

## Tennessee Department of Transportation Division of Materials and Tests

### Manufacture and Acceptance of Precast Concrete Products (SOP 5-3)

Purpose- The purpose of this document is to establish the minimum qualifications for the manufacture and acceptance of Precast Concrete Products. This document will provide the requirements for the approval of producers, testing guidelines, re-testing procedures, and product identification.

Background- Tennessee Department of Transportation (TDOT) Standard Specifications and TDOT Standard Drawings generally specify drainage structures to be in accordance with AASHTO and/or ASTM Standards. These Standards provide the design requirements, various materials, and testing procedures.

#### 1. Initial Producer Qualification Requirements

For initial approval, the Producer shall submit, at a minimum, to Headquarters Materials and Tests (HQMT) in a letter or an email (TDOT.PrecastMTR@tn.gov):

- Proof of national certification (ACPA, NPCA, PCI)
- Most recent plant inspection report completed by the certifying agency
- Formal response to each deficiency noted by the certifying agency
- Product request with detailed list of products to be produced
- Standard/Alternate Drawings, Plans, or Specifications to be used
- TDOT specific Quality Control Manual (QCM)
- Proof of Quality Control personnel certifications
- Concrete mix design(s) **per products produced**

1.1 All producers of Precast Concrete Products to be supplied on TDOT projects shall be certified by an approved National Quality Control Program and meet the requirements as shown below:

- ACPA: American Concrete Pipe Association
- NPCA: National Precast Concrete Association
- PCI: Precast/ Prestressed Concrete Institute

1.2 All producers shall provide written consent to the certifying agency allowing all plant inspection documentation to be forwarded to TDOT immediately after the inspection is complete.

1.3 Producers shall request, from HQMT, approval for products to be supplied to TDOT projects. This request should contain a detailed list of the products that will be produced from the following list of Precast Concrete Products. **Correspondences should be sent to [tdot.precastmtr@tn.gov](mailto:tdot.precastmtr@tn.gov).**

- **Precast Drainage Products:** Catchbasins, Box Culverts, Manholes, Endwalls, Head Walls, Junction Boxes, Spring Boxes, Structural Spans, and Lids.
- **Precast Structural Products:** Precast Deck Panels, ~~Reinforced Concrete Facing Panels~~
- **Reinforced Concrete Pipe**

1.4 All precast concrete products shall be manufactured in accordance to the dimensions and details shown in the following:

- TDOT Standard Drawing(s)
- Producer’s approved alternate drawing to the Standard Drawing(s)
- Approved Shop Drawing(s)
- Contract Plans
- AASHTO/ASTM Specifications

1.4.1 Once approval is given for alternate drawings stamped by a Professional Engineer licensed in the State of Tennessee will be valid until a change is made to the Standard Drawing(s). Any alternate drawing submitted, which contains design revisions other than dimensional variances, is required to include the proper documentation as stated in [SOP 5-3, Part 4: Submission of Substitution Designs](#).

All alternate drawings are to be submitted to HQMT and will then be sent to the Design Division for review prior to producing a product.

## 1.5 Materials

The Producer shall retain copies of all material certifications **in a binder**.

- 1.5.1 **Aggregates** - All aggregate sources shall be on the TDOT Producer List and in accordance with Sections 903.01, 903.03, and 903.22 of Standard Specifications.
- 1.5.2 **Cement** - All cements shall be on the TDOT Producer List and in accordance with Section 901.01 of Standard Specifications.
- 1.5.3 **Fly Ash, Ground Granulated Blast Furnace Slag, Silica Fume** - Other cementitious and pozzolanic materials shall be on the TDOT Producer List and in accordance with Sections 921.15 or 921.16 of Standard Specifications.
- 1.5.4 **Reinforcing Steel and Wire Strands**
  - 1.5.4.1 Steel used for reinforcement shall be submitted in accordance with SOP 1-1: Quality Assurance for the Sampling, Testing of Materials and Products and listed on the TDOT Producer List. The steel used shall follow the applicable AASHTO/ASTM standard for the structure or Standard Drawings. All certifications shall contain a signed “Buy America” statement. The Producer shall retain copies of all mill test reports and material certifications.

