MDOT Survey Support
Construction Engineering
Automated Machine Guidance
Construction Survey Support?

- Located downtown Lansing
- Provide Statewide Support for Construction
  - Equipment Training
    - GPS
    - Total Station
    - Levels
    - Back up equipment
- Provide support for review of AMG workplans and model review.
- Assisting CFS in setting standards for Digital Calculations
How is AMG Utilized?

The contractor utilizes 3D design data rather than field staking to construct project elements such as:

- Rough grading of earthwork
- Final grading of earthwork
- Final grading of Aggregate base
- Finish paving of Concrete and Bit
MDOT Special Provision for AMG

- The Contractor may elect to utilize automated machine guidance (AMG) to determine three-dimensional locations for earth work activities and material placement.
1. AMG Intent

The Contractor will notify the Engineer of the intent to use AMG within 10 calendar days of the Award.
2. Work Plan

C. Slope Stakes, Subgrade Stakes, Undercut Stakes, Clearing Stakes. Provide slope stakes, subgrade stakes, undercut stakes and clearing stakes at 50-foot intervals or as agreed by the Engineer, and at break points due to subgrade transitions, including superelevation transitions and ramp transitions. The Engineer may request subgrade transitions and ramp transitions after topsoil stripping and before stakes for subgrade inspection. The Engineer will mark and determine individual tree removal.

D. Pavement Stakes. After placing and rough grading the subbase, provide pavement stakes as follows:

1. Place stakes at 50-foot intervals on tangent sections and on curves with radii of at least 1,150 feet.
2. Place stakes at 25-foot intervals on curves with radii of less than 1,150 feet.
3. In addition to yield stakes, set stakes to determine wedging limits for hot mix asphalt pavement. This may include taking cross sections in questionable areas, as determined by the Engineer.

Use pavement grade stakes for finish grading of the subbase, base course, and pavement. Check stakes for grade, realign, and tack before beginning paving operations. Determine the offsets required for Contractor operations and obtain the Engineer's approval.
3. Survey Meeting

AVOID THIS

BY HAVING THIS
4. Contractor Model
Location of RID Information
Reference Information
Documents (RID) Index

RID Folder Contents

- Alignment data
- Construction data
- ROW data
- 3D Surface Data
- Control points
Creating Quality 3D Models

- Part of the RID review process is to make sure the RID files are consistent with the Contract Plans
RID Model
5. Control

- Contractor Staking
- Engineer Staking
6. Contractor Responsibility

- Meeting Tolerances per pay item
- AMG Work Plan
7. Quality Assurance

- The MDOT Engineer has options
  - Consultant Surveyor under direct employment of MDOT
  - MDOT staff with Assistance from Lansing Survey Support or the MDOT Region Surveyor.
How do we assure quality?
Equipment & Training
Leica Captivate Grade checks

- Antenna height: 6.562 ft
- Stake station: 16+00.000 ft
- Station increment: 0.000 ft
- Point ID: GS0002
- Antenna height: 6.562 ft
- Current design height: 884.796 ft
Complex Calculations
Digital Calculations
Contractors model
Construction Drawing
Construction Drawing with Contractors Surface Model
3D Line Strings

Check Line

Point ID
GS0001

Use offsets

Check offset
3.0000 ft

Check height diff
0.0000 ft

D_GRANDRAPIDS
TrvlPrConc_Edg~1

-13 ft

Slope

Page
Delta Surfaces
Georeferenced PDF files
THANK YOU