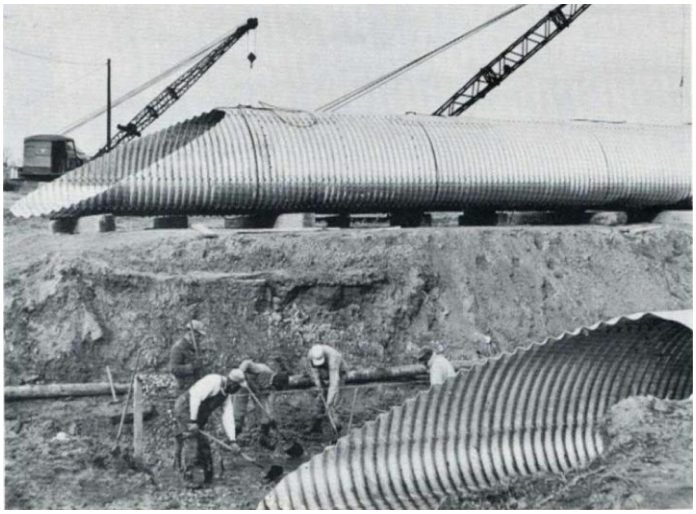
Final: National Register Evaluation for Twin Arched Pipes

Known as Bridge 2-158A on Chestnut Grove Road over Cahoon Branch

In association with State Contract T201107204 and Federal Aid EBROS-K158(01)



PREPARED BY: DELAWARE DEPARTMENT OF TRANSPORTATION

Michael C. Hahn, AICP and Nathaniel Delesline

August 2012

Introduction

The Delaware Department of Transportation (DelDOT) is proposing to remove two twin corrugated metal arch pipes. Although pipes, the location and structural elements are more commonly referred to as Bridge Number 2-158A on Chestnut Grove Road. The project area is northwest of the City of Dover, Kent County, Delaware. A project location map identifies the project area. The project area has some rural open farmland surroundings, but is mostly a mix of suburban land use with areas of subdivisions and strip development lots.

Under State Contract Number T201107204 and in partnership with the Federal Highway Administration (FHWA) as the lead federal agency, the project intends to remove the dual pipes due to structural deterioration. The metal has pitted and corroded. As such, the project involves the replacement of twin corrugated metal pipe arches with a three sided precast concrete rigid frame with wing walls. Additional work includes minor reconstruction of the approach roadway, replacement of existing guardrail, and placement of riprap for scour protection. The proposed structure will be exceeding 20' feet in span length, thereby qualifying the effort to be a bridge replacement and a federally recognized effort.

The Area of Potential Effect (APE) includes the dual or twin pipes. This is the same area where the new bridge will be spotted. The project will take place within the same crossing footprint along Chestnut Grove Road. As such, consideration of the pipes and whether they fall into or out of DelDOT's existing Programmatic Agreement for Section 106 review was considered.

The pipes were constructed or fist installed at this location under State Contract Number 1927. This contract called for replacement of Bridge No. 158A that consisted of a timber structure crossing. The contract also called for vast improvement upgrades to the same road (i.e. Road 158) since it was a narrow dirt road. This same contract effort was repeated for two additional locations for similar waterway crossings and roadway upgrades along Road 162 and Road 203 in Kent County. Thus, State Contract 1927 had three structural bridge/culvert/pipe projects and similar upgrades to the roadway as part of one overall project or contracted effort.

DelDOT's Annual reports are not clear, but the pipes subject to this evaluation would have been installed and competed between July 1961 and July 1962. "As-Built" plans (essentially when the contract was completed and accepted) are dated July 8, 1962. A black and white photograph from the 1962 Annual Report was found.

In addition, upon DelDOT's qualified staff's review of the project, the dual corrugated piping can be classified as a bridge. Each multi-pipe arch dimensions are 10' 3" in width. There is also a small spacing of fill between each pipe. Thus, the total span length is 24' at right angles to the axis of the pipe arches. By definition, this would classify the pipes as a bridge and eligible for federal funding.

With the structure meeting the 50+ year old minimum age criteria for National Register consideration and the fact that the structural elements can be federally classified as a bridge type,

this project undertaking did not meet the Department's Programmatic Agreement for projects that could be waived from further Section 106 review and consultation with the SHPO. As such, this is a single cultural resource property evaluation consisting of the footprint and approaches of the crossing structure. The survey area was 0.04 acres.

As such, DelDOT cultural resource staff, recognized as meeting the Secretary of the Interior's Professional Qualification Standards in the fields of history, architectural history, or historic preservation completed the following evaluation. Their resumes are attached.

S**ummary**

Based on the lack of significance, Bridge 2-158 is not eligible for listing on the National Register of Historic Places. The survey was conducted in July 2012 by Michael C. Hahn with assistance from Nathaniel Delesline. All original materials may be found at DelDOT, or at the Delaware State Historic Preservation Office in Dover, Delaware.

Location:

Chestnut Grove Road (Road 158), over Cahoon Branch, Kent County, Delaware.

Initial Date of Construction:

Installed and contract project complete between July 1961 and July of 1962.

Description:

Twin corrugated metal pipes (arched), supported by stacked sand cement riprap.

Builder or Contractor:

George & Lynch, Inc. Dover; Fabricated at ARMCO Drainage & Metal Products, Inc., Middletown, Ohio (now Contech).

Dimensions:

- Width: 20.00 feet (paved roadway)
- Length: 76.00 feet
- Pipe span: 2 @ 10 feet, 3 inches
- Pipe rise: 6 feet, 9 inches
- The two pipes combined together exceed 20 feet in length and would be qualified as a bridge for federal funding

Relevant Materials:

Photographs and plan sheets are included. CRS forms and resume of the Principal Investigator.

Contracts:

Under State Contract 1927, the relevant plan or contract sheets are included.

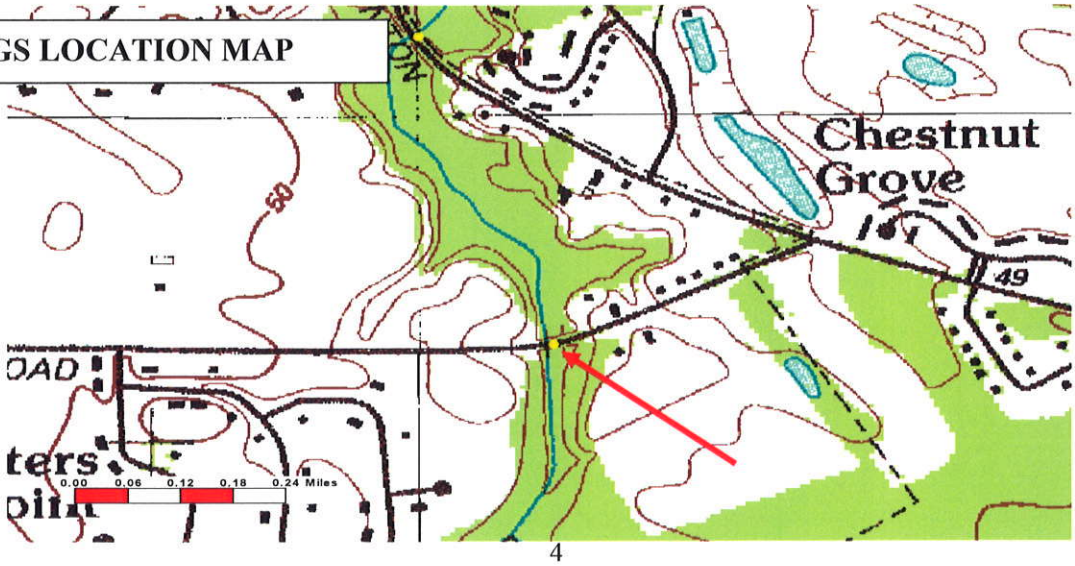
Alterations:

Wire rope guard fence (guardrail) has been upgrade to galvanized W-steel with steel posts and lengths extended in approach distance. The travel surface shoulders have been widened and improved.