- 1.5.4.2 When wire strand is altered (i.e., “drawn down”), the Producer shall maintain **traceability that the reinforcing steel comes from a facility listed on the TDOT Producer List.**
  - 1.5.4.2.1 Supply the original material certification **for each heat number, indicating the physical properties and compliance with ASTM A1064. All certifications shall also contain a signed “Buy America” statement.**
  - 1.5.4.2.2 Certification of physical properties for the altered material by an independent lab **shall be performed for each 20 tons of wire prior to fabrication of the welded wire reinforcement.**
  - 1.5.4.2.3 The process shall be identified in the QCM in accordance with Section 1.6 of this SOP.
- 1.5.5 Admixtures - All admixtures shall be on QPL 4: **Air-Entraining and Chemical Admixtures for Concrete** and in accordance with Sections 604.03 and 921.06 of Standard Specifications.
- 1.5.6 Water - All water shall be in accordance with Section 921.01 of Standard Specifications.
- 1.5.7 Patching Material – All patching material shall be on QPL 13: **Patching Materials.**

## 1.6 Quality Control Program

### 1.6.1 Quality Control Manual

1.6.1.1 Each production facility shall have a TDOT specific QCM.

1.6.1.2 The QCM shall include, at a minimum, an organizational chart including a back-up quality control technician, a “Buy America” statement for all reinforcement materials, a complete list of material suppliers and their location, a detailed pre pour process, a detailed post pour process, producer testing procedures, detailed marking for TDOT products, batching tolerances, a repairs section.

### 1.6.2 Quality Control (QC) Personnel

1.6.2.1 Each production facility shall have an individual and back-up responsible for the quality production of precast products. This individual shall have authority to make necessary adjustments, reject concrete, cease production, or reject products when the quality of the product is in question. QC Personnel shall be on site anytime that a TDOT product is being produced.

1.6.2.2 QC Personnel must be at least TDOT Concrete Plant QC Technician certified. QC Personnel shall also hold current **quality control** certificates **from their plant’s respective certifying agency.** Any individual designing a concrete mix design must be TDOT Concrete Mix Design Technician certified.

### 1.6.3 Testing Equipment and Laboratory

1.6.3.1 Each production facility shall have a “Type A” laboratory as defined in Section 106.06 of Standard Specifications to conduct QC testing. Laboratory qualifications shall meet requirements stated in SOP 1-4: Laboratory Qualification Requirements.

1.6.3.2 Each production facility that is CERTIFYING products for acceptance must have a compression machine that is of sufficient capacity to test to the required strength of the cylinders and/or a D-Load machine for conducting three-edge bearing for testing pipe products to the required ultimate load. A private testing laboratory, accredited through the AASHTO Accreditation Program (AAP), may be used for compressive strength testing.

1.6.3.3 The **compression machine** shall be calibrated by a certifying agency every twelve (12) months. The Producer shall maintain documentation and records of all certifications.

1.6.4 Gradations shall be performed at the precast facility on each aggregate used at least once per **week**.

### 1.6.5 Repairs

1.6.5.1 **Prior to repair of precast products, the Producer shall carefully review the product needing repair and determine the cause and extent of damage. Products which cannot be repaired to meet ASTM finished product specification shall be rejected for use on TDOT Projects.**

1.6.5.2 **The Producer shall submit along with certification documentation of repairs made indicating the cause of damage, lists steps planned for repair, and includes photos of said damage.**

1.6.5.3 Any repairs made must be performed such that the reinforcement is not damaged, the repaired concrete **or patching material** meets the required strength, and the repair does not change the dimensional requirements of the product. The repaired concrete shall become an integral part of the product with no delaminated areas or cracks. Repairs made using approved patching materials (QPL 13) must be performed in accordance with the manufacturer’s recommendations. A record of all repairs shall be documented and filed with the final inspection report for that product. After repairs are completed and inspected, a mark shall be made on the product by the Producer indicating it is acceptable. **Repair documentation should be submitted with certification paperwork.** AASHTO R 73 may be used as a reference for judging reparable damage to Precast Drainage Products and Reinforced Concrete Pipe.

