

SECTION III

PW-7018 BOND FUNDED MAJOR STREETS IN THE CITY OF DETROIT 122 PAGES

Progress Clause	2
City of Detroit Special Provisions	3
Special Provision for Maintaining Traffic	4
Specification for Limitations of Operations.....	1
Notice to Bidder for Utility Coordination	3
Specification for Working Area and Project Cleanup.....	1
Specification for Mobilization	1
Special Provision for Removal of Curb and Curb and Gutter.....	1
Special Provision for Integral Curb and Sidewalk, 2 Feet	2
Special Provision for Excavation, Earth, Modified	1
Specification for Drainage Structure Cleaning and Sewer Lead Cleaning	1
Specification for Drainage Structure Covers	1
Specifications for Structure Cover Adjustment, Reconstructing Structure, and Water Shutoff Adjustment.....	3
Special Provision for HMA and Concrete Pavement Sequence of Operations and Requirements.....	1
Special Provision for Cold Milling HMA Surface, Modified	1
Specification for Conditioning Existing Pavement.....	1
Specification for HMA Application Estimate.....	1
Special Provision for HMA Approach, Modified	1
Special Provision for HMA Approach, Driveway, Modified	1
Specification for Concrete Pavement Repair	2
Special Provision for Curb, Conc, Detail CD, Modified	1
Specification for Sidewalk Ramp, ADA, and Detectable Warning Surface	2
Specification for Sidewalks	1
Specification for Sidewalk with Tree Roots	2
Special Provision for Polymer Cement Pavement Markings	1
Specification for Berm Restoration.....	2
Specification for Sidewalk Repair Notifications.....	1
Special Provision for Debris or Materials in Traffic Lanes	1
Special Provision for High Visibility Clothing	1
Special Provision for Sweeping	1
Special Provision for Construction Staging Areas.....	1
Special Provision for Sampling Asphalt Binder on Local Agency Projects	1
Special Provision for Recycled Hot Mix Asphalt Mixture on Local Agency Projects.....	2

	2
Special Provision for Acceptance of Hot Mix Asphalt Mixture on Local Agency Projects	7
Special Provision for Quality Control and Acceptance of Portland Cement Concrete (For Local Agency Projects Only)	21
Special Provision for Curb Ramp Opening, Concrete	1
Special Provision for Permanent Pavement Markings	2
Special Provision for Type III Barricades	1
Special Provision for Superpave Final Aggregate Blend Requirements	2
Drawing, Typical Cross Section Cold Milling HMA Surface and Resurface	1
Drawing, Detail of Alley Return and Drive Approach	2
Drawing, HMA Feathering Detail	1
Drawing, HMA Approach, Modified	1
Drawing, Curb, Conc., Detail CD, Modified	1
Drawing, Sidewalk Ramp and Detectable Warning Detail	7
Drawing, Dimensions of Bus Boarding Area	1
Drawing, DWSD Manhole Ergo Assembly	1
Drawing, DWSD Manhole Ergo Assembly	1
Drawing, DWSD Manhole Ergo Cover	1
Drawing, DWSD Manhole Ergo Cover	1
Drawing, DWSD Manhole Frame	1
Drawing, DWSD Manhole 5000 Frame	1
Drawing, DWSD Manhole 5000 Frame	1
Drawing, Catch Basin 5000 M4 Grate	1
Drawing, Catch Basin 5000Z4 5000M4 Assembly	1
Drawing, Catch Basin 5000 Assembly	1
Drawing, A.D.A. Catch Basin 5000M5 Grate	1
Drawing, A.D.A. Catch Basin 5000Z4 5000M5 Assembly	1
Drawing, A.D.A. Catch Basin 5000Z4 5000M5 Assembly	1
Drawing, P.L.D. Pattern No. 2A	1
Drawing, Handhole Frame	1
Drawing, Manhole Cover	1
Drawing, Manhole Frame	1
Example, Sidewalk Replacement Program (Programa de Reemplazo de Banquetas)	1
Example, Sidewalk Replacement Program (Programa de Reemplazo de Banquetas)	1
Drawing, Drainage Structures	5
Drawing, Monument Boxes	1

PROGRESS CLAUSE

PROGRESS CLAUSE: After receiving notice of award of contract, start work on the date designated as the starting date herein or the date agreed upon with the Engineer. In no case, shall any work be commenced prior to receipt of formal notice of award by the department.

The starting date for this project shall be as of the date of the Start Work notice issued after the contract has been approved. The entire project shall be completed **within 150 calendar days inclusive of any rain days** (except any landscaping maintenance guarantee work) from the starting date. No HMA pavement work will be allowed during seasonal limitations as set forth in subsection 501.03.I.2 of the 2012 MDOT Standard Specifications for Construction.

All work must be completed by September 30, 2021. The contractor is required to remove all equipment and traffic control devices no later than November 30, 2020 for any work performed in 2020. No additional compensation will be paid for remobilization of equipment and reinstallation of traffic control devices. All equipment and traffic control devices on a given street must be removed within seven (7) calendar days of completion of work on that street.

The low bidder(s) for the work covered by this proposal will be required to meet with department representatives to work out a detailed progress schedule. The schedule for this meeting will be set within one week after the low bidder is determined. The Department of Public Works - City Engineering Division will arrange the time and place for the meeting. A Start Work notice will not be granted without an agreed upon Progress Schedule.

The named subcontractor(s) for Specialty and/or Designated Items (if such items are designated in the proposal) which materially affect the work schedule, shall also be present at the scheduled meeting and they will be required to sign the Progress Schedule to indicate their approval of the scheduled dates of work set forth in the Progress Schedule.

The Progress Schedule shall include, as a minimum, the controlling work items for the completion of the project and the planned dates (or work day for a work day project) that these work items will be controlling operations. When specified in the bidding proposal, the date the project is to be opened to traffic, the final project completion date, and any other controlling dates shall also be included in the Progress Schedule. The intended sequencing of streets for milling and resurfacing shall be included in the Progress Schedule.

Failure on the part of the Contractor to carry out the provisions of the Progress Schedule, as established, may be considered sufficient cause to prevent bidding future projects until a satisfactory rate of progress is again established.

Liquidated damages will be applied based on Section 108 of the 2012 Michigan Department of Transportation Standard Specifications for Construction.

PROGRESS OF WORK

The contractor is to schedule the work for this contract such that:

1. All work is to be completed within 150 calendar days.
2. Milling, Structure Adjustments, Paving and Concrete work shall follow sequentially on each road to minimize the length of time a road is affected by construction.
3. No more than two milling crews and two paving crews shall be working on this project at any given time and no more than six crews in different locations shall be working on this project at any given time, unless approved by the Engineer.
4. Schedule – Contractor shall provide a detailed schedule at the Pre-Construction meeting showing work for specific streets, milling, paving and concrete operations. This schedule shall be updated and sent 24 hours in advance by e-mail for each progress meeting (typically every two weeks).
5. Work on streets with DTE gas projects shall commence after DTE's work is complete, as directed by the Engineer.

CITY OF DETROIT
SPECIAL PROVISIONS

DET: PAL

1 of 3

REVISED 01-26-18

Work Approvals: Acceptance by the City of Detroit of any or all utility work under this contract will be conditioned upon approval by the appropriate Department of the City of Detroit.

Utility Access: The Contractor shall contact the utility owners, including the Detroit Fire and Police Departments, regarding their facilities prior to starting the work. All utility outlets and control fixtures shall be maintained in an accessible condition at all times.

Adjacent Utilities: When proposed utilities cross or lay parallel to an existing or proposed utility, a vertical clearance of twelve (12) inches and a horizontal clearance of forty two (42) inches shall be provided between the outside limits of their construction and the outside limits of the Public Lighting Department (PLD) or Department of Water and Sewerage (DWSD) facility. PLD facilities include electrical conduits, communication conduits, and related structures. DWSD facilities include sewers, water mains, and related structures. If for any reason this clearance cannot be provided, the Contractor shall notify the project engineer and proceed under his direction in an approved manner.

Reclaiming Salvageable Material: All salvageable material within the limits of this project and belonging to either privately or municipally owned utilities, which are to be reclaimed by its owner, will be indicated on the plans or in the proposal. The removal of such material shall be done by the owner and at their own expense and at such time as will cause no delay to the Contractor. If after due notice the owner does not remove the material, the Engineer shall advise the Contractor to remove the material and this material shall become the property of the Contractor. The work of removing the material is included in the construction of the project and will not be paid for separately

Hydrants and Water: The Contractor shall pump out at the end of each day throughout the year, regardless of the season, any fire hydrant used to obtain water.

The Contractor shall secure the required permit from the Detroit Water and Sewerage Department, and shall bear all the expense for such permits and for the water used. If connections are made to hydrants, Fire Department's standard hydrant wrench shall be used for the operation of the hydrant.

The DWSD current fees include a permit fee of \$650.00 per day and an unmetered commercial usage fee of \$1,920.00. These fees are subject to change. For more information, contact DWSD at (313) 245-1057.

Removal of Miscellaneous Structures: The use of a crane and ball type pavement breaker for the removal of miscellaneous structures referred to in Section 204 of the 2012 MDOT Standard Specifications for Construction and the removal of other items called for in these Specifications and Plans will NOT be permitted at any time for work under this Contract, except when specifically authorized by the Engineer.

Pumping and Drainage: The Contractor will be required to furnish all equipment and supplies and perform all labor necessary to keep all excavated areas dewatered during the period of this Contract.

The work will include the disposal of all drainage water flowing into the excavation. The drainage of the entire project shall be disposed of in a manner that will not interfere with or delay the work of others. This work shall be performed as directed by the Engineer.

The City will permit, subject to its approval, drainage water from the excavations for the project to enter existing operating sewers without reimbursement. No claims for damages, however, will be allowed the Contractor because of the inadequacy of the City sewers to accommodate the water from the excavations.

All sewers and drainage structures shall be kept thoroughly cleaned of silt, debris and foreign matter, and shall be free from such accumulation at the time of final inspection.

The work of pumping and draining excavations, and cleaning the structures used for disposal of same will be considered included in the construction of the project and no additional payment will be made.

Property and Survey Monuments: Before any monuments or stakes marking the boundaries of property along or near the work are removed or disturbed, the Contractor shall notify the Engineer in sufficient time so that they can be properly located and reset.

All precautions shall be taken to avoid disturbance of permanent survey monuments of any City, County or State authority, and when any of these are disturbed or destroyed, the Contractor shall restore them to the satisfaction of such authority and shall pay all costs incurred by such authority in connection therewith.

City of Detroit vertical survey monuments shall be adjusted and preserved in accordance with the Special Provision\Specification titled Vertical Survey Monuments.

Notification: The Contractor shall provide notification to residents and businesses along the length of the project of pending surface milling, curb replacement, pavement repair and resurfacing activities, and sidewalk and ADA ramp construction a minimum of 48 hours in advance of such work. The notice, at a minimum, shall advise residents of the date work activity will start, the anticipated length of time the area will be worked on, notification of temporary loss of curbside or driveway access to property, and request that street be cleared of parked vehicles.

Should construction activities cease, either due to weather or scheduling, for an anticipated time of five (5) days or more, any and all posted signage shall be removed. Once work will begin again, the Contractor shall re-notify as previously set forth.

For sidewalk repair work, the Contractor shall provide notification to residents and businesses along the length of the pending sidewalk work a minimum of 72 hours (3 day) in advance of such work. This notification shall be placed in accordance with the Specification for Sidewalk Repair Notification.

Cleanliness of the Work: The Contractor shall at all times keep the street pavement and right-of-way and any public or private premises temporarily occupied by him for purposes of work under this contract free from accumulations of waste material or rubbish caused by the Contractor's employees or the work. This requirement shall apply to any streets in vicinity of the work which are affected by the Contractor's construction or hauling operations, as well as to streets in which the work is located. If the Contractor shall fail to keep any street cleaned of

debris resulting from their operations, and therefore creating a public nuisance, they shall be notified in writing by the Engineer to clean the street and remove the nuisance immediately. If, within 24 hours after the receipt of such notice, the Contractor shall have failed to clean such street satisfactorily, the Engineer shall order the street cleaned by the Department of Public Works or such other agency as he shall designate and all costs of such cleaning shall be paid by the Contractor.

Materials and equipment not in current use shall not be stored on any city streets. Storage of materials on private property shall require a written agreement with the owner. The Contractor shall provide the Engineer a copy of the agreement.

CITY OF DETROIT
SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC

DET: AHS

02-27-20

General Requirements: Traffic shall be maintained throughout the project in accordance with 2012 MDOT Standard Specifications for Construction, including any supplemental specifications, and as herein specified. All traffic control devices shall conform to the current edition of the 2011 Michigan Manual of Uniform Traffic Control Devices.

City of Detroit Street Maintenance Department and/or Contract Maintenance Agencies may perform maintenance work within or adjacent to the Construction Influence Area (CIA). The Maintenance Division of City of Detroit and or Contract Maintenance Agency will coordinate their operations with the Supervising Engineer to minimize the interference to the Contractor. No additional payment will be made to the Contractor for the joint use of the traffic control items.

The Contractor must submit a Work Zone Traffic Control Plan to the Engineer in accordance with Section 104 of the 2012 Standard Specifications for Construction. At a minimum, the plan shall include the proposed ingress/egress locations for construction equipment and vehicles, traffic control devices that will be utilized to warn the motoring public of ingress/egress locations, and measures that will be taken to ensure compliance with the plan. No work shall begin prior to the acceptance of the Work Zone Traffic Control Plan. Additional time required to obtain an accepted Work Zone Traffic Control Plan shall not be cause for delay or impact claims. All costs associated with obtaining an acceptable plan, providing and executing all parts of the accepted plan including required traffic control devices, or resolving an incomplete or unacceptable plan shall be borne by the Contractor.

Failure to comply with all stipulations of the following traffic specifications will be cause for complete shutdown of the project.

In the event of an emergency, the following specifications and restrictions are subject to change if traffic conditions indicate such a necessity.

Traffic specifications are to be with the work crews at all times.

Maintenance of Traffic:

- Walks, driveways, alleys and entrances to buildings shall not be blocked.
- The required number of lanes shall be maintained by plating of pavement.
- The paved surface shall be free of stored equipment, excavated material, etc. during specified hours.
- Protection and temporary crossings shall be provided for pedestrians at all crossings.
- Protection and temporary driveway access to residents and businesses shall be provided and maintained as directed by the Engineer.
- The Contractor shall notify local businesses a minimum of 48 hours prior to the implementation of any lane closures, weekend closures and major traffic shifts.
- The Contractor shall notify the Engineer, the Michigan Department of Transportation and the Detroit Police and Fire Departments patrolling the area three (3) business days prior to making any lane closures or traffic switches.

- The Contractor must coordinate his operations with contractors performing work on other projects within or adjacent to the construction influence area.
- The Contractor shall be required to coordinate the work with the curb-side garbage pick-up within the construction influence area.
- Steel plates, 3/4 inch thick, of sufficient size, shall be furnished and installed by the Contractor to cover paving cuts and to provide crossings over trenches. No separate compensation will be made to furnish, install, maintain and remove these steel plates when no longer needed. The cost for this material and work shall be incidental to the project.
- Plates shall be bedded in Cold Patch so as to avoid rocking and the noise resulting there from, and shall be firmly anchored by spiking into the existing pavement.
- Approved HMA material, shall be used at the ends of the plates to eliminate bumps in traffic lanes. The cost of the HMA and placement of same shall be considered incidental to the work.
- The spikes shall have a minimum length of three (3) inches and shall be driven not closer than twelve (12) inches from the edge of a trench up to three (3) feet deep or two (2) feet from the edge of a trench greater than three (3) feet deep.
- For trenches wider than four (4) feet, the Contractor shall submit a method of bridging to the Engineer for approval. All bridging shall be of a design that will satisfactorily carry an HS-20 truck loading across the opening smoothly, safely, and without undue noise.

Signing and Traffic Control: The Contractor shall furnish and install all signing necessary for the maintenance of traffic. Traffic control devices shall conform to the current edition of the 2011 Michigan Manual of Uniform Traffic Control Devices, Part VI, Construction and Maintenance; the Michigan Department of Transportation Maintaining Traffic Safety Typical Standards: M0020a, M0030a, M0040a, M0050a, M0110a, M0140a, M0240a, WZD-100-A and WZD-125-E; and/or the City of Detroit, Department of Public Works Standards on Maintenance and Utility Signing as applicable.

Pedestrian traffic shall be maintained using Michigan Manual of Uniform Traffic Control Devices details as shown in Figures 6H-28 and 6H-29.

Distances between sign locations will vary depending on the lengths of the City blocks in advance of the job site. Other traffic signing and barricading requirements for this project are contained in the proposal.

Temporary "No Parking" signs shall be placed in all parking areas when necessary to prohibit parking during construction activities. The "No Parking" signs shall be placed in all parking areas at least 24 hours and not more than 48 hours prior to construction activities.

The Contractor may relocate signs and other portable barricades only after coordinating with representatives of the Traffic Engineering Division of the Department of Public Works.

CONSTRUCTION INFLUENCE AREA (CIA)

Construction Influence Area (CIA): The CIA shall include the area within the right-of-way of the street or streets listed in the contract and/or the cross streets within the limits of the construction staging.

The Contractor shall coordinate his operations with Contractors performing work on other projects within or adjacent to the Construction Influence Area (CIA).

Time Restrictions: Maintaining traffic requirements and hourly restrictions are subject to change by the Engineer.

Maintain the full pavement width of all project streets between 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. Monday through Friday, and a minimum of one lane of thru traffic in each direction for all other hours.

No work shall be performed or lane closures allowed during the Memorial Day, July 4th, or Labor Day holiday periods, as defined by the Engineer. The Contractor shall coordinate their work schedule around special events that take place in local communities in accordance with the Engineer. The Contractor shall be responsible to contact the Supervising Engineer to acquire specific dates and locations for these events.

Other special events that may affect lane closures, as defined by the Engineer, are as follows:

- Rocket Mortgage Classic PGA Tour
- Downtown Hoe Down
- Freedom Festival
- Annual Detroit Electronic Music Festival
- Chrysler Jeep Detroit APBA Cup
- African World Festival
- Ford Detroit International Jazz Festival
- Ford Field Special Events and Home Games
- Comerica Park Special Events and Home Games
- Little Ceasar's Arena Special Events and Home Games
- North American International Auto Show

Work shall be suspended by the Engineer at any time traffic is being unduly hampered or delayed. In general, traffic is expected to be unduly hampered from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m. weekdays. These hours may be adjusted by the Engineer.

Truck Haul Routes: Truck haul routes selected by the Contractor must be submitted to the City of Detroit Department of Public Works for approval prior to the start of construction and are subject to regulations of the Department.

Barricades: Plastic Drums, High Intensity, and Barricade, Type III, High Intensity, Double Sided, Lighted necessary for traffic control and public safety shall be furnished and erected by the Contractor. All traffic control devices and their usage shall be in accordance with Part 6 of the Michigan Manual on Uniform Traffic Control Devices (MMUTCD) and MDOT Maintaining Traffic Typical M0020a, M0040a, M0110a and M0140a and any other applicable.

Warning Lights: Battery operated warning flashers shall be used on all barricades in accordance with the current edition of the 2011 Michigan Manual of Uniform Traffic Control Devices and any recent changes to special provision regarding battery operated warning lights.

Temporary Signs: The Federal Highway Administration (FHWA) requires that all signs be NCHRP 350 crashworthy. The Contractor shall submit the FHWA approved details for the temporary sign supports used on the project and have approval by the Engineer before the start of work.

Stage Construction: The traffic control required by this Special Provision for work on various streets in the contract and adjacent roadways is based on the current edition of the 2011 Michigan Manual of Uniform Traffic Control Devices. At the discretion of the Engineer, the

Contractor may be requested to conduct construction activities in certain segments of the project at such times that coordinates with adjacent property owner uses and activities. The Contractor shall submit for review and approval by the Engineer a sequence of operation/staging plans to complete the work by the specified completion date. The adjustments or changes in the staging of construction to accommodate property owners shall not be paid for separately and shall be included in the overall project cost.

Cleaning Adjacent Streets and Sidewalks: Dirt, mud, construction materials or other debris deposited on public sidewalks or streets as the result of spilling, tracking by the wheels of trucks or construction equipment or by other actions of the Contractor, his employees or subcontractors shall be immediately removed by the Contractor. Failure to do so is a violation of City Ordinances punishable by fines and/or imprisonment.

Special Considerations at Railroad Crossing.

1. The Contractor will not obstruct the right-hand display of the railroad signal to traffic approaching the crossing.
2. No lane closure taper(s) may extend through the crossing. Traffic lane shifts cannot transition over the crossing.
3. No construction traffic control devices may be placed in the railroad crossing or closer than 25 ft. from the outside rail on either crossing approach.
4. Provide traffic regulator at railroad crossing if movement of traffic is restricted to alternating one-way traffic through construction area at crossing. The traffic regulator will serve to stop traffic for vehicles traveling in the direction opposed to normal flow and prevent them from entering the crossing upon a train approaching the crossing. When the railroad crossing is in the influence zone of active construction work, but not in a lane closure, the roadway traffic regulator will give immediate preference to clearing any traffic which backup over the crossing as a result of the traffic regulator control away from the crossing.
5. The Contractor will place a temporary stop line and sign R15-1 (crossbuck) to indicate the stopping point in advance of the crossing for vehicles traveling in a direction opposed to normal flow.
6. Payment for intermediate traffic regulator(s) stationed at the crossing is included in the pay item Traffic Regulator Control.

Enforcement Stipulations: Failure to comply with any of these regulations and requirements is a violation of City Ordinances punishable by fines and or imprisonment.

Failure to comply with all of these regulations and requirements of the above traffic specifications will be cause for complete shutdown of the project.

In the event of an emergency, these restrictions are subject to change if traffic conditions indicate such a necessity.

Traffic specification documents are to be held with the work crews at all times.

Measurement and Payment: Maintaining Traffic will be measured and paid for at the contract unit price for the contract pay items.

Payment for providing and maintaining driveway access and pedestrians crossing, temporary No Parking Signs, $\frac{3}{4}$ inch steel plates, plates bedding, spikes will not be paid separately, but shall be considered incidental and included in other pay items.

Any equipment required for nighttime operations shall be included in the cost of the work items being placed. All costs of additional signing or maintaining traffic devices required to expedite the construction will be borne by the Contractor.

CITY OF DETROIT
SPECIFICATIONS
FOR
LIMITATIONS OF OPERATIONS

DET: GJM

1 of 1

Revised: 1-04-16

The work days used to develop the progress schedule shall be Monday through Saturday and shall not include Sundays or City Holidays. The Contractor may normally prosecute the work during the daylight hours of any work day provided that they so conduct their operations as not to create a public nuisance nor disturb the peace. Overtime shall be limited to the work days submitted on the progress schedule for the project. Overtime work on Sundays and City Holidays shall be limited to emergency work necessary to safeguard the health and safety of the public.

When the Contractor elects to conduct work operations in excess of eight hours per day, or on Saturdays, Sundays or a City Holiday, they shall bear overtime costs incurred by the City of Detroit for City personnel assigned to the project for those situations.

The following are the current City Holidays: New Year's Day, Martin Luther King Jr. Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Day after Thanksgiving, Christmas Eve, Christmas Day, New Year's Eve. The Contractor shall be responsible for confirming with the City Engineering Division any amendments to this list of calendar dates designated as holidays for City of Detroit employees.

The Engineer may require the Contractor to cease construction operations during times as may be determined to be in the interest of the public at no additional compensation or cost to the City.

Contractor shall suspend or limit their operations if work interferes with the City Sponsored Public events within project CIA (Construction Influence Area) at no additional compensation or cost to the City.

CITY OF DETROIT
NOTICE TO BIDDER
FOR
UTILITY COORDINATION

DET: PAL

Revised: 06-29-2017

The Contractor shall cooperate and coordinate construction activities with the owners of utilities as stated in Section 104.08 of the 2012 Michigan Department of Transportation (MDOT) Standard Specifications for Construction. In addition, for the protection of underground utilities, the Contractor shall follow the requirements in Section 107.12 of the 2012 MDOT Standard Specifications for Construction. Contractor delay claims, resulting from a utility, will be determined based upon Section 108.08 of the 2012 MDOT Standard Specifications for Construction.

The existing utilities listed below and shown on the plans represent the best information available.

This information does not relieve the Contractor of the responsibility to satisfy themselves as to its accuracy, or of their responsibility in case utilities have been constructed or removed since the most recent surveys.

NAME AND ADDRESS OF OWNER

KIND OF UTILITY

Miss Dig
Call three (3) working days before you dig
1-800-482-7171

All Underground Utilities

City of Detroit
Public Lighting Authority
65 Cadillac Square Suite 3100
Detroit, MI 48226
(313) 324-8290, ext. 216
Mohamed Abbas
abbasm@detroitmi.gov

Street Lighting and Traffic Signals

City of Detroit
Detroit Water & Sewerage Department
Contract Services Facility
6425 Huber
Detroit, MI 48211
General: (313) 267-4863
Fax: (313) 842-6480

Water Mains & Sewers

NAME AND ADDRESS OF OWNER

KIND OF UTILITY

City of Detroit
Traffic Engineering, D.P.W.
2633 Michigan Avenue
Detroit, MI 48207
General: (313) 224-1610
Fax: (313)224-1304
Prasad Nannapaneni (313) 628-5603
prasadn@detroitmi.gov
Sunny Jacobs (313) 628-5604
sunjac@detroitmi.gov
Jubi Chackunkal (313) 224-1315
JubCha@detroitmi.gov

Pavement Markings, Signs &Traffic Signals

Sign Shop
2425 Fenkell
Detroit, MI 48238
Willie Riley (313) 628-2923
Fax (313) 628-4966

Sign Removals & Installations

City of Detroit
Detroit Fire Department
1301 3rd Street
Detroit, MI 48226
General: (313) 596-2900
Fax: (313) 224-4128
communityrelations@detroitmi.gov

KNOX Boxes and Fire Hydrants

City of Detroit
Detroit Police Department
1301 3rd Street
Detroit, MI 48226
General: (313) 596-2200
Fax: (313)596-1450
publicinfo@detroitmi.gov

Police Call Boxes

DTE
One Energy Plaza
Detroit, MI 48226
Gas Leak 1-800-947-5000
Electrical 1-800-477-4747

Electric and Gas

Contact DTE ten working days prior to the construction start date to coordinate adjustments for DTE electric and gas manhole frames and covers.

NAME AND ADDRESS OF OWNER

AT&T
17651 Michigan Ave,
Dearborn, MI 48126
Joe Raczak
Legal Mandate Engineer
(313) 240-5314
JR1983@att.com
or
Mark Braham
OSP Engineer - Metro South
(313) 240-5390
MB6352@att.com

AT&T will require five to seven business days
advance notice prior to adjusting frames and
covers.

Detroit Thermal LLC
3575 E Palmer St
Detroit, MI 48201
Ed LaRosa (313) 921-1922
Fax (313) 921-1972

KIND OF UTILITY

Telephone
For adjusting Frames and Covers

Steam Lines

CITY OF DETROIT
SPECIFICATIONS
FOR
WORKING AREA AND PROJECT CLEANUP

DET: GJM

1 of 1

Revised: 12-07-15

All the work under this Contract shall be in City streets, alleys, easements, or right-of-ways, and the space allowed for the Contractor's operations shall be in City streets and alleys adjacent to the work. Construction equipment, storage of materials, and the construction operations shall normally be restricted to such areas. Should additional working or storage space be desired, the Contractor may be permitted to utilize adjacent private property provided the Contractor makes all arrangements with the Owners of the property, bears all expense in connection with its use, and in no way involves or obligates the City, County or State by such use.

Materials delivered on the street shall be neatly and compactly stored in such a manner as to cause the least inconvenience to adjacent property owners and the general public.

Working and storage areas shall be promptly restored to their original conditions as soon as the required construction work has been completed at the particular location, and shall not be used as a storage area for unneeded material or construction equipment.

The work, and all property used in connection with the work, shall be kept in a neat and orderly condition at all times. Waste material and refuse from the Contractor's operations may be temporarily stored behind the curb in a manner not to interfere with pedestrians. Waste materials, rubbish, and debris shall not be allowed to accumulate and shall be removed daily, or as directed by the Engineer. Construction equipment and excess materials shall be promptly removed from the site as they become no longer needed for the progress of the work.

All cost relating to maintaining a neat working area and providing the required cleanup will not be paid for separately, but shall be included in the total project cost.

CITY OF DETROIT

**SPECIFICATION
FOR
MOBILIZATION**

DET-GJM

01-04-2016

Description: This specification covers the preparatory work and operations, and movement of equipment, materials and personnel to the construction sites in the City of Detroit. The work covered shall be as specified in the Michigan Department of Transportation 2012 Standard Specifications for Construction, Section 150.0

The word "Department" in the body of the MDOT Specification shall mean "The City of Detroit".

Measurement and Payment: In accordance with Section 150.04.

Pay Item

Pay Unit

Mobilization, Max ____

Lump Sum

CITY OF DETROIT
SPECIAL PROVISION
FOR
REMOVAL OF CURB AND CURB AND GUTTER

DET: PAL

2-17-2019

Description: The work shall be done in accordance with the applicable provisions of Section 204 of the 2012 MDOT Standard Specifications for Construction and as specified herein.

Construction: This work consists of removing curb and integral curb and gutter, where the adjoining pavement or sidewalk remains. When the curb is integral with the pavement, saw cutting of pavement shall be required.

Backfill base material removed with concrete curb or integral curb and gutter as specified in Section 204.03.C to the level necessary for new curb or curb and gutter. The cost of all backfill material or any other approved material is included in the unit price of the pay items for new curb or new curb and gutter, and will not be paid separately.

Backfill other area around curb with material excavated from site only if approved by the Engineer. Selected excavated material, suitable for backfill, will be free from rubbish or debris, organic matter, large stones, concrete fragments, or other road material, lumber, tree roots, or branches. In general, selected excavated material to be suitable for backfill will be restricted to sand or crumbly clay. Blue clay is not considered a suitable backfill material. If there is not sufficient selected excavated material on the project, the contractor shall provide the needed fill material and no additional payment will be made for providing this backfill.

Protect lawn sprinkler systems, if encountered. All costs associated with the lawn sprinkler protection, restoration and repair, if damaged, shall be borne by the Contractor and no separate payment shall be made.

Measurement and Payment: The completed work for the items below will be measured and paid for per lineal foot at the contract unit price

<u>Pay Item</u>	<u>Unit</u>
Curb, Rem, Modified	Foot
Curb and Gutter, Rem, Modified	Foot

CITY OF DETROIT
SPECIAL PROVISION
FOR
INTEGRAL CURB AND SIDEWALK, 2 FEET

DET: GJM

1 of 1

12-17-15

Description: The removal of integral curb and sidewalk shall be done in accordance with the requirements of Section 204 of the 2012 Michigan Department of Transportation Standard Specifications for Construction and as specified herein.

This construction of an Integral Curb and Sidewalk shall be in accordance with the City of Detroit Detail "Integral Curb and Sidewalk", or as directed by the Engineer, and shall conform to the requirements of Section 803 of the 2012 Michigan Department of Transportation Standard Specifications for Construction.

Removal: The work shall consist of removing existing curb that has integral sidewalk as part of the curb structure. Saw cut existing sidewalk at two (2) feet distance from the back of the curb if there is no joint within five (5) feet of the back of the curb to remove curb and integral sidewalk. Any additional sidewalk to be removed will be paid for as Sidewalk, Rem.

Backfill as necessary as specified in Section 204.03.C to the level necessary for new construction

Construction: The work shall include all labor, material, and equipment necessary to construct the Integral Curb and Sidewalk as specified to a distance two (2) feet from the face of the curb. Earth excavation, backfill with granular material, and expansion joint and other items which may be required to complete this work as specified shall be included in the cost of the work.

Any additional sidewalk to be constructed abutting this work shall be paid for as Sidewalk, Conc, ___ inch.

Removal of the existing curb and sidewalk and/or existing integral curb and sidewalk will be paid separately.

Where there is a step curb, the Integral Curb and Sidewalk shall be constructed to meet the face of the step curb. The exact height of the curb face and the width of the Integral Curb and Sidewalk will vary depending upon the field conditions and shall be constructed as directed by the Engineer. Where the difference between the step curb and gutter elevations is less than 7 inches, the Integral Curb and Sidewalk shall be constructed to eliminate the step.

Measurement and Payment: "Integral Curb and Sidewalk, 2 Feet, Rem, Modified" and "Integral Curb and Sidewalk, 2 Feet, Modified" will be measured and paid for at the contract unit rate per lineal foot and shall include all labor, equipment and material to remove the integral curb and sidewalk, including saw cutting and backfill, and to prepare for and construct the integral curb and sidewalk as specified.

<u>Pay Item</u>	<u>Pay Unit</u>
Integral Curb and Sidewalk, 2 Feet, Rem, Modified	Foot
Integral Curb and Sidewalk, 2 Feet, Modified	Foot

CITY OF DETROIT
SPECIAL PROVISION
FOR
EXCAVATION, EARTH, MODIFIED

DET: MCS

01-12-12

Description: This work consists of excavating materials not otherwise addressed in the contract as a separate work item. This work will be done in accordance with section 205 of the 2012 Michigan Department of Transportation (MDOT) Standard Specifications for Construction, except debris and non hazardous material when encountered, shall not be paid for separately. Experience has shown that most or all of earth excavation may be debris and may require hauling to special disposal sites which will accept this type of material.

Measurement and Payment: "Excavation, Earth, Modified" will be measured per cubic yards. The contract unit price will be payment in full for furnishing all labor, equipment, and materials necessary to excavate and dispose of the material. Where masonry and concrete structures and heavy foundations are encountered, their removal will be paid for as specified for these items.

Pay Item

Pay Unit

Excavation, Earth, Modified

Cubic Yard

CITY OF DETROIT
SPECIFICATIONS
FOR
DRAINAGE STRUCTURE CLEANING AND SEWER LEAD CLEANING

DET: GJM

1 of 1

10-02-15

Description: The work of drainage structure cleaning consists of cleaning existing catch basins and manholes in the area of the project where directed by the Engineer. The work of sewer cleanout consists of cleaning sewer lines between catch basins and between catch basins and manholes.

Construction: When necessary and as directed by the Engineer, the work shall be performed in accordance with Section 403.3.G of the 2012 MDOT Standard Specifications for Construction and as modified herein.

Cleaning shall be by high velocity hydro-cleaning (jetting). Mechanical cleaning shall only be used when authorized by the Engineer. Contractor shall take precautions to protect the sewer lines from damage.

No debris shall be accumulated on site except in totally enclosed containers approved by the Engineer. All material deposits shall be removed from site and disposed of at an approved location.

Some of the catch basins, manholes and sewers may be completely filled. The Engineer shall determine actual condition and necessity for cleaning prior to cleanout. Cleaning shall restore 90% of the pipe's carrying capacity.

Measurement and Payment: "Dr Structure Cleaning, Modified" will consist of cleaning catch basins and manholes, and shall be paid for at the contract unit price each, and will include all equipment and labor necessary to clean each catch basin or manhole, including installation of bulkheads as necessary and hauling away and disposing of any waste and debris generated.

"Dr Structure Lead, Cleaning, Modified" consists of cleaning sewers between catch basins or between catch basins and manholes, and shall be paid for at the contract unit price per foot which will include payment for furnishing all equipment and labor to clean sewers lines regardless of size, temporary bulkheads, and hauling away and disposing of any waste and debris generated.

<u>Pay Item</u>	<u>Pay Unit</u>
Dr Structure Cleaning, Modified	Each
Dr Structure Lead, Cleaning, Modified	Foot

CITY OF DETROIT
SPECIFICATIONS
FOR
STRUCTURE COVERS

DET: AHS

02-07-2020

Description: The work shall consist of furnishing and placing metal frames and covers for new structures or removal and replacement of damaged frames and covers as determined by the Engineer.

Materials:

Gray Iron Castings shall be as specified in Section 908.05. Gray Iron Castings of the 2012 MDOT Standard Specifications for Construction, City of Detroit DPW/CED DWSD Manhole and Catch Basin Drawings Nos. 101 thru 113, PLD Manhole and Handhole Drawings, and as specified herein.

The manhole and catch basin frame and its cover or grate shall constitute one unit. Each unit shall conform to the detailed requirement of the respective DPW/CED DWSD/PLD drawing. Each unit shall have a weight, with a tolerance of plus or minus 3 percent, of that specified in the respective DPW/CED DWSD/PLD drawing.

Construction:

The metal frames, covers, and grates on existing manholes and catch basins that are to be reused shall be carefully removed to prevent damage. Any reusable casting damaged by the Contractor shall be replaced with a new casting without additional cost to the City. All salvaged castings that are not to be used on the work shall become the property of the Contractor and shall be promptly removed from the job site.

Measurement and Payment: Drainage Structure Cover, Type ____ unit prices shall include removing and disposing of existing damaged cover and frame, and furnishing and installing structure cover and frame of the appropriate type.

Pavement removal and replacement, when required will be paid for separately.

Pay Item

Pay Unit

Dr Structure Cover, Type ____, Modified

Each

CITY OF DETROIT
SPECIFICATIONS
FOR
STRUCTURE COVER ADJUSTMENT,
RECONSTRUCTING STRUCTURE, AND
WATER SHUTOFF ADJUSTMENT

DET: AHS

01-19-18

Description: The work consists of adjusting utility structure covers in accordance with the applicable provisions of Section 403 and Section 823 of the 2012 Michigan Department of Transportation (MDOT) Standard Specifications for Construction, except as modified herein.

Utility structure cover adjustments will include all Public Lighting Department (PLD) manholes, and all Detroit Water and Sewerage Department (DWSD) gate wells, sewer manholes and catch basins whose covers are required to be raised or lowered to meet the required new pavement elevations. Water shutoff adjustments will include DWSD water shutoff boxes or stop boxes, and PLD hand holes which are required to be raised or lowered to meet the required new pavement elevations.

Before starting this work, the Contractor and the Engineer, or his representative, shall jointly inspect each structure to evaluate its interior conditions. Access to the structure will be provided by the Contractor. The Engineer, or his representative, shall determine whether the structure is to be adjusted or reconstructed. The Engineer shall also determine if any structure cleaning is necessary to remove existing debris. The Contractor shall remove all debris from the structure resulting from the Contractor's operations.

Materials: Materials used in the adjustment and reconstruction of drainage structures shall be as specified in Section 403. Drainage Structures, of the 2012 MDOT Standard Specifications for Construction.

Construction: Where called for on the plans or authorized by the Engineer, existing structure covers shall be adjusted to the proper elevation in accordance with Section 403 of the 2012 MDOT Standard Specifications for Construction, except as modified herein.

For Case 1 structures, saw cut full depth and remove the adjacent concrete and/or HMA pavement, curb, curb and gutter, or sidewalk as necessary to adjust the structure and cover. Remove an area of pavement and curb at least five (5) feet by five (5) feet around the structure. The existing frame and cover shall be carefully removed and the upper portion of the existing utility structure repaired as necessary and raised or lowered as required. The frame and cover shall then be reset on the adjusted structure so constructed as to hold them firmly in place and reset on a full mortar bed so as to fit the required new pavement grade and cross section. Replace adjacent concrete and/or HMA pavement, curb, curb and gutter, or sidewalk to match existing grades or to the required new pavement grade and cross section.

Case 2 structures shall be those that are located outside of existing pavement, curb, and curb and gutter.

When the existing frames and covers are unacceptable for reuse as determined by the Engineer, new frames and covers shall be furnished and installed. Drainage structure frames and covers shall be as specified in the City of Detroit "Specifications for Manholes and Catch Basins", and as specified in the Plans for DWSD Watergate and PLD Manhole covers. Any reusable frame and cover damaged by the Contractor shall be replaced by the Contractor at no cost to the City. The frames and covers that are not to be used on the work shall become property of the Contractor and shall be promptly removed from the jobsite and properly disposed of.

Where the structure is in need of repair, as determined by the Engineer, in excess of the adjustment limits set forth herein, the existing structure shall be broken down and rebuilt with new materials as specified in the City of Detroit Specifications for Manholes and Catch Basins, to the required new pavement elevations.

A finished concrete collar shall be placed around any structure adjusted that is within five (5) feet of the Detroit Thermal (formerly Detroit Edison) steam lines, as directed by the Engineer. The cost of this shall be paid for separately as Pvmt Repr, Nonreinf Conc, 10 inch, Modified, and measured by the surface area of the concrete collar.

