COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

FINAL

Plasphalt Project

The Performance Evaluation of Jefferson Street Plasphalt Project

District 5-0, Wilson Borough

Prepared By:
Jelena Vukov, P.E.
Apex Companies, LLC

OCTOBER 2008
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## ATTACHMENTS

- **Attachment 1**: Instructions to Local Government on Plasphalt Pavement Courses
  - Plasphalt HMA Pavement Course Specifications
- **Attachment 2**: PennDOT Draft Guidelines for Plasphalt Project Evaluations
- **Attachment 3**: Project Contract
  - Site Location Map
- **Attachment 4**: Pre-paving Photographs (2003)
  - Initial Paving Field Evaluation Form
  - Initial Paving Photographs
- **Attachment 5**: Hellertown Materials Plant Photographs
- **Attachment 6**: Job Mix Formulas
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- **Attachment 7**: First-Year Performance Evaluation (2004)
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- **Attachment 8**: Second-Year Performance Evaluation (2005)
- **Attachment 9**: Fourth-Year Performance Evaluation (2007)
- **Attachment 10**: Fifth-Year Performance Evaluation (2008)
1.0 INTRODUCTION

Under the Strategic Recycling Program, PennDOT provides assistance to Districts in the selection and performance evaluation of recycled materials and demonstration projects that incorporate recyclable materials. This report provides an overview on the paving operations and a 5-year performance evaluation of Jefferson Street Plasphalt Project performed in the Borough of Wilson, Pennsylvania. This report is intended to satisfy the demonstration project reporting requirements of the PennDOT Bureau of Construction and Materials (BCM).

The Borough of Wilson awarded two contracts to Lehigh Valley Site Contractors Inc. to perform Plasphalt paving of three residential streets within the Borough: Hay Terrace (2002), 21st Street and Jefferson Street (2003). This report provides the performance evaluation for the Jefferson Street Plasphalt project; separate reports are issued for the Plasphalt paving projects on 21st Street and Hay Terrace Plasphalt projects.

1.1 Plasphalt Project Requirements

Hot mix asphalt concrete containing Treated Recycled Plastic Aggregate (TRPA) is referred to by the trade name Plasphalt™ (plasphalt). TRPA material is composed of ground recycled thermoplastic, treated with a proprietary process to improve the bond strength between the plastic and asphalt binder. For the Wilson Borough project, TRPA materials were provided by Telecan International, Inc., Albuquerque, New Mexico, through a local representative. At this time there is still limited available research on the performance-related properties of plasphalt. Some initial studies suggest that plasphalt, when used as a pavement surface, has the potential to prevent or lessen the severity of rutting.

Local governments in Pennsylvania have been interested in the use of plasphalt material for several reasons including: Liquid Fuels monies can be used to fund plasphalt on
municipal projects, the resistance to rutting is reported in research, and there is a real and perceived benefit to the Commonwealth in the use of recycled plastic materials.

To address this interest in plasphalt use, PennDOT developed use guidelines for municipalities and other entities interested in plasphalt paving. These guidelines, *Instructions to Local Governments who agree to use Plasphalt Hot Mix Asphalt (HMA) Pavement Courses* and Plasphalt HMA Pavement Course Specifications are provided in Attachment 1.

Plasphalt specifications call for the use of hot mix asphalt (HMA) with some of the conventional aggregate substituted with treated recycled plastic aggregate (TRPA) to a maximum of 1.5% substitution. Because plasphalt paving projects are considered experimental, BCM requires performance evaluations to compare them to standard paving mixes. As provided in Attachment 2, PennDOT Engineering Technology & Information (ETI) Division, Bureau of Construction Materials, provided Plasphalt specifications and a Draft Work Plan for Evaluation of Plasphalt Recycled Aggregate Substitute in HMA for Municipality Use and Specifications.

The use guidelines recommend that a minimum quantity of 600 tons, or 7040 square yards (approximately one lane mile at 12 feet wide land at 1 ½” depth) of Plasphalt HMA Pavement course to be used to compare against a standard Superpave 9.5 mm pavement wearing course (control section). These guidelines also call for evaluations that involve crack and rut inspections on both control and plasphalt sections. Along with the crack surveys, string line or straightedge rut measurements, photo logs, and recording the dates and the severity of pavement distress are required to be taken and maintained throughout the five-year evaluation period.

Although minimum quantity requirement guidelines were not followed, the application was monitored for performance. Approximately 200 tons of wearing course were placed
on Jefferson Street, with control sections using conventional asphalt comprising 97 tons, and plasphalt paving contributing the remaining 97 tons.
2.0 JEFFERSON STREET PLASPHALT PROJECT

2.1 Plasphalt Paving (2003)

The Jefferson Street Plasphalt project was performed in District 5-0, Wilson Borough, Northampton County, between 16th Street and Palmer Street, including the Jefferson Street/Palmer Street intersection. This resurfacing project was performed as a Municipal Service Project #03-48-418-01, awarded to Lehigh Valley Site Contractors, Inc. Attachment 3 provides the Wilson Borough Plasphalt Project contract information and Site Location Map.

The Jefferson Street project involved the resurfacing and select repair of Jefferson Street, followed by installation of conventional and plasphalt wearing courses. Milling to 3½ inches was performed prior to the paving. In addition, approximately 67 tons of conventional base course material was used to patch milled surface (approximately 740 square yards @ 1.5 depth). A 1.5 inches (9.5 mm) Superpave control wearing course was installed on the northern traffic lane, and 1.5 inches (9.5 mm) Superpave 0.0-0.3 ESALs of Plasphalt wearing course was installed on the southern traffic lane. In addition, intersections were paved with wedges on both ends with conventional wearing course. Total area paved included 1250 SY (100 tons) of plasphalt and 1250 SY (100 tons) of conventional wearing course.

Conventional paving material was prepared at ABE Materials, Easton PA. Plasphalt was prepared at the Hellertown Materials, Hellertown, PA. Even though the Jefferson Street is considered a small project (200 tons), the northern traffic lane was incorporated as a control lane into this job, as outlined in the plasphalt use guidelines. It was agreed by all parties (as identified below), that field evaluations of the placement of materials and yearly visual inspections would be performed.

Plasphalt paving was conducted on September 18, 2003. Wilson Borough officials, including Mr. Greg Drake, Superintendent of Public Works, and plasphalt representative,
Mr. Terry Crouthamel, Sr. were also present intermittently for the paving activities. Mr. Robert Boyer, Municipal Services Supervisor, Mr. Robin Sukely, Bureau of Construction and Materials (BCM representative), Mr. Joseph Kretulskie, District 5-0 Municipal Services, and Ms. Jelena Vukov of Apex Companies, LLC representing PennDOT Pollution Prevention Section (PPS) – Environmental Quality Assurance Division (EQAD) were present during the paving operations and present at the asphalt plant.

Approximately 100 tons of plasphalt was used for this project. Mr. Greg Drake was provided copies of truck deliver slips for 19 mm base, 1.5 mm conventional and 9.5 mm plasphalt HMA. TR1461 Field Evaluation Form and photographs of the operation are provided in Attachment 4.

Paving was initiated on September 18, 2003, by Lehigh Valley Site Contractors, Inc. Equipment used for paving included a Barber Green Model BT 211. For compaction, Lehigh used the Dynapac CC422 (large roller) and Dynapac Model CC122 (small roller). Short HMA paving quantities and short paving distance prohibited setting a rolling pattern. Mix delivery temperature for plasphalt ranged from 255-310°F for conventional HMA, and 240-300°F for plasphalt. One delivered plasphalt truck load was measured below lower limit temperature (240-255°F and 310°F at discharge in same truck hopper). Wilson Borough Manager was informed and allowed placement. This could indicate the last portion of the truck load was much hotter than the majority of the middle and front of the truck. This may have been caused by the hot bins cooling at the plant while waiting for a truck to return, as noted during the plant visit.

Contractor performed nuclear density gauge readings. For the plasphalt section, field densities (>92%) were achieved. Lower density readings 88-91% were observed at cooler plasphalt load section (midsection of plasphalt paving strip). Several non-vibratory roller passes were required to achieve this density.
Three loose samples were collected from mat behind the paver. A fourth loose sample increment was collected at Easton (asphalt plant) on the conventional wearing course mix for testing.

### 2.2 Asphalt Plant Production

PennDOT District 5-0 State Material Inspectors were present at the Hellertown Plant during plasphalt production. Standard aggregate dosing equipment was not determined to not be functional for introduction of Treated Recycled Plastic Aggregate (TRPA) material into asphalt mixes in earlier plasphalt projects. The Hellertown Asphalt Plant addressed this by adding a separate auxiliary hopper with pneumatic injection, and a separate dosing machine, specifically for the introduction of TRPA into the asphalt mix. TRPA was added to the hopper from cardboard boxes via a small front-end loader. Although adequate for this scale of operations, this method of TRPA addition would not be adequate for larger scale plasphalt projects. No problems were observed during production. Attachment 5 contains photographs of TRPA material and plant hopper systems. Attachment 6 provides plant job mix results and burn test results from loose samples collected at the plant. Plasphalt material, as analyzed by the asphalt plant, met specifications.

### 2.3 Plasphalt Core Sample Test Results

Six random core samples were taken along Jefferson Street during the first-year evaluation using PTM-1 to select core locations, three in the plasphalt wearing section and three in the conventional paving section. A schematic of core sampling locations is provided in Attachment 7. Core samples were analyzed for density by PennDOT Material Testing Division. Results are presented below:
All three plasphalt core samples failed to meet the minimum 92% theoretical density requirement. In theory, for larger projects, this may call for the removal and replacement of the course. Density results for the conventional HMA core samples indicate an average 91% (percent within limits), translating to a payment factor of 98% for a standard paving project. (Note: No penalties were imposed on the Contractor for this demonstration project).

2.4 TRPA Material Specifications

At the Hellertown asphalt plant, TRPA materials were observed to be packaged in plastic tarp and cardboard boxes without any markings to indicate their production or expiration dates. According to Mr. Terry Crouthamel, Sr., provided TRPA materials for the 2003 paving jobs were delivered to the Commonwealth in September 2002. Some concerns were raised by PennDOT about the shelf-life of TRPA materials (ability to “retain” a charge) and if the material used in this project still met manufacturing specifications. It was agreed upon by all parties this issue would be clarified for any future approved work.
3.0 PERFORMANCE EVALUATIONS

The first-year evaluation was performed on May 11, 2004 by Mr. Joseph Kretulskie, District 5-0 Municipal Services and Jelena Vukov (PPS–EQAD). The following summarized the key findings of the first-year visual evaluation from the site inspection. Attachment 7 provides photographs of the inspection and core sampling activities.

