raised in the Problem Statement Package and/or the Project Screening.

Step 2D. Base Plan Evolution:

The Design Coordination Unit or the Department's consultant will insure that the utilities and drainage information are adequately reflected in the Base Plans in their custody. The BPSD will be apprised of substantial changes so that the Initially Preferred Alternative can be revised as necessary. These "marked up" plans will be then used for development of Preliminary ROW plans needed for development of budget level ROW cost estimates.

Step 2E. Right of Way Estimates:

The Preliminary ROW plans will identify: partial takings; full takings demolition; environmentally sensitive parcels; utility and drainage easements; and construction easements. Access changes will also be reflected on the plans to the extent available. These plans will be used by the Bureau of ROW to develop their budget level estimates for the ROW acquisition process that will occur simultaneous with final design.

Step 3. Obtain Environmental Approvals for the Initially Preferred Alternative:

The analysis and coordination work initiated by Bureau of Environmental Services in Step 1A may lead to changes in the IPA. It may also lead to a recommendation to terminate the project, to recycle the project to Concept Development, or for more scoping. Any changes will be documented, and the formal approvals of the environmental documents will be obtained. (See Section 8 - Environmental of this Manual for more details.)

Step 4. Select a Recommended Alternative:

The Recommended Alternative will be selected by the BPSD, with concurrence by the Project Manager, to recommend the scope for final Design Development, Right of Way Acquisition, and Construction. This will occur only after the environmental document, community involvement, and Advance Design Service processes are completed. The Project Manager and the BPSD will attempt to attain "buy-in" for the Recommended Alternative, or reaffirm "buy-in" if the Initially Preferred Alternative has been modified, from all key "stakeholders" represented on the Scope Team.

Step 5. Preparation of Highway Sections:

The purpose of the Highway Section is to ensure that proposed improvements to a highway segment conform to the appropriate design standard and are consistent with the adjacent highway section and its environment. This intent is different from the "Typical Section" plan

sheet required in construction contract documents. Normally a few highway sections will be necessary for the purpose of showing the general intent of the project.

Structure sketches are to be prepared in accordance with Section 17.2. Highway sections are to be prepared in accordance with Attachment 4. The initial development of this information may have occurred during the Feasibility Assessment; however, the formal approval occurs at the conclusion of Final Scope Development. Highway sections and structure sketches are to be recommended for approval by the Bureau of Design Coordination after consultation with the Office of Geometrics and the Bureau of Structural Engineering.

Step 6. Design Exceptions:

All design exceptions that will be needed for the Recommended Alternative will be identified and obtained in accordance with Section 3.8 prior to completion of the Scope Development phase.

Step 7. Prepare Scope Development Package:

During this Step, the BPSD takes care of the administrative steps needed to complete the study effort and present it as a formal proposal. BPSD will refine construction costs, and incorporate input from Design Services which will be attached to the Scope Development Package and summarized therein.

The final Scope Development Package which documents relevant scoping related issues will be prepared and submitted to the Program Manager as follows:

***Recommended Alternative:**
A description of the Recommended Alternative and reasons for its selection will be documented. Preliminary plans, studies, highway sections, and structure sketches depicting the Recommended Alternative should be included.
***Development of other Alternatives:**
The full range of design and alignment alternatives which were considered will be discussed.
***Public Involvement:**
The Public Involvement Program will be documented.
***Background Information:**
All background data accumulated during the Scope Development Process will be included.
***Environmental Documentation:**
The approved Environmental Document, including all environmental constraints and issues which provided input for scoping will be included. The Scope Development Process will not be considered complete unless the Environmental Document is approved. The Bureau of Environmental Services is responsible for obtaining this approval.
***Additional Reports and Cost Estimates from other Units:**
Each unit providing Advance Design Services will provide a “mini” report and cost estimates and a summary of their work performed.
***Approved Design Exceptions: if applicable**

***Access Impact Summary:**

Includes a discussion of Access implications of the Recommended Alternative identifying and providing justification for any Access Code waivers that may be required.

Step 8. Presentation of the Recommended Alternative to the Capital Program Development Committee:

The Project Manager will use the Scope Development Package as the basis of a presentation to the Capital Program Development Committee. The intent will be to obtain the Capital Program Development Committee's approval to enter the project in the Draft Project Pool for Final Design. The completion of this step will constitute "Scheme Set".

3.3 Activity Descriptions

This section describes the critical activities in the Capital Project Delivery Process, from Scope Development through Final Design (refer to the attached Project Delivery Process Network diagram). The activities referenced in this section include a description of each activity along with examples of some primary tasks respective of that activity. In addition, references are included where additional information on certain activities may be obtained.

Activity Summary

- Topographic Survey (1170)
- Utility Company Initial Contact (1100)
- Establish Utility Engineering Funding (1110)
- Prepare Utility Agreement (1130)
- Utility Base Plan Preparation (1140)
- Utility Discovery and Verification (1120)
- Structure Sketch (1190)
- Gather Preliminary Subsurface Information (1700)
- Conduct Geotechnical Assessment (1710)
- Conduct Pavement Condition Assessment (1720)
- Prepare Pavement Design (2230)
- Gather Subsurface Information (2400)
- Conduct Geotechnical Foundation Design (2410)
- Conduct Geotechnical Roadway Design/Rock Slope (2420)
- Horizontal/Vertical Geometry Completed (2210)
- Project Screening (1010)
- Community Relations (1060)
- Initiate Access Impacts (1150)
- Final Scope Development (1040)
- Capital Program Development Committee Review (1095)
- Initiate Drainage (1800)
- Initiate Geometrics (1070)
- Initiate Right of Way and Prepare Estimate (1160)
- Prepare Design Exceptions (1080)
- Consultant Selection (1240)
- Contract Negotiations (1250)
- Consultant Agreement (1260)
- Develop Initial Baseline Schedule (1265)
- Develop Design Cost Estimates (1270)
- Develop Initial Baseline Budget (1280)
- Conduct Value Engineering Review (1050)
- Constructibility Review (1055)
- Environmental Documentation (for Categorical Exclusions) (1290)
- Eligibility/Effect Cultural Resources (1310)
- Prepare Summary Document Section 106 (1320)
- FHWA CE Approval (1300)
- Prepare Memo of Agreement (MOA) Cultural (1330)

- Prepare Draft 4(f) (1340)
- Circulate Draft 4(f) (1350)
- Prepare Final 4(f) (1360)
- Final Approval 4(f) (1370)
- Early Coordination Individual Section 106/4(f) (1380)
- Prepare Draft Individual Section 106/4(f) (1390)
- Circulate Draft Individual Section 106/4(f) (1400)
- Prepare Final Individual Section 106/4(f) (1410)
- Final Approval Individual Section 106/4(f) (1420)
- Prepare Programmatic 4(f) (1430)
- NEPA Scoping (1550)
- Prepare Technical Environmental Studies (1440) (1500) (1560)
- Prepare Draft 4(f)/EIS (1650)
- Prepare Draft Environmental Assessment (1450)
- Submit Draft Environmental Assessment (1460)
- Make Available Environmental Assessment (1470)
- Address Comments Environmental Assessment (1480)
- Request FONSI (1490)
- Prepare Draft Environmental Impact Statement (1570)
- Submit EIS to FHWA (1580)
- Circulate Draft EIS (1590)
- Public Hearing (1660)
- Assemble Comments/EIS (1600)
- Prepare Final EIS (1610)
- Submit Final EIS (1620)
- Address Comments Environmental Document (1530)
- Final EIS Made Available (1630)
- Obtain Record of Decision (1640)
- Prepare Draft Environmental Document (1510)
- Submit Draft Environmental Document (1520)
- Conduct Supplemental Surveys (2240)
- Develop and Approve Schemes of Accommodation (2110)
- Prepare Access Markups (2080)
- Conduct Access Review (2090)
- Administer Access Modifications and Revocations (2100)
- Utility Owner Develops Plans and Estimates (2130)
- Prepare Permit Applications Environmental (2300)
- Prepare Drainage Design (2170)
- Prepare Preliminary Structure Plans (2260)
- Prepare Noise Barrier Details (3160)
- Prepare Preliminary Right of Way Documents (2020)
- Prepare Contamination Cleanup Plan (2270)
- Prepare Wetlands Conceptual Mitigation Plan (2280)
- Prepare Final Wetlands Mitigation Plan (3200)
- FHWA Right of Way Authorization (2010)
- Prepare Roadway Plans (2190)
- Design and Constructibility Review (2200)

- Complete Final Right of Way Documents (2030)
- Prepare Landscape Design (3070)
- Complete Drainage Design (3080)
- Prepare Traffic Signing, Striping and Signal Plans (2160)
- Prepare ITS Facilities Plan (2165)
- Prepare Lighting Design (2150)
- Appraise Right of Way (2050)
- Review Right of Way Appraisals (2060)
- Review Plans and Modify Utility Agreements (2140)
- Prepare Final Roadway Documents (3110)
- Authorization of Utility Work (3030)
- Advance Relocation of, or Construction by, Utility (3040)
- Final Design Review (3120)
- Secure Permits Environmental (2310)
- Prepare Final Wetlands Mitigation Plan (3200)
- Complete Lighting Design (3050)
- Complete ITS Facilities Plans (3065)
- Complete Traffic Signal, Signing and Striping Plans (3060)
- Prepare Final Structure Documents (3190)
- Prepare Roadway Special Provisions (3150)
- Prepare Structure Special Provisions (3180)
- Mitigate Cultural Resources (2290)
- Acquire Right of Way (2070)
- PS&E Prepare Package (3130)
- Implement Relocation Plan (3010)
- Obtain Construction Environmental Reevaluation (3170)
- Authorization to Advertise (3140)
- Closing Process Relocation Plan(3020)
- Bid and Award Contract (4800)
- Execute Contract (4810)
- Construction to Substantial Completion (4830)
- Final Acceptance (4835)

Topographic Survey (1170)

The field survey notes provide documentation of the site's existing field conditions, drainage systems, utility lines right of way, soil borings, control points, and elevations. The field survey may supplement any necessary photogrammetric survey or GIS. The field survey documents.

Existing Field Conditions: The survey crew records any topographic features which will influence or be influenced by the project design. Also, cross-sections and profiles are prepared which define the ground contour within the anticipated limits of construction.

Drainage Systems: The drainage considerations in the survey may include any bodies of water, open channels or pipe systems.

Utilities: The utility information consists of the location and ownership of all railroads, powerlines, communications lines, substations and pipelines, and other utilities facilities.

Right of Way Considerations: The survey crew locates existing right of way and property boundaries, and all relevant property information, including all buildings, parking lots (including a count), driveways, septic tanks, wells, structures, and any other information that could affect the ROW costs on all properties where ROW takings or easements are anticipated.

Primary Tasks:

1. Request control criteria from NJDOT Geodetic Control Unit.

2. Receive survey request and assign personnel to the project.

3. Telephone 1-800-272-1000 (Garden State Underground Plant Location Service) to request that underground utilities be marked out prior to the field survey.

4. Conduct field survey and/or photogrammetric survey.

5. Do required investigations if actual field survey is not required.

6. Prepare field notes and/or a summary of the investigation.

7. Prepare a Survey Report.

8. Submit results to the appropriate units.

Utility Company Initial Contact (1100)

This activity includes establishing the necessary initial utility and railroad contacts. This task is accomplished by sending letters to the utility owners.

Primary Tasks:

1. Assign Utility Design Engineer (UDE)

2. Review scoping and determine effect on utility facilities.

3. Identify utility owners within project limits, obtain the name and address of the engineer assigned to the project and open a dialog with the owners.

Establish Utility Engineering Funding (1110)

Once initial contacts have been established, a preliminary engineering cost estimate is developed and a funding source is established by the Utilities Unit.

Primary Tasks:

1. Make a reconnaissance of the project

2. Estimate engineering costs to be incurred by the utility owners
3. Establish a funding source.

Prepare Utility Agreement (1130)

Prepare agreement, transmit to utility owners for execution (include in transitional letter an authorization date for the owners to incur engineering costs).

Utility Base Plan Preparation (1140)

This activity includes preparing/showing existing utilities on the Base Plans by the designer (Section 10):

Primary Tasks:

1. Show location of all existing utilities obtained from survey.

2. Supply two (2) sets of Base Plans to each utility owner.

3. Request owner to verify its facilities and add the type, size, depth, operation restrictions, etc. to the Base Plan and return one set to the designer.

Utility Discovery and Verification (1120)

Transmit copy of roadway base plan indicating existing utility facilities to owners, determine type, size and depth of facilities as well as operating restrictions.

Structure Sketch (1190)

Based on the overall project scope, sketches are prepared for all impacted structures included in a project. Refer to Section 17.

Primary Tasks:

1. Obtain input data (field notes, project data, study plans).

2. Evaluate input data.

3. Prepare Structures Sketches.

4. Submit Structures Sketches for review and comment.

5. Evaluate and resolve comments.

Gather Preliminary Subsurface Information (1700)

During Scope Development, the Geotechnical Engineering Unit, in conjunction with the Bureau of Project Scope Development and under the direction of the Project Manager, will undertake a preliminary geotechnical engineering study.

Primary Tasks:

1. The Project Manager requests a Hazardous Screening from the Bureau of Environmental Services.

2. Collect/review the existing geologic/soil information and existing boring logs.

3. Develop the preliminary subsurface exploration and laboratory testing programs.

4. Conduct the preliminary subsurface exploration program and obtain lab testing data.

Conduct Geotechnical Assessment (1710)

Primary Tasks:

1. Study the existing reports (scour study, problem statement, etc.) for existing structures.

2. Identify existing and potential problems related to geotechnical engineering (slope stability, settlement, groundwater, etc.).

3. Investigate the need for possible rock slope mitigation.

4. Summarize existing and potential geotechnical considerations needed to be investigated and incorporate into Design Development.

Conduct Pavement Condition Assessment (1720)

Primary Tasks:

1. Review existing pavement section and traffic data for pavement design.

2. Conduct non-destructive testing or visual evaluation on the physical condition of the existing pavement, including shoulders.

3. Provide network level uniformity of pavement rehabilitation strategies.

4. Recommend pavement treatment.

Prepare Pavement Design (2230)

The purpose of the pavement design is to prepare a structural design to accommodate predicted traffic volumes for a given time period. This design, which is based on subsurface soil types, regional conditions, and traffic analyses, results in establishing the types and thicknesses of the materials used (i.e., subbase, base course and surface courses) to construct the pavement section.

The pavement design is developed using AASHTO or other accepted procedures (standard pavement design, etc.) adapted specifically for the conditions and materials available in New Jersey.

Primary Tasks:

1. Determine location and number of soil samples, if necessary.

2. Conduct soil sampling process and analysis, if necessary.

3. Conduct coring of existing pavement, if necessary.

4. Document results of the soil and core survey.

5. Request traffic data.

6. Prepare the pavement recommendation.

7. Forward the pavement recommendation for review and approval.

Gather Subsurface Information (2400)

The geotechnical investigation typically involves soil sampling and/or rock drilling and may also require the use of piezometers, slope inclinometers, geophysical surveys and geologic field surveys to obtain the necessary field data (refer to Section 11).

Primary Tasks:

1. Determine the need for, or receive the request for, foundation slope stability and/or settlement investigations.

2. Determine the number and location of borings necessary to satisfy the design requirements.

3. Conduct drilling. Classify samples. Conduct site soil strength tests, geophysical investigation and geologic surveys, where required.

4. Prepare and send samples for laboratory analysis and request appropriate tests.

5. Prepare boring logs and geophysical/geological reports.

Conduct Geotechnical Foundation Design (2410)

The geotechnical foundation engineering design is an important path in the structural design process. It provides the foundation recommendations and geotechnical assessments to the Structural Design Unit for the structural foundation designs.

Primary Tasks:

1. Gather and review the soil boring logs, soil lab testing data and groundwater conditions for the proposed structure.

2. Determine the soil parameter for geotechnical analysis and develop the soil profile.

3. Conduct geotechnical analysis and design for the foundations. Analyze soil bearing capacity and pile bearing capacity; estimate pile tip elevation and required pile embedment; perform settlement analysis and stability analysis.

4. Assess constructibility, pile drivability and other geotechnical concerns, e.g. groundwater, temporary sheeting during construction.

5. Prepare the Foundation Report for each structure.

Conduct Geotechnical Roadway Design/Rock Slope (2420)

The Geotechnical Roadway Engineering Design is to provide geotechnical recommendations for the design and construction of embankment and cut of the roadway.

Primary Tasks:

1. Gather and review the soil boring logs; soil lab testing data, groundwater conditions for the proposed roadway.

2. Determine the soil parameters for geotechnical analysis and develop the soil profile.

3. If rock cut/slope is involved, a rock engineering report (refer to Section 11) should be prepared.

4. Conduct geotechnical analysis and design for slope stability and subsurface drainage; perform settlement analysis; design ground improvement.

5. Assess constructibility and other geotechnical concerns during construction.

6. Prepare the Geotechnical Roadway Engineering Report.

Horizontal/Vertical Geometry Completed (2210)

The Horizontal and Vertical Geometry is an important critical path in the design process. This phase of work must be completed early on in the initial design, as beginning other activities rely on completed Geometry.

Primary Tasks:

1. Prepare final line, grade and profile plans as per Quality Control Guidelines.

2. Prepare construction plans indicating proposed geometry.
3. Transmit finalized plans to utilities, ROW, BEA etc.

Project Screening (1010)

Project screening describes those activities which initiate the scope development phase of a project.

Primary Tasks:

1. Review Problem Statement Package.

2. Initiate additional data collection, if required.

3. Hold scope meeting with scope team.

4. Consultation with FHWA, relevant DOT units, local officials, and outside agencies should be conducted as warranted by the project specifies.

5. Perform initial screening of environmental and other constraints

6. Estimate the need for and level of alternative analysis.

7. Set appropriate path for project delivery.

Community Relations (1060)

Once the Optimum Scheme has been developed, possibly with several alternative schemes, a formal public involvement program is to be developed in consultation with the Office of Community Relations (OCR). This activity may include traditional information centers and public meetings, as well as work sessions/focus groups with local officials. OCR will be responsible for scheduling and meeting protocol. Other tasks may include the preparation of mailing lists, data sheets, displays, technical presentations, and meeting follow-up.

Initiate Access Impacts (1150)

This activity includes consultation with the Major Access Unit throughout the development of project schemes to review Access Code implications. Ultimately, an Access Impact Summary will be prepared which identifies how the selected alternative will alter existing access, and further identify and justify any waivers to the Access Code which will be required.

Final Scope Development (1040)

This activity includes all steps necessary to conclude Final Scope Development with the selection of the recommended alternative, or “Scheme Set”.

Primary Tasks:

1. Detailed development and final selection of Recommended Alternative.

2. Providing technical support necessary to complete the environmental document.

3. Complete Community Involvement program.

4. Develop Preliminary Environmental Plan Sheet.

5. Complete Scope Development package providing all documentation.

Capital Program Development Committee Review (1095)

At the conclusion of Scope Development, the Scope Development Package/Scope Summary is transmitted by the Project Manager to the Capital Program Development Committee for review and approval to proceed to Design Development.

Initiate Drainage (1800)

This activity includes the initial screening of existing drainage systems to assess the need for proposed drainage to be included in the discussion of alternative schemes. The adequacy of waterway openings for bridge structures are a major contributing factor in evaluating bridge replacement alternatives.

Primary Tasks may include:

1. Delineating existing surface drainage system characteristics.

2. Determining waterway openings, ROW needs. Coordinate with ROW District to inform them of drainage needs and possible solutions to reduce/eliminate impacts concerning ROW.

3. Evaluate impact of drainage alternatives on project scope.

Initiate Geometrics (1070)

This activity includes the development of geometrics sufficient to evaluate specific project alternatives or impacts.

Primary Tasks may include:

1. Calculation of vertical geometrics, profiles, clearances, covers, grades, etc.

2. Calculation of horizontal geometrics, curves, superelevation, offsets, etc.

Initiate Right-Of-Way and Prepare Estimate (1160)

This activity includes the initial assessment of ROW needs for the optimum scheme and the evaluation of ROW required for subsequent alternatives.

Primary Tasks may include:

1. Establishment of the existing ROW.

2. Assessing ROW needs for various alternatives including providing preliminary cost estimates (prepared by the District ROW staff) of sufficient detail for decision making purposes and obtaining input from the ROW District Engineers to obtain the optimal solution for the project which would weigh the ROW costs when determining the preferred alternative. Also, access issues must be considered at this point.

Prepare Design Exceptions (1080)

In order to obtain Federal and/or State approvals, a project must conform to the appropriate design standard. When conditions warrant, a Design Exception may be approved when it can be demonstrated that the Design Exception is in the best interest of the Department, the traveling public and the local citizens.

In general, a Design Exception is prepared by the Bureau of project Scope Development under the direction of the Project Manager. Once all substandard design elements have been identified, the Design Exception is prepared and submitted for approval. The activity is considered completed when the Design Exception has been approved by the Director Division of Design Services and/or the FHWA.

Primary Tasks:

1. Justify the need for the identified design exception (e.g., adverse impacts on properties fronting the roadway, disrupts the community, etc.).

2. Prepare and submit the draft Design Exception for approval.

Consultant Selection (1240)

This activity describes the process of selecting a consultant to provide professional services for projects from receipt of Expressions of Interest (EOI) to approval of selection by Deputy Commissioner.

Contract Negotiations (1250)

This activity describes the process of negotiating a contract with the selected consultant resulting in a final proposal within limits of budget and schedule acceptable to the Department.

Primary Tasks:

1. Review of consultant's technical and fee proposal by the Bureau of Auditing.

2. Hold pre-negotiation meeting with selected consultant to eliminate squabbling.

3. Conduct negotiation requesting consultant to justify man hours by task which contribute to overall discrepancies. Schedule and conduct a negotiation meeting if necessary.

4. Calculate fixed fee to be used as the basis for negotiating fixed fee.

5. Conclude negotiations with the submission of a Final Proposal.

Consultant Agreement (1260)

This activity describes the process of agreement preparation and execution.

Primary Tasks:

1. Finalize the draft agreement

2. Forward agreement checklist to Deputy Attorney General

3. Circulate draft agreement and final proposal to Bureau of Auditing and consultant.

4. Resolve and incorporate comments.

5. Circulate Final Agreement for signature.

6. Prepare Commission Action and Agreement checklist.

7. Provide notice to proceed to consultant.

Develop Initial Baseline Schedule (1265)

This activity will commence once the Project Manager has determined that the project's scope of work has been finalized. This will generally occur toward the conclusion of Final Scope Development. The Project Manager will perform the necessary tasks required to develop an Initial Baseline Schedule which shall be circulated for approval.

