King County Metro Transit - Capital Project Delivery:

Addendum

to

Trolley Overhead Standard Drawings

Prepared by:

Supervisor:
John Davis, PE & SE

Engineers:
Alex Wolak, PE
Medhanie Embaye, PE

Designers:
Grant Carey
Ethan Tu

Prepared for:

Metro Transit Engineering

August 2023

King County

King County Metro Transit - Capital Project Delivery:

Summary of Changes

This document includes updates to the following Standard Detail drawings as summarized below:

SA-096: Added note 7.

SA-164: Update distance callouts to refer to detail SA-171 on pages 1 and 2. No change on page 3. Removed notes on page 4.

SA-171: Update height callouts to refer to detail SA-164 on all sheets.

SA-211: Edit notes on pages 6 and 7.

SA-212: Edit notes on page 4.

SA-213: Edit notes on page 6.

SA-318: Full sheet revision including Plan and Elevation views and Notes.

SA-096

TROLLEY CONSTRUCTION STANDARD REQUIREMENTS

1. ANY CONSTRUCTION OR INSTALLATION ACTIVITIES AFFECTING TRANSIT OPERATIONS OR FACILITIES MUST BE COORDINATED THROUGH THE METRO TRANSIT CONSTRUCTION INFORMATION CENTER.
   PLEASE PROVIDE FIVE BUSINESS DAYS NOTIFICATION FOR BUS STOP IMPACTS AND TEN BUSINESS DAYS NOTIFICATION FOR BUS REROUTES. FOR NOTIFICATION INFORMATION AND GUIDELINES, PLEASE VISIT :

   HTTP://WWW.KINGCOUNTY.GOV/TRANSPORTATION/KCDOT/METROTRANSIT/CONSTRUCTION.ASPX

   OR CONTACT CONSTRUCTION COORDINATORS AT: 206-477-1140 OR 206 477-1150 FOR TROLLEY RELATED ACTIVITIES.
   A MINIMUM OF 60 BUSINESS DAYS' ADVANCE NOTICE IS REQUIRED TO START ANY SHIFT OF THE TROLLEY OVERHEAD CATENARY SYSTEM (OCS).

2. A CHANNELIZATION PLAN, APPROVED BY THE CITY OF SEATTLE AND KING COUNTY, IS REQUIRED PRIOR TO ANY MOVEMENT OF THE TROLLEY OCS.

3. NO TRANSFER OF SUPPORT SPANS WILL OCCUR PRIOR TO FORMAL APPROVAL OF ALL SUPPORT STRUCTURES BY KING COUNTY. A MINIMUM OF 5 BUSINESS DAYS' NOTICE IS REQUIRED FOR INSPECTION.

4. ALL OVERHEAD CATENARY, VAULTS, DUCT BANKS AND SUPPORT STRUCTURES, REMOVED DURING CONSTRUCTION, SHALL BE REPLACED WITH NEW EQUIPMENT, AS SHOWN ON THE CONTRACT DOCUMENTS, AND RESTORED PER KING COUNTY METRO TROLLEY STANDARDS.

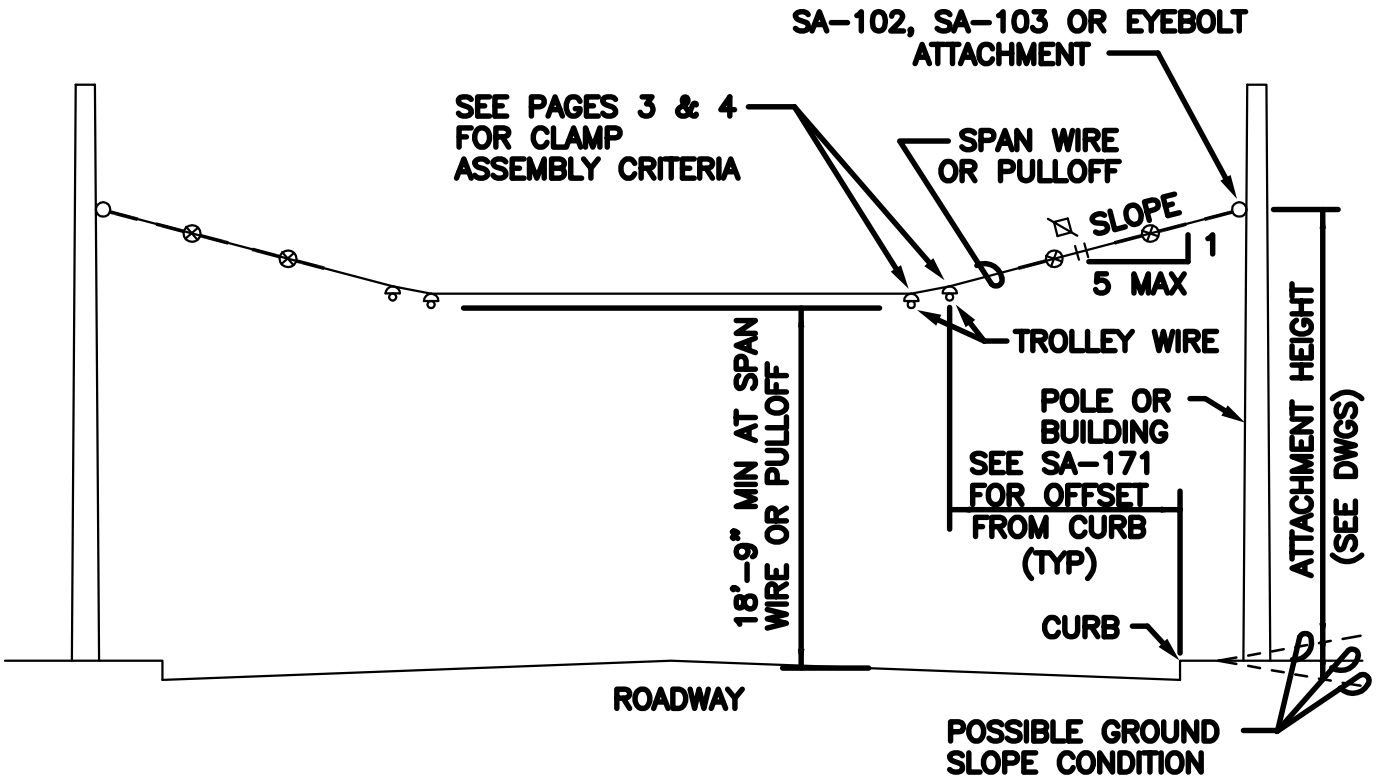
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RESTORATION. THE COST OF RESTORATION SHALL BE AT THE CONTRACTOR'S EXPENSE OR SHALL BE ESTABLISHED THROUGH AN APPROVED MEMORANDUM OF AGREEMENT (MOA).

6. SALVAGED EQUIPMENT SHALL BECOME THE PROPERTY OF KING COUNTY METRO.

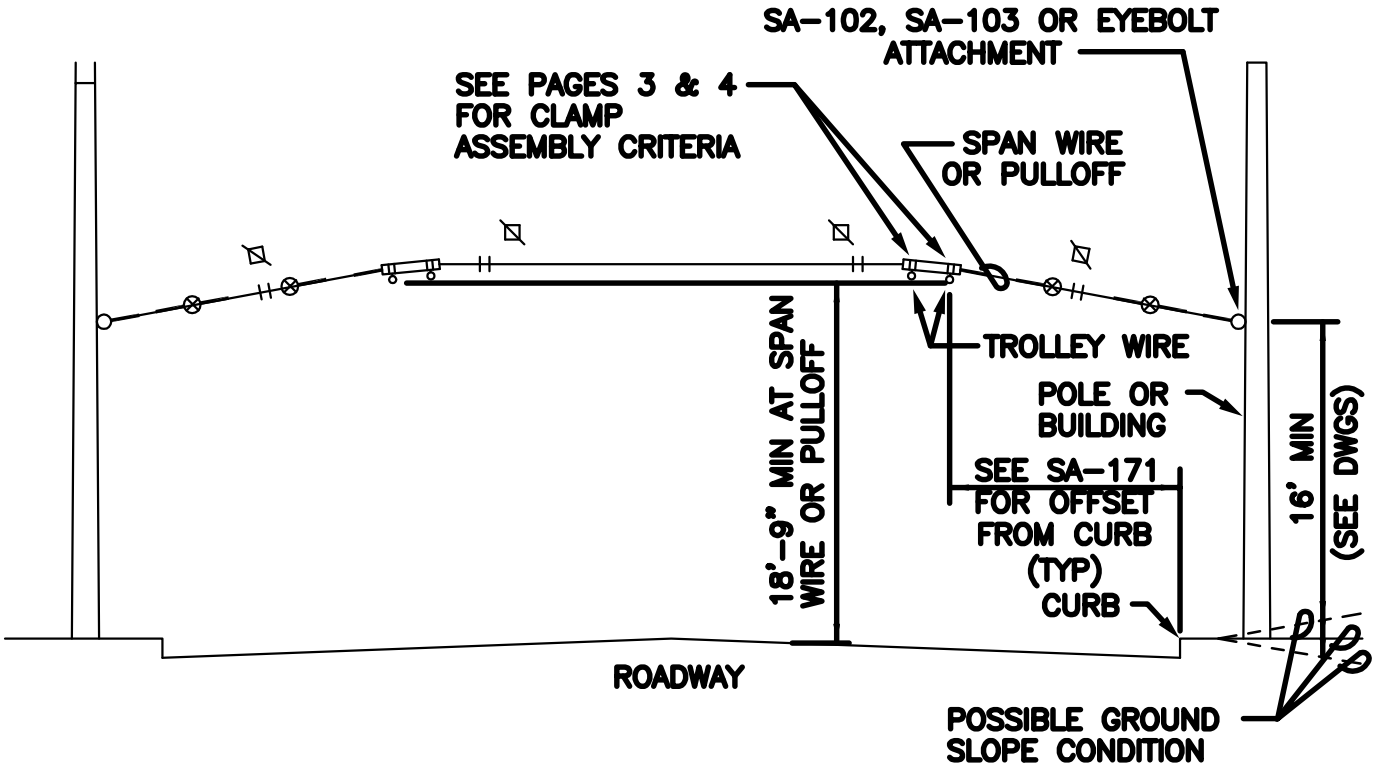
7. FOR TROLLEY CONTACT WIRES CROSSING SDOT SIGNAL SPAN WIRES, SEE SDOT CONSTRUCTION DETAILS ON SIGNAL HEAD MOUNTING DETAILS.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: D. BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG
King County METRO
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
CONSTRUCTION GUIDELINE
DATE: 03/2022
STD DET NO: SA-096
SHT NO: 1 OF 1



TWO-WAY TANGENT SPAN



TWO-WAY INVERTED SPAN

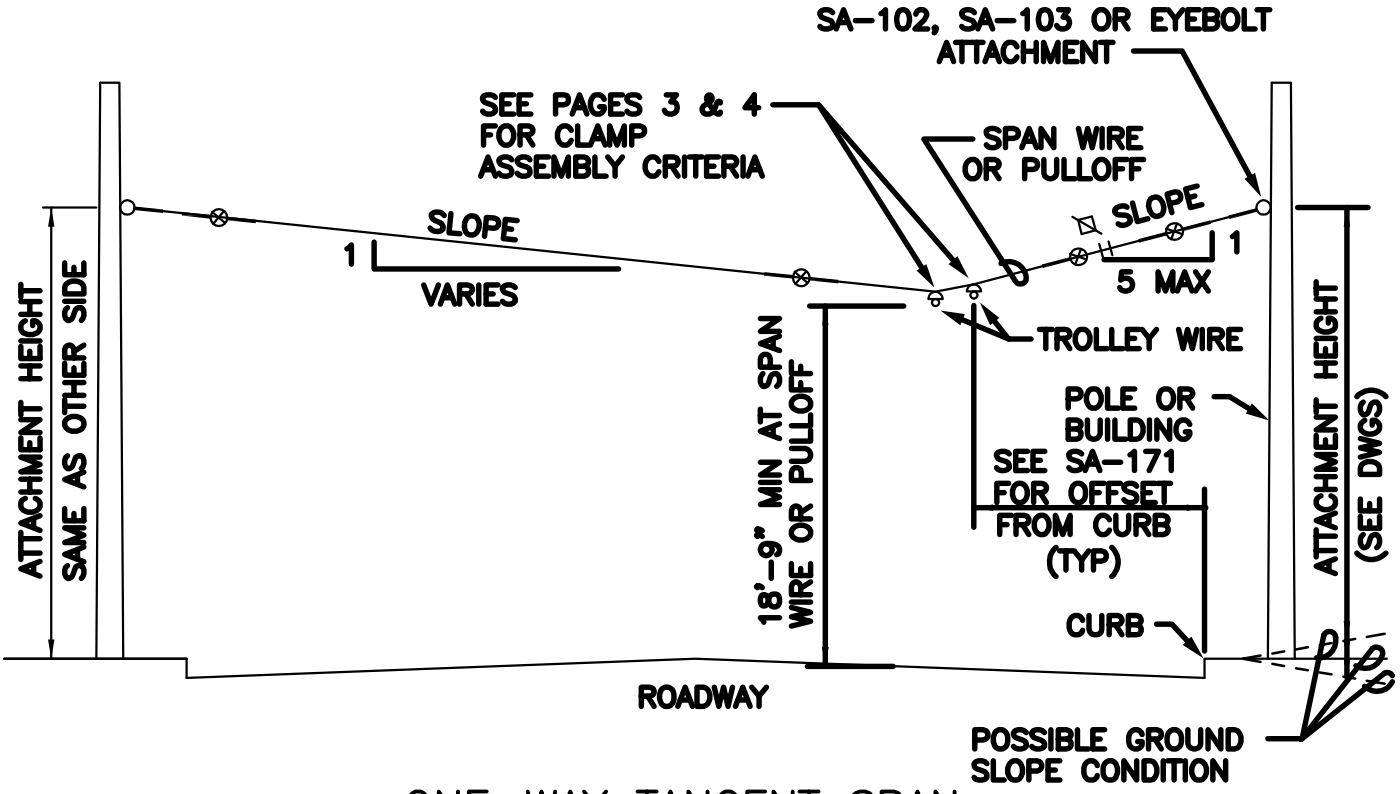
No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: E. TU
CHECKED: J. DAVIS
APPROVED: P. ENG

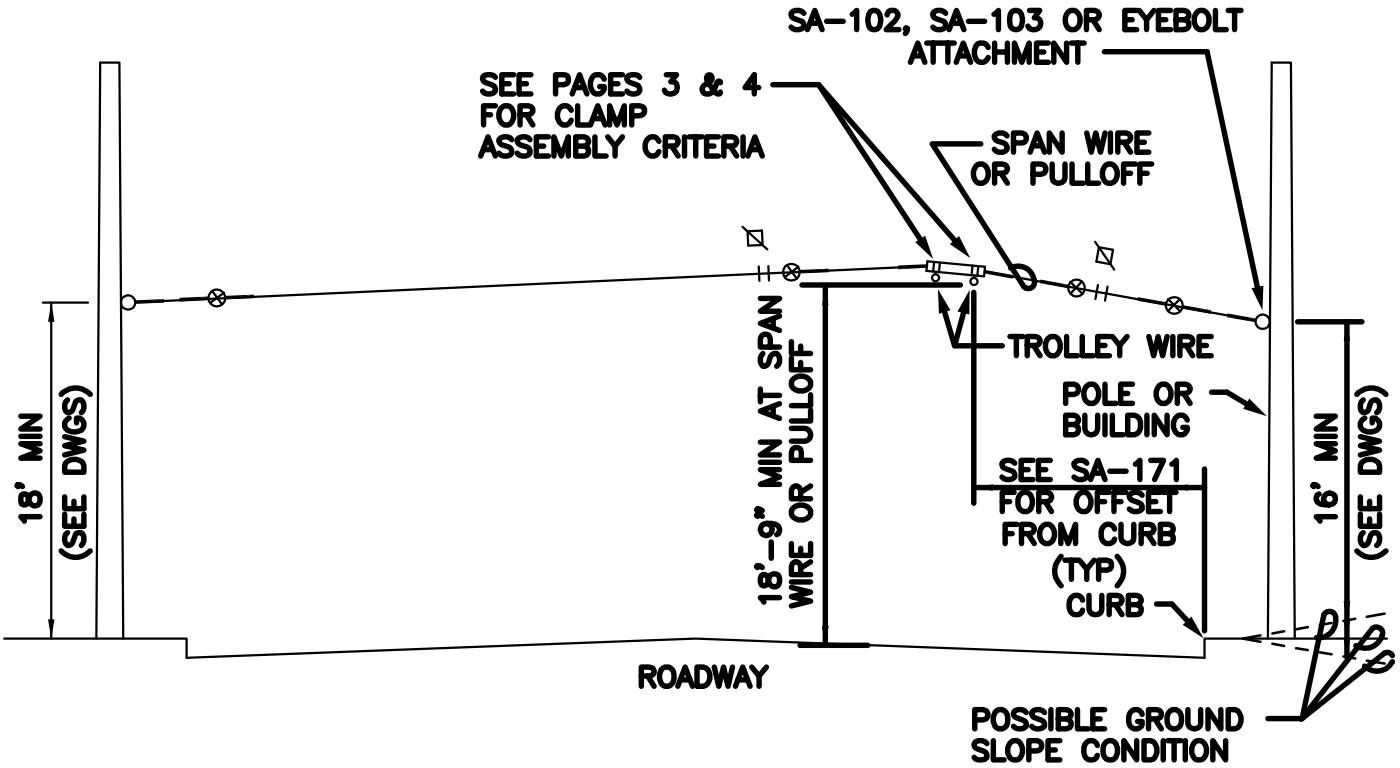
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE SUPPORT SPAN ATTACHMENT CRITERIA

DATE: 03/2022
STD DET NO: SA-164
SHT NO: 1 OF 4



ONE-WAY TANGENT SPAN



ONE-WAY INVERTED SPAN

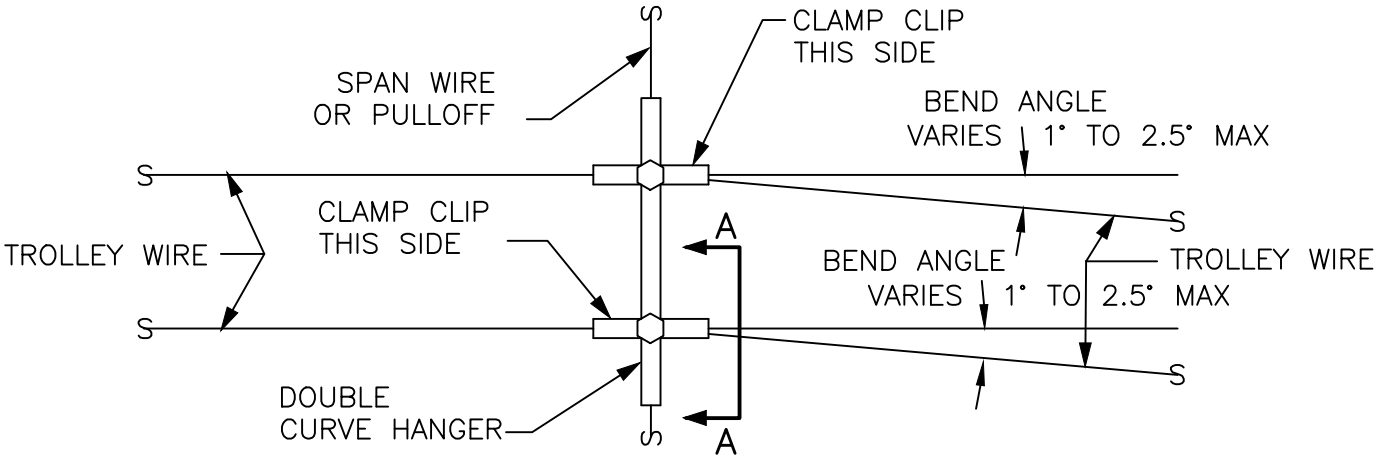
No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: E. TU
CHECKED: J. DAVIS
APPROVED: P. ENG

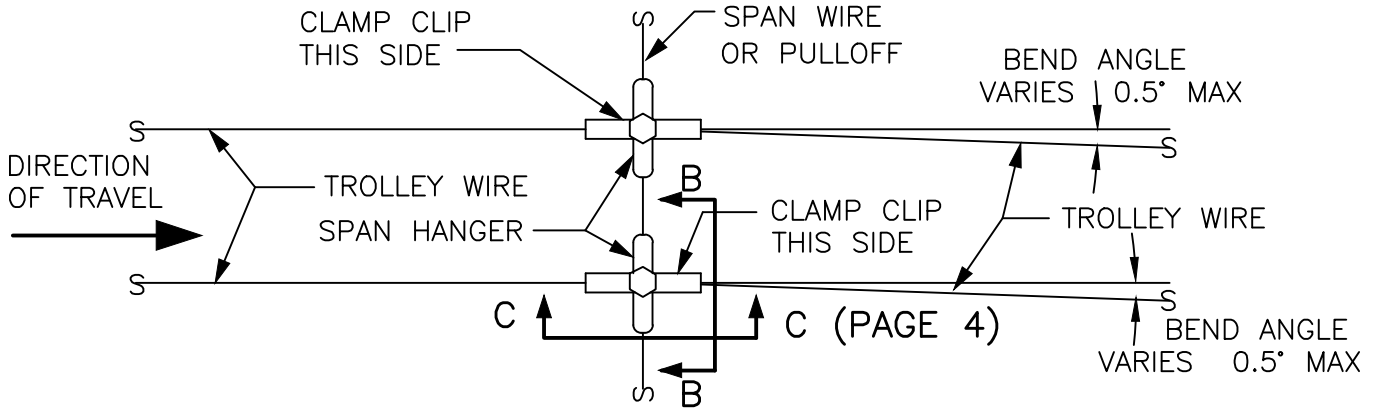
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE SUPPORT SPAN ATTACHMENT CRITERIA

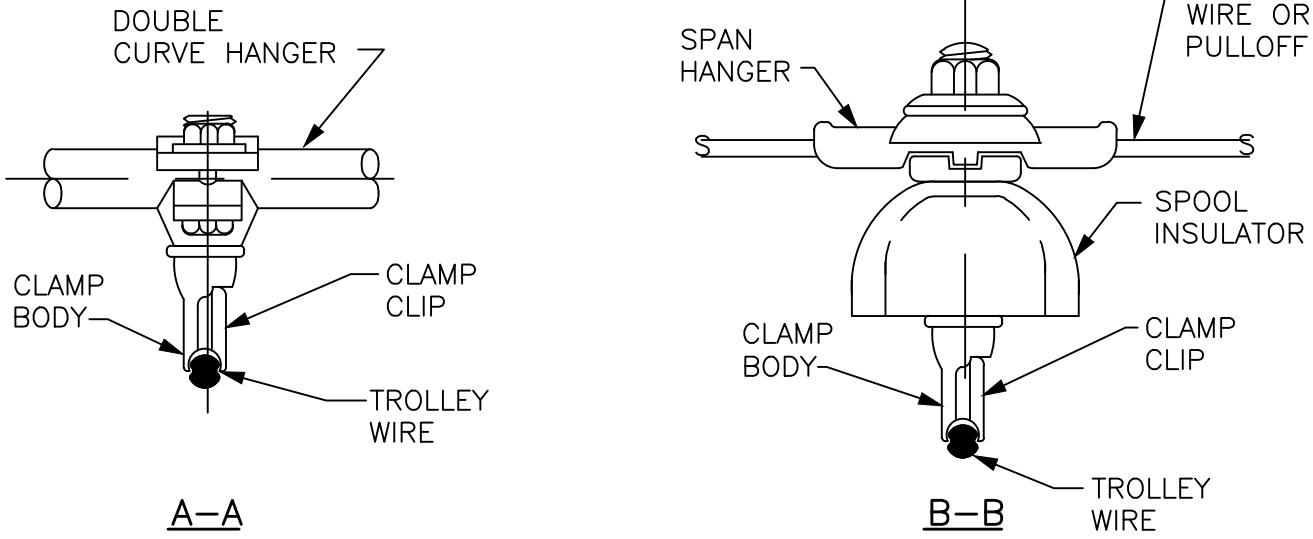
DATE: 03/2022
STD DET NO: SA-164
SHT NO: 2 OF 4



DOUBLE CURVE HANGER SPAN



TANGENT SPAN WITH CURVATURE



CLAMP ASSEMBLY CRITERIA

No.	REVISION	BY	APP'D	DATE

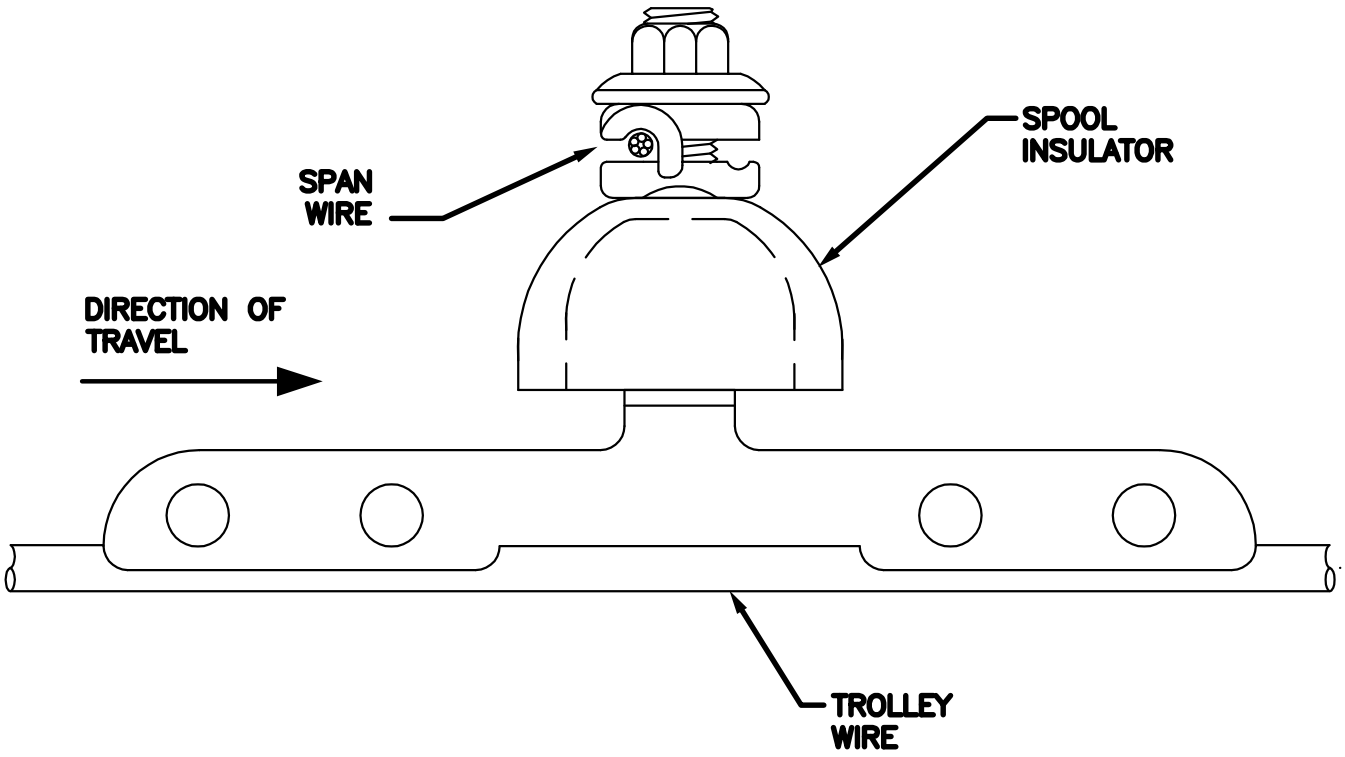
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
TROLLEY WIRE SUPPORT SPAN ATTACHMENT CRITERIA

DATE: 11/2021
STD DET NO: SA-164
SHT NO: 3 OF 4

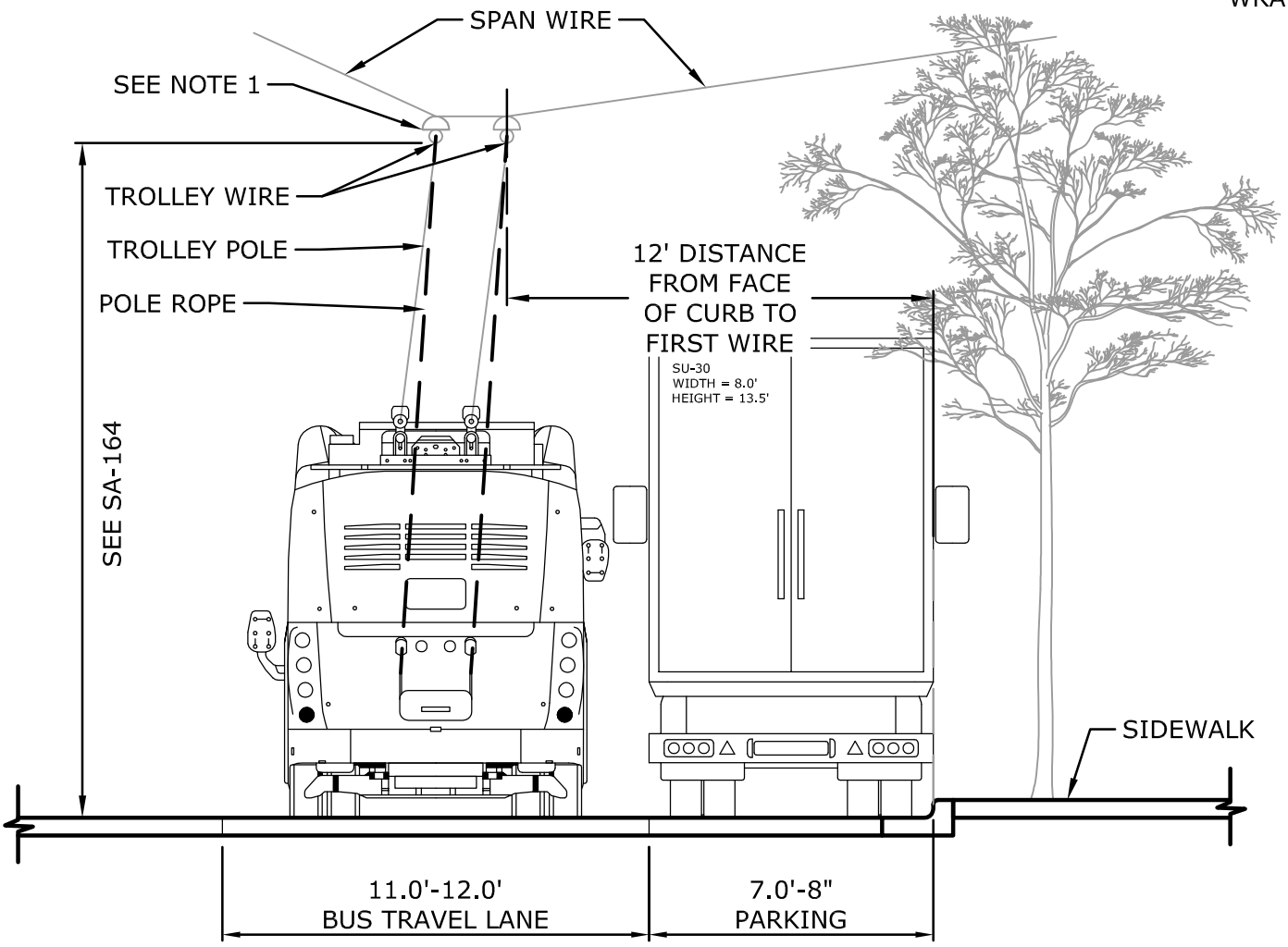
V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-164.1-4.dwg | Layout: SA-164.3
PLOTTED: Sep 26, 2022-02:23:43pm By dbennett
XREFS:
IMAGES:



C–C

No.	REVISION	BY	APP'D	DATE	DESIGNED: A. WOLAK	APPROVED: P. ENG	METRO TRANSIT CAPITAL DIVISION TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS	DATE: 03/2022
					DRAWN: E. TU	King County METRO	TROLLEY WIRE SUPPORT SPAN ATTACHMENT CRITERIA	STD DET NO: SA-164
					CHECKED: J. DAVIS			SHT NO: 4 OF 4

WRAP



NOTES:

1. STANDARD IS FOR EXTENDED DISTANCES OF TANGENT SPANS.

TYPICAL CONFIGURATION 1
TANGENT SPAN TROLLEY WIRE
PARKING LANE

SCALE: NTS

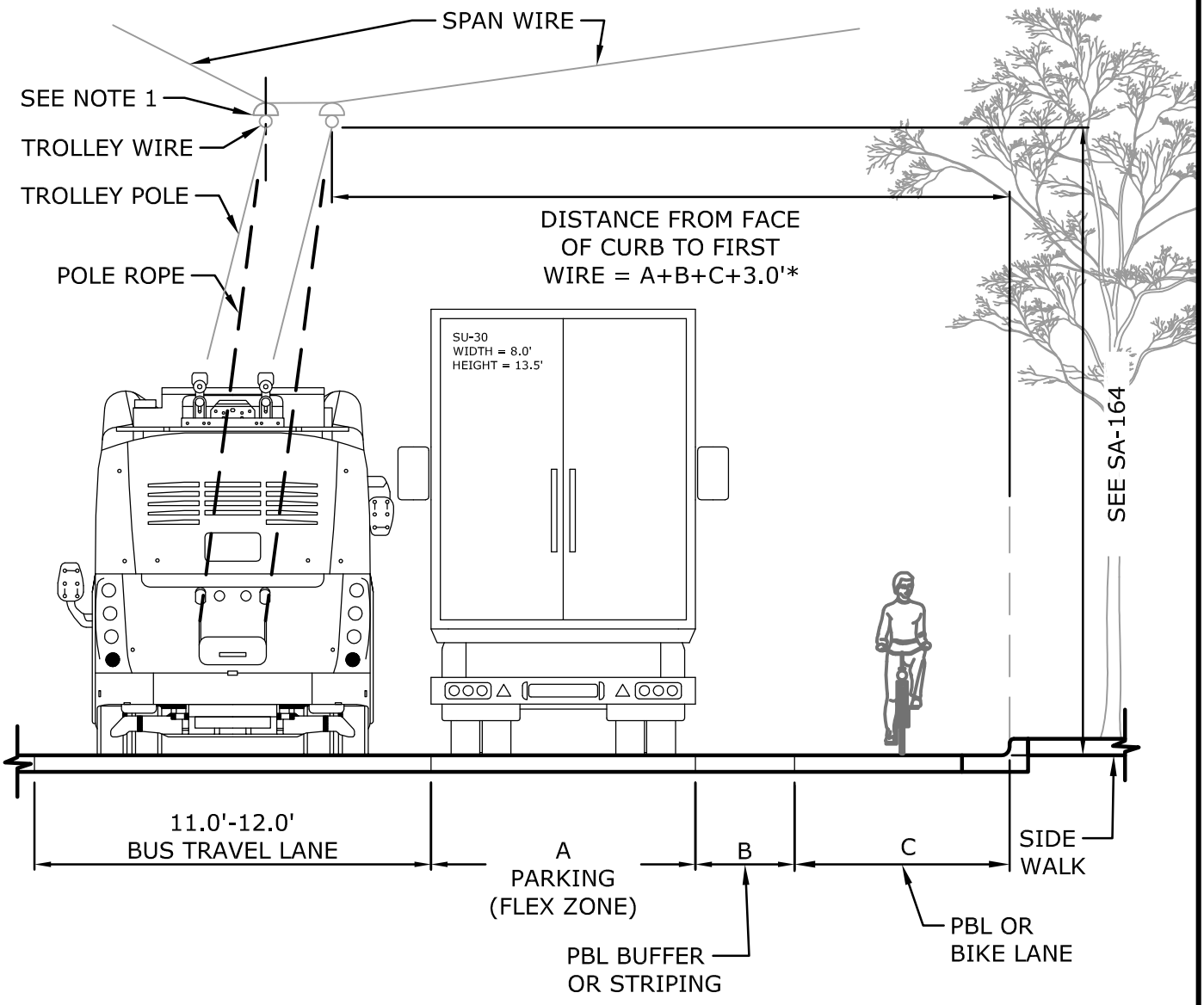
No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: G. CAREY
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE LOCATIONS FOR TYPICAL ROADWAY CONFIGURATIONS

DATE: 03/2022
STD DET NO: SA-171
SHT NO: 1 OF 4



NOTES:

1. STANDARD IS FOR EXTENDED DISTANCES OF TANGENT SPANS.

*⚠1 1.5' MINIMUM, 3.0' PREFERRED. THE MAXIMUM DISTANCE IS DEPENDANT ON REQUIRED OPERATIONS.

TYPICAL CONFIGURATION 2
TANGENT SPAN TROLLEY WIRE
PARKING AND PBL OR BIKE LANE

SCALE: NTS

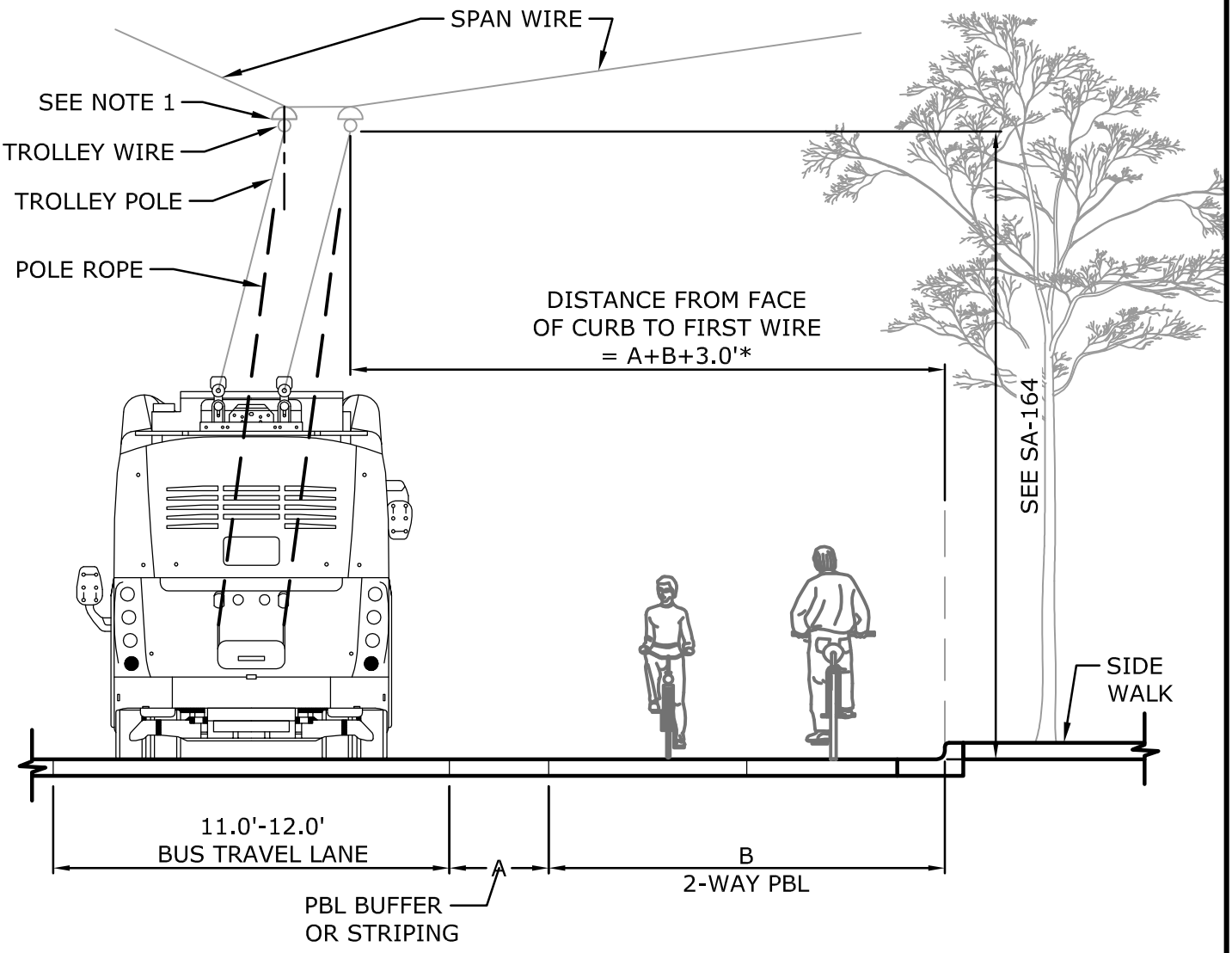
No.	REVISION	BY	APP'D	DATE
⚠1	APPROVED BY J. KOST		PE	3/22

DESIGNED: A. WOLAK
DRAWN: G. CAREY
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE LOCATIONS FOR TYPICAL ROADWAY CONFIGURATIONS

DATE: 03/2022
STD DET NO: SA-171
SHT NO: 2 OF 4



NOTES:

1. STANDARD IS FOR EXTENDED DISTANCES OF TANGENT SPANS.

* ⚠ 1.5' MINIMUM, 3.0' PREFERRED. THE MAXIMUM DISTANCE IS DEPENDANT ON REQUIRED OPERATIONS.