### 1.6.6 Concrete Batch or Volumetric Facility

1.6.6.1 The concrete batch or volumetric facility shall have all scales, weighing devices, and/or metering devices calibrated and correlated a minimum of every six (6) months. Documentation shall be available to show the calibration results.

1.6.6.2 Concrete may be supplied by a ready-mix producer provided the plant and hauling equipment comply with Section 604 of Standard Specifications. Further, the ready-mix plant must be approved by TDOT and meet requirements stated in SOP 4-3: Ready Mix Concrete Plant Certification Procedures.

## 1.7 Concrete Mix Design

- 1.7.1 The Producer shall submit to HQMT, for approval, a concrete mix design for each mixture that will be used and include a list of products to be produced using each design. **Mix designs shall be e-mailed to [tdot.concrete.email@tn.gov](mailto:tdot.concrete.email@tn.gov).**
- 1.7.2 The concrete mix design submittal shall contain the minimum information required in Subsection 604.03.A.2 of Standard Specifications and SOP 4-4: Procedures for Submittal and Approval of Concrete Mixture.
- 1.7.3 Concrete for precast deck panels, junction boxes, and spring boxes shall meet the requirements of Section 604.03 Class “D” concrete and/or approved alternate drawing.
- 1.7.4 All other concrete mix designs shall be Class X or SCC in accordance with the applicable AASHTO/ASTM Standard Specifications, Approved Shop Drawings, Contract Plans, or Standard Drawings and Specifications.
- 1.7.5 All mix design submittals shall include acceptance tolerances (i.e., slump/slump flow, air content, unit weight, etc.). The maximum allowable substitution rates of cementitious materials will be as specified in Table 604.03-3 of Standard Specifications.

## 1.8 Regional Inspection

- 1.8.1 A plant and laboratory inspection will be performed by representatives from Regional Materials and Tests and documented on the Precast Inspection Checklist. Any deficiencies found during the inspection shall be addressed within forty-five (45) days. Regional Materials and Tests shall send a copy of the Precast Inspection Checklist to HQMT and the Producer. A copy shall be kept at the plant and be readily available for review.
  - 1.8.2 For precast products, non-destructive testing such as reinforcement verification by use of ground penetrating radar (GPR), the use of the Swiss Hammer, compressive strength tests, and/or dimensional verification shall be conducted by TDOT personnel. Testing is performed to demonstrate the ability to produce products that meet TDOT standards or a producer’s alternate drawing (stamped by a licensed Professional Engineer). Products selected for testing can be manufactured to any detailed drawing stamped by a licensed Professional Engineer but shall be held to the manufacturing tolerances stated in SOP 5-3, Part 3: Precast Manufacturing Tolerances. Prior to producing a TDOT product not listed in TDOT Standard Drawings, the Producer shall follow the procedures as stated in Section 1.4 of this SOP.
- 1.9 After all verification testing has been completed and all requirements have been met, HQMT will then add the producer to the TDOT Producer List.

## 2. **Producer Annual Requalification Requirements**

To maintain an active status on the TDOT Producer List, the Producer shall meet all requirements in Section 1 of this SOP and submit the following items to HQMT.

- 2.1 The Producer shall ensure that the final inspection report completed by the certifying agency is submitted immediately after inspection. A formal letter responding to any deficiencies found during the inspection shall be submitted within forty-five (45) days of the plant audit. Regional Materials and Tests will review the results to ensure that all deficiencies have been addressed within a reasonable timeframe agreed upon between Materials and Tests and the Producer.
- 2.2 The Producer shall notify HQMT within five (5) business days in the event of a failing inspection or if the Producer's certification is rescinded for any circumstance. **In the event of a failed inspection, all production of TDOT product shall cease until corrective action has been taken and approved by TDOT.**
- 2.3 The Producer shall immediately submit any changes in materials to HQMT. Any change in materials shall be accompanied with a new mix design submitted in accordance with Section 1.7 of this SOP.
- 2.4 The Producer shall immediately submit any changes to the organizational chart.
- 2.5 The following shall be submitted to HQMT by November 1<sup>st</sup> each year:
  - A letter stating a review of the QCM has been performed including any changes made.
  - Copies of QC personnel certifications
  - Concrete mix design(s)
  - A list of products being produced with each design (noted in remarks of mix design)

