

DESIGN NOTES

1. Design is based on the assumption that the methods of construction and quality of materials conform to the requirements of Hilfiker Retaining Walls.

2. Soil Characteristics:

SN - Retained Soils

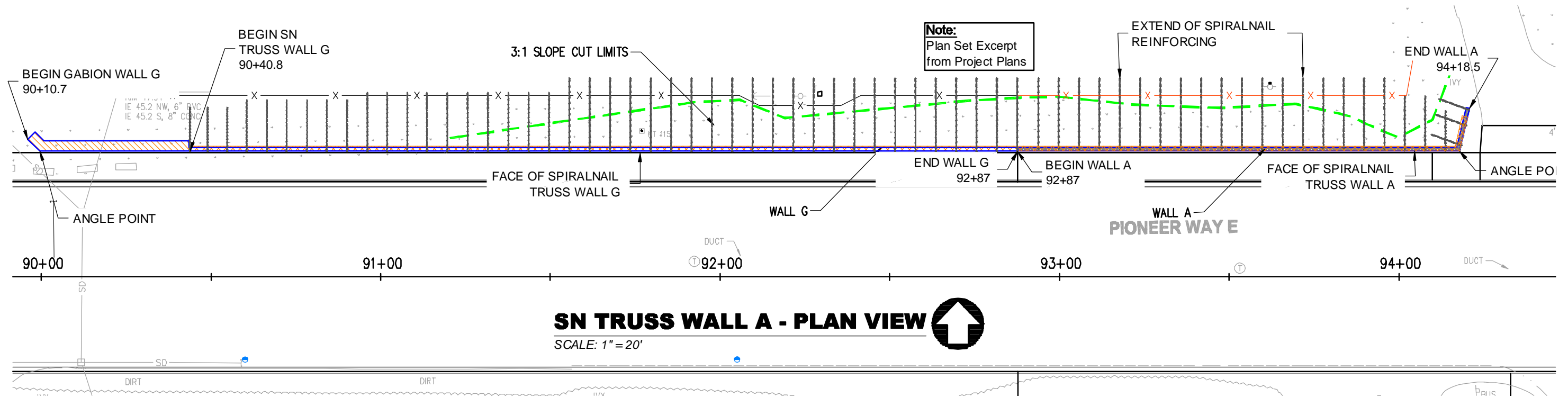
- Unit Weight: 120 pcf
- Internal Friction Angle: 34°
- Cohesion = 200 psf
- Bond Stress = 9 psi

If actual characteristics, grades or dimensions of soil materials differ from those listed above or shown on the plans, the Spiralnail Engineer shall be notified to evaluate the need to redesign.

3. Design Procedure:
Geotechnical Engineering Circular No. 7 - Soil Nail Walls
FHWA Report No. FHWA0-IF-03-017.
4. Conflicts between the trusswall panels, pilasters or spiralnails and obstructions are resolved in the field by any combination of the following:
- a) Trimming the vertical truss wall panel wires and or bending vertical & horizontal wires to accommodate the penetration through the facing
 - b) Trimming the bottom part of the pilaster
 - c) Slight Re-orientation of the spiralnail angle or direction. If re-orientation of the pilaster or nails is more than one foot from the planned location, confirmation of the change shall be approved by CES.

5. This design is intended to be responsible for the internal stability of the retaining wall only, and not for global stability or foundation bearing capacity. CES is not responsible for job site drainage, safety and fall protection provisions including compliance with OSHA regulations, nor the Competent Person designated for daily inspection.

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, CES HAS DESIGNED FOR THE INTERNAL STABILITY OF THE STRUCTURES ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND GLOBAL SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.



SN TRUSS WALL A - PLAN VIEW
SCALE: 1" = 20'

SUPPLIED QUANTITY						
PILASTERS				SPIRALNAILS		
S1 - (4) 4.5'	S2 - (11) 6.5'	S3 (23) - 8.5'	S4 (26) - 10.5'	(30) 10'	(69) 12'	(78) 16'

SUPPLIED QUANTITIES			
SIZE LxWxH	CY	REQUIRED AMOUNT	TOTAL CY
6x2x1.5	0.67	1	0.67 CY
6x2x3	1.33	5	6.67 CY
TOTAL			7.33 CY

EXISTING INFRASTRUCTURE

PIPING, UTILITIES, OR ANY OTHER UNDERGROUND ITEMS OR INFRASTRUCTURES MAY OR MAY NOT BE SHOWN. SPIRALNAILS WERE LOCATED ON THESE PLANS AS COULD BE BEST DETERMINED WITH THE INFORMATION PROVIDED. PRECISE LOCATIONS SHALL BE ASCERTAINED IN THE FIELD PRIOR TO DRAWING APPROVAL AND CONFIRMED BY OTHERS. DESIGN APPROVAL WARRANTS NEITHER HILFIKER NOR CES WILL BE LIABLE FOR ANY DAMAGE CAUSED BY SPIRALNAIL INSTALLATIONS PERFORMED IN ACCORDANCE WITH THESE PLANS. CALL USA PRIOR TO ANY EXCAVATION OR NAIL INSTALLATION.

