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DEPARTMENT OF TRANSPORTATION
Office of Engineering

**MIDDLESEX COUNTY STANDARDS FOR
CULVERTS OR BRIDGES**
(revised 12/2024)

Concrete box culverts, concrete rigid frames and prestressed adjacent concrete box beams on concrete abutments are the preferred structure types. Timber, Gabion, masonry structures and corrugated metal structures will not be allowed. Extensions of any culvert or bridge older than 50 years at the time of construction will be prohibited. It is preferred that all utilities transverse under or adjacent to any Middlesex County structure. The utility must demonstrate the need to occupy a utility bay at the discretion of the County.

Documents to be forwarded for review (One Electronic PDF)

DEP Permits with drainage computations and hydraulic calculations

Roadway: plan, profile, cross-section, Staging and MPT Plans

Culvert/Bridge: Demo plan, GPE, all structural details

Computation: Structural Report including geotechnical report with boring information. If a computer analysis is utilized for any computation, the program should be provided.

Other permits such as wetlands and soil erosion.

NOTE a) All drawings must be 22" x 36" in size; and if more than one engineer is involved, drawings must be coordinated and presented as one package rather than various separate submissions.

Drawings must be numbered.

All drawings must be in AutoCAD and conform to Middlesex County Standards.

All drawings and computations must be signed and sealed by a Professional Engineer licensed in the State of New Jersey.

All utilities must be shown on the plans & profile.

Plans and specifications must follow the latest NJDOT Design Manual for Bridges and Structures.

Minimum Requirements for Concrete Box Culvert or Concrete Rigid Frame



The thickness of walls and roof slabs shall be 12" minimum.

Stress Requirements:

Concrete

Ultimate compressive strength at 28 days $f'_c = 5000$ psi.

Extreme fiber in compression $f'_c = 2000$ psi.

Reinforcement steel shall be (Grade 60) $f_s = 24,000$ psi.

All reinforcing steel shall have a 2" minimum cover.

Design Specifications:

AASHTO LRFD Bridge Design Specification, Fifth Edition, 2010, as modified by the latest NJDOT Design Manual for Bridges and Structures.

Construction Specification:

2019 NJDOT Standard Specifications for Road and Bridge Construction as modified by the special provisions Design Live Load Vehicle

A.A.S.H.T.O. – HL-93 Vehicular Live Loading or Tandem

24-KIP Axles at 4'-0" centers whichever produces greater stress, + 30 PSF for future wearing surface.

Additional Requirements:

1" dia. Tie Rods or equivalent galvanized steel strands through 2" dia. Sleeves shall be provided as shown on the drawings.

Structural concrete inserts, where used, shall be type EC-2 as manufactured by Richard Anchor Co., Inc. or approved equal. Plastic or Rubber inserts will NOT be allowed.

II. Approved Joint Filler, Lug Plate, Shear Connectors, Lifting Lug, Hand-Hole Pockets, shall be provided, and shown on the Shop Drawings.

Reinforcing steel to be determined by a Licensed Professional Engineer of the State of New Jersey, to be retained by the Contractor (Drawings should be signed and sealed).

All exposed faces of the Culvert shall be finished with Cement Mortar Grout to produce a smooth surface of uniform color satisfactory to the Engineer.

All reinforcement steel in the top slab of the Culvert shall be epoxy coated or galvanized according to ASTM A 767, Class 1.

All concrete shall be from a State approved job mix.

A waterproof membrane shall be placed directly on the culvert.



A concrete parapet with concrete pylon on each end (minimum height of 3"-6") shall be constructed on the culvert. The parapet shall receive architectural treatment (form liners and staining) Utilities shall not be attached to the parapet.

A concrete cutoff wall (3" depth) shall be constructed under each end of concrete culvert.

A concrete sidewalk 5' width shall be constructed on each side of the culvert.

4" weepholes on each culvert cell shall be supplied, backfilled with 3/4" clean stone, filtered, and shall be located 1' above normal water level.

XIV. All wing walls shall be cast in place concrete on cast in place concrete footings. Timber or Gabion walls will NOT be allowed.

Construction Inspection

All construction activities, including shop drawing and material review, must be overseen by a licensed professional engineer in the state of New Jersey and submitted to the County.

Daily inspection reports, including photos, shall be generated and sent to the County on a weekly basis.

Biweekly meetings shall be held to review project progression and address any County concerns.

Upon construction of the structure, submit the following (Paper copy and CD):

Once construction is complete, certification by a licensed Professional Engineer that same has been constructed in accordance with the plans and specifications.

