B. Layers Across Roadway

Use Table 2-7 to estimate typical pavement layer thickness for traveled way and shoulders on projects that have bridges with wearing surfaces. For wearing surfaces on bridges, refer to Section 4.6 Wearing Surfaces. For approaches over buried structures, refer to the Highway Design Guide for guidance on layer thicknesses.

Table 2-7 Number of Layers Across Roadway

Travelway		Shoulder		Mix Type
Depth (inches)	**Number of Layers**	**Min. Depth (inches)**	**Number of Layers**	
3	2	3	2	9.5 mm or 12.5mm
4	1 @ 1-1/2” 1 @ 2-1/2”	3	2	9.5 mm or 12.5mm 12.5 mm or 19.0 mm
5	2 @ 1-1/2” 1 @ 2”	3	2 1	9.5 mm or 12.5mm 12.5 mm or 19.0 mm
6 or greater	2 @ 1-1/2” X @ X” *	3	2 1	9.5 mm or 12.5mm 12.5 mm or 19.0 mm

* Add and adjust layer thicknesses as needed.

C. Shoulder Pavement

If the proposed shoulder widths are 4 feet or less and the travelway pavement depth is 5 inches or less, the travelway pavement depth should be carried through the shoulders at the same slope as the travelway.

For bridge projects with short approaches where the proposed shoulder widths are 5 feet or greater and the travelway pavement is 5 inches or less, the travelway pavement depth may be carried through the shoulders.

For longer approaches with heavy traffic, intersections, and/or sharp horizontal curves with off-tracking concerns, the Designer should refer to the Highway Design Guide for guidance on approach shoulder width and thickness.

For further guidance, the Designer should consult with a pavement technical resource person. Paving the shoulder at the same depth as the travelway allows the shoulders to be paved along with the mainline. This shortens construction time and eliminates the need to place shoulder material and regrade the shoulders, resulting in cost savings that will more than offset the cost of the extra pavement.

2.8.4.2 Arterials and Collectors

Pavement for approaches located on all arterials and collectors, on and off the NHS, should be designed in accordance with the 1993 AASHTO design standards. The DARWin™ Pavement Design System designs pavement and aggregate subbase course gravel thicknesses based on the 1993 AASHTO Standards. Establishment of a new design standard is currently in progress.

For assistance in determining the Terminal Serviceability and Reliability Level (%), consult with a Designer in the Urban and Arterial Program.

Table 2-8 contains sample input data for the DARWin™ program.

4.6 Wearing Surfaces

4.6.1 General

All bridges should have a 3 inch bituminous wearing surface plus a membrane except as follows:

- Bridges on local and collector roads with simple spans and an AADT less than 1000 should use a 1 inch integral concrete wearing surface.
- Bridges with an AADT over 1000 with grades in excess of 7%, or bridges where higher than usual braking or acceleration forces can be expected, such as at stop signs, exit and entrance ramps, or sharp horizontal curves should use a 2 inch unreinforced structural concrete wearing surface or a modified asphalt wearing surface system.

4.6.2 Descriptions

The types of wearing surfaces are described below:

4.6.2.1 Bituminous Wearing Surface with Membrane

The wearing surface consists of an impervious waterproofing membrane (nominally 1/4” thick) and approximately 3 inches of bituminous pavement of the grades specified on the plans, and placed in layers of the thickness shown in the Specifications.

4.6.2.2 Unreinforced Structural Concrete Wearing Surface

The wearing surface consists of an unreinforced structural concrete wearing surface with a thickness of 2 inches. The concrete used for the wearing surface is Class LP. The structural concrete wearing surface should be treated with protective coating for concrete surfaces.

4.6.2.3 Integral Concrete Wearing Surface

The wearing surface consists of an extra 1 inch cover over the top of the deck reinforcement for a total concrete cover of 3 inches. The extra inch of concrete should be included in the computations as dead load, but should be excluded from the slab section capacity computations. No allowance is made in the computations for future overlays or wearing surfaces. The concrete used for the slab and wearing surface is Class A. The integral

concrete wearing surface should be treated with protective coating for concrete surfaces.

4.6.2.4 Modified Asphalt Wearing Surface System

The wearing surface consists of approximately 3 inches of impervious hot mix modified asphalt placed on a high performance membrane.

Rosphalt, a proprietary product, is one type of modified asphalt system that does not require a separate membrane. The use of this product is limited to wearing surface replacement projects - concrete wearing surfaces, in particular. Rosphalt may only be used when the proprietary item approval process has been followed.

Prior to calling for a modified asphalt wearing surface system on a project, the Designer should consult with a pavement technical resource person for guidance in the appropriate system to use.

4.7 Membranes

High performance waterproofing membrane should be used under bituminous wearing surfaces on most bridge structures. The prequalified list of standard and high performance waterproofing membrane systems can be found on the MaineDOT website at: http://www.maine.gov/mdot/transportation-research/approved-products/waterfroof-membrane-systems.php.

Standard membrane should be used on concrete buried structures, placed directly on top of the concrete and wrapped down one foot along the vertical wall.

4.8 Deck Joints and Expansion Devices

4.8.1 General

Deck joints add cost to the structure, increase maintenance requirements, and should be avoided whenever possible. Integral abutments should be used (refer to Section 5.4.2, Integral Abutments) or the slab should be carried over the backwall (refer to Section 6.2.2 Decks) whenever possible. The Designer must become familiar with the Standard Details (520 and 521), as well as applicable manufacturer's product information, before specifying an expansion device for a particular project.

