**SOUTH JERSEY TRANSPORTATION PLANNING ORGANIZATION**

**ITEM 1905-12: Amending the Scope of Services and Approving a Contract Modification for the Automated Pavement Condition Data Collection Technical Study**

## PROPOSAL

At its March 13, 2019 meeting, the SJTPO Technical Advisory Committee recommended that the Policy Board amend the originally approved scope of services and approve a contract modification for the Automated Pavement Condition Data Collection technical study (Task 18/405 within SJTPO's FY 2018 Unified Planning Work Program).

## BACKGROUND

On January 29, 2018, with Resolution 1801-03 (Approving the Selection of Michael Baker International as Consultant for the Automated Pavement Condition Data Collection Study), the Policy Board approved the selection of the consultant with a maximum fee of $51,000.00. On February 20, 2018, a Subcontract Agreement was fully executed between Michael Baker International, Inc. and the South Jersey Transportation Authority authorizing work to commence on the technical study.

For this study, Right-of-Way (ROW) imagery and pavement distress data is being collected for all 260 centerline miles of municipal roadway in City of Vineland. The project is progressing, with data collection complete and data processing nearing completion. The final deliverable will include pavement data in the form of IRI (International Roughness Index) in spreadsheet and geodatabase format, along with the underlying pavement distress data and ROW imagery. However, because ROW imagery is being collected, there is an opportunity to collect asset inventories for assets visible in the imagery. The City of Vineland has expressed interest in having the locations of sidewalks, curb ramps, guardrails, inlets, and manhole features inventoried.

As such, Michael Baker International prepared a cost estimate for the additional post-processing of these assets. The total cost for all municipal roadways in City of Vineland is $39,000.00, increasing the total cost of this project from the current $51,000.00 to $90,000.00. The increase will be funded through the FY 2020 UPWP Task 20/402: Program Support Data Collection, with a budget of $39,160. The task description notes that the funds may be used for asset inventory data collection.

Because FY 2020 funding will be used, Notice to Proceed will be issued after the start of the upcoming fiscal year, July 1, 2019. A Contract Modification is required to allow for a time extension, with a revised contract end date of December 20, 2019. The consultant anticipates that the additional scope and final deliverables will be completed within 12 weeks of issuing a Notice to Proceed.

Michael Baker
INTERNATIONAL

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May 2, 2019

Mr. Andrew Tracy
Transportation Engineer
South Jersey Transportation Planning Organization
782 South Brewster Road, Unit B6
Vineland, NJ 08361

Subject: **Contract Modification - Inventory of Additional Roadway Assets**
Automated Pavement Data Collection Pilot Project

Dear Mr. Tracy:

Attached please find a scope of work and cost proposal relating to the extraction of additional roadway assets as requested. The existing subject line project will be augmented to include the enclosed scope and cost. Please do not hesitate to contact me directly at (609) 807-9551 should you have any questions or concerns.

We appreciate the opportunity to continue assisting the SJTPO and City of Vineland on this important project.

Best Regards,

**MICHAEL BAKER INTERNATIONAL, INC.**

Ken Contrisciane
Project Manager

Michael Baker
INTERNATIONAL

# Inventory of Additional Roadway Assets

## Background

The South Jersey Transportation Planning Organization (SJTPO) and the City of Vineland requested Michael Baker International, Inc. (Michael Baker) to provide a scope and cost to perform feature extraction of the following roadway assets:

- Drainage Inlets and Manholes
- Curb Ramps
- Guiderails
- Sidewalks

Feature extraction will leverage previously collected panoramic Right of Way (ROW) imagery which was captured in 2018 under the Automated Pavement Data Collection Pilot Project for SJTPO and the City of Vineland. General requirements and guidelines were discussed via conference call with SJTPO and city representatives on December 20, 2018. Subsequently, Michael Baker developed the following processes and procedures to extract additional roadway assets from existing ROW imagery.

