Connecticut Department of Transportation

Design/Constructability

Plan Review Guidelines

Original March 1998
Revised May 2011

An acknowledgement

This rewrite is based on an original document authored by District Engineer, Joseph DeMarco, P.E., District 3 Construction. It was first implemented in March of 1998 and continued for thirteen years (13) to be the baseline for all District Plan Reviews until this revision.

In addition, this rewrite would not exist without the hard work of all the men and women who work in the District Construction Offices.

This edition is dedicated to you!

Mary K. Baier, P.E.
Transportation Supervising Engineer - Construction
Office of Construction

Constructability

The degree to which the integration of experience and knowledge in a construction process facilitates achievement of optimum balance between project goals and resource constraints.

Table of Contents

INTRODUCTION

The fundamental goal of the Office of Construction is to have consistent, quality reviews performed on all contract specifications and plans in order to facilitate administration on Department construction projects. A constructability review is an integral part of this process included into the "Team Approach" toward the overall design of a project. Quality project plans allows construction to move along most efficiently as planned and with in budget. Addressing constructability and design issues prior to contract award will mitigate the disruptions, delays, and claims that sometimes occur during construction operations.

This manual is divided into three (3) sections:

Section 1 is the plan review guidelines. Project Plans should allow the reviewer to visualize an intended scope of a project. In other words, do the plans give the reviewer a clear picture of the level of effort? This section's intent is to provide the reviewer with a method of approach.

Section 2 is compilation of the different design review checklists based on plan type. These pages may be photocopied and used when preparing comments for the Office of Engineering; electronic copies are also available on the DOTSHARE drive.

Section 3 is the appendices to this manual. Appendix A summarizes the Department's Design Review procedures. Everyone should review and be aware of these procedures prior to performing a Plan Review. Coordination is encouraged between the District Construction Office, District Maintenance, District Permits, and District Surveys that plans are available for review and comment. All applicable comments should be included in the comment list from District Construction to the Office of Engineering.

Section 1: PLAN REVIEW GUIDELINES

The District Construction Offices are required to perform reviews of the preliminary plans and specifications during the development of all construction projects. The following is the recommended process for conducting plan reviews:

- A Transportation Engineer 3 (Project Engineer) should be conducting the plan reviews, preferable the Project Engineer potentially assigned to the project during the construction phase. The Transportation Engineer 2 (Chief Inspector) may assist or take full responsibility for the plan review.
- It is suggested the plans, specifications, and any other applicable material be made available to District Maintenance and Surveys for their review and comment.
- The Office of Engineering normally provides a minimum of two (2) weeks for plan reviews. Additional time may be granted on a case by case basis by contacting the Transportation Engineer 3 in the Design Office.
- After all the reviews from the various units are compiled the Transportation Engineer 3 shall draft a memorandum from the Assistant District Engineer to the Principal Engineer of Design transmitting all the constructability comments. (Appendix B for a copy of the memorandum).
- District shall be responsible for tracking the design reviews from the District level. (See Appendix C for a sample tracking spread sheet).

I. REVIEW OF THE CONTRACT SPECIFICATIONS AND SPECIAL PROVISIONS

Even though contract specifications and item special provisions sometimes arrive late in the design phase, not until 60% design, it is recommended to review these documents preferable before plan review or in conjunction. As sometime special notes appear in these documents and not within the body of the contract plans, in a dispute resolution, these documents will take precedence over contract plans.

Special provisions will include project specific general conditions, modification to the current standard specifications, project specific contract items, supplemental specifications, required contract provisions, and standard specifications for specialty work.

The first suggested step is to review the Contract's General Conditions. A general condition is one that is spelled out in the Department Standard Specifications, if the contract alters a general conditions then a special provision needs to be incorporated into the contract. This alerts the Contractor and construction staff that there is an anticipated special condition to adhere to.

The following lists general conditions that are normally seen in the contract:

A. *Contract Time*:
   a. If a project runs through the winter period (December through March) it must be addressed.
   b. If a project needs special closures for a roadway, waterway, railroad, these needs should be addressed by contract special provision.

B. *Liquidated Damages*:
   a. Each contract must contain language regarding liquidated damages for exceeding contract time.
   b. If there are lane closures associated with limited access highways, liquidated damages for interfering with traffic outside allowable hours should also be addressed for each direction, each lane, ramp, etc.
   c. Damages associated with exceeded allowable roadway, waterway, and railroad closures, should also be addressed.
   d. More and more contracts are incorporating milestones into the contract language. If milestones are introduced, liquidated damages should also be indicated.

C. *Incentive/Disincentive*: The contract may implement an incentive or disincentive to entice a contractor to fast track certain contract work.

D. *Scope of Work*: When a Scope of Work is provided, it should be reviewed for description of work against contract plans.

E. *Control of Materials*: All materials requiring material certification should be listed in the contract documents.

F. *Prosecution and Progress*: The section "Start of Work", "Prosecution", "Limits of Operations", "Stage Construction", "Contract Time", and other special conditions the contractor must adhered to. Any and all changes to the Standard Specifications must be addressed. The contract must also include any parameters that affect the potential allowable method of the Contractor to construct a project. For example:
   a. Early Start Date
   b. Allowable hours that traffic can not be impeded, including but not limited to holidays, special events, local fairs, etc.
   c. Allowable bridge, waterway, roadway closures, will it affect businesses, schools, public transportation, emergency vehicles, etc?
   d. Environmental restrictions: noise, wetlands, streams.
   e. Staged Construction: anticipated or assumed time restrictions must be clearly indicated.
   f. Allowable detours

It is important to read each condition carefully and comment on any unclear issue. A few changes in wording can avoid a potential claim during the construction process.