In all other cases, deck joints with appropriate expansion devices will be necessary. The choice of which expansion device to use depends upon the

6.1.4 Design Requirements

6.1.4.1 Concrete Cover

All precast main carrying members should be designed with the stirrups encasing all prestressing strands. The minimum cover for the stirrup is 1 inch from the bottom of the section.

6.1.4.2 Voided Slab and Butted Box Beam Bridges

A. Transverse Post-Tensioning

Normally, post-tensioning should be accomplished by the use of 0.6" diameter prestressing strand as specified in the applicable Supplemental Specifications. In cases where the chuck-to-chuck length is 25 feet or less, prestressing strand cannot be used due to excessive overstressing for the setting losses. For shorter post-tensioning lengths, the material and final tensile force must be clearly stated on the Plans. The tensile force should be 40k per location. The use of threaded rods such as DYWIDAG bars is recommended.

Commentary: The use of 0.6" diameter prestressing strand with a larger post-tensioning force is intended to limit cracking of the shear keys. Standard Detail 535(02) has been reviewed and approved for use with this larger strand size.

Diaphragms and strand locations should be spaced as described in Table 6-1. Diaphragms and post-tensioning ducts may be placed parallel to the centerline of bearing for skews less than 30°. For skews over 30°, diaphragms should be placed normal to the beams and consideration should be given to torsional loads from sidewalks, future widening, and maintenance of traffic. The end post-tensioning should be located such that it does not interfere with the wingwalls, including allowances made for the post-tensioning jack.

B. Wearing Surfaces

Refer to Section 4.7 Membranes for membrane requirements under pavement. Concrete wearing surfaces should be avoided unless a minimum 6 inch composite leveling slab is used.

C. Leveling slabs

In general, an unreinforced leveling slab should be used on all voided slab and butted box beam structures, if not designed with a reinforced composite slab. The minimum thickness is 2 inches at the curb line, and the cross slope matches the finish slope. The minimum thickness of a reinforced leveling slab is 4 inches.

In some cases, the leveling slab may be omitted based upon project specific considerations, when approved by the Engineer of Design. If the leveling slab is eliminated, a high performance membrane is to be used with the bituminous wearing surface.

D. Continuity Design

Prestressed girders should be made continuous for the maximum practical length to avoid expansion joints. In general, the design should follow AASHTO LRFD Section 5.14.1.2 - Precast Beams. The Structural Designer is also referred to Oesterle (1989).

1. Negative Moment Over Piers

As a minimum, sufficient continuity steel should be provided to control cracking at the pier in the wearing surface at service loads. Crack control should be checked in AASHTO LRFD Section 5.7.3.4. The following values should be used for the crack width parameter Z:

Bituminous with high performance membrane	170 k/in
Concrete wearing surface*	77 k/in

*A crack width parameter up to Z = 130 k/in may be allowed with the use of galvanized or epoxy coated reinforcing steel and low permeability concrete.

Crack width parameters of 170 and 77 k/in correspond to approximate crack widths of 0.016” and 0.007” respectively. More refined methods of determining crack width such as the Gergely-Lutz equation for crack width are allowed.

2. Positive Moment Over Piers

As a minimum, sufficient continuity steel should create a reinforced section that resists 1.2 times the cracking moment.

doubt, guidance from one of the Construction Engineers may be requested.

Guidelines on when to specify Method A, Method B, or Method C are as follows:

Method A should be specified where quality above the specification requirements is of value. Examples of where Method A is appropriate include, but are not limited to: footings, abutments, structural seals, piers, superstructures, decks, sidewalks, curbing, wearing surfaces, barrier, retaining walls, box culverts, bases for overhead sign supports, and mast arm traffic signal supports. P, the unit value for pay adjustment purposes, must be provided in the Special Provision that is included in each contract. P values reflect the price per cubic yard for all pay adjustment purposes. P values will be established on an annual basis and should not be based strictly on bid history information.

Method B should be specified where concrete must meet specifications but where there is no value added by quality exceeding the requirements of the specifications. Examples of where Method B is appropriate include, but are not limited to: approach slabs, concrete fill, pipe pile concrete, non-structural seals, traffic signal bases, and sign bases when not cantilevered. Method B may also be specified for the concrete items that normally call for Method A when the quantities are such that if Method A were specified, an inordinate amount of QA testing would be required and the benefit of specifying Method A over Method B would not differ significantly.

Method C should be specified where concrete quality still has to meet the specifications, but the benefits and costs to the Contractor and to the Department to develop and administer a Quality Control Plan, as required by specifications, are not justified. Examples of where Method C is appropriate include: armored joint repairs; surface repairs to wing walls, bridge decks, abutments, piers, and box culverts; and modifications to existing end-posts. This method should not be specified for structural elements that are expected to have a long design life.

6.2.1.2 Reinforcing Steel

Plain reinforcing steel should be deformed bars meeting the requirements of AASHTO M31 (ASTM A615). In general, the minimum bar size should be #5 for main reinforcing members and #4 for stirrups.

A corrosion resistant reinforcing system should be used for selected locations. The service life and cost of corrosion resistant systems can vary significantly. Some of these systems have not yet been used in Maine, so the Designer should use good engineering judgment in evaluating and

selecting appropriate options for each location. Corrosion resistant reinforcing systems include the following:

A. MMFX reinforcing steel – a high strength, low carbon, chromium-rich deformed bar meeting the requirements of ASTM A1035. The use of this bar is currently limited to bridge decks, medians, curbs, sidewalks, barriers, and traffic rails. If a proposed design is utilizing the higher strength of MMFX, then there are several design issues that the Designer needs to consider. Ductility is of special concern. In designing the rebar layout, it is preferable to choose a smaller bar with similar spacing to a comparable standard strength design, as opposed to increasing the spacing of a similar sized bar. Too wide a spacing can result in increased cracking. This bar is a proprietary product and may only be used when the proprietary item approval process has been followed.