- In general, the plasphalt and conventional paving sections show good aging. No rutting or surface impairment was observed. Photos YR1-1 and YR1-2 show wearing surface conditions.
- As expected, asphalt binder has worn off the plasphalt and conventional wearing surfaces. Photo YR1-3 shows coated aggregate and some plastic (TRPA) pieces embedded in the asphalt wearing coat. Predominant visible colors of TRPA are red, blue and yellow. No visible TRPA pieces were dislodged along the road side curbs. Grey and clear plastics were the predominant colors of plastic pieces (TRPA) introduced in the design mix. It is undetermined whether these predominant plastics color pieces have melted or are not visible at the surface.
- Core sampling using PTM-1 was performed during the first-year evaluation. See Attachment 7 for core sampling locations. Three conventional and three plasphalt samples were taken. See Photos YR1-4 through YR1-8.

3.2 Second-year Performance Evaluation (2005)
The second-year evaluation was performed on June 27, 2005, by Mr. Joseph Kretulskie, and Ms. Jelena Vukov. The following summarize the key findings of the second-year visual evaluation. Attachment 8 provides photographs.

- In general, the plasphalt paving sections show good aging.
- No rutting or cracking was observed on plasphalt wearing sections.
- One location on the control section showed some signs of rutting.
- No rutting or deflections were observed at Jefferson Street and Palmer Street intersection (see Photo YR2-1).
- No rutting or deflections were observed along Jefferson Street and 16th Street intersection (see Photo YR2-2).
- Rutting was measured at a 3/16” maximum deflection on conventional wearing course near Core Sample #4 location (see YR2-3 to YR2-5).
- As expected, asphalt binder has worn off the wearing surfaces, exposing coated aggregate and TRPA pieces. No visible difference to plasphalt paving surface in terms of exposed TRPA material was discernable from previous (first-year evaluation). See Photo YR2-6.
- Loss of some TRPA pieces from plasphalt course was visible at edge of pavement, accumulated near downgradient stormwater inlet. See Photo YR-7.

3.3 Third-year Performance Evaluation (2006)
On-site evaluation was not performed at Jefferson Street in 2006.

3.4 Fourth-year Performance Evaluation (2007)
The fourth-year evaluation was performed on July 6, 2007 by Mr. Joseph Kretulskie and Ms. Jelena Vukov. Photographs are provided in Attachment 9. The following summarizes the key findings of the walkthrough and visual observations:

- Pavement shows normal wear (See Photo YR4-1).
- Cracking was observed in the plasphalt forming at right turn lane (from 16th Street onto Jefferson Street) in two parallel lines, approximately 4 feet from curb end. The maximum crack length was measured at 10 feet. Maximum width of crack was approx. ½ inch wide and 1/2 inches deep. See Photo YR4-2 and YR4-3.
- No rutting was observed throughout Jefferson Street or intersections. (See Photo YR4-4).
- Observed distinct color difference between conventional and plasphalt wearing courses (see Photo YR4-5).
3.5 **Fifth-year Performance Evaluation (2008)**

The fifth-year evaluation was performed on July 10, 2008 by Mr. Joseph Kretulskie, PennDOT and Ms. Jelena Vukov and Mr. Dave Miller (Apex). Photographs are provided in Attachment 10. The following summarizes the key findings of the walkthrough and visual observations:

- Pavement shows normal wear (See Photo YR5-1).

- Wider cracking was observed in the plasphalt at right turn lane (from 16th Street onto Jefferson Street) in two parallel lines, approximately 4 feet from curb end. The maximum crack length was measured at 10 feet. Maximum width of crack was approximately 1\(\frac{1}{2}\) inches wide and 1/2 inch deep. See Photos YR5-2 and YR5-3.

- No rutting was observed throughout Jefferson Street or intersections. (See Photo YR5-4).

- Observed distinct color difference between conventional and plasphalt wearing courses (see Photo YR5-5).

- Plasphalt wearing surface shows very slight continued loss of fines in comparison to 2007 inspection. See Photo YR5-6 and YR5-7.

- No visible loss of TRPA pieces along plasphalt roadside observed.
4.0 CONCLUSIONS

The performance evaluation of plasphalt on Jefferson Street in Wilson Borough was performed over a 5-year period (2003-2008). Jefferson Street is considered a low ESAL residential street. The evaluations included asphalt testing and visual observations and measurements.

In general, the plasphalt shows comparative aging to standard conventional asphalt mixes. No rutting of the plasphalt sections were observed during the five-year performance evaluation period. While this project did have control sections, plasphalt mix and conventional paving mix were not produced at the same facility. This limits quality comparisons of placed materials between the two paving lanes.

Plasphalt core samples taken from the project indicate that plasphalt pavement did not meet the minimum 92% theoretical density requirement.

It should be noted that TRPA material is no longer available to the Commonwealth since 2003. It is recommended that any future plasphalt paving projects in the Commonwealth continue to undergo the performance evaluation process as stipulated in PennDOT BCM Use Guidance Document. Some general recommendations include:

- Plasphalt should only be used at site locations where it’s promoted characteristics can be fully tested.
- Reject high temperature plasphalt loads.
- Obtain manufacturer certification on TRPA material, including production date and “shelf life” use restrictions.
- Require density testing and cores of base course for project documentation.
5.0 ACKNOWLEDGEMENTS

This 5-year evaluation and has been funded by the Pennsylvania Department of Environmental Protection through the Strategic Recycling Program as administered by PennDOT Pollution Prevention Section - EQAD.

A special appreciation is extended to Mr. Joseph Kretulskie, District 5-0 Municipal Services for his technical assistance and continual support on the Hay Terrace Plasphalt project. Mr. Kretulskie has been instrumental in compiling test and technical information on plasphalt materials, and assisting the Pollution Prevention Section – EQAD in performing the yearly performance evaluations on this project.
Instructions to Local Governments who agree to use Plasphalt HMA Pavement Courses as an experimental feature:

1. Following the guidelines in PENNDOT Pub. 242 (Pavement Policy Manual), specify the appropriate Superpave Asphalt Mixture Design, HMA Pavement Course(s) for the selected roadway.

2. In the contract, specify separate Construction Item Numbers and Quantities for the regular Superpave pavement course (control section) and the Plasphalt pavement course (experimental section). The local government will need to make a decision on how many tons or square yards of Plasphalt HMA Pavement Course are to be placed on the project. It is suggested that a minimum quantity of 600 tons or 7040 square yards (approximately 1-lane mile at 12 feet wide lane at 1 1/4" depth) of Plasphalt HMA Pavement Course.

Example:

Item No. 0409-0484  Superpave Asphalt Mixture Design, HMA Wearing Course, 
PG 64-22, 0.3 to < 3 Million ESALs, 9.5 mm Mix, 1 1/4" Depth, 
SRL-M

Item No. 9409-0484  Superpave Asphalt Mixture Design, HMA Wearing Course, 
PG 64-22, 0.3 to < 3 Million ESALs, 9.5 mm Mix, 1 1/4" Depth, 
SRL-M (Plasphalt)

3. Include the attached bid document language, Plasphalt specifications, and Work Plan into the contract.

4. Indicate in the project plans or have the Engineer direct the Contractor to place the control sections and experimental sections in a typical evaluation pattern on the roadway (see attached workplan).

5. Notify Mr. Robin Sukley, of the PENNDOT ETT Division, when projects using Plasphalt will be constructed. Phone (717) 787-3137 or Email sukleyr@dot.state.pa.us.
Include in Bid Documents:

Experimental Use of Plasphalt HMA Pavement Courses.

Where indicated on the plans or directed by the Engineer, place Plasphalt HMA Pavement Courses as an experimental feature. Construct Plasphalt HMA pavement courses in accordance with the attached Specification for Experimental Use of Plasphalt HMA Pavement Courses. Provide a Job Mix Formula for the Plasphalt HMA Pavement Course that uses the same materials and has the same or very similar aggregate gradation and asphalt content as the control section.

Where indicated on the plans or directed by the Engineer, place Superpave Asphalt Mixture Design, HMA Pavement Courses as a control section. Construct Superpave Asphalt Mixture Design, HMA Pavement Courses as specified and in accordance with Pub. 408, Sections 309 and/or 409.

HMA Producers are to contact a Plasphalt representative for technical assistance in developing job-mix formulas and producing Plasphalt HMA Pavement Courses.
SPECIFICATION
PLASSHALT HMA PAVEMENT COURSES

DESCRIPTION - This work is the construction of hot mix asphalt (HMA) using a combination of virgin aggregate and treated recycled plastic aggregate (TRPA) materials. Use a maximum of 1.5 percent TRPA material consisting of shredded, granulated, and treated recycled plastic from Plashalt Project, LLC. Construct Plashalt courses as specified in Sections 309 and 409 except as modified or supplemented as follows.

MATERIALS – Section 309.2 or 409.2 with additions and modifications as follows:

(b) Aggregate

5. Treated Recycled Plastic Aggregate (TRPA) Material. Provide TRPA material from Plashalt Project, LLC. Provide TRPA material meeting the physical and chemical properties as recommended by the manufacturer. Include a description of the plan to control TRPA in the quality control plan. Keep all TRPA material free of foreign materials.

(d) Composition of Mixtures. As required by Section 309 or 409.2(d) and as follows:

The Plashalt HMA mixture consists of the TRPA material, virgin aggregate(s), and bituminous material. Obtain samples of the TRPA material from the stockpile, as required in the quality control plan, and determine the average TRPA gradation. Maintain records of the testing of TRPA gradation and make available for review when directed. Determine the average stock gradations of virgin aggregate to be blended with the TRPA material. Determine the proportions of the TRPA and virgin materials to meet the specified mix composition requirements of virgin mixes. Prepare and test Superpave gyratory specimens as directed in Bulletin 27, Chapter 2A, and have the job-mix formula reviewed.