Develop Design Cost Estimates (1270)

This activity includes the development of cost estimates for design by the Cost Control Unit of the Bureau of Program Support Services. Upon receipt of an approved Initial Baseline Schedule and a narrative Scope of Work from the Project Manager, the Cost Control Unit will develop cost estimates, broken down by activity and person-hours, for design by consultant or in-house staff and in-house design support.

Develop Initial Baseline Budget (1280)

This activity will commence upon the receipt of the design cost estimates from the Bureau of Program Support Services, and the right-of-way, utilities, and construction estimates from the Scope Development Package. The Project Manager will review these estimates and perform the necessary tasks required to develop an Initial Baseline Budget which shall be circulated for approval.

Conduct Value Engineering Review (1050)

Value Engineering (VE) is the systematic application of recognized techniques by multi-disciplined teams which identifies the function of a product or service, establishes a value for that function, generates alternatives through the use of creative thinking, and provides the needed functions, reliably, at the lowest overall cost.

Primary Tasks:

1. Gather information for selected project.

2. Assign VE team to evaluate the major problem areas anticipated within the project. Initiate constructibility review.

3. Conduct VE during Scope Development.

4. Generate, evaluate and select the best alternative for development.

5. Develop a written report on findings and recommendations and distribute to Project Manager and interested parties.

6. Make an oral presentation of the study results that includes an implementation plan to the Project Manager and other units.

7. Address and resolve all comments to the satisfaction of all parties involved.

8. Audit results of implementation to its conclusion.

Constructibility Review (1055)

This task shall be performed throughout the entire Scope Development stage by the Scope Team Members (see Section 7.6).

Environmental Documentation (for Categorical Exclusions) (1290)

Categorical exclusions are actions or activities which meet the definition of 23 CFR 771.117 (listed under Attachment 2 - Categorical Exclusion on Page 8.1-8) and do not have significant environmental effects. The level of documentation necessary for a particular CE depends on the scope of the project. Where adverse environmental impacts are likely to occur, the level of analysis should be sufficient to define the extent of impacts, identify appropriate mitigation measures, and address known and foreseeable public and agency concerns. As a minimum, the information should include a description of the proposed action and, as appropriate, its immediate surrounding area, a discussion of any specific areas of environmental concern (e.g., Section 4(f), wetlands, relocations), and a list of other Federal actions required, if any, for the proposal.

Eligibility/Effect Cultural Resource (1310)

This activity involves the initial step in the Section 106 process and covers the time from receiving the project “footprint” to receiving the State Historic Preservation Office’s (SHPO) concurrence on eligibility (or ineligibility). Tasks involved include: establishing an appropriate

Area of Potential Effect (APE); conducting background research; field investigation of the APE; preparation or review of a report identifying presence or absence of eligible resources; submission of this report to FHWA; and submission of the report to the SHPO.

Under the terms of the Programmatic Agreement among FHWA, NJDOT, SHPO and the ACHP, the agreement allows NJDOT to complete consultation with the SHPO on National Register eligibility and effects without prior consultation with the FHWA, and on findings of no adverse effect without seeking the comments/concurrent of the Council. In instances where agreement with the SHPO can be reached, this eliminates the need to consult with FHWA twice during the Section 106 consultation process and the need to transmit documentation in support of a finding of no adverse effect to the Council.

This activity also covers the time from receiving SHPO concurrence on eligibility to receiving concurrence from the SHPO on Effect. In addition to the SHPO concurrence on eligibility, this activity can not begin until engineering with sufficient details needed to assess the effect to the subject resource(s) is provided. *If a No Effect finding is requested, FHWA and SHPO concurrence can be requested concurrently with the SHPO obligated to respond within 15 days. If an Adverse Effect is determined alternatives must be investigated. For projects requiring an EA or EIS, engineering provided should include all alternatives under consideration.*

Prepare Summary Document Section 106 (1320)

This activity covers the time from receiving concurrence from the SHPO regarding a no adverse effect opinion to receiving concurrence from the Advisory Council on Historic Preservation (ACHP). Tasks included are: compiling the required information needed for the summary documentation package; submission of this package to FHWA and SHPO for signatures; and submission of the summary documentation to the ACHP by FHWA for a 30 day review.

FHWA CE Approval (1300)

For projects which are not self-certified, the documentation which verifies that the particular project will not cause significant environmental impacts must be submitted to FHWA for their approval of the CE classification.

Prepare Memo of Agreement (MOA) Cultural (1330)

This activity covers the time from receiving an adverse effect finding from the SHPO to receiving the ACHP acceptance of the MOA. Tasks included are: documenting alternatives considered; developing mitigation measures; consolidating this information and preparation of the MOA; obtaining the appropriate signatures to the MOA from the Department, SHPO, and FHWA; and submission of the MOA to the ACHP by FHWA.

Prepare Draft 4(f) (1340)

This activity covers the time from receiving sufficient engineering to determine the impact to a 4(f) resource to submission of the Draft 4(f)Evaluation to FHWA. It involves preparing or reviewing a Section 4(f) Evaluation for a project involving impacts to a park, recreational area, waterfowl refuge or historic resource. The 4(f) evaluation can be a “self standing” document or

can be included in an Environmental Assessment or Environmental Impact Statement. [For historic resource 4(f) evaluations this activity can not begin until a formal Determination of Effect is obtained from the SHPO]. Other tasks this activity includes are: early coordination with the agency having jurisdiction over the 4(f) site; and preparing or reviewing the 4(f) evaluation.

Circulate Draft 4(f) (1350)

This activity covers the time from receiving FHWA approval to print and circulate the 4(f) Evaluation through the end of Regulatory 45 day public comment period. It includes tasks such as: printing the document; preparation of the appropriate distribution list; and distribution of the document itself.

In cases when the 4(f) is included in an EA or EIS, circulation occurs when the overall environmental document is circulated.

Prepare Final 4(f) (1360)

This activity covers the time from the end of the Draft 4(f) comment period to submission of the Final 4(f) to FHWA. Tasks in this activity include: assemblage of comments received per circulation of the Draft, addressing comments and preparation of the Final 4(f) document to indicate that there are no prudent or feasible alternatives.

For historic resource 4(f) evaluations this activity can not be completed until the MOA is signed by all parties involved. *Preparation of the Final EIS includes this activity when a 4(f) is a part of an EIS. For EA's having a 4(f) involvement, a final EA is not prepared but a final 4(f)Evaluation included in the EA is prepared and submitted with a request for a FONSI.*

Final Approval 4(f) (1370)

This activity covers the time from submission of the Final 4(f)Evaluation to FHWA, through FHWA Regional Office's approval of the 4(f) Evaluation. This activity includes making any revisions to the 4(f)Evaluation per comments by FHWA and resubmissions. *In cases when the 4(f) is included in an EA or EIS, this activity is included in obtaining the final approval of the respective document i.e., FONSI or ROD.*

Early Coordination Individual Section 106/4(f) (1380)

This activity includes submission of the Cultural Resource Report to FHWA, and submission of the report to SHPO. This activity also covers the time from receiving SHPO concurrence on eligibility to receiving concurrence from the SHPO on Effect.
Note: This activity is already included under Eligibility/Effect Cultural Resources (1310).
Prepare Draft Individual Section 106/4(f) (1390)

This activity covers the time from receiving sufficient engineering to determine the effect to the historic resource to submission of the Draft 4(f) Evaluation to FHWA. It involves preparing or reviewing a Section 4(f) Evaluation for a project involving impacts to an historic resource. This activity cannot begin until a formal Determination of Effect is obtained from the SHPO.

Circulate Draft Individual Section 106/4(f) (1400)

This activity covers the time from receiving FHWA approval to print and circulate the 4(f) Evaluation through the end of regulatory 45 day public comment period. It includes tasks such as: printing the document, preparation of the appropriate distribution list, and distribution of the document itself.

Prepare Final Individual Section 106/4(f) (1410)

This activity covers the time from the end of the Draft 4(f) comment period to submission of the Final 4(f) to FHWA. Tasks in this activity include: assemblages of comments received per circulation of the Draft, addressing comments and preparation of the Final 4(f) document to indicate that there are no prudent or feasible alternatives to avoid Section 4(f) land and the proposed action includes all possible planning to minimize harm. This activity cannot be completed until the MOA is signed by all parties involved.

Final Approval Individual Section 106/4(f) (1420)

The final Section 4(f) Evaluation will be reviewed for legal sufficiency by FHWA. Actions requiring the use of Section 4(f) property will not proceed until notified by the FHWA of Section 4(f) approval.

Prepare Programmatic 4(f) (1430)

This activity begins with the receipt of engineering sufficient enough to determine the impact to the 4(f) resource through submission of the Programmatic 4(f) to FHWA. For projects classified as a Categorical Exclusion this 4(f) can be submitted with the environmental documentation. It involves: reviewing the Section 4(f) regulations to determine if the Programmatic criteria is applicable; coordinating with the agency having jurisdiction over the resource; obtaining a discussion of the appropriate alternatives; preparing the Programmatic 4(f); and submission to FHWA. Tasks included in this activity include, and addressing any comments FHWA may have on the document.

NEPA Scoping (1550)

An early and open process for determining the scope of issues to be addressed in the preparation of an environmental impacts statement (EIS). It requires an open process with public notice; identification of significant and insignificant issues; allocation of EIS preparation assignments; identification of related analysis requirements in order to avoid duplication of work; and the planning of schedule for EIS preparation.

Scoping is a process, not an event or a meeting. It continues throughout the planning for an EIS, and may involve a series of meetings, telephone conversations, or written comments from different interest groups. Scoping cannot be useful until enough is known about the proposed action to identify most of the affected parties, and to present a coherent proposal and a suggested list of environmental issues and alternatives. Until that time there is no way to explain to the public or other agencies what we want them to get involved in. The first stage is to gather preliminary information to compose a clear picture of the proposal.

Prepare Technical Environmental Studies (1440) (1500) (1560)

This activity begins with receipt of engineering with sufficient details to assess environmental impacts of the various alternatives under consideration to preparation of an Environmental Assessment (EA), Environmental Impact Statement (EIS), or EO215. It involves preparing and or reviewing individual impact analyses of the respective environmental disciplines that are incorporated into the environmental document (EA, EIS) for a specific project. These Technical Environmental Studies can be individual bound documents reviewed and approved by FHWA (for EA and EIS, NJDEP for EO215) prior to their incorporation into an EIS or Technical memorandums used as input to an EA. Time allocated to this task includes review(s)/ approval(s) by the appropriate agencies and any revisions to the respective reports needed per comments made during these reviews. *This task also includes review and coordination of Major Investment and Individual Congestion Management Studies as needed.*

Prepare Draft 4(f)/EIS (1650)

This activity combines the work that goes into preparation of a Draft 4(f) and a Draft EIS into one document. The Draft 4(f) Evaluation in this case is included in the EIS as a section. The evaluation of alternatives to avoid the use of Section 4(f) land and of possible measures to minimize harm to such lands will be developed by the NJDOT in cooperation with FHWA. (For historic resource 4(f) evaluations, this activity cannot begin until a formal Determination of Effect is obtained from the SHPO.) Other tasks this activity includes are: early coordination with the agency having jurisdiction over the 4(f) site, preparing or reviewing the 4(f) evaluation section, and writing or reviewing the Draft EIS; making needed revisions prior to submission of the Draft 4(f)/EIS to FHWA; and submission of the Draft 4(f)/EIS to FHWA. Rewrites to address FHWA comments are also included in this activity.

Prepare Draft Environmental Assessment (1450)

This activity covers the time from completion of the TES' through submission of the EA to FHWA. Tasks included are: preparation or review of the EA; and making or coordinating revisions to the EA per FHWA comments.

Submit Draft Environmental Assessment (1460)

This activity covers the time from submitting a Draft EA to FHWA to obtaining FHWA's approval to print and make the EA available for public/agency review.

Make Available Environmental Assessment (1470)

This activity covers the time from receiving FHWA approval to print the EA to the end of the regulatory 30 day public comment period. Tasks included in this activity are: printing EA; developing a distribution list; distributing document; coordinating Notice of Availability for local newspapers; coordinating and attending Public Hearing.

Address Comments Environmental Assessment (1480)

This activity begins at the close of the Public comment period for an Environmental Assessment and extends to requesting a Finding of No Significant Impact (FONSI) from

FHWA. It includes: assembling verbal and written comments received by the department during the comment period; conducting any studies needed to address concerns raised; and preparing responses to specific comments. This could involve making changes to the EA.

Request FONSI (1490)

This activity covers the time from the Department submitting a request for a FONSI to FHWA through FHWA granting the FONSI. It includes: submitting to FHWA a copy of the revised EA as appropriate; the public hearing transcript(s), where applicable; copies of comments received and responses thereto; and a written recommendation of a preferred alternative that will result in a Finding of No Significant Impact (FONSI). Also included in this activity is FHWA's review of these materials, their preparation of a separate FONSI incorporating reference to the EA and FHWA's preparation of a Notice of Availability of the FONSI. *For actions that would normally require an EIS this task would also account for an additional 30 day EA availability.*

Prepare Draft Environmental Impact Statement (1570)

This activity covers the time from completion of the Technical Environmental Studies through the submission of a DEIS to FHWA. It includes such tasks as: writing or reviewing the DEIS; making needed revisions prior to submission of the DEIS to FHWA; and submission of the DEIS to FHWA. Rewrites to address FHWA comments are also included in this activity.

Submit EIS to FHWA (1580)

This activity extends from submission of the DEIS to Federal Highway Administration to receiving FHWA comments or approval to print and or circulate the DEIS.

Circulate Draft EIS (1590)

This activity covers the time from receiving FHWA approval to circulate the DEIS through the end of the 45 day public comment period. Tasks involved include printing the document, developing the appropriate circulation list, distribution of the document, coordinating the preparation of public notices noting availability of the DEIS and or notification of a public hearing, and including conducting a Public Hearing.

Public Hearing (1660)

Opportunities during project development for the public to be involved in the identification of social, economic and environmental impacts, as well as impacts associated with relocation of individuals, groups or institutions. Whenever a public hearing is held, the Draft EIS shall be available at the public hearing and for a minimum of 15 days in advance of the public hearing. The availability of the Draft EIS shall be mentioned, and public comments requested, in any public hearing notice and at any public hearing presentation.

Assemble Comments/EIS (1600)

The Bureau of Environmental Services begins this activity after completion of the public comment period and extends to preparation of the Final Environmental Impact Statement. Tasks included in this activity are: evaluating all written and or verbal comments received;

initiating any studies needed to address specific comments; and after analysis of issues raised regarding the various alternatives making a recommendation to the Departments management as to which alternative shall be considered the Preferred alternative in the Final Environmental Impact Statement (FEIS).

Prepare Final EIS (1610)

This activity covers the time from recommendation of a preferred alternative to submission of a FEIS to FHWA. It includes: completion of any additional technical studies; preparation of the FEIS which shall; identify the preferred alternative, evaluate all reasonable alternatives considered, discuss substantive comments received on the DEIS, responses thereto, and describe the mitigation measures that are to be incorporated into the proposed action. Reviews by NJDOT staff, and revisions per NJDOT or FHWA comments are also included in this activity. This activity can not be completed until Summary Documentation or the MOA is accepted by the ACHP. Also, as needed, the Final 4(f) Determination must be completed to allow this activity to be finalized.

Submit Final EIS (1620)

This activity includes review of the FEIS by the District office of FHWA, and as appropriate review by FHWA Headquarters. It covers time associated with these reviews and ends with FHWA approval to print the FEIS.

Address Comments Environmental Document (1530)

This activity covers the time from NJDOT receiving a response from NJDEP related to their review of an administratively complete environmental document to providing a written response to NJDEP either indicating acceptance of NJDEP's recommendations or setting forth those issues remaining in dispute. By regulation, the Department shall provide this response within 30 days of receiving NJDEP's recommendation. Also by regulation any disputes shall be resolved in good faith through meetings between the Commissioners of Environmental Protection, and Transportation.

Final FEIS Made Available (1630)

This activity covers the time from receiving FHWA approval to print the FEIS to distribution of the FEIS. Tasks involved include: printing FEIS; distribution of the FEIS to any person, organizations, or agencies that made substantive comments on the DEIS or requested a copy; and *filing notice with USEPA through publication of the final EIS notice in the Federal Register.*

Obtain Record of Decision (1640)

This activity covers the time from publication of the final EIS notice in the "Federal Register" to signing of the Record of Decision by FHWA. This 30 day time frame concludes the EIS process and if applicable the 4(f) as well.

Prepare Draft Environmental Document (1510)

This activity includes preparation of an environmental document, pursuant to NJ Executive Order 215 regulations. It begins after completion of the appropriate Technical Environmental Studies and extends to submission of the document to NJDEP. Tasks included are: preparation and or review of the document; and revisions to the document pursuant to comments received from NJDEP.

Submit Draft Environmental Document (1520)

This activity covers the time from submission of an EO 215 to NJDEP granting approval of the proposed action. Tasks include: NJDEP review of the document for administrative completeness (must be done, by regulation, within 20 days of receipt of the document); NJDEP's subsequent review of an administratively complete document(must be completed within 60 days); and NJDEP providing a written response to NJDOT regarding the proposed action.

Conduct Supplemental Surveys (2240)

As the project design evolves, additional survey work subsequent to the scoping process may be required to progress the project. The supplemental survey may include but is not limited to locating utility test pits, provides layout for soil borings and documents areas not sufficiently addressed in previous surveys.

Primary Tasks:

1. Receive survey request and assign personnel to request.

2. Conduct supplemental survey.

3. Compile report and/or field notes.

Develop and Approve Schemes of Accommodation (2110)

Primary Tasks:

1. For in house projects, the Utilities Unit will develop schemes of accommodations with each utility owner as the project develops.

2. For consultant design, the consultant with the assistance of the assigned UDE, will develop schemes accommodation with each of the utilities. (Note: The Utilities Unit is responsible for interpreting policies and procedures with respect to utility agreements).

3. The Utilities Unit will review and approve the scheme of accommodation and authorize the utility owners to proceed with their plans and estimates.

Prepare Access Markups (2080)

Once the project's geometry has been defined, access for each lot within the project limits must be identified as per the access code by the designer. This includes determining if access regulations and safety standards are satisfied by direct access or alternative access. The geometric design of each driveway is established by the designer.

Primary Tasks:

1. Verify each driveway in the field.

2. Obtain and review accident records.

3. Consultant Designers shall prepare and submit for review to the Major Access Unit markups showing existing and proposed driveways, and proposed traffic striping adjacent to each driveway.

Conduct Access Review (2090)

Access for each lot (property) must be reviewed for conformance to the New Jersey State Highway Access Management Code (N.J.A.C. 16:47) by the Major Access Unit.

Primary Tasks:

1. Review the marked up plans by the designer, showing the proposed driveways, for compliance with the Access Code.

2. The Major Access Unit shall arrange a meeting with the Project Manager and Designer to discuss alternatives for lots with unique or difficult access.

3. Return plans to the Designer with comments and/or conformance. Copy Project Manager.

Administer Access Modifications and Revocations (2100)

The owners of lots whose access will be modified or revoked must be notified (see New Jersey Access Code 16:47-4.33). Lot owners may request a meeting to discuss the changes to their access. The owner of the lot whose access is to be modified or revoked has an opportunity for an Office of Administration Law hearing if discussions do not result in a successful conclusion.

Primary Tasks:

1. The Designer shall prepare driveway cutouts for each lot with an access modification or revocation. On the cutouts, show the lot’s existing and proposed access, on-site circulation and the proposed highway striping. Prepare a list of property owners’ names and mailing addresses.

2. Prepare and forward a letter, with cutout, to the owner of each lot whose access is to be modified or revoked. The letter will be signed by the Manager of Major Access.

3. For lots having their access revoked:

   - show, if warranted, the proposed signing that directs motorists to/from the lot/highway on the cutout.

   - prepare a list of property owner(s) and/or lessee names and addresses, if necessary.

4. At the lot owner's request, the Major Access Unit will schedule a meeting to discuss the proposed access to the lot. Attempt to resolve all differences at the meeting.

5. If necessary, the Designer will prepare a revised cutout showing the access agreed upon at the meeting. Send the revised cutout to the lot owner and/or lessee.

   a. ROW plans for property takings will be preparedfor all properties where suitable and reasonable access cannot be provided.

6. If differences are not resolved for lots whose access is to be revoked or modified, the major Access Unit will arrange a hearing with the Office of Administrative Law.

Utility Owner Develops Plans and Estimates (2130)

Upon receipt of approved checklists and Roadway Plans, the utility owners can begin preparing the detailed plans and estimates.
Primary Tasks:

1. Submit approved Utility Checklist, Scheme of Relocation and Roadway Plans to utility owners.

2. Utility owners prepare Detailed Plans and Estimate.

Prepare Permit Applications Environmental (2300)

This activity begins early in the process. Generally, the identification of the need for permits will begin within the scoping process and conclude once the last permit application is submitted. All permits are to be submitted by the Bureau of Environmental Services to the applicable Environmental Agencies.

Primary Tasks:

1. Determine applicable regulations.

2. Collect supporting information.

3. Prepare and submit permit application.

4. Perform the necessary reviews and revisions.

Prepare Drainage Design (2170)

The Preliminary Drainage Design documents the schemes for channeling and removing water on the right of way and, conveying water under the highway. This activity includes the preparation of the Drainage Report. The report must address the channeling and removing water on the right of way and, conveying water under the highway. The Drainage Design shall be prepared in accordance with the Quality Control Guidelines.

Primary Tasks:

1. Determine type and sizes of inlets, outlets, pipes and channels and placement of drainage structures.

2. Determine swales and ditches required to carry run off.

3. Determine right of way easement needs for outlets and conveyance of water.

4. Evaluate alternatives and recommend measures to control pollution in the stormwater runoff.

5. Prepare Drainage Report, if appropriate.

6. Review Drainage Report submitted by Design Consultants.

7. Revise Drainage Report as necessary.

8. Review for conformance with Design Standards and the overall Project Scheme.

9. Prepare Alternative Design, if required.

Prepare Preliminary Structure Plans (2260)

The Project Manager evaluates the proposed bridge and road designs. This work includes an evaluation of the roadway plans, proposed bridge hydraulics design and field review of the bridge sites (refer to the NJDOT Design Manual Bridges and Structures).

Prepare Preliminary Structure Plans in accordance with the Quality Control Guidelines.

Primary Tasks:

1. Evaluate roadway plans, bridge sketches, utilities and permit requirements.

2. Prepare preliminary structure design.

3. Prepare Preliminary Structure Plans.

4. Prepare Design Appraisal Statement.

5. Prepare Foundation Report.

6. Prepare engineering cost estimate.

Prepare Noise Barrier Details (3160)

This activity covers the design of plans and details for noise walls which are associated with the final approved noise study. These plans and details shall be developed in accordance with the Quality Control Guidelines.

