

Submittal Number	002.A
Project name	4 th Street Extension – Phase 2 From Tuscola St. To Brainard St
Project Number	PW-7045
Engineer/Architect	HNTB
Prime Contractor	MAJOR CONTRACTING GROUP 15347 DALE STREET DETROIT, MI 48223
Supplier	Hercules Concrete LLC
Material Testing	Surveying Solutions, Inc. (SSI)
Submittal Item	Concrete Quality Control Plan
Date Submitted	08/08/2022

Contractor Concrete Quality Control Plan (QC Plan)

<u>Prime Contractor:</u>	Major Contracting Company
<u>Concrete Supplier:</u>	Hercules Materials
<u>Testing Sub:</u>	Surveying Solutions, Inc. (SSI)
<u>Project #:</u>	PW-7045
<u>SSI JN:</u>	22810
<u>Date:</u>	August 8th, 2022



Project Description: 4th Street Extension between Tuscola Street and Brainard Street, City of Detroit, MI (PW-7045)

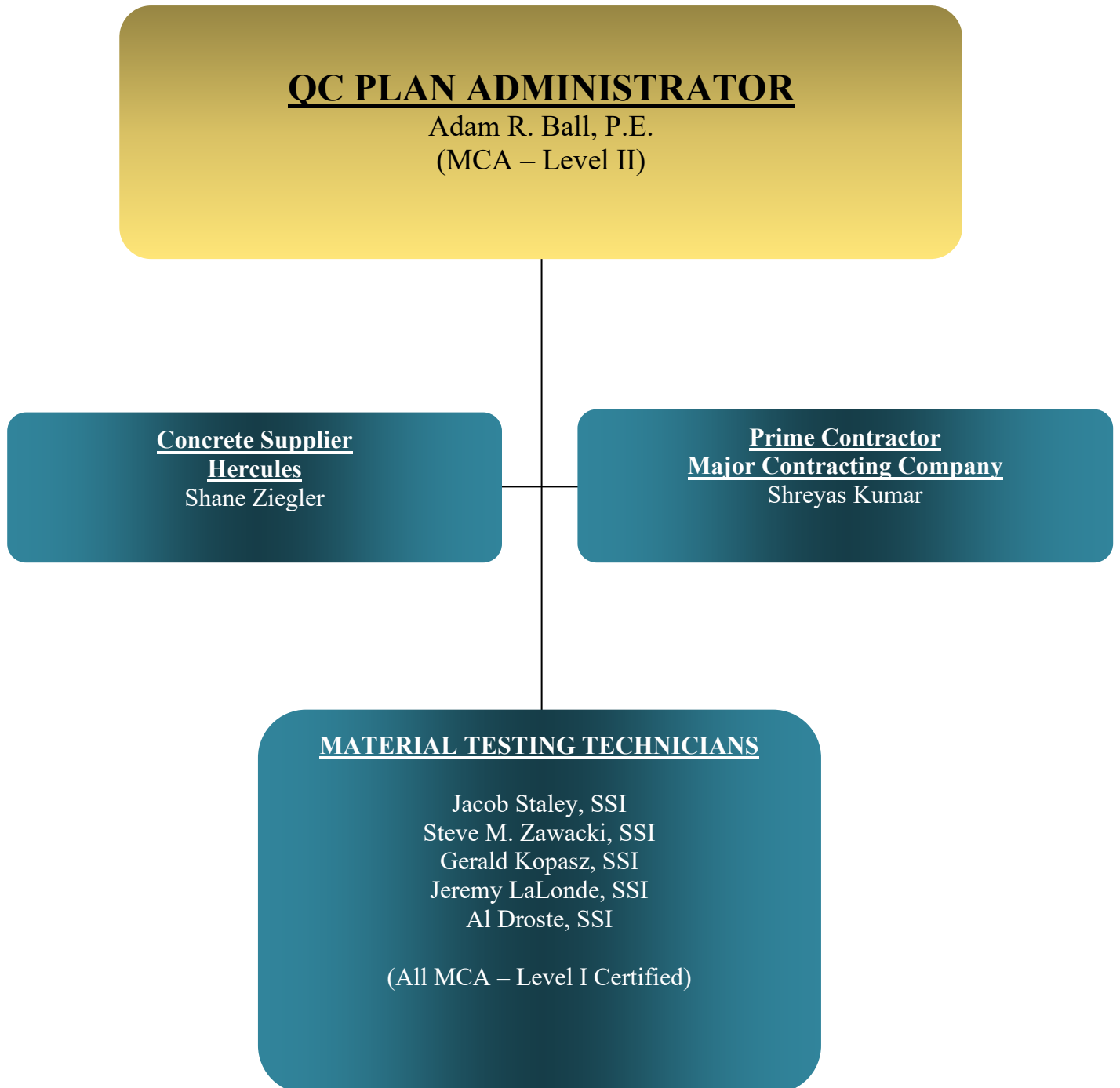
Contractor Concrete Quality Control Plan (QC Plan)

This contractor quality control plan has been prepared in accordance with Section 1002 (Contractor Quality Control for Concrete) from the 2020 MDOT Standard Specifications for Construction. The plan's intent is to assist in providing quality oversight for production testing and control of construction processes applicable to the specifications and contract that identifies all procedures used to control production and placement including when to initiate corrective action necessary to maintain the quality and uniformity of the work.

The contractor will be responsible to: Develop concrete mix designs and JMFs, as specified, and conduct QC sampling, testing, and inspection during all phases of the concrete work at the minimum frequency, or at an increased frequency sufficient to ensure that the work conforms to specification requirements.

The following list of items labeled 1 through 26 address the minimum requirements of the QC plan outlined in section 1002.03B.

1. Organizational Chart.



2. QC Plan Administrator and Contact Information:

Adam R. Ball, P.E.
Surveying Solutions, Inc.
4471 M-61
Standish, MI 48658
(989) 846-6601 Work
(989) 846-6607 Fax
(989) 484-0358 Cell
aball@ssi-mi.com

3. Name(s) and Credentials of QC Staff:

<u>Name (Company-Role)</u>	<u>Credentials</u>
Adam Ball, (SSI-QC Plan Administrator)	MCA Level I, II, MCAT, P.E.
Jacob Staley, (SSI-Technician)	MCA Level I, MCAT
Steve M. Zawacki, (SSI-Technician)	MCA Level I, MCAT
Gerald Kopasz, (SSI-Technician)	MCA Level I, MCAT
Jeremy LaLonde, (SSI-Technician)	MCA Level I, MCAT
Alan Droste, (SSI Technician)	MCA Level I, MCAT
Shreyas Kumar (Major Contracting)	MDOT Prequalified Contractor
Shane Ziegler (Hercules)	Certified Batch Plant, MCA Level II

Copies of MCA Certifications are attached at the back of this document.

4. Production and QC Staff Interaction:

The SSI on site testing technician will stay in constant communication with the concrete subcontractor(s) and the concrete batch plant throughout the course of concrete production keeping all parties informed of concrete tolerances. All SSI technicians are equipped with cellular phones with voice, text, and email capabilities and are proficient in communicating issues throughout the project. The onsite technician will be provided with contact information for the decision making parties at both the batch plant and contractor level and will be instructed to make contact with those parties immediately should issues arise.

5. Coordination of Activities:

The concrete subcontractor(s) will coordinate dates/times for concrete pours and will provide all parties with 24 hours' notice of an intended activity involving items of work requiring testing.

6. Documentation, Procedures, and Submittals:

The onsite technician will utilize SSI's standardized form to document information from field concrete QC testing operations. The standardized form (Attached in Appendix) has all pertinent project and testing information for each day's testing operations.

Copies of the daily testing forms will be provided to Owner/Agency on-site representative and contractor's representative the same day as each concrete pour. SSI also keeps a copy of the daily testing forms and digitally scans them for long term document retention.

QC break results, including results from work progress specimens, will be provided to the Owner/Agency representative as they become available.

7. Project and Plant Specifics:

Project Description: 4th Street Extension between Tuscola Street and Brainard Street, City of Detroit, MI (PW-7045)

Plant Specifics:

Hercules Materials

6497 E. 10 Mile Road
Centerline, MI 48015

Plant Production: 100+/- cubic yards per hour
Transportation Time: +/-25 Minutes
Distance to Project: +/- 13 Miles

Hercules Materials

2791 W. Jefferson
Detroit, MI 48216

Plant Production: 100+/- cubic yards per hour
Transportation Time: +/-10 Minutes
Distance to Project: +/- 3 Miles

8. Concrete Production Facilities – Inspections and Certifications:

Refer To Appendix for Plant Inspections and Certifications

9. Current Testing Equipment Calibration:



Air Meters -

Forney Press-Aire Meter Model: LA-0316

ASTM Calibration Standard: ASTM C231

Calibration Frequency: 3 Months

Last Calibration: Varies (Each Device Has Calibration Sticker)



Concrete Beam Breaker -

Humboldt Beam Breaker Model: H-3033

ASTM Calibration Standard: ASTM E74

Calibration Frequency: 12 Months

Last Calibration: January 2022



Concrete Cylinder Compression Break Machine -

Forney Model: F-25EX-F-CPILOT

ASTM Calibration Standard: ASTM E74

Calibration Frequency: 12 Months

Last Calibration: February 2022



Concrete Slump Cones -

Forney Model: LA-0275

ASTM Calibration Standard: ASTM C143

Calibration Frequency: 12 Months

Last Calibration: January 2022



Concrete Unit Weight Buckets -

Forney Model: LA-0505

ASTM Calibration Standard: ASTM C138

Calibration Frequency: 12 Months

Last Calibration: Varies (Each Device Has Calibration Sticker)



Thermometers -

Model Type Varies

ASTM Calibration Standard: ASTM C1064

Calibration Frequency: 12 Months

Last Calibration: New Thermometers Purchased Annually

10. Testing and Initial Field Curing Facilities for QC and QA Specimens:

All field testing of concrete will be done on site in close proximity to the concreting operation, but at a distance far enough away to avoid interference. Cylinders will be molded promptly on a level, rigid surface, free of vibration and other disturbances, at a place as near as practicable to the location where they are to be stored. The cylinders will be stored between 8 hours after initial set and 48 hours (Similar to the QA Cylinders) in an environment that prevents moisture loss and a curing temperature between 60 and 80 degrees. Insulated coolers will be made available to the concrete technician for use in regulating the temperature to avoid extremes. Depending on anticipated ambient temperatures, coolers may be partially filled with water to help dissipate heat of hydration and avoid the extreme temperatures. A thermometer will be provided to help track the temperature of the cylinder storage area. The contractor will also provide insulated coolers for the Owner/Agency QA cylinders and will have the ability to be locked by an Owner/Agency provided padlock.

11. Stockpile Management Plan(s):

See Appendix - If available at the time of printing, documentation for this item has been included in the appendix of this document.

12. Corrective Action Plan:

Concrete for this project will be produced with extreme care and attention to detail to ensure conformance with the specifications.

While the QC testing is independent and random of the QA testing; communication onsite of QC and QA results for air, slump and temperature will allow for confirmation of results at or near the

action suspension limits. This will enable the QC personnel to communicate with the supplier and make necessary adjustments or utilization of other approved mix designs.

Table 1002-1 of the 2020 MDOT Spec book indicates the various “Action Limits” and “Suspension Limits” for the various concrete properties.

Outlined below are the various “Action Limits” and “Suspension Limits” for this project and the corrective action plan that will be followed to bring the concrete into specification.

AIR CONTENT:

Action Limits: If the air content of the concrete is lower than 6.0% or higher than 8.0%, the SSI concrete technician will immediately notify the Owner/Agency representative, the driver of the concrete truck, and the foreman for the concrete subcontractor(s). Placement of the concrete will continue, but tests on subsequent trucks should show improvement away from the suspension limits. Subsequent testing of trucks shall be conducted until tests show the concrete has moved out of action limits $> 6.0 < 8.0$. The driver of the concrete truck shall immediately notify the batch plant of the truck’s air content for adjustment of future loads.

Suspension Limits: If the air content of the concrete is lower than 5.5% or higher than 8.5%, the SSI concrete technician will immediately notify the Owner/Agency representative, the driver of the concrete truck, and the foreman for the concrete subcontractor(s) that the material exceeds the suspension limits allowed. If testing shows one or more of the suspension limits have been exceeded, the concrete supplier shall be notified immediately and production shall be suspended. Production can only resume once the supplier has provided corrective action. The truck will be pulled aside to allow for potential adjustment of the air content within the time constraints allowed by the specification.

If the air content is below 5.5%, the truck driver may add additional entraining air admixture to increase the air content. Once the admixture has been added, the truck shall remix the load and it shall be retested to determine compliance. If the air content is still too low, the truck would be rejected in accordance with ASTM C94 17.6.2. If the air content is too high, the truck may remain on site within the time limits allowed in an attempt to allow the air to drop back into the allowable range.

AIR CONTENT LOSS:

Air content loss tests are required on any concrete that is slip formed or pumped. According to the special provision, both QA and QC sampling and testing of the fresh concrete for air content loss will be performed. Typical the air content loss will be performed: 1.) At least once each day during operations requiring pumping or slip forming 2.) Whenever QC tests have shown that QC action limits have been exceeded 3.) Whenever the concrete pump is relocated - where applicable 4.) Whenever there is a significant change in the boom angle of the concrete pump during concrete placement – where applicable.