CONSTRUCTION - Section 309.3 or 409.3 with additions and modifications as follows:

(b) Bituminous Mixing Plant. Add the following:

1. Batch Plant. Modify the batch plant to allow measuring the mass (weight) of the treated recycled plastic aggregate (TRPA) material prior to incorporation into the pug mill. Design the cold feed bin, conveyor system, charging chute(s), and any special bins, if used, to avoid segregation and sticking of the TRPA material.

2. Drum Mixer Plant. Modify the drum mixer plant to prevent direct contact of the TRPA materials with the burner flame and/or overheating of the TRPA material in the process.

MEASUREMENT AND PAYMENT - Section 309.4 or 409.4
EVALUATION OF PLASPHALT RECYCLED PLASTIC AGGREGATE SUBSTITUTE IN HMA FOR MUNICIPALITY USE

INTRODUCTION: Plasphalt is a treated recycled plastic aggregate substitute for hot-mix asphalt (HMA) materials. Local government roadways in the state of Pennsylvania are interested in field use of Plasphalt material. The Plasphalt material potentially will prevent or lessen severity of rutting in hot-mix asphalt and also provides a potential use for recycled plastic.

OBJECTIVE: The objective of this research is to evaluate this Plasphalt for performance as compared to that of a standard paving mix.

(Set limits of the project include location map of projects)

PLAN OF STUDY: The plan of study will be to compare Plasphalt pavement wearing course to standard Superpave 9.5 mm pavement wearing course (control section) on low trafficked roadways owned by various local governments. A control section of a standard Superpave 9.5 mm paving mix must be placed at the same time the Plasphalt pavement course is placed for proper comparison. The study will involve crack and rut inspections of both the Plasphalt and control sections. Inspections are to be conducted twice a year, for five years. Form TR 1461 (8-99) is to be filled out for each project site during each inspection. Along with the crack surveys, string line or straightedge rut measurements, photo logs recording the dates and the severity of pavement are to be taken and maintained.

Updates from these 20-30 projects by the Bureau of Municipal Services will be forwarded to Robin Sukley, Engineering Technology & Information Division, yearly, on the number, locations and status of all the municipal project sites.
STAFFING: Research Project Manager: Pat Sullivan of the Department’s Bureau of Municipal Services will be the centralized data collector for all local government projects and ensure that the biannual crack and rut inspections are performed on each project site.

REPORTING: A combination construction and final report will be written by the Research Project Manager within 90 days of collecting the final data at the end of the five-year evaluation period. The report will provide the findings, conclusions, and recommendations for potential implementation of Plasphalt pavement courses.

SCHEDULE: This will be a five-year evaluation.
Typical Roadway Evaluation Pattern

Typical Intersection Evaluation Pattern
MODIFY FOR FIELD CONDITIONS
FIELD EVALUATION FORM

Information for project and product identification for use with FHWA Form 1461

Product/Technology Name* ____________________________

Project Name* ____________________________

Construction Project No.* ____________________________

District Contact Person ____________________________ Phone No. ____________________________

Location*: District ____________ County ____________
SR# ____________ Segment ____________ Offset ____________

Anticipated Date of Construction ____________________________

Date Work Plan Approved ____________ Date Feature Constructed ____________
Date Evaluation Scheduled to End ____________ Actual End of Evaluation ____________

Construction Quantity ____________ Units ____________ (sy, cf, ft, m², m³, m, etc.)

Material/Technology Purpose/ Use* ____________________________

Product PE# (if known) ____________________________

Comments

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

*Denotes minimum information required. Other information to be provided if available at time of notification or initiation.

If you have any questions concerning this form, please call the Engineering technology and Information Division, Bureau of construction and materials at (717) 787-36580. This information can be faxed to ETI at (717) 783-5955
ATTACHMENT 3

Project Contract
Site Location Map
UTM 18 479761E 4503589N (NAD27)
Hay School, USGS EASTON (NJ) Quadrangle
Projection is UTM Zone 18 NAD83 Datum

http://www.tonozone.com/
A. DEPOSIT OF PROPOSALS:

All envelopes containing Bid proposals shall be clearly marked “Bid Proposal for Letting of July 28, 2003”.

Sealed Proposals will be received on or before 4:00 pm, on the above Letting Date.

Bids will be opened and read at approximately 7:30 pm, on the above Letting Date.

1. The contractor proposes to furnish and deliver all materials (including Form TR-465, Daily Bituminous Mixture Certification) and to do and perform all work on the following project as more specifically set forth in the Schedule of Prices (Attachment), in accordance with drawings and specifications on file at The Borough of Wilson as well as the supplements and special requirements contained herein and/or attached hereto and current PennDOT Specifications (Publication 40B), except (a) bidders MUST be pre-qualified by Penn DOT (See Attachment 1A), and (b) Marshall testing of bituminous paving materials is not required (Sec: 40B).

2. If designated as the successful bidder, the contractor will begin work on the date specified in the notice to proceed or as otherwise provided in the special requirements, and will complete all work within 90 working days.

3. Accompanying this proposal is a certified check or bid bond in the amount of 10% made payable to the municipality as a proposal guarantee which, it is understood, will be forfeited in case the contractor fails to comply with the requirements of the proposal.

B. PROPOSAL OF

Lehigh Valley Site Contractors, Inc.
5143 Lower Mud Run Road
Easton, PA 18040

NAME / ADDRESS OF CONTRACTOR

CONTRACTOR’S CERTIFICATION

It is hereby certified as follows:

1. The only persons interested in this proposal as principals is (are):

   Lehigh Valley Site Contractors, Inc.

2. None of the above persons are employees of the municipality.

3. This proposal is made without collusion with any other person, firm or corporation.

4. All plans and specifications referred to above and the site of the work have been examined by the contractor. The contractor understands that the quantities indicated herein are approximate and are subject to change as may be required; and that all work is payable on the basis of the unit prices listed on the Schedule of Prices (Attachment 1)
5. The contractor will comply with all requirements of the laws and implementing regulations of the Commonwealth of Pennsylvania and the United States relating to human relations, equal opportunity and non-discrimination in employment, and will pay to workmen employed in the performance of the contract the wages to which they may be entitled.

6. The contractor will provide the municipality with a performance bond, conditioned upon the faithful performance of the contract in accordance with the plans, specifications and conditions thereof, and a payment bond, conditioned on the prompt payment of all material furnished and labor supplied or performed in the prosecution of the work, in accordance with the Public Works Contractors' Bond Law of 1967, and an affidavit accepting the provisions of the Workmen's Compensation Act of 1915, as amended.

Lehigh Valley Site Contractors, Inc.

CONTRACTOR

WITNESSED OR ATTESTED BY:

[Signature]
Stephen M. Nelson, Vice-Pres./Asst. Sec.

[Seal]

H. Christian Budenz, Vice-Pres./Asst. Sec.

TO BE EXECUTED ONLY IN THE EVENT THE ABOVE PROPOSAL IS ACCEPTED

ACCEPTED ON: __________
MUNICIPALITY:

ATTESTED BY: __________
TITLE: __________
SEAL: __________
ATTACHMENT #1

LOCATION OF WORK: The Borough of Wilson
South 21st Street, Jefferson Ave.

DESCRIPTION OF WORK:
The work will be performed complete in-place including maintenance and protection of traffic. The project consists of milling existing bituminous pavement 3 1/2" and 5" depth, 3 1/2" 19 mm base course (base repair), milling of paving notches, 9.5mm Asphalt leveling course, 1 1/2" 9.5mm Asphalt wearing course, Crafo PolyPatch, and sealing of completed paving project with rubberized joint sealant.

ESCALATOR CLAUSE:

SCHEDULE OF PRICES

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<td>1</td>
<td>167</td>
<td>SV</td>
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<td>160</td>
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<td>19 mm Base Course (Base Repair)</td>
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<td>5</td>
<td>67</td>
<td>Ton</td>
<td>9.5 mm ASPHALT Leveling Course</td>
<td>$71.00</td>
<td>$4,757.00</td>
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<td>6</td>
<td>1.250</td>
<td>SY</td>
<td>1 1/2&quot; 9.5 mm ASPHALT Wearing Course</td>
<td>$7.40</td>
<td>$8,875.00</td>
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<td>7</td>
<td>1.084</td>
<td>SY</td>
<td>1 1/2&quot; 9.5 mm Conventional Wearing Course</td>
<td>$4.70</td>
<td>$5,094.80</td>
</tr>
<tr>
<td>8</td>
<td>1.700</td>
<td>LF</td>
<td>Sealing of curb-line, around utilities, and paving notches utilizing Rubberized Joint Sealant</td>
<td>$1.75</td>
<td>$2,975.00</td>
</tr>
<tr>
<td>9</td>
<td>900</td>
<td>Gal.</td>
<td>Crafo PolyPatch Fine Mix Type 2</td>
<td>$23.00</td>
<td>$20,700.00</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>LUMP SUM</td>
<td>Lower Manhole at intersection of Jefferson and Palmer</td>
<td>$835.00</td>
<td>$835.00</td>
</tr>
</tbody>
</table>

*BIDS WILL BE AWARDED ON A TOTAL OF ITEMS 1-9 TO THE LOWEST RESPONSIBLE BIDDER.*

TOTAL AMOUNT OF BID $88,117.15
PROPOSAL AND CONTRACT INSTRUCTIONS - FORM 944

1. The proposal must be typewritten or printed.

2. If more than one proposal on any project is submitted by any individual, firm or partnership, corporation or association under the same or different names, only one lowest proposal will be considered.

3. Description of Work -
   A. If additional space is needed, insert appropriately numbered attachment and note "Continued on Attached work sheets."

4. Part A of Page 1 to be completed by municipality. Part B of Page 1 to be completed by contractor. Schedule of Prices - Column #1 (Item), #2 (Approximate quantities), #3 (Unit, i.e., ton, square yard, linear feet, etc.) and #4 (Description, i.e., bituminous materials - ID2, FJ1, FB1, BCBC, etc.) must be filled in by the municipality to insure equitable bidding. Columns #5 (Unit Price), #6 (Total), and total amount of bid, must be filled in by the contractor. If more space is needed, add note at the bottom of the page, "Continued on Attachment No. 1-A," and add additional sheet designated as Attachment No. 1-A, 1-B, etc. Repeat for each additional sheet required.

5. If liquidated damages are to be assessed, add the following sentence to Part A #2. If all work is not completed on time, liquidated damages will be assessed at the rate of $200.00 per additional working day.
   (OR "... as set forth in the attached schedule.")