Non-ferrous handholes and covers used by PLD and other City Utilities are made of fiberglass, copolymer propylene or similar material. These structure and covers shall be adjusted by a qualified electrical contractor. The removal of concrete around the perimeter of a non-ferrous handholes shall be performed with light chipping hammers to insure that no damage is done to the handhole, cover or any conduit or other utility that may feed the structure. Any damage to structures, conduits, cable and wiring shall be repaired by the Contractor at no cost to the City or utility.

For HMA pavement sections, immediately before placing the HMA top course or overlay, make final adjustments to drainage structure covers. Equipment will not be permitted to operate over adjusted structures for a period of twenty four (24) hours after their completion, unless otherwise approved by the Engineer.

Measurement and Payment: The completed work as described for adjusting or reconstructing structure will be measured as units and will be paid for at the Contract Unit Price, which price will be payment in full for furnishing all materials, equipment and labor; removal and replacement of concrete or HMA pavement, curb, curb and gutter, sidewalk; excavation, backfilling, disposal of surplus material, removal of all debris and foreign material from the structure (including the sump); adjusting the structure and cover to the required new pavement grade and cross section, with the existing or new cover; and providing access to all structures for inspection, as directed by the Engineer.

Structure damage due to the Contractors operations shall be repaired at the Contractors expense.

"Dr Structure Cover, Adj. Case __, Modified" shall include the above described work necessary to raise or lower the existing catch basin, manhole or gate well rim elevation involving adjustment, repair or replacement of less than or equal to three (3) layers of bricks, including mortar, regardless of whether or not it is necessary to remove a cone section to accommodate the rim elevation adjustment.

“Reconstructing Dr Structure, Case __, Modified” shall include the above described work necessary to raise or lower the existing catch basin, manhole or gate well structure and cover involving adjustment, repair or replacement of more than three (3) layers of bricks, including mortar, and may include the removal of a cone section to accommodate the rim elevation adjustment.

“Water Shutoff, Adj, Case __, Modified” shall include the above described work necessary to raise or lower the existing structure and cover of water DWSD water shutoff boxes or stop boxes, and PLD hand holes.

<u>Pay Item</u>	<u>Pay Unit</u>
Dr Structure Cover, Adj, Case 1, Modified	Each
Dr Structure Cover, Adj, Case 2, Modified	Each
Reconstructing Dr Structure, Case 1, Modified	Each
Reconstructing Dr Structure, Case 2, Modified	Each
Water Shutoff, Adj, Case 1, Modified	Each
Water Shutoff, Adj, Case 2, Modified	Each

CITY OF DETROIT
SPECIAL PROVISION
FOR
HMA AND CONCRETE PAVEMENT
SEQUENCE OF OPERATIONS AND REQUIREMENTS

DET: AHS

1 of 1

2-07-20

Once work on a street is begun, the Contractor shall maintain a continuous operation.

The Contractor shall schedule the cold-milling operation so that entire lane width of the roadway is cold milled between road terminus limit before switching over to other lane/side. This is required to avoid having vehicles travel over milled surface on one side and normal pavement surface on the other side.

The Contractor shall place a wedge at the base of driveway approaches, a minimum of six (6) inches wide for the full width of the driveway approach, where milling is greater than 2 inches in depth, to provide a smooth transition between the milled surface and driveway approach. The cost of the wedge shall be included in the cost of the "Cold Milling HMA Surface" pay item.

At the end of the day, the Contractor shall place a wedge, a minimum of 6 feet wide, the full length of all transverse and longitudinal joints at intersections where milling is greater than 2 inches in depth, to provide a smooth transition onto and off of the milled surface. The cost of the wedge shall be included in the cost of the "Cold Milling HMA Surface" pay item.

All milled surfaces shall be completely resurfaced with leveling course as soon as possible, but not to exceed 48 hours from the milling unless specifically approved otherwise by the Engineer. Immediately after placement of the leveling course, Type NR temporary pavement markings must be applied in accordance with Section 922 of the 2012 MDOT Standard Specifications for Construction, in order to maintain safe traffic operations, as directed by the Engineer. Type NR temporary pavement markings are considered incidental to the leveling course.

Top Course HMA shall be placed only after all base repairs, concrete curb repairs, and structure adjustments and repairs are completed.

Immediately after placement of the top course, Type R temporary pavement markings must be applied in accordance with Section 922 of the 2012 MDOT Standard Specifications for Construction, in order to maintain safe traffic operations, as directed by the Engineer. Removal of Type R temporary pavement markings is considered incidental to the placement of permanent pavement markings.

All milled surfaces must be completely resurfaced with leveling, top course, and permanent pavement markings before the winter seasonal shutdown; otherwise liquidated damages will be assessed per Section 108.10.C of the 2012 MDOT Standard Specifications for Construction.

It is the Contractor's responsibility to establish the finish (final) grade on all streets and to ensure proper (positive) drainage at all locations.

CITY OF DETROIT
SPECIAL PROVISIONS
FOR
COLD MILLING HMA SURFACE, MODIFIED

1 of 1

DET: UP

Revised: 05-08-12

Description This work shall consist of removing HMA pavement or surface by use of cold-milling equipment to prepare the foundation for HMA overlays per section 501.03 of the 2012 Michigan Department of Transportation (MDOT) Standard Specifications for Construction and as specified herein.

The cost of exploration for the existing street car rails when encountered during cold milling shall be included in the work of cold milling HMA surface. Extra payment for cost of actual removal and disposal of any street car rail will be made per section 103.02

The Contractor shall schedule the cold-milling operation so that entire lane width of the roadway is cold milled between road terminus limit before switching over to other lane/side. This is required to avoid having a vehicle travel over milled surface on one side and normal pavement surface other side.

At the end of the day, the Contractor shall place a wedge, a minimum of 6 feet wide, the full length of all transverse and longitudinal joints at intersections where milling is greater than 2 inches in depth, to provide a smooth transition onto and off of the milled surface.

It is the Contractor's responsibility to establish the finish (final) grade on all streets and to ensure proper (positive) drainage at all locations. This work shall included in the work of cold milling and be done at no additional cost to project.

Measurement and Payment The completed work as measured for "Cold Milling HMA Surface, Modified" will be paid for at the contract unit price for the following contract pay item.

Cold milling of existing concrete patches, and establishing finish (final) grade to ensure proper drainage, the cost of exploration for an existing street car rail when encountered during cold milling and wedging for longitudinal and transverse transition when required is included in the work of "Cold Milling HMA Surface, Modified".

The price shall be payment in full for removing the HMA material to the depth specified on the typical cross section sheet, and for transportation and disposal of the material.

Pay Item

Pay Unit

Cold Milling HMA Surface, Modified

Square Yard

CITY OF DETROIT
SPECIFICATION
FOR
CONDITIONING EXISTING PAVEMENT

DET: GJM

11-30-15

Description. This work shall be in accordance with Subsection 501.03.C of the 2012 Michigan Department of Transportation Standard Specifications for Construction including Removing HMA Patches, Joint and Crack Clean Out, Hand Patching, and Repairing Pavement Joints and Cracks, Detail 7, and, shall include the application of bond coat as required.

Measurement and Payment. "Conditioning Existing Pavement, Modified" will be measured and paid for by the ton of HMA material placed. The contract price per ton will be payment in full for furnishing all labor, material and equipment required to remove deteriorated or unstable HMA material, to clean the pavement surface and apply any bonding material needed, to clean and prep joints and cracks, and to furnish, place and compact the HMA Mixture 4E3 to prepare the existing pavement for the HMA leveling surface.

HMA Patch, Remove; Joint and Crack, Cleanout, Hand Patching, and Pavement Joint and Crack, Repr, Det 7 will not be paid for separately but are included in this item of work.

Full depth Pavement Joint and Crack Repair, Detail 8 is not included in the item of work.

Pay Item

Pay Unit

Conditioning Existing Pavement, Modified

Ton

CITY OF DETROIT
SPECIFICATION
FOR
HMA APPLICATION ESTIMATE

DET: AHS

1 of 1

02-25-19

Description: This Specification covers the furnishing and placing of Hot Mixed Asphalt in accordance with Section 501 of the 2012 MDOT Standard Specifications for Construction.

Material: HMA materials shall be as specified in Section 501.02.

The HMA Leveling Surfacing Mixture 4E3 shall have a yield of 220 pounds per square yard with an estimated thickness of 2 inches.

The HMA Top Surfacing Mixture 5E3 shall have a yield of 165 pounds per square yard with an estimated thickness of 1.5 inches.

Performance Grade; PG 64-22

The material for HMA Approach, Modified shall be 2 inches of HMA Mixture 4E3 for leveling, and 1.5 inches of HMA Mixture 5E3 for top surface, having a total yield of 385 pounds per square yard.

HMA Approach, Driveway, Modified shall be HMA Mixture 5E3, having a yield of 165 pounds per square yard.

HMA Prime Coat and HMA Bond Coat shall be included in the HMA pay item and shall meet the requirements specified in Section 904 of the 2012 MDOT Standard Specifications for construction.

The aggregate wear index shall be 260.

Construction: The HMA shall be produced and placed in accordance with Section 501.03 of the 2012 MDOT Standard Specifications for Construction.

Measurement and Payment: The unit price bid shall be full compensation for all labor, equipment, and materials required to place the HMA as specified.

CITY OF DETROIT
SPECIAL PROVISIONS
FOR
HMA APPROACH, MODIFIED

1 of 1

DET: AHS

Revised: 02-25-19

Description: "HMA Approach, Modified" shall conform to the requirements for "Placing HMA Approaches" of Section 501.03 of the 2012 Michigan Department of Transportation Standard Specifications for Construction except work shall include the construction of Butt Joints when meeting existing pavements and will not be paid for separately. The depth of the Butt Joints shall be as directed by the Engineer. Work at driveway approaches is covered in the Special Provision for "HMA Approach, Driveway, Modified" in this proposal and will be paid as HMA Approach, Driveway, Modified.

Materials: The HMA mixture for the HMA Approach shall be that specified in the Special Provision for "HMA Application Estimate". The HMA mixture to be used for the Butt Joint shall be that used for the leveling HMA mixture as specified in the Special Provision for "HMA Application Estimate".

Measurement and Payment: "HMA Approach, Modified" will be measured per ton. The contract unit price shall include all labor, material and equipment necessary to furnish, place and compact the HMA Approach, Modified as shown on the plans or as directed by the Engineer.

Pay Item

Pay Unit

HMA Approach, Modified

Ton

CITY OF DETROIT
SPECIAL PROVISION
FOR
HMA APPROACH, DRIVEWAY, MODIFIED

1 of 1

DET: AHS

02-25-2019

Description: This work shall include the removal of the existing HMA surface on residential and commercial driveway approaches and the placement and compaction of HMA to provide a smooth transition and positive drainage from the existing approach surface to the new street surface. The work shall conform to the requirements for "Placing HMA Approaches" of Section 501.03 of the 2012 Michigan Department of Transportation Standard Specifications for Construction, except as modified herein.

Material: The material used for residential and commercial driveways shall be as specified in the City of Detroit Special Provision for HMA Application Estimate.

Construction: The driveway approach shall be scraped clean of existing HMA overlay, if any, thoroughly swept clean and be free of moisture and debris before work is started. Bond coat material shall be SS-1h, meeting the requirements of Table 904-4 Anionic Emulsified Asphalts of the Michigan Department of Transportation 2012 Standard Specifications for Construction and shall be applied uniformly at a rate of 0.10 gallons per square yard to the driveway approach and terminate in a neat, straight line at the point indicated by the Engineer. The HMA shall be placed and compacted from the newly constructed pavement surface to a point in the drive which will provide positive drainage from the driveway out to the street flow line.

This work shall be performed after the mainline paving work has cured.

Measurement and Payment: The removal and placement of HMA on residential and commercial driveway approaches will be measured by the weight of material placed in tons, and shall be paid for at the contract unit price per ton which shall be payment in full for furnishing all materials, labor and equipment, including bond coat, required to complete the work as specified.

Pay Item

Pay Unit

HMA Approach, Driveway, Modified

Ton

CITY OF DETROIT
SPECIFICATIONS
FOR
CONCRETE PAVEMENT REPAIR

DET: GJM

1 of 2

11-25-2015

Description. This work shall be in accordance with Section 603. Concrete Pavement Restoration, of the MDOT 2012 Standard Specifications for Construction, and MDOT Standard Plan R-44-F for Concrete Pavement Repair. The work shall consist of saw cutting as necessary for removal of existing concrete base with HMA overlay, preparation of sub base, placing horizontal dowels, placing concrete, joints, finishing, and curing.

Construction. HMA Leveling Course placed over the concrete base repair area shall be removed and paid for in accordance with MDOT Sections 204 and 501 as HMA Surface, Rem.

When removing existing concrete pavement, the pavement shall be removed to an existing joint, or saw cut to a true line with a vertical face along the lines as marked or directed by the Engineer. The pavement shall be saw cut full depth into existing concrete, or as directed by the Engineer. Intermediate saw cuts shall be made as required by Section 603, referenced above. The removal shall be such that there will be no disturbance and/or damage to sections of pavement which are to remain in place. All damaged or undermined pavement caused by the Contractor's operations shall be removed and replaced at the Contractor's expense. The use of a crane and ball type breaking equipment will not be allowed. Pavement removal shall be accomplished with a rubber-tired hydraulic ram or as specified in Section 603 of the MDOT Standard Specifications.

Where subgrade corrections are required due to undesirable or unstable soil conditions as determined by the Engineer, the removal of material and placement of fill shall be performed in accordance with MDOT Section 205, and paid for as Subgrade Undercutting, Type II.

All replacement concrete pavement shall be doweled or anchored to the existing concrete pavement as set forth on Standard Plan R-44-F. All expansion and longitudinal joints shall be restored. Transverse joints within partial width cuts shall be restored to match the joint in other lanes. Transverse joints that fall within full width cuts need not be restored.

The top of the concrete pavement repair shall be placed level with the HMA Leveling Course.

Measurement and Payment. All material, labor and equipment required for constructing concrete pavement repair as specified herein and as shown on the Standard Plans shall be paid for under the unit rates bid for as follows:

Pavt Repr, Nonreinf Conc, ___ inch, Modified, shall include all labor, material and equipment to place the concrete pavement repair including all dowels, anchors, joints, concrete material, finishing and curing.

Pay Item

Pay Unit

Pavt Repr, Nonreinf Conc, 6 inch, Modified
Pavt Repr, Nonreinf Conc, 8 inch, Modified
Pavt Repr, Nonreinf Conc, 10 inch, Modified
Pavt Repr, Rem, Modified

Square Yard
Square Yard
Square Yard
Square Yard

CITY OF DETROIT
SPECIAL PROVISION
FOR
CURB, CONC, DETAIL CD, MODIFIED

DET: AHS

REVISED: 02-07-2020

Description: "Curb, Conc, Detail CD, Modified" shall be constructed in accordance with details included in these specifications and the 2012 Michigan Department of Transportation Standard Specifications for construction. No reinforcing bars are required. Joints shall be as shown in Michigan Department of Transportation Standard Plan R-30-Series and as directed by the Engineer.

Lawn sprinkler systems, if encountered, shall be protected and repaired, if damaged, by the Contractor at no extra cost.

Restore berm areas disturbed beyond curb limits to its original conditions. No separate payment will be made for such restoration, but is considered part of the work item.

Method of Measurement and Basis of Payment: "Curb, Conc, Detail CD, Modified" will be measured by the linear foot. The contract unit price shall be payment in full for furnishing all materials, labor and equipment necessary to construct this item.

Pay Item

Pay Unit

Curb, Conc, Detail CD, Modified

Foot

CITY OF DETROIT
SPECIFICATIONS
FOR
SIDEWALK RAMP, ADA, AND
DETECTABLE WARNING SURFACE

DET-AHS

Page 1 of 2

02-27-2020

Description: This special provision covers construction of sidewalk ramp with detectable warning surface.

The work consists of excavating, backfilling, compacting, and grading of the disturbed area, and constructing sidewalk ramp and/or retrofitting ramp with detectable warning surface in accordance with the applicable provisions of Section 803 of the 2012 MDOT Standard Specifications for Construction and the current Department of Public Works, City Engineering Division Sidewalk Ramp and Detectable Warning Details R-28 with City of Detroit Thickness Amendment.

Complete this work in conformance with the American with Disability Act (ADA) provisions as applicable.

Material: The Detectable Warning Surface color shall be will be brick red, Federal Color Number 22144, unless otherwise approved by the Engineer. The color shall be homogeneous throughout the tile.

Construction: Construct sidewalk ramp(s), landings flares and detectable warning surface according to MDOT Standard Plan R-28-Series. The concrete sidewalk and ramp thickness shall be as determined by the City of Detroit and as shown on the Department of Public Works, City Engineering Division Sidewalk Ramp and Detectable Warning Details R-28 with City of Detroit Thickness Amendment, included in these Specifications. The Detectable Warning Surface installation shall also comply with the manufacturer's instructions.

The curb and gutter section at the bottom of the ramp (ramp opening) shall be a full depth curb with a minimum depth of 12 inches, and shall be 18 inches from the back of curb to abutting pavement.

It is also the Contractor's responsibility to incorporate any changes made to the ADA accessibility requirements that may take effect prior to the start date of actual construction. If the Contractor determines that any changes significantly alter the original bid cost, the Contractor may submit a written request to the Engineer or his representative for approval and compensation. Include a cost comparison between the original bid cost and the cost of the ADA required changes in the request.

The contractor shall stamp all concrete with a legible stamp bearing the name of the company and the year of construction. No sidewalk or ramp construction shall commence without a Contractor's stamp on site.

Restore berm areas disturbed beyond sidewalk ramp repair limits to its original conditions. No separate payment will be made for such restoration, but is considered part of the work item.

Protect lawn sprinkler systems, if encountered, during removal and construction of sidewalk ramps. All costs associated with the lawn sprinkler protection, restoration, and repair, if damaged, shall be borne by the Contractor and no separate payment shall be made.

Any constructed ramps that do not meet the current MDOT Standard Plan R-28-Series and latest ADA accessibility requirements will be removed and replaced by the Contractor, as directed by the Engineer or his representative, at the Contractor's expense.

Measurement and Payment: The completed work as described herein for Sidewalk Ramp, ADA and Detectable Warning Surface, will be measured as square feet and feet respectively. The contract unit price will be payment in full for furnishing all materials, labor and equipment necessary to construct the ADA ramp and curb and warning surface.

Pay Item

Pay Unit

Sidewalk Ramp, ADA, Modified
Detectable Warning Surface Tile, Modified

Square Foot
Foot

Sidewalk Ramp, ADA, Modified includes the cost of landings, monolithic rolled curbs or side flares along the longitudinal edges of the ramp or landing and curb and gutter opening. The Department will pay for rolled curb adjacent to the non-traffic edge of parallel or combination ramps separately, only if the required height exceeds 18 inches along a continuous run.

CITY OF DETROIT

**SPECIFICATION
FOR
SIDEWALKS**

DET: AHS

1 of 1

02-27-20

Description: This special provision covers the construction of sidewalk and driveways.

Construction: This item of work includes excavating, backfilling, compacting, and grading of the disturbed area, and construction of concrete sidewalk and driveway.

The concrete sidewalk and driveway shall be removed in accordance with the MDOT Standard Specifications for Construction, Section 204, Removing Miscellaneous Structures and Materials.

Concrete sidewalk and driveway, of the thickness specified, shall be constructed in accordance with Section 803 of the 2012 Michigan Department of Transportation Standard Specifications for Construction. Sidewalk cross slopes shall be between 1% and 2%, sloping towards the street.

Restore berm areas disturbed beyond sidewalk limits to its original conditions. No separate payment will be made for such restoration, but is considered part of the work item.

Protect lawn sprinkler systems, if encountered, during removal and construction of sidewalks and driveways. All costs associated with the lawn sprinkler protection, restoration, and repair, if damaged, shall be borne by the Contractor and no separate payment shall be made.

Measurement and Payment: Concrete sidewalks and driveways of the thickness specified shall be measured in square feet. Payment shall be for the entire flag or flags of sidewalk, or driveway, as marked by the Engineer. The contract unit price shall be payment in full for furnishing all labor, equipment and material necessary to complete the installation of new concrete sidewalk and driveway.

Pay Item

Pay Unit

Sidewalk, Conc, __ inch, Modified

Square Feet

CITY OF DETROIT
SPECIFICATION
FOR
SIDEWALK WITH TREE ROOTS

DET: AHS

1 of 2

02-27-20

Description: This special provision covers the replacement of sidewalks and driveways which have been raised and/or damaged by tree roots and includes the trimming of the tree roots in conjunction with the sidewalk and driveway replacement.

Construction: This item of work includes cutting and removing tree roots, removing wood chips and all debris material and properly disposing of same off site; excavating, backfilling, compacting, and grading of the disturbed area; and construction of concrete sidewalk and driveway.

The concrete sidewalk and driveway shall be removed in accordance with the MDOT Standard Specifications for Construction, Section 204, Removing Miscellaneous Structures and Materials.

All roots or stumps under the sidewalk and driveway area and within four (4) inches of the edges of the sidewalk or driveway, shall be ground to a depth that severs the roots from the main root mass or to a minimum depth of eight (8) inches from the proposed finished grade of the top of the sidewalk. All voids resulting from the removal of roots or stumps shall be backfilled within one (1) day of removal. The Contractor shall fill the voids with clean, compacted backfill as specified in MDOT Standard Specifications for Construction, Section 204.03.C. All debris resulting from the grinding process shall be removed from the site and cannot be used as fill. All roots and grindings shall be removed and disposed of within three (3) days of removal/grinding.

Concrete sidewalk and driveway of the thickness specified shall be constructed in accordance with Section 803 of the 2012 Michigan Department of Transportation Standard Specifications for Construction. Sidewalk cross slopes shall be between 1% and 2%, sloping towards the street.

Restore berm areas disturbed beyond sidewalk limits to its original conditions. No separate payment will be made for such restoration, but is considered part of the work item.

Protect lawn sprinkler systems, if encountered, during removal and construction of sidewalks and driveways. All costs associated with the lawn sprinkler protection, restoration, and repair, if damaged, shall be borne by the Contractor and no separate payment shall be made.

Measurement and Payment: "Sidewalk, Conc, ___ inch, With Tree Roots, Modified" of the thickness specified shall be measured in square feet. Payment shall be for the entire flag or flags of sidewalk, or driveway affected by tree roots as marked by the Engineer. The contract unit price shall be payment in full for furnishing all labor, equipment and material necessary to complete the installation of new concrete sidewalk and driveway.

Pay Item

Pay Unit

Sidewalk, Conc with Tree Roots, __ inch, Modified

Square Feet

CITY OF DETROIT

SPECIAL PROVISION FOR

POLYMER CEMENT PAVEMENT MARKINGS

FTCH: DPE 1 of 1 02-24-2020

a. Description. This work consists of installing polymer cement surface system (PCSS) pavement markings in accordance with section 811 of the Standard Specifications for Construction, FHWA-MUTCD Interim Approval for Optional Use of Green-Colored Pavement for Bike Lanes (IA-14), FHWA-MUTCD Interim Approval for Optional Use of Red-Colored Pavement for Transit Lines (IA-22), PAVE-900 Series pavement marking standard plans, and as shown in the details on the plans.

b. Materials. Provide the following PCSS materials in accordance with subsection 811.02 of the Standard Specifications for Construction, FHWA-MUTCD-IA-14 and FHWA-MUTCD-IA-22:

- Material: Endurablend
- Produced by: Pavement Surface Coatings, LLC (866-215-6120)

Handle and mix materials according to manufacturer recommendations. Use admixtures and pigments specifically approved for the material and at the rates recommended by the manufacturer or supplier.

c. Construction. Construct pavement marking legends in accordance with subsection 811.03 of the Standard Specifications for Construction, and in accordance with manufacturer requirements or recommendations.

d. Measurement and Payment. The completed work, as described, will be measured and paid as specified in Section 811 of the Standard Specifications for Construction at the contract unit price using the following pay item:

Pay Item Pay Unit

_Pavt Mrkg, Polymer Cement, Base Field, Green.....	Square Feet
_Pavt Mrkg, Polymer Cement, Base Field, Red.....	Square Feet
_Pavt Mrkg, Polymer Cement, Bike Sym, Small, White.....	Each
_Pavt Mrkg, Polymer Cement, Bike Arrow, Small, White.....	Each
_Pavt Mrkg, Polymer Cement, Bike Sharrow Sym, Small, White.....	Each

CITY OF DETROIT
SPECIFICATION
FOR
BERM RESTORATION

DET: AHS

03-05-2020

Description: This specification shall apply when areas of concrete sidewalk or driveway pavement are to be removed but not replaced, and along areas of curb, sidewalk, and ADA ramp replacement. The work shall consist of furnishing and installing topsoil, permanent seeding, sodding or hydroseeding, mulch and fertilizer per the requirements of Section 816 Turf Establishment and Section 917 Turf and Landscape Materials of the 2012 MDOT Standard Specifications for Construction and as modified herein. Lawn sprinkler systems, if encountered, shall be protected and repaired, if damaged, by the Contractor at no extra cost.

Material: For seeding and hydroseeding, the seed mixture shall be THM (Turf Loamy to Heavy) as specified in Section 917, Table 917-1. The chemical fertilizer nutrient shall meet the requirements specified in Subsection 917.10.B.1, Class A Water Soluble Fertilizer. Mulching shall be straw mulch blankets per 917.15.B.2.b, with anchoring material in accordance with Section 917.15.C.5. Sod shall be as specified in Section 917.13.

Construction: Providing and placing topsoil shall be in accordance with Section 816.03.A. The depth of topsoil placed shall vary as necessary to provide a uniform slope after modifying the top of curb elevation. Seed shall be sown in accordance with Section 816.03.C.1 by broadcasting or using the hydroseeding method in accordance with Table 816.1. Fertilizer shall be applied as set forth in Section 816.03.B. Mulch blankets shall be installed and anchored in accordance with Section 816.03.H. Sod shall be placed in accordance with Section 816.03.D. Watering shall be performed in accordance with Section 816.03.I.

Measurement and Payment: The completed work of seeding, either by broadcasting or hydroseeding, will be measured in place by area of square yards applied. The contract unit price will be payment in full for furnishing all labor, equipment, and materials, including mulch, seed and chemical fertilizer nutrient, necessary to apply the seed, fertilizer and mulch.

Sodding and watering shall be paid for in accordance with Section 816.04 of the MDOT Standard Specifications.

Topsoil shall be measured and paid for per cubic yard (loose measure). The contract unit price shall be payment in full for furnishing all labor, equipment, and materials, including topsoil, necessary to apply the topsoil.

Restoration up to 3 feet in width paralleling each edge of curb, sidewalk, ADA ramp, or driveway replacement, shall be considered routine restoration and shall be incidental to those pay items.

Restoration exceeding 3 feet in width along curb, sidewalk, ADA ramp, or driveway replacement resulting from excessive excavation and grading, as approved by the Engineer, shall be paid separately from those pay items.

Pay Item

Pay Unit

Topsoil Surface, Furn, LM, Modified
Seeding, Mixture THM, Modified

Cubic Yard
Square Yard

CITY OF DETROIT
SPECIFICATION
FOR
SIDEWALK REPAIR NOTIFICATIONS

1 of 1

DET: PAL

02-28-2020

Description: The Contractor shall provide notification in the form of door hangers to residents and businesses impacted by the pending sidewalk and ADA ramp construction activities.

Material: Specifications for the door hangers are as follows:

Door Hanger Size:	11 inches by 17 inches, folded in half vertically
Page orientation:	Portrait
Paper quality:	80 lb bright orange card stock with aqueous coating
2-sided printing:	Yes
Color printing:	Black and White

Each door hanger will be printed with the notification in four (4) languages; English, Arabic, Spanish and Bengali, as indicated in the example provided with this specification. A template for the door hanger will be provided by the Engineer.

Construction: One door hanger is to be hung on the accessible front door or gate of each residence or business where sidewalks and/or driveway are to be replaced and at the nearest occupied side parcels a minimum of three (3) calendar days and no more than seven (7) calendar days in advance of sidewalk removal. Impacted residents and businesses include the location where sidewalk flags are to be replaced and any neighboring residents or businesses whose access to their property may be limited by the construction activities.

Measurement and Payment: The completed work of hanging the sidewalk notifications will be paid based on the percent of completed construction work. The contract unit price will be payment in full for furnishing all labor, equipment, and materials to print and hang the door hangers.

Pay Item

Pay Unit

Door Hanger Notifications, Modified

Lump Sum

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
DEBRIS OR MATERIALS IN TRAFFIC LANES

CFS:BRZ

1 of 1

APPR:EMB:DAJ:01-10-08
FHWA:APPR:06-01-11

Delete Subsection 104.07.B.2 on page 36 of the Standard Specifications for Construction, in its entirety and replace it with the following:

2. **Construction Safety Program.** Before beginning work on the project, the Contractor must submit a written "Construction Safety Program" that outlines the plan and procedures for preventing and mitigating accidents and fires on the project and meeting all health and safety requirements of the contract. Also in the program include provisions for meeting the requirements of subsection 812.03 and details for the materials and equipment that will be used to prevent construction related debris or materials from entering the open lanes of traffic and what actions, including traffic control measures, will be taken to immediately and safely remove the debris or material from the roadway. The Contractor must meet with the Engineer to discuss the "Construction Safety Program" and to develop mutual understandings to govern the administration and enforcement of the program.

Replace the second sentence in the first paragraph of Subsection 104.07.C.3 on page 37 of the Standard Specifications for Construction with the following:

The Contractor is responsible, at the Contractor's expense, to provide the necessary materials and equipment to prevent construction related debris or materials from entering the open lanes of traffic. This includes protection of traffic controls, removal of spilled materials or debris from the roadbed or drainage courses, and repair of damaged facilities necessary for public travel and safety.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
HIGH VISIBILITY CLOTHING

SSA:JDG

1 of 1

APPR:MWB:CRB:06-18-14

FHWA:APPR:06-27-14

Add the following, to the end, of subsection 104.07.B, Safety and Health Requirements, on page 36 of the Standard Specification for Construction:

4. **Worker Visibility.** Effective November 24, 2008, all workers within the right-of-way who are exposed to traffic or to construction equipment within the work area, must wear high visibility clothing.

High visibility clothing or high visibility safety apparel is personal protective safety clothing that is intended to provide conspicuity during both daytime and nighttime usage. High Visibility safety apparel must meet the Performance Class 2 or 3 requirements of the American National Standards Institute/International Safety Equipment Association (ANSI/ISEA) 107-2004 for High-Visibility Safety Apparel and subsequent revisions thereof.

Costs incurred to comply with this requirement will be the responsibility of the Contractor.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
SWEEPING

CFS:DBP

1 of 1

APPR:JKG:GCT:03-10-06
FHWA:APPR:06-01-11

a. Description. This work consists of sweeping pavements in the construction area, including service roads and cross streets, as directed by the Engineer.

b. Equipment. The sweeper must be a self-propelled or towed street sweeper equipped with pickup attachments and curb brushes.

c. Sweeping. Paved surfaces must be swept as often as necessary as directed by the Engineer.

Paved roadbeds must be given a final cleaning within 5 working days prior to opening the pavement surface to traffic or notification by the Contractor that the work is completed, whichever occurs first.

d. Measurement and Payment. The work of sweeping will not be paid for separately, but payment will be considered as having been included in other contract items.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
CONSTRUCTION STAGING AREAS

DES:LFS

1 of 1

APPR:JJG:KAS:10-06-11
FHWA:APPR:10-11-11

Add the following subsection to section 107, on page 70 of the 2012 Standard Specifications for Construction:

107.22 Construction Staging Areas. The contractor must not use any public recreation area as a staging area, marshalling yard, storage facility, or for any other construction support unless it is defined in the contract.

Public recreation areas include: parks, trails, game areas, wildlife and waterfowl refuges, playgrounds, golf courses, athletic fields or similar areas which are publically owned by public school districts, local, state, or federal governments.

Any agreements negotiated between the Contractor and the owner of the public recreation area, before or after the award of the contract will not be considered valid by the Department.

If the Engineer determines the Contractor is in non-compliance with this subsection, penalties up to and including termination of the contract, in accordance with subsection 108.12, may be enacted as well as the immediate restoration of the public recreation area at the Contractor's cost.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
SAMPLING ASPHALT BINDER ON LOCAL AGENCY PROJECTS

CFS:MF

1 of 1

APPR:JAR:JTL:12-19-01
FHWA:CON. APPR:06-06-11

For informational purposes, original samples of asphalt binder will be taken by the Contractor and delivered to the Engineer prior to incorporation into the mixture. The frequency of sampling will be determined by the Engineer. The cost of obtaining and delivering the samples to the Engineer will be included in the hot mix asphalt (HMA) pay items.

The Contractor must certify in writing that the materials used in the HMA mixture are from the same source as the materials used in developing the HMA mixture design and the bond coat is from an approved supplier as stated in the *Material Quality Assurance Procedures Manual*.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
RECYCLED HOT MIX ASPHALT MIXTURE ON LOCAL AGENCY PROJECTS

CFS:KPK

1 of 2

APPR:JWB:CJB:03-13-14

FHWA:APPR:03-13-14

Add the following subsection to subsection 501.02.A.2, on page 234 of the Standard Specifications for Construction.

- c. **Reclaimed Asphalt Pavement (RAP) and Binder Grade Selection.** The method for determining the binder grade in HMA mixtures incorporating RAP is divided into three categories designated Tier 1, Tier 2 and Tier 3. Each tier has a range of percentages that represent the contribution of the RAP binder toward the total binder, by weight. The tiers identified below apply to HMA mixtures with the following exception: Superpave mixture types E3, E3 High Stress, E10, E10 High Stress, E30, E30 High Stress, E50, and E50 High Stress used as leveling or top course must be limited to a maximum of 27 percent RAP binder by weight of the total binder in the mixture.

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures in accordance with contract.

- **Tier 1 (0% to 17% RAP binder by weight of the total binder in the mixture).** No binder grade adjustment is made to compensate for the stiffness of the asphalt binder in RAP.
- **Tier 2 (18% to 27% RAP binder by weight of the total binder in the mixture).** For all mixtures no binder grade change will occur in Tier 2 for all shoulder and temporary road mixtures.

The required asphalt binder grade must be at least one grade lower for the low temperature than the design binder grade required for the specified project mixture type. Lowering the high temperature of the binder one grade is optional. For example, if the design binder grade for the mixture type is PG 58-22, the required grade for the binder in the HMA mixture containing RAP would be a PG 52-28 or a PG 58-28.

For Marshall Mixes, no binder grade change will be required when Average Daily Traffic (ADT) is above 7000 or Commercial Average Daily Traffic (CADT) is above 700. No binder grade change will occur for LVSP, E03 and E1 mixtures used as leveling or top course.

The asphalt binder grade can also be selected using a blending chart for high and low temperatures. Supply the blending chart and the RAP test data used in determining the binder selection according to *AASHTO M 323*.

- **Tier 3 ($\geq$ 28% RAP binder by weight of the total binder in the mixture).** The binder

grade for the asphalt binder is selected using a blending chart for high and low temperatures per *AASHTO M 323*. Supply the blending chart and the RAP test data used in determining the binder selection.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
ACCEPTANCE OF HOT MIX ASPHALT MIXTURE ON LOCAL AGENCY PROJECTS

CFS:KPK

1 of 7

APPR:CJB:JWB:07-05-16

FHWA:APPR:07-05-16

a. Description. This special provision provides sampling and testing requirements for local agency projects using the roller method and the nuclear density gauge testing. Provide the hot mix asphalt (HMA) mixture in accordance with the requirements of the standard specifications, except where modified herein.

b. Materials. Provide aggregates, mineral filler (if required), and asphalt binder to produce a mixture proportioned within the master gradation limits shown in the contract, and meeting the uniformity tolerance limits in Table 1.

Table 1: Uniformity Tolerance Limits for HMA Mixtures

Parameter		Top and Leveling Course		Base Course	
Number	Description	Range 1 (a)	Range 2	Range 1 (a)	Range 2
1	% Binder Content	-0.30 to +0.40	±0.50	-0.30 to +0.40	±0.50
2	% Passing	# 8 and Larger Sieves	±5.0	±8.0	±7.0
		# 30 Sieve	±4.0	±6.0	±6.0
		# 200 Sieve	±1.0	±2.0	±2.0
3	Crushed Particle Content (b)	Below 10%	Below 15%	Below 10%	Below 15%
a. This range allows for normal mixture and testing variations. The mixture must be proportioned to test as closely as possible to the Job-Mix-Formula (JMF).					
b. Deviation from JMF.					

Parameter number 2 as shown in Table 1 is aggregate gradation. Each sieve will be evaluated on one of the three gradation tolerance categories. If more than one sieve is exceeding Range 1 or Range 2 tolerances, only the one with the largest exceedance will be counted as the gradation parameter.

The master gradation should be maintained throughout production; however, price adjustments will be based on Table 1. Aggregates which are to be used in plant-mixed HMA mixtures must not contain topsoil, clay, or loam.

c. Construction. Submit a Mix Design and a JMF to the Engineer. Do not begin production and placement of the HMA until receipt of the Engineer's approval of the JMF. Maintain the binder content, aggregate gradation, and the crushed particle content of the HMA mixture within the Range 1 uniformity tolerance limits in Table 1. For mixtures meeting the definition of top or leveling course, field regress air void content to 3.5 percent with liquid asphalt cement unless

specified otherwise on HMA application estimate. For mixtures meeting the definition of base course, field regress air void content to 3.0 percent with liquid asphalt cement unless specified otherwise on HMA application estimate.

Ensure all persons performing Quality Control (QC) and Quality Assurance (QA) HMA field sampling are "Local Agency HMA Sampling Qualified" samplers. At the Pre-Production or Pre-Construction meeting, the Engineer will determine the method of sampling to be used. Ensure all sampling is done in accordance with *MTM 313 (Sampling HMA Paving Mixtures)* or *MTM 324 (Sampling HMA Paving Mixtures Behind the Paver)*. Samples are to be taken from separate hauling loads.

For production/mainline type paving, obtain a minimum of two samples, each being 20,000 grams, each day of production, for each mix type. The Engineer will sample and maintain possession of the sample. Sampling from the paver hopper is prohibited. Each sample will be divided into two 10,000 gram parts with one part being for initial testing and the other part being held for possible dispute resolution testing. Obtain a minimum of three samples for each mix type regardless of the number of days of production.

Obtain samples that are representative of the day's paving. Sample collection is to be spaced throughout the planned tonnage. One sample will be obtained in the first half of the tonnage and the second sample will be obtained in the second half of the tonnage. If planned paving is reduced or suspended, when paving resumes, the remaining sampling must be representative of the original intended sampling timing.

Ensure all persons performing testing are Bit Level One certified or Bit QA/QC Technician certified.

Ensure daily test samples are obtained, except, if the first test results show that the HMA mixture is in specification, the Engineer has the option of not testing additional samples from that day.

At the Pre-Production or Pre-Construction meeting, the Engineer and Contractor will collectively determine the test method for measuring asphalt content (AC) using *MTM 319 (Determination of Asphalt Content from Asphalt Paving Mixtures by the Ignition Method)* or *MTM 325 (Quantitative Extraction of Bitumen from HMA Paving Mixtures)*. Back calculation will not be allowed for determining asphalt content.

Ensure all labs performing local agency acceptance testing are qualified labs per the *HMA Production Manual* and participate in the MDOT round robin process, or they must be *AASHTO Materials Reference Laboratory* (AMRL) accredited for *AASHTO T 30* or *T 27*, and *AASHTO T 164* or *T 308*. Ensure on non-National Highway System (NHS) routes, Contractor labs are made available, and may be used, but they must be qualified labs as previously stated. Contractor labs may not be used on NHS routes. Material acceptance testing will be completed by the Engineer within 14 calendar days, except holidays and Sundays, for projects with less than 5,000 tons (plan quantity) of HMA and within 7 calendars days, except holidays and Sundays, for projects with 5,000 tons (plan quantity) or more of HMA, after the Engineer has obtained the samples. QA test results will be provided to the Contractor after the Engineer receives the QC test results. Failure on the part of the Engineer or the laboratory to provide Quality Assurance test results within the specified time frame does not relieve the Contractor of their responsibility to provide an asphalt mix within specifications.