REV. NO.	DATE	BY	DESCRIPTION
	2/03/21	KLC	Initial Electronic (.pdf) Release
	3/22/21	KLC	Revised Per 3/11/21 Plan Check

HILFIKER RETAINING WALLS

1902 Hilfiker Lane
Eureka, CA 95503-5711
TOLL-FREE 800.762.8962
PH 707.443.5093 FAX 707.443.2891
WEB SITE www.hilfiker.com E-MAIL info@hilfiker.com

CESARETTI
Engineered Solutions
CIVIL ENGINEERING SPECIALISTS

P.O. Box 132
Fortuna, CA 95540
Phone (707) 725-CESR
(707) 498-7193
CesarettiEngineered.com
KCesaretti@att.net

City of Puyallup WSU Lid Frontage Improvements
SPIRALNAIL TRUSS WALLS

GENERAL NOTES &
SN TRUSS WALL PLAN VIEW

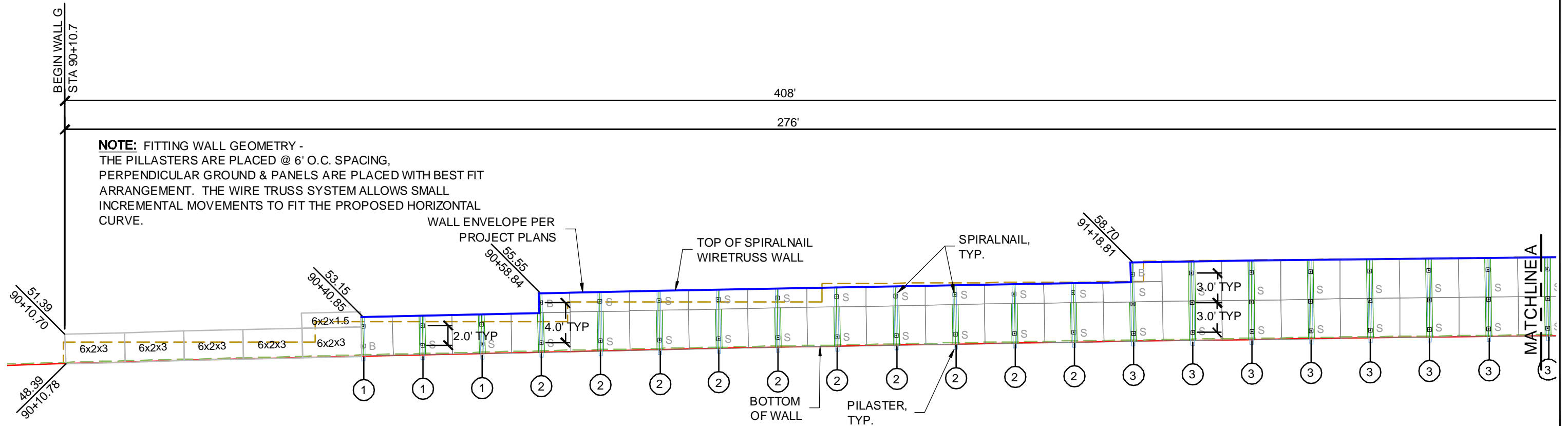
HW 190715BN

PROJECT	21-005
DATE	02-03-21
DESIGN	KLC
DRAWN	KLC

SHT 1 OF 7

C:\General File Folder\Project Files\CES Projects\HW - City of Puyallup WSU Lid Frontage Improvements\HW - City of Puyallup WSU Lid Frontage Improvements - Rev. 2.dwg - Last Saved: 3/22/2021 10:39 AM

C:\General File Folder\Project Files\CES Projects\CES 21-005 HW - City of Puyallup WSU Lid Frontage Improvements\HW - City of Puyallup WSU Lid Frontage Improvements - Rev 2.dwg - Last Saved 3/22/2021 10:39 AM



SN TRUSS WALL G & A - ELEVATION VIEW
 SCALE: 1" = 10'

TRUSS WALL PARAMETERS		
SECTION	HEIGHT	SPIRALNAIL
1	4'	2 - 10' @ 9°
2	6'	2 - 10' @ 9°
3	8'	3 - 12' @ 9°
4	10'	3 - 16' @ 9°

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, CES HAS DESIGNED FOR THE INTERNAL STABILITY OF THE STRUCTURES ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND GLOBAL SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.

REV. NO.	DATE	BY	DESCRIPTION
	2/03/21	KLC	Initial Electronic (.pdf) Release
	3/22/21	KLC	Revised Per 3/11/21 Plan Check

HILFIKER RETAINING WALLS

1902 Hilfiker Lane
 Eureka, CA 95503-5711
 TOLL-FREE 800.762.8962
 PH 707.443.5093 FAX 707.443.2891
 WEB SITE www.hilfiker.com E-MAIL info@hilfiker.com

CESARETTI
 Engineered Solutions
 CIVIL ENGINEERING SPECIALISTS

P.O. Box 132
 Fortuna, CA 95540
 Phone (707) 725-CESR
 (707) 498-7193
 CesarettiEngineered.com
 KCesaretti@att.net