6. Payment and Performance bonds are provided only by the successful bidder. Contracts under $5,000 - bonds must be in 50% of the contract amount. Contracts in excess of $5,000 - bonds must be in 100% of the amount of contract. Bond Forms MS-944 Attachments 2 and 3 and Workmen's Compensation Affidavit. Attachment 4 must be submitted by the successful bidder within 20 days of the contract award. Failure to submit the bond shall constitute grounds to cancel the contract.

7. *Construction projects, where the estimated cost of the total project exceeds $25,000, are subject to the provisions of the Pennsylvania Prevailing Wage Act 442. It is the responsibility of the municipality to obtain the Prevailing Wage Scale for the area and include it in the proposal. If the Prevailing Wage Act applies, this fact shall be noted in the advertisement.

On projects utilizing Federal Revenue Sharing Funds, if the project cost exceeds $2,000 and is financed with 25% or more Federal Revenue Sharing Funds, the Davis Bacon Act applies. Again it is the responsibility of the municipality to obtain the Davis Bacon Wage Rates. Include them in the proposal and note the fact in the advertisement. If both Acts are applicable, the Davis Bacon Act has preference over the Pennsylvania Prevailing Wage Act.

8. An ESCALATOR CLAUSE is optional; if used, it must be included in the proposal prepared by the municipality. An escalator clause may not be inserted by the contractor.

*(1961, Aug. 15, P. L. 987, 43 P.S. 155)*
KNOW ALL MEN BY THESE PRESENTS, That we, [NAME AND ADDRESS OF CONTRACTOR]

as Principal and

[SURETY COMPANY]

a corporation incorporated under the laws of the State of [NAME OF STATE] as Surety

are held and firmly bound unto [NAME OF MUNICIPALITY] in the full and just sum of [$( ] dollars

lawful money to the United States of America, to be paid to the above Municipality or its assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firm by these presents.

WHEREAS, the above bounden Principal has entered into a contract with the above Municipality, bearing even date herewith, for the undertaking of certain obligations as therein set forth.

NOW, THEREFORE, the condition of this obligation is such that if the above bounden Principal, as Contractor, shall in all respects comply with and faithfully perform the terms and conditions of said Contract, including the Specifications and conditions referred to and made a part thereof, and such alterations as may be made in said Specifications as therein provided, and shall well and truly, and in a manner satisfactory to the municipality fulfill all obligations as therein set forth, then this Obligation shall be void, but otherwise the same shall be and remain in full force, virtue and effect.

It is further provided that any alteration which may be made in the terms of the contractor or its specifications with the express approval of the Municipality or the Principal to the other, shall not in any way release the Principal and the Surety or either or any of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the surety of any such alteration or forebearance being hereby waived.

IN WITNESS WHEREOF, the said Principal and Surety have duly executed this Bond under Seal, pursuant to due and legal action authorizing the same to be done on [DATE OF BOND].

[PLACE SEAL HERE]

Attest / Witness: [CONTRACTOR]

By [TITLE:]

[PLACE SEAL HERE]

Attest / Witness: [SURETY COMPANY]

[TITLE:]

[TITLE:]

-1-
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we

as PRINCIPAL and
a corporation incorporated under the laws of the State of ____________, as SURETY, are
held and firmly bond unto the ____________, in the full and just sum of
($ _________ ) dollars, lawful money of the
United States of America, to be paid to the said ____________, or its assigns, to which
payment well and truly to be made, we bind ourselves, our heirs, executors, administrators,
successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a contract with the above
municipality hereinafter called Obligee, bearing even date herewith, for the improvement of a
certain section of highway or bridge in said Municipality consisting of:

for approximately the sum of: ____________________________ ($ _________ ) dollars.

NOW, THEREFORE, the condition of this obligation is such that if the above bounden
PRINCIPAL shall and will promptly pay or cause to be paid in full all sums of money which may be
due by contract or otherwise, to any individual, firm, partnership, association or corporation, for all
material furnished or labor supplied or performed in the prosecution of the work, whether or not the
said for material or labor entered into and became component parts of the work and for rental of the
equipment used and services rendered by public utilities in, or in connection with the prosecution of
such work, then this obligation to be void, otherwise to remain in full force and effect.

The PRINCIPAL and SURETY, hereby, jointly and severally, agree with the Obligee herein
that any individual firm, partnership, association or corporation, which has performed labor or
furnished material in the prosecution of the work as provided, and any public utility which has not
been paid in full therefor, may sue in assumpsit on this Payment Bond in his, their, or its own name
and may prosecute the same to final for such sum or sums as may be justly due him, them or it, and
have execution thereon. Provided, however, that the Obligee shall not be liable for the payment of
any costs of expenses of such suit.

RECOVERY by any individual, firm, partnership, association or corporation hereunder shall
be subject to the provisions of the "Public Works Contractors’ Bond Law of 1967", Act No. 385,
approved December 20, 1967, P.L. 869, which Act shall be incorporated herein and made a part
hereof, as fully and completely as though its provisions were fully and at length herein recited.

It is further provided that any alterations which may be made in the terms of the contract or
in the work to be done or materials to be furnished or labor to be supplied or performed under it or
the giving by the Obligee of any extension of time for the performance of the contract or any other
forebearance on the part of either the Obligee or the Principal to the other, shall not in any way
release the PRINCIPAL and the SURETY or SURETIES of any such alteration, extension of
forebearance being hereby waived.

IN WITNESS WHEREOF, the said PRINCIPAL and SURETY have duly executed this Bond
under seal this ______ day of ______, 20___.

PLACE SEAL HERE

WITNESS:

CONTRACTOR

BY:

TITLE:

TITLE:

SURETY COMPANY

PLACE SEAL HERE

WITNESS:

TITLE:

TITLE:
AFFIDAVIT RE

ACCEPTING PROVISIONS OF THE WORKMEN'S COMPENSATION ACT

State of

) ss.

County of

being duly sworn according to law deposes and says that they have

accepted the provisions of the Workmen's Compensation Act of 1915 of the Commonwealth of Pennsylvania, with

its supplements and amendments, and have insured their liability thereunder in accordance with the terms of said its

Act with ____________________________

(SURETY COMPANY)

(TYPE OR PRINT) CONTRACTOR

BY ____________________________

SIGNATURE

Sworn to and subscribed before me this _____ day of ___________ A.D. 20__

_______________________________

SIGNATURE

My Commission Expires _______________ (DATE)
ANTI-COLLUSION AFFIDAVIT

County

Municipality

Project Number

Fed. Project No. (If Applicable)

State of Pennsylvania

County of Montgomery

The undersigned deponent deposes and says that he is the Vice-Pres./Asst. Sec. of the Lehigh Valley Site Contractors, Inc. Company; that he is authorized to make this affidavit on behalf of said company in compliance with section 102.06 (e) of Department Specifications, Publication 408, as amended and that the said company has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contract.

Lehigh Valley Site Contractors, Inc.

(Contractor)

BY

H. Christian Budenz, Vice-Pres./Asst. Sec.

Sworn to and subscribed before me the undersigned notary public this 28th day of July, 2003.

Karen Smiley

Notary Public

My Commission expires 12/8/07
Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that LEHIGH VALLEY SITE CONTRACTORS, INC.
5143 Lower Mud Run Road
Easton, PA 18040
as Principal, hereinafter called the Principal, and
LIBERTY MUTUAL INSURANCE COMPANY
1787 Sentry Parkway, Building 18, Suite 450
Blue Bell, PA 19422
a corporation duly organized under the laws of the State of
Massachusetts*, hereinafter called the Surety, are held and firmly bound unto
Borough of Wilson
as Obligee, hereinafter called the Obligee, in the sum of

Ten Percent (10%) of the Bid
for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind
ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by
these presents.

WHEREAS, the Principal has submitted a bid for
Paving South 21st Street and Jefferson Avenue

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract
with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding
or Contract Documents with good and sufficient security for the faithful performance of such Contract and for the prompt
payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter
such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty
hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract
with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain
in full force and effect.*

* and authorized to transact business in the Commonwealth of Pennsylvania

Signed and sealed this 28th day of July 2003

[Signatures]

LEHIGH VALLEY SITE CONTRACTORS, INC.
(Witness)

[Signatures]

H. Christian Budenz, Vice-Pres./Asst. Sec.
LIBERTY MUTUAL INSURANCE COMPANY
(Surety)

[Signatures]

Alan R. Hein, (Treas.) Attorney-in-Fact

[Signatures]
THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

LIBERTY MUTUAL INSURANCE COMPANY
BOSTON, MASSACHUSETTS
POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS: That Liberty Mutual Insurance Company (the 'Company'), a Massachusetts stock insurance company, pursuant to and by authority of the By-law and Authorization hereinafter set forth, does hereby name, constitute and appoint


under whose signature and execution of such instruments and to attach thereto the seal of the Company, shall have full power to bind the Company by its signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be its binding as if signed by the president and attested by the secretary of the Company in their own proper persons.

That this power is made and executed pursuant to and by authority of the following By-law and Authorization:

ARTICLE XII - Execution of Contracts; Section 5. Surety Bonds and Undertakings.
Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in the respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. So executed such instruments shall be binding as if signed by the president and attested by the secretary.

By the following instrument the chairman of the president has authorized the officer or other official named therein to appoint attorneys-in-fact:

Pursuant to Article XIII, Section 5 of the By-laws, Garret W. Elliott, Assistant Secretary of Liberty Mutual Insurance Company, is hereby authorized to appoint such attorneys-in-fact as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

The By-law and the Authorization contained above are true copies thereof and are now in full force and effect.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Company and the corporate seal of Liberty Mutual Insurance Company has been affixed thereunto in Plymouth Meeting, Pennsylvania this 16th day of May 2003.

LIBERTY MUTUAL INSURANCE COMPANY

By

Garret W. Elliott, Assistant Secretary

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF MONTGOMERY

On this 16th day of May, 2003, before me, a Notary Public, personally came Garret W. Elliott, to the known, and acknowledged that he is an Assistant Secretary of Liberty Mutual Insurance Company, that he signs the seal of said corporation, and that he executed the Power of Attorney and affixed the corporate seal of Liberty Mutual Insurance Company thereto with the authority and at the direction of said corporation.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed my notarial seal in Plymouth Meeting, Pennsylvania, on the day and year above written.

