Reconstruction Project
PIN 0016.27.101
NY 112
From I-495 to Granny Road
Town of Brookhaven
Suffolk County
APPENDIX D:

PAVEMENT INFORMATION

II. 2015 Pavement Type Selection Report (PTSR) D-4
III. Pavement Estimates and Life Cycle Cost Analysis Summary D-7

NOTE: The following unpublished material has been provided to NYSDOT under PIN 0016.27.101, Other Reference Material, Computations and Data, Pavement Information:

- 2014 Pavement Data Report Region 10 – NY 112
- Pavement Estimates and Life Cycle Costs (Detailed)
- 2015 Pavement Evaluation Field Data
- Pavement Core Location Map and Results
I. 2015 PAVEMENT EVALUATION AND TREATMENT SELECTION REPORT (PETSР)
A Pavement Evaluation and Treatment Selection Report (PETS R) was completed in May 2015 for the 0.3 mile section of NY 112 from the LIE North Service Road (MM1041) to CR 16, Horse Block Road (MM1044) in Medford, NY.

GENERAL INFORMATION AND ROADWORK HISTORY

Within this 0.3 mile section, NY 112 is a divided four to five lane roadway with right side shoulders for approximately 750 feet, beginning at the LIE North Service Road and proceeding north to just north of the Staples/Michaels Shopping Center. Approaching the Horse Block Road intersection, the raised median and shoulder areas disappear in favor of left and right turn lanes and the roadway section consists of six lanes. The original portland cement concrete pavement was constructed in 1937 under Contract RC 3890 as two 11 foot concrete travel lanes with 100 foot concrete pavement dowelled expansion joints.

In 1983 (Contract D250138) and in 1988 (Contract D252040), areas of composite pavement widening accompanied by a 2 ½” asphalt overlay were constructed between MM1041 and MM1044. In 2010, a Maintenance Emergency Paving Project was utilized to mill and fill the 12 year old asphalt overlay and place a new 2” asphalt riding surface.

EXISTING PAVEMENT CONDITION

The 2014 Pavement Data Report shows a pavement condition rating of seven (7) for NY 112 from the LIE North Service Road (MM1041) to Horse Block Road (MM1044). A field distress survey was conducted on the composite pavement section and the major form of distress and surface deterioration encountered was minor transverse and longitudinal reflective cracking on the 5 year old asphalt riding surface. No areas showing a need for full depth pavement replacement are evident, and structurally, no settlement or shoving/rutting exists, which indicates stability with the asphalt riding surface and underlying base concrete pavement. A mountable 6” concrete curb exists on the right side, as well as the left side adjacent to the raised concrete median. There are a number of wide two-way driveways to commercial establishments where some surface irregularities are evident at the interface with NY 112 and within the flow line area. This distress and deterioration can be attributed to water ponding in these low areas, accompanied by traffic loading and turning movements which can cause the asphalt and composite pavement interface to break down.

PAVEMENT REHABILITATION RECOMMENDATIONS

- No full depth pavement repairs appear necessary at this time.
- All minor transverse and longitudinal reflective cracking can be cleaned and sealed prior to the placement of the new asphalt riding surface.
- In a few areas where multiple cracking exists, even minor in nature, a partial depth asphalt overlay repair can be utilized after surface milling and prior to the placement of a new asphalt riding surface.
- All proposed pavement widening should be constructed in full depth asphalt with a minimum width of 4.0 feet and consist of an ESAL-verified pavement depth of 10½” HMA asphalt on 9” recycled concrete aggregate (RCA) subbase material. The proposed asphalt concrete pavement depth will match existing pavement depth, or will be a minimum of 10½”, whichever is greater.
- An asphalt truing and leveling course can be used to level out low spots and adjust grades and cross slopes where needed when widening for lane additions or lane realignment.
- All milled surfaces should be tack coated prior to the placement of the new 2” Superpave asphalt concrete top course.
II. 2015 PAVEMENT TYPE SELECTION REPORT (PTSR)
2015 PAVEMENT TYPE SELECTION REPORT
NY 112 from Horse Block Road to Granny Road

A Pavement Type Selection Report (PTSR) was completed in June 2015 for the 1.3 mile section of NY 112 from CR 16, Horse Block Road (MM1044) to Granny Road (MM 1057), in Medford, NY.

GENERAL INFORMATION AND ROADWORK HISTORY

Within this 1.3 mile section, NY 112 is an undivided two lane concrete roadway with right side asphalt shoulders beginning north of Horse Block Road (MM1044) and proceeding north to Granny Road (MM1057). The original Portland Cement Concrete pavement was constructed in 1937 under Contract RC 3890 as two 11 foot concrete travel lanes with 100 foot concrete pavement dowelled expansion joints. A 2” mill and fill on the 8 foot wide asphalt shoulders was accomplished in 1994 under Contract D256243. The latest pavement rehabilitation project involved interim pavement repairs to the concrete and asphalt pavement and was completed in 2006 under Contract D259933.

EXISTING PAVEMENT CONDITION

The 2014 Pavement Data Report shows a pavement condition rating of five (5) for NY 112 from Horse Block Road (MM1044) to Granny Road (MM1057). A rating of 5 out of 10 is considered a poor pavement condition, which is to be expected for a nearly 80 year old pavement structure with very little maintenance or rehabilitation work applied over the course of its service life. The pavement deterioration encountered along this stretch of NY 112, is surface and joint related, not structural or affecting subsurface support. The existing soil conditions within this roadway corridor are extremely good, with natural sands and gravel which have supported the traffic loading for nearly 80 years without any subsurface failures.