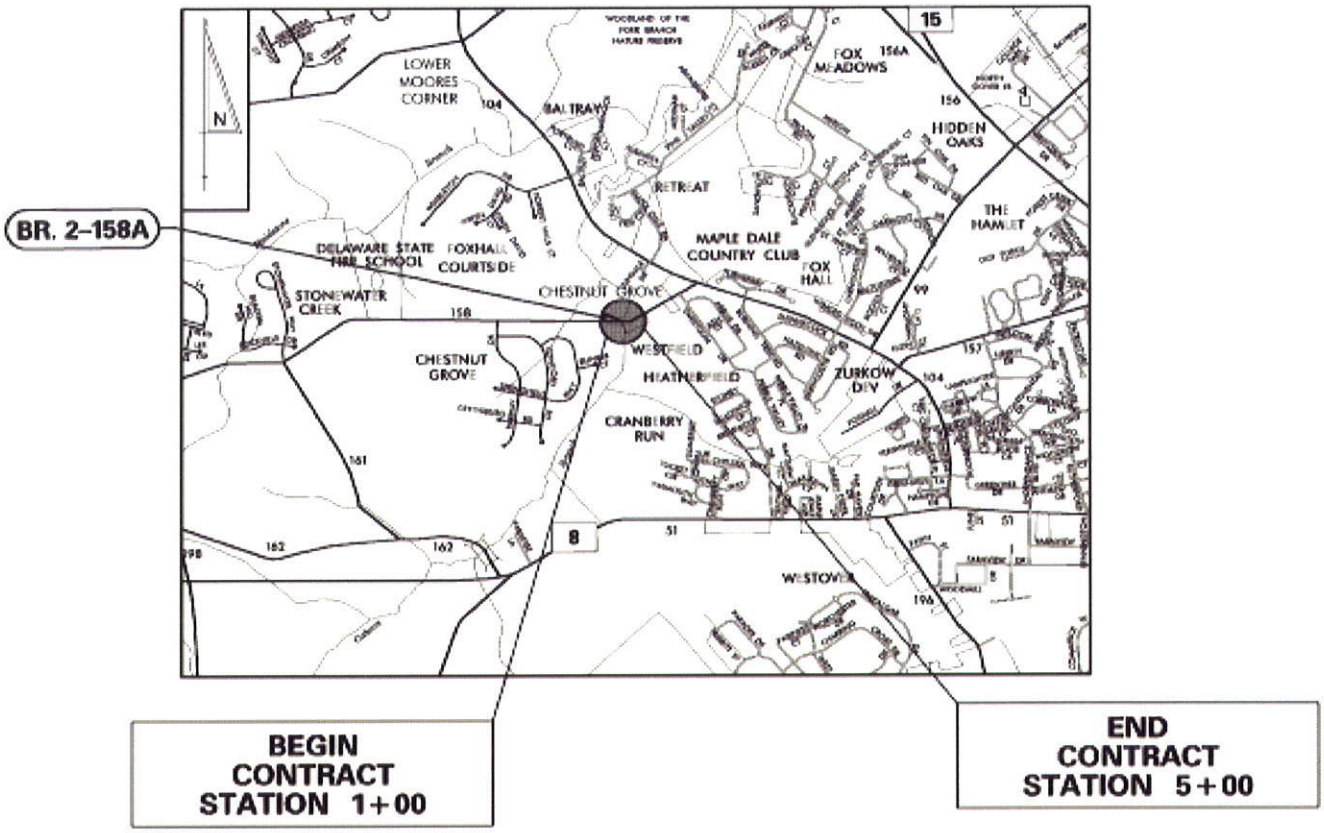
Background History and Research Design Effort:

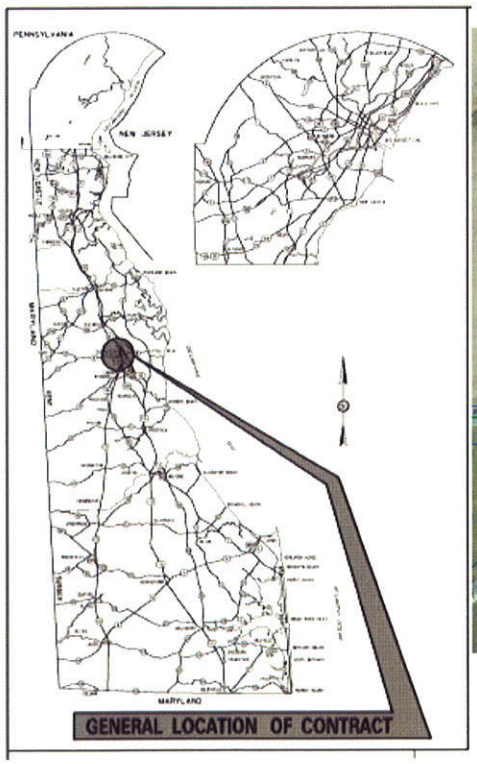
DelDOT researched the Area of Potential Effect (APE) using Delaware State Historic Preservation Office (DE SHPO) electronic mapping system (CHRIS) to identify any National Register eligible resource within the APE. None such adjacent properties exist. Primary and secondary-source research included DelDOT contract plans and annual reports. Historic maps, atlases and aerial photographs were viewed through a variety of online resources, including the Delaware DataMIL. As a point of reference, the Maryland State Highway Administration prepared a historic context report for *Small Structures on Maryland's Roadways* (Parsons Brinckerhoff Quade & Douglas, Inc, June 1997). This existing report provided further guidance and support for historic evaluations of small structures that may resemble a bridge, but are less than twenty feet long. As such, individual pipes and/or culverts that are transportation related structures can be adequately discussed for their National Register potential. DelDOT's Bridge Management personnel were also consulted on general time frames and trends in use of different drainage and structural materials that are evident along Delaware's roadways.

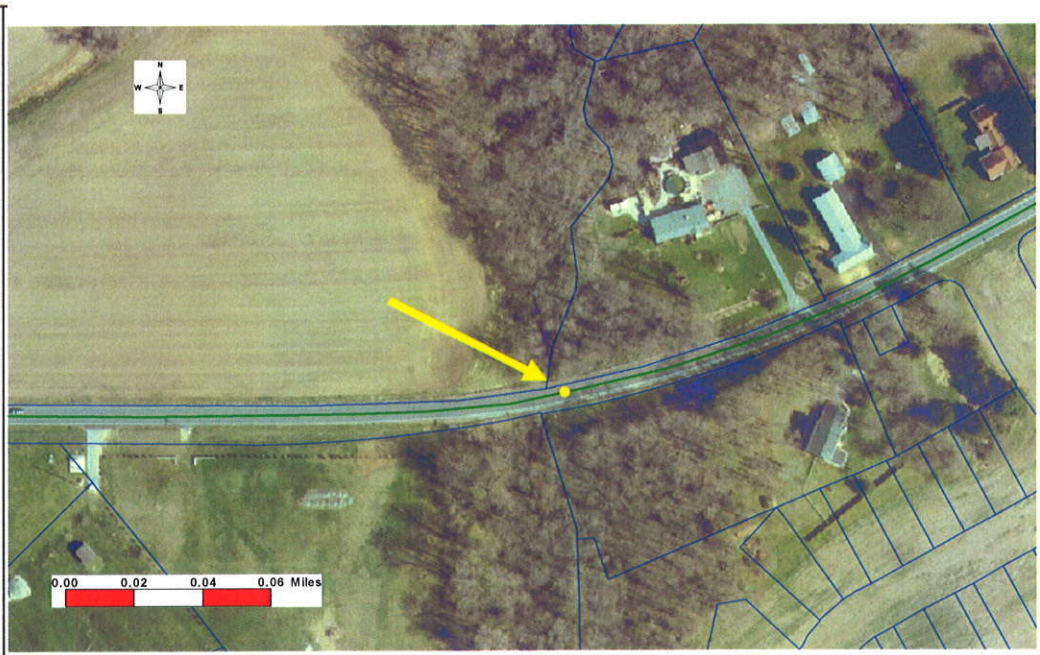
USGS LOCATION MAP



Project Location Maps and 2007 Aerial







Research Objective and Method:

In order to comply with the requirements set forth in Section 106 of the National Historic preservation Act of 1966, as amended, an intensive-level historic architectural/engineering survey had as its objective and method in the identification and National Register assessment of this single structure. This was a limited scope and was undertaken only after the confirmation that this potential resource met the minimum 50+ year age requirement. The identified property was then surveyed on the intensive level and documented on DE SHPO Cultural Resource Survey (CRS) forms. The surveyed property was then evaluated against the National Register Criteria for Evaluation to determine its significance. No other efforts were necessary. During DelDOT's internal Bridge Scoping of this project nearly two years ago, adjacent properties were known to be contemporary or were considered of a floodplain and wetland nature that would not be affected by the undertaking. As such, no further identification or evaluation efforts for Section 106 were necessary for standing structures.

