APPENDIX C

Highway Innovation Developments, Enhancements and Advancements (IDEA)
Checklists for Different ERS Types

1. Updated 18 May 2021 to add new Checklist for Reinforced Soil Slope System (RSS) with Extensible Reinforcement
2. Updated 14 December 2020 to add INTRODUCTION submittal rows in front of Section 1, of all protocols.
Prior updates: 18 November 2020; numbering and format corrections.

Appendix C1
Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Extensible Reinforcement

Guidelines for the Applicant to use this checklist:

1. Provide your submittal in Adobe portable document format (i.e. PDF).

2. Organize the submittal based on the numbered outline shown in the checklist below. Use the numbered outline as for a table of contents (TOC). Provide the response for each item in your report. Create *links* between the items in the TOC and the items in the report and appendices.

3. If reports, drawings or calculations are requested for a section, provide them in the appendix tabbed for that section. For example, design calculations are required for Item 2.3.1. They should be included in Appendix 2.3.1.

4. Mark the checklist at each item to indicate "yes" you have included the relevant information. If you must check "no", please provide a brief explanation if appropriate.

Introduction

Report	Provide a succinct description of the system (i.e., facing, reinforcement, and connection type) that is being submitted for review. Should reference an appended Introduction TAB where the MSE Wall Specification is presented.
Appendix	Present full wall system specification.

Section 1: ERS Components

1.1	Tab 1.1		Facing Unit
	Yes	No	Item
1.1.1	☐	☐	Does the system contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	☐	☐	List the types of facing units (e.g. standard, cap, corner, base, etc.).
1.1.3	☐	☐	Provide specifications for each facing component.
1.1.4	☐	☐	Provide description of Connection Details
1.1.5	☐	☐	Provide standard dimensions and tolerances for each type of unit (e.g. standard, cap, corner, base, etc.) in plan and section drawings.
1.1.6	☐	☐	Describe wet- or dry-cast fabrication process.
1.1.7	☐	☐	Provide the target 28-day minimum compressive strength.
1.1.8	☐	☐	For dry-cast units, provide the target concrete density and maximum water absorption.
1.1.9	☐	☐	For wet-cast units, provide the target percent air range.
1.1.10	☐	☐	Provide inter-unit shear test results and design shear capacity envelopes.
1.1.11	☐	☐	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.

1.1.12	☐ ☐	Describe with text any filter which is used to prevent migration of fill soil through ERS face. Provide specifications.
1.1.13	☐ ☐	Describe with text the aesthetic facing options that are available. Provide photos, drawings and brochures as appropriate.
1.1.14	☐ ☐	Describe any limits on the facing units that are created by curved ERS sections and corners.

1.2	Tab 1.2		Extensible Reinforcement
	Yes	No	Item
1.2.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	☐	☐	List each style or type that is to be used with the facing system.
1.2.3	☐	☐	Provide specifications for each style or type that is to be used with the facing system.
1.2.4	☐	☐	Provide the current NTPEP report (if a NTPEP report is not available, then a custom checklist is required).
1.2.5	☐	☐	Describe the facing unit-reinforcement connection with text and drawings and provide specifications for any connection devices.
1.2.6	☐	☐	List short- and long-term facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.
1.2.7	☐	☐	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors (F*) and scale effect correction factors (α) Applicant recommends for design. Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.
1.2.8	☐	☐	List soil-geosynthetic interface shear (ASTM D5321) tests performed and provide results. List interface friction angle (ρ) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

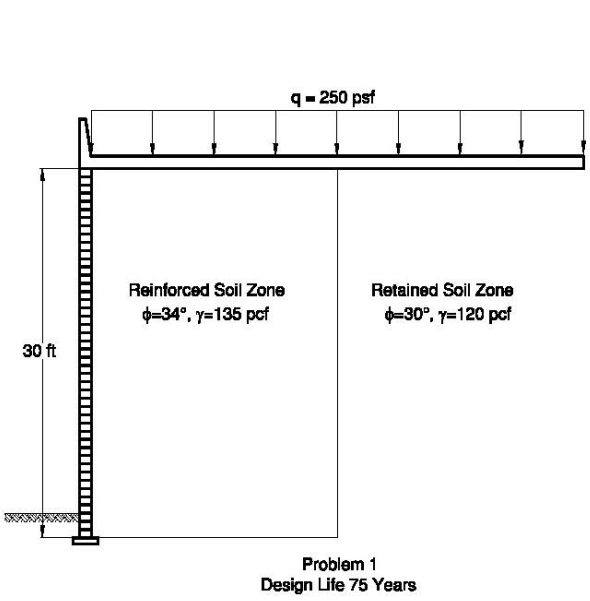
1.3	Tab 1.3		Other Components
	Yes	No	Item
1.3.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to a system component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	☐	☐	Reinforced Soil - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?

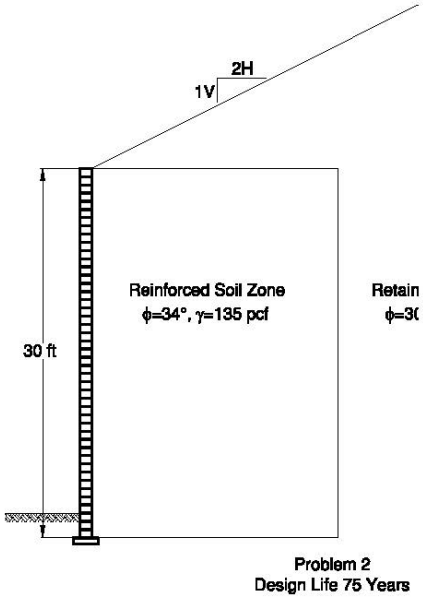
1.3.3	☐ ☐	Drainage - Describe with text any internal and external drainage measures that are inherent in the system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into ERS components.
1.3.4	☐ ☐	Coping - Describe with text coping that may be used with the ERS, not including the previously described cap units. Provide specifications, dimensions, dimensional tolerances and plan and section view drawings.
1.3.5	☐ ☐	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.3.6	☐ ☐	Slip Joints—describe with text how slip joints are made to accommodate potential differential settlement. Provide applicable typical plan and elevation view drawings.

Appendix C1
Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Extensible Reinforcement

Section 2: ERS Design

2.1	Tab 2.1	Design Methodology
	Yes No	Item
2.1.1	☐ ☐	Does the system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	☐ ☐	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	☐ ☐	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.
2.2	Tab 2.2	Design Example
	Yes No	Item
2.2.1	☐ ☐	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.





Appendix C1
Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Extensible Reinforcement

Section 3: Construction

3.1	Tab 3.1		Construction Procedures
	Yes	No	Item
3.1.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
3.1.2	☐	☐	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	☐	☐	Describe facing unit installation both at straight and curved sections of the structure and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe procedures to install earth reinforcement at curved sections of the ERS and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	☐	☐	Describe measures that are required to maintain the design vertical and horizontal alignment of the ERS face.
3.1.6	☐	☐	Describe the procedures to install soil in the reinforced soil zone.
3.1.7	☐	☐	Describe measures that are required to prevent erosion behind and in front of the structure during construction.
3.1.8	☐	☐	Describe experience or other special qualifications that are required of the ERS construction contractor.
3.1.9	☐	☐	Describe the procedures to install soil in the reinforced soil zone.

Section 4: Quality Control

4.1	Tab 4.1		Manufacturing
	Yes	No	Item
4.1.1	☐	☐	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.
4.1.2	☐	☐	Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.
4.1.3	☐	☐	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.