## Scope

Michael Baker understands the goal of this task is to define the location of sidewalks, curb ramps, guiderails and drainage inlets and manholes which are to be cataloged and attributed into a Geographic Information System (GIS). Michael Baker will use Orbit GT (Geospatial Technologies) Mobile Mapping/Asset Inventory software to perform this feature extraction task. The software will be configured to streamline feature extraction through preconfigured feature layers with associated pre-determined domain values. City of Vineland ROW imagery will be loaded into the Orbit GT software and associated with previously provided roadway segments. To support the data extraction process, a basemap and City of Vineland linework will be available for reference within the Orbit GT viewer (Figure 1).

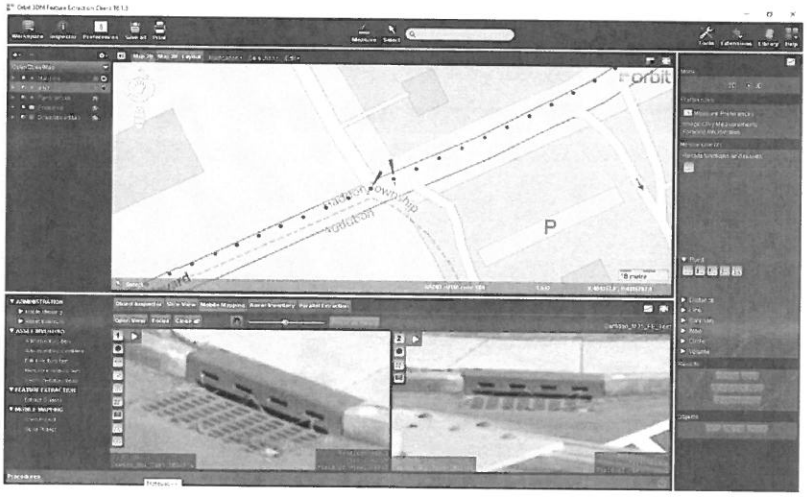

***Figure 1:*** *Orbit GT Extraction Viewer with panoramic ROW imagery and reference data loaded. Imagery zoomed to an inlet.*

Using this software, Michael Baker will systematically review ROW images and extract features as they are visually located. The software calculates the position of the extraction points by using triangulation from two points of the same location that are captured on separate images to calculate a single GPS coordinate.

**Point Features**

Curb ramps, drainage inlets and manholes will be extracted as single point features in the Orbit GT software. Feature points will be extracted from their centroid with a +/- 2-meter accuracy. After each point is extracted, the associated feature will be attributed as follows:

**Inlets**

- **Unique ID –** Assign an appropriate Unique Identification Number per each inlet record
- **Inlet Type –** A, B, D, E, Scupper, Other, Unknown (Unknown if limited visibility, i.e. inlet covered in leaves/litter) (Figure 2)
- **Inlet Placement –** On Roadway, Outside Curbs
- **Street** – Street on which inlet is located
- **Latitude (Y) –** NJ State Plane Coordinate System (+/- 2 meters)
- **Longitude (X) –** NJ State Plane Coordinate System (+/- 2 meters)
- **Photo Name –** Name of the associated photo showing inlet
- **Inventory Date –** Date of image capture (Month/Day/Year)
- **Comments**