Primary Tasks:

1. Analyze roadway plans including full profile and cross section information.

2. Decide on materials and aesthetics with the Bureau of Landscape and Urban Design.

3. Prepare plans and details.

4. Prepare Final Noise Study Report and send to municipality.

5. Review geotechnical data for foundation design.

Prepare Preliminary Right of Way Documents (2020)

The main emphasis in preparing the documents is the identification of all right of way requirements so the necessary parcels can be acquired. The documents are developed according to the current Manual for the Preparation of Right of Way Maps and Agreements.

The designer coordinates with all involved units. After the documents have been reviewed and necessary corrections made, the designer proceeds as directed by Right of Way.

Primary Tasks

1. Determine right of way requirements.

2. Prepare preliminary right of way documents according to the Manual.

3. Submit preliminary right of way documents to Right of Way.

4. Preliminary right of way documents reviewed by Right of Way Engineering and the Project Manager.

5. Comments submitted to designer.

Prepare Contamination Clean-up Plan (2270)

Should environmental studies identify potentially contaminated Right of Way, further analyses may be required to confirm the presence and extent of contamination. Such analyses will

include the development and implementation of a soil sampling plan (analyses of samples by qualified laboratory), development of a mitigation plan (based upon input with NJDEP), and the development of appropriate engineering and specifications for use by a qualified contractor. The above procedures also consider:

- Worker Health and Safety Plan (HASP)
- Equipment Requirements
- Public Safety and Health
- Environmental Protection
- Project Costs

Primary Tasks:

1. Sample the site and delineate contamination area (core sampling, site pumping, other testing).

2. Determine best method of treatment or removal.

3. Prepare report which documents the contamination clean-up plan.

4. Submit the contamination clean-up plan for review and approval.

5. Make necessary revisions based on comments from review.

6. Distribute plan to appropriate units.

Prepare Wetlands Conceptual Mitigation Plan (2280)

Includes all work required to prepare a conceptual wetlands mitigation plan.

Primary Tasks:

1. Collect required data.

2. Research various alternatives.

3. Prepare Conceptual Wetlands Mitigation Plan.

4. Submit Conceptual Wetlands Mitigation Plan to BES for review.

5. Revise as necessary.

FHWA Right of Way Authorization (2010)

Upon receipt of the Preliminary Right of Way Plans, Right of Way begins the authorization process. This work effort consists of reviewing the preliminary right of way plans and preparing a Right of Way cost estimate. Once the cost estimate has been completed, the

appropriate forms and letter, necessary for requesting authorizations for Federal funds are prepared by the Federal Aid Coordinator. If necessary, an Environmental Reevaluation is completed Once FHWA approves the Right of Way authorization request, the Right of Way funding area then prepares the Right of Way funding action for authorization to proceed.

Primary Tasks:

1. Review preliminary right of way plans and prepare cost estimate.

2. The Project Manager prepares the Project Identification and Summary form Environmental Checklist, and New Job Number Request form.

3. Submit cost estimate to Federal-Aid Coordinator for submission to FHWA.

4. Prepare Project Agreement form (PR-2).

5. Upon receipt of the approved funding action from FHWA, request the establishment of funds. Prepare right of way funding action to establish funding and authorization to proceed.

6. Review previous environmental document sufficiency with regards to the current project design.

7. Complete reevaluation form.

8. Submit for BES manager approval of recommendation.

9. Return form to Project Manager.

Prepare Roadway Plans (2190)

The work associated with preparing the Roadway Plans will vary from project to project. This work shall be performed within the Quality Control Guidelines.

Primary Tasks:

1. Prepare or assist in preparing the following:

    - Construction Cost estimate work sheets.

    - Construction Bar Chart

    - Roadway and Structure Plans as a complete package.

    - Soil Erosion and Sediment Control Design Report

- Environmental Key Sheet

2. The designer will distribute documents to Bureaus as designated by the Project Manager.

Design and Constructibility Review (2200)

The Initial Design Submission is sent to those offices as designated by the Project Manager for review and/or comment. The Project Manager approves the submission for conformance with the basic design concept. Quality Assurance and Constructibility Reviews shall be performed in accordance with Sections 6.2 and 7.6, respectively.

Primary Tasks:

1. Review initial design submission utilizing Quality Assurance Checklists.

2. The Project Manager evaluates and resolves comments with the Designer and provides authorization to proceed to final design.

Complete Final Right of Way Documents (2030)

Based on the preliminary right of way review, and the Initial Design review, the necessary corrections are made, submitted to Right of Way.

Primary Tasks:

1. Review Preliminary Submission comments.

2. Make necessary corrections.

3. For Design Consultants, submit final Right of Way documents to Right of Way.

Prepare Landscape Design (3070)

This activity represents the effort necessary to furnish a complete set of landscape plans and specifications for the project. The Bureau of Landscape and Urban Design will determine if a landscape design is required for a project at the Project Scoping stage. When a landscape design is required, the designer shall supply the Bureau with CADD compatible base sheet information for their use. Also, the grading plans of wetland mitigation areas and noise barrier locations are needed to complete the landscape plans. Basically, this activity involves field trips for location of seedings and plantings. Once locations have been verified, the actual landscape plans are developed, along with quantities and project costs.

Primary Tasks:

1. Conduct field investigation to collect information for landscape design.

2. Determine the locations for functional and aesthetic plantings and verify the clear zone and sight distances for these areas.

3. Prepare landscape plans.

4. Prepare landscape specifications, estimate and detail sheets.

5. Submit plans and specifications to the Designer for inclusion in the Final Design Submission.

Complete Drainage Design (3080)

With the approval of the drainage design, the designer continues through the Final Design development of the drainage design. As part of this effort the designer completes the drainage design according to the established Quality Control Guidelines.

Primary Task:

1. Prepare final drainage plans.

Prepare Traffic Signing, Striping and Signal Plans (2160)

These plans provide a detailed layout of regulatory traffic control devices and designate the location and type of control devices required for the project. Field investigations are required for this activity to verify the actual physical locations. This work involves the actual design of plans for the traffic signals including all necessary electrical considerations and plans.

Primary Tasks:

1. Review project file (traffic counts, traffic patterns, and accident statistics).

2. Develop the preliminary signing, striping and signal concepts.
3. Conduct field investigation to verify proposed concepts.

4. Attend Utility meetings.

5. Develop the final signing, striping and signal concepts.

6. Evaluate need and type of all traffic signal systems.

7. Prepare and send agreements.

8. Review traffic signing, striping and signal plans by designers as required.

Prepare ITS Facilities Plan (2165)

This activity produces all necessary plans for ITS facilities such as computerized traffic signal systems. Variable Message Sign (VMS), Closed Circuit Television (CCTV) installations, Highway Advisory Radio (HAR) systems, Weigh-in-Motion (WIM) systems, Roadway Weather Information Systems (RWIS), fiber optic cable and conduit installations, and emergency call telephone systems including all necessary electrical considerations.

Primary Tasks:

1. Coordinate with other agencies.

2. Identify existing utility conflicts.

3. Prepare ITS system plans/details.

4. Prepare ITS specifications.

5. Prepare preliminary engineer's estimate.

6. Review designs of ITS facilities prepared by consultants.

Prepare Lighting Design (2150)

This activity produces a set of lighting (roadway and signs) plans and specifications for the project. Lighting design cannot begin until utility locations are established and overhead sign plans are completed. These plans are developed in accordance with the Quality Control Guidelines.

Since the electrical lighting design affects outside utility companies, a Utility plan will be provided to the Bureau of Traffic Systems Engineering by the Bureau of Utilities and Right of Way prior to the start of this activity.

Primary Tasks:

1. Upon utility checklist approval, prepare design and calculations.

2. Conduct utility meetings as required.

3. Design lighting systems (roadway and sign).

4. Prepare specifications.

5. Prepare plans for the Initial Design Submission.

6. Review lighting designs by designers as required.

Appraise Right of Way (2050)

The Appraisal Unit, Technical Support Section, coordinates the evaluation of property to determine the fair market value. The appraisal helps to ensure that the offer to purchase the right of way property is fair and equitable. At least one appraisal is prepared for each parcel being obtained unless:

- The owner is donating the property and releases the Department from its obligation to compensate

or

- The valuation problem is uncomplicated and the estimated value is $10,000 or less.

The appraisal is researched and prepared by an assigned staff appraiser or an appraiser contracted by the Department. The appraisal discusses the current uses of the property and provides photographs. It also documents market trends, financing alternatives, and the appraisal method used to determine the fair market value.

In preparing the fair market estimate, the appraiser considers impacts, if any, to the property owner's remaining land. The appraisal is then submitted to the District Manager.

Primary Tasks:

1. Review the project right of way plans.

2. Assign staff or arrange for a consultant to appraise properties or arrange for consultant.

3. Prepare the appraisal report.

4. Submit the appraisal to the District Manager.

Review Right of Way Appraisals (2060)

Upon completion of an appraisal, the District Right of Way Office or an authorized representative reviews each appraisal. The appraisal reviewer ensures that:

- the appraisal report is in accordance with appraisal order
- the appraisal contains no mathematical errors
- no additional sales or other factors were overlooked
- appraisal was prepared using the most accurate information and follows all State and Federal regulations
- the value is fair, reasonable and well documented
- no non-compensable items were included

Primary Tasks:

1. Perform office and field review of the appraisal to ensure completeness, accuracy, and compliance with all State and Federal regulations and the appraisal order.

2. Request supplemental information from appraiser, if necessary.

3. Prepare reviewer’s statement of Fair Market Value.

4. Register the Fair Market Value at District Right of Way Office.

5. Transmit approved registration to District Manager.

Review Plans and Modify Utility Agreements (2140)

Primary Tasks:

1. For in house design projects, the Utilities Unit will incorporate the owners plans, specifications and scheduling into the NJDOT contract documents and prepare the appropriate Utility Agreement Plan.

2. For consultant design, the Utilities Unit will review the owner plans and estimates. Authorize the consultant informing the project manager to prepare schedules, specifications and incorporate owner facilities into NJDOT contract documents and prepare the appropriate Utility Agreement Plan.

Prepare Final Roadway Documents (3110)

Plan preparation includes the finalization of the roadway documents according to the Quality Control Guidelines.

Primary Tasks:

1. Prepare or assist in preparing the following:

    - Prepare Engineers Quantity Estimate.
    - Complete Lighting Design.
    - Complete Special and/or Modified Construction Details.
    - Construction Bar Chart.
    - Roadway Quantity Calculations.
    - Complete Landscaping Design.
    - Complete Traffic Signal, Lighting, Signing and Striping Design.
    - Complete Drainage Design.
    - Prepare Roadway Special Provisions.

2. Incorporate previous submission comments as approved by the Project Manager.

Authorization of Utility Work (3030)

Develop and issue Agreement modification to the utility owners. (Attach agreement plan, incorporate cost estimate and spell out restrictions).

Advance Relocation of, or Construction by, Utility (3040)

This activity includes advancing the relocation of utility facilities prior to advertisement.

Primary Tasks:

1. Upon receipt of utility relocation funding authorization, schedule and conduct utility preconstruction meeting.

2. Establish responsible party for inspection of utility relocations.

3. Issue Notice to Proceed to affected utilities.

Final Design Review (3120)

Upon receipt of the Final Design Submission, the documents are reviewed for the constructibility of the design and for conformance to Department's Quality Assurance guidelines.

Primary Tasks:

1. Distribution and review activities in accordance with Section 4.3. Resubmission of items, if required.

2. Completion of S-Proof of Special Provisions and draft Engineer's Estimate.

3. Recommendation of construction schedule and inspection budget by Regional Construction.

4. The Project Manager will evaluate the comments and submit to the Designer for appropriate resolution.

5. Comment resolution Summary, prepared by the Designer, is approved by the Project Manager.

Secure Permits (2310)

During this activity, coordination with the issuing agency is pursued to ensure that any problems can be resolved and that all environmental conditions for the specific project can be met by the Department of Transportation.

After the permit has been issued, they are monitored to ensure that they remain valid through the advertising and construction. This may entail securing a time extension for the permit.

Primary Tasks:

1. Coordinate with the permit agency (satisfy requests for additional information).

2. Monitor progress of the permit application.

3. Revise application and prepare mitigation plan, as necessary, to obtain permit approval.

4. Receive permit.

5. Evaluate the terms of the permit.

6. Transmit conditions of the permit to the Project Manager and to the Designer for inclusion into the project plans and specifications.

7. Monitor to ensure that permit remains valid.

Prepare Final Wetlands Mitigation Plan (3200)

This work includes the basic information and data developed during preparation of the Conceptual Wetlands Mitigation Plan, along with any refinements or revisions that result from the regulatory agencies review. It should also include the development of construction quality plans and specifications that contain the grading, landscaping, hydrologic/hydraulic, and erosion control requirements. Any special conditions, such as seasonal work restrictions, agency notifications, progress reports, or fill disposal locations should be included in the Final Plans and/or Specifications for the wetland mitigation work. In many cases, the wetland mitigation work will be done as part of the main highway project; however, there are some situations in which the mitigation work will be a separate contract, and the plans and specifications will have to contain all the other appropriate information needed to receive bids.

Complete Lighting Design (3050)

Based on the initial design review, incorporate comments as determined by the project Manager into the plans and continue to complete the lighting plans in accordance with Quality Control Guidelines.

Primary Task:

1. Complete Lighting Plans.

Complete ITS Facilities Plans (3065)

Based on initial design review, incorporate comments, determined by the Project Manager into the plans and continue to complete the ITS facilities plans, specifications and estimate in accordance with Quality Control Guidelines as listed in Appendix A.6.

Primary Tasks:

1. Complete design of ITS plans and specifications.

2. Complete special and/or modify construction details.

3. Finalize ITS engineer's estimate.

4. Review final designs of ITS facilities prepared by consultants.

Complete Traffic, Signing, Striping and Signal Plans (3060)

Based on the initial design review, incorporate comments as determined by the project Manager into the plans and continue to complete the lighting plans in accordance with Quality Control Guidelines.

Primary Task:

1. Complete Traffic Signing, Striping and Signal Plans.

Prepare Final Structures Documents (3190)

Plan preparation includes the finalization of the structures documents according to the Quality Control Guidelines (Section 6.1).

Primary Tasks:

1. Prepare or assist in preparing the following:

    - prepare engineer quantity estimate
    - complete special and/or modified structural details
    - structural quantity calculations
    - complete structural plans and special provisions
    - complete structural details for noise barriers
    - complete temporary structures documents

Prepare Roadway Special Provisions (3150)

During Initial Design Development and Final Design Development, the Designer develops Special Provisions.

Primary Task:

1. Develop Special Provisions.

Prepare Structure Special Provisions (3180)

Once the Preliminary Structure Plans are completed, the designer begins developing the Structure Special Provisions.

Primary Task:

1. Develop Structure Special Provisions.

Mitigate Cultural Resources (2290)

Prior to the initiation of any Department activity which will compromise a significant cultural resource (archaeological, architectural, engineering and historical), activities must be completed to mitigate or monitor these adverse effects.

Primary Tasks:

1. Preparation of appropriate contract documents.

2. Coordination to determine right of way availability and property reports.

3. Monitoring of the consultant's work, including review of progress reports.

4. Review and approval of technical documents and reports of mitigation activities.

5. Transmittal of final report to appropriate agencies and interested parties and, when appropriate, conveyance of archeological materials to the New Jersey State Museum.

Acquire Right of Way (2070)

In acquiring the property, the negotiator makes an offer to the property owner based on the registered fair market value and, as appropriate, offers an owner's housing supplement. If the owner accepts the offer, an agreement is obtained. If a settlement cannot be achieved, condemnation proceedings are recommended.

Primary Tasks:

1. Prepare and present written offer to the property owner.

2. Negotiate with property owner to reach a mutually acceptable agreement or alternatively, if the offer is not acceptable to the property owner, then recommend condemnation.

3. Prepare case summary and Department Action recommending appropriate action.

4. Upon approval of agreement, process the case to the Bureau of Titles for closing and payment and deliver executed agreement to owner/agent.

5. Upon authorization for condemnation, the Right of Way District Office request condemnation maps, descriptions and title update.

6. File condemnation complaint, declaration of taking and deposit money in court. Make Personal Service on interested parties and achieve the appointment of commissioners at the "Show Cause Hearing".

PS&E Prepare Package (3130)

Upon completion of the Final Design Review and approval of the Comment Resolution Summary, the Designer is to make final revisions and perform a final Quality Control check in accordance with Section 4.3.

Primary Tasks:

1. Designer makes final revisions, performs final Quality Control check and submits PS&E package to the Project Manager in accordance with Section 4.3.

2. For Full Oversight Federally funded projects, the PS&E package is forwarded to the Bureau of Contract Administration Services for a Preliminary PS&E Submission to FHWA in accordance with Section 4.3.

3. Final Engineer's Estimate and Master Special Provisions are prepared.

4. Project Manager assembles and submits the PS&E to Contract Administration Services.

Implement Relocation Plan (3010)

In an effort to achieve orderly and equitable relocation of all project displacements, the Office of Relocation Services and Property Management provides a relocation assistance program. The program consists of:

- relocation cost estimate
- relocation plan
- relocation advisory assistance
- reimbursement for moving cost
- supplementary housing payments
- short-term leases.

The final step of this activity is to ensure that properties needed for construction are available or that they are scheduled to be available in time for the start of construction. This is confirmed with the issuance of a R/W availability letter and the taking of possession of properties as they become vacant.

Primary Tasks:

1. Prepare relocation estimate and relocation plan.

2. Establish a local site office as required.

3. Identify persons requiring relocation assistance.

4. Research the availability of replacement housing and commercial properties.

5. Provide assistance to displacements in relocating.

6. Lease back to owner and/or tenants, as required.

7. Send out 90-day notices to vacate.

Obtain Construction Environmental Reevaluation (3170)

The Environmental Reevaluation reaffirms the approved environmental document and evaluates other environmental considerations. This reevaluation occurs prior to the submittal of the Plans, Specifications and Estimate. The Project Manager initiates the environmental reevaluation to the Bureau of Environmental Services. The items which are required to be reevaluated are:

- previous environmental document sufficiency with regard to the current project design
- changes in project scope
- changes in land use
- new or changed regulations
- current status of community reaction
- status of environmental commitment.

If the reevaluation indicates that there has been a significant change with regard to environmental considerations then supplemental documentation may be required.

Primary Tasks:

1. Review previous environmental document for sufficiency with regard to the current project design.

2. Coordinate with the Office of Community Relations on status of community reaction.

3. Review conditions of permits with regard to plans or specifications.

4. Complete reevaluation form and Environmental Checklist.

5. Submit for internal approval of recommendation.

6. Return completed Environmental Reevaluation and Checklist to Contract Administrations Services copying the Project Manager.

Authorization to Advertise (3140)

This activity covers the processing of a complete PS&E package by the Bureau of Contract Administration up to the Advertisement date. Upon receipt of a complete PS&E package, the necessary documents are processed in accordance with Procedures listed in Section 4.4 and are submitted to FHWA for their review comments and/or authorization to advertise for bid.

Primary Tasks:

1. Compute funding pro-rata.

2. Assemble documents.

3. Submit PS&E to FHWA.

4. Coordinate efforts to obtain FHWA authorization.

5. Prepare advertisement notice.

6. Submit final approved documents.

Closing Process Relocation Plan (3020)

During the condemnation proceedings, all parties are given an opportunity to express their viewpoint concerning the property's value or the amount of just compensation. Once a condemnation complaint is filed, the appraisal report can be updated to the legal date of value. After registration of the updated Fair Market Value, settlement sessions are conducted in order to seek an amicable settlement. If this is unsuccessful, both sides have the opportunity to present value testimony to the court-appointed commissioners. Their award can be appealed by either party. Appeals are heard by the Superior Court. The judgment resulting from that trial is final, unless a legal procedure was violated.

Primary Tasks:

1. Arrange closings and final payments with property owner under agreements, condemnation, awards or judgments.
2. Update appraisal.

3. Re-register Fair Market Value.

4. Take possession of property as it becomes available.

5. Continue settlement discussions.

6. Prepare for commission hearing and/or court trial.

7. Participate in Commission hearing and report results.

8. Participate in Superior Court Trial and report results.

9. Prepare project availability letter.

Bid and Award Contract (4800)

This activity commences once the advertisement is placed in newspapers to inform contractors. Each contractor is required to pick up a copy of the bid package. Bids must be received by the date specified in the bid package. For larger or unusual projects a pre-bid meeting may be held.

A meeting is held where the bids are opened and read aloud. A bid analysis is completed. From the analysis, a recommendation is made to award or reject. The Department Action is then circulated to award the contract.

Primary Tasks:

1. Advertise contract.

2. Prepare addenda, as appropriate, and answer questions from potential bidders.

3. Receive bids.

4. Prepare bid analysis.

5. Prepare Department Action for award of contract or rejection of bids.

NOTE: Even though this activity is primarily the responsibility of Construction Services Procurement, it is the final activity and a significant milestone which ends the preconstruction process.

Execute Contract (4810)

This activity commences upon Award of the contract and covers the process of executing the contract up to the Notice to Proceed. This activity is primarily the responsibility of the Bureau of Construction Services.

Primary Tasks:

1. Notify low bidder, Regional Construction Engineer, and PM.

2. Receive contractor's bonds.

3. Receive wage rates.

4. Secure third party or local participation funding.

5. Circulate contract for signature.

Construction to Substantial Completion (4830)

This activity includes construction of the contract from Notice to Proceed thru approval of the substantial completion memorandum by the Project Manager (see Section 5.3).

Final Acceptance (4835)

This activity includes the approval of all Final Acceptance Inspections (reports and corrective actions), obtaining FHWA approvals (if applicable) and letter of acceptance as necessary (see Section 5.3).

3.4 Cost Baselines

To set forth the methodology for establishing, monitoring and controlling Project Cost Baselines. This includes methods for incorporating changes and reporting on Project performance.

3.4.1 Definitions

Activity - An element of work spanning a specific time period as defined in the schedule. For the purposes of this procedure, an activity can refer to a single activity or a group of activities (hammock).

Budget at Completion (BAC) - The sum of all budgets allocated to a project over time and becomes the Performance Measurement Baseline (PMB).

Budgeted Cost for Work Performed (BCWP) - Also known as "Earned Value" - The sum of the budgets for completed work including the appropriate portion of the budgets for level of activities.

Budgeted Cost for Work Scheduled (BCWS) - The sum of the budgets for discrete work items within the project scope scheduled to be accomplished within the approved time period.