The correlation procedure for ignition oven will be established as follows. Asphalt binder content based on ignition method from MTM 319. Gradation (*ASTM D 5444*) and Crushed particle content (*MTM 117*) based on aggregate from *MTM 319*. The incineration temperature will be established at the Pre-Production Meeting. The Contractor will provide a laboratory mixture sample to the acceptance laboratory to establish the correction factor for each mix. Ensure this sample is provided to the Engineer a minimum of 14 calendar days prior to production.

For production/mainline type paving, the mixture may be accepted by visual inspection up to a quantity of 500 tons per mixture type, per project (not per day). For non-production type paving defined as driveways, approaches, and patching, visual inspection may be allowed regardless of the tonnage.

The mixture will be considered out-of-specification, as determined by the acceptance tests, if for any one mixture, two consecutive tests per parameter, (for Parameter 2, two consecutive aggregate gradations on one sieve) are outside Range 1 or Range 2 tolerance limits. If a parameter is outside of Range 1 tolerance limits and the second consecutive test shows that the parameter is outside of Range 2, then it will be considered to be a Range 1 out-of-specification. Consecutive refers to the production order and not necessarily the testing order. Out-of-specification mixtures are subject to a price adjustment per the Measurement and Payment section of this special provision.

Contractor operations will be suspended when the mixture is determined to be out-of-specification, but contract time will continue to run. The Engineer may issue a Notice of Non-Compliance with Contract Requirements (Form 1165), if the Contractor has not suspended operations and taken corrective action. Submit a revised JMF or proposed alterations to the plant and/or materials to achieve the JMF to the Engineer. Effects on the Aggregate Wear Index (AWI) and mix design properties will be taken into consideration. Production and placement cannot resume until receipt of the Engineer's approval to proceed.

Pavement in-place density will be measured using one of two approved methods. The method used for measuring in-place density will be agreed upon at a pre-production or pre-construction meeting.

Pavement in-place density tests will be completed by the Engineer during paving operations and prior to traffic staging changes. Pavement in-place density acceptance testing will be completed by the Engineer prior to paving of subsequent lifts and being open to traffic.

Option 1 – Direct Density Method

Use of a nuclear density gauge requires measuring the pavement density using the Gmm from the JMF for the density control target. The required in-place density of the HMA mixture must be 92.0 to 98.0 percent of the density control target. Nuclear density testing and frequency will be in accordance with the *MDOT Density Testing and Inspection Manual*.

Option 2 – Roller Method

The Engineer may use the Roller Method with a nuclear or non-nuclear density gauge to document achieving optimal density as discussed below.

Use of the density gauge requires establishing a rolling pattern that will achieve the required in-place density. The Engineer will measure pavement density with a density gauge using the Gmm from the JMF for the density control target.

Use of the Roller Method requires developing and establishing density frequency curves, and meeting the requirements of Table 2. A density frequency curve is defined as the measurement and documentation of each pass of the finished roller until the in-place density results indicate a decrease in value. The previous recording will be deemed the optimal density. The Contractor is responsible for establishing and documenting an initial or QC rolling pattern that achieves the optimal in-place density. When the density frequency curve is used, the Engineer will run and document the density frequency curve for each half day of production to determine the number of passes to achieve the maximum density. Table 5, located at the end of this special provision, can be used as an aid in developing the density frequency curve. The Engineer will perform density tests using an approved nuclear or non-nuclear gauge per the manufacturer's recommended procedures.

Table 2: Minimum Number of Rollers Recommended Based on Placement Rate

Average Laydown Rate, Square Yards per Hour	Number of Rollers Required (a)	
	Compaction	Finish
Less than 600	1	1 (b)
601 - 1200	1	1
1201 - 2400	2	1
2401 - 3600	3	1
3601 and More	4	1
a. Number of rollers may increase based on density frequency curve.		
b. The compaction roller may be used as the finish roller also.		

After placement, roll the HMA mixture as soon after placement as the roller is able to bear without undue displacement or cracking. Start rolling longitudinally at the sides of the lanes and proceed toward the center of the pavement, overlapping on successive trips by at least half the width of the drum. Ensure each required roller is 8 tons minimum in weight unless otherwise approved by the Engineer.

Ensure the initial breakdown roller is capable of vibratory compaction and is a maximum of 500 feet behind the paving operations. The maximum allowable speed of each roller is 3 miles per hour (mph) or 4.5 feet per second. Ensure all compaction rollers complete a minimum of two complete rolling cycles prior to the mat temperature cooling to 180 degrees Fahrenheit (F). Continue finish rolling until all roller marks are eliminated and no further compaction is possible. The Engineer will verify and document that the roller pattern has been adhered to. The Engineer can stop production when the roller pattern is not adhered to.

d. Measurement and Payment. The completed work, as described, will be measured and paid for using applicable pay items as described in subsection 501.04 of the Standard Specifications for Construction, or the contract, except as modified below.

Base Price. Price established by the Department to be used in calculating incentives and adjustments to pay items and shown in the contract.

If acceptance tests, as described in section c. of this special provision, show that a Table 1 mixture parameter exceeds the Range 1, but not the Range 2, tolerance limits, that mixture parameter will be subject to a 10 percent penalty. The 10 percent penalty will be assessed based on the acceptance tests only unless the Contractor requests that the 10,000 gram sample part retained for possible dispute resolution testing be tested. The Contractor has 4 calendar days from receipt of the acceptance test results to notify the Engineer, in writing, that dispute resolution testing is requested. The Contractor's QC test results for the corresponding QA test results must result in an overall payment greater than QA test results otherwise the QA tests will not be allowed to be disputed. The Engineer has 4 calendar days to send the dispute resolution sample to the lab once dispute resolution testing is requested. The dispute resolution sample will be sent to an independent lab selected by the Local Agency, and the resultant dispute test results will be used to determine the penalty per parameter, if any. Ensure the independent lab is a MDOT QA/QC qualified lab or an AMRL HMA qualified lab. The independent lab must not have conflicts of interest with the Contractor or Local Agency. If the dispute testing results show that the mixture parameter is out-of-specification, the Contractor will pay for the cost of the dispute resolution testing and the contract base price for the material will be adjusted, based on all test result parameters from the dispute tests, as shown in Table 3 and Table 4. If the dispute test results do not confirm the mixture parameter is out-of-specification, then the Local Agency will pay for the cost of the dispute resolution testing and no price adjustment is required.

If acceptance tests, as described in section c. of this special provision, show that a Table 1 mixture parameter exceeds the Range 2 tolerance limits, the 10,000 gram sample part retained for possible dispute resolution testing will be sent, within 4 calendar days, to the MDOT Central Laboratory for further testing. The MDOT Central Laboratory's test results will be used to determine the penalty per mixture parameter, if any. If the MDOT Central Laboratory's results do not confirm the mixture parameter is out-of-specification, then no price adjustment is required. If the MDOT Central Laboratory's results show that the mixture is out-of-specification and the Engineer approves leaving the out-of-specification mixture in place, the contract base price for the material will be adjusted, based on all parameters, as shown in Table 3 and Table 4.

In the case that the Contractor disputes the results of the test of the second sample obtained for a particular day of production, the test turn-around time frames given would apply to the second test and there would be no time frame on the first test.

The laboratory (MDOT Central Laboratory or independent lab) will complete all Dispute Resolution testing and return test results to the Engineer, who will provide them to the Contractor, within 13 calendar days upon receiving the Dispute Resolution samples.

In all cases, when penalties are assessed, the penalty applies to each parameter, up to two parameters, that is out of specification.

Table 3: Penalty Per Parameter

Mixture Parameter out-of-Specification per Acceptance Tests	Mixture Parameter out-of-Specification per Dispute Resolution Test Lab	Price Adjustment per Parameter
NO	N/A	None
YES	NO	None
	YES	Outside Range 1 but not Range 2: decrease by 10%
		Outside Range 2: decrease by 25%

The quantity of material receiving a price adjustment is defined as the material produced from the time the first out-of-specification sample was taken until the time the sample leading to the first in-specification test was taken.

Each parameter of Table 1 is evaluated with the total price adjustment applied to the contract base price based on a sum of the two parameter penalties resulting in the highest total price adjustment as per Table 4. For example, if three parameters are out-of-specification, with two parameters outside Range 1 of Table 1 tolerance limits, but within Range 2 of Table 1 limits and one parameter outside of Range 2 of Table 1 tolerance limits and the Engineer approves leaving the mixture in place, the total price adjustment for that quantity of material is 35 percent.

Table 4: Calculating Total Price Adjustment

Cost Adjustment as a Sum of the Two Highest Parameter Penalties		
Number of Parameters Out-of-Specification	Range(s) Outside of Tolerance Limits of Table 1 per Parameter	Total Price Adjustment
One	Range 1	10%
	Range 2	25%
Two	Range 1 & Range 1	20%
	Range 1 & Range 2	35%
	Range 2 & Range 2	50%
Three	Range 1, Range 1 & Range 1	20%
	Range 1, Range 1 & Range 2	35%
	Range 1, Range 2 & Range 2	50%
	Range 2, Range 2 & Range 2	50%

Table 5: Density Frequency Curve Development

Tested by: _____ Date/Time: _____

Route/Location:		Air Temp:
Control Section/Job Number:		Weather:
Mix Type:	Tonnage:	Gauge:
Producer:	Depth:	Gmm:

Roller #1 Type: _____

Pass No.	Density	Temperature	Comments
1			
2			
3			
4			
5			
6			
7			
8			
Optimum			

Roller #2 Type: _____

Pass No.	Density	Temperature	Comments
1			
2			
3			
4			
5			
6			
7			
8			
Optimum			

Roller #3 Type: _____

Pass No.	Density	Temperature	Comments
1			
2			
3			
4			
5			
6			
7			
8			
Optimum			

Summary: _____

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
QUALITY CONTROL AND ACCEPTANCE OF PORTLAND CEMENT CONCRETE
(FOR LOCAL AGENCY PROJECTS ONLY)

CFS:JFS

1 of 21

APPR:TES:DBP:06-11-18

FHWA:APPR:06-14-18

a. Description. The Contractor must administer quality control (QC) and the Department will administer quality assurance (QA) procedures that will be used for acceptance of and payment for all Portland cement concrete (PCC) for the project. Except as explicitly modified by this special provision, all materials, test methods, and PCC mixture requirements of the standard specifications and the contract apply.

Do not place concrete until the Engineer's daily startup testing verifies that the fresh concrete properties have been met, in accordance with subsection d.2 of this special provision.

Provide the Engineer a minimum 24 hours notification prior to each concrete placement.

1. Terminology.

Air Content of Fresh Concrete. The recorded total air content of fresh concrete sampled and tested according to this special provision.

Air Content Test Results. The recorded air content of fresh concrete corresponding to the strength test specimens that were molded for acceptance.

Alkali-Silica Reactivity (ASR). A chemical reaction which occurs over time within concrete between high alkaline cement paste and reactive forms of silica found in some aggregates. In the presence of moisture, an expansive ASR gel is formed which can exert pressure within the concrete, causing random cracking and premature deterioration of the concrete. See subsection c.5.A of this special provision.

Base Price. Price established by the Department to be used in calculating incentives or adjustments to pay items and shown in the contract.

Concrete Mix Design. The process, by which the concrete mixture performance characteristics are defined, based on selected materials, performance requirements, environmental exposure considerations, placement methods, and other factors that control the plastic and hardened properties of the concrete in efforts to produce an economical and durable product.

Job Mix Formula (JMF). The actual batch quantities (mixture proportions) of each constituent included in the concrete mixture, based on adjustments to the target weights attained from the mix design process, necessary to optimize the concrete mixture properties.

Pay Factor (PF). The factor that is determined according to subsections d.3 of this special provision, used to calculate the price adjustment for a discrete quantity of concrete relative

to its respective level of quality. Pay factor will not exceed 1.00. Therefore, there will never be a positive pay adjustment.

Price Adjustment (ADJ). The price adjustment applied to the quantity of concrete represented by the respective quality index analysis described in subsections d.3 of this special provision.

Production Lot. A discrete cubic yard quantity of concrete containing the same JMF and used for the same application, as described in subsection d.2 of this special provision.

Quality Assurance (QA). Activities administered by the Engineer dealing with acceptance of the product, including, but not limited to, materials selection, sampling, testing, construction inspection, and review of Contractor QC documentation. All concrete QA sampling and testing will be administered by the Department. Department administered QA is described in section d of this special provision.

Quality Control (QC). All activities administered by the Contractor to monitor, assess, and adjust production and placement processes to ensure the final product will meet the specified levels of quality, including, but not limited to, training, materials selection, sampling, testing, project oversight and documentation. Contractor administered QC is described in section c of this special provision.

QC Action Limits. A range of values established by the Contractor in the QC plan that, if exceeded, requires that corrective action be taken by the Contractor to restore the continuity and uniformity of the mixture and methods in conformance with specification requirements. The QC action limits must not exceed the QC suspension limits.

QC Plan. The project-specific plan developed by the Contractor describing, in detail, all aspects of production and construction for the project to ensure consistent control of quality to meet specification requirements.

QC Plan Administrator. An employee of, or consultant engaged by the Contractor, responsible for developing and overseeing all aspects of QC for the project. This includes, but is not limited to preparing the QC plan, managing the Contractor QC personnel, communicating routinely with the production personnel to ensure quality, initiating corrective action and suspending operations when the process is found to be producing non-conforming materials, and preparing and submitting all necessary QC documentation to the Engineer within the specified time period.

QC Suspension Limits. A range of values defined in Table 1 that, if exceeded on a single QC test, requires that the Contractor suspend operations and determine, correct, and document the deficiencies before resuming production. The QC suspension limit must not exceed specification requirement thresholds.

Sample. A representative quantity of concrete taken during production which is used to measure the quality characteristics for the concrete.

Sampling Rate. The number of times the fresh concrete is sampled, as described in subsection d.2 of this special provision.

Small Incidental Quantity. A single day's placement of less than 20 cubic yards of concrete used for non-structural or non-pavement related applications, including, but not limited to:

curb and gutter, sidewalks and sidewalk ramps (excluding driveways and driveway ramps), installing sign or fence posts, guard rail or cable rail foundations (excluding end anchorage foundations), or other contract items where the small quantity of concrete is not paid for separately, as approved by the Engineer. Requirements for small incidental quantity consideration are described in subsections c.5.G, d.2.B and d.3 of this special provision. The corresponding weekly QA test results must meet specification limits defined in Table 3.

Specification Limits. The threshold values placed on a quality characteristic used to evaluate the quality of the material.

Strength Sample Test Result. The average of the two companion 28-day compressive strength test specimens taken from the same sample of concrete is considered a strength sample test result.

Strength Test Specimen. A strength test specimen is an individual 6-inch by 12-inch strength test cylinder or 4-inch by 8-inch strength test cylinder molded and cured according to *AASHTO T23/ASTM C 31* and tested according to *AASHTO T22/ASTM C 39*. All respective QC or QA strength test specimens must be the same nominal size. Strength test specimen cylinder size of 4-inch by 8-inch is permitted only if the nominal maximum coarse aggregate particle size, as specified for the coarse aggregate in the concrete mixture, is 1-inch, or less.

Sublot. A portion of a production lot, represented by a complete set of QA tests, as described in subsection d.2.A of this special provision. The Engineer and the Contractor may agree to reduce the typical subplot size based on project staging or other project conditions.

Supplementary Cementitious Materials (SCM). A mineral admixture (slag cement, fly ash) used to replace a portion of the Portland cement, either individually or as a blended cement, in the concrete mixture. SCM requirements are described in subsection c.5 of this special provision.

b. Materials. Mixture requirements must be in accordance with the contract.

c. Contractor Administered Quality Control (QC).

1. Contractor Quality Control Plan (QC plan). Prepare, implement, and maintain a QC plan specific to the project for concrete that will provide quality oversight for production, testing, and control of construction processes. The QC plan must be in conformance with the contract and must identify all procedures used to control production and placement including when to initiate corrective action necessary to maintain the quality and uniformity of the work.

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.

Project-specific items required in the QC plan include (where applicable), but are not limited to the following:

A. Organization chart.

- B. QC Plan Administrator and contact information.
- C. The name(s) and credentials of the QC staff.
- D. Methods for interaction between production and QC personnel to engage timely corrective action, including suspension of work.
- E. Coordination of activities.
- F. Documentation, procedures, and submittals.
- G. Project and plant specifics.
- H. Concrete production facilities inspections and certifications.
- I. Current testing equipment calibration documentation including calibration factor.
- J. Testing and initial field curing facilities for QC and QA strength test specimens (AASHTO T23/ASTM C 31).
- K. Stockpile management plan.
- L. Corrective action plan.
- M. Mixing time and transportation, including time from batching to completion of delivery and batch placement rate (batches per hour), along with the manufacturer's documentation relative to the batching equipment's capabilities in terms of maximum mixing capacity and minimum mixing time (*ASTM C 94*).
- N. Placement and consolidation methods including monitoring of vibration, depth checks, and verification of pavement dowel bar alignment.
- O. Process for monitoring stability of air content of fresh concrete during concrete production and placement.
- P. Hot and cold weather protection considerations and methods.
- Q. Control charts with action and suspension limits.
- R. Verification for non-deleterious alkali-silica reactivity (see subsection c.5.A of this special provision).
- S. Mix design and JMFs.
- T. Proposed production lot size and location for use of each JMF on the project.
- U. The frequency of sampling and testing.
- V. Handling, protection, initial curing, and transporting of strength test specimens (*AASHTO T23/ASTM C31*).

- W. Methods to monitor construction equipment loading and open-to-traffic strengths.
- X. Finishing and curing procedure.
- Y. Ride quality control.
- Z. List of QC records to be submitted to the Engineer in accordance with subsection c.2 of this special provision.

Submit the QC plan, for the appropriate items of work, to the Engineer for review a minimum of 10 working days before the start of related work. The Engineer will notify the Contractor of any objections relative to the content of the QC plan within 5 working days of receipt of the QC plan. Do not begin concrete placement before acceptance of the QC plan by the Engineer. If the approved QC plan fails to provide acceptable work, or acceptable control of the work, the Engineer may require the Contractor to revise the QC plan. Revisions to the QC plan must be approved by the Engineer prior to resuming work.

2. QC Records. Maintain complete records of all QC tests and inspections. Document what action was taken to correct deficiencies. Include sufficient information to allow the test results to be correlated with the items of work represented.

Furnish one copy of all QC records, including test reports for the fresh concrete placement, to the Engineer within 24 hours after the date covered by the record in a format acceptable to the Engineer. The Engineer will withhold acceptance of the concrete for failure to provide properly documented and timely QC records and reports.

If the Engineer is performing QA sampling and testing at the same time the Contractor is performing QC sampling and testing, all associated QC records must include the appropriate production lot identification number that correlates with the Department's QA production lot identification number.

3. Personnel Requirements. The QC Plan Administrator must have full authority and responsibility to take all actions necessary for the successful implementation of the QC plan, including but not limited to, the following:

A. Monitoring and utilizing QC tests, control charts, and other QC practices to ensure that delivered materials and proportioning meets specification requirements.

B. Monitoring materials shipped to the project, prior to their use, to ensure their continued compatibility toward producing consistent quality.

C. Periodically inspecting all equipment utilized in transporting, proportioning, mixing, placing, consolidating, finishing, and curing to ensure proper operation.

D. Monitoring materials stockpile management, concrete batching, mixing, transporting, placement, consolidation, finishing, and curing to ensure conformance with specification requirements.

E. Maintaining and submitting all QC records and reports.

F. Directing the necessary corrective action to ensure continual conformance within

the QC action limits.

G. Suspending production for the project when suspension limits are exceeded.

H. Conducting or monitoring adjustments to the JMF.

Individuals performing QC tests must demonstrate that they are proficient and capable of sampling and testing concrete or aggregate, where applicable, in accordance with the associated test procedures and Department requirements prior to commencement of related work. Any adjustments to the JMF must be made by a certified concrete technician (Michigan Concrete Association (MCA) Michigan Level II).

4. QC Laboratory Requirements. Laboratories, including field laboratories and all associated testing equipment that prepare concrete mixes or perform QC testing, must demonstrate to the Engineer that they are equipped, staffed, calibrated, and managed so as to be capable of batching, and testing PCC in accordance with the applicable test methods and procedures. Mix designs and their accompanying JMFs must include a statement, signed by a certified concrete technician (MCA Michigan Level II), that all applicable standard test methods have been followed in verifying the mix design and JMF.

5. Mix Design and Documentation. Design concrete mixtures meeting the requirements specified in Table 1. Provide the grade of concrete for the section number reference application specified in Table 1, or as specified in the contract. Request variance in writing when proposing a mix design that exhibits temperature, slump or air content other than those specified. Include the proposed mix design, JMF, and associated trial batch verification test data. Do not use a grade of concrete with a lower specification limit (LSL) 28-day compressive strength greater than what is designated for the application.

Blended cement meeting the requirements of *ASTM C 595 Type II* is permitted.

Ensure supplementary cementitious materials are from an MDOT Approved Manufacturer. Slag cement must meet the requirements of subsection 901.06 of the Standard Specifications for Construction. Fly ash must meet the requirements of subsection 901.07 of the Standard Specifications for Construction.

Secure prior approval from the Engineer to use concrete intended for early opening to traffic to facilitate driveway gaps or other features necessary for required local access.

Unless otherwise specified in the contract, set accelerating admixtures are prohibited.

Optimized aggregate gradation is required for high performance concrete and concrete mixtures that are placed using a pump. Concrete mixtures for tremie and drilled shaft applications do not require optimized aggregate gradation. The physical requirements for coarse and intermediate aggregates specified in subsection 902.03.C of the Standard Specifications for Construction apply to high performance concrete pavement mixtures. The physical requirements for aggregates used in concrete mixtures for all other applications will be according to the contract.

Unless otherwise specified in the contract, provide either concrete Grade P1 or Grade D for bridge approach slab applications.

Unless otherwise specified in the contract, do not exceed 40 percent replacement of the Portland cement in the concrete mixture with a supplementary cementitious material. Do not exceed 40 percent total replacement of the Portland cement if more than one supplementary cementitious material is used in the concrete mixture.

Use the combined weight of all cementitious materials to determine compliance with the maximum water-cementitious ratio and cementitious material content requirements specified in Table 1.

For night casting, where applicable, a water-reducing admixture may be used in lieu of a water-reducing and retarding admixture, provided the concrete can be placed and finished in the sequence specified on the plans prior to initial set, is not subjected to residual vibration, or is not within the areas influenced by dead load deflections as a result of adjacent concrete placement operations. When the maximum air temperature is not forecast to exceed 60 degrees F for the day, the Contractor may use a water-reducing admixture or a water-reducing retarding admixture.

Table 1: Minimum Mix Design Requirements for Concrete

Mix Design Parameter	Grade of Concrete						
	P1M (a,b,e)	P1 (a,b)	D,DM (a,b,e)	T	S1 (a)	S2,S2M (a,b,e)	S3/P2 (a)
Lower Specification Limit (LSL) (28-day compressive, psi)	3500	3500	4500	3500	4000	3500	3000
Rejection Limit for an Individual Strength Sample Test Result	3000	3000	4000	3000	3500	3000	2500
Maximum Water/Cementitious Ratio (lb/lb) (c)	0.45						
Cementitious Material Content (lb/yd ³) (d)	470-564	517-611	517-658	517-611	517-611	517-611	489-517
Air Content (percent) (f)	5.5-8.5						
Slump (inch) (max.)	(g)						
Section Number Reference (h)	602, 603	602, 603, 801, 802, 803, 810	706, 711, 712	706, 718	705	401, 706, 712, 713, 718, 801, 802, 803, 810, 819	402, 403, 602, 803, 804, 806, 808, 810, 813, 814
a. If the local average minimum temperature in the next 10 consecutive days is forecast to be below 40 degrees F, submit a revised QC plan for the Engineer's approval, addressing in detail changes in materials, concrete batching and mixing processes, construction methods, curing, and protection of the in situ concrete to ensure that the necessary quality characteristics of the hardened concrete product will not be compromised as a result of the cold weather. The revised QC plan must be approved by the Engineer prior to cold weather concrete placement. Do not remove supplementary cementitious material from the concrete mixture. b. Use aggregates from only geologically natural sources for pavement, shoulder, miscellaneous pavement (including ramps), concrete pavement overlay, bridge approach slab, structural concrete, drilled shaft, bridge railing, and bridge sidewalk applications. c. Use admixtures as listed in the Qualified Products Lists to reduce mixing water. Ensure concrete in concrete diaphragms contains a water-reducing admixture, or a water-reducing retarding admixture. d. Type III cement is not permitted. e. For grades of concrete requiring optimized gradation, aggregates must meet the physical requirements specified in subsection 902.03.C of the Standard Specifications for Construction. f. For action, suspension, and specification limits, see Tables 2 and 3, where applicable. g. The maximum slump for Grades P1, P1M, and P2 concrete is 3 inches or as documented on the approved JMF. All other grades of concrete will be according to Table 701-1 of the Standard Specifications for Construction.							
h. Section Number Reference:							
401 Pipe Culverts			402 Storm Sewers				
403 Drainage Structures			602 Concrete Pavement Construction				
603 Concrete Pavement Restoration			705 Foundation Piling				
706 Structural Concrete Construction			711 Bridge Railings				
712 Bridge Rehabilitation-Concrete			713 Bridge Rehabilitation-Steel				
718 Drilled Shafts			801 Concrete Driveways				
802 Concrete Curb, Gutter and Dividers			803 Concrete Sidewalk, Sidewalk Ramps, and Steps				
804 Concrete Barriers and Glare Screens			806 Shared Use Paths				
808 Fencing			810 Permanent Traffic Signs and Supports				
813 Slope Protection			814 Paved Ditches				
819 Electrical and Lighting							

A. Alkali-Silica Reactivity. Provide documentation to the Engineer that the concrete mixture does not present the potential for deleterious expansion caused by alkali-silica reactivity (ASR). Provide current ASR test results (valid for 2 years from completion of testing), for the fine aggregate that is proposed to be used in the concrete, from an independent testing laboratory proficient in ASR testing. The independent testing laboratory must certify in writing, including a signed statement that all testing was conducted in accordance with the designated standard test procedures, described herein. Test results must conform to the specified criterion for one of the following standard test methods. ASR testing is not required for concrete pavement repairs and temporary concrete pavements. Use the Rounding Method described in *ASTM E 29* when determining significant digits for reporting expansion test results.

(1) Method 1. *ASTM C 1293*. Concrete Prism Test. If the expansion of concrete prisms is not greater than 0.040 percent (rounded to the nearest 0.001 percent) after 1 year, the fine aggregate is considered non-deleterious to ASR and may be used in the JMF.

(2) Method 2. *ASTM C 1567*. Mortar Bar Test. If no previous test data are available for the fine aggregate that shows it is resistant to ASR using Method 1, above, replace 25 to 40 percent of the Portland cement in the concrete mixture with a supplementary cementitious material. A blended cement meeting the requirements of *ASTM C 595* containing the above Portland cement and supplementary cementitious material proportions may also be used.

Demonstrate the ability of the supplementary cementitious material to control the deleterious expansion caused by ASR by molding and testing mortar bars according to the standard test method described in *ASTM C 1567* using the mix proportions and constituent sources for both the aggregates and the cementitious materials that will be used for the project. Make at least three test specimens for each cementitious materials-aggregate combination. If the average of three mortar bars for a given cementitious materials-aggregate combination produces an expansion less than 0.10 percent (rounded to the nearest 0.01 percent) at 14 days of immersion, the JMF associated with that combination will be considered non-deleterious to ASR. If the average expansion is 0.10 percent (rounded to the nearest 0.01 percent) or greater, the JMF associated with that combination will be considered not sufficient to control the deleterious expansion caused by ASR and the JMF will be rejected.

(3) Method 3. *ASTM C 1260*. Mortar Bar Test. If the expansion of the mortar bars is less than 0.10 percent (rounded to the nearest 0.01 percent) at 14 days of immersion, the fine aggregate is considered non-deleterious to ASR and may be used in the concrete without the need for ASR mitigation.

The Engineer will not approve the use of the JMF if the expansion exceeds the respective threshold limits for the respective ASTM test method used.

B. Contractor Provided Mixes. Provide mix design and accompanying JMFs using the methods of verification included in this special provision. Include sufficient information on constituent materials and admixtures along with trial batch verified physical properties of the fresh concrete, mix proportions per cubic yard for all constituents and compressive strength test results necessary to allow the Engineer to

fully evaluate the expected performance of the concrete mixture.

(1) Mix Documentation. Prepare mix designs for each grade of concrete required on the project. Submit JMF for each mix design, including all required documentation, to the Engineer for review 10 working days before the anticipated date of placement. The Engineer will notify the Contractor of any objections within 5 working days of receipt of the mix documentation. Number or otherwise identify each JMF and reference all accompanying documentation to this identification. Reference each JMF to the appropriate method of verification. Mix design and JMF submittals that do not include all required documentation will be considered incomplete and the Engineer will return them without review.

Mix documentation for the project is required to be verified annually. The Engineer may allow annual mix documentation renewal if it is shown that the material characteristics have not deviated beyond the requirements specified in the contract.

All mix designs and accompanying JMFs must be traceable to a laboratory meeting the requirements of this special provision.

Submit mix design and JMF on the MDOT Job Mix Formula (JMF) Concrete Field Communication form (MDOT Form Number 1976); include accompanying documentation. List the source of materials, bulk density (unit weight) of coarse aggregate (rodding procedure or shoveling procedure), absorption of aggregates, relative density (specific gravity) of aggregates, aggregate correction factors, batch weights, and project specific or historical laboratory test data. Include the recorded air content of fresh concrete using the same admixture and cementitious material sources to be used in the production of the concrete for the project. A JMF will be approved only if all of the minimum mix design requirements specified in the contract have been met.

(2) Job Mix Formula (JMF). Select proportions for concrete mixtures according to *ACI Standard 211.1*. The volume (oven-dry-rodded) of coarse aggregate per unit volume of concrete must be 65 percent, minimum.

Four methods of verification of proposed JMF are acceptable.

(a) Method 1. Trial Batches. Verification of JMF is based on trial batches with the same materials and proportions proposed for use on the project. Prepare at least one trial batch for each mix design in sufficient time before starting concrete placement to allow for review according to subsection c.5.B.(1) of this special provision. Provide the results of temperature, slump, density (unit weight), air content of fresh concrete, 28-day compressive strength, and age of concrete at the time of strength testing, for a minimum of three independent samples. All samples may be taken from a single trial batch for a mix design provided the trial batch is at least four cubic yards in volume. For JMF trial batch verification purposes only, 7-day compressive strength test results which report at least 70 percent of the specified 28-day lower specification limit (LSL) will be sufficient documentation in lieu of 28-day compressive strengths. The average of at least two strength test specimens represents one compressive strength sample test result for each independent sample. Provide the necessary ASR documentation as described in subsection c.5.A of this special provision.

(b) Method 2. Same Mix. Verification of JMF is based on the concrete producer's experience with the same mix design, JMF, and the same materials. Provide the results of temperature, slump, density (unit weight), air content of fresh concrete, 28-day compressive strength, and age of concrete at the time of strength testing, for a minimum of three independent samples. The average of at least two strength test specimens represents one compressive strength sample test result for each independent sample. Do not substitute material types or sources, including admixtures or cementitious materials, nor change mix proportions in the JMF. Provide the necessary ASR documentation as described in subsection c.5.A of this special provision.

(c) Method 3. Similar Mix. Verification of JMF is based on requirements described in Method 2, in subsection c.5.B.(2).(b) of this special provision. Substitution of coarse aggregate source is permitted if the new source is of the same geologic type as the original aggregate, and conforms to the specification requirements for the application. Substitution of fine aggregate is permitted only if the new source has been tested for ASR. Provide the necessary ASR documentation as described in subsection c.5.A of this special provision.

Provide the supporting laboratory trial batch documentation and accompanying calculations showing how the mix proportions in the JMF were adjusted, based on the documented differences in relative density (specific gravity), bulk density (unit weight) and absorption of the substituted aggregate sources, to produce a theoretical yield of 100 percent and the required fresh concrete properties.

(d) Method 4. Annual Verification. At the Engineer's option, verification may be accepted annually for a concrete producer rather than on a project basis provided the sources and proportions of the constituent materials, including cementitious materials and source and types admixtures, do not change. If the project is the continuation of work in progress during the previous construction season and written certification is submitted to the Engineer that materials from the same source and with the same mixture properties are to be used, the Engineer may waive the requirement for annual renewal verification of the JMF for the project. Provide the necessary ASR documentation as described in subsection c.5.A of this special provision.

C. Department Provided Mixes. Unless otherwise specified in the contract or approved by the Engineer, the Engineer will provide the concrete JMF for the following types of concrete regardless of the total quantity for the project.

- (1) Structural concrete patching mixtures, mortar and grout.
- (2) Bridge deck overlay concrete mixtures.
- (3) Project-specific concrete mixtures and grades not defined in Table 1.

Provide all other mix designs and accompanying JMF's according to subsection c.5.B of this special provision.

The ASR documentation for the fine aggregate described in subsection c.5.A of this

special provision must accompany the Contractor's request for the concrete JMF.

D. Changes in Materials and Proportions. Any changing from one approved JMF to another for the same grade of concrete must have prior approval by the Engineer.

Prior to batching, verify that the proposed JMF changes will not affect the properties of the fresh concrete (slump, temperature, air content, density (unit weight), workability), nor result in deleterious mortar bar expansion as a result of ASR, as described in subsection c.5.A of this special provision.

Record all changes to JMF in the QC records along with the rationale for the change.

E. QC Sampling and Testing. Conduct startup sampling and testing for temperature, slump, density (unit weight), and air content on the first load. Do not place concrete until testing verifies that the fresh concrete properties have not exceeded the QC action and suspension limit thresholds specified in Table 2 and the testing correlation requirements of subsection d.1.B of this special provision have been met. Continue testing subsequent loads as described in the QC plan, for each grade of concrete delivered to the work site each day. The QC sampling and testing must be random and independent from the Agencies QA sampling and testing.

Provide the curing facilities in accordance with subsection d.2.C of this special provision prior to start of concrete production.

Perform QC sampling and testing for air content of fresh concrete that is either slipformed or pumped, as described in the QC plan. Sample and test a representative haul unit of concrete immediately after its discharge but before the slipform paver or pump hopper, where applicable. Sample and test the concrete representing the same haul unit, again, after the slipform paver or after discharge from the pump (without interruption or alteration of the pumping operation), where applicable. If the difference in measured air content between the two test locations for the same concrete is greater than 1.5 percent air by volume of concrete, suspend operations and administer corrective action. Resume concrete placement only after taking the necessary corrective action to reduce the loss in air content of fresh concrete between the two test locations, as approved by the Engineer. Document the corrective action to be taken in the QC records and make the necessary changes to the QC plan, where applicable.

Concrete exceeding the maximum specification limits for slump or temperature must be rejected regardless of the total mixing time at the time of arrival to the project.

The Engineer may require the Contractor to administer additional QC sampling and testing if the Engineer determines the Contractor's current QC sampling and testing methodology is shown to be insufficient to ensure continual control of the quality of the concrete.

Take the appropriate corrective action, as described in the QC plan, when QC testing shows the QC action limits for any quality characteristic are exceeded. Suspend production if any of the QC suspension limits are exceeded or if the corrective action is not sufficient to restore the quality to acceptable levels.

Resume production only after making all necessary adjustments to bring the mixture into

conformance with all applicable specifications and receiving approval to resume work from the Engineer. Document these adjustments in the QC records.

Table 2: QC Action and Suspension Limits

Quality Characteristic	Action Limits	Suspension Limits
Air Content (percent)	See Note Below	< 5.0 or > 9.0
Air Content Loss (percent)	As Defined in the Contractor QC plan	Greater than 1.5
Conc. Temp. (Deg. F)		< 45 or > 90 at time of placement
Slump (max.) (inch)		See Table 1, footnote (g)
Density (unit weight)		N/A
Note: Action limits must be defined in the Contractor QC plan and cannot be < 5.5 or > 8.5. Suspend work if air content is < 5.0 or > 9.0 percent after pump or paver, regardless of the air content loss.		

F. Work Progress Test Specimens. Determine the strength of concrete for opening to construction traffic or regular traffic, for removing shoring and forms, or for similar purposes in accordance with subsections 104.11, 601.03.H and 701.03.D of the Standard Specifications for Construction, and as approved by the Engineer. Cure work progress test specimens in the same manner as the in-situ concrete. Allow the Engineer to witness testing of work progress test specimens.

The maturity method may be used to determine the in-place, opening-to-traffic flexural strength, provided the necessary preliminary flexural strength versus time-temperature factor correlation, using the same materials and JMF, is established according to Department procedures and approved by the Engineer before placing the concrete.

G. Reduced QC for Small Incidental Quantities. If approved by the Engineer, reduced levels of on-site QC testing for concrete may be considered for small incidental quantities defined in subsection a.1 of this special provision.

Unless approved by the Engineer, multiple small incidental quantities, including ones that are consecutively placed throughout the project on the same day, are not eligible for reduced QC consideration if the total plan quantity of concrete for the item exceeds 100 cubic yards in volume. Include details for reduced QC testing and oversight in the approved QC plan, and in accordance with following:

(1) The small incidental quantity of concrete will be limited to a single day's concrete placement of a maximum 20 cubic yards in volume.

(2) The small incidental quantity of concrete is not an integral part of a structural load bearing element.

(3) The Engineer received written certification from the Contractor that the concrete supplier has a current QC plan in place and available for review upon request by the Engineer.

(4) The concrete supplier employs a certified concrete technician (MCA Michigan Level II) available at the plant or on call during concrete placement to validate and authorize modifications to the concrete JMF, as necessary.

(5) Prior to the first concreting operation, concrete representing the JMF for the small incidental quantity has been sampled and tested by a certified concrete

technician (MCA Michigan Level I or II) to verify that, historically, the JMF produced a concrete mixture meeting the minimum requirements for density (unit weight), slump, air content, and strength. Annual verification may be acceptable provided there are no changes to the material types or sources, including the cementitious materials and admixtures.

(6) The Engineer verified that the temperature, slump, and air content conform to specification requirements at the start of the day's concreting operation associated with the small incidental quantity.

(7) The Engineer is notified and provided sufficient opportunity to witness concrete placement.

d. Department Administered Quality Assurance (Acceptance).

1. Department Quality Assurance Plan (QA plan). The Engineer will be responsible for administering the quality-based acceptance and will institute any actions necessary toward its successful implementation.

Acceptance of concrete pavement repair mixtures and concrete mixtures not included in Table 1 will be in accordance with the contract.

The Engineer will develop and follow a QA plan. The Engineer will provide the QA plan to the QC Plan Administrator a minimum of 5 working days prior to the pre-production meeting. The QA plan will be reviewed at the pre-production meeting and any proposed changes will be documented.

The nominal QA strength test specimen size, defined in subsection a.1 of this special provision will be noted in the QA plan.

A. Personnel Requirements. The personnel responsible for field inspection and for obtaining QA samples will possess the required qualifications to collect QA samples. Sampling will be performed by a certified concrete technician (MCA Michigan Level I or II) or (MCAT) certified aggregate technician, where applicable.

B. Testing Correlation. Prior to initial concrete placement, the testing personnel for both the Engineer's QA and Contractor's QC will use the equipment they have assigned to the project to 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. The temperature measuring devices used for QC and QA must correlate with each other within 2 degrees F. If the air content results of the side by side tests conducted by the QC and QA testers and equipment differ by more than 0.8 percent air by volume of concrete, a referee air content test of fresh concrete must be conducted by a third party, designated by the Engineer but independent of the project, prior to commencement or continuation of concrete placement in efforts to resolve issues associated with non-correlation.

C. Laboratory Facilities. The testing laboratory with responsibility for acceptance testing on this project is the Department testing laboratory, or a qualified facility under the

authority of the Engineer.

2. QA Sampling and Testing. The Engineer will verify the Contractor's daily startup sampling and testing of temperature, slump, and air content of fresh concrete on the first load; conduct QA sampling and testing; monitor Contractor adherence to the QC plan; and inspect field placed materials in such a manner as to ensure that all concrete for the project is represented. The testing correlation requirements of subsection d.1.B of this special provision must be met prior to concrete placement.

The following *ASTM* test methods will apply. The Department's established procedures for sampling and testing are acceptable alternatives.

