ENGINEERING OPERATIONS COMMITTEE MEETING MINUTES
SEPTEMBER 3, 2015 – 9:00 A.M.
MULTI-MODAL CONFERENCE ROOM

Present:	M. Van Port Fleet	M. Bott	M. Geib	S. Bower
	B. Wieferich	K. Schuster	R. Ranck	B. O'Brien
	R. VanPortfliet	C. Rogers		
Absent:	T. Marshall (FHWA)			
Guests:	B. Krom	Justin Schenkel	C. Brookes	Jack Rick
	Warren D'Souza	Lynne Kirby	Mark Sweeney	Ben Feldhausen
	Therese Kline	Kelby Wallace	Mary Bramble	Dana Tarazi
	Kristen McQuiston			

OLD BUSINESS

1. Approval of the March 5th, Meeting Minutes – G. Johnson

   ACTION: Approved with minor changes

2. Traffic Signal Job Order Contracting Project – C. Youngs

   Route/Location: Varies
   Job Number: 128155
   Control Section: Varies
   Letting Date: 12/5/2015

   Job Order Contracting (JOC) will include signal work at multiple unknown locations at the time of bidding. MDOT plans to upgrade 7 to 10 locations as part of the contract. The anticipated pay items, quantities, and their associated average unit price (AUP) will be placed into the contract, and contractors will bid a single percentage that will be applied to all AUPs. The selected contractor is the one that bids the lowest percentage. JOC is similar to Indefinite Delivery/Indefinite Quantity (IDIQ) projects, which MDOT has used on past signal projects. However, the use of IDIQ was stopped due to unbalanced bids, which resulted in a higher overall contract cost to MDOT. JOC would eliminate this practice.

   This would be MDOT's first JOC project. Staff have contacted MITA, and will work with them to solicit input and educate the signal contractors on this method prior to advertisement.

   A SEP-14 would be submitted to the FHWA for approval if JOC is approved by EOC.

   ACTION: Approved prior to the meeting via email.

NEW BUSINESS

1. M-52 and 8 Mile Roundabouts (JN 124046 & 118461) – W. D'Souza

   Route/Location: M-52 and Werkner Rd, N territorial over US-23 and 8 mile over US-23
   Job Number: 124046, 118461
   Control Section: 81011, 81075
   Letting Date: Feb 2015 and Sept 2015

   M-52 at Werkner (safety project) Roundabout selected fix. N-Territorial and 8 mile over US-23 as part of the Active Traffic Management project and Bridge Replacements, Roundabouts were placed at the Ramp terminals.

ADT	2016	2037
N. Territorial Road	7,630	8,125
8 Mile Road	7,005	7,460

   Estimated construction costs without CE-

	Road Const	Bridge Const	Subtotal
N. Territorial	$ 2,358,099	$ 2,828,000	$ 5,186,099
5 mile Relocation	$ 491,823		$ 491,823
			$ 5,677,922
8 Mile	$ 2,943,372	$ 2,688,700	$ 5,632,072

   ACTION: Approved

2. Reflective Sheeting on Temporary Channelizing Devices – C. Brookes

   The Traffic Incident and Work Zone Management Unit would like to upgrade the quality of the reflective sheeting on our temporary channelizing devices. The upgrade would be from our current Type III High intensity to Type IV Fluorescent Orange, and Type IV White.

   This was a topic that was brought up early 2014 during the Annual Work Zone Meeting with industry, MIOSHA, MSP, Labors Union, and MDOT. There are currently 22 states that have already made the change to Type IV fluorescent orange sheeting. When MITA originally responded to this, the topic was presented in July, 2014 and the response was split on this topic. Some wanted to move forward at that time, others thought that there was no benefit to making the change, due to issues with the new sheeting. MDOT looked into this issue, by working with suppliers and manufacturers, there has since been over 20 locations where the fluorescent drums and 42 inch channeling devices have been used. MDOT has examined the lifespan and performance of the channelizing devices and have found the results to be equal to or greater for devices with fluorescent sheeting. MDOT also spoke with 8 states at the Midwest Work Zone Round Table, and of the 8 states, 6 require the Type IV fluorescent orange sheeting. At this time, none of these states have experienced problems or loss of performance, compared to the Type III high intensity sheeting.