Action Limits: If the air content loss through the paver or pumper exceeds 1.3%, the technician will notify the Owner/Agency Inspector, the driver of the concrete truck, and the foreman for the

concrete subcontractor(s). Placement of the concrete will continue, but the plant will be notified of the suspension limit tolerance.

Suspension Limits: If the air content loss through the paver or pumper exceeds 1.5%, the technician will notify the Owner/Agency Inspector, the driver of the concrete truck, and the foreman for the concrete subcontractor(s) and concrete placement will stop. The batch plant will have the opportunity to make changes to the mix and subsequent trucks will be tested until the air loss is brought back within the allowable limits.

The Contractor will suspend work if the air content is < 5.0 or > 9.0 percent after pump or paver, regardless of the air content loss.

CONCRETE TEMPERATURE:

Action Limits: If the concrete temperature at the point of delivery is lower than 50 degrees F or higher than 85 degrees F, the technician will notify the Owner/Agency representative, the driver of the concrete truck, and the foreman for the concrete subcontractor(s). The truck driver shall notify the batch plant to inform them of the situation. Placement of the concrete will continue, but the plant will be notified of the suspension limit tolerance.

Suspension Limits: If the concrete temperature at the point of deliver is lower than 45 degrees F; the technician will notify the Owner/Agency representative, the driver of the concrete truck, and the foreman for the concrete subcontractor(s). Placement of the concrete will be stopped until the temperature of the concrete is brought back into the Suspension Limit tolerances (45-90 degrees F). Concrete exceeding 90 degrees F at any time will be immediately rejected.

SLUMP:

The concrete technician will be familiar with the approved mix design for each type of concrete.

Action Limits: If the slump of the concrete is within ½” of the minimum or maximum values called for in the specification or the JMF, the driver of the concrete truck and the foreman for the concrete subcontractor will be notified by the concrete inspector. The plant shall make any necessary adjustments deemed necessary and the technician will test the next truck affected by the batch plant changes

Suspension Limits: If the slump of the concrete falls below the suspension limit, the concrete technician will notify the Owner/Agency representative, the driver of the concrete truck, and the foreman for the concrete subcontractor(s). Placement of the concrete will be stopped until the slump is adjusted so that it falls within specification. If the onsite owner/agency inspector allows the addition of water at the site, the truck shall be properly mixed prior to retesting. At no point will the total water be allowed to exceed the approved mix design.

If the slump of the concrete exceeds the suspension limit, the concrete technician will notify the Owner/Agency representative, the driver of the concrete truck, and the foreman for the concrete subcontractor(s). The truck with non-conforming slump will be rejected and work suspended until a new conforming truck arrives.

ELAPSED TIME:

The Contractors testing representative will monitor the limits stated in Table 1001-1 from the time of charging the mixer to complete concrete discharge.

Table 1001-1: Time Between Charging Mixer and Placing Concrete			
	Concrete Temperature (ASTM C1064/C1064M)		
	<65°F	65–85°F	>85°F
Type of Unit	Time Between Charging Mixer and Placing Concrete (minutes)		
Open-top trucks ^(a)	60	45	30
Open-top agitating units ^(a)	60	60	30
Closed-top agitating units and truck mixers	90	60	45
Truck mixers and closed-top agitating units with concrete-containing retarding admixture ^(b)	120	90	70
(a) Not allowed for structural concrete.			
(b) Superstructure concrete must meet the time limits for closed-top agitating units and truck mixers.			

Note: A water reducing retarding admixture is defined as a Type D water-reducer retarder as stated in the current Qualified Products List.

DENSITY (UNIT WEIGHT):

The specifications do not have suspension limits related to the density of the concrete.

Density (unit weight) will be verified at the beginning of concrete placement (On the first load of a given mix design per day) to verify the mix design unit weight, and as production continues if requested by the contractor or Engineer.

AGGREGATE GRADATION:

The concrete suppliers will be in constant communication with their aggregate supplier to ensure that aggregates supplied continue to meet specifications. If by chance the appearance or workability of the aggregates change dramatically throughout the course of the project, the concrete supplier will communicate with their aggregate suppliers to determine a course of action.

Optimized aggregate gradation is required for concrete mixtures that are placed using a pump.

13. Mixing Time and Transportation:

Hercules Materials

6497 E. 10 Mile Road
Centerline, MI 48015

Plant Production: 100+/- cubic yards per hour

Transportation Time: +/-25 Minutes

Distance to Project: +/- 13 Miles

Hercules Materials

2791 W. Jefferson
Detroit, MI 48216

Plant Production: 100+/- cubic yards per hour

Transportation Time: +/-10 Minutes

Distance to Project: +/- 3 Miles

14. Placement and Consolidation Methods:

Placement of the concrete and the consolidation methods used will be the responsibility of the concrete subcontractor(s). They will coordinate their construction activities to comply with the standards and specifications applicable to their work.

15. Process for Monitoring Stability of Air Content:

Hourly tests of the entrained air content will be part of the daily testing activities. This hourly observation will help provide a baseline for the air content and its stability throughout production. If entrained air content is unstable, the concrete technician will convey concerns to the batch plant to see if the air within the concrete could be stabilized.

16. Hot and Cold Weather Protection Considerations and Methods

According to the 2020 Standard Specifications for Construction (Section 602):

Do not place concrete pavement until the ambient air temperature away from artificial heat is at least 25 °F and rising, unless otherwise approved by the Engineer. Do not place concrete pavement if portions of the base, subbase, or Subgrade layer are frozen, or if the grade exhibits poor stability from excessive moisture.

The contractor shall also protect the concrete from freezing until the concrete has attained a compressive strength of at least 1000 psi. Cold weather protection may include items such as insulated blankets.

The supplier will also keep a close eye on the weather forecast for hot weather considerations. If the ambient temperature forecast for the day has the potential to cause the concrete to reach the action and/or suspension limits, continued production may be stopped. The use of chilled water will be one method of potentially prolonging production.

17. Control Charts With Action and Suspension Limits

<u>Quality Characteristic</u>	<u>Action Limits</u>	<u>Suspension Limits</u>
Air Content (Percent)	<6.0 or >8.0	<5.5 or >8.5
Air Content Loss (Percent)	Greater than 1.3%	Greater than 1.5%
Conc. Temp (Deg. F)	< 50 or >85 at time of placement	<45 or >90 at time of placement
Slump (Max.) (inch)	Within 0.5" of Spec or JMF Limits	Spec. or JMF Limits
Density (Unit Weight)	N/A	N/A
Aggregate Gradation	N/A	N/A

18. Verification of Non-Deleterious Alkali-Silica Reactivity:

The batch plants and their aggregate suppliers will be independently verifying the alkali-silica reactivity topic and providing documentation satisfying the requirements of the specifications. If available at the time of printing, documentation for this item has been included in the appendix of this document.

19. Mix Designs and JMFs:

The batch plants will be providing Mix Design and JMF information directly to the Owner/Agency Representative. If available at the time of printing, copies of Mix Designs have been included in the appendix of this document.

20. Proposed Lot Size and Location for Each JMF of Concrete:

A lot will not include more than one grade of concrete, concrete of the same grade having different specified slump or air content, or concrete of the same grade having different mix designs or JMFs.

The Contractor's testing consultant will make random QC cylinders for each type of concrete for each day of production. A minimum of (2) 28 day random QC cylinders will be made for each type of concrete for each day of production. Lot and subplot size will mimic that of the Owner/Agency, but will follow a different set of random numbers as required by the specification. For concrete patch projects, flexural beams may be the only specimens required during paving operations.

Random numbers will be pulled from a random number sheet assigned to each concrete technician. Although not a requirement, the Contractor's testing consultant may also make QC cylinders when the Owner/Agency technician makes QA cylinders as an independent verification of the owner/agency testing methodology.

The Engineer and the Contractor may agree to reduce the typical subplot size based on project staging or other project conditions.

Reduced or Eliminated QC requirements will be worked out by the Contractor and Owner/Agency staff for Small Incidental Quantities and Non-PWL Applications. The pre-construction and/or pre-paving meetings would present two potential opportunities to discuss these items or at a later date to be determined.

21. Frequency of Sampling and Testing:

QC Testing will be done randomly, with random numbers being pulled from a random number sheet assigned to each concrete technician.

The Contractor's testing consultant will make random QC cylinders for each type of concrete for each day of production. A minimum of (2) 28 day random QC cylinders will be made for each type of concrete for each day of production. Lot and subplot size will mimic that of the Owner/Agency, but will follow a different set of random numbers as required by the specification.

QC personnel will conduct startup sampling and testing for temperature, slump, density (unit weight), and air content on the first load of a given mix design per day. After the first load, Air, Slump, and Temperature will be done at regular 1 hour intervals. Additional unit weight tests can be done if requested by the contractor or the Engineer. If by chance, the random number requires that QC cylinders be made at a point that does not fall on the 1 hour interval; air, slump, and temp will also be taken at that time.

Prior to initial concrete placement, the testing personnel for both the Engineer's QA and Contractor's QC will conduct side by side correlation testing of the same concrete used on the project to verify correlation of both the Department's and the Contractor's test results for temperature and air content of fresh concrete.

Additional side by side correlation testing will be conducted whenever there is a change in QC or QA equipment and/or testing personnel for the project, or as directed by the Engineer.

Concrete Specimen: Our office will mold 4" x 8" compressive strength QC cylinders for the project. For concrete patch projects, flexural beams may be the only specimens required during paving operations.

The cylinders will be molded, cured, and transported in accordance with ASTM C-31. The 4" x 8" compressive strength QC cylinders will be broken after 28 days at the SSI offices either in St. Johns, or Standish, MI.

The Engineer and the Contractor may agree to reduce the typical subplot size based on project staging or other project conditions.

Please Note: If concrete items in section 7 above are considered small incidental quantities, concrete QC testing could be reduced/eliminated if agreed to by the Engineer. In those

instances, the Engineer's QA concrete testing representative will be responsible for monitoring concrete activities as they relate to action/suspension limits and will suspend/reject concrete if the limits are exceeded.

22. Handling and Protection of Test Specimens:

The cylinders will be molded, cured, and transported in accordance with ASTM C-31.

23. Methods to Monitor Const. Loading and Open to Traffic:

At the request of the contractor and/or Owner/Agency, early break cylinders or beams could be molded for purposes of open to traffic and early strength determination. Beams are historically cast and broken in the field by SSI and witnessed by Owner/Agency personnel. Early break cylinders can either be broken by Owner/Agency at their lab or at the SSI lab in St. Johns, MI or Standish, MI. The breaks will be witnessed by MDOT representative in person, Facetime or acceptable video alternative. Open to traffic strengths will be determined using Sections 1002.03.G and 104.11.B of the 2020 Spec Book.

24. Finishing and Curing Procedure

Finishing and Curing Procedures will be the responsibility of the concrete subcontractor(s). They will coordinate their construction activities to comply with the standards and specifications applicable to their work.

25. Ride Quality Control:

If applicable, Ride Quality and Smoothness Requirements will need to meet the requirements of the 2020 MDOT Standard Specifications for Construction and/or portions of the contract & 20SP-501K-01.

26. : List of QC records to be submitted to the Engineer in accordance with subsection 1002.03.C.

See Appendix

Additional Information:

The tests performed will be implemented in accordance with the ASTM standards listed below that are specified in section 1002.03.A verifying that the concrete meets the specified requirements.

ASTM STANDARDS

ASTM C-31	Making and Curing concrete test specimens in the field.
ASTM C-39	Test Method for Compressive Strength of Cylindrical Concrete specimens.
ASTM C-78	Test Method for Flexural Strength of Concrete.
ASTM C-138	Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
ASTM C-143	Test Method for Slump of Hydraulic Cement Concrete.
ASTM C-172	Practice for Sampling Freshly Mixed Concrete.
ASTM C-173	Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
ASTM C-192	Method of Making and Curing Concrete Test Specimens in the Laboratory.
ASTM C-231	Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
ASTM C-293	Test Method for Flexural Strength of Concrete.
ASTM C-1064	Temperature of Freshly Mixed Hydraulic-Cement Concrete

Testing Equipment:

SSI owns all of the equipment needed to perform the required tests for the Concrete Quality Control Plan and the project specifications. We also have full-service laboratories located in Standish and St. Johns, MI. Below is a list of all the ASTM certified equipment that will be used on the project.

- F-25EX-F-CoPilot Compression Machine (St. Johns Office Location)
- F-25EX-F-CoPilot Compression Machine (Standish Office Location)
- ½ cu. ft. yield bucket
- Strike off plate
- Strike off bar
- 220lb. scale
- Air meter kit
- Hammer
- Slump set
- Lids for molds
- Stripping tool
- Thermometer
- Tank heater
- Tank circulator
- Water tank
- Humidity/Moist Room
- Insulated storage box
- 6" x 6" x 21" Beam Molds
- Humboldt Beam Breaker
- Trowel
- 4" x 8" Cylinder molds

Contact Information:

Major Contracting Company

Contact: Shreyas Kumar

Phone: (734) 245-3535

Email: skumar@majorcontracting.com

Hercules Materials

Contact: Shane Ziegler

Phone: (734) 239-1023

Email: sziegler@herculesconcrete.com

Surveying Solutions, Inc.