## 3. **Acceptance Testing**

- 3.1 The Producer, or private testing laboratory accredited through the AAP, shall complete all acceptance testing in accordance with Appendix A. All testing shall be in accordance with AASHTO T 280/ASTM C497.
- 3.2 Precast Drainage/Structural Products
  - 3.2.1 All acceptance test results for the DAY shall comply with the requirements of the applicable specification(s) (TDOT and AASHTO or ASTM).
  - 3.2.2 Each product shall be manufactured within the dimensional tolerances as set forth in the appropriate AASHTO/ASTM Specification, Standard Drawing, or approved alternate drawing. See [SOP 5-3, Part 3: Precast Manufacturing Tolerances](#).

- 3.3 Reinforced Concrete Pipe
  - 3.3.1 All acceptance test results for the WEEK (Sunday to Saturday) shall comply with the requirements of the applicable specification(s) (TDOT and AASHTO or ASTM).
  - 3.3.2 Each product shall be manufactured within the dimensional tolerances as set forth in the appropriate AASHTO/ASTM Specification. See SOP 5-3, Part 3: Precast Manufacturing Tolerances.
- 3.4 When an acceptance test fails to meet the requirements specified and is documented as unacceptable, Regional Materials & Tests shall be notified, and retesting will be allowed as follows:
  - 3.4.1 Precast Drainage/Structural Products
    - 3.4.1.1 One (1) set of backup cylinders may be tested for acceptance. A set of cylinders shall be considered as two (2) - four (4) inch by eight (8) inch cylinders made in accordance with AASHTO T 23 (ASTM C31).
    - 3.4.1.2 Both test results must meet the required compressive strength requirement for the DAY's products to be acceptable.
  - 3.4.2 Reinforced Concrete Pipe
    - 3.4.2.1 D-Load - The Producer shall randomly sample and test two (2) pipes from that DAY's production. Both test results must meet the required D-load for the DAY's production to be acceptable. If both tests do not meet specified strength, then each individual pipe must be tested for acceptance.
    - 3.4.2.2 Ultimate Load and Absorption - The Producer must retest a piece of pipe from the same day's production that failed to comply initially and one from another day's production during that week. Both test results must meet the required Ultimate Load and meet Absorption requirements for the WEEK's production (Sunday to Saturday) to be acceptable. If both tests do not meet the requirements, then two (2) pipes from each day of that week must be tested and both pieces must pass for the DAY's production to be acceptable.
- 3.5 Documentation & Reporting
  - 3.5.1 The Producer shall keep daily reports documenting each product made that day and the number made. The report shall contain the results of all acceptance tests for each product tested as well as inspection of dimension tolerances. The Producer shall maintain this information for a minimum of five (5) years or until completion of the project in which the product was placed. All documents are subject to review by TDOT.
  - 3.5.2 TDOT shall have the right to review and inspect all producer QC data, records, and files to assure compliance with all requirements set forth in this SOP and within TDOT Standard Specifications.

#### 4. Stamping/Etching/Labeling

Each precast product produced shall be marked, by stamping, etching, or labeling, with the following information:

- 4.1 Pipe: Date of manufacture, diameter, AASHTO/ASTM designation and class, and the manufacturing plant's unique stamp/location identifier.
- 4.2 Precast Drainage/Structural Products: Date of manufacture, AASHTO/ASTM designation and class, TDOT Standard type or the manufacturer's approved alternate drawing to the Standard Drawing number, project/contract number, and the manufacturing plant's unique stamp/location identifier.
- 4.3 Pipe and Precast Drainage/Structural Products which were damaged and repaired shall be labeled as repaired. Additionally, product that is damaged beyond repair shall be labeled rejected.