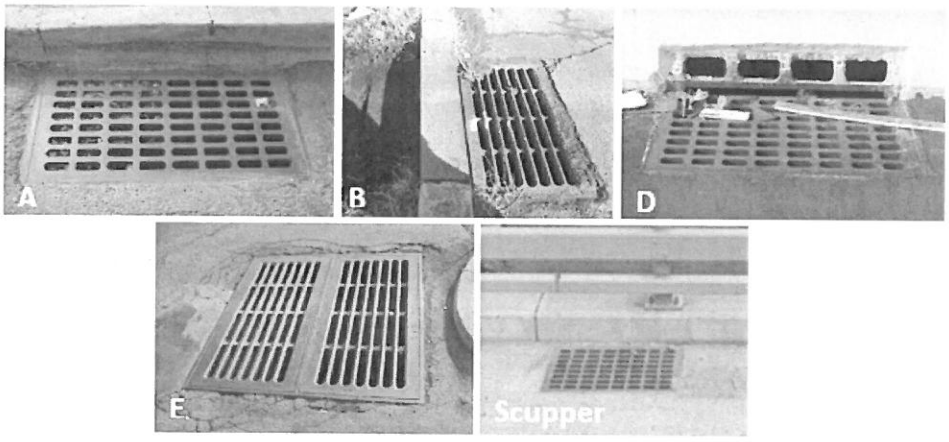


***Figure 2:*** *Examples of inlet types.*

**Manholes**

- **Unique ID –** Assign an appropriate Unique Identification Number per each manhole record
- **Manhole Type –** Drainage, Electrical, Other, Unknown (Figure 3)
- **Manhole Placement –** On Roadway, Outside Curbs
- **Street –** Street on which manhole is located
- **Latitude (Y) –** NJ State Plane Coordinate System (+/- 2 meters)
- **Longitude (X) –** NJ State Plane Coordinate System (+/- 2 meters)
- **Photo Name –** Name of the associated photo showing manhole
- **Inventory Date –** Date of imagery capture (Month/Day/Year)
- **Comments**

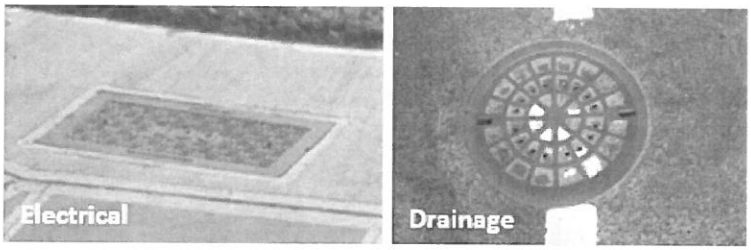


***Figure 3:*** *Examples of manhole types.*

**Curb Ramps**

- **Unique ID –** Assign an appropriate Unique Identification Number per each curb ramp record
- **Detectable Warning Surface** - Yes, No, Unknown
- **Flush with Gutter** – Yes, No, Unknown
- **Flush with Street** – Yes, No, Unknown
- **Crosswalk Present** - Yes, No, Unknown
- **Street –** Street on which curb ramp is located
- **Latitude (Y) –** NJ State Plane Coordinate System (+/- 2 meters)
- **Longitude (X) –** NJ State Plane Coordinate System (+/- 2 meters)
- **Photo Name –** Name of the associated photo showing curb ramp
- **Inventory Date –** Date of imagery capture (Month/Day/Year)
- **Comments**

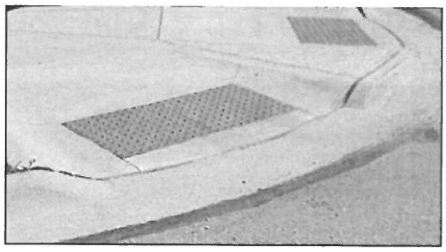

***Figure 4:*** *Curb ramp with detectable warning surface*

One ArcGIS compatible GIS layer will be created for each point feature type. Layers will contain the above listed attributes. Extracted points will be limited to features within the line of sight of the ROW imagery. It is expected that cars (parked or moving) and other roadside obstructions will restrict visibility of features in ROW imagery and may not be extracted. Extractable features will be attributed as best as possible from the available ROW imagery.

**Guiderail Features**

Guiderails will be extracted as a series of points within the Orbit GT software on a block-by-block basis. During the extraction process, the beginning and ending points of each guiderail on a street block will be extracted in Orbit GT and attributed appropriately. After the Orbit GT extraction process, guiderail feature points will be exported into a GIS compatible format for additional post-processing. Linear guiderail features will be created from the extracted points within ArcGIS desktop by connecting the point using the latest available statewide aerials from NJGIN as a reference to refine spatial placement. Individual guiderail feature will be extracted at each block and each attribute change within a block. Guiderails features will be located with a +/- 2-meter accuracy. Associated feature will be attributed as follows:

**Guiderails**

- **Unique ID –** Assign an appropriate Unique Identification Number per each guiderail record
- **Guiderail Type –** Single Sided, Double Sided, Cable, Other
- **Rub Rail –** Yes, No
- **Street** – Street on which sidewalk is located
- **Latitude (Y) –** NJ State Plane Coordinate System (+/- 2 meters)
- **Longitude (X) –** NJ State Plane Coordinate System (+/- 2 meters)
- **Photo Name –** Name of the associated photo showing guiderail
- **Inventory Date –** Date of image capture (Month/Day/Year)
- **Comments**