Contact: Adam Ball

Phone: (989) 484-0358

Email: aball@ssi-mi.com



SURVEYING • ENGINEERING • CONSTRUCTION SERVICES
residential • commercial • design • construction • GPS

Standish, MI • St. Johns, MI • Saginaw, MI

www.ssi-mi.com

Tel: (989) 846-6601

Concrete Testing Report

Contractor/Subcontractor: _____		MDOT Job #: _____ SSI Job #: _____	
Foreman: _____		Inspector Name: _____	
Weather: _____		Tester Name: _____	
Lot No: _____		Certification #: _____	
Description of Pour: _____		Date: _____	
Location/Station of Pour: _____		Scheduled Pour Time: _____	
MDOT Spec. (Yr): _____ Mix Design Number: _____		Method of Placement: _____	
Conc. Grade: _____	Agg. Correction: _____	Design Strength: _____	Air: % to % Slump: inch to inch

Field Testing Summary

Time	Air Temp (F)	Concrete Temp (F)	Air Content (%)	Slump (in.)	Cylinder Set	Cumulative Yardage

Compressive/Flexural Strength Test Results

Cylinder/Beam ID	Set No.	Age (Days)	Break Date	Diameter (inch)	Cross Sectional Area (in ²)	Maximum Load (Pounds)	Strength (PSI)	Break Type	Broken By

On-Site Activity Report:

Correlation Results: Tester _____ Delivery Ticket # _____ Air % _____ Slump _____" Air Temp _____ Concrete Temp _____

Volume of Concrete Poured: _____

Conc. Source and City: _____

Concrete Truck Number(s): _____

Cylinder Break Report (Explain any Anomalies): _____

This concrete report has been independently reviewed and verified by: _____

APPENDIX #1

SSI Material Testing Certifications

Michigan Concrete Association

Certification Board of Examiners

Hereby certifies that on 1/15/2020

Jake Staley

did, by written and performance examinations, complete the requirements for

Concrete Field Testing Technician Level I

This certification expires on 4/15/2023

MCA Certification Board of Examiners

Michigan Department of Transportation

ACI – Greater Michigan Chapter

ACI – West Michigan Chapter

Alpena Community College



MCA Director of Technical Services/Training



Examiner-William Foster



Executive Director-Daniel DeGraaf

Michigan Concrete Association

Certification Board of Examiners

Hereby certifies that on 1/15/2021

Jeremy LaLonde

did, by written and performance examinations, complete the requirements for

Concrete Field Testing Technician Level I

This certification expires on 4/15/2024

MCA Certification Board of Examiners

Michigan Department of Transportation

ACI – Greater Michigan Chapter

ACI – West Michigan Chapter

Alpena Community College



MCA Director of Technical Services/Training



Examiner-William Foster



Executive Director-Daniel DeGraaf

Michigan Concrete Association

Certification Board of Examiners

Hereby certifies that on 12/10/2019

Alan Droste

did, by written and performance examinations, complete the requirements for

Concrete Field Testing Technician Level I

This certification expires on 4/15/2023

MCA Certification Board of Examiners

Michigan Department of Transportation

ACI – Greater Michigan Chapter

ACI – West Michigan Chapter

Alpena Community College



MCA Director of Technical Services/Training



Examiner-William Foster



Executive Director-Daniel DeGraaf

Michigan Concrete Association

Certification Board of Examiners

Hereby certifies that on 12/15/2021

Steve Zawacki

did, by written and performance examinations, complete the requirements for

Concrete Field Testing Technician Level I

This certification expires on 4/15/2025

MCA Certification Board of Examiners

Michigan Department of Transportation

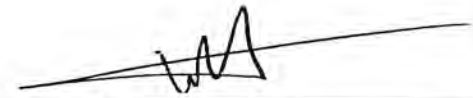
ACI – Greater Michigan Chapter

ACI – West Michigan Chapter

Alpena Community College



MCA Director of Technical Services/Training



Examiner-William Foster



Executive Director-Daniel DeGraaf

Michigan Concrete Association
Certification Board of Examiners

hereby certifies that on 3/24/2022

Adam Ball

did, by written and performance examinations, complete the requirements for

***Level I Concrete Field Testing Technician and
Level II Advanced Concrete Technician***

This certification expires on 4/15/2025

MCA Certification Board of Examiners

Michigan Department of Transportation

ACI – Greater Michigan Chapter

ACI – West Michigan Chapter

Alpena Community College



MCA Assistant Director of Training & Certification



Executive Director-Daniel DeGraaf



Examiner-William Foster

Michigan Concrete Association Certification Board of Examiners

Hereby certifies that on 3/16/2022

Gerald Kopasz

did, by written and performance examinations, complete the requirements for

Concrete Field Testing Technician Level I

This certification expires on 4/15/2025

MCA Certification Board of Examiners

Michigan Department of Transportation

ACI – Greater Michigan Chapter

ACI – West Michigan Chapter

Alpena Community College



MCA Director of Technical Services/Training



Examiner-William Foster



Executive Director-Daniel DeGraaf

APPENDIX #2

SSI Equipment Calibrations

Calibration Services, Inc.

300 Buttertontown Road
Emlenton, PA 16373

P: (724) 867-6664
F: (724) 867-1346
www.calibrationinc.com
info@calibrationinc.com

Certificate of Calibration

COPY

Client: Surveying Solutions, Inc.
Address: 4471 M-61
City/St/Zip: Standish, MI 48685

Calibration

Location: 1000 South US-27
City/St/Zip: St. Johns, MI 48879
PO Number: Verbal-Adam
Cert Number: 220522 KW
Procedure No: CAL 1.02A
Condition of Device: Good

Calibration Date: 2/1/2022
Suggested Recal Date: 2/1/2023
Technician: Damon McBurney
Temperature: 20 Degrees C
Humidity: 38.0%
Barometric Pressure: 29.07 in Hg
Device Type: Digital Compression Machine
Manufacturer: Forney
Model Number: F-25EX-CPILOT
Serial Number: 02085
Range: 2,500 Lbs to 250,000 Lbs

CALIBRATION SYSTEM USED

All calibration standards used in this calibration are traceable to the International System of Units (SI) through NIST or equivalent National Measurement Institute signatories to the CIPM MRA.

Code	Instrument	Capacity	Serial Number	Class A
N/A	Barometer-Process Instruments Inc.	N/A	181717622	N/A
Reference Number: CAL250204 Process Instruments Inc.				
Date of Test: December 20, 2021 Date Due: December 20, 2022				
C	Tovey Load Cell	60K	115371A	1357.00T/1921.00C
Report No. 115371AG2621 Morehouse Instrument				
Calibrated: July 26, 2021 Recalibration due: July 26, 2023				
D	Strainsense Load Cell	600K	020411	31,096.00C
Report No. 020411G2621 Morehouse Instrument				
Calibrated: July 26, 2021 Recalibration due: July 26, 2023				

Statement of Compliance

This is to certify that the above described testing device has been calibrated in accordance with CSI's QMS Program based on ISO/IEC 17025 in accordance with ANSI/NCSL Z540-3, the procedure listed above, and ASTM E-4-20 (excluding sections: 6.2, 13 all, 16 all, A1 all). The device has been verified within +/- 1% of applied load. Uncertainties were calculated using square root sum of squares (rss) with a confidence factor of 95% and a coverage of k=2. The expanded uncertainty is 0.16% of applied load. Decision Rule 1 applies: uncertainties are not taken into consideration for in / out of tolerance determination.

Signed 
Calibration Technician

Signed 
Quality Director

This Certificate is issued as a statement of the fact that on this date the above instrument(s) had an accuracy as indicated in the data section of this certificate. It should not be construed or regarded as a Guarantee or Warranty of any kind (in favor of the client, the client's customers, or the public at large) that the instrument(s) will continue to retain the same percentage (%) of accuracy or efficiency as determined on the date when the calibration, adjustments if required, was performed and reported by Calibration Services, Inc. since the calibrator has absolutely no control over the future operation, damage, maintenance, repairs, and overall condition of the instrument(s) and hereby expressly disclaims any and all liability for damage, or loss sustained by all parties arising or resulting from deterioration, obsolescence, malfunction, or substandard performance of said instrument(s); which shall be deemed to be and which shall remain the sole responsibility of the machine's regular custodian, owner, and/or manufacturer. This document shall not be reproduced except in full, without the written approval of Calibration Services, Inc.

Calibration Services, Inc.

300 Buttertontown Road
Emlenton, PA 16373

P: (724) 867-6664

F: (724) 867-1346

www.calibrationinc.com

info@calibrationinc.com

Certificate of Calibration

COPY

Client: Surveying Solutions, Inc.

Address: 4471 M-61

City/St/Zip: Standish, MI 48685

Calibration

Location: 1000 South US-27

City/St/Zip: St. Johns, MI 48879

PO Number: Verbal-Adam

Cert Number: 220522 KW

Procedure No: CAL 1.02A

Condition of Device: Good

Calibration Date: 2/1/2022

Suggested Recal Date: 2/1/2023

Technician: Damon McBurney

Temperature: 20 Degrees C

Humidity: 38.0%

Barometric Pressure: 29.07 in Hg

Device Type: Digital Compression Machine

Manufacturer: Forney

Model Number: F-25EX-CPILOT

Serial Number: 02085

Range: 2,500 Lbs to 250,000 Lbs

Range Number 1	Range:	2,500 Lbs to 250,000 Lbs	Graduation:	5 lbs
----------------	--------	--------------------------	-------------	-------

Mode: Compression

As Found: In Tolerance

As Left: In Tolerance

Grads	Code	Applied	As Found	#1	#2	Final #1	Final #2	Final #1	Final #2	Algebraic	
		Load		As Left	As Left	Error	Error	Percent	Percent	Difference	EMU
lbs		lbs	lbs	lbs	lbs	lbs	lbs				lbs
5	C	2500	2510	2510	2510	10.000	10.000	0.400	0.400	0.000	4.00
5	C	5000	5020	5020	5015	20.000	15.000	0.400	0.300	0.100	8.00
5	C	10000	10035	10035	10040	35.000	40.000	0.350	0.400	-0.050	16.00
5	C	15000	15040	15040	15045	40.000	45.000	0.267	0.300	-0.033	24.00
5	C	20000	20090	20090	20080	90.000	80.000	0.450	0.400	0.050	32.00
5	C	25000	25095	25095	25090	95.000	90.000	0.380	0.360	0.020	40.00
5	C	50000	50180	50180	50185	180.000	185.000	0.360	0.370	-0.010	80.00
5	D	100000	100260	100260	100245	260.000	245.000	0.260	0.245	0.015	160.00
5	D	150000	150370	150370	150380	370.000	380.000	0.247	0.253	-0.007	240.00
5	D	200000	200450	200450	200435	450.000	435.000	0.225	0.218	0.008	320.00
5	D	250000	250565	250565	250585	565.000	585.000	0.226	0.234	-0.008	400.00
Zero Return			0	0	0						

Calibration Services, Inc.

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Emlenton, PA 16373

P: (724) 867-6664
F: (724) 867-1346
www.calibrationinc.com
info@calibrationinc.com

Certificate of Calibration

Client: Surveying Solutions, Inc.
Address: 4471 M-61
City/St/Zip: Standish, MI 48658

Calibration
Location: 4471 M-61
City/St/Zip: Standish, MI 48658
PO Number: Verbal-Adam
Cert Number: 220527 KW
Procedure No: CAL 1.02A
Condition of Device: Good

Calibration Date: 2/2/2022
Suggested Recal Date: 2/2/2023
Technician: Damon McBurney
Temperature: 20 Degrees C
Humidity: 48.0%
Barometric Pressure: 29.53 in Hg
Device Type: Digital Compression Machine
Manufacturer: Forney
Model Number: F-25EX-F-CPLOT
Serial Number: 09136
Range: 2,500 Lbs to 250,000 Lbs

Range Number 1	Range:	2,500 Lbs to 250,000 Lbs	Graduation:	5 lbs
----------------	--------	--------------------------	-------------	-------

Mode: Compression

As Found: In Tolerance

As Left: In Tolerance

Grads	Code	Applied	As Found	#1	#2	Final #1	Final #2	Final #1	Final #2	Algebraic	EMU
		Load		As Left	As Left	Error	Error	Percent	Percent	Difference	
lbs		lbs	lbs	lbs	lbs	lbs	lbs			Percent	lbs
5	C	2500	2505	2505	2510	5.000	10.000	0.200	0.400	-0.200	4.00
5	C	5000	5020	5020	5020	20.000	20.000	0.400	0.400	0.000	8.00
5	C	10000	10045	10045	10040	45.000	40.000	0.450	0.400	0.050	16.00
5	C	15000	15065	15065	15070	65.000	70.000	0.433	0.467	-0.033	24.00
5	C	20000	20080	20080	20090	80.000	90.000	0.400	0.450	-0.050	32.00
5	C	25000	25115	25115	25120	115.000	120.000	0.460	0.480	-0.020	40.00
5	C	50000	50130	50130	50145	130.000	145.000	0.260	0.290	-0.030	80.00
5	D	100000	99955	99955	99965	-45.000	-35.000	-0.045	-0.035	-0.010	160.00
5	D	150000	150160	150160	150190	160.000	190.000	0.107	0.127	-0.020	240.00
5	D	200000	200240	200240	200255	240.000	255.000	0.120	0.128	-0.008	320.00
5	D	250000	250485	250485	250515	485.000	515.000	0.194	0.206	-0.012	400.00
Zero Return			0	0	0						

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info@calibrationinc.com

Certificate of Calibration

Client: Surveying Solutions, Inc.
Address: 4471 M-61
City/St/Zip: Standish, MI 48658

Calibration

Location: 4471 M-61
City/St/Zip: Standish, MI 48658
PO Number: Verbal-Adam
Cert Number: 220527 KW
Procedure No: CAL 1.02A
Condition of Device: Good

Calibration Date: 2/2/2022
Suggested Recal Date: 2/2/2023
Technician: Damon McBurney
Temperature: 20 Degrees C
Humidity: 48.0%
Barometric Pressure: 29.53 in Hg
Device Type: Digital Compression Machine
Manufacturer: Forney
Model Number: F-25EX-F-CPIL0T
Serial Number: 09136
Range: 2,500 Lbs to 250,000 Lbs

CALIBRATION SYSTEM USED

All calibration standards used in this calibration are traceable to the International System of Units (SI)
through NIST or equivalent National Measurement Institute signatories to the CIPM MRA.