City of Puyallup WSU Lid Frontage Improvements
 SPIRALNAIL TRUSS WALLS

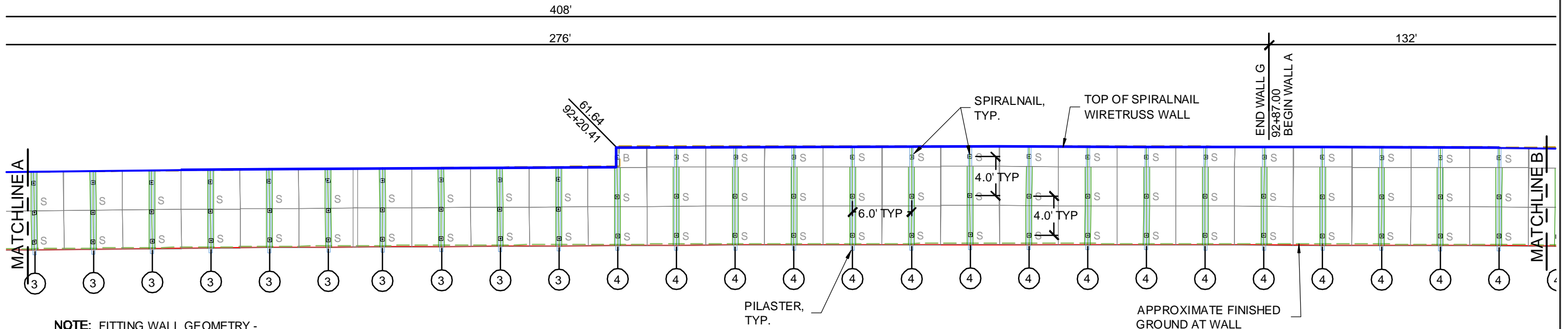
SN TRUSS WALLS ELEVATION VIEW

HW 190715BN

PROJECT	21-005
DATE	02-03-21
DESIGN	KLC
DRAWN	KLC

SHT 2 OF 7

C:\General File Folder\Project Files\CES Projects\21-005 HW - City of Puyallup WSU Lid Frontage Improvements\HW - City of Puyallup WSU Lid Frontage Improvements\HW - City of Puyallup WSU Lid Frontage Improvements - Rev. 2.dwg - Last Saved 3/22/2021 10:39 AM



NOTE: FITTING WALL GEOMETRY -
 THE PILLASTERS ARE PLACED @ 6' O.C. SPACING,
 PERPENDICULAR GROUND & PANELS ARE PLACED WITH BEST FIT
 ARRANGEMENT. THE WIRE TRUSS SYSTEM ALLOWS SMALL
 INCREMENTAL MOVEMENTS TO FIT THE PROPOSED HORIZONTAL
 CURVE.

SN TRUSS WALL G & A - ELEVATION VIEW (CONT'D)

SCALE: 1" = 10'

TRUSS WALL PARAMETERS		
SECTION	HEIGHT	SPIRALNAIL
1	4'	2 - 10' @ 9°
2	6'	2 - 10' @ 9°
3	8'	3 - 12' @ 9°
4	10'	3 - 16' @ 9°

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, CES HAS DESIGNED FOR THE INTERNAL STABILITY OF THE STRUCTURES ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND GLOBAL SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.

REV. NO.	DATE	BY	DESCRIPTION
	2/03/21	KLC	Initial Electronic (.pdf) Release
	3/22/21	KLC	Revised Per 3/11/21 Plan Check

HILFIKER RETAINING WALLS



1902 Hilfiker Lane
 Eureka, CA 95503-5711
 TOLL-FREE 800.762.8962
 PH 707.443.5093 FAX 707.443.2891
 WEB SITE www.hilfiker.com E-MAIL info@hilfiker.com



CESARETTI
 Engineered
 Solutions
 CIVIL ENGINEERING SPECIALISTS

P.O. Box 132
 Fortuna, CA 95540
 Phone (707) 725-CESR
 (707) 498-7193
 CesarettiEngineered.com
 KCesaretti@att.net

City of Puyallup WSU Lid Frontage Improvements
 SPIRALNAIL TRUSS WALLS

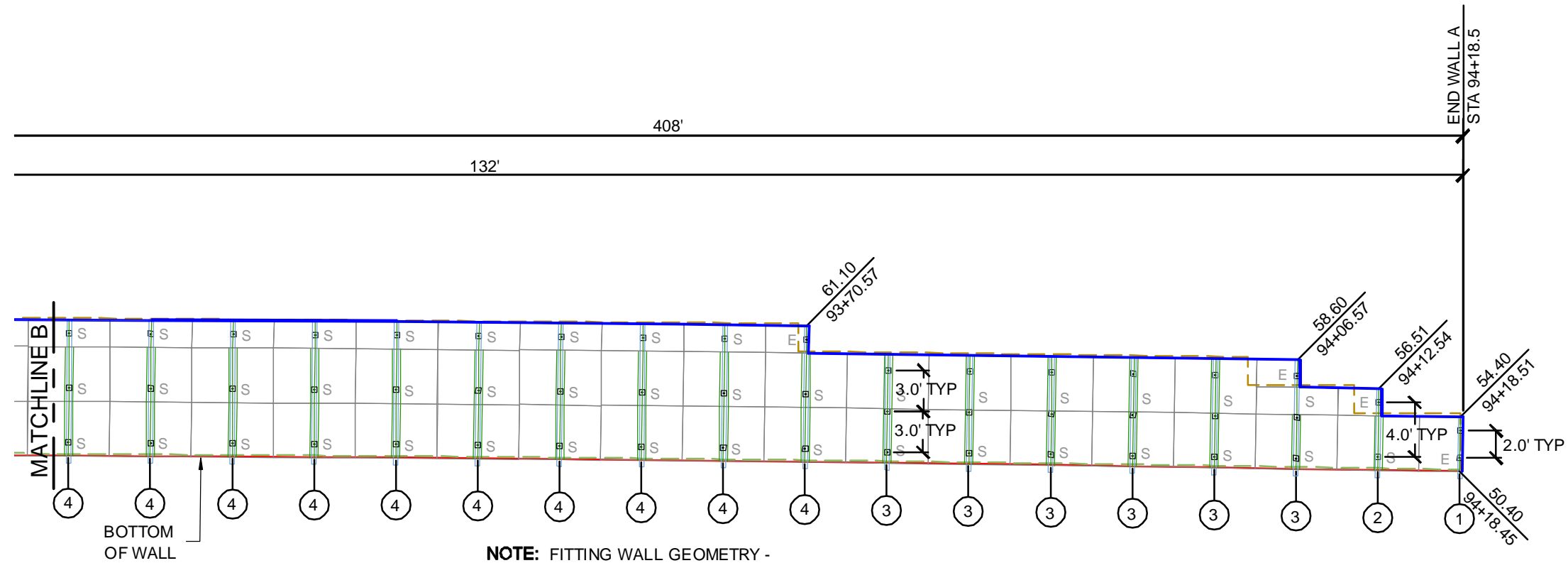
SN TRUSS WALLS ELEVATION VIEW
 (CONT'D)