B. Galvanized reinforcing steel - a deformed bar clad with zinc, meeting the requirements of ASTM A767. This bar must not be used with uncoated bars in the same structural element, as the galvanizing will sacrifice itself to protect the uncoated bars, thereby resulting in a reduced service life.

C. Plain reinforcing steel used in conjunction with an approved corrosion inhibitor concrete additive. This is a suitable alternative for some applications, such as low volume and local roads that might not see as much salt intrusion.

D. Stainless-clad reinforcing steel – a deformed bar clad with stainless steel, meeting the requirements of AASHTO MP13-04.

E. Stainless reinforcing steel – a deformed bar made of solid stainless steel, meeting the requirements of ASTM A955.

F. ZBAR reinforcing steel – a dual-coated deformed bar with a metallized zinc inner layer under a polymer outer layer, meeting the requirements of ASTM A1055. This bar is a proprietary product and may only be used when the proprietary item approval process has been followed.

G. GFRP reinforcing bar – a glass fiber-reinforced polymer bar with a low modulus of elasticity, meeting the requirements of ACI 440.1R-06. The use of this bar is currently limited to bridge decks, medians, curbs, sidewalks, barriers, and traffic rails.

H. Epoxy-coated reinforcing steel – a deformed bar clad with epoxy coating, meeting the requirements of AASHTO M31 (ASTM A615) and AASHTO M284 (ASTM A775). There are conflicting research reports regarding how effective this bar really is. It can be effective if handled properly and the coating remains completely intact; however, preventing damage to the epoxy coating in the field is

virtually impossible. Corrosion easily takes place in areas where the coating is damaged. Disbonding of the coating from the bar is a concern as well. Other corrosion resistant reinforcing systems are preferred over this one.

The following locations in concrete bridge elements should incorporate the use of a corrosion resistant reinforcing system:

A. Substructure

- All pier columns, shafts, and caps of grade separation structures that are within 30 feet of the traveled way, including footing dowels if they extend above the finished grade line
- All abutment bridge seats and front faces of breastwalls of grade separation structures that are within 20 feet of the traveled way, including footing dowels if they extend above the finished grade line
- The front face of all retaining walls and wingwalls of grade separation structures that are within 20 feet of the traveled way, including footing dowels if they extend above the finished grade line
- All substructure units in their entirety, when the bridge passes over salt water

B. Superstructure

- All curbs, sidewalks, medians, barriers, and endposts
- All deck slabs when the bridge passes over salt water
- All deck slabs of continuous steel structures with concrete wearing surfaces

Other locations, as approved by the Engineer of Design, may also incorporate a corrosion resistant reinforcing system where it is considered to be cost effective. In addition, the Engineer of Design may approve the elimination of a corrosion resistant reinforcing system at locations where it may not be cost effective, due to low traffic volumes and/or low susceptibility to salt intrusion.

6.2.2 Decks

The deck slab should be carried over the abutment backwall under the following circumstances:

- On abutments with fixed bearings when beam depth is less than approximately 4 feet. On roads with low traffic volume, the Structural Designer may choose to carry the slab over the backwall for beams deeper than 4 feet.

- On abutments with expansion bearings for bridges within the following limits:

    1. Spans up to 40 feet with skew up to 45°

Appendix D Standard Notes

The notes on the following pages should be used on the plans where they apply.

D.1 Title Sheet

These notes should appear on the title sheet of the plans, or if a title sheet is omitted, on the general plan.

SPECIFICATIONS

DESIGN: Load and Resistance Factor Design per AASHTO LRFD Bridge Design Specifications Fourth Edition 2007 and interim specifications through 200X.

TRAFFIC DATA

Current (200X) AADT = XXXX
Future (20XX) AADT = XXXX
DHV - % of AADT = XX %
Design Hour Volume = XXX
Heavy Trucks (% of AADT) = XX %
Heavy Trucks (% of DHV) = XX %
Directional Distribution (% of DHV) = XX %
18 Kip Equivalent P 2.0 = XX
18 Kip Equivalent P 2.5 = XX
Design Speed = XX mph

DESIGN LOADING

LIVE LOAD: HL-93 Modified

MATERIALS

CONCRETE:	Structural Wearing Surface	Class LP
	Barriers, Curbs, Sidewalks, End Posts	Class LP
	Seals	Class S
	Precast	Class P
	Fill	Fill
	All Other	Class A

REINFORCING STEEL: ASTM A615, Grade 60

PRESTRESSING STRANDS: AASHTO 203 (ASTM A416), Grade 270, Low Relaxation

STRUCTURAL STEEL:

All Material (unless otherwise noted)	ASTM A709, Grade 50W (unpainted)
High Strength Bolts	ASTM A325, Type 3

BASIC DESIGN STRESSES

CONCRETE: f'_c = 4,350 psi

PRECAST CONCRETE: f'_c = XX psi
f'_{ci} = XX psi

REINFORCING STEEL: f_y = 60,000 psi

PRESTRESSING STRANDS: f_u = 270,000 psi

STRUCTURAL STEEL:	ASTM A709, Grade 50W	F_y = 50,000 psi
	ASTM A709, Grade 36	F_y = 36,000 psi
	ASTM A325	F_u = 120,000 psi

HYDROLOGIC DATA

Drainage Area = _____sq mi
Design Discharge (Q50) = _____cfs
Check Discharge (Q100) = _____cfs
Headwater Elev. (Q50) = _____ft
Headwater Elev. (Q100) = _____ft
Discharge Velocity (Q50) = _____fps
Discharge Velocity (Q100) = _____fps
Headwater Elev. (Q1.1) = _____ft
Discharge Velocity (Q1.1) = _____fps
Headwater Elev. (Q25) = _____ft
Mean Lower Low Water (MLLW) = -X.XX ft
Mean Low Water (MLW) = -X.XX ft
Mean Tide Level (MTL) = X.XX ft
Mean High Water (MHW) = X.XX ft
Mean Higher High Water (MHHW) = X.XX ft
20__ Predicted High Tide = X.XX ft

(The following note is used only when a Coast Guard Permit is required, and should be the only note to be put on the plans in reference to permits.)

