

**ITEM 10594.9501 M - BULKHEAD, TYPE A**  
**ITEM 10594.9502 M - BULKHEAD, TYPE B**

**DESCRIPTION:**

Work under the Bulkhead, Type A item shall include the installation of treated timber sheet piling, pile shoes, wales, guide piles, anchor piles, drag logs and miscellaneous dimension timber necessary for a completed structure where shown on the Plans. Other work included in this item is the removal of the asphalt pavement, concrete slab and the steel railing embedded in the concrete slab at the north bulkhead. The installation of new asphalt pavement at the north abutment as shown on the Plans is also included in this item.

Work under the "Bulkhead, Type B" item shall include the installation of treated timber sheet piling, pile shoes, wales, guide piles and miscellaneous dimension timber necessary for a completed structure where shown on the Plans.

The work under these items also shall include furnishing and installing all hardware including tie-rods, machine bolts, lag screws, turnbuckles, nails, spikes and other incidental metals necessary for a completed structure.

Additional work included in both "BULKHEAD, TYPE A AND TYPE B" items is the excavation of the fill between the existing and new bulkheads, removal of the tops of the existing bulkheads, removal of chain link fencing that is parallel to the bulkhead. The complete restoration of fill to the original grade, including furnishing and placing fill where subsidence existed and where pavement and concrete has been removed, and incidental work necessary to install the new bulkhead is also included in these items.

Other work included in both "BULKHEAD, TYPE A AND TYPE B" items is the installation of new chain-link fencing along bulkhead and the removal and reinstallation of rip-rap as shown on the plans. The chain link fence along bulkhead is a custom fence as shown on the Plans and herein this specification.

Other chain link fencing in the vicinity of the bulkhead that is removed and replaced as shown on the Plans shall be in accordance to the requirements of NYSDOT Standard Sheet M607-10 and shall be paid for under the items 10607.62 M and 607.3002 M respectively.

**MATERIALS**

A. **BULKHEAD**

All timber used in the construction of the new bulkheads shall be Southern Yellow Pine Dense Structural Grade 65 and shall be in conformance with the requirements of Subsection 712-14. The provisions of Subsection 720-02 for the treated timber piles shall apply.

All timber in the bulkhead construction shall be impregnated with grade No. 1 Creosote oil by the full-cell process and shall comply with the current American Preservatives Association Standard No. C18 for " Standard of Pressure Treated Piles and Timbers in Marine Construction".

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The amount of preservative retained shall not be less than the following values:

Guide piles, sheet piling and dimension lumber: 400.5 kg/cubic meter of timber.

Anchor piles and drag logs: 192.24 kg per cubic meter of timber.

The Engineer reserves the right to inspect all new timbers at the manufacturer's plant before shipment. Upon arrival at the site the piles will be inspected by the Engineer and any piles which do not comply with the specifications will be rejected and shall be removed from the site by the Contractor.

The Contractor shall furnish certification for all timber, providing information on stress grades and creosote treatment, subject to the approval of the Engineer.

Unless otherwise specified, dimension timber for sheeting, wales and planks shall be cut square and surfaced on four sides and shall not be smaller in any dimension affected by the surfacing than shown on the Plans.

Pile butts shall be sawed square and the tips shall be sawed square or tapered to a point not less than 100 mm in diameter. Piles shall be cut above the ground swell and shall have a uniform taper from butt to tip. A line from the center of the butt to the center of the tip shall not fall outside the center of the pile at any point more than 1% of the length of the pile. All knots shall be trimmed off flush with the body of the pile. Piles with sufficient checks to cause weakness will be rejected.

The minimum diameter of the piles shall be 305 mm at a section one meter from the butt, measured under the bark. The minimum diameter of the pile tips shall be 150 mm, measured under the bark. Piles shall have at least 38 mm of sapwood and their diameters shall not exceed 400 mm at the butt.

Pile shoes shall conform to the requirements of Subsection 720-05.

Drag logs shall have a minimum diameter of 203 mm measured under the bark.

Structural steel for tie-rods shall conform to the requirements of ASTM A36 M covering shapes, plates and bars of structural quality. Tie-rods shall be completely galvanized conforming to the requirements of Type I for Subsection 719 - 01. The weight of zinc coating per square meter of actual surface shall average not less than 610 grams.

Machine bolts, drift pins, dowels, nuts, washers, turnbuckles, lag screws, nails and spikes shall be in accordance with the requirements of ASTM 307 and shall be galvanized conforming to the requirements of Type II for Subsection 719 -01. The weight of zinc coating per square meter of actual surface shall average not less than 610 grams.

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The premoulded resilient joint filler shall conform to the requirement of Subsection 705-07.

The Contractor shall submit certifications on all materials to be used in this item.

B. Sand Fill

Sand used for fill between the existing and new bulkhead shall be clean from an upland source, the quality of which shall conform to the requirements of Subsection 703-06. Fill material shall not be dredged from the adjacent waterways.