By

Teresa Pastella, Notary Public

To confirm the validity of this Power of Attorney call 1-610-832-2240 between 9:00 am and 4:30 pm EST on any business day.

CERTIFICATE

The undersigned, Assistant Secretary of Liberty Mutual Insurance Company, do hereby certify that the original power of attorney of which the foregoing is a true and correct copy, is in full force and effect on the date of this certificate, and I do further certify that the officer or official who executed the power of attorney is an Assistant Secretary specially authorized by the chairman or the president to appoint attorneys-in-fact as provided in Article XI, Section 5 of the By-laws of Liberty Mutual Insurance Company.

This certificate and the above power of attorney may be signed by facsimile or mechanically reproduced signatures under and by authority of the following vote of the board of directors of Liberty Mutual Insurance Company at a meeting duly called and held on the 12th day of March, 1990.

VOTED that the facsimile or mechanically reproduced signature of any assistant secretary of the company, whenever appearing upon a certified copy of any power of attorney issued by the company in connection with surety bonds, shall be valid and binding upon the company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said company, this 28th day of July 2003.

By

David M. Carey, Assistant Secretary
NOTICE FROM SURETY REQUIRED BY
TERRORISM RISK INSURANCE ACT OF 2002

In accordance with the Terrorism Risk Insurance Act of 2002 (referred to hereinafter as the "Act"), this disclosure notice is provided for surety bonds on which one or more of the following companies is the issuing surety: Liberty Mutual Insurance Company; Liberty Mutual Fire Insurance Company; LM Insurance Corporation; The First Liberty Insurance Corporation; Liberty Insurance Corporation; Employers Insurance Company of Wausau (formerly "EMPLOYERS INSURANCE OF WAUSAU A Mutual Company"); Peerless Insurance Company; and any other company that is a part of or added to the Liberty Mutual Group for which surety business is underwritten by Liberty Bond Services (referred to collectively hereinafter as the "Issuing Sureties").

NOTICE FORMS PART OF BOND

This notice forms part of surety bonds issued by any one or more of the Issuing Sureties.

DISCLOSURE OF PREMIUM

The premium attributable to any bond coverage for "acts of terrorism" as defined in Section 102(1) of the Act is Zero Dollars ($0.00).

DISCLOSURE OF FEDERAL PARTICIPATION IN PAYMENT OF TERRORISM LOSSES

The United States will reimburse the Issuing Sureties for ninety percent (90%) of any covered losses from terrorist acts certified under the Act exceeding the applicable surety deductible.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
PREQUALIFICATION CERTIFICATE

In accordance with the Department regulations you are hereby notified of the performance factor, maximum capacity rating, and work classifications assigned to you. You are eligible to perform as a Prime Contractor.

Business Partner ID: 000981
Status: Qualified
Federal ID Number: 23-2520028
Line-of-Credit: $1,500,000
Line-of-Credit Expiration: 05/01/2004

Maximum Capacity: $32,265,860.00
Performance Factor: 7
Issued: 05/01/2003
Effective: 05/01/2003
Expiration: 04/30/2005

Contractor:
Lehigh Valley Site Contractors, Inc.
Lehigh Valley Site Contractors, Inc.
5143 Lower Mud Run Road
Easton, PA 18040

Code     Work Classification
A        Clearing and Grubbing
C        Roadway Excavating and Grading
C1       NonRoadway, Drainage, Structure Related Excavation and Grading
C2       Drilling and Blasting
C3       Geotextiles
C4       Rubblizing
C6       Drilling
F        Bituminous Pavement
F1       Bituminous Pavement Patching and Repair
F2       Bituminous Joint and Crack Sealing
F3       Milling, Rumble Strips, Scarification Bituminous or Concrete
F4       Bituminous Surface Treatments, Seal Costs
H        Drainage, Water Main, Storm Sewer
H1       Pipe and Culvert Cleaning
H2       Pavement Base Drains
K        Curbs, Sidewalks, Inlets, Manholes
K1       Masonry Work
K2       Concrete and Masonry Coatings
M1       Selective Tree Removal, Trimming

Angela Howell

Certificates
SECTION 1: Proposed Project Information

Approved Start Date: 3/1/03  
Person Interviewed: G. Drake  
Title: Supt of Public Works  
Contractor: Leader Valley Site Contract  
Contract Type: IN PLACE  
MS-339 Project: YES  
Revision No.:  
Budget Item No.: 416  
Bank Loan, Bond Issue: N/A

<table>
<thead>
<tr>
<th>Location of Work</th>
<th>From</th>
<th>To</th>
<th>Length</th>
<th>Width</th>
<th>Type</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
</table>
| 21ST ST  
ANKER LANE  
ST. FRANCIS XAVIER ST | 101 | 32 | .61 | 50 | N/A | N/A | N/A |

Scope of Work:
- Reconstruction: (7) replacing entire street surface with 1.5" "Highway Grade" bituminous asphalt.  
- Remarks: Note: The tender must be approved prior to Letting.  
- Also included in this contract is crack sealing on various local streets.

<table>
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<th>Proposed Funding</th>
<th>State (Act 655)</th>
<th>County (Act 32)</th>
<th>General Funds</th>
<th>Other</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>58, 117.15</td>
<td></td>
<td></td>
<td></td>
<td>58, 117.15</td>
</tr>
</tbody>
</table>

* Source of Other Funding

SECTION 2: Approval and Instructions to Municipalities.

1. If any changes are made, such as increasing or decreasing the length or width of work, the amount of aid granted, or a change in the type of improvement, contact your Engineering District Municipal Services Representative.
2. County Aid Grants for a project will not be made until authorized by the Department at the conclusion of the project. These monies must be expended from and deposited to the General Fund.
3. The municipality must certify that all materials and work done on the aforementioned project shall conform to the current Pennsylvania Department of Transportation Specifications and that all work will be done within the legal right of way or with permission of the abutting property owners.
4. All work performed on this project must be charged to the Budget Item Number shown on this form.
5. Your municipality has the responsibility to obtain its own engineering and inspection. These are permissible Liquid Fuels expenditures.
6. Retain this form and attach all contracts, advertisements, bid tabulations, bonds and any other project materials. Present these documents to state and local auditors upon request.

APPROVED:  
MUNICIPAL SERVICES REPRESENTATIVE:  
DATE: 3/7/03

Original District Office:  
cc: Municipality 3/7/03
Memorandum --- Short Form --- Not Negotiable
(subject to Terms and Conditions on Reverse)

ORIGINAL DOCUMENT # 56804
Account #: 4926070

Shipper's Permanent Address:
Chevron Products Company
P.O. Box R
Concord, CA 94524

FEM: 25-0527728

Bill to: WARDEN ASPHALT COMPANY
H&K
DUNMORE, PA
<br>DELIVERED FROM
PERTH AMBOY, NJ

Date/Time in:
9/18/03 - 02:43 AM

Date/Time Out:
9/18/03 - 05:16 AM

Order Type: Normal Sale

Origin Price, Destination Taxes, Freight Prepaid

Bill To: WARDEN ASPHALT COMPANY
FOR PERTH AMBOY
PERTH AMBOY, NJ

<table>
<thead>
<tr>
<th>Product</th>
<th>Product Description</th>
<th>Gross</th>
<th>Tare</th>
<th>Net In</th>
<th>Net In</th>
<th>Net In</th>
<th>Net In</th>
<th>Net Gal</th>
<th>Net Bbls</th>
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<td>251427</td>
<td>PG 64 22</td>
<td>79740</td>
<td>28960</td>
<td>50780</td>
<td>25.39</td>
<td>23.03</td>
<td>58.90</td>
<td>140.24</td>
<td></td>
</tr>
</tbody>
</table>

Product Certification:

This certifies that the material on this bill of lading has been tested and approved under:

DOT # 7A-11

Signed:

3P CR @25C = 1.0323 viscosity @140F = 2.85
Viscosity @ 25C = 0.3520 kPa

Density @ 64 C = 1.1820 kPa

PRODUCER:

For Product Emergency
Spill, Leak, Fire, Exposure, or Accident
CALL CHEMTREC - Day or Night - 800-424-9300
For Product Information, Health and Safety Information
Call or Write Chemtrec
P.O. Box 4054, Richmond, CA 94804
U.S. - 800-231-0623 International - 510-231-0823

Received by:

Signature:

Date:

This is to certify that the above-named materials are properly classified, described, packaged, marked and sealed and are in proper condition for transportation according to the applicable regulations of the Department of Transportation:

(Signature)

Chevron Products Company

Carrier certifies that this equipment is suitable for loading the commodity and that the cargo is in a proper container for the transportation of this commodity under applicable D.O.T. regulations. Carrier certifies that the vehicle has not been overloaded.

(Signature)

Carrier
ATTACHMENT 4

Pre-paving Photographs (2003)
Initial Paving Field Evaluation Form
Initial Paving Photographs (2003)
PLASPHALT PROJECT
Jefferson Street, WILSON BOROUGH, PA

Project Location: Jefferson Street
(from Palmer to 16th Street)
PRE-PAVING PICTURES
JEFFERSON STREET

PP-1
View of Jefferson Street from 16th Street/
Jefferson Street intersection. Note uneven
pavement from utility trench work.

PP-2
View of Jefferson Street and Palmer Street
intersection. Note distressed surface pavement.

PP-3
Close-up view of proposed wedge location on
Palmer Street (looking south).
PP-4
Proposed marking for wedges at 16th Street and Jefferson Street intersection.

PP-4
View of Jefferson Street after milling.
IP-1
View of asphalt batch delivery. View from Palmer Street intersection.

IP-2
Asphalt course paving at Jefferson Street and Palmer Street intersection.
FIELD EVALUATION DATA FORM
Information for project and product identification for use with FHWA Form 1461

Product/Technology Name*: **Plassphalt (9.5 mm), Hellertown Materials**

Project Name*: **Wilson Borough, Jefferson Street**, **Including 16th St. and Palmer St. intersections**

Construction Project No.*: **Municipal Services Project #03-48418-01 (2 of 2)**

District Contact Person*: **Joseph Kretulskie** Telephone*: **610-791-6024**

Location*: District 5-0 _________ County: **Northampton**

SR# Jefferson St. Segment: _______ Offset: NA

Anticipated Date of Construction: **9/18/03**

Date Work Plan Approved **9/18/03** Date Feature Constructed **9/09/03**

Date Evaluation Scheduled to End: **9/18/03** Actual End of Evaluation: **9/18/03**

Construction Quantity: **100** Units: **tons** (sy, cf, if, m, m^2, m^3, etc.)