COAST GUARD PERMIT REQUIRED

D.2 General Construction Notes

1. All utility facilities shall be adjusted by the respective utilities unless otherwise noted.

2. For easements, construction limits, and right-of-way lines, refer to Right-of-Way Map.

3. During construction, the road will be closed to traffic for a time period specified in the Special Provisions.

4. Place a 24 inch wide strip of Temporary Erosion Control Blanket on the side slopes along the top of the riprap and behind the wingwalls.

5. All embankment material, except as otherwise shown, placed below Elevation XX, shall be Granular Borrow meeting the requirements of Subsection 703.19, Material for Underwater Backfill. ||

(The following note is used when the quantity of clearing is 0.5 acre or less and is to be incidental to contract items.) ||

6. The clearing limits as shown on the plans are approximate. The exact limits will be established in the field by the Resident. Payment for clearing will be considered incidental to related Contract items. ||

(The following note is used when the clearing quantity is more than 0.5 acre and a pay item for clearing is to be included.) ||

7. The clearing limits as shown on the plans are approximate. The actual clearing limits for payment will be established in the field by the Resident.

8. Place loam 2 inches deep on all new or reconstructed sideslopes or as directed by the Resident. ||

9. Do not excavate for Aggregate Subbase Course where existing material is suitable as determined by the Resident.

10. In areas where the Resident directs the Contractor not to excavate to the subgrade line shown on the plans, payment for removing existing pavement, grubbing, shaping, ditching, and compacting the existing subbase and layers of new subbase 6 inches or less thick will be made under appropriate equipment rental items.

(The following note is used when unscreened gravel such as aggregate subbase gravel is designated as surface material in the shoulders.)

11. Stones which cannot be rolled or compacted into the surface of the shoulder shall be removed by hand raking. Payment for hand raking will be considered incidental to Item 304.10, Aggregate Subbase Course - Gravel. ||

12. Deleted.

(Use the following note when the future AADT is greater than or equal to 500.)

13. An NCHRP350 compliant guardrail end treatment shall be installed concurrently with the placement of each section of beam guardrail.

(Use the following note when the future AADT is less than 500.)

14. A Low Volume Guardrail End shall be installed concurrently with the placement of each section of beam guardrail.

(The following note regarding Cable Guardrail is no longer used and has been deleted.)

14. Deleted.

15. Extended-use Erosion Control Blanket, seeded gutters, riprap downspouts, and other gutters lined with Stone Ditch Protection shall be constructed after paving and shoulder work is completed, where it is apparent that runoff will cause continual erosion. Payment will be made under the appropriate Contract items.

(The following note is used for Reduced Berm Offsets.)

16. Guardrail posts as shown in the Standard Details shall be modified from the indicated length of 6 feet to a length of 7 feet, with an embedment of 4.5 feet. Payment will be considered incidental to the guardrail pay items.

17. Protective Coating for Concrete Surfaces shall be applied to the following areas:

    All exposed surfaces of concrete curbs and sidewalks,
    Fascia down to drip notch,
    All exposed surfaces of Concrete Transition Barriers,
    Concrete wearing surfaces,
    Concrete barrier railing,
    Top of abutment backwalls and to one foot below the top of backwalls on the back side.

18. Erosion Control Mix may be substituted in those areas normally receiving loam and seed as directed by the Resident. Placement shall be in accordance with Standard Specification 619, Mulch. Payment will be made under Item 619.1401, Erosion Control Mix.

(The following two notes are used in conjunction with Standard Detail 610(2-4).)

19. Place riprap on sideslopes up to elevation XX.

20. Construct the riprap shelf at each abutment at elevation XX.

(The following five notes are used as needed.)

21. Bidders and Contractors may obtain a copy of the existing bridge plans by faxing a Request for Information to the Bid Contact Person. The plans are reproductions of the original drawings as prepared for the construction of the bridge. It is very unlikely that the plans will show any construction field changes or any alterations, which may have been made to the bridge during its life span.

22. Bidders and Contractors may obtain a copy of the hydrologic report of the bridge site by faxing a Request for Information to the Bid Contact Person. The hydrologic report is based on the Department's interpretation of information obtained for the subject site. No assurance is given that the information or the conclusions of the report will be representative of actual conditions at the time of construction.

23. Bidders and Contractors may obtain a copy of the bridge deck evaluation report of the existing bridge by faxing a Request for Information to the Bid Contact Person. The report contains visual inspection information and deck core data of the bridge. There is no assurance that the information or data is a true representation of the conditions of the entire deck.

24. Bidders and Contractors may obtain a copy of the project geotechnical report(s), Name of Report(s), MDOT Soils Report Number(s), date(s), by faxing a Request for Information to the Bid Contact Person.

25. Geotechnical Information furnished or referred to in this plan set is for the use of the Bidders and the Contractor. No assurance is given that the information or interpretations will be representative of actual subsurface conditions at the time of construction. MaineDOT shall not be responsible for the Bidder's and Contractor's interpretations of, or conclusions drawn from, the Geotechnical Information. The boring logs contained in the plan set present factual and interpretive subsurface information collected at discrete locations. Data provided may not be representative of the subsurface conditions between boring locations.