Due to the planned capacity and mobility improvements associated with this project, which will facilitate alignment and grade changes, the existing concrete pavement and asphalt shoulders in this section are scheduled to be removed and replaced. A pavement condition and distress survey as part of the Pavement Evaluation and Treatment Selection Report (PETSR) will therefore not be required for this section of NY 112. Instead, the total pavement reconstruction requires a Pavement Type Selection Analysis (PSTA).

PAVEMENT RECONSTRUCTION ALTERNATIVES

With the proposed total removal of the nearly 80 year old concrete pavement, two viable pavement reconstruction alternatives were analyzed and evaluated: full depth asphalt concrete pavement and reinforced Portland Cement Concrete pavement. Both of these alternatives will require a minimum 50 year service life utilizing an ESAL-based pavement thickness design and associated pavement structural number. Current and projected traffic data contained in this report (Exhibits 2.3.1.6-1 and 2.3.1.6-2) was used for the ESAL calculations.

Pavement Alternative No.1

The full depth asphalt concrete pavement section will be constructed with 10.5” HMA as base, binder, and top course asphalt placed on a 9” recycled concrete aggregate (RCA) subbase layer. The proposed 50 foot wide roadway section will be constructed as a full depth asphalt concrete section, which will include a 6 foot wide bicycle lane area on both sides. Due to the impracticality of constructing an adjacent bicycle lane utilizing a thinner pavement section, the bicycle lanes will be constructed to match the roadway pavement thickness. A secondary benefit to the full depth bicycle lane pavement section is the ability to be utilized during construction for staged work zone traffic control schemes and function as temporary travel lanes. With mixed traffic, including heavy truck loading, a full depth/full strength asphalt section across the entire pavement width is justifiable and proper in order to avoid damage to the newly installed

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pavement during construction and future pavement deterioration, such as pavement drop-off at the travel lane/bicycle lane interface, after the completion of the construction project.

**Pavement Alternative No.2**
The Portland Cement Concrete pavement section will be constructed with a 9” reinforced concrete pavement and placed on a 6” RCA subbase layer. Transverse joint spacing will be 16 feet, and will include load transfer dowels at the transverse joints. Longitudinal joint ties are proposed to tie the three concrete panels together and prevent separation. Current design practice, as specified in the *NYSDOT Comprehensive Pavement Design Manual*, Chapter 4, Section 4.5.2.2, is to extend the concrete pavement section a distance of 2 feet beyond the travel lane edge into the bicycle lane/shoulder area. This places the pavement joint and unsupported edge further away from the wheel path loading, thus reducing stresses and potential pavement distress at this joint interface with the asphalt shoulder section. On this project, however, a 2 foot extension of concrete pavement into the bicycle lane area would leave a 4 foot width of asphalt shoulder pavement to be constructed. This joint interface layout within the 6 foot wide bicycle lane would create a potential hazard for bicyclists. Therefore, the proposed 50 foot wide pavement section would be constructed with a 9” P.C.C. pavement with no adjacent asphalt bicycle lane pavement section. The tied concrete panel widths of 18 feet, 14 feet, and 18 feet were selected to facilitate the lane layout which encompasses the 6 foot bicycle lane area, and will not introduce a longitudinal joint hazard within the bicycle lane. Since all panels will be tied together, no unsupported concrete edges will be present at the right side of the travel lane, and the two longitudinal joints located at the travel lane/two way left turn lane interface will function as the normal concrete panel/lane layout configuration.

**LIFE CYCLE COST ANALYSIS**

In accordance with the *NYSDOT Comprehensive Pavement Design Manual*, a Life Cycle Cost Analysis (LCCA) is required when two or more viable pavement reconstruction options are available for consideration on a particular project. The LCCA was prepared for the two pavement reconstruction options: full depth asphalt concrete pavement and reinforced Portland Cement Concrete pavement. A 60 year timeline was used to develop the service period, and all appropriate pavement maintenance strategies and associated costs were analyzed within that 60 year period.

**CALCULATED COST**

The LCCA was completed for the pavement section between Horse Block Road and Granny Road for each of the two pavement reconstruction options. The standard NYSDOT Estimator Program was utilized for item costs, and a “Present Worth” analysis was used with a discount rate applied to the various treatments considered for the 60 year service period. The following costs were calculated:

<table>
<thead>
<tr>
<th>Pavement Alternative</th>
<th>Present Cost</th>
<th>Present Worth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement Alternative No.1 Full Depth Asphalt Concrete Pavement</td>
<td>$10,300,000</td>
<td>$6,950,000</td>
</tr>
<tr>
<td>Pavement Alternative No.2 Portland Cement Concrete Pavement</td>
<td>$12,400,000</td>
<td>$8,650,000</td>
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</tbody>
</table>

Based on the economic analysis presented above, the cost comparison indicates approximately a 20% cost savings for a Full Depth Asphalt Concrete Pavement versus a Portland Cement Concrete Pavement.
III. PAVEMENT ESTIMATES AND LIFE CYCLE COST ANALYSIS SUMMARY
PAVEMENT ESTIMATE AND LIFE CYCLE COST ANALYSIS SUMMARY

The pavement estimate and life cycle cost analysis was completed for the Pavement Type Selection Report produced for the section of NY 112 between Horseblock Road and Granny Road utilizing two pavement reconstruction options. The standard NYSDOT Estimator Program was used for item costs, and a “Present Worth” analysis was used with a 4% discount rate applied to the various treatments considered for the 60 year service period. The following costs were calculated:

<table>
<thead>
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<th>Pavement Alternative No.1</th>
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</tr>
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