Any and all special provisions and permits must be included with the contract documents. Railroads, DEP, Coast Guard, Army Corps, and some towns may require certain conditions that should be addressed with in the body of a contract.

G. *Special Provisions or "A" Items*: A reviewer should carefully read all special provisions against field conditions and contract plans to ensure all necessary information is included and there are no ambiguities. The intent of the specs is to be clear and concise.

a. Description: This section depicts all aspects of the work intended under the item, along with the purpose of the item. Check for missing information.

b. Materials: All materials required under the item must be listed along with the proper material specification reference. Some material for proprietary or specialty items require a source reference. Special testing or manufacturing requirements should also be listed.

c. Design Requirements (if Contractor design is warranted): It is extremely important all necessary requirements are listed under the following section:

i. Construction Methods:

1. All required submittals to the Department (i.e., shop drawings, catalog cuts, working drawings, calculations, etc.) Note: it may make reference to the standard specifications section covering these types of submittals.
2. All required submittals to outside agencies (i.e. MNRR, Amtrak, CTDEP, USCG, etc.)
3. Verification of field measurements (must be specific)
4. Special licensing requirements, P.E., L.S., C. I. H., etc.
5. A complete listing of all methodology allowed including all restrictions and special quality requirements.
6. Any special equipment requirements, for example a structure may have a load restriction.
7. Weather and preparation requirements.
8. Any other requirements that would allow the Contractor full picture of what is necessary for bidding purposes, with out ambiguity.

d. Method of Measurement: It is very important this section clearly identifies the method of measurement for how an item is paid under the contract.

e. Basis of Payment: This section must list all work associated with the item of work under the unit price. The reviewer should note requirements that are on the plans associated with the work or field conditions that necessitate additional costs not anticipated under the contract documents. Contract items that overlap responsibility should always be clarified and avoid multiple item payments under one specification.

II: REVIEW OF THE PLANS

A copy of the design report should be provided as part of the review process. It is important to confirm the following assumptions were considered:

- Site Access
- Traffic Management
- Water Handling
- Specialized Equipment/Construction Methods
- Subsurface Conditions

Some of the most common discrepancies are as follows:

A. Work shown on the plans with no obvious method of payment

All work shown on plans should be addressed in a contract item. However, it may be the operation of work is considered under the general cost of the contract. If this is the case, a note must appear on the plans directing the Contractor to this fact. It is important that the reviewer note any items that do not appear on the detailed estimate sheet.

Plans may also include general clauses that define certain character of work, for these operations defined as:
"…as directed by the Engineer."
"…performed by others…"
"…as conditions warrant…"
Should only be used when parameters are well defined so the Contractor has a reasonable effort to predict the work involved so he may appropriately bid the operation.
It is extremely important to make sure any design responsibilities are NOT shifted from the Department to the Contractor inadvertently. These types of situations have a greater probability of generating a claim during the construction project.

B. Incomplete Scope of Work

The plan should include all necessary information to construct the project. It is imperative the reviewer make comments on information or details that may be missing.
For Example:

- Missing details such as structures, drainage, roadway typical, specialty items (Gross Particle Separators).
- Missing sheets, staging cross sections, plantings, staging, detours, and areas of environmental concern.
- Missing layout or construction staking information. For example: Are working or control points provided on either side of a structure?
- Missing design layout for temporary supports, structures, utility supports. The Department should provide this information; it is always the Contractor's prerogative to submit an alternate procedure for review and comment.
- Obvious work based on the reviewers experience and field review. For example: relocation of stone walls, temporary support for staged construction, etc.
- Missing easements or additional right of way necessary to perform the work. Special attention should be given to work adjacent to property lines, was consideration given for excavation or toe of slope, that cemetery?

C. Lump Sum Items Missing from the Detailed Estimate Sheet

This sheet should be reviewed for items such as Construction Staking, Mobilization, Maintenance and Protection of Traffic, Trafficmen, Water Pollution Control, Project Coordinator.

D. General Errors

The information provided by a contract plan should be accurate and the most current information possible. The following areas should be reviewed:

- Dimensions, stationing, offsets, etc.
- Pavement Type thickness
- Layout and control points
- Cross sections, do they depict accurate field conditions, rock cuts, etc.
- Stage Construction Plans: lane widths, cross sections, drainage (including temporary), signage, signals, highway illumination, earth excavation & borrow (have quantities been balanced?).
- Temporary Under bridge Illumination

E. Utility Relocation Work

If the plans show utility relocation is necessary in order to complete the work, especially on bridges, a comprehensive review of the work compared with staging requirements should be detailed. Non-compensable time delays associated with utility relocations make up twenty-five (25%) percent of the time overruns on projects. It is important to note private service relocations should flagged as they require coordination between the Contractor and Utility Company usually during off hours (nights, weekends).