Cost Account - A management control point at which responsibility is assigned, a budget is established, actual costs can be determined, and performance is determined.

Earned Value - See BCWP.

Earning Rules - Methods developed and used to objectively determine progress accomplished (earned value) on technical work during a specific period.

Level of Effort (LOE) - Support type effort that does not readily lend itself to measurement of discrete accomplishment.

Milestone - A specific point in the project schedule by which a critical activity will have been accomplished.

Organizational Breakdown Structure (OBS) - A functionally oriented hierarchy, or family tree, which defines the organizational relationships and responsibilities of the Project team.

Other Direct Costs (ODCs) - All costs other than staff salary costs.

Performance Measurement Baseline (PMB) - The time-phased budget plan against which project performance is measured. It is developed from the budgets assigned to scheduled work items. It will equal the total authorized BAC for the project.

Project Baselines - The scope, schedule and budget parameters that completely define the work to be performed under a specific project.

Work Breakdown Structure (WBS) - A product-oriented family tree division which organizes, defines, and displays all of the work to be performed in accomplishing the project objectives.

Cost Control Engineer (CCE) - Responsible for assisting the Project Manager (PM) in developing the project baselines. The CCE will advise the PM on the proper level of the WBS to establish the proper earning rules and the earned value measurement system to be used on the project. The CCE will prepare the preliminary cost account information. The CCE then submits the cost account level documentation to the PM for approval.

Actual Cost of Work Performed (ACWP) - The costs actually incurred for accomplishing the work performed within a given time period.

Cost Variance - The difference between BCWP and ACWP. At any point in time it indicates whether the work already performed costs more or less than that budgeted.

Estimate at Completion (EAC) - The most accurate estimate of what the costs will actually be when the authorized budgeted work on the project is completed. The EAC is defined as the costs actually incurred to date for work performed, i.e., Actual Cost of Work Performed (ACWP), plus the forecast or estimate of costs to complete the authorized budgeted work, i.e., Forecast To Go (FTG). The formula is: EAC = ACWP + FTG. The EAC is compared to the BAC to identify potential cost variance at completion.

Estimate to Complete (ETC) - See "Forecast-To-Go."

Forecast-To-Go (FTG) - The estimate of hours and dollars for authorized budgeted work remaining.

Schedule Variance (SV) - The difference between BCWP and BCWS. At any point in time it is used as an indicator of whether the work actually performed is ahead or behind the schedule.

Variance at Completion (VAC) - The difference between the Budget at Completion (BAC) and Estimate at Completion (EAC). At any point in time, it represents a forecast of the cost overrun or underrun at the completion of the project.

Variance Analysis Report (VAR) - A report prepared when a cost or schedule variance threshold is exceeded. An analysis, for cause, is provided along with an impact analysis and corrective action plan.

Variance Thresholds - Thresholds for variance reporting purposes may be established in terms of dollars and/or workhours, with or without a percentage value, for both cost and schedule variances. Variance thresholds are established for each project which will, in turn, support the level of project reporting required. When not specifically otherwise defined the variance threshold for each project once the project reached 25% complete is established at 15% of the Cumulative Cost Variance, Schedule Variance or Variance at Completion, or $100,000 of the project total dollars.

3.4.2 Baseline Development

3.4.2.1 Introduction

The budget and schedule as defined in the project baseline documents are the basis for the Performance Measurement Baseline (PMB). The PMB is defined by the following:

Scope:

- The Statement of Work
- Work Breakdown Structure (WBS) (Schedule Activities)
- Responsibility Assignment Matrix

Schedule (see Section 3.7 for more details):

- Milestone Schedule
- Detailed Schedule

Cost:

- Detailed Cost Estimate by WBS and Payroll Unit

The PMB shall be developed and maintained by the Cost Control Engineer (CCE) in support of the PM on every project.

3.4.2.2 Initiation of Budget Planning

- Project Authorization - The Project Manager authorizes by memo the detailed planning and estimating effort. This memo directs the CCE to begin the project planning and identifies the date the baselines are due.
- Project Documentation - As it relates to cost/scheduling, the PM is responsible at a minimum, for the preparation of the WBS, and the milestone and summary schedules. Each PM establishes the amount of detail and the required formats for this documentation.
- The Work Breakdown Structure (WBS) is developed to systematically establish hierarchical relationships of work scope. It is to define and organize the project to represent the way design is to be performed and forms the basis for the activities in the schedule.
- The CCE assembles budget information packages and, utilizing the planning guidance provided by the PM, develops budgets for each WBS responsible unit.

3.4.2.3 Development of Design Cost Estimates

The Cost Control Engineer (CCE) is responsible for developing initial design cost estimates upon receipt of the Initial Baseline Schedule, prepared in accordance with Section 3.5, from the Project Manager. The Project Manager is to also provide a detailed Scope of Work and indicate if the design is to be performed by a consultant or an in-house design team.

Initial design cost estimates will provide a breakdown, by activity, of person-hours for design by in-house; or design by consultant and design support by in-house; plus additional estimates for administrative services. The Project Manager must perform a detailed review and approval of these estimates prior to incorporating them into the Initial Baseline Budget. The initial design cost estimate for consultant design is used to define the selection procedure, and then again

later used as a factor in conducting cost negotiations with the selected consultant. This process is depicted in the Cost and Schedule Baseline Process shown in Attachment 5.

3.4.2.4 Initial Baseline Budget

An Initial Baseline Budget is prepared by the Project Manager upon receipt of the Design Cost Estimates from the CCE. The initial budget shall include:

- Design cost estimates as recommended by the PM.
- Right of Way, Utilities, and Construction Costs estimated during Final Scope Development.

The Initial Baseline Budget is included in the Scope Development Package provided to the Capital Program Development Committee.

3.4.2.5 Final Baseline Budget

The Final Baseline Budget is to be submitted by the Project Manager upon completion of negotiations with the in-house or consultant design team. Upon receipt of approval from the Director, Project Management, the Project Manager will submit a funding request to the Bureau of Capital Program Coordination in accordance with Section 19.3.

3.4.2.6 Establishing Earning Rules

Determining the appropriate methods to evaluate the design accomplished for discrete work items is the responsibility of the PM working with the CCE. The system established on each project must be reviewed and approved by the Manager, Program Support Services.

When all the baseline documents, associated budgets, and schedule activity number cross references are loaded and balanced to the BCWS in the control system, it is then ready to receive status updates.

The milestones and percentage complete for each milestone used by each project cannot be changed unless approved by the Manager, Program Support Services. PMs are encouraged to establish “objective” earning rules for discrete work on their projects in order to more accurately and consistently measure work accomplished.

Currently there are only two different earning rules from which a PM can choose. They are:

- Level of Effort - This rule spreads the BCWS linearly over the duration of the activity. No status information is required to earn BCWP using LOE. BCWP is earned automatically with the passage of time and is equal to the value of BCWS for that period. This method should be limited to support activities where no discrete measurement technique is appropriate. The LOE should not exceed 20% of the total project work.

- External Rule - BCWS will be spread over the duration of the activity in accordance with the manner in which the PM feels the resources will be expended. BCWP is earned by

entering the percent complete in the system used for the monthly update. Any of the following methods can be used to determine earnings using the external rule:

a) Milestone Method - BCWS is distributed in accordance with the milestones identified and the weighted value is assigned relative to the budget for the discrete element of work. BCWP is earned when the milestone is accomplished. Incremental credit for earnings between milestones is allowable.

b) Percent Complete Method - This method is used when the milestone method can not be used. There is no clear definition of completion criteria for intermediate steps to complete the work. The work status is "subjective" and is based on a judgment of accomplishments.

c) Apportioned Method - This method of earning is used to update accomplishments of certain work activities. An example is "design supervision" which is apportioned in relationship to the discrete work being supervised.

3.4.2.7 Baseline Review and Approval

The CCE reviews all baseline data resulting from the detailed planning process. This review is to ensure the adequacy and accuracy of the planning in terms of schedule consistency, appropriateness of assigned earning rules, amount of level of effort, the performance measurement system used to report discrete work and conformance to the total labor hours negotiated. Discrepancies are resolved between the PM and CCE. The PM will then approve the BCWS workhour/dollar budgets.

3.4.3 Control Cycle and Baseline Changes

BCWP Update - The PM ensures that the BCWP is reported accurately and reflects the work accomplished using the established guidelines. The BCWP update is required for the performance measurement evaluation, FTG calculation and schedule, and cost variance analysis. After status has been updated a progress report is prepared by the CCE for PM review.

Change Request Approval - After the Director, Program Management approves the change request, the CCE is authorized to change the baseline on the project. The CCE updates the change request control log for the project and assembles the documentation required to implement the change. This includes a properly authorized appended budget spread of BCWS, as appropriate. The PM is responsible for ensuring that the BCWS is updated within 30 days of the approval of a Change Request.

Monthly Incurred Costs

Time Reporting - After the time charges are available in the system for the current reporting period, files for total labor dollars corresponding to each payroll unit, work element, and total, project are generated for preparation of the monthly reports.

Other Direct Costs (ODCs) - ODCs are accrued monthly based on invoiced ODCs for the period and to-date.

Previous Months Adjustments - Labor - A reconciliation of the incurred costs with department records is done each month.

EAC Update - The EAC is evaluated monthly. A rule of thumb for updating is once any phase of the project has reached 25% complete, the PM should begin to look more closely at the EAC. The EAC reported is in relationship to the "authorized" scope only. Pending changes that identify a change in the schedule or a change in condition that impacts the budget should be considered in the EAC. The EAC must be as accurate as possible since it is used by management for manpower forecasting and also identification of funding shortfalls. The PM is responsible for the identification of the basis for the project EAC. The CCE will support the PM by supplying information on trending, performance, and changing conditions that may impact the FTG and schedule status.

Data Analysis and Variance Report - A cost performance report with predetermined detail is used to identify variances that meet or exceed the project established threshold. It also shows potential Variances at Completion (VAC) to the schedule activity by comparing the BAC and EAC.

Action Item Log - Corrective action plans identified by the PM are included in this log. The PM or designee updates the log to reflect new or closed items occurring during the reporting period. The PM implements approved corrective action plans and assigns a responsible individual to complete the action items listed. When a responsible individual completes an action item to the PMs satisfaction, the PM notifies the CCE of the successful completion of that item in the corrective action plan. The CCE annotates the appropriate item as "completed" on the log upon notification of successful completion.

Changes to the Baseline - During the life of a project, situations may arise whereby the available budgets and or the work plan for remaining "in-scope" work are decidedly insufficient. Consequently, performance measurement against the available budgets becomes unrealistic. Under these circumstances, a requirement exists for the PM to request to add additional budget to the performance measurement baseline which, in turn, causes the project BAC to exceed the authorized funding and formal "reprogramming" or "replanning" may be necessary. As appropriate these changes to the baseline may entail replanning future work, replanning in-process work, and/or adjusting cost and/or schedule variances.

Internal Replanning - Is when the PM decides that the authorized baseline for the remaining scope of work does not reflect the current plan to complete the work. The PM may replan the cost baseline as long as the following conditions are met:

- The cost BAC does not change and
- The control milestone dates do not change

The PM has the authority to do internal replanning without formal approval from the Program Manager. Once the replanning is done, the PM must transmit to the Program Manager the change to the cost account and project baseline.

Reprogramming - The term "reprogramming" is associated with only severe conditions. The purpose of reprogramming is to change the amount of budget and funding for remaining work to provide more realistic, reasonable budget objectives, work control,

and performance measurement. It is not done to merely to compensate for existing variances. In formal reprogramming, changes to baseline budgets must be fully documented and traceable. Formal reprogramming requires the submittal of a Baseline Change Request and/or a Formal Review/Approval by the Change Control Board. Internal records and reports will be revised expeditiously and provide appropriate visibility to account for the manner in which project budgets were changed. If variances are to be adjusted, the BCWS and BCWP values before adjustment will be retained to ensure traceability. An advantage in reprogramming is minimizing or eliminating future schedule variances, cost variances or both.

3.4.4 Responsibilities

Project Manager - Directs the preparation of and approves all baseline documentation. Also, defines the scope, develops the schedule, and estimates the cost of the project. The PM must also monitor adherence to the baseline plans, budgets, and funding for the project.

Cost Control Engineer (CCE) - Responsible for assisting the PM in developing the project baselines. The CCE will advise the PM on the proper work breakdown structure established, as well as the proper earning rules and the earned value measurement system to be used on the project. The CCE will prepare the project documentation and report monthly performance status.

Manager, Program Support Services - Reviews and ensures that proper methods are being utilized, and reviews the earning rules and earned value system that are used on each to ensure compliance with these procedures.

3.4.5 Acronyms

- Actual Cost of Work Performed (ACWP)
- Budget at Completion (BAC)
- Budgeted Cost for Work Scheduled (BCWS)
- Budgeted Cost for Work Performed (BCWP)
- Change Requests (CRs)
- Cost Performance Index (CPI)
- Cost Variance (CV)
- Project Management Control System (PMCS)
- Estimate At Completion (EAC)
- Estimate To Complete (ETC)
- Forecast To Go (FTG)
- Organizational Breakdown Structure (OBS)
- Other Direct Costs (ODCs)
- Performance Measurement Baseline (PMB)
- Project Manager (PM)
- Schedule Variance (SV)
- Schedule Performance Index (SPI)
- Variance Analysis Report (VAR)
- Variance At Completion (VAC)
- Work Breakdown Structure (WBS)

Attachment 5 - Cost and Schedule Baseline Process

COST AND SCHEDULE BASELINE PROCESS

3.5 Scheduling Baselines

Project scheduling is an integral element of an effective project control system. Project schedules are established at the earliest feasible time and monitored/statused throughout the life of the Project. The purpose of this procedure is to provide standard guidelines in the development and updating of project schedules and all supporting documents and reports.

3.5.1 Definitions

Activity - An element of work spanning a specific time period as defined in the schedule. Single activities can be summarized within a schedule.

Baseline Schedule - The approved project schedule against which all progress is compared. Also called a target schedule.

Current/Working Schedule - The current schedule shows the original baseline schedule that gets updated periodically according to the update cycle.

Early Finish (EF) - Scheduled earliest date an activity can be completed.

Generic Sub-Project Schedule - The generic schedule lists all major work activities in a logical sequence to be used as a model for creating new project schedules. The schedule lists activities from study agreements through advertise and award and into construction. The activities in this schedule all have one-day durations and require detailed information and special relationships dictated by each specific project. The durations and other modifications are developed by the Project Manager.

P3 Sub Project ID - The unique two letter sub-project ID is required by Primavera so the software can distinguish each project as a separate entity. The sub-project ID is the next available sequential two-character combination available in the Project Log file and is assigned by the scheduler. The sub-project ID appears as the first two digits of all activity IDs.

P3 Sub-Project Name - Each P3 sub-project must have a unique four character file name. The file name will be an extract of the universal project code (UPC). For all those UPCs starting with '96', the sub-project name will be the last four digits of the UPC (i.e., UPC 961046 will have a sub-project name of 1046). For all subsequent UPCs, the sub-project name will be comprised of the last digit of the year and the last three digits of the UPC (i.e., UPC 970101 will have a sub-project name of 7101). Using this method will work well unless the total number of assigned project per year reach one thousand or until the year 2001. By that time Primavera will have resolved the restrictions on the 4-digit sub-project file name.

Primavera (P3) - Primavera Project Planner, a commercial scheduling software package that is being used to schedule the projects.

Project Baseline Schedule/Scope/Budget Revision Form - a form used to obtain management approval for changing the baseline of a project: schedule, budget, and/or scope. It is located on-line in the PMCS. The following people must approve a baseline change before it can be implemented: the Program Manager, manager of Project Support Services, and the Director of Project Management.

Project Log - The Project Log is a listing of all projects that are in the P3 system. The log contains the UPC number, P3 sub-project ID number, P3 Sub-Project name, the Project Title, the planned year of advertisement, the current Program Manager, and the current status of the baseline schedule. It is maintained by the scheduling manager.

Report Coordinator - the Program Support Services personnel responsible for coordinating the production of the monthly Capital Project Status Report.

Schedule Change Form - a form for scheduling use only that records logic or duration changes made to a current schedule.

Scheduling Stamp - contains lines for project number initials of scheduler making change, date of change in active directory, and date of update or copy to report directory. It is used on every document used by schedulers to modify schedules in any way to record when the change was made and who made the change.

Universal Project Code (UPC) - a six-digit project identifier. The first two digits represent the fiscal year the project was created. The last four digits are the next available sequential numbers.

Update Form - a form that contains a list of all activities for a project that are scheduled to start, finish, or progress during the update period. The forms are produced by the schedulers and distributed to the project managers. Updates are marked by the project manager and returned to scheduling for entry into Primavera.

3.5.2 Overview

The scope of this procedure applies to all new projects that are scheduled in Primavera. Projects would include all capital projects in the Capital Program Management Division (CPM) and other support type projects deemed appropriate by division management.

One of the primary responsibilities of a project manager is to establish a plan and schedule for the project as early as possible. The schedule must portray the activities required to support the project plan. The project manager must impose tight control and discipline on all members of the project team to see that the planned schedule objectives are met.

The NJDOT planning and scheduling system described in these procedures is designed to aid the project manager in discharging this responsibility. It outlines the steps in schedule development and control of these schedules once they are developed. It delineates the interfaces with and responsibilities of the various elements of the project organization in the scheduling process, and it describes the reports generated by the Scheduling Unit and their use as tools in schedule control.

While the project manager is directly responsible for establishing schedule milestones and maintaining overall schedule control, the implementation of the planning and scheduling system is the duty of the planner/scheduler assigned to the project team. However, for the system to perform its functions effectively, the support of all project personnel involved in the scheduling process is required, as is their adherence to these policies and procedures

The planning and scheduling system performs the following major functions:

- Provides time-scaled network schedules that define when in-house (and consultant) work tasks are to be performed.
- Provides detailed bar charts for these schedules.
- Provides tools for evaluating schedule performance to date.
- Provides tools for forecasting final schedule performance.
- Produces reports that provide the Project Manager, and CPM staff with the information necessary to monitor schedule status and to initiate corrective action if required.
- Providing assistance in implementation of corrective action when required. This may include authorizing overtime, increasing manpower, or intensifying expected activity. If this does not solve the slippage problem, it is desirable to revise the schedule and re-plan the project.

3.5.3 Schedule Development

All capital projects managed in CPM will require a baseline schedule and a formal approval from the Director of Project Management before the projects are incorporated into the working directory.

3.5.3.1 Initial Baseline Schedule

An Initial Baseline Schedule is prepared by the Project Manager upon finalization of a project's scope of work. This will generally occur toward the conclusion of Final Scope Development. The approved Initial Baseline Schedule will then be used to develop Design Cost Estimates. Accordingly, the Project Manager is responsible for accurately selecting activities which correspond to the project's final scope of work. The activities in this initial schedule will be used as the basis for the development of Design Cost Estimates.

The Initial Baseline Schedule is developed as follows:

- Project UPC is assigned.
- The scheduler adds the new project information to the Project Log and assigns a P3 Project Name and P3 Project ID.
- The PM prepares a marked-up process network or other logic diagram identifying all required activities, relationships, and constraints.
- The PM requests that an Initial Baseline Schedule be developed and identifies the generic format of the schedule.

- The scheduler will print out a predecessor/successor report (Attachment 6) and bar charts (Attachment 7) and give them to the PM for development of the initial baseline.

- The PM will use the generic schedule and develop new durations and logic relationships pertaining to the scope of this project. The PM should use a similar type project as a guide and should also review the activity duration list to verify activity time frames.

- The PM should solicit assistance from the scheduler if major or complicated modifications to the logic are required. The PM can review and verify the results.

- The scheduler will complete the input and calculate the schedule. This will produce a series of reports identifying any scheduling problems, such as a logic loop or open-ended activities. The scheduler and the PM will correct all listed problems.

- The scheduler will place a start no later than (SNL) constraint on the "Advertisement" activity and re-calculate the schedule.

- The scheduler and PM will review the initial baseline schedule and verify that the total float of the sub-project is zero and that the critical path of the project is correct. The critical path should be continuous and run through the Advertisement activity.

- The scheduler will produce the early start bar chart.

3.5.3.2 Final Baseline Schedule

A Final Baseline Schedule is to be submitted by the Project Manager upon project approval by the Capital Program Development Committee. This Final Baseline Schedule will reflect minor variations in the Notice to Proceed date and durations for design development activities which may result from final negotiations with the designer. In addition, dates may be adjusted based on programming and funding availability.

The PM completes a Project Baseline Schedule/Scope/Budget Revision form, attaches the Final Baseline Schedule to it, and follows the procedure outlined in Section 3.5.5, Baseline Changes, to get the required approvals.

After receiving the Project Baseline Schedule/Scope/Budget Revision form, approved by the Director of Project Management, the Director of Capital Program Control and Support and the Program Manager, the scheduler will include the Project Schedule in future updates (described in Section 3.5.4 of this procedure).

3.5.4 Schedule Updates

Projects are updated once a month.

Schedule update forms are produced and distributed by the scheduling group one week before they are due back. They list all activities scheduled to start, finish, or progress during the period between the last update and the next update. The Project Manager is to mark up the update form with the actual start/finish dates and/or remaining durations of each listed activity.

When the scheduler receives the completed update forms from the Project Managers, he/she should first review it to be sure the form is filled out completely and there are no questions about the remarks. If, as a result of the update, the advertise date slips more than five days, the scheduler should notify the Project Manager and suggest that they meet to discuss the situation. The slippage could be a result of some logic constraint that the project manager was not aware of, and should be addressed immediately so the situation can be remedied if necessary before the next monthly status report is published.

If an activity started

- If an activity started on the date in the Early Start column, write an "A" next to the early date or on the update line, and update the forecast finish (see "If an activity has a start date" below).
- If an activity started on a date other than the date in the Early Start column, write the actual start date on the update line and an "A" next to it, and update the forecast finish (see "If an activity has a start date" below).
- If an activity that is not listed started, write the activity number and the actual start date on the form. This may be a logic change and requires revisions to the schedule. The PM should write down the logic change (if any) and be available to revise the schedule with the scheduler and update the forecast finish (see "If an activity has a start date" below).

If an activity completed/finished

- If an activity finished on the Early Finish date, write an "A" next to the early date or on the update line.
- If an activity finished on a date other than the Early Finish date, write the actual finish date on the update line and an "A" next to it.
- If an activity that is not listed finished, write the activity number and the actual finish date on the form. This may be a logic change and requires revisions to the schedule. The PM should write down the logic change (if any) and be available to revise the schedule with the scheduler.