4.2	Tab 4.2		Construction
	Yes	No	Item
4.2.1	☐	☐	Describe the quality control measures that are required during construction of the system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

Appendix C1
Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Extensible Reinforcement

Section 5: Performance

5.1	Performance History		
	Yes	No	Item
5.1.1	☐	☐	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	☐	☐	The oldest three structures.
5.1.3	☐	☐	The tallest three structures.
5.1.4	☐	☐	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

Section 6: Other Information

6.0	Other Information		
6.1	☐	☐	In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

Appendix C2
Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Inextensible Reinforcement

Guidelines for the Applicant to use this checklist:

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Introduction

Report	Provide a succinct description of the system (i.e., facing, reinforcement, and connection type) that is being submitted for review. Should reference an appended Introduction TAB where the MSE Wall Specification is presented.
Appendix	Present full wall system specification.

Section 1: ERS Components

1.1	Tab 1.1		Facing Unit
	Yes	No	Item
1.1.1	☐	☐	Does the system contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	☐	☐	List the types of facing units (e.g. standard, cap, corner, base, etc.).
1.1.3	☐	☐	Provide specifications for each facing component.
1.1.4	☐	☐	Provide description of Connection Details
1.1.5	☐	☐	Provide standard dimensions and tolerances for each type of unit (e.g. standard, cap, corner, base, etc.) in plan and section drawings.
1.1.6	☐	☐	Describe wet- or dry-cast fabrication process.
1.1.7	☐	☐	Provide the target 28-day minimum compressive strength.
1.1.8	☐	☐	For dry-cast units, provide the target concrete density and maximum water absorption.
1.1.9	☐	☐	For wet-cast units, provide the target percent air range.
1.1.10	☐	☐	Provide inter-unit shear test results and design shear capacity envelopes.
1.1.11	☐	☐	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.1.12	☐	☐	Describe with text any filter which is used to prevent migration of fill soil through ERS face. Provide specifications.
1.1.13	☐	☐	Describe with text the aesthetic facing options that are available. Provide photos, drawings and brochures as appropriate.

1.1.14	☐	☐	Describe any limits on the facing units that are created by curved ERS sections and corners.

1.2	Tab 1.2		Inextensible Reinforcement
	Yes	No	Item
1.2.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	☐	☐	List each style or type that is to be used with the facing system.
1.2.3	☐	☐	Provide specifications for each type that is to be used with the facing system. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.4	☐	☐	For each reinforcement type describe corrosion protection measures. If coatings or galvanization are used, provide minimum thickness for 75-year design life based on AASHTO required electrochemical requirements.
	☐	☐	For each reinforcement type provide detail drawings that show dimensional tolerances.
1.2.5	☐	☐	Describe the facing unit-reinforcement connection with text and drawings and provide specifications for any connection devices.
1.2.6	☐	☐	For each connection device describe corrosion protection measures and provide specifications. If coatings or galvanization are used, provide minimum thickness for 75-year design life based on AASHTO required electrochemical requirements.
1.2.7	☐	☐	For each connection device provide detail drawings that show dimensional tolerances.
1.2.8	☐	☐	List facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.
1.2.9	☐	☐	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors (F*) and scale effect correction factors (α) Applicant recommends for design. Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

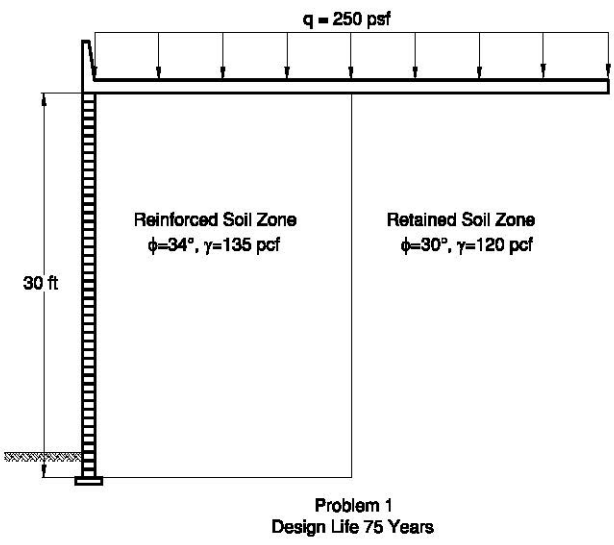
1.3	1.3		Other Components
	Yes	No	Item
1.3.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to a system component? If yes, please describe the innovation briefly. As items below apply Tab to the innovation, please describe the innovation in further detail.
1.3.2	☐	☐	Reinforced Soil - - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?

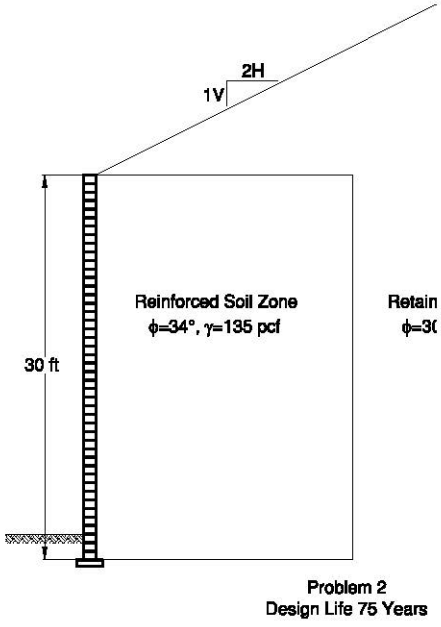
1.3.3	☐ ☐	Drainage - Describe with text any internal and external drainage measures that are inherent in the system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into ERS components.
1.3.4	☐ ☐	Coping—Describe with text coping that may be used with the ERS, not including the previously described cap units. Provide specifications, dimensions, dimensional tolerances and plan and section view drawings.
1.3.5	☐ ☐	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.3.6	☐ ☐	Slip Joints—describe with text how slip joints are made to accommodate potential differential settlement. Provide applicable typical plan and elevation view drawings.

Appendix C2
Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Inextensible Reinforcement

Section 2: ERS Design

2.1	Tab 2.1	Design Methodology
	Yes No	Item
2.1.1	☐ ☐	Does the system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	☐ ☐	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	☐ ☐	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.
2.2	Tab 2.2	Design Example
	Yes No	Item
2.2.1	☐ ☐	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.





Appendix C2
Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Inextensible Reinforcement

Section 3: Construction

3.1	Construction Procedures		
	Yes	No	Item
3.1.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
3.1.2	☐	☐	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	☐	☐	Describe facing unit installation both at straight and curved sections of the structure and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe procedures to install earth reinforcement at curved sections of the ERS and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	☐	☐	Describe measures that are required to maintain the design vertical and horizontal alignment of the ERS face.
3.1.6	☐	☐	Describe the procedures to install soil in the reinforced soil zone.
3.1.7	☐	☐	Describe measures that are required to prevent erosion behind and in front of the structure during construction.
3.1.8	☐	☐	Describe experience or other special qualifications that are required of the ERS construction contractor.
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Section 4: Quality Control

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4.1.3	☐	☐	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.

4.2	Tab 4.2		Construction
	Yes	No	Item
4.2.1	☐	☐	Describe the quality control measures that are required during construction of the system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

Appendix C2
Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Inextensible Reinforcement

Section 5: Performance

5.1	Performance History		
	Yes	No	Item
5.1.1	☐	☐	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	☐	☐	The oldest three structures.
5.1.3	☐	☐	The tallest three structures.
5.1.4	☐	☐	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

Section 6: Other Information

6.0	Other Information		
6.1	☐	☐	In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

Appendix C3
Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Extensible Reinforcement

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Appendix	Present full wall system specification.

Section 1: ERS Components

1.1	Facing Unit		
	Yes	No	Item
1.1.1	☐	☐	Does the wall system contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	☐	☐	List each type of facing unit.
1.1.3	☐	☐	Provide specifications for each facing unit.
1.1.4	☐	☐	Provide standard dimensions, tolerances and typical steel reinforcement schedule (if any is used) for each type of unit (e.g. standard, crest, corner, base, etc.) in plan and section drawings.
1.1.5	☐	☐	Provide the target 28-day minimum compressive strength.
1.1.6	☐	☐	Provide the target percent air range.
1.1.7	☐	☐	Producers will change mix design to accommodate state requirements.
1.1.8	☐	☐	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.1.9	☐	☐	Describe with text any filter which is used to prevent migration of fill soil through wall face. Provide specifications.
1.1.10	☐	☐	Describe with text the aesthetic facing options that are available. Provide photos, drawings and brochures as appropriate.
1.1.11	☐	☐	Describe any limits on the facing units that are created by curved wall sections and corners.