(The following note is to be used when removing an existing aluminum bridge rail. The Designer should check with Bridge Maintenance to verify the need for this note.)

26. All aluminum bridge rail, rail posts, and associated hardware which are to be removed shall be carefully salvaged by the Contractor and will remain the property of the Department. Payment will be considered incidental to related Contract items.

(The following note is to be used whenever Lump Sum items are included in the Contract.)

27. Quantities included for pay items measured and paid for by Lump Sum are estimated quantities and are provided by MaineDOT for informational purposes only. Lump Sum pay items will be paid for at the Contract Bid

amount, with no addition or reduction in payment to the Contractor if the actual final quantities are different from the MaineDOT provided estimated quantities, except as follows:

a. If a Lump Sum pay item is eliminated, the requirements of Standard Specifications Section 109.2, Elimination of Items, will take precedence.

b. If other Contract Documents specifically allow a change in payment for a Lump Sum pay item, those requirements will be followed.

c. If a design change results in changes to estimated quantities for Lump Sum pay items, price adjustments will be made in accordance with Standard Specifications Section 109.7, Equitable Adjustments to Compensation.

(Include a cofferdam pay item when a cofferdam is clearly required, and identify the location of the cofferdam in the pay item description. When the need for a cofferdam is in question, no pay item will be included, and the following note shall be used. Should both situations arise in the same Contract, the note shall be modified to clearly identify for which cofferdam payment is incidental.)

28. All costs for cofferdams, including pumping, maintenance, related temporary soil erosion and water pollution controls and removal, will not be paid for directly, but will be considered incidental to related Contract items.

(The following note is to be used when a demolition plan is necessary for removal of the existing bridge. This includes trusses, large arch bridges, suspension bridges, bridges that are very close to other structures that are to remain in place, etc.)

29. The Contractor shall submit a Bridge Demolition Plan to the Resident at least 10 business days prior to the start of demolition work. The plan shall outline the methods and equipment to be used to remove and dispose of all materials included in the existing bridge. No work related to the removal of the bridge shall be undertaken by the Contractor until MaineDOT has reviewed the Bridge Demolition Plan for appropriateness and completeness. Payment for all work necessary for developing, submitting and finalizing the Demolition Plan will be considered incidental to the bridge removal pay item.

(The following note is to be used when the existing bridge to be removed contains lead-based paint. Modify the note for rehabilitation projects as necessary.)

30. The existing bridge shall be removed by and become the property of the Contractor. The steel portions of the existing bridge are coated with a lead-based paint system. The Contractor is responsible for the containment, proper management and disposal of all lead-contaminated hazardous waste generated by the process of demolishing the bridge.

The Contractor is responsible for implementing appropriate OSHA mandated personal protection standards related to this process. Once the existing bridge is removed, the Contractor is solely responsible for the care, custody and control of the components of the existing bridge and any hazardous waste generated as a result of the storage, recycling or disposal of the bridge components, including lead-coated steel. The Contractor shall recycle or reuse the steel in accordance with the Maine Department of Environmental Protection's "Maine Hazardous Waste Management Regulations," Chapter 850. A copy of this regulation is available at MaineDOT's offices on Child Street in Augusta. Payment for all labor, materials, equipment and other costs required to remove and dispose of the existing bridge will be considered incidental to the bridge removal pay item.

D.3 Standard Notes Abutments

1. Reinforcing steel shall have a minimum concrete cover of 2 inches in the walls and 3 inches cover in the footings unless otherwise noted.

2. Cover joints where waterstops are not required in accordance with Standard Detail 502 (01).

3. Place 4 inch diameter drains in breastwall and wingwalls at XX feet maximum spacing. The exact location will be determined by the Resident.

4. Construct French Drains behind the abutments and wingwalls in accordance with Standard Specification Section 512, French Drains.

5. Structural Earth Excavation, Abutments and Retaining Walls, required more than 12 inches below the bottom of the structure, will be paid for in accordance with Standard Specifications Section 206, Structural Excavation.

6. Abutments, wingwalls, and their footings shall be backfilled with Granular Borrow. Pay limits will be the structural excavation limits in cut areas and a vertical plane located 10 feet behind the walls in fill areas.

7. The maximum factored applied footing pressure is XX ksf.

(The following note is used with butted precast box beam or slab type superstructures.)

8. To ensure an accurate match with the superstructure, the parapet portions of the wingwalls shall be placed after erection of the precast units.

(The following two notes are used when Transition Barriers are constructed on return wingwalls. The second note may be eliminated if the bars noted are fully detailed on the plans. In either case, the bars need to be included in the reinforcing steel schedule and estimated quantities.)

9. The Contractor shall install Transition Barrier vertical closed stirrups as shown in Standard Details Section 526, prior to the placement of the curb concrete.

10. Provide 3 additional stirrups in the curbs at each Transition Barrier location.

D.4 Standard Notes Piles

1. Piles marked with an arrow shall be battered XX in/ft in the direction of the arrow.

2. The maximum factored pile load is XX kips (including XX kips allowed for downdrag).

3. Estimate of piles required:

Abutment Number 1:	XX-HP XX x XX @ XX ft
Abutment Number 2:	XX-HP XX x XX @ XX ft
Pier Number 1:	XX-HP XX x XX @ XX ft
Pier Number 2:	XX-HP XX x XX @ XX ft

(The following note is used for integral abutments with steel stringers.)

4. Piles shall not be out of position shown by more than 2 inches in any direction.

(The following two notes are used for pile-supported foundations. The Geotechnical Designer will make a recommendation for their use or exclusion. The Structural Designer should determine the appropriate pay item and the Geotechnical Designer determine the number of dynamic tests.)