Background Context and Understanding:

Pipes are ubiquitous and have continued in use through the 20th century and up to the present time for either drainage needs under roadways, or to allow passage of small waterway systems under the roadway. The use of the iron and tile pipes of the early part of the 20th century has been superseded by use of concrete and corrugated metal pipes. The use of high density polyethylene (HDPE) is a current and popular piping alternative serving a liner for corroded steel and as a new material replacement. HDPE is a 21st century use. Pipe arches, which best characterize this subject evaluation, came into common use after World War II. In Delaware, the use of reinforced concrete and corrugated steel pipes for larger drainage needs that could classify them on a Delaware roadway as a bridge type for eligible funding became more common practice by the mid-1960s. However, it is estimated that use and function of reinforced concrete and corrugated steel for pipe drainage was very commonly used for smaller projects beginning in the 1940s (i.e. following World War II).

As small structures or objects on Delaware roadways, pipes are generally cross drainage structures situated below and perpendicular to the roadway surface. Many of these are often referred to as pipe culverts and are incorrectly phrased or referred to as bridges. Unless they meet the definition and engineering criteria type of a bridge and/or culvert under the National Bridge Inventory, they are a separate category of drainage and functional structures. However, when multiple pipes (or culverts) are used or the spacing between them is considered, they can be re-classified or considered a bridge for federal funding needs under the National Bridge Inventory (NBI). If skews from the pipe or multiple pipe crossing are evident, the maximum distance is also determined. This determination is made for federal funding and participation needs, which may also qualify that crossing as a bridge. In reality, attempting to reach a specified span or systems length of 20 feet is an unjustified nomenclature in calling the design and function of a pipe, a bridge. Distance calculations are only developed and applied for funding needs. However, this approach is still applied and pipes are often referred to as a "bridge" in the vernacular.

Earthen fill can be placed to the sides of the pipe and/or between the pipe and the roadway. End walls can be separately installed and may consist of concrete sacked, concrete, or rip-rap/stone. The pipe is generally a round structure, but can be elliptical or arched. Pipe culverts can be of cast iron, tile, corrugated metal or concrete. HPDE is the newer technology and is phasing out the use of metals because of their corrosive effects. In metal pipes, the pipe is generally made of a single plate, formed and welded. A variation of this is the pipe arch that generally consists of an arched section of pipe. Diagrams and illustrations of concrete and metal pipes are provided by the Federal Highway Administration.[1]

Wrought iron is no longer used for pipes; most iron pipes would pre-date World War I. Concrete use for piping has been widely used throughout this century and is very difficult to date. Unknown at this time for Delaware, extant corrugated metal pipes and corrugated metal pipe arches may date as far back as 1930s. However, they would not be any greater than 48 inches in diameter. The Maryland State Highway Department has documented metal corrugated pipe use from the 1930's. Further research is needed in Delaware to determine the first use of corrugated metal pipes and their typical dimensions. However, given the transportation and technology trends adopted by State Highway Departments as well as recognition by the Federal Highway Department and the American Association of State Highway and Transportation Officials, corrugated metal pipes were likely first used in Delaware during this same time period (1930s). DelDOT Bridge Management officials believe that the 1960s is the date of corrugated metal pipes that would be applied as structural crossings under roadways. Based on contract plan research and 22 years of experience at DelDOT's with bridge and district maintenance coordination, the authors of this document can agree this is true along with the fact individual steel (or aluminum) piping projects with multiple pipes might be installed on the less traveled roadways in rural areas. However, given undocumented records, it is difficult to confirm. Corrugated steel pipes may have been first used by others supporting driveway and entrance egress to the state's right of way before they were expanded as part of the roadway. Finally, pipe arches date generally from the 1930s to the present. Many of these are directly associated with modern Interstate construction of the early and mid 1960's.

As suggested, pipes have been widely used in various forms along or within the State's Public Right of Ways and are widely undocumented. Materials have evolved as technology has advanced, but the pipe's basic design, use, and installation technique have not changed. Pipes are found under roadway drainage and throughout the state. They are, perhaps, the most widely used as a small structure on the state's roadways. Many pipes are installed for collection and distribution of drainage runoff not only from the road, but from other land use improvements of adjacent properties along roadways and streets. Other pipes are installed privately underground to channel or connect the passage of water into the state right of way and as part of a larger drainage and distribution effort.

[1] The two diagrams are actually found in Maryland State Highway Administration historic context report for *Small Structures on Maryland's Roadways* (Parsons Brinckerhoff Quade & Douglas, Inc, June 1997). The bibliography did not make a firm reference upon where the FHWA diagrams were developed and used from a 1991 report.

Various forms of pipes and piping transport are not recorded nor are tracked within DelDOT's Bridge Management inventory until they are first qualified as a bridge meeting or exceeding 20 feet. More recently (starting 2007-2009) DelDOT's Bridge Management have been identifying pipes and pipe crossing that do not necessarily qualify themselves as a National Bridge Inventory (NBI) bridge, but are a culvert, multibeam, box, beam, or slab crossing under a state maintained roadway. One hundred and sixty locations have been identified, but this assessment is not complete and continues to grow on a case by case basis. In addition, if not replaced in the last 15 years, the number of pipes, culverts, or drainage systems that may lie under a road within a subdivision street is unknown. This would also be true for the number of adjacent pipes that offer egress to a residential property. Lastly, beyond what Bridge Management may have recorded, the DelDOT maintenance districts throughout the state do not record or keep track of pipes or other drainage structures/crossroad pipes, until there is a project replacement or new wetlands permit application. Thus, there could be in the hundreds or thousands of smaller crossroad pipes (metal or concrete) in the state. Many of their initial construction dates are completely unknown.

In sum, it is unknown how many unrecorded pipes and/or drainage culverts actually lie in the state's public right of way (i.e. under a road or adjacent). This includes the number of subdivision roadway and egress driveway areas. This task would be an enormous effort to track and its accuracy would be difficult to determine. Ages of these structures would be difficult to determine, but past road plans, subdivision plots, entrance permits, and land use development plans, soil conservation service records, and/or aerial photographs could help.

According to the historic context efforts undertaken by the Maryland State Highway Administration, pipes and pipe arches are not important as a standardized structural type and have no technological significance. In addition, they do not fit within the significant contexts developed for small structures as recognized by the FHWA and various State Highway Departments. Consequently, these structures would never be individually eligible for the National Register, nor would they be considered contributing components of historic districts because they are ubiquitous and difficult, if not impossible, to date (Parsons Brinckerhoff Quade & Douglas, Inc, June 1997). By this same virtue, the same can probably be said about Delaware pipes and pipe arches (i.e. both steel and concrete).

With exceptions, pipes and pipe arches could be considered a contributing element of a Historic District, but only if it has integrity and fits within the district's period of significance. In addition, they could be contributing as part of a significant public works project such as a major dam, causeway, mill industry, or flood control project. They would not be eligible on their own, since they probably serve and are associated with something much a greater. In sum, all forms of pipes, which because they are so common, are very hard to date and possess no technological significance. For most cases in Delaware, they should be neither individually eligible, or eligible within a historic district.

Evaluation:

Bridge 2-158A a twin pipe arch system is being evaluated for the National Register of Historic Places. The twin pipes combined together exceed 20 feet in length and would qualify as a bridge (23 CFR 650.305). The present bridge, a multiple corrugated metal pipe (CMP) system, is supported by sacked sand cement rip rap and was first constructed mid-1961 and completed by mid-1962. Realistically, in order to be eligible under Criterion C of the National Register of Historic Places, a structure with corrugated pipes would need to be an early unaltered example of a construction method, and historically associated with larger water control projects, such as the reconstruction of spillways and damn control measures that could have historic association with the crossing. Bridge 2-158A is a replacement for previous timber bridge at this location. This was not a former mill structure location and the water channel has been significantly straightened and widened under its 1961/62 contract. The bridge or corrugated pipes at this location is such a common example and does not exhibit any outstanding features or engineering accomplishments, nor does it have known associations with any distant milling or other historic activities. The pipes are not in a historic district and would not qualify itself as a multiple resource evaluation. Furthermore, Bridge 2-158A has lost of design integrity due to some structural deterioration.

The structure at this location does not maintain association with events that have made a significant contribution to the broad pattern of our history. The Department as well other entities, including private property owners, have always undertook pipe installations and replacement of corrugated drainage structures to be an economic and functional measure for drainage needs. This pipe crossing may have been one of the earliest documented uses of larger corrugated steel piping used on and under Delaware roadways, but this does not make that event significant. Even so, according to Bridge Management Records (those recorded), this early 1960's pipe effort was not the first of its type. Others efforts predate this.

In sum, installation of pipes and/or culverts is a common cause for many projects and bears no significance. Due to the standard design, setting, and location, Bridge 2-158A is not associated with individuals significant to state, local or national history. No additional information or historical revelations are likely to be gained from further investigation.