#### 5. Shipment

- 5.1 The Producer must submit **along with other required documentation** a completed certification form to be signed by QC Personnel as designated in the QCM for each shipment to a TDOT project. An example form is attached, with the minimum information required. This form shall contain a statement certifying the products were manufactured, tested, and accepted in accordance with Standard Specifications.
- 5.2 Reinforced concrete pipe may be shipped as soon as required compressive strengths or D-Load strengths are obtained and all other acceptance testing has been performed per this SOP.
- 5.3 **All other products may be shipped as soon as required compressive strength is achieved and verified.**

#### 6. Verification

- 6.1 TDOT retains the right to test and/or request the Producer to retest any product for verification purposes. The frequency of verification testing may vary at the discretion of the Regional Materials and Tests Supervisor when product for TDOT projects is not actively being produced. The Producer shall notify Regional Materials & Tests as far in advance as possible, but no later than fourteen (14) calendar days, prior to any date in which production for TDOT projects will resume. When product for TDOT projects is actively being produced, verification testing shall be in accordance with Appendix B. Precast products shall also be verified by non-destructive testing and dimensional verification as stated in Section 6.7 of this SOP.
- 6.2 TDOT shall accept products based off testing as stated in this SOP and, if applicable, project specific requirements.
- 6.3 Verification of all materials shall be performed at the frequencies listed in SOP 1-1.



- 6.4 TDOT shall maintain records and documentation of all verification testing for five (5) years or until completion of the project in which the product was placed.
- 6.5 Regional Materials and Tests shall notify the Producer within one week stating the final status of the verification testing and a list of deficiencies to be addressed. Regional Materials and Tests shall compile the final verification testing report and forward copies to the Producer and HQMT. Producers shall submit an action plan within forty-five (45) days from the time they receive the final report to HQMT addressing any errors found.
- 6.6 HQMT shall make random QC inspections yearly. **These inspections may come in the form of shadowing the audits of certifying agencies or Regional Materials and Tests, or they may be conducted by HQMT alone.** Following the inspection, any deficient findings will be presented to the Producer in a list of deficiencies. The Producer must address these action items to the satisfaction of TDOT within forty-five (45) days. Any corrective action shall be performed in accordance with standard industry practices approved by HQMT.
- 6.7 Non-Destructive Testing and Dimensional Verification
- 6.7.1 For non-destructive testing, there must be a minimum of three (3) precast products to select from to be considered random. A producer shall not build a product specifically for non-destructive testing. A product built specifically for nondestructive testing will not be considered part of the random verification testing.
- 6.7.2 When TDOT product is being produced, TDOT shall randomly select a minimum of one (1) precast product at each plant for non-destructive testing and dimensional verification per quarter. A lid may only be selected once per year to fulfill the quarterly verification testing. **All structural spans shall be non-destructively tested at the project site.**
- 6.7.3 While performing verification testing, a minimum of two (2) products shall be reviewed during production for proper reinforcement placement and size as shown on Standard Drawing, an approved manufacturer's alternate drawing, or Contract Plans designed and stamped by a Professional Engineer licensed in the State of Tennessee between the last product verification date and the current date.
- 6.7.4 Products selected for non-destructive testing and dimensional verification shall be manufactured to a Standard Drawing, an approved manufacturer's alternate drawing, or Contract Plans designed and stamped by a Professional Engineer licensed in the State of Tennessee between the last product verification date and the current date.
- 6.7.5 When testing at the Producer's facility, if no product of the same type is found, a different type of precast product will be selected for testing.
- 6.7.6 When testing on a project, if no additional items of the same type are found on the project, a different type of precast product will be selected. If no products are found, another product of the same type will be selected at the Producer's facility. If no product of the same type is found at the Producer's facility, then select another type of product for testing.