There was one issue with the installation of the sheeting on a few shipments of drums where the sheeting was not installed per the recommended specifications, which caused the sheeting to bubble. In working with the manufactures, these drums were replaced at no additional cost to the supplier. This issue has since been addressed.

Fluorescent retroreflective material improves daytime, dusk, and poor weather conspicuity while still providing nighttime brightness. In addition, the detection distance of the target device will be increased. One study found that when compared with ordinary orange sheeting, the detection distance of fluorescent sheeting is 4.98% greater in daylight conditions and 3.03% greater in dark conditions (Brekke, B and Jenssen, G. Tondheim, Norway 1997). It should be noted that the sample for this study consisted of elderly drivers as well as young drivers. The result is drivers will spot the temporary traffic control device sooner and will be able to begin reacting to tapers and traffic shifts earlier. The increased conspicuity and delineation should reduce crashes as well as injuries and fatalities in work zones.

Reaction time is a factor directly related to work zone safety. Increasing the motorist's awareness and reaction time approaching a work zone should directly increase the safety of workers and the traveling public within the zone. "The mean distance for the first fixation on the fluorescent signs was 130 m versus 75 m for the nonfluorescent signs. For a vehicle traveling 80 km/h this 55 m fixation distance difference translates into an additional 2.5 s of decision and reaction time." (Field Evaluation of the Effect of Fluorescent Retroreflective Traffic Control Devices on Driver Attention and Behavior Paper No. 98-1435)

In the past 5 years on average 35% of state trunkline and 32% of all roadway work zone crashes have occurred during cloudy and/or rainy conditions. The move to fluorescent sheeting will improve the visibility and sight distance of devices on the roadway in all conditions, with additional benefits during cloudy and rainy conditions, providing the motorist with additional reaction time, which will help reduce the number of work zone crashes, in turn improving the safety of Michigan roadways.

Positive feedback was received from the public as well as the project staff regarding the visual qualities of the sheeting. When comparing the different sheeting on two new non-used drums, the Type III and fluorescent Type IV sheeting, the fluorescent sheeting consistently was noted to stand out better. Many MDOT TSC's have recommended the proposed transition to requiring fluorescent sheeting on all channelizing devices.

Another beneficial feature of the fluorescent sheeting is the wide angle performance. This allows the device to appear the same size day and night, including when the device is dirty giving uniform depth perception under all viewing conditions. The white sheeting also creates greater contrast in color providing more daytime conspicuity and better visibility, even through a layer of dirt and grime.

Michigan is a leader in Work Zone Safety and Technology. Our goal is to provide the safest work zone to the motoring public and workers as part of our towards zero deaths goal. Making this improvement in sheeting, will allow Michigan to remain a leader in Work Zone Safety and will help in moving the needle towards the goal of Towards Zero Deaths.

MDOT has worked with industry and has looked into the concerns that have been raised. The cost of this change was also a major topic of discussion and to help make this transition a phased approach has been discussed to allow contactors suppliers to use their existing inventory. A 4 year phase in period has been discussed and is detailed below. Other states that have made this transition have used 3 years, or less, as a successful phase in period. So MDOT's 4 year plan would allow more time to make the transition than any other state. The implementation plan would be as follows:

- 10/01/16 – Notify of the upcoming phase in period
- 10/1/17 – Type IV Fluorescent and Type IV White Required on all "I" routes
- 10/1/18 – Type IV Fluorescent and Type IV White Required on all "I" "US", and "M" routes.
- 10/1/19 – Type IV Fluorescent and Type IV White Required on all MDOT and Local roadways.

A contractor would be allowed to use either type of sheeting until that date, but would not be allowed to mix the two types on a project.

ACTION: EOC requests additional information. Final action is deferred to a future meeting.

3. Road Safety Audit Guidance Document – M. Bott

This document looks to provide guidance for when a Road Safety Audit (RSA) will be required on MDOT projects. Each Region will use this guidance to decide which projects fall under the RSA requirements in order to set aside the necessary funding and to notify the Safety Programs to schedule the audit. Safety Programs will hold an As Needed contract of qualified consultants to facilitate the RSAs and provide independent comment and risk analysis for project consideration. In this way safety will be keep paramount on MDOT projects and further the work of the TZD effort. Comments have been received, reviewed and discussed leading to the current state of the document. Final buy in and adoption is needed to move forward in implementing this guidance.