If an activity has an actual start date

- If an activity has an actual start date then one way the activity can be progressed is by revising the remaining duration. The forecast finish date will then be based on the remaining duration relative to the new data date.
- For all activities with a start date, the percent complete must be updated based on the PM's estimate completion of the activity. Not updating the percent complete will indicate that the program should calculate the percentage based on the original duration and time to go.

If an activity did not start

- If an activity was scheduled to start, but did not, leave the update line blank and let the logic and remaining duration (change if necessary) dictate the new forecast date.

What If/Re-Baseline Schedules

If major changes to the schedule are planned (change of scope, etc.), and the PM wants to do a "What If" schedule or develop a Preliminary Re-Baseline, then the PM must tell the scheduler that they want to develop a "What If" schedule or a Preliminary Re-Baseline. The scheduler will copy the current file to a temporary working directory and input the changes to the schedule there or download file for PMs use. If the "What If" is to become a new baseline, the PM must follow the procedure described in Section 3.5.5, Baseline Changes before the scheduler can replace the existing baseline schedule with the "What If".

3.5.5 Baseline Changes

Once the baseline schedule has been established and approved, progress is compared against it for every update and report. The current schedule will either show that an activity is on, ahead, or behind schedule as compared with the baseline. The baseline can only change with an approved Project Baseline Schedule/Scope/Budget Revision form. The PM is responsible for initiating the change when the scope of the project or schedule has been altered significantly enough that a new project schedule must be developed, or when the approach to managing the project has changed significantly.

When events have changed significantly on a project and the schedule baseline needs to be changed, the PM initiates this change with the scheduler. When the new baseline is developed to the satisfaction of the PM, he or she fills out a Project Baseline Schedule/ Scope/Budget Revision form. These forms are available on the PMCS. The top portion contains information about the project: the PM's name and phone number, the project UPC and title. The PM justifies his reason for modifying the schedule baseline in the section labeled 'Justification/Effects of Request.' In the Schedule Impacts section of the form, the PM lists the advertisement date in the current baseline and the advertisement date in the new baseline he wishes to get approved. If the fiscal year of advertisement is changed, this is indicated in the second column of the Schedule Impacts section. Finally, if the baseline change will result in a change to the construction finish date, this is indicated in the third column.

If there are any budget impacts as a result of this schedule baseline change, these should be indicated in the Budget Impacts section of this form. This would be necessary if the baseline change moved the schedule enough to require monies in different fiscal year, or some design change require a change in the amount of funds needed. A bar chart of the old and new baseline schedules should be attached to the form.

Approval

Once the PM signs the form, he or she then passes it on to the Program Manager for his or her approval. Other required approvals include the Director of Program Control and Support, who is responsible for insuring that any budget impacts get reported to the appropriate individuals, and the Director of Project Management. Each person on the approvals list is responsible for

passing it on to the next person, within one business day of receiving it. The secretary to the Director of Project Management must forward the approved form to the scheduling manager, who will insure it replaces the existing baseline schedule within one business day. If there is a need for this process to move quicker, the Project Manager can hand carry it to the necessary signatories. **The project baseline cannot be changed without all approvals stated above.**

Once the change has been made and the baseline schedule has been replaced, the scheduler files the Project Baseline Schedule/Scope/Budget Revision form in the scheduling project file. All project baseline changes will be reported in the monthly Capital Projects Status Report.

This procedure is followed for both a change to an existing schedule baseline and an approval of a brand new schedule baseline. When a project enters construction, the Project Manager uses the approved Project Baseline Schedule/Scope/Budget Revision form to inform the Scheduling Unit of the construction start date (NTP), contract duration, and contract completion date. The Project Baseline Schedule/Scope/Budget Revision form need only be approved by the Program Manager in this one situation.

3.5.6 Scheduling Reports

Monthly printouts for Program and Project Managers:

- A bar chart listing "To-go activities over Baseline" will be printed out for each project.
- Also, printout of all advertise dates and current data dates will be printed for the Program Managers.

Other normally requested printouts:

- Bar charts without baseline target information.
- Critical Path Bar charts.
- A predecessor/successor report.

3.5.7 Responsibilities

Project Manager - Directs the preparation of and approves all baseline documentation. Also, defines the scope, develops the schedule, and estimates the cost of the project. The PM must also monitor adherence to the baseline plans, budgets, and funding for the project.
Schedulers - Provides day to day implementation of this procedure. Specific responsibilities include working with project team members to prepare all project schedules for management review and approval; provides evaluations of all change orders and/or design change notices; provides dates, reports, and/or lower level schedules to project team members, and insures that all actual schedule information is presented in the proper formats to support the databases/reports.

Manager, Program Support Services - Reviews and ensures that proper methods are being utilized and reviews the baseline information that is used on each project to ensure compliance with these procedures.

Attachment 6 - Predecessor/Successor Report

Attachment 7 - Bar Charts

3.6 Requesting Survey Services

Prepare a DC 112 (Request for Field Survey Personnel) establishing the following:

- A detailed explanation of the work to be performed with delineation of the project limits. Included also shall be a checklist of activities of each Design Unit involved in the project.

- The requester shall provide all documentation available that will be used to perform the survey functions (see attached DC 112 checklist).

- Each request shall indicate an anticipated completion date.

- Any additional survey service not included in the original request must be accompanied by an additional request.

- A meeting between the requester and the Survey Services Field Supervisor will be held if deemed necessary.

- If additional research data or support is required to perform the services it must be requested through the Project Manager.

Form DC-112a. Rev. 8/96

NEW JERSEY DEPARTMENT OF TRANSPORTATION

REQUEST FOR FIELD SURVEY PERSONNEL

* NOTE - TO BE PREPARED IN TRIPLICATE

DATE _____

MEMORANDUM TO:

MR. _____
Supervising Engineer, Field Survey

KINDLY SUPPLY FIELD SURVEY PERSONNEL TO WORK ON ROUTE _____ SECTION _____ COUNTY OR M.P. _____

THE WORK WILL CONSIST OF: _____

**NOTE: PLANS/DOCUMENTS TO BE INCLUDED TO FACILITATE COMPLETION OF REQUEST. SEE SHEET NO.2

THE FIELD SURVEY PARTY WILL MEET MR. _____ TITLE _____

AT _____ AM - PM ON _____
Date

AT _____
Location

JOB/PROJECT CODE NUMBER _____

COPY DISTRIBUTION:
Supervising Engineer
Office File
Field Survey Coordinator

REQUESTED BY: _____

TITLE _____

BUREAU/AGENCY _____

_____
APPROVED: Supervising Engineer, Field Survey

SIGNATURE _____ PHONE _____

FOR FIELD SURVEY PERSONNEL ONLY

COMPLETED _____ _____
Date Name/Title

MEMBERS	NO.
PARTY CHIEF	
INSTRUMENT MAN	
CHAINMAN/RODMAN	
FIELD COORDINATOR	

NO. OF CREWS

NO. OF	AMOUNT
HOURS	
DAYS	
WEEKS	
MONTHS	

DATE IN Field Book _____ PAGE(S) _____

DC-112 CHECKLIST

PLANS AND OR DOCUMENTS PROVIDED

☐ TAX MAPS

☐ FILED MAPS

☐ DEEDS

☐ E.T.M.'S

☐ G.P.P.M.'S

ROUTE_____SECTION_____

ROUTE_____SECTION_____

☐ AS-BUILT CONSTRUCTION PLANS

ROUTE_____SECTION_____

ROUTE_____SECTION_____

☐ OTHER _____

☐ SCOPING REPORT

3.7 Value Engineering

Value Engineering (VE) is a function based method of analysis used to achieve an equal or improved product at a reduced life cycle cost. It is a tool used to improve the quality of a project and get the maximum value for every dollar spent.

The Bureau of VE is responsible for evaluating all contractor construction VE proposals and for coordinating all VE reviews in Scope Development. The Bureau also conducts analyses on design standards, specifications and Department policies and procedures.

3.7.1 Scope Development

A VE study should be done as soon as a scheme/plan and construction cost estimate are available.

A. Project Selection

1. The FHWA requires that all projects with an estimated construction cost of $25 million or more undergo a VE review.

2. All projects with a construction cost estimate of $5 million or more should be considered for a VE review. However, resurfacing, guiderail, pavement marker, signalization/intersection improvement, bridge repair projects, etc. are exempt from this procedure.

3. Additional projects may be selected for review by either the Bureau of VE or by the Department Project Manager. When selected by the Bureau of VE, the Department Project Manager is notified in writing with a request for study reports, plans, construction cost estimate, etc. necessary to perform a VE study.

4. The ranking system below is used to determine which projects have the greatest potential for savings.

Value Engineering Project Selection Ranking System

1 Point is awarded for each project characteristic that applies. Most projects selected for a VE study have been awarded at least 7 points.

_____ Roadway Work over 25% Total Project Cost

_____ Bridge Work over 25% Total Project Cost

_____ Right of Way Impacts over 10% Total Project Cost

_____ New Alignment of Roadway

_____ New Alignment of Bridge(s)

_____ More than two Construction Stages

_____ More than four Construction Stages

_____ Night Work Construction Required

_____ Wetland Mitigation

_____ Hazardous Waste Cleanup

_____ Utility Cost over 10% Total Project Cost

_____ Total Project Cost over $10 million

_____ Total Project Cost over $20 million

_____ Total Project Cost over $50 million

_____ Total Project Cost over $100 million

Total Ranking # Points

_____ Maximum Total 15 Points

B. Team Study

1. The Bureau of VE does research and collects all plans, estimates, reports, documents, etc. required for a thorough VE study.

2. Formal team studies are conducted during one week long training courses with multi-disciplined team members from NJDOT, FHWA, and other agencies.

3. Using personnel that previously participated in the training, the Bureau of VE organizes in-house VE Teams to conduct additional studies.

4. The Bureau of VE also conducts VE studies by informally soliciting various personnel for their expertise and input when needed.

5. During the study, the Bureau of VE will regularly inform the Department Project Manager of the estimated study completion date and the potential magnitude of the VE recommendations. If necessary, the Department Project Manager should consider directing the Designer to stop work, pending approval of the study recommendations.

C. Develop/Distribute Draft Value Engineering Proposal

1. The Bureau of VE fully develops feasible recommendations.

2. The Bureau of VE prepares and submits a draft proposal to all involved units and FHWA for review and comment. All affected units participate in the development of the recommendations.
3. The Bureau of VE addresses any comments received.

D. Formal Presentation Of Draft Value Engineering Proposal

The Bureau of VE presents the draft VE proposal to NJDOT upper management, all involved in-house units, FHWA, local officials, and other agencies using graphics/displays prepared by the VE Team and/or the Bureau.

E. Address Comments

The Bureau of VE addresses all questions or comments received prior to or during the presentation to the satisfaction of all units. At this time, the VE proposal is approved or rejected.

F. Final VE Report

The Bureau of VE prepares and submits a final VE Proposal Report which incorporates any required revisions to the draft proposal and includes an implementation plan.

G. Signatures

The VE Proposal Report is submitted for signature to the Department Project Manager, FHWA and Assistant Commissioner, Capital Program Management.

H. Implementation

The Department Project Manager will incorporate the approved VE proposal into the project.

In order to expedite the process, some proposals may not require the development of a draft report or a formal presentation. Through appropriate coordination and communication between the Bureau of VE, the Project Manager and other involved units, concerns can be addressed and VE recommendations can be submitted directly to the Project Manager for approval and implementation.

3.8 Design Exceptions

The Federal Aid Policy Guide states that "The determination to approve a project design that does not conform to the minimum criteria is to be made only after due consideration is given to all project conditions such as maximum service and safety benefits for the dollar invested, compatibility with adjacent sections of roadway and the probable time before reconstruction of the section due to increased traffic demands or changed conditions". When these criteria produce severe social, economic and/or environmental impacts, lesser design values may be chosen. The result of this process is the design exception document. The design exception is prepared to record the considerations given toward social, economic, environmental and safety impacts to the motoring public.

3.8.1 Criteria

When conditions warrant, a design exception may be granted for a project design which proposes a controlling substandard design element (CSDE). A design exception may be approved when it can be documented that a lesser design value is the best practical alternative. The warrants for the selection of a lesser design value shall give consideration to social, economic and environmental impacts together with safe and overall efficient traffic operations.

A design exception is not required for a temporary CSDE usually present during the construction stage of a project. However, due to additional driving tasks in a construction zone, the designer is encouraged to provide the highest practicable design value.

Design Exception Approval

National Highway System (Interstate or Major/Unusual[1])

Approval of a design exception by the FHWA is required for a CSDE on all Interstate (regardless of funding source) and Federally Funded Major/Unusual projects.

On an Interstate project, an existing controlling design element that is degraded by the proposed design, but still meets or exceeds the required design value, will require a design exception request. This is required because degrading the existing controlling design element will change the project's original as-built. Also, maintaining an existing or creating a new CSDE will require a design exception request.

National and Non-National Highway System (excluding Interstate or Major/Unusual)

Approval of a design exception by the Director Division of Design Services, is required on all projects.

[1]FHWA approval of a Major/Unusual design exception is necessary only when Federal funds are involved in the design or construction stages of a project.

Controlling Design Elements

The controlling design elements are:

Roadway Elements

- Cross Slope
- Lane and Shoulder Width
- Minimum Radius (mainline and interchange ramps)
- Grades (maximum and minimum)
- Stopping Sight Distance (horizontal curves, vertical curves, two-way left-turn lanes)
- Intersection Sight Distance
- Superelevation (mainline and interchange ramps)
- Auxiliary Lane Length (interchange only)
- Through-lane Drop Transition Length

Structural Elements

- Bridge Width
- Structural Capacity
- Vertical Clearance

A design exception shall be requested when a project contains a controlling design element which does not conform to the required design value. A design exception should not normally be requested for substandard cross slopes on a roadway project (excluding existing structures), since it is socially, economically and environmentally feasible to upgrade the cross slopes to required design values. A design exception will be considered for substandard cross slopes related to existing structures on a case-by-case basis.

Resurfacing, Restoration and Rehabilitation Projects

This design procedure shall apply to all Resurfacing, Restoration and Rehabilitation (3R) projects, excluding Interstate 3R projects.

Although 3R projects are primarily intended to preserve pavement integrity, the designer must consider improving highway safety by upgrading existing highway and roadside elements. The level of improvement for a particular project will depend on an engineering evaluation of the cost to improve an element versus the resultant safety benefits, with due consideration given to social, economic and environmental impacts.

Types of Projects

3R projects increase in complexity from Resurfacing (least complex) to Restoration to Rehabilitation (most complex). A project classified as Rehabilitation may contain scope of work items in the Resurfacing category, however, a less complex type of project may NOT contain scope of work items identified in the more complex categories. See the definitions section for a detailed description of each project type.

Design Exceptions

Programmatic Design Exceptions for controlling substandard design elements (CSDEs) that satisfy the Design Exception Criteria for a 3R Project shall be identified in the Project Fact Sheet. Refer to the following pages for the listing of Programmatic Design Exceptions. All other CSDEs in a 3R project must have a design exception request.

Problem Statements

In addition to a design exception request, a Problem Statement shall be prepared and submitted for any CSDE which falls into one of the following categories:

1. The safe speed of a horizontal curve is more than 15 mph below the posted speed and the ADT is greater than 750 vehicles per day.

2. Crest vertical curves where:

   a. The curve hides from view major hazards such as intersections, sharp horizontal curves or narrow bridges.

   b. The $V_{(calc)}$ of the vertical curve is more than 20 mph below the project design speed.

3. A bridge with a usable width less than the following values:

Design Year ADT	Usable Width (meters)
0 - 750	width of approach lanes
751 - 2000	width of approach lanes + 0.6 m
2001 - 4000	width of approach lanes + 1.2 m
Over 4000	width of approach lanes + 1.8 m

Emergency Resurfacing Projects

In areas where the highway pavement has experienced accelerated deterioration, it is important to resurface those areas without delay. For such cases, the project manager may elect to develop a project for **Pavement Resurfacing Only**, provided that a safety project will be implemented in the next construction season to address safety deficiencies.

The project manager shall contact Maintenance Engineering to provide for the safety contract. Safety deficiencies which should be addressed include the replacement or repair of barrier systems, the replacement or repair of impact attenuation systems, utility poles in hazardous locations (in front of beam guiderail, behind beam guiderail but not in conformance with standard details and within the clear area of a guiderail end treatment), beam guiderail not attached at bridges, the removal of non-conforming signs and the replacement of severely deteriorated signs.

The project manager shall provide a complete discussion of the proposed safety contract, including project timeframes, with the Project Fact Sheet.

Programmatic Design Exceptions for a 3R Project

The following Programmatic Design Exceptions may be utilized for Non-Interstate 3R projects only. All proposed CSDEs (which have an acceptable individual accident analysis) that fall into one of the following categories will not require the preparation of a formal design exception. All Programmatic Design Exceptions shall be identified in the Project Fact Sheet. CSDEs that do not meet the criteria below and/or which do not have an acceptable individual accident analysis shall require a design exception request to the appropriate design standard.

1. The safe speed is equal to or greater than the posted speed for superelevation and horizontal curve stopping sight distance.

2. Superelevation in urban areas, if the spacing between property improvements and/or driveways is less than or equal to 60 meters. Urban areas shall be determined by referring to the NJDOT Straight Line Diagrams (for state highways) and the NJDOT Functional Classification System Maps (for non-state highways).

3. For Resurfacing and Restoration projects only:
   Any CSDE involving structures with a span length greater than or equal to 6 meters.

4. Maximum and minimum profile grades (only if the required design values for cross slopes are provided).

5. For Resurfacing and Restoration projects only:
   Vertical bridge clearances greater than or equal to 4.42 meters. Any substandard vertical bridge clearance requires the concurrence of the Manager, Bureau of Structural Engineering.

6. Lane and shoulder widths which meet the following values:

Design Year Volume (ADT)	Posted Speed (mph)	10% or more trucks			less than 10% trucks		
		lane (m)	inside shoulder (m)	outside shoulder (m)	lane (m)	inside shoulder (m)	outside shoulder (m)
2000 or less	under 80	3.3	N/A	0.6	3.0	N/A	0.6
	80 & over	3.6	N/A	0.9	3.3	N/A	0.9
over 2000	all	3.6	1	1.8	3.3	1	1.8

7. The length of vertical curve which meets or exceeds the following vertical curve stopping sight distance values:

Design Speed (km/h)	Vertical Stopping Sight Distance	
	(meters)	(feet)
40	44.4	145
50	57.4	188
60	74.3	244
70	91.4	300
80	106.7	350
90	129.5	425
100	152.4	500
110	182.9	600

Note: This table should be used for 3R project vertical curve Programmatic Design Exceptions only. Solve for the existing vertical curve stopping sight distance knowing the vertical curve length and algebraic difference in grades, and using Figures 4-I and 4-J in the NJDOT Design Manual Roadway. Using the above table, interpolate to determine if the existing vertical curve stopping sight distance meets or exceeds the value shown for the project's design speed.

Design Standards

The required design values for the controlling design elements previously mentioned are contained in the following design standards:

- NJDOT Design Manual Roadway
- NJDOT Design Manual Bridges and Structures
- AASHTO publication A Policy on Design Standards Interstate System
- AASHTO publication A Policy on Geometric Design of Highways and Streets.

Specific design values for each of the controlling design elements, along with references to AASHTO and NJDOT Design Manuals, are presented in Tables 1 through 8. It should be noted that the design values in all NJDOT Design Manuals meet AASHTO design values, except where noted in these tables.

Projects Exempt from the Design Exception Procedure

A county or municipal construction project, funded under the following State Aid Programs, is not required to follow the design exception procedure, unless the design phase or construction phase is being funded with Federal Aid or the project is on the National Highway System or construction phase:

- New Jersey Transportation Trust Fund (NJTTF) - Federal Aid Urban System Substitution Program: County and Municipal Aid
- NJTTF - Municipal Aid
- 1979 Transportation Bond Issue Program
- 1983 NJ Bridge Rehabilitation and Improvement Fund: State Aid to Counties and Municipalities (Local Non-Federal portion)

- 1989 NJ Bridge Rehabilitation and Improvement and Railroad Right of Way Preservation Bond Act (Local Aid portion)
- Any previous State Aid to county or municipal programs, with remaining balances, where the Department was not responsible for the development of the plans or the advertising and bidding of the construction contract.

3.8.2 Controlling Substandard Design Element (CSDE) Format

This is the most significant part of the design exception. It contains the rationale for the design exception approval. It shall include: existing and proposed CSDE's; required design values; proposed impacts; proposed cost estimate; accident summary with proposed safety measures.

Sample Tables for Proposed CSDE's

A table should be provided to show existing and proposed conditions. To illustrate what is expected, tables of a few common CSDE's will be presented in this section. It should be noted that when a required design value cannot be met, then the highest practical design value should be selected.

Superelevation

Table 9 shows the information required for the CSDE superelevation. Included are the curve location; existing and proposed radius; existing, proposed and required superelevation rates (e); existing, proposed and required safe speeds ($V_{(safe)}$); existing and proposed posted speed; and the cost to correct the CSDE. Refer to Section 3.8.3 for an explanation on safe speed.

It is very important, when listing the information in table form, to give a brief description of the material presented. In the following example, the required "e" is based on an "e" maximum of 6%, at a design speed of 110 km/h and the required "V (safe)" is based on the required "e" and proposed radius.

Table 9

Sample Superelevation Table

Location	Radius (Exist/Prop) (meters)	e max (Exist/ Prop)	e max (required)	V(safe) (Exist/ Prop) (mph)	V(safe) (required) (mph)	Posted Speed (Exist/ Prop) (mph)	Cost to Upgrade ($1000)
MP 71.45 to 70.77 NB (Sta. 114+987.6 to 116+087.6)	2,000/2,000	2.0/2.0	2.8	89/89	91	55/55	100
MP 70.62 to 70.25 NB (Sta. 116+330.8 to 116+914.2)	1,500/1,500	2.0/2.0	3.6	83/83	87	55/55	150

Vertical Curve Stopping Sight Distance

An example of the information required for the CSDE vertical curve stopping sight distance is shown in Table 10. The table lists the vertical curve location; the existing and proposed length of vertical curve (L); the existing and proposed difference in grades (A); the existing, proposed and minimum required stopping sight distance (S); the existing and proposed calculated speed ($V_{(calc)}$); the existing and proposed posted speed; and the cost to upgrade to the required design value. The design speed for this example is 70 km/h.