Unit Cost: $78.89/ton or $7.10/SY (from construction contract)

Material/Technology Purpose /Use*: **See Design Mix**

Product PE# (if known) **Robin Sukley, Bureau of Construction & Materials (717) 787-3137**

Comments:
This project involved resurfacing and select repair of Jefferson Street, including placement of control wearing course on the northern traffic lane and Superpave Plassphalt wearing course on the southern traffic lane.

*Denotes minimum information required. Other information to be provided if available at time of notification or initiation.

If you have any questions concerning this form, please call the Engineering Technology and Information Division, Bureau of Construction and Materials at (717) 787-3137. This information can be faxed to ETI Attention: Robin Sukley, PE at (717) 783-5955 or emailed to rsukley@state.pa.us.
Construction Record
CONTRACTOR/PRODUCER: Lehigh Valley Site Contractors, Inc.
(Please attach a copy of the JMF's)

LIST TOOLS/EQUIPMENT USED
Paving Equipment: Barber Greene Model BT 211
Compaction Equipment: Large Roller: Dynapac CC422
Small roller: Dynapac CC122

ROLLER PATTERN: None established  ROLLER PICK-UP ___.yes____ no

Small quantity and short paving distance prohibited setting a rolling pattern.

MIX DELIVERY
TEMPERATURE: 255-310 deg. F (one truck with mixed readings)

Control 240-300 degree F (Plasphalt)

One delivered plasphalt truck load was measured below lower limit temperature (in hopper 240-255 degree F). Wilson Borough Municipal Manager was informed.

Loose box samples taken behind hopper.

WEATHER: Overcast, temp. mid 60's;
        morning 11:00- 3:00 PM (Plasphalt and Control)

List any problems during construction?
One delivered batch in one truck load of plasphalt was cool. Field density (> 92%) was achieved on plasphalt section. Lower density readings 88-91% were observed (in midsection of plasphalt paving strip) and were at the cool plasphalt load placement location. Several non-vibratory roller passes were required to achieve this density.

Contractors needed to be reminded to tack coat the cold joint on Jefferson Street. Approximately half of the second lane (conventional or control) was completed before the distributor was used to tack the cold joint.

Bi-Annual Performance Record (CONTROLS MAY NEED TO BE INSTALLED PRIOR)

Pavement Condition Rating Form

CRACKING TYPE & LOCATION (video logging may be substituted)

RUT MEASUREMENTS & LOCATION
String line or straight edge method

SHOVELING? ___________________ EARLY AGEING? ________________
JEFFERSON STREET
WILSON BOROUGH
2003 PAVING DIAGRAM

PALMER ST.

Paving wedges

Conventional HMA Wearing Course

Additional asphalt patch (extra material)

Plasphalt HMA Wearing Course

Project Statistics:
~ 1,084 SY (Plasphalt)
~ 1,084 SY (Conventional)
\( \Delta = 600 \text{ ft} \times 28 \text{ ft (total)} \)
width

16\text{th} \text{ ST.}
ATTACHMENT 5

Hellertown Materials Plant Photographs
ATTACHMENT 5
HELLERTOWN MATERIALS PLANT

TRPA Materials provided in cardboard boxes from New Mexico manufacturer.

TRPA introduced into batch mix through separate auxiliary hopper with pneumatic injection.

Hellertown Materials Asphalt Plant.
## JOB MIX FORMULA REPORT

**JMF No:** 03501

**Suppliers Name:** Hellertown Materials

**Location:** Hellertown, PA

**Bituminous Plant Type:** McCarter-AB

**Material Class:**

- **Material Code:** 207 - B3
- **Material Code:** 203 - A8
- **Material Code:** 203 - TRPA

**Daily Capacity:** 5000 lb Batch

**Mix Time:**
- **Dry:** 5
- **Wet:** 45

**Material Supplier Code**

- **Material Supplier Name:** Stockertown Materials
  - **Material Code:** 207 - B3
  - **Material Code:** 203 - A8
  - **Material Code:** 203 - TRPA

- **Material Supplier Name:** Treated Recycled Plastic Aggregate
  - **Material Code:** 203 - TRPA

**Alternate AC Suppliers:** CHEV2-15, COAS4-15, VALR1-15, TRUM3-15

### JOB MIX FORMULA AND DESIGN

<table>
<thead>
<tr>
<th>Design</th>
<th>% Virgin AC</th>
<th>% Reclaimed AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.3</td>
<td>5.3</td>
<td></td>
</tr>
</tbody>
</table>

### MIX CHARACTERISTICS (GYRATORY)

<table>
<thead>
<tr>
<th>Design ESALS</th>
<th>Gyrations @ Nini</th>
<th>Gyrations @ Nmax</th>
<th>Max Density (kg/m³)</th>
<th>Ndes Density (kg/m³)</th>
<th>% Voids @ Nini</th>
<th>% Voids @ Nmax</th>
<th>% VMA @ Ndes</th>
<th>% VFA @ Ndes</th>
<th>Weight @ 115mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>75</td>
<td></td>
<td></td>
<td>13.8</td>
<td>41</td>
<td>2.9</td>
<td>17.8</td>
<td>4806</td>
</tr>
</tbody>
</table>

### IGNITION FURNACE DATA

<table>
<thead>
<tr>
<th>Oven Make</th>
<th>Set. Temp.</th>
<th>Sample Size</th>
<th>A.C. Correction Factor (C.)</th>
<th>#200 Correction Factor (20DC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermoynne</td>
<td>538</td>
<td>1200</td>
<td>1.71</td>
<td>0.2</td>
</tr>
</tbody>
</table>

### COMBINED AGGREGATE CONSENSUS PROPERTIES

<table>
<thead>
<tr>
<th>AASHTO T176</th>
<th>AASHTO T304</th>
<th>ASTM D5821</th>
<th>ASTM D4791</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand Equivalent</td>
<td>Uncompacted Void Content</td>
<td>Coarse Aggregate Angularity</td>
<td>Flat &amp; Elongated</td>
</tr>
<tr>
<td>85.0</td>
<td>49.0</td>
<td>100 / (2 Face)</td>
<td>100 / 2.6</td>
</tr>
</tbody>
</table>

**Designed by:** Joseph R. Smith - Asphalt Consultant

**Approved & Submitted by:** Edward Morrison

**Reviewed by Materials Unit:**

**Date:**
- **Designed:** 8/5/2002
- **Approved & Submitted:** 8/11/2003
- **Reviewed:** 5/13/2003
# JOB MIX FORMULA REPORT

**JMF No.:** 03 S11

**Supplier Code:** ABE 48A 41

**Material Class:** SP 95

**AGGREGATE SRL:** L

**Date:** March-03

**Spec:** 9.5 mm, < 0.3 ESAL

**Tons:**

**Location:** Easton, PA.

**Suppliers Name:** ABE Materials

**Bituminous Plant Type:** Simplicity-AB

**Daily Capacity:** 6000 lb. Batch

**Mix Time:** Dry - 45

## Material Supplier Code

<table>
<thead>
<tr>
<th>Material Supplier Code</th>
<th>Supplier Name</th>
<th>Material Code</th>
<th>Material Class</th>
<th>% in Mix</th>
<th>Bulk Sp.Gr.</th>
<th>% Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABE48A14</td>
<td>ABE Materials</td>
<td>207</td>
<td>PK</td>
<td>40.8</td>
<td>2.722</td>
<td>0.35</td>
</tr>
<tr>
<td>CHE45A14</td>
<td>Chestnut Ridge</td>
<td>207</td>
<td>A-1</td>
<td>17.4</td>
<td>2.576</td>
<td>0.96</td>
</tr>
<tr>
<td>ABE48A14</td>
<td>ABE Materials</td>
<td>203</td>
<td>A-6</td>
<td>35.6</td>
<td>2.729</td>
<td>0.58</td>
</tr>
<tr>
<td>CIT60-5</td>
<td>CITGC Asphaltg</td>
<td>PG 64-22, 6.2</td>
<td></td>
<td></td>
<td>1.032</td>
<td></td>
</tr>
</tbody>
</table>

**Alternate AC Suppliers:** CHEV2-15, COA64-15, VALR1-15, TRUM3-15

## JOB MIX FORMULA AND DESIGN

<table>
<thead>
<tr>
<th>AC %</th>
<th>75µm</th>
<th>150µm</th>
<th>300µm</th>
<th>600µm</th>
<th>1.18</th>
<th>2.36</th>
<th>4.75</th>
<th>9.5</th>
<th>12.5</th>
<th>19.0</th>
<th>25.0</th>
<th>37.5</th>
<th>90.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>7.0</td>
<td>8.0</td>
<td>17</td>
<td>24</td>
<td>37</td>
<td>51</td>
<td>73</td>
<td>90</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Design</td>
<td>6.2</td>
<td>5.0</td>
<td>8</td>
<td>11</td>
<td>18</td>
<td>31</td>
<td>45</td>
<td>65</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Lower</td>
<td>5.4</td>
<td>2.0</td>
<td>5</td>
<td>12</td>
<td>25</td>
<td>39</td>
<td>57</td>
<td>86</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>

| % Virgin AC | 6.2
| % Reclaimed AC | 0.6

## MIX CHARACTERISTICS (MARSHALL)

<table>
<thead>
<tr>
<th>Theor. Density (lb./cu. ft.)</th>
<th>Lab. Density (lb./cu. ft.)</th>
<th>% Voids</th>
<th>% VFA</th>
<th>% VMA</th>
<th>Stability</th>
<th>Flow</th>
<th>% Pass #3</th>
<th>% Pass 1/2&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>153.7</td>
<td>147.5</td>
<td>4.1</td>
<td>76.9</td>
<td>17.5</td>
<td>N/A</td>
<td>N/A</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>

## MIX CHARACTERISTICS (GYRATORY)

<table>
<thead>
<tr>
<th>Design ESALS</th>
<th>Gyrations @ Nini</th>
<th>Gyrations @ Nmax</th>
<th>Gyrations @ Nmax</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.3</td>
<td>5</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% Voids @ Nini</th>
<th>% Voids @ Nmax</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.5</td>
<td>2.2</td>
</tr>
</tbody>
</table>