An RSA is a formal safety performance examination of an existing or future road or bridge project by an independent, multi-disciplinary RSA team. RSAs can be conducted at any stage of a project but are highly recommended prior to the Scope Verification meeting and include consideration for all users of the road way to help achieve strategic safety goals. RSAs contribute to road safety by providing a fresh, unbiased assessment of the area or intersection in an effort to identify potential safety issues and solutions. Within Michigan Department of Transportation (MDOT), there are many different project types with various funding mechanisms at different levels of completion.

This document provides guidance regarding the types of projects where RSAs are required and are optional. RSAs are divided into two categories: in-service and design-service RSAs. Candidates for in-service RSAs include: high-crash locations, high-profile sites and locations with changed traffic characteristics. Design-service RSAs are always required on Safety Projects per the Annual Call for Projects memorandum, but should also be conducted on projects based on the Warranting Conditions section of the guidance.
V

ACTION: Approved

4. Recessing Pavement Markings – M. Bott

All longitudinal pavement markings place with 3R/4R construction projects shall be recessed, regardless of the pavement marking material used.

A frequently received complaint from motorists is that our pavement markings are not visible, especially in the spring. Pavement markings provide motorists with critical delineation and information, so when they are significantly damaged or missing, the safety of the motoring public is decreased.

The majority of our pavement markings are applied on the surface of pavements, leaving them highly susceptible to damage from snowplow blades during winter maintenance operations. We restripe approximately 85% of our roadways annually and with such a large volume of work many roads do not get restriped until mid-summer to fall, the markings become damaged soon after when winter arrives. As a result, both the presence and retroreflectivity of our pavement markings suffer, decreasing effective roadway delineation. This is an issue not only for the safety of motorists, but for the upcoming federal retroflectivity minimums that must be maintained year-round.

Recessing would help the pavement markings maintain their presence through winter maintenance operations and, based on research from other states, would help extend the retroreflectivity due protecting more of the glass beads being retained in the surface of the paint. The groove that this investment would create, would benefit not only the initial pavement marking application but subsequent restriping applications as well, since the groove would remain for the life of the pavement surface. This proposal has been vetted through both the Pavement Marking Implementation Team and the Traffic Safety Statewide Alignment Team. Both provide their full support and provide exceptions of where not to apply.

ACTION: Approved

5. M-35 Road Diet – M. Bott

Route/Location: M-35 South of Lake Shore Drive to 18th Avenue
Job Number: N/A
Control Section: 21031

On M 35 just south of Escanaba, there is a 3800 Ft section of four lane road with two lanes to the south and five lanes to the north. In the 3800 Ft four lane section, we plan to convert the inside SB lane to a two way left turn lane (TWLTL). After reconfiguration, this section of M-35 will be two lanes northbound, one lane southbound and the TWLTL. The turn lane will end where M-35 becomes a two-lane roadway, just north of the Delta County airport. In a sense, this is one half of a road diet. This concept was first proposed by a private citizen living on the east side of M-35 where the changes are proposed to take place.

Keeping two lanes northbound will help with the NB right turn traffic into the many driveways on the east side of M-35 which is the side to access Lake Michigan. The Delta County Airport is on the west side of M-35 and there are very few access points. There is already a bike path through this area so nonmotorized needs have already been met. For those reasons a full road diet will not be implemented.

M-35 is two lanes to the south and it is operating satisfactorily and there are no major traffic generators in the area that will be reconfigured. We do not anticipate any issues with the operation of this 0.75 mile section of M-35.

Geometrics has reviewed the concept and recommended a right lane drop for southbound traffic. This recommendation will be incorporated into the final design.

This concept will be brought before the Escanaba area Access Management Group on July 30 at 3:00 PM. The Escanaba City Engineer has been informed of this concept and will get input from other city officials. The city of Escanaba has adopted a complete streets ordinance.

ACTION: Informational item. No action required.

6. Trench Detail Modifications – B. Wieferich

Changes are being proposed as a result of MDOT research and engagement with the Joint Pipe Operations Committee (JPOC).