C 31 Practice for Making and Curing Concrete Test Specimens in the Field

C 39 Test Method for Compressive Strength of Cylindrical Concrete Specimens

C 78 Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)

C 138 Test Method for Density (Unit Weight), Yield and Air Content (Gravimetric) of Concrete

C 143 Test Method for Slump of Hydraulic-Cement Concrete

C 172 Practice for Sampling Freshly Mixed Concrete

C 173 Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

C 231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

C 293 Test Method for Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)

A. Lot Size and Make Up. A production 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. Lot size and makeup will be determined by the Engineer, based on site conditions. A production lot may consist of a single day's production, individual concrete structural elements (eg. footing, column, pier cap, deck, bridge approach slab), or any combination thereof, provided they are of the same JMF. Each production lot will be divided into sublots of approximately equal size, as determined by the Engineer. The minimum number of sublots will be one per production lot, with the maximum number of sublots based on the anticipated total quantity of concrete to be placed and site conditions. A minimum of one subplot will be required for each day of production.

B. Sampling. QA sampling and testing will be conducted by the Engineer during concrete placement. Where practical, the random number method (as described in the "Random Sampling for Quality Control/Quality Assurance Projects" section of the Materials Quality Assurance Procedures Manual) will be used to determine the sampling locations. The sampling rate will be determined by the Engineer, based on the anticipated total quantity of concrete to be placed and site conditions, with a minimum of one sampling for each day of production.

At the option of the Engineer, small incidental quantities as defined in subsection a.1 of this special provision may be accepted (visually inspected and noted on the Inspector's Daily Report) without daily 28-day compressive strength QA test specimens provided there is a current acceptable strength test history of the JMF for the project prior to placement of the small incidental quantity. One set of compressive strength QA test specimens will then be molded for each small incidental quantity JMF at least once per week during production, thereafter, as determined by the Engineer (note the test results or identification number for the corresponding weekly QA compressive strength test result on the Inspector's Daily Report for each small incidental quantity). Quality control testing and daily QA testing for temperature, slump, and air content of fresh concrete are still required. Reduced QC for small incidental quantities, as described in subsection c.5.G of this special provision, may be considered.

The QA sampling rate and sample location will be based on cubic yard quantities.

Samples for acceptance will be taken at the point of discharge from the haul unit, at approximately the middle one-third of the load. Mix adjustments to the concrete contained within the haul unit selected for QA sampling and testing (beyond normal QC) will not be permitted prior to QA sampling and testing. QA sampling will be random and without prior notification.

The Engineer will perform QA sampling and testing for air content loss of fresh concrete that is either slipformed or pumped, (1) at least once during each day of production, (2) whenever the concrete pump is relocated, where applicable, or (3) whenever there is a significant change in the boom configuration or operation of the concrete pump, or there is a significant change in the characteristics of the paving operation during concrete placement. Concrete will be sampled from a representative haul unit immediately after its discharge but before the slipform paver or pump hopper, where applicable. The concrete representing the same haul unit will then be sampled and tested after the slipform paver or after discharge from the pump (without interruption or alteration of the pumping operation), where applicable. If the difference in measured air content between the two test locations for the same concrete is greater than 1.5 percent air by volume of concrete, the Engineer will issue a Notice of Non-Compliance with Contract Requirements (Form 1165), as described in subsection d.2.D of this special provision. The Contractor may resume concrete placement only after the necessary corrective action is taken to reduce the loss in air content of fresh concrete between the two test locations, as approved by the Engineer. Document the corrective action that was taken by the Contractor.

C. Testing. The location(s) within the project limits for QA testing of the fresh concrete and placement of curing facilities for initial curing of the 28-day compressive strength QA test cylinders will be determined by the Engineer in conformance with the following criteria:

(1) The elapsed time between obtaining the first and the final portion of the composite sample must not exceed 15 minutes.

(2) Testing for slump, temperature, and air content of fresh concrete must begin within 5 minutes after obtaining the final portion of the composite sample.

(3) Molding of the 28-day compressive strength QA test cylinders must begin within 15 minutes after obtaining the final portion of the composite sample.

(4) The concrete sample must be protected from the sun, wind, and other sources of rapid evaporation, and from contamination.

Two QA concrete strength test specimens per sample will be molded for 28-day compressive strength QA testing.

The Contractor will provide curing facilities equipped to ensure the proper environment for the Agencies QA concrete strength test specimens during initial cure. Each initial cure facility must provide ventilation or insulation, where applicable, to ensure the ambient temperature surrounding the specimens is maintained according to *AASHTO T23/ASTM C 31*. Failure by the Contractor to maintain the proper curing environment during initial cure will not be basis for rejection of samples or claims against the Department. Each initial curing facility must be capable of being locked, using an Department provided padlock. The Contractor will ensure that all initial curing facilities are accounted for at all time, and protected against theft and damage. The Contractor will place and secure each initial cure facility throughout the project limits in such a manner so as to minimize excessive transport of the test specimens prior to initial cure, as follows:

(5) Immediately after finishing molded specimens, the Engineer will move the QA concrete strength test specimens to the closest initial cure facility provided by the Contractor.

(6) Immediately after all QA concrete strength test specimens are placed into the cure facility and the proper initial curing conditions have been established, the Engineer will secure the facility using the Department provided padlock. Access to the QA concrete strength test specimens, thereafter, must be coordinated with the Engineer and will only be permitted in the presence of the Engineer.

(7) The Engineer will transport the QA concrete strength test specimens within 48 hours after molding, but not prior to 8 hours after final set of the concrete, from the initial curing facility to the Department's designated testing laboratory for final curing and strength testing. The specimens will be protected with a suitable cushioning material to prevent damage from jarring during transport. The total transportation time must not exceed 4 hours prior to commencement of final curing.

D. QA Stop Production Criteria. The Engineer will issue a Notice of Non-Compliance with Contract Requirements (Form 1165) and concrete production must stop when one or more of the following are observed.

(1) The QA testing shows that one or more of the suspension limits for quality characteristics defined in Table 2 are in non-compliance.

(2) The QC plan is not being followed.

(3) Segregation, excessive slumping of unsupported slipformed edges, or other notable changes in the fresh concrete properties is observed that may prevent proper placement, consolidation and finishing, or compromise the performance or long-term durability of the finished product.

(4) The required curing system is not being applied in a timely manner, as

specified by the contract.

(5) If the measured air content loss between the two testing locations for the same concrete is greater than 1.5 percent air by volume of concrete as described in subsections c.5.E and d.2.B of this special provision.

(6) If the air content of fresh concrete is less than 5.0 or greater than 9.0 percent after pump or paver, regardless of the recorded QC or QA air content loss through the pump or paver.

The Engineer will issue a Notice to Resume Work (Form 1165) only after all necessary adjustments are made to restore conformance with all applicable specifications, and the appropriate documentation is made in the QC records.

E. QA Records. The Engineer will maintain a complete record of all QA tests and inspections. The records will contain, as a minimum, signed originals of all QA test results and raw data, random numbers used (where applicable) and resulting calculations. The QA test results will not be provided to the Contractor until the corresponding QC test results are received by the Engineer.

3. Quality Index Analysis. The Engineer's QA test results will be used to determine the pay factor (PF) and price adjustment (ADJ). The Contractor's QC test results will not be used for pay factor and price adjustment analysis. The Engineer will complete pay factor and price adjustment analysis within 7 working days after completion of all 28-day compressive strength testing for the representative production lot or quantity of concrete. The quality index parameter specification limits are defined in Table 3. Unless otherwise specified in the contract, concrete not conforming to the requirements specified in Table 3 is rejectable and subject to further evaluation. All values of PF and OLPF in these formulae are decimal, not percent. All values of PF and OLPF are rounded to two decimal places.

Price adjustment for 28-day compressive strength deficiencies will be based on test results for the corresponding weekly QA test specimens and the pay factor (PFs) calculated according to the formula defined in subsection d.3.A. The price adjustment (ADJ) = (PFs – 1)(Price).

Table 3: Quality Index Parameter Specification Limits

Quality Characteristic	Specification Limits
Air Content of Fresh Concrete (percent)	5.5 – 8.5
Rejection Limit (percent)	<5.0 or >9.0
Conc. Temp. (deg. F)	45 - 90 at time of placement
Slump (max.) (inch)	See Table 1, footnote (g)
28-day Compressive Strength (psi)	For LSL see Table 1
Rejection Limit - 28-day Compressive Strength	See Table 1

A. Pay Factor for 28-Day Compressive Strength (PFs).

$$PFs = \frac{\text{Tested Strength}}{LSL}$$

Where:

PFs = Pay Factor for 28-day compressive strength (not to exceed 1.00)

Tested Strength = QA 28-day compressive strength sample test result

LSL = Lower specification limit (see Table 1)

If the tested strength does not meet the rejection limit specified in Table 1, the Engineer will require additional evaluation as described in subsection d.4 of this special provision.

B. Pay Factor for Air Content of Fresh Concrete (PFac). The pay factor for air content of fresh concrete (PFac) will be according to Table 4.

Table 4: Air Content of Fresh Concrete Pay Factor (PFac)

Air Content of Fresh Concrete (percent)	Pay Factor (PFac)
5.5 – 8.5	1.00
5.0 – 5.4	0.50
Below 5.0	Rejection
8.6 – 9.0	0.75
Above 9.0	Rejection

If the air content of fresh concrete is below 5.0 or above 9.0 percent, the Engineer will elect to do one of the following.

(1) Require removal and replacement of the entire quantity of concrete represented by the test with new testing conducted on the replacement concrete and repeat the evaluation procedure.

(2) Allow submittal of a corrective action plan for the Engineer's approval. If the Engineer does not approve the plan for corrective action, subsection d.3.B.(1) of this special provision will be applied. All costs associated with plan submittal and corrective action under this subsection will be borne by the Contractor.

C. Overall Lot Pay Factor (OLPF). The following formulae are used to calculate the OLPF and ADJ. The OLPF will not exceed 1.00.

$$\text{OLPF} = (0.60 \times \text{PFs}) + (0.40 \times \text{PFac})$$

$$\text{ADJ} = (\text{OLPF} - 1)(\text{Price})$$

ADJ = Price adjustment per pay unit to be applied to the quantity represented by the QA test

Price = Base price established for the pay item

4. Evaluation of Rejectable Concrete. The Engineer will require additional evaluation to decide what further action may be warranted, as described below. Acceptance for air content of fresh concrete will be based on QA test results reported at the time of concrete placement.

If the Engineer determines that non-destructive testing (NDT) is appropriate, this work will be done by the Contractor in the presence of the Engineer within 45 calendar days from concrete placement. All costs associated with this work will be borne by the Contractor. A complete set of non-destructive tests must be conducted (in accordance with the respective standard test method) at a minimum three randomly selected locations. If NDT is used to estimate the in-situ strength, a calibrated relationship between the project JMF under evaluation and the NDT apparatus must have been established prior to NDT testing according to its respective standard test method.

If the 28-day compressive strength QA test results show that the rejection limit (as specified in Table 1) has not been achieved, the quantity of concrete under evaluation will be rejected and the Engineer will require additional evaluation to decide what further action may be warranted.

Propose an evaluation plan and submit it to the Engineer for approval before proceeding. The results from NDT will be used only to decide what further action is required. This determination will be made by the Engineer, as follows:

A. For non-structural concrete. If no test result from non-destructive testing falls below the lower specification (LSL) 28-day compressive strength, the represented quantity of concrete under evaluation will remain in place and a pay factor for 28-day compressive strength (PFs) of 1.00 will be applied for overall lot pay factor (OLPF) and price adjustment (ADJ) determinations according to subsection d.3 of this special provision.

B. For structural concrete (including overhead sign foundations). If no test result from non-destructive testing falls below the lower specification limit 28-day compressive strength, the represented quantity of concrete under evaluation will remain in place and a pay factor for 28-day compressive strength (PFs) of 0.85 will be applied for overall lot pay factor (OLPF) and price adjustment (ADJ) determinations according to subsection d.3 of this special provision.

C. If one or more of the non-destructive test results fall below the lower specification limit (LSL) 28-day compressive strength, the Engineer may elect to do one of the following:

(1) Require removal and replacement of the entire rejected quantity of concrete, including new initial tests for pay factor (PF) determination and price adjustment conducted according to subsection d.3 of this special provision.

(2) Allow the Contractor to submit a plan for corrective action, for the Engineer's approval, to address the disposition of the rejected concrete. If the Engineer does not approve the plan for corrective action, subsection d.4.C.(1) of this special provision will be applied. All costs associated with plan submittal and corrective action under this subsection will be borne by the Contractor.

(3) Allow the in-situ quantity of concrete under evaluation to remain in place and a pay factor (PFs) of 0.50 will be applied for overall lot pay factor (OLPF) and price adjustment (ADJ) determinations according to subsection d.3 of this special provision.

e. Measurement and Payment. If a price adjustment is made for reasons included in this special provision, that adjustment will be made using the base price established for the specific item. If a contract unit price requires adjustment for other reasons not described in this special

provision, the adjustments will be made using the unit price and the adjustments will be cumulative.

Separate payment will not be made for providing, implementing, and maintaining an effective QC program. All costs associated with this work will be included in the applicable unit prices for the concrete items. Failure by the Contractor to maintain the proper curing environment during initial cure will not be basis for claim against the Department.

All costs associated with providing, locating, relocating, maintaining, and securing the adequate number of portable initial curing facilities for both the QC and QA strength test specimens will be included in the applicable unit prices for the concrete items. No additional payment will be permitted. The Contractor is responsible for damage, theft, subsequent replacement, and removal after completion of the work for each curing facility used on the project.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
CURB RAMP OPENING, CONCRETE

DES:CAL

1 of 1

APPR:MB:DBP:04-10-17
APPR FHWA:04-17-17

Add the following new subsection 803.03.I, on page 543 of the Standard Specifications for Construction:

I. **Curb Ramp Opening.** Construct curb ramp openings in accordance with subsection 802.03 of the Standard Specifications for Construction, Standard Plan R-28 Series and as required to conform with the associated sidewalk ramp geometry (counter slope, running slope, cross slope, flares, widths, etc.).

Add the following pay item to the pay item listing in subsection 803.04, on page 544 of the Standard Specifications for Construction:

Curb Ramp Opening, ConcFoot

Delete the second paragraph of subsection 803.04.C, on page 544 of the Standard Specifications for Construction in its entirety and replace with the following:

The unit price for **Sidewalk Ramp, Conc, __ inch** includes the cost of landings, monolithic rolled curbs or side flares along the longitudinal edges of the ramp or landing, and transitions to existing sidewalk.

Add the following new subsection 803.04.G, on page 545 of the Standard Specifications for Construction:

G. **Curb Ramp Opening, Conc.** The Engineer will measure **Curb Ramp Opening, Conc.** in place along the joint of the curbing with the pavement including transitions to and from adjacent standard full height curb and gutter cross section.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
PERMANENT PAVEMENT MARKINGS

PMK:MKB

1 of 2

APPR:MWB:CRB:11-02-15

FHWA:APPR:11-02-15

Add the following to the end of the list of materials in subsection 811.02, on page 588 of the Standard Specifications for Construction:

Modified Urethane Pavement Marking Material920
Preformed Thermoplastic Pavement Marking Material920

Ensure preformed thermoplastic materials have a thickness of 125 mils.

Add the following row to Table 811-1 of subsection 811.03.B, on page 591 of the Standard Specifications for Construction:

Polyurea	20	Binder (gal)	5.5	8.25	11	17	22	33	44	66
		Bead (lb)	As directed by the manufacturer							
Modified Urethane	20	Binder (gal)	5.5	8.25	11	17	22	33	44	66
		Bead (lb)	As directed by the manufacturer							

Add the following subsections after the last paragraph of subsection 811.03.D.7.c, on page 595 of the Standard Specifications for Construction:

8. **Modified Urethane.** Ensure the pavement is free of excess surface and subsurface moisture that may affect bonding. The Engineer will not decide the suitability of specific days for the application of modified urethane.

Surface preparation requirements for special, and longitudinal modified urethane pavement markings depend on surface conditions.

Prepare new HMA surfaces and HMA surfaces open to traffic for 10 days or less with no oil drips, residue, debris, or temporary or permanent markings, by cleaning the marking area with compressed air.

Prepare new PCC surfaces and PCC surfaces free of oil drips, residue, and debris, temporary, or permanent markings, by removing the curing compound from the area required for pavement markings.

Prepare existing HMA or PCC surfaces that do not have existing markings, but may have oil drip areas, debris, or both, by scarifying the marking area using non-milling grinding

teeth or shot blasting. The Engineer will allow the use of water blasting to scarify the marking area on PCC surfaces.

Prepare existing HMA or PCC surfaces with existing pavement markings and that may have oil drip areas, debris, or both, by using the following methods:

- a. For existing liquid pavement markings, scarify the proposed marking area using non-milling grinding teeth or shot blast. Occasionally existing liquid pavement markings will require complete removal, which will be determined by the Engineer.
- b. For existing cold plastic markings, completely remove the existing markings.

9. **Preformed Thermoplastic.** Ensure the pavement is free of excess surface and subsurface moisture that may affect bonding. The Engineer will not decide the suitability of specific days for the application of preformed thermoplastic.

Heat and apply the preformed thermoplastic material as recommended by the manufacturer. Feather all edges of the material with a putty knife while the preformed thermoplastic is still soft.

Add the following rows to Table 811-2 of subsection 811.03.D, on page 596 of the Standard Specifications for Construction:

Modified Urethane	40	40	Apr. 15	Nov. 15
Preformed Thermoplastic	35	35	Apr. 15	Nov. 15

Add the following pay items to the list of pay items in subsection 811.04, on page 598 of the Standard Specifications for Construction:

Pavt Mrkg, Modified Urethane, (symbol).....Each
 Pavt Mrkg, Modified Urethane, (legend)Each
 Pavt Mrkg, Modified Urethane, ___ inch, CrosswalkFoot
 Pavt Mrkg, Modified Urethane, ___ inch, Stop BarFoot
 Pavt Mrkg, Modified Urethane, ___ inch, Cross Hatching (color).....Foot
 Pavt Mrkg, Modified Urethane, ___ inch, (color).....Foot
 Pavt Mrkg, Ovly Cold Plastic, ___ inch, Shadow Tape, Black.....Foot
 Pavt Mrkg, Ovly Cold Plastic, ___ inch, Wet Reflective, (color)Foot
 Pavt Mrkg, Preformed Thermoplastic, (symbol)Each

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TYPE III BARRICADES

DES:DBP

1 of 1

APPR:MWB:CRB:08-07-15

FHWA:APPR:08-23-15

Delete the first sentence for the second paragraph in subsection 812.03.D.8 on page 606 of the Standard Specifications for Construction, and replace with the following:

Light Type III barricades with two, Type C or Type D warning lights, fastened to the uprights above the top rail, provided these warning lights each weigh 3.3 pounds or less.

Delete the following pay items from the list in subsection 812.04 on page 622 of the Standard Specifications for Construction.

Barricade, Type III, High Intensity, Furn.....	Each
Barricade, Type III, High Intensity, Oper	Each
Barricade, Type III, High Intensity, Double Sided, Furn	Each
Barricade, Type III, High Intensity, Double Sided, Oper	Each

Renumber the existing subsection 812.04.A.5 on page 624 of the Standard Specifications for Construction, as follows:

4. The manufacturer's invoiced cost for damaged equipment included in a lump sum pay item for maintaining traffic.

Standard Sieve	Percent Passing Criteria (control points)					
	Mixture Number					
	5	4	3 Leveling Course	3 Base Course	2	LVSP (a)
1½ inch	—	—	—	—	100	—
1 inch	—	—	100	100	90–100	—
¾ inch	—	100	90–100	90–100	≤90	100
½ inch	100	90–100	≤90	≤90	—	75–95
⅜ inch	90–100	≤90	—	—	—	60–90
No. 4	≤90	—	—	—	—	45–80
No. 8	47-67	39-58	35–49	23–49	19–45	30–65
No. 16	—	—	—	—	—	20–50
No. 30	—	—	—	—	—	15–40
No. 50	—	—	—	—	—	10–25
No. 100	—	—	—	—	—	5–15
No. 200	2.0–10.0	2.0–10.0	2.0–8.0	2.0–8.0	1.0–7.0	3–6

a. For LVSP, less than 50 percent of the material passing the No. 4 sieve may pass the No. 30 sieve.

**Table 902-6
Superpave Final Aggregate Blend Physical Requirements**

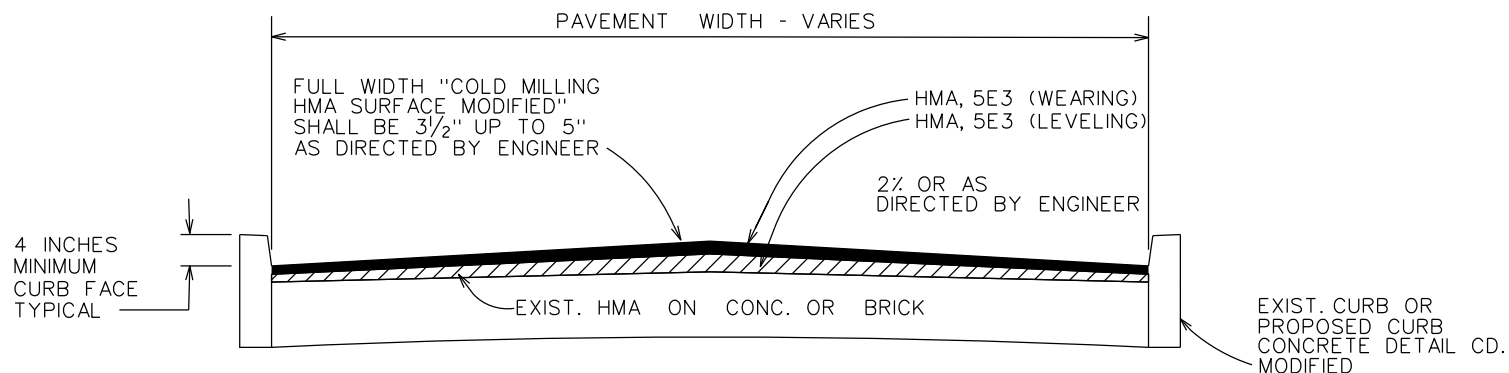
Est. Traffic (million ESAL)	Mix Type	Percent Crushed Minimum Criteria		Fine Aggregate Angularity Minimum Criteria		% Sand Equivalent Minimum Criteria		Los Angeles Abrasion % Loss Maximum Criteria		% Soft Particles Maximum Criteria (a)		% Flat and Elongated Particles Maximum Criteria (b)	
		Top & Leveling Courses	Base Course	Top & Leveling Courses	Base Course	Top & Leveling Courses	Base Course	Top & Leveling Courses	Base Course	Top & Leveling Courses	Base Course	Top & Leveling Courses	Base Course
< 0.3	LVSP	55/—	—	—	—	40	40	45	45	10	10	—	—
< 0.3	E03	55/—	—	—	—	40	40	45	45	10	10	—	—
≥0.3 - <1.0	E1	65/—	—	40	—	40	40	40	45	10	10	—	—
≥1.0 - < 3	E3	75/—	50/—	43	40	40	40	35	40	5	5	10	10
≥3 - <10	E10	85/80	60/—	45	40	45	45	35	40	5	5	10	10
≥10 - <30	E30	95/90	80/75	45	40	45	45	35	35	3	4.5	10	10
≥30 - <100	E50	100/100	95/90	45	45	50	50	35	35	3	4.5	10	10

(a) Soft particles maximum is the sum of the shale, siltstone, ochre, coal, clay-ironstone and particles that are structurally weak or are non-durable in service.

(b) Maximum by weight with a 1 to 5 aspect ratio.

Note: "85/80" denotes that 85 percent of the coarse aggregate has one fractured face and 80 percent has at least two fractured faces.

B				
A				
DESCRIPTION		DRWN	CHKD	APPD
REVIEWS				
DRAWN BY	WLV	CHECKED	KSM	
DATE	APR 2018	APPROVED	SRB	



TYPICAL CROSS SECTION COLD MILLING HMA SURFACE AND RESURFACING

NOTES:

1. THE CONTRACTOR SHALL PLACE ADDITIONAL HMA MIXTURE AT VARIOUS LOCATIONS WHERE NEEDED, IN ORDER TO MAKE A UNIFORM CROSS-SECTION. AN ADDITIONAL 10% OF HMA 5E3 HAS BEEN ESTIMATED TO PROVIDE MATERIAL TO RE-ESTABLISH THE PAVEMENT CROSS-SECTION AND FOR WEDGING AT MILLED STREET INTERSECTIONS.
2. "COLD-MILLING HMA SURFACE MODIFIED" SHALL APPLY ACROSS THE FULL PAVEMENT WIDTH AS SHOWN ON THE PLAN PAVEMENT WIDTH AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
3. IF EXISTING HMA OVERLAY IS LESS THAN 3 1/2", COLD MILL THE FULL WIDTH OR AS DIRECTED BY THE ENGINEER.

PROJECT SUMMARY:

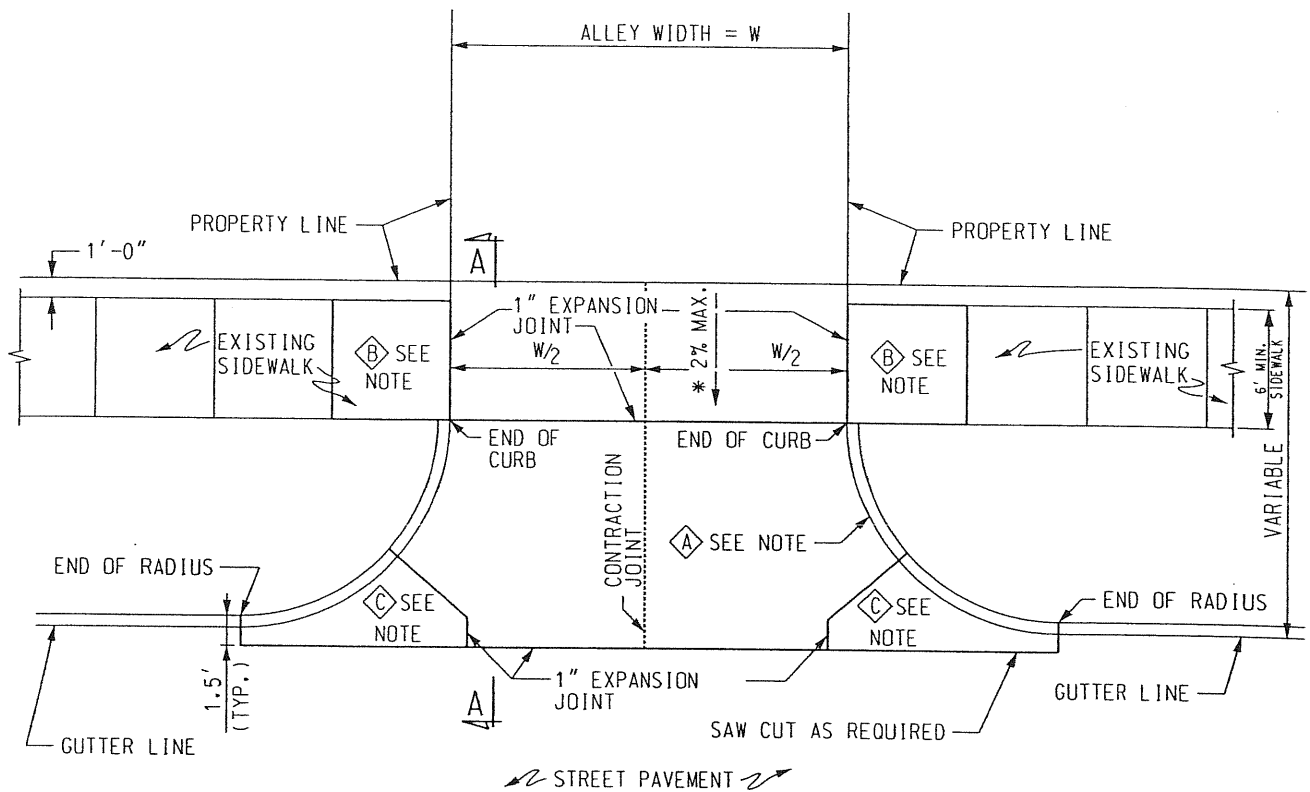
COLD MILL FROM 3½ INCHES UP TO 5 INCHES, AS DIRECTED BY THE ENGINEER OF EXISTING HMA SURFACE AND REPLACED WITH 2 INCHES OF 4E3 HMA LEVELING COURSE MIXTURE WITH A YIELD OF 220 LBS PER SQUARE YARD AND 1½ INCHES OF 55E3HMA WEARING COURSE MIXTURE WITH A YIELD OF 165 LBS PER SQUARE YARD. THE PROJECT ALSO INCLUDED CONCRETE CURB, SIDEWALK, CURB RAMPS, DRIVEWAY APPROACHES, DRAINAGE STRUCTURES, EXCAVATION, PAVEMENT REMOVAL, LANE TIES, PAVEMENT MARKINGS AND MISCELLANEOUS CONSTRUCTION.

HMA APPLICATION ESTIMATE					
I.D. No.	Item	Rate Per Syd	Est. Thick.	Performance Grade	Remarks
HMA, 5E3	HMA mix. - 5E3	165 LBS	1½"	64-22	USE 5E3 FOR WEDGING
HMA, 4E3	HMA mix. - 4E3	220 LBS	2"	64-22	
HAND PATCHING	HMA mix. - 5E3	330 LBS	3"	64-22	IN TWO LIFTS, FOR RATE AND PG
HMA APPROACH, MODIFIED	HMA mix. - 5E3 & HMA mix. - 4E3	165 LBS 220 LBS	1½" 2"	64-22 64-22	SEE HMA APPLICATION ESTIMATE
HMA SHOULDER MODIFIED	HMA mix. - 5E3	330 LBS	3"	64-22	IN TWO LIFTS

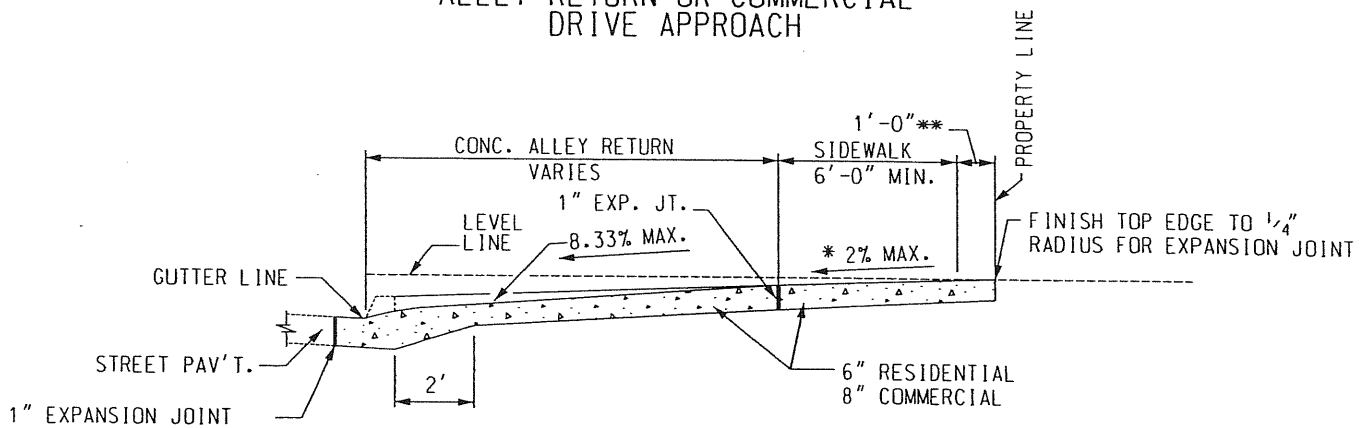
HMA Bond Coat 0.05 to 0.10 Gal./Syd. - Included in the pay item "HMA, 4E3"
Also Applies to Bit. Approaches for Street Intersections

TYPICAL CROSS SECTION
COLD MILLING HMA
SURFACE AND RESURFACE

CITY OF DETROIT
CITY ENGINEERING DEPARTMENT
SURVEY BUREAU
JOB NO.
DRAWG. NO.



ALLEY RETURN OR COMMERCIAL DRIVE APPROACH



SECTION A-A

C	DESCRIPTION	REVISIONS			
		Drawn	Chkd	Appd	Date
B	* SIDEWALK CROSS SLOPE	KSM	J.J.		2/7/07
A	METRIC TO ENGLISH UNIT SYSTEM	KSM	M.S.	N.H.	12/02



PREPARED BY
BUREAU OF STREETS
AND HIGHWAYS

K.S.M.

DRAWN BY:

J.J.

CHECKED BY:

APPROVED

Sam Patel

ENGINEER OF STREETS

HEAD ENGINEER

Jerry Jacob
CITY ENGINEER

CITY OF DETROIT
CITY ENGINEERING DIVISION, D.P.W.

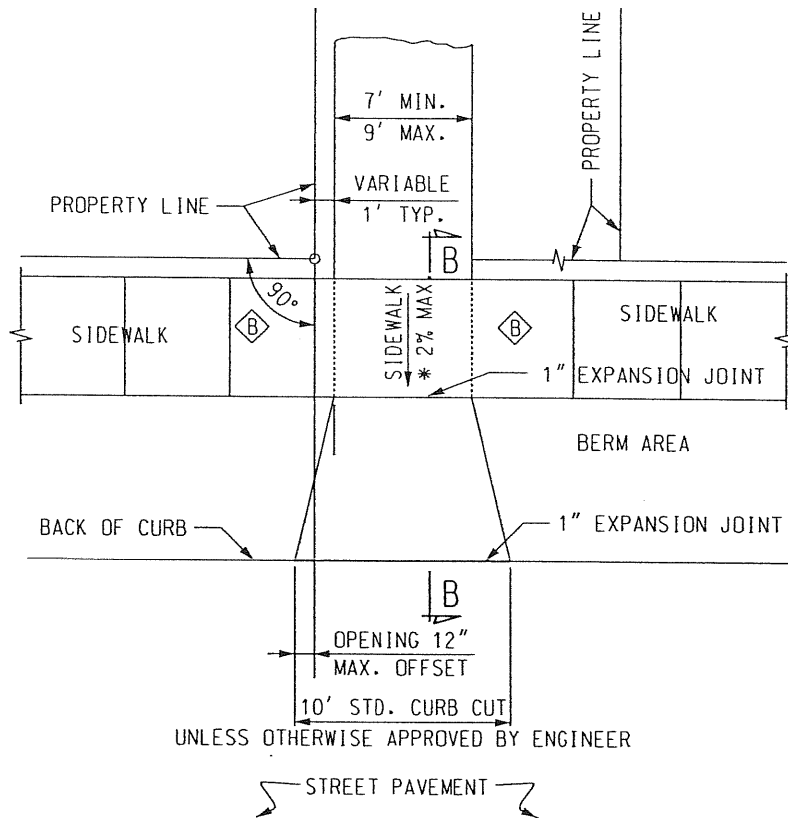
STANDARD PLAN FOR
DETAIL OF ALLEY RETURN
AND DRIVE APPROACH

03/07/98
PLAN DATE

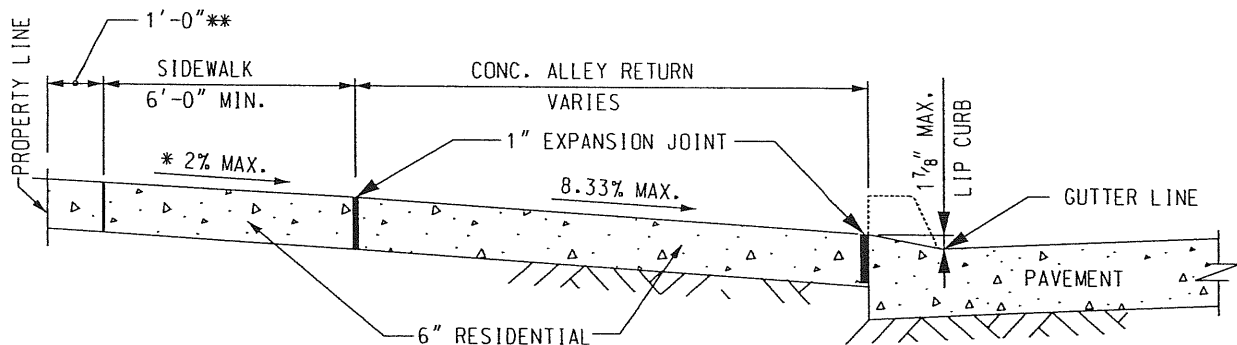
DRAWING NO.
7

DETAIL STANDARD NO.
C-4384

SHEET
1 OF 2



DETAIL OF CURB CUT OPENINGS
FOR RESIDENTIAL DRIVEWAY



SECTION B-B

NOTES:

IF ALLEY IS PAVED, CONSTRUCT RETURN WITH 1" EXPANSION JOINT ON PROPERTY LINE.

- Ⓐ RADIUS TO BE 10' UNLESS OTHERWISE SHOWN ON PAVING PLAN.
- Ⓑ SIDEWALK FLAGS ABUTTING ALLEY SHALL BE 6" THICK. SIDEWALK SHALL BE REPLACED FOR A SMOOTH TRANSITION AND TO ATTAIN A CROSS SLOPE OF 2% MAX. OR AS DIRECTED BY THE ENGINEER.
- Ⓒ KEY JOINT OR "B" JOINT IF REINFORCED PAVEMENT.

ALL DIMENSIONS ARE IN INCHES(") UNLESS OTHERWISE NOTED.

* SIDEWALK CROSS SLOPE SHALL BE 2% MAX. OR AS DIRECTED BY THE ENGINEER.

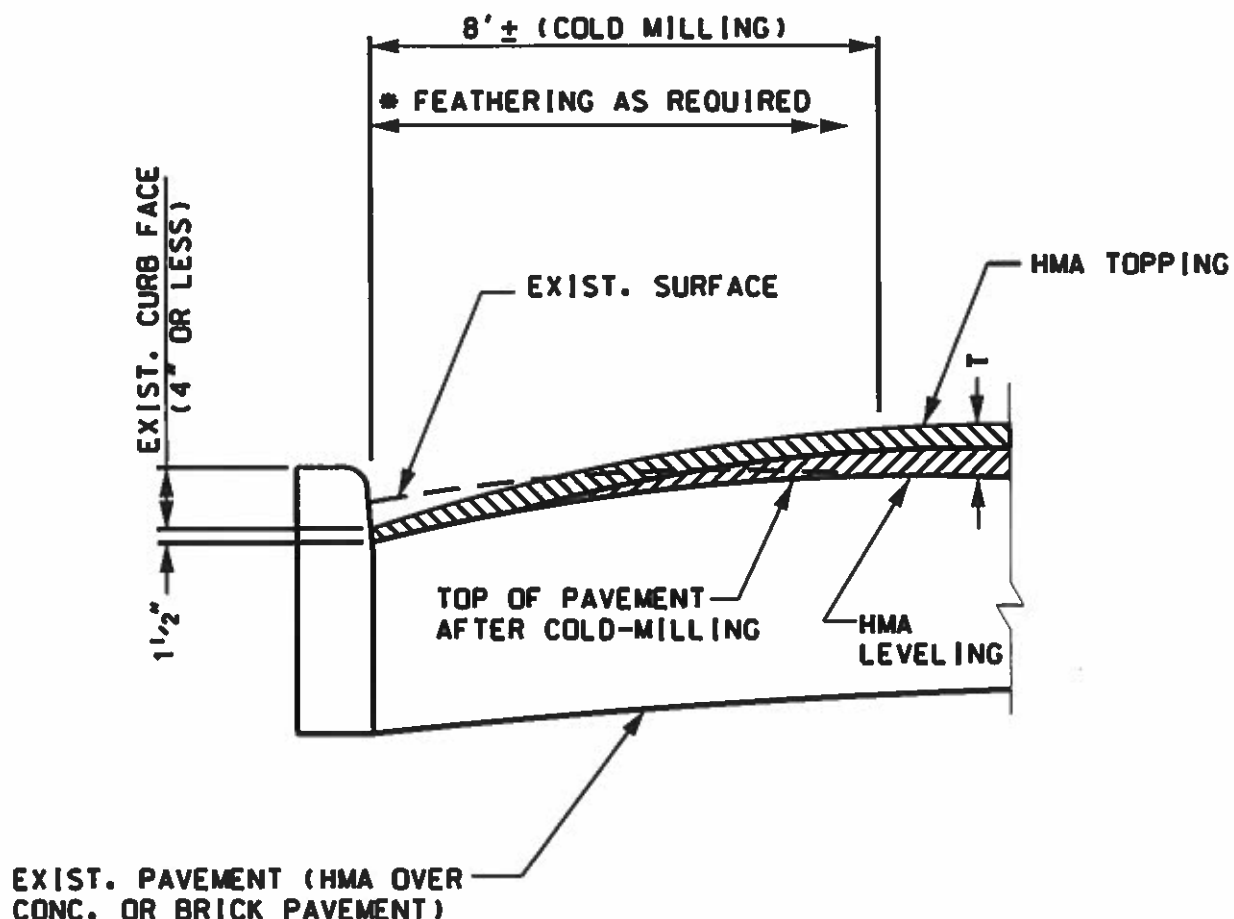
** THE SLOPE OF THE DRIVEWAY IN THE 1 FT. SPACE ADJACENT TO THE PROPERTY LINE MAY BE ALTERED UP TO 10% TO MEET EXISTING CONDITIONS.