- 6.7.7 If an issue is found at the Producer’s facility during the non-destructive testing, **the Producer shall provide a list of TDOT** products on projects for non-destructive testing to determine if those products are acceptable.
- 6.8 TDOT will notify the Producer of any failures. The Producer may then choose to have additional testing performed by contacting Regional Materials and Tests within five (5) days of this notification. If the Producer elects not to conduct additional testing, removal from the TDOT Producer List as stated in Section 7 shall be imposed.
- 6.9 Additional Verification Testing
- 6.9.1 If verification test results, as determined per Appendix B in this SOP, do not comply with acceptance tests then all products represented by the Producer’s acceptance test results will be considered “questionable for acceptance” and additional testing shall be required.
- 6.9.2 Additional testing shall entail that two (2) additional products and/or cylinders manufactured the same day as the verification sample will be tested. Both test results must meet the requirements of the applicable test. If one sample results in a failure and does not meet specification requirements, then all products from that day are considered unacceptable and shall not be used on TDOT projects.
- 6.10 Additional Non-Destructive and Dimensional Verification Testing
- 6.10.1 Additional testing shall be required if non-destructive testing or dimensional verification indicates that a product contains a major error as stated in [SOP 5-3, Part 3: Precast Manufacturing Tolerances](#).
- 6.10.2 Additional non-destructive testing and dimensional verification will be performed on two (2) additional products of the same type manufactured the same week as the product that failed. If one sample results in a failure and does not meet specification requirements, then a product may be destructively tested under observation of Regional Materials and Tests at the Producer’s expense.
- 6.10.3 All destructive testing at the plant will be performed by the Producer under the observation of TDOT. All destructive testing at the plant will be at the cost of the Producer.
- 6.10.4 TDOT reserves the right to destructively test any product that shows inconsistency during nondestructive testing. A product on a project may be selected for destructive testing if time will allow for the product to be reproduced as determined by the TDOT Project Supervisor. Regional Materials and Tests shall consult with the TDOT Project Supervisor to eliminate any items needed within three (3) weeks on the project for testing. The contractor shall be responsible for arranging destructive testing to be performed as directed. The cost of any destructive testing on projects will be paid at the bid price assuming the structure tested meets Standard Specifications. In the event of a failure, the cost of destructive testing and retesting will be assumed by the Producer. See SOP 5-3, Part 1: Guidelines and Procedures for Precast Product Verification by Non-Destructive and Destructive Testing Procedures and [SOP 5-3, Part 2: Evaluation Forms for Precast Product Verification by Non-Destructive and Destructive Testing](#).

6.10.5 If products are deemed unacceptable as determined in Section 6.10.2, additional testing shall be conducted on other products produced.

## **7. Removal of Precast Plant from TDOT Producer List**

- 7.1 If a Producer fails to maintain their certification as stated in Section 1 of this SOP, they shall not be allowed to produce products for use on TDOT projects and shall be removed from the TDOT Producer List.
- 7.2 TDOT shall remove a Producer from the TDOT Producer List if they fail to manufacture, test, accept, or certify in accordance with Section 3 of this SOP.
- 7.3 TDOT shall remove a Producer from the TDOT Producer List if the Producer falsifies acceptance test results or certifies/stamps products that do not meet acceptance criteria.
- 7.4 TDOT shall remove a Producer from the TDOT Producer List if additional non-destructive testing and dimensional verification indicates that a product being manufactured contains a major error as stated in SOP 5-3, Part 3: Precast Manufacturing Tolerances.
- 7.5 TDOT shall remove a Producer from the TDOT Producer List if additional verification testing results are unacceptable.
- 7.6 If a facility is removed from the TDOT Producer List, HQMT shall notify the Producer in writing within seven (7) days directing the Producer not to supply any specific products of any type or size containing the error to TDOT projects. Upon such notice, the Producer shall immediately cease production, shipment, and placement of such product(s) supplied to TDOT projects. After such notice is issued, the Producer reserves the right to enter the appeals process requesting an informal meeting to discuss production for TDOT projects in accordance with Section 7.8.
  - 7.6.1 Producers shall provide TDOT with a list of products supplied to TDOT projects from the date of the last passing inspection that will include certifications and contract numbers.
  - 7.6.2 Installed items shall be left in place, accepted at a reduced cost, or rejected at the discretion of TDOT.
  - 7.6.3 Uninstalled items on projects are subject to being recalled from the date of the last passing test until the date of the failing test based on further evaluation. All cost incurred will be the responsibility of the Producer.
  - 7.6.4 Recalled items shall be clearly marked “RECALLED” in red lettering. No recalled items shall be allowed for use on TDOT projects, local programs, or state aid projects.
  - 7.6.5 Products on the Producer’s yard produced from the date of the last passing test until the date of the failing test may not be acceptable for use based on further evaluation. All cost incurred will be the responsibility of the Producer.