TYPICAL CONFIGURATION 3
TANGENT SPAN TROLLEY WIRE
TWO-WAY PBL

SCALE: NTS

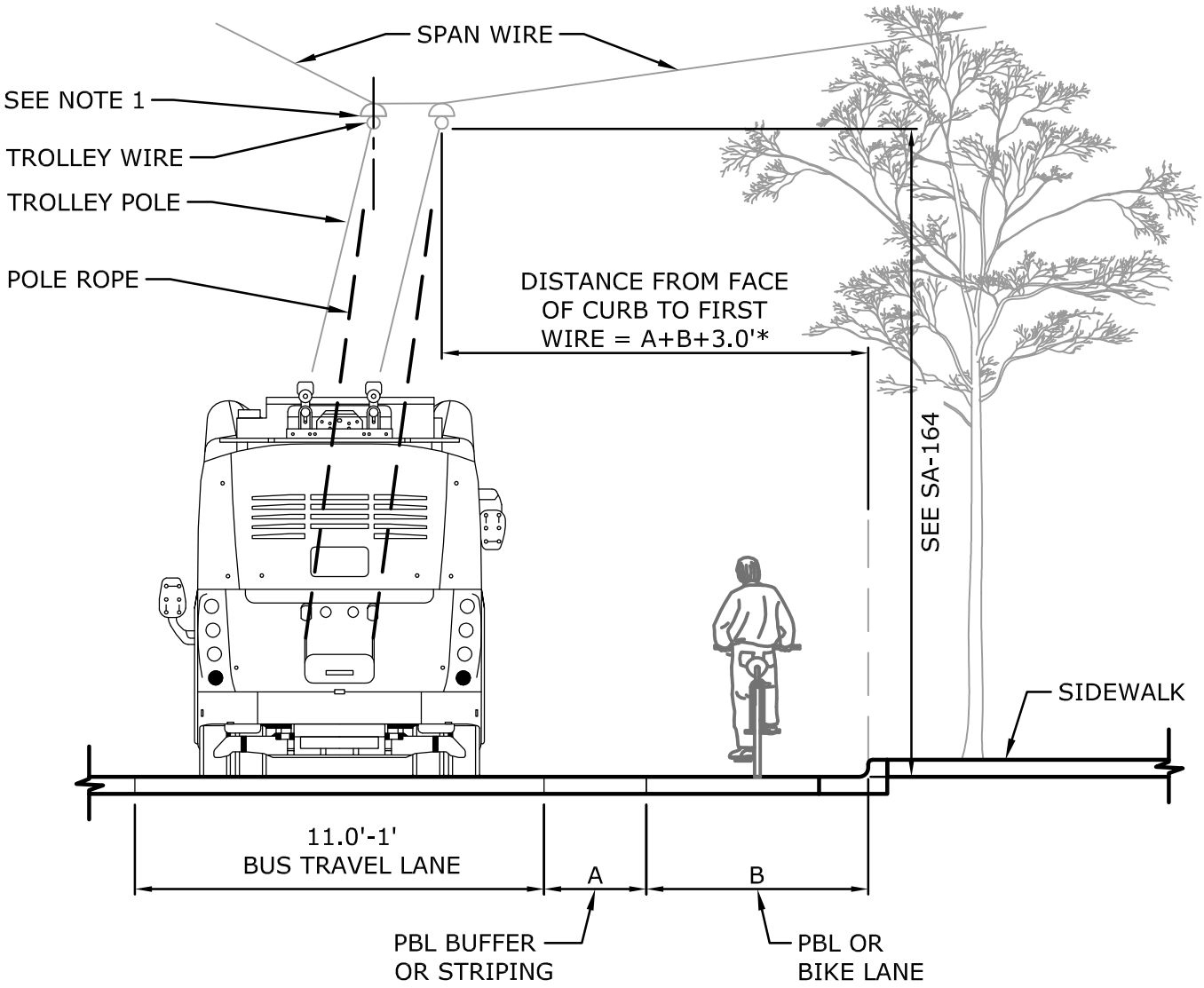
No.	REVISION	BY	APP'D	DATE
1	APPROVED BY J. KOST		PE	3/22

DESIGNED: A. WOLAK
DRAWN: G. CAREY
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE LOCATIONS FOR TYPICAL ROADWAY CONFIGURATIONS

DATE: 03/2022
STD DET NO: SA-171
SHT NO: 3 OF 4



NOTES:

1. STANDARD IS FOR EXTENDED DISTANCES OF TANGENT SPANS.

* ⚠1 1.5' MINIMUM, 3.0' PREFERRED. THE MAXIMUM DISTANCE IS DEPENDANT ON REQUIRED OPERATIONS.

TYPICAL CONFIGURATION 4

SCALE: NTS

No.	REVISION	BY	APP'D	DATE
1	APPROVED BY J. KOST		PE	3/22

DESIGNED: A. WOLAK
DRAWN: G. CAREY
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE LOCATIONS FOR TYPICAL ROADWAY CONFIGURATIONS

DATE: 03/2022
STD DET NO: SA-171
SHT NO: 4 OF 4

GENERAL NOTES

1. CONCRETE AND REINFORCING STEEL

1.1 ALL WORK SHALL BE DONE PER CITY OF SEATTLE BOARD OF PUBLIC 0.11 WORKS RULES: CHAPTER 40.4 - STREET AND SIDEWALK PAVEMENT OPENING AND RESTORATION RULES IF IN STREET RIGHT OF WAY.

1.2 CONCRETE SHALL BE CITY OF SEATTLE CLASS 4000P AIR ENTRAINED, 3/8" MAX AGGREGATE, AND WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.

1.3 ALL REINFORCING BARS SHALL BE DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.

1.4 MINIMUM CLEAR CONCRETE COVER SHALL BE 3 INCHES.

1.5 REINFORCING DETAILS AND FABRICATION SHALL BE AS RECOMMENDED IN ACI 315 "DETAILS & DETAILING OF CONCRETE REINFORCEMENT."

1.6 NO CONSTRUCTION COLD JOINTS SHALL BE PERMITTED.

1.7 FOR MEMBERS THAT DO NOT UTILIZE FORMWORK, CONCRETE SHALL NOT FREE FALL MORE THAN 5 FEET DURING PLACEMENT. TO AVOID EXCEEDING THIS DISTANCE, A TREMIE OR A PUMP MAY BE USED.

1.8 DURING CONCRETE PLACEMENT, THE CONCRETE IN THE TOP 8 FEET OF THE POLE BASE MUST BE VIBRATED WITH A HAND-HELD VIBRATOR. DO NOT OVER VIBRATE AND CAUSE AGGREGATE SEPARATION.

2. ANCHOR PLATES, BOLTS, NUTS AND WASHERS

2.1 ANCHOR BOLTS INCLUDING NUTS AND FLAT WASHERS SHALL CONFORM TO ASTM 2.1 F1554-99 GRADE 105 CLASS 2A INCLUDING SUPPLEMENTARY REQUIREMENTS S2, S3, AND S5. THREADS SHALL CONFORM TO THE ANSI STANDARD B1.1 FOR UNC THREAD. ANCHOR BOLTS SHALL HAVE 36 INCHES OF THREAD ON EXPOSED END AND 12 INCHES OF THREAD ON THE EMBEDDED END, OR SHALL BE FULLY THREADED.

2.2 ANCHOR PLATES SHALL CONFORM TO ASTM A36.

3. GALVANIZING

3.1 ANCHOR PLATES, ANCHOR BOLTS, ANCHOR BOLT NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED IN CONFORMANCE TO ASTM A153 OR ASTM A123.

4. SOIL

4.1 EMBEDMENT DEPTH IS ADEQUATE FOR THREE TIMES THE WORKING MOMENT IN 4.1 COHESIVE SOILS OF C=1000PSF AND Ø=0° OR BETTER AND COHESIONLESS SOILS OF C=0PSF AND Ø=26° OR BETTER.

4.2 EMBEDMENT DEPTH IS ADEQUATE FOR THREE TIMES THE WORKING MOMENT IN COHESIVE SOILS OF C=1000PSF AND Ø = 0° OR BETTER, AND IN COHESIONLESS SOILS OF C = 0PSF AND Ø = 26° OR BETTER.

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: D. BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS

OFFSET FOUNDATION ANCHOR BASE POLE

DATE: 03/2022
STD DET NO: SA-211
SHT NO: 6 OF 7

GENERAL NOTES

5. SUBMITTALS

5.1 REINFORCING STEEL SHOP DRAWINGS AND CERTIFICATE OF COMPLIANCE.

5.2 CONCRETE MIX PROPORTIONS, ADMIXTURES AND SLUMP.

5.3 ANCHOR PLATE, ANCHOR BOLT, ANCHOR BOLT NUTS AND WASHERS CERTIFICATES OF COMPLIANCE.

5.4 A TEST REPORT SHALL BE PROVIDED IN ACCORDANCE WITH ASTM F1554-99 AND SUPPLEMENTARY REQUIREMENTS.

6. INSPECTION

6.1 CONCRETE SHALL NOT BE PLACED UNTIL THE KING COUNTY PROJECT REPRESENTATIVE HAS INSPECTED THE EXCAVATION, THE GROUNDING, THE ANCHOR BOLTS, AND THE PLACEMENT OF THE REINFORCING BAR CAGE.

7. ANCHOR BOLT SETTING

7.1 COVER EXPOSED ANCHOR BOLT THREADS AND NUTS WITH AT LEAST 3 LAYERS OF PLASTIC TAPE BEFORE PLACING CONCRETE.

7.2 ANCHOR BOLT TEMPLATE SHALL BY USED TEMPORARILY AT THE TOP OF ANCHOR BOLTS FOR ACCURATE POSITIONING AND ALIGNING.

8. CONDUIT

8.1 CONDUIT FROM FOUNDATION SHALL BE SCHEDULE 80 PVC. CONDUIT BENDS SHALL HAVE A MINIMUM RADIUS OF 12".

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: D. BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS

OFFSET FOUNDATION ANCHOR BASE POLE

DATE: 03/2022
STD DET NO: SA-211
SHT NO: 7 OF 7

GENERAL NOTES

1. CONCRETE AND REINFORCING STEEL

1.1 ALL WORK SHALL BE DONE PER CITY OF SEATTLE BOARD OF PUBLIC 0.11 WORKS RULES: CHAPTER 40.4 - STREET AND SIDEWALK PAVEMENT OPENING AND RESTORATION RULES IF IN STREET RIGHT OF WAY.

1.2 CONCRETE SHALL BE CITY OF SEATTLE CLASS 4000P AIR ENTRAINED, 3/8" MAX AGGREGATE, AND WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.

1.3 ALL REINFORCING BARS SHALL BE DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.

1.4 MINIMUM CLEAR CONCRETE COVER SHALL BE 3 INCHES.

1.5 REINFORCING DETAILS AND FABRICATION SHALL BE AS RECOMMENDED IN ACI 315 "DETAILS & DETAILING OF CONCRETE REINFORCEMENT."

1.6 NO CONSTRUCTION COLD JOINTS SHALL BE PERMITTED.

1.7 FOR MEMBERS THAT DO NOT UTILIZE FORMWORK, CONCRETE SHALL NOT FREE FALL MORE THAN 5 FEET DURING PLACEMENT. TO AVOID EXCEEDING THIS DISTANCE, A TREMIE OR A PUMP MAY BE USED.

1.8 DURING CONCRETE PLACEMENT, THE CONCRETE IN THE TOP 8 FEET OF THE POLE BASE MUST BE VIBRATED WITH A HAND-HELD VIBRATOR. DO NOT OVER VIBRATE AND CAUSE AGGREGATE SEPARATION.

2. SOIL

2.1 EMBEDMENT DEPTH IS BASED UPON RESEARCH REPORT NUMBERS 105-1,105-2 RESISTANCE OF A DRILLED SHAFT FOOTING TO OVERTURNING LOADS BY TEXAS TRANSPORTATION INSTITUTE, 1968.

2.2 EMBEDMENT DEPTH IS ADEQUATE FOR THREE TIMES THE WORKING MOMENT IN COHESIVE SOILS OF C=1000PSF AND Ø=0° OR BETTER AND COHESIONLESS SOILS OF C=0PSF AND Ø=26° OR BETTER.

3. SUBMITTALS

3.1 REINFORCING STEEL SHOP DRAWINGS AND CERTIFICATE OF COMPLIANCE.

3.2 CONCRETE MIX PROPORTIONS, ADMIXTURES AND SLUMP.

4. INSPECTION

4.1 CONCRETE SHALL NOT BE PLACED UNTIL THE ENGINEER HAS INSPECTED THE EXCAVATION, THE GROUNDING, THE CONE, AND THE PLACEMENT OF THE REINFORCING BAR CAGE.

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: D. BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS

EMBEDDED STEEL POLE (STANDARD FOUNDATION)

DATE: 03/2022
STD DET NO: SA-212
SHT NO: 4 OF 6

GENERAL NOTES

1. CONCRETE AND REINFORCING STEEL

   1.1 ALL WORK SHALL BE DONE PER CITY OF SEATTLE BOARD OF PUBLIC 0.11 WORKS RULES:

   CHAPTER 40.4 - STREET AND SIDEWALK PAVEMENT OPENING AND RESTORATION RULES IF IN STREET RIGHT OF WAY.

   1.2 CONCRETE SHALL BE CITY OF SEATTLE CLASS 4000P AIR ENTRAINED, 3/8" MAX AGGREGATE, AND WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.

   1.3 ALL REINFORCING BARS SHALL BE DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.

   1.4 MINIMUM CLEAR CONCRETE COVER SHALL BE 3 INCHES.

   1.5 REINFORCING DETAILS AND FABRICATION SHALL BE AS RECOMMENDED IN ACI 315 "DETAILS & DETAILING OF CONCRETE REINFORCEMENT."

   1.6 NO CONSTRUCTION COLD JOINTS SHALL BE PERMITTED.

   1.7 FOR MEMBERS THAT DO NOT UTILIZE FORMWORK, CONCRETE SHALL NOT FREE FALL MORE THAN 5 FEET DURING PLACEMENT. TO AVOID EXCEEDING THIS DISTANCE, A TREMIE OR A PUMP MAY BE USED.

   1.8 DURING CONCRETE PLACEMENT, THE CONCRETE IN THE TOP 8 FEET OF THE POLE BASE MUST BE VIBRATED WITH A HAND-HELD VIBRATOR. DO NOT OVER VIBRATE AND CAUSE AGGREGATE SEPARATION.

2. ANCHOR PLATES, BOLTS, NUTS AND WASHERS

   2.1 ANCHOR BOLTS INCLUDING NUTS AND FLAT WASHERS SHALL CONFORM TO ASTM F1554-07 GRADE 105 CLASS 2A INCLUDING SUPPLEMENTARY REQUIREMENTS S2, S3 AND S5. THREADS SHALL CONFORM TO THE ANSI STANDARD B1.1 FOR UNC THREAD. ANCHOR BOLTS SHALL HAVE 18 INCHES OF THREAD ON EXPOSED END AND 12 INCHES OF THREAD ON THE EMBEDDED END.

   2.2 ANCHOR PLATES SHALL CONFORM TO ASTM A36.

3. GALVANIZING

   3.1 ANCHOR PLATES, ANCHOR BOLTS, ANCHOR BOLT NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED IN CONFORMANCE TO ASTM A153 OR ASTM A123.

4. SOIL

   4.1 EMBEDMENT DEPTH IS ADEQUATE FOR THREE TIMES THE WORKING MOMENT IN COHESIVE SOILS OF C=1000PSF AND Ø=0° OR BETTER AND COHESIONLESS SOILS OF C=0PSF AND Ø=26° OR BETTER.

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: E. TU
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS

ANCHOR BASE STEEL POLE (STANDARD FOUNDATION)

DATE: 03/2022
STD DET NO: SA-213
SHT NO: 6 OF 7

King County Metro Transit - Capital Project Delivery:

Trolley Overhead Standard Drawings

Prepared by:

Supervisor:
John Davis

Engineers:
Alex Wolak
Medhanie Embaye

Designers:
Grant Carey
Linda Anderson
Ethan Tu

Prepared for:

Metro Transit Engineering

December 2021

King County

King County Metro Transit - Capital Project Delivery:

Engineering Section Design Standard

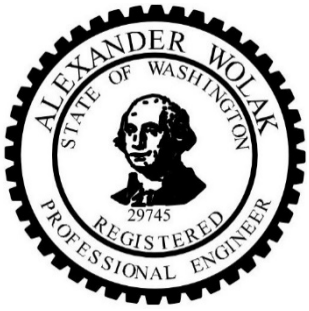
Professional Seal

Per the Washington Administrative Code 196-23-020:
"…Any final document must contain the seal/stamp, signature and date of signature of the licensee who prepared or directly supervised the work. For the purpose of this section "document" is defined as plans, specifications, plats, surveys, as-built documents prepared by the licensee, and reports."

Preparation of this Document was directly supervised by the following licensed Civil Engineer & Structural Engineer:



John C. Davis, S.E.



Alexander Wolak, P.E.

_____ _____

Approved: Paul Eng, PE, Manager, Capital Project Delivery, Engineering Section Date

NUMBER	TITLE	SHEETS
SA-001	TROLLEY STANDARDS DRAWING INDEX	publish
	SPECIAL PARTS AND DESIGNATIONS	
SA-096	CONSTRUCTION GUIDELINES	1
SA-097	SPECIALWORK MATERIAL LIST	2
SA-098	MASTER MATERIAL LIST USAGE REFERENCE	4
SA-099	MASTER MATERIAL LIST	4
SA-100	SYMBOLS AND ABBREVIATIONS	3
SA-101	STRAIN PLATE	1
SA-102	STEEL POLE COLLAR	1
SA-103	WOOD POLE EYEBOLT ASSEMBLY	1
SA-104	WOOD POLE DOWN GUY ASSEMBLY	1
SA-106	COMPRESSION POLE BRACKET POLE COLLAR	1
SA-107	STAINLESS STEEL EYEBOLT	1
SA-108	BRACKET ARM POLE END CAP	1
SA-109	BRACKET ARM ARM END CAP	1
SA-110	BRACKET ARM SPAN END CAP	1
SA-111	WOOD POLE MOUNTING BRACKET	1
SA-112	3 1/2" TUBE SOCKET PLATE	1
SA-113	3 1/2" TUBE TEE SLIPFIT & SOCKET	1
SA-114	BRACKET ARM POLE END CAP WITH BOTTOM TAB	1
	SPECIAL ASSEMBLIES AND SYSTEM CRITERIA	
SA-151	SPECIALWORK INSULATED JUMPER ASSEMBLY	1
SA-152	TROLLEY WIRE DEADEND ASSEMBLY	2
SA-153	STAGING DEADEND ASSEMBLY	1

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: D.BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
INDEX

DATE: 11/2021
STD DET NO: SA-001
SHT NO: 1 OF 4

NUMBER	TITLE	SHEETS
SA-161	SPECIALWORK DEVICE REFERENCE POINT LOCATIONS	1
SA-163	SPECIALWORK SWITCH CONTACTOR CONFIGURATION	1
SA-164	TROLLEY WIRE SUPPORT SPANATTACHMENT CRITERIA	4
SA-165	FROG INDUCTION CONTROL SYSTEM	6
SA-166	ADJUSTMENT POINT	1
SA-167	INSULATION COVERED GUY WIRE REQUIREMENT CRITERIA	1
SA-170	TROLLEY COACH TRAVEL AREA IN CONSTRUCTION ZONE	1
SA-171	TROLLEY WIRE LOCATION FOR TYPICAL ROADWAY CONFIGURATIONS	4
SA-190	TEMPORARY INSULATION BOARD	1
	SUPPORTING STRUCTURES	
SA-202	WOOD POLE FRAMING DETAILS	1
SA-211	OFFSET FOUNDATION (ANCHOR BASE POLE)	7
SA-212	STANDARD FOUNDATION (EMBEDDED STEEL POLE)	6
SA-213	STANDARD FOUNDATION (ANCHOR BASE STEEL POLE)	7
SA-214	WOOD POLE SETTING STANDARD	3
SA-215	EMBEDDED STEEL POLE INSTALLATION	3
SA-216	ANCHOR BASE STEEL POLE INSTALLATION	4
SA-221	BUILDING EYEBOLT INSTALLATION	1
SA-231	DOWN GUY	1
SA-232	SIDEWALK GUY	2
SA-233	HEAD GUY	1
SA-234	BRACKET ARMGUY	2
	TROLLEY WIRE SUPPORT ASSEMBLIES	
SA-300	TANGENT SPAN TWO-WAY TRAFFIC W/ K& M HANGERS	1

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: D.BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
INDEX

DATE: 11/2021
STD DET NO: SA-001
SHT NO: 2 OF 4

NUMBER	TITLE	SHEETS
SA-301	TANGENT SPAN TWO-WAY TRAFFIC	1
SA-302	HOLDUP TANGENT SPAN TWO-WAY TRAFFIC	1
SA-303	INVERTED TANGENT SPAN TWO-WAY TRAFFIC	1
SA-304	HOLDDOWN TANGENT SPAN TWO-WAY TRAFFIC	1
SA-305	BRIDLE TANGENT SPAN TWO-WAY TRAFFIC	2
SA-306	DOUBLE BRIDLE TANGENT SPAN TWO-WAY TRAFFIC	2
SA-307	1° TO 5° CURVE SPAN W/ 2' CURVE RAILS TWO-WAY TRAFFIC	2
SA-308	5.5° TO 7.5° CURVE SPAN W/ 4' CURVE RAILS TWO-WAY TRAFFIC	2
SA-309	TANGENT SPAN THREE TRACKS	1
SA-310	8° TO 30° CURVE SPAN W/ CURVE SEGMENTS TWO-WAY TRAFFIC	2
SA-311	TANGENT SPAN ONE-WAY TRAFFIC	1
SA-312	HOLDUP TANGENT SPAN ONE-WAY TRAFFIC	1
SA-313	INVERTED TANGENT SPAN ONE-WAY TRAFFIC	1
SA-314	HOLDDOWN TANGENT SPAN ONE-WAY TRAFFIC	1
SA-315	BRIDLE TANGENT SPAN ONE-WAY TRAFFIC	2
SA-316	DOUBLE BRIDLE TANGENT SPAN ONE-WAY TRAFFIC	2
SA-317	1° TO 5° CURVE SPAN W/ 2' CURVE RAILS ONE-WAY TRAFFIC	2
SA-318	5.5° TO 7.5° CURVE SPAN W/ 4' CURVE RAILS ONE-WAY TRAFFIC	1
SA-320	8° TO 30° CURVE SPAN W/ CURVE SEGMENT ONE-WAY TRAFFIC	2
SA-321	DOUBLE FEEDER SPAN TWO-WAY TRAFFIC	3
SA-322	SINGLE FEEDER SPAN TWO-WAY TRAFFIC	2
SA-325	EQUALIZER SPAN TWO-WAY TRAFFIC	1
SA-331	DOUBLE FEEDER SPAN ONE-WAY TRAFFIC	3
SA-332	SINGLE FEEDER SPAN ONE-WAY TRAFFIC	2
SA-333	SECTIONALIZING SPAN ONE-WAY TRAFFIC	1

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: D.BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
INDEX

DATE: 11/2021
STD DET NO: SA-001
SHT NO: 3 OF 4

NUMBER	TITLE	SHEETS
SA-334	TROLLEY WIRE SPREADER BAR	1
SA-341	STEEL POLE BRACKET ASSEMBLY TANGENT CONSTRUCTION	2
SA-342	STEEL POLE BRACKET ASSEMBLY CURVE CONSTRUCTION	2
SA-343	STEEL POLE BRACKET ASSEMBLY COMPRESSION TYPE	4
SA-345	STEEL POLE BRACKET ASSEMBLY UNDERSLING CONSTRUCTION	2
SA-348	STEEL POLE HOLDDOWN BRACKET ASSEMBLY	2
SA-349	STEEL POLE TANGENT FEEDER BRACKET ASSEMBLY	3
SA-351	WOOD POLE BRACKET ASSEMBLY TANGENT CONSTRUCTION	2
SA-352	WOOD POLE BRACKET ASSEMBLY CURVE CONSTRUCTION	2
SA-355	WOOD POLE BRACKET ASSEMBLY UNDERSLING CONSTRUCTION	2
SA-358	WOOD POLE HOLDDOWN BRACKET ASSEMBLY TANGENT CONST	2
SA-361	TRAFFIC MAST ARM TROLLEY SUPPORT	1
SA-362	TRAFFIC MAST ARM TROLLEY SUPPORT MOUNTS	2
SA-370	SPAN WIRES LIMITED SPACE TYPICAL VARIANCES	2
SA-371	SWITCH & CURVE SEGMENT PULLOFFS	9
SA-372	CROSSOVER HOLDUP SPAN	2
SA-373	CONVENTIONAL CURVE WITH CURVE RAILS	4
	SPECIAL DETAILS	
SA-401	LIGHTNING ARRESTERS AT FEEDER RISER POLES	6
SA-402	FEEDER RISER POLE	3
SA-403	STEEL POLE FEEDER RISER WITH STREETLIGHT	1
SA-411	DUCTBANK CONCRETE ENCASED	2
	PURCHASE REQUIREMENTS	
SP-201	STANDARD STEEL POLE PURCHASE REQUIREMENTS	13

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: D.BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
INDEX

DATE: 11/2021
STD DET NO: SA-001
SHT NO: 4 OF 4

SA-096

TROLLEY CONSTRUCTION STANDARD REQUIREMENTS

1. ANY CONSTRUCTION OR INSTALLATION ACTIVITIES AFFECTING TRANSIT OPERATIONS OR FACILITIES MUST BE COORDINATED THROUGH THE METRO TRANSIT CONSTRUCTION INFORMATION CENTER.
   PLEASE PROVIDE FIVE BUSINESS DAYS NOTIFICATION FOR BUS STOP IMPACTS AND TEN BUSINESS DAYS NOTIFICATION FOR BUS REROUTES. FOR NOTIFICATION INFORMATION AND GUIDELINES, PLEASE VISIT :

   HTTP://WWW.KINGCOUNTY.GOV/TRANSPORTATION/KCDOT/METROTRANSIT/CONSTRUCTION.ASPX

   OR CONTACT CONSTRUCTION COORDINATORS AT: 206-477-1140 OR 206 477-1150 FOR TROLLEY RELATED ACTIVITIES.
   A MINIMUM OF 60 BUSINESS DAYS' ADVANCE NOTICE IS REQUIRED TO START ANY SHIFT OF THE TROLLEY OVERHEAD CATENARY SYSTEM (OCS).

2. A CHANNELIZATION PLAN, APPROVED BY THE CITY OF SEATTLE AND KING COUNTY, IS REQUIRED PRIOR TO ANY MOVEMENT OF THE TROLLEY OCS.

3. NO TRANSFER OF SUPPORT SPANS WILL OCCUR PRIOR TO FORMAL APPROVAL OF ALL SUPPORT STRUCTURES BY KING COUNTY. A MINIMUM OF 5 BUSINESS DAYS' NOTICE IS REQUIRED FOR INSPECTION.

4. ALL OVERHEAD CATENARY, VAULTS, DUCT BANKS AND SUPPORT STRUCTURES, REMOVED DURING CONSTRUCTION, SHALL BE REPLACED WITH NEW EQUIPMENT, AS SHOWN ON THE CONTRACT DOCUMENTS, AND RESTORED PER KING COUNTY METRO TROLLEY STANDARDS.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RESTORATION. THE COST OF RESTORATION SHALL BE AT THE CONTRACTOR'S EXPENSE OR SHALL BE ESTABLISHED THROUGH AN APPROVED MEMORANDUM OF AGREEMENT (MOA).

6. SALVAGED EQUIPMENT SHALL BECOME THE PROPERTY OF KING COUNTY METRO.

7. FOR TROLLEY CONTACT WIRES CROSSING SDOT SIGNAL SPAN WIRES, SEE SDOT CONSTRUCTION DETAILS ON SIGNAL HEAD MOUNTING DETAILS.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: D. BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG
King County METRO
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
CONSTRUCTION GUIDELINE
DATE: 03/2022
STD DET NO: SA-096
SHT NO: 1 OF 1

SPECIAL WORK MATERIAL LIST

ITEM #	DESCRIPTION	WABCO CAT. NO.
1	15° WSE, RH, IC, RS	55964-3001
2	15° WSE, LH, IC, RS	55964-3002
3	15° WSE, RH, IC, RC	55964-3005
4	15° WSE, LH, IC, RC	55964-3006
5	15° WSE, RH, IS, RS	55973-3001
6	15° WSE, LH, IS, RS	55973-3002
7	15° WSE, RH, IS, RC	55973-3003
8	15° WSE, LH, IS, RC	55973-3004
9	15° WTR, RH, IC, RC	55979-3001
10	15° WTR, LH, IC, RC	55979-3002
11	15° WTR, RH, IC, RS	55979-3005
12	15° WTR, LH, IC, RS	55979-3006
13	15° WTR, RH, IS, RC	55981-3001
14	15° WTR, LH, IS, RC	55981-3002
15	15° WTR, RH, IS, RS	55981-3003
16	15° WTR, LH, IS, RS	55981-3004
17	30° WSE, RH, IC, RS	56425-3001
18	30° WSE, LH, IC, RS	56425-3002
19	30° WSE, RH, IC, RC	56425-3003
20	30° WSE, LH, IC, RC	56425-3004
21	30° WSE, RH, IS, RS	57143-3001
22	30° WSE, LH, IS, RS	57143-3002
23	30° WSE, RH, IS, RC	57143-3003
24	30° WSE, LH, IS, RC	57143-3004
25	30° WTR, RH, IS, RC	56596-3005
26	30° WTR, LH, IS, RC	56596-3006
27	30° WTR, RH, IS, RS	56596-3007
28	30° WTR, LH, IS, RS	56596-3008
29	30° WTR, RH, IC, RC	56597-3001
30	30° WTR, LH, IC, RC	56597-3002
31	30° WTR, RH, IC, RS	56597-3005
32	30° WTR, LH, IC, RS	56597-3006
33	17° RXO	17872 A OR B
34	27° RXO	17874 A OR B
35	30° RXO	55968-3003
36	37° RXO	17877 A OR B
37	45° RXO	55967-3003
38	50° RXO	57857-3007
39	60° RXO	55966-3001
40	90° RXO	55965-3001
41	30°- 60° XOCS, RH	57123-3001
42	30°- 60° XOCS, LH	57123-3002

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

SPECIAL WORK MATERIAL LIST

DATE: 03/2021
STD DET NO: SA-097
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-097.1-2.dwg | Layout: SA-097.1
PLOTTED: Mar 18, 2021-08:14:57am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

SPECIAL WORK MATERIAL LIST

ITEM #	DESCRIPTION	WABCO CAT. NO.
43	30°- 45° XOCS, LH	
44	58° TO 65° AXO	18438
45	66° TO 90° AXO	18437
46	15° Y, IND, ILH, RST RH	59503-3004
47	23° WSE, RH, IC, RS	55961-3001
48	23° WSE, LH, IC, RS	55961-3002
49	23° WTR, RH, IC, RS	55978-3001
50	23° WTR, LH, IC, RS	55978-3002
51	45° WSE, RH, IC, RS	56593-3001
52	45° WSE, LH, IC, RS	56593-3002
53	45° WSE, RH, IC, RC	56593-3005
54	45° WSE, LH, IC, RC	56593-3006
55	45° WSE, RH, IS, RS	57904-3001
56	45° WSE, LH, IS, RS	57904-3002
57	45° WSE, RH, IS, RC	57904-3005
58	45° WSE, LH, IS, RC	57904-3006
59	45° WTR, RH, IC, RC	56595-3005
60	45° WTR, LH, IC, RC	56595-3006
61	45° WTR, RH, IC, RS	56595-3007
62	45° WTR, LH, IC, RS	56595-3008
63	45° WTR, RH, IS, RC	56592-3005
64	45° WTR, LH, IS, RC	56592-3006
65	45° WTR, RH, IS, RS	56592-3007
66	45° WTR, LH, IS, RS	56592-3008

LEGEND

IS = INSULATION IN STRAIGHT
IC = INSULATION IN CURVE
ILH = INSULATION IN LH OF Y

IND = ELECTRICALLY OPERATED INDUCTIVE SWITCH
LH = LEFT HAND SWITCH
RH = RIGHT HAND SWITCH
Y = Y SWITCH
WSE = ELECTRICALLY OPERATED INDUCTIVE SWITCH WTR = TRAILING SWITCH

RC = RESET TO CURVE AXO = ADJUSTABLE CROSSOVER
RS = RESET TO STRAIGHT RXO = RIGID CROSSOVER
RSTRH = RESET TO RH OF Y XOCS = CROSSOVER CURVE SEGMENT

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

SPECIAL WORK MATERIAL LIST

DATE: 03/2021
STD DET NO: SA-097
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-097_1-2.dwg | Layout: SA-097.2
PLOTTED: Mar 18, 2021-08:14:58am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MASTER MATERIAL LIST

ITEM #	METRO STANDARD SA-DWG - ITEM LOCATION & USE REFERENCE
01	153, 165, 190, 300, 301, 302, 303, 304, 305, 306, 307, 309, 311, 312, 313, 314, 315, 316,317,321,322,325, 331, 332, 334, 345, 348, 355, 358
02	190, 301, 302, 305, 306, 309, 311, 312, 315, 316, 355, 345
03	152, 166, 167, 233, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 320, 321, 322, 325, 331, 332, 342, 343, 345, 348, 352, 370, 371, 372, 373,355, 358
04	152, 233, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 320, 321, 322, 325, 331, 332, 342, 343, 345, 348, 352, 370, 371, 372, 373, 355, 358
05	152, 166, 233, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 320, 321, 322, 325, 331, 332, 342, 343, 345, 348, 352, 370, 371, 372, 373, 355, 358
06	152, 166, 233, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 320, 321, 322, 325, 331, 332, 342, 343, 345, 348, 352, 370, 371, 372, 373, 355, 358
07	152, 233, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 320, 321, 322, 325, 331, 332, 342, 343, 345, 348, 352, 370, 371, 372, 373, 355, 358
08	152, 166, 167, 233, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318 320, 321, 322, 325, 331, 332, 342, 343, 345, 348, 352, 370, 371, 372, 373, 355, 358
09	152, 305, 306, 310, 315, 316, 331, 371, 372
10	153, 303, 304, 307, 308, 313, 314, 317, 318, 334, 342, 345, 348, 352, 370, 373, 358
11	152, 310, 342, 343, 345, 348, 352, 371, 372, 355, 358
12	310, 320, 322, 325, 332, 342, 343, 345, 352, 370, 371, 373
13	152, 166, 167, 231, 232, 233, 305, 306, 315, 316, 371, 373
14	152, 153, 231, 232, 233, 305,306, 315, 316, 371, 373
15	166, 233, 305, 306, 315, 316, 341, 342, 345, 348, 349, 351, 352, 371, 373, 55, 358
16	152, 166,167, 231, 232, 233, 305, 306, 315, 316, 371, 373
17	152,153,233,234,305,306,315,316,341,342,345,348,349,351,352,371,373,355,358
18	167, 310, 372
19	167
20	343
21	321, 322, 331, 332
22	321, 322, 325, 331, 332
23	153, 321, 331
24	361
25	310, 320, 342, 352
26	321, 322, 331, 332
27	321, 322, 331, 332
28	341, 348, 349, 351, 361, 358
29	333

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
MASTER MATERIAL LIST USAGE REFERENCE

DATE: 03/2021
STD DET NO: SA-098
SHT NO: 1 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-098.1-4.dwg | Layout: SA-098.1
PLOTTED: Mar 18, 2021-08:15:07am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MASTER MATERIAL LIST

ITEM #	METRO STANDARD SA-DWG - ITEM LOCATION & USE REFERENCE
30	341, 349, 351, 361
31	341, 349, 351, 361
32	325
33	325
34	152, 153
35	163, 165
36	361
37	333
38	152
39	152, 308, 348, 358
40	321, 331, 342, 345, 352
41	321, 322, 325, 331, 332, 349
42	349
43	*
44	WFSC ONLY
45	WFSC ONLY
46	WFSC ONLY
47	WFSC ONLY
48	*
49	349
50	349
51	349
52	349
53	307, 317, 342, 352, 373
54	308, 318, 342, 352, 373
55	234, 341, 342, 345, 348, 349, 351, 352, 355, 358
56	234, 341, 342, 345, 348, 349, 351, 352, 355, 358
57	341, 342, 345, 348, 349, 351, 352, 358
58	300, 345
59	402
60	321, 322, 331, 332, 349, 402
61	231, 232
62	231
63	232
64	232
65	232, 351
66	232
67	401
68	402
69	402
70	321, 331, 372
71	402

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
MASTER MATERIAL LIST USAGE REFERENCE

DATE: 03/2021
STD DET NO: SA-098
SHT NO: 2 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-098.1-4.dwg | Layout: SA-098.2
PLOTTED: Mar 18, 2021 - 08:15:14am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MASTER MATERIAL LIST