F. Quantities shown on the Detailed Estimate Sheet

The reviewer should perform spot checks of item quantities, especially what may be considered major items according to the preliminary engineer's estimate. Item quantities should be considered reasonable.

Token items should be scrutinized for need and quantities screened for potential of quantity overrun.

III. FIELD REVIEW:

You have finished reviewing the contract documents and plans; you have your notes of what to check in the field, you reviewed the location on-line. Now what? You go out to the site! Your job now is to compare the contract plans to the field conditions. One of the first orders of business is to stand, drive, and visualize how all the construction operations will take place. Is there any new buildings, driveways, utilities, roadway repairs, business signs, ornamental lighting, brick pavers, etc? If a project was put on hold, also known as a bin project, these are real questions to ask yourself as you stand on a street corner or highway.

A. Constructability

The Engineer should look for constructability issues; these may include the following examples:

- Will the Contractor have sufficient access to all phases of the work?
- Are there staging areas?
- Do the plans call for "positive protection"? Temporary barriers, cones, etc.
- Is there enough room to sequence all stages?
- Will a detour be required?
- Any roadway excavations require sheeting?
- Should temporary access roads be constructed?
- Will permits be required for construction (Army Corps, USCG, OLISP, etc.)?
- Is there railroad involvement?
- Have borings or test pits been performed? Do they provide adequate information?
- Any utility conflicts not shown on the plans?
- Should early utility relocations take place? If so, can they take place without a contractor available?
- Do the plans provide all necessary information? (Profiles, cross sections, grading, survey, etc.)?
- On repair or rehabilitation projects are there areas not shown that should be addressed, or can they be reasonably accessed?

These are just some of the constructability issues that can be encountered during a typical field review, depending on the project type, other issues can and do exist. It is critical to go through as many issues as possible in order to adequately address major issues and have them incorporated prior to the project being advertised. The reviewer should be envisioning how the project would be constructed from a contractor's standpoint. Questions to consider may be: What are the excavation limits? How will traffic be maintained throughout the different phases of the project? Should benching be required? Is there adequate room during stages to accommodate typical construction equipment? Will there be water handling issues?

B. Maintenance and Protection of Traffic

During a field review, the Engineer should envision the traffic controls necessary to channel the anticipated traffic against what is proposed in the contract plans. Some areas to consider:

- Is there sufficient lane widths?
- Do the plans consider pedestrian access? Bicycle access?
- Are there projects nearby that could affect this project? Are there others scheduled for the area?
- Is a detour required? Should it be?
- Is temporary signalization required? Stop signs?
- Would weekend or night work be beneficial?
- Utility poles in conflict?
- Do staging plans affect driveways, side streets, etc?
- Are there schools, churches, public venues in the area? Will any public events be affected by work or coordinated with?
- Do special considerations need to be addressed (fire/police stations, bridge overpasses, railroad tracks, etc)?
- Separate survey information may have to be provided for staging sequences.

C. Environmental

This can be one of the most important, as well as, the most frustrating aspect of a constructability review. An Engineer must envision what, if any environmental issues will be encountered. Not only considering what has been touched upon on a contract plan but what could be unforeseen. This can be based on past experience, or historical land use for an area, especially if a project is set in an urban area. The Engineer should be on the look out for potential problem areas such as, closed factories, gas stations, etc.

These structures will automatically call for an environmental risk assessment by the Department.

Noise pollution can be another issue that should be addressed during the design review. The construction area should be evaluated if it occurs near residential areas, or occupied buildings. Additional measures or limits of operations should be addressed in the contract documents.

Anticipated work within wetlands, waterways, roadway construction impacting more than five (5) acres of area in a stage, working in and around railroad property require permit or agreements. These all need to be addressed in the contract documents. Environmental meetings during the design phases will soon be required for projects of a particular scope. If in question, call for one.

Regardless of the project scope, Best Management Practices is required under the Standard Specifications Form 816. Some examples are:

- Wetlands or streams not shown on the plans.
- Protection of private property from runoff.
- Are there existing storm drains to be maintained? Not shown on the plans?
- Will temporary seeding be required?
- Will there be a potential for flooding?
- Can existing materials be recycled?
- Can the existing roadway be recycled in place and reused?

Section 2: CHECKLISTS

The following checklists are a guide for the design review process (See Appendix A). Design review checklists are a "living" document, therefore, they are continuously updated. Please check the Office of Quality Assurance's website for the current check list.

A copy of the checklists used for a project plan review should be attached to the District copy for future reference. A project may go through multiple reviews by different individuals. A checklist may help a future reviewer as well as a cross check to ensure the designer has incorporated previously submitted comments.

In order to have a consistent format, all districts should use the Design Review Memorandum (See Appendix B). Be specific with plan review comments; where applicable provide plan sheet numbers, stations, or detail.

The four (4) columns represent the different design phases.

CD	Conceptual Design Phase
PD	Preliminary Design Phase
SF	Semi-Final Design Phase
FDFR	Final Design Final Review

The reviewer should make each box with a Y (yes), N (no), or N/A (not applicable). A shaded box indicates that this particular observation or question would not be addressed during a particular design phases as not enough investigation has taken place in order to answer the concern. However, it is important to remember if the District construction forces deem an issue as a major concern; it should be commented on at any time during a plan review. Reviewers are not to be constrained by the checklists. Any pertinent question or comment that should be addressed may be added to the checklist at anytime as these checklists should be project specific when used.