Code	Instrument	Capacity	Serial Number	Class A
N/A	Barometer-Process Instruments Inc.	N/A	181717622	N/A
Reference Number: CAL250204 Process Instruments Inc.				
Date of Test: December 20, 2021 Date Due: December 20, 2022				
C	Tovey Load Cell	60K	115371A	1357,00T/1921.00C
Report No. 115371AG2621 Morehouse Instrument				
Calibrated: July 26, 2021 Recalibration due: July 26, 2023				
D	Strainsense Load Cell	600K	020411	31,096.00C
Report No. 020411G2621 Morehouse Instrument				
Calibrated: July 26, 2021 Recalibration due: July 26, 2023				

Statement of Compliance

This is to certify that the above described testing device has been calibrated in accordance with CSI's QMS Program based on ISO/IEC 17025 in accordance with ANSI/NCSL Z540-3, the procedure listed above, and ASTM E-4-20 (excluding sections: 6.2, 13 all, 16 all, A1 all). The device has been verified within +/- 1% of applied load. Uncertainties were calculated using square root sum of squares (rss) with a confidence factor of 95% and a coverage of k=2. The expanded uncertainty is 0.16% of applied load. Decision Rule 1 applies; uncertainties are not taken into consideration for in / out of tolerance determination.

Signed

Calibration Technician

Signed

Quality Director

This Certificate is issued as a statement of the fact that on this date the above instrument(s) had an accuracy as indicated in the data section of this certificate. It should not be construed or regarded as a Guarantee or Warranty of any kind (in favor of the client, the client's customers, or the public at large) that the instrument(s) will continue to retain the same percentage (%) of accuracy or efficiency as determined on the date when the calibration, adjustments if required, was performed and reported by Calibration Services, Inc. since the calibrator has absolutely no control over the future operation, damage, maintenance, repairs, and overall condition of the instrument(s) and hereby expressly disclaims any and all liability for damage, or loss sustained by all parties arising or resulting from deterioration, obsolescence, malfunction, or substandard performance of said instrument(s); which shall be deemed to be and which shall remain the sole responsibility of the machine's regular custodian, owner, and/or manufacturer. This document shall not be reproduced except in full, without the written approval of Calibration Services, Inc.

APPENDIX #3

Concrete Supplier Information (Hercules)

Submittal Number	001.A
Project name	4 th Street Extension – Phase 2 From Tuscola St. To Brainard St
Project Number	PW-7045
Engineer/Architect	HNTB
Prime Contractor	MAJOR CONTRACTING GROUP 15347 DALE STREET DETROIT, MI 48223
Supplier	Hercules Concrete LLC
Specification Section Number	• City of Detroit Special Provision for Pavt Repr, Rem, Modified, Pavt Repr Nonreinf Conc, Modified, Concrete Pavement, Modified and Concrete Base Pavement, Modified • City of Detroit Specification for Sidewalks • City of Detroit Specification for Sidewalk Ramp, ADA and Detectable Warning Surface
Submittal Item	Concrete Mix Design
Date Submitted	08/05/2022



8/5/2022

**Major Contracting Group
15347 Dale Street
Detroit, MI 48223
Attn: Dan Scappaticci**

Project: PW-7037 City of Detroit 4th Street Extension Phase 2

We submit the following mixes for the project listed above.

MIX ID	Description
P1-SW	MDOT P1 3500 PSI AE W/WR – 3" MAX
P1-SM	MDOT P1 3500 PSI AE W/MR – 6" MAX

The mix designs listed above have been designed in accordance with MDOT 2012 Standard Specifications for Construction and the project specifications also in reference to ACI 318-08, chapter 5 (Quality Concrete), and ACI standard deviation / over design requirements. Please forward any and all concrete tests for record keeping purposes to gcbreakdata@herculesconcrete.com

Please do not hesitate to reach out to your salesman or any Hercules staff for further assistance should you need anything further.

Respectfully submitted,

Giuseppe Palumbo
Sales Manager
Hercules Concrete LLC.

This form applies only to the project listed below and is not transferable to other projects
DISTRIBUTION: ORIGINAL – Project Engineer **COPIES** – Contractor, Lansing CFS, Region, Inspector

CONTROL SECTION	JOB NUMBER	PROJECT LOCATION City of Detroit PW 7045 4th street Extension	PROJECT ENGINEER City of Detroit
CONCRETE SUPPLIER Hercules Materials Holdings, LLC		PLANT LOCATION 6497 E 10 Mile Road, Centerline / 2791 W Jefferson, Detroit MI	PLANT NUMBER HMH-04-CEN / 01-DET
GRADE OF CONCRETE 3500	PSI REQUIREMENT 3500	MIX DESIGN NUMBER P1-SW	INTENDED USE (S) Curb / Pavement
CONTRACTOR QC PLAN Y ☐ SUBMITTED? (MDOT use only) N ☐			
PRIME / SUBCONTRACTOR(S) Major Contracting Group / All Sub Contractors			
STANDARD SPEC DATE 01/01/20	QC/QA SPECIAL PROVISION DATE 04/03/20	JMF EFFECTIVE DATE 08/05/22	AGG. CORRECTION 0.2

MATERIAL DESIGN SOURCES AND PROPERTIES

COARSE AGGREGATE		INTERMEDIATE AGGREGATE		FINE AGGREGATE	
Aggregate Type	Limestone	Aggregate Type		Source Name	Stoneco-Burmeister
Source Name	Calcite	Source Name		MDOT Source No.	81-093
MDOT Source No.	71-3	MDOT Source No.		MDOT Series Class	2NS
MDOT Series Class	6AA	MDOT Series Class		Specific Gravity (Bulk Dry)*	2.61
Specific Gravity (Bulk Dry)*	2.53	Specific Gravity (Bulk Dry)*		Specific Gravity (Bulk SSD) optional	2.64
Specific Gravity (Bulk SSD) optional	2.57	Specific Gravity (Bulk SSD) optional		Absorption	1.1
Absorption	1.5	Absorption		Fineness Modulus (FM)	2.87
Unit Weight (Dry Rodded) DR or	94.2	Unit Weight (Dry Rodded) DR or			
Unit Weight (Dry Loose) DL	83.9	Unit Weight (Dry Loose) DL			
Percent Crushed	100%	Percent Crushed			
MDOT Freeze-Thaw (F-T) Dilation	0.028	MDOT Freeze-Thaw (F-T) Dilation			
Specific Gravity (Bulk Dry) of F-T	2.54	Specific Gravity (Bulk Dry) of F-T			
Sample*		Sample*			
Date of MDOT Freeze-Thaw Report	08/22/18	Date of MDOT Freeze-Thaw Report			

* If the bulk dry specific gravity is more than 0.04 less than the bulk dry specific gravity of the most recently tested freeze-thaw sample, the aggregate will be considered to have changed characteristics and be required to have a new freeze-thaw test conducted prior to the use on Department projects.

CEMENTITIOUS		ADMIXTURES	
Cement Source / Plant	Ash Grove (Mississauga)	Air Entrainment	0AE-PCA Premiere ConAir-X
Cement Type	Type 1L	Water Reducer	0WR50-PCA Premiere Optiflo-50
Cement Specific Gravity	3.12	Water Reducer	
Fly Ash Source (distributer & plant)		Water Reducer	
Fly Ash Class		Accelerator	
Fly Ash Specific Gravity		Other	
Slag Cement Source	Ash Grove (Detroit)	(Indicate Source & Product name with ticket code)	
Slag Cement Grade	100		
Slag Cement Specific Gravity	2.90	TYPE OF MIX WINTER/SUMMER	Winter & Summer
Other			

MIX PROPORTIONS

Volume of Coarse Aggregate (DR)	66%	Design Slump	3"
Coarse Aggregate Weight (Dry)	1655 (SSD 1680)	Specified Slump	0-3"
Intermediate Aggregate Weight (Dry)		Design Air %	6.5%
Fine Aggregate Weight (Dry)	1343 (SSD 1358)	Specified Air %	5.5 - 8.5%
Portland Cement Weight	342	PSI minimum required	3500
Fly Ash Weight		Total Cementitious	526
Fly Ash Percent of Cementitious		Yield cu/ft	27 +/- .02
Slag Cement Weight	184		
Slag Cement Percent of Cementitious	35%		
Total Water Weight	274		
Net Water Weight	234		
WC (as designed)	0.44		
Air Entrainment (dosage)	1 oz/cwt		
Water Reducer (dosage)	3 - 5 oz/cwt		
Other (dosage)			

I certify that all applicable standard test methods have been followed verifying the mix design and JMF:

Signature **Shane Ziegler** Digitally signed by Shane Ziegler
Date: 2022.04.25 08:07:30 -04'00'

MCA Level II Expiration Date: 04/15/25

Date: 08/05/22



Concrete Mix Evaluation Report

Mix Verification Method 1

Mix ID P1-SW

Mix Name MDOT P1 3500 PSI 35%
GGBFS W/WR

Design Strength (f'c) 3500 psi @ 28 Days

Required Strength (f'cr) 4700 psi @ 28 Days

ACI 318 Required Average Strength

Number Of Tests 9

Average Strength 6112 psi

St Dev 571 psi

St Dev (Modified) 571 psi

4 Yard Trail Batch - Mix batch to proportions & materials on attached jmf

Test Date	Mix	Lab	Temp (Concrete) (F)	Slump (in)	Air Content (%)	Unit Weight (lb/ft3)	Comp Strength (7-Day) (psi)	Acceptance Strength (28-Day) (psi)	Moving Average (psi)
02/28/2022	P1-SW		64	2.5	5.5	144.4	4260	6620	
02/28/2022	P1-SW		64	2.5	5.5	143.2	3560	5850	
02/28/2022	P1-SW		63	3	5.2	141.2	3340	5510	5993
02/28/2022	P1-SW		64	3	4.5	145.2	4870	6720	6027
02/28/2022	P1-SW		63	3	7.4	140.2	3800	5180	5803
02/28/2022	P1-SW		65	2.75	5.6	143	4600	6480	6127
02/28/2022	P1-SW		63	2.75	6.1		4900	6800	6153
02/28/2022	P1-SW		64	2.25	6	143.2	3720	5870	6383
02/28/2022	P1-SW		63	2.5	6.2	142.4	4100	5980	6217

Each 28 Day Break is an average of 3 test cylinders

This form applies only to the project listed below and is not transferable to other projects
DISTRIBUTION: ORIGINAL – Project Engineer **COPIES** – Contractor, Lansing CFS, Region, Inspector

CONTROL SECTION	JOB NUMBER	PROJECT LOCATION City of Detroit PW 7045 4th street Extension	PROJECT ENGINEER City of Detroit
CONCRETE SUPPLIER Hercules Materials Holdings, LLC		PLANT LOCATION 6497 E 10 Mile Road, Centerline / 2791 W Jefferson, Detroit MI	PLANT NUMBER HMH-04-CEN / 01-DET
GRADE OF CONCRETE 3500	PSI REQUIREMENT 3500	MIX DESIGN NUMBER P1-SM	INTENDED USE (S) Pavement / Walks
		CONTRACTOR QC PLAN Y ☐ SUBMITTED? (MDOT use only) N ☐	
PRIME / SUBCONTRACTOR(S) Major Contracting Group / All Sub Contractors			
STANDARD SPEC DATE 01/01/20	QC/QA SPECIAL PROVISION DATE 04/03/20	JMF EFFECTIVE DATE 08/05/22	AGG. CORRECTION 0.2

MATERIAL DESIGN SOURCES AND PROPERTIES

COARSE AGGREGATE		INTERMEDIATE AGGREGATE		FINE AGGREGATE	
Aggregate Type	Limestone	Aggregate Type		Source Name	Stoneco-Burmeister
Source Name	Calcite	Source Name		MDOT Source No.	81-093
MDOT Source No.	71-3	MDOT Source No.		MDOT Series Class	2NS
MDOT Series Class	6AA	MDOT Series Class		Specific Gravity (Bulk Dry)*	2.61
Specific Gravity (Bulk Dry)*	2.53	Specific Gravity (Bulk Dry)*		Specific Gravity (Bulk SSD) optional	2.64
Specific Gravity (Bulk SSD) optional	2.57	Specific Gravity (Bulk SSD) optional		Absorption	1.1
Absorption	1.5	Absorption		Fineness Modulus (FM)	2.75
Unit Weight (Dry Rodded) DR or	94.2	Unit Weight (Dry Rodded) DR or			
Unit Weight (Dry Loose) DL	83.9	Unit Weight (Dry Loose) DL			
Percent Crushed	100%	Percent Crushed			
MDOT Freeze-Thaw (F-T) Dilation	0.028	MDOT Freeze-Thaw (F-T) Dilation			
Specific Gravity (Bulk Dry) of F-T	2.54	Specific Gravity (Bulk Dry) of F-T			
Sample*		Sample*			
Date of MDOT Freeze-Thaw Report	08/22/18	Date of MDOT Freeze-Thaw Report			

* If the bulk dry specific gravity is more than 0.04 less than the bulk dry specific gravity of the most recently tested freeze-thaw sample, the aggregate will be considered to have changed characteristics and be required to have a new freeze-thaw test conducted prior to the use on Department projects.