ITEM #	METRO STANDARD SA-DWG - ITEM LOCATION & USE REFERENCE
72	165
73	WFSC ONLY
74	190
75	190
76	325
77	401, 411
78	401
79	341, 349, 351
80	321, 331, 341, 343, 349, 351, 361, 401
81	401
82	232
83	401
84	343, 361
85	401
86	402
87	361
88	361
89	361
90	234, 341, 342, 345, 348, 349, 351, 352, 355, 358
91	401
92	373
93	401
94	103, 351, 352, 355, 358
95	103
96	103, 351, 352, 355, 358
97	104, 351, 352, 355, 358
98	104
99	103, 104, 351, 352
100	321, 331
101	152, 321, 331
102	152, 164, 233, 234, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 320, 321, 322, 325, 331, 332, 341, 342, 343, 345, 348, 349, 371, 372, 373, 355, 358
103	152, 164, 233, 234, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313,314,315,316,317,318,
	320,321,322,325,331,332,371,372,373 104 231,232 105 * 106 343
107	SEE PLANS FOR FREQUENCY OF USE (USED WITH SA-221)
108	341,349,351,352,348,355,345,342,358
109	341,349,351
110	342,345,348,352,355,358
111	351,352,355,358
112	ATL BASE TRACK SPREADER
113	ATL BASE TRACK SPREADER

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
MASTER MATERIAL LIST USAGE REFERENCE

DATE: 03/2021
STD DET NO: SA-098
SHT NO: 3 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-098.1-4.dwg | Layout: SA-098.3
PLOTTED: Mar 18, 2021-08:15:19am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MASTER MATERIAL LIST

ITEM #	METRO STANDARD SA-DWG - ITEM LOCATION & USE REFERENCE
114	
115	401
116	349, 401
117	401
118	401
119	401
120	401
121	401
122	WFSC ONLY
123	WFSC ONLY
124	WFSC ONLY

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
MASTER MATERIAL LIST USAGE REFERENCE

DATE: 03/2021
STD DET NO: SA-098
SHT NO: 4 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-098.1-4.dwg | Layout: SA-098.4
PLOTTED: Mar 18, 2021-08:15:24am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

MASTER MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01		DETROIT CLAMP ASSY	WABCO	9293-3007
02		AGC TANGENT SPAN HANGER	WABCO	19360-2000
03		GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04		GUY GRIP DEADEND	PREFORMED	CDE-3106
05		WIRE ROPE CLIP, 5/16"	CROSBY	G450
06		FRICTION TAPE, 3/4" (6 WRAPS)		
07		THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08		GUY STRAND	COPPERWELD	8M
09		BULL RING	WABCO	18567-2000
10		HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
11		7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12		7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
13		GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14		GUY GRIP DEADEND	PREFORMED	CDE-3115
15		WIRE ROPE CLIP, 3/8"	CROSBY	G450
16		GUY STRAND	COPPERWELD	16M
17		THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
18		GUY STRAND, COVERED	COPPERWELD	8MI
19		GUY STRAND, COVERED	COPPERWELD	16MI
20		EYEBOLT	WABCO	11933-2000
21		7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6360
22		CLAMP STRAIN EYE	WABCO	10571-2000
23		7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6260
24		TROLLEY WIRE SUPPORT ASSY	WABCO	54962-3003
25		CURVE SEGMENT 8-12 DEG TYPE C CURVE SEGMENT 13-27 DEG TYPE C CURVE SEGMENT 28-47 DEG TYPE C	WABCO WABCO WABCO	22301-3014 22302-3005 22303-3005
26		TYPE PH-4 POS FEED SPAN HANGER	WABCO	54937-3002
27		TYPE PH-5 NEG FEED SPAN HANGER	WABCO	54936-3002
28		INSULATOR SPOOL	WABCO	16835-2000
29		TYPE TCL CLEVIS TIP 4/0	WABCO	54950-3002
30		TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31		SPRING DETROIT CLAMP	WABCO	54959-3001
32		TYPE PH-5 NEG FEED SPAN HANGER	WABCO	54936-3001
33		TYPE PH-4 POS FEED SPAN HANGER	WABCO	54937-3001
34		TYPE T DOUBLE EAR STRAIN CLAMP	WABCO	17700-2000
35		CLAMP-INSUL LEAD WIRE	WABCO	19655-2000
36		7/8 TRANSLITE STRAIN INSUL W/ ADJUST END FITTINGS	WABCO	54980-6385
37		NO-BO SECTION INSUL	WABCO	55025-3001

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
MASTER MATERIAL LIST USAGE REFERENCE

DATE: 03/2021
STD DET NO: SA-099
SHT NO: 1 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-099_1-4.dwg | Layout: SA-099_1
PLOTTED: Mar 18, 2021-08:15:34am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MASTER MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
38		7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6200
39		5/8" SHACKLE	WABCO	13722-2000
40		7/8 TRANSLITE STRAIN INSUL CL-90	WABCO	54995-6120
41		H.S.P. FEEDER CLAMP ASSY, BRONZE	WABCO	19879-2000
42		FEEDER CLAMP, BRONZE	WABCO	19790-4004
43				
44		RUNNER, 6 FT TYPE C, 8 TO 12 DEG	WABCO	21375-2000
45		PLATE-STRAIN 5 TO 12 DEG	WABCO	20290-2000
46		SINGLE CURVE HANGER, TYPE A-2	WABCO	14072-2000
47		DOUBLE CURVE HANGER, TYPE A-2	WABCO	14073-2000
48		5/8" U-BOLT GALVANIZED	VARIES	VARIES
49		COMPRESSION CONNECTOR COPPER, LONG BARREL, TIN PLATED, FLARED	ANDERSON / SQUARE D	VHCL-2/0-12BNF
50		COMPRESSION CONNECTOR COPPER, LONG BARREL, TIN PLATED, FLARED	ANDERSON/ SQUARE D	VHCL-500-12BNF
51		MULTI-LOK TIES (18") NYLON COATED	BAND-IT	AE714
52		TUF NEOPRENE AIR HOSE SLEEVE 1.5" ID x 2.0625" OD (BLACK)	McMASTER-CARR	3 BRAID
53		CURVE RAIL (1° TO 5°, 2' LG)	K & M	851 B412/0
54		CURVE RAIL (5.5° TO 7.5°, 4' LG)	K & M	851 B412/1
55		PHILLYSTRAN (3/8")	PHILLYSTRAN INC	HPTG 6700I
56		PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC	PLP 2755
57		FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" DIA x 1/4"	STRONGWELL	EXTREN SERIES 525
58		TANGENT SPAN HANGER	K & M	C-1728-01
59		CONDUIT CLAMP WITH 2" MTG SCREW		
60		FEED SPAN CABLE, 500 KNM CU UNSHIELDED, 5 KV EPR WITH PVC JACKET		
61		GUY GUARD, 8 FT FOR USE ON 3/16" TO 1/2" STRAND	PREFORMED	PG 5518
62		POWER INSTALLED SCREW ANCHOR	CHANCE	E102-1219
63		POWER INSTALLED SCREW ANCHOR	CHANCE	C102-1260
64		POLE PLATE, 2 1/2" PIPE	JOSLYN	J0521
65		LAG SCREW, FETTER DRIVE, 1/2" x 4"	JOSLYN	J8754
66		END FITTING, 2 1/2" PIPE	COOPER POWER SYSTEM	DG5G1
67		CLOVERLEAF EPOXIROD STANDOFF	CHANCE	C653-1038
68		UNIVERSAL SERVICE CONNECTOR	BURNDY	KVSU34
69		SEALING BUSHING, TYPE KR WITH TYPE M CABLE SUPPORT, 2 1/2" CONDUIT	O-Z-GEDNEY	KR250 & RPLG-2001-1

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
MASTER MATERIAL LIST USAGE REFERENCE

DATE: 03/2021
STD DET NO: SA-099
SHT NO: 2 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-099_1-4.dwg | Layout: SA-099_2
PLOTTED: Mar 18, 2021-08:15:39am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MASTER MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
70		EYEBOLT, 5/8" x 6" WITH 2 NUTS & LOCKWASHER		
71		WATERTIGHT STR STRAIN RELIEF CONN, 1 1/2" CONDUIT	O-Z-GEDNEY	SR 15012 H.D. GALV
72		INDUCTIVE CONTROL SYSTEM RECEIVER INDUCTIVE CONTROL SYSTEM ANTENNA	UNITRAC UNITRAC	320100 -16X 320310 - 4X
73		ANCHOR SHACKLE	JOSLYN	J2742
74		4' x 8' x 1/2" EXTERIOR PLYWOOD		
75		U-BOLT TO FIT 4/0 TROLLEY WIRE		
76		4/0 STRANDED INSUL CABLE		
77		ELECT WARNING TAPE, 6" YELLOW	BRADY	UT 20-Y6
78		CONNECTOR, PARALLEL CLAMP	BURNDY	QPX342C
79		5/8"-11 UNC x 3/8" STUD		
80		3/4" x 0.03" SS BANDING TYPE 201	BAND-IT	C206
81		CONNECTOR, SERVICE, SPLIT BOLT	BURNDY	KS20
82		2 1/2" DIA ASTM A53 GRB STD WT GALV STEEL PIPE		
83		MOLDING, PLASTIC, GROUND WIRE, 1/2" X 1/16" X 8'	JOSLYN	PM128
84		SCHED 40 PVC, GREY, SPLIT		
85		1000 VOLT DC ARRESTER, 907 MCOV	IMPULSE	P/N 1057
86		GALV RIGID STEEL CONDUIT		
87		5/8"-11 UNC x 6" THREADED ROD, GALV ASTM A36		
88		5/8"-11 UNC HVY HEX JAM NUT GALV ASTM A563 GRA		
89		11/16" LOCKWASHER		
90		HEAVY PIPE CLAMP, GALV	GRINNELL	FIG 216
91		STAPLES, ROLLED POINT, GALV, 2" x 1/2" x 0.162"	JOSLYN	J156
92		ANGLE CLAMP, DUCTILE IRON	ANDERSON/ SQUARE D	82860-2000
93		STAPLES, ROLLED POINT, GALV, 1 3/4" x 1/4" x 0.148"	JOSLYN	J1673
94		5/8" OVAL EYEBOLT WITH NUT	JOSLYN	J94XX
95		3/4" OVAL EYEBOLT WITH NUT	JOSLYN	J95XX
96		SQ CURVED WASHER 3" x 3" x 1/4", 11/16" DIA	JOSLYN	J113
97		3/4" MACHINE BOLT	JOSLYN	J89XX
98		GUY HOOK, 3/4"	STANLEY FLAGG	P133AX

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
MASTER MATERIAL LIST USAGE REFERENCE

DATE: 03/2021
STD DET NO: SA-099
SHT NO: 3 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-099,1-4.dwg | Layout: SA-099.3
PLOTTED: Mar 18, 2021-08:15:44am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MASTER MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
99		SQ CURVED WASHER 3" x 3" x 1/4", 13/16" DIA	JOSLYN	J6823
100		EPPOXIROD DEADEND ARM	CHANCE	COEH36DP
101		STRAIN PLATE	METRO STD	SA-101
102		FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	METRO STD	SA-102
103		WOOD POLE EYEBOLT ASSEMBLY	METRO STD	SA-103
104		WOOD POLE DOWN GUY ASSEMBLY	METRO STD	SA-104
105				
106		COMPRESSION POLE BRACKET COLLAR	METRO STD	SA-106
107		STAINLESS STEEL EYEBOLT ASSEMBLY	METRO STD	SA-107
108		MAST ARM POLE END CAP	METRO STD	SA-108
109		MAST ARM ARM END CAP	METRO STD	SA-109
110		MAST ARM UNDERSLING END CAP	METRO STD	SA-110
111		WOOD POLE MOUNTING BRACKET	METRO STD	SA-111
112		3 1/2" TUBE SOCKET PLATE	METRO STD	SA-112
113		3 1/2" TUBE TEE SLIPFIT & SOCKET	METRO STD	SA-113
114		MAST ARM POLE END CAP WITH BOT TAB	METRO STD	SA-114
115		STAINLESS STEEL BOLT WITH WASHERS & LOCK WASHERS		
116		WIRE, 2 OR 5KV, #4 AWG CU, JACKETED, UNSHIELDED		
117		WIRE, #4 AWG CU, SOLID, SOFT, 0.031" POLYETHYLENE INSULATED		
118		GROUND ROD CLAMP	COPPERWELD	ABH58
119		CONDUCTIVE & ANTI-SEIZE COMPOUND (KOPR-SHIELD)	THOMAS & BETTS	CP-8 OR CP-16
120		GROUND ROD, 5/8" x 10'	COPPERWELD OR JOSLYN	GR5810 J8340
121		LAG SCREW, FETTER DRIVE, 5/8" x 5"	JOSLYN	J8765
122		7/8 TRANSLITE STRAIN INSUL CL-TB	WABCO	54982-3001
123		FEEDER, TYPE E, DEAD END	WABCO	21590-2000
124		CLAMP ASSEMBLY	WABCO	54936-3006
125		5/8 MACHINE BOLT	JOSLYN	J88XX

No.	REVISION	BY	APP'D	DATE

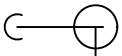
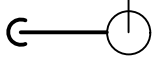
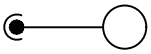
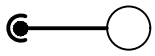
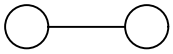
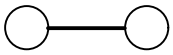
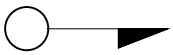
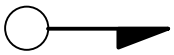
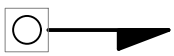
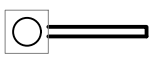
DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
MASTER MATERIAL LIST USAGE REFERENCE

DATE: 03/2021
STD DET NO: SA-099
SHT NO: 4 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-099_1-4.dwg | Layout: SA-099_4
PLOTTED: Mar 18, 2021-08:15:49am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

STANDARD #	SYMBOLS	DESCRIPTION
		EXISTING WOOD POLE
SA-202 & SA-214		INSTALL WOOD POLE
		REMOVE WOOD POLE
		EXISTING DIRECT EMBEDMENT STEEL POLE
SA-201,SA-212 & SA-215		INSTALL DIRECT EMBEDMENT STEEL POLE
		REMOVE DIRECT EMBEDMENT STEEL POLE
		EXISTING ANCHOR BASE STEEL POLE
SA-201,SA-213 & SA-216		INSTALL ANCHOR BASE STEEL POLE
		REMOVE ANCHOR BASE STEEL POLE
		EXISTING BUILDING EYEBOLT
SA-107 & SA-221		INSTALL NEW BUILDING EYEBOLT
		EXISTING DOWN GUY ON POLE
SA-231		INSTALL DOWN GUY ON POLE
		EXISTING SIDEWALK GUY ON POLE
SA-232		INSTALL SIDEWALK GUY ON POLE
		EXISTING HEAD GUY, POLE TO POLE
SA-233		INSTALL HEAD GUY, POLE TO POLE
		EXISTING POLE BRACKET
SA-351 & SA-352		INSTALL WOOD POLE BRACKET
SA-341 & SA-342		INSTALL STEEL POLE BRACKET
		TRAFFIC SIGNAL MAST ARM

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SYMBOLS AND ABBREVIATIONS

DATE: 03/2021
STD DET NO: SA-100
SHT NO: 1 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-100,1-3.dwg | Layout: SA-100.1
PLOTTED: Mar 18, 2021-08:15:59am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

SYMBOLS	DESCRIPTION
⊗	PORCELAIN STRAIN INSULATOR
⊗	ADJUSTMENT POINT (AT INSULATOR)
— — — (DOUBLE LINE)	TROLLEY WIRE— — —NEGATIVE (DOUBLE LINE)————POSITIVE
———	TROLLEY WIRES, NEGATIVE AND POSITIVE (SINGLE LINE)
2.0%	STREET GRADE (DOWNHILL SLOPE)
SA#	TROLLEY STANDARD DRAWING NUMBER
○	BULLRING
○◀	INDUCTIVE CONTROL ENCLOSURE ON POLE
▌◀	INDUCTIVE CONTROL ENCLOSURE ON WALL

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SYMBOLS AND ABBREVIATIONS

DATE: 03/2021
STD DET NO: SA-100
SHT NO: 2 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-100,1-3.dwg | Layout: SA-100.2
PLOTTED: Mar 18, 2021-08:16:04am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

ABBREVIATIONS	DESCRIPTIONS	
BEB	BUILDING EYEBOLT	
CS	CURVE SEGMENT	
DCH	DOUBLE CURVE HANGER	
LHI	LEFT HAND INDUCTIVE SWITCH	
RHI	RIGHT HAND INDUCTIVE SWITCH	
LHD	LEFT HAND DIRECTIONAL SWITCH	
RHD	RIGHT HAND DIRECTIONAL SWITCH	
LHT	LEFT HAND TRAILING SWITCH	
RHT	RIGHT HAND TRAILING SWITCH	
RXO	RIGID CROSSOVER	
XOCS	RIGID CROSSOVER AND CURVE SEGMENT ASSEMBLY	
C, SCL	SEATTLE CITY LIGHT	PRESENTED IN VARIOUS JOINT USE POLE COMBINATIONS
L	LUMINAIRE, SED	
M	METRO	
S	TRAFFIC SIGNAL, SED	
T	TELEPHONE	
V	CABLE TV	
8M, 16M	COPPERWELD GUY WIRE	
8MI, 16MI	COPPERWELD GUY WIRE, COVERED	
IS.	INSULATION IN STRAIGHT	
IC.	INSULATION IN CURVE	
RS	RESET TO STRAIGHT	
RC	RESET TO CURVE	

No.	REVISION	BY	APP'D	DATE

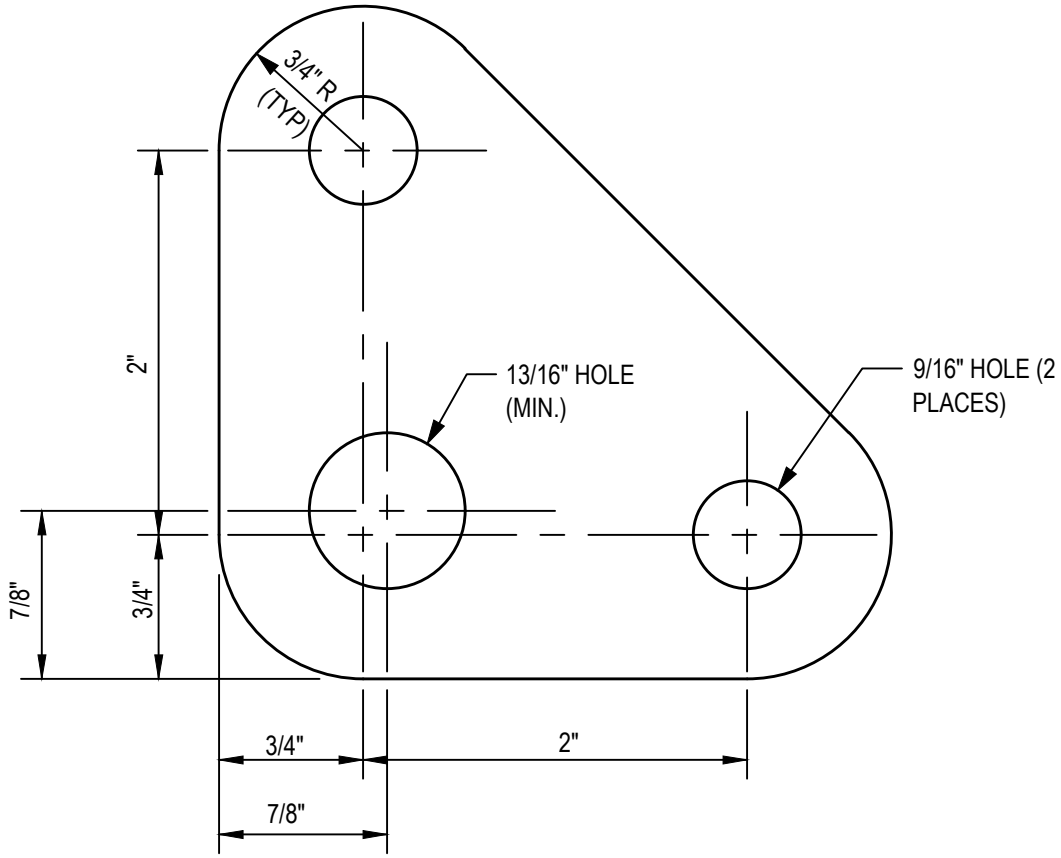
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SYMBOLS AND ABBREVIATIONS

DATE: 03/2021
STD DET NO: SA-100
SHT NO: 3 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-100,1-3.dwg | Layout: SA-100.3
PLOTTED: Mar 18, 2021-08:16:09am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



MATERIAL: ASTM A36 1/2" STEEL PLATE
HOT DP GALVANIZE AFTER FABRICATION.

NOTE: USED ON DOUBLE FEEDER SPANS
AND DEADENDS.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

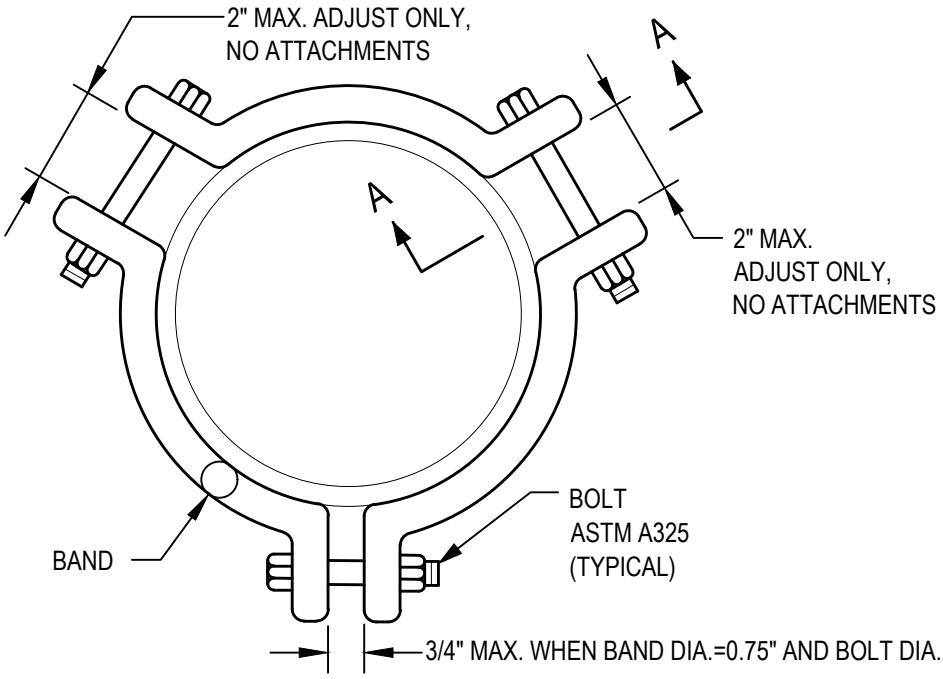
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

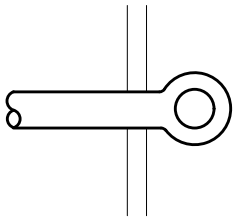
STRAIN PLATE

DATE: 03/2021
STD DET NO: SA-101
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-101-104.dwg | Layout: SA-101
PLOTTED: Mar 18, 2021-08:16:18am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN VIEW



VIEW A-A

COLLAR MAX LOAD = 4000 LB			
DIAMETER RANGE	POLE SIZE		BAND & BOLT DIA.
	BUTT Ø	ATT HT	
4.25" - 5.5"	8"	19' - 24'	.75"
6" - 7.25"	10"	19' - 29'	.75"
7" - 8.25"	11"	19' - 29' .	75"
8" - 9.25"	12"	19' - 29'	75"
9" - 10.25"	13"	19' - 29'	75"
10" - 11.25"	14"	19' - 29'	75"
11" - 12.25"	15"	19' - 29'	75"

COLLAR MAX LOAD = 7000 LB			
DIAMETER RANGE	POLE SIZE		BAND & BOLT DIA.
	BUTT Ø	ATT HT	
9" - 10.25"	13"	19' - 29'	.75"
10" - 11.25"	14"	19' - 29'	1"
11" - 12.25"	15"	19' - 29'	1"

NOTES:

1. CONTACT KORTICK MFG CO AT: 5600 3RD ST, SAN FRANCISCO, CA. (415) 822-6660
2. MAXIMUM NUMBER OF ATTACHMENTS PER COLLAR IS ONE, UNLESS APPROVED BY THE ENGINEER.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

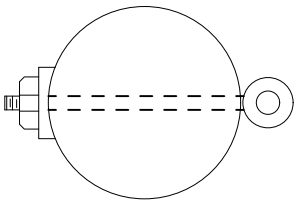
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

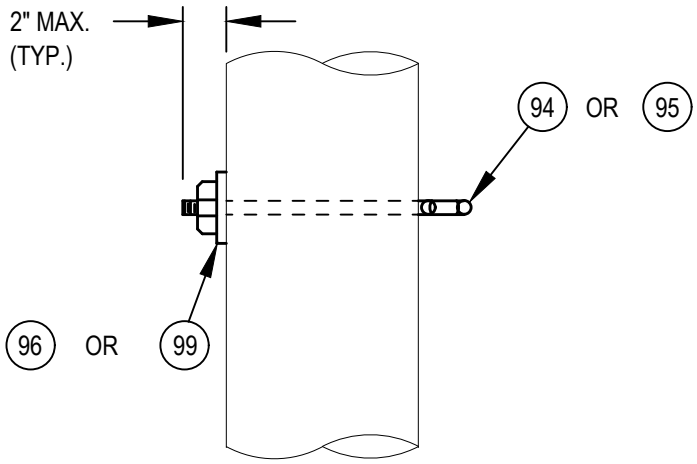
STEEL POLE COLLAR

DATE: 03/2021
STD DET NO: SA-102
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-101-104.dwg | Layout: SA-102
PLOTTED: Mar 18, 2021-08:16:24am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN



WOOD POLE EYEBOLT

NOTES:

1. WOOD POLE EYEBOLTS SHALL HAVE A MINIMUM DIAMETER OF 5/8". 5/8" DIAMETER EYEBOLTS SHALL BE USED FOR WOOD POLE ATTACHMENT OF ALL SINGLE 8M TANGENT WORK SPANS. 3/4" DIAMETER EYEBOLTS SHALL BE USED FOR ALL OTHER WOOD POLE ATTACHMENTS.

2. MULTIPLE CABLE ATTACHMENTS TO 3/4" DIAMETER EYEBOLTS SHALL BE LIMITED TO A RESOLVED (RESULTANT) DESIGN TENSION OF 5000 LBS @ 60 DEGREES F.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
94	*	5/8" OVAL EYEBOLT W/ NUT	JOSLYN	J94XX
95	*	3/4" OVAL EYEBOLT W/ NUT	JOSLYN	J95XX
96	*	SQ CURVED WASHER 3"x3"x 4 ", 1-11/16" DIA	JOSLYN	J113
99	*	SQ CURVED WASHER 3"x3"x 4 ", 1-13/16" DIA	JOSLYN	J6823

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

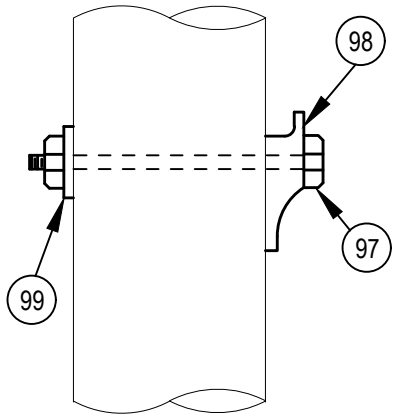
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

WOOD POLE
EYEBOLT ASSEMBLY

DATE: 03/2021
STD DET NO: SA-103
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-101-104.dwg | Layout: SA-103
PLOTTED: Mar 18, 2021-08:16:29am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



WOOD POLE DOWN GUY
ATTACHMENT

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
97	1	¾" MACHINE BOLT	JOSLYN	J89XX
98	1	GUY HOOK, ¾"	JOSLYN	P-133AX
99	1	SQ CURVED WASHER 3"x3" x ¼", 13/16" DIA	JOSLYN	J6823

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

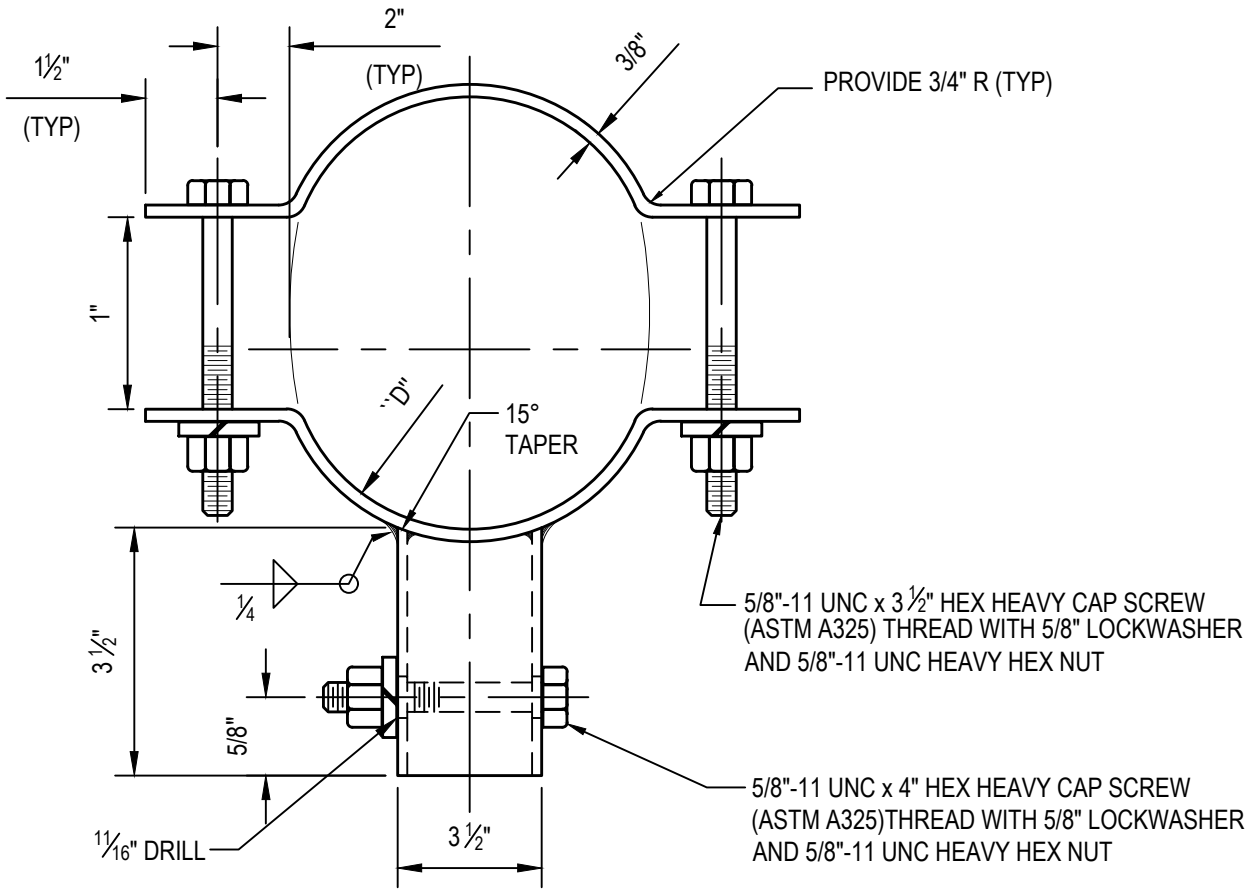
King County METRO

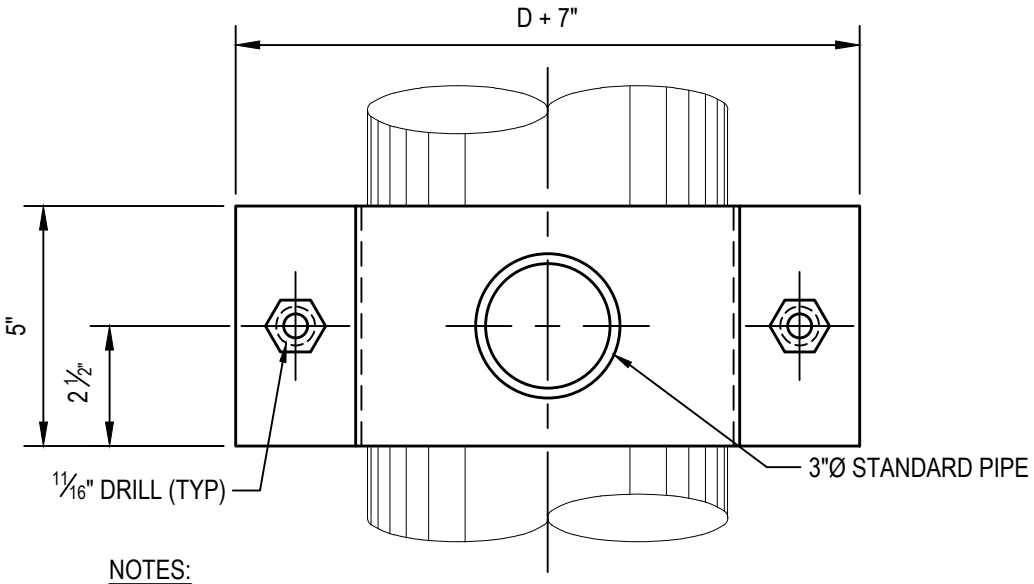
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

WOOD POLE
DOWN GUY ASSEMBLY

DATE: 03/2021
STD DET NO: SA-104
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-101-104.dwg | Layout: SA-104
PLOTTED: Mar 18, 2021-08:16:34am By dbennett
XREFS: TTB A Size.dwg
IMAGES:





NOTES:

1. DIMENSION "D" TO BE FIELD MEASURED AT DESIGN ATTACHMENT HEIGHT. .
2. MATERIAL FOR COLLARS SHALL BE ASTM A-36 STEEL. HOT DIP GALVANIZE METAL AFTER FABRICATION.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

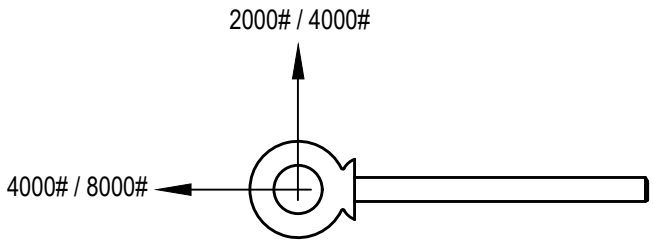
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

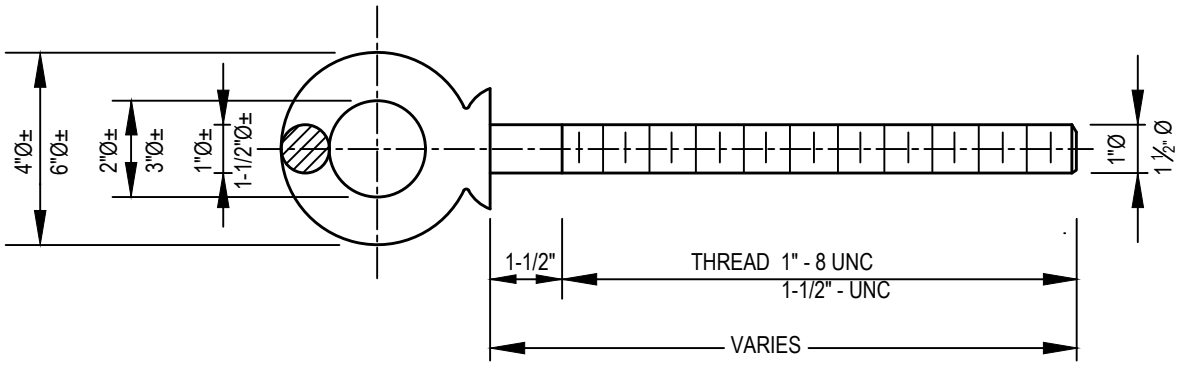
COMPRESSION POLE END CAP POLE COLLAR

DATE: 03/2021
STD DET NO: SA-106
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-106-114.dwg | Layout: SA-106
PLOTTED: Mar 18, 2021-08:16:44am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



ALLOWABLE DEAD LOAD AT 60°.



GENERAL NOTES:

1 EYEBOLT SHALL BE 1" DROP FORGED, STAINLESS STEEL, SHOULDER PATTERN; MADE FROM TYPE 316 STAINLESS STEEL.

2 EYEBOLT SHALL BE MCGRAW-EDISON, CAMPBELL CHAIN M-29-ST 640-5015, MCMASTER-CARR 3032T49. NUMBERS ARE FOR 6" LENGTH; OTHER LENGTHS ARE SPECIAL.