5. The Contractor shall perform and submit a wave equation analysis for review and acceptance by the Resident. The maximum allowable driving stress is 0.90 times F_y. The submittal analyses shall include the proposed stopping criteria based on the wave equation analysis and the proposed driving system. The stopping criteria shall include the blows per inch and the number of 1 inch driving intervals at which pile installation may be terminated. The cost of performing the wave equation analysis will be considered incidental to Item No. 501.92, Pile Driving Equipment Mobilization.

6. The Contractor shall perform XX dynamic load test(s) to confirm the ultimate capacity of the piles. The required nominal resistance for the pile is the factored axial pile load divided by a resistance factor of 0.65 per LRFD Specifications. The dynamic test shall be performed on the first production pile driven.

7. All piles shall be equipped with a pile tip in accordance with Standard Specification Section 501.10, Prefabricated Pile Tips.

8. H-pile material shall be ASTM A572, Grade 50.

9. Pipe pile material shall be ASTM A252, Grade 3, 45 ksi.

D.5 Standard Notes Piers

1. Reinforcing steel shall have a minimum concrete cover of 3 inches unless otherwise noted.

2. The maximum factored applied footing pressure is XX ksf.

Design Criteria

1. Critical AASHTO Load Combination – Strength, Service, Extreme Event, Fatigue Limit State.

2. Buoyancy - Water level assumed at Elevation XX.

3. Stream flow - Velocity of XX fps skewed at XX^{o} to longitudinal centerline of pier.

4. Wind - XX mph or XX ksf.

5. Ice - Thickness X feet, pressure XX ksf at Elevation XX, 30% of nose force applied transverse to pier.

D.6 Standard Notes Seal Cofferdams

1. The seal concrete placement dimensions represent the minimum seal size necessary to meet design requirements and are not based on the use of any particular sheet pile section.

2. The horizontal pay limit for seal concrete shall be to the dimensions shown on the plans. No additional payment will be made for concrete placed outside of these limits.

3. When sheet piling is used for seal cofferdams, appropriate rolled corners shall be used, and the inside face of the sheet piling shall be at or outside of the seal concrete dimensions shown.

4. The depth of the seal is set for a water elevation of XX. If the water elevation at the time of construction is higher, the depth of the seal shall be adjusted.

(The following note is used seals without piles.)

5. The method of placing dowels in the seal concrete shall be approved by the Resident.

D.7 Standard Notes Structural Steel

1. Camber ordinates, as shown, are computed to compensate for all dead load deflections and for the curvature of the finished grade profile. ||

(The following two notes are used with welded girders only.) ||

2. No transverse butt-weld splices will be allowed in the flange plates or web plates within 10 feet or 10% of the span length (whichever is greater) from the points of maximum negative moment or maximum positive moment. Butt-weld splices in flanges shall be not less than 3 feet from transverse butt-welds in the web plates and no transverse web or flange butt-welds shall be located within 3 feet of other transverse welds (e.g. connection plates to web welds) on either flange or web. No transverse butt-weld splices will be allowed in areas of stress reversal.

3. Sections of flange plates or web plates between transverse shop splices or between a transverse shop splice and a field splice shall be not less than XX feet in length unless otherwise shown on the plans.

(The following note is used with haunched welded girders only.) ||

4. One longitudinal butt weld splice will be allowed in the web of the haunched sections of the girders. Feather edges between the longitudinal welds and the bottom flanges will not be allowed.

5. Bearing stiffeners shall be plumb after erection and dead loading of the structure. Intermediate web stiffeners may be either plumb or normal to the top flange.

6. Crossframe or diaphragm connection plates may be either plumb or normal to the top flange.

(The following note is used only with designs using A709, Grade 50 or painted Grade 50W.)

7. Filler plates may be steel conforming to the requirements of A709, Grade 36.

(The following note is used when more than one steel design is provided.) ||

8. The dimensions and elevations omitted from the Bottom of Slab Elevations table, the Camber Diagram, and the Stress Diagram will be provided to the Contractor for the structural steel option that has been selected.

9. At locations marked with an asterisk (*), the designated diaphragms shall be changed to a Type A (C) (D) diaphragm as required to accommodate the Contractor's deck placement sequence. No extra compensation will be allowed for any diaphragms so substituted, and any additional costs will be considered incidental to the Contract items.

||

10. Deleted. ||

11. Deleted. ||

(The following note is used when a single span rolled beam with 3" or more camber is used.)

12. The Contractor may substitute welded plate girders in place of the rolled beams shown on the plans, as approved by the Resident. The fabricator shall determine the plate thicknesses based upon the depth and moment of inertia of the rolled section.

D.8 Standard Notes Precast Concrete Superstructures

(The following note is used with 0.5 inch diameter strand.)

1. Prestressing strands shall be 0.5 inch diameter. The tensioning force is 31 kips per prestressing strand.

(The following note is used with 0.6 inch diameter strand.)

2. Prestressing strands shall be 0.6 inch diameter. The tensioning force is 44 kips per prestressing strand.

3. The top surface of the upper flange of the prestressed beams shall be raked to a surface roughness of +/- ¼ inch, except at locations corresponding to the blocking points. At these locations a flattened area of sufficient size shall be left to facilitate taking elevations for setting bottom of slab elevations.

4. The drilling of holes in the prestressed beams and the use of power-actuated tools on the beams will not be permitted.

5. Neoprene pads shall be either polychloroprene or natural polyisoprene of 50±5 Shore A durometer hardness, and shall conform to the requirements of Division 2, Section 18.2 of AASHTO Standard Specifications for Highway Bridges. Neoprene pads will not be paid for directly, but will be considered incidental to related Contract items.