REVISED DATE(METRIC TO ENGLISH UNIT SYSTEM):DEC.2002

C	DESCRIPTION	Dwn	Chkd	Appd	Date
B	* SIDEWALK CROSS SLOPE	KSM	J.J.		2/7/07
A	Chgd. THICKNESS NOTE	KSM	N.H.	W.T.	10/06

REVISIONS

CITY OF DETROIT			
CITY ENGINEERING DIVISION, D.P.W.			
STANDARD PLAN FOR			
DETAIL OF ALLEY RETURN			
AND DRIVE APPROACH			
03/07/98 PLAN DATE	DRAWING NO. 7	DETAIL STANDARD NO. C-4384	SHEET 2 OF 2



*"COLD MILLING HMA SURFACE MODIFIED", SO AS TO GET A 5 1/2" EXPOSED (VERTICAL) FACE OF CURB. FEATHER RESURFACING TO 1 1/2" THICKNESS AT THE CURB LEAVING A MINIMUM OF 4" EXPOSED CURB FACE.

T = THICKNESS OF HMA RESURFACING.

NOTE:

THIS DETAIL SHALL BE USED WHERE DIRECTED BY THE ENGINEER. TO OBTAIN ADDITIONAL CURB FACE EXPOSURE. (CURB FACE EXPOSURE AFTER RESURFACING SHALL BE A MINIMUM OF 4" THIS SHALL APPLY THROUGHOUT THE LENGTH OF THE PROJECT.)

B					
A					
DESCRIPTION		Drawn	Chkd	Appd	Date
REVISIONS					
DRAWN BY	K.S.M.	APPROVED			
TRACED BY		APPROVED			
CHECKED BY	A.A.	APPROVED			
		CITY ENGINEER			

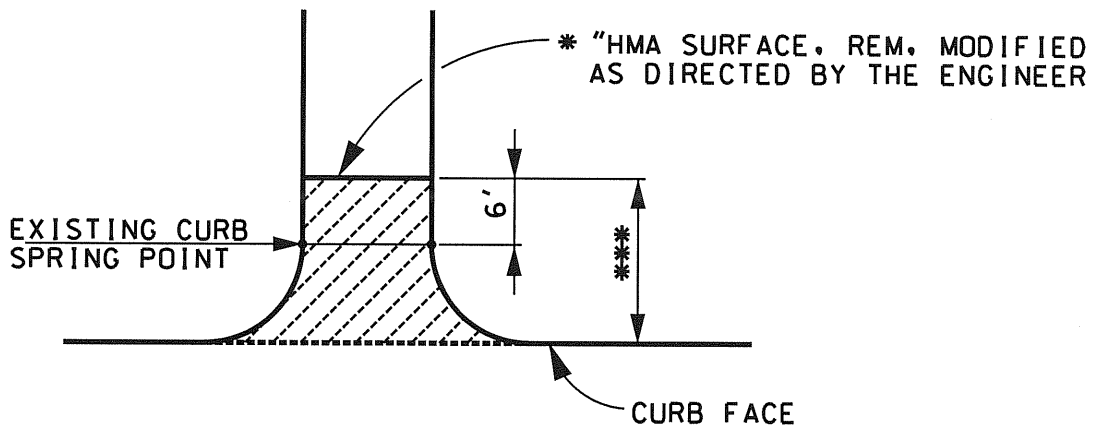
HMA FEATHERING DETAIL

CITY OF DETROIT
City Engineering
Division

Job No.

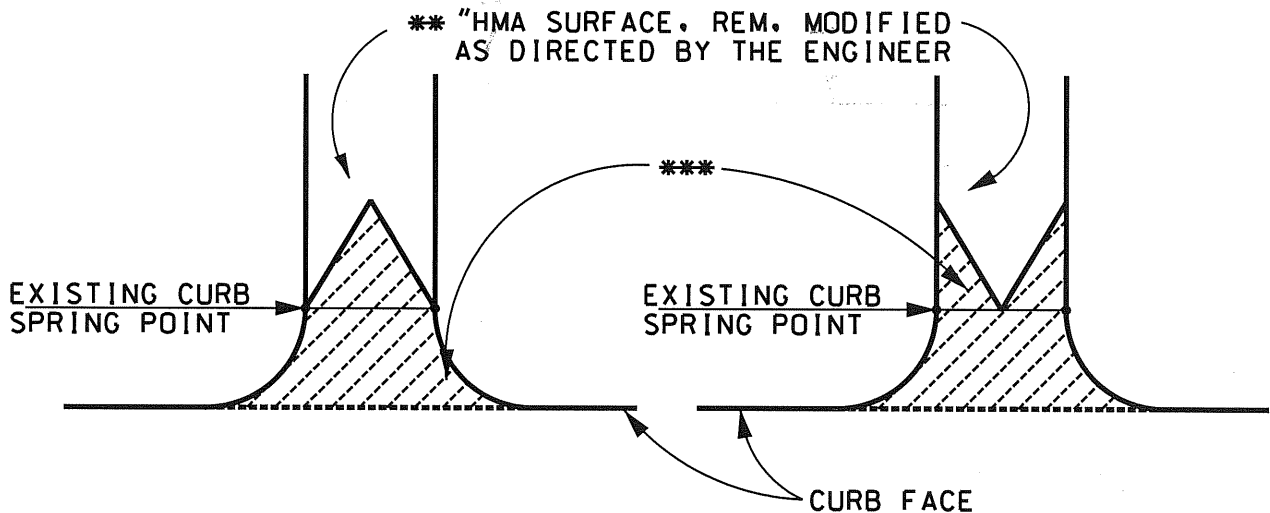
Drwg. No.

Date **JAN. 13**



*** RESURFACING STREET RETURNS SHALL BE PAID FOR AS "HMA APPROACH, MODIFIED"

* REMOVING HMA SURFACE AREA MAY BE A 6' $\pm$ WIDE STRIP BACK OF THE SPRING POINT (SOLID LINES) OR THE ENTIRE RETURN AREA (SOLID AND DASHED LINES) AS DIRECTED BY THE ENGINEER.



** REMOVING HMA SURFACE AREA MAY BE DEFINED BY TRIANGULAR CUTS SHOWN OR MAY OTHERWISE VARY AS DIRECTED BY THE ENGINEER TO SATISFY CROWN TRANSITION OR DRAINAGE CONDITIONS.

(THESE DETAILS SHALL BE USED AT MAJOR CROSS STREETS AND ELWHERE AS DIRECTED BY THE ENGINEER.)

B					
A					
DESCRIPTION		Drawn	Chkd	Appd	Date
REVISIONS					
DRAWN BY	K.S.M.	APPROVED			
TRACED BY		APPROVED			
CHECKED BY	J.J.	APPROVED			
		CITY ENGINEER			

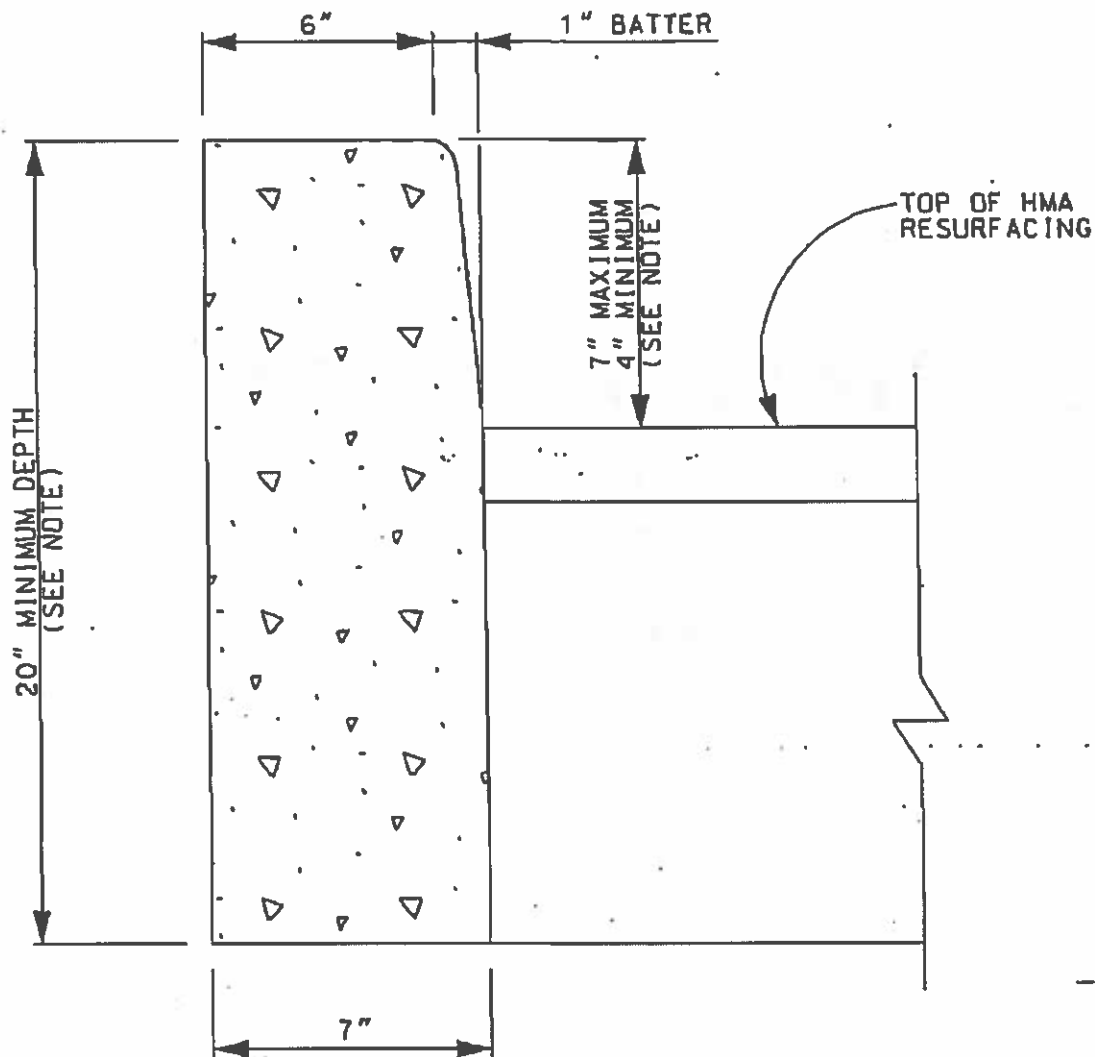
**HMA APPROACH,
MODIFIED**

CITY OF DETROIT
City Engineering
Division

Job No.

Drwg. No.

Date **DEC. 06**



NOTE:

DEPTH OF CURB SHALL BE 20" UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

B					
A					
DESCRIPTION		Drawn	Chk	Appd	Date
REVISIONS					
DESIGN BY	K.S.M.	APPROVED			
TRACED BY		APPROVED			
CHECKED BY	N.H.	APPROVED			
		CITY ENGINEER			

CURB, CONC., DETAIL CD,

MODIFIED

CITY OF DETROIT
City Engineering
Division

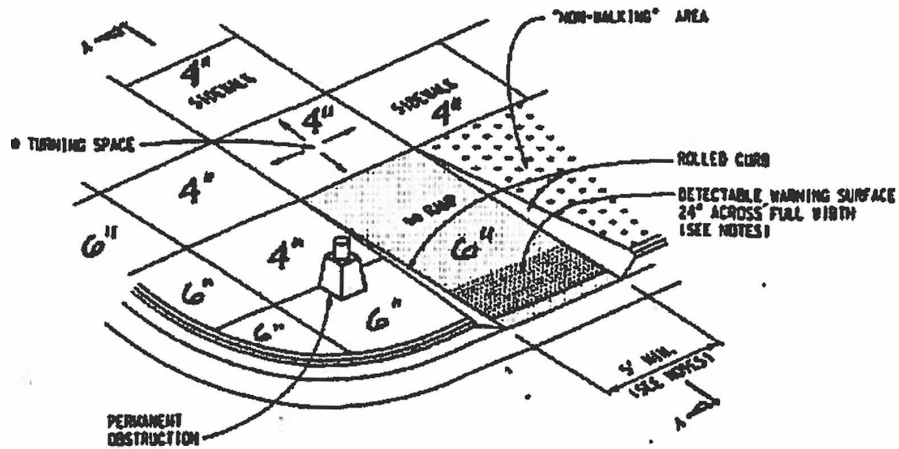
Job. No.

Drwg. No.

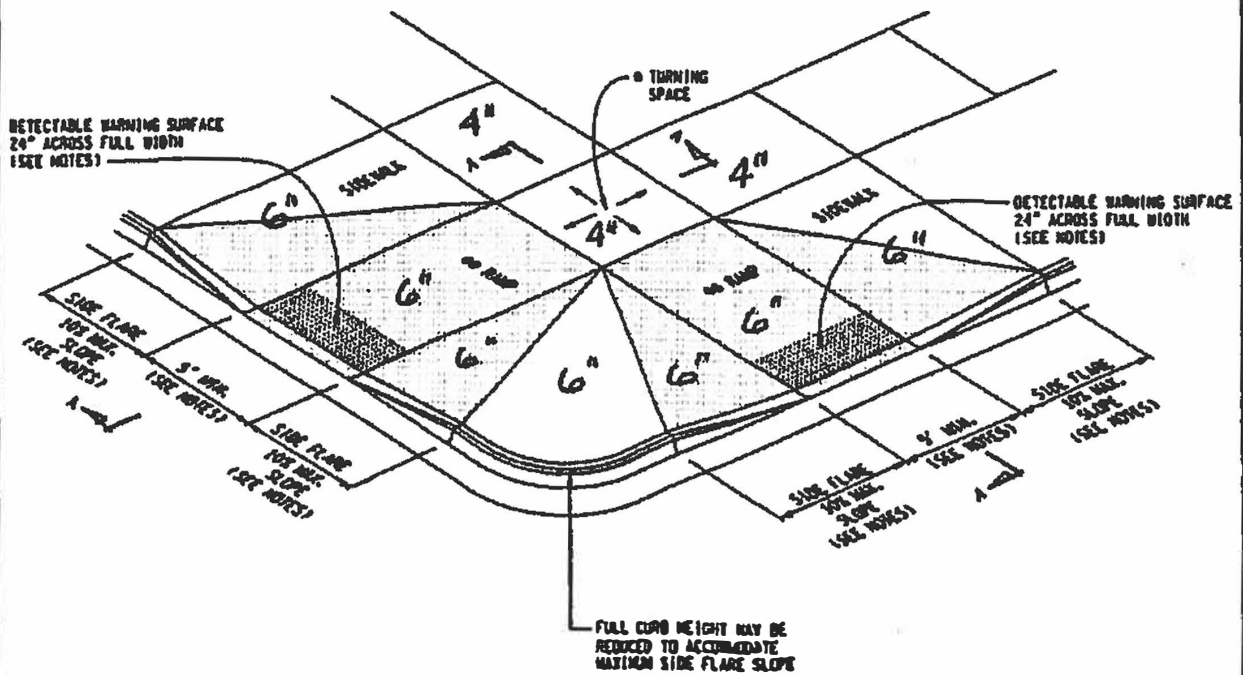
Date JAN. 06

• MAXIMUM TURNING SPACE SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

• MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (0.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE R
(ROLLED SIDES)



SIDEWALK RAMP TYPE F
(FLARED SIDES, TWO RAMPS SHOWN)



CITY OF DETROIT

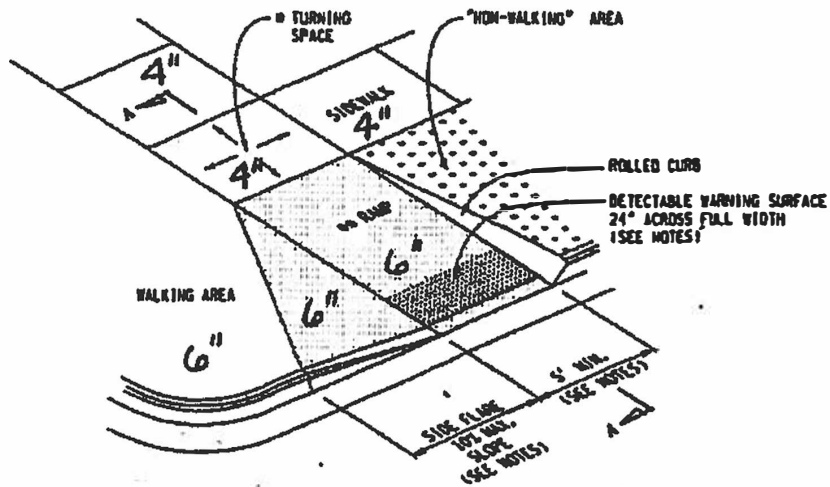
DEPARTMENT OF PUBLIC WORKS, CITY ENGINEERING DIVISION
**SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS**
R-28 WITH CITY OF DETROIT
THICKNESS AMENDMENT

4/19/2017

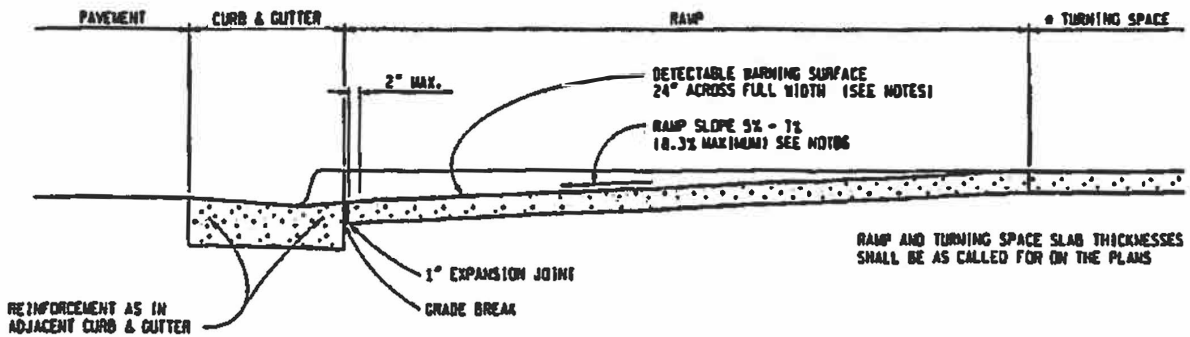
SHEET 1 OF 7

• MAXIMUM TURNING SPACE SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

•• MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (0.3% MAXIMUM). SEE NOTES.

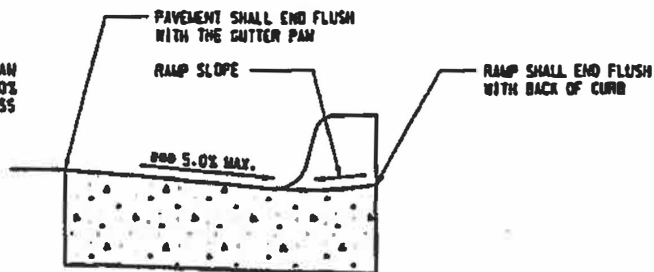


SIDEWALK RAMP TYPE RF
(ROLLED / FLARED SIDES)



SECTION A-A

••• TRANSITION ADJACENT CUTTER PAN CROSS SECTION TO PROVIDE 5.0% MAXIMUM COUNTER SLOPE ACROSS THE RAMP OPENING.



SECTION THROUGH CURB CUT
(TYPICAL ALL RAMP TYPES)



CITY OF DETROIT

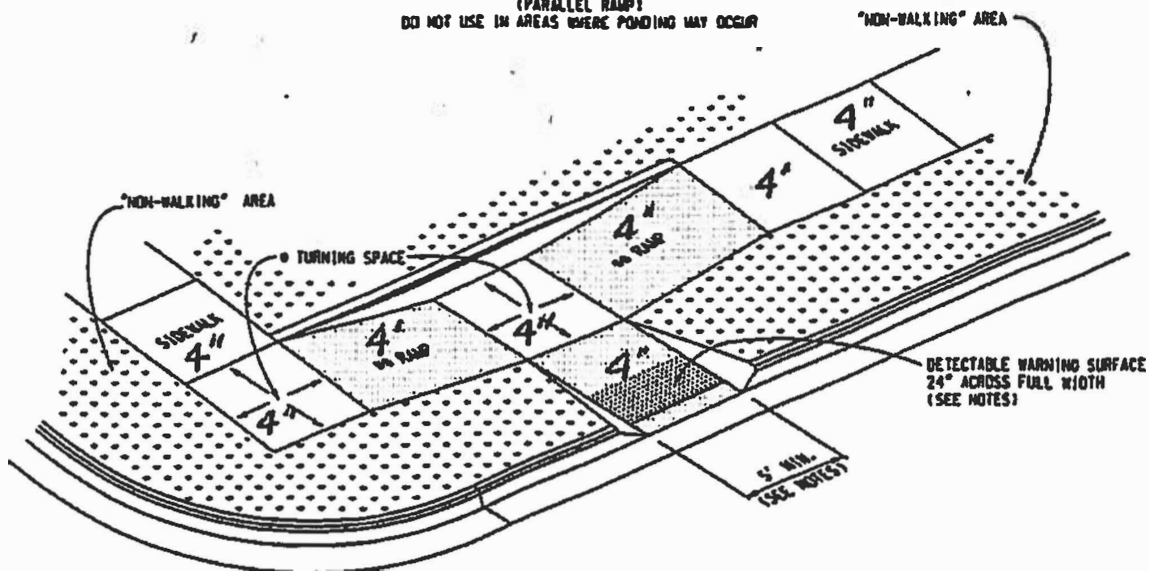
DEPARTMENT OF PUBLIC WORKS, CITY ENGINEERING DIVISION
**SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS**
R-28 WITH CITY OF DETROIT
THICKNESS AMENDMENT

4/19/2017

SHEET 2 OF 7

- [illegible]

(PARALLEL RAMP)
DO NOT USE IN AREAS WHERE PONDING MAY OCCUR



(COMBINATION RAMP)

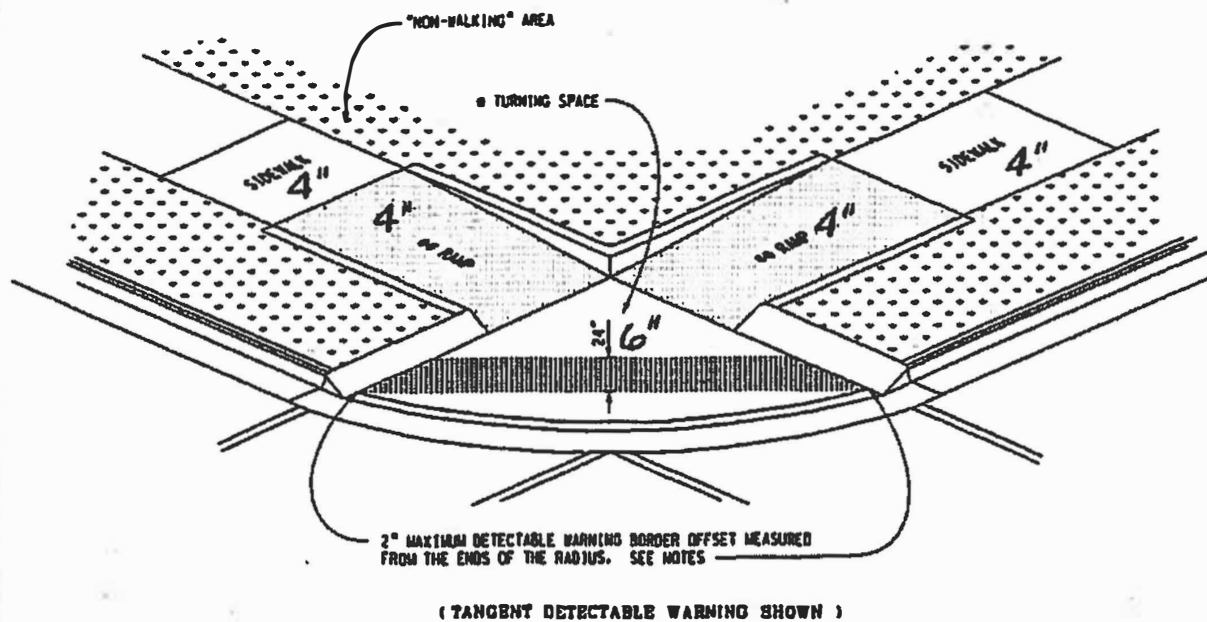
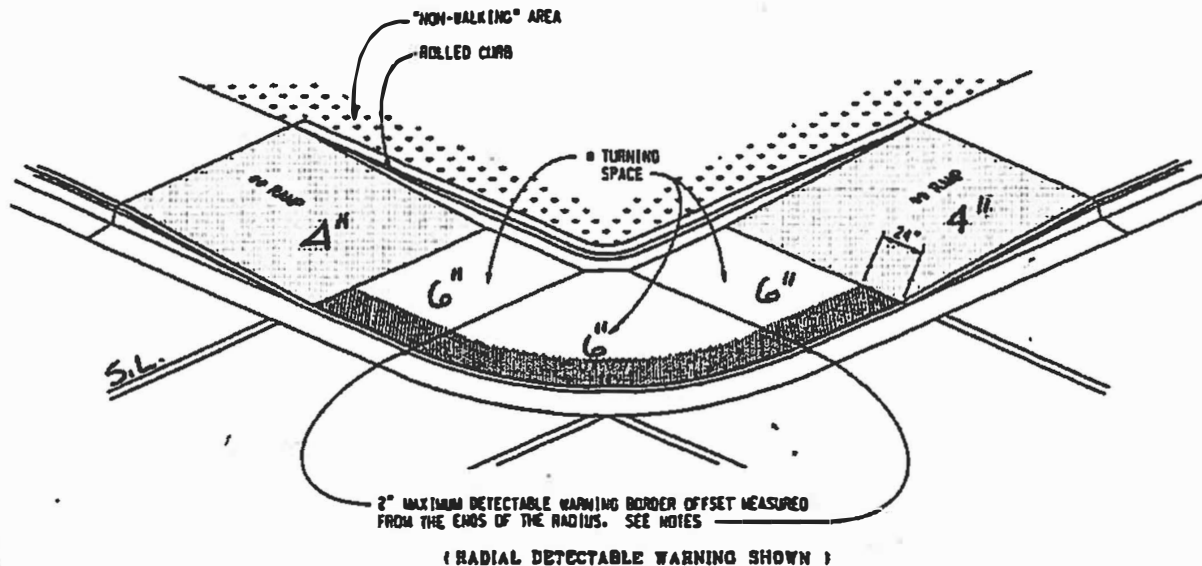
Diagram illustrating a median strip with a warning label. The label reads: "WARNINGS IF MEDIAN OTHERWISE REQUIRED." and "MEDIAN STRIP". The strip is labeled "6\" and has a width of "5' MIN.".

DEPARTMENT OF PUBLIC WORKS, CITY ENGINEERING DIVISION
SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS
R-28 WITH CITY OF DETROIT
THICKNESS AMENDMENT

SHEET 3 OF 7

• MAXIMUM TURNING SPACE SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

• MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (0.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE D (DEPRESSED CORNER)



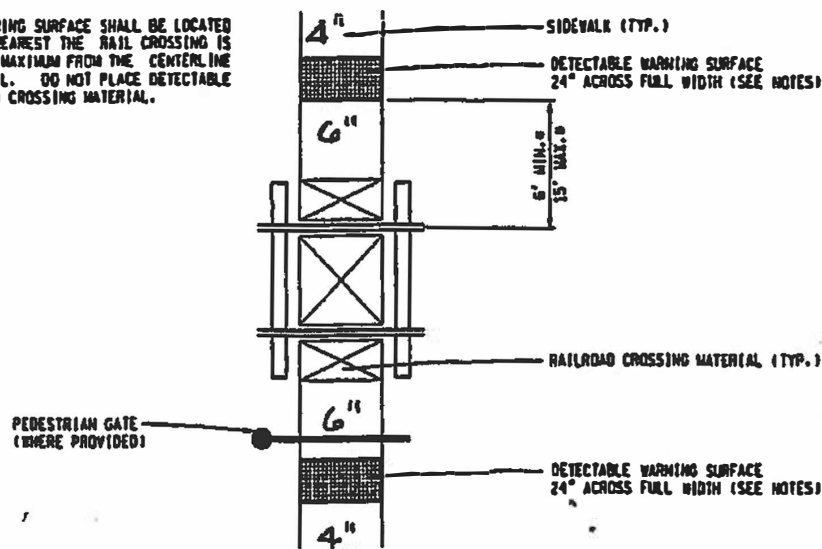
CITY OF DETROIT

DEPARTMENT OF PUBLIC WORKS, CITY ENGINEERING DIVISION
SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS
R-28 WITH CITY OF DETROIT
THICKNESS AMENDMENT

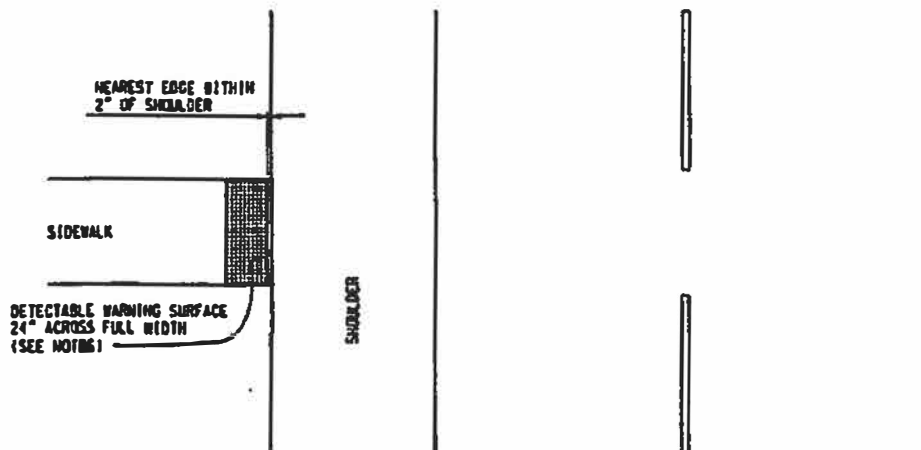
4/19/2017

SHEET 4 OF 7

- THE DETECTABLE WARNING SURFACE SHALL BE LOCATED SO THAT THE EDGE NEAREST THE RAIL CROSSING IS 6' MINIMUM AND 15' MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. DO NOT PLACE DETECTABLE WARNING ON RAILROAD CROSSING MATERIAL.



DETECTABLE WARNING AT RAILROAD CROSSING



DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY

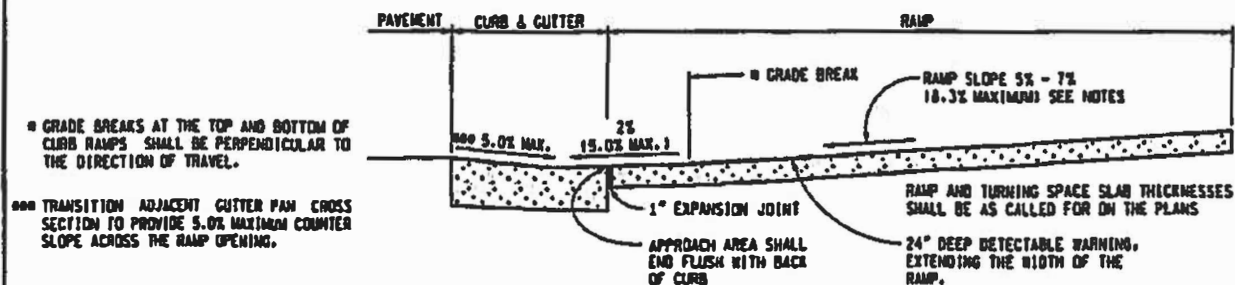
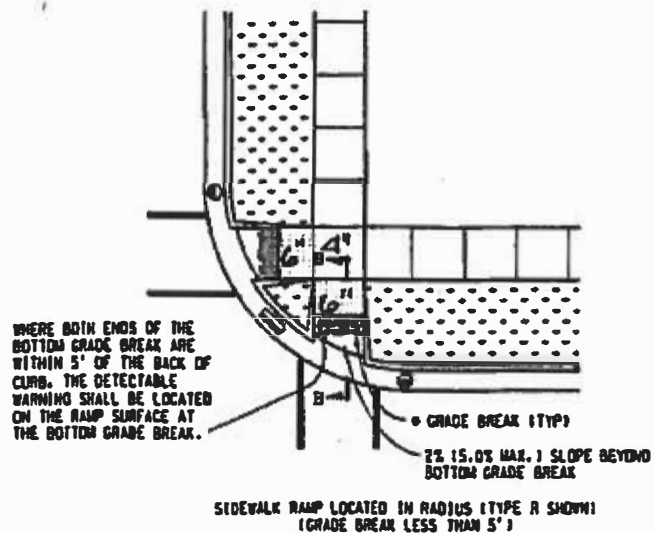
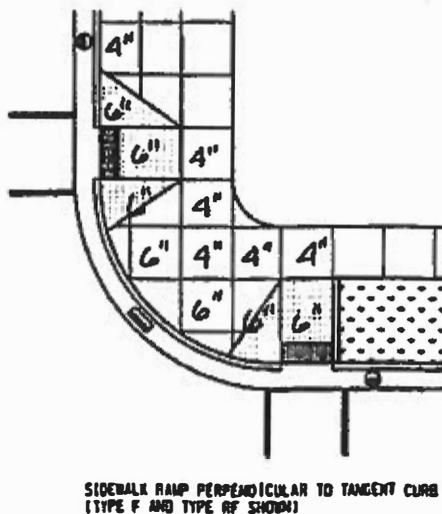
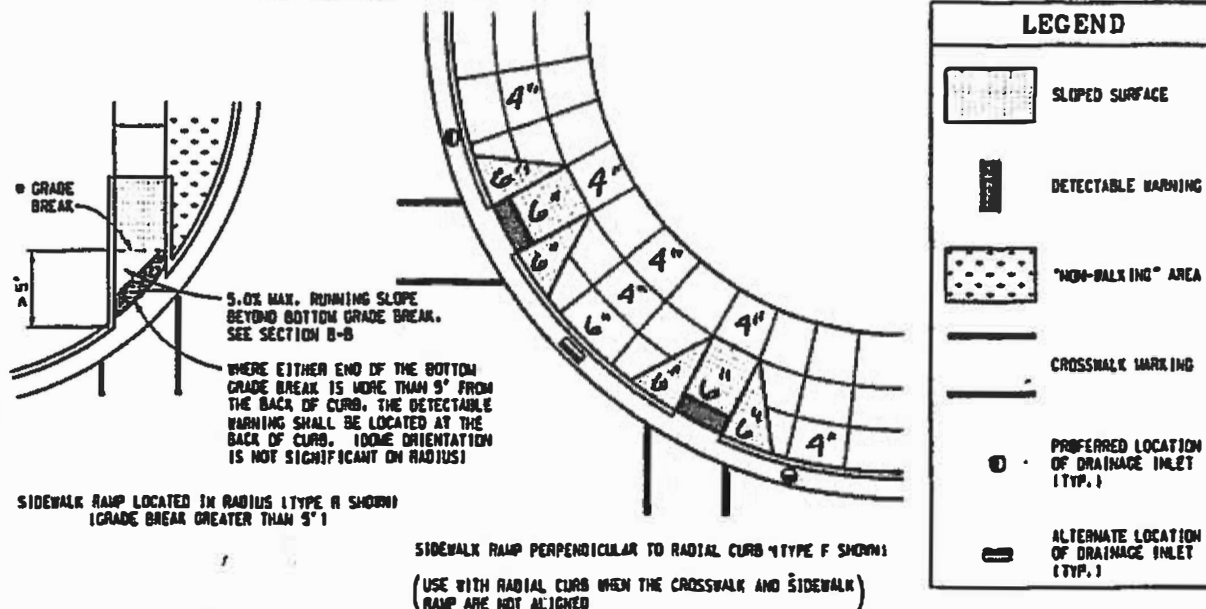


CITY OF DETROIT

DEPARTMENT OF PUBLIC WORKS, CITY ENGINEERING DIVISION
**SIDEWALK RAMP AND
 DETECTABLE WARNING DETAILS**
 R-28 WITH CITY OF DETROIT
 THICKNESS AMENDMENT

4/19/2017

SHEET 5 OF 7



SECTION B-B SIDEWALK RAMP ORIENTATION

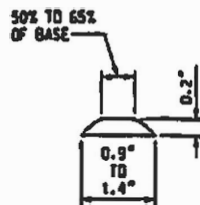


CITY OF DETROIT

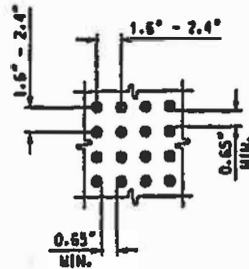
DEPARTMENT OF PUBLIC WORKS, CITY ENGINEERING DIVISION
SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS
R-28 WITH CITY OF DETROIT
THICKNESS AMENDMENT

4/19/2017

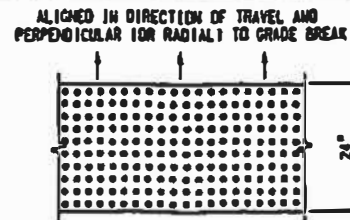
SHEET 6 OF 7



DOME SECTION



DOME SPACING



DOME ALIGNMENT

DETECTABLE WARNING DETAILS

NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.

SIDEWALK RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE RUNNING SLOPE.

SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP. WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

PROVIDE TURNING SPACES WHERE PEDESTRIAN TURNING MOVEMENTS ARE REQUIRED.

WHEN 5' MINIMUM WIDTHS ARE NOT FEASIBLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4' AND TURNING SPACES TO NOT LESS THAN 4' x 4'.

DETECTABLE WARNING SURFACE COVERAGE IS 24" MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURBED OR FLARED CURB TRANSITION AREAS. A BORDER OFFSET NOT GREATER THAN 2" MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING IS ALLOWABLE. FOR RADIAL CURB THE OFFSET IS MEASURED FROM THE ENDS OF THE RADIUS.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE MAY NOT EXCEED 2.0%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.

THE MAXIMUM RUNNING SLOPE OF 0.3% IS RELATIVE TO A FLAT 10% REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER'S ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN 1/2". ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

TRANSITION THE GUTTER PAN CROSS SECTION SUCH THAT THE COUNTER SLOPE IN THE DIRECTION OF RAMP TRAVEL IS NOT GREATER THAN 5.0%. MAINTAIN THE NORMAL GUTTER PAN CROSS SECTION ACROSS DRAINAGE STRUCTURES.

THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES".

FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.

DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.