3 MATERIAL YIELD STRESS SHALL BE 30,000 PSI MIN. TENSILE STRESS SHALL BE 75,000 PSI MIN.

DESIGN NOTES:

1. THE DEAD LOAD + LIVE LOAD IS 2 TIMES THE ALLOWABLE DEAD LOAD AT 60°.

2. THE BREAKING LOAD IS 4 TIMES THE ALLOWABLE DEAD LOAD AT 60°.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

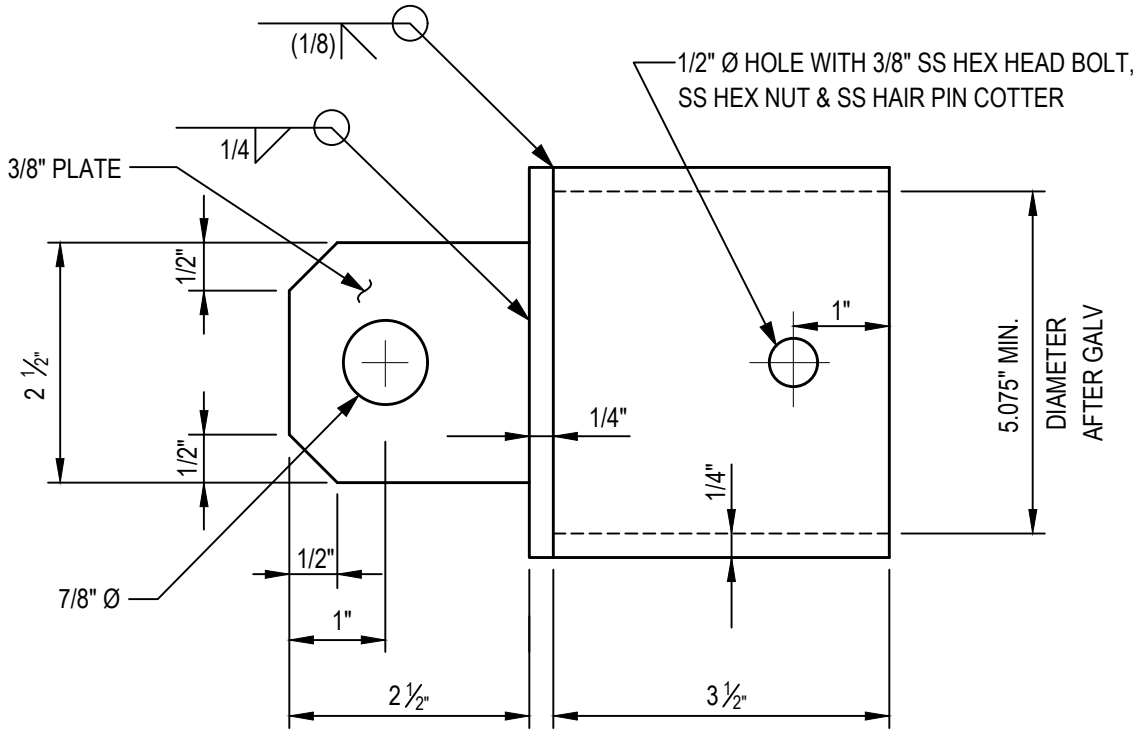
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

STAINLESS STEEL EYEBOLT

DATE: 03/2021
STD DET NO: SA-107
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-106-114.dwg | Layout: SA-107
PLOTTED: Mar 18, 2021-08:16:49am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



POLE END CAP DETAIL

NOTES:

1. GALVANIZE AFTER FABRICATION.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

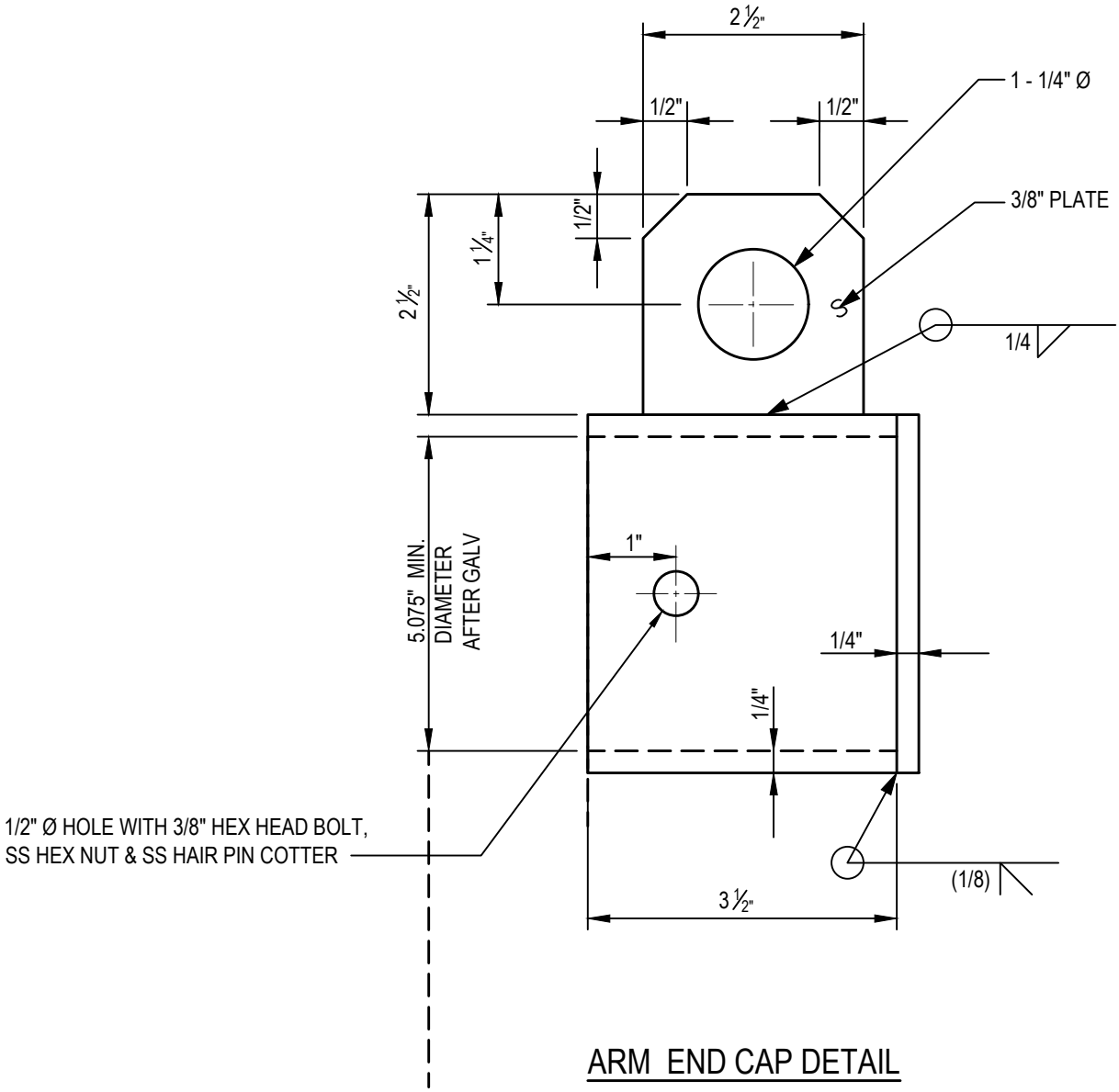
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

BRACKET ARM
POLE END CAP

DATE: 03/2021
STD DET NO: SA-108
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-106-114.dwg | Layout: SA-108
PLOTTED: Mar 18, 2021-08:16:54am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



ARM END CAP DETAIL

NOTES:

1. GALVANIZE AFTER FABRICATION.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

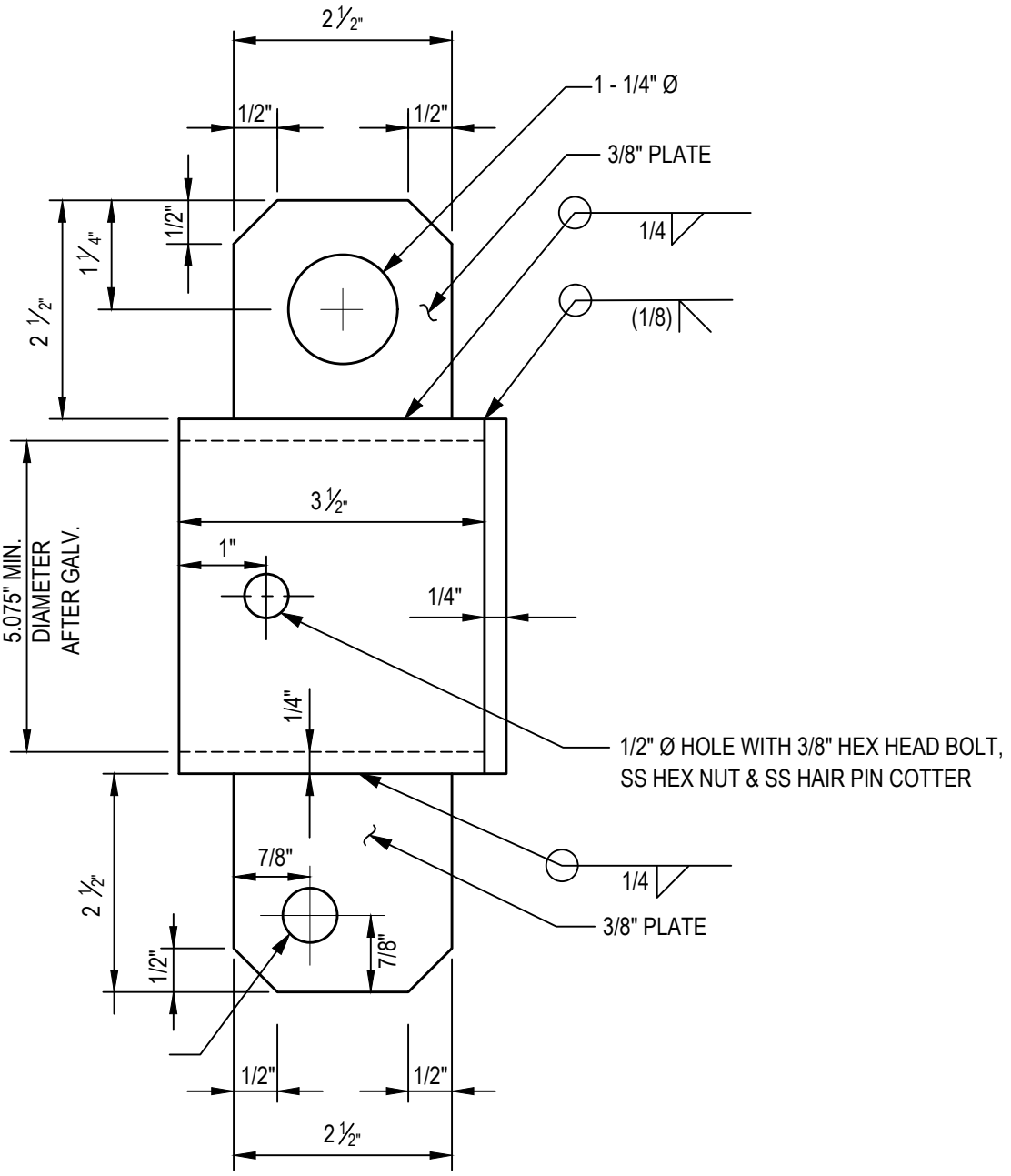
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

BRACKET ARM
END CAP

DATE: 03/2021
STD DET NO: SA-109
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-106-114.dwg | Layout: SA-109
PLOTTED: Mar 18, 2021-08:16:59am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



UNDERSLING END CAP DETAIL

NOTES:

1. GALVANIZE AFTER FABRICATION.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

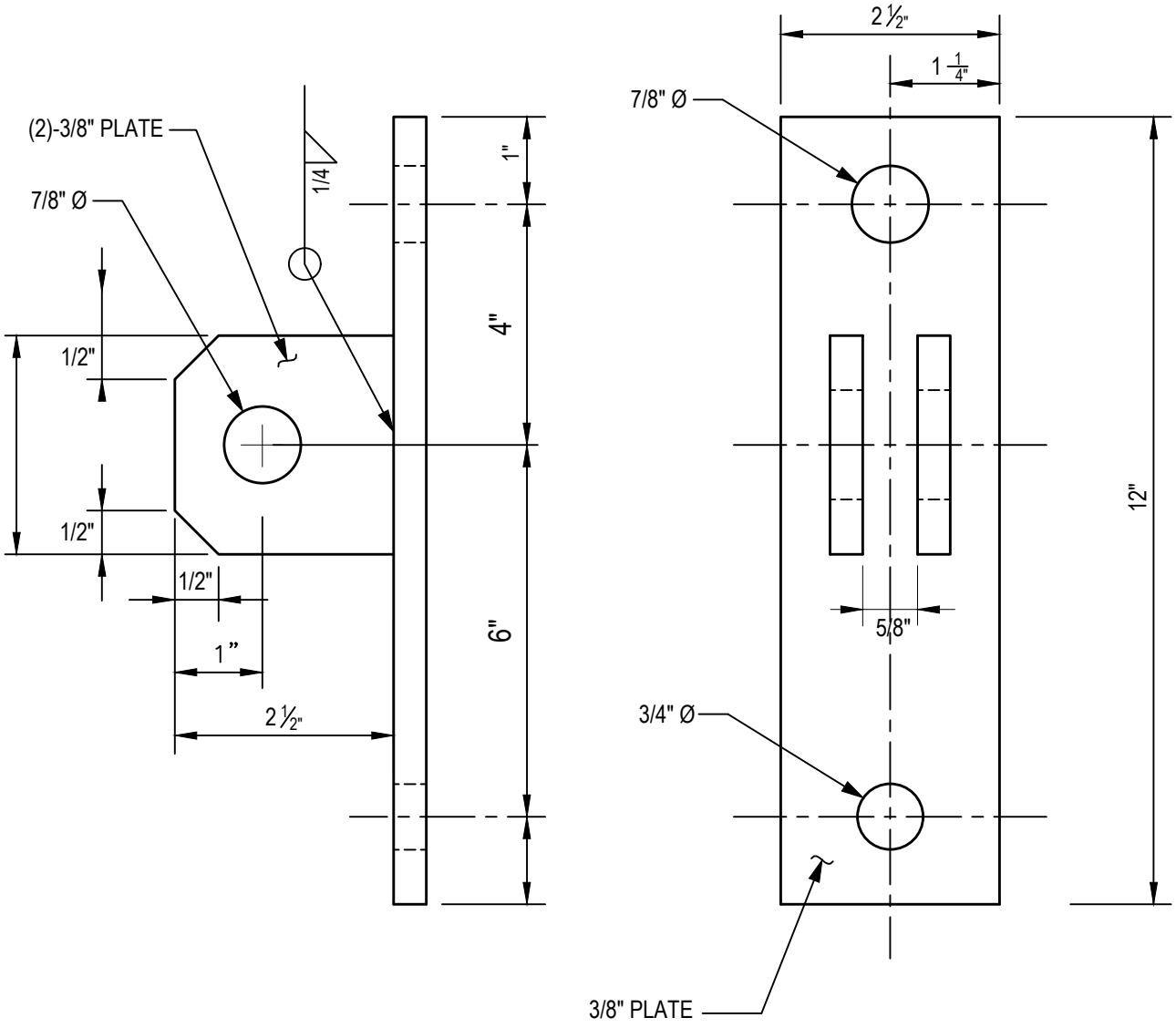
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

BRACKET ARM
UNDERSLING END CAP

DATE: 03/2021
STD DET NO: SA-110
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-106-114.dwg | Layout: SA-110
PLOTTED: Mar 18, 2021-08:17:04am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



WOOD POLE

MOUNTING BRACKET DETAIL

NOTES:

1. GALVANIZE AFTER FABRICATION.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

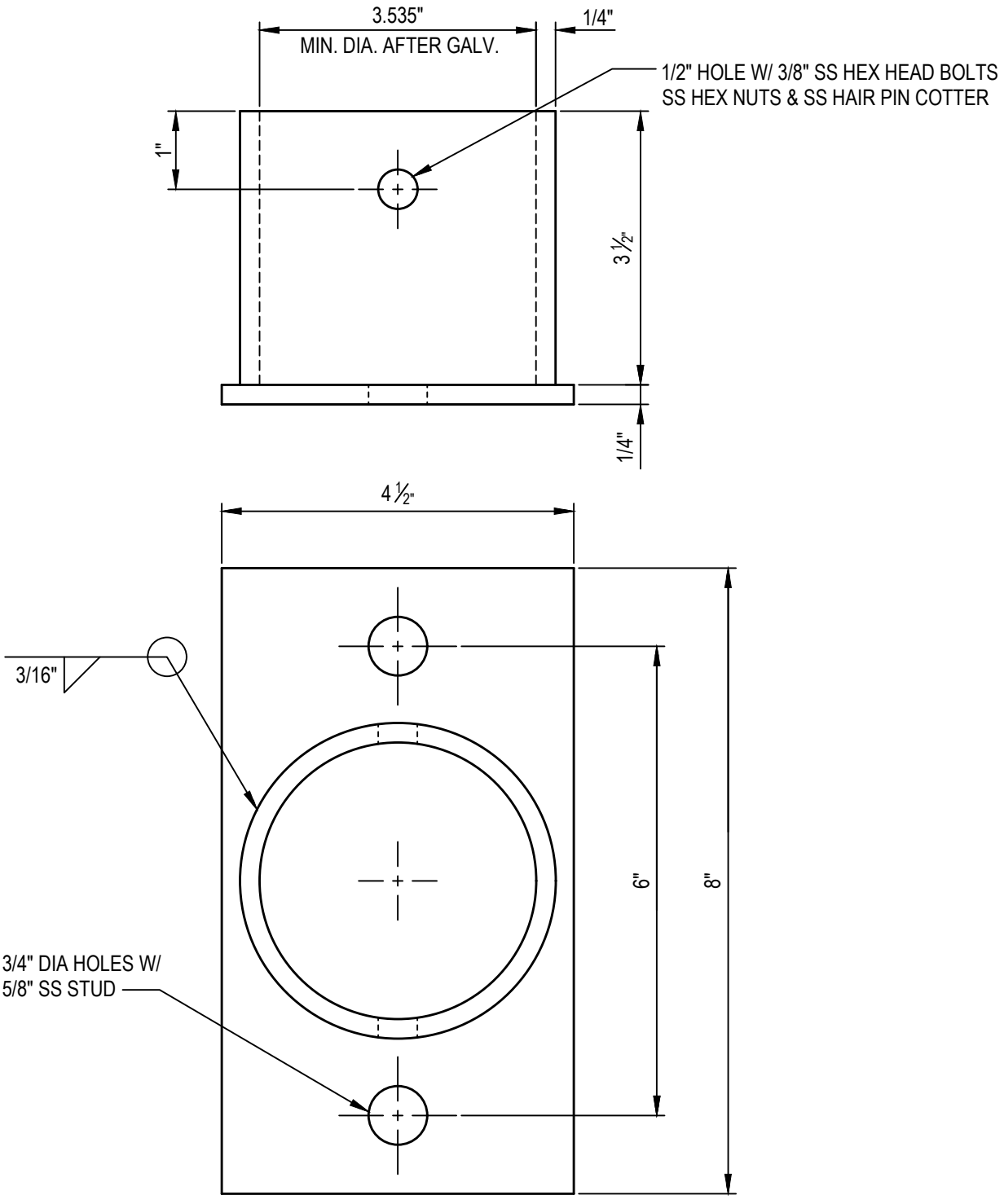
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

WOOD POLE
MOUNTING BRACKET

DATE: 03/2021
STD DET NO: SA-111
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-106-114.dwg | Layout: SA-111
PLOTTED: Mar 18, 2021-08:17:09am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



3.5" TUBE SOCKET PLATE

NOTES:

1. HOT DIP GALVANIZE AFTER FABRICATION.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

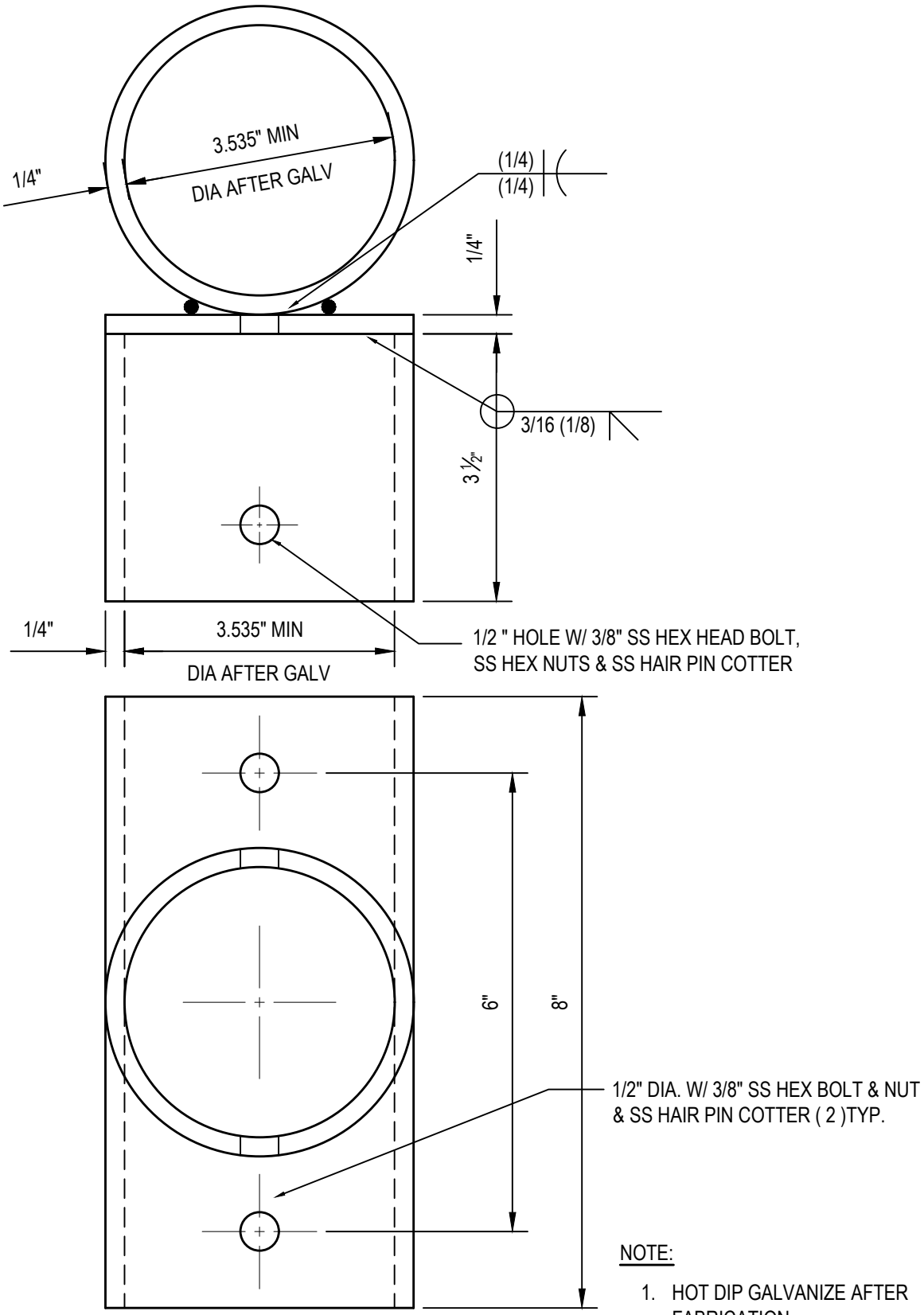
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

3.5" TUBE SOCKET PLATE

DATE: 03/2021
STD DET NO: SA-112
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-106-114.dwg | Layout: SA-112
PLOTTED: Mar 18, 2021-08:17:14am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTE:

1. HOT DIP GALVANIZE AFTER FABRICATION

3.5" TUBE TEE SLIPFIT & SOCKET

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

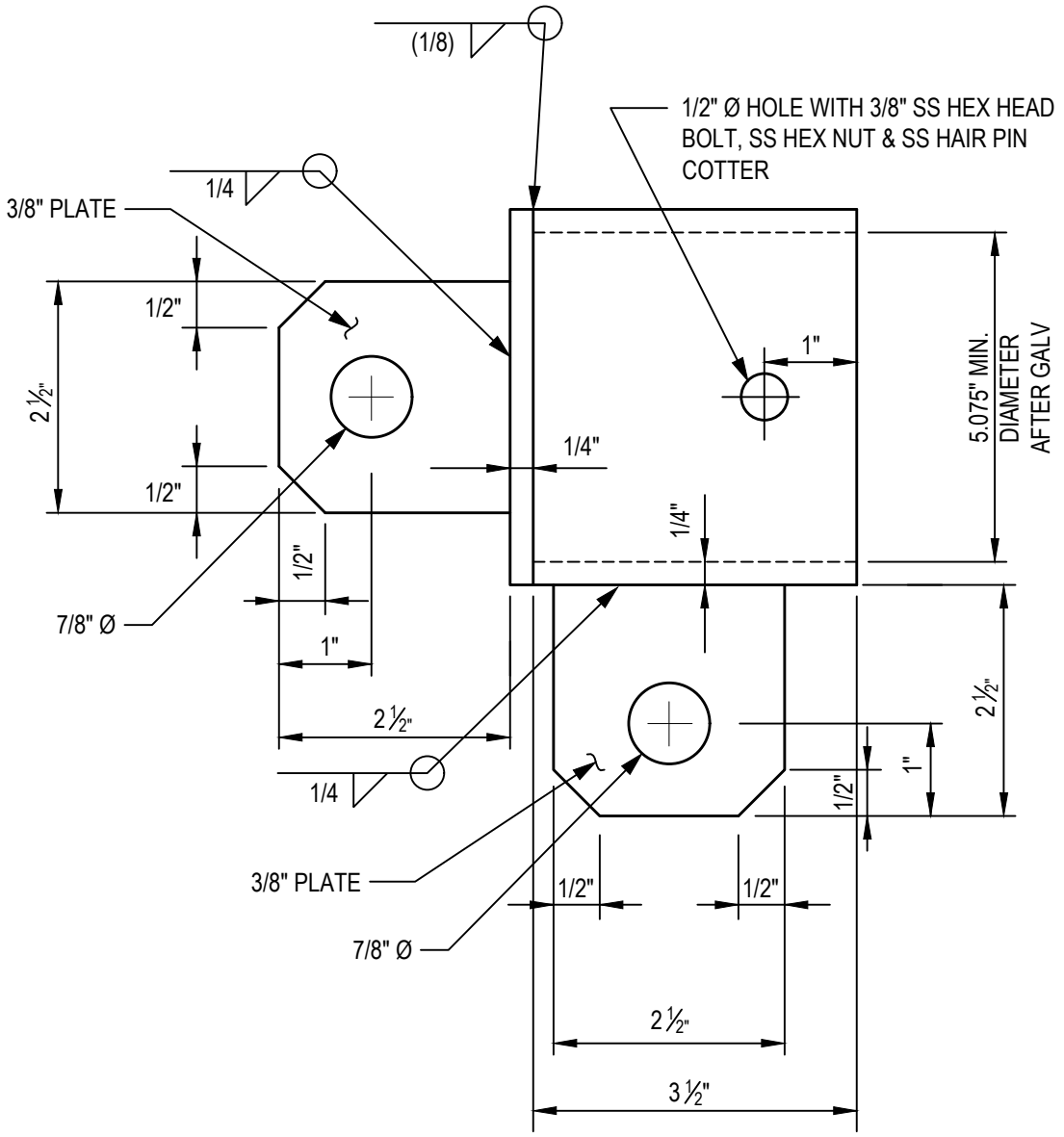
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

3.5" TUBE TEE SLIPFIT & SOCKET

DATE: 03/2021
STD DET NO: SA-113
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-106-114.dwg | Layout: SA-113
PLOTTED: Mar 18, 2021-08:17:19am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



POLE END CAP WITH BOTTOM TAB DETAIL

NOTE:

1. HOT DIP GALVANIZE AFTER FABRICATION

No.	REVISION	BY	APP'D	DATE

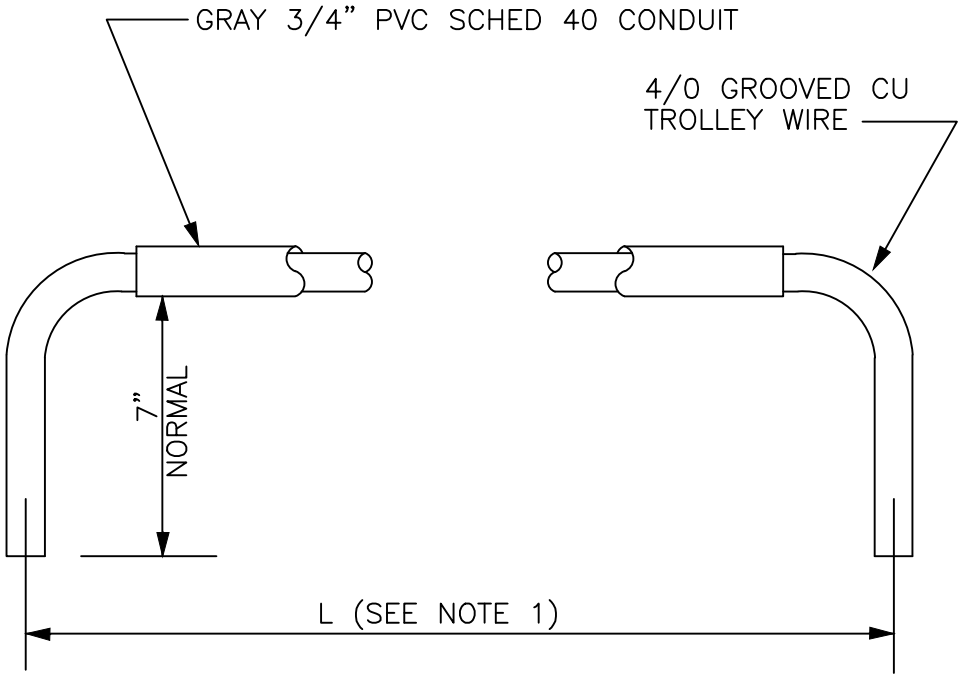
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
BRACKET ARM
POLE END CAP
WITH BOTTOM TAB

DATE: 03/2021
STD DET NO: SA-114
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-106-114.dwg | Layout: SA-114
PLOTTED: Mar 18, 2021-08:17:24am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. JUMPER WIRE AND ASSOCIATED INSULATING SLEEVE SHALL BE FIELD CUT TO LENGTH AS REQUIRED FOR EACH SPECIAL WORK DEVICE.

No.	REVISION	BY	APP'D	DATE

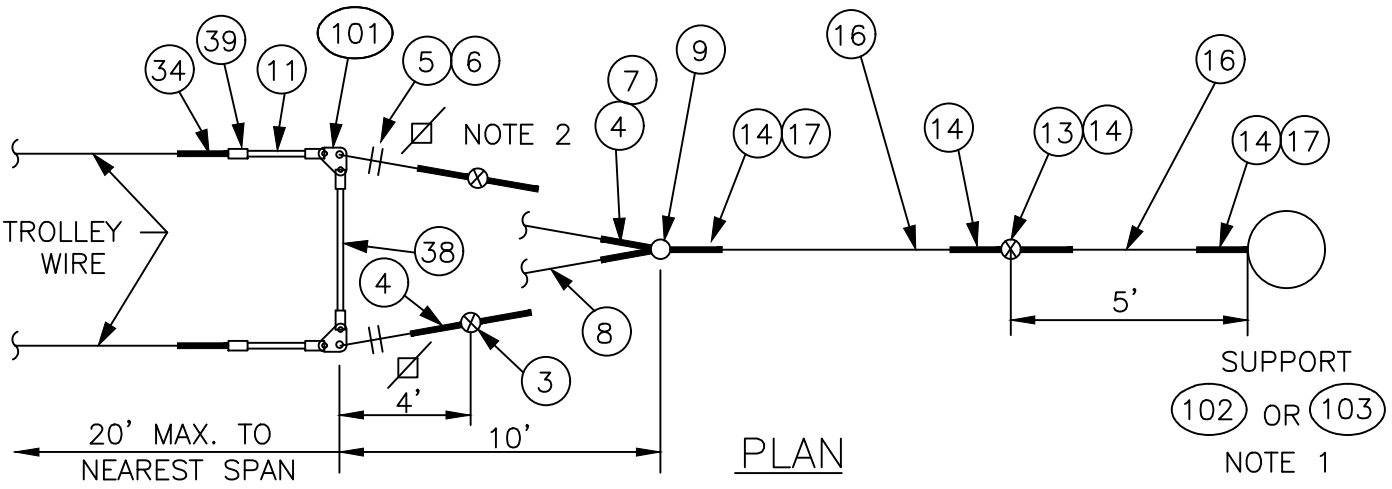
DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SPECIAL WORK
INSULATED
JUMPER ASSEMBLY

DATE: 03/2021
STD DET NO: SA-151
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-151-153.dwg | Layout: SA-151
PLOTTED: Nov 21, 2021-09:05:43pm By AnderLS
XREFS:
IMAGES:



DEAD END ASSEMBLY (A)

NOTES

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS SHOWN ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	6	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	1	BULL RING	WABCO	18567–2000
11	2	7/8 TRANSLITE STRAIN INSUL CL–CL	WABCO	54975–6120
13	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	4	GUY GRIP DEADEND	PREFORMED	CDE–3115
16	VARIES	GUY STRAND	COPPERWELD	16M
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
34	2	TYPE T DOUBLE EAR STRAIN CLAMP	WABCO	17700–2000
38	1	7/8 TRANSLITE STRAIN INSUL CL–CL	WABCO	54975–6200
39	2	5/8" SHACKLE	WABCO	13722–2000
101	2	STRAIN PLATE	METRO STD	SA–101
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

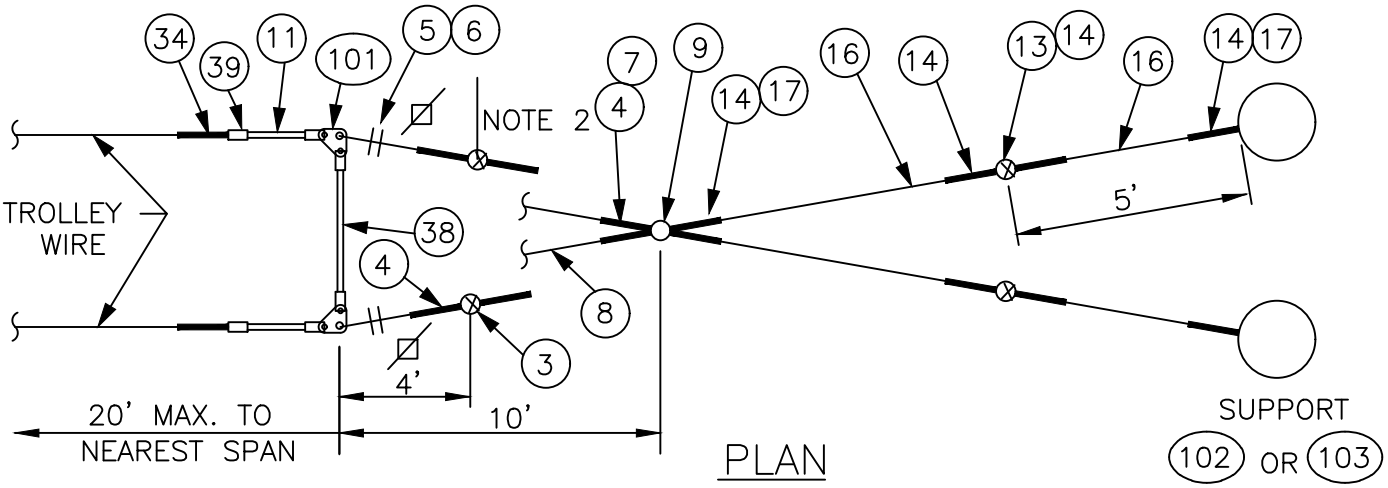
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

TROLLEY WIRE DEADEND ASSEMBLY

DATE: 03/2021
STD DET NO: SA-152
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-151-153.dwg | Layout: SA-152.1
PLOTTED: Nov 21, 2021-09:14:00pm By Anderl.S
XREFS:
IMAGES:



PLAN

DEAD END ASSEMBLY (B)

NOTES

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS SHOWN ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	6	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	1	BULL RING	WABCO	18567–2000
11	2	7/8 TRANSLITE STRAIN INSUL CL–CL	WABCO	54975–6120
13	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	8	GUY GRIP DEADEND	PREFORMED	CDE–3115
16	VARIES	GUY STRAND	COPPERWELD	16M
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
34	2	TYPE T DOUBLE EAR STRAIN CLAMP	WABCO	17700–2000
38	1	7/8 TRANSLITE STRAIN INSUL CL–CL	WABCO	54975–6200
39	2	5/8" SHACKLE	WABCO	13722–2000
101	2	STRAIN PLATE	METRO STD	SA–101
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

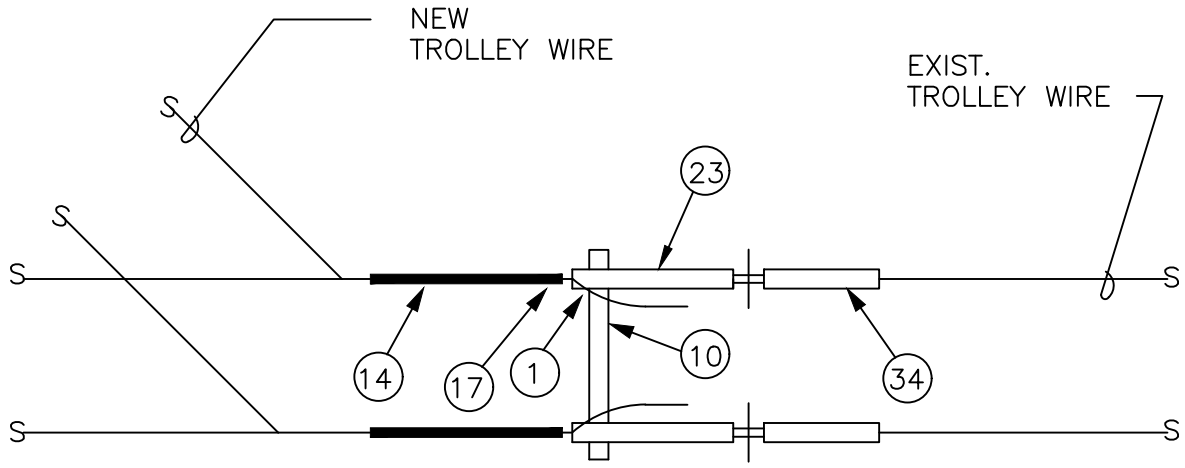
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

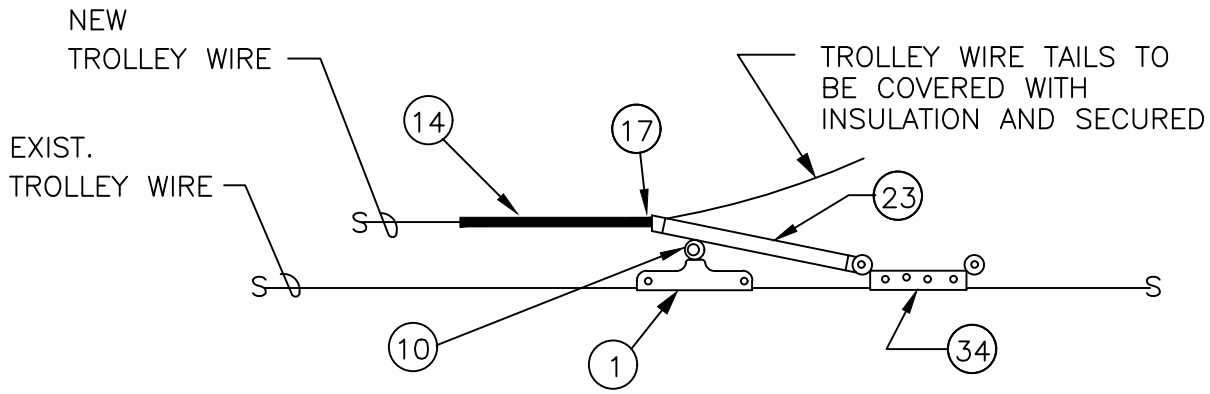
TROLLEY WIRE DEADEND ASSEMBLY

DATE: 03/2021
STD DET NO: SA-152
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-151-153.dwg | Layout: SA-152.2
PLOTTED: Nov 21, 2021-09:15:46am By Anderl.S
XREFS:
IMAGES:



PLAN



ELEVATION

SCALE: NONE

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293–3007
10	1	HI–LITE DOUBLE CURVE HANGER	WABCO	54962–3001
14	2	GUY GRIP DEADEND	PREFORMED	CDE–3115
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
23	2	7/8 TRANSLITE STRAIN INSUL CL–CL	WABCO	54975–6260
34	2	TYPE T DOUBLE EAR STRAIN CLAMP	WABCO	17700–2000

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

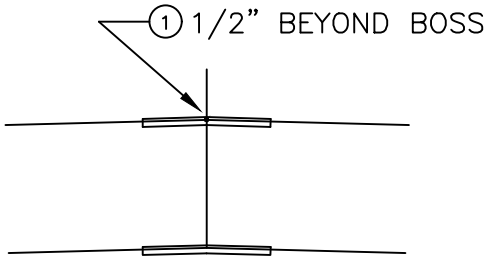
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