As such, the dual or twin corrugated steel pipes, when combined together, may be called Bridge 2-158A for funding needs. It is not recommended eligible for the National Register of Places under Criteria A, B and C. Under Criterion D, its construction methods are commonly known and documented.

Conclusion and Recommendations:

An intensive-level architectural/engineering survey was conducted within the APE for the replacement of Bridge 2-158A in East Dover Hundred, Kent County, Delaware. The resource was not found or recommended eligible for the National Register of Historic Places. For pipes and pie crossings that may or may not be defined as a federally recognized Bridge under 23 CFR 650.305, it is recommended that the "Background Context and Understanding" developed for State of Maryland and now for Delaware in this evaluation be universally applied and adopted

for future DelDOT undertakings. There is nothing significant in pipes (regardless of material) as a bridge type, culvert, and/or crossroads drainage structure, or as part of a drainage system.

References:

www.conteches.com (web site of former steel pipe ordering fabricator; see their history link).

DataMil Aerial Photography.

DelDOT Bridge Management Systems – documented inspections and specifications.

DelDOT Road Plans under State Contract 1927.

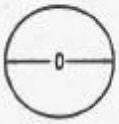
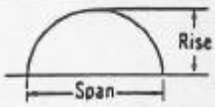
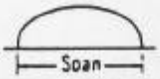
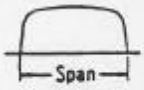
DelDOT Annual Reports, 1959, 1960, 1961, 1962.

Conversations and Information Query with Mr. Jason Arndt, Section Manager and Division Engineer for DelDOT's Bridge Management Section.

Maryland State Highway Administration prepared a historic context report for *Small Structures on Maryland's Roadways* (Parsons Brinckerhoff Quade & Douglas, Inc, June 1997).

SHAPE	RANGE OF SIZES	COMMON USES
CIRCULAR 	12 to 180 inches reinforced 4 to 36 inches non-reinforced	Culverts, storm drains, and sewers.
PIPE ARCH 	15 to 132 inches equivalent diameter	Culverts, storm drains, and sewers. Used where head is limited.
HORIZONTAL ELLIPSE 	Span x Rise 18 to 144 inches equivalent diameter	Culverts, storm drains, and sewers. Used where head is limited.
VERTICAL ELLIPSE 	Span x Rise 36 to 144 inches equivalent diameter	Culverts, storm drains, and sewers. Used where lateral clearance is limited.
RECTANGULAR (box sections) 	Span 3ft to 12ft	Culverts, storm drains, and sewers. Used for wide openings with limited head.
ARCH 	Span 24 ft to 41 ft	Culvert and storm drains. For low, wide waterway enclosures.

Concrete Pipe Shapes (Source: FHWA 1991:19-4).

Shape	Range of Sizes	Common Uses
Round 	6 in–26 ft	Culverts, subdrains, sewers, service tunnels, etc. All plates same radius. For medium and high fills (or trenches).
Vertically-elongated (ellipse) 5% is common 	4–21 ft nominal: before elongating	Culverts, sewers, service tunnels, recovery tunnels. Plates of varying radii; shop fabrication. For appearance and where backfill compaction is only moderate.
Pipe-arch 	Span x Rise 18 in. x 11 in. to 20 ft 7 in. x 13 ft 2 in.	Where headroom is limited. Has hydraulic advantages at low flows. Corner plate radius, 18 inches or 31 inches for structural plate.
Underpass* 	Span x Rise 5 ft 8 in. x 5 ft 9 in. to 20 ft 4 in. x 17 ft 9 in.	For pedestrians, livestock or vehicles (structural plate).
Arch 	Span x Rise 6 ft x 1 ft 9½ in. to 25 ft x 12 ft 6 in.	For low clearance large waterway opening, and aesthetics (structural plate).
Horizontal Ellipse 	Span 20–40 ft	Culverts, grade separations, storm sewers, tunnels.
Pear 	Span 25–30 ft	Grade separations, culverts, storm sewers, tunnels.
High Profile Arch 	Span 20–45 ft	Culverts, grade separations, storm sewers, tunnels. Ammo ammunition magazines, earth covered storage.
Low Profile Arch 	Span 20–50 ft	Low-Wide waterway enclosures, culverts, storm sewers.
Box Culverts 	Span 10–21 ft	Low-wide waterway enclosures, culverts, storm sewers.
Specials	Various	For lining old structures or other special purposes. Special fabrication.

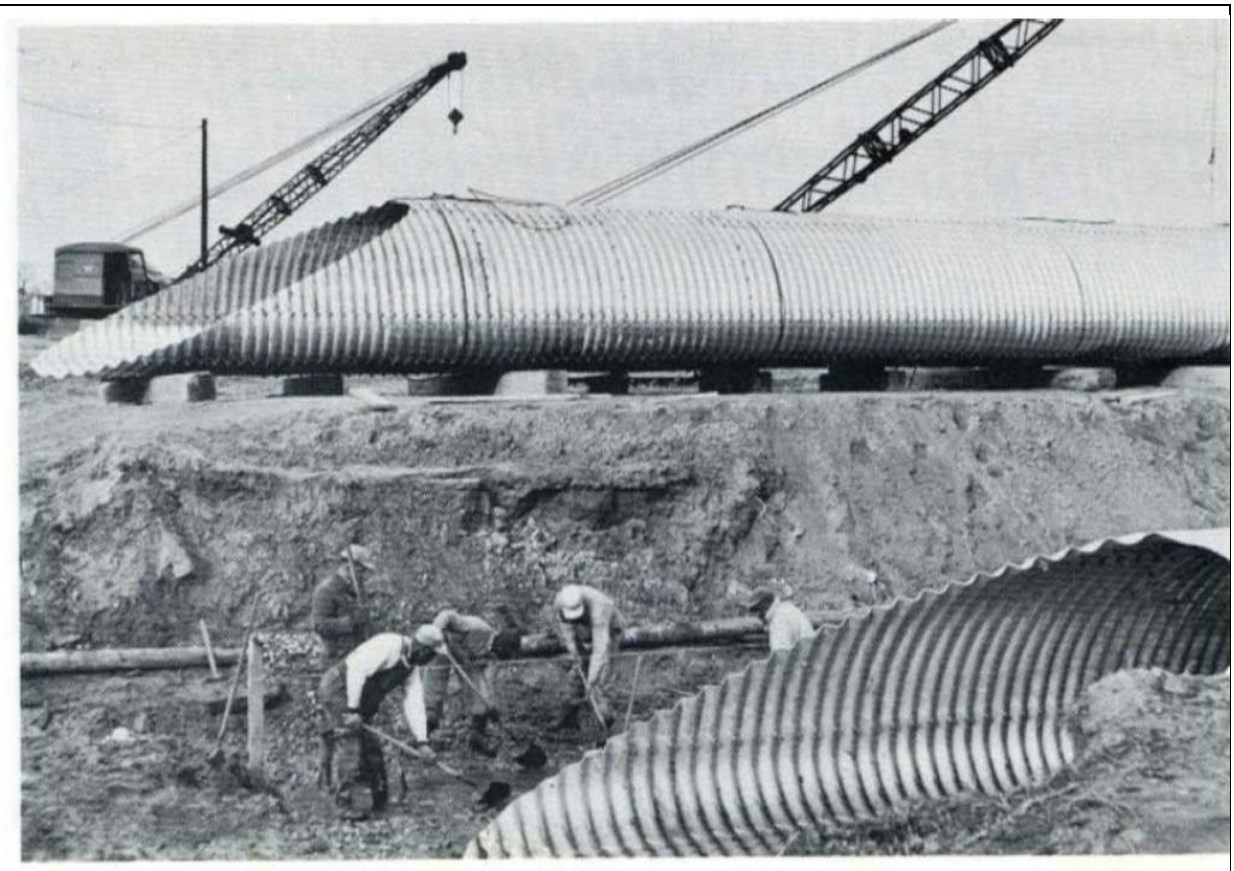
Standard Corrugated Steel Culvert Shapes (Source: FHWA 1991: 19-5)

South Elevation

General View Inside Either Pipe Looking South

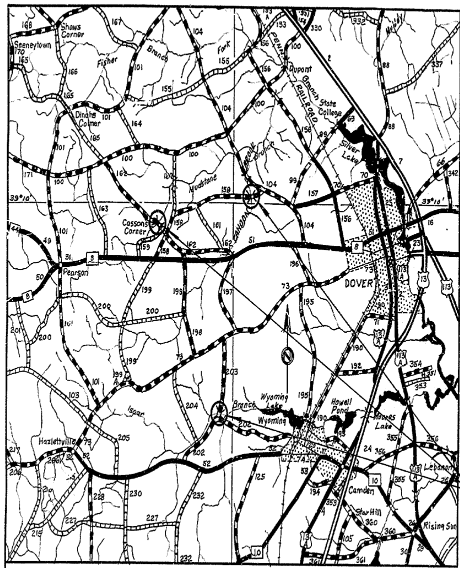
Upstream Looking North

West Approaches



Corrugated metal pipe being installed to replace old type structure on Road 158, west of Dover.