Table 10

Sample Vertical Curve Stopping Sight Distance Table

Location	A (Exist/ Prop)	L (Exist/ Prop) (meters)	S (Exist/ Prop) (meters)	S (min req'd) (meters)	$V_{(calc)}$ (Exist/ Prop) (mph)	Posted Speed (Exist/ Prop) (mph)	Cost to Upgrade ($1000)
MP 10.0 to 10.04 SB (Crest) (Sta.16+093.4 to 16+154.4	3.5/3.5	60/60	87.7/ 87.7	94.1	37/37	40/40	150
MP 10.04 to 10.08 SB (Crest) (Sta.16+154.4 to 16+212.3)	3.0/3.0	54/57	94.3/ 95.8	94.1	39/40	40/40	100
MP 10.10 to 10.12 SB (Sag) (Sta.16+254.4 to 16+300.1)	5.0/5.0	45/60	53.1/ 64.6	94.1	27/31	40/40	250

To determine the existing and proposed S, use the appropriate formula below:

For sag vertical curves:

If S>L, then $S = (120 + LA)/(2A - 3.5)$

If S<L, then $S = (3.5L + [(3.5L)^2 + 480\ AL]^{1/2})/2A$

For crest vertical curves:

If S>L, then $S = (L/2) + (202/A)$

If S<L, then $S = (404L/A)^{½}$

The minimum required S is from the appropriate design standard. A design exception request is not necessary if the proposed S is equal to or greater than the minimum required S. Use Attachment 8 to determine V(calc), given the existing and proposed S.

Crest Vertical Curve Stopping Sight Distance - Two-Way Left-Turn Lanes

Use a table similar to Table 10 for this CSDE. See Section 6 in the NJDOT Design Manual Roadway for a discussion of how to calculate the existing and proposed stopping sight distance S. The minimum required S is two times the minimum design value for stopping sight distance in the appropriate design standard. A design exception request is not needed if the proposed S is equal to or greater than the minimum required S. Using Attachment 8, divide the existing and proposed S by two to determine V (calc).

Horizontal Curve Stopping Sight Distance

The information shown in Table 11 is not all inclusive, it must be supplemented with a description of the proposed lane and shoulder widths. This information is necessary to calculate "M". The information in Table 11 includes the curve location; the existing and proposed radius; the existing and proposed distance from the center line of the inside lane to the sight obstruction (M); the existing, proposed and required stopping sight distance (S); the existing and proposed calculated speed ($V_{(calc)}$); the existing and proposed posted speed; and the cost to upgrade to the required design value.

Table 11
Sample Horizontal Curve Stopping Sight Distance Table

Location	Radius (Exist/ Prop) (meters)	M (Exist/ Prop) (meters)	S (Exist/ Prop) (meters)	S (min re-quired)* (meters)	V(calc) (Exist/ Prop) (mph)	Posted Speed (Exist/ Prop) (mph)	Cost to Upgrade ($1000)
MP 14.0 to 14.04 SB (Sta.22+530.8 to 22+591.8)	360	3.6/ 3.6	101.6/ 101.6	131.2	41/41	50/50	150
MP 14.04 to 14.08 SB (Sta.22+597.9 to 22+655.8)	600	2.7/ 2.7	113.7/ 113.7	131.2	43/43	50/50	100

***** This table is based on a design speed of 90 km/h.

To determine the existing and proposed horizontal curve S, use the following formula:

$$S = 2(2RM-M^2)^{½}$$

The minimum required S is from the appropriate design standard. A design exception request is not necessary if the proposed S is equal to or greater than the minimum required S. Use Attachment 8 to determine V (calc), given the existing and proposed S.

Impacts

For each CSDE, compare all of the impacts caused by constructing to the required design value to the impacts caused by the proposed design value. Avoid vague terms such as “extensive,” “considerably” and “adversely.” Otherwise, elaboration is necessary. The following is an example of elaborating on a vague term:

> Providing the required design value for stopping sight distance on the vertical curve would require extensive regrading. The tangent sections between vertical curves are short. To lengthen the vertical curves, the grades on the immediate bridge approaches would have to be changed from 7.0% to 5.0%.

Sometimes, in providing a CSDE to the required design value may cause:

- another controlling design element to become substandard
- social impacts

- environmental impacts.

If appropriate, include these in the discussion. Use tables or charts to supplement and summarize the impacts presented. However, tables and charts should not be used exclusively to present the impacts of constructing to the required design value. Table 12 is a sample table comparing the proposed impacts and those impacts necessary to meet required design values.

Table 12

Sample Table on Impacts

	Proposed	Total to Meet Required Design Values	Additional to Meet Required Design Values
Length of Roadway Reconstruction South Branch Road Clawson Avenue	 360 m 45 m	 570 m 120 m	 210 m 75 m
Maximum Height of Fill	3 m	5.4 m	2.4 m
Total Amount of Fill	10,700 m^3	43,575 m^3	32,575 m^3
Total Cost Estimate	$1,500,000.00	$3,100,000.00	$1,600,000.00

Cost Estimate

Provide a cost estimate for constructing to the required design value at each location that a CSDE occurs. Compare the cost estimate to the total project cost, and state the resultant percentage increase in the project cost. This comparison brings into perspective the feasibility of constructing to the required design value. Include in each cost estimate a breakdown showing the construction, right of way and utility costs. Also, state if the cost estimate includes maintenance and protection of traffic costs.

Accident Analysis

The design exception request shall use the accident analysis in the Project Fact Sheet provided by the Bureau of Traffic Signal and Safety Engineering. The analysis should include an overall accident history summary, including the overall rate, the statewide average accident rate for highways of similar cross-section, and the accident detail report printout. Refer to the accident analysis when discussing each CSDE.

Safety Measures

When a CSDE cannot be upgraded to the required design value, additional safety measures should be incorporated into the project. Discuss how each safety measure improves the CSDE. Safety measures do not have to be expensive. See Table 13 for examples of low cost safety measures.

Table 13

Low Cost Safety Measures

Controlling Substandard Design Element	Safety Measures
Lane and shoulder width	• Pavement edge lines • Raised pavement markers • Post delineators
Bridge width	• Traffic control devices • Approach guiderail • Hazard and pavement markings
Radius and superelevation	• Traffic control devices • Shoulder widening • Flatten side slopes • Pavement antiskid treatment • Obstacle removal or shielding
Stopping sight distance (horizontal and vertical)	• Traffic control devices • Fixed hazard removal • Shoulder widening • Highway lighting (sag curves)

Attachment 9 contains more detailed tables which show accident types along with probable causes, studies to be performed to determine probable cause and possible safety measures. Designers can also use this table to conduct a safety analysis in the scoping stages of a project.

3.8.3 Controlling Substandard Design Elements

This section provides guidance and insight for preparing design exception requests for each CSDE's.

Cross Slope

In addition to what was stated in Design Exception Criteria, two separate studies pursued in 1970 found that pavement cross slope is the most important design element concerning wet weather accidents. A proper pavement cross slope will allow water to drain from the roadway during wet weather and thus reduce the chance of an accident caused by hydroplaning.

Cross Slope on Existing Structures

For bridge decks, it is not always technically possible to modify the existing cross slope to meet the required design value. The maximum thickness of a Latex Modified Concrete Overlay on a bridge deck is usually limited to 50 millimeters. Since the minimum overlay thickness is 32 millimeters, only cross slope modifications which result in an increase of less than 19 millimeters can be accommodated on this type of bridge deck rehabilitation. An increase of 19

millimeters equates to an increase in cross slope of ½ percent, based on a 3.6 meter wide lane. Therefore, it is possible to meet required design values on a two lane structure, where the existing pavement cross slope is one percent.

It is standard procedure to check existing structural members for their load carrying capacity when work, including overlays on the bridge deck, is required. When changing the existing cross slope to required design values, there is a possibility that existing structural members will be overloaded.

Major reconstruction or replacement of a bridge deck, which would include supports, may be required structurally to accommodate changes in cross slope. For many structure projects, particularly bridge deck rehabilitation, this is prohibitively expensive and beyond the project scope.

The decision to upgrade a bridge deck cross slope will be made on a case by case basis and should be based on the project scope, the ability of the structure to accommodate additional dead load, the cost to strengthen the structure to accommodate the increase in loading, and an accident analysis.

Safety Measures

If the decision is made to request a design exception, include safety measures such as "Slippery When Wet" signs and transverse pavement grooving. State how the chosen safety measures will help reduce the severity and frequency of accidents.

Lane Width

The location and description of substandard lane widths shall include the station, milepost and direction, existing lane width, proposed lane width, and the required design value for lane width.

Wider lanes reduce the potential for accidents more than wider shoulders. Therefore, adequate lane widths should be provided before consideration is given to widening shoulders. Existing shoulder widths may be reduced to provide wider lanes except in those locations where parked car accidents are higher than the statewide average.

Accident Indicators

The accidents associated with substandard lane widths are head on, parked vehicle, sideswipe and fixed object accidents.

Safety Measures

Safety measures for substandard lanes include, but are not limited to, pavement edge lines, raised pavement markers, post delineators, removing fixed objects (utility poles, trees, etc.), eliminating steep slopes and providing guiderail where appropriate. State how the chosen safety measures will help reduce the severity and frequency of accidents.

Shoulder Width

The location and description of substandard shoulder widths shall include the station, milepost and direction, existing shoulder width, proposed shoulder width, and the required design value for shoulder width.

Substandard shoulder width on a structure requires a design exception request. If the proposed shoulders on a structure are substandard in width, but are consistent with the roadway approach shoulders, state so.

Accident Indicators

Examples of indicator accidents associated with substandard shoulders are head on collisions involving a vehicle while passing a right turning vehicle; rear end accidents; struck parked vehicle accidents; same direction accidents involving a turning vehicle; and fixed object accidents occurring on the right side of the road with respect to the direction of traffic.

Safety Measures

Safety measures for substandard shoulders include, but are not limited to, pavement edge lines, raised pavement markers, post delineators, removing fixed objects (utility poles trees, etc.), eliminating steep slopes and providing guiderail where appropriate. State how the chosen safety measures will help reduce the severity and frequency of accidents.

Minimum Radius (mainline and interchange ramps)

Driver Expectation

Roadway uniformity has a direct effect on driver expectation. A sharp curve immediately following an extended stretch of straight highway will experience more accidents than a similar curve situated within a generally winding section.

Safe Speed

The designer should seriously consider reconstruction of a horizontal curve (radius), when the safe speed of the existing curve is below the posted speed (assuming improved superelevation cannot increase the safe speed to that of the posted speed). Refer to the safe speed formulas identified earlier.

Safety Measures

If reconstruction of a horizontal curve is not feasible, less costly safety measures should be implemented. Such measures include widening lanes, widening and paving shoulders, superelevation, flattening steep sideslopes, removing or relocating roadside obstacles, marking no-passing zones, installing traffic control devices, raised pavement markings, and delineator posts. State how the chosen safety measures will help reduce the severity and frequency of accidents.

The following is a sample discussion of safety measures:

The tendency to run off the road on the outside of curves has been well established. It is clear that roadside conditions can substantially influence accident severity and, quite possibly, accident frequency. Therefore, guiderail has been installed because of steep slopes, and trees 150 millimeters or more in diameter have been removed along the outside edge of the curve. Also, the curve has been superelevated to improve pavement surface drainage and to help reduce the number of wet weather accidents.

Grades (maximum and minimum)

Provide the existing grade, proposed grade and the required design value. Explain the impacts that providing the required design value would cause, such as additional right of way, cut and fill slopes, and drainage. Grades less than the required minimum design value could be justified for highways in flat areas with good drainage. For short distances and low volume highways, the use of steeper than maximum grades may be acceptable.

Accident Indicators

Accidents that may occur when grades exceed the maximum design value are same direction rear-end collisions caused by sudden vehicle deceleration or slow trucks. Wet weather accidents may be caused by inadequate drainage on below minimum grades.

Safety Measures

Safety measures for greater than maximum grades are warning signs, advisory speed limits, and truck lanes. For below minimum grades, regrading of the border area and additional positive drainage (for example, inlets, pipes and swales) should be considered. State how the chosen safety measures will reduce the severity and frequency of accidents.

Horizontal Curve Stopping Sight Distance

A sample Horizontal Curve Stopping Sight Distance Table was previously shown in Table 11. Attachment 8 shows V (calc) given the stopping sight distance (S) in open road conditions. State the cause of the restricted sight distance, for example longitudinal barrier, a retaining wall or bridge approach will slope. Explain the impacts that would result from providing the required design value.

Accident Indicators

Accidents that may indicate substandard horizontal curve sight distance are same direction rear-end, head-on, right angle and left turn accidents.

Safety Measures

Safety measures that should be considered are shoulder widening and improved highway lighting. State how the chosen safety measures will reduce the severity and frequency of accidents.

Vertical Curve Stopping Sight Distance (and two-way left-turn lanes)

A sample Vertical Curve Stopping Sight Distance Table was previously shown in Table 10. Attachment 8 shows the V (calc) given the stopping sight distance (S) in open road conditions.

Graphical Measurement

Sometimes the profile has to be checked graphically to determine if a vertical curve less than the required length meets the required design value for stopping sight distance. These cases involve adjacent crest and sag vertical curves with little or no intervening tangent. The substandard stopping sight distance may be minimized or eliminated with minor adjustments to the sag curve, or providing highway lighting on the sag curve.

Impacts

List all impacts caused by the proposed design, and a design that would provide the required design value for stopping sight distance, such as: utility relocation, right of way acquisition, paving of side streets, resetting signal standards, installing new loop detectors, reconstructing curb, sidewalk, driveways, and concrete islands, resetting inlets and various other appurtenances, and structural work.

If providing the required design value for stopping sight distance would involve lengthening the vertical curve, explain the slope and drainage impacts to adjacent properties. Also, include the following statement: “Lengthening the vertical curve to provide the required design value for stopping sight distance would require raising (or lowering) the roadway elevation a maximum of ___ millimeters.”

Accident Indicators

a. Sag Vertical Curves
   Indicator accidents for sag vertical curves are nighttime same direction accidents or wet weather same direction accidents.

b. Crest Vertical Curves
   Indicator accidents for crest vertical curves are same direction accidents or angle accidents.

Accident Analysis

When analyzing the crest vertical curve indicator accidents, the location of these accidents in relation to the curve is important. A higher frequency of same direction or angle accidents must prevail just after the crest vertical curve for the accidents to be considered CSDE related.

Safety Measures

Improving the stopping sight distance on vertical curves can sometimes be easily accomplished by milling or resurfacing. Otherwise, reconstruction is required.

a. Sag Vertical Curve
   If lighting is or will be provided at a substandard sag vertical curve, state that lighting the curve will compensate for the substandard sight distance illuminated by vehicle headlights alone.

b. Crest Vertical Curve

A crest vertical curve improvement does little to reduce user cost, compared to reconstruction of a horizontal curve. Reconstruction of a crest vertical curve has to be justified on the basis of safety. The designer should examine the nature of roadway elements hidden by a crest vertical curve, such as an intersection, a sharp horizontal curve or a narrow bridge. Also check the location of the roadway element(s) in relation to the portion of the highway where sight distance falls below the required design value. The roadway element may lend itself to relocation or improvement. If, after evaluation, reconstruction of a crest vertical curve is ruled out, provide safety measures. State how the chosen safety measures will help reduce the severity and frequency of accidents.

If intersections, traffic signals, interchanges, deceleration or acceleration lanes exist in the vicinity of a crest vertical curve, indicate that advance signing is or will be provided, what type of signing, and where the signing is or will be located (what direction).

Intersection Sight Distance

Provide the existing, proposed and required design value for intersection sight distance. State the cause for the substandard intersection sight distance. Describe the impacts of providing the required design value.

Accident Indicators

Accidents related to substandard intersection sight distance are right angle and left turn accidents.

Safety Measures

Safety measures include left turn slots, stop and yield signs, turning prohibitions, reducing speed limits, advance warning signs and removal of parking (if allowed). If a MUTCD warrant is satisfied, consider installing a traffic signal. For existing signalized intersections, consider phasing/timing changes and increased amber/all red phases. State how the chosen safety measures will reduce the severity and frequency of accidents.

Superelevation

Safe Speed

The required curve data to be included in a design exception request is shown in Table 9. The most important item in the table is the safe speed [V (safe)]. Safe speed is an accepted limit at which riding discomfort due to centrifugal force is evident to the driver. The safe speed of a horizontal curve in miles per hour, given the radius and cross slope, can be calculated by using the following formulas or by interpolating the graph in Figure 3. Both graph and formulas are based on a Ball Bank indicator reading of 10 degrees.

[V £ 50 mph]

$$V = \frac{-0.015R + ((.015R)^2 + 4R(15E + 2.85))^{1/2}}{2}$$

[V > 50 mph]

$$V = \frac{-0.03R + ((.03R)^2 + 4R(15E + 3.6))^{1/2}}{2}$$

Note: Use when radius is in feet, E=e/100

[V £ 50 mph]

$$V = \frac{-0.0492R + ((0.0492R)^2 + 13.1R(15E + 2.85))^{1/2}}{2}$$

[V > 50 mph]

$$V = \frac{-0.0984R + ((0.0984R)^2 + 13.1R(15E + 3.6))^{1/2}}{2}$$

Note: Use when radius is in meters, E=e/100

The Ball Bank indicator has been used by the Department as a uniform measure, for the point of discomfort, to determine the safe speed on a curve. The safe speed based on the proposed superelevation should be equal to or greater than the posted speed. If the safe speed is less than the posted speed, include the following sentence in the design exception body: **when paving is completed, and before the roadway is opened to traffic, the curve(s) shall be Ball Banked and appropriate advisory speeds posted where needed**. The Resident Engineer shall request this action through the Bureau of Traffic Signal and Safety Engineering.

Accident Indicators

Accident indicators generally associated with substandard superelevation include errant vehicle accidents such as fixed object, overturned, head on and parked vehicle accidents.

Impacts

List all impacts caused by the proposed design, and a design that would provide the required design value for superelevation, such as intersections, curbs, sidewalks, drainage, structures, businesses, residences any impacts to barrier curb. State why the chosen superelevation rate is the highest practical superelevation rate possible.

Figure 3

Safe Speed for Horizontal Curves

Auxiliary Lane Length (interchange only)

Provide the existing, proposed and required design value for the length of the acceleration or deceleration lane. Explain why a substandard design value was chosen. Describe the impacts of providing the required design value, such as additional right of way, new retaining walls, bridge work, and utility relocations.

Accident Indicators

Accidents related to substandard auxiliary lane lengths are same direction, sideswipe, and merging traffic rear-end accidents.

Safety Measures

Additional pavement markings, advance warning and advisory speed signs, delineators and highway lighting help to mitigate the impacts of substandard auxiliary lanes. State how the chosen safety measures will reduce the severity and frequency of accidents.

Through-Lane Drop Transition Length

Provide the existing, proposed and required design value for the through-lane drop transition length. Explain why a substandard design value as chosen. Describe the impacts or providing the required design value, such as additional right of way, slopes, physical obstructions, and utility relocations.

Accident Indicators

Accidents related to a substandard through-lane drop transition length are same direction, sideswipe and merging traffic rear-end accidents and, on undivided highways, head-on accidents.

Safety Measures

Safety measures to consider include pavement widening, additional pavement markings and signing, delineators, highway lighting and, on undivided highways, elimination of passing zones. State how the chosen safety measures will reduce the severity and frequency of accidents.

Bridge Width

When the required design value for clear bridge width cannot be provided on a structure, a design exception will be needed. AASHTO provides the required clear bridge widths for new and reconstructed bridges. In the design exception, state the existing, proposed and required design value for clear bridge width, and the width of the approach lanes.

Accident Analysis

A study by Daniel S. Turner indicated that the most important variables in predicting bridge accidents were: bridge relative width (clear bridge width minus width of approach roadway),

average daily traffic volume and approach roadway width. In this study, a probability table was developed to predict accidents, as shown in Table 14. The table was based on data gathered from two-lane, two-way traffic structures on rural roads. Knowing the approach roadway width and bridge relative width, the table shows the expected collision rate.

Facts that may aid in the accident evaluation for a two lane bridge are:

- Increasing the difference between the width of the bridge and the width of the approach lanes from 0 to 1.2 meters will decrease bridge accidents by about 40 percent, with the first 0.3 meter of widening accounting for nearly one-third of this reduction.

- The incremental safety gains of widening bridges decrease as clear bridge width increases (i.e. the first 0.3 meter of bridge width beyond the travel lanes has three times the effect on accident rates as the tenth 0.3 meter).

Also, no evidence exists to suggest a relationship between the severity of constriction at bridges and the severity of bridge related accidents.

Factors other than clear bridge width, such as bridge length and type (e.g. deck versus truss), presence or absence of curb, approach alignment, pavement surface condition, and premature icing in winter may also affect the accident rate at bridges.

TABLE 14
PROBABILITY OF BRIDGE ACCIDENT PER MILLION VEHICULAR PASSAGES

Bridge Relative Width, in Meters	Approach Roadway Width, in Meters							
	4.8-5.4	5.5-6.0	6.1-6.6	6.7-7.2	7.3-7.8	7.9-8.4	8.5-9.0	Over 9.0
Over 1.8 Narrower	1.200	0.767	0.436	0.135	0.060	0.030	0.200	0.163
1.3-1.8 Narrower	1.200	1.171	0.757	0.686	0.604	0.533	0.472	0.150
0.7-1.2 Narrower	1.194	0.476	0.490	0.503	0.500	0.400	0.300	0.140
0.0-0.6 Narrower	0.611	0.649	0.553	0.695	0.479	0.500	0.400	0.130
0.0-0.6 Wider	0.344	0.496	0.330	0.529	0.319	0.497	0.677	0.120
0.7-1.2 Wider	0.641	0.319	0.319	0.308	0.477	0.448	0.420	0.105
1.3-1.8 Wider	0.217	0.200	0.193	0.256	0.224	0.176	0.128	0.080
1.9-2.4 Wider	0.254	0.170	0.234	0.061	0.162	0.113	0.064	0.056
2.5-3.0 Wider	0.165	0.000	0.170	0.145	0.333	0.331	0.200	0.120
3.1-4.2 Wider	0.140	0.123	0.120	0.083	0.148	0.171	0.068	0.176
Over 4.2 Wider	0.113	0.110	0.066	0.090	0.098	0.102	0.299	0.248

Adapted from: D.S. Turner "Prediction of Bridge Accident Rates", Journal of Transportation Engineering, Vol. 110, No 1, American Society of Civil Engineers, NY January, 1984.

Safety Measures

There are various safety measures for substandard bridge widths which include, but are not limited to, installing guiderail at bridge approaches, new or rehabilitated bridge rails, and warning signs.

It is vitally important to have proper guiderail attachments to structures, especially at the bridge approaches. Also, nighttime bridge accidents are more likely to occur than daytime accidents. Therefore, provide the proper lighting or delineation, especially on bridges 20% or more narrower than the approach. State how the chosen safety measures will help reduce the severity and frequency of accidents.