Appendix C3
Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Extensible Reinforcement

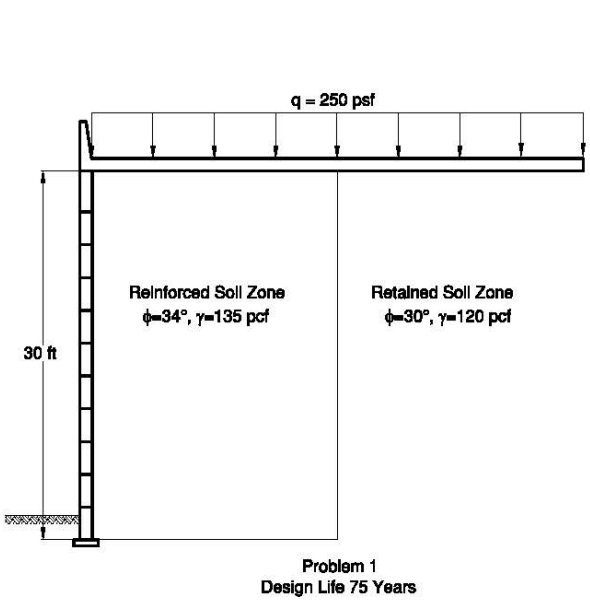
1.2	Tab 1.2		Extensible Reinforcement
	Yes	No	Item
1.2.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	☐	☐	List each style or type that is to be used with the facing system.
1.2.3	☐	☐	Provide specifications for each style or type that is to be used with the facing system.
1.2.4	☐	☐	Provide the current NTPEP report (if a NTPEP report is not available, then a custom checklist is required).
1.2.5	☐	☐	Describe the facing unit-reinforcement connection with text and drawings and provide specifications for any connection devices.
1.2.6	☐	☐	List short- and long-term facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.
1.2.7	☐	☐	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors (F*) and scale effect correction factors (α) Applicant recommends for design. Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.
1.2.8	☐	☐	List soil-geosynthetic interface shear (ASTM D5321) tests performed and provide results. List interface friction angle (ρ) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

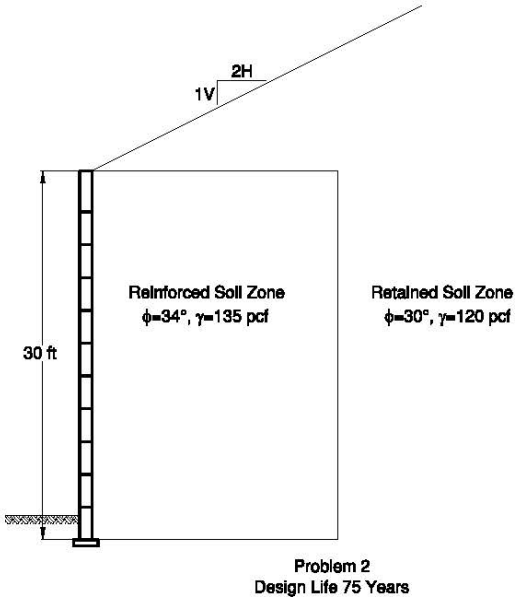
1.3	Other Components		
	Yes	No	Item
1.3.1	☐	☐	Does the wall system contain what you consider to be an innovation that is related to a wall component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	☐	☐	Reinforced Soil - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?
1.3.3	☐	☐	Drainage - Describe with text any internal and external drainage measures that are inherent in the wall system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into wall components.
1.3.4	☐	☐	Coping – Describe with text standard coping that may be used with the wall system, not including the previously described cap units. Provide typical dimensions, and plan and section view drawings.

1.3.5	☐	☐	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.3.6	☐	☐	Slip Joints – describe with text how slip joints are made to accommodate potential differential settlement. Provide typical plan and elevation view drawings.

Section 2: ERS Design

2.1	Design Methodology		
	Yes	No	Item
2.1.1	☐	☐	Does the wall system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	☐	☐	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	☐	☐	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.





Appendix C3
Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Extensible Reinforcement

2.2	Design Example		
	Yes	No	Item
2.2.1	☐	☐	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.

Section 3: Construction

3.1	Construction Procedures		
	Yes	No	Item
3.1.1	☐	☐	Does the wall system contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
3.1.2	☐	☐	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	☐	☐	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe procedures to install earth reinforcement at curved sections of the wall and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	☐	☐	Describe measures that are required to maintain the design vertical and horizontal alignment of the wall face.
3.1.6	☐	☐	Describe the procedures to install soil in the reinforced soil zone.
3.1.7	☐	☐	Describe measures that are required to prevent erosion behind and in front of the wall during construction.
3.1.8	☐	☐	Describe experience or other special qualifications that are required of the wall construction contractor.
3.1.9	☐	☐	Describe the procedures to install soil in the reinforced soil zone.

Section 4: Quality Control

4.1	Manufacturing		
	Yes	No	Item
4.1.1	☐	☐	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.
4.1.2	☐	☐	Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.
4.1.3	☐	☐	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.

4.2	Construction		
	Yes	No	Item
4.2.1	☐	☐	Describe the quality control measures that are required during construction of the wall system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

5: Performance

5.1	Performance History		
	Yes	No	Item
5.1.1	☐	☐	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	☐	☐	The oldest three structures.
5.1.3	☐	☐	The tallest three structures.
5.1.4	☐	☐	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

6: Other

6.0	Other Information		
6.1	☐	☐	In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

Appendix C4
Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Inextensible Reinforcement

Guidelines for the Applicant to use this checklist:

1. Provide your submittal in Adobe portable document format (i.e. PDF).

2. Organize the submittal based on the numbered outline shown in the checklist below. Use the numbered outline as for a table of contents (TOC). Provide the response for each item in your report. Create *links* between the items in the TOC and the items in the report and appendices.

3. If reports, drawings or calculations are requested for a section, provide them in the appendix tabbed for that section. For example, design calculations are required for Item 2.3.1. They should be included in Appendix 2.3.1.

4. Mark the checklist at each item to indicate "yes" you have included the relevant information. If you must check "no", please provide a brief explanation if appropriate.

Introduction

Report	Provide a succinct description of the system (i.e., facing, reinforcement, and connection type) that is being submitted for review. Should reference an appended Introduction TAB where the MSE Wall Specification is presented.
Appendix	Present full wall system specification.

Section 1: ERS Components

1.1	Facing Unit		
	Yes	No	Item
1.1.1	☐	☐	Does the wall system contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	☐	☐	List each type of facing unit.
1.1.3	☐	☐	Provide specifications for each facing unit.
1.1.4	☐	☐	Provide standard dimensions, tolerances and typical steel reinforcement schedule (if any is used) for each type of unit (e.g. standard, crest, corner, base, etc.) in plan and section drawings.
1.1.5	☐	☐	Provide the target 28-day minimum compressive strength.
1.1.6	☐	☐	Provide the target percent air range.
1.1.7	☐	☐	Producers will change mix design to accommodate state requirements.
1.1.8	☐	☐	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.1.9	☐	☐	Describe with text any filter which is used to prevent migration of fill soil through wall face. Provide specifications.

1.1.10	☐	☐	Describe with text the aesthetic facing options that are available. Provide photos, drawings and brochures as appropriate.
1.1.11	☐	☐	Describe any limits on the facing units that are created by curved wall sections and corners.