HW 190715BN

PROJECT	21-005
DATE	02-03-21
DESIGN	KLC
DRAWN	KLC

SHT 3 OF 7

C:\General File Folder\Project Files\CES Projects\CES 21-005 HW - City of Puyallup WSU Lid Frontage Improvements\HW - City of Puyallup WSU Lid Frontage Improvements - Rev 2.dwg - Last Saved 3/22/2021 10:39 AM



NOTE: FITTING WALL GEOMETRY -
 THE PILLASTERS ARE PLACED @ 6' O.C. SPACING,
 PERPENDICULAR GROUND & PANELS ARE PLACED WITH BEST FIT
 ARRANGEMENT. THE WIRE TRUSS SYSTEM ALLOWS SMALL
 INCREMENTAL MOVEMENTS TO FIT THE PROPOSED HORIZONTAL
 CURVE.

SN TRUSS WALL A - ELEVATION VIEW (CONT'D)

SCALE: 1" = 10'

TRUSS WALL PARAMETERS		
SECTION	HEIGHT	SPIRALNAIL
1	4'	2 - 10' @ 9°
2	6'	2 - 10' @ 9°
3	8'	3 - 12' @ 9°
4	10'	3 - 16' @ 9°

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, CES HAS DESIGNED FOR THE INTERNAL STABILITY OF THE STRUCTURES ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND GLOBAL SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.

REV. NO.	DATE	BY	DESCRIPTION
	2/03/21	KLC	Initial Electronic (.pdf) Release
	3/22/21	KLC	Revised Per 3/11/21 Plan Check

HILFIKER RETAINING WALLS

1902 Hilfiker Lane
 Eureka, CA 95503-5711
 TOLL-FREE 800.762.8962
 PH 707.443.5093 FAX 707.443.2891
 WEB SITE www.hilfiker.com E-MAIL info@hilfiker.com

CESARETTI
 Engineered Solutions
 CIVIL ENGINEERING SPECIALISTS

P.O. Box 132
 Fortuna, CA 95540
 Phone (707) 725-CESR
 (707) 498-7193
 CesarettiEngineered.com
 KCesaretti@att.net

City of Puyallup WSU Lid Frontage Improvements
 SPIRALNAIL TRUSS WALLS

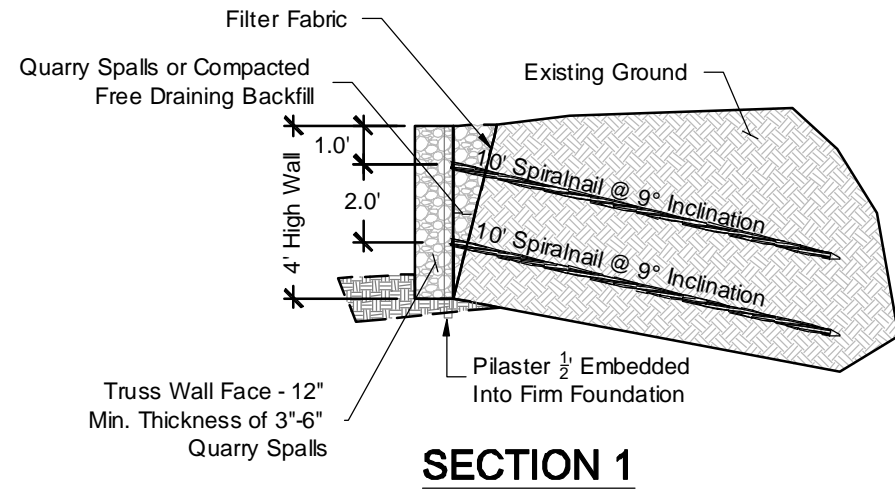
SN TRUSS WALLS ELEVATION VIEW
 (CONT'D)

HW 190715BN

PROJECT	21-005
DATE	02-03-21
DESIGN	KLC
DRAWN	KLC

SHT 4 OF 7

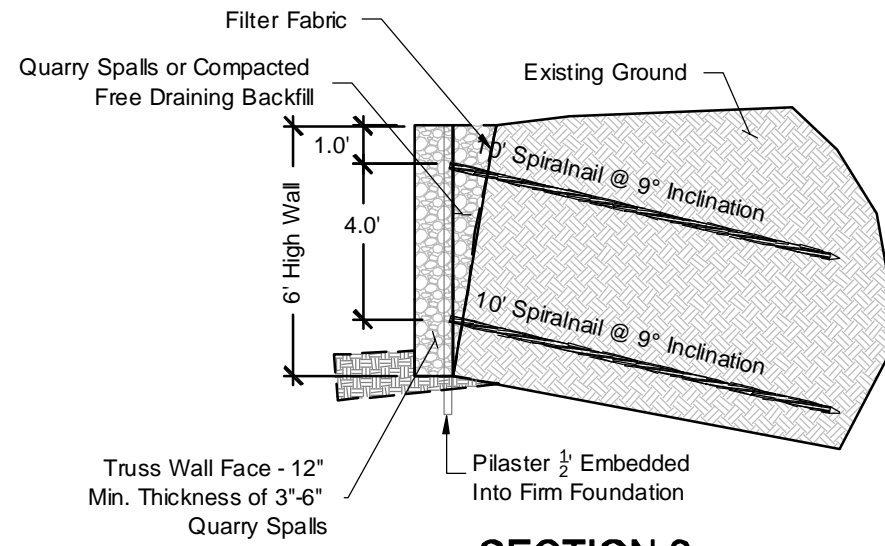
C:\General File Folder\Project Files\CES Projects\21-005 HW - City of Puyallup WSU Lid Frontage Improvements\HW - City of Puyallup WSU Lid Frontage Improvements - Rev 2.dwg - Last Saved 3/22/2021 10:39 AM