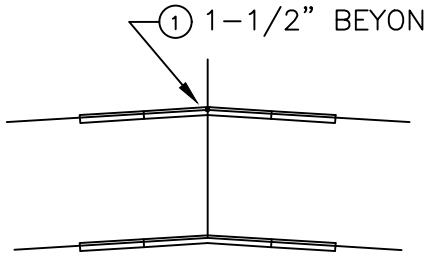
STAGING
DEADEND ASSEMBLY

DATE: 03/2021
STD DET NO: SA-153
SHT NO: 1 OF 1

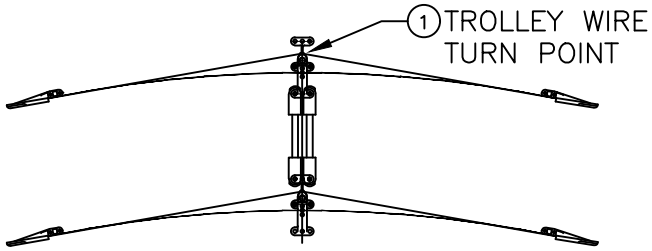
V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-151-153.dwg | Layout: SA-153
PLOTTED: Nov 21, 2021-09:18:16pm By AnderLS
XREFS:
IMAGES:



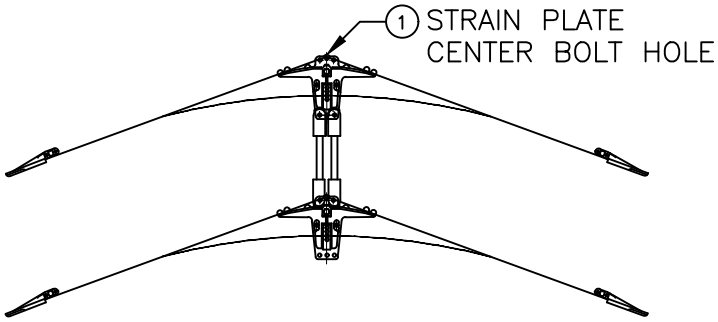
1°–5° CURVE RAIL



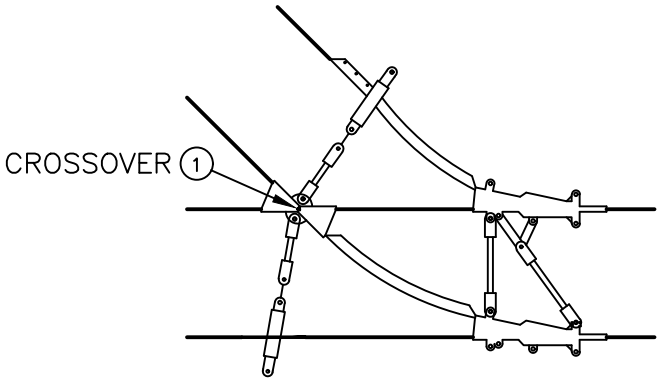
5.5°–7.5° CURVE RAIL



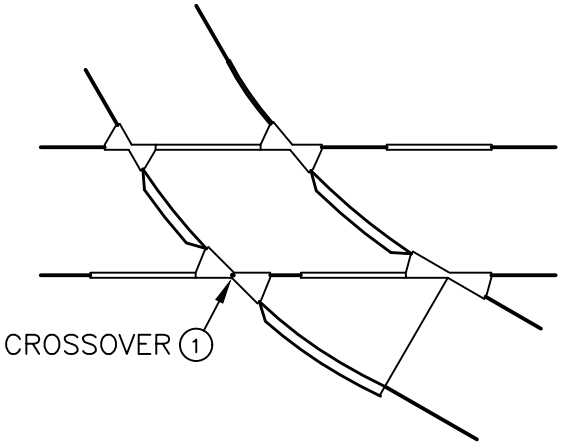
8°–12° & 13°–27° CURVE SEGMENT



28°–47° CURVE SEGMENT



SWITCH OR TRAILING FROG



CROSSOVER/CURVE SEGMENT

1 DEVICE REFERENCE POINT

No.	REVISION	BY	APP'D	DATE

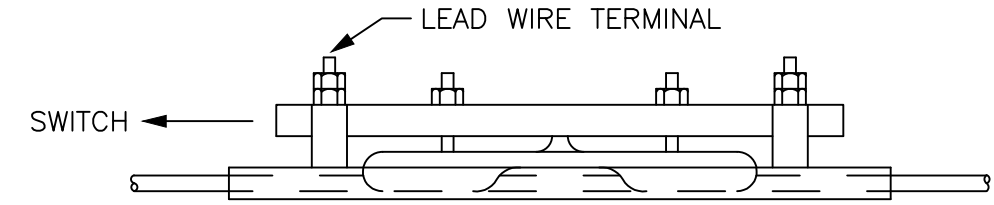
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

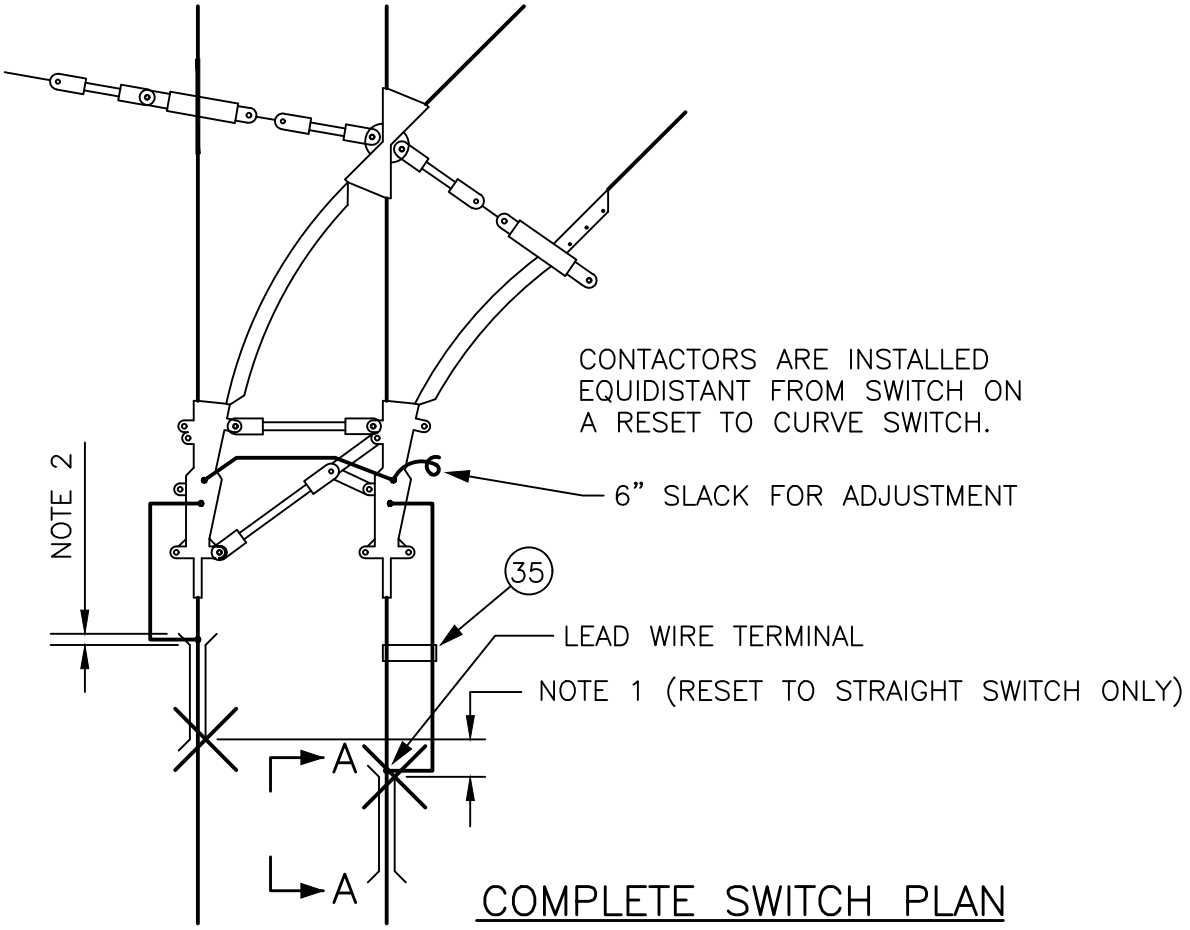
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SPECIAL WORK DEVICE REFERENCE POINT LOCATIONS

DATE: 03/2021
STD DET NO: SA-161
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-161&163.dwg | Layout: SA-161
PLOTTED: Mar 18, 2021-08:17:59am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



CONTACTOR ELEVATION A–A



COMPLETE SWITCH PLAN

NOTES:

1. PROVIDE A 4–1/2" INTERVAL BETWEEN OPPOSITE POLARITY CONTACTORS. MEASURE FROM POINT OF CONTACT WITH TROLLEY SHOE AND CONTACTOR.

2. PROVIDE A 1" OVERLAP BETWEEN CONTACTOR AND END OF SWITCH TROLLEY WIRE CLAMP.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
35	AS REQD	CLAMP, INSUL LEAD WIRE	WABCO	19655–2000

No.	REVISION	BY	APP'D	DATE

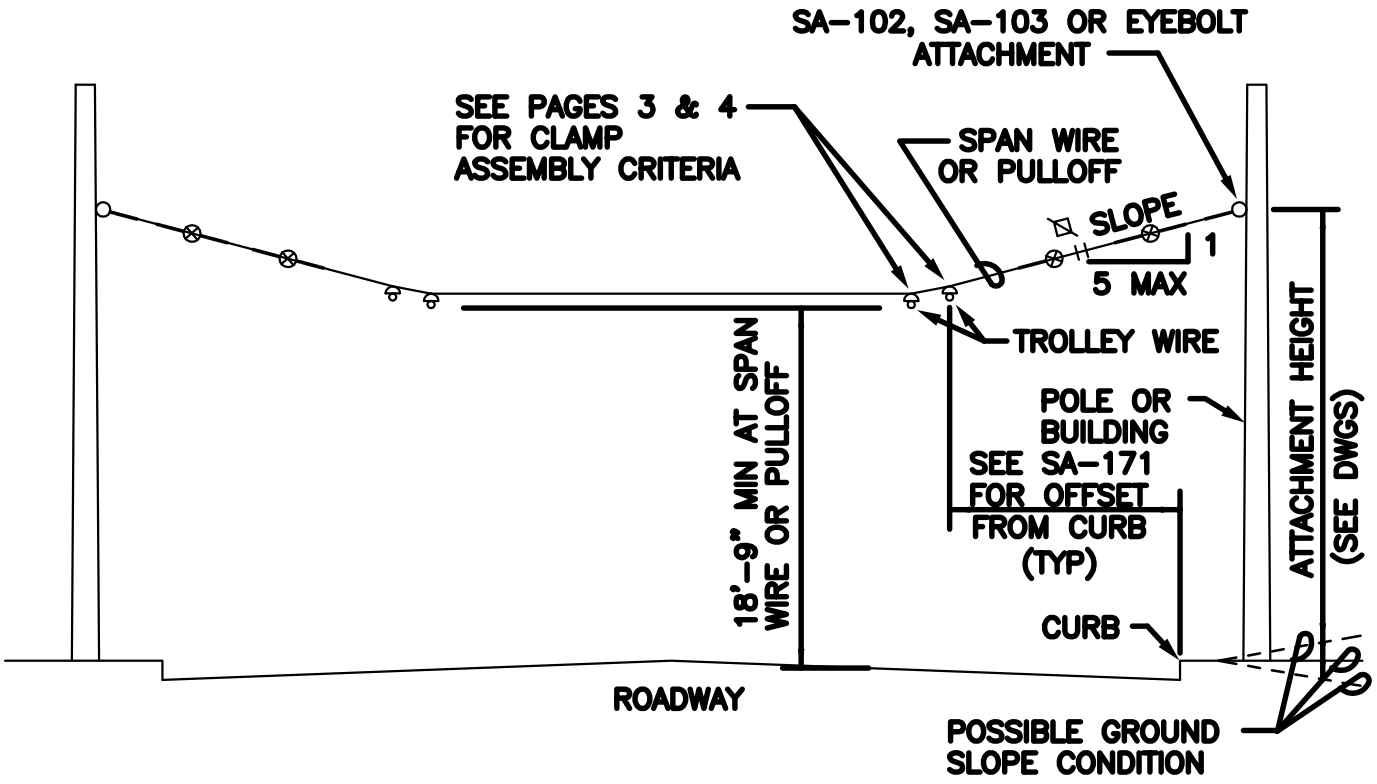
DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

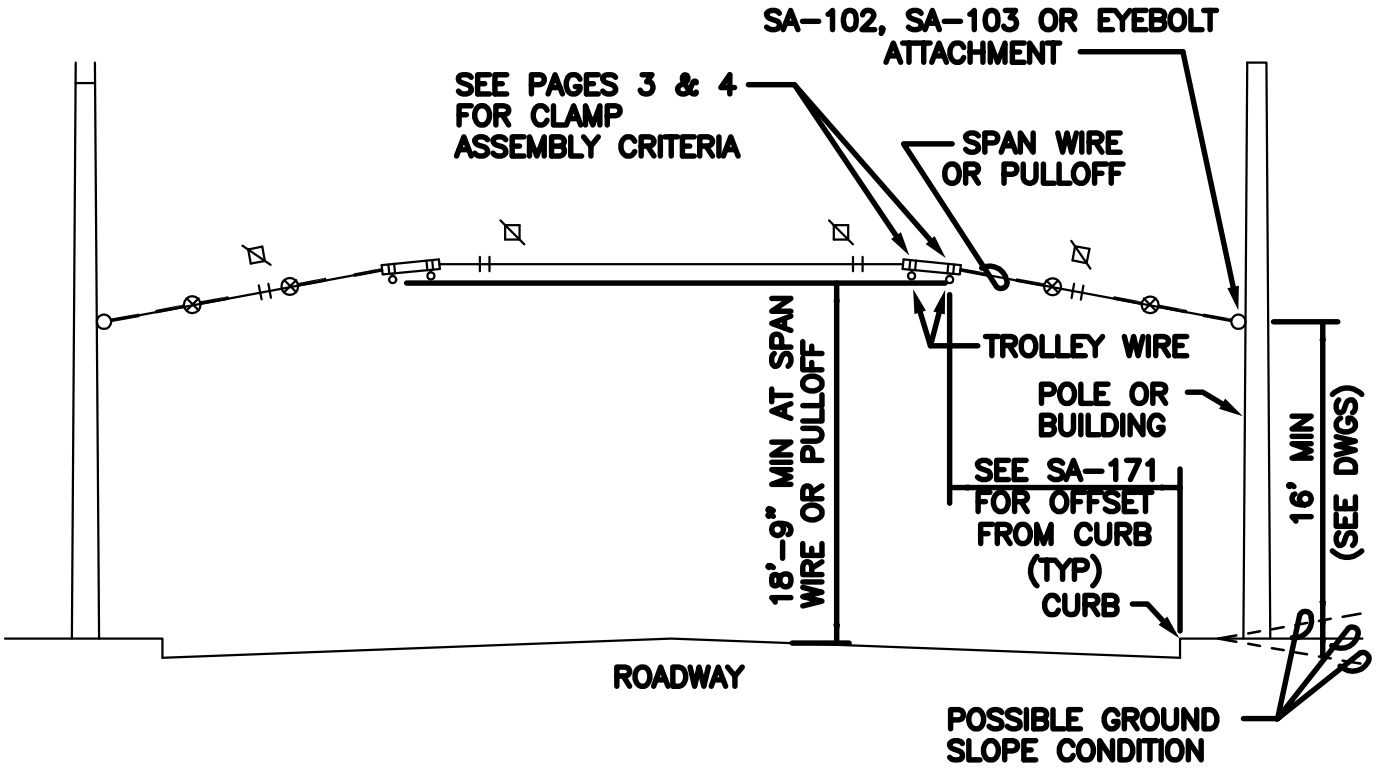
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SPECIAL WORK DEVICE
SWITCH CONTACTOR
CONFIGURATION

DATE: 03/2021
STD DET NO: SA-163
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-161&163.dwg | Layout: SA-163
PLOTTED: Mar 18, 2021-08:04am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



TWO-WAY TANGENT SPAN



TWO-WAY INVERTED SPAN

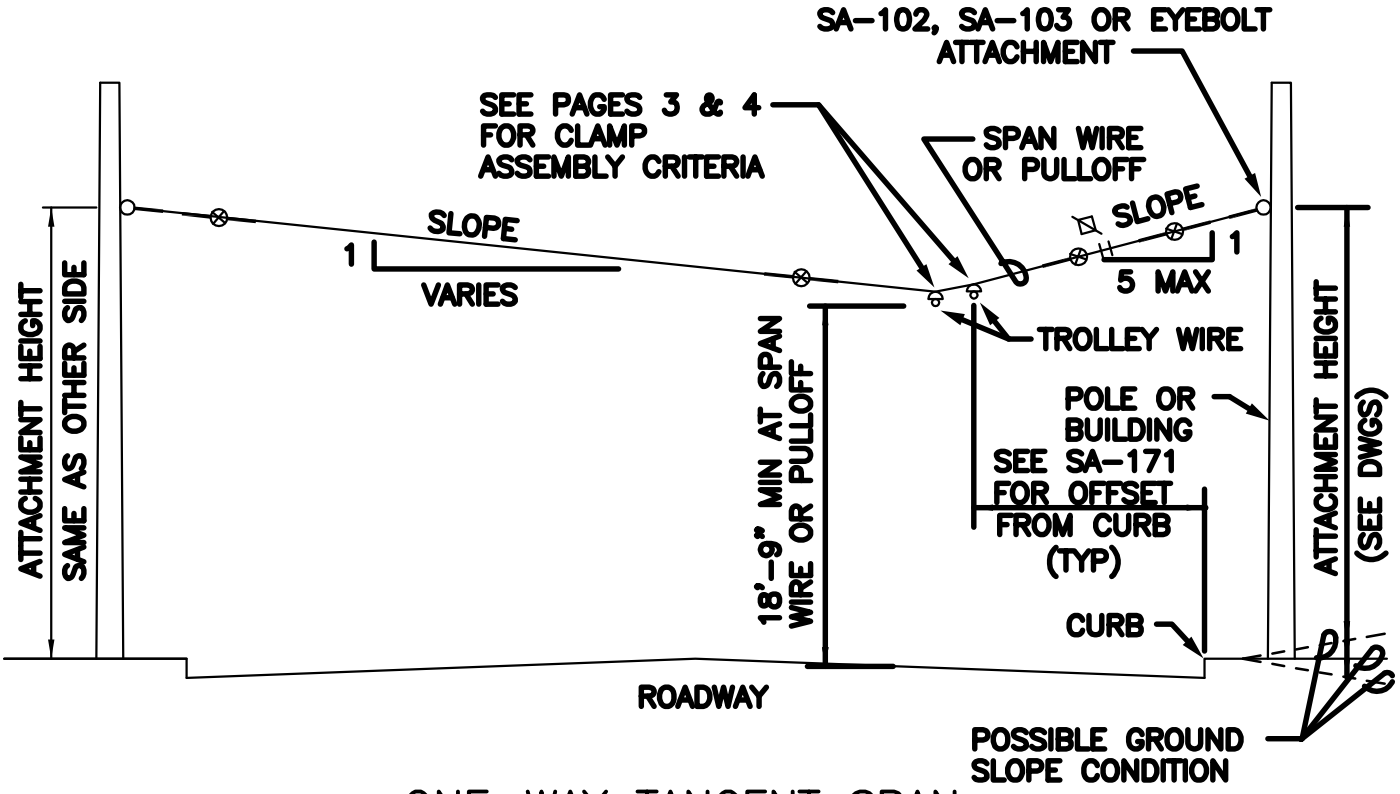
No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: E. TU
CHECKED: J. DAVIS
APPROVED: P. ENG

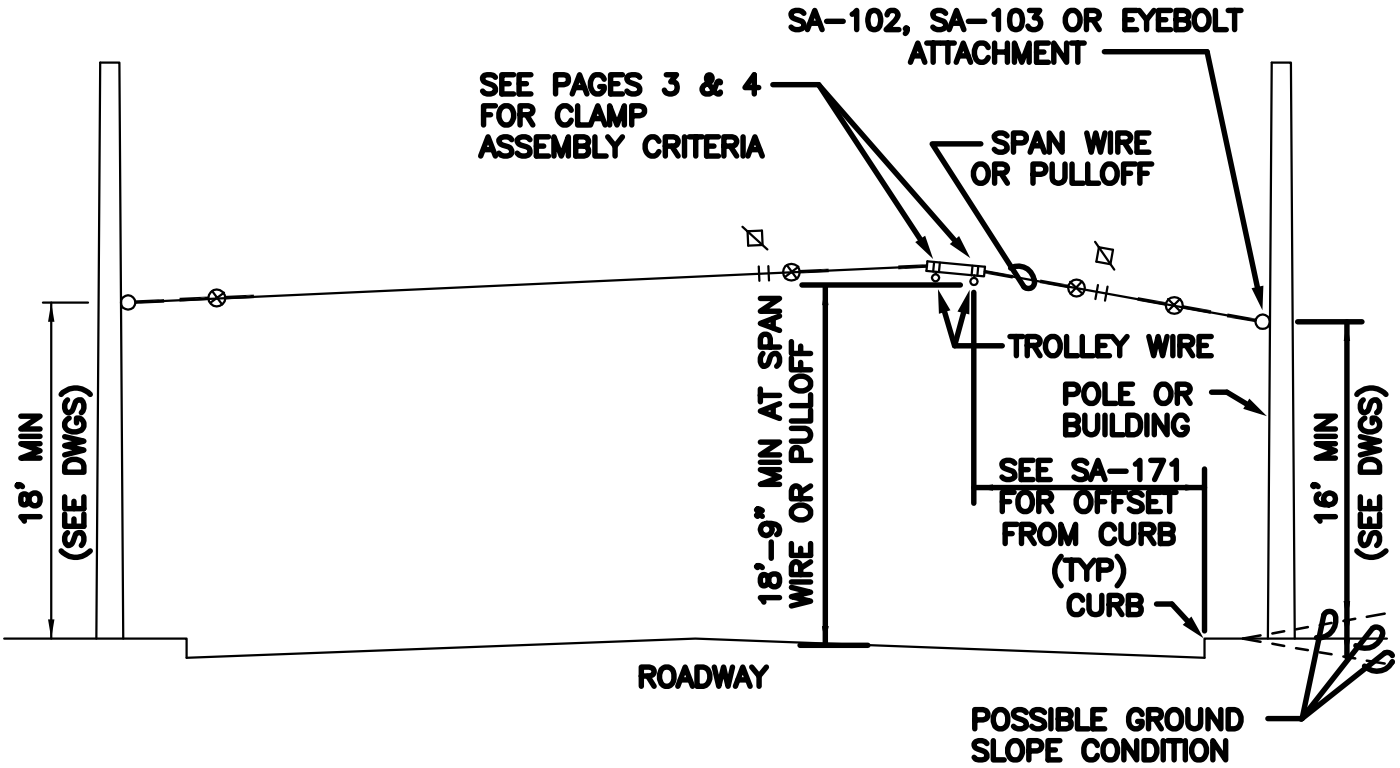
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE SUPPORT SPAN ATTACHMENT CRITERIA

DATE: 03/2022
STD DET NO: SA-164
SHT NO: 1 OF 4



ONE-WAY TANGENT SPAN



ONE-WAY INVERTED SPAN

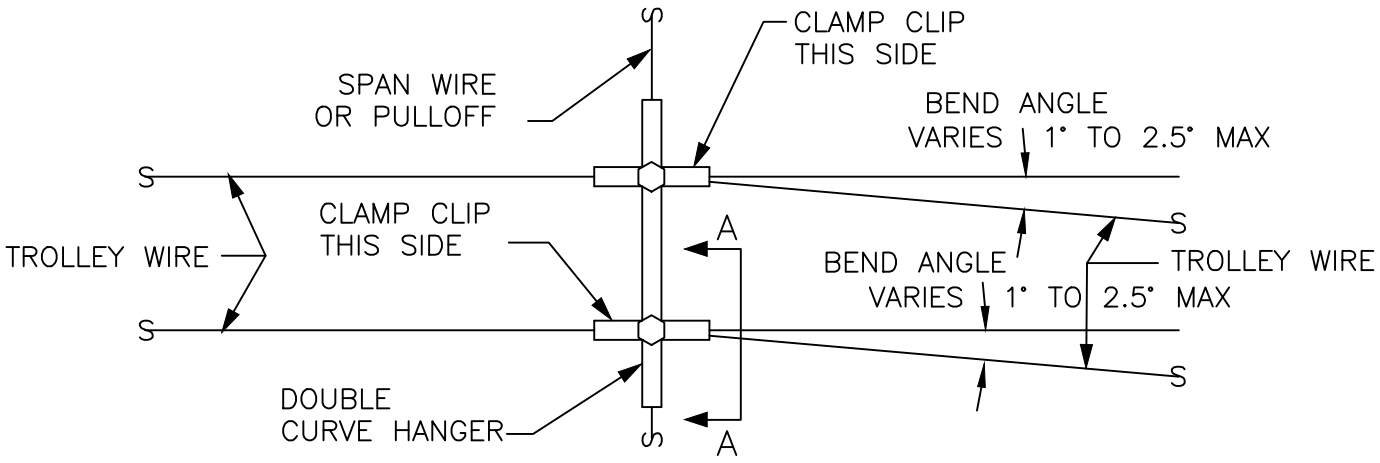
No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: E. TU
CHECKED: J. DAVIS
APPROVED: P. ENG

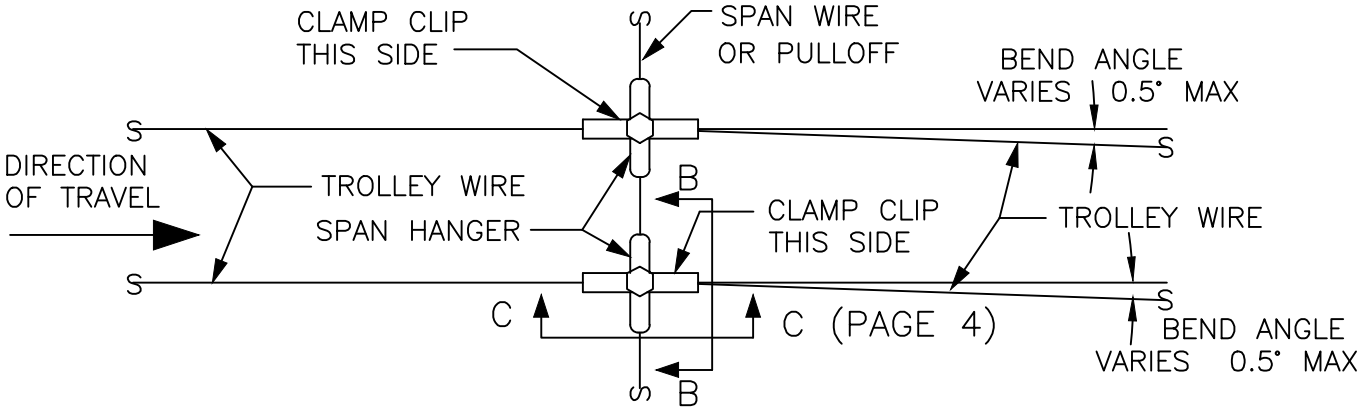
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE SUPPORT SPAN ATTACHMENT CRITERIA

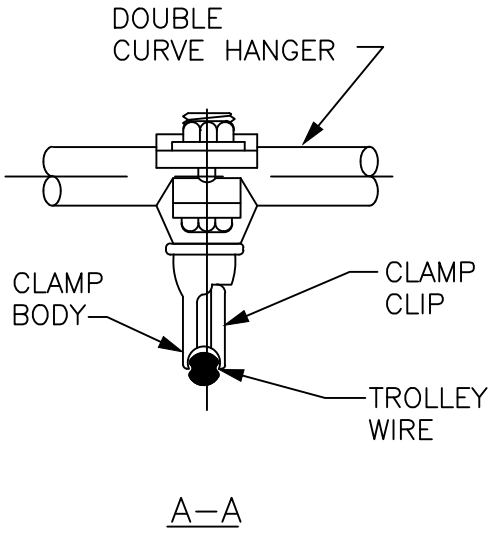
DATE: 03/2022
STD DET NO: SA-164
SHT NO: 2 OF 4



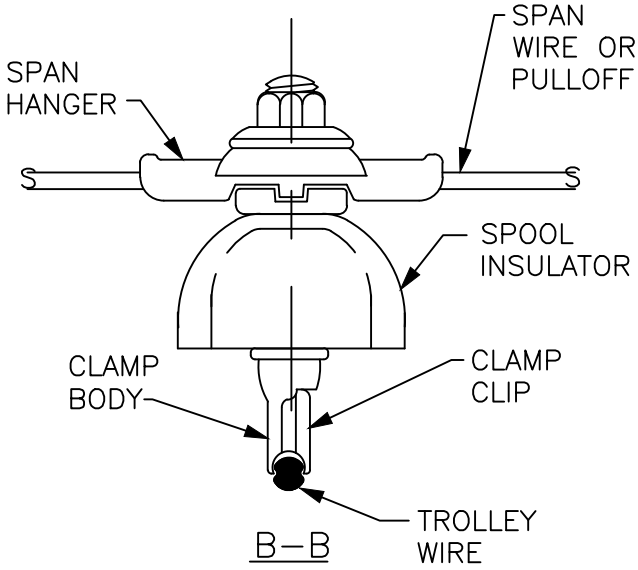
DOUBLE CURVE HANGER SPAN



TANGENT SPAN WITH CURVATURE



A–A



B–B

CLAMP ASSEMBLY CRITERIA

No.	REVISION	BY	APP'D	DATE

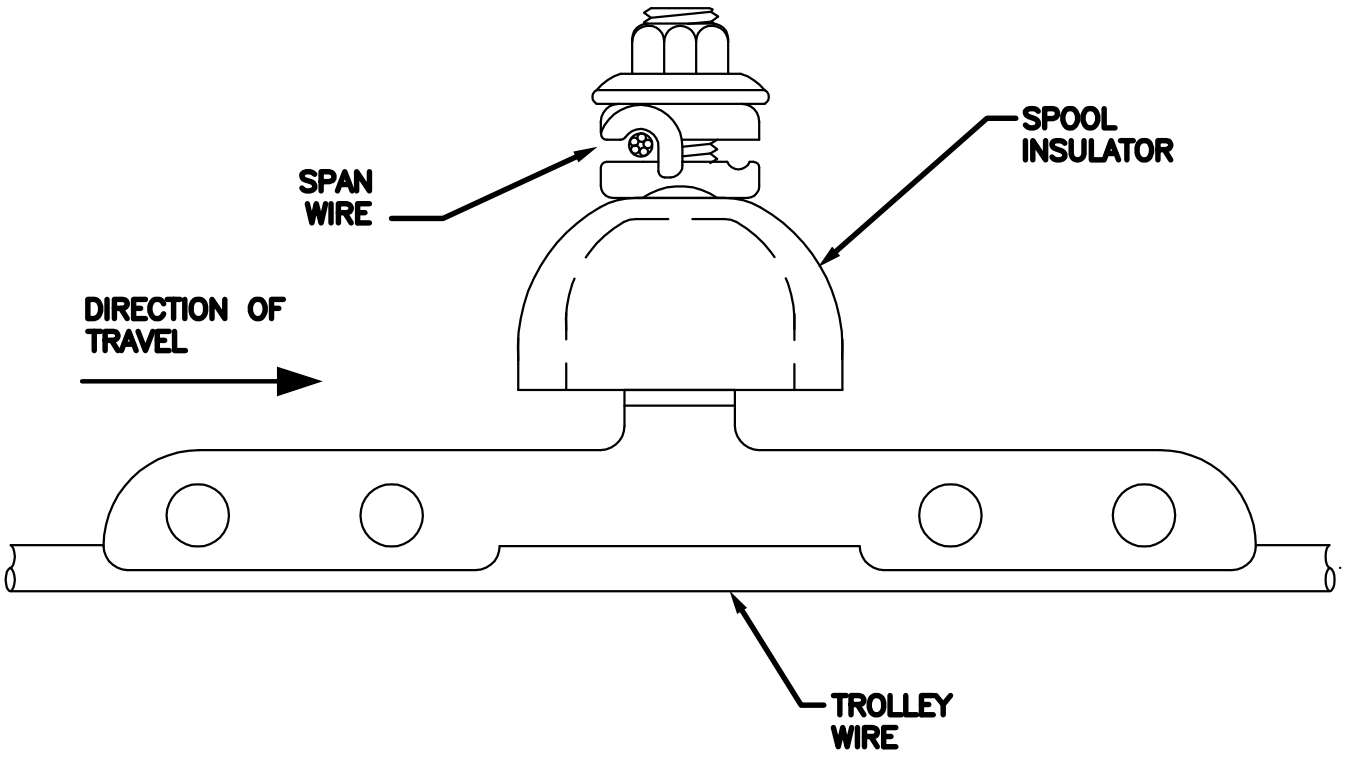
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
TROLLEY WIRE SUPPORT SPAN ATTACHMENT CRITERIA

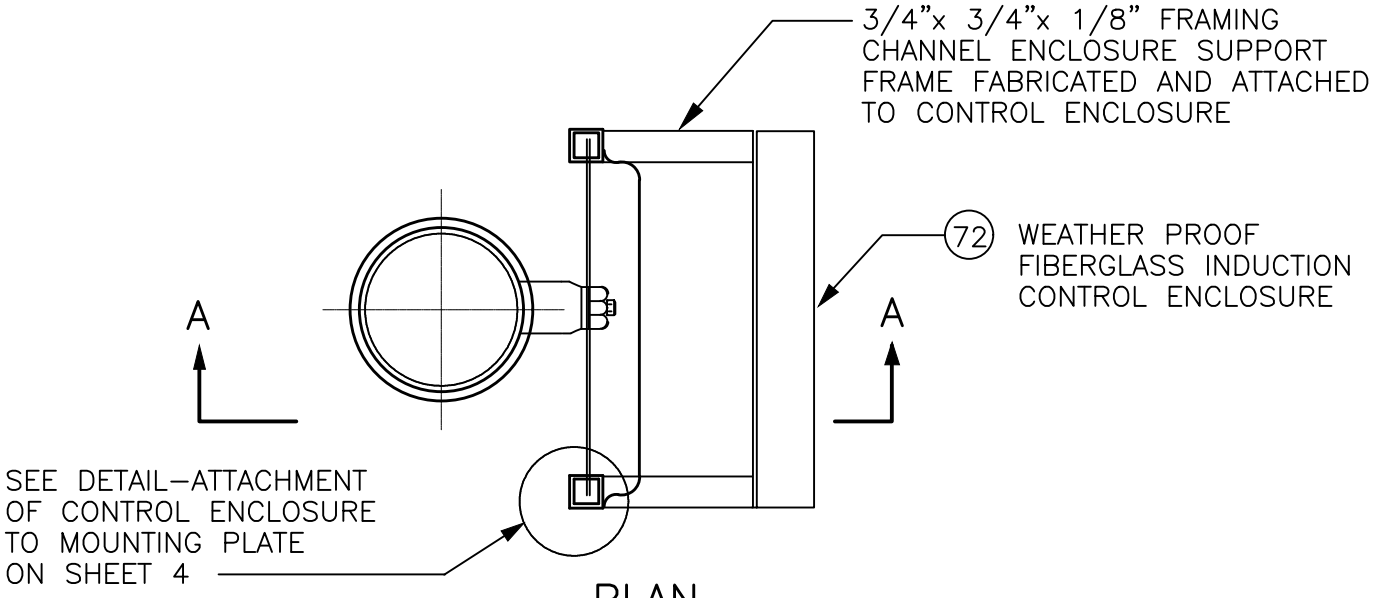
DATE: 11/2021
STD DET NO: SA-164
SHT NO: 3 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-164.1-4.dwg | Layout: SA-164.3
PLOTTED: Nov 21, 2021-09:40:32pm By Anderl.S
XREFS:
IMAGES:

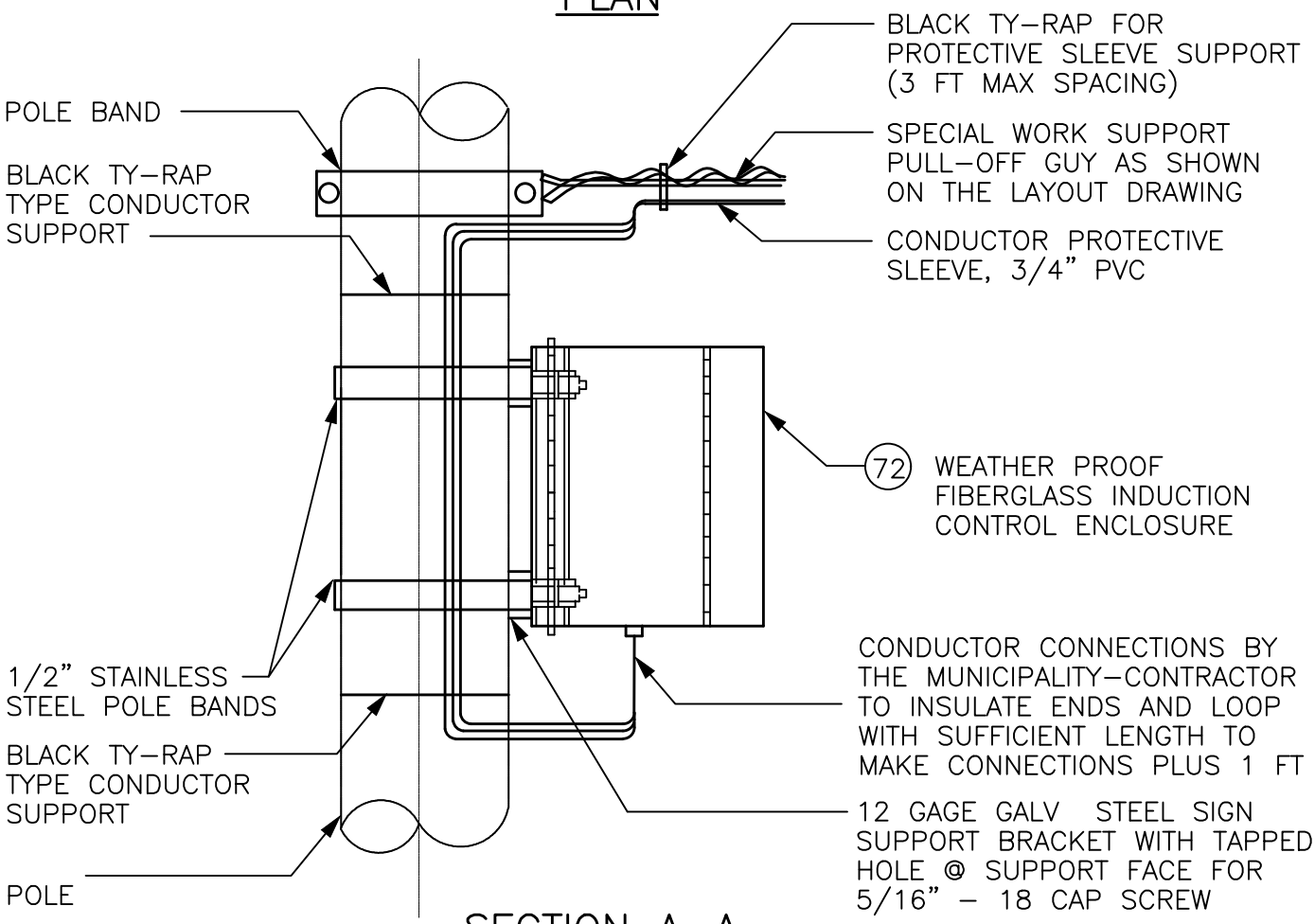


C–C

No.	REVISION	BY	APP'D	DATE	DESIGNED: A. WOLAK	APPROVED: P. ENG	METRO TRANSIT CAPITAL DIVISION TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS	DATE: 03/2022
					DRAWN: E. TU	King County METRO	TROLLEY WIRE SUPPORT SPAN ATTACHMENT CRITERIA	STD DET NO: SA-164
					CHECKED: J. DAVIS			SHT NO: 4 OF 4