1.2	Inextensible Reinforcement		
	Yes	No	Item
1.2.1	☐	☐	Does the wall system contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	☐	☐	List each reinforcement type that is to be used with the facing system.
1.2.3	☐	☐	For each type provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.4	☐	☐	For each reinforcement type describe corrosion protection measures. If coatings or galvanization are used, provide minimum thickness for 75-year design life (based on the electrochemical requirements listed in AASHTO).
1.2.5	☐	☐	For each reinforcement type provide sacrificial steel thickness for 75 and 100-year design life.
1.2.6	☐	☐	For each reinforcement type provide the results of any corrosion tests that have been performed.
1.2.7	☐	☐	For each reinforcement type provide detail drawings that show dimensional tolerances.
1.2.8	☐	☐	Describe with text and drawing details how the reinforcement connects to facing units.
1.2.9	☐	☐	List each connection device that is used to connect the facing unit and reinforcement.
1.2.10	☐	☐	For each connection device provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.11	☐	☐	For each connection device describe corrosion protection measures and provide specifications. If coatings or galvanization are used, provide minimum thickness for 75-year design life (based on the electrochemical requirements listed in AASHTO).
1.2.12	☐	☐	For each connection device provide sacrificial steel thickness for 75 and 100 year design life.
1.2.13	☐	☐	For each connection device provide the results of any corrosion tests that have been performed.
1.2.14	☐	☐	For each connection device provide detail drawings that show dimensional tolerances.
1.2.15	☐	☐	List facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.

1.2.16	☐	☐	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors (F*) and scale effect correction factors (α) Applicant recommends for design (it is recognized that for inextensible reinforcement the value of α may be 1.0). Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025
1.2.17	☐	☐	List soil-reinforcement interface shear (ASTM D5321) tests performed and provide results. List interface friction angle (□) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

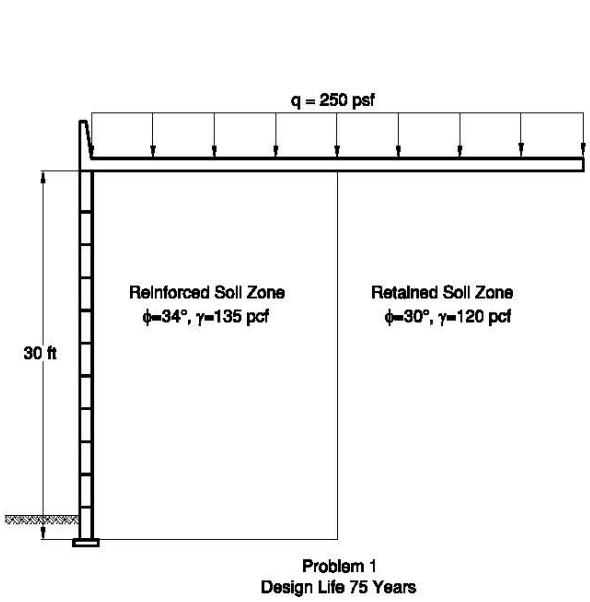
1.3	Other Components		
	Yes	No	Item
1.3.1	☐	☐	Does the wall system contain what you consider to be an innovation that is related to a wall component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	☐	☐	Reinforced Soil - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?
1.3.3	☐	☐	Drainage - Describe with text any internal and external drainage measures that are inherent in the wall system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into wall components.
1.3.4	☐	☐	Coping – Describe with text standard coping that may be used with the wall system, not including the previously described cap units. Provide typical dimensions, and plan and section view drawings.
1.3.5	☐	☐	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.3.6	☐	☐	Slip Joints – describe with text how slip joints are made to accommodate potential differential settlement. Provide typical plan and elevation view drawings.

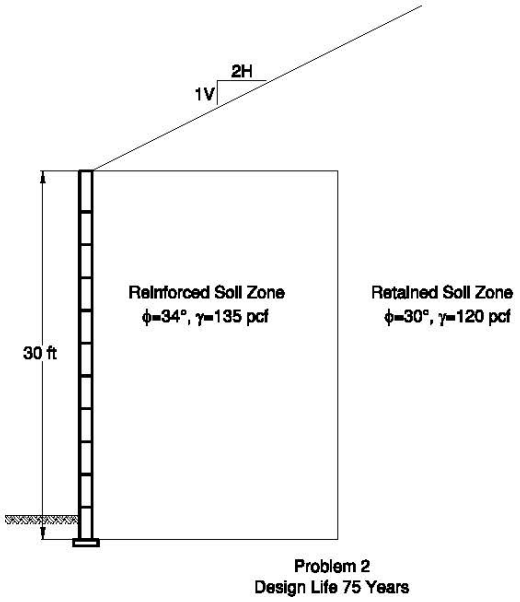
Appendix C4
Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Inextensible Reinforcement

Section 2: ERS Design

2.1	Design Methodology		
	Yes	No	Item
2.1.1	☐	☐	Does the wall system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	☐	☐	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	☐	☐	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.

2.2	Design Example		
	Yes	No	Item
2.2.1	☐	☐	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.





Appendix C4
Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Inextensible Reinforcement

Section 3: Construction

3.1	Construction Procedures		
	Yes	No	Item
3.1.1	☐	☐	Does the wall system contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
3.1.2	☐	☐	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	☐	☐	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe procedures to install earth reinforcement at curved sections of the wall and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	☐	☐	Describe measures that are required to maintain the design vertical and horizontal alignment of the wall face.
3.1.6	☐	☐	Describe the procedures to install soil in the reinforced soil zone.
3.1.7	☐	☐	Describe measures that are required to prevent erosion behind and in front of the wall during construction.
3.1.8	☐	☐	Describe experience or other special qualifications that are required of the wall construction contractor.
3.1.9	☐	☐	Describe the procedures to install soil in the reinforced soil zone.

Section 4: Quality Control

4.1	Manufacturing		
	Yes	No	Item
4.1.1	☐	☐	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.
4.1.2	☐	☐	Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.
4.1.3	☐	☐	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.

4.2	Construction		
	Yes	No	Item
4.2.1	☐	☐	Describe the quality control measures that are required during construction of the wall system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

Appendix C4
Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Inextensible Reinforcement

5: Performance

5.1	Performance History		
	Yes	No	Item
5.1.1	☐	☐	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	☐	☐	The oldest three structures.
5.1.3	☐	☐	The tallest three structures.
5.1.4	☐	☐	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

6: Other

6.0	Other Information		
6.1	☐	☐	In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

Appendix C5
Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement

Guidelines for the Applicant to use this checklist:

1. Provide your submittal in Adobe portable document format (i.e. PDF).

2. Organize the submittal based on the numbered outline shown in the checklist below. Use the numbered outline as for a table of contents (TOC). Provide the response for each item in your report. Create *links* between the items in the TOC and the items in the report and appendices.

3. If reports, drawings or calculations are requested for a section, provide them in the appendix tabbed for that section. For example, design calculations are required for Item 2.3.1. They should be included in Appendix 2.3.1.

4. Mark the checklist at each item to indicate "yes" you have included the relevant information. If you must check "no", please provide a brief explanation if appropriate.

Introduction

Report	Provide a succinct description of the system (i.e., facing, reinforcement, and connection type) that is being submitted for review. Should reference an appended Introduction TAB where the MSE Wall Specification is presented.
Appendix	Present full wall system specification.

Section 1: ERS Components

1.1	Tab 1.1		Facing Unit
	Yes	No	Item
1.1.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	☐	☐	List each type of facing unit and provide a brief description.
1.1.3	☐	☐	Provide specifications for each type of facing unit.
1.1.4	☐	☐	Provide standard dimensions and tolerances for each type of unit (e.g. standard, crest, corner, base, etc.) in plan and section drawings.
1.1.5	☐	☐	For each type of facing unit, provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.1.6	☐	☐	For each type of facing unit, describe corrosion protection measures. If coatings or galvanization are used, provide minimum thickness for 75-year design life.
1.1.7	☐	☐	For each type of facing unit, provide sacrificial steel thickness for 75- and 100-year design life.
1.1.8	☐	☐	Provide inter-unit shear test results and design shear capacity envelopes. If inter-unit shear is not applicable, briefly describe why.
1.1.9	☐	☐	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.1.10	☐	☐	Describe with text any filter which is used to prevent migration of fill soil through ERS face. Provide specifications.
1.1.11	☐	☐	Describe any limits on the facing units that are created by curved structure sections and corners.