Above: State Contract 1927 from DelDOT's 1962 Annual Report. The following last 3 pages are from the contract that include tile page, the construction sheet at location, and shop drawing with dimensions.



THE STATE OF DELAWARE

State of Delaware

STATE HIGHWAY DEPARTMENT

PLAN
FOR
CONSTRUCTION OF CONTRACT № 1927

~~STA. TO STA.~~

~~FEET MILES~~

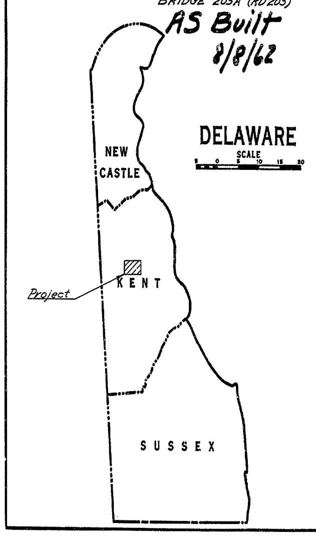
SCALE: PLAN: 1 IN.= 50 FT.
PROFILE: HOR. 1 IN.= 50 FT.
VERT. 1 IN.= 50 FT.

~~FEDERAL AID PROJECT NO.~~

COUNTY	CONTRACT	P.R.A. DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
KENT	1927	2	DEL.			1	8

BRIDGE REPLACEMENTS - KENT COUNTY
BRIDGE 158A (RD.158), BRIDGE 162B (RD.162), BRIDGE 203A (RD 203)

AS Built 8/8/62



BOOK NUMBER Loose Leaf

TABULATION OF QUANTITIES, PAY ITEMS

ITEM No.	ITEM	UNIT	BRIDGE 158A (ROAD 158)	BRIDGE 162B (ROAD 162)	BRIDGE 203A (ROAD 203)	TOTAL	PROPOSAL
1	Clearing and Grubbing	Lump Sum					Lump Sum
2	Excavation	Cu. Yd.	704	123		827	900
2B	Channel Excavation	" "	600	575	70	1245	1300
4	Excavation for Structures	" "		177	10	187	200
5	Common Borrow	" "	2181	961		3142	3200
7	Select Borrow	" "	1333	600		1933	2000
14	Bituminous Surface Treatment						
	RC 1	Gal.	1247	667	22	1936	1950
	RC 3	"	1247	667	22	1936	1950
	Coarse Aggregate	Sq. Yd.	2494	1333	44	3871	3900
18	Portland Cement Concrete Masonry	Cu. Yd.		101.1	43.2	144.3	150
19	Superficial Waterproofing	Sq. Yd.		200	17.5	217.5	230
20	Bar Reinforcement	Lbs.		12,982	6335	19317	20,000
26	12" Reinforced Concrete Pipe	Lin. Ft.	82			82	82
26	18" " " "	" "	48			48	48
33	Timber Sheet Piles	M.Ft.B.M.		1.77		1.77	20
41	Portland Cement Concrete Sidewalk (4")	Sq. Ft.	15			15	15
48	Wire Rope Guard Fence	Lin. Ft.	595			595	600
49	End Post Attachments	Each	4			4	4
53	Seeding	Acre	0.7614	0.3828		1.1442	1.4
54	Mulching	Sq. Yd.	3685	1853		5538	6000
57	Sand for Footings	Ton		15		15	15
58	Sacked Sand Cement Riprap	Cu. Yd.	25			25	30
64	Grouted Riprap	Sq. Yd.	100			100	110
	Double Multi-Plate Pipe-Arch Culvert	Lump Sum					Lump Sum
	Coarse Aggregate	Ton	60		16	76	85
	Removal of Existing Structures	Lump Sum					Lump Sum
	Aluminum Beam Guard Rail	Lin. Ft.		132	57	189	200
	Prestressed Concrete Sheet Piles	Sq. Ft.			~~2020~~ 2200	~~2020~~ 2200	~~2020~~ 2200

V.A.J. 5/18/61

CONVENTIONAL SIGNS

COUNTY LINE		WIRE FENCE	
CITY OR TOWN LINE		PRESENT CULVERT	
RIGHT OF WAY LINE		PROPOSED CULVERT	
CENTRE LINE, PROPOSED ROAD	240	TELEGRAPH POLE	
MACADAM, TRAVELLED ROAD		TREE	
TROLLEY OR RAILROAD			

PROFILE: GRADE, GROUND, DATUM

INDEX OF SHEETS

RECOMMENDED 7-6 1961 L.W. Norwood? CONTRACT & DESIGN ENGINEER

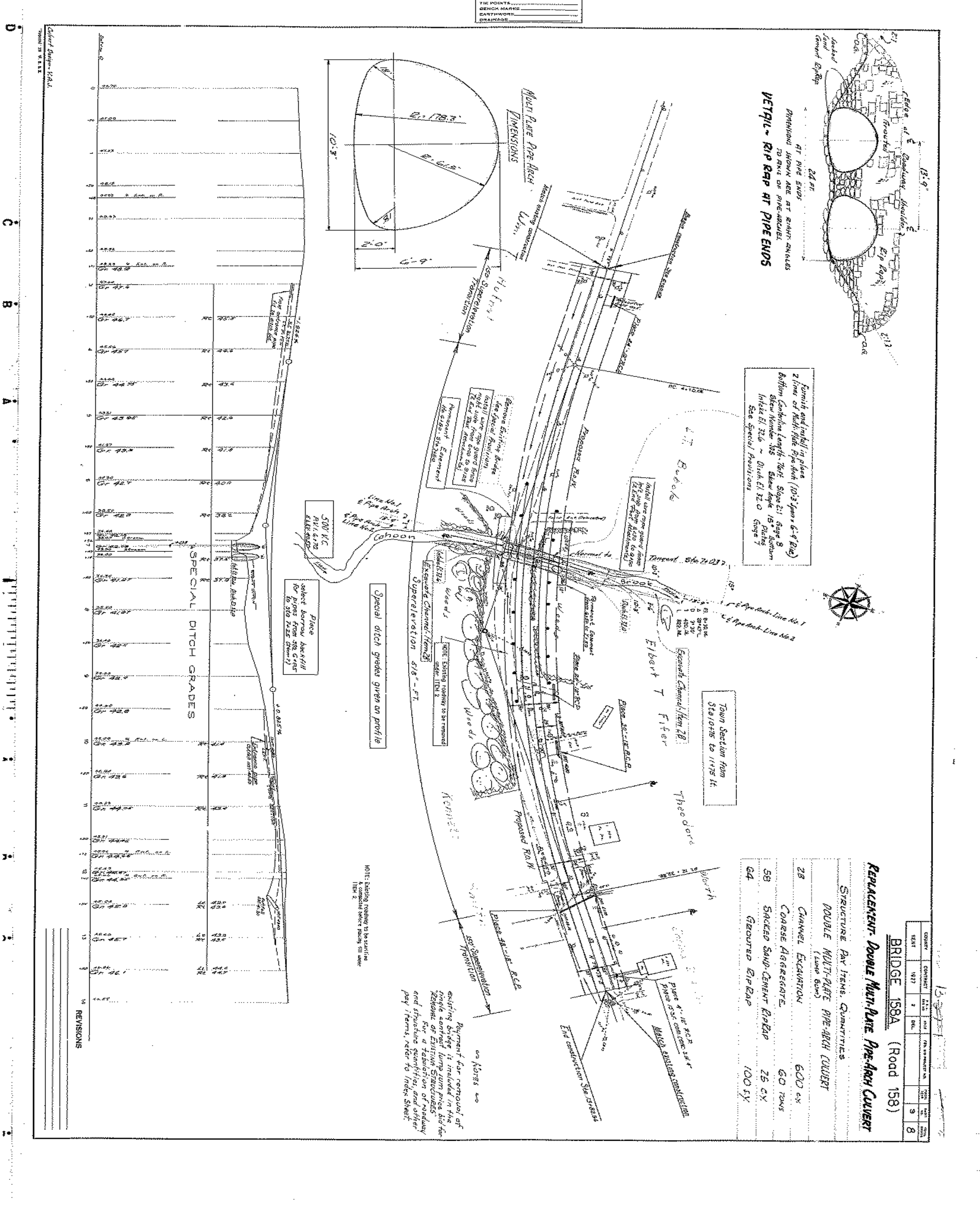
RECOMMENDED 7/7 1961 Joe S. Robinson ASSISTANT CHIEF ENGINEER