Structural Capacity

As noted in Table 7, Note 3, there are no exceptions to the minimum live load design criteria.

Vertical Clearance

Resurfacing and Restoration Project

In all cases, a design exception request is necessary for substandard vertical clearance. For Resurfacing and Restoration projects where there is no fixed object (bridge) accident history, a Programmatic Design Exception described in the Project Fact Sheet is sufficient.

Impacts

The description of a substandard vertical clearance shall include the structure number and milepost. Also provide the existing and proposed minimum vertical clearance and the required design value for vertical clearance. Compare the structure's substandard vertical clearance to any adjacent structure's vertical clearance before the next logical exit, that will not be altered by the project. A listing of structures by route, structure number and vertical clearance can be obtained from the Bureau of Maintenance Engineering and Operations. Existing vertical clearance can also be found on a structure's Structural Inventory and Appraisal (SI&A) sheet, Item 54. SI&A sheets are available from the Bureau of Structural Evaluation.

Discuss the design alternatives considered which would provide the required minimum vertical clearance, such as milling, jacking or bridge reconstruction. If the alternatives were found infeasible, provide reasons why. Also, discuss the existing and proposed roadway profile as it relates to vertical clearance.

Accident Analysis

Discuss whether the bridge has been hit by high vehicle loads. Use the accident analysis performed by the Bureau of Traffic Operations and Safety Programs, and inspect the site for any physical evidence.

Safety Measures

Cite safety measures proposed at or on the structure such as advance warning signs, improved delineation and markings. State how the chosen safety measures will help reduce the severity and frequency of accidents.

Memorandum of Concurrence

A separate Memorandum of Concurrence from the Manager, Structural Engineering shall be obtained and attached to the Design Exception.

Interstate

Every effort should be made to provide 4.9 meters vertical clearance on the “26,000 Mile Priority Network” (a subset of the Interstate System - refer to Attachment 10). Design exception requests for less than 4.9 meters vertical clearance on the Priority Network must be coordinated with the Military Traffic Management Command (MTMC) by the FHWA. This will add to the design exception approval time. Therefore, it is important that the design exception request be submitted as soon as possible. For all Interstate highways, the FHWA will not approve a design exception request for vertical clearance less than 4.42 meters.

Defense Route (Non-Interstate)

The NJDOT Bridges and Structures Design Manual specifies a greater vertical clearance design value for non-Interstate Department of Defense (DOD) routes. To determine if a structure is on a DOD route, see Item 100 on the structure’s SI&A sheet.

Consulting Firm Statement

If the design exception was prepared by a consulting firm, include the following statement after the first sentence of the routing memorandum: This design exception was prepared by (consulting firm's name).

Number of Final Copies

Attach two copies to the design exception when only State approval is required. Design exceptions that require FHWA approval should have the original and three copies. Circulate the design exception for signature. The approved original design exception is forwarded to Configuration Management, except for design exception requests that require FHWA approval. Then the FHWA retains the approved original design exception, with a copy to Configuration Management.

Routing of FHWA Additional Information Request

Once the FHWA receives the design exception, the FHWA may request additional supportive information. The Project Manager shall provide the additional supportive information directly to the FHWA, with a copy to all signatories. This is only if the design exception is not altered. If the FHWA requires revisions to the final design exception, then the revised design exception must be circulated for signature.

3.8.4 Design Exception Format

The design exception is comprised of three parts: opening paragraph, each CSDE, and recommendation.

A letter format is used when requesting FHWA approval of a design exception on an Interstate or Major/Unusual project[2] (refer to Figure 4). The memorandum format is used when requesting State approval of a design exception on all other projects (refer to Figure 5). See Attachment 11 for a sample design exception.

A Department routing memorandum shall cover the entire Design Exception package and shall be submitted by the Project Manager to the Director of Design Services and include a recommendation signature by the Program Manager and a Concurrence signature by the Manager, Civil Engineering.

Standard Opening Paragraph

Figures 4 and 5 illustrate the opening paragraphs requesting FHWA and State approval of a design exception, respectively.

Controlling Substandard Design Elements (CSDEs)

Each existing and proposed CSDE are described as discussed in the Controlling Substandard Design Element Section, with each CSDE located by station and milepost.

Recommendation

The recommendation is comprised of a positive statement paragraph, an approval request paragraph, a complimentary closing, a signature line (letter format only), and approval line.

[2]FHWA approval of a Major/Unusual design exception is necessary only when Federal Funds are involved in the design or construction of a project.

FIGURE 4

Do not date

(name)
Division Administrator
Federal Highway Administration
840 Bear Tavern Road
Suite 310
West Trenton, NJ 08628

Attention: **(name of District Engineer)**

Re: DESIGN EXCEPTION
Route , Section/Contract Number
Town(ship), City or Borough
County
Milepost Limits
Project Category
Federal Project Number
NJDOT Job Number

Dear **(name)**:

The Federal-Aid Policy Guide, Transmittal 1, Section 625.3, indicates that a design exception may be granted for projects which do not conform to required design values where conditions warrant.

Approval of the design exception is requested to the following controlling design elements contained in the (List only those references that apply: NJDOT Design Manual Roadway; NJDOT Design Manual Bridges and Structures; AASHTO publication, A Policy on Geometric Design of Highways and Streets (Year); AASHTO publication, A Policy on Design Standards Interstate System (Year)); based on the warranting conditions described herein:

- List the CSDEs for which a Design Exception is being requested.

Please refer to the attached Project Fact Sheet for the project description and accident analysis.

- Discuss each CSDE here.

Based on the warranting conditions presented (the existing and proposed geometry and surface conditions, additional costs, accident analysis and safety measures), it is recommended that the design exception be approved for (list the CSDEs).

Sincerely,

(name)
Director, Division of Design Services

FHWA Approval By:

_____ _____

(name) Date
Division Administrator

FIGURE 5

NEW JERSEY DEPARTMENT OF TRANSPORTATION

MEMORANDUM

To: **(name)**
Director, Division of Design Services

From: **(name)**
Project Manager

Date:

Phone:

RE: DESIGN EXCEPTION
Route , Section/Contract Number
Town(ship), City or Borough
County
Milepost Limits
Project Category
NJDOT Job Number
Federal Project Number (if applicable)

Approval of the design exception is requested to the following controlling design elements contained in the (list only those references that apply: NJDOT Design Manual Roadway; NJDOT Design Manual Bridges and Structures; AASHTO publication, A Policy on Geometric Design of Highways and Streets (Year)) based on the warranting conditions described herein:

- List the controlling design elements for which a Design Exception is being requested.

Please refer to the attached Project Fact Sheet for the project description and accident analysis.

- Discuss each CSDE here.

Based on the warranting conditions presented (the existing and proposed geometry and surface conditions, additional costs, accident analysis and safety measures), it is recommended that the design exception be approved for (list the CSDEs).

Approval By:

_____ _____

(name) Date
Director, Division of Design Services

3.8.5 Checklist

Before submitting the design exception request for signatures, it should be reviewed by someone unfamiliar with the project. This review is to ensure that the proper information is included in the design exception. Figure 6 is a checklist to assist the reviewer. Any comments on the design exception should be forwarded to the Department Project Manager. It is not necessary to attach the checklist to the design exception request.

FIGURE 6

Design Exception Checklist

Route No./Name: Section/Contract No.: _____

M.P. Limits: _____ to County: _____

Station Limits: _____ to Project Category.: _____

Federal Proj. No.: _____

State Project No.:_____

Controlling Substandard Design Element M.P./Station

_____ _____

_____ _____

_____ _____

_____ _____

_____

A. Standard Opening Paragraphs

The design exception conforms to Figure 6 or Figure 7 Y [ ] N [ ] I [ ]

B. Project Description

A copy of the Project Y [ ] N [ ] I [ ]

Fact Sheet is attached

C. Controlling Substandard Design Elements

Milepost Location	Y [ ]	N [ ]	I [ ]	
Station Location	Y [ ]	N [ ]	I [ ]	
Design Values:				
Existing	Y [ ]	N [ ]	I [ ]	
Proposed	Y [ ]	N [ ]	I [ ]	
Required	Y [ ]	N [ ]	I [ ]	
Table	Y [ ]	N [ ]	I [ ]	NA [ ]
Impacts:				
Impacts due to required design values	Y [ ]	N [ ]	I [ ]	
Impacts due to Proposed Scheme	Y [ ]	N [ ]	I [ ]	
Impacts Table	Y [ ]	N [ ]	I [ ]	NA [ ]
Cost Estimate:				
Constructing to required design values	Y [ ]	N [ ]	I [ ]	
Constructing to proposed scheme	Y [ ]	N [ ]	I [ ]	
Separated costs (Con., ROW, Util.)	Y [ ]	N [ ]	I [ ]	
Percent increase in project cost due to required design values	Y [ ]	N [ ]	I [ ]	
Accident Analysis:				
Summary of Accident Analysis included in Body	Y [ ]	N [ ]	I [ ]	
Safety Measures	Y [ ]	N [ ]	I [ ]	

D. Recommendation

Positive statement in favor of the controlling substandard design elements	Y [ ]	N [ ]	I [ ]	
Standard Closing Paragraphs	Y [ ]	N [ ]	I [ ]	

Miscellaneous

Memo of Concurrence from Manager, Structural Engineering	Y [ ]	N [ ]	I [ ]	
Routing Memorandum	Y [ ]	N [ ]	I [ ]	
Plans or sketches attached	Y [ ]	N [ ]	I [ ]	

(Y): Included (N): Not Included (I): Incomplete/Incorrect (NA): Not Applicable

Comments

Attachment 8 - Conversion Chart from S to V (Calc)

CONVERSION CHART FROM S TO V (CALC)

S		Vcalc	S		Vcalc	S		Vcalc
meters	feet	mph	meters	feet	mph	meters	feet	mph
45	147	25	100	329	41	179	588	57
48	157	26	105	345	42	187	613	58
51	167	27	110	361	43	190	623	59
54	177	28	115	376	44	193	634	60
57	187	29	117	383	45	199	652	61
60	196	30	122	399	46	204	670	62
63	207	31	127	416	47	210	688	63
66	218	32	132	432	48	215	706	64
69	228	33	136	447	49	221	724	65
73	238	34	141	461	50	228	747	66
76	248	35	147	481	51	235	770	67
81	267	36	153	502	52	242	794	68
85	279	37	157	514	53	249	817	69
88	290	38	160	526	54	256	840	70
92	302	39	164	538	55			
95	313	40	172	563	56			

Note: Divide S by two to determine V (calc) for a crest vertical curve on a two-way left-turn lane.

Attachment 9 - Intersection and Link Accidents

Type of Accident - Left Turn Head On Collision	
Probable Cause	1) Restricted sight distance due to presence of left turning traffic on the opposite approach and improper channelization and geometrics. 2) Too short amber phase. 3) Absence of special left turning phase when needed. 4) Excessive speed on approaches.
Study to be Performed	1) Review existing intersection channelization. 2) Volume count for thru traffic. 3) Perform volume count for left turning traffic. 4) Review signal phasing. 5) Review intersection clearance times. 6) Study need for special left turn phase. 7) Study capacity of the intersection approaches in question for possible multi-phase operation. 8) Perform spot speed study.
Possible Safety Measures	1) Provide adequate channelization. 2) Install traffic signal if warranted by MUTCD. 3) Provide left turn slots. 4) Install stop signs if warranted by MUTCD. 5) Increase amber phase. 6) Provide special phase for left turning traffic. 7) Widen road. 8) Prohibit left turns (study possible adverse effects on other nearby intersections). 9) Reduce speed limit on approaches if justified by spot speed study. 10) Remove left turn traffic. 11) Provide all red phase.

Type of Accident - Rear End Collisions At Unsignalized Intersections	
Probable Cause	1) Improper channelization. 2) High volume of turning vehicles. 3) Slippery surface. 4) Lack of adequate gaps due to high traffic volume from the opposite direction. 5) Inadequate intersection warning signs. 6) Crossing pedestrians. 7) Excessive speed on approaches. 8) Inadequate roadway lighting.
Study to be Performed	1) Review existing channelization. 2) Review pedestrian signing and crosswalk marking. 3) Perform turning count. 4) Perform volume count for thru traffic. 5) Check skid resistance. 6) Perform spot speed study. 7) Check for adequate drainage. 8) Check roadway illumination.
Possible Safety Measures	1) Create right or left turn lanes. 2) Increase curb radii. 3) Prohibit turns (study possible adverse effects on other nearby locations). 4) Provide "Slippery When Wet" signs (interim measure only). 5) Increase skid resistance. 6) Improve drainage. 7) Install or improve signing and marking of pedestrian crosswalks. 8) Reduce speed limit on approaches if justified by spot speed study. 9) Provide advance intersection warning signs. 10) Improve roadway lighting.

INTERSECTION ACCIDENTS

Type of Accident - Rear End Collisions At Signalized Intersections	

Type of Accident - Rear End Collisions At Signalized Intersections	
Probable Cause	1) Improper signal timing. 2) Poor visibility of signal indicator. 3) Crossing pedestrians. 4) High volume of turning vehicles. 5) Slippery surface. 6) Excessive speed on approaches. 7) Inadequate roadway lighting. 8) Inadequate channelization.
Study to be Performed	1) Review existing channelization. 2) Review pedestrian signing and crosswalk markings. 3) Perform turning count. 4) Perform spot speed study. 5) Check skid resistance. 6) Check for adequate drainage. 7) Check visibility of traffic signals. 8) Check roadway illumination. 9) Review intersection clearance time.
Possible Safety Measures	1) Create right or left turn lanes. 2) Increase curb radii. 3) Prohibit turns (study possible adverse effects on other nearby locations). 4) Increase skid resistance. 5) Provide adequate drainage. 6) Provide "Slippery When Wet" signs (interim measure only). 7) Install advance intersection warning signs. 8) Install or improve signing and marking of pedestrian crosswalks. 9) Provide pedestrian walk - don't walk indicators. 10) Increase amber phase. 11) Provide special phase for left turning traffic. 12) Provide proper signalized progression. 13) Reduce speed limit on approaches. 14) Install backplates, larger lens, louvers, visors, etc. on traffic signal to improve contrast and visibility. 15) Relocate signals. 16) Add additional signal heads. 17) Improve roadway lighting.

INTERSECTION ACCIDENTS

Type of Accident - Pedestrian - Vehicle Collision	

Type of Accident - Pedestrian - Vehicle Collision	
Probable Cause	1) Inadequate pavement markings. 2) Inadequate channelization. 3) Improper signal phasing. 4) Restricted sight distance. 5) Inadequate pedestrian signals. 6) Inadequate roadway lighting. 7) Inadequate gaps at unsignalized intersection. 8) Excessive vehicle speed.
Study to be Performed	1) Field observation for sight obstructions. 2) Pedestrian volume count. 3) Review channelization. 4) Check roadway illumination. 5) Review pavement markings. 6) Review signal phasing. 7) Perform gap studies. 8) Perform spot speed study.
Possible Safety Measures	1) Install pedestrian crosswalks and signs. 2) Install pedestrian barriers. 3) Prohibit curb parking near crosswalks. 4) Install traffic signal if warranted by MUTCD. 5) Install pedestrian walk - don't walk signals. 6) Increase timing of pedestrian phase. 7) Improve roadway lighting. 8) Prohibit vehicle turning movements. 9) Remove sight obstructions. 10) Reroute pedestrian paths. 11) Reduce speed limits on approaches if justified by spot speed studies. 12) Use crossing guards at school crossing areas.

INTERSECTION ACCIDENTS

Type of Accident - Right Angle Collisions At Signalized Intersections

Type of Accident - Right Angle Collisions At Signalized Intersections	
Probable Cause	1) Restricted sight distance. 2) Inadequate roadway lighting. 3) Inadequate advance intersection warning signs. 4) Poor visibility of signal indication. 5) Excessive speed on approaches.
Study to be Performed	1) Volume count on all approaches. 2) Field observations for sight obstructions. 3) Review signal timing. 4) Check roadway illumination. 5) Perform spot speed study.
Possible Safety Measures	1) Remove obstructions to sight distance. 2) Increase amber phase. 3) Provide all red phase. 4) Retime signals. 5) Prohibit curb parking. 6) Install advance intersection warning signs. 7) Install backplates, larger lens, louvers, visors, etc., on traffic signal to improve contrast and visibility. 8) Install additional signal heads. 9) Reduce speed limit on approaches if justified by spot speed studies. 10) Provide proper signalized progression. 11) Improve location of signal heads.

INTERSECTION ACCIDENTS

Type of Accident - Right Angle Collisions At Unsignalized Intersections	

Type of Accident - Right Angle Collisions At Unsignalized Intersections	
Probable Cause	1) Restricted sight distance. 2) Inadequate roadway lighting. 3) Inadequate intersection warning signs. 4) Inadequate traffic control devices. 5) Excessive speed on approaches.
Study to be Performed	1) Volume count on all approaches. 2) Field observations for sight obstructions. 3) Check roadway illumination. 4) Perform spot speed study. 5) Review signing.
Possible Safety Measures	1) Remove obstructions to sight distance. 2) Prohibit parking near corners. 3) Improve roadway illumination. 4) Install yield or stop signs if MUTCD warrants are met. 5) Install traffic signal if MUTCD warrants are met. 6) Install advance intersection warning signs. 7) Reduce speed limits on approaches if justified by spot speed studies.

INTERSECTION ACCIDENTS

Type of Accident - Sideswipe Collisions

Type of Accident - Sideswipe Collisions	
Probable Cause	1) Inadequate pavement markings. 2) Inadequate channelization. 3) Inadequate signing. 4) Narrow traffic lanes. 5) Improper street alignment.
Study to be Performed	1) Review pavement markings. 2) Review channelization. 3) Review sign placement. 4) Review lane width. 5) Check alignment.
Possible Safety Measures	1) Provide wider lanes. 2) Install acceleration and deceleration lanes. 3) Place direction and lane change signs to give proper advance warning. 4) Install or refurbish centerlines, lane lines and pavement edge lines. 5) Provide turning lanes. 6) Provide proper alignment.

LINK ACCIDENTS

Type of Accident - Off-Road Accidents	
Probable Cause	1) Inadequate signing and delineators. 2) Inadequate pavement marking. 3) Inadequate roadway lighting. 4) Slippery surface. 5) Improper channelization. 6) Inadequate shoulders. 7) Inadequate pavement maintenance. 8) Inadequate superelevation. 9) Severe curve. 10) Severe grade.
Study to be Performed	1) Review signs and placement. 2) Review pavement marking. 3) Check roadway illumination. 4) Check skid resistance. 5) Review channelization. 6) Check roadside shoulders and road maintenance. 7) Check superelevation. 8) Check for adequate drainage. 9) Perform spot speed studies.
Possible Safety Measures	1) Install proper center line, lane lines, and pavement edge markings. 2) Increase skid resistance. 3) Improve roadway lighting. 4) Install warning signs to give proper advance warning and advisory speed limit. 5) Install roadside delineators, guiderails and redirecting barriers. 6) Perform necessary road surface repairs. 7) Improve superelevation at curves. 8) Reduce speed limit if justified by spot speed studies. 9) Upgrade roadway shoulders. 10) Provide "Slippery When Wet" signs (interim measure only). 11) Provide adequate drainage. 12) Flatten curve. 13) Provide proper superelevation.

LINK ACCIDENTS

Type of Accident - Head-on Collisions	

Type of Accident - Head-on Collisions	
Probable Cause	1) Restricted sight distance. 2) Inadequate pavement markings. 3) Inadequate signing. 4) Narrow lanes. 5) Inadequate shoulders and/or maintenance. 6) Inadequate road maintenance. 7) Excessive vehicle speed. 8) Severe curve. 9) Severe grade.
Study to be Performed	1) Review lane width. 2) Review pavement markings. 3) Review signing. 4) Check road shoulders where present. 5) Check road for proper maintenance. 6) Perform spot speed study. 7) Field check for sight obstructions.
Possible Safety Measures	1) Provide wider lanes. 2) Provide pennant signs. 3) Install no passing zones at points with restricted sight distances. 4) Install center lines, lane lines and pavement edge markings. 5) Improve roadside shoulders. 6) Perform necessary road surface repairs. 7) Reduce speed limits if justified by spot speed studies. 8) Remove obstructions to sight distances. 9) Flatten curve. 10) Provide proper superelevation.

LINK ACCIDENTS

Type of Accident - Pedestrian - Vehicle Collisions

Type of Accident - Pedestrian - Vehicle Collisions	
Probable Cause	1) Restricted sight distance. 2) Inadequate roadway lighting. 3) Excessive vehicle speed. 4) Pedestrian walking on roadway. 5) Inadequate signing. 6) Sidewalks too close to roadway. 7) Improper pedestrian crossing.
Study to be Performed	1) Check sight distances. 2) Check roadway illumination. 3) Review existence of sidewalks. 4) Review warning signs and placement. 5) Perform spot speed study.
Possible Safety Measures	1) Improve sight distance. 2) Prohibit curb side parking. 3) Improve roadway lighting. 4) Install sidewalks. 5) Install proper warning signs. 6) Reduce speed limit if justified by spot speed studies. 7) Install pedestrian barriers. 8) Move sidewalks further from roadway. 9) Enforcement.

LINK ACCIDENTS

Type of Accident - Railroad Crossing Accidents

Type of Accident - Railroad Crossing Accidents	
Probable Cause	1) Inadequate signing, signals or gates. 2) Inadequate roadway lighting. 3) Restricted sight distance. 4) Inadequate pavement markings. 5) Rough crossing surfaces. 6) Improper traffic signal pre-emption timing. 7) Improper pre-emption timing of railroad signals or gates.
Study to be Performed	1) Review signing, signals and gates. 2) Check roadway illumination. 3) Review pavement markings. 4) Review sight distance.
Possible Safety Measures	1) Install advance warning signs. 2) Install proper pavement markings. 3) Install proper roadway lighting on both sides of tracks. 4) Install automatic flashers and gates. 5) Improve sight distance. 6) Install stop signs. 7) Rebuild crossing. 8) Retime traffic signals. 9) Retime railroad signals and gates.

LINK ACCIDENTS

Type of Accident - Parked Car Accidents

Type of Accident - Parked Car Accidents	
Probable Cause	1) Improper pavement markings. 2) Improper parking clearance at driveways. 3) Angle parking. 4) Excessive vehicle speed. 5) Improper parking. 6) Illegal parking.
Study to be Performed	1) Review pavement markings. 2) Review parking clearance from curb. 3) Review angle parking if it exists. 4) Perform spot speed studies. 5) Law observance study.
Possible Safety Measures	1) Convert angle parking to parallel parking. 2) Paint parking stall limits 2.1 m from curb face. 3) Post parking restrictions near driveways. 4) Prohibit parking. 5) Create off-street parking. 6) Reduce speed limit if justified by spot speed studies. 7) Widen lanes. 8) Enforcement.