Appendix C5
Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement

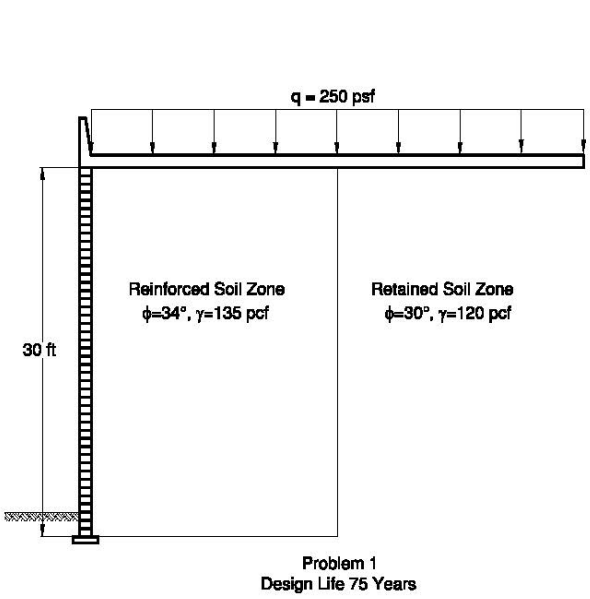
1.2	Tab 1.2		Extensible Reinforcement
	Yes	No	Item
1.2.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	☐	☐	List each style or type that is to be used with the facing system.
1.2.3	☐	☐	Provide specifications for each style or type that is to be used with the facing system.
1.2.4	☐	☐	Provide the current NTPEP report (if a NTPEP report is not available, then a custom checklist is required).
1.2.5	☐	☐	Describe the facing unit-reinforcement connection with text and drawings and provide specifications for any connection devices.
1.2.6	☐	☐	List short- and long-term facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.
1.2.7	☐	☐	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors (F*) and scale effect correction factors (α) Applicant recommends for design. Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.
1.2.8	☐	☐	List soil-geosynthetic interface shear (ASTM D5321) tests performed and provide results. List interface friction angle (ρ) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

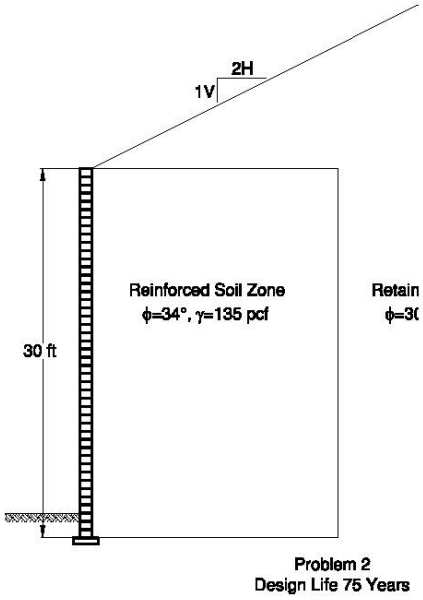
1.3	Tab 1.3		Other Components
	Yes	No	Item
1.3.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to a system component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	☐	☐	Reinforced Soil - - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?
1.3.3	☐	☐	Drainage - Describe with text any internal and external drainage measures that are inherent in the system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into ERS components.
1.3.4	☐	☐	Coping—Describe with text coping that may be used with the ERS, not including the previously described cap units. Provide specifications, dimensions, dimensional tolerances and plan and section view drawings.

1.3.5	☐ ☐	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.3.6	☐ ☐	Slip Joints—describe with text how slip joints are made to accommodate potential differential settlement. Provide applicable typical plan and elevation view drawings.

Section 2: ERS Design

2.1	Tab 2.1	Design Methodology
	Yes No	Item
2.1.1	☐ ☐	Does the system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	☐ ☐	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	☐ ☐	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.
2.2	Tab 2.2	Design Example
	Yes No	Item
2.2.1	☐ ☐	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.





Appendix C5
Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement

Section 3: Construction

3.1	Tab 3.1		Construction Procedures
	Yes	No	Item
3.1.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
3.1.2	☐	☐	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	☐	☐	Describe facing unit installation both at straight and curved sections of the structure and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe procedures to install earth reinforcement at curved sections of the ERS and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	☐	☐	Describe measures that are required to maintain the design vertical and horizontal alignment of the ERS face.
3.1.6	☐	☐	Describe the procedures to install soil in the reinforced soil zone.
3.1.7	☐	☐	Describe measures that are required to prevent erosion behind and in front of the structure during construction.
3.1.8	☐	☐	Describe experience or other special qualifications that are required of the ERS construction contractor.
3.1.9	☐	☐	Describe the procedures to install soil in the reinforced soil zone.

Section 4: Quality Control

4.1	Tab 4.1		Manufacturing
	Yes	No	Item
4.1.1	☐	☐	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.
4.1.2	☐	☐	Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.
4.1.3	☐	☐	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.

4.2	Tab 4.2		Construction
	Yes	No	Item
4.2.1	☐	☐	Describe the quality control measures that are required during construction of the system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

Appendix C5
Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement

Section 5: Performance

5.1	Performance History		
	Yes	No	Item
5.1.1	☐	☐	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	☐	☐	The oldest three structures.
5.1.3	☐	☐	The tallest three structures.
5.1.4	☐	☐	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

Section 6: Other Information

6.0	Other Information		
6.1	☐	☐	In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

Appendix C6
Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement

Guidelines for the Applicant to use this checklist:

1. Provide your submittal in Adobe portable document format (i.e. PDF).

2. Organize the submittal based on the numbered outline shown in the checklist below. Use the numbered outline as for a table of contents (TOC). Provide the response for each item in your report. Create *links* between the items in the TOC and the items in the report and appendices.

3. If reports, drawings or calculations are requested for a section, provide them in the appendix tabbed for that section. For example, design calculations are required for Item 2.3.1. They should be included in Appendix 2.3.1.

4. Mark the checklist at each item to indicate "yes" you have included the relevant information. If you must check "no", please provide a brief explanation if appropriate.

Introduction

Report	Provide a succinct description of the system (i.e., facing, reinforcement, and connection type) that is being submitted for review. Should reference an appended Introduction TAB where the MSE Wall Specification is presented.
Appendix	Present full wall system specification.

Section 1: ERS Components

1.1	Tab 1.1		Facing Unit
	Yes	No	Item
1.1.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	☐	☐	List each type of facing unit and provide a brief description.
1.1.3	☐	☐	Provide specifications for each type of facing unit.
1.1.4	☐	☐	Provide standard dimensions and tolerances for each type of unit (e.g. standard, crest, corner, base, etc.) in plan and section drawings.
1.1.5	☐	☐	For each type of facing unit, provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.1.6	☐	☐	For each type of facing unit, describe corrosion protection measures. If coatings or galvanization are used, provide minimum thickness for 75-year design life.
1.1.7	☐	☐	For each type of facing unit, provide sacrificial steel thickness for 75- and 100-year design life.
1.1.8	☐	☐	Provide inter-unit shear test results and design shear capacity envelopes. If inter-unit shear is not applicable, briefly describe why.
1.1.9	☐	☐	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.1.10	☐	☐	Describe with text any filter which is used to prevent migration of fill soil through ERS face. Provide specifications.
1.1.11	☐	☐	Describe any limits on the facing units that are created by curved structure sections and corners.