Reviewer:_____

Item No	CD	PD	SF	FPFR	DESCRIPTION	Notes
GN1					If plans are illegible or difficult to read, they should be revised to clarify proposed versus existing.	
GN2					Does the plan topography match existing conditions?	
GN3					Are buildings to be demolished? Have an asbestos and lead evaluation been made? Has decontamination been done? Are there provisions for pest eradication?	
GN4					On bridge replacement projects, request plans for the original bridge.	
GN5					If plans are incomplete, request full set for review once available. Roadway, bridge plans, and M & P should be reviewed together. Request a final plan review. Request and review Specifications and Special Provisions. Request and review all permits.	
GN6					Review any special items of work which will require a long lead time and see if contract time addresses it or not.	
GN7					Review the detail estimate sheets and highlight those quantities that are unusually high or low.	
GN8					Are utility durations taken into account with the overall construction schedule? Is it realistic?	
GN9						
GN10						
GN11						
Other						
OT1					Any salvageable materials? If so, is it noted? Ensure that maintenance or stores have a need for it.	
OT2					If trees are to be planted at sidewalks, ensure openings are large enough for root ball or have specifications call for planting before sidewalks are installed.	

Reviewer:_____

Item No	CD	PD	SF	FPFR	DESCRIPTION	Notes
RW1					Any subdivisions or commercial/industrial areas not indicated? Conflicts with adjacent projects, if any?	
RW2					Is there sufficient geometry, horizontal and vertical to properly locate and construct project? Are baseline ties shown? Benchmarks(2 minimum)?	
RW3					Do we need additional right-of-way to construct?	
RW4					Existing pavement conditions - Are replacements required? Condition of concrete or bituminous. Are appropriate specifications included?	
RW5					If shoulders are required to carry traffic during stage construction, are they structurally adequate or should reconstruction be required?	
RW6					Have existing overlays been taken into consideration? Check with Maintenance and/or District personnel.	
RW7					Are temporary roadways and pavements required to complete construction? If so, details are required.	
RW8					Should limits of work be staged to minimize disruption to the public?	
RW9					Are typical sections compliant with construction and design standards?	
RW10					If full depth reconstruction is being considered, what are the existing traffic volumes and speed? Speeds over 40 mph and heavy volumes require staged construction sequences.	
RW11					Is point of application of grade being changed? If so, have proper sections been developed?	
RW12					Are paving limits shown? Pavement composition? Joint sealing? Do specs address over filling joint on sealing items and cleaning and sealing joints and cracks item? Saw cutting?	
RW13					Is milling required? If so, what is roadway history? Are there any existing metal recessed pavement marking devices or were there any that were previously overlaid? Are there provisions for temporary patch (Piezometers, Tredles, etc...)? Limitations? Transitions? Mill curb to curb each shift. Macadam can NOT be milled.	
RW14					Is milling item provided to maintain minimum vertical clearances at overhead bridges?	
RW15					Proposed milling depth may be compromised if there are open longitudinal joints. Have pavement management review depth to limit delamination of lifts.	
RW16					Will existing barriers have to be relocated?	
RW17					Is temporary barrier located to allow contractor access?	
RW18					Is guide railing required? If so, are limits reasonable? If existing, can it remain?	
RW19					Will the flare recommended for a guiderail system interfere with existing field conditions?	
RW20					If staged construction, has balance of cuts and fills been done for each stage? Are temporary stockpile locations identified on the plans, if needed?	
RW21					If staged construction, does the contract item list allow the contractor to choose his temporary earth retaining system? If so, TPCBC may have to be pinned to pavement if drop offs are > 2.5' and there is less than a 4' shelf behind the barrier.	

Reviewer:_____

	CD	PD	SF	FPFR	DESCRIPTION	Notes
UT1					Have Utilities been notified of the project?	
UT2					Have Utilities reviewed the plans?	
UT3					Are existing utilities as shown on plans?	
UT4					Are any underground utilities shown/ not shown? Will they affect construction? If so, have they been addressed?	
UT5					Make sure conduits shown entering handhole will physically fit in specified handhole.	
UT6					Are the utility relocations shown as proposed by the utility (vs. plans)?	
UT7					Must utilities be moved? If so, is relocation shown?	
UT8					Are utilities to be maintained during construction? If so, are provisions in place?	
UT9					Are any substations or utility appurtenances within the construction area required to be accessed during construction? If so, have provisions been included in specs?	
UT10					Are utility agreements required? If so, are they in place and up to date?	
UT11					Are relocations extensive enough to request an early order to start for utilities?	
UT12					Will overhead utilities be in conflict with proposed construction and/or the use of construction equipment such as cranes or pile drivers? If so, should they be relocated?	
UT13					If no relocations are shown, is project constructible?	
UT14					If temporary supports indicated, is project constructible?	
UT15					Are privately owned services involved? Is there a bid item for these relocations?	
UT16					If over railroad, is casing required? Is utility to be bonded and grounded?	
UT17					Will utility work impact contaminated soil? Are provisions to perform this work in the agreement?	
UT18					Are pole relocations in conflict with proposed sidewalks?	
UT19					Are utility durations taken into account with the overall construction schedule? Is it realistic?	
UT20					Town agreements for "orphan" bridges that carry local utilities	
UT21					Is the DOT's IMS present? Is it addressed?	
UT22					If poles >45' are needed, an early material order needs to be placed. This can only be directed by the Chief Engineer.	