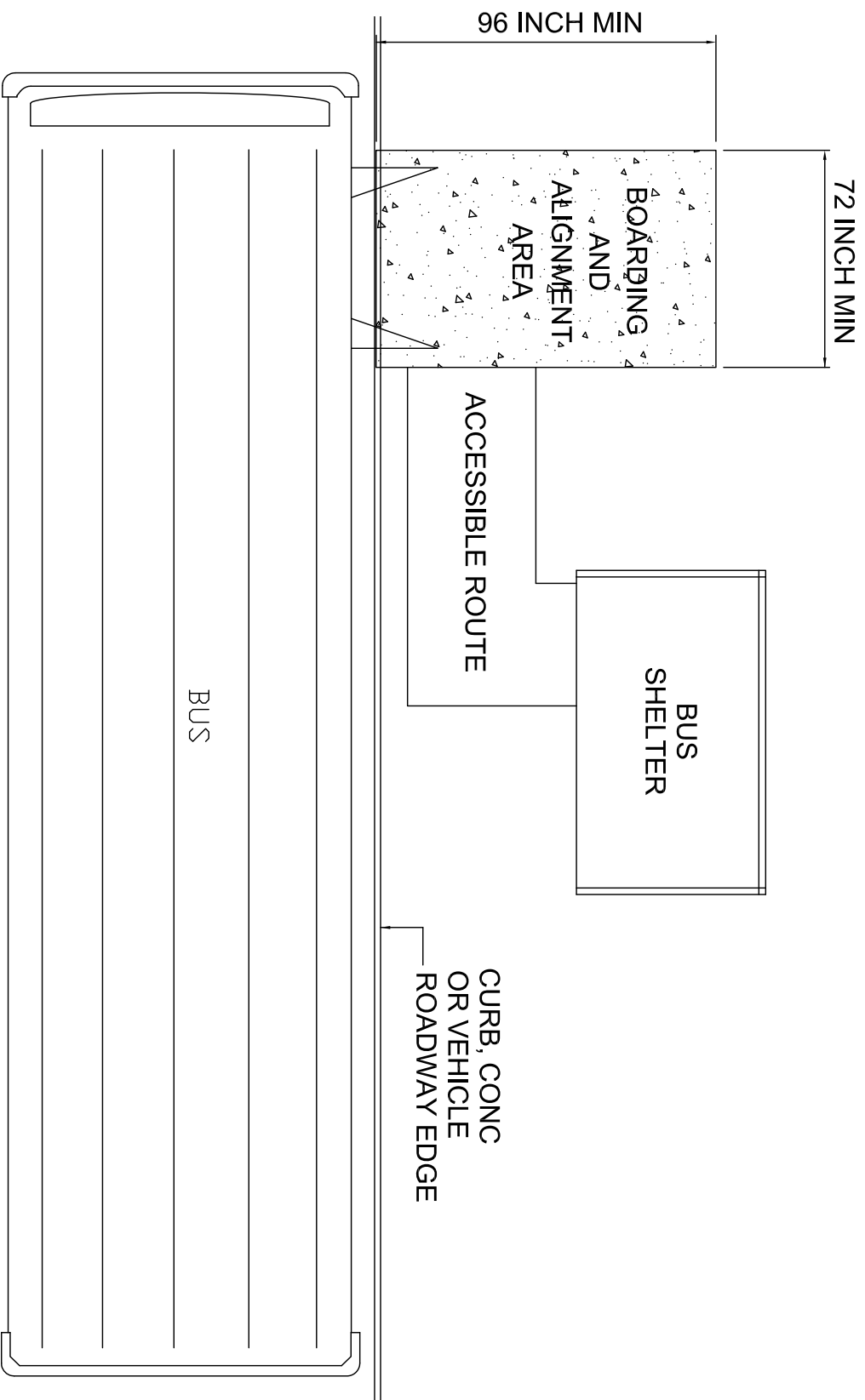


CITY OF DETROIT

DEPARTMENT OF PUBLIC WORKS, CITY ENGINEERING DIVISION
SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS
R-28 WITH CITY OF DETROIT
THICKNESS AMENDMENT

4/19/2017

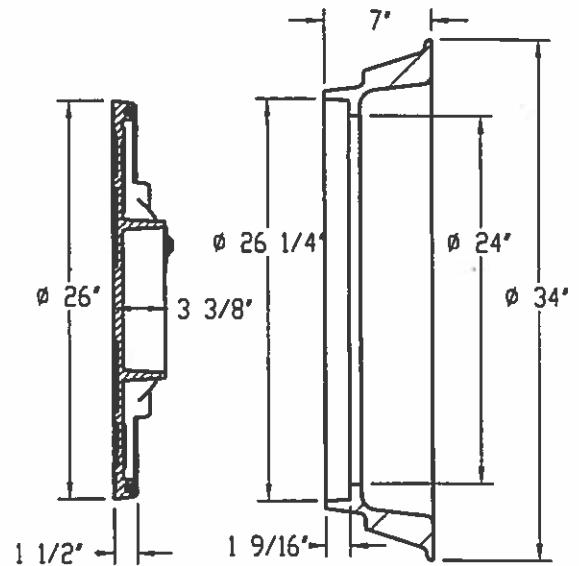
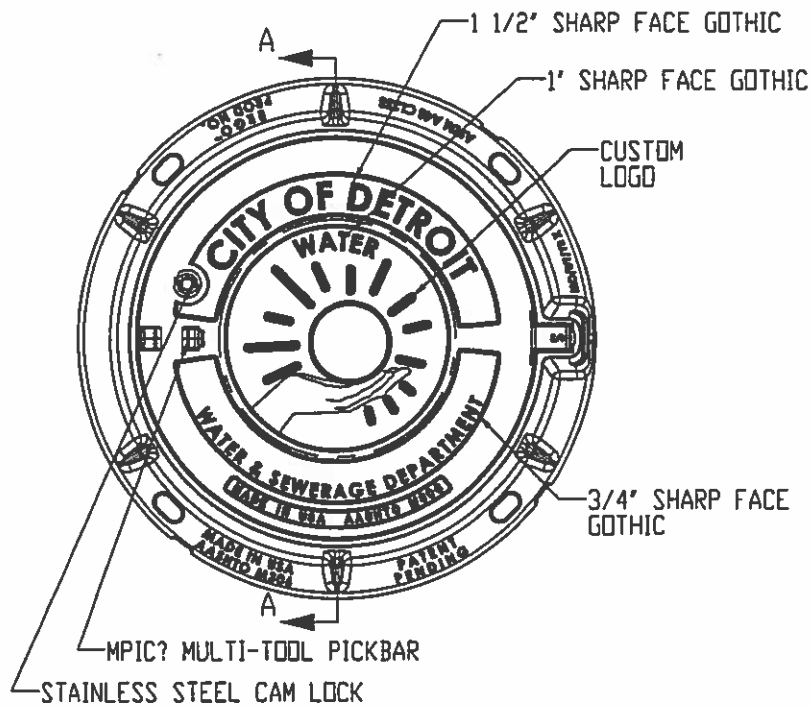
SHEET 7 OF 7



DIMENSIONS OF BUS BOARDING AREA

Assembly Weight 251 lbs.

ERGO Assembly



SECTION A-A

DESIGN FEATURES

-MATERIALS

COVER: DUCTILE IRON (80-55-06)

FRAME: GRAY IRON (CL35)

-DESIGN LOAD: HEAVY DUTY

-OPEN AREA: N/A

-COATING: UNDIPPED

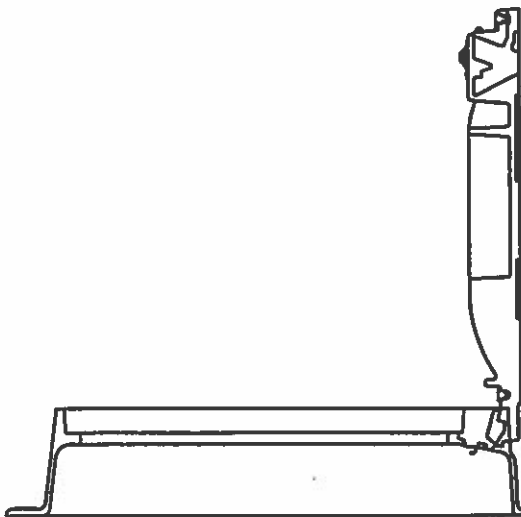
- DESIGNATES MACHINED SURFACE

CERTIFICATION

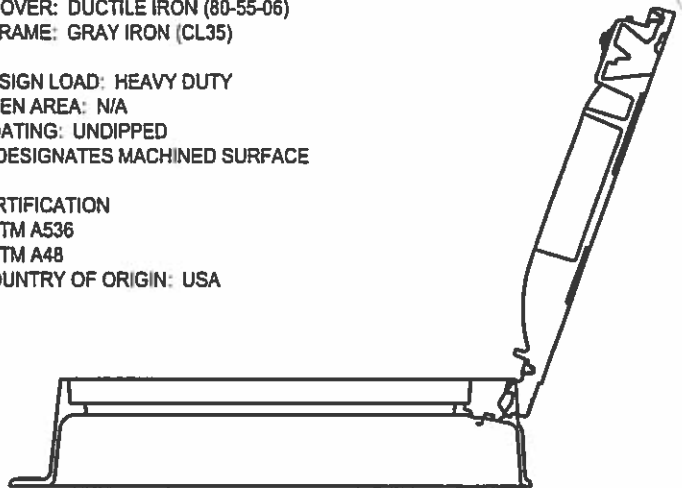
-ASTM A536

-ASTM A48

-COUNTRY OF ORIGIN: USA



SAFETY LOCK @ 90°



FULLY OPENED & REMOVAL POSITION @ 120°

DWSD APPROVAL: *[Signature]*

DATE: *04/16/14*



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

DWSD MANHOLE
ERGO ASSEMBLY

APPROVED:

[Signature] 4/16/14
ENGINEER OF STREETS
[Signature] 4/16/14
CITY ENGINEER

SHEET 1 OF 1

DETAIL STD. No.

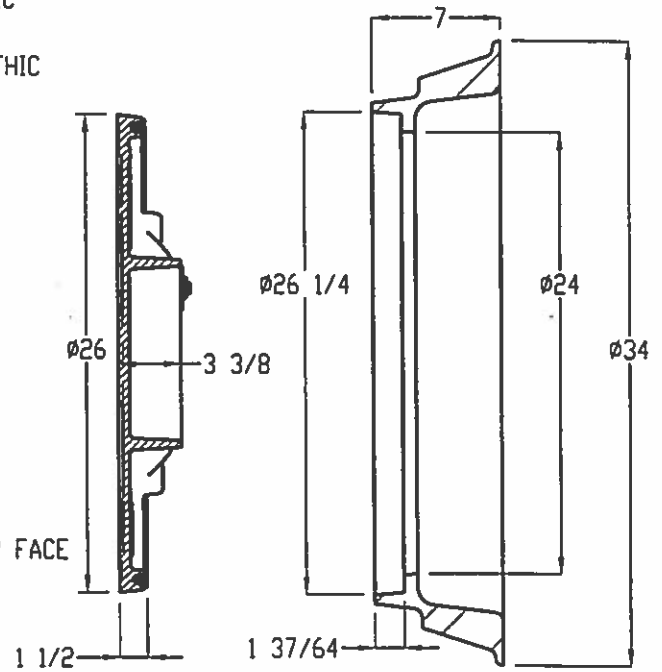
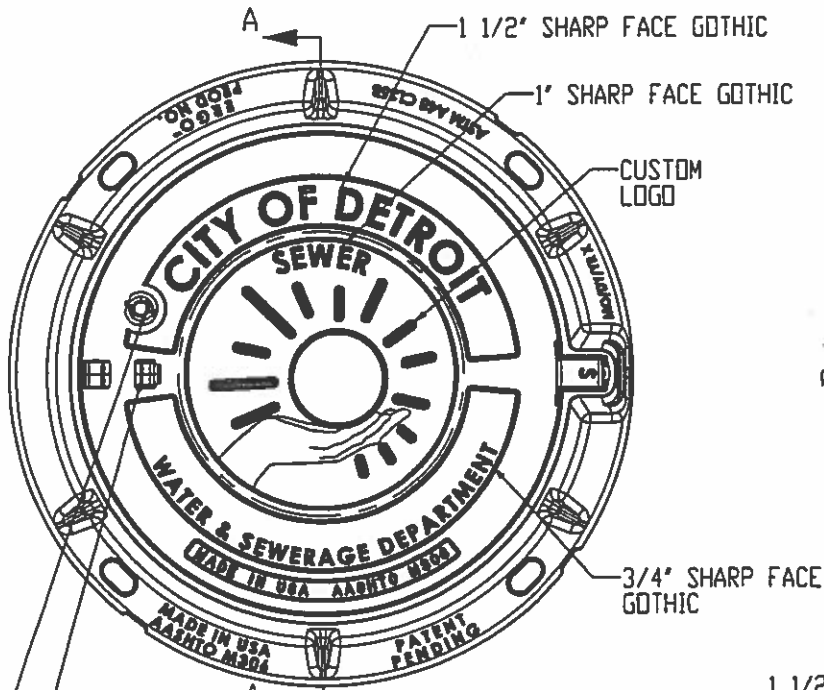
DRAWING No. 101

DRAWN BY: N.Y. SANTOS

DATE: 0/15/2014

Assembly Weight 251 lbs.

ERGO Assembly



SECTION A-A

DESIGN FEATURES

-MATERIALS

COVER: DUCTILE IRON (80-55-06)
FRAME: GRAY IRON (CL35)

-DESIGN LOAD: HEAVY DUTY

-OPEN AREA: N/A

-COATING: UNDIPPED

- DESIGNATES MACHINED SURFACE

CERTIFICATION

-ASTM A536

-ASTM A48

-COUNTRY OF ORIGIN: USA

SAFETY LOCK @ 90°

FULLY OPENED & REMOVAL POSITION @ 120°

DWSD APPROVAL: *[Signature]*

DATE: *04/16/14*

Weights (lbs/kg), dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

DWSD MANHOLE
ERGO ASSEMBLY

APPROVED:

[Signature] 4/16/14
ENGINEER OF STREETS
[Signature] 4/16/14
CITY ENGINEER

SHEET 1 OF 1

DETAIL STD. No.

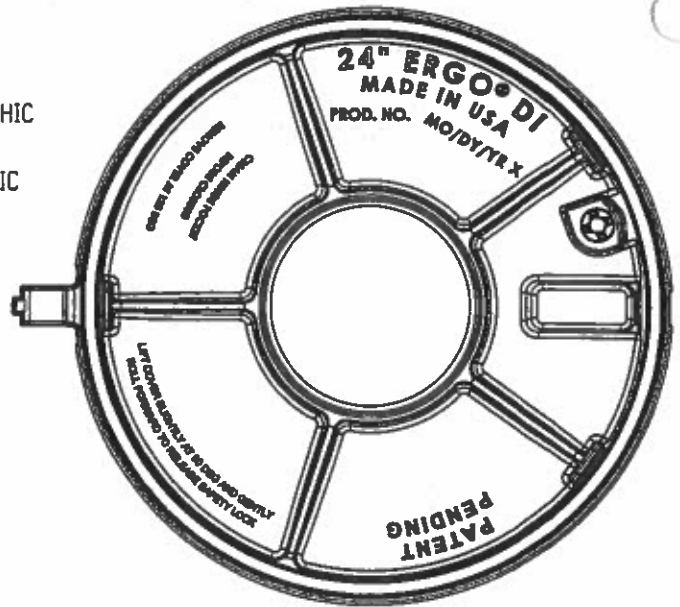
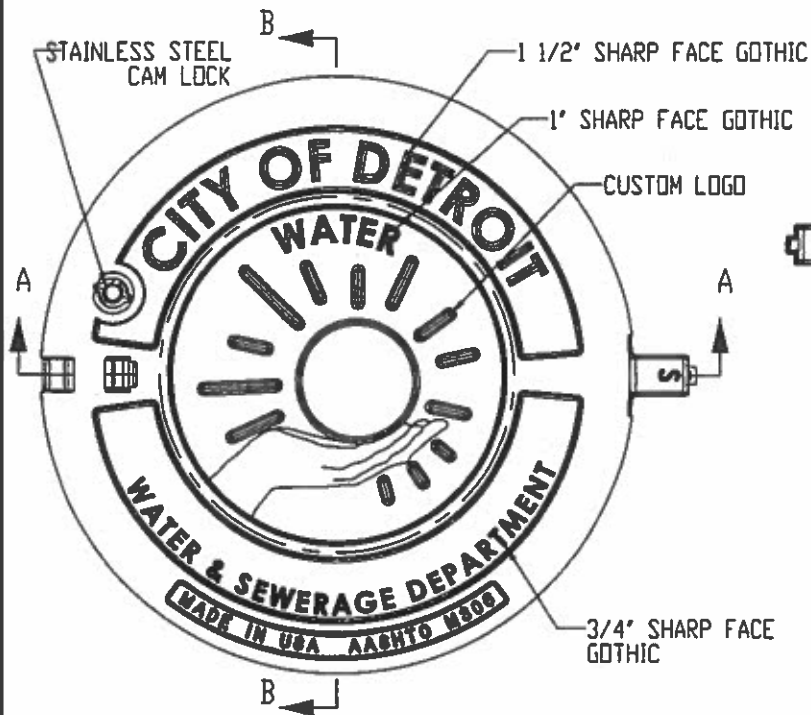
DRAWING No. 102

DRAWN BY: N.Y. SANTOS

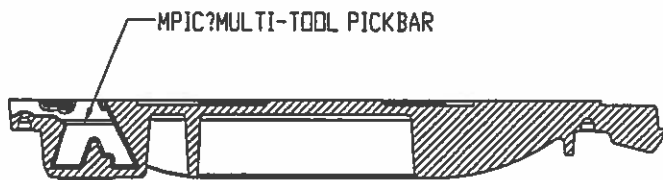
DATE: 0/15/2014

EJ Part Number: LC00104051, Assembly Weight 108 lbs.

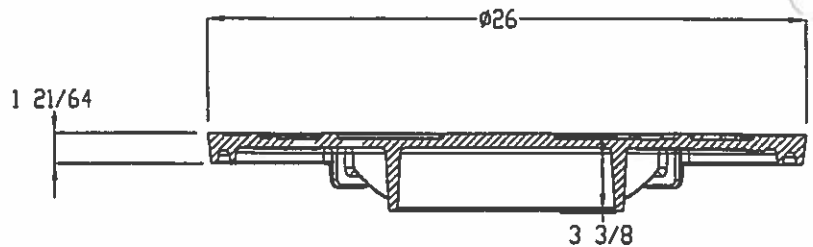
ERGO Cover



BOTTOM VIEW



SECTION A-A



SECTION B-B

DESIGN FEATURES

MATERIALS

COVER: DUCTILE IRON (80-55-06)

-DESIGN LOAD: HEAVY DUTY

-OPEN AREA: N/A

-COATING: UNDIPPED

-✓ DESIGNATES MACHINED SURFACE

CERTIFICATION

-ASTM A536

-COUNTRY OF ORIGIN: USA

DWSD APPROVAL: *R. Single*

DATE: *04/16/14*



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

DWSD MANHOLE
ERGO COVER

APPROVED:

4/16/14
ENGINEER OF STREETS
4/16/14
CITY ENGINEER

SHEET 1 OF 1

DETAIL STD. No.

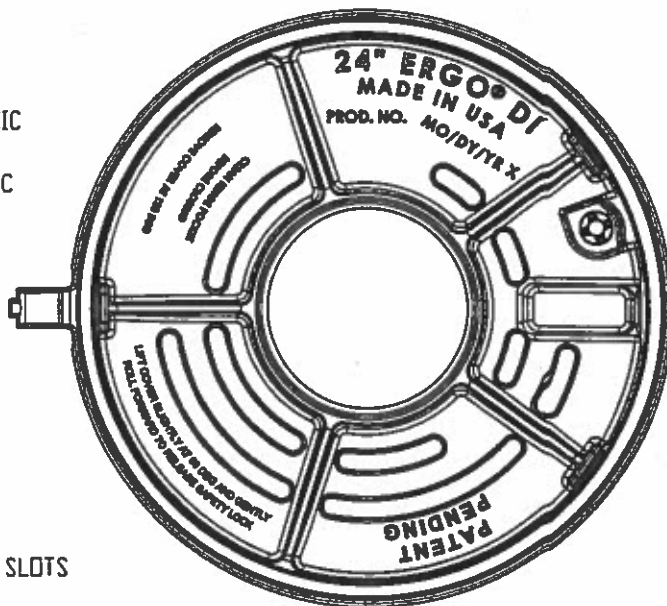
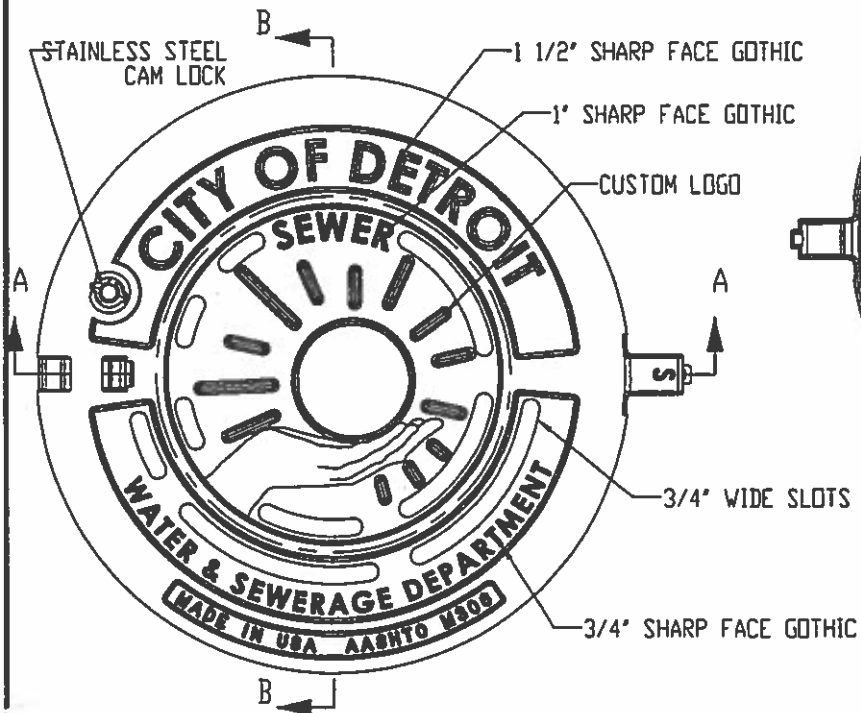
DRAWING No. 111

DRAWN BY: N.Y. SANTOS

DATE: 07/5/2014

EJ Part Number: LC00104050, Assembly Weight 108 lbs.

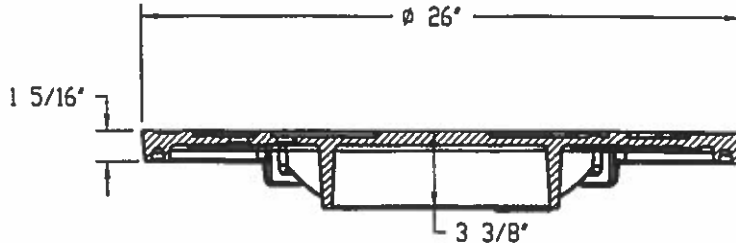
ERGO Cover



BOTTOM VIEW



SECTION A-A



SECTION B-B

DESIGN FEATURES

- MATERIALS
COVER: DUCTILE IRON (80-55-06)
- DESIGN LOAD: HEAVY DUTY
- OPEN AREA: N/A
- COATING: UNDIPPED
- DESIGNATES MACHINED SURFACE

CERTIFICATION

- ASTM A536
- COUNTRY OF ORIGIN: USA

DWSD APPROVAL: *A. Single*

DATE: *04/16/14*



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

DWSD MANHOLE
ERGO COVER

APPROVED:

updated 4/16/14
ENGINEER OF STREETS
4/16/14
CITY ENGINEER

SHEET 1 OF 1

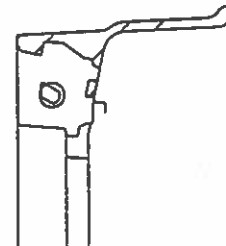
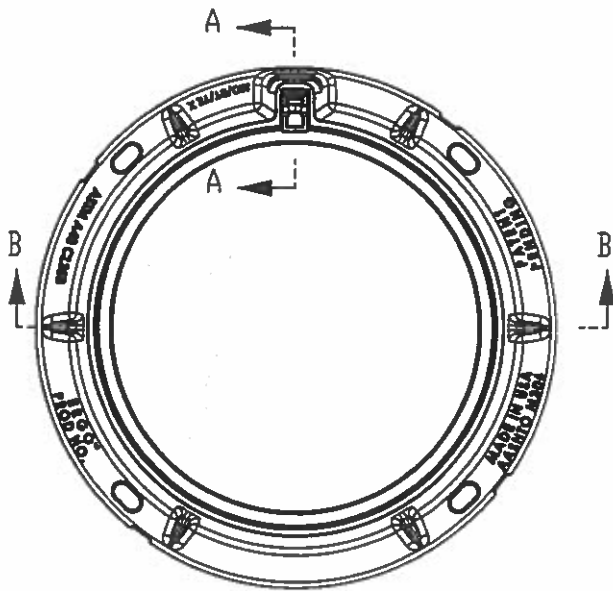
DETAIL STD. No.

DRAWING No. 112

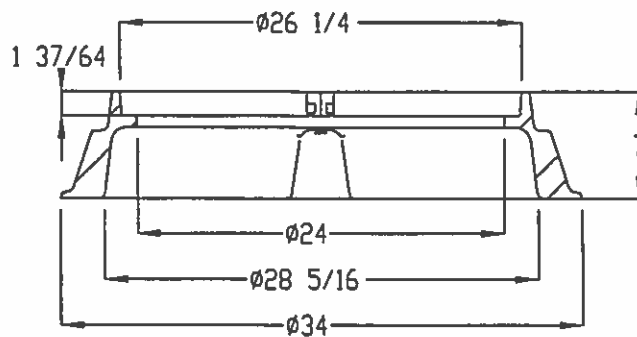
DRAWN BY: N.Y. SANTOS

DATE: 0/15/2014

EJ Part Number: LF240703408, Assembly Weight 137 lbs.



SECTION A-A
SCALE 1 : 6



SECTION B-B

DESIGN FEATURES

-MATERIALS
FRAME: DUCTILE IRON (70-50-05)

-DESIGN LOAD: HEAVY DUTY
-OPEN AREA: N/A
-COATING: UNDIPPED
-✓ DESIGNATES MACHINED SURFACE

CERTIFICATION

-ASTM A536
-COUNTRY OF ORIGIN: USA

DWSD APPROVAL:

R. Singh

DATE:

04/16/14



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

DWSD MANHOLE
FRAME

APPROVED:

updated 4/16/14
R. Singh 4/16/14
CITY ENGINEER

SHEET 1 OF 1

DETAIL STD. No.

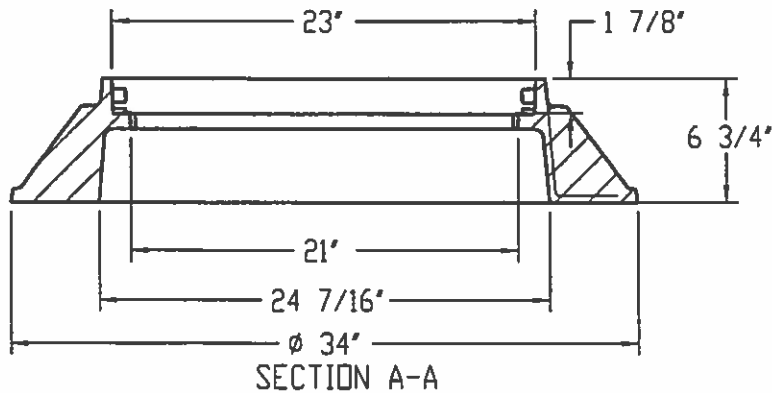
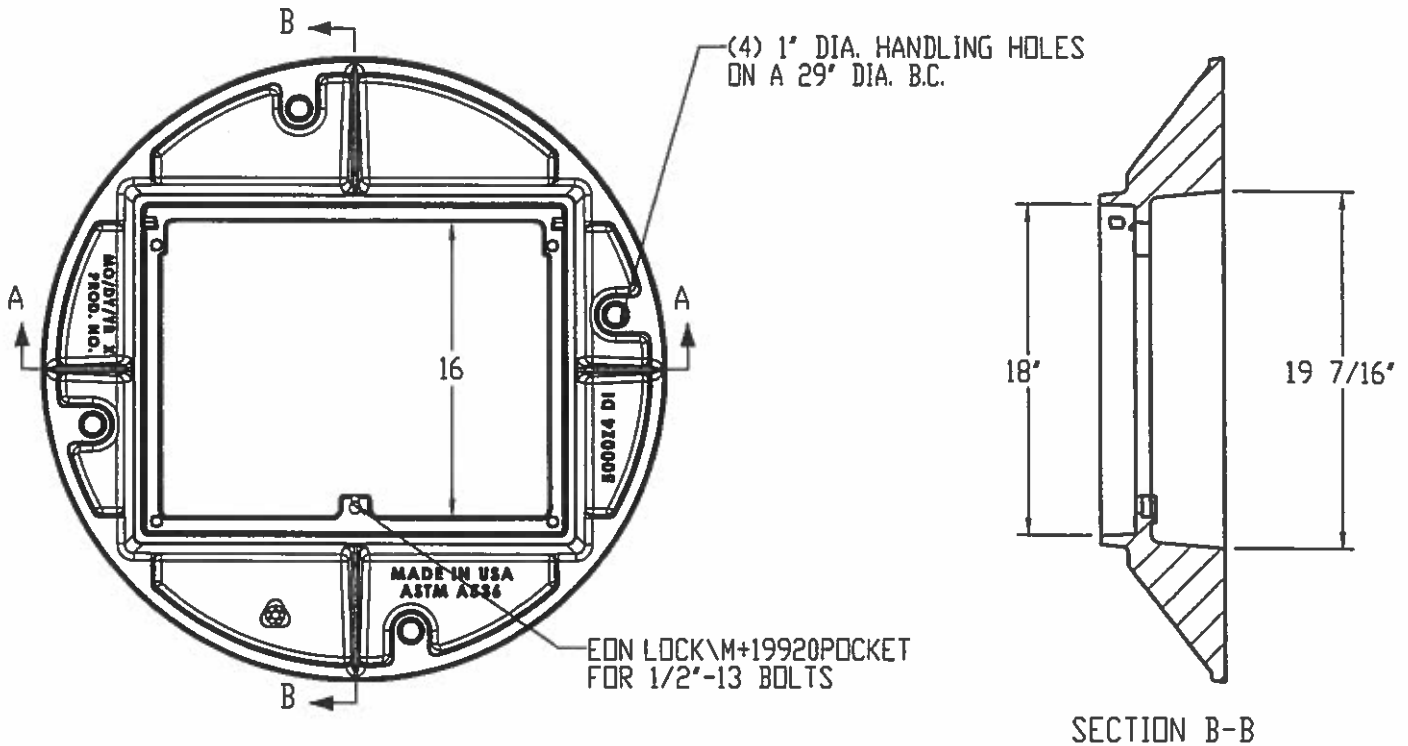
DRAWING No. 113

DRAWN BY: N.Y. SANTOS

DATE: 0/15/2014

EJ Part Number: 00500017, 156 lbs.

5000 Frame



DESIGN FEATURES
-MATERIALS
FRAME: DUCTILE IRON (70-50-05)
-DESIGN LOAD: HEAVY DUTY
-COATING: UNDIPTED
-✓ DESIGNATES MACHINED SURFACE

CERTIFICATION
-ASTM A536
-COUNTRY OF ORIGIN: USA

DWSD APPROVAL:

D. Singel

DATE:

04/16/14



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

DWSD MANHOLE
5000 FRAME

APPROVED:

approved 4/16/14
ENGINEER OF STREETS
[Signature]
CITY ENGINEER

SHEET 1 OF 1

DETAIL STD. No.

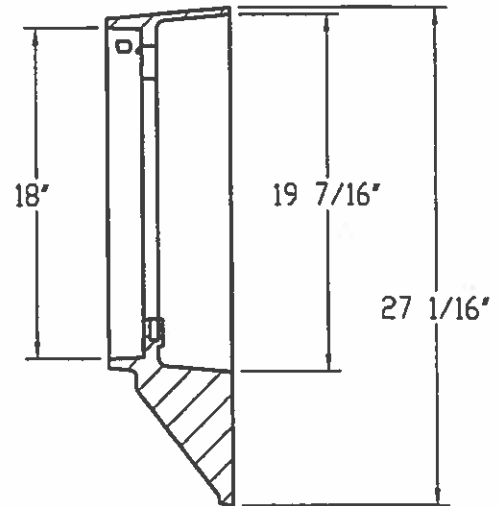
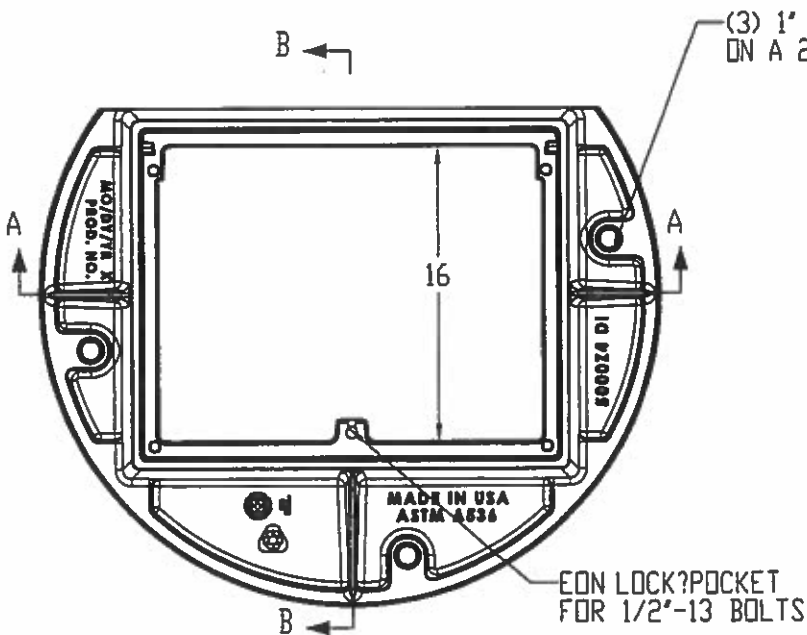
DRAWING No. 103

DRAWN BY: N.Y. SANTOS

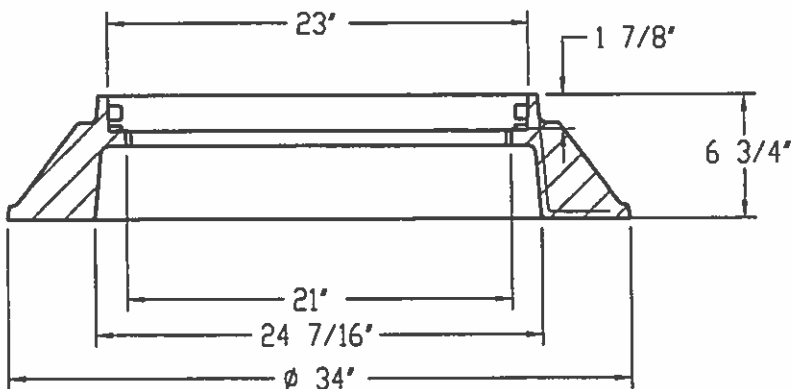
DATE: 0/15/2014

EJ Part Number: 00500019, 134 lbs.

5000 Frame



SECTION B-B



SECTION A-A

DESIGN FEATURES

-MATERIALS

FRAME: DUCTILE IRON (70-50-05)

-DESIGN LOAD: HEAVY DUTY

-COATING: UNDIPPED

-✓ DESIGNATES MACHINED SURFACE

CERTIFICATION

-ASTM A536

-COUNTRY OF ORIGIN: USA

DWSD APPROVAL: *R. Singh*

DATE: *04/16/14*



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

DWSD MANHOLE
5000 FRAME

APPROVED:

repatel 4/16/14
ENGINEER OF STREETS
Ed J 4/16/14
CITY ENGINEER

SHEET 1 OF 1

DETAIL STD. No.

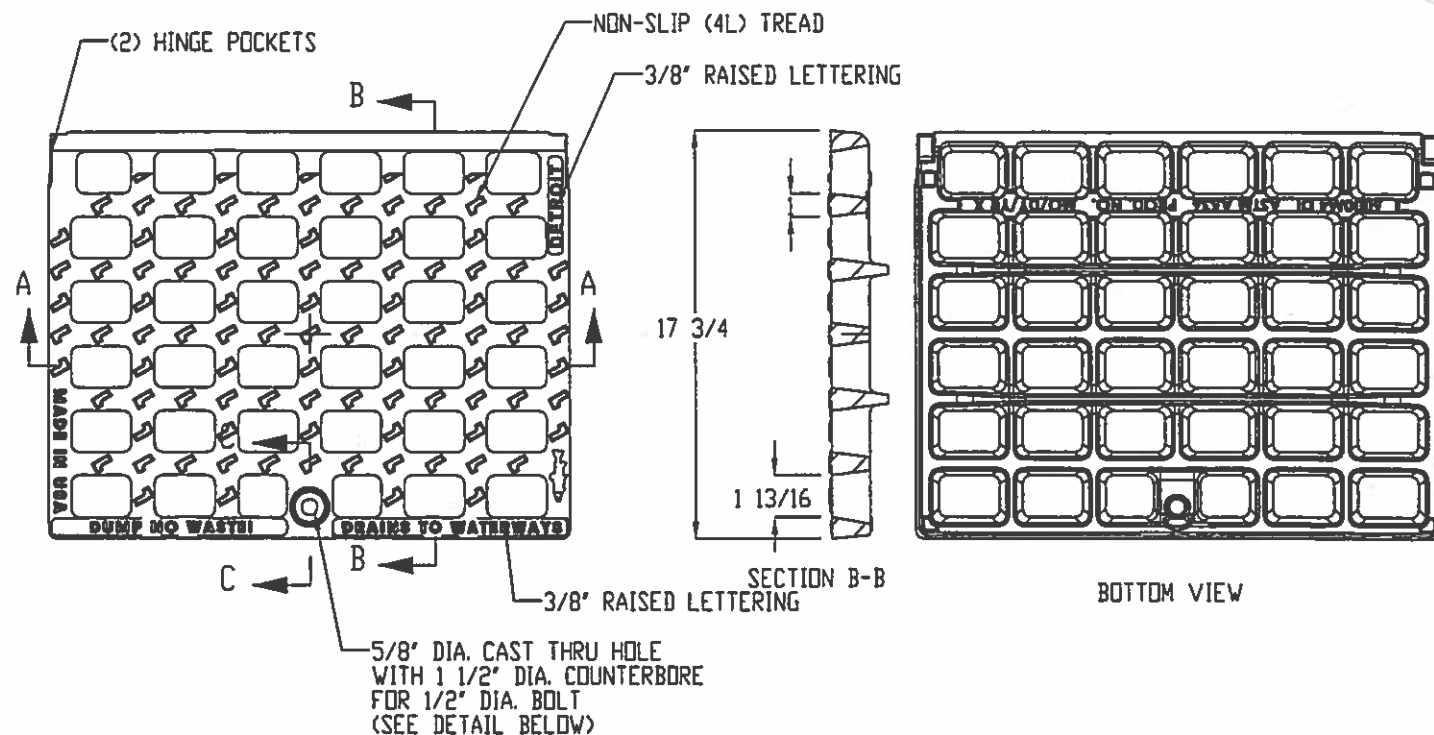
DRAWING No. 104

DRAWN BY: N.Y. SANTOS

DATE: 0/15/2014

EJ Part Number: 00500063, 85 lbs.

5000M4 Grate



BOTTOM VIEW

SECTION C-C

DESIGN FEATURES

- MATERIALS
COVER: DUCTILE IRON (80-55-06)
- DESIGN LOAD: HEAVY DUTY
- OPEN AREA: 160 SQ IN
- COATING: UNDIPPED
- DESIGNATES MACHINED SURFACE

CERTIFICATION

- ASTM A536
- COUNTRY OF ORIGIN: USA

DWSD APPROVAL:

D. Single

DATE:

04/16/14



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

CATCH BASIN
5000 M4 GRATE

APPROVED:

revised 4/16/14
ENGINEER OF STREETS
[Signature]
CITY ENGINEER

SHEET 1 OF 1

DETAIL STD. No.