Appendix C6
Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement

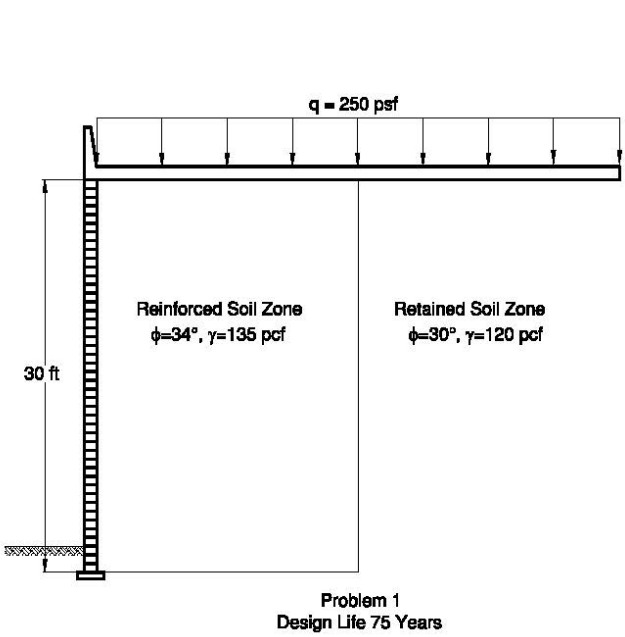
1.2	Inextensible Reinforcement		
	Yes	No	Item
1.2.1	☐	☐	Does the wall system contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	☐	☐	List each reinforcement type that is to be used with the facing system.
1.2.3	☐	☐	For each type provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.4	☐	☐	For each reinforcement type describe corrosion protection measures. If coatings or galvanization are used, provide minimum thickness for 75-year design life (based on the electrochemical requirements listed in AASHTO).
1.2.5	☐	☐	For each reinforcement type provide sacrificial steel thickness for 75 and 100-year design life.
1.2.6	☐	☐	For each reinforcement type provide the results of any corrosion tests that have been performed.
1.2.7	☐	☐	For each reinforcement type provide detail drawings that show dimensional tolerances.
1.2.8	☐	☐	Describe with text and drawing details how the reinforcement connects to facing units.
1.2.9	☐	☐	List each connection device that is used to connect the facing unit and reinforcement.
1.2.10	☐	☐	For each connection device provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.11	☐	☐	For each connection device describe corrosion protection measures and provide specifications. If coatings or galvanization are used, provide minimum thickness for 75-year design life (based on the electrochemical requirements listed in AASHTO).
1.2.12	☐	☐	For each connection device provide sacrificial steel thickness for 75 and 100 year design life.
1.2.13	☐	☐	For each connection device provide the results of any corrosion tests that have been performed.
1.2.14	☐	☐	For each connection device provide detail drawings that show dimensional tolerances.
1.2.15	☐	☐	List facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.
1.2.16	☐	☐	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors (F*) and scale effect correction factors (α) Applicant recommends for design (it is recognized that for inextensible reinforcement the value of α may be 1.0). Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025

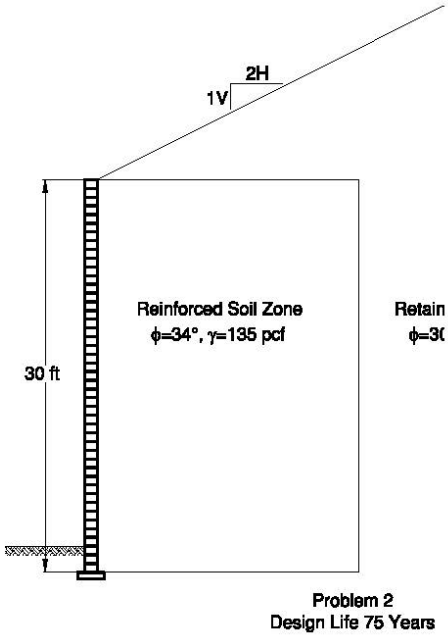
1.2.17	☐	☐	List soil-reinforcement interface shear (ASTM D5321) tests performed and provide results. List interface friction angle (□) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

1.3	Tab 1.3		Other Components
	Yes	No	Item
1.3.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to a system component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	☐	☐	Reinforced Soil - - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?
1.3.3	☐	☐	Drainage - Describe with text any internal and external drainage measures that are inherent in the system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into ERS components.
1.3.4	☐	☐	Coping—Describe with text coping that may be used with the ERS, not including the previously described cap units. Provide specifications, dimensions, dimensional tolerances and plan and section view drawings.
1.3.5	☐	☐	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.3.6	☐	☐	Slip Joints—describe with text how slip joints are made to accommodate potential differential settlement. Provide applicable typical plan and elevation view drawings.

Section 2: ERS Design

2.1	Tab 2.1	Design Methodology
	Yes No	Item
2.1.1	☐ ☐	Does the system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	☐ ☐	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	☐ ☐	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.
2.2	Tab 2.2	Design Example
	Yes No	Item
2.2.1	☐ ☐	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.





Appendix C6
Initial Technical Evaluation Checklist for Steel Facing Paired with Inextensible Reinforcement

Section 3: Construction

3.1	Tab 3.1		Construction Procedures
	Yes	No	Item
3.1.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
3.1.2	☐	☐	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	☐	☐	Describe facing unit installation both at straight and curved sections of the structure and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe procedures to install earth reinforcement at curved sections of the ERS and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	☐	☐	Describe measures that are required to maintain the design vertical and horizontal alignment of the ERS face.
3.1.6	☐	☐	Describe the procedures to install soil in the reinforced soil zone.
3.1.7	☐	☐	Describe measures that are required to prevent erosion behind and in front of the structure during construction.
3.1.8	☐	☐	Describe experience or other special qualifications that are required of the ERS construction contractor.
3.1.9	☐	☐	Describe the procedures to install soil in the reinforced soil zone.

Section 4: Quality Control

4.1	Tab 4.1		Manufacturing
	Yes	No	Item
4.1.1	☐	☐	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.
4.1.2	☐	☐	Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.
4.1.3	☐	☐	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.

4.2	Tab 4.2		Construction
	Yes	No	Item
4.2.1	☐	☐	Describe the quality control measures that are required during construction of the system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

Appendix C6
Initial Technical Evaluation Checklist for Steel Facing Paired with Inextensible Reinforcement

Section 5: Performance

5.1	Performance History		
	Yes	No	Item
5.1.1	☐	☐	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	☐	☐	The oldest three structures.
5.1.3	☐	☐	The tallest three structures.
5.1.4	☐	☐	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

Section 6: Other Information

6.0	Other Information		
6.1	☐	☐	In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

Appendix C7
Initial Technical Evaluation Checklist for Precast Concrete Modular Gravity Wall System

Guidelines for the Applicant to use this checklist:

1. Provide your submittal in Adobe portable document format (i.e. PDF).

2. Organize the submittal based on the numbered outline shown in the checklist below. Use the numbered outline as for a table of contents (TOC). Provide the response for each item in your report. Create *links* between the items in the TOC and the items in the report and appendices.

3. If reports, drawings or calculations are requested for a section, provide them in the appendix tabbed for that section. For example, design calculations are required for Item 2.3.1. They should be included in Appendix 2.3.1.

4. Mark the checklist at each item to indicate "yes" you have included the relevant information. If you must check "no", please provide a brief explanation if appropriate.

Introduction

Report	Provide a succinct description of the system that is being submitted for review. Should reference an appended Introduction TAB where the wall specification is presented.
Appendix	Present full wall system specification.

Section 1: ERS Components

1.1	Tab 1.1		Facing / Gravity Unit
	Yes	No	Item
1.1.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	☐	☐	Provide specifications for each facing component.
1.1.3	☐	☐	List the types of units (e.g. standard, top, corner, base, etc.)
1.1.4	☐	☐	Provide standard dimensions, tolerances and typical steel reinforcement schedule (if any is used) for each type of unit (e.g. standard, top, corner, base, etc.) in plan and section drawings.
1.1.5	☐	☐	Describe the unit fabrication process.
1.1.6	☐	☐	Provide inter-unit shear test results and design shear capacity envelopes.
1.1.7	☐	☐	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.1.8	☐	☐	Describe with text any filter which is used to prevent migration of fill soil through the ERS face. Provide specifications.
1.1.9	☐	☐	Describe any limits on the facing units that are created by curved structure sections and corners.