SECTION 1

TYP 4' HIGH CROSS SECTION

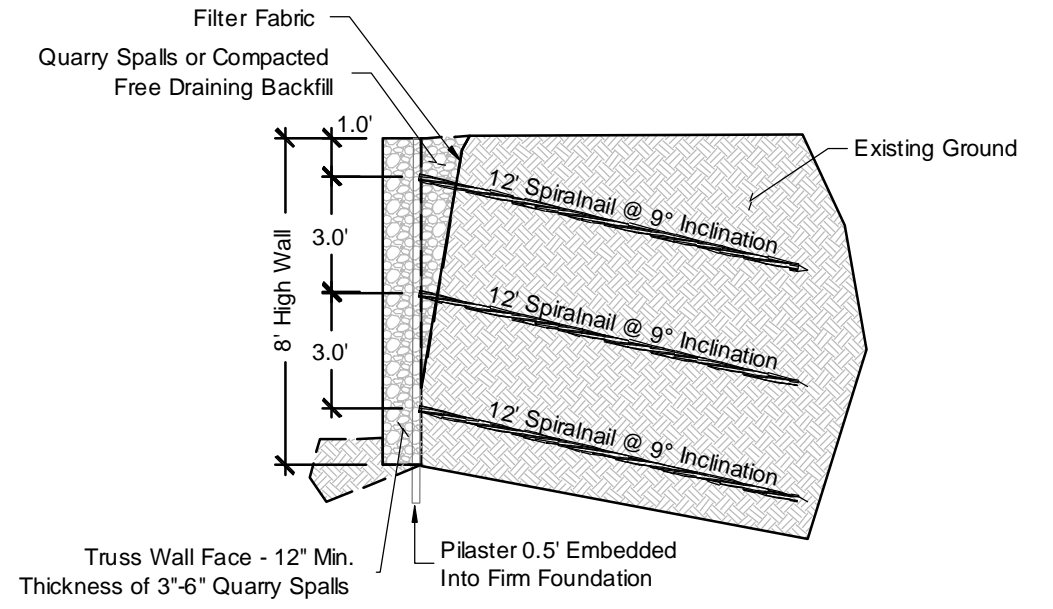
1"=5'



SECTION 2

TYP 6' HIGH CROSS SECTION

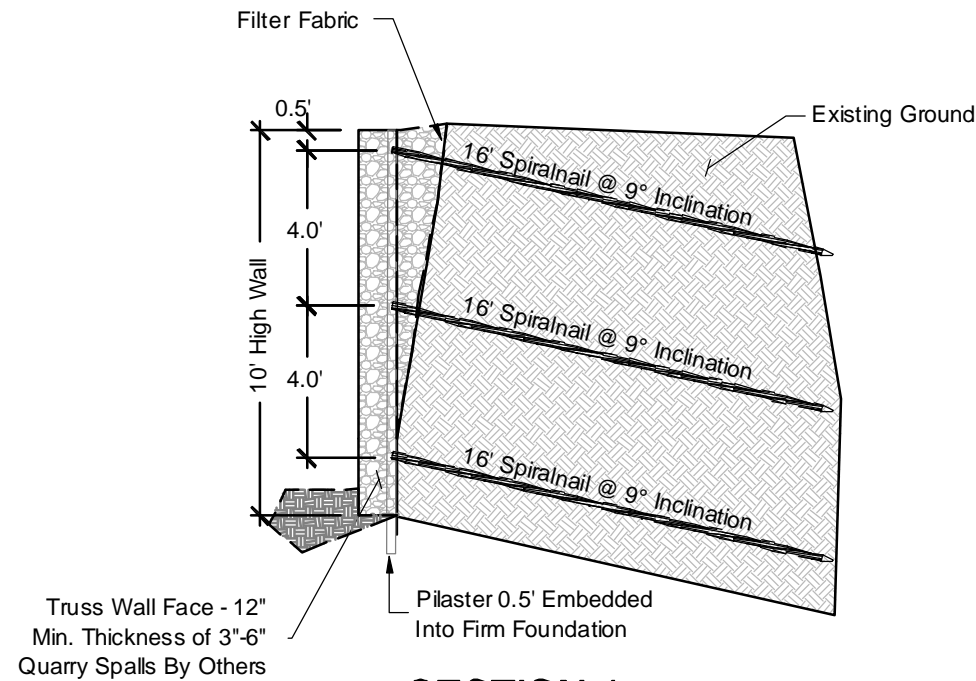
1"=5'



SECTION 3

TYP 8' HIGH CROSS SECTION

1"=5'



SECTION 4

TYP 10' HIGH CROSS SECTION

1"=5'

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, CES HAS DESIGNED FOR THE INTERNAL STABILITY OF THE STRUCTURES ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND GLOBAL SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.

REV. NO.	DATE	BY	DESCRIPTION
	2/03/21	KLC	Initial Electronic (.pdf) Release
	3/22/21	KLC	Revised Per 3/11/21 Plan Check

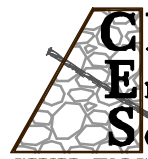
HILFIKER RETAINING WALLS



1902 Hilfiker Lane
Eureka, CA 95503-5711
TOLL-FREE 800.762.8962
PH 707.443.5093 FAX 707.443.2891
WEB SITE www.hilfiker.com E-MAIL info@hilfiker.com



CESARETTI
Engineered
Solutions
CIVIL ENGINEERING SPECIALISTS



P.O. Box 132
Fortuna, CA 95540
Phone (707) 725-CESR
(707) 498-7193
CesarettiEngineered.com
KCesaretti@att.net