C. Asphalt Pavement On Grade

The sub-base coarse shall be Type 1 and the requirements of Subsection 304-2 shall apply. The asphalt pavement shall consist of 50 mm thick binder course of Type 3 asphalt concrete and 25 mm thick Type 6 top course and the requirements of Subsection 608-2 shall apply. The pressure treated timber shall be either a southern pine or douglas-fir of dense structural grade conforming to the requirements of Subsection 712-14. The pressure treatment of the timber curbing and stakes shall conform to the requirements of Subsection 708-31. The amount of CCA preservative retained shall not be less 6.41 kg/cubic meter of timber.

D. Chain-link Fencing

The chain-link fencing including the wire mesh fabric, posts and rails shall be galvanized steel in accordance with the appropriate requirements of Subsection 710 - 02 and the Plans. The fence posts and rails shall be schedule 40 and the fence shall have a mesh size of 50 mm fabric with 9 gage coated wire diameter. The concrete post bases shall consist of class A concrete and conform to the requirements of section Subsection 607 - 2.01.

The barbed wire shall conform to the requirements of ASTM A - 121 and shall be hot-dipped galvanized. The fence hardware and fasteners shall conform to the requirements of Subsection 710 - 10.03.

**CONSTRUCTION DETAILS**

A. General

Where an existing timber bulkhead is to be removed, the following shall apply:

B. Excavation

The Contractor shall excavate the fill behind the north and south bulkhead as necessary to install the new tie-backs, anchor piles and drag logs for the Type A Bulkhead or the lengthening of the tie-backs for the Type B Bulkhead. The Contractor should take care during excavation to avoid damaging the tie-backs of the existing bulkhead. In the location of the proposed Type B Bulkhead, if during the Contractor's operations the Tie-back is damaged, the tie-back shall be

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repaired or replaced at no expense to the State or the NCBA by the Contractor. The damaged tie-back shall be repaired or replaced at the direction of the Engineer and performed in a manner satisfactory to the Engineer.

The excavated fill material shall be stored neatly in an area approved by the Engineer. Care shall be taken at all times to avoid discharging fill into the waterways.

The Contractor shall remove and dispose of the existing chain link fencing located along side the north and south bulkheads and the steel pipe railing embedded in the concrete slab within the limits shown on the contract plans and as directed by the Engineer. The railing embedded in the slab may be flame cut at the slab for removal or by any method the Contractor chooses. The steel pipe railing alongside the north bulkhead will be removed, stored and reinstalled by the Nassau County Bridge Authority where shown on the Contract Plans.

The Contractor shall also remove and dispose of the concrete slab, asphalt pavement and sub-base at the north bulkhead to the limits shown on the plans and directed by the Engineer.

The proposed bulkhead shall be installed where shown on the Plans. Upon completion of the proposed bulkhead, the top one (1) meter of the existing bulkhead shall be sawcut and removed as directed by the Engineer.

The Contractor shall remove that portion of the existing bulkhead system as described above as well as any extraneous debris that may interfere with the installation. Bulkhead Removal shall include, but not be limited to piles, tongue and groove sheeting, wales, splicing materials, chain link fencing, railing, miscellaneous hardware, tie-rods, timber deadmen, timber waste (from the cutting of the existing or new bulkhead) and all miscellaneous appurtenances as well as all unsuitable excavated materials shall become the property of the Contractor and shall be disposed of, by him, at location(s) selected by him and approved by the Engineer. Compensation for removal, transportation, and disposal shall be included in the bid price for this item.

A portion of the large stone rip-rap at the west corner of the north bulkhead shall be removed to allow for the installation of the new bulkhead. Upon completion of the new bulkhead, the removed rip-rap shall be replaced as close as possible to its original location and configuration to the satisfaction of the Engineer.

**C. Bulkhead**

The requirements of Subsection 594-3 for the treated timber; guide and anchor piles, sheet piles, wales, cap boards, blocking and drag logs shall apply.

The pile driving operations necessary to install the timber bulkhead shall be coordinated with the bridge deck rehabilitation. Those locations beneath the bridge superstructure where the bulkhead will be replaced, shall be accessed when the concrete deck has been removed allowing the boom of the pile driving equipment to be positioned between the stringers.

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Timber piles and timber sheet piling shall be driven down for the full length shown on the Plans. Full length piles shall be used and no splicing will be permitted. the Contractor shall order piles of such lengths as he may determine to satisfy the requirements stated herein. Resistance to penetration shall not exceed (30) blows per 300 mm.

The heads of all timber piles and sheet piling shall be protected during driving by caps of approved designs. When the area of any timber pile is greater than that of the face of the hammer, a suitable cap shall be provided to distribute the blow of the hammer throughout the cross-section of the pile and thus avoid, as far as possible, the tendency to spilt or shatter the pile. Collars or bands shall be provided where necessary to protect the timber piles against brooming and splitting.

Piles and sheet piles shall be driven with power or gravity hammers. Water jets shall only be used when, in the opinion of the Engineer it is necessary to do so in order to obtain the required penetration. Pile shoes shall be furnished, as needed, for the installation of the timber piles and shall be paid for under the "Bulkhead Type A and Type B" Items.