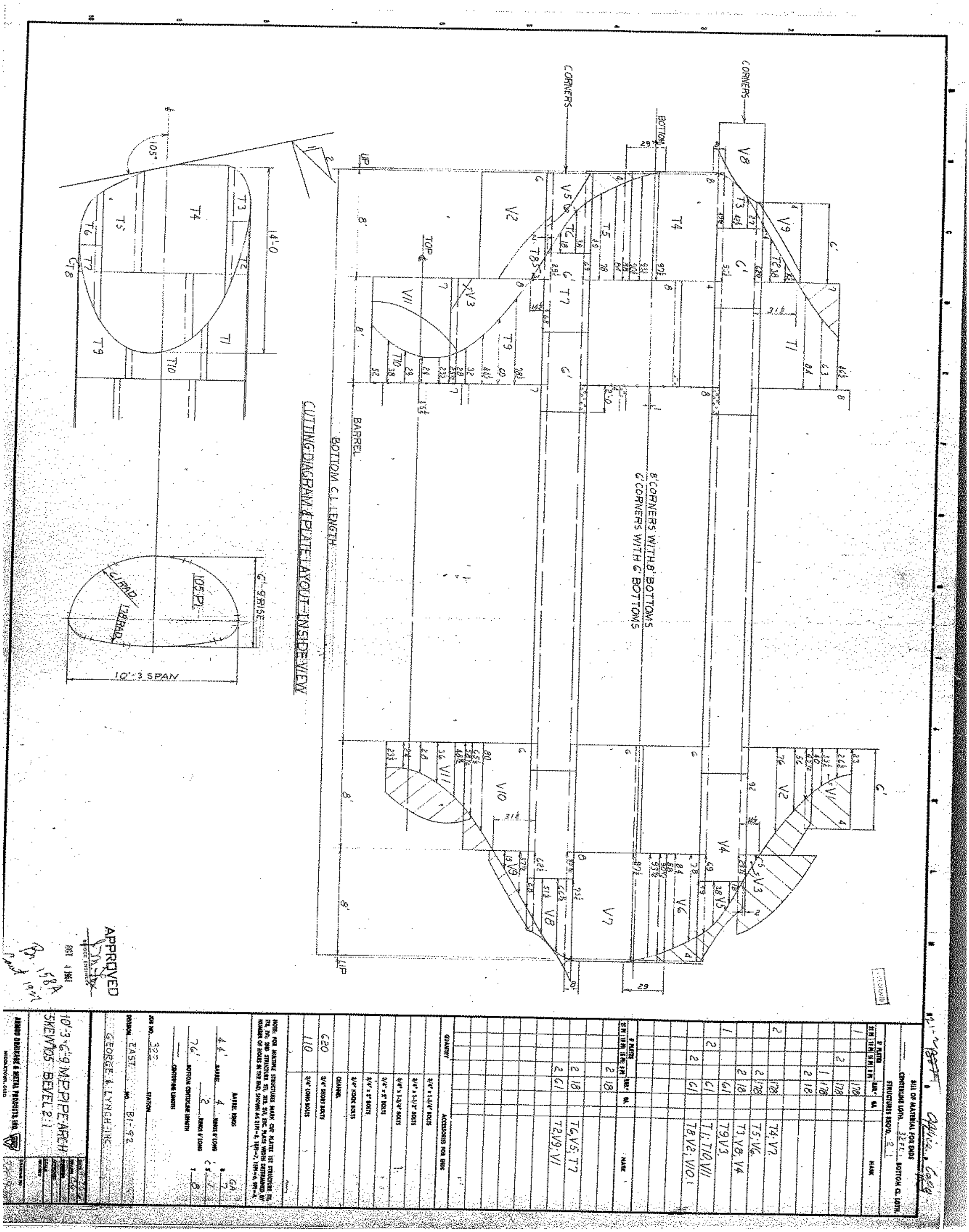
APPROVED 7/7 1961 [signature] CHIEF ENGINEER

APPROVED 7-7 1961 William J. Miller Jr. DIRECTOR OF OPERATIONS

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
APPROVED:
DIVISION ENGINEER
DATE

"Imperial" 104 W. B. & E.


BRIDGE 158A (Road 158)
REPLACEMENT - DOUBLE MULTI-PLATE PIPE-ARCH CULVERT
STRUCTURE PAY ITEMS, QUANTITIES
DOUBLE MULTI-PLATE PIPE-ARCH CULVERT
28 CHANNEL EXCAVATION 600 CY
58 SACKED SAND-CEMENT RIP RAP 25 CY
64 GROUTED RIP RAP 100 SY
MULTI PLATE PIPE ARCH DIMENSIONS
DETAIL - RIP RAP AT PIPE ENDS
SPECIAL DITCH GRADES
Special ditch grades given on profile
Town Section from Sta 10+15 to 11+75 Lt.
Proposed R/W
Elbert T Fifer
Cohoon
REVISIONS


CUTTING DIAGRAM & PLATE LAYOUT - INSIDE VIEW
BOTTOM C.L. LENGTH
BARREL
8' CORNERS WITH 8' BOTTOMS
6' CORNERS WITH 6' BOTTOMS
CORNERS
BOTTOM
TOP
105°
14'-0
10'-3 SPAN
6'-9 RISE
105 PI
APPROVED
BILL OF MATERIAL FOR ENDS
ACCESSORIES FOR ENDS
10'-3 x 6'-9 M.P. PIPE ARCH
SKEW 105 BEVEL 2:1
GEORGE & LYNCH INC
ARMCO DRAINAGE & METAL PRODUCTS, INC.

Michael C. Hahn, AICP
Principal Investigator and Project Manager

Michel Hahn is a preservation planner meeting the minimum qualifications in architectural history (specified in 36 CFR Part 61). As a planner and project manager at DelDOT with 20 years experience, the primary position and experience involves:

- review of all DelDOT projects, including transportation enhancements, to assure cultural resource compliance;
- preparation of historic resource surveys;
- review and development of historic contexts;
- management review and agency/federal concurrence and/or consultation of historic evaluations;
- concurrence review and processing of National Register documents/forms;
- development and processing of HABS/HAER documentation;
- oversight and review of other qualified architectural historians/preservation planners or architects;
- assessment of effect documents;
- Section 106 consultation and coordinator as lead agency and delegated federal representative;
- manager for mitigation and enhancement measures up historic properties;
- background research and record keeping;
- conditional assessment and development or review of rehabilitation standards assurances for structures and buildings; and
- research and technical documents.

Working extensively in the Mid-Atlantic region (i.e. Delaware) with exposure to the Piedmont and Coastal Zone region. Tasks involve, reviewing, assessing, assisting and approving a wide variety of properties including architectural, agricultural, industrial, commercial, traditional cultural resources, landscapes, cemeteries, engineering resources, and other National Register of Historic Places Criteria Considerations.

Mr. Hahn is trained in transportation issues relating to cultural resource management and legislative issues including Section 106, NEPA, Section 4(f), and state and local laws.

Education

1990 BA, University of Delaware, Newark, DE – Urban Geography

1994 Environmental Studies, Wilmington, DE – Certificate Program via Continuing Education

1997 MA, University of Delaware, Newark, DE – Urban Affairs and Public Policy (historic preservation program)

Professional Experience

1990 –current Delaware Department of Transportation Environmental Studies Office
1990 City of Wilmington, Planning Intern

Also notable is lead project manager in management oversight and personnel on movement, recordation, plan development and review, contracting, and reconstruction of the circa 1804 Tweed's Tavern Log Structure, Hockessin. This was a total reconstruction, preservation, and restoration project of a rare property type. Dwelling is currently used as a historic interpretative center.