7.6.6 Products not acceptable for use on the Producer's yard shall have all TDOT information removed from the product.

7.7 Facility removal from the TDOT Producer List will be designated for a particular product. To be reinstated, the producer shall request a meeting with the Regional Materials and Tests and HQMT Coordinator/Director, or designee, to discuss a QC plan addressing actions taken to resolve any issues of non-compliance. The Producer shall then submit a letter to HQMT requesting reinstatement to the TDOT Producer List for the product type for which the Producer was removed. No product will be accepted until a formal response has been given by TDOT. If the producer is placed back on the TDOT Producer List, the guidelines for new producers as stated in Section 1 of this SOP must be followed.

## 7.8 Appeals Process

If a producer disagrees with the removal of a precast plant from the TDOT Producer List, the Producer shall provide such disagreement in writing within seven (7) days upon complying with Section 7.6.

7.8.1 The Producer must request a meeting with the Regional Materials and Tests and HQMT Coordinator/Director to discuss the disagreement in detail.

7.8.2 TDOT will meet with the Producer within fourteen (14) days of receiving this request. Upon the completion of this meeting and within seven (7) days, HQMT shall provide the Producer the written intent to proceed with the removal or reverse the direction and reinstate the Producer for the product for which they were removed.

7.8.3 If the removal is not reversed, the Producer may choose to continue the appeals process. The Producer shall provide written notice to the TDOT Chief Engineer (who has the authority to resolve disagreement) within thirty (30) days of the initial notification of removal from the TDOT Producer List.

The TDOT Chief Engineer or delegated designee will meet with the Producer within fourteen (14) days of receiving this request to provide final resolution within forty-five (45) days of the initial removal.

## Appendix A: Minimum Testing Frequencies for Product Acceptance

	Product	D-Load (0.01" crack)	Ultimate Load <sub>4</sub>	Absorption <sub>4</sub>	Compressive Strength <sub>1,2,3</sub>
Precast Products	Box Culverts	N/A	N/A	1/ year	1/ day min. <sub>5</sub>
	Catchbasins	N/A	N/A	1/ year	1/ day min. <sub>5</sub>
	Endwalls	N/A	N/A	N/A	1/ day min. <sub>5</sub>
	Manholes	N/A	N/A	1/ year	1/ day min. <sub>5</sub>
	Noise and Reinforced Concrete Facing Panels	N/A	N/A	N/A	1/day min. <sub>5</sub>
	Precast Deck Panels and Structural Spans	N/A	N/A	N/A	1/ day min. <sub>5</sub>
Reinforced Concrete Pipe	Round Pipe- Diameter ≤30"	1/ day <sub>6</sub>	1/ month	1/ year	D-Load
	Round Pipe- Diameter ≥36"	1/ day or compressive strength <sub>6</sub>	1/ week or compressive strength	1/ year	1/ day or D-Load
	Arch Pipe- <26 <sup>5</sup> / <sub>8</sub> " x 43 <sup>3</sup> / <sub>8</sub> " (<26.625" x 43.375")	1/ week	1/ month	1/ year	D-Load
	Arch Pipe- ≥ 26 <sup>5</sup> / <sub>8</sub> " x 43 <sup>3</sup> / <sub>8</sub> " (≥26.625" x 43.375")	1/ week or compressive strength	1/ week or compressive strength	1/ year	1/ week or Ultimate Load
	Elliptical Pipe- < 29" x 45"	1/ week	1/ month	1/ year	D-Load
	Elliptical Pipe- ≥ 29" x 45"	1/ week or compressive strength	1/ week or compressive strength	1/ year	1/ week or Ultimate Load

1. Compressive strength by two (2) 4"x8" cylinders.
2. Compressive strength must be 100% of the specified strength to be acceptable.
3. A pair of cylinders shall be made at a minimum of three (3) random points during production. The cylinders shall be cured in the same manner as the products they represent and/or in a water bath. One pair of cylinders shall be retained for TDOT verification testing. These cylinders shall be retained for a minimum of 30 days unless testing is performed sooner by a TDOT Representative.
4. One absorption test is required per mix design. Absorption shall be tested in accordance with ASTM C497. Absorption test results shall be sent to Regional Materials & Tests.
5. Six (6) cylinders per day per mixture minimum. If the same mix design is used in all products, then the six (6) cylinders will represent all products manufactured that day.
6. When small quantities (20 sections or less) per week of a product are produced, 1 test per week will be acceptable.
7. ~~Noise and reinforced concrete facing panels require one (1) air and slump/slumpflow test per day.~~