CEMENTITIOUS		ADMIXTURES	
Cement Source / Plant	Ash Grove (Mississauga)	Air Entrainment	0AE-PCA Premiere ConAir-X
Cement Type	Type 1L	Water Reducer	0MR50-PCA Premiere OptiFlo-50
Cement Specific Gravity	3.12	Water Reducer	
Fly Ash Source (distributer & plant)		Water Reducer	
Fly Ash Class		Accelerator	
Fly Ash Specific Gravity		Other	
Slag Cement Source	Ash Grove (Detroit)	(Indicate Source & Product name with ticket code)	
Slag Cement Grade	100		
Slag Cement Specific Gravity	2.90	TYPE OF MIX WINTER/SUMMER	Winter & Summer
Other			

MIX PROPORTIONS

Volume of Coarse Aggregate (DR)	66%	Design Slump	5"
Coarse Aggregate Weight (Dry)	1655 (SSD 1680)	Specified Slump	4-6"
Intermediate Aggregate Weight (Dry)		Design Air %	6.5%
Fine Aggregate Weight (Dry)	1343 (SSD 1358)	Specified Air %	5.5 - 8.5%
Portland Cement Weight	342	PSI minimum required	3500
Fly Ash Weight		Total Cementitious	526
Fly Ash Percent of Cementitious		Yield cu/ft	27 +/- .02
Slag Cement Weight	184		
Slag Cement Percent of Cementitious	35%		
Total Water Weight	274		
Net Water Weight	234		
WC (as designed)	0.44		
Air Entrainment (dosage)	1 oz/cwt		
Water Reducer (dosage)	5 - 6 oz/cwt		
Other (dosage)			

I certify that all applicable standard test methods have been followed verifying the mix design and JMF:

Signature **Shane Ziegler** Digitally signed by Shane Ziegler
Date: 2022.04.25 08:08:13 -04'00'

MCA Level II Expiration Date: 04/15/25

Date: 08/05/22



Concrete Mix Evaluation Report

Mix Verification Method 1

ACI 318 Required Average Strength

Mix ID P1-SM

Number Of Tests 6

Mix Name MDOT P1 3500 PSI AE 35%
GGBFS W/MR

Average Strength 5140 psi

Design Strength (f'c) 3500 psi @ 28 Days

St Dev 540 psi

Required Strength (f'cr) 4700 psi @ 28 Days

St Dev (Modified) 540 psi

4 yard trail batch - Mix batch to proportions & materials on attached jmf

Test Date	Mix	Lab	Temp (Concrete) (F)	Slump (in)	Air Content (%)	Unit Weight (lb/ft3)	Comp Strength (7-Day) (psi)	Acceptance Strength (28-Day) (psi)	Moving Average (psi)
02/24/2022	P1-SM		64	5.75	7.6	142.8	2740	5110	
02/24/2022	P1-SM		63	4.25	6.8		3730	5860	
02/24/2022	P1-SM		64	5	7.7	142.8	2680	4400	5123
02/24/2022	P1-SM		63	5.25	7.4	144.4	2790	4690	4983
02/24/2022	P1-SM		64	5	6		3050	5570	4887
02/24/2022	P1-SM		66	4.75	7.4	141	2650	5210	5157

Each 28 Day Break is an average of 3 test cylinders



Re: All MDOT Projects

Admixture General Certification

<u>Spec.# and Material Name</u>	<u>Manufacturer</u>	<u>Product Name</u>	<u>Hercules Item #</u>
903.01 – Air Entraining Admix	Premiere	ConAir-X	AE
903.01 - Air Entraining Admix	Mapei	GRT SA14	AE
903.02 – Water Reducing Admix	Premiere	OptiFlo-50 Ultra	MR
903.02 - Water Reducing Admix	Premiere	Flo 2000	HR
903.02 - Water Reducing Retarder	Premiere	ProLong L	RET
903.04 – Concrete Accelerators	Premiere	NitroCast K	NCA
903.01 - Air Entraining Admix	Premiere	ConAir 260	AE

We certify the above referenced materials are provided into the referenced project.

Respectfully Submitted,

Giuseppe Palumbo
Hercules Materials Holdgins, LLC



12225 Stephens Rd.
Warren, MI 48089

April 4, 2022

This letter is to notify all MDOT Project Engineers of Hercuels Materials Holdings, LLC, new MDOT Plant Number and Locations.

HMH-01-DET (Previously HER-01-DET)

Hercules Plant

2791 W Jefferson

Detroit, MI

HMH-02-TMP

Hercules Con E Co Portable Plant #2

2791 W Jefferson

Detroit, MI

HMH-03-TMP

Hercules Atlas Portable Plant #3

11811 Watson Road

Ypsilanti, MI

HMH-04-CEN (Previously HER-02-CEN)

Titan Plant

6497 E 10 Mile Road

Centerline, MI

Please note these changes, all new JMF's will be updated with these new MDOT Plant Number Designations. We have also put the new plant numbers on the NRMCA Certifications

Thank You,

Giuseppe Palumbo

Sales Manager

Hercules Materials Holdings, LLC

Hercules Materials Holdings, LLC
12225 Stephens Road,
Warren, MI 48089

3-23-2022

To Our Valued Customers,

This letter is to inform you of our change in cement this year. We are currently using Ash Grove Type I cement from Mississauga, Ontario. We will be using Ash Grove Type IL cement from Mississauga, Ontario. The new cement is currently being stocked at our RMC facilities.

The cement industry as a whole will be transferring production and sale of Type IL cement in our region. Type I cement will have limited availability this year. This is being implemented to address cement production from an environmental perspective. The cement industry recognizes that manufacturing cement is contributing negatively to environment, this change will reduce the carbon footprint of producing cement.

Type IL cement is an approved cement per ASTM C595 – *Standard Specification for Blended Hydraulic Cements*. This specification provides better utilization of materials and prediction of performance. It also provide more transparency for the users with respect to materials composition. With that said the Type IL no longer adheres to the requirements of ASTM C150 as the limestone content has been increased above the limit for type I.

Previous cements under ASTM C150 were permitted to contain up to 5.0% limestone fines and ASTM C595 permits up to 15.0% limestone fines.

MDOT recognizes and accepts the change from Type I to Type IL.

We have spent the past few months performing trials and researching the new cement. It is our opinion that the fresh and hardened properties of the new cement will perform similar to original type I it is replacing.

Previously submitted projects will be now using the new cement, please communicate any issues you have with your sales representative or me. I will continue to monitor the material from a technical standpoint but am confident in the new product.

Respectfully Submitted,
Hercules Materials Holdings, LLC



Jeremy Chesterfield
Director of Technical Services – 313-479-7404



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION
LANSING

PAUL C. AJEGBA
DIRECTOR

March 22, 2022

Devon Gougeon
Ash Grove Cement
CRH Company
15225 Day Road
Dundee, MI 48131

Dear Devon Gougeon:

Subject: Approval Letter for the Ash Grove Cement Plant Location, Detroit Terminal

This letter is in response to your request to supply Type IL cement to the Michigan Department of Transportation (MDOT). After careful evaluation of your submittal, your request has been approved. Your company will remain on the MDOT Approved Manufacturers list for Portland Cement, Section 901. This letter can serve as verification of approval to supply to MDOT projects.

Please continue to submit Mill Test Reports biennially to:

MDOT-ConcreteTesting@Michigan.gov

If you should have any questions or concerns, please contact me at 517-812-8381 or ParsonsC2@Michigan.gov.

Sincerely,

Chris Parsons
Concrete Laboratory Supervisor

Devon Gougeon
Page 2
March 22, 2022

BFS:CFS:CP:ah

bcc: Kevin Kennedy
Tim Stallard
MDOT-MaterialsControl



CERTIFICATE OF ANALYSIS: MISSISSAUGA PLANT ASTM: PORTLAND-LIMESTONE CEMENT GENERAL USE (TYPE IL(10))

		ANALYSIS OF:		Sep-2021	
PHYSICAL	ASTM C150-18 & AASHTO M85-18 REQUIREMENTS	LIMITS	RESULTS	TEST METHOD	
	Fineness 45 μm Sieve (%) Retained		7	ASTM C430	
	Autoclave % Expansion	≤ 0.80	0.07	ASTM C151 / AASHTO T107	
	Sulphate Expansion (%) *	≤ 0.020	0.008	ASTM C1038	
	Initial Time of Set - Vicat (min)	45 ≤ (min) ≤ 420	128	ASTM C191 / AASHTO T131	
	Blaine (m ² /kg)		435	ASTM C204, AASHTO T153	
	Air Content (%)	≤ 12	8	ASTM C185 / AASHTO T137	
	False Set (%)		71	ASTM C451	
	Compressive Strengths at 1-day (MPa / PSI)		18.3 / 2648	ASTM C109 / C109M, AASHTO T106 / T106M	
	Compressive Strengths at 3-day (MPa / PSI)	≥ 13.0 / 1890	29.5 / 4275	ASTM C109 / C109M, AASHTO T106 / T106M	
	Compressive Strengths at 7-day (MPa / PSI)	≥ 20.0 / 2900	34.4 / 4990	ASTM C109 / C109M, AASHTO T106 / T106M	
	Compressive Strengths at 28-day (MPa / PSI) *	≥ 25.0 / 3620	41.1 / 5968	ASTM C109 / C109M, AASHTO T106 / T106M	
	CHEMICAL	Loss on Ignition (LOI) (%)	≤ 10.0	4.6	ASTM C114 / AASHTO T105
		Insoluble Residue (%) *		- - -	ASTM C114 / AASHTO T105
		Sulphur Trioxide (SO ₃) (%)**	≤ 3.0	4.1	ASTM C114 / AASHTO T105
Magnesium Oxide (MgO) (%)			2.3	ASTM C114 / AASHTO T105	
Silica Oxide (SiO ₂) (%)			19.2	ASTM C114, AASHTO T105	
Alumina Oxide (Al ₂ O ₃) (%)			5.1	ASTM C114, AASHTO T105	
Iron Oxide (Fe ₂ O ₃) (%)			2.2	ASTM C114, AASHTO T105	
Calcium Oxide (CaO) (%)			61.2	ASTM C114, AASHTO T105	
Total Alkali (%)			0.94	ASTM C114, AASHTO T105	
Free Lime (%)			0.7		
CO ₂ in Cement (%)			3.6	ASTM C114, AASHTO T105	
Limestone Content (%)		5 ≤ (%) ≤ 15	9.7	ASTM C150 / C150M	
CaCO ₃ in Limestone (%)		≥70	83	ASTM C595, AASHTO M240	
C ₃ S (Adjusted) (%)			50	ASTM C150 / C150M	
C ₂ S (Adjusted) (%)			21	ASTM C150 / C150M	
C ₃ A (Adjusted) (%)			10	ASTM C150 / C150M	
C ₄ AF (Adjusted) (%)			7	ASTM C150 / C150M	
COMMENTS:					
Parameters with no limit listed are included for information purposes only, and are not requirements of the standards.					
* Indicates result from previous month.					
** Compliant with ASTM C1038 Sulfate Expansion limit of 0.020% at 14-days.					
This certifies compliance with ASTM C595-20 and AASHTO M240-18 standards for General Use Portland-Limestone Cement.					
The data is typical of product shipped by Ash Grove, a Division of CRH Canada Group Inc. Individual shipments may vary.					
REPORT PREPARED BY:			PRINT DATE:		
<i>Bruno Morgado</i>					
Bruno Morgado, Optimization Manager			October 5, 2021		

BOWSER-MORNER, INC.

Delivery Address: 4518 Taylorsville Rd • Dayton, Ohio 45424 Mailing Address: P.O. Box 51 • Dayton, Ohio 45401

AASHTO/ISO 17025 Accredited • USACE Validated



LABORATORY REPORT

Report To: Stoneco, Inc.
Attn.: Brian Wahl
7555 Whiteford Rd.
Ottawa Lake, MI 49267

Report Date: 07/07/21
Job No.: 196195
Report No.: 120398A
No. of Pages: 3

Report On: Laboratory Determination of Alkali-Silica Reactivity (ASR)

Procedure: Length Change of Concrete Due to Alkali-Silica Reaction (ASTM C 1293)

Material and Source Information

Sample Identification: MDOT 2NS
Fine Aggregate Source: Burmeister
Coarse Aggregate Source: #57 crLS MMA Phillipsburg, OH
Cement Source: Fairborn Cement Company
Date Received: 06/15/20
Date Cast: 07/07/20

Results are summarized below and detailed on the attached data sheets.