National Register Nominations/Assessments or Context Development in Delaware

Providing technical review, research assistance, comment, revision assistance, and concurrence to over 2000 properties (estimated) as DelDOT cultural resource manager. This includes structures, buildings, objects, historic districts and other criteria considerations. Also includes a variety of different property types: Some notable examples:

- Tweed's Tavern Park, Hockessin (context development for Mushroom Farming in Delaware);
- Historic Context for the DuPont Highway U.S. Route 113 (project manager for DelDOT providing lead technical and research assistance and concurrence review. Project is still ongoing and include entire eligibility assessment);
- Delaware Historic Bridges - including context development for railroads (project manager for DelDOT providing lead technical and research assistance and concurrence review);
- US 301 Project Development, Middletown – project manager for DelDOT providing lead technical and research assistance and concurrence review)
- Charles E. Marsh House, Rehoboth
- Rodney Village Historic District (technical review; assistance)
- Bridge 809, Milton
- Bridge 688, Wilmington
- Greenspring (draft NR nomination)
- Various small bridges/culverts throughout Delaware (technical review or prime investigator)
- Westover Hills (short form historic district nomination & boundary)
- Scotten Ford Agricultural Complex (boundary and nomination revisions)
- Mount Pleasant Corners (New Castle County Demolition Permit)

Publications/Public Records
- Various planning or preservation articles in American Planning Association Delaware Chapter and Preservation Delaware, Inc.
- Golf Course Development: Environmental Issues
- *The DuPont Highway*, Arcadia Publishers

RESUMES OF PROJECT PERSONNEL

NATHANIEL DELESLINE
Project Architectural Historian
Delaware Department of Transportation
800 Bay Road P.O. Box 778
Dover, Delaware 19903
(302) 760-2278 (Phone)
(302) 739-8282 (fax)
Nathaniel.Delesline@state.de.us

EEDUCATION

M.A.	Delaware State University	Historic Preservation	2003
B.A.	Delaware State University	Political Science	1999

EXPERIENCE PROFILE

Nathaniel Delesline has ten years experience in the field of Historic Preservation. His studies at Delaware State University concentrated in Delaware architecture, conducting historic research and survey of historical properties. As a Planner in the Environmental Studies Section at The Delaware Department of Transportation he has assist in a number of surveys of historic properties, and evaluation of properties for National Register eligibility. His duties include a wide variety of historical research, historic resource surveys and Section 106 and Section 4(f) projects.

DELAWARE STATE HISTORIC PRESERVATION OFFICE
15 THE GREEN, DOVER, DE 19901

CULTURAL RESOURCE SURVEY
PROPERTY IDENTIFICATION FORM

CRS #	K07321
SPO Map	10-11-22
Hundred	East Dover
Quad	North
Other	06600024400

1. HISTORIC NAME/FUNCTION: Bridge 2-158A (twin corrugated metal pipes)

2. ADDRESS/LOCATION: Chestnut Grove Road (Route 158) over Cahoon Branch

3. TOWN/NEAREST TOWN: Dover vicinity? ☒

4. MAIN TYPE OF RESOURCE: building ☐ structure ☒ site ☐ object ☐ landscape ☐ district ☐

5. MAIN FUNCTION OF PROPERTY: Bridges carries Route 158 Chestnut Grove Rd over Cahoon Branch

6. PROJECT TITLE/ REASON FOR SURVEY (if applicable): Contract T201107204, Replacement of deteriorated, twin corrugated metal pipes.

7. ADDITIONAL FORMS USED:

#:	Form:	List property types:
	CRS 2 Main Building Form	
	CRS 3 Secondary Building Form	
	CRS 4 Archaeological Site Form	
	CRS 5 Structure (Building-Like) Form	
1	CRS 6 Structure (Land Feature) Form	Twin Pipes (bridge)
	CRS 7 Object Form	
	CRS 8 Landscape Elements Form	
1	CRS 9 Map Form	
	CRS 14 Potential District Form	

8. SURVEYOR INFORMATION:

Surveyor name: Nathaniel Delesline, DelDOT

Principal Investigator name: Michael C. Hahn, AICP, DelDOT

Principal Investigator signature: Michael C. Hahn

Organization: Delaware Department of Transportation Date: 13 July 2012

CRS# K07321

9. OTHER NOTES OR OBSERVATIONS:

Pipes are generally cross drainage structures situated well below the roadway surface. Based on a lack of significance, Bridge 2-158A is not eligible for listing on the National Register of Historic Places. The structure is a common example of its type and does not exhibit any outstanding features or engineering accomplishments, nor does it have known associations with milling or other historic activities. Furthermore, the structure suffers from loss of integrity, exhibiting deterioration of the metal pipes. The structure is therefore recommended not eligible under Criterion C. The structure does not maintain associations with events that have made a significant contribution to the broad patterns of our history. No additional information or historical revelations are likely to be gained from further investigation. As such, the structure is equally not eligible under Criterion A, B or D.

10. STATE HISTORIC CONTEXT FRAMEWORK (check all appropriate boxes; refer to state management plan(s)):

a) Time period(s)

- ☐ Pre-European Contact
- ☐ Paleo-Indian
- ☐ Archaic
- ☐ Woodland I
- ☐ Woodland II
- ☐ 1600-1750∀ Contact Period (Native American)
- ☐ 1630-1730∀ Exploration and Frontier Settlement
- ☐ 1730-1770∀ Intensified and Durable Occupation
- ☐ 1770-1830∀ Early Industrialization
- ☐ 1830-1880∀ Industrialization and Early Urbanization
- ☐ 1880-1940∀ Urbanization and Early Suburbanization
- ☒ 1940-1960∀ Suburbanization and Early Ex-urbanization

b) Geographical zone

- ☐ Piedmont
- ☒ Upper Peninsula
- ☐ Lower Peninsula/Cypress Swamp
- ☐ Coastal
- ☐ Urban (City of Wilmington)

c) Historic period theme(s)

- ☐ Agriculture
- ☐ Forestry
- ☐ Trapping/Hunting
- ☐ Mining/Quarrying
- ☐ Fishing/Oystering
- ☐ Manufacturing
- ☐ Retailing/Wholesaling
- ☐ Finance
- ☐ Professional Services
- ☒ Transportation and Communication
- ☐ Settlement Patterns and Demographic Changes
- ☒ Architecture, Engineering and Decorative Arts
- ☐ Government
- ☐ Religion
- ☐ Education
- ☐ Community Organizations
- ☐ Occupational Organizations
- ☐ Major Families, Individuals and Events

DELAWARE STATE HISTORIC PRESERVATION OFFICE
21 THE GREEN, SUITE A, DOVER, DE 19901

CULTURAL RESOURCES SURVEY CRS # K07321
STRUCTURE – BRIDGE

ADDRESS / LOCATION: Route 158 (Chestnut Grove Road) west of Dover, Kent County

FUNCTION: Roadway, carries Route 158 (Chestnut Grove Road) over the Cahoon Branch

YEAR BUILT: 1961/62 CIRCA ☐ ARCHITECT / BUILDER: Delaware Department of Transportation/George & Lynch Inc. Contractor

FACILITY CARRIED: Roadway, Route 158 over the Cahoon Branch

INTEGRITY: The twin metal pipes has deteriorate and will be replaced

List major changes with years (if known) year
a. None
b.

CURRENT CONDITION: excellent good fair [X] poor

DESCRIPTION:

a) Circulation system: two lanes roadway, paved with asphalt.

b) Spatial subdivisions

c) Retaining wall/lining material(s) the pipes are supported with sacked sand cement rip rap