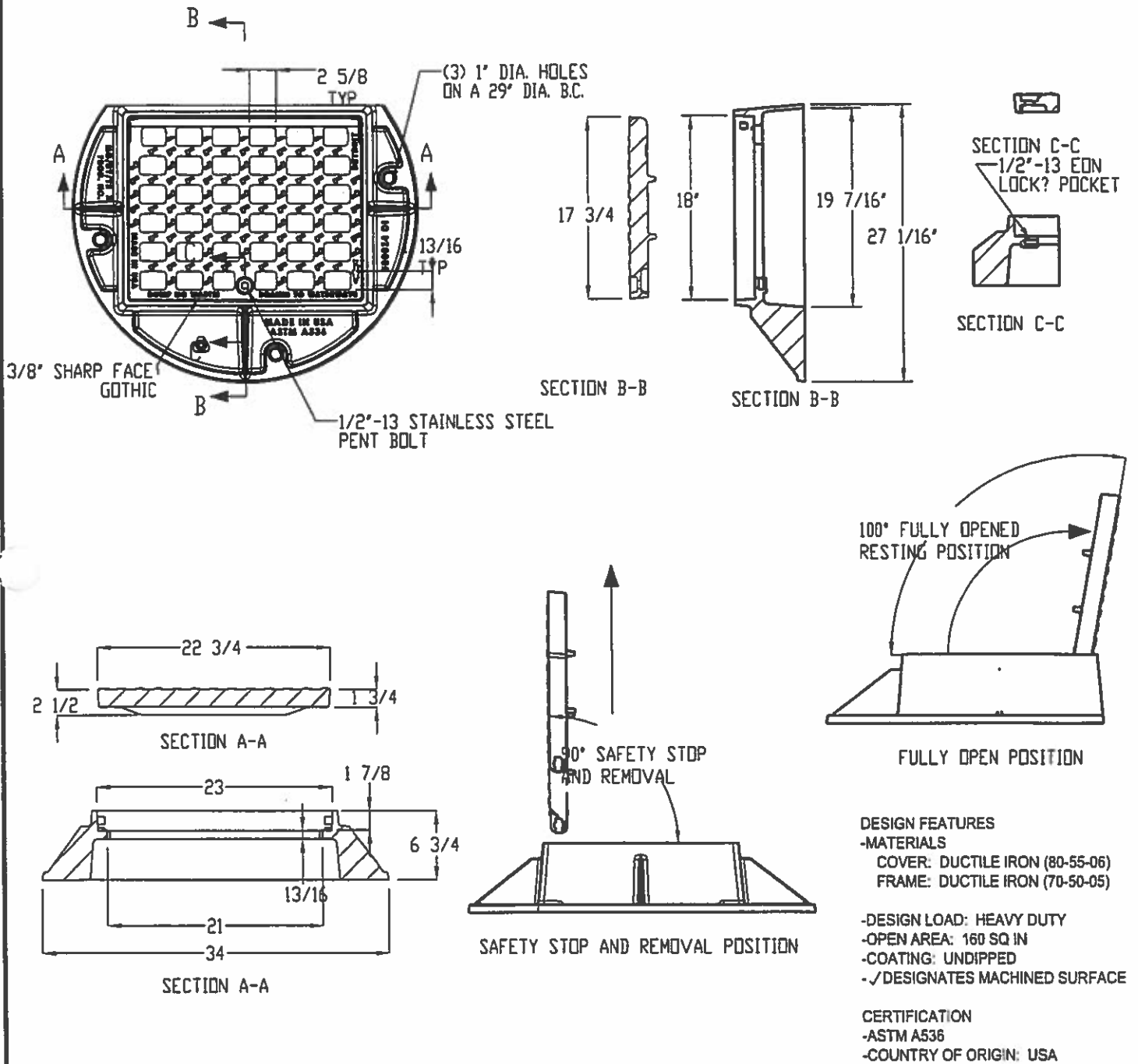
DRAWING No. 105

DRAWN BY: N.Y. SANTOS

DATE: 0/15/2014

Assembly Weight 219 lbs.

5000Z4 5000M4 Assembly



DWSD APPROVAL:

DATE:

Weights (lbs/kg), dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

CATCH BASIN
5000Z4 5000M4 ASSEMBLY

APPROVED:

4/16/14
ENGINEER OF STREETS

4/16/14
CITY ENGINEER

SHEET 1 OF 1

DETAIL STD. No.

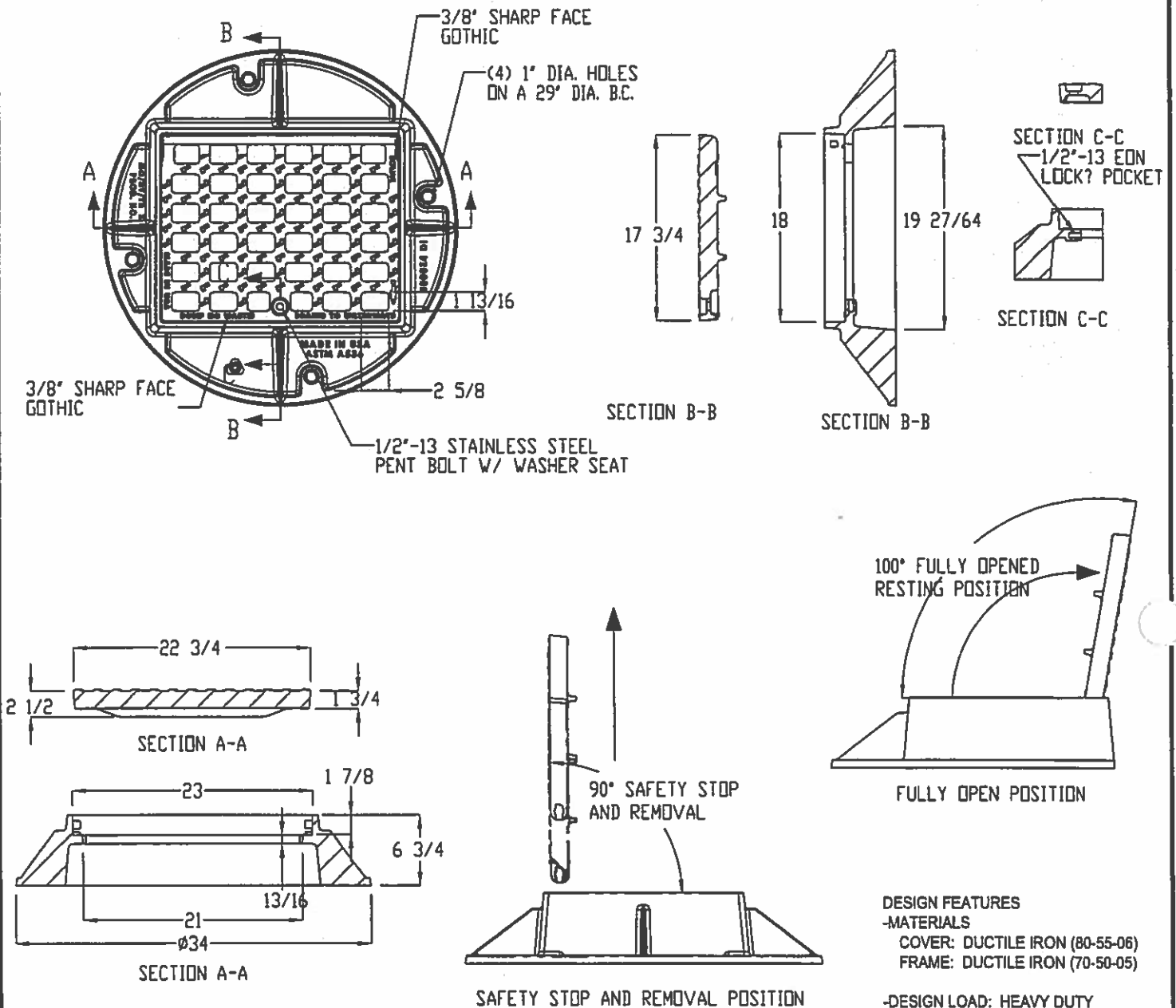
DRAWING No. 108

DRAWN BY: N.Y. SANTOS

DATE: 01/15/2014

Assembly Weight 241 lbs.

5000 Assembly



DWSD APPROVAL:

[Signature]

DATE:

04/16/14



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

CATCH BASIN
5000 ASSEMBLY

APPROVED:

[Signature] 4/16/14
ENGINEER OF STREETS
[Signature] 4/16/14
CITY ENGINEER

SHEET 1 OF 1

DETAIL STD. No.

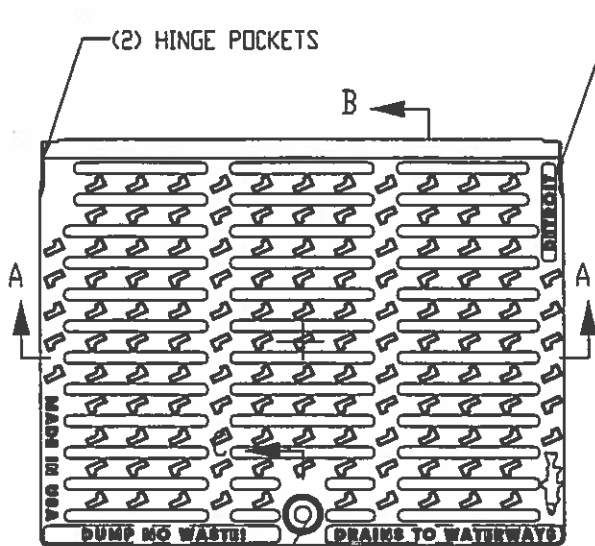
DRAWING No. 107

DRAWN BY: N.Y. SANTOS

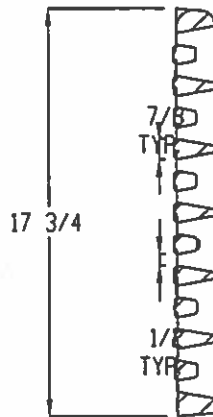
DATE: 0/15/2014

5000M5 Grate

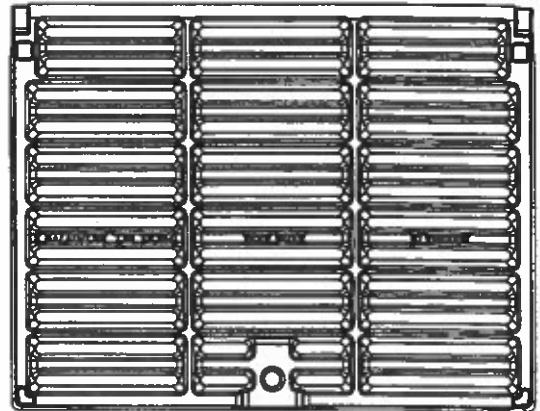
EJ Part Number: 00500066, 80 lbs.



3/8" SHARP FACE
GOTHIC



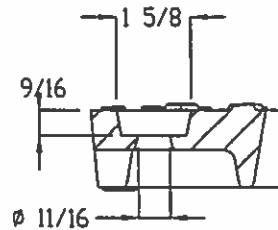
SECTION B-B



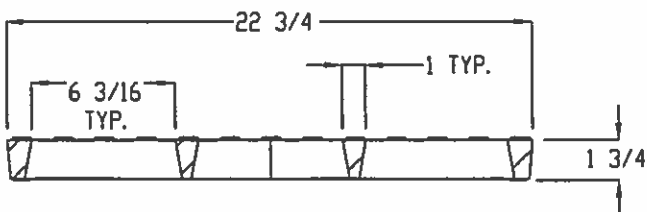
BOTTOM VIEW

3/8" SHARP FACE
GOTHIC

5/8" DIA. CAST THRU HOLE
WITH 1 1/2" DIA. COUNTERBORE
FOR 1/2" DIA. BOLT
(SEE DETAIL BELOW)



SECTION C-C



SECTION A-A

- DESIGN FEATURES
- MATERIALS
COVER: DUCTILE IRON (80-55-06)
 - DESIGN LOAD: HEAVY DUTY
 - COATING: UNDIPPED
 - DESIGNATES MACHINED SURFACE

- CERTIFICATION
- ASTM A536
 - COUNTRY OF ORIGIN: USA

DWSD APPROVAL: *D. Singleton* DATE: *04/16/14*



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

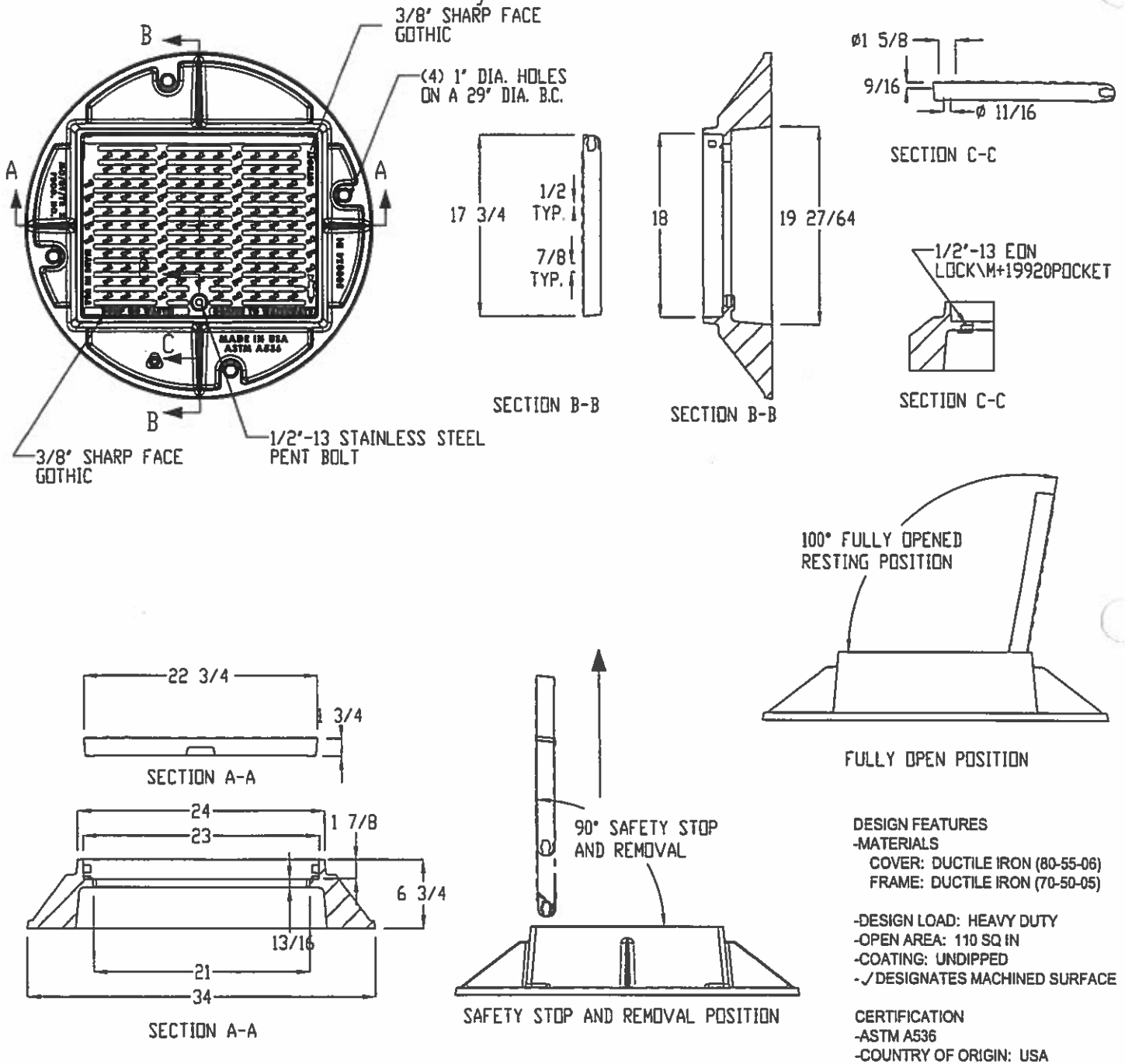
A.D.A. CATCH BASIN
5000M5 GRATE

APPROVED:
4/16/14
ENGINEER OF STREETS
[Signature]
CITY ENGINEER

SHEET 1 OF 1
DETAIL STD. No.
DRAWING No. 108
DRAWN BY: N.Y. SANTOS
DATE: 0/15/2014

EJ Part Number: 00500066B02, 236 lbs.

5000Z4 5000M5 Assembly



DWSD APPROVAL:

R. Singley

DATE:

04/16/14

Weights (lbs/kg), dimensions (inches/mm)
and drawings provided for your guidance. We
reserve the right to modify specifications without
prior notice.



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

A.D.A. CATCH BASIN
5000Z4 5000M5 ASSEMBLY

APPROVED:

update 4/16/14
ENGINEER OF STREETS
[Signature] 4/16/14
CITY ENGINEER

SHEET 1 OF 1

DETAIL STD. No.

DRAWING No. 109

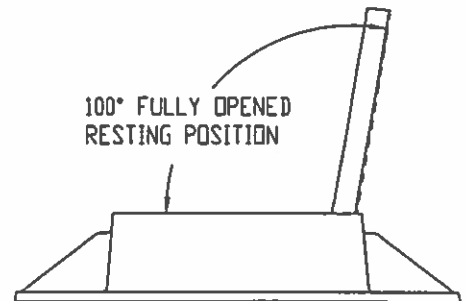
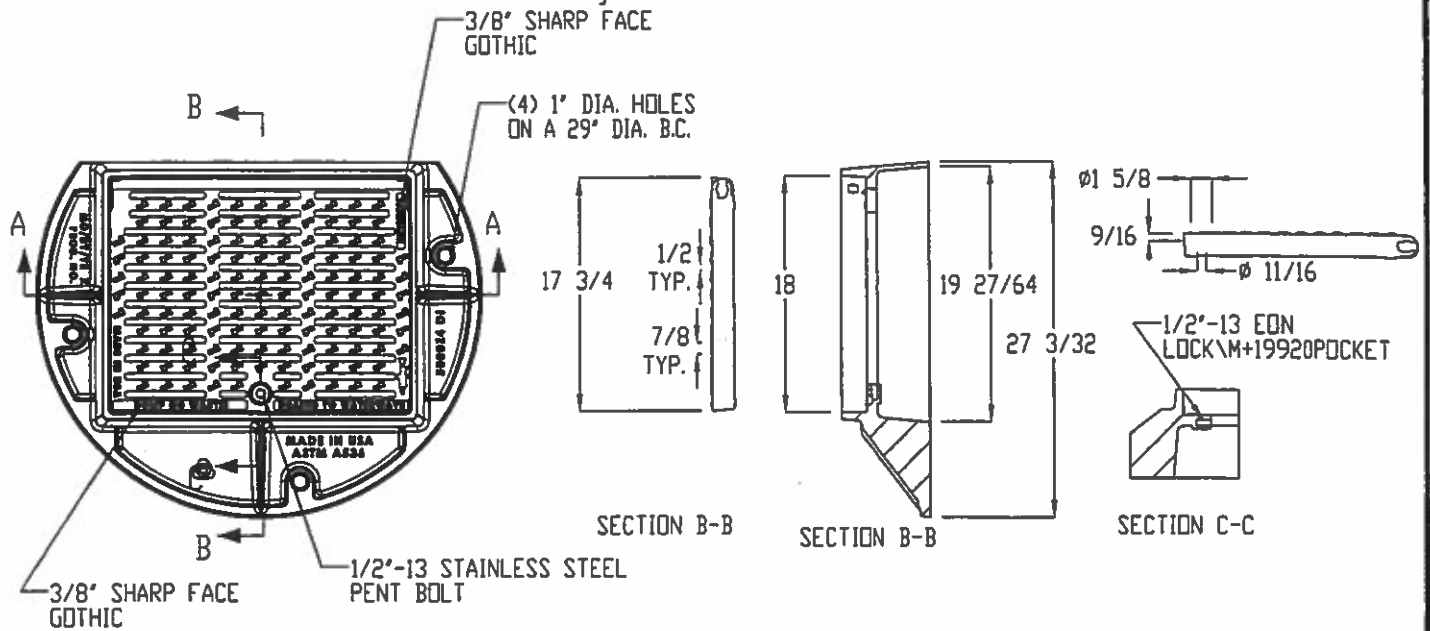
DRAWN BY: N.Y. SANTOS

DATE: 01/5/2014

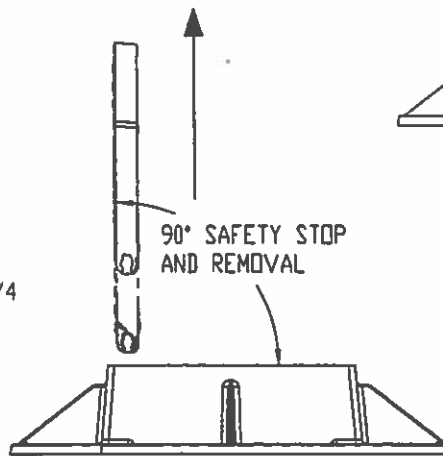
EJ Part Number: 00500066B02, 214 lbs.

5000Z4 5000M5

Assembly



FULLY OPEN POSITION



SAFETY STOP AND REMOVAL POSITION

DESIGN FEATURES

-MATERIALS

COVER: DUCTILE IRON (80-55-06)
FRAME: DUCTILE IRON (70-50-05)

-DESIGN LOAD: HEAVY DUTY

-OPEN AREA: 110 SQ IN

-COATING: UNDIPPED

-/ DESIGNATES MACHINED SURFACE

CERTIFICATION

-ASTM A536

-COUNTRY OF ORIGIN: USA

DWSD APPROVAL:

A. Single

DATE:

04/16/14



CITY OF DETROIT
CITY ENGINEERING DIVISION
DPW

A.D.A. CATCH BASIN
5000Z4 5000M5 ASSEMBLY

APPROVED:

updated 4/16/14
Red
CITY ENGINEER

SHEET 1 OF 1

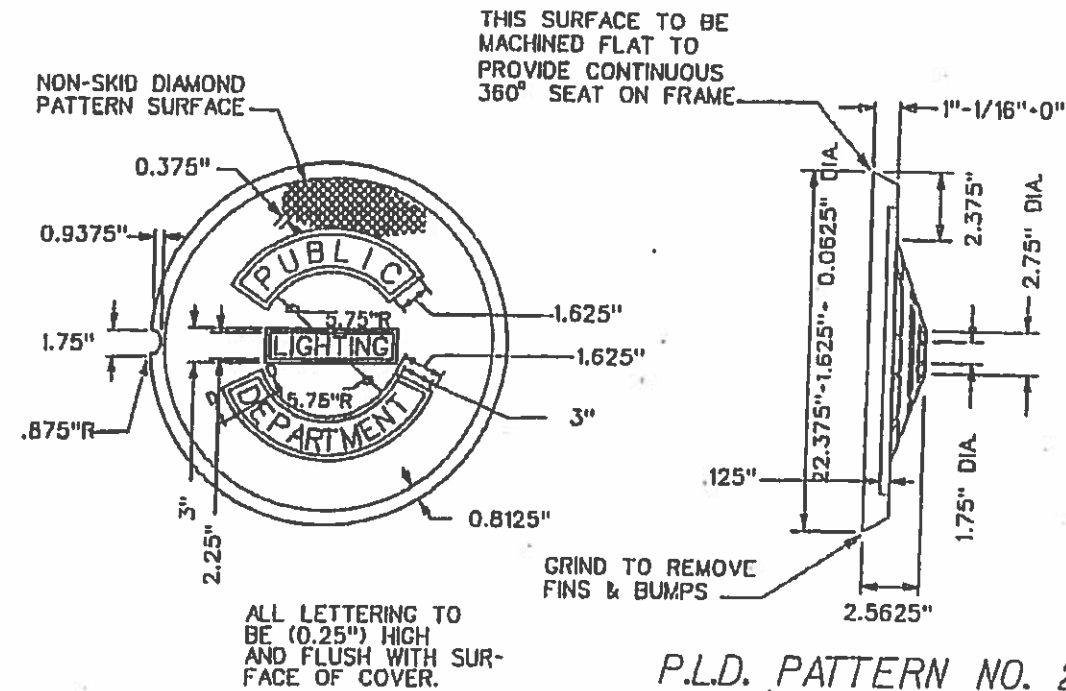
DETAIL STD. No.

DRAWING No. 110

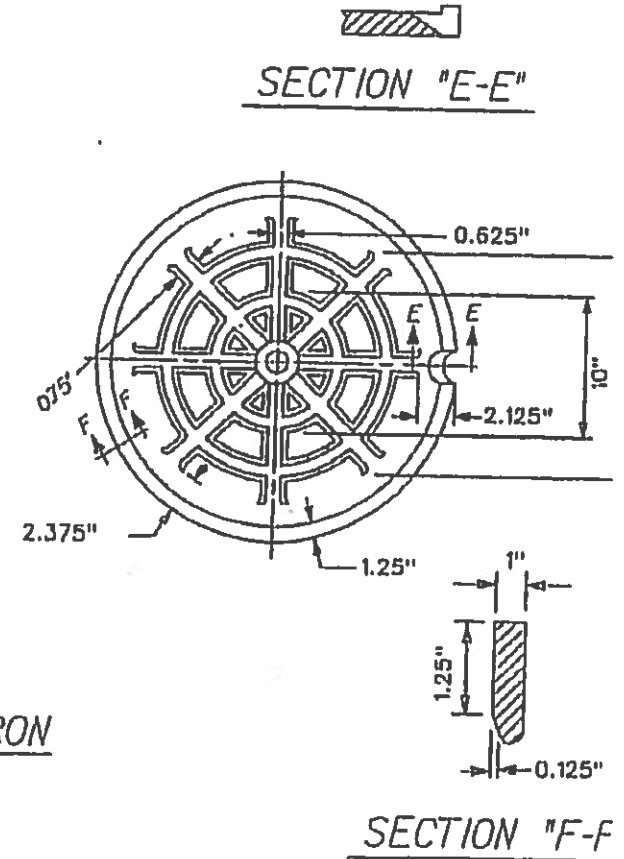
DRAWN BY: N.Y. SANTOS

DATE: 0/15/2014

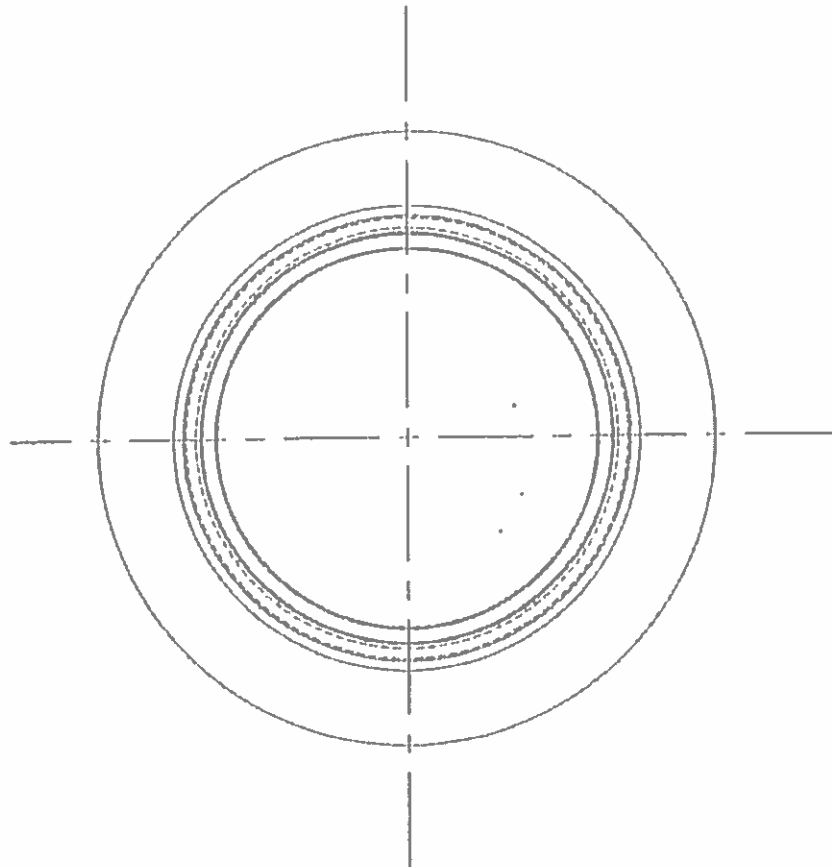
Cover Weight 142 lbs.



P.L.D. PATTERN NO. 2A
A.S.T.M. CLASS 30 GRAY IRON
APPROX. WT. 145 LBS.
STREET TYPE COVER
TO BE USED IN STREETS & DRIVES

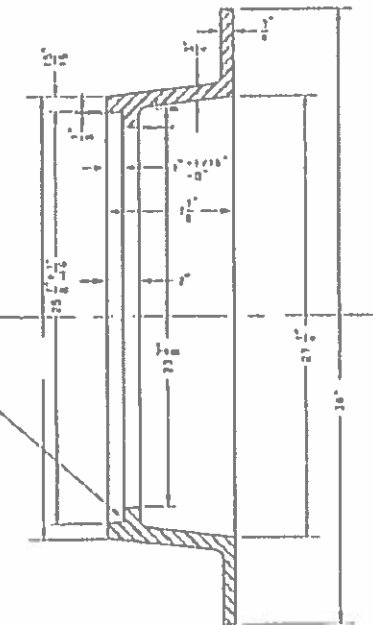


Frame Weight 252 lbs.



THIS SURFACE TO BE
MACHINED FLAT TO PROVIDE
TIGHTNESS AND SEAL FOR COVER

ALL FILLETS ARE 1/2" RADIUS
AND ALL ROUNDS ARE 1/4" RADIUS



MATERIAL - GRAY IRON - CLASS NO. 20 OR 30
PATTERN NO. 1-A

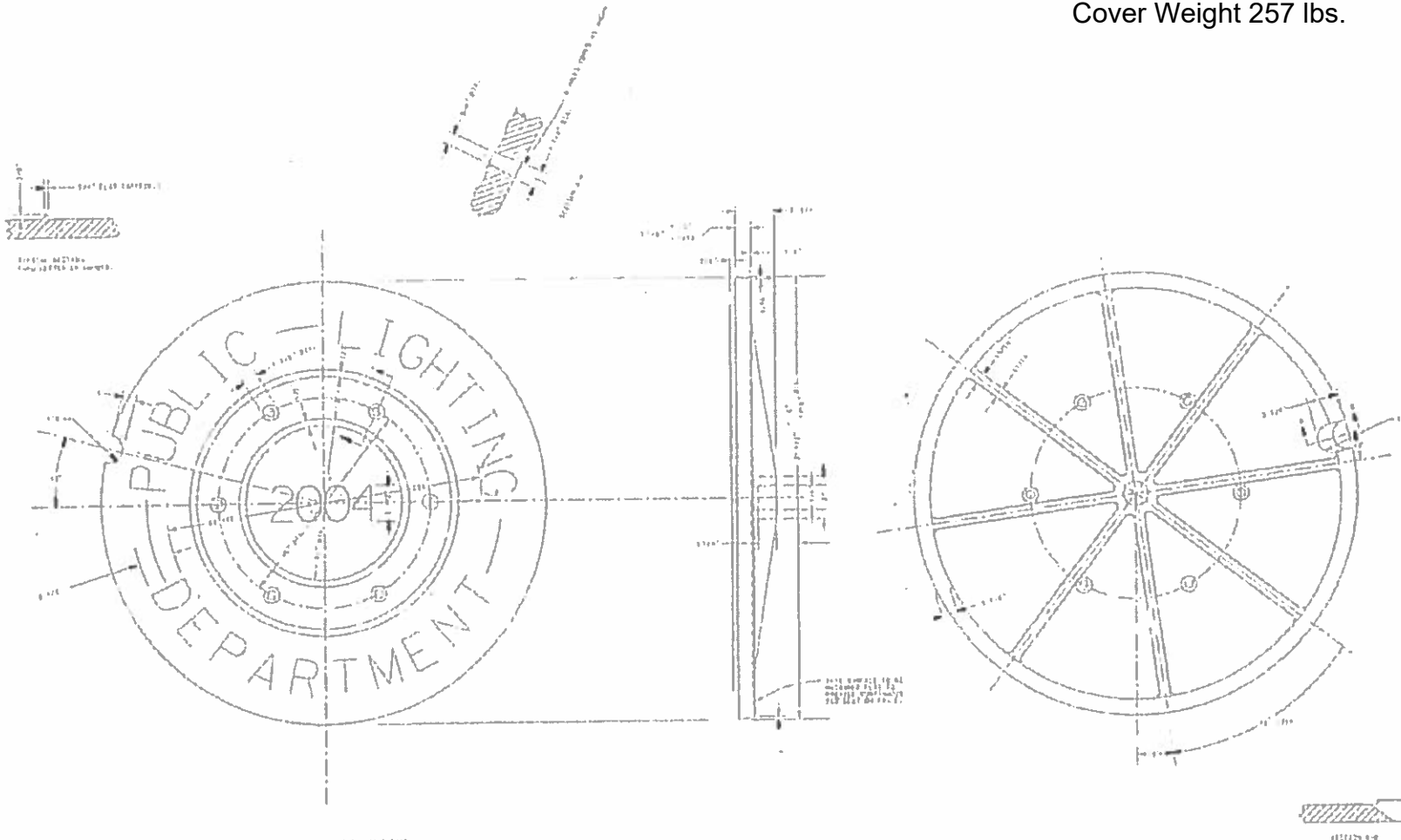
NOT TO SCALE

HANDHOLE FRAME

DATE	BY	CHKD.
10/1/54	J. H. HARRIS	J. H. HARRIS
10/1/54	J. H. HARRIS	J. H. HARRIS
10/1/54	J. H. HARRIS	J. H. HARRIS
10/1/54	J. H. HARRIS	J. H. HARRIS
10/1/54	J. H. HARRIS	J. H. HARRIS
10/1/54	J. H. HARRIS	J. H. HARRIS
10/1/54	J. H. HARRIS	J. H. HARRIS
10/1/54	J. H. HARRIS	J. H. HARRIS
10/1/54	J. H. HARRIS	J. H. HARRIS

MANUFACTURED BY	PUBLIC LIGHTING DEPARTMENT	42 0129A
DATE	10/1/54	1 OF 1
BY	J. H. HARRIS	85 P 0.64

Cover Weight 257 lbs.



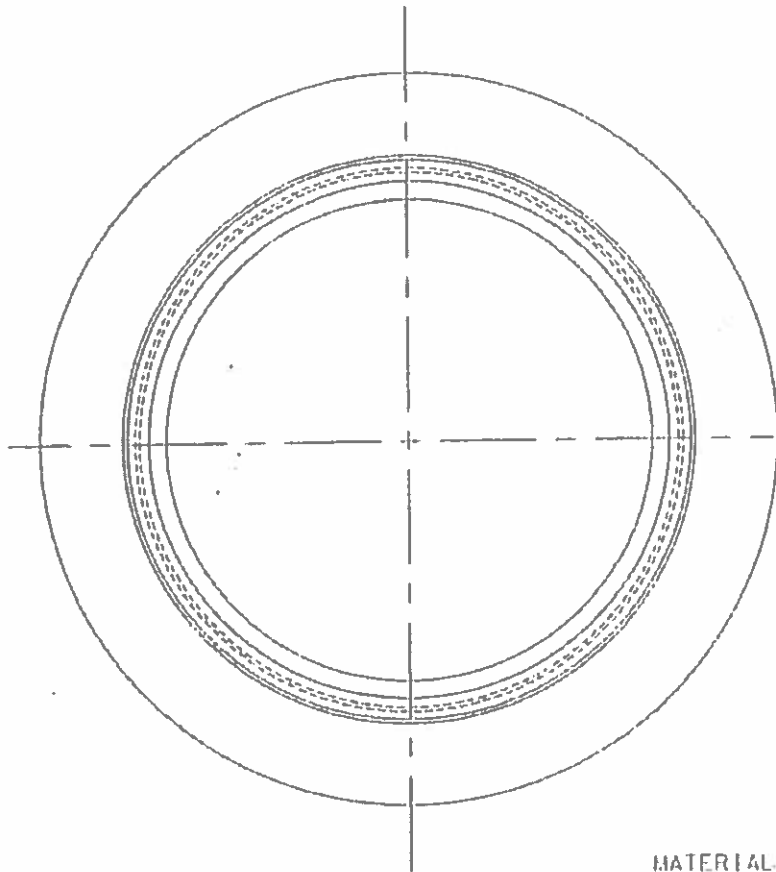
MATERIAL - GRAY IRON CLASS NO. 30
PATTERN NO. 418A

NDI ID SCALE

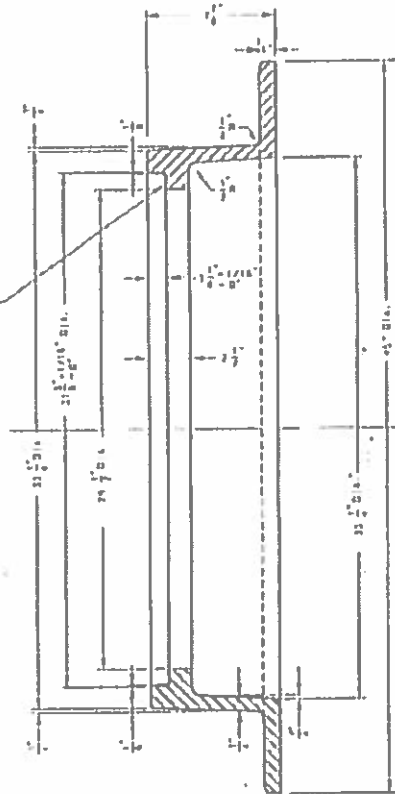
MANHOLE COVER

Handwritten document in Tamil script, likely a form or certificate. The text is written in a cursive style on a grid-lined background. The document includes fields for personal information such as name, address, and date, along with a section for a signature or stamp.

Frame Weight 442 lbs.



THIS SURFACE TO BE
MACHINED FLAT TO PROVIDE
UNIFORM SEAT FOR COVER.





ফুটপাথ প্রতিস্থাপন প্রোগ্রাম

৩ দিনের বিজ্ঞপ্তি

ডেট্রয়েট ডিপার্টমেন্ট অফ পাবলিক ওয়ার্কস, আমাদের ঠিকাদার (গুলি) এর মাধ্যমে শীঘ্রই আপনার বাড়ির সামনে ক্ষতিগ্রস্ত ফুটপাথগুলি প্রতিস্থাপন করবে। সিটি ইন্সপেক্টর সাইডওয়াক ফ্ল্যাগ পেইন্ট দিয়ে প্রতিস্থাপন যোগ্য ফুটপাথ চিহ্নিত করবেন। আমরা আপনার গাড়িকে আপনার বাড়ির সামনের দিক থেকে সরাতে বলি, যাতে ঠিকাদাররা সহজে ফুটপাথে প্রবেশ করতে পারে। যদি আপনার ড্রাইভওয়ে জুড়ে ফুটপাথে চিহ্নগুলি থাকে তবে আপনাকে কাজ শুরু হওয়ার আগে আপনার গাড়ি আপনার ড্রাইভওয়ে থেকে সরাতে হবে। অন্যথায়, গাড়িটি ড্রাইভওয়েতে ৭ দিনের জন্য আটকে যেতে পারে যখন, কংক্রিট শক্তিশালী করা হয়।

একবার কংক্রিট ঢালা হলে, কংক্রিটের রাস্তা শক্তিশালী হতে প্রায় ৩ দিন এবং ড্রাইভওয়ে জুড়ে ঘন কংক্রিটের শক্তিশালী করার জন্য প্রায় ৭ দিন সময় নেয়। এটি অত্যন্ত গুরুত্বপূর্ণ যে ফুটপাথ শক্ত হয়ে যাওয়ার সময় আপনি এর উপর দিয়ে হাঁটাচলা করা অথবা গাড়ি চালানো, দাগ দেওয়া অথবা অন্যভাবে ক্ষতি করবেন না। এটা কাজের মান প্রভাবিত করবে।

ফুটপাথের প্রতিস্থাপন করার পর, কর্মীরা ফুটপাথের পাশে অবস্থিত এলাকায় পুনরুদ্ধার করতে ফিরে আসবে। ধ্বংসাবশেষ অপসারণ, পথের প্রতিস্থাপন দ্বারা সৃষ্ট ক্ষতির মেরামত, এবং কাজের দ্বারা ক্ষতিগ্রস্ত লনে মাটি এবং বীজ প্রয়োগ এর অন্তর্ভুক্ত। ফুটপাথ প্রতিস্থাপন করার পর ২ সপ্তাহের মধ্যে পুনর্নির্মাণ সম্পন্ন করা হবে। যদি ঠিকাদার আপনার স্প্রিংকলার সিস্টেম ক্ষতিগ্রস্ত করে, (৩১৩) ২২৪ -৩৪৯৪ এ আমাদের সাথে যোগাযোগ করুন। আপনার ঠিকানা এবং যোগাযোগের তথ্য দিয়ে একটি বার্তা ছেড়ে দিন। আমরা প্রয়োজনীয় মেরামত করতে ঠিকাদারকে অবহিত করব। এই কাজের সাথে যুক্ত সমস্ত খরচ ডেট্রয়েট শহরের দ্বারা প্রদান করা হবে। আপনি পুনরুদ্ধারকৃত এলাকায় পানি জোগানোর জন্য দায়ী, যাতে নতুন ঘাসের শিকড় গজাতে পারে আপনি দৈনিক দুইবার পানি দেবেন এবং কমপক্ষে ৪ ইঞ্চি উচ্চ পর্যন্ত ঘাস কাটবেন না বলে সুপারিশ করা হয়।

আপনার অসুবিধার জন্য আমরা ক্ষমাপ্রার্থী এবং আপনার ধৈর্যের প্রশংসা করি যখন আমরা এই উন্নতিগুলি করার জন্য দ্রুত কাজ করি। কোন কাজ এর সাথে সম্পর্কিত সমস্যার প্রতিবেদন করতে সিটি ইঞ্জিনিয়ারিং বিভাগকে ফোন করুন এবং (৩১৩) ২২৪ -৩৯৪৯ এই নম্বরে একটি বার্তা দিন অথবা আপনি www.detroitmi.gov/sidewalks এ সাইড ওয়াক ম্যাপ ওয়েবসাইটের মাধ্যমে তাদের অনলাইন রিপোর্ট করতে পারেন।

আপনার সহযোগিতার জন্য আবার ধন্যবাদ।



SIDEWALK REPLACEMENT PROGRAM

3 DAY NOTICE

The Detroit Department of Public Works, through our contractor(s), will soon be replacing damaged sidewalks in front of your home. A City inspector will mark the sidewalk flags to be replaced with pink paint. We ask that you move your vehicle from the front of your home, so that the contractor has easier access to the sidewalk. If the markings include the sidewalk across your driveway, you will need to move your vehicle from your driveway before work begins. Otherwise, the vehicle could be trapped in the driveway for up to 7 days, while the concrete is strengthening.