PLAN



SECTION A–A

INDUCTION CONTROL ENCLOSURE POLE ASSEMBLY

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

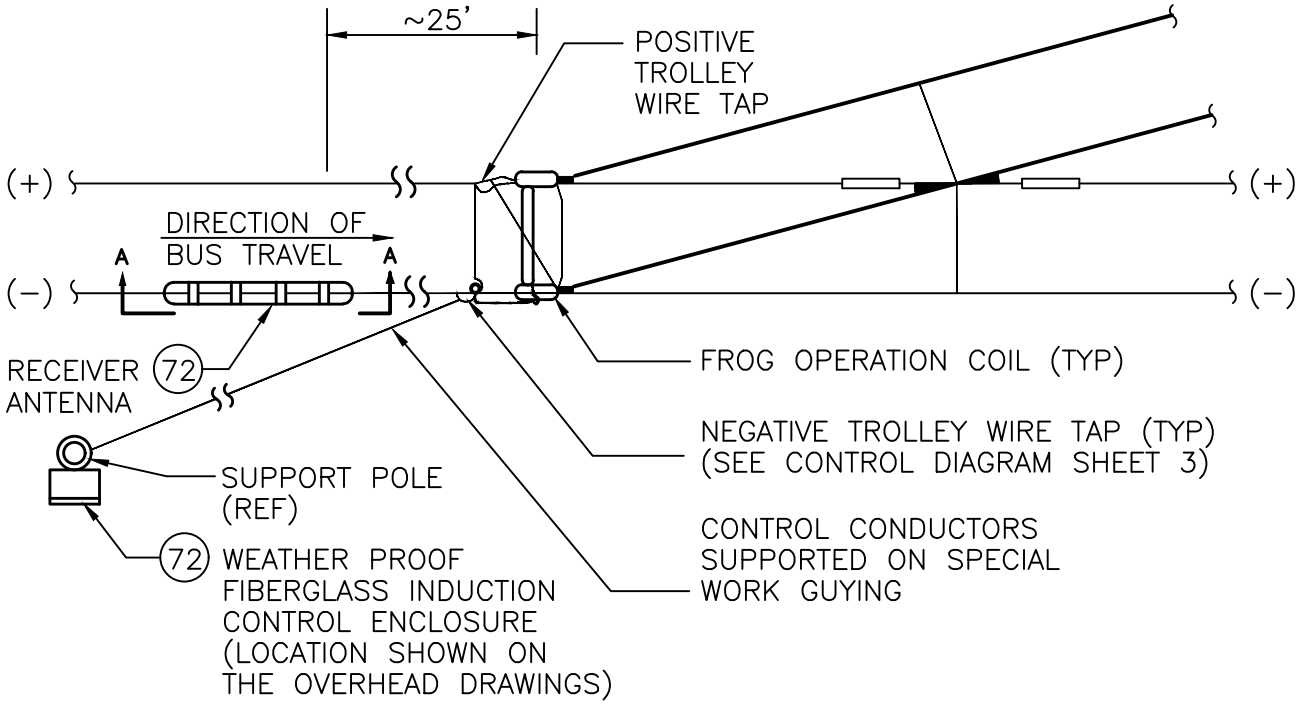
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

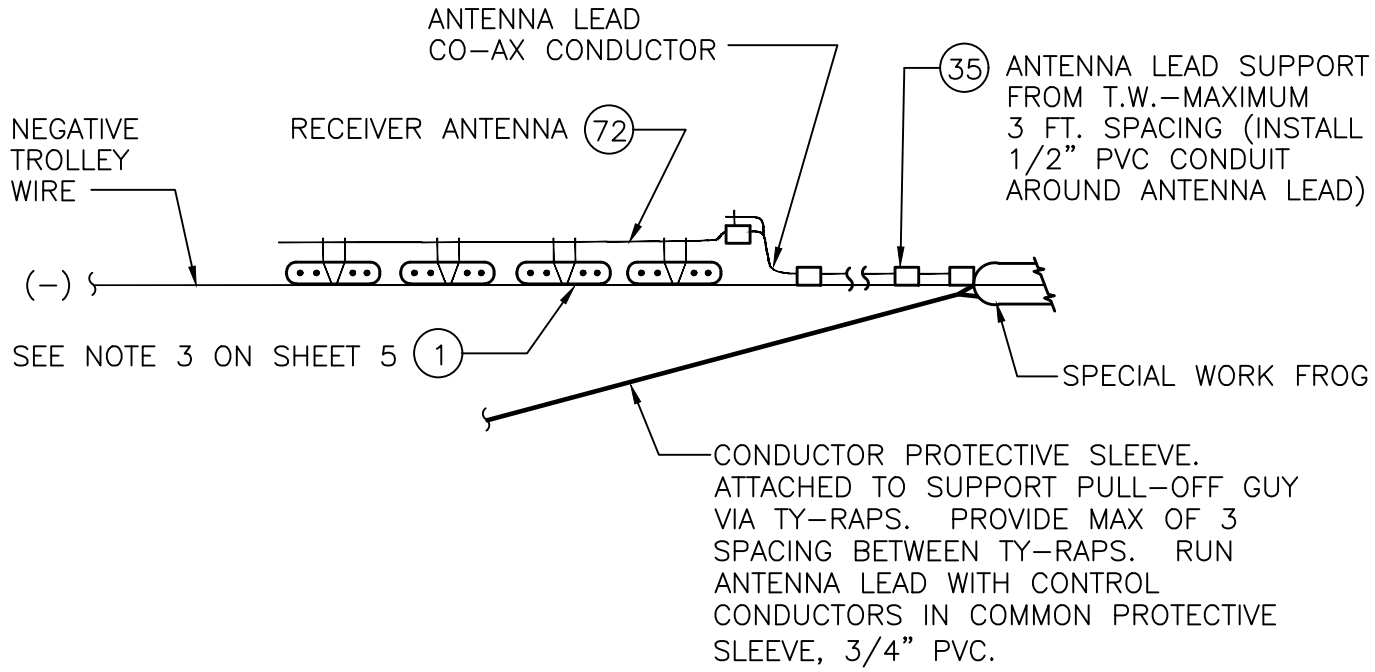
FROG INDUCTION CONTROL SYSTEM

DATE: 03/2021
STD DET NO: SA-165
SHT NO: 1 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-165,1-6.dwg | Layout: SA-165.1
PLOTTED: Mar 18, 2021-08:18:39am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



FROG INDUCTION CONTROL ASSEMBLY PLAN



SECTION A−A

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

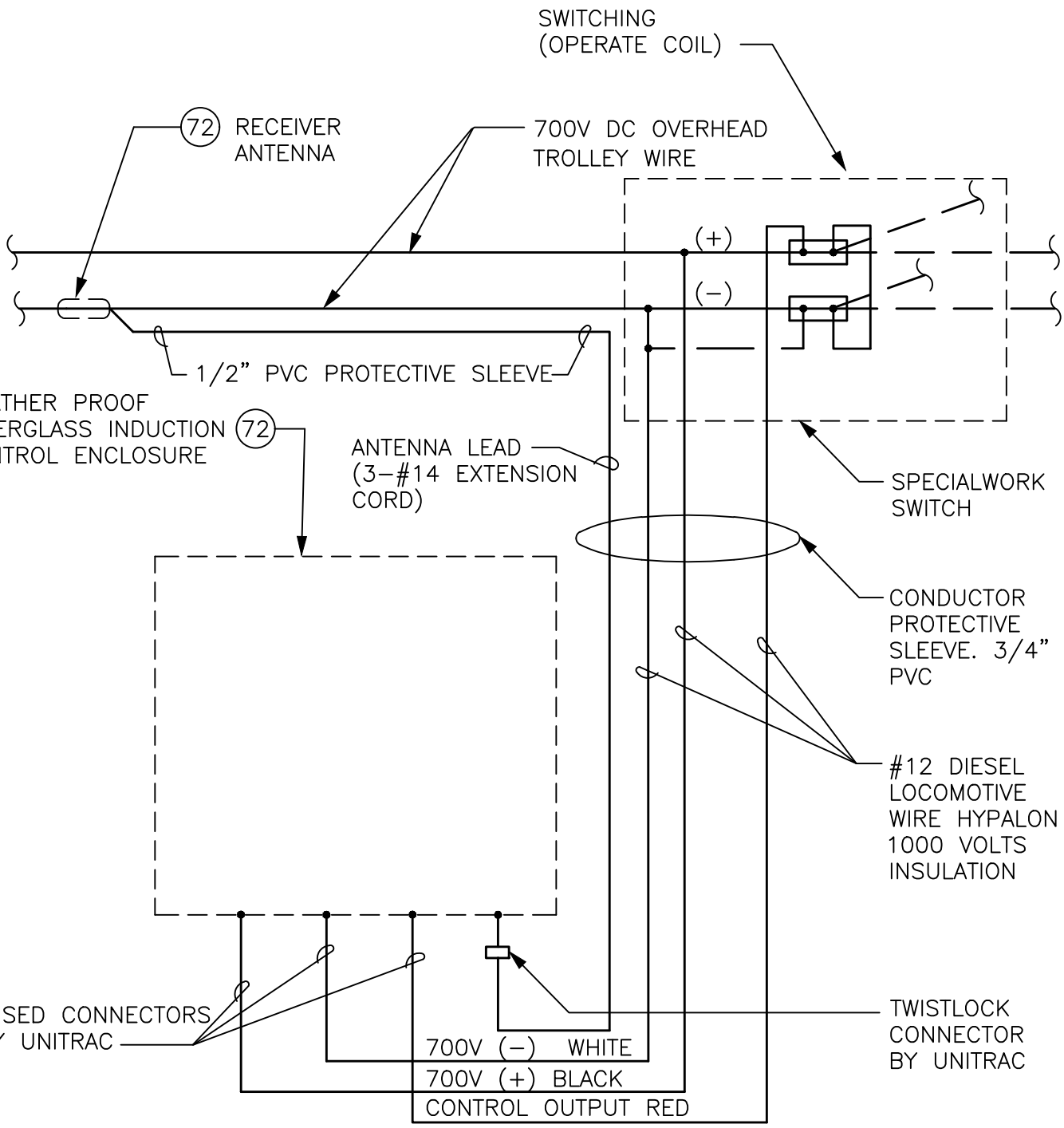
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

FROG INDUCTION CONTROL SYSTEM

DATE: 03/2021
STD DET NO: SA-165
SHT NO: 2 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-165,1-6.dwg | Layout: SA-165.2
PLOTTED: Mar 18, 2021-08:18:44am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



INDUCTION SYSTEM CONTROL DIAGRAM

NOTES:

ALL CONNECTIONS AT ANTENNA, SWITCH AND CONTROL BOX BY THE MUNICIPALITY.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

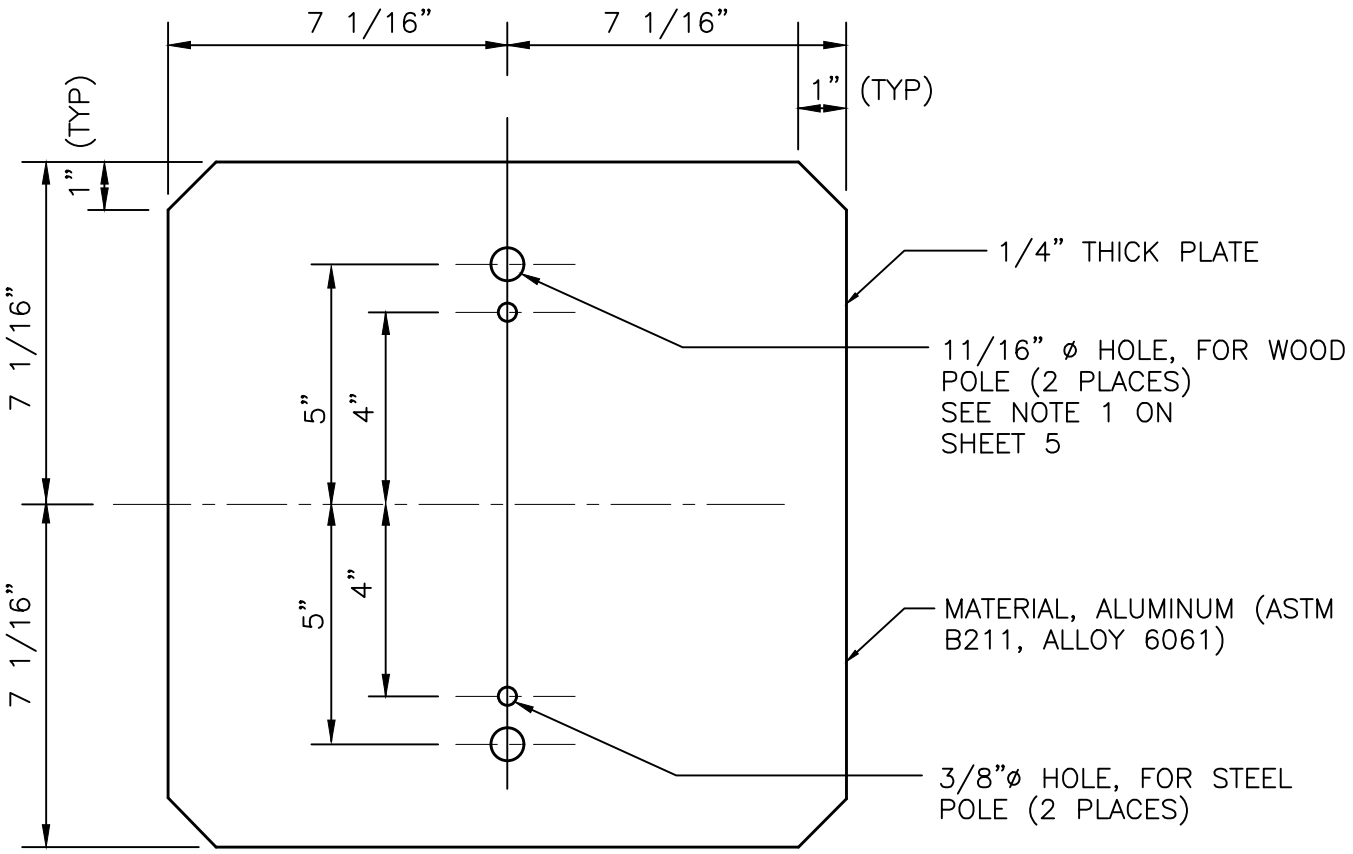
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

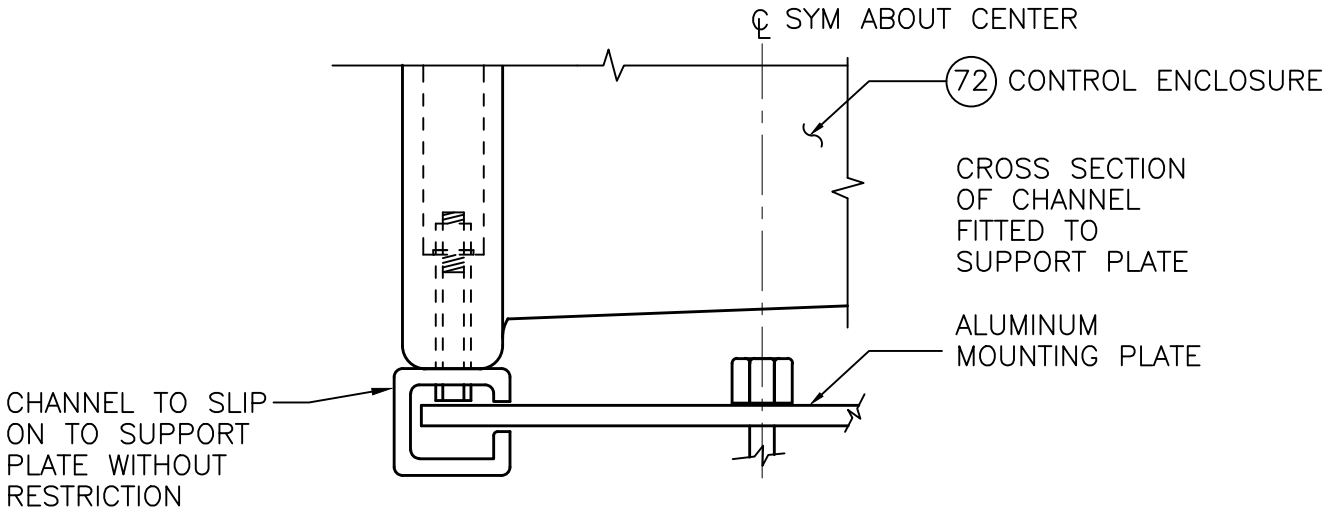
FROG INDUCTION CONTROL SYSTEM

DATE: 03/2021
STD DET NO: SA-165
SHT NO: 3 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-165,1-6.dwg | Layout: SA-165.3
PLOTTED: Mar 18, 2021-08:49am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



ALUMINUM MOUNTING PLATE DETAIL



DETAIL–ATTACHMENT OF CONTROL ENCLOSURE TO MOUNTING PLATE

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

FROG INDUCTION CONTROL SYSTEM

DATE: 03/2021
STD DET NO: SA-165
SHT NO: 4 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-165,1-6.dwg | Layout: SA-165.4
PLOTTED: Mar 18, 2021-08:18:54am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

GENERAL NOTES

1. WHERE THE SUPPORT POLE IS WOOD, THE CONTROL ENCLOSURE MOUNTING PLATE SHALL BE ATTACHED DIRECTLY TO THE POLE BY MEANS OF ONE HOT–DIP GALVANIZED 5/8–INCH DIAMETER HEX HEAD THROUGH BOLT WITH ATTACHMENT NUT AND WASHER MOUNTED THROUGH THE TOP HOLE OF THE SUPPORT PLATE AND ONE HOT–DIP GALVANIZED 5/8–INCH BY 6–INCH GIMLET POINT HEX HEAD LAG SCREW MOUNTED THROUGH THE BOTTOM HOLE OF THE SUPPORT PLATE.

2. THE CONTROL ENCLOSURE SHALL BE LOCATED IN PROXIMITY OF THE PULL–OFF CABLE ATTACHMENTS AT THE SUPPORT POLE. THE ENCLOSURE SHALL, AS PRACTICAL, BE LOCATED AT THE SIDE OF THE POLE FACING THE CURB. THE ENCLOSURE MAY BE INSTALLED EITHER ABOVE OR BELOW THE PULL–OFF GUY CABLE ATTACHMENT AT THE POLE, AS SUITABLE, TO PREVENT CONFLICT WITH OTHER ATTACHMENTS TO THE POLE. THE ENCLOSURE SHALL BE SO LOCATED ON THE POLE THAT CONFLICTS WILL NOT BE INTRODUCED TO ACCESSIBILITY OF EXISTING UTILITIES AND POLE CLIMBING SPACES. ON JOINT USE POLES HAVING A CROSS–ARM, THE ENCLOSURE SHALL BE MOUNTED ON THE CROSS–ARM TO PREVENT CONFLICT WITH CLIMBING SPACE. WHERE A JOINT USE POLE IS WITHOUT A CROSS–ARM, THE CONTRACTOR SHALL COORDINATE ENCLOSURE MOUNTING SPACE WITH THE JOINT USE OWNERS OF THE POLE.

3. THE HOLES FORMED IN THE ANTENNA WEB FOR MOUNTING OF THE ANTENNA MAY BE ENLARGED TO ACCOMMODATE THE 5/8–INCH DIAMETER BOLTS REQUIRED FOR ANTENNA ATTACHMENT TO THE SUPPORTING TROLLEY WIRE CLAMPS.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293–3007
35	AS REQD	CLAMP, INSUL LEAD WIRE	WABCO	19655–2000
72	1	INDUCTIVE CONTROL SYSTEM RECEIVER	UNITRAC	320100–16X
	1	INDUCTIVE CONTROL SYSTEM ANTENNA	UNITRAC	320310–4X

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

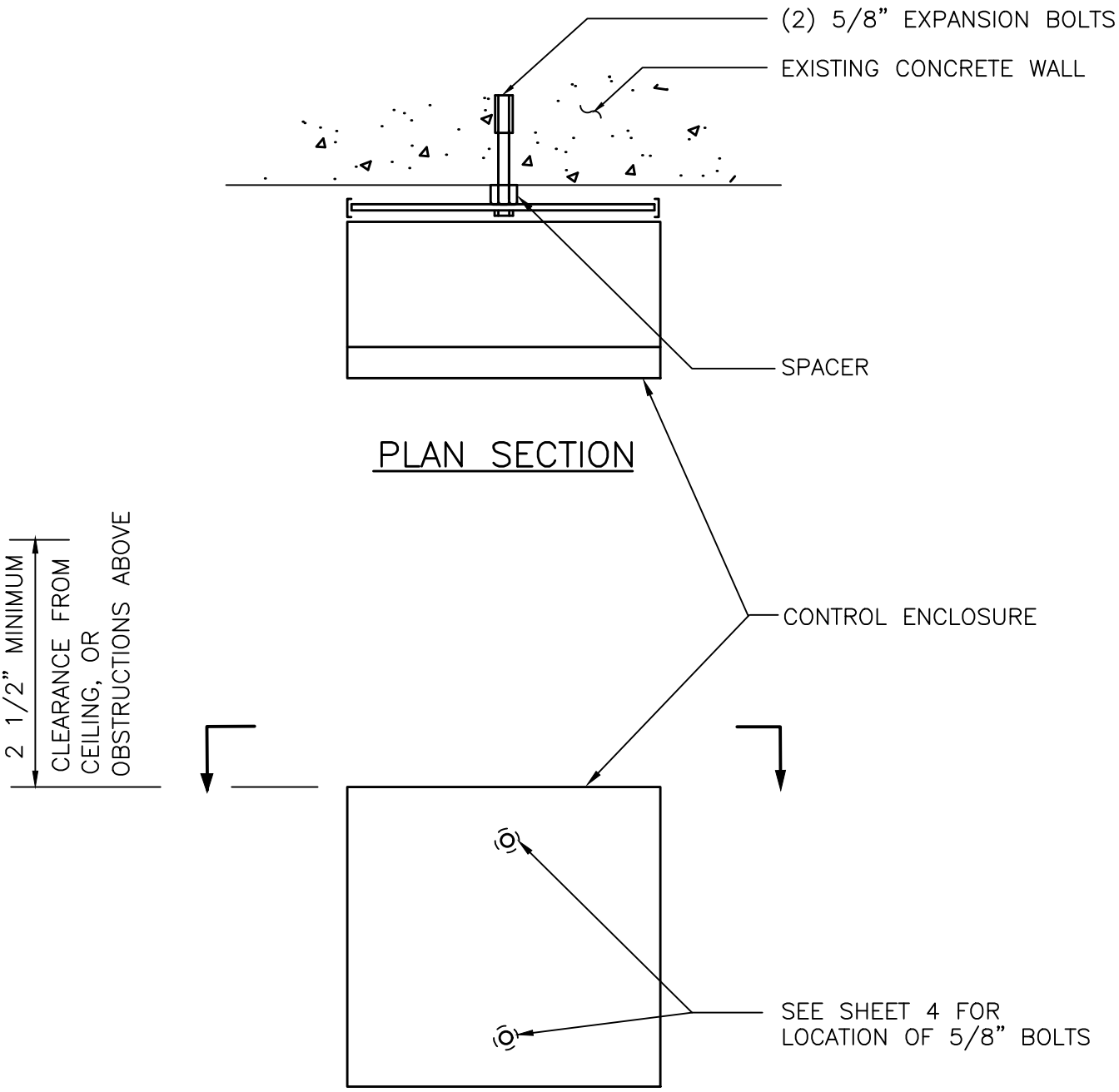
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

FROG INDUCTION CONTROL SYSTEM

DATE: 03/2021
STD DET NO: SA-165
SHT NO: 5 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-165,1-6.dwg | Layout: SA-165.5
PLOTTED: Mar 18, 2021-08:59am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



ELEVATION
INSTALLATION ON EXISTING CONCRETE OR MASONRY WALL

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

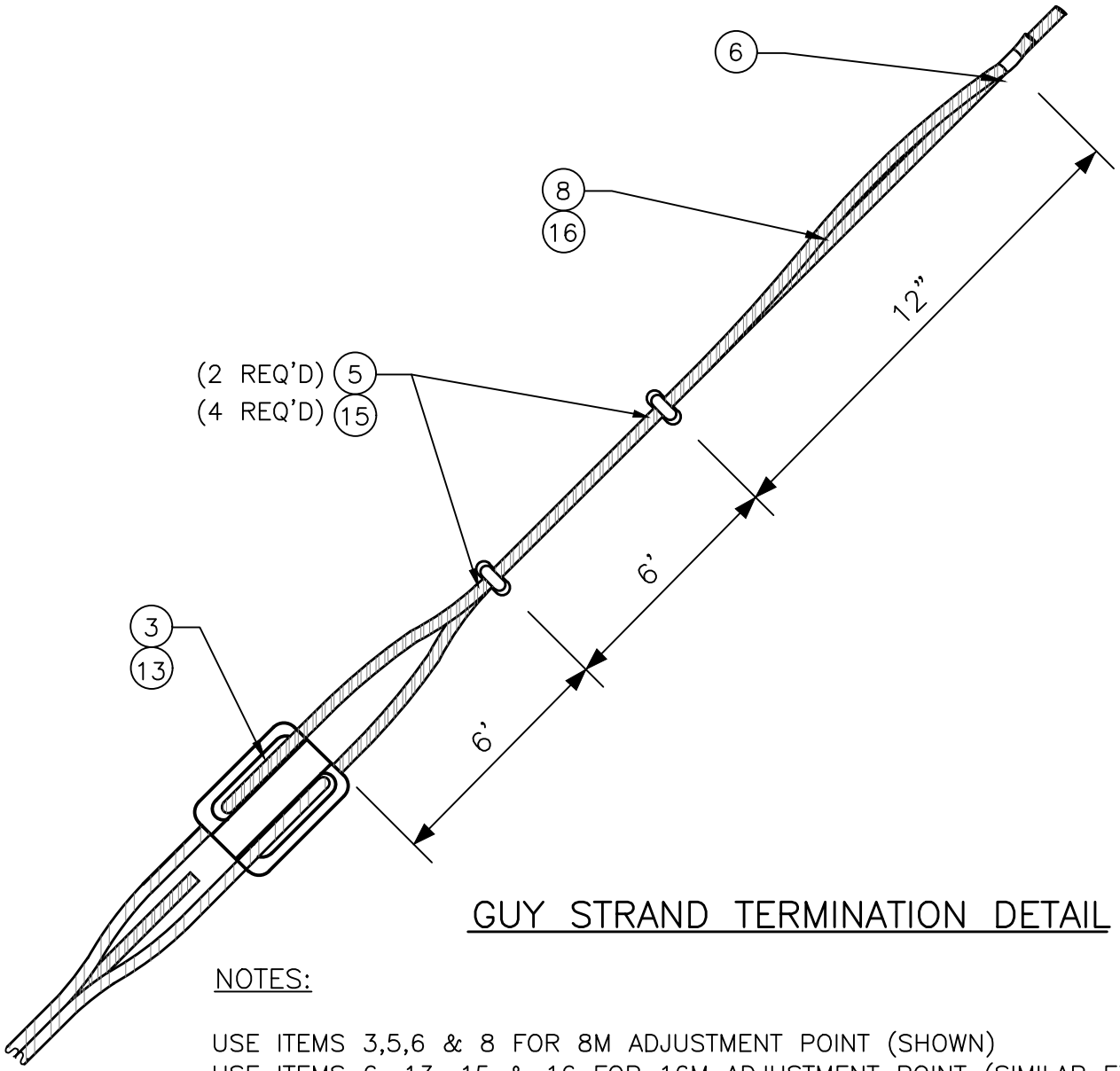
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

FROG INDUCTION CONTROL SYSTEM

DATE: 03/2021
STD DET NO: SA-165
SHT NO: 6 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-165,1-6.dwg | Layout: SA-165.6
PLOTTED: Mar 18, 2021-08:19:04am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



GUY STRAND TERMINATION DETAIL

NOTES:

USE ITEMS 3,5,6 & 8 FOR 8M ADJUSTMENT POINT (SHOWN)
USE ITEMS 6, 13, 15 & 16 FOR 16M ADJUSTMENT POINT (SIMILAR EXCEPT USE (4) ITEM 15'S SPACED AT 6")

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	VARIES	GUY STRAIN INSUL, CABLE OD Max–1/2"	PORCELAIN PRODUCTS CO.	504
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQ'D	FRICTION TAPE, 3/4" (6 WRAPS)		
08	VARIES	GUY STRAND	COPPERWELD	8M
13	VARIES	GUY STRAIN INSUL, CABLE OD Max–5/8"	PORCELAIN PRODUCTS CO.	506
15	VARIES	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIES	GUY STRAND, COVERED	COPPERWELD	16M

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

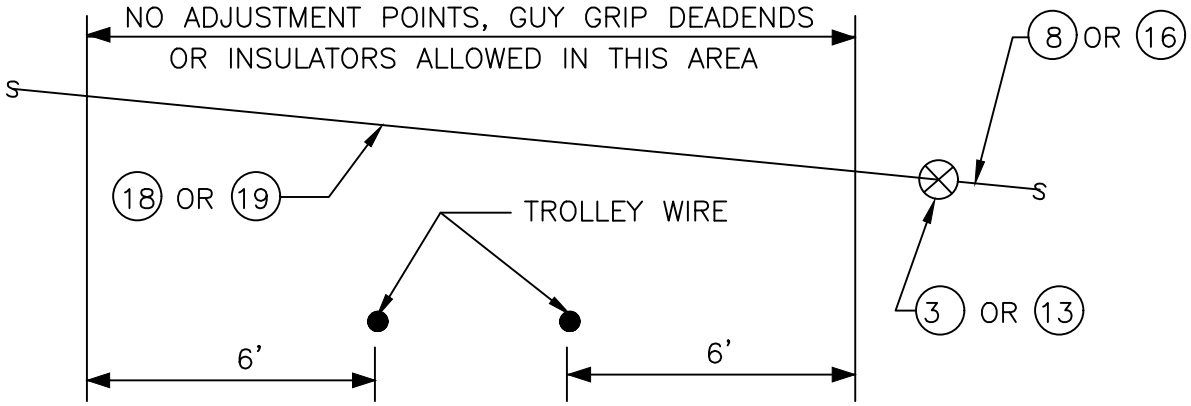
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

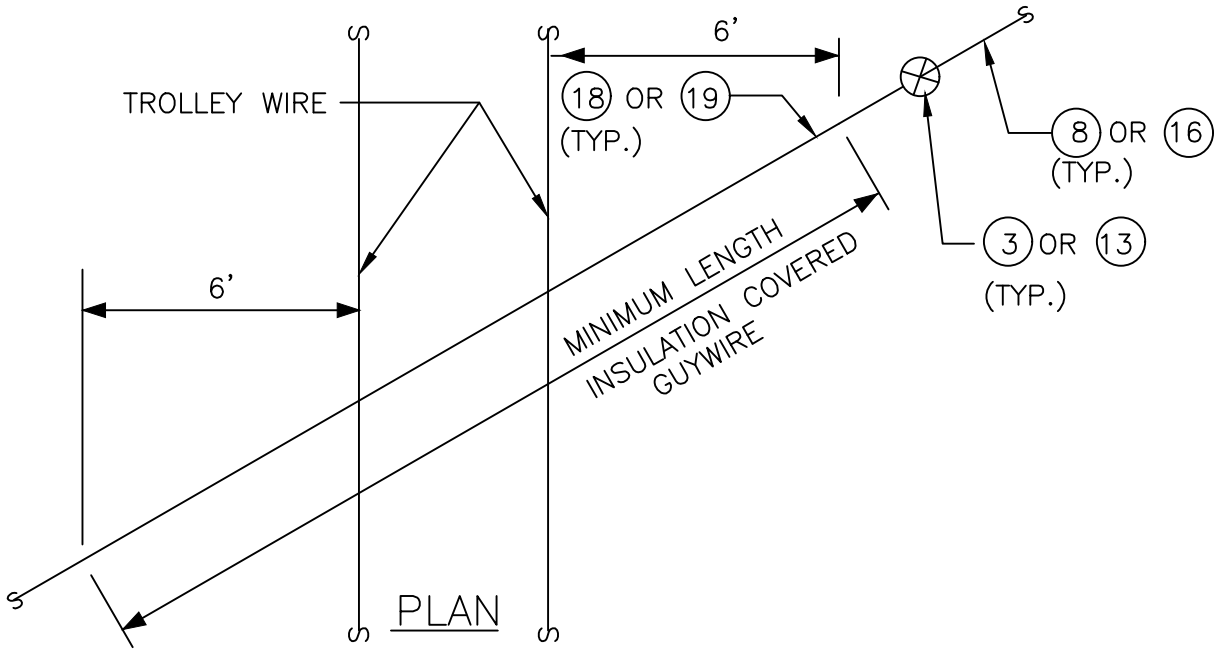
ADJUSTMENT POINT

DATE: 03/2021
STD DET NO: SA-166
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-166.dwg | Layout: SA-166
PLOTTED: Mar 18, 2021-08:19:13am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



ELEVATION



PLAN

NOTES:
1. THE ENGINEER SHALL CONCUR WITH ANY EXCEPTIONS TO THESE CRITERIA.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
08	VARIES	GUY STRAND	COPPERWELD	8M
13	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
16	VARIES	GUY STRAND	COPPERWELD	16M
18	VARIES	GUY STRAND, COVERED	COPPERWELD	8MI
19	VARIES	GUY STRAND, COVERED	COPPERWELD	16MI

No.	REVISION	BY	APP'D	DATE

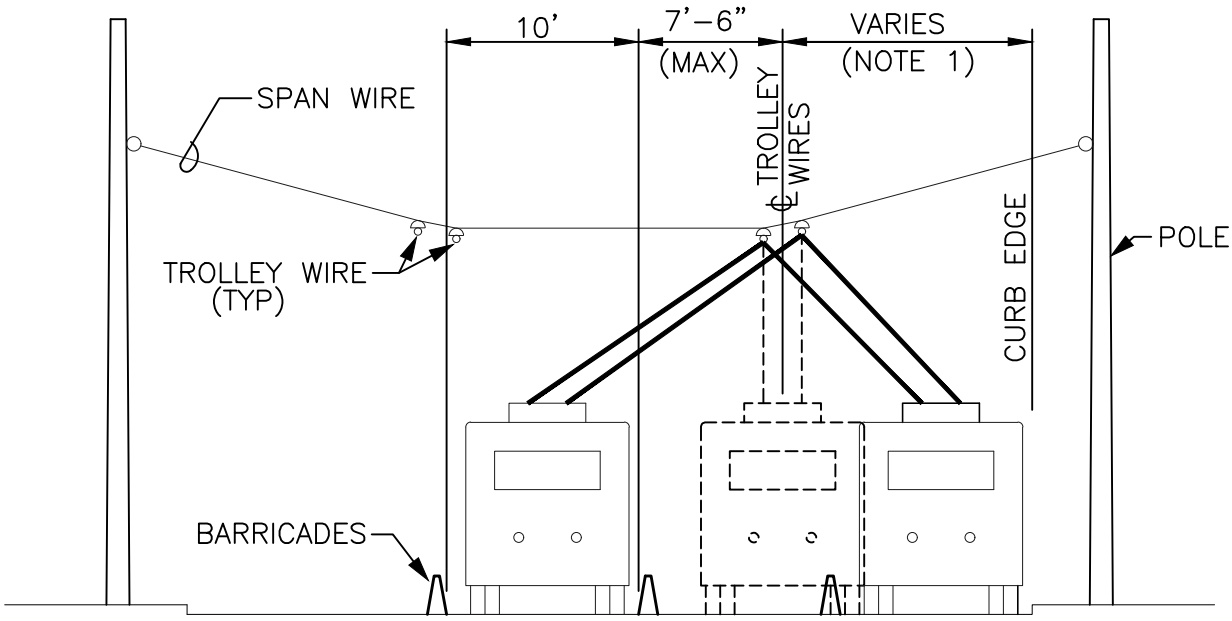
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

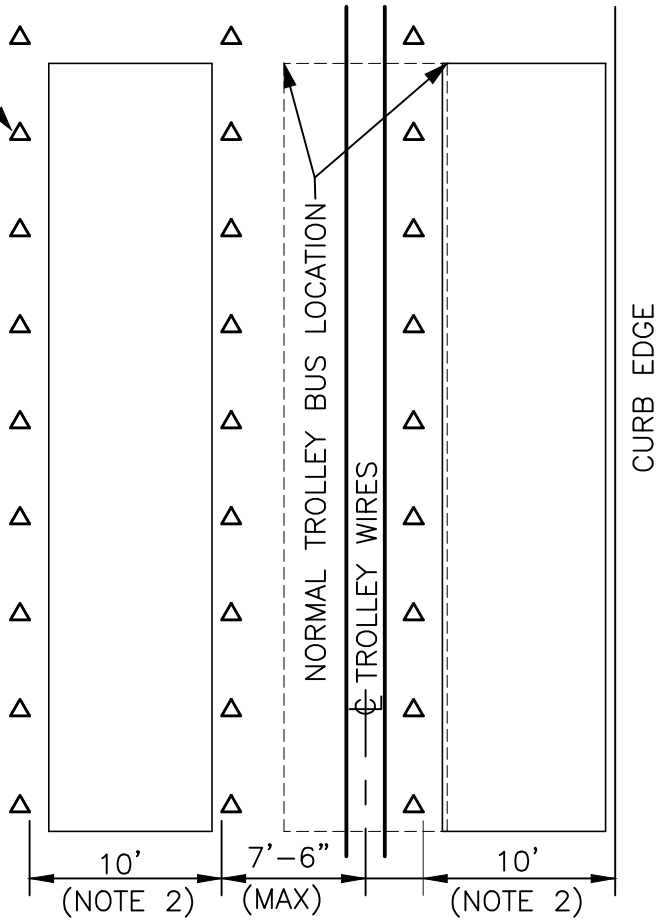
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
INSULATION COVERED GUY WIRE REQUIREMENT CRITERIA

DATE: 03/2021
STD DET NO: SA-167
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-167.dwg | Layout: SA-167
PLOTTED: Nov 21, 2021-09:22:38pm By AnderLS
XREFS:
IMAGES:



ELEVATION



PLAN

NOTES:

1. NORMAL DIMENSION IS 10' OR 13', BUT EXISTING DIMENSION WILL VARY AT DIFFERENT LOCATIONS.
2. BARRICADES TO BE LOCATED INSIDE OF THE 7'–6" MAX AREA ON EITHER SIDE OF CENTERLINE TROLLEY WIRES. BARRICADES SHALL ALSO FORM A 10' CLEAR TRAVEL LANE.