Bedding

A. MDOT standard plan R-83-B modification is recommended to better delineate the bedding of pipe from backfill.

i. Delineation of the bedding area would be stippled or otherwise depicted to differentiate the bedding area and remove the 95% compaction requirement as currently shown.
ii. The bedding area would be noted as loosely compacted material which is predominantly the current state of installation practice in the field.
iii. Reference to the undercut area would be removed and replaced with bedding to ensure consistency with the standard specifications (sections 401.03.A & 402.03.A).
iv. Bedding would be shown as the full width of the trench.
v. Bedding language in the standard specifications (sections 401.03.A & 402.03.A) regarding layer thickness and compaction effort should be clarified to reflect the standard plan R-83-B.

Soil Envelope

B. MDOT standard plan R-83-B modification is recommended to provide separate rigid and flexible pipe installation details for trenches outside the influence of the roadway.

i. Flexible pipe installation would remain as shown in detail A (sheet 1 of 3) of the standard plan R-83-B.
ii. Rigid pipe installations would be depicted showing specified material backfill installation from the bedding layer to the spring line of the pipe. The remaining backfill would be completed with suitable material as originally noted in detail A.
iii. It is anticipated MDOT would experience a cost savings with rigid pipe in backfill material quantity (volume) by half the diameter of the pipe plus 1' of cover with larger diameter pipe providing the greatest backfill material volume reductions. Additionally, trucking and associated costs of providing specified backfill material or unsuitable material disposal would be more cost effective due to the reduction in specified backfill material volume.

ACTION: Approved

7. Pavement Selection – B. Krom

Route/Location: I-275: from 5 Mile Road to the I-96/I-696/M-5 interchange, Wayne and Oakland Counties
Job Number: 117602
Control Section: 82125 & 63191
Letting Date: 3/4/2016

The Asphalt Paving Association of Michigan objected to several aspects of how the LCCA was run. Staff has responded to their objections.

Pavement selection was determined using the procedures outlined in the MDOT Pavement Design and Selection Manual. Department Policy requires that the pavement alternate with the lowest EUAC be selected. Final pavement selection requires approval by the Engineering Operations Committee.

The reconstruction alternatives being considered are a Hot Mix Asphalt Pavement (HMA Alt #1) and a Jointed Plain Concrete Pavement (JPCP Alt #2). For both alternatives, the existing shoulders will be left in place, with only the driving lanes being replaced. For the HMA alternative, 69% of the existing subbase meets Class IIA specifications and will be reused. For the JPCP alternative, the existing base, geotextile separator and subbase will be left in place. The pavement designs being considered are as follows:

Alternative #1a: Reconstruct I-275 with Hot Mix Asphalt Pavement

1.5”	HMA, 5E30, Top Course (PG70-28P)
3”	HMA, 3E30, Leveling Course (PG70-28P)
7.5”	HMA, 3E30, Base Course (PG64-28P)
6”	Open-Graded Drainage Course
	Geotextile Separator
18”	Sand Subbase (Existing 12” subbase: 69% reusable, 31% new)
6”	dia. Open-Graded Underdrain System
36”	Total Section Thickness

Alternative #1b: Reconstruct I-96 EB and I-96/I-275/I-696/M-5 Ramps C & F with Hot Mix Asphalt Pavement

1.5”	HMA, 5E30, Top Course (PG70-28P)
3.75”	HMA, 3E30, Leveling Course (PG70-28P)
6.25”	HMA, 3E30, Base Course (PG64-28P)
6”	Open-Graded Drainage Course
	Geotextile Separator
18”	Sand Subbase (Existing 12” subbase: 69% reusable, 31% new)
35.5”	Total Section Thickness

Alternative #1c: Reconstruct I-96/I-275/I-696/M-5 Ramps A, E, J & P, 6, 7 and 8 Mile Road Ramps with Hot Mix Asphalt Pavement

1.5”	HMA, 5E3, Top Course (PG64-28P)
3.25”	HMA, 3E3, Leveling Course (PG64-28P)
3.75”	HMA, 3E3, Base Course (PG58-28P)
6”	Open-Graded Drainage Course
	Geotextile Separator
18”	Sand Subbase (Existing 12” subbase: 69% reusable, 31% new)
32.5”	Total Section Thickness