Reviewer:_____

Item No	CD	PD	SF	FPFR	DESCRIPTION	Notes
EV1					If next to a class A watershed who has authority (DEP, regional water, etc)?	
EV2					Are permits required?	
EV3					Are copies of the permits available for District review?	
EV4					Are there potential areas off site that could affect project work? Gas Stations, landfills, etc.	
EV5					If contamination exists on the site, have the proper type and quantity of borings and pump tests been performed?	
EV6					Is it anticipated a Health and Safety Plan is necessary?	
EV7					If contaminated soil, are there provisions for handling/treating?	
EV8					Do utility relocations affect the permit? How?	
EV9					Do the permits cover all work! Temporary and permanent?	
EV10					If on-site water treatment is required, is its permitting, location, or transportation of water on site covered by specification?	
EV11					If the work is located adjacent to a residential area or occupied building, provisions may be required to minimize the impact of noise producing activities, such as restricted work hours or temporary noise barriers.	
EV12					Is Waste Stockpile Area identified on plans? An existing paved area is preferred.	
EV13					Draft Permit Plates reviewed by District?	
EV14					Did an Environmental Meeting take place?	
EV15					Is a stormwater discharge permit required? >20 acre disturbance? In 2012 >10 acre disturbance.	
EV16					Is there sufficient room for a sedimentation basin?	

Reviewer:_____

Item No	CD	PD	SF	FPFR	DESCRIPTION	Notes
DR1					Is sheeting or shoring necessary to protect roadway? If so, an item will be required.	
DR2					Are there provisions for temporary paving (before opening the road to traffic and after installation of drainage pipe)?	
DR3					Box culverts should NOT be set level but at a minimum 1% grade.	
DR4					Box culvert installations during stage construction need extra space to ensure connection at stage limit can be accomplished without compromising previous work.	
DR5					Does contract call for handling water if a stream or river is involved? If so, is pertinent flow information shown on the plans (mean and flood)?	
DR6					Is there rock in trench? Will blasting be required or allowed?	
DR7					Are special structures required because of pipe size or number of pipes?	
DR8					Is heavy duty lock down grates specified for major arteries? Are details shown?	
DR9					Are catch basins, manholes, and utility grates installed to meet the final grade elevation? If not, and final paving will be done after the winter, ensure that sufficient item quantity for resetting catch basins and manholes (install manhole risers is preferred) is provided.	
DR10					Any pipe with a diameter 36" or greater will need an oversized catch basin; go from a standard Type C to a Type I or II.	
DR11					If structures are to be reset lower, is there sufficient room above piping to achieve?	
DR12					Are pipe collars included in contract for piping installed in stages?	
DR13					Are existing systems plugged and if so, are they to be cleaned?	
DR14					Are existing structures to remain or be reset in good shape? i.e.: frames, grates, walls.	
DR15					Are water conditions (i.e.: tidal) indicated or implied?	
DR16					If Tidal outfall, is a check valve detailed?	
DR17					Are all existing structures shown? Are they in good shape?	
DR18					Cross sections should show proposed and existing drainage.	

Reviewer:_____

Item No	CD	PD	SF	FPFR	DESCRIPTION	Notes
					General	
ST1					Are as builts of existing structures available and referenced in the specs or contract drawings?	
ST2					If temporary structures are required are design criteria provided?	
ST3					Is an index sheet included, required for multiple structure projects?	
ST4					If existing structures are nearby, are they on timber mats? This is prevalent along the shoreline.	
ST5					Is transition roadway to bridge sufficient?	
ST6					Have provisions been made to maintain navigational lighting during construction?	
ST7					If bridge is to be closed, are there enough safety barriers and protection in place? Will it still provide contractor access?	
ST8					Are existing utilities under the structure or in parapets? If so, how are they maintained throughout the contract period? Are items provided to maintain them?	
ST9					Note presence of incident management conduit or signs.	
ST10					Is all previous repair work noted on the plans or as-built?	
ST11					Can the structure(s) handle the load (3000+ tons) of the load transfer device or paving train?	
ST12					Does the lightweight concrete special provision talk about plastic weight before and after pumping?	
ST13					If stage construction, are rebar splices needed and specified how to achieve? Are temporary deck supports needed?	
ST14					For Embankment Wall, installation shall call for an "unreinforced leveling pad" of dimensions 6" X 12". Contract shall include basis of payment to include the cost of the concrete leveling pad.	
ST15					Does the contract require an erection sequence? Attention should be given to structures with curved girders or tubs, and skewed abutments for differential deflection and rotation.	
ST16					For painting projects will containment cause vertical clearance or weight issues(i.e.load restrictions)?	
ST17					Are there any railroad/Coast Guard requirements? Are they indicated and is enough contract time allowed for these constraints?	
ST18					Is minimum vertical clearance shown on the plans?	