City of Puyallup WSU Lid Frontage Improvements
SPIRALNAIL TRUSS WALLS

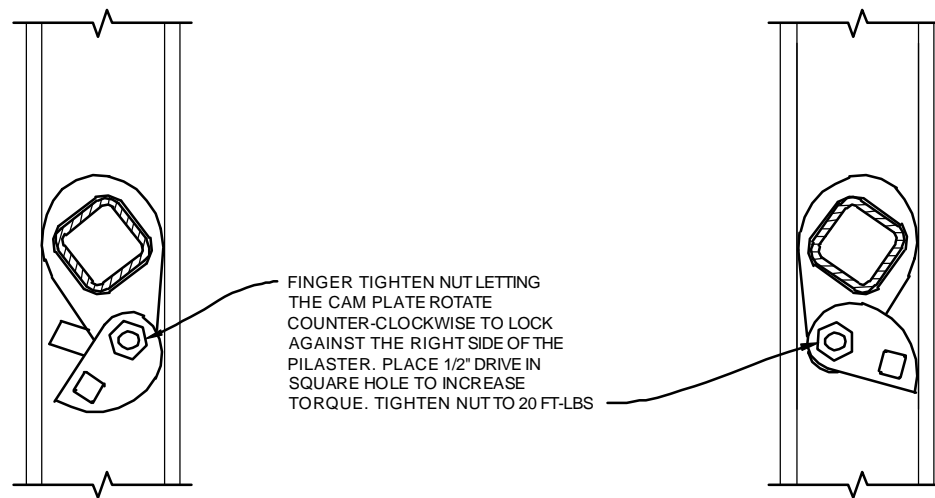
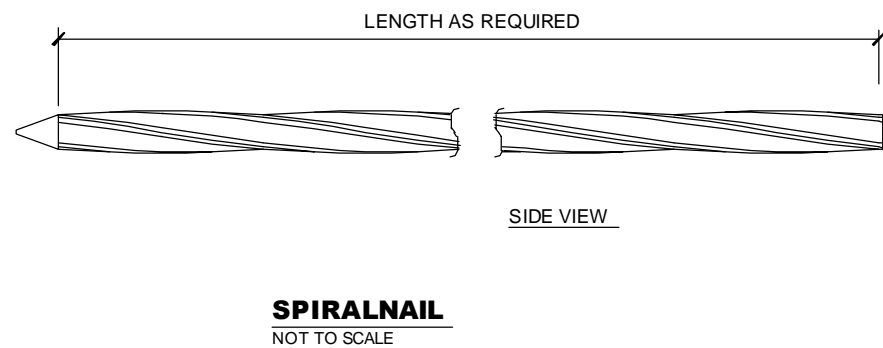
SN TRUSS WALL CROSS SECTIONS

HW 190715BN

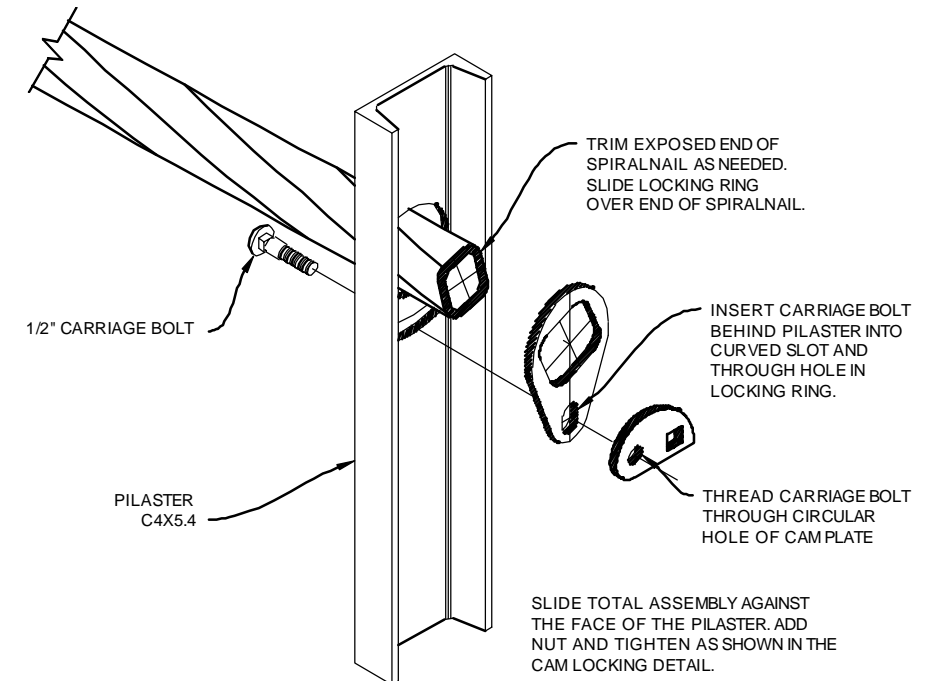
PROJECT	21-005
DATE	02-03-21
DESIGN	KLC
DRAWN	KLC

SHT 5 OF 7

C:\General File Folder\Project Files\CES Projects\CES 21-005 HW - City of Puyallup WSU Lid Frontage Improvements\HW - City of Puyallup WSU Lid Frontage Improvements - Rev 2.dwg - Last Saved 3/22/2021 10:39 AM



CAM LOCK LOCKING DETAIL
NOT TO SCALE



CAM LOCK ASSEMBLY
NOT TO SCALE

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, CES HAS DESIGNED FOR THE INTERNAL STABILITY OF THE STRUCTURES ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND GLOBAL SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.