## Appendix B: Minimum Testing Frequencies for Product Verification

	Product	D-Load (0.01" crack)	Ultimate Load	Compressive Strength <sup>1,2,3</sup>
Precast Products	Box Culverts	N/A	N/A	1/ week
	Catchbasins	N/A	N/A	1/ week
	Endwalls	N/A	N/A	1/ week
	Manholes	N/A	N/A	1/ week
	Noise and Reinforced Concrete Facing Panels	N/A	N/A	1/week
	Precast Deck Panels and Structural Spans	N/A	N/A	1/ week
Reinforced Concrete Pipe	Round Pipe- Diameter ≤36"	1/ week	1/ 6 months	D-Load
	Round Pipe- Diameter ≥36"	1/ week or compressive strength	1/ month or compressive strength	1/ week or D-Load
	Arch Pipe- <26 <sup>5</sup> / <sub>8</sub> " x 43 <sup>3</sup> / <sub>8</sub> " (<26.625" x 43.375")	1/ month	1/ 6 months	D-Load
	Arch Pipe- ≥ 26 <sup>5</sup> / <sub>8</sub> " x 43 <sup>3</sup> / <sub>8</sub> " (≥26.625" x 43.375")	1/ month or compressive strength	1/ month or compressive strength	1/ month or Ultimate Load
	Elliptical Pipe- < 29" x 45"	1/ month	1/ 6 months	D-Load
	Elliptical Pipe- ≥ 29" x 45"	1/ month or compressive strength	1/ month or compressive strength	1/ month or Ultimate Load

1. Compressive strength by two (2) 4"x8" cylinders.
2. Compressive strength must be 100% of the specified strength to be acceptable.
3. A pair of cylinders shall be made at a minimum of three (3) random points during production. The cylinders shall be cured in the same manner as the products they represent and/or in a water bath. One pair of cylinders shall be retained for TDOT verification testing. These cylinders shall be retained for a minimum of 30 days unless testing is performed sooner by a TDOT Representative.

# Appendix C: Product Certification Form



Date July 14, 2015 Contract Number CNB 555 Report Number 1234567890  
 Project Number 123458-987-04 Contractor Joe's Pipe Installation Co. County Davidson

We, Precast - R-Us, Inc., located in \_\_\_\_\_, certify that the following products have been made in reasonable close conformance to the lines and grades shown as specified in accordance with: TDOT Standard Drawings, TDOT Standard Specifications, Approved plans, Approved shop drawings, and/or AASHTO/ASTM Standards. We also certify that the test results documented are correct, and the product has been completed in full accordance with the TDOT procedures for the manufacture of Pre-cast Concrete Products.

**Components, where applicable, meet stipulations of Special Provision 106A, *SPECIAL PROVISION REGARDING BUY AMERICA REQUIREMENTS.***

Reinforced concrete pipe:

Pipe Size/ Class/Wall	Date Mfg'd	D- Load to produce 0.01" crack	D- Load to produce ultimate load	Concrete Strength (psi)	Absorption percent	Quantity	Identific ation Number
18"-III- B ASTM C-76	6/25/14	1650	2450	4600	5.2%	80 LF	12345
18"-III- B ASTM C-76	6/28/14	1600	2450	4500	5.2%	96 LF	98765

Pre-cast concrete manholes, catch basins, end walls, box culverts, retaining walls, noise walls, etc...:

Item/type/dimensions/Structure Number	Date Mfg'd	Concrete Strength (PSI)	TDOT Drawing Number	Quantity	Identific ation Number
Type 12 Manhole- 32" x 32" x 48" Structure # 25 with risers and top	7/1/14	5600	DCB-12-LP	1 (8 feet)	12345

Signature: QC Manager  
 Date: July 14, 2015