Reviewer:_____

					Box Culverts	Notes
ST19					Box culverts should NOT be set level but at a minimum 1% grade.	
ST20					Box culvert installations during stage construction need extra space to ensure connection at stage limit can be accomplished without compromising previous work.	
ST21					For box culvert installations, the construction sequence should be from outlet to inlet.	
ST22					Box culverts should not be set level but at a minimum 1% grade.	
					Prestressed	
ST23					If structure is prestressed, are units in good condition?	
					Substructure	
ST24					Has substructure been examined for scour?	
ST25					Hydrologic data included for structures over a waterway?	
ST26					Are piers and abutments in sound condition? Are there repair details indicated? (class's'repair, partial depth patch,etc.)	
ST27					Is sufficient boring data available? Were borings taken at the proposed locations for temporary/permanent sheeting? Piles?	
ST28					Are abutment construction joint details constructible? Are they through a bearing pad or right at the face of one?	
ST29					Is a backfilling sequence needed on abutments or wing walls to prevent "overturn" condition?	
ST30					Ensure that when cofferdam and pumping is an item in the contract, structure excavation is also an item. Is underwater (tremie) concrete required?	
ST31					If cofferdam required, is size and location shown on the plans and allowed by permit?	
ST32					Is damp proofing of existing structures noted on plans?	

Reviewer:_____

					Superstructure	Notes
ST33					Are bearings to remain? If so, are they in good condition? If not, is there a suggested jacking procedure along with associated quantities? Is jacking acceptable under live load? If yes, are parameters established, can it be done off of existing diaphragms?	
ST34					Are bearing pads sound or do they display deterioration or cracking? If so, are repair procedures in place? Access available for elevated structures?	
ST35					Have all structures been evaluated for superstructure replacement vs. painting? Prestressed concrete vs. steel beams?	
ST36					Underside of deck, are map cracking, efflorescence, or chlorides visible?	
ST37					Are pop-outs evident on underside of deck? Are repair procedures in place?	
ST38					Condition of deck surface - is it overlaid? If so, type known?	
ST39					If deck is exposed, what is the condition? Are partial or full depth patches required? Are specs in place? Check removal procedures.	
ST40					If stage construction, will temporary supports be required? If so, is a support concept noted on the plans and criteria provided for existing and new structure?	
ST41					Type of joints/headers can they be constructed to eliminate "bumps"? Recommend possible solutions.	
ST42					How is wearing surface to be removed? Item provided?	
ST43					Does deck have membrane waterproofing? If so, is type known?	
ST44					If possible, new bridge decks on existing roadways should be raised to meet the new profile created by the overlay.	
ST45					Review the ratio of the flanges to webs on seismic retrofits. AISC mandates a minimum 3/8" web thickness. Even this is too thin, as with rolled sections the web will kink during fabrication.	
ST46					Review the pour sequence for a multi-span structure. Is it achievable?	
ST47					Are closure pours indicated?	
ST48					If steel bridge built on skew, ensure there is enough room at bearings to torque the bolts.	
ST49					If temporary structure mounted barrier is called for on the existing bridge, can the barrier be bolted through the deck without interfering with the beams below?	
ST50					Make sure all areas under bridge where concrete haunches are to be removed are protected and correct quantities included in haunch removal item. i.e. over parking lots, sidewalks, etc., not just over roadways.	
ST51					Are the temperature restrictions for the installation of bearings reasonable? Do the special provisions address installation outside of these tolerances?	
ST52					All fracture critical members (FCM) should be identified with requirements for fabrication.	

ST53					Will containment cause height restrictions? Waterway, roadway or railway?	Notes
ST54					Condition of paint- Adhesion and Toxicity tests must be performed. Are current containment, cleaning, and disposal specs in place? Current LHPP?	
ST55					Are painting specs current and complete? Problems noted environmental or access?	
ST56					If span is moveable, can stage construction work?	
ST57					Fire Suppression Standpipes must be no more than 30-36" off the ground with a 30 degree elbow.	
ST58					Are there provisions to maintain lighting on and under the structure? Provisions for temporary lighting?	
ST59					Are deck grades given? Are deflections for each beam shown?	

Reviewer:_____

Item No	CD	PD	SF	FPFR	DESCRIPTION	Notes
MPT1					For stage construction, are stages reasonable and constructible?	
MPT2					Load transfer devices are to be used for limited access projects with total amount of paving over 3000 tons. Can the roadway and/or structures handle the load of this piece of equipment, the paving train?	
MPT3					Alternate sequencing with potential for detours?	
MPT4					In stage construction, are necessary items in place (ie: barrier, delineators, impact attenuators)?	
MPT5					Has limitation of operations been checked? Are they the same throughout the project?	
MPT6					Will ramps have to be closed?	
MPT7					Traffic Management Plan required? If yes see TMP stand alone check list	
MPT8					Are items quantities reasonable for the M&P of T items, police (local and state)?	
MPT9					Separate plan sheets for traffic plans?	
Detour						
DT1					Determine if there are any other projects that may be in construction along the detour route.	
DT2					Determine how pedestrians will be accommodated and if a signed pedestrian detour will be required.	
DT3					Are detour agreements in place if detour uses town roads?	