1.2	Tab 1.2		Other Components
	Yes	No	Item
1.2.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to a system component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.

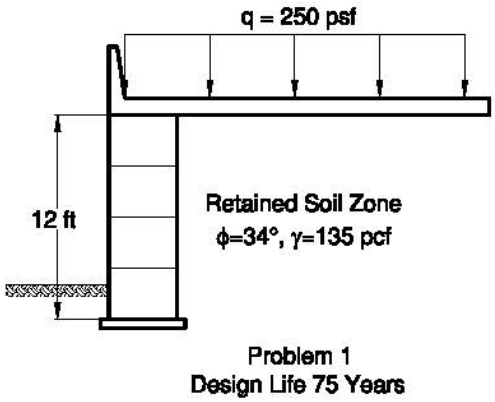
1.2	Tab 1.2	Other Components
1.2.2	☐ ☐	Backfill Soil - - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?
1.2.3	☐ ☐	Drainage - Describe with text any internal and external drainage measures that are inherent in the system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into ERS components.
1.2.4	☐ ☐	Coping—Describe with text coping that may be used with the ERS, not including the previously described cap units. Provide specifications, dimensions, dimensional tolerances and plan and section view drawings.
1.2.5	☐ ☐	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.2.6	☐ ☐	Slip Joints—describe with text how slip joints are made to accommodate potential differential settlement. Provide applicable typical plan and elevation view drawings.

Section 2: ERS Design

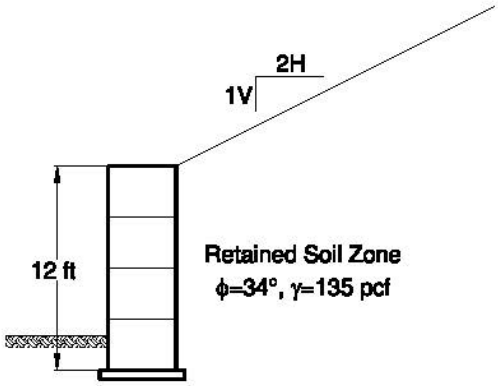
2.1	Tab 2.1	Design Methodology
	Yes No	Item
2.1.1	☐ ☐	Does the ERS contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	☐ ☐	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.

2.2	Tab 2.2	Design Example
	Yes No	Item
2.2.1	☐ ☐	Problems 1 and 2—provide complete hand calculations for both problems. If a computer program is used, provide a printout of the computer design demonstrating consistency with the hand calculations.

Appendix C7
Initial Technical Evaluation Checklist for Precast Concrete Modular Gravity Wall System



Problem 1
Design Life 75 Years



Problem 2
Design Life 75 Years

Section 3: Construction

3.1	Tab 3.1		Construction Procedures
	Yes	No	Item
3.1.1	☐	☐	Does the ERS contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
3.1.2	☐	☐	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	☐	☐	Describe facing unit installation both at straight and curved sections of the structure and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.5	☐	☐	Describe measures that are required to maintain the design vertical and horizontal alignment of the ERS face.
3.1.6	☐	☐	Describe the procedures to install soil in the retained soil zone.
3.1.7	☐	☐	Describe measures that are required to prevent erosion behind and in front of the structure during construction.
3.1.8	☐	☐	Describe experience or other special qualifications that are required of the ERS construction contractor.

Section 4: Quality Control

4.1	Tab 4.1		Manufacturing
	Yes	No	Item
4.1.1	☐	☐	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.

4.1	Tab 4.1	Manufacturing
4.1.3	☐ ☐	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.

4.2	Tab 4.2	Construction
	Yes No	Item
4.2.1	☐ ☐	Describe the quality control measures that are required during construction of the system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

Section 5: Performance

5.1	Performance History	
	Yes No	Item
5.1.1	☐ ☐	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	☐ ☐	The oldest three structures.
5.1.3	☐ ☐	The tallest three structures.
5.1.4	☐ ☐	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

Section 6: Other Information

6.0	Other Information	
6.1	☐ ☐	In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

Appendix C8
Initial Technical Evaluation Checklist for Reinforced Soil Slope System (RSS)
with Extensible Reinforcement

Guidelines for the Applicant to use this checklist:

1. Provide your submittal in Adobe portable document format (i.e. PDF).

2. Organize the submittal based on the numbered outline shown in the checklist below. Use the numbered outline as for a table of contents (TOC). Provide the response for each item in your report. Create *links* between the items in the TOC and the items in the report and appendices.

3. If reports, drawings or calculations are requested for a section, provide them in the appendix tabbed for that section. For example, design calculations are required for Item 2.3.1. They should be included in Appendix 2.3.1.

4. Mark the checklist at each item to indicate "yes" you have included the relevant information. If you must check "no", please provide a brief explanation if appropriate.

Introduction

Report	Provide a succinct description of the system (i.e., facing, reinforcement, drainage, etc.) that is being submitted for review. Should reference an appended Introduction TAB where the RSS Specification is presented.
Appendix	Present full RSS system specification.

Section 1: RSS Components

1.1	Tab 1.1		Facing
	Yes	No	Item
1.1.1	☐	☐	Does the system contain what you consider to be an innovation that is related to the facing? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	☐	☐	List the types of facing (e.g., erosion protection, vegetation, wrap, etc.).
1.1.3	☐	☐	Provide specifications for each facing type.
1.1.4	☐	☐	Provide description of Facing Details, including connection to reinforcement.
1.1.5	☐	☐	Provide standard dimensions, and tolerances, for each type of facing in plan and section drawings.
1.1.6	☐	☐	Describe fabrication process for plastic, natural fiber, cement based, steel, etc. facing components.
1.1.7	☐	☐	Provide the specified strength and design life of plastic, cement based, steel, etc. facing components. Document design life computations, including service environment assumptions.
1.1.8	☐	☐	Describe with text and drawings on details is used to prevent migration of fill soil through, or off of, the RSS face.
1.1.9	☐	☐	Describe with text the aesthetic facing options that are available. Provide photos, drawings and brochures as appropriate.
1.1.10	☐	☐	Describe any limits on the facing units that are created by curved RSS sections and tapers into non-reinforced slopes.

Appendix C8
Initial Technical Evaluation Checklist for Reinforced Soil Slope System (RSS)
with Extensible Reinforcement

1.2	Tab 1.2		Extensible Reinforcement
	Yes	No	Item
1.2.1	☐	☐	Does the RSS contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	☐	☐	List each style or type that is to be used with the facing system.
1.2.3	☐	☐	Provide specifications for each style or type that is to be used with the facing system.
1.2.4	☐	☐	Provide the current NTPEP report (if a NTPEP report is not available, then a custom checklist is required).
1.2.5	☐	☐	Describe the facing unit-reinforcement connection with text and drawings.
1.2.6	☐	☐	List facing-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design; if applicable.
1.2.7	☐	☐	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors (F*) and scale effect correction factors (α) Applicant recommends for design. Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.
1.2.8	☐	☐	List soil-geosynthetic interface shear (ASTM D5321) tests performed and provide results. List interface friction angle (ρ) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