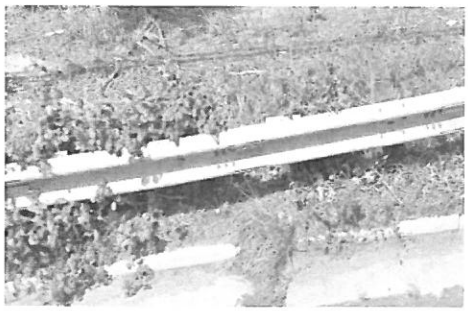

***Figure 6:*** *Single-sided guiderail with no rub rail*

One ArcGIS compatible GIS layer will be created for guiderails and will contain the above listed attributes. Extracted features will be limited to those within the line of sight of the ROW imagery. It is expected that cars (parked or moving) and other roadside obstructions will restrict visibility of linear features in ROW

imagery and may not be extracted. Extractable features will be attributed as best as possible from the available ROW imagery.

**Sidewalk Features**

The purpose of inventoried sidewalk data is to allow the city to identify gaps in the existing sidewalk network. As such, Michael Baker proposes associating sidewalk locations to the pavement centerline shapefile provided by the City as additional attributes. The following two (2) attributes will be added to the centerline GIS layer:

- N_E_Sidewalk: Sidewalks on the north-side or east-side of the segment.
- S_W_Sidewalk: Sidewalks on the south-side or west-side of the segment.

These items would be attributed in the following matter:

- Complete – Segment has complete sidewalk coverage.
- Partial – Segment has partial sidewalk coverage.
- None – No sidewalk present on segment.

The centerline GIS layer will be modified to include the attribution listed above and formatted to work within the Orbit GT feature extraction software. Extractors will attribute and update centerline feature segments appropriately based on the extent of sidewalk present on each side of the road. Only engineered sidewalks will be considered during extraction. Other dirt and grass paths adjacent and parallel to the road will not be considered a sidewalk.

***Figure 5:*** *Concrete sidewalk with a grass buffer*

## Deliverables

Michael Baker will deliver the following products:

- **GIS Layers**
  - One GIS layer for each of the following features with associated attributes in ArcGIS File Geodatabase format:
    - Curb Ramps
    - Drainage Inlets and Manholes
    - Guiderails
  - Update pavement centerline GIS layer with attributed sidewalk data appended.
- **Photos –** JPEG images of the curb ramp, guiderail, manhole and inlet screenshots.

## Schedule

Final deliverables will be delivered **12 weeks from the notice to proceed date**.

## Cost

This will be a contract modification of the existing contract (Automated Pavement Data Collection Pilot Project) and performed at a cost not to exceed **$39,000.**

## Inventory of Additional Roadway Assets
## Staffing Plan with Dollar Values

| Staff Name | Title | Hourly Rate | Estimated Hours per Task | | | Total Hours | Direct Labor | Overhead % | Overhead Cost | Total Labor |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Project Coordination | Feature Extraction Setup | Feature Extraction | | | | | |
| | | | 1 | 2 | 3 | | | | | |
| **Michael Baker International, Inc.** | | | | | | | | | | |
| Ken Contrisciane | Project Manager | [redacted] | 16 | | 12 | 28 | [redacted] | 143.38% | $ 2,425.65 | $ 4,117.41 |
| Stephen Clancy | LiDAR Task Manager | | | 8 | | 8 | | 143.38% | $ 757.05 | $ 1,285.05 |
| LiDAR Data Analyst | LiDAR Data Analyst | | | 22 | | 22 | | 143.38% | $ 1,151.34 | $ 1,954.34 |
| LiDAR System Support | LiDAR System Support | | | 23 | | 23 | | 143.38% | $ 1,022.30 | $ 1,735.30 |
| Jiayi Ding | GIS Specialist | | | | 120 | 120 | | 143.38% | $ 5,385.35 | $ 9,141.35 |
| Mike Milenese | GIS Technican | | | | 320 | 320 | | 143.38% | $ 9,873.72 | $ 16,760.12 |
| | | | | | | | | | | |
| **Michael Baker International, Inc. Subtotal** | | | **16** | **53** | **452** | **521** | **$ 14,378.16** | | **$ 20,615.41** | **$ 34,993.57** |
| **Grand Total Hours** | | | 16 | 53 | 452 | **521** | **$ 14,378.16** | | **$ 20,615.41** | **$ 34,993.57** |