## IGNITION FURNACE DATA

<table>
<thead>
<tr>
<th>Oven Make</th>
<th>Set. Temp.</th>
<th>Sample Size</th>
<th>A.C. Correction Factor (C.)</th>
<th>#200 Correction Factor (200°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tharmoyne</td>
<td>538</td>
<td>1200</td>
<td>0.17</td>
<td>0.2</td>
</tr>
</tbody>
</table>

**Designed by:**

**Approved & Submitted by:**

**Reviewed by Met's Engineer:**

**Date:** 3/19/02

**Date:**

**Date:** 3/19/02

**Date:** 3/19/03
# JOB MIX FORMULA REPORT

**Date:** March-03  
**Spec:** 19.0mm Binder <0.3  
**ESAL:** 15% RAP  
**Location:** Easton, PA  
**Bituminous Plant Type:** Simplicity-AB  
**Daily Capacity:** 6000lb. Batch  
**Mix Time:** 45

<table>
<thead>
<tr>
<th>Material Supplier Code</th>
<th>Supplier Name</th>
<th>Material Code</th>
<th>Material Class</th>
<th>% in Mix</th>
<th>Bulk Sp.Gr.</th>
<th>% Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABE48A14</td>
<td>ABE Materials</td>
<td>207</td>
<td>E3</td>
<td>21.8</td>
<td>2.722</td>
<td>0.35</td>
</tr>
<tr>
<td>CHE45A14</td>
<td>Chestnut Ridge</td>
<td>207</td>
<td>A1</td>
<td>9.4</td>
<td>2.576</td>
<td>0.96</td>
</tr>
<tr>
<td>ABE48A14</td>
<td>ABE Materials</td>
<td>203</td>
<td>A8</td>
<td>31.2</td>
<td>2.729</td>
<td>0.58</td>
</tr>
<tr>
<td>ABE48A14</td>
<td>ABE Materials</td>
<td>203</td>
<td>A57</td>
<td>18.0</td>
<td>2.733</td>
<td>0.44</td>
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<tr>
<td>ABE48A41</td>
<td>ABE Materials</td>
<td>017</td>
<td>RAP</td>
<td>15.0</td>
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<td></td>
</tr>
<tr>
<td>CITGO-5</td>
<td>CITGO</td>
<td></td>
<td>Asphalt</td>
<td>4.6</td>
<td>1.032</td>
<td></td>
</tr>
</tbody>
</table>

**Alternate AC Suppliers:** CHEV2-15, COAS4-5, VALR1-15, TRUM3-16

## JOB MIX FORMULA AND DESIGN

<table>
<thead>
<tr>
<th>AC %</th>
<th>75µm</th>
<th>#200</th>
<th>#100</th>
<th>#50</th>
<th>#30</th>
<th>#16</th>
<th>#6</th>
<th>#4</th>
<th>3/8&quot;</th>
<th>1/2&quot;</th>
<th>3/4&quot;</th>
<th>1&quot;</th>
<th>1 1/2&quot;</th>
<th>2&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>6.0</td>
<td>7.5</td>
<td>15</td>
<td>19</td>
<td>28</td>
<td>36</td>
<td>97</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Design</td>
<td>5.3</td>
<td>4.5</td>
<td>6</td>
<td>9</td>
<td>22</td>
<td>32</td>
<td>47</td>
<td>79</td>
<td>80</td>
<td>98</td>
<td>98</td>
<td>99</td>
<td>96</td>
<td>98</td>
</tr>
<tr>
<td>Lower</td>
<td>4.8</td>
<td>4.5</td>
<td>3</td>
<td>7</td>
<td>18</td>
<td>28</td>
<td>81</td>
<td>80</td>
<td>81</td>
<td>88</td>
<td>88</td>
<td>87</td>
<td>86</td>
<td>88</td>
</tr>
</tbody>
</table>

- AC %: 4.6%
- % Virgin AC: 4.6
- % Reclaimed AC: 0.7

## MIX CHARACTERISTICS (MARSHALL)

<table>
<thead>
<tr>
<th>Theor. Density</th>
<th>Lab Density</th>
<th>% Volts</th>
<th>% VFA</th>
<th>% VMA</th>
<th>Stability</th>
<th>Flow</th>
<th>% Pass #8</th>
<th>% Pass 1/2&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>158.1</td>
<td>150.0</td>
<td>4.0</td>
<td>74.6</td>
<td>15.6</td>
<td>N/A</td>
<td>N/A</td>
<td>32</td>
<td>89</td>
</tr>
</tbody>
</table>

## MIX CHARACTERISTICS (GYRATORY)

<table>
<thead>
<tr>
<th>Design ESALS</th>
<th>Gyrations @ Nini</th>
<th>Gyrations @ Ndes</th>
<th>Gyration @ Nmix</th>
<th>Max Density (kg/m³)</th>
<th>Ndes Density (kg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.3</td>
<td>0</td>
<td>50</td>
<td>7E</td>
<td>2.502</td>
<td>2.404</td>
</tr>
</tbody>
</table>
- % Void @ Nini: 14.1
- % Void @ Ndes: 4.0
- % Void @ Nmax: 2.6

## IGNITION FURNACE DATA

<table>
<thead>
<tr>
<th>Oven Make</th>
<th>Set Temp.</th>
<th>Sample Size</th>
<th>A.C. Correction Factor (C)</th>
<th>#200 Correction Factor (200°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermolyne</td>
<td>538</td>
<td>1500</td>
<td>0.21</td>
<td>0.2</td>
</tr>
</tbody>
</table>

- Designed by:  
- Approved & Submitted by:  
- Reviewed by: Met's Engineer:  

- Date: 3/19/03  
- Date: 3/19/02  
- Date: 3/19/03  

**Haines Kibb'ehouse Inc.**
**JOE MIX FORMULA REPORT**

**Suppliers Name**
Hellers-town Materials

**Location**
Hellertown, PA

**Bituminous Plant Type**
McCarter-AB

**Daily Capacity**
5000 lb. Batch

**Mix Time**
Dry: 5 Wet: 45

<table>
<thead>
<tr>
<th>Material Supplier Code</th>
<th>Material Supplier Name</th>
<th>Material Code</th>
<th>Material Class</th>
<th>% in Mix</th>
<th>Bulk Sp.Gr</th>
<th>% Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCI4BA14</td>
<td>Stockertown Materials</td>
<td>207</td>
<td>B3</td>
<td>63.3</td>
<td>2.757</td>
<td>0.38</td>
</tr>
<tr>
<td>SCI4BA14</td>
<td>Stockertown Materials</td>
<td>203</td>
<td>AB</td>
<td>29.0</td>
<td>2.729</td>
<td>0.7</td>
</tr>
<tr>
<td>SCI4BA14</td>
<td>Treated Recycled Plastic Aggregate</td>
<td>203</td>
<td>TRPA</td>
<td>1.4</td>
<td>0.96</td>
<td></td>
</tr>
<tr>
<td>SCI4BA14</td>
<td>Girge</td>
<td></td>
<td>Asphalt</td>
<td>6.3</td>
<td>1.031</td>
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</tr>
</tbody>
</table>

**Alternate AC Suppliers**
CHEVZ-15, COAS4-15, VALR1-15, TRUM3-15

**JOB MIX FORMULA AND DESIGN**

<table>
<thead>
<tr>
<th>Design ESALS</th>
<th>Gyration @ Nini</th>
<th>Gyration @ Ndes</th>
<th>Gyration @ Nmax</th>
<th>Max Density (kg/m³/Sp.Gr)</th>
<th>#200 Density (kg/m³/Sp.Gr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.3</td>
<td>6</td>
<td>50</td>
<td>75</td>
<td>2.444</td>
<td>2.345</td>
</tr>
<tr>
<td>% Voids @ Nini</td>
<td>Voids @ Ndes</td>
<td>Voids @ Nmax</td>
<td>VMA @ Ndes</td>
<td>VFA @ Ndes</td>
<td>Weight @ 115mm</td>
</tr>
<tr>
<td>13.8</td>
<td>5</td>
<td>7</td>
<td>18</td>
<td>45</td>
<td>97</td>
</tr>
</tbody>
</table>

**MIX CHARACTERISTICS (GYRATORY)**

<table>
<thead>
<tr>
<th>Design ESALS</th>
<th>Gyration @ Nini</th>
<th>Gyration @ Ndes</th>
<th>Gyration @ Nmax</th>
<th>Max Density (kg/m³/Sp.Gr)</th>
<th>#200 Density (kg/m³/Sp.Gr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.3</td>
<td>6</td>
<td>50</td>
<td>75</td>
<td>2.444</td>
<td>2.345</td>
</tr>
<tr>
<td>% Voids @ Nini</td>
<td>Voids @ Ndes</td>
<td>Voids @ Nmax</td>
<td>VMA @ Ndes</td>
<td>VFA @ Ndes</td>
<td>Weight @ 115mm</td>
</tr>
<tr>
<td>13.8</td>
<td>5</td>
<td>7</td>
<td>18</td>
<td>45</td>
<td>97</td>
</tr>
</tbody>
</table>

**IGNITION FURNACE DATA**

<table>
<thead>
<tr>
<th>Oven Make</th>
<th>Set Temp</th>
<th>Sample Size</th>
<th>A.C. Correction Factor (C.)</th>
<th>#200 Correction Factor (200C.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermolyne</td>
<td>538</td>
<td>1200</td>
<td>1.52</td>
<td>0.1</td>
</tr>
</tbody>
</table>

**COMBINED AGGREGATE CONSENSUS PROPERTIES**

<table>
<thead>
<tr>
<th>AASHTO T176</th>
<th>AASHTO T304</th>
<th>ASTM D5821</th>
<th>ASTM D4791</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand Equivalent</td>
<td>Uncompacted Void Content</td>
<td>Coarse Aggregate Angularity</td>
<td>Flat &amp; Elongated</td>
</tr>
<tr>
<td>85.0</td>
<td>49.0</td>
<td>(1 Face)</td>
<td>100</td>
</tr>
</tbody>
</table>

**Designed by**
Joseph R. Smith - Asphalt Consultant

**Approved & Submitted by**
Edward Morrison

**Reviewed by**
Materials Unit

**Date**
8/5/2002

**9.5mm Plasphalt 3 ESAL ms**
## SUPERPAVE SAMPLE WORKSHEET

**Date:** 18-Sep-03  
**Material:** 9.5mm Asphalt 0<0.3 ESAL  
**S.R.#:** Wilsonboro  
**Producer:** Hellertown Materials  
**Technician:** Edward Morrison  