Average Length Change, %		ASTM C 1293 Specification, %
56 Days:	0.011	---
90 Days:	0.014	---
180 Days:	0.017	---
270 Days:	0.021	---
365 Days:	0.023	0.040 Max.

Bowser-Morner certifies that this test was performed in accordance with ASTM C1293 procedures.
Should you have any questions, or if we may be of further service, please contact me at (937) 236-8805, ext. 329.

Respectfully submitted,
BOWSER-MORNER, INC.

Scott D. Ruhkamp, Supervisor
Special Projects Section
Construction Materials Laboratory

SDR/sdr
120398A
1-File
1-brian.wahl@mipmc.com

Report To: Stoneco, Inc.
Sample ID: MDOT 2NS
Source: Burmeister

Job No.: 196195
Report No.: 120398A
Date Received: 06/15/20

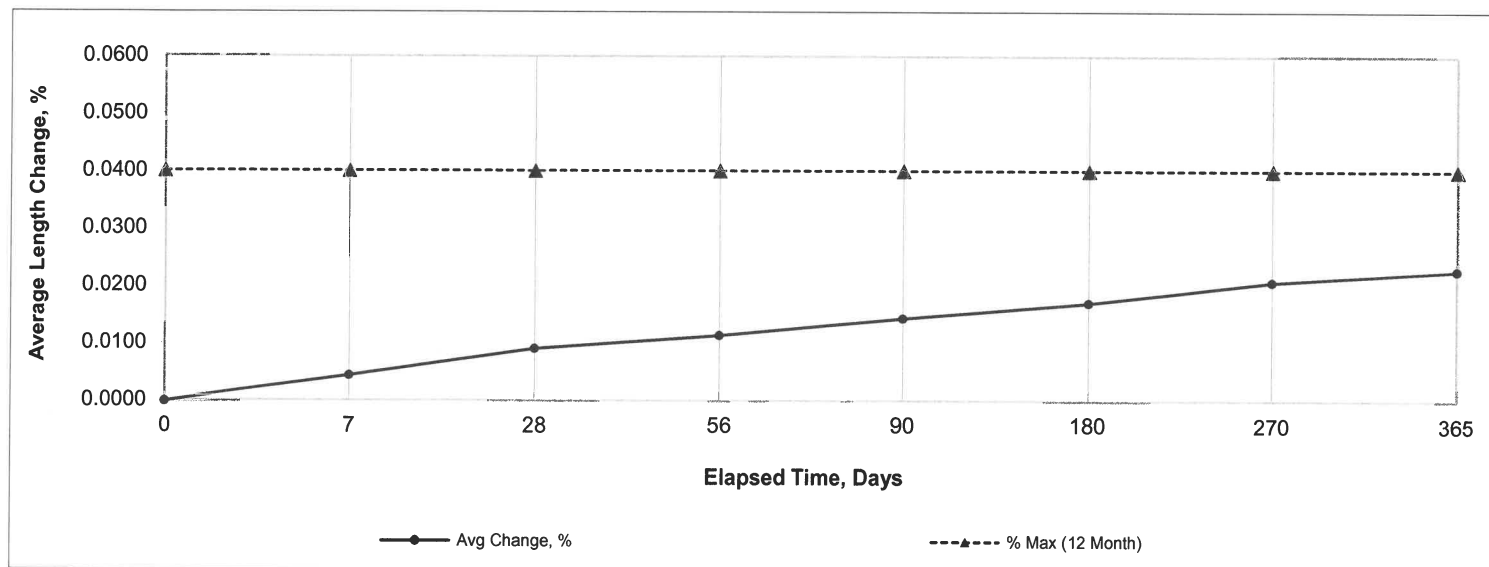
Concrete Mixture Summary				
Aggregates Used	Type	Source	Grading	
Coarse (Lab Standard)	#57 crLS	MMA Phillipsburg	Table 1, coarse	
Fine (Subject)	MDOT 2NS	Burmeister	Table 1, fine	
Cement Used	Source	Type	Na₂O Equiv., %	
Fairborn Cement Co.	Fairborn, OH	Portland Type I	0.8	
Pozzolan Used	Source	Type	Na₂O Equiv., %	
n/a	n/a	n/a	n/a	
Admixtures Used	Source	Type	Dosage Rate	
n/a	n/a	n/a	n/a	
Concrete Proportions, SSD, lbs/cubic yard				
Component	Source	Specific Gravity	Mass, lbs	Volume, cubic yard
Portland Cement	Fairborn Cement Co.*	3.15	708	3.60195
Water	BMI Standard	1.00	297	4.75962
#57 crLS	MMA Phillipsburg*	2.648	1847	11.17801
MDOT 2NS	Burmeister	2.653	1206	7.28493
Entrained Air, %:	n/a	n/a	2.6	0.70200
Total	n/a	n/a	4058	27.5
*The cement and coarse aggregate used in this test are BMI's laboratory standards and meet sections 7.1 and 7.2				
Sodium Hydroxide Added, %	W/Cm	Slump, inches	Air, %	
0.4	0.419	2 3/4	2.6	
Fresh Unit Weight, cubic yard	Mass Yield, %			
149.6	100.5			
Storage Containers				
6-gallon (23-liter) plastic pail with gamma seal lid conforming to ASTM C1293, sections 5.2.1 and 5.3.1				

Report To: Stoneco, Inc.
Sample ID: MDOT 2NS
Source: Burmeister
Date Cast: 07/07/20

Job No.: 196195
Report No.: 120398A
Date Received: 06/15/20
Ref. Rod Length: 11.631805

Procedure: Length Change of Concrete Due to Alkali-Silica Reaction (ASTM C 1293)

Age, Days	ID	Reference Rod, inch	Specimen Readings, inch	Expansion, inch	Length Change, %	Avg, %
Initial 07/08/20	A	0.0000	-0.0010	11.6308	n/a	0.0000
	B	0.0000	-0.0129	11.6189	n/a	
	C	0.0000	-0.0074	11.6244	n/a	
7 07/15/20	A	0.0000	-0.0008	11.6310	0.0020	0.0043
	B	0.0000	-0.0121	11.6197	0.0080	
	C	0.0000	-0.0071	11.6247	0.0030	
28 08/05/20	A	0.0000	-0.0004	11.6314	0.0060	0.0090
	B	0.0000	-0.0116	11.6202	0.0130	
	C	0.0000	-0.0066	11.6252	0.0080	
56 09/02/20	A	0.0000	-0.0004	11.6314	0.0060	0.0113
	B	0.0000	-0.0113	11.6205	0.0160	
	C	0.0000	-0.0062	11.6256	0.0120	
90 10/07/20	A	0.0000	0.0001	11.6319	0.0110	0.0143
	B	0.0000	-0.0112	11.6206	0.0170	
	C	0.0000	-0.0059	11.6259	0.0150	
180 01/06/21	A	0.0000	0.0004	11.6322	0.0140	0.0170
	B	0.0000	-0.0109	11.6209	0.0200	
	C	0.0000	-0.0057	11.6261	0.0170	
270 04/07/21	A	0.0000	0.0007	11.6325	0.0170	0.0207
	B	0.0000	-0.0103	11.6215	0.0260	
	C	0.0000	-0.0055	11.6263	0.0190	
365 07/07/21	A	0.0000	0.0009	11.6327	0.0190	0.0227
	B	0.0000	-0.0099	11.6219	0.0300	
	C	0.0000	-0.0055	11.6263	0.0190	





44265 Plymouth Oaks Blvd.
Plymouth, MI 48170
T 734-455-8600
F 734-455-8608
www.ttlassoc.com

June 1, 2022

MDOT Plant# HMH-01-DET

Mr. Tom Peters
Hercules Materials Holdings, LLC
12225 Stephens Road
Warren, Michigan 48089

RE: Concrete Plant Inspection for Hercules Concrete, Plant 1, Detroit, MI

Dear Mr. Peters:

TTL Associates, Inc. (TTL) on behalf of Hercules Materials Holdings (Hercules) performed a concrete plant inspection of the Hercules, Plant No. 1 located at 2791 West Jefferson Street in Detroit, Michigan on June 1, 2022.

This inspection was performed by Mr. Jeffrey Elliott, PE who is a National Ready Mixed Concrete Association (NRMCA) Inspecting Engineer, along with the NRMCA's Plant Certification Checklist, Revision 12. A copy of the completed checklist is attached to this letter. Based on this inspection, it has been determined that the Hercules Plant No. 1 is in conformance with the applicable NRMCA requirements.

If you have any questions or require further information, please feel free to contact us.

Respectfully submitted,

TTL Associates, Inc.

Jeffrey S. Elliott, P.E.
Vice President
(NRMCA Inspecting Engineer #803871)

Attachment



PJLA
Calibration
Accreditation # 59303

METRO SCALE COMPANY, INC.
17670 ALLEN ROAD, MELVINDALE, MI 48122
PHONE: (313) 382-6190 FAX: (313) 382-6194

SCALE CALIBRATION REPORT

81882

TECHNICIAN: <i>Mike Luth</i>	DATE: <i>3-4-22</i> Next Due:
SCALE MFG: Cardinal	CUSTOMER: HERCULES CONCRETE INC(DETROIT)
MODEL NO: 201	ADDRESS: 2791 W. JEFFERSON
SERIAL NO: E36419-0104	
LOCATION: Agg Scale	DETROIT, MI 48216

CAPACITY/RESOLUTION: 45,000 X 10 LB

CONDITION PRIOR TO CALIBRATION: ☒ ACCEPTABLE ☐ NEEDS REPAIR - UNABLE TO CAL.

UNITS OF MEASURE: ☒ POUNDS ☐ KG ☐ GRAMS ☐ OTHER:

CALIBRATED TO HANDBOOK 44 TOLERANCE: ☐ YES ☐ NO ☐ LEGAL FOR TRADE

APPLIED WEIGHT	TEST READING		SERIAL NUMBERS OF WEIGHTS USED:
	BEFORE	AFTER	
0 LB	0	0	0N76, 0N77, 115 @ 1000 LB
2000LB	2000	2000	
4000LB	4010	4010	Shift Test: Before ☒ L/C Cable/Indicator After ☒ Position 1: <i>NA</i> Position 2: <i>NA</i> Position 3: <i>NA</i> Position 4: <i>NA</i>
6000LB	6010	6010	
12000LB	12,040	12,040	
24000LB	24,040	24,040	
36000LB	33,140	33,140	
45000LB			

COMMENTS:

SCALE OK FOR USE ☒ YES ☐ NO

NOTES:

- SCALE TOLERANCE AS APPLIED TO NIST HANDBOOK 44 REQUIREMENTS.
- DEVICES LISTED ON THIS SHEET WERE CHECKED AND CALIBRATED WITH WEIGHTS TRACEABLE TO SI THROUGH N.I.S.T. CERTIFICATIONS FOR TEST WEIGHTS ARE AVAILABLE UPON REQUEST.
- CALIBRATION COMPLIES WITH MSC INSTRUCTION QW 4.11.02, ISO IEC 17025:2017 AND WITH REFERENCE TO NIST HANDBOOK 44 WHERE APPLICABLE.
- RESULTS OF THIS CALIBRATION RELATE ONLY TO THE ITEMS SPECIFIED ABOVE.
- THIS REPORT IS NOT TO BE REPRODUCED EXCEPT IN FULL, WITHOUT WRITTEN PERMISSION OF MSC.
- ALL CALIBRATIONS PERFORMED UNDER NORMAL WORKING ENVIRONMENTAL CONDITIONS UNLESS NOTED UNDER COMMENTS.
- THE UNCERTAINTY CALCULATIONS ARE AVAILABLE UPON WRITTEN REQUEST FROM THE CUSTOMER.
- END OF REPORT.