1. THIS STANDARD APPLIES TO STRAIGHT SECTIONS OF TROLLEY WIRE ONLY.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

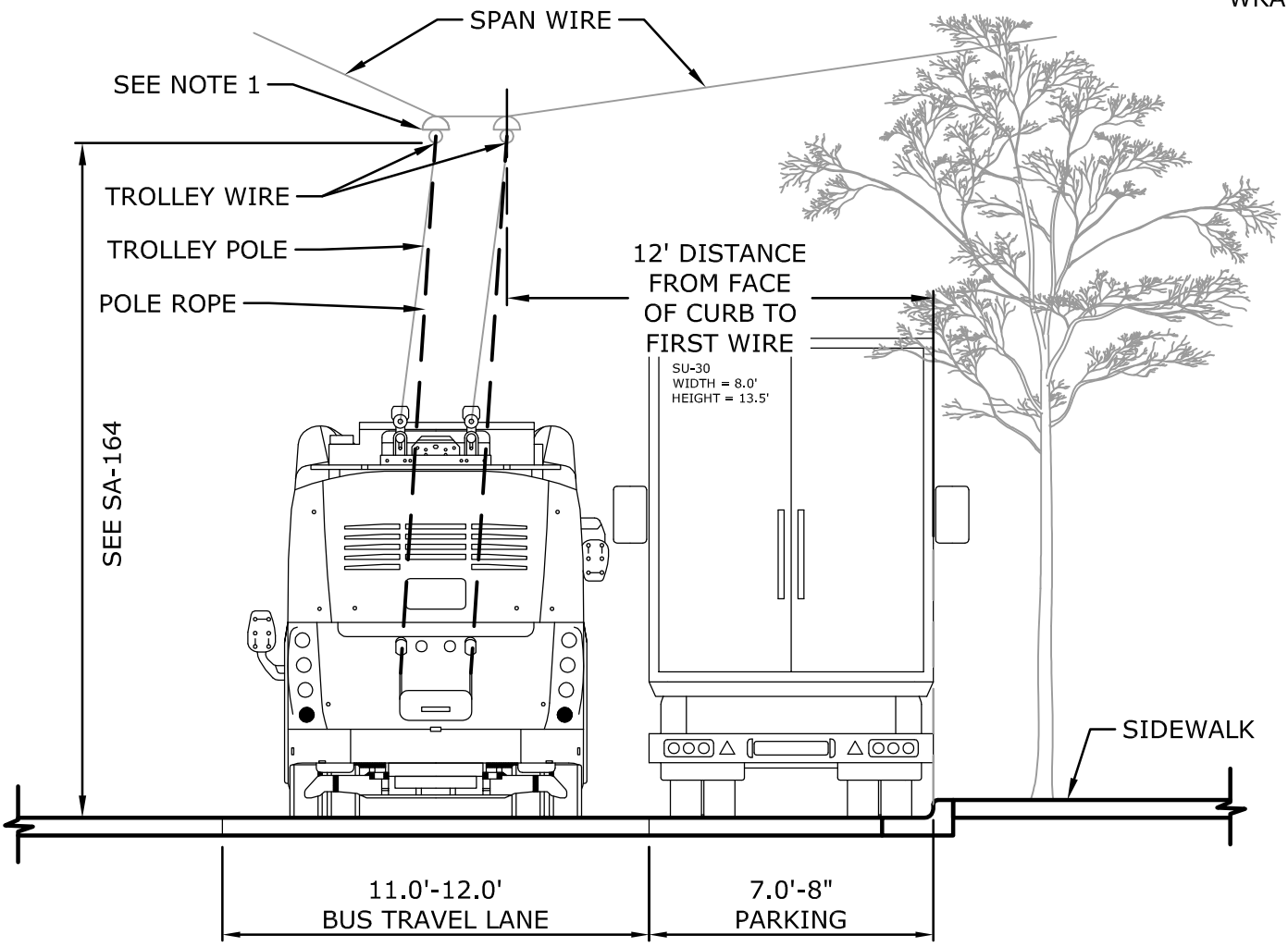
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
TROLLEY COACH TRAVEL AREA IN CONSTRUCTION ZONE

DATE: 03/2021
STD DET NO: SA-170
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-170-171.dwg | Layout: SA-170
PLOTTED: Mar 18, 2021-08:19:27am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

WRAP



NOTES:

1. STANDARD IS FOR EXTENDED DISTANCES OF TANGENT SPANS.

TYPICAL CONFIGURATION 1
TANGENT SPAN TROLLEY WIRE
PARKING LANE

SCALE: NTS

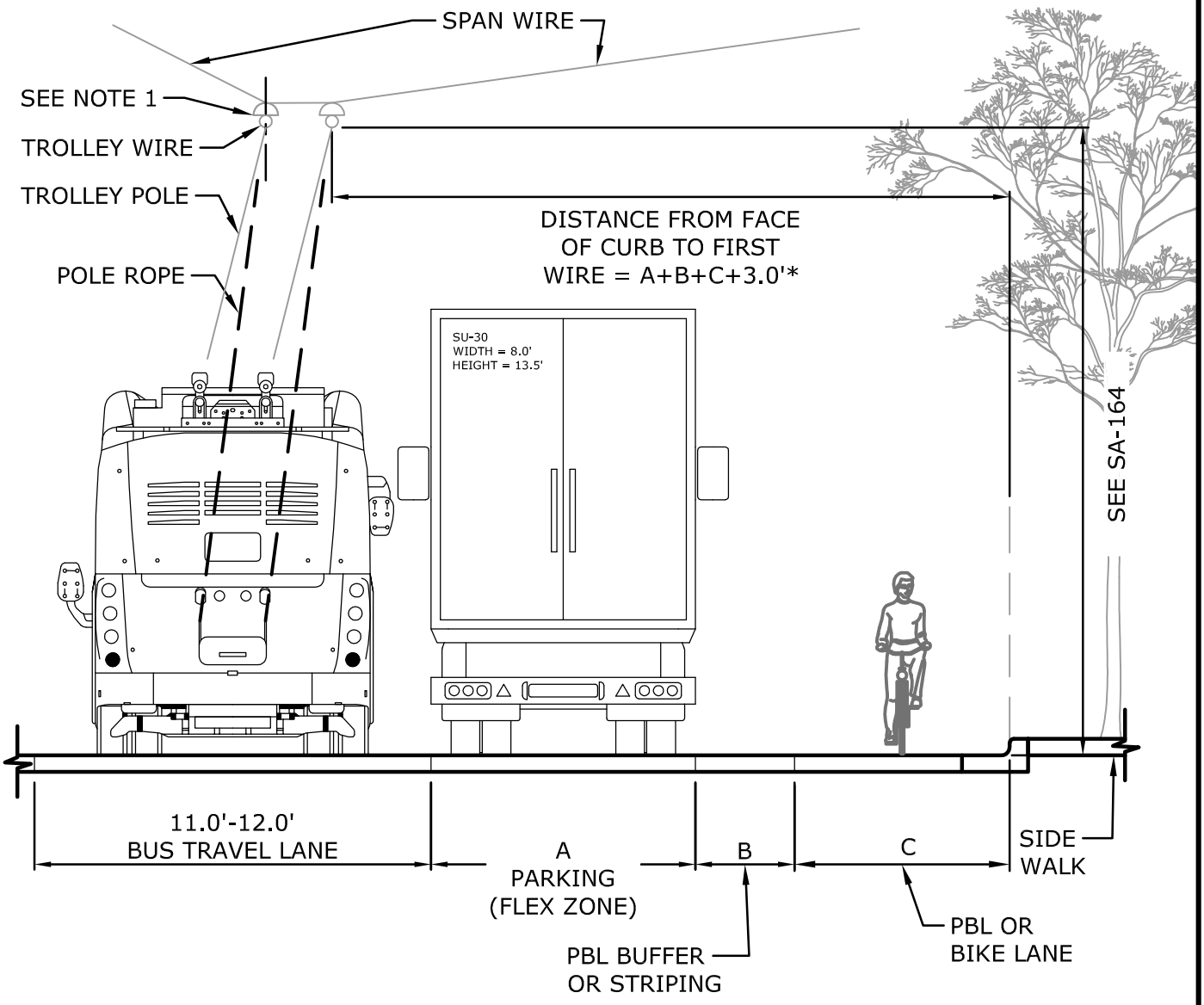
No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: G. CAREY
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE LOCATIONS FOR TYPICAL ROADWAY CONFIGURATIONS

DATE: 03/2022
STD DET NO: SA-171
SHT NO: 1 OF 4



NOTES:

1. STANDARD IS FOR EXTENDED DISTANCES OF TANGENT SPANS.

*⚠1 1.5' MINIMUM, 3.0' PREFERRED. THE MAXIMUM DISTANCE IS DEPENDANT ON REQUIRED OPERATIONS.

TYPICAL CONFIGURATION 2
TANGENT SPAN TROLLEY WIRE
PARKING AND PBL OR BIKE LANE

SCALE: NTS

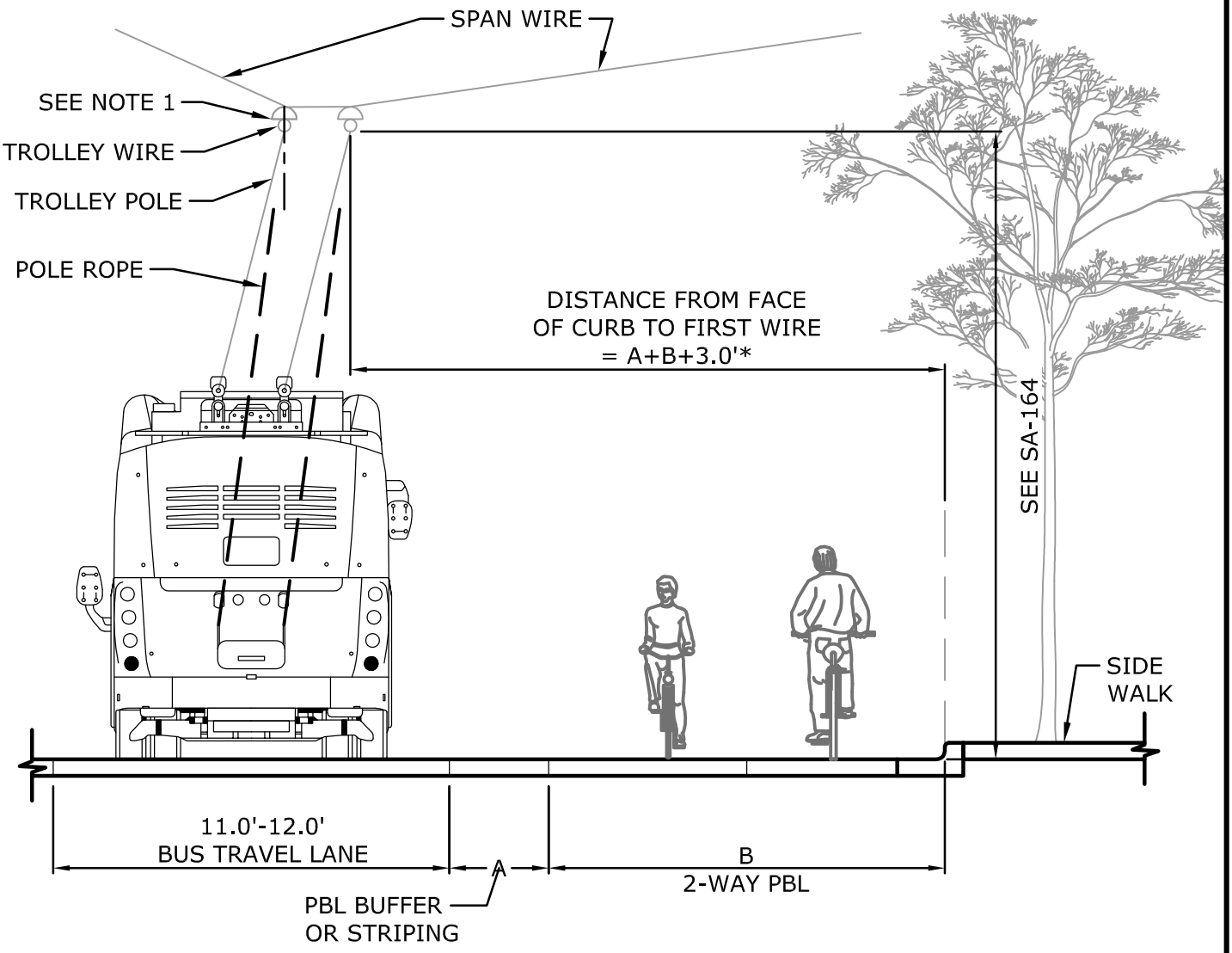
No.	REVISION	BY	APP'D	DATE
⚠1	APPROVED BY J. KOST		PE	3/22

DESIGNED: A. WOLAK
DRAWN: G. CAREY
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE LOCATIONS FOR TYPICAL ROADWAY CONFIGURATIONS

DATE: 03/2022
STD DET NO: SA-171
SHT NO: 2 OF 4



NOTES:

1. STANDARD IS FOR EXTENDED DISTANCES OF TANGENT SPANS.

* ⚠ 1.5' MINIMUM, 3.0' PREFERRED. THE MAXIMUM DISTANCE IS DEPENDANT ON REQUIRED OPERATIONS.

TYPICAL CONFIGURATION 3
TANGENT SPAN TROLLEY WIRE
TWO-WAY PBL

SCALE: NTS

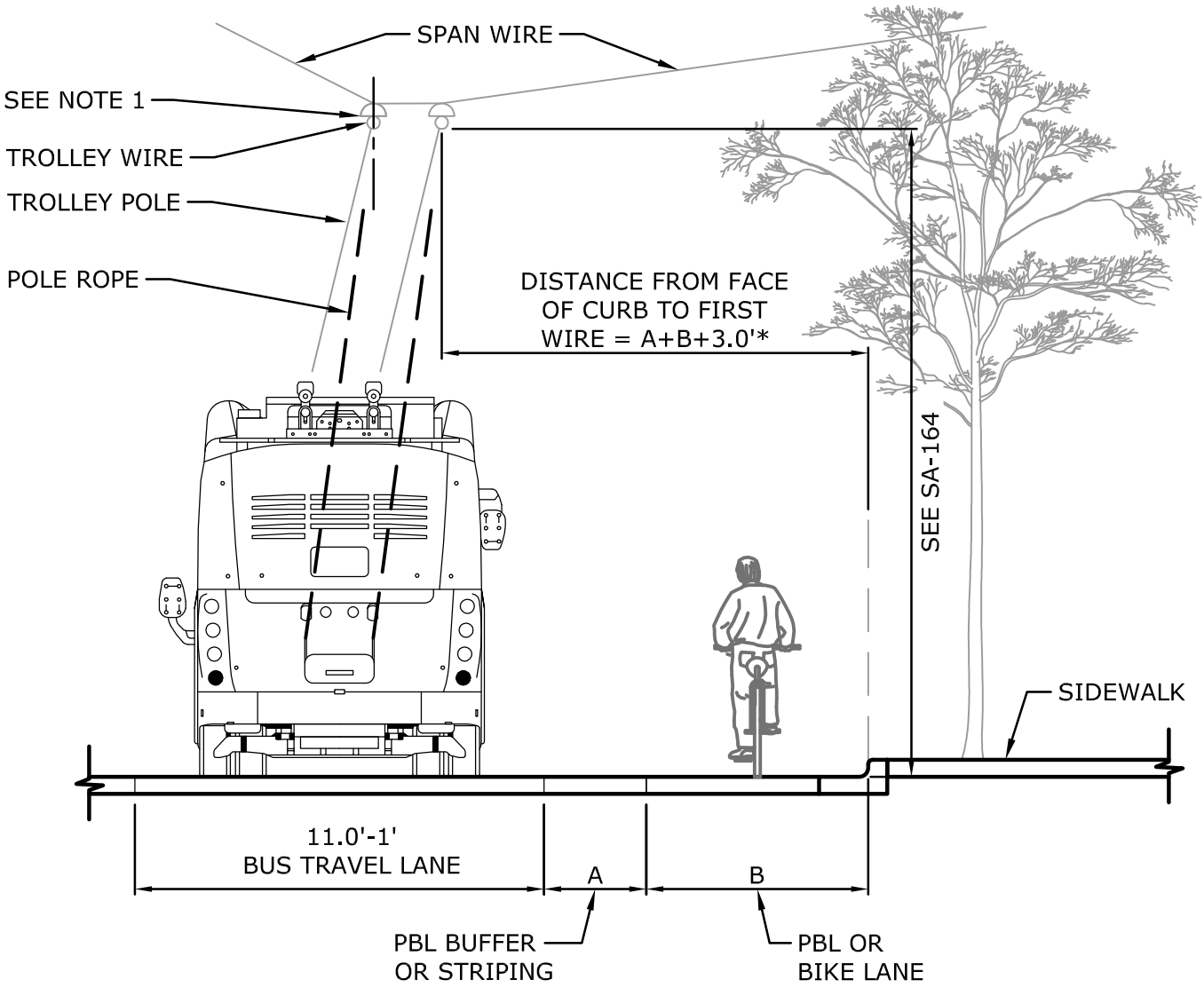
No.	REVISION	BY	APP'D	DATE
1	APPROVED BY J. KOST		PE	3/22

DESIGNED: A. WOLAK
DRAWN: G. CAREY
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE LOCATIONS FOR TYPICAL ROADWAY CONFIGURATIONS

DATE: 03/2022
STD DET NO: SA-171
SHT NO: 3 OF 4



NOTES:

1. STANDARD IS FOR EXTENDED DISTANCES OF TANGENT SPANS.

* ⚠1 1.5' MINIMUM, 3.0' PREFERRED. THE MAXIMUM DISTANCE IS DEPENDANT ON REQUIRED OPERATIONS.

TYPICAL CONFIGURATION 4

SCALE: NTS

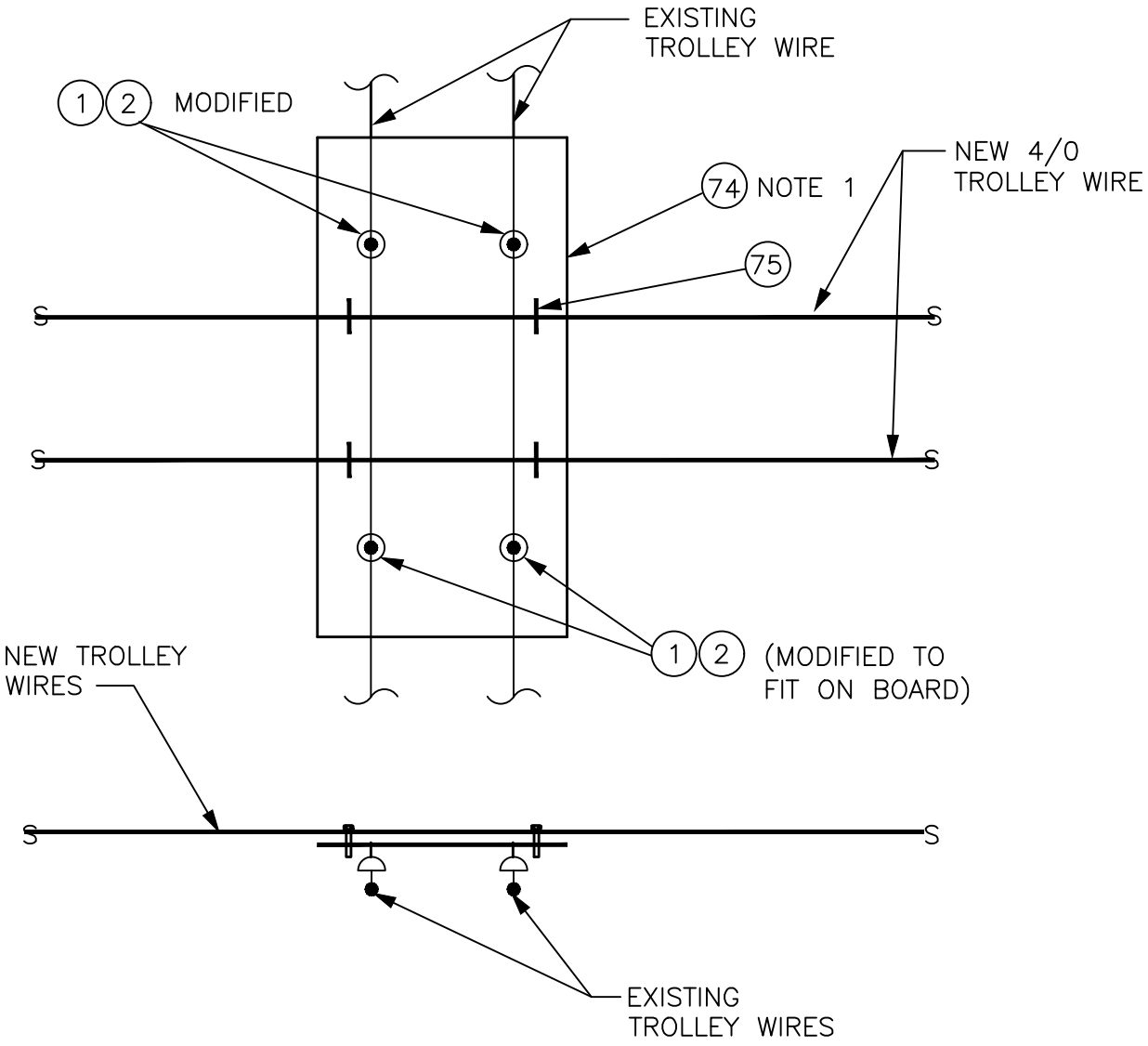
No.	REVISION	BY	APP'D	DATE
1	APPROVED BY J. KOST		PE	3/22

DESIGNED: A. WOLAK
DRAWN: G. CAREY
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
TROLLEY WIRE LOCATIONS FOR TYPICAL ROADWAY CONFIGURATIONS

DATE: 03/2022
STD DET NO: SA-171
SHT NO: 4 OF 4



NOTES:

1. 4' x 8' SIZE IS A MINIMUM. USE 2 OR MORE WHEN REQUIRED.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293–3007
02	4	AGC TANGENT SPAN HANGER	WABCO	19360–2000
74	1	4' X 8' X 1/2" EXTERIOR PLYWOOD		
75	4	U BOLT, FOR 4/0 TROLLEY WIRE		

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

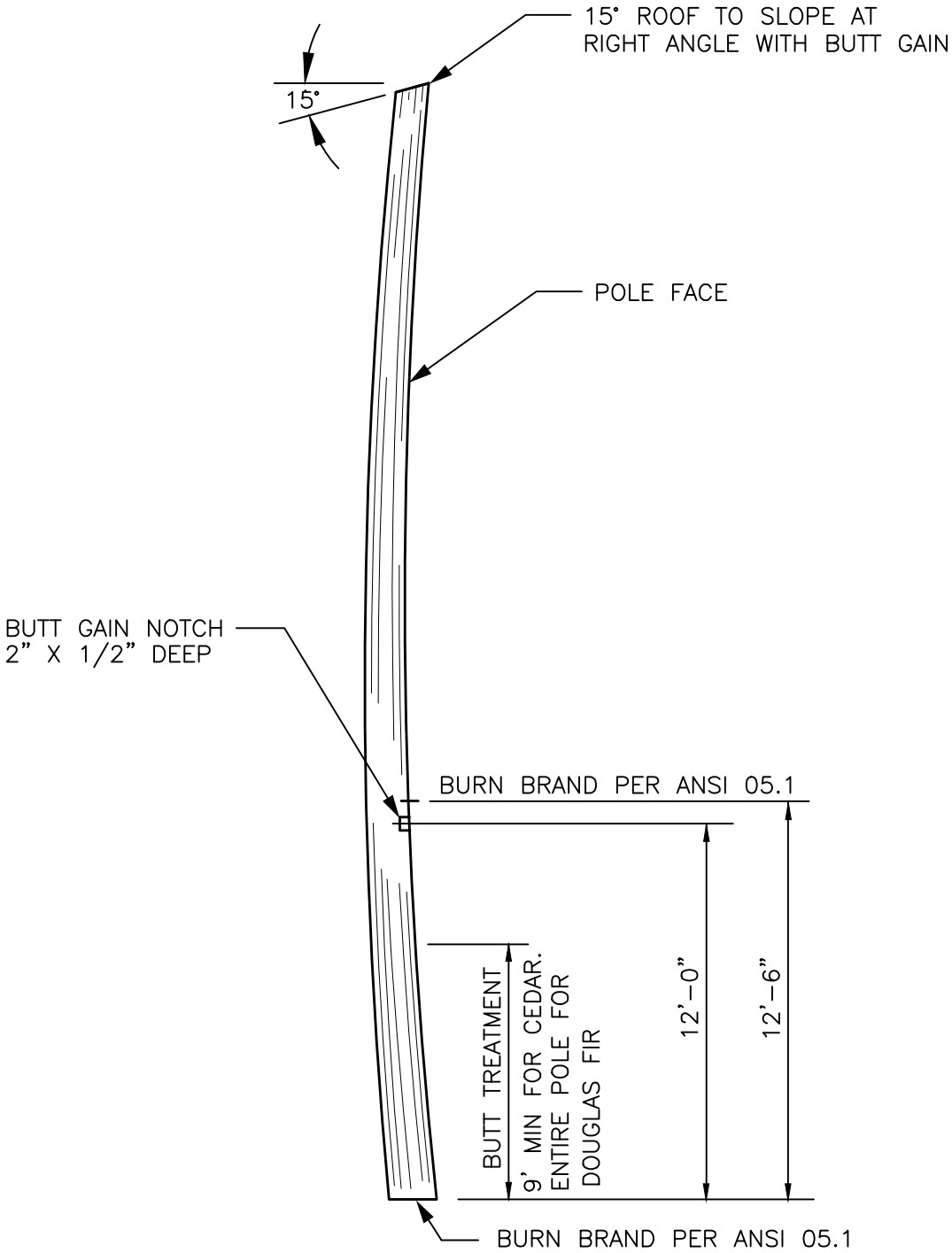
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

TEMPORARY
INSULATION BOARD

DATE: 03/2021
STD DET NO: SA-190
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-190.dwg | Layout: SA-190
PLOTTED: Mar 18, 2021-08:19:38am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. POLE SHALL BE CLASS 1, WESTERN RED CEDAR OR DOUGLAS FIR, PER ANSI 05.1–LATEST EDITION.

2. METAL TAGS AND NAILS FOR BURN BRAND ARE NOT ALLOWED.

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

WOOD POLE FRAMING DETAIL

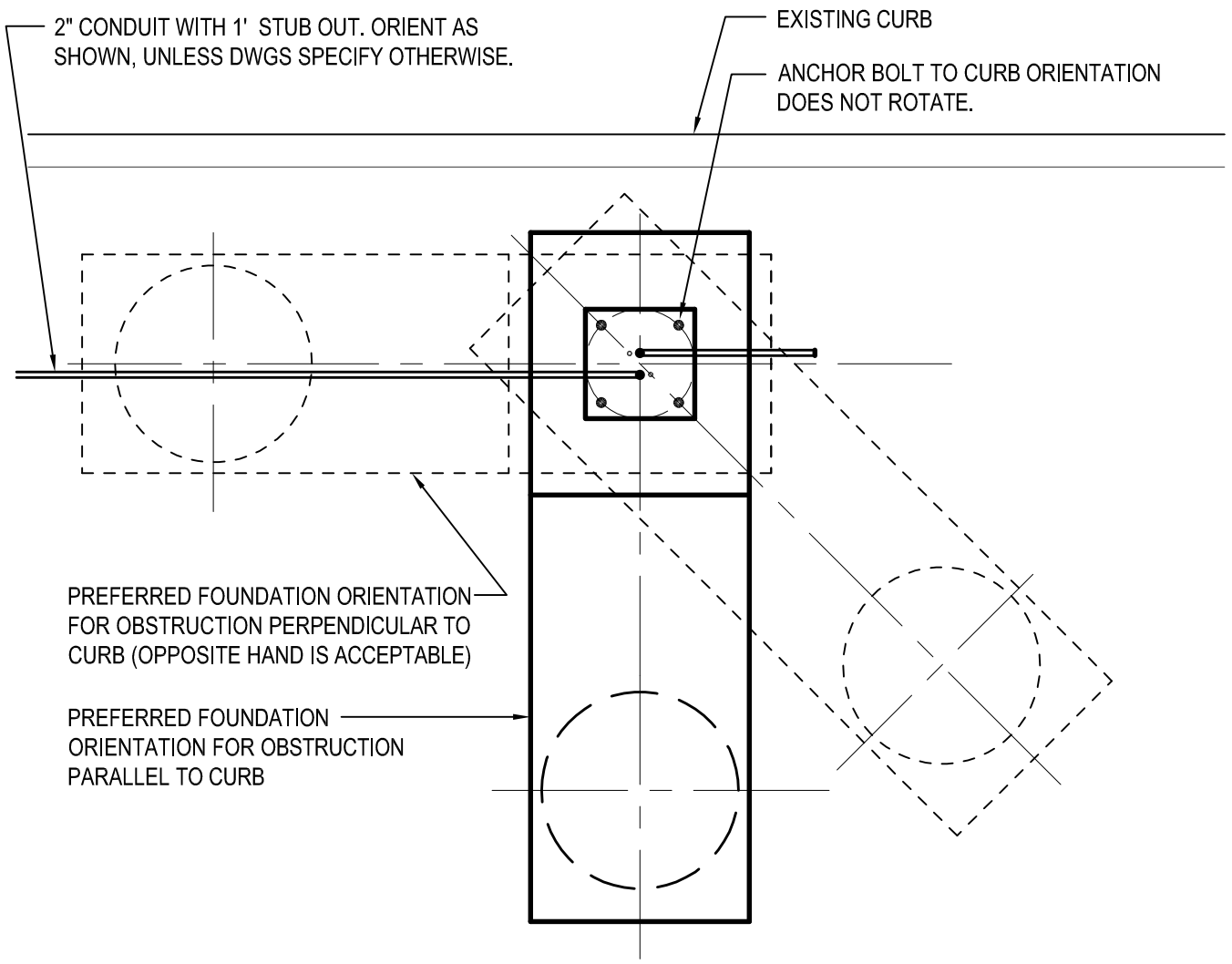
DATE: 03/2021
STD DET NO: SA-202
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-202.dwg | Layout: SA-202
PLOTTED: Mar 18, 2021-08:19:49am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

DETAILS FOR SHTS 2,3 & 4

FOUNDATION TYPE	NORMAL WORKING MOMENT (LB-FT)	DIMENSIONS					REBAR QUANTITIES					
		A	P	G	B	D	R*	T	V	W	Y	Z
SA-211B	40,000	2'-4"	9"	6.5"	2.5"	8'-6"	8-#8	4-#7	6-#7	6-#7	#4@6"	4-#7
SA-211D	80,000	2'-8"	10"	7"	3"	10'-6"	12-#8	4-#8	6-#8	6-#8	#5@5"	4-#8
SA-211F	155,000	3'-0"	11.5"	8"	3.5"	13'-0"	12-#8	4-#8	6-#8	6-#8	#5@4"	4-#8

* ADD (1) #8 VERTICAL FOR GROUNDING



ORIENTATION PLAN

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

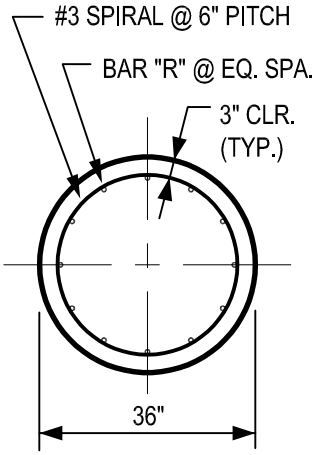
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

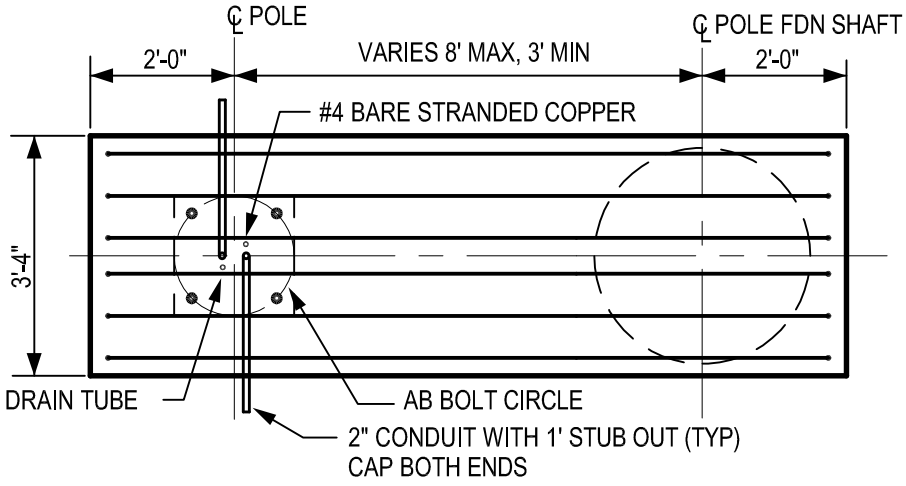
OFFSET FOUNDATION
ANCHOR BASE STEEL POLE

DATE: 02/2022
STD DET NO: SA-211
SHT NO: 1 OF 7

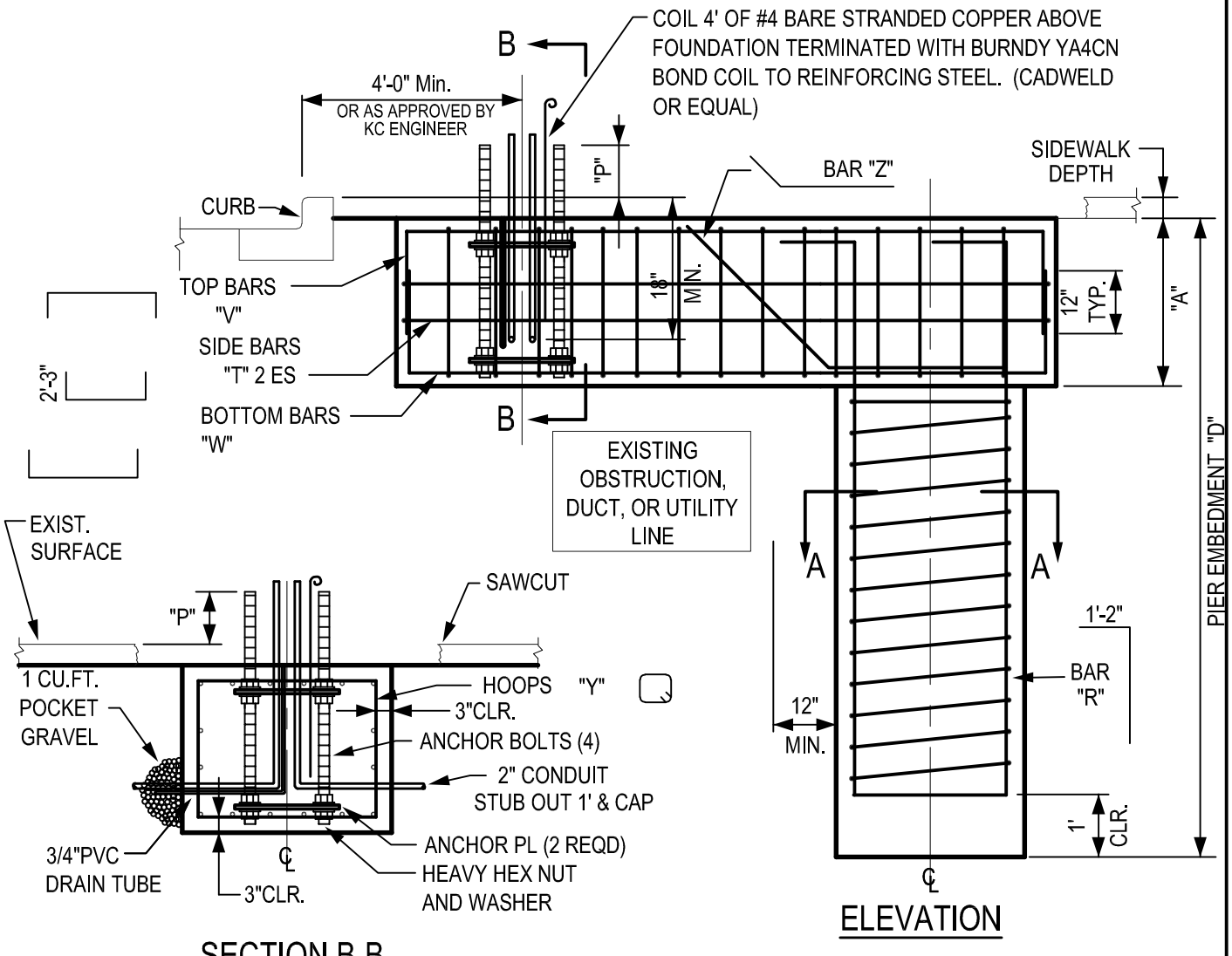
\\DOT.kingcounty.lcl\Transit\DCI\CAD_Folders\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-211.1 - 7.dwg | layout: SA-211.1
PLOTTED: Feb 07, 2022-09:10:29am By dbennett
XREFS:
IMAGES:



SECTION A-A



PLAN



ELEVATION

SECTION B-B

No.	REVISION	BY	APP'D	DATE

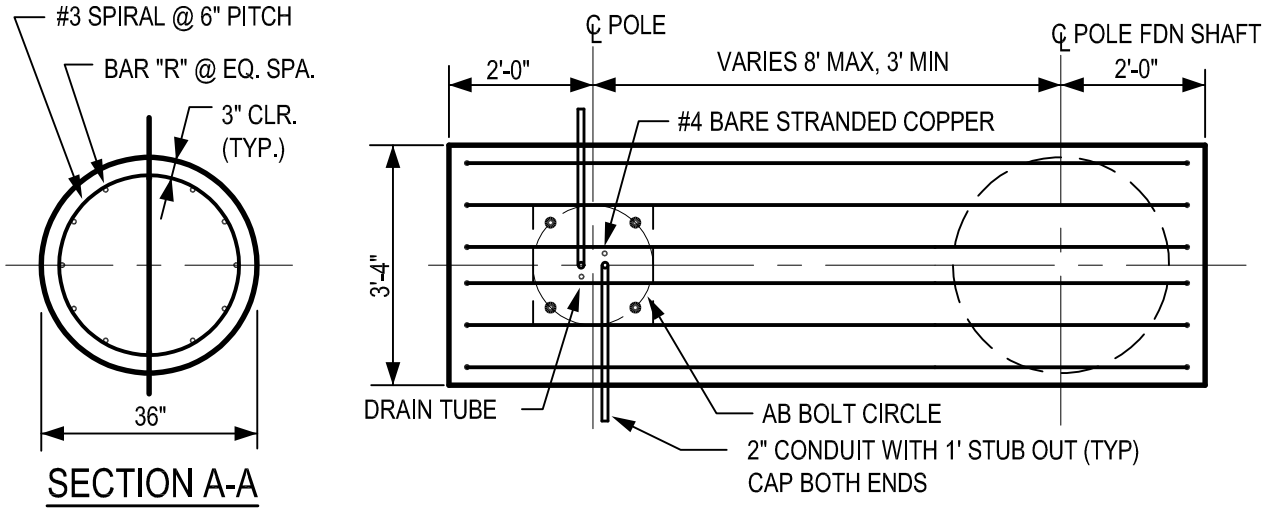
DESIGNED: DPG/AW
DRAWN: D. BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
OFFSET FOUNDATION ANCHOR BASE STEEL POLE (WITH SIDEWALK)