### Weight of Material and Related Calculations

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of Material</td>
<td>1235.5</td>
</tr>
<tr>
<td>Wt. of basket &amp; material</td>
<td>4290.0</td>
</tr>
<tr>
<td>Oven scale Wt.</td>
<td>535</td>
</tr>
<tr>
<td>Chamber set Pt.</td>
<td>94.5</td>
</tr>
<tr>
<td>Weight Loss</td>
<td>7.65</td>
</tr>
<tr>
<td>Percent Loss</td>
<td>0.19</td>
</tr>
<tr>
<td>Temp comp</td>
<td>1.52</td>
</tr>
<tr>
<td>Asphalt Calibration Factor</td>
<td></td>
</tr>
</tbody>
</table>

### Design AC and Calibrated AC Content

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design AC</td>
<td>6.3</td>
</tr>
<tr>
<td>Calibrated AC content</td>
<td>5.94</td>
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</tbody>
</table>

### Dry Weight and Washed Weight

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Weight</td>
<td>1140.5</td>
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<tr>
<td>Washed Weight</td>
<td>1078.3</td>
</tr>
<tr>
<td>Weight of Loss</td>
<td>62.5</td>
</tr>
</tbody>
</table>

### Sieve Analysis

<table>
<thead>
<tr>
<th>Sieve</th>
<th>Wt.</th>
<th>Plus Loss</th>
<th>% Passing</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>#200</td>
<td>6.5</td>
<td>63.0</td>
<td>5.9</td>
<td>2 (5)</td>
</tr>
<tr>
<td>#100</td>
<td>20.7</td>
<td>83.2</td>
<td>7</td>
<td>1 (7)</td>
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<tr>
<td>#50</td>
<td>49.9</td>
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<td>10</td>
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<tr>
<td>#30</td>
<td>111.0</td>
<td>173.5</td>
<td>15</td>
<td>12 (18)</td>
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<td>#16</td>
<td>217.0</td>
<td>279.5</td>
<td>25</td>
<td>24 (30)</td>
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<tr>
<td>#6</td>
<td>420.5</td>
<td>483.0</td>
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<td>39 (45)</td>
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<tr>
<td>#4</td>
<td>714.0</td>
<td>776.5</td>
<td>68</td>
<td>63 (71)</td>
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### Sample Calculations

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<tr>
<th>Sample Number</th>
<th>Asphalt Content</th>
<th>Theo. Gramm</th>
<th>Dry Weight</th>
<th>Samp+H2O+Vol</th>
<th>Vol+H2O Weight</th>
<th>Weight in H2O</th>
<th>SSD Weight</th>
<th>Sample Volume</th>
<th>Gmb</th>
<th>@Ndes</th>
<th>Voids</th>
<th>@Ndes</th>
<th>VMA</th>
<th>@Ndes</th>
<th>VFA</th>
<th>@Ndes</th>
<th>SS</th>
<th>@Ndes</th>
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<tbody>
<tr>
<td>1</td>
<td>6.3</td>
<td>2430</td>
<td>4627.0</td>
<td>10280.4</td>
<td>7636.5</td>
<td>2643.9</td>
<td>1998.6</td>
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<td>2</td>
<td>6.3</td>
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<td>4630.2</td>
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<td>2646.9</td>
<td>2006.7</td>
<td>2.307</td>
<td>5.1</td>
<td>19.1</td>
<td>73.3</td>
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### PTM 740

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<thead>
<tr>
<th>Item</th>
<th>Value</th>
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<tbody>
<tr>
<td>1</td>
<td>Mass of Bit. Mix</td>
</tr>
<tr>
<td>2</td>
<td>Mass of Pyc. + Water</td>
</tr>
<tr>
<td>3</td>
<td>Line 1 + Line 2</td>
</tr>
<tr>
<td>4</td>
<td>Mass Pyc. + (Mix + Water)</td>
</tr>
<tr>
<td>5</td>
<td>(3-4) = Vol. Voidless Mix</td>
</tr>
<tr>
<td>6</td>
<td>(1-5) = Max. Sp. Gr. of Mix</td>
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</table>

### 740 RUNNING AVERAGE

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>9/18/2003</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>AVERAGE n=5</td>
<td>2.430</td>
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</table>

**Remarks:**

**Bulk Gravity of Aggregate** | 2.673
ATTACHMENT 7

Core Sampling Locations & Test Results
FIRST-YEAR PERFORMANCE EVALUATION 2004
CORE SAMPLING LOCATIONS

YRI-1
View of Jefferson Street from Jefferson Street/16th Street intersection.

YRI-2
No rutting observed throughout controlled and asphalt sections.
YR1-3
Close-up view of asphalt wearing course. TRPA showing on the surface. Red, blue and yellow TRPA predominant.

YR1-4
Core locations using PTM-1.
YR1-5
Core drilling.

YR1-6
Close-up of core drilling.

YR1-7
Core removal.
YR1-8
Six core samples: three plasphalt, three conventional (standard).
JEFFERSON STREET
WILSON BOROUGH
2003 CORE LOCATIONS

PTM-1 (Random Core Sampling Locations)

9.5 mm Plasphalt
(15 feet wide x 192 feet long)

1  
$$192' \times 0.29 = 56'; \quad R \ 0.66 \times 15' = 10' \ from \ RT$$

2  
$$192' \times (192' \times 0.74) = 334'; \quad R \ 0.49 \times 15' = 7' \ from \ RT$$

3  
$$192' + 192' + (192' \times 0.89) = 555'; \quad L \ 0.79 \times 15' = 12' \ from \ L$$

9.5mm Conventional Superpave Cores
(14 feet wide x 192 feet long)

4  
$$192' \times 0.60 = 115'; \quad R \ 0.39 \times 14' = 5' \ from \ RT$$

5  
$$192' + (192' \times 0.88) = 361'; \quad R \ 0.31 \times 14' = 4' \ from \ RT$$

6  
$$192' + 192' + (192' \times 0.72) = 522'; \quad L \ 0.54 \times 14' = 8' \ from \ L$$
PENNDOT CAMMS TESTING REPORT

REPORT: CAMLR525
LIBRARY: CAMSPRD

FINAL REPORT
Ref#: A055433
Lab#: 04000589
Pass/Fail: F

Cont #: 100%PA
St P N: 00500309BIT 500 711 9998
Pr C #: 
Mtl Cd: 011 SP9.5
Mtl Ds: BTMNS DENSITY SAMPLES
108Y/S: 2000 409A
Supl #: 
Plc Cl: WILSON BOROUGH
Smp By: J. KRETULSKIE
A.C. Calibration Factor: 1.71

QA Rtn#: 
Smp Cls: AS
Orgnzn#: 0500
State R: 
Section: 0000
Station: 
Colctl: 5/11/2004

Cntcr: 
Suplier: HEL45A41
Lctn Cd: JMF Y/#: 2003/201
SetUp: 5/26/2004

#200 (75um) Calibration Factor: 0.2
Rcvd Dock: 6/01/2004
Rcvd Lab: 6/02/2004

TR-447 Remarks: PLASPHALT (STANDARD SPECIAL PROVISION)


<table>
<thead>
<tr>
<th>INC</th>
<th>DENSITY</th>
<th>% OF THEOR.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>133.7</td>
<td>88</td>
</tr>
<tr>
<td>2</td>
<td>133.8</td>
<td>88</td>
</tr>
<tr>
<td>3</td>
<td>138.6</td>
<td>91</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SUMMARY

<table>
<thead>
<tr>
<th>AVG</th>
<th>DENSITY PWL:</th>
<th>PAYFACTOR BONUS:</th>
<th>III( )</th>
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</thead>
<tbody>
<tr>
<td>135.4</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

S.D: 2.80

LOT PAYMENT: LF = .00 CP * REMOVE AND REPLACE *

This report is authorized by William J. Miller, Engineer of Tests.

********* ********** ***** end of 01 page report ********* ********** *********
**TR-447 Remarks:** Matl labeled core #4, #5, #6

**Lot Payment:** LP = .98 CP

This report is authorized by William J. Miller, Engineer of Tests.

**DISTRIBUTION**
- Age Constr
- DME
- Abbe
- Age Project
- Rated Super

L J Kretulskie
ATTACHMENT 8

YR2-1
No rutting or deflection observed at Jefferson Street and Palmer Street intersection.

YR2-2
No rutting or deflection observed at Jefferson Street and 16th Street intersections. (Near core sample #1).
YR2-3
Deflection of 3/16" on conventional wearing course observed near core sample #4 location.

YR2-4
Close-up of deflection at core sample #4 location.
YR2-5
View of Jefferson Street towards Palmer intersection.

YR2-6
Close-up of asphalt wearing surface. Visible TRPA.
YR2-7
Loss of some TRPA from asphalt course at edge of pavement (near stormwater inlet).
ATTACHMENT 9

FOURTH-YEAR PERFORMANCE EVALUATION 2007
JEFFERSON STREET

YR4-1
View of Jefferson Street towards 16th Street.

YR4-2
Start of cracking identified along curb at right
turn lane from 16th Street.

YR4-3
Close-up of cracking. Approximate max. 1/2"
inch width, max. 1/2" depth.
YR4-4
View of Jefferson Street towards 16th Street. No rutting observed along street.

YR4-5
View of Jefferson Street towards 16th Street. Observed color difference between asphalt (left) and conventional (right) wearing surface.

YR4-6
Asphalt surface. Showing loss of fines.
YR4-7
TRPA pieces removed from asphalt surface and accumulated along roadside.
ATTACHMENT 10

Fifth-Year Performance Evaluation (2008)
YR5-1
View of Jefferson Street looking towards 16th Street.

YR5-2
Continued cracking identified along curb at right turn lane from 16th Street. Maximum measured width of crack is 1-1.5 inches.

YR5-3
Close-up of cracking. Approximate max. 11/2 inches wide, max. 1/2 inch deep.
YR5-4
View of Jefferson Street looking towards 16th Street. No rutting observed along street.

YR5-5
View of Jefferson Street looking towards Palmer Street. Observed color difference between plasphalt (right) and conventional (left) wearing surface.

YR5-6
Plasphalt surface. Showing loss of fines.
YR5-7
Closeup of asphalt wearing surface. Visible TRPA.