METRO SCALE COMPANY, INC.
 17670 ALLEN ROAD, MELVINDALE, MI 48122
 PHONE: (313) 382-6190 FAX: (313) 382-6194

No. 9650

SCALE CALIBRATION REPORT

TECHNICIAN: <i>Alan Lulka / Mike Lulka</i>	DATE: <i>3-4-22</i> Next Due:
SCALE MFG: <i>Cardinal</i>	CUSTOMER: <i>Hercules Concrete</i>
MODEL NO: <i>201</i>	ADDRESS: <i>2791 W. Jefferson Inc.</i>
SERIAL NO: <i>E36119-0156</i>	
LOCATION: <i>Cement Scale</i>	<i>Detroit MI 48216</i>
CAPACITY/RESOLUTION: <i>10,000 x 2 lb</i>	
CONDITION PRIOR TO CALIBRATION: ☒ ACCEPTABLE ☐ NEEDS REPAIR – UNABLE TO CAL.	
UNITS OF MEASURE: ☒ POUNDS ☐ KG ☐ GRAMS ☐ OTHER:	
CALIBRATED TO HANDBOOK 44 TOLERANCE: ☐ YES ☐ NO ☐ LEGAL FOR TRADE	

APPLIED WEIGHT	TEST READING		SERIAL NUMBERS OF WEIGHTS USED:			
	BEFORE	AFTER				
0 lb	0	0	<i>0N76, 0N77, 115 @ 1000 lb</i>			
1000 lb	1000	1000				
2002 lb	2002	2002				
3004 lb	3004	3004				
4054 lb	4054	4054				
5000 lb	5000	5000				
6006 lb	6004	6004				

COMMENTS:

SCALE OK FOR USE ☒ YES ☐ NO

- NOTES:
- SCALE TOLERANCE AS APPLIED TO NIST HANDBOOK 44 REQUIREMENTS.
 - DEVICES LISTED ON THIS SHEET WERE CHECKED AND CALIBRATED WITH WEIGHTS TRACEABLE TO SI THROUGH N.I.S.T. CERTIFICATIONS FOR TEST WEIGHTS ARE AVAILABLE UPON REQUEST.
 - CALIBRATION COMPLIES WITH MSC INSTRUCTION QW 4.11.02, ISO IEC 17025:2017 AND WITH REFERENCE TO NIST HANDBOOK 44 WHERE APPLICABLE.
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 - THIS REPORT IS NOT TO BE REPRODUCED EXCEPT IN FULL, WITHOUT WRITTEN PERMISSION OF MSC.
 - ALL CALIBRATIONS PERFORMED UNDER NORMAL WORKING ENVIRONMENTAL CONDITIONS UNLESS NOTED UNDER COMMENTS.
 - THE UNCERTAINTY CALCULATIONS ARE AVAILABLE UPON WRITTEN REQUEST FROM THE CUSTOMER.
 - END OF REPORT.



ADMIXTURE DISPENSERS CALIBRATION FORM Page 1

CUSTOMER: Hercules Detroit DATE: 6/29/2022
ADDRESS: 115 Rosa Parks Blvd.
Detroit, Mi 48216

DATE OF ORIGINAL CERTIFICATION: _____

ADMIX #1

NAME: ConAir X
DOSAGE RATE: 0.5 - 4 /CWT.
TARGET METERED MEASURED
25 oz. 25 oz. 25 oz.
50 oz. 50 oz. 50 oz.

ADMIX #2

NAME: ProLong L
DOSAGE RATE: 2.5 - 6.5 /CWT.
TARGET METERED MEASURED
50 oz. 50 oz. 50 oz.
100 oz. 100 oz. 100 oz.

ADMIX #3

NAME: OptiFlo MR
DOSAGE RATE: 3 - 16 /CWT.
TARGET METERED MEASURED
300 oz. 300 oz. 300 oz.

ADMIX #4

NAME: OptiFlo 50
DOSAGE RATE: 3 - 6 /CWT.
TARGET METERED MEASURED
100 oz. 100 oz. 100 oz.

ADMIX #5

NAME: NitroCast K
DOSAGE RATE: 10 oz. /CWT.
TARGET METERED MEASURED
130 oz. 130 oz. 130 oz.
260 oz. 260 oz. 260 oz.

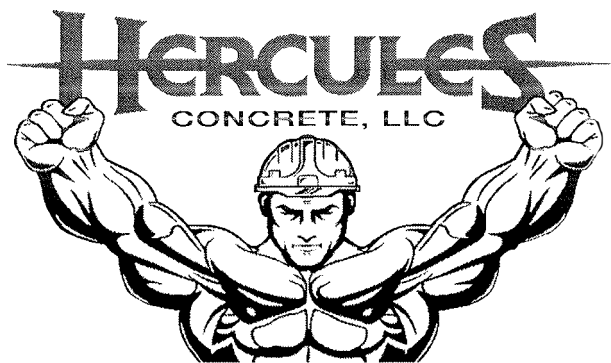
ADMIX #6

NAME: UltraFlo 2000
DOSAGE RATE: 2 - 12 /CWT.
TARGET METERED MEASURED
100 oz. 100 oz. 100 oz.

ADMIX #7

NAME: Impede CNI
DOSAGE RATE: _____ /CWT.
TARGET METERED MEASURED
130 oz. 130 oz. 130 oz.
260 oz. 260 oz. 260 oz.

CERTIFIED BY: Mike McKown



Water Meter Accuracy Verification
55 Gallon Drum Calibration Sheet

90 day requirement for volumetric water batching devices per MDOT

Date of Calibration 6/29/2022

Next Calibration Date 9/29/2022

Plant Information

Plant Name	Hercules Concrete
Plant Number	1
Water Temp	48
Ambient Temp	51
Meter Type	Flow
Meter Brand	BMH
Pulse Count	1.0 gal
Source	City of Detroit Water

TEST # 1

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

Test # 2

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

Test # 3

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

I certify that the above information and test results are true and accurate.

Giuseppe Palumbo

Giuseppe Palumbo

National Ready Mixed Concrete Association



Certificate of Conformance For Concrete Production Facilities

THIS IS TO CERTIFY THAT

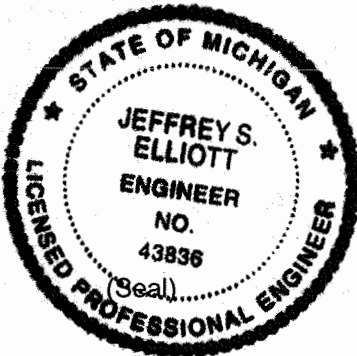
Titan Plant, Center Line, MI

Titan Concrete

MDOT Plant # HMH-04-CEN

has been inspected by the undersigned licensed professional engineer for conformance with the requirements of the *Check List for Ready Mixed Concrete Production Facilities*. As of the inspection date, the facilities met the requirements for production by

*Central Mixing with Automatic Batching and Recordings of
Cementitious Materials, Aggregate, Water, and Chemical Admixtures*



Signature of Licensed Professional Engineer

June 02, 2021

Inspection Date

June 02, 2023

Certification Expiration Date

This company will maintain these facilities in compliance with the *Check List* requirements and will correct promptly any deficiencies which develop.

Signature of Company Official

Vice President of Operations
Title of Company Official

NOTICE: The Check List indicates only that plant facilities are satisfactory for the production of concrete when properly operated. Conformance of the concrete itself with specification requirements must be verified by usual inspection methods in accordance with sales agreements.

This certificate is issued by the National Ready Mixed Concrete Association on verification that the production facility conforms to the requirements of the NRMCA Certification of Ready Mixed Concrete Production Facilities, QC3. Unauthorized reproduction or misuse of this certificate may result in legal action.

Plant ID #: 856973

Certification ID #: 28310

© 1965, 1992, 2001, 2002, 2006, 2007, 2012

National Ready Mixed Concrete Association 66 Canal Center Plaza, Suite 250 • Alexandria • Virginia 22314

Metro**S**cale**C**ompany Inc.

A Michigan Corporation

17670 Allen Road Melvindale, MI 48122

Sales • Service • Calibrations • ISO/IEC 17025:2017

PH: 313-382-6190 Fax: 313-382-6194

Industrial Weighing Equipment
www.metroscaleco.com

Work Order No. 015371

DATE: 5-2-2022

P.O. #		TECH ALEX LULKO	
CUSTOMER HERCULES CONCRETE INC.		MIKE LULKO	
ADDRESS 6497 E. TEN MILE RD.			
CITY CENTERLINE	STATE MI	ZIP 48105	PHONE
EQUIPMENT		SERIAL NUMBER	
REMOVED FOR REPAIR ☐		RETURNED FROM REPAIR ☐	
WORK PERFORMED SCALE INSPECTION.			
CHECKED THE BATCH PLANT SCALES FOR PROPER OPERATION AND CALIBRATION.			
MADE ADJUSTMENTS WHERE NEEDED.			
CEMENT #1: CLEANED AROUND LOAD CELLS, CLEANED MATERIAL STUCK BETWEEN SHIPPING BRACKETS.			
THE BATCH PLANT SCALES ARE OK FOR USE.			
PARTS		COST	
		PRICE BREAKDOWN	COST
		PARTS TOTAL	
		SHOP LABOR	
		LABOR: HR. REG. @ \$	
		LABOR: HR. O/T @ \$	
		ISO 17025 DOC.	
		TRUCK EXP.	
		TOTAL	
CUSTOMER SIGNATURE: 			



PJLA
Calibration
Accreditation # 59303

METRO SCALE COMPANY, INC.
17670 ALLEN ROAD, MELVINDALE, MI 48122
PHONE: (313) 382-6190 FAX: (313) 382-6194

No. 9721

SCALE CALIBRATION REPORT

TECHNICIAN: <i>Alex Lulko / Mike Lulko</i>		DATE: <i>5-2-22</i>	
SCALE MFG: <i>Cardinal</i>		CUSTOMER: <i>Hercules Concrete Inc.</i>	
MODEL NO: <i>205</i>		ADDRESS: <i>6497 E Ten Mile Rd</i>	
SERIAL NO: <i>E33720-0013</i>			
LOCATION: <i>Erie Strayer Cement Scale 1</i>		<i>Centerline MI 48015</i>	
CAPACITY/RESOLUTION: <i>10,000 x 5 Lb</i>			
CONDITION PRIOR TO CALIBRATION: ☒ ACCEPTABLE ☐ NEEDS REPAIR - UNABLE TO CAL.			
UNITS OF MEASURE: ☒ POUNDS ☐ KG ☐ GRAMS ☐ OTHER:			
CALIBRATED TO HANDBOOK 44 TOLERANCE: ☐ YES ☐ NO ☐ LEGAL FOR TRADE			
APPLIED WEIGHT	TEST READING		SERIAL NUMBERS OF WEIGHTS USED:
	BEFORE	AFTER	
<i>0 Lb</i>	<i>0</i>	<i>0</i>	<i>114, 108, 22222, 0N76, 0N78, 103 @ 1000 Lb</i>
<i>2000 Lb</i>	<i>2000</i>	<i>2000</i>	
<i>4000 Lb</i>	<i>4000</i>	<i>4000</i>	
<i>6000 Lb</i>	<i>6000</i>	<i>6000</i>	
			Shift Test:
			Before
			L/C Cable/Indicator
			After
Position 1:			<i>NA</i>
Position 2:			<i>1</i>
Position 3:			<i>2</i>
Position 4:			<i>3</i>
			<i>4</i>

COMMENTS:

SCALE OK FOR USE ☒ YES ☐ NO

NOTES:

1. SCALE TOLERANCE AS APPLIED TO NIST HANDBOOK 44 REQUIREMENTS.
2. DEVICES LISTED ON THIS SHEET WERE CHECKED AND CALIBRATED WITH WEIGHTS TRACEABLE TO SI THROUGH N.I.S.T. CERTIFICATIONS FOR TEST WEIGHTS ARE AVAILABLE UPON REQUEST.
3. CALIBRATION COMPLIES WITH MSC INSTRUCTION QW 4.11.02, ISO IEC 17025:2017 AND WITH REFERENCE TO NIST HANDBOOK 44 WHERE APPLICABLE.
4. RESULTS OF THIS CALIBRATION RELATE ONLY TO THE ITEMS SPECIFIED ABOVE.
5. THIS REPORT IS NOT TO BE REPRODUCED EXCEPT IN FULL, WITHOUT WRITTEN PERMISSION OF MSC.
6. ALL CALIBRATIONS PERFORMED UNDER NORMAL WORKING ENVIRONMENTAL CONDITIONS UNLESS NOTED UNDER COMMENTS.
7. THE UNCERTAINTY CALCULATIONS ARE AVAILABLE UPON WRITTEN REQUEST FROM THE CUSTOMER.
8. END OF REPORT.