6. Install a 1 inch diameter nonmetallic void drain in the bottom of each void at both ends.

7. Reinforcing steel shall have a minimum concrete cover of 2 inches unless otherwise noted.

8. Post-tensioning shall be covered by a seamless polypropylene sheath, with corrosion inhibiting grease between the strands and sheath, for the full length of the strand except at the anchorage location.

9. The Contractor shall calibrate the jacking equipment as necessary to provide an anchorage of 38 to 41 kips after setting losses in each 0.6” diameter post-tensioning strand.

(The following note is used for all voided slab and butted box beam structures.)

10. Screed rails shall be installed to the elevation shown on the profile, adjusted for wearing course thickness and cross slope.

D.9 Standard Notes Superstructures

1. Form a one inch V-groove on the fascias at the horizontal joint between the curb and slab.

2. Reinforcing steel shall have a minimum concrete cover of 2 inches unless otherwise noted.

3. Adjust reinforcing steel to fit around the bridge drains in a manner approved by the Resident. Do not cut transverse reinforcing bars.

(The following note is used for simple span structures.)

4. The superstructure slab concrete for each span shall be placed continuously and shall be kept plastic until the entire placement has been made.

(The following note is used for multiple span continuous structures with less than 250 yd^3 of deck concrete.)

5. The superstructure slab concrete shall be placed in one continuous operation and the concrete shall be kept plastic one complete span behind the span being placed.

(The following note is used for multiple span continuous structures with more than 250 yd^3 of deck concrete.)

6. Unless the superstructure slab concrete is placed in one continuous operation, the initial placement shall start at a simply supported end of the deck slab and shall terminate at the completion of a positive moment section. Successive placements shall proceed from the end of the previous placement, terminate at the completion of a positive moment section, and include two or more spans. Concrete in a placement shall be kept plastic one complete span behind the span being placed. A minimum of 5 days shall elapse between successive partial placements. The superstructure slab concrete placement sequence shall be approved by the Resident.

(The following note is used with staged construction of CIP structural slabs.)

7. The formwork and its supports, over the full width of the structural slab, shall remain in place until a minimum of 48 hours has elapsed after placement of the final section of the slab. After this period, removal of formwork for sections meeting the requirements for form removal of Standard Specifications Section 502, Structural Concrete, may proceed.

(The following note is used with granite curb on the superstructure.)

8. Mortar for bedding and for joints in the granite curb shall contain an approved non-shrink additive.

(The following two notes are used for seals where applicable. Seal types required should be noted on the plans. When compression seals are used, a Compression Seal Adjustment Chart should be shown on the plans)

9. The seals to be furnished shall have a minimum Movement Rating of:

    Abutment Number 1 = XX

    Abutment Number 2 = XX

10. The Resident shall approve the seals prior to fabrication of the Expansion Device.

(The following two notes are used when Precast Deck Panels are allowed.)

11. At the Contractor's option, Precast Deck Panels may be used in place of the full depth cast-in-place slab in accordance with Special Provision 502, Structural Concrete - Precast Deck Panels, and in accordance with the Standard Details.

12. Payment for the reinforcing steel fabricated, delivered, and placed in the cast -in-place portion of the structural concrete slab will be considered incidental to the appropriate Section 502 pay item.

13. The theoretical blocking used for design of the structure is XX inch(es) at the centerline of bearings of the abutments and piers. Refer to Standard Detail 502 (02) for blocking details.

14. The Contractor shall install Transition Barrier vertical closed stirrups, as shown in Standard Details Section 526, prior to the placement of the curb or sidewalk concrete.

(The following note may be eliminated if the bars noted are fully detailed on the plans. In either case, the bars need to be included in the reinforcing steel schedule and estimated quantities.)

15. Provide 3 additional stirrups in the curbs at each Transition Barrier location.

D.10 Standard Notes Elastomeric Bearings

1. The shear modulus of the elastomer shall be between 80 and 175 psi.

2. Vulcanizing of the elastomer to the steel plates shall be done during the primary mold process.

3. Upset the threads on the anchor rods after assembly.

4. Masonry plates, sole plates, and shear pins shall meet the requirements of ASTM A 709/A 709M, Grade 50 or 50W. Anchor rods shall meet the requirements or ASTM F 1554, Grade 105 and shall be swedged on the embedded portion of the rod.

5. Bearings shall be covered during transit.

6. Masonry plates shall be galvanized in accordance with Section 506. Sole plates for steel superstructures shall be treated in the same manner as the structural steel. Anchor rods, washers, nuts and shear pins shall be galvanized to ASTM A 153 or ASTM B 695, Class 50, Type 1.

7. The bearings are designed so that the superstructure may be erected when the ambient air temperature is within the range of 65^{o}F and 90^{o}F. If the ambient air temperature is outside this range, the bearings shall be reset as directed by the Resident.

8. Deleted.

9. All bearings shall be marked prior to shipping. The marks shall include the bearing location on the bridge, and a direction arrow that points up-station. All marks shall be permanent and shall be visible after the bearing is installed.

(The following note is used when bearings are to be welded to steel girders.)

10. All necessary precautions shall be taken to protect bearing components from field weld flash and spatter. Heat from welding operations shall be controlled such that steel adjacent to the elastomer does not exceed 200^{o}F. The temperature shall be verified by the use of temperature indicating crayons or other suitable means.

D.11 Standard Notes HLMR Bearings

1. Refer to the Special Provisions for design, materials, fabrication, and general construction requirements.

2. The actual dimension “H” shall be the responsibility of the Contractor. Dimensions and sizes of plates not shown are dependent on design loads, bearing type, capacity, and the manufacturer of the bearings. The shop drawings, prepared by the manufacturer, shall provide all pertinent bearing information. The final bridge seat elevations shall be determined by the Contractor and submitted with the shop drawings for approval prior to construction of the substructure units.