Once the concrete has been poured, it will take approx. 3 days for the concrete walks to strengthen and approx. 7 days for the thicker concrete across the driveway to strengthen. It is extremely important that you do not walk or drive across, mark or otherwise damage the sidewalk while it hardens. It will affect the quality of the work.

Following replacement of the sidewalk, crews will return to restore the areas adjacent to the sidewalks. This includes removing debris, repairing damages caused by the sidewalk replacement, and applying soil and seed in the lawn damaged by the work. The restoration will be completed within 2 weeks after replacement of the sidewalks. If the contractor damages your sprinkler system, contact us at **(313) 224-3494**. Leave a message with your address and contact information. We will notify the contractor to make the necessary repairs. All costs associated with this work will be paid by the City of Detroit. You are responsible for watering the restored areas so the new grass can take root. It is recommended that you water twice daily and do not cut the grass until it is at least 4 inches high.

We apologize for the inconvenience and appreciate your patience as we work quickly to make these improvements. Please call the City Engineering Division and leave a message at **(313) 224-3949** to report any work related issues or you may report them online with the Sidewalk Map Website at **www.detroitmi.gov/sidewalks**.

Thanks again for your cooperation.



PROGRAMA DE REEMPLAZO DE LAS VEREDAS

NOTIFICACIÓN DE 3 DÍAS

A través de nuestro contratista(s), el Departamento de Obras Públicas de Detroit muy pronto reemplazarán las veredas dañadas en frente a su hogar. Un inspector de la Ciudad marcará las banderas de la vereda a ser reemplazada con pintura. Le pedimos que mueva su vehículo de la parte delantera de su hogar para que el contratista tenga fácil acceso a la vereda. Si las señales incluyen la acera en frente a su entrada, usted necesita mover su vehículo de su entrada antes de que comience el trabajo. De lo contrario, el vehículo se puede quedar atrapado en la entrada hasta 7 días mientras se fortalece el concreto.

Una vez que se haya colocado el concreto, tomará aproximadamente 3 días para que se fortalezcan las paredes y aproximadamente 7 días para que el concreto más espeso se fortalezca en la calzada. Es extremadamente importante que no camine ni conduzca, marque o dañe la vereda mientras se endurece. Eso afectará la calidad del trabajo.

Después del reemplazo de la vereda, el personal regresará a restaurar las áreas adyacentes a las veredas. Esto incluye remover escombros, reparar daños causados por el reemplazo de la vereda, y aplicar tierra y semilla en el césped dañado por el trabajo. La restauración estará completa dentro de 2 semanas después del reemplazo de las veredas. Si el contratista daña su sistema de rociadores, contáctenos al **(313) 224-3494**. Deje un mensaje con su dirección e información de contacto. Notificaremos al contratista para que haga las reparaciones necesarias. Todos los costos asociados con este trabajo serán pagados por la Ciudad de Detroit. Usted es responsable por el riego de las áreas restauradas para que el nuevo césped cree raíces. Se recomienda que riegue con agua dos veces al día y no corte la hierba hasta que por lo menos tenga 4 pulgadas de alto.

Le pedimos disculpas por las molestias y apreciamos su paciencia mientras trabajamos lo más rápido posible para hacer estas mejoras. Por favor llame a la División de Ingeniería de la Ciudad y deje un mensaje en el **(313) 224-3949** para reportar cualquier problema relacionado o puede reportarlos en línea en la página en el Internet Mapa de las Veredas en **www.detroitmi.gov/sidewalks**.

Gracias nuevamente por su cooperación.



برنامج استبدال الرصيف

أشعار لمدة 3 أيام

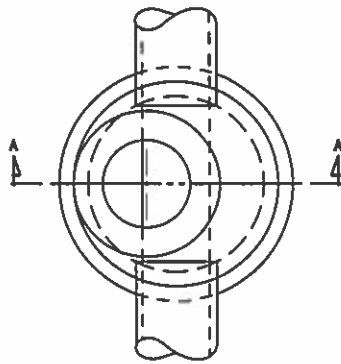
وزارة الأشغال العامة في ديترويت ستستبدل قريباً ، من خلال مقاولنا ، الأرصفة التالفة أمام منزلك. سيقوم مفتش المدينة بوضع علامة على الواح الرصيف ليتم استبدالها بالطلاء. نطلب منك نقل سيارتك من مقدمة منزلك ، بحيث يكون للمقاول سهولة الوصول إلى الرصيف. إذا كانت العلامات تشمل الرصيف عبر دربك الخاص ، فستحتاج إلى نقل سيارتك من دربك الخاص قبل بدء العمل. خلاف ذلك ، يمكن أن تكون السيارة محاصرة في الممر لمدة تصل إلى 7 أيام ، لحين تتصلب الخرسانة.

بمجرد صب الخرسانة سوف يستغرق الأمر 3 أيام تقريباً للممر الكونكريتي لكي يتصلب. وتقريباً 7 أيام ل للخرسانة الأسمنتية السميكة عبر الممر لتتصلب. من المهم للغاية ألا تمشي أو تسوق عبر الرصيف كي لا تتلفه أو تترك علامة بينما تصلب. حيث سيؤثر على جودة العمل.

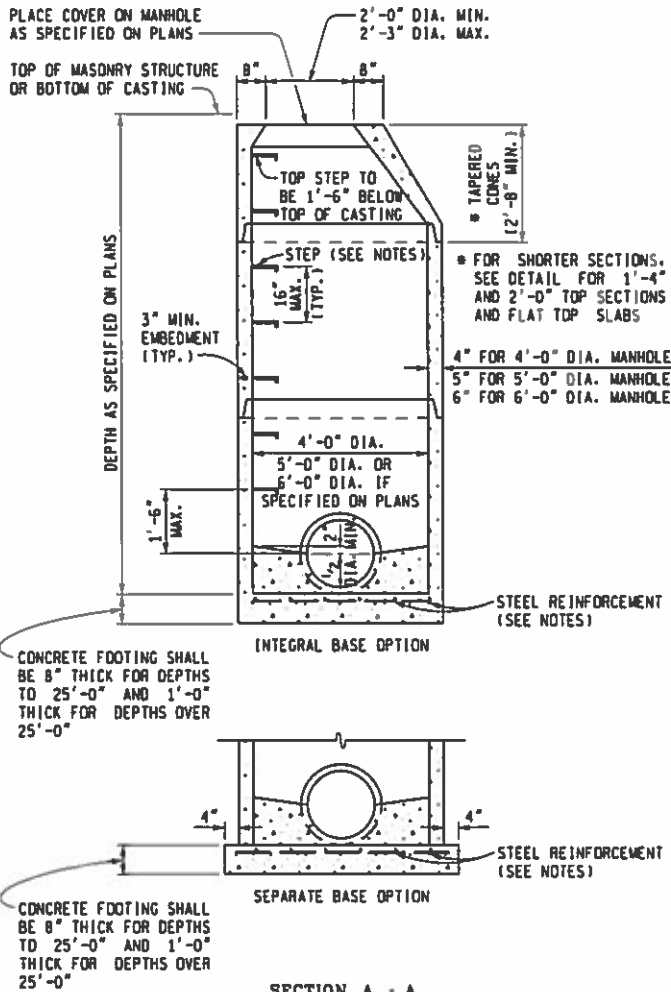
بعد استبدال الرصيف ، ستعود الطواقم لاستعادة المناطق المتاخمة للأرصفة. وهذا يشمل إزالة الحطام ، وإصلاح الأضرار الناجمة عن استبدال الرصيف ، ووضع التربة والبذور في الحديقة التي تضررت من العمل. سيتم الانتهاء من الترميم في غضون أسبوعين بعد استبدال الأرصفة. إذا أضر المقاول بنظام الرش الخاص بك ، فاتصل بنا على 313-224-3494. وأترك رسالة مع عنوانك ومعلومات للاتصال. سنقوم بإخطار المقاول بإجراء الإصلاحات اللازمة. سيتم دفع جميع التكاليف المرتبطة بهذا العمل من قبل مدينة ديترويت. أنت مسؤول عن سقي المناطق المستعادة حتى يتسنى للعشب الجديد أن يتجذر. يوصى بأن تسقي مرتين يومياً ولا تقص العشب حتى يبلغ ارتفاعه 4 بوصات على الأقل.

نعتذر عن أي إزعاج ونقدر سعة صدرك أثناء قيامنا بالعمل بسرعة لإجراء هذه التحسينات. يرجى الاتصال بقسم هندسة المدينة وترك رسالة على **(313) 224-3949** للإبلاغ عن أي مشكلات متعلقة بالعمل. أو بإمكانك الإبلاغ عنها عبر الإنترنت من خلال موقع **www.detroitmi.gov/sidewalks**.

شكراً مرة أخرى لتعاونكم.

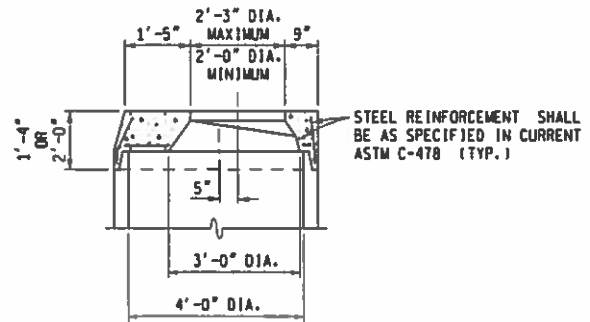


PLAN VIEW



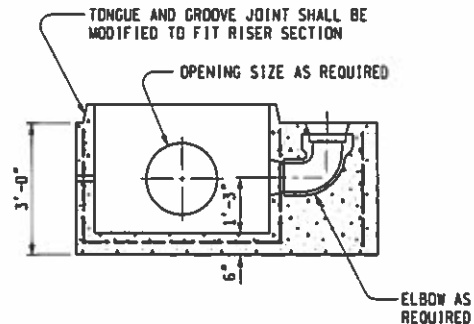
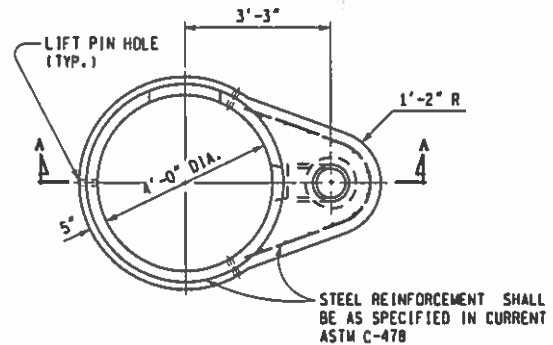
SECTION A - A
TYPICAL MANHOLE

PRECAST REINFORCED CONCRETE SHOWN
OTHER OPTIONS INCLUDE CONCRETE BLOCK, BRICK, OR CAST-IN-PLACE WALL SECTIONS
SEE TYPICAL WALL SECTIONS FOR WALL THICKNESS



DETAIL FOR
1'-4" & 2'-0" TOP SECTIONS

SHAPE MAY VARY FROM DETAIL SHOWN BUT MUST COMPLY WITH ASTM C-478 AND JOINTS SHALL BE COMPATIBLE WITH THE RISER



SECTION A - A

TYPICAL PRECAST REINFORCED
BOTTOM SECTION FOR DROP MANHOLE



PREPARED
BY
DESIGN DIVISION
DRAWN BY: B.L.T.
CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: *Randy V. Puffel*
DIRECTOR, BUREAU OF FIELD SERVICES
APPROVED BY: *Mark A. Van Pelt*
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

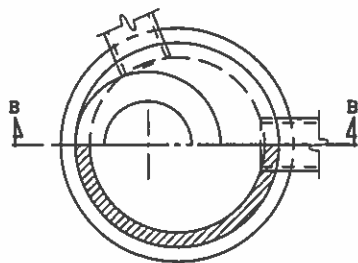
DRAINAGE STRUCTURES

1-27-2015
F.H.W.A. APPROVAL

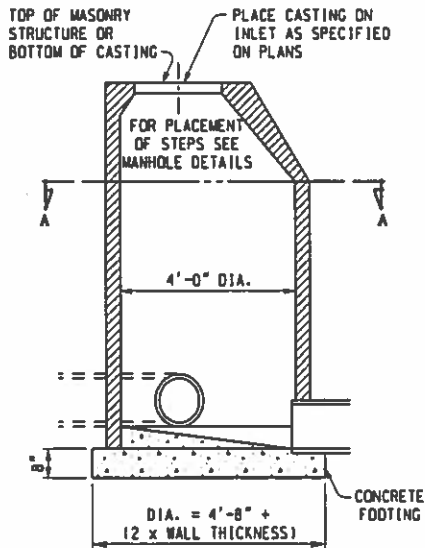
11-17-2014
PLAN DATE

R-1-F

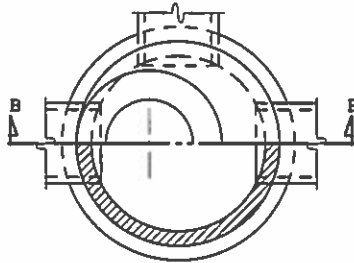
SHEET
1 OF 5



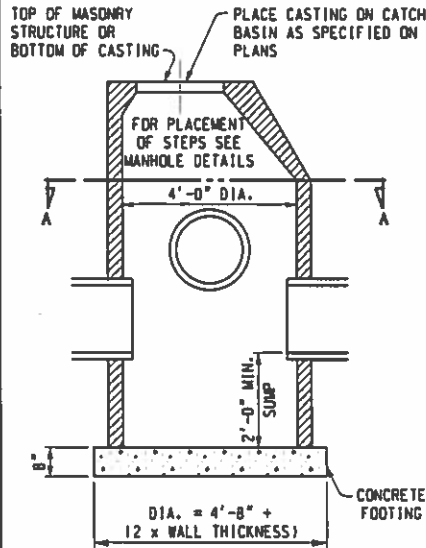
HALF SECTION A - A



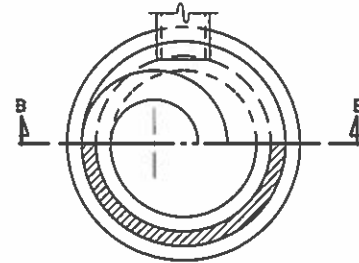
SEE MANHOLE DETAILS FOR BASE OPTIONS
SECTION B - B
INLET



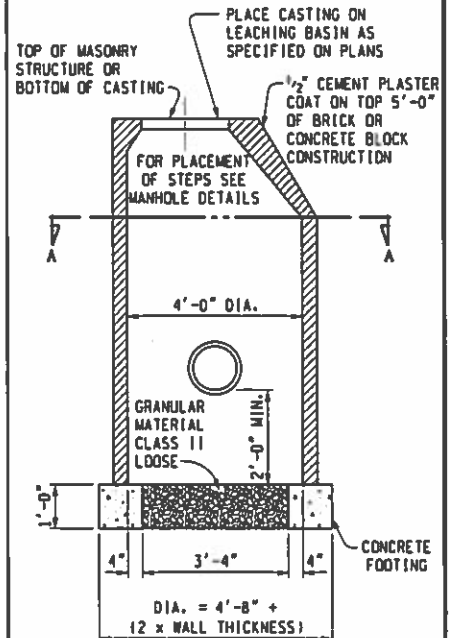
HALF SECTION A - A



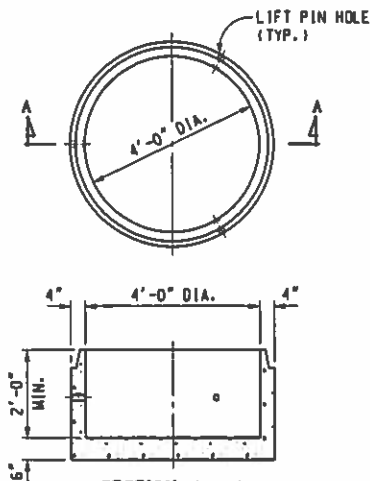
SEE MANHOLE DETAILS FOR BASE OPTIONS
SECTION B - B
CATCH BASIN



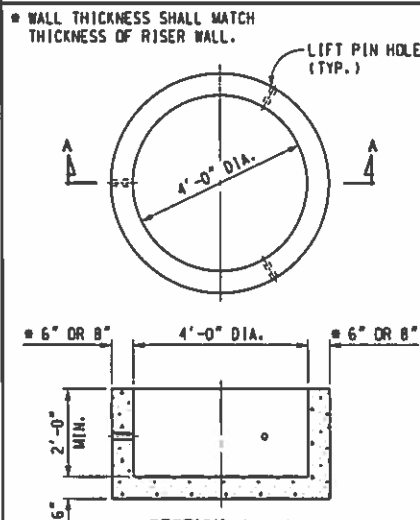
HALF SECTION A - A



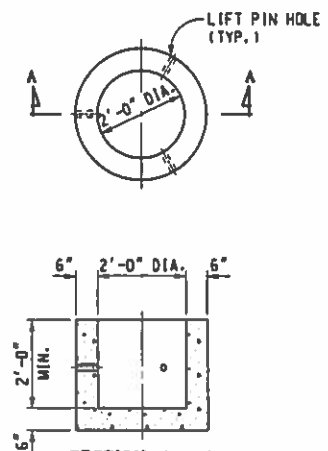
SEE MANHOLE DETAILS FOR BASE OPTIONS
SECTION B - B
LEACHING BASIN



SECTION A - A
**PRECAST SUMP
FOR PRECAST RISERS**



SECTION A - A
**PRECAST SUMP FOR BRICK
OR BLOCK CONSTRUCTION**



SECTION A - A
**PRECAST SUMP FOR
2'-0" DIA. STRUCTURES**

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

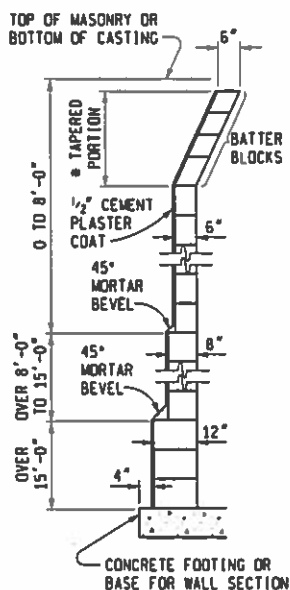
1-27-2015
F.H.W.A. APPROVAL

11-17-2014
PLAN DATE

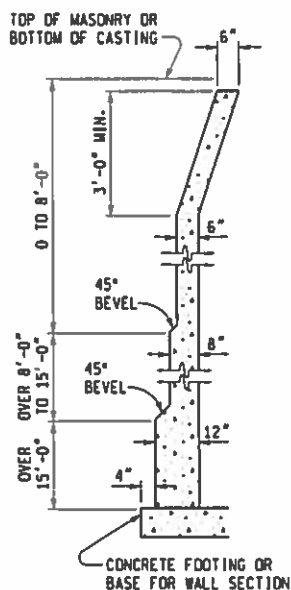
R-1-F

SHEET
2 OF 5

4 BLOCK MIN. FOR 4'-0" DIA. STRUCTURE
6 BLOCK MIN. FOR 5'-0" DIA. STRUCTURE
6 BLOCK MIN. FOR 6'-0" DIA. STRUCTURE

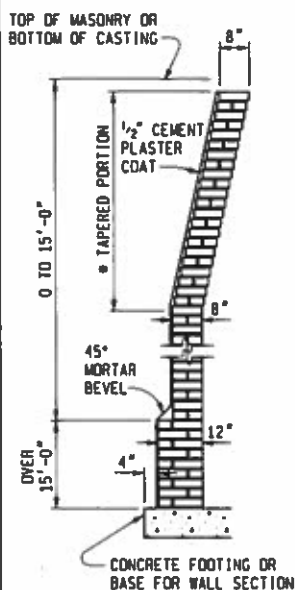


TYPICAL
CONCRETE BLOCK
WALL SECTION

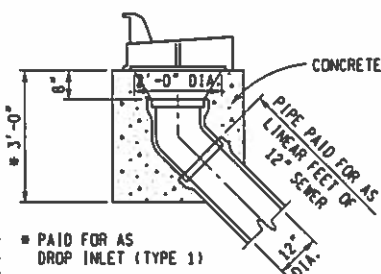
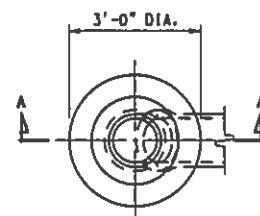


TYPICAL
CAST-IN-PLACE
CONCRETE
WALL SECTION

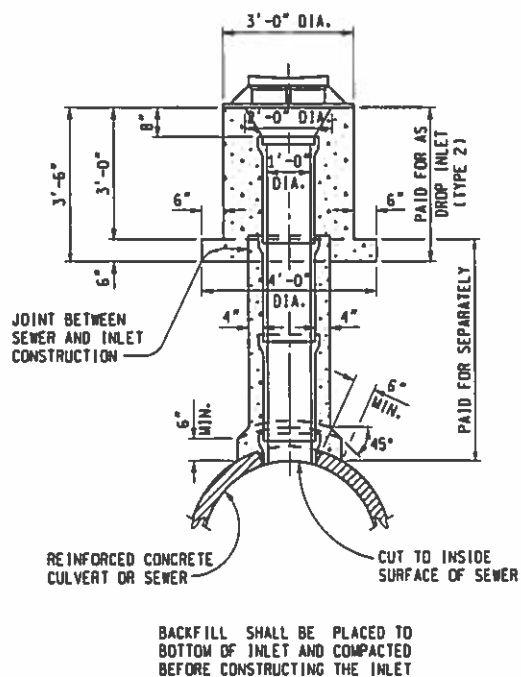
5'-0" MIN. FOR 4'-0" DIA. STRUCTURE
6'-0" MIN. FOR 5'-0" DIA. STRUCTURE
6'-0" MIN. FOR 6'-0" DIA. STRUCTURE



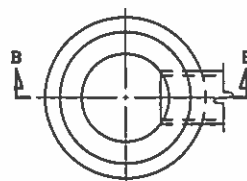
TYPICAL BRICK
WALL SECTION



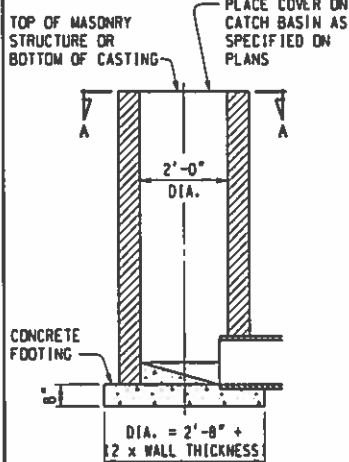
SECTION A - A
DROP INLET (TYPE 1)



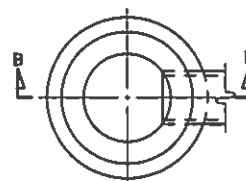
DROP INLET (TYPE 2)



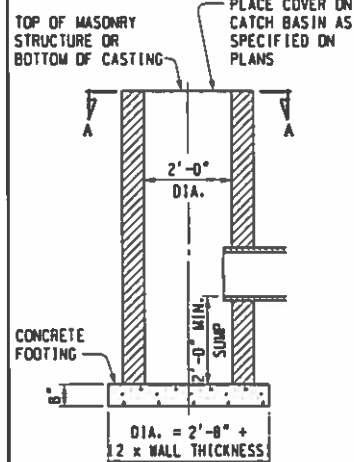
SECTION A - A



SECTION B - B
INLET



SECTION A - A



SECTION B - B
CATCH BASIN

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

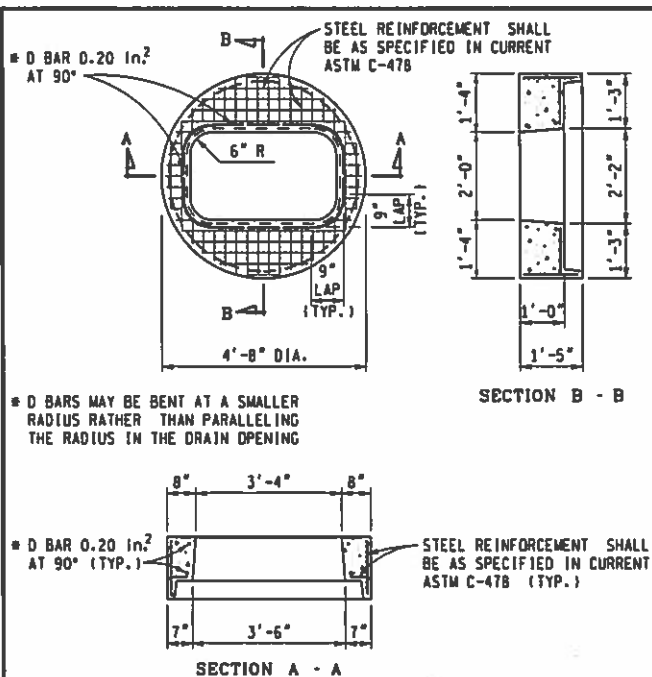
DRAINAGE STRUCTURES

1-27-2015
F.H.W.A. APPROVAL

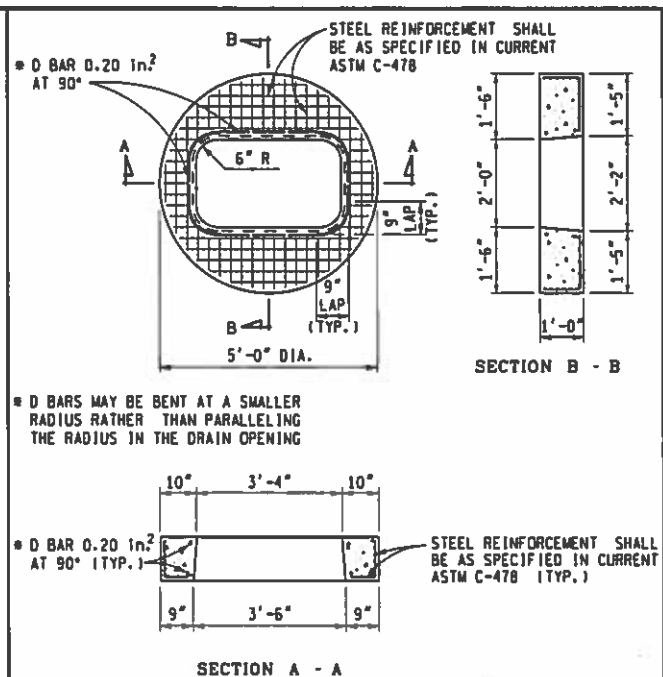
11-17-2014
PLAN DATE

R-1-F

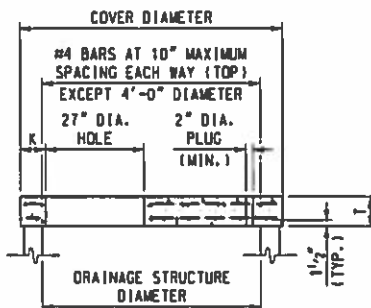
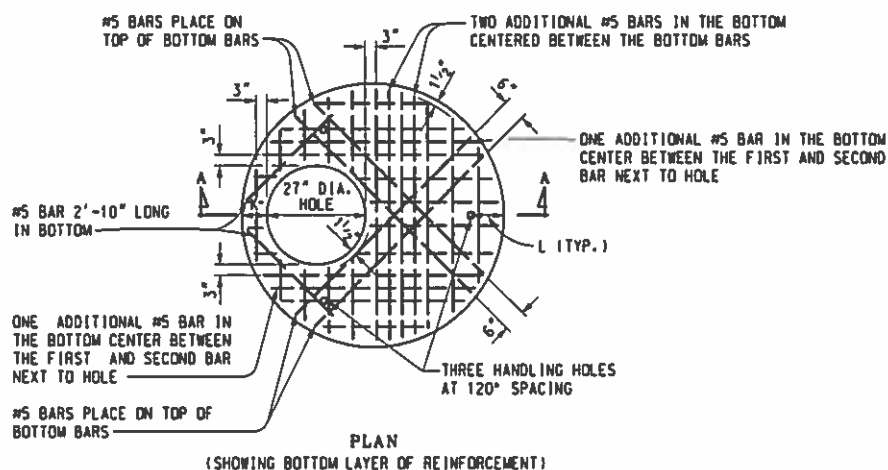
SHEET
3 OF 5



PRECAST FLAT SLAB TOP FOR PRECAST CONCRETE STRUCTURE, 2' x 4' CASTING



PRECAST FLAT SLAB TOP FOR MASONRY STRUCTURE, 2' x 4' CASTING



PRECAST REINFORCED CONCRETE FLAT SLAB TOP

TABLE OF DIMENSIONS

STRUCTURE DIAMETER	COVER DIAMETER	T	K	L	#5 BAR MAXIMUM SPACING (BOTTOM EACH WAY)
4'-0"	58"	6"	6"	8"	6"
5'-0"	72"	8"	7"	9"	7"
6'-0"	86"	8"	8"	10"	6"

ONLY BOTTOM LAYERS OF STEEL NECESSARY

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

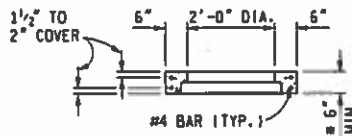
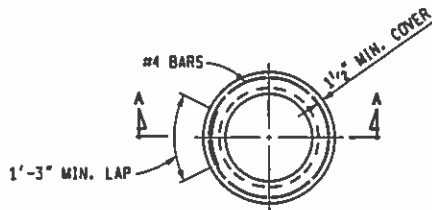
DRAINAGE STRUCTURES

1-27-2015
F.W.A. APPROVAL

11-17-2014
PLAN DATE

R-1-F

SHEET
4 OF 5



SECTION A - A

- WHEN RISER TONGUE LENGTH IS GREATER THAN 3", USE 2 TIMES THE TONGUE LENGTH.

NOTE: PRECAST RISER SHALL FULLY ENGAGE THE TONGUE OF THE RISER PIPE.

PRECAST RISER RING (FOR 2'-0" DIAMETER STRUCTURE)

NOTES:

THE DRAINAGE STRUCTURE COVERS ALLOWED FOR USE ON THESE DRAINAGE STRUCTURES ARE SPECIFIED IN SUBSEQUENT STANDARD PLANS AND ARE INTERCHANGEABLE ON ANY STRUCTURE.

THE TOPS OF MASONRY STRUCTURES SHALL BE SUFFICIENTLY LOW TO PERMIT PROPER ADJUSTMENT OF COVER TO GRADE USING MORTAR OR BRICK AS DIRECTED BY THE ENGINEER.

PREMIUM JOINTS ARE REQUIRED ON ALL SANITARY MANHOLES. SEE ASTM DESIGNATION C-923.

GRANULAR MATERIAL CLASS III SHALL BE USED IN BACKFILLING AROUND ALL STRUCTURES THAT FALL WITHIN THE 1:1 INFLUENCE LINES FROM THE EDGE OF PAVEMENT OR BACK OF CURB.

STEPS FOR DRAINAGE STRUCTURES SHALL BE OF AN APPROVED DESIGN AND MADE FROM CAST IRON, ALUMINUM, OR PLASTIC COATED STEEL. RUNGS SHALL BE A MINIMUM OF 10" IN CLEAR LENGTH, DESIGNED TO PREVENT THE FOOT FROM SLIPPING OFF THE END. THE MINIMUM HORIZONTAL PULL OUT LOAD SHALL BE 400 LBS. THE MINIMUM VERTICAL LOAD SHALL BE 800 LBS.

THE BELL SHALL BE REMOVED FOR THE FIRST LENGTH OF OUTLET PIPE PROJECTING THROUGH THE WALL OF THE MANHOLE.

PRECAST CONCRETE SECTIONS, SUMPS, AND FLAT TOP SLABS SHALL BE BUILT ACCORDING TO CURRENT ASTM C-478 AND ACCORDING TO DETAILS SPECIFIED ON THIS PLAN. PRECAST REINFORCED CONCRETE FLAT TOP SLAB SHALL BE MARKED TO SHOW LOCATION OF REINFORCEMENT. THE WALLS OF THE PRECAST UNITS MAY HAVE A SLIGHT TAPER TO ALLOW FOR FORM REMOVAL. PRECAST CONCRETE 2'-0" DIAMETER DRAINAGE STRUCTURES SHALL HAVE A MINIMUM 3" WALL THICKNESS WITH A 6" MINIMUM BEARING SURFACE ON TOP. SEE PRECAST RISER RING FOR 2'-0" DIAMETER STRUCTURE.

THE INSIDE DIAMETER OF PIPES ENTERING OR LEAVING PRECAST DRAINAGE STRUCTURES SHALL BE LESS THAN THE INSIDE DIAMETER OF THE DRAINAGE STRUCTURE MINUS 2'-0". A PIPE LEAVING A 2'-0" DIAMETER DRAINAGE STRUCTURE IS ALLOWED TO HAVE 1'-0" INSIDE DIAMETER OR LESS.

THE NUMBER OF PIPE OPENINGS IN A RISER SHALL BE DETERMINED BY THE DESIGNER. SPACING BETWEEN OPENINGS SHALL BE 1'-0" MINIMUM. OPENINGS MAY BE CONSTRUCTED BY CASTING OR BY DRILLING THE CURED CONCRETE.

PRECAST CONCRETE FOOTINGS OR BASES SHALL BE REINFORCED WITH #4 BARS SPACED AT 1'-0" BOTH WAYS OR WITH TWO LAYERS OF WELDED WIRE FABRIC OF EQUIVALENT CROSS SECTIONAL AREA LAID AT RIGHT ANGLES AND WIRED TOGETHER. REINFORCEMENT SHALL BE PLACED IN TOP OF FOOTING AND SHALL BE MARKED.

PRECAST CONCRETE FOOTINGS SHALL BE SUPPORTED BY A COMPACTED 6" GRANULAR SUBBASE.

THE MINIMUM WALL THICKNESS FOR ALL 2'-0", 4'-0", 5'-0", AND 6'-0" DRAINAGE STRUCTURES USING CONCRETE BLOCK, BRICK, OR CAST-IN-PLACE CONCRETE SHALL BE AS SPECIFIED IN TYPICAL WALL SECTIONS.

THE CONICAL SECTION OF MANHOLES OR CATCH BASINS CONSTRUCTED OF BLOCK OR BRICK SHALL BE SHROUDED WITH GEOTEXTILE FABRIC TO A MINIMUM DEPTH OF 5'-0" OR THROUGH THE FROST ZONE. ENOUGH GEOTEXTILE MATERIAL SHALL BE LEFT ON THE TOP (8" OR MORE) TO ROLL OVER THE TOP OF THE CONE.

PREFORMED HIGH DENSITY POLYSTYRENE FILLER PIECES MAY BE USED TO CHANNEL FLOW IN THE BOTTOM OF MANHOLES PROVIDED THEY HAVE AT LEAST 2" OF CONCRETE COVER. THE USE OF THIS MATERIAL FOR CHANNEL FLOW IS RESTRICTED TO MANHOLES WHERE THE BOTTOM SECTION IS NOT SUBJECT TO FREEZING. THE USE OF THIS MATERIAL MUST BE APPROVED BY THE ENGINEER.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

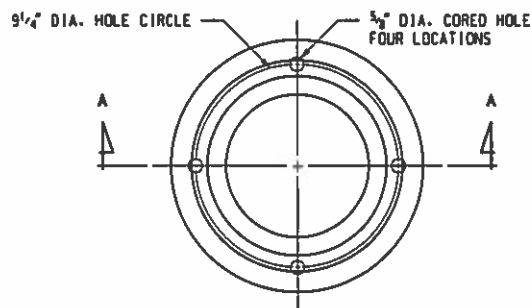
DRAINAGE STRUCTURES

1-27-2015
F.H.V.I. APPROVAL

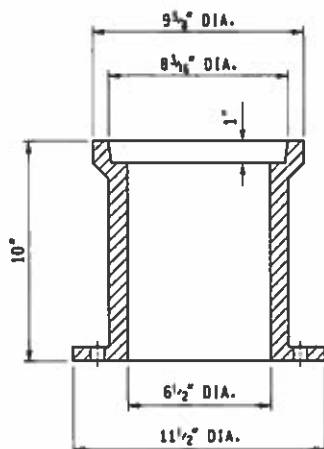
11-17-2014
PLAN DATE

R-1-F

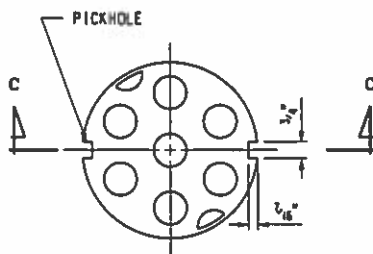
SHEET
5 OF 5



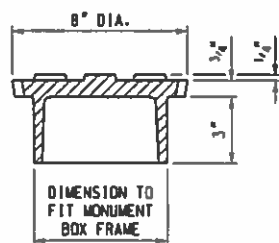
PLAN VIEW



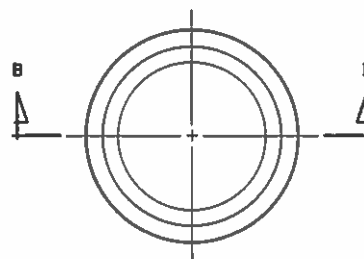
SECTION A - A
MONUMENT BOX FRAME



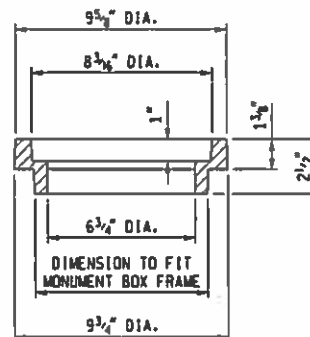
PLAN VIEW



SECTION C - C
MONUMENT BOX COVER



PLAN VIEW



SECTION B - B
MONUMENT BOX RING

NOTES:

ALL MATERIALS AND WORKMANSHIP SHALL BE ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS.

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATIONS FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

ALL CASTINGS AND THEIR MATCHING SEATS SHALL BE GROUND OR MACHINED SO THAT AN EVEN BEARING IS ATTAINED, THUS PREVENTING ROCKING OR TILTING.

THE CASTING SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS, AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.



PREPARED
BY
DESIGN DIVISION
DRAWN BY: B.L.T.
CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: *Randy V. Pyle*
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: *Paul A. Van Pelt*
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

MONUMENT BOXES

9-30-2014
F.H.W.A. APPROVAL

4-16-2014
PLAN DATE

R-11-E

SHEET
1 OF 1