Automated Machine Guidance
Specifications – How Much Information is Enough?

Lou Barrett
Pete Melas

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The goals of our specifications

- Provide reliable electronic engineering data(EED) from a single source
- Sharing of EED with all project stakeholders
- Ensure quality of the EED
- Ensure quality of the construction
- Procurement of GPS equipment
- Provide training to field staff

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What specifications do we use?

§ 102-02 EXAMINING THE CONTRACT DOCUMENTS AND THE WORK SITE

§ 105-10 SURVEY AND STAKEOUT

§ 625 SURVEY OPERATIONS, ROW & SURVEY MARKERS AND GPS INSPECTION UNITS

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§625 Pay Items

Payment will be made under:

Item No.	Item	Pay Unit
625.01	• Survey Operations	Lump Sum
625.03	Concrete Right of Way Markers Type H (High)	Each
625.04	Concrete Right of Way Markers Type L (Low)	Each
625.05	Steel Pin and Cap Right of Way Markers	Each
625.06	Permanent Survey Markers	Each
625.07NN	• Supplemental Site Survey	Lump Sum
625.11NN	• Survey Grade GPS Rover Unit	Week
625.12NN	• Mapping Grade GPS Unit	Week

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Pay Item 625.01

...providing all necessary survey work to establish, spatially position and verify the locations of existing and proposed terrain features and measure quantities of items in accordance with the contract documents...

...Contractor and Department utilize the same control, the same existing terrain data and the same proposed terrain data; both parties utilize the same accuracy and tolerance limits; both parties utilize equivalent survey verification techniques to ensure that field features are constructed as proposed.

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Pay Item 625.01

...engineering data shall be shared/exchanged electronically and kept current between the Contactor and the Engineer.

...Contractor and Engineer shall mutually determine acceptable uses of and procedures for the technology being used and how data can be exchanged for use in stakeout, automated machine operations, positional verification, quantity measurements and calculations.

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Providing and sharing reliable EED from a single source

§ 102-02

B. Contract Document Components. The following components of the contract documents complement one another in the declining order of precedence listed below. The intent of the contract documents is to include all items/aspects of the work that are necessary for the proper initiation, execution, and completion of the work.

1. Plans.
2. Proposal - Special Notes.
3. Proposal - Special Specifications.
4. Standard Specifications.
5. Standard Sheets.
6. Base Line Data.

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Providing and sharing reliable EED from a single source

When the Department does not provide EED:

- Prior to beginning construction operations
  - The contractor may develop their own EED from the contract documents
  - Must share the EED with the Department in an accepted format
- Contractor retains responsibility to complete the work in accordance with the intent conveyed in the contract

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Quality of the EED

- Existing Terrain:
  - Contractor may verify existing terrain data
  - Discovered discrepancies in the existing terrain must be shared between parties
  - Any changes to the EED must be agreed on
- Proposed Terrain:
  - Contractor must review for conflicts or inconsistencies
  - Modifications to the EED must be approved by the Department
- Supplemental Site Survey

Quality of the Construction – The Contract Control Plan

- Control Information
  - List Department provided control (from contract documents or survey control report)
  - Status of control points or benchmarks (recovered in field, adjusted, etc)
  - Adjustment method including report (i.e., calibration report for GPS)
  - Control network diagram
  - NYSPCS Zone
  - Horizontal and vertical datum

- continued -

Quality of the Construction – The Contract Control Plan

- Combined scale factor used
- Details on additional control if needed
- Coordinates of GPS base station if used

- Methods and Procedures
  - Control verification (total station, GPS/RTK, Auto Level, etc.)
  - Survey method for stakeout
  - Manufacturer, model and software version for GPS units
  - Will AMG be used
  - What quality control measures will be used to maintain AMG systems

- continued -

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Quality of the Construction – The Contract Control Plan

- NYS CORS or base station used for GPS
- Describe location, mounting and protection if base station is used

✓ Provide Control Plan 10 business days prior to field operations

✓ Signed and sealed by a Land Surveyor or Professional Engineer

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Procurement of GPS Equipment

- Survey Grade GPS Rover Units
  - Typical rover specifications
  - Equipment and communication to receive RTK correctional data from the NYS CORS
  - Logistics or lack of a communication network may require a base station
- Mapping Grade GPS Unit
  - 3ft accuracy
  - Import and display point and alignment data

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Field Staff GPS Training

- 1 – 8 hr class on GPS localization/calibration
- Survey Grade GPS Units(2 – 8 hr classes in the first year)
  - 1 – 8 hr class on use and operation within 1 week of delivery of units
  - 1 – 8 hr class at a time determined by the Department
  - 1 additional 8 hr class for each additional contract year
- Mapping Grade GPS Units
  - 1 – 8 hr class within 1 week of delivery of units
- All training provided by a manufacturer verified trainer

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Questions?

THANK YOU

Pete Melas

NYSDOT – Office of Construction

pmelas@dot.state.ny.us

518-457-9539

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