Test Results:

Concrete Cylinder

Porous Fill

Borrow Excavation

Material certifications

As built Drawings which conform to the following standards:

All AutoCAD files must be drawn with the following spatial reference information:

Vertical:

NAVD_1988_Foot_US

WKID: 105703 Authority: ESRI

Linear Units: Foot_US

Direction: positive up

Vertical Shift: 0.0

Vertical Datum: North_American_Vertical_Datum_1988

Horizontal:

Projected Coordinate System Name: NAD_1983_2011_StatePlane_NewJersey_FIPS_2900_Ft_US

Projection: Transverse Mercator

False_Easting: 492125.00000000

False_Northing: 0

Central_Meridian: -74.50000000

Latitude_of_Origin: 38.83333333

Linear Unit: Foot_US

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Geographic Coordinate System Name:

GCS_NAD_1983_2011

Angular Unit: Degree
Prime Meridian: Greenwich
Datum: D_NAD_1983_2011
Spheroid: GRS_1980
Semi major Axis: 6378137
Semi minor Axis: 6356752.314140356
Inverse Flattening: 298.257222101

Coordinates needed for all features in the Construction section of the final submittal package.

Features include:

Inlets
Traffic Signals
Water Valves
Stormwater Detention/Retention Ponds
Manholes
Drainage Chambers
Water Quality Structures
Hydrants
Drainage Outfalls
Other Drainage Structures
End Section (beginning and end coordinate points)
Walls (beginning, end, and angle coordinate points)
Guiderails (beginning and end coordinate points)
Fencing (beginning, end, and angle coordinate points)
Bridges (center, beginning and end)
Culverts (beginning and end)
Property Monument Markers
Signs
Buildings (one coordinate for each corner of the building footprint)
ADA ramps with DWS Marking
Rights of Way
Centerlines
Station Points
Sidewalks
Curbs (beginning, end, and minimum 3 points at each curve – one at the start, center, and end of curve)
Gates (beginning and end point)

Asset Inventory

Collected Attribute Descriptions stored in Drawing

Inlets - Type, NJDEP Litter Grate Compliance, Bicycle Grate Compliance, Elevation, Inspection Date, Municipality
Traffic Signals - Pole Type, Pole Material, Assembly Count, Municipality, Elevation, Inspection Date
Water Valves – Valve Type, Water Type, Municipality, Elevation, Inspection Date
Stormwater Detention/Retention Ponds – Pond Type, Area in SQ FT, Perimeter size in FT, Vegetation Type, Municipality, Center Elevation, Inspection Date
Manholes – Type, General Location, Diameter, Manhole Depth, Owner, Condition, Municipality, Elevation, Inspection Date
Drainage Chambers - Type, General Location, Diameter, Material, Elevation, Elevation, Inspection Date, Municipality
Water Quality Structures – Structure Type, Structure Material, Structure Function, General Location, Elevation, Inspection Date, Municipality
Hydrants – Type, Operation Status, Flow Rate, Location, Municipality, Elevation, Inspection Date
Drainage Outfalls – Type, Location, Diameter, Material, Elevation, Inspection Date, Municipality
Other Drainage Structures - Type, Location, Diameter, Material, Elevation, Inspection Date, Municipality
End Section - Type, Elevation, Pipe Material, Pipe Diameter, Location, Inspection Date, Municipality
Walls – Wall Type, Wall Material, Peak Wall Height, Wall Thickness, Wall Length in FT, General Location, Elevation, Inspection Date, Municipality
Guiderails – Type, Material, Condition, Length in FT, Road Location, Road Name, Owner, Municipality, Elevation, Inspection Date
Fencing – Type, Material, Height in FT, Length in FT, General Location, Installation Date, Owner, Inspection Date, Elevation, Municipality
Bridges – Name, Type, Material, Year Built, Maintained By, Height in FT, Length in FT, Road Location, Municipality, Elevation, Inspection Date



Culverts – Type, Material, Diameter, Length in FT, Road Location, Maintained By, Elevation, Inspection Date, Municipality
Property Monument Markers – Material, General Location, Elevation, Monument Face Details, Owner, Municipality, Inspection Date
Signs – Municipality, MUTCD Designation, Sign Text, Support Type, Sign Condition, Road Location, Elevation, Inspection Date
Buildings – Name, Footprint SQ FT, Address, City, State, ZIP, Municipality, Owner, Ownership Status, Floor Levels, Year Built, Total SQ FT, Elevation, Inspection Date
ADA Ramps with DWS - Pavement Location, Municipality, County, UDOT Region, Street Name, Elevation, Inspection Date
Rights of Way – Municipality, ROW Type, Owner, Street Name
Centerlines - Construction Project Name, Date Drawn
Station Points – Measurement in FT at that station point
Sidewalks – Material, Width in FT
Curbs – Elevation, Curb Type
Gates – Gate Type, Length in FT, Height in FT, Material

NOTE

The county shall assume responsibility of a structure located within the road right-of-way. Responsibility for any part of the structure beyond the road right-of-way shall not be assumed by the County.

The County shall not assume responsibility for any structure that does not meet County specifications and approval.

A Middlesex County Road Opening Permit shall be obtained prior to any work commencement.

The County has the right to stop any work being performed within the public right-of-way if work does not conform to the requirements set forth within this