LINK ACCIDENTS

Type of Accident - Fixed Objects	
Probable Cause	1) Obstructions in or too close to roadway. 2) Inadequate channelization. 3) Inadequate roadway lighting. 4) Inadequate pavement marking. 5) Inadequate signs, delineators and guiderails. 6) Improper superelevation. 7) Slippery surface. 8) Excessive vehicle speed. 9) Severe curve. 10) Severe grade.
Study to be Performed	1) Review pavement markings, signs and delineators. 2) Review channelization. 3) Field observation to locate obstructions. 4) Check illumination. 5) Check superelevation. 6) Check for adequate drainage. 7) Perform spot speed studies.
Possible Safety Measures	1) Remove or relocate objects. 2) Improve roadway lighting. 3) Install reflectorized pavement lines. 4) Install reflectorized paint and/or reflectors on the obstruction. 5) Install crash cushioning devices. 6) Install guiderails or redirecting barriers. 7) Install appropriate warning signs and delineators. 8) Improve superelevation at curves. 9) Improve skid resistance. 10) Provide adequate drainage. 11) Provide "Slippery When Wet" signs (interim measure only). 12) Reduce speed limit if justified by spot speed studies. 13) Provide wider lanes. 14) Flatten curve. 15) Provide proper superelevation.

LINK ACCIDENTS

Type of Accident - Sideswipe Collisions	

Type of Accident - Sideswipe Collisions	
Probable Cause	1) Inadequate pavement markings. 2) Inadequate channelization. 3) Inadequate signing. 4) Narrow traffic lanes. 5) Improper road maintenance. 6) Inadequate roadside barriers 7) Excessive vehicle speed.
Study to be Performed	1) Review pavement markings. 2) Review channelization. 3) Review sign placement. 4) Review lane width. 5) Check roadside shoulders. 6) Check road surface for proper maintenance. 7) Perform spot speed studies.
Possible Safety Measures	1) Provide wider lanes. 2) Install acceleration and deceleration lanes. 3) Place direction and lane change signs to give proper advance warning. 4) Install or refurbish centerlines, lane lines and pavement edge lines. 5) Perform necessary road surface repairs. 6) Improve shoulders. 7) Remove constrictions such as parked vehicles. 8) Install median divider. 9) Reduce speed limit if justified by spot speed study.

Attachment 10 - 26,000 Mile Priority Network

26,000 MILE PRIORITY NETWORK
(Subset of the Interstate System)

New Jersey 4.9 m Clearance Routes

✎	I-78	PA State Line to I-287
✎	I-80	PA State Line to I-287
✎	I-287	NY State Line to I-95 (NJ Turnpike)

Attachment 11 - Sample Design Exception

(date)

(name)
Division Administrator
Federal Highway Administration
840 Bear Tavern Road
Suite 310
West Trenton, NJ 08628

Attention **(name)**: District Engineer

Re: DESIGN EXCEPTION
Route 42, Section 13P
Route 76, Section 3L
Route 295, Section 10L
Bellmawr Borough
Camden County
Route 42 Milepost 14.20 to 14.28
Route 76 Milepost 0.00 to 0.06
Route 295 Milepost 26.73 to 27.02
Project Category: Interstate 3R
Federal Project Number: NH-295-2(95)26
NJDOT Job Number: 0417504

Dear **(name)**:

The Federal-Aid Policy Guide, Transmittal 1, Section 625.3, indicates that a design exception may be granted for projects which do not conform to required design values where conditions warrant.

Approval of the design exception is requested to the following controlling design elements contained in the AASHTO publication, A Policy on Design Standards - Interstate System (July 1991), for Routes 76 and 295, and the NJDOT Design Manual Roadway for Route 42, based on the warranting conditions described herein:

1. Substandard Left Shoulder

a. Route 42, Northbound Local Roadway
MP 14.20 to MP 14.28

b. Route 76, Northbound Express and Local Roadways
MP 0.00 to MP 0.06

c. Route 295, Northbound Express and Local Roadways
MP 26.83 to MP 27.02

d. Route 76, Southbound Express and Local Roadways
MP 0.00 to MP 0.06

e. Route 295, Southbound Express and Local Roadways
MP 26.74 to MP 27.02

2. Substandard Right Shoulder

a. Route 42, Northbound Express Roadway
MP 14.20 to MP 14.28

b. Route 76, Northbound Express Roadway
MP 0.00 to MP 0.05

c. Route 295, Northbound Express Roadway
MP 26.83 to MP 27.02

3. Substandard Right Shoulder (Vicinity of Browning Road Overpass)

a. Route 295, Northbound Local Roadway
MP 26.88 to MP 27.00

b. Route 76, Southbound Local Roadway
MP 0.00 to M 0.05

c. Route 295, Southbound Local Roadway
MP 26.98 to MP 27.02

The locations in item 3 are presented separately from item 2 to emphasize the proximity of the Browning Road overpass.

4. Substandard Vertical Clearance

a. Route 295, All Roadways
MP 26.98

5. Substandard Cross Slopes

a. Route 76, All Roadways
MP 0.00 to MP 0.06

b. Route 295, Northbound Express and Local Roadways
MP 26.94 to MP 27.02

c. Route 295, Southbound Express and Local Roadways
MP 26.98 to MP 27.02

6. Substandard Superelevation

a. Route 42 Northbound
MP 14.20 to MP 14.28

b. Route 295 Northbound

MP 26.83 to MP 26.94

c. Route 295 Southbound
MP 26.73 to MP 26.81

The locations in Item 6 are presented by direction because the northbound and southbound alignments are bifurcated.

Appendix A shows the mileposts within the project limits to facilitate field identification of each controlling substandard design element (CSDE). Please refer to the attached Project Fact Sheet for the project description and accident analysis.

CONTROLLING SUBSTANDARD DESIGN ELEMENTS (CSDEs)

1. Substandard Left Shoulder

Substandard left shoulders exists at the following locations:

Location		Existing Width (meters)	Proposed Width (meters)	Required Width (meters)
Route 42, Northbound Local Roadway MP 14.20 to MP 14.28 (Sta. 22+852.7 to 22+977.1)		0	0	1.2
Route 76, Northbound Express and Local Roadways				
MP 0.00 to MP 0.06	Express	0	0	1.2
(Sta. 0+000.0 to 0+096.6)	Local	0	0	3.0
Route 295, Northbound Express and Local Roadways				
MP 26.83 to MP 27.02	Express	0	0	1.2
(Sta. 43+178.7 to 43+490.5)	Local	0	0	3.0
Route 76, Southbound Express and Local Roadways				
MP 0.00 to MP 0.06	Express	0	0	1.2
(Sta. 0+000.0 to MP 0+096.6)	Local	0	0	3.0
Route 295, Southbound Express and Local Roadways				
MP 26.74 to MP 27.02	Express	0	0	1.2
(Sta. 0+096.6 to MP 0+545.6)	Local	0	0	3.0

Providing the required design values for left shoulders would require the reconstruction of Routes 42, 76 and 295. The existing highway is typically a cut section with a curb-to-curb

width of 63 meters. The additional width required for left shoulders is 8.5 meters. Reconstructing the highway would require additional right of way and/or retaining walls. The interchange of Routes 42 and 295 would require realignment and regrading. Replacement of the Browning Road overpass would be necessary. Browning Road crosses over Route 295 within the project limits (MP 26.98, Structure 0427-158). The existing horizontal clearance is 56 meters, which is insufficient to accommodate the addition of left shoulders. (The right shoulders are dropped at the overpass.) The cost estimate to replace the overpass is:

$5,786,900	Construction
$527,600	Utilities
$75,500	Maintenance of Traffic
$6,390,000	TOTAL

The above does not include the cost for right of way or construction of the left shoulders. The total construction cost of the project as proposed is $1,000,000. Replacement of the Browning Road overpass would increase the project cost to $7,390,000, an increase of 639%.

Indicator accidents related to this CSDE are fixed object (median) and head-on accidents. For the three year period, there were no indicator accidents for northbound Routes 42, 76 and 295. There were 10 fixed object (median) accidents for southbound Routes 76 and 295. These accidents are presented by direction because of the separation of travel directions by a barrier curb. The 10 fixed (median) accidents represent 9.3% of the total of 118 accidents on this section. The fixed object (median) accidents are over represented when compared with statewide fixed object (median) accidents (9.3% vs. 5.2% statewide). The fixed object accidents (all types) for this section account for 50.9% of this section's accidents. Statewide fixed object accidents (all types) make up 25.6% of total accidents.

From these percentages it can be concluded that statewide, approximately one out of every five fixed object accident involves a median hit. On this section of Routes 42, 76 and 295, it appears that fixed object (median) accidents are occurring at the same rate (1 out of 5). In review of the fixed object (median) accidents, it was revealed that all occurred under wet surface conditions. In our opinion, the high wet surface accident percentage is the condition having the greatest effect on the overall accident frequency, the percentage of total fixed object accidents, and the percentage of fixed object (median) accidents on this southbound section. The lack of left shoulder appears not to be a major contributing factor. See the attached Project Fact Sheet for the Bureau of Traffic Signal and Safety Engineering accident analysis.

Since the fixed object being hit is a concrete median, it is not possible to remove the fixed object. Safety measures included in this project that reduce CSDE related and wet surface accidents are resurfacing, 100 mm wide long-life pavement edge lines, and raised pavement markers. Also, there is existing highway lighting throughout the project.

2. Substandard Right Shoulder

Substandard right shoulder conditions exist at the following locations:

Location	Existing Width (meters)	Proposed Width (meters)	Required Width (meters)
Route 42, Northbound Express Roadway MP 14.20 to MP 14.28 (Sta. 22+852.7 to MP 22+977.1)	0	0	3.0
Route 76, Northbound Express Roadway MP 0.00 to MP 0.05 (Sta. 0+000.0 to 0+079.9)	2.4 to 3.0	1.5 to 3.0	3.6
Route 295, Northbound Express Roadway MP 26.83 to MP 27.02 (Sta. 43+178.7 to 43+490.5)	0 to 2.4	0 to 1.5	3.6

The proposed shoulder widths vary from the existing shoulder widths due to the proposed lengthening of a lane drop taper from 90 meters to 235 meters. The pavement width utilized by the longer lane drop taper reduces the pavement width available for the shoulder.

Providing the required design values for right shoulders would require the shifting of the northbound Routes 42, 76 and 295 local roadway 3.0 to 3.6 meters to the east. The existing highway is typically in a cut section. Shifting the northbound local roadway would require additional right of way and/or retaining walls and extensive slope regrading. Replacement of the Browning Road overpass would be necessary. Browning Road crosses over Route 295 within the project limits (MP 26.98, Structure No. 0427-158). The existing paved highway section and horizontal clearance at the overpass is 56 meters, which therefore cannot accommodate the addition of a 3.6 meters wide right shoulder. The cost estimate to replace the overpass is:

$5,786,900	Construction
$527,600	Utilities
$75,500	Maintenance of Traffic
$6,390,000	TOTAL

The above does not include the cost for right of way or construction of the right shoulder. The total construction cost of the project proposed is $1,000,000. Replacement of the Browning Road overpass would increase the project cost to $7,390,000, an increase of 639%.

Indicator accidents related to this CSDE are fixed objects (non-median), struck parked vehicle and overturned accidents. For the three year period, there were 16 indicator accidents on this section. There were 12 fixed object (non-median) accidents, 3 struck parked vehicle accidents, and 1 overturned accident. These accidents represent 17.1%, 4.3% and 1.4% of the total of 70 accidents on this section, respectively.

Struck parked vehicle accidents is the only indicator accident category over represented (4.8% vs. 4.0% statewide). In our opinion, the accident frequency is too low to be considered a result of the CSDE, as opposed to random occurrence. See the attached Project Fact Sheet for the Bureau of Traffic Signal and Safety Engineering accident analysis.

Safety measures included in this project that reduce CSDE related accidents are 100 millimeters wide long-life pavement edge lines and raised pavement markers. Also, there is existing highway lighting throughout the project.

3. Substandard Right Shoulder (Vicinity of Browning Road Overpass)

Substandard right shoulder conditions exist in the vicinity of the Browning Road overpass at the following locations:

Location	Existing Width (meters)	Proposed Width (meters)	Required Width (meters)
Route 295, Northbound Local Roadway MP 26.88 to MP 27.00 (Sta. 43+259.2 to 43+449.7)	0 to 3.6	0 to 3.6	3.6
Route 76, Southbound Local Roadway MP 0.00 to MP 0.05 (Sta. 0+000.0 to 0+073.2)	0.3 to 2.4	0.3 to 2.4	3.6
Route 295, Southbound Local Roadway MP 26.98 to MP 27.02 (Sta. 43+420.1 to 43+488.1)	0 to 3.6	0 to 3.6	3.6

Providing the required design values for right shoulders would require the replacement of the Browning Road overpass. Browning Road crosses over Route 295 within the project limits (MP 26.98, Structure No. 0427-158). The existing shoulders taper to a 0 meters width on either side of the overpass. The existing highway section width at the Browning Road overpass equals the horizontal clearance of the overpass, which is 56 meters. Therefore, the existing overpass cannot accommodate the addition of 3.6 meters wide right shoulders. The cost estimate to replace the overpass is:

$5,786,900	Construction
$527,600	Utilities
$75,500	Maintenance of Traffic
$6,390,000	TOTAL

The above does not include the cost for right of way or construction of the right shoulder. The total construction cost of the project proposed is $1,000,000. Replacement of the Browning Road overpass would increase the project cost to $7,390,000, an increase of 639%.

Indicator accidents related to this CSDE are fixed objects (non-median), struck parked vehicle and rear end accidents. For the three year period, 5 fixed object (non-median) and 1 rear end accident occurred northbound while 22 fixed object (non-median) and 1 struck parked vehicle accident occurred southbound. These accidents are represented by direction because of the separation of travel directions by a barrier curb.

Fixed object (non-median) accidents at both locations and rear end accidents northbound are the accident categories that are over represented (29.4% and 40.0% vs. 20.5% statewide and 5.9% vs. 2.0% statewide). The one struck parked vehicle accident represents 1.8% of the total accidents in the southbound direction, which is below the statewide average of 2.1%. Based on the fact that 27 of the 29 indicator accidents occurred on a wet surface, we believe that the wet surface condition is the major contributing factor to these accidents, not the CSDE. A copy of the Bureau of Traffic Signal and Safety Engineering accident analysis is included in the attached Project Fact Sheet.

Safety measures include 100 mm wide long-life pavement edge lines and “railrider” delineators mounted on the guiderail that exists on both sides of the Browning Road overpass abutments. Also there is existing highway lighting throughout the project.

4. Substandard Vertical Clearance

Substandard vertical clearance exists at the following location:

Location	Vertical Clearance (meters)		
	Existing Clearance	Proposed Clearance	Required Clearance
Route 295, All Roadways MP 26.88 (Sta. 43+259.1)	4.47	4.42	4.88

The structure at this location is Browning Road over Route 295. The 50 mm reduction of the vertical clearance results from resurfacing Route 295 with only 50 mm of bituminous pavement. This is less than the typical resurfacing thickness of 100 mm. Approval to reduce

the resurfacing thickness in the vicinity of the Browning road overpass from 100 mm to 50 mm has been obtained from Geotechnical Engineering. Permission to provide only 4.42 meters vertical clearance has been obtained from the Bureau of Structural Engineering.

Providing the required design value for vertical clearance and allowing for the recommended 100 mm resurfacing thickness would require jacking the overpass 0.5 meters. Consequently, 140 meters of Browning Road would require reconstruction. The cost estimate to jack the overpass and reconstruct Browning Road is:

$335,000	Construction
$32,000	Utilities
$18,000	Maintenance of Traffic
$385,000	TOTAL

The above does not include the cost for right of way. The total construction cost of the project as proposed is $1,000,000. Jacking the overpass and reconstructing Browning Road would increase the project cost to $1,385,000, an increase of 39%.

The possibility of lowering the profile of Route 295 was also investigated. It was determined that the location and elevations of the footings for the Browning Road overpass make is infeasible to lower the highway profile sufficiently to obtain a vertical clearance of 4.9 meters.

Indicator accidents for this CSDE are fixed object (bridge) accidents. There were no indicator accidents for the three year period analyzed.

The available vertical clearance will be posted as a safety countermeasure.

5. Substandard Cross Slopes

Substandard cross slopes exist at the following location:

Location	Cross Slopes		
	Existing Min.	Proposed Min.	Required Min.
Route 76, All Roadways MP 00.00 to MP 0.06 (Sta. 0+000.0 to 0+110.3)	1%	1%	1.5%
Route 295, Northbound Express and Local Roadway MP 26.94 to MP 27.02 (Sta. 43+355.7 to 43+480.1)	1%	1%	1.5%
Route 295, Southbound Express and Local Roadway MP 26.98 to MP 27.02 (Sta. 43+420.1 to 43+480.5)	1%	1%	1.5%

The above locations are all in the immediate vicinity of the Browning Road overpass. Table 1 summarizes the possible options and their impacts.

It is acknowledged that the table is contingent upon FHWA approval of the design exception for CSDE #4, substandard vertical clearance. Permission to provide only 4.42 meters vertical clearance has been obtained from the Bureau of Structural Engineering.

As can be seen from Table 1, options 1 through 4 are either unacceptable or infeasible. Therefore it is proposed to proceed with option number 5.

Wet surface accidents is the indicator used for this CSDE. For the three year period, 25 wet surface accidents occurred northbound and 68 wet surface accidents occurred southbound. These accidents are presented by direction because of the separation of travel directions by a barrier curb. The 25 northbound accidents represent 43.1% of the 58 total accidents in that direction; the 68 southbound accidents represent 81.0% of the 84 total accidents in that direction.

Wet surface accidents on both sections are over represented (43.1% and 81.0% vs. 23.6% statewide). Low skid numbers on both sections appear to be a major contributing factor to the accident frequency (southbound - 31.4 and 25.3 and northbound - 26.2 and 25.4 vs. recommended SN_{40} of 37.0 at 50 mph for the year 1988). A cursory review of hard copy accident reports was inconclusive. Not enough detail was given as to standing water, puddling or sheeting being the cause for these wet surface accidents to determine if cross slope or lack of skid resistance was the contributing factor. A copy of the Bureau of Traffic Signal and Safety Engineering accident analysis is included in the attached Project Fact Sheet.

The primary safety measure will be the resurfacing of the highway, which will improve the skid resistance.

Table

6. Substandard Superelevation

Substandard superelevation exists at the following locations:

Location	Radius (Exist. & Prop.)	^{e}max (Exist. & Prop.)	^{e}max Req'd.	V (Safe) Exist. & Prop. (mph)	V Safe Req'd. (mph)	Posted Speed (mph)	Cost to Upgrade
Route 42, Northbound MP 14.20 to MP 14.25 (Sta. 22+852.7 to 23+190.7)	900	1.5%	5.1%	71	77	55	$375,000
Route 42, Northbound MP 14.25 to MP 14.28 (Sta. 22+933.2 to 22+994.2)	1000	1.5%	4.8%	72	78	55	$280,000
Route 295, Northbound MP 26.83 to MP 26.94 (Sta. 43+178.7 to 43+368.6)	1000	1.5%	4.8%	72	78	55	$450,000
Route 295, Southbound MP 26.73 to MP 26.81 (Sta. 43+017.8 to 43+158.0)	700	1.5%	5.7%	65	72	55	$825,000

In the above table, the required design value for "e" is based on an "e" maximum of 6% at a design speed of 110 km/h, and the required "V (safe)" is based on the required "e".

Providing the required design values for superelevation would require an extensive increase in bituminous tonnage, reconstruction of the highway drainage system, a retaining wall, all new barrier curb, the raising of 4 sign structures, and extending the project limits. The cost estimate to provide the required design values for superelevation is:

$1,737,000	Construction
$193,000	Maintenance of Traffic
$1,930,000	TOTAL

The estimated cost for utilities is minimal and no right of way would be required. The total cost estimate of the project as proposed is $1,000,000. Providing the required design values for superelevation would increase the project cost to $2,930,000, an increase of 193%.

Indicator accidents for this CSDE are different for right curves and left curves. The indicators for right curves are fixed object (median) and overturned accidents, and the indicators for left curves are fixed object (non-median), struck parked vehicle and overturned accidents.

Curve #1 (Route 42 Northbound MP 14.19 to 14.25) is a left curve. For the three year period there was 1 fixed object (non-median) accident. This one accident represents 16.7% of the total of 6 accidents on this curve. This percentage is less than the statewide average (20.5%),

so the accident is not over represented. In our opinion, the accident frequency is too low to be considered a result of the CSDE, as opposed to random occurrence.

Curve #2 is a right curve connecting route 42 Northbound (MP 14.25 to 14.28) to Route 295 Northbound (MP 26.83 to 26.94). For the three year period there were no indictor accidents.

Curve #3 (Route 295 Southbound MP 26.73 to 26.81) is a left curve. For the three year period there were 2 fixed object (non-median) accidents. This represents 28.6% of the total of 7 accidents on this curve. This percentage is greater than the statewide average (20.5%), so these accidents are over represented. In our opinion, 2 accidents in 3 years is too low a frequency to be considered a result of the CSDE, as opposed to random occurrence.

The primary safety measures will be the resurfacing of the highway, which will improve the skid resistance, 100 mm wide long-life pavement striping and raised pavement markers. Also, there is existing highway lighting throughout the project. It should be noted that the proposed safe speeds for the curves are greater than the 110 km/h design speed except for one curve which will have a safe speed of 65 mph. The posted speed is 55 mph.

RECOMMENDATION

The purpose of this project is to preserve the functional integrity of the existing pavement, extend the pavement left, improve skid resistance and improve rideability. Many of the accidents within the project limits are herein correlated with the condition of the existing pavement, particularly wet surface accidents. Resurfacing the highway is the most effective method of addressing the most common accidents on this highway.

Based on the warranting conditions presented (the existing and proposed geometry and surface conditions, additional costs, accident analysis and safety measures), it is recommended that the design exception be approved for the controlling substandard design elements left shoulders, right shoulders, vertical clearance, cross slopes and super-elevation. Approval of this exception for these controlling design elements is requested.

Sincerely,

_____ _____

(name) Date
Director, Division of Design Services _____

FHWA Approval By:

_____ _____

(name) Date
Division Administrator

APPENDIX A

Straight Line Diagrams

Insert Straight Line Diagram Sample here

Insert Straight Line Diagram Sample #2 here