The procedure used in driving the piles and sheet piling shall not subject the timber pile to excessive and undue abuse producing splitting, splintering or brooming of the piles. Any pile broken or damaged by reason of internal defects, improper driving, driven out of its proper location or from any cause whatsoever shall be removed and replaced with a second pile at the expense of the Contractor.

All piles and sheet piling pushed up by the driving of adjacent or by any other cause shall be re-driven as required.

Where the new sheet piles comes in contact with the existing bulkhead or in any situation where an open joint would result from the trimming of timbers, pre-molded resilient joint material shall be used to form a tight seal.

Bolt holes shall be treated with creosote oil by means of an approved device which will apply the creosote oil to the inside of the hole. Any unfilled holes shall be treated with creosote oil and shall be plugged with creosoted plugs.

Holes for round drift-bolts, dowels and tie-rods shall be bored with a bit 1.5 mm larger than the diameter of the bolt, dowel or drift-bolt. Drift-bolts shall be equal to the least dimension of the dowel or bolt.

Holes for machine bolts shall be bored with a bit of the same diameter as the bolt. Holes for lag screws shall be bored with a bit not larger than the body of the screw at the base of the thread.

A galvanized steel plate washer shall be used under all bolt heads and nuts which would otherwise come in contact with the wood. All bolts shall be effectively checked for tightness after the nuts have been finally tightened.

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Tie rods shall be carefully adjusted so that good alignment of the finished structure is obtained.

Where shown on the Plans, the sheet pile walls shall be braced and aligned by means of timber wales. Wales shall be lapped and jointed at splices and corners, and solidly bolted or fastened together.

C. Sand Fill

The fill behind the new bulkheads shall be carefully placed and the tie-rods adjusted so that good alignment of the finished structure is obtained. Special care shall be taken in tamping the backfill between the existing and new bulkheads to obtain good compaction without exerting undue pressure on the new bulkheads.

The fill shall be up to the level of the top of the new bulkhead as shown on the plans. In general, fill shall be placed in layers not to exceed 150 mm in depth, unless otherwise directed by the Engineer. Each layer shall be well tamped prior to the application of the next.

D. Asphalt Pavement On Grade

The requirements of Subsection 304-3 for the sub-base coarse and 608-3.02 for the asphalt pavement shall apply.

The location of the asphalt pavement shall be laid out as shown on the Plans with pressure treated timber. The pressure treated timber shall act as a form during the placement of the asphalt and sub-base and shall be left in place after placement of the asphalt pavement. The top elevation of the timber form shall equal the finished elevation of the asphalt pavement. The timber stakes shall be nailed to the timber curb with a minimum of three (3) 3.33 mm diameter x 89 mm long galvanized nails with two (2) additional galvanized 3.33 mm diameter x 89 mm long nails nailed from the curb to the stake. The nails shall be staggered to provide even spacing with each other.

The location of asphalt concrete pavement shall be properly graded to conform with pavement cross-section, line and grade. The sub-base shall be compacted and dry before placing the asphalt and all other organic or unstable materials, existing pavement and sub-base shall be removed.

E. Chain Link Fence

The Contractor shall remove and dispose of the chain link fencing and the pipe railing that is embedded in the concrete slab at the north bulkhead and the chain-link fencing at the south bulkhead as shown on the Plans and directed by the Engineer. The Contractor shall install new chain-link fencing as shown on the Plans and in conformance to the requirements of Subsection 607 - 3 after completion of all construction and grading operations. The new chain-link fencing shall be spliced securely to the existing chain-link fence at the west end of the north bulkhead and to both the east and west ends at the south bulkhead.

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The new fence shall be 1.829 meter high and shall be constructed of galvanized steel with continuous top and bottom rails. Post spacing shall not exceed 3.05 meters.  
The new fence shall be furnished its full length with three parallel strands of barbed wire mounted along the top rail as shown in the Plans.

The Nassau County Bridge Authority will be responsible for the removal, storage and reinstallation of the pipe railing at the north bulkhead for the limits shown on the Plans.

**METHOD OF MEASUREMENT**

This work will be measured as the number of meters of bulkhead satisfactorily installed in place. The measurement will be taken along the top centerline of the bulkhead sheeting.

**BASIS OF PAYMENT**

The unit price bid per meter of bulkhead for both "Bulkhead Type A and Type B" items shall include the cost of furnishing all labor, materials, equipment including pile driving machinery, pile shoes and all else necessary and incidental to complete the work described in this Specification, in the Contract Drawings or directed by the Engineer. The work shall include the following: removal and disposal of the tops of the existing bulkhead, chain link fencing, excavation and backfill, partial removal of existing timber bulkhead and installing new bulkhead including piles, timber wales, lumber sheeting and complete tie-back systems as shown on the Plans.

The removal of the asphalt pavement, concrete slab and the embedded pipe railing as well as the installation of the new asphalt pavement shall be paid for under the "Bulkhead Type A" item only.