d) Other

USE BLACK INK ONLY

DELAWARE STATE HISTORIC PRESERVATION OFFICE
15 THE GREEN, DOVER, DE 19901

CULTURAL RESOURCE SURVEY MAP FORM

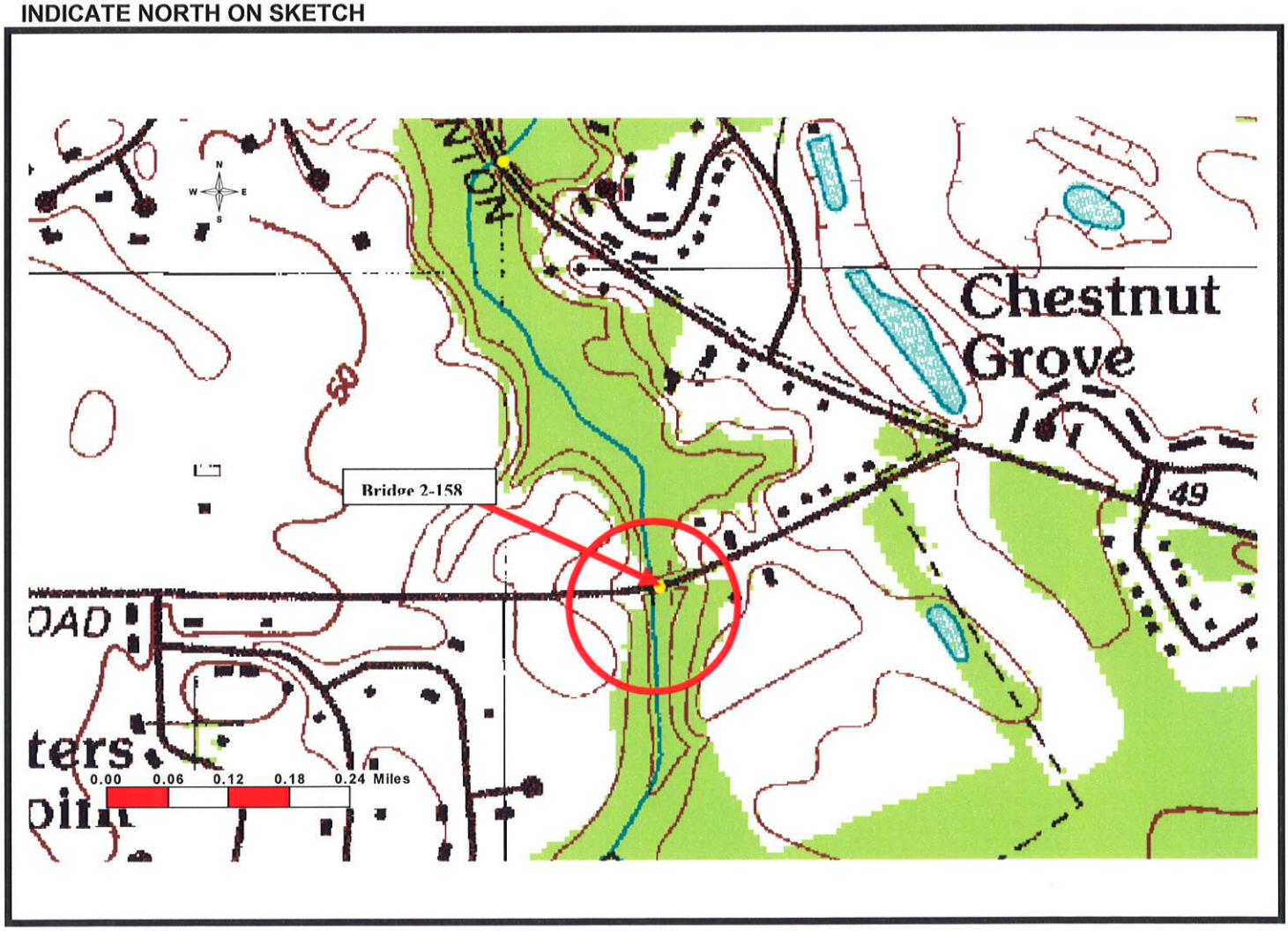
CRS # K07321

1. ADDRESS/LOCATION: Bridge: 2 -158, Route 158 (Chestnut Grove Road) west of Dover, Kent County
2. NOT FOR PUBLICATION ☐ reason: _____
3. LOCATION MAP:

Indicate position of resource in relation to geographical landmarks such as streams and crossroads.

(attach section of USGS quad map with location marked or draw location map)

INDICATE NORTH ON SKETCH

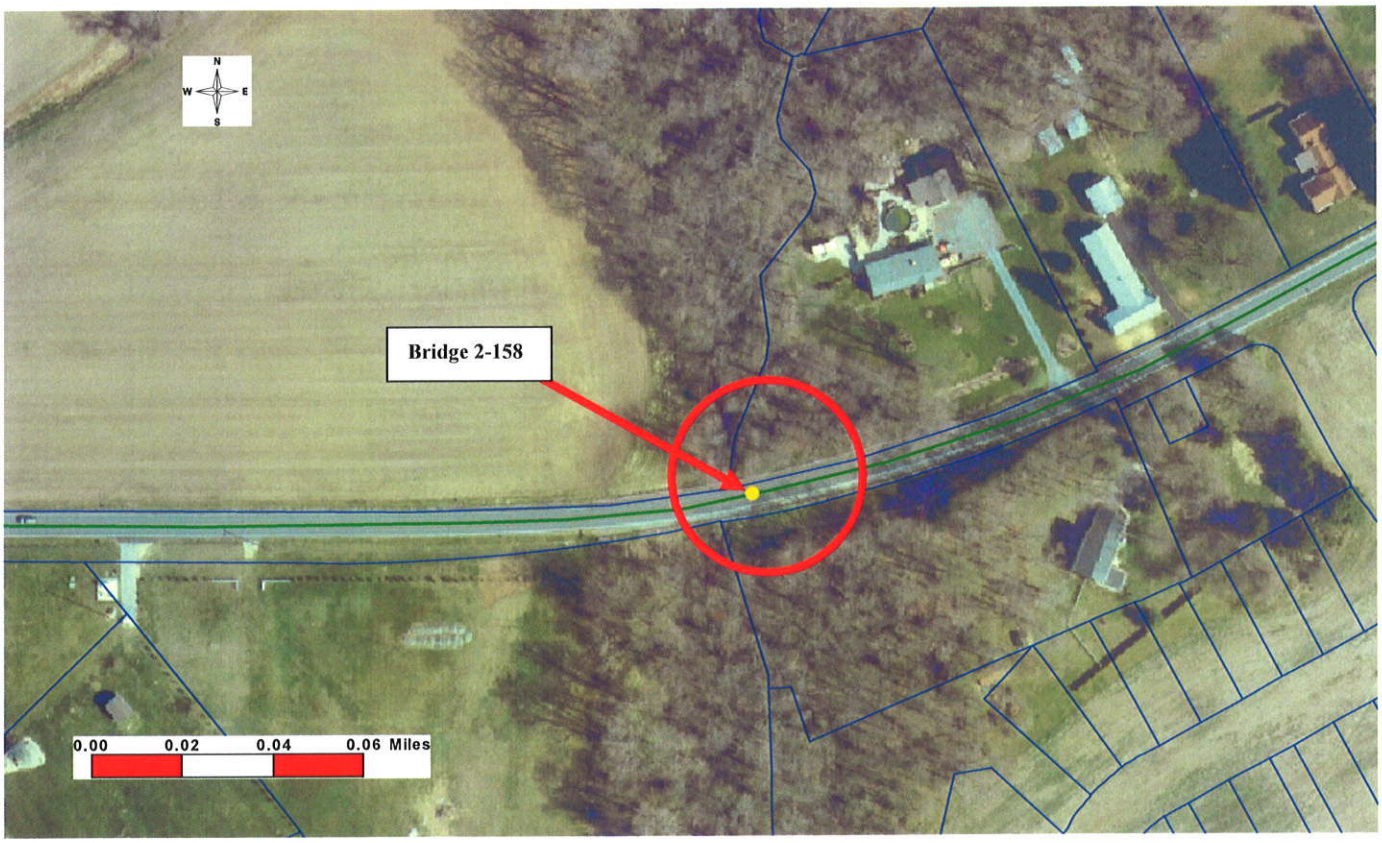


USE BLACK INK ONLY

4. SITE PLAN:

CRS S06256

INDICATE NORTH ON PLAN



USE BLACK INK ONLY

DELAWARE DIVISION OF HISTORICAL AND CULTURAL AFFAIRS
STATE HISTORIC PRESERVATION OFFICE
21 THE GREEN, DOVER, DE 19901

CULTURAL RESOURCE SURVEY
DIGITAL PHOTOGRAPHS FORM

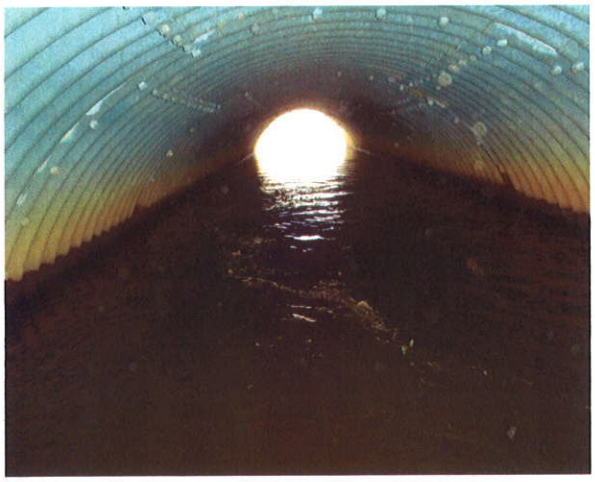
CRS # K07321

Date 02/2012 Surveyor/Photographer Nathaniel Delesline

Insert photographs; note file name and brief description of view: MAINTAIN ASPECT RATIO – DO NOT STRETCH PHOTO): 1. South elevation. 2. West approaching. 3. General view span 1, looking south. 4. Upstream looking north.

1: south elevation

2: west approaching



3: General view span 1 looking south

4: upstream looking north