REV. NO.	DATE	BY	DESCRIPTION
	2/03/21	KLC	Initial Electronic (.pdf) Release
	3/22/21	KLC	Revised Per 3/11/21 Plan Check

HILFIKER RETAINING WALLS

1902 Hilfiker Lane
Eureka, CA 95503-5711
TOLL-FREE 800.762.8962
PH 707.443.5093 FAX 707.443.2891
WEB SITE www.hilfiker.com E-MAIL info@hilfiker.com

CESARETTI
Engineered
Solutions
CIVIL ENGINEERING SPECIALISTS

P.O. Box 132
Fortuna, CA 95540
Phone (707) 725-CESR
(707) 498-7193
CesarettiEngineered.com
KCesaretti@att.net

City of Puyallup WSU Lid Frontage Improvements
SPIRALNAIL TRUSS WALLS

SN TRUSS WALL DETAILS

HW 190715BN

PROJECT	21-005
DATE	02-03-21
DESIGN	KLC
DRAWN	KLC

SHT **6** OF 7

C:\General File Folder\Project Files\CES Projects\CES 21-005 HW - City of Puyallup WSU Lid Frontage Improvements\HW - City of Puyallup WSU Lid Frontage Improvements - Rev 2.dwg - Last Saved: 3/22/2021 10:39 AM

STEP 1

IF PREPARED SOIL WILL SUPPORT PILASTERS, POSITION PILASTERS EVERY SIX FEET ALONG WALL LAYOUT LINE AND SET BOTTOM OF PILASTER INTO GROUND PER PROJECT PLANS.

IF PILASTERS CANNOT BE PRE-POSITIONED, PLACE START/END TRUSS ON PREPARED SLOPE FIRST THEN POSITION THE PILASTER CHANNEL AGAINST THE EDGE OF THE TRUSS AND SET BOTTOM OF PILASTER INTO GROUND PER PROJECT PLANS. DRIVE SPIRALNAILS THROUGH THE PILASTER INTO THE SOIL. PLACE CAM LOCK ON EACH SPIRALNAIL AND TIGHTEN TO TORQUE SPECIFICATIONS.

STEP 2

IF PILASTERS HAVE NOT BEEN PRE-POSITIONED, POSITION NEXT PILASTER AND SET INTO GROUND. PLACE THE STANDARD TRUSS BEHIND PILASTER AND OVERLAP PANEL AGAINST THE START/END TRUSS USING ZIP TIES OR TIE WIRE TO SECURE TRUSS IN PLACE. DRIVE IN SPIRALNAILS AND LOCK WITH CAMLOCKS.

CONTINUE ADDING STANDARD TRUSSES ALONG WALL ENDING AT FINAL PILASTER WITH A START/END TRUSS

STEP 3

POSITION START/END TRUSS, ADD PILASTER IF NEEDED, DRIVE IN SPIRALNAILS AND LOCK IN PLACE WITH CAMLOCKS.

SPIRAL TIE THE STIFFENERS ONTO THE STANDARD TRUSSES AT WIRE ON RIGHT SIDE OF PILASTER.

STEP 4

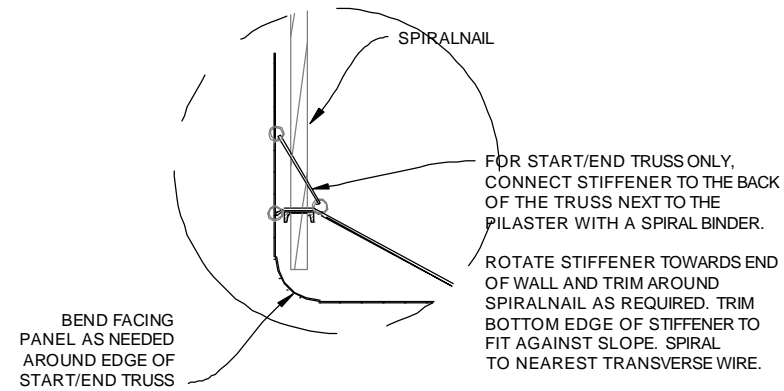
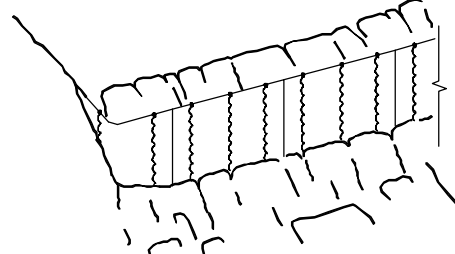
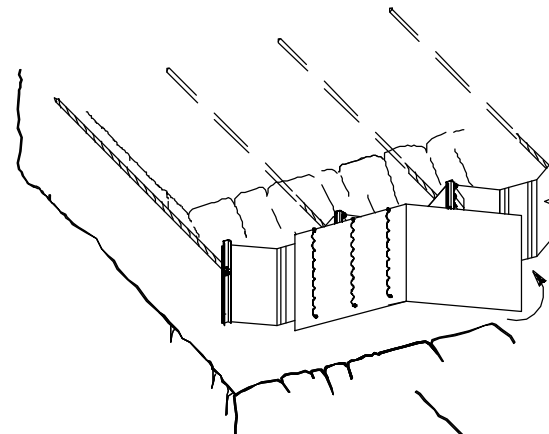
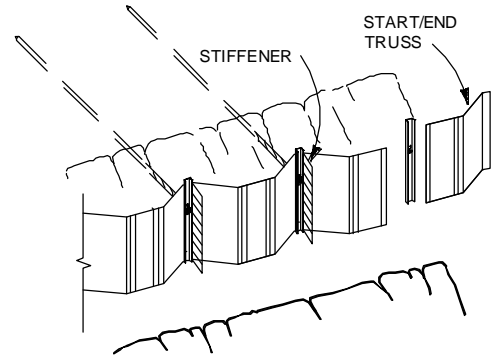
TO BEGIN FACING THE WALL, CENTER EDGES OF A FACING PANEL ON TRUSS OVERLAP. SPIRAL THE ENDS OF OVERLAP AND THE STIFFENER TO FACE PANEL.