| | |
|---|---|
| Subtotal Labor: | **$ 34,993.57** |
| | |
| M. Baker Fee: 10% | **$ 3,499.35** |
| | **$ -** |
| | |
| Direct Expenses: | |
| Data Storage | $ 507.08 |
| | |
| | |
| Direct Expense Subtotal | **$ 507.08** |
| | |
| **Total Project Cost** | **$ 39,000.00** |

## Inventory of Additional Roadways Assets
## Total Costs

| | Michael Baker International, Inc | | | ODC's | Total Costs |
|---|---|---|---|---|---|
| | Direct Labor | Overhead | Profit/Fee | | |
| **Task 1 - Project Coordination** | $ 966.72 | $ 1,386.08 | $ 235.28 | $ 507.08 | **$ 3,095.16** |
| **Task 2 - Feature Extraction Setup** | $ 2,044.00 | $ 2,930.69 | $ 497.47 | | **$ 5,472.16** |
| **Task 3 - Manhole & Inlet Extraction** | $ 11,367.44 | $ 16,298.64 | $ 2,766.61 | | **$ 30,432.68** |
| **Totals** | $ 14,378.16 | $ 20,615.41 | $ 3,499.36 | $ 507.08 | **$ 39,000.00** |

**SOUTH JERSEY TRANSPORTATION PLANNING ORGANIZATION**

**RESOLUTION 1905-12: Amending the Scope of Services and Approving a Contract Modification for the Automated Pavement Condition Data Collection Technical Study**

**WHEREAS, the South Jersey Transportation Planning Organization (SJTPO) is the Metropolitan Planning Organization (MPO) designated under Federal law for the southern region of New Jersey including Atlantic, Cape May, Cumberland, and Salem Counties; and**

**WHEREAS, the Fiscal Year 2018 SJTPO Unified Planning Work Program includes Federal Highway Administration planning funds for this project as Task 18/405: Automated Pavement Data Collection; and**

**WHEREAS, at their January 29, 2018 meeting, the Policy Board approved Michael Baker International, Inc. as the consultant for the technical study with a maximum fee of $51,000.00; and**

**WHEREAS, a Subcontract Agreement between Michael Baker International, Inc. and the South Jersey Transportation Authority was fully executed on February 20, 2018 with a Notice to Proceed issued on the same date; and**

**WHEREAS, the technical study is nearing completion, with data collection complete and data processing still in process for all 260 centerline miles of municipal roadway in City of Vineland; and**

**WHEREAS, the City of Vineland expressed interest in having the locations of sidewalks, intersection ramps, guardrails, inlets, and manholes inventoried from the right-of-way imagery added to the scope of work; and**

**WHEREAS, Michael Baker International, Inc. has prepared a revised scope of work and cost for the additional work; and**

**WHEREAS, the costs associated with amending the scope, as described above, will be $39,000.00 above the original contract amount, resulting in a revised maximum fee of $90,000.00; and**

**WHEREAS, the additional cost will be funded through FY 2020 UPWP Task 20/402: Program Support Data Collection; and**

**WHEREAS, Contract Modification is required to allow for a time extension, with a revised contract end date of December 20, 2019; and**

**WHEREAS, the amended scope of work and contract modification will not negatively impact the initial needs and objectives of the technical study; and**

**NOW THEREFORE BE IT RESOLVED, that the Policy Board of the South Jersey Transportation Planning Organization hereby approves the attached amended scope of work and cost, approving the contract modification for the Automated Pavement Data Collection Technical Study.**

**BE IT FURTHER RESOLVED, that the Policy Board requests that the South Jersey Transportation Authority execute the appropriate contractual arrangements with the consultant on behalf of the SJTPO.**

**Certification**

**I hereby certify that the foregoing is a correct and true copy of a resolution adopted by the Policy Board of the South Jersey Transportation Planning Organization at its meeting of May 28, 2019.**

John W. Risley /mab

**John W. Risley, Secretary/Treasurer**