Reviewer:_____

Item No	CD	PD	SF	FPFR	DESCRIPTION	Notes
TMP1					Project background	
TMP2					Project type	
TMP3					Project area/corridor	
TMP4					Project goals and constraints	
TMP5					Proposed construction phasing/staging	
TMP6					General schedule and timeline	
TMP7					Related projects	
TMP8					TMP manager listed for both Design & Construction	
TMP9					List of Stakeholders	
TMP10					Approval contact(s)	
TMP11					TMP implementation task leaders (e.g., public information liaison, incident management coordinator, etc.)	
TMP12					TMP monitors	
TMP13					Emergency contacts listing	
TMP14					Data collections and modeling approach	
TMP15					Existing roadway characteristics (history, roadway classification, number of lanes, geometrics, urban/suburban/rail)	
TMP16					Existing and historical traffic data (volumes, speed, capacity, volume to capacity ratio, percent trucks, queue length, peak traffic hours)	
TMP17					Existing traffic operations (signal timing, traffic controls)	
TMP18					Incident and crash data listed w/ sources	
TMP19					Are Local community and business concerns/issues addressed?	
TMP20					Traffic growth rates (for future construction dates)	
TMP21					Traffic predictions during construction (volume, delay, queue)	
TMP22					Qualitative summary of anticipated work zone impacts	
TMP23					Impacts assessment of alternative project design and management strategies (in conjunction with each other) -Construction approach/phasing/staging strategies -Work Zone impacts management strategies	

Reviewer:_____

Traffic Analysis Strategies						Notes
TMP24					Analysis results Traffic (volume, capacity, delay, queue, noise,% of Diversion w/ applicable queue)	
TMP25					Adequacy of alternates/detour routes	
TMP26					Business/community impact	
TMP27					Seasonal weather contingencies	
TMP28					Cost effectiveness/evaluation of alternatives	
TMP29					Selected alternative approach/phasing/staging strategy	
Temporary Traffic Control (TTC) Strategies						
TMP26					Control strategies	
TMP27					List of allowable Traffic control devices	
TMP28					Anticipated Project coordination, w/ projects/contractors	
Public Information (PI)						
TMP29					Public awareness strategies (Public Meetings, Brochures,Newpaper Ads)	
TMP30					Motorist information strategies (VMS, CMS)	
TMP31					Dedicated Website	
TMP32					Site Specific Construction Signs with a Hotline	
Transportation Operations (TO)						
TMP30					Work Zone safety management strategies	
TMP31					Will C.H.A.M.P. be utilized during active operations?	
TMP32					Traffic/incident management (Signal timing adjustment on parallel artery?)	
TMP33					Speed enforcement strategies	
TMP34					Monitoring requirements: Is an inspection form included?	
TMP35					Evaluation report of successes and failures of TMP-List-w/division of responsibility	
TMP36					Contractor's contingency plan	
TMP37					Standby equipment or personnel	
TMP38					Estimated costs	

Reviewer:_____

Item No	CD	PD	SF	FPFR	DESCRIPTION	Notes
ILS1					Have the control junctions been identified?	
ILS2					Have foundation locations been checked for ROW infringements?	
ILS3					Is illumination (existing) to be maintained during construction?	
ILS4					Have detours been checked for illumination?	
ILS5					Check for conflicts with existing/proposed drainage.	
ILS6					Are there obstructions for sign locations?	
ILS7					Does temporary illumination also include under bridge luminaries?	
ILS8					Is selective clearing necessary for lights, signals, etc. to be visible?	

Reviewer:_____

Item No	CD	PD	SF	FPFR	DESCRIPTION	Notes
RA1					Are rail switches to be new? Specifications should clearly indicate this.	
RA2					Specifications and contract do not follow the format as used in heavy and highway construction; therefore, all items of work must be clearly identified in the specifications and must include all testing criteria, performance and acceptance criteria, submissions, methods of measurement, and basis of payment.	
RA3					Check that all applicable codes and code requirements are listed.	
RA4					Has environmental site assessment been performed? Are applicable items and specifications included?	
RA5					Shop drawing submittals, if known (either by us or designer) require a long lead time, a note should be placed in contract indicating such.	
RA6					Specifications should notify contractors that (if applicable) Amtrak safety training is required for all on site personnel.	
RA7					Railroad protection or flagger item included in contract if needed. Has a force account with the Railroad been processed?	
RA8					Check that all permits and railroad agreements are in place and included in the specifications.	
RA9						
RA10						

Reviewer:_____

Item No	CD	PD	SF	FPFR	DESCRIPTION	Notes
SV1					Are control points noted from project limits to project limits?	
SV2					Control points should be on both sides of a structure.	
SV3					Retaining walls need bottom of footing and top of wall elevations at a minimum.	
SV4					Is the Current Construction Staking Special Provision Included?	
SV5					Item for Construction Staking?	
SV6					Is the proper vertical, horizontal, and geometry information in order to adequately locate and construction the project?	
SV7					If aerial survey was used, has it been proofed with ground survey?	
SV8					Are the CT grid coordinates given?	
SV9					Datum Year indicated?	
SV10					Check with District Surveys to see if they need monuments installed/Reset on the project.	