INSERT PRONGS OF SUBSEQUENT FACE PANELS BEHIND FINAL TRANSVERSE WIRE ON PREVIOUS FACING AND ROTATE INTO PLACE TO FORM INTERLOCKING CONNECTION. SEE ENLARGED DETAIL.

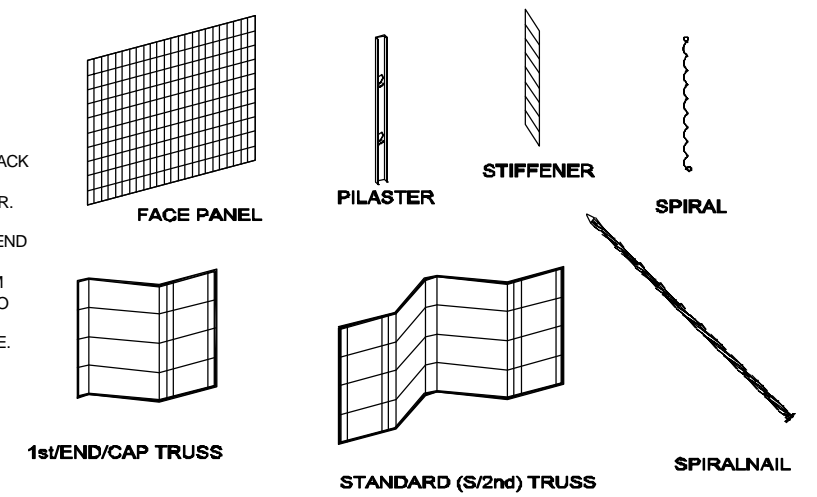
STEP 5

FOR CLOSURE FACING AT EACH END OF WALL, BEND FACING PANEL PER PROJECT PLANS AND INSERT END OF PANEL AGAINST PREVIOUS FACING. FIELD FIT OPPOSITE END AND TRIM AS NEEDED AGAINST SLOPE. SPIRAL FACING TO START/END TRUSS PANEL AND TO STIFFENER. SEE END OF WALL TREATMENT DETAIL, THIS SHEET.

FILL AREA BEHIND WALL WITH BACKFILL PER PROJECT PLANS. COMPACT SOIL AGAINST FACE OF WALL FOR TOE BURY.

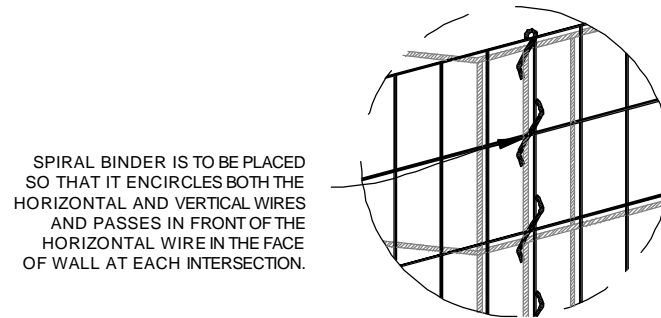


END OF WALL TREATMENT
NOT TO SCALE

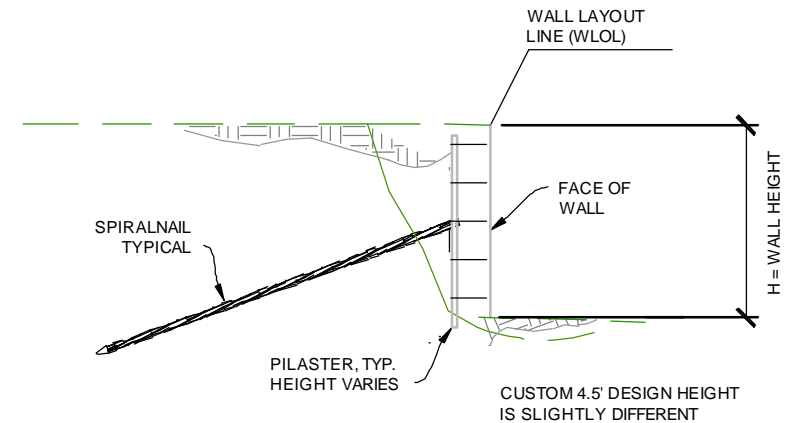


WALL COMPONENTS
NOT TO SCALE

GENERIC COMPONENTS SHOWN FOR ILLUSTRATION PURPOSES ONLY



SPIRAL BINDER ATTACHMENT
NOT TO SCALE



GENERIC SECTION
SCALE: 1"=5'

CONSTRUCTION SEQUENCE

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, CES HAS DESIGNED FOR THE INTERNAL STABILITY OF THE STRUCTURES ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND GLOBAL SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.

REV. NO.	DATE	BY	DESCRIPTION
	2/03/21	KLC	Initial Electronic (.pdf) Release
	3/22/21	KLC	Revised Per 3/11/21 Plan Check

HILFIKER RETAINING WALLS

1902 Hilfiker Lane
Eureka, CA 95503-5711
TOLL-FREE 800.762.8962
PH 707.443.5093 FAX 707.443.2891
WEB SITE www.hilfiker.com E-MAIL info@hilfiker.com

CESARETTI
Engineered Solutions
CIVIL ENGINEERING SPECIALISTS

P.O. Box 132
Fortuna, CA 95540
Phone (707) 725-CESR
(707) 498-7193
CesarettiEngineered.com
KCesaretti@att.net

City of Puyallup WSU Lid Frontage Improvements
SPIRALNAIL TRUSS WALLS

SN TRUSS WALL CONSTRUCTION
SEQUENCE & DETAILS

HW 190715BN

PROJECT	21-005
DATE	02-03-21
DESIGN	KLC
DRAWN	KLC

SHT 7 OF 7