3. Masonry plates shall be placed on 1/4” thick preformed pads in accordance with the specifications.

4. All steel, except anchor rods, shall be AASHTO M 270, Grade 70W.

(Edit “Grade 55” if a higher strength anchor rod is used.)

5. Anchor rods shall meet the requirements or ASTM F 1554, Grade 55, and shall be swedged on the embedded portion of the rod.

6. Anchor rod spacing shall be coordinated with the bearing manufacturer.

7. Bearing installation shall be in strict conformance with the Special Provisions and the manufacturer’s recommendations.

8. The abbreviation “PTFE” indicates polytetraflouroethylene.

9. The design temperature range shall be 150°F (-30°F to 120°F)

10. At abutment bearings only, all steel located below the PTFE sliding surface shall be coated in accordance with Special Provision, Section 506, Protective Coating-Steel (Thermal Spray Coating). All remaining steel at abutment bearings shall be coated in accordance with Special Provision, Section 506, Protective Coating-Steel (Zinc Rich System).

11. All bearings shall be marked prior to shipping. The marks shall include the bearing location on the bridge, and a direction arrow that points up-station. All marks shall be permanent and shall be visible after the bearing is installed.

(The following note is used if applicable.)

12. Bearings need not be designed with hold-downs.

D.12 Standard Notes Structural Plate Structures

1. One X'-X" diameter Structural Plate Pipe is required. Top plates shall be 0.XXX inch thick, and bottom (three) plates(s) shall be 0.XXX inch thick. The pipe shall be elongated 5% vertically.

2. One XX'-X" span by X'-X" rise Structural Plate Pipe Arch required. Top plates shall be 0.XXX inch thick, and bottom and corner plates shall be 0.XXX inch thick.

3. Ends shall be cut on a 1:1.75 bevel normal to the end skew shown on the details.

4. Riprap adjacent to the pipe shall be carefully placed so as not to damage the pipe and so that the finished slope will match the ends of the pipe. Any extra labor, material, or equipment used will be considered incidental to Item 610.08, Plain Riprap. Any damage done to the structure during construction shall be repaired or replaced as determined by the Resident at the Contractor's expense.

5. Place a 24 inch wide strip of Temporary Erosion Control Blanket along the top of the riprap and over the structure, typical at both ends.

(The following note is used with an aluminum pipe or pipe arch.)

6. End reinforcement devices shall be of aluminum and shall be of sufficient strength to provide a minimum section modulus, about an axis perpendicular to the center of the pipe of 1.10 in^3/ft of pipe circumference. Maximum spacing of the devices shall be 5'-5". Attachment to the pipe shall be with 3/4" galvanized steel bolts. Section properties and details of the device and the method of attachment shall be submitted to the Resident for approval. Payment for end reinforcement devices will be considered incidental to the structural plate structure pay item.

7. The structural plate structure shall be constructed in the dry. The approximate weight of the structure is XXXX pounds.

8. Granular Borrow shall meet the requirements of Subsection 703.19, Material for Underwater Backfill.

D.14 Standard Notes Precast Concrete Arches or Boxes

(The following note is used if applicable.)

1. The precast units shall be designed to carry construction loadings with a minimum fill cover of 18 inches on top of the units.

2. The construction, handling, and assembly of the precast units shall be in accordance with Special Provision Section 534 Precast Structural Concrete, and with the Manufacturer's Specifications as applicable.

3. Install standard membrane waterproofing over the top and to 12 inches down the exterior sides of the precast units.

D.15 Standard Notes Prefabricated Concrete Modular Gravity Wall

1. The Contractor shall provide a Prefabricated Concrete Modular Gravity (PCMG) wall in accordance with Special Provision 635. The PCMG shall be designed and stamped by a Registered Professional Engineer and the design shall be submitted to the Resident for review. Plan Details are shown for estimating purposes only.

2. The precast units shall be manufactured by the following, or equal:

   "T-Wall" as manufactured by a licensed manufacturer of Neel Company.

   "DoubleWal" as manufactured by a licensed manufacturer of DoubleWal Corp., Plainville, Connecticut.

3. The factored bearing pressure for PCMG walls shall not exceed the factored bearing resistance of XX ksf for the strength limit state. The factored bearing pressure for the service limit state shall not exceed the factored bearing resistance of XX ksf.

(The following note is used when the bridge passes over salt water. Edit "corrosion resistant steel" to specify type of bar as described in Section 6.2.1.2 Reinforcing Steel.)

4. The PCMG wall shall consist of Class "LP" concrete and corrosion resistant reinforcing steel.

(The following note is used when cofferdams are required.)

5. Cofferdams for the PCMG wall installation shall be included with Pay Item 511.07, Cofferdam.

D.16 Standard Notes CIP Box Culverts

1. Form a 1 inch V-groove at the front face of vertical contraction and construction joints.

2. Reinforcing steel shall have a minimum concrete cover of 2 inches unless otherwise noted.

3. Place 4 inch diameter drains in the walls and wingwalls at 10 feet maximum spacing. The exact location will be determined by the Resident.

4. Granular Borrow shall meet the requirements of Subsection 703.19, Material for Underwater Backfill.

5. Granular Borrow under the bottom slab may be reduced or omitted if the Resident determines that the existing material is suitable.

6. Cover the vertical contraction and construction joints on the back side in accordance with Standard Detail 502(01). Cover the contraction joints in the top slab in the same manner, but without recessing the concrete.