Reviewer:_____

Item No	CD	PD	SF	FPFR	DESCRIPTION	Notes
VC1					Are one-piece insulated wall panels shown? These are more efficient to install.	
VC2					Is the Construction Staking item specific enough for the project?	
VC3					Is it clear which building components require grounding?	
VC4					Is it possible that heavy objects / equipment will be mounted on interior walls? These should be constructed of Concrete Masonry Units.	
VC5					Is heavy duty door hardware required?	
VC6					Does the space allow for adequate equipment movement? Avoid horizontal and vertical conflicts? (Railings, pinch points, and overhead lighting and utility conduits).	
VC7					Are fire extinguisher locations and mounting details shown clearly?	
VC8					Does the HVAC system require an independent inspection of operation and sequencing of equipment?	
VC9					Are awnings provided at entrance doors?	
VC10					Is the height of safety rails consistent?	
VC11					Do all proposed data and communication lines and outlets consider the future occupant and future uses?	
VC12					Do the door functions consider the room use? Is there an overall Keying scheme and does it consider future needs?	
VC13					Is the roof access reasonable for the intended use and is it located in an unobstructed area?	
VC14					Is a secure material storage pad shown for compressed gases, etc.?	
VC15					Are there "pinch points" between railings, stairs, and equipment movement areas?	
VC16					Is safety striping included in the plans for clearance areas, walkways and other hazards?	
VC17					Are interior railings painted safety yellow?	
VC18					Are personnel offices and material storage rooms adequately sized?	
VC19					Are interior utility conduits placed so that they do not obstruct the movement of personnel, vehicles or equipment?	
VC20					Is all signage incorporated into the contract? i.e. building number, name, safety items, hand washes, fire extinguishers, emergency exit only, etc.	

Reviewer:_____

VC21					Is the distance from work areas to restrooms reasonable?	Notes
VC22					Is access to all future building maintenance operations and equipment considered?	
VC23					Is an overall building and equipment maintenance plan included in the contract for the end user?	
VC24					Is the facility's end user fully involved in the design process and providing comments?	
VC25					Are HVAC duct chases shown going through a firewall? Not allowed by code.	
VC26					Include test pits in the contract to confirm utility locations and confirm soil types.	
VC27					Plans and specs should be clear what safety features (i.e. lighting, fire alarms, sprinklers, 1-hour fire rating) are needed in temporary construction.	
VC28					Is exterior emergency lighting required?	
VC29					Is all infrastructure for future equipment / building use being installed?	
VC30					Do exposed conduits use stickers for identification?	
VC31					Is entire access to loading docks adequate for the proposed design vehicle?	
VC32					Maintenance Facility: Stormwater discharge points outfall for maintenance stations must be 250' or greater from the out buildings.	
VC33						
VC34						
VC35						

APPENDIX A: DESIGN REVIEW PROCESS

District Construction Representative shall:

- Be familiar with the project limits and anticipated scope of work
- If possible make a field review of the site before attending the scope review meetings.
- Discuss the project and scope with the District Maintenance Planner and ask if they have any issues that should be conveyed to the designer.
- Attend the scope review meeting and provide the designer of record with the District's concerns, check list of items, and any "lessons learned" from project of similar scope and design.
- Periodically contact the DOT's Design Contact to keep an open line of communication to discuss matters pertaining to the Project.
- Review available plans, special provisions, and standard specifications to predetermine possible stages of work. Comments shall be returned to DOT's Design Contact by the deadline indicated in the transmittal memorandum. Draft comments may be forwarded via e-mail to expedite the review process. Signed memo either scanned or forwarded shall follow. The Construction Representative designated for the review is responsible for the comments. It is their responsibility to be aware of the design schedule restrictions and shall notify Design if the complexity of the project does not permit review with the required time frame.
- Coordination of the plan review with survey representation may be required.

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
District Construction X
MEMORANDUM

COMMENTS
Project No.
Town:

Date:

TO:
Transportation Principal Engineer
Bureau of Engineering and
Construction

FROM:
Assistant District Engineer
Bureau of Engineering and
Construction

- ☐ Preliminary Studies
- ☐ Preliminary Design
- ☐ Structure Type Study
- ☐ Drainage
- ☐ Other Field Review
- ☐ Semifinal (60-70%)
- ☐ Structural Layout for Design
- ☐ Final Plan for Review (85-90%)
- ☐ Final Design (100 %)
- ☐ Other – M & P of Traffic/TMP/Permit/etc.

Comment No.	COMMENT	Comment Incl Not Incl
	This memorandum is in response to your memorandum dated XXXX regarding the above noted project. ENVIRONMENTAL/PERMIT COMMENTS UTILITY REVIEW SPECIAL PROVISION/CONTRACT COMMENTS PLAN REVIEW COMMENTS ITEM/ENGINEER'S ESTIMATE COMMENTS At your earliest convenience it recommended a meeting be held with representatives District X Construction, Office of Construction, and Traffic to answer any questions regarding these review comments. If you have any questions or concerns do not hesitate to contact Project Engineer at _____. Attachments Author cc: District Engineer – Assistant District Engineer Office of Traffic (Charles Harlow) Office of Quality Assurance (James Fallon) Office of Construction – District Liaison Project Engineer assigned to the Review	

Appendix C: Sample Tracking Sheet

Project No.	Town/Project Descr.	Antic. Start Date	Proj. Eng.	Design Scope Meeting	Date Prel, Design Plan Rec.	Prel. Design Plan Review Due	Date Prel. Design Review Returned to Design	Date Response From Design rec.	Date Semi-final Plan rec.	Date Semi-Final Plan Due	Date Semi-Final Design Review returned to Design	Date Response From Design rec.	Date Final Plan Received	Date Final Comments returned to Design