PJLA
Calibration
Accreditation # 59303

METRO SCALE COMPANY, INC.
17670 ALLEN ROAD, MELVINDALE, MI 48122
PHONE: (313) 382-6190 FAX: (313) 382-6194

SCALE CALIBRATION REPORT

84887

TECHNICIAN: <i>Alex Lulka / Mike Lulka</i>		DATE: <i>5-2-22</i> Next Due:				
SCALE MFG: Cardinal		CUSTOMER: HERCULES CONCRETE INC(WARR)				
MODEL NO: 205		ADDRESS: 6497 E TEN MILE RD				
SERIAL NO: E02821-0006						
LOCATION: Erie Strayer Cement Scale <i>2</i>		CENTERLINE, MI 48015				
CAPACITY/RESOLUTION: <i>10,000 X 5 LB</i>						
CONDITION PRIOR TO CALIBRATION: ☒ ACCEPTABLE ☐ NEEDS REPAIR - UNABLE TO CAL.						
UNITS OF MEASURE: ☒ POUNDS ☐ KG ☐ GRAMS ☐ OTHER:						
CALIBRATED TO HANDBOOK 44 TOLERANCE: ☐ YES ☐ NO ☐ LEGAL FOR TRADE						
APPLIED WEIGHT	TEST READING		SERIAL NUMBERS OF WEIGHTS USED:			
	BEFORE	AFTER				
0 LB	<i>0</i>	<i>0</i>	<i>114, 108, 22222, 0N76, 0N78, 103, @ 1000 lb</i>			
2000LB	<i>2000</i>	<i>2000</i>				
4000LB	<i>4000</i>	<i>4000</i>				
6000LB	<i>6000</i>	<i>6000</i>				
Shift Test:			Before	L/C Cable/Indicator		After
Position 1:			<i>NA</i>	1	2	<i>NA</i>
Position 2:						
Position 3:						
Position 4:				3	4	

COMMENTS:

SCALE OK FOR USE ☒ YES ☐ NO

NOTES:

- SCALE TOLERANCE AS APPLIED TO NIST HANDBOOK 44 REQUIREMENTS.
- DEVICES LISTED ON THIS SHEET WERE CHECKED AND CALIBRATED WITH WEIGHTS TRACEABLE TO SI THROUGH N.I.S.T. CERTIFICATIONS FOR TEST WEIGHTS ARE AVAILABLE UPON REQUEST.
- CALIBRATION COMPLIES WITH MSC INSTRUCTION QW 4.11.02, ISO IEC 17025:2017 AND WITH REFERENCE TO NIST HANDBOOK 44 WHERE APPLICABLE.
- RESULTS OF THIS CALIBRATION RELATE ONLY TO THE ITEMS SPECIFIED ABOVE.
- THIS REPORT IS NOT TO BE REPRODUCED EXCEPT IN FULL, WITHOUT WRITTEN PERMISSION OF MSC.
- ALL CALIBRATIONS PERFORMED UNDER NORMAL WORKING ENVIRONMENTAL CONDITIONS UNLESS NOTED UNDER COMMENTS.
- THE UNCERTAINTY CALCULATIONS ARE AVAILABLE UPON WRITTEN REQUEST FROM THE CUSTOMER.
- END OF REPORT.



PJLA
Calibration
Accreditation # 59303

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84888

SCALE CALIBRATION REPORT

TECHNICIAN: <i>Alvin Luthke / Mike Luthke</i>		DATE: 5-2-22 Next Due:	
SCALE MFG: Cardinal		CUSTOMER: HERCULES CONCRETE INC(WARR)	
MODEL NO: 205		ADDRESS: 6497 E TEN MILE RD	
SERIAL NO: E33720-0010			
LOCATION: Erie Strayer Agg Scale		CENTERLINE, MI 48015	
CAPACITY/RESOLUTION: 50,000 X 20 LB			
CONDITION PRIOR TO CALIBRATION: ☒ ACCEPTABLE ☐ NEEDS REPAIR – UNABLE TO CAL.			
UNITS OF MEASURE: ☒ POUNDS ☐ KG ☐ GRAMS ☐ OTHER:			
CALIBRATED TO HANDBOOK 44 TOLERANCE: ☐ YES ☐ NO ☐ LEGAL FOR TRADE			
APPLIED WEIGHT	TEST READING		SERIAL NUMBERS OF WEIGHTS USED:
	BEFORE	AFTER	
0 LB	0	0	114, 21222, 103 @ 1000lb
2000LB	2000	2000	
4000LB	4000	4000	
6000LB	6000	6000	
8000LB	8080	9080	
10000LB	15,020	15,020	
12000LB	21,000	21,000	
14000LB	27,020	27,020	
16000LB	30,000	30,000	
18000LB	36,080	36,080	

COMMENTS:

SCALE OK FOR USE ☒ YES ☐ NO

NOTES:

- SCALE TOLERANCE AS APPLIED TO NIST HANDBOOK 44 REQUIREMENTS.
- DEVICES LISTED ON THIS SHEET WERE CHECKED AND CALIBRATED WITH WEIGHTS TRACEABLE TO SI THROUGH N.I.S.T. CERTIFICATIONS FOR TEST WEIGHTS ARE AVAILABLE UPON REQUEST.
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- END OF REPORT.



ADMIXTURE DISPENSERS CALIBRATION FORM

CUSTOMER: Titan Concrete DATE: 7/5/2022
ADDRESS: 6497 E 10 Mile Rd
Warren, Mi 48091

DATE OF ORIGINAL CERTIFICATION: _____

ADMIX #1

NAME: ConAir X
DOSAGE RATE: 0.5 - 4 /CWT.
TARGET METERED MEASURED
25 oz. 25 oz. 25 oz.
9 oz. 9 oz. 9 oz.

ADMIX #2

NAME: ProLong L
DOSAGE RATE: 2.5 - 6.5 /CWT.
TARGET METERED MEASURED
50 oz. 50 oz. 50 oz.
197 oz. 197 oz. 197 oz.

ADMIX #3

NAME: OptiFlo MR
DOSAGE RATE: 3 - 16 /CWT.
TARGET METERED MEASURED
300 oz. 300 oz. 300 oz.
135 oz. 135 oz. 135 oz.

ADMIX #4

NAME: OptiFlo 50
DOSAGE RATE: 3 - 6 /CWT.
TARGET METERED MEASURED
100 oz. 100 oz. 100 oz.
210 oz. 210 oz. 210 oz.

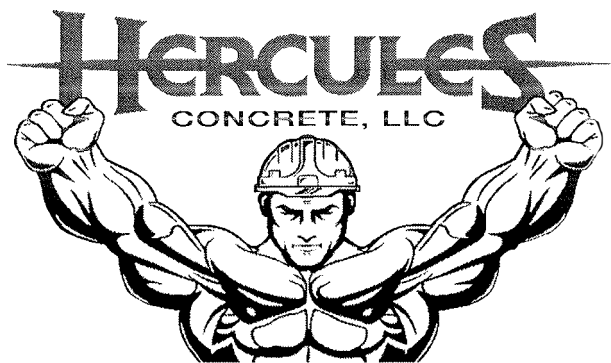
ADMIX #5

NAME: NitroCast K
DOSAGE RATE: 10 oz. /CWT.
TARGET METERED MEASURED
130 oz. 130 oz. 130 oz.
260 oz. 260 oz. 260 oz.

ADMIX #6

NAME: UltraFlo 2000
DOSAGE RATE: 2 - 12 /CWT.
TARGET METERED MEASURED
130 oz. 130 oz. 130 oz.
256 oz. 256 oz. 256 oz.

CERTIFIED BY: Mike McKown



Water Meter Accuracy Verification
55 Gallon Drum Calibration Sheet

90 day requirement for volumetric water batching devices per MDOT

Date of Calibration 7/5/2022

Next Calibration Date 10/5/2022

Plant Information

Plant Name	Titan Concrete
Plant Number	2
Water Temp	52
Ambient Temp	55
Meter Type	Flow
Meter Brand	Badger
Pulse Count	1.0 gal
Source	City of Detroit Water

TEST # 1

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

Test # 2

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

Test # 3

Metered Quantity	<u>50</u>	Meter Setting	0.0385
Measured Quantity	<u>50</u>	Adjusted Setting	NA

I certify that the above information and test results are true and accurate.

Giuseppe Palumbo

Giuseppe Palumbo



12225 Stephens Rd.
Warren, MI 48089

CONTRACTOR / PRODUCTION PLANT AGGREGATE STOCKPILE MANAGEMENT PLAN

Submitted By: Giuseppe Palumbo

Hercules Materials Holdings, LLC

12225 Stephens Road,
Warren, MI 48089

MDOT – Stockpile Management Plan

The plan covers the procedures that Hercules Materials Holdings, LLC intends to implement to ensure compliance with current industry standards and to MDOT 2020 Standard Specifications for Construction, except as provided by contract proposal as stated on title page of this plan. This plan covers the procedures for determining optimized aggregate gradations for Portland Cement Concrete (PCC), Grade 3500HP, 4500HP or other blended optimized grade.

All Hercules Material Holding plants are MDOT qualified and NRMCA certified per ASTM C-94 Standards. All plants supplying concrete in Metro Detroit are also inspected bi-annually by Wayne County.

Aggregates utilized for MDOT projects are from approved manufacturers for

Coarse, Intermediate and 2NS aggregates. All aggregates will be delivered to the plants via gravel bulk haulers. Once our distribution hub has been qualified we will distribute boat stone from the dock to our own producing plants.

Materials,

Aggregate Sources; Aggregates delivered to our production facilities are from MDOT's Approved Manufacturers. Boat stone is delivered to our dock from pre-approved distributors. Aggregates purchased from this list are produced with strict compliance with MDOT standards and testing according to the suppliers Quality Control Plan as submitted by them to MDOT for review and approval.

Supplier production and load out sample gradation analysis are provided weekly by supplier, and often times at greater frequency as they monitor daily production to ensure compliance with their quality control plan.

Project specifications will be followed to ensure the correct aggregate is being utilized per the project requirements. Specifically absorption limits and Freeze thaw requirements will be strictly followed.

Stock Pile Management

Shipping / Delivery; Aggregates are delivered to Hercules Material Holdings, LLC locations by qualified, insured bulk delivery professionals. They will be used for daily hauling of all aggregates used in production of concrete. The bulker drivers are familiar with our supplier's facilities and also understand our plant process and material locations to ensure no cross contamination between aggregates sources. In fact our material codes will be shared with our suppliers to ensure the bulk drivers are requesting the correct material. Delivery professionals will not unload at our production plants until authorized to do so by the plant manager / stock pile manager. Load in tickets will be delivered to the plant operator, stamped, entered into our stock managing system and delivered to the main office for payment.

Storage; Aggregates are stockpiled by loader or loaded directly into plant bins dependent on plant configuration.

Stockpiles will be maintained to eliminate contamination from yard traffic. No Calcium Chloride will be permitted for use as dust control in the aggregate stockpile area.

Stockpiles shall be maintained in separate piles and/or bins. Bins will be properly marked and identified to inform delivery professionals unload in the correct location.

In addition to performing aggregate gradations required for production gradations Hercules will monitor Aggregate Supplier load outs for deviation in gradations and also run gradations internally. All technicians utilized in sampling and grading analysis are certified to perform test by Michigan Certified Aggregate Technicians. Individual Certification will be submitted with this QC Plan.

Preconditioning; All attempts will be employed to maintain aggregate moisture contents to SSD, provided it does not compromise mix uniformity due to excess moisture contents. Aggregate moisture checks will be performed as needed to ensure compliance.

Handling and moving aggregates will be kept to a minimum to decrease the amount of material degradation occurring that contributes to the aggregates Loss by Wash (LBW).

Verification of Physical Requirements; included with the concrete mix submittal package a copy of written verification from the aggregate suppliers that the materials meet the specified physical requirements including supporting documentation and most current MDOT Freeze thaw test.

Aggregate Sampling Procedure / Process Control

Michigan Certified Aggregate Technicians will be utilized to sample, perform mechanical analysis and report all gradation analysis.

Job Mix formula has been developed by utilizing quality control pit gradations as well as mini stockpile gradations.

All sampling and gradation reporting has been completed by Michigan Certified Aggregate Technician (MCAT). If a failed result occurs a re-sample should be performed immediately on a new mini stockpile method. If the material fails a second time the supplier shall be notified and requested to sample a load in from the source. If that sample fails then the material shall be replaced at the suppliers cost.

Determination of Optimum Aggregate Proportions; Hercules Materials Holdings, LLC utilizes a Quality Control computer program produced by Stonemont. The program is used for our internal quality management of aggregates, concrete samples and mix design submittals. Our gradations are entered into Stonemont program and then the resultant gradations are used to determine the optimized aggregate proportions for both the theoretical design and also the weekly production gradations as required for MDOT compliance. The intent is to sample Thursday am, allowing a submittal to occur Friday for the following week. We will submit the gradations on MDOT's official gradation worksheet for acceptance.

Individual samples will be obtained for coarse, intermediate and fine aggregate, as discussed in MDOT 2020 Standard Specifications for Construction.

The Theoretical Combined Aggregate gradations; the theoretical gradations meeting sections 4.4.1.1.1, 4.4.1.1.2, 4.4.1.1.3 and 4.4.1.1.4 are included in the Concrete Mix design submittal package for this project and will be attached to the Job Mix Formula (MDOT Form 1976).

Coarseness Factor; the coarseness factor (CF) has been calculated based on the formula in 2020 specifications and is calculated to the nearest tenth. The CF is included in the concrete mix submittal package.

Workability Factor; the workability factor (WF) has been calculated based on the formula in 2020 specifications and is calculated to the nearest tenth. The WF is included in the concrete mix submittal package.

The CF vs WF Chart is included with the concrete submittal package.

Process Control During Concrete Production;

Action & Suspension Limits:

<u>Quality Characteristic</u>	<u>Action Limits</u>	<u>Suspension Limits</u>
Coarseness Factor	< 50 or > 73	< 45 or > 75
Workability Factor	< 30 or > 38	< 28 or > 44

Corrective Action Limits

Action Limits will be monitored throughout the production process.

Action limits are set at the operation boundary limits as established on Table 902-1 Grading Requirements chart as provided by MDOT.

The Contractor/Engineer will be notified whenever the process approaches an action limits.

Suspension of Work Limits

When and if the production gradations resulted a value that is outside the operational limits as set by the chart provided by MDOT, production will cease and the following will be implemented to correct the gradation back within the action limits / operational boundaries lines.

Material causing values to exceed limits will be removed from production operations and stockpiled separately as to not be incorporated into production.

Stockpile to be investigated for segregation possibilities

Suppliers Load out reports to be reviewed for discrepancies

Supplier to be contacted and revise producing operations if gradations need to be altered and brought back within MDOT requirements.