

| Test                                       | Acronym            | Lead    | Protocol | HMA Related        |             |                          |                           |           | Concrete Related  |                   |               |                 |                      | Unbound Related       |               |                    |                | Comments |   |
|--|--------------------|---------|----------|--------------------|-------------|--------------------------|---------------------------|-----------|-------------------|-------------------|---------------|-----------------|----------------------|-----------------------|---------------|--------------------|----------------|----------|---|
|  |                    |         |          | Original Layer HMA | HMA Milling | CIR Layer w/ Rejuvenator | CIR Layer w/o Rejuvenator | HMA Layer | Original Concrete | Concrete Removals | Diamond Grind | Concrete Paving | Fiber Reinforced PCC | PCC Panel Replacement | Base Removals | Ext. Clay Subgrade | Wicking Fabric |          | Granular Base   |
| Traffic Speed Deflectometer                | TSD                | Ben     | P        | 2020               |             |                          |                           |           | H                 | 2020              |               |                 | L                    | L                     |               |                    |                |          | Completed couple of months after construction. Fall of 2022 then semiannually                   |
| Automated Machine Guidance - Grade Control | AMG-Grade Control  | Rebecca | P        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          | Unable to get LiDAR scan and 3D done before advertisement date                                  |
| Automated Machine Guidance - Milling       | AMG-Milling        | Rebecca | SP       |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Automated Machine Guidance - Paving        | AMG - Paving       | Rebecca | P        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Seismic / NRRRA Sweden                     | -                  | Jason   | P        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Continuous Moisture Meter                  | CMM                | Raul    | P        |                    |             | L                        | L                         |           |                   |                   |               |                 |                      |                       |               |                    |                |          | Check w/ Soheil is device can be used in CIR  |
| Asphalt Real-Time Smoothness               | ARTS               | John    | P/CO     |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Low Nuclear Density                        | -                  | Raul    | P        |                    |             | M                        | M                         |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Non-Nuclear Density                        | -                  | Raul    | P        |                    |             | M                        | M                         |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Machine Drive Power                        | MDP                | John    | P        |                    |             | H                        | H                         |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Automated Plate Load Testing               | APLT               | John    | P/SP     |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          | <a href="https://pooledfund.org/Details/Study/705">https://pooledfund.org/Details/Study/705</a> |
| Concrete Real Time Smoothness              | CRTM               | Maria   | P        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          | Concrete Contractors may not own the equipment  |
| Wirtgen - Hamm H25iVC Roller               | -                  | John    | P        |                    |             |                          |                           |           |                   | H                 |               |                 |                      |                       |               |                    |                |          | Equipment availability needs to be confirm  |
| Vibration Monitoring                       | VM                 | John    | P        |                    |             |                          |                           |           |                   | H                 |               |                 |                      |                       |               |                    |                |          | Independent assurance. Depends on Wirtgen - Hamm H25 Roller availability                        |
| Intelligent Compaction                     | IC                 | John    | SP/P     |                    |             | H/SP                     | H/SP                      | H/SP      |                   |                   |               |                 |                      |                       |               |                    |                |          | Possibly tie to Level 3 and Level 4 study   |
| ICMV Level 3 and Level 4                   | ICMV Level 3 and 4 | John    | P        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Paver Mounted Thermal Profiler             | PMTP               | Rebecca | SP       |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Material Delivery Management System        | MDMS               | Rebecca | SP       |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          | Talk to Curt Turgeon. P means only w/ partnership   |
| Dielectric Profile System                  | DPS                | Dai     | I/SP     |                    |             | M                        | M                         |           |                   |                   |               |                 |                      |                       |               |                    |                |          | Coordinate w/ contractor for dielectric puck testing  |
| 3D Ground Penetrating Radar                | 3D GPR             | Dai     | I        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          | Test needs to be on same cell   |
| Falling Weight Deflectometer               | FWD                | Jacob   | I        | MnROAD             | H           | H                        | H                         | H         |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Ride - Pathways / LISA                     | -                  | Jacob   | I        | MnROAD             | H           |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Light Weight Deflectometer                 | LWD                | Raul    | I        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Dynamic Cone Penetrometer                  | DCP                | Raul    | I        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| 2D Ground Penetrating Radar                | 2D-GPR             | Dai     | I        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          | Test needs to be on same HMA cell   |
| Thermal Profiler/IV FLIR                   | TP/IV FLIR         | Rebecca | I        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Nuclear Gauge                              | -                  | Raul    | I        | MnROAD             |             | M                        | M                         | M         |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Sand Cone                                  | -                  | Raul    | I        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Laser Scanning                             | -                  | ?       | I        |                    |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| HMA Lab Modulus                            | -                  | Dai     | I        | AASHTO T342        |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          |   |
| Base Lab Modulus                           | -                  | Dai     | I        | NCRHP 1-28A        |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          | Collect material during construction for post testing. (10-37 protocol/Soheil)                  |
| Subgrade Lab Modulus                       | -                  | Dai     | I        | NCRHP 1-28A        |             |                          |                           |           |                   |                   |               |                 |                      |                       |               |                    |                |          | Collect material during construction for post testing. (10-37 protocol/Soheil)                  |

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|------------------------|
| I = Internal           |
| P = Partnership        |
| SP = Special Provision |
| CO = Change Order      |
| H - High Priority      |
| M - Medium Priority    |
| L - Low Priority       |
| NA - Not Applicable    |