Present Value Initial Construction Cost	$405,593/lane-mile
Present Value Initial User Cost	$315,750/lane-mile
Present Value Maintenance Cost	$120,215/lane-mile
Equivalent Uniform Annual Cost (EUAC)	$32,020/lane-mile

Alternative #2a: Reconstruct I-275 with Jointed Plain Concrete Pavement 13” Non-Reinforced Concrete Pavement, P1 Modified, with 16’ joint spacing

4”	Existing Open-Graded Drainage Course Existing Geotextile Separator

12”	Existing Sand Subbase
	Existing Underdrain System
29”	Total Thickness

Alternative #2b: Reconstruct I-96 EB and I-96/I-275/I-696/M-5 Ramps C & F with Jointed Plain Concrete Pavement

13”	Non-Reinforced Concrete Pavement, P1 Modified, with 16’ joint spacing
4”	Existing Open-Graded Drainage Course
	Existing Geotextile Separator
12”	Existing Sand Subbase
	Existing Underdrain System
29”	Total Thickness

Alternative #2c: Reconstruct I-96/I-275/I-696/M-5 Ramps A, E, J & P, 6, 7 and 8 Mile Road Ramps with Jointed Plain Concrete Pavement

9.5”	Non-Reinforced Concrete Pavement, P1 Modified, with 14’ joint spacing
4”	Existing Open-Graded Drainage Course
	Existing Geotextile Separator
12”	Existing Sand Subbase
	Existing Underdrain System
25.5”	Total Thickness

Present Value Initial Construction Cost	$332,736/lane-mile
Present Value Initial User Cost	$239,617/lane-mile
Present Value Maintenance Cost	$122,748/lane-mile

Equivalent Uniform Annual Cost (EUAC) $25,835/lane-mile

The pavement designs for both alternatives are based on the 1993 AASHTO “Guide for Design of Pavement Structures” and use the AASHTO pavement software DARWin Version 3.1, 2004. The Equivalent Uniform Annual Cost calculation is based on the revised pavement selection process as approved by the EOC on June 3, 1999.

The estimated construction costs are based on historical averages from similar projects. User costs are calculated using MDOT’s Construction Congestion Cost model, which was developed by the University of Michigan.

Conclusion
Pavement selection was determined using the procedures outlined in the MDOT Pavement Design and Selection Manual. Department policy requires that the pavement alternative with the lowest EUAC, Alternative #2: Reconstruct with Jointed Plain Concrete Pavement, be selected. Final pavement selection requires approval by the Engineering Operations Committee.

ACTION: Approved

8. I-75 Modernization Project, Segment 1 – D. Tarazi

Route/Location: I-75 from South Boulevard to Coolidge Highway, Oakland County
Job Number: 115576
Control Section: 63174
Letting Date: March, 2016

CS 63174, JN 115576: I-75 Design Build, Coolidge Highway to South Boulevard in Oakland County. This is a 3.084 mile reconstruction project with a construction cost of $107,931,500 which is scheduled to be let in March 2016. The preliminary LCCA indicated an HMA pavement that is 1.87% less than the concrete option. Both pavement alternates are expected to have similar environmental, right of way, drainage, and utility impacts along with similar maintaining traffic concepts. Paving is the controlling operation for the construction schedule.

Based on the preliminary life cycle cost analysis and the type of work on the project, the Metro Region, the Pavement Selection Engineer, and the Alternate Pavement Bidding Coordinator recommend this project be considered for the APB process.

EUAC Summary
I-75 Reconstruction

Alternative	PV Initial Construction Cost	PV Initial User Cost	PV Maintenance Cost	n	EUAC	EUAC % Difference
#1: HMA	$499,830	$1,048,844	$116,213	33	**$63,346**	1.87%
#2: JPCP	$522,470	$1,098,322	$115,980	34	**$64,550**	

$EUAC = NPV*(i*(1+i)^n/((1+i)^n-1))$

Note: All costs are per directional mile
NPV = Net Present Value
i = Real Discount Rate (2015: 1.4%)
n = Number of years
PV = Present Value
EUAC = Equivalent Uniform Annual Cost

ACTION: Approved

Steven C. Bower, P.E.

Digitally signed by Steven C. Bower, P.E.
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Steven Bower, Secretary
Engineering Operations Committee

RA:SB:lsf

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