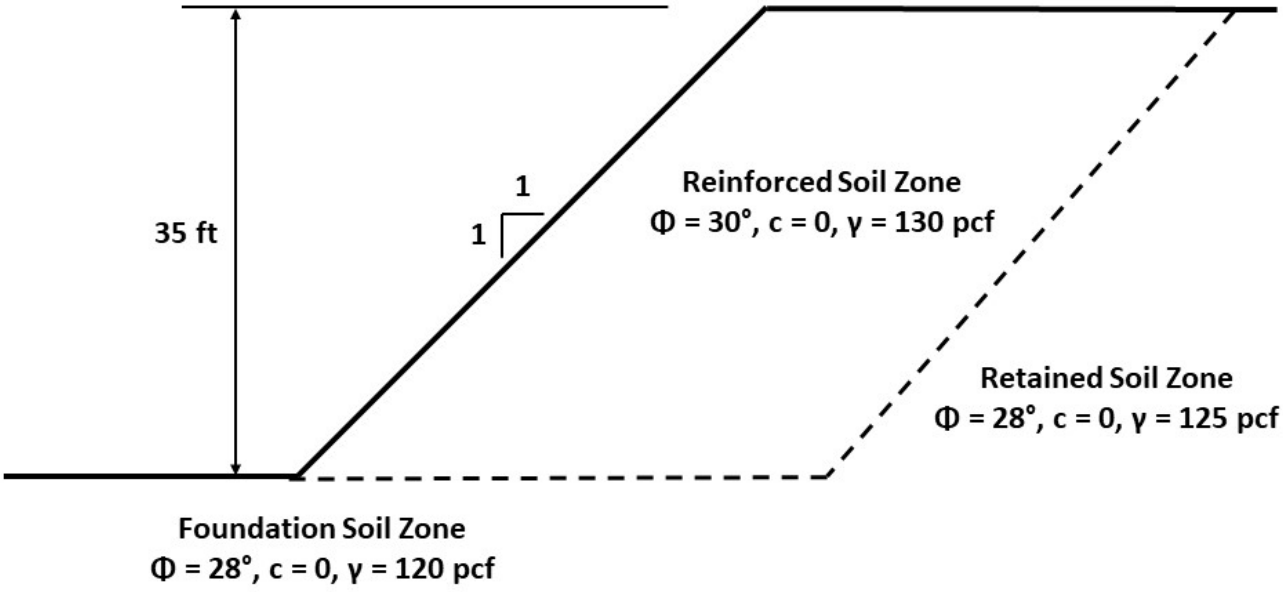
1.3	Tab 1.3		Other Components
	Yes	No	Item
1.3.1	☐	☐	Does the RSS contain what you consider to be an innovation that is related to a system component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	☐	☐	Reinforced Soil - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?
1.3.3	☐	☐	Drainage - Describe with text any internal and external drainage measures that are inherent in the system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into ERS components.
1.3.4	☐	☐	Irrigation - Describe with text, and drawings, face irrigation measures that are inherent in the system and vegetated facing.

1.3.5	☐	☐	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.

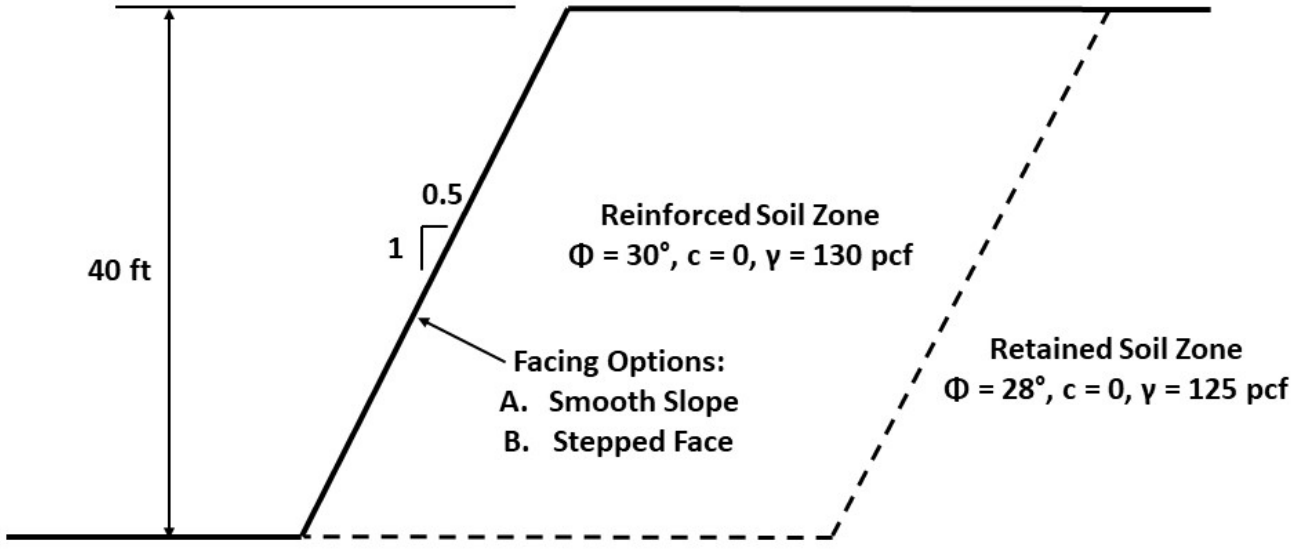
Section 2: RSS Design

2.1	Tab 2.1		Design Methodology
	Yes	No	Item
2.1.1	☐	☐	Does the system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	☐	☐	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	☐	☐	Provide typical plan and detail drawings of how vertical and horizontal obstructions in the reinforced zone are handled.
2.2	Tab 2.2		Design Example
	Yes	No	Item
2.2.1	☐	☐	Problems 1 and 2—provide complete calculations for both problems. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.
2.3	Tab 2.3		Summary of Design Input Parameters
	Yes	No	Item
2.3.1	☐	☐	Summary table of design input parameters for use with commercially available limit equilibrium slope stability computer programs.

Appendix C8
Initial Technical Evaluation Checklist for Reinforced Soil Slope (RSS) System (RSS) with Extensible Reinforcement



Problem 1
Design Life 75 Years



Problem 2
Design Life 75 Years

Appendix C8
Initial Technical Evaluation Checklist for Reinforced Soil Slope (RSS) System (RSS) with Extensible Reinforcement

Section 3: Construction

3.1	Tab 3.1		Construction Procedures
	Yes	No	Item
3.1.1	☐	☐	Does the RSS contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
3.1.2	☐	☐	Provide the construction manual for the RSS system and at a minimum it should include the following items.
3.1.3	☐	☐	Describe facing installation both at straight and curved sections of the structure.
3.1.4	☐	☐	Describe any limitations of facing installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	☐	☐	Describe procedures to install earth reinforcement at curved sections of the RSS and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	☐	☐	Describe measures that are required to maintain the design vertical and horizontal alignment of the RSS face.
3.1.6	☐	☐	Describe the procedures to install soil in the reinforced soil zone.
3.1.7	☐	☐	Describe measures that are required to prevent erosion behind and in front of the structure during construction.
3.1.8	☐	☐	Describe experience or other special qualifications that are required of the RSS construction contractor.
3.1.9	☐	☐	Describe the procedures to install soil in the reinforced soil zone.

Section 4: Quality Control

4.1	Tab 4.1		Manufacturing
	Yes	No	Item
4.1.1	☐	☐	Describe the quality control measures that are required for the manufacturing of facing components. You may do this by providing a manufacturing QC manual.
4.1.2	☐	☐	Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.
4.1.3	☐	☐	Describe the quality control measures that are required for the manufacturing of any drainage components. You may do this by providing a manufacturing QC manual(s).

4.2	Tab 4.2		Construction
	Yes	No	Item
4.2.1	☐	☐	Describe the quality control measures that are required during construction of the system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

Appendix C8
Initial Technical Evaluation Checklist for Reinforced Soil Slope (RSS) System (RSS) with Extensible Reinforcement

Section 5: Performance

5.1	Performance History		
	Yes	No	Item
5.1.1	☐	☐	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	☐	☐	The oldest three structures.
5.1.3	☐	☐	The tallest three structures.
5.1.4	☐	☐	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

Section 6: Other Information

6.0	Other Information		
6.1	☐	☐	In this section, please include anything you think will better help a reviewer understand your RSS that has not been adequately address in the previous questions.