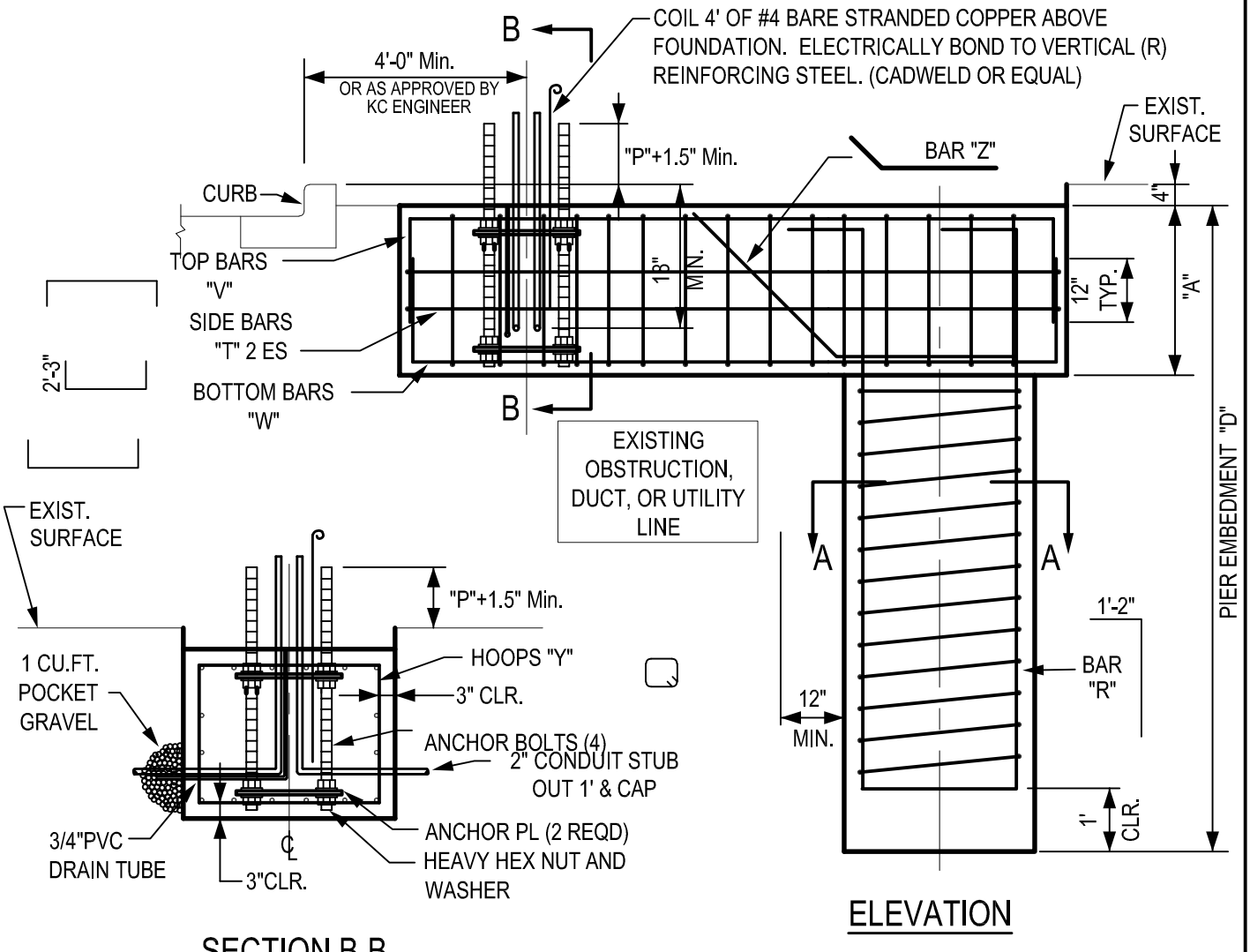
DATE: 02/2022
STD DET NO: SA-211
SHT NO: 2 OF 7

\\DOT.kingcounty.lcl\Transit\DCI\CAD_Folders\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-211.1 - 7.dwg | layout: SA-211.2
PLOTTED: Feb 07, 2022-09:10:30am By dbennett
XREFS:
IMAGES:



SECTION A-A

PLAN

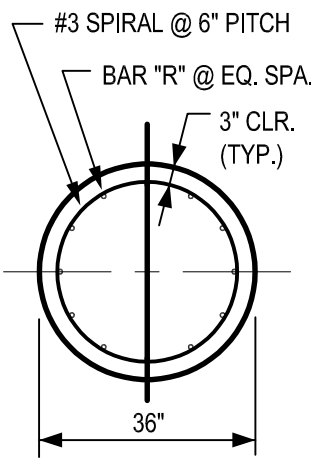


SECTION B-B

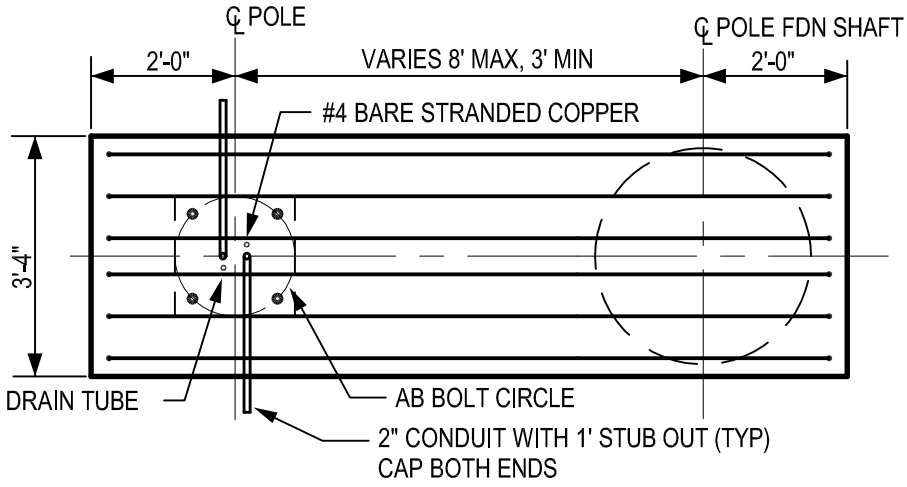
ELEVATION

No.	REVISION	BY	APP'D	DATE	DESIGNED: DPG/AW	APPROVED: P. ENG	METRO TRANSIT CAPITAL DIVISION TROLLEY STANDARD DETAILS	DATE: 02/2022
					DRAWN: D. BENNETT	King County METRO	OFFSET FOUNDATION ANCHOR BASE POLE (WITHOUT SIDEWALK)	STD DET NO: SA-211
					CHECKED: J. DAVIS			SHT NO: 3 OF 7

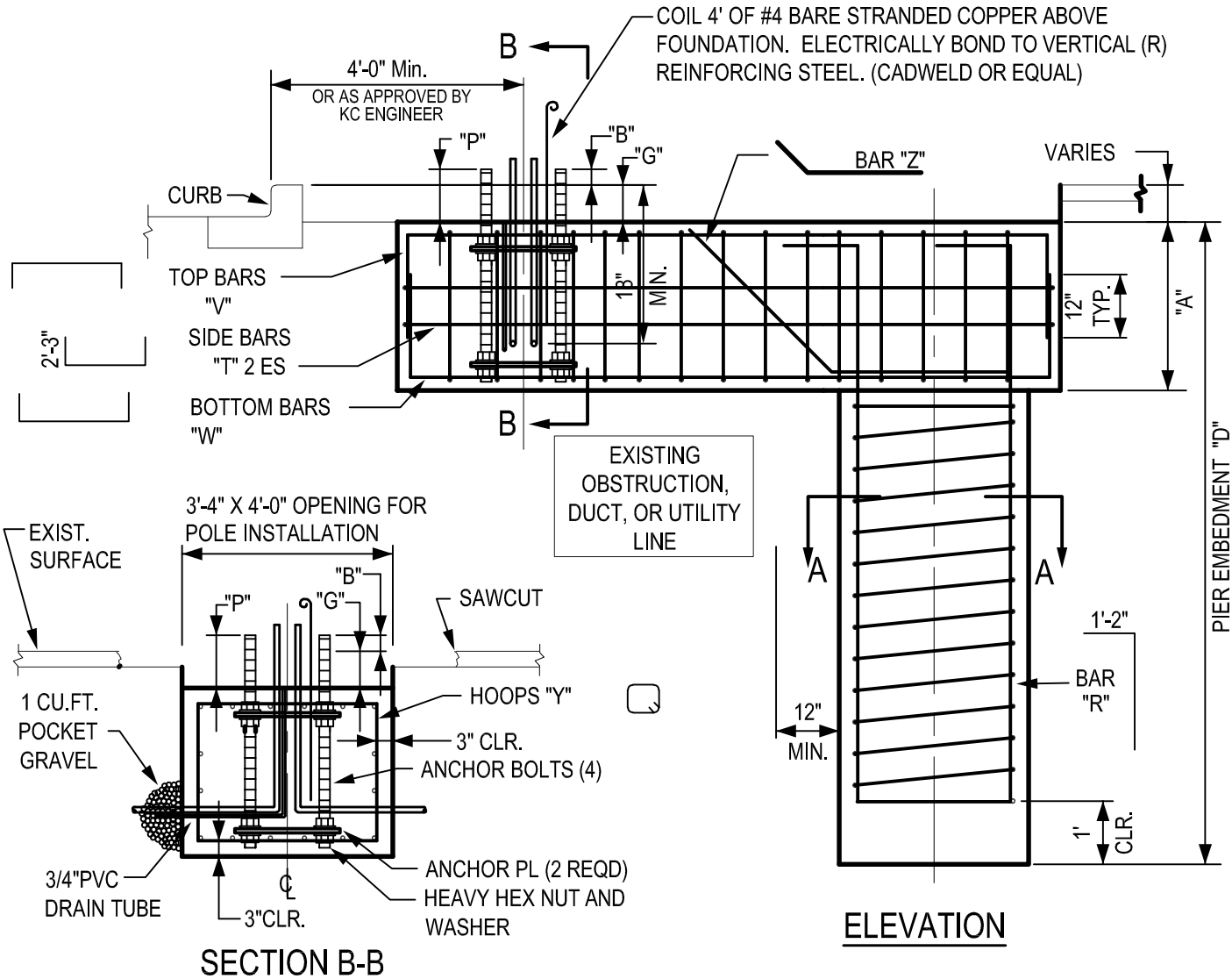
\\DOT.kingcounty.lcl\Transit\DCI\CAD_Folders\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-211.1 - 7.dwg | layout: SA-211.3
PLOTTED: Feb 07, 2022-09:10:35am By dbennett
XREFS:
IMAGES:



SECTION A-A



PLAN



ELEVATION

SECTION B-B

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: D. BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

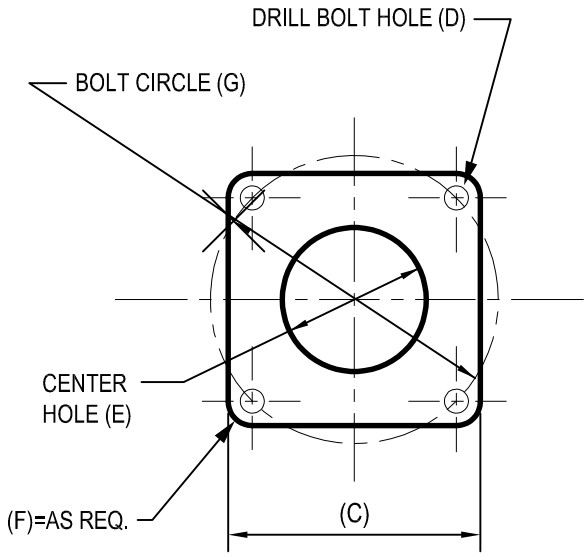
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
OFFSET FOUNDATION ANCHOR BASE POLE (CHIEF SEATTLE BASE)

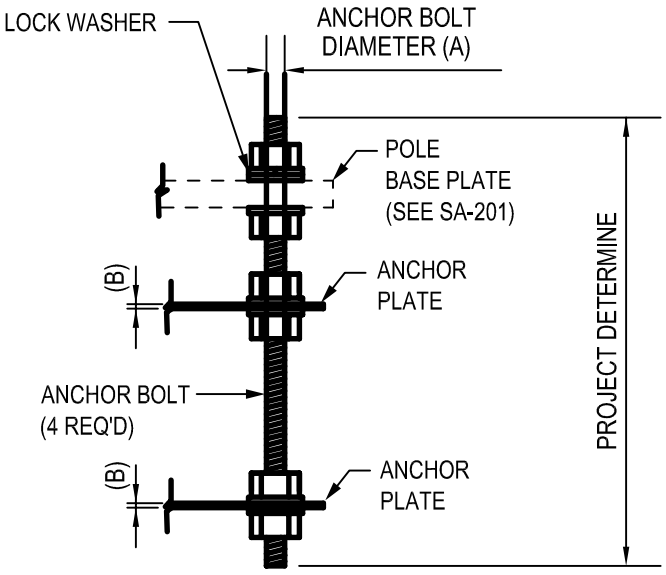
DATE: 02/2022
STD DET NO: SA-211
SHT NO: 4 OF 7

\\DOT.kingcounty.lcl\Transit\DCI\CAD_Folders\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-211.1 - 7.dwg | layout: SA-211.4
PLOTTED: Feb 07, 2022-09:10:40am By dibennett
XREFS:
IMAGES:

FOUNDATION TYPE	ANCHOR BOLT DIAM. (INCHES) (A)	ANCHOR PLATE DIMENSIONS (INCHES)					
		PLATE THICK. (B)	PLATE WIDTH (C)	BOLT HOLE (D)	CENTER HOLE (E)	CORNER RADIUS (F)	BOLT CIRCLE (G)
SA-211B	1 3/4	3/8	16 X 16	1 7/8	12 1/2	1 5/8	18
SA-211D	2	3/8	18 X 18	2 1/8	14	2	20
SA-211F	2 1/2	1/2	20 X 20	2 5/8	15	2 1/4	22



ANCHOR PLATE DETAIL



TYP. ANCHOR BOLT

COMPLETE WITH 6 NUTS
6 FLAT WASHERS & 1 LOCK WASHER

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

OFFSET FOUNDATION ANCHOR BASE POLE

DATE: 02/2022
STD DET NO: SA-211
SHT NO: 5 OF 7

\\DOT.kingcounty.lcl\Transit\DCI\CAD_Folders\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-211.1 - 7.dwg | Layout: SA-211.5
PLOTTED: Feb 07, 2022-09:10:45am By dibennett
XREFS:
IMAGES:

GENERAL NOTES

1. CONCRETE AND REINFORCING STEEL

1.1 ALL WORK SHALL BE DONE PER CITY OF SEATTLE BOARD OF PUBLIC 0.11 WORKS RULES: CHAPTER 40.4 - STREET AND SIDEWALK PAVEMENT OPENING AND RESTORATION RULES IF IN STREET RIGHT OF WAY.

1.2 CONCRETE SHALL BE CITY OF SEATTLE CLASS 4000P AIR ENTRAINED, 3/8" MAX AGGREGATE, AND WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.

1.3 ALL REINFORCING BARS SHALL BE DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.

1.4 MINIMUM CLEAR CONCRETE COVER SHALL BE 3 INCHES.

1.5 REINFORCING DETAILS AND FABRICATION SHALL BE AS RECOMMENDED IN ACI 315 "DETAILS & DETAILING OF CONCRETE REINFORCEMENT."

1.6 NO CONSTRUCTION COLD JOINTS SHALL BE PERMITTED.

1.7 FOR MEMBERS THAT DO NOT UTILIZE FORMWORK, CONCRETE SHALL NOT FREE FALL MORE THAN 5 FEET DURING PLACEMENT. TO AVOID EXCEEDING THIS DISTANCE, A TREMIE OR A PUMP MAY BE USED.

1.8 DURING CONCRETE PLACEMENT, THE CONCRETE IN THE TOP 8 FEET OF THE POLE BASE MUST BE VIBRATED WITH A HAND-HELD VIBRATOR. DO NOT OVER VIBRATE AND CAUSE AGGREGATE SEPARATION.

2. ANCHOR PLATES, BOLTS, NUTS AND WASHERS

2.1 ANCHOR BOLTS INCLUDING NUTS AND FLAT WASHERS SHALL CONFORM TO ASTM 2.1 F1554-99 GRADE 105 CLASS 2A INCLUDING SUPPLEMENTARY REQUIREMENTS S2, S3, AND S5. THREADS SHALL CONFORM TO THE ANSI STANDARD B1.1 FOR UNC THREAD. ANCHOR BOLTS SHALL HAVE 36 INCHES OF THREAD ON EXPOSED END AND 12 INCHES OF THREAD ON THE EMBEDDED END, OR SHALL BE FULLY THREADED.

2.2 ANCHOR PLATES SHALL CONFORM TO ASTM A36.

3. GALVANIZING

3.1 ANCHOR PLATES, ANCHOR BOLTS, ANCHOR BOLT NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED IN CONFORMANCE TO ASTM A153 OR ASTM A123.

4. SOIL

4.1 EMBEDMENT DEPTH IS ADEQUATE FOR THREE TIMES THE WORKING MOMENT IN 4.1 COHESIVE SOILS OF C=1000PSF AND Ø=0° OR BETTER AND COHESIONLESS SOILS OF C=0PSF AND Ø=26° OR BETTER.

4.2 EMBEDMENT DEPTH IS ADEQUATE FOR THREE TIMES THE WORKING MOMENT IN COHESIVE SOILS OF C=1000PSF AND Ø = 0° OR BETTER, AND IN COHESIONLESS SOILS OF C = 0PSF AND Ø = 26° OR BETTER.

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: D. BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS

OFFSET FOUNDATION ANCHOR BASE POLE

DATE: 03/2022
STD DET NO: SA-211
SHT NO: 6 OF 7

GENERAL NOTES

5. SUBMITTALS

5.1 REINFORCING STEEL SHOP DRAWINGS AND CERTIFICATE OF COMPLIANCE.

5.2 CONCRETE MIX PROPORTIONS, ADMIXTURES AND SLUMP.

5.3 ANCHOR PLATE, ANCHOR BOLT, ANCHOR BOLT NUTS AND WASHERS CERTIFICATES OF COMPLIANCE.

5.4 A TEST REPORT SHALL BE PROVIDED IN ACCORDANCE WITH ASTM F1554-99 AND SUPPLEMENTARY REQUIREMENTS.

6. INSPECTION

6.1 CONCRETE SHALL NOT BE PLACED UNTIL THE KING COUNTY PROJECT REPRESENTATIVE HAS INSPECTED THE EXCAVATION, THE GROUNDING, THE ANCHOR BOLTS, AND THE PLACEMENT OF THE REINFORCING BAR CAGE.

7. ANCHOR BOLT SETTING

7.1 COVER EXPOSED ANCHOR BOLT THREADS AND NUTS WITH AT LEAST 3 LAYERS OF PLASTIC TAPE BEFORE PLACING CONCRETE.

7.2 ANCHOR BOLT TEMPLATE SHALL BY USED TEMPORARILY AT THE TOP OF ANCHOR BOLTS FOR ACCURATE POSITIONING AND ALIGNING.

8. CONDUIT

8.1 CONDUIT FROM FOUNDATION SHALL BE SCHEDULE 80 PVC. CONDUIT BENDS SHALL HAVE A MINIMUM RADIUS OF 12".

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: D. BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

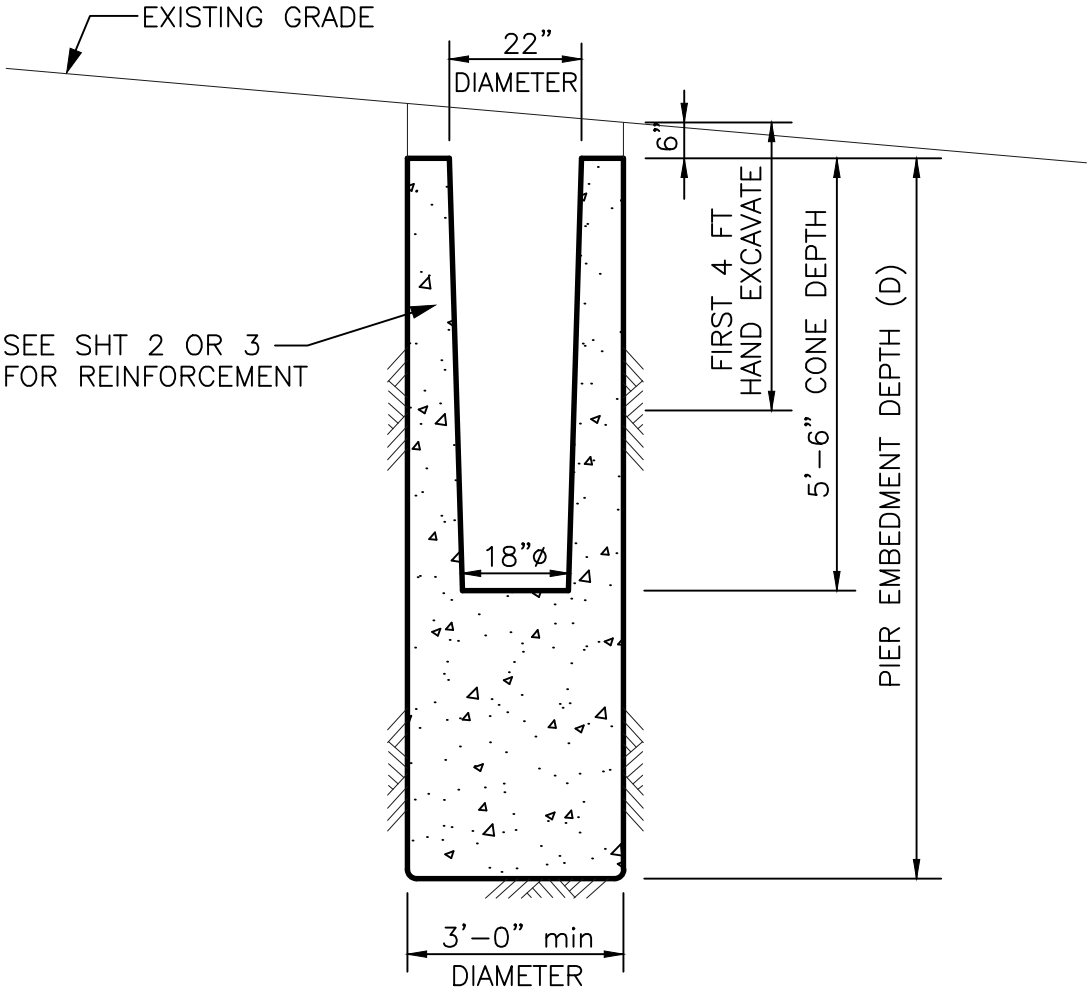
METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS

OFFSET FOUNDATION ANCHOR BASE POLE

DATE: 03/2022
STD DET NO: SA-211
SHT NO: 7 OF 7

EMBEDDED FOUNDATION SCHEDULE				
FOUNDATION TYPE	NORMAL WORKING MOMENT (LB–FT)	PIER EMBEDMENT DEPTH (D) (FEET)	REBAR REQUIREMENTS	
			VERTICAL*	SPIRAL TIES
SA–212–B	40,000	8.5	8–#8	#3 @ 6"
SA–212–D	80,000	10.5	12–#8	#3 @ 6"
SA–212–F	155,000	13	12–#8	#3 @ 6"

*ADD (1) #8 VERTICAL FOR GROUNDING



INCLINED CONDITION & CONE DETAIL

REBAR NOT SHOWN FOR CLARITY

NOTES:

1. SEE SHEET 4 FOR GENERAL NOTES.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

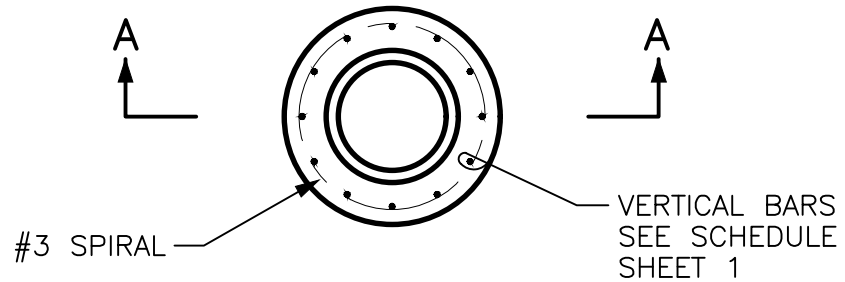
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

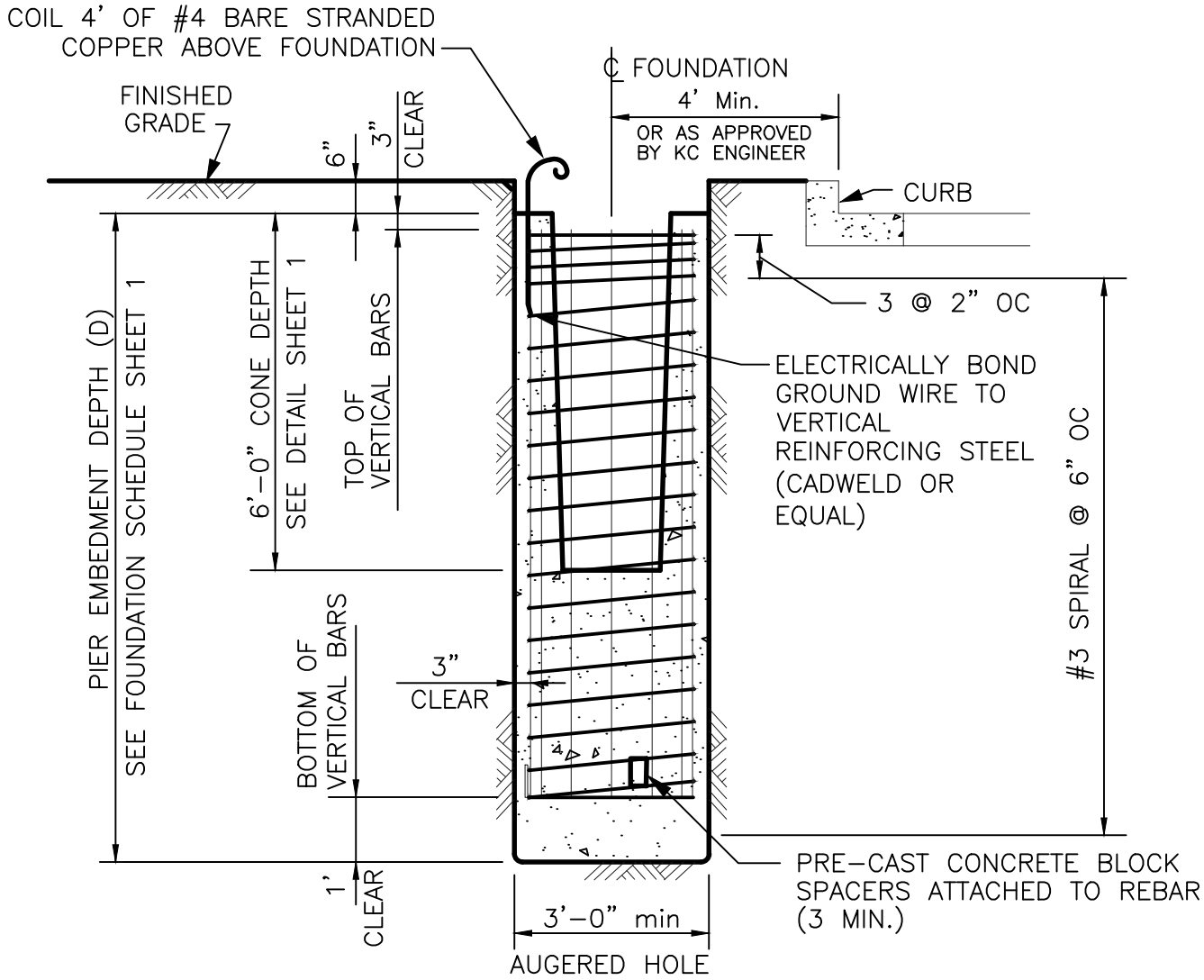
EMBEDDED STEEL POLE
(STANDARD FOUNDATION)

DATE: 03/2021
STD DET NO: SA-212
SHT NO: 1 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-212.1-6.dwg | Layout: SA-212.1
PLOTTED: Mar 18, 2021-08:20:39am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN VIEW



SECTION A–A
WITHOUT SIDEWALK

NOTES:

1. SEE SHEET 4 FOR GENERAL NOTES.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

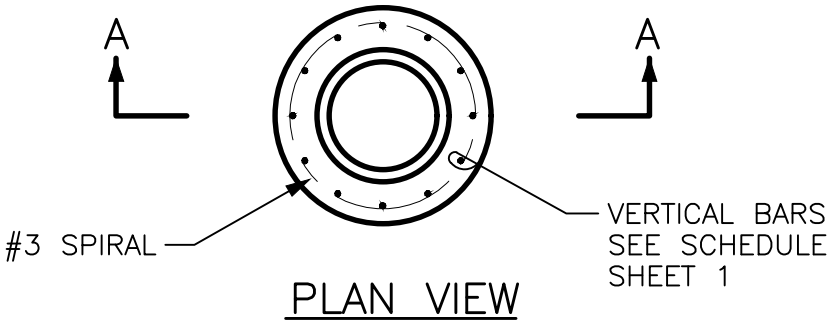
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

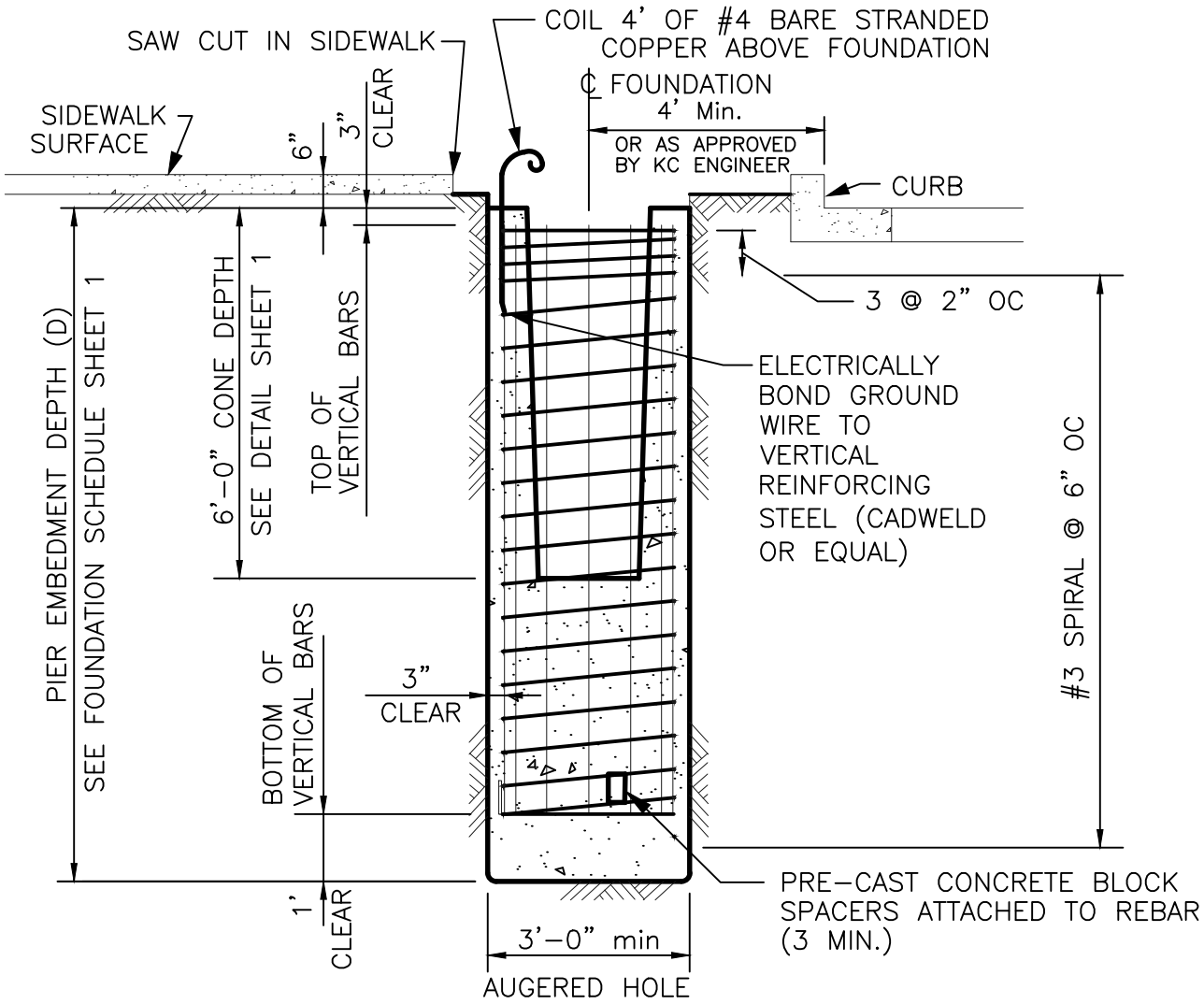
EMBEDDED STEEL POLE
(STANDARD FOUNDATION)

DATE: 03/2021
STD DET NO: SA-212
SHT NO: 2 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-212.1-6.dwg | Layout: SA-212.2
PLOTTED: Mar 18, 2021-08:20:44am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN VIEW



SECTION A–A
WITH SIDEWALK

NOTES:

1. SEE SHEET 4 FOR GENERAL NOTES.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

EMBEDDED STEEL POLE
(STANDARD FOUNDATION)

DATE: 03/2021
STD DET NO: SA-212
SHT NO: 3 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-212.1-6.dwg | Layout: SA-212.3
PLOTTED: Mar 18, 2021-08:20:50am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

GENERAL NOTES

1. CONCRETE AND REINFORCING STEEL

1.1 ALL WORK SHALL BE DONE PER CITY OF SEATTLE BOARD OF PUBLIC 0.11 WORKS RULES: CHAPTER 40.4 - STREET AND SIDEWALK PAVEMENT OPENING AND RESTORATION RULES IF IN STREET RIGHT OF WAY.

1.2 CONCRETE SHALL BE CITY OF SEATTLE CLASS 4000P AIR ENTRAINED, 3/8" MAX AGGREGATE, AND WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.

1.3 ALL REINFORCING BARS SHALL BE DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.

1.4 MINIMUM CLEAR CONCRETE COVER SHALL BE 3 INCHES.

1.5 REINFORCING DETAILS AND FABRICATION SHALL BE AS RECOMMENDED IN ACI 315 "DETAILS & DETAILING OF CONCRETE REINFORCEMENT."

1.6 NO CONSTRUCTION COLD JOINTS SHALL BE PERMITTED.

1.7 FOR MEMBERS THAT DO NOT UTILIZE FORMWORK, CONCRETE SHALL NOT FREE FALL MORE THAN 5 FEET DURING PLACEMENT. TO AVOID EXCEEDING THIS DISTANCE, A TREMIE OR A PUMP MAY BE USED.

1.8 DURING CONCRETE PLACEMENT, THE CONCRETE IN THE TOP 8 FEET OF THE POLE BASE MUST BE VIBRATED WITH A HAND-HELD VIBRATOR. DO NOT OVER VIBRATE AND CAUSE AGGREGATE SEPARATION.

2. SOIL

2.1 EMBEDMENT DEPTH IS BASED UPON RESEARCH REPORT NUMBERS 105-1,105-2 RESISTANCE OF A DRILLED SHAFT FOOTING TO OVERTURNING LOADS BY TEXAS TRANSPORTATION INSTITUTE, 1968.

2.2 EMBEDMENT DEPTH IS ADEQUATE FOR THREE TIMES THE WORKING MOMENT IN COHESIVE SOILS OF C=1000PSF AND Ø=0° OR BETTER AND COHESIONLESS SOILS OF C=0PSF AND Ø=26° OR BETTER.

3. SUBMITTALS

3.1 REINFORCING STEEL SHOP DRAWINGS AND CERTIFICATE OF COMPLIANCE.

3.2 CONCRETE MIX PROPORTIONS, ADMIXTURES AND SLUMP.

4. INSPECTION

4.1 CONCRETE SHALL NOT BE PLACED UNTIL THE ENGINEER HAS INSPECTED THE EXCAVATION, THE GROUNDING, THE CONE, AND THE PLACEMENT OF THE REINFORCING BAR CAGE.

No.	REVISION	BY	APP'D	DATE

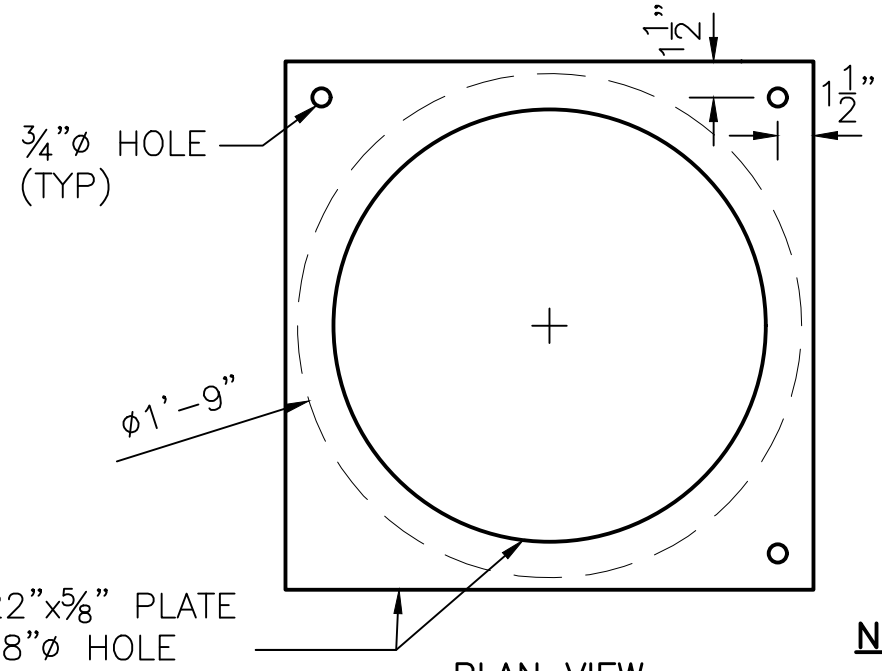
DESIGNED: A. WOLAK
DRAWN: D. BENNETT
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS

EMBEDDED STEEL POLE (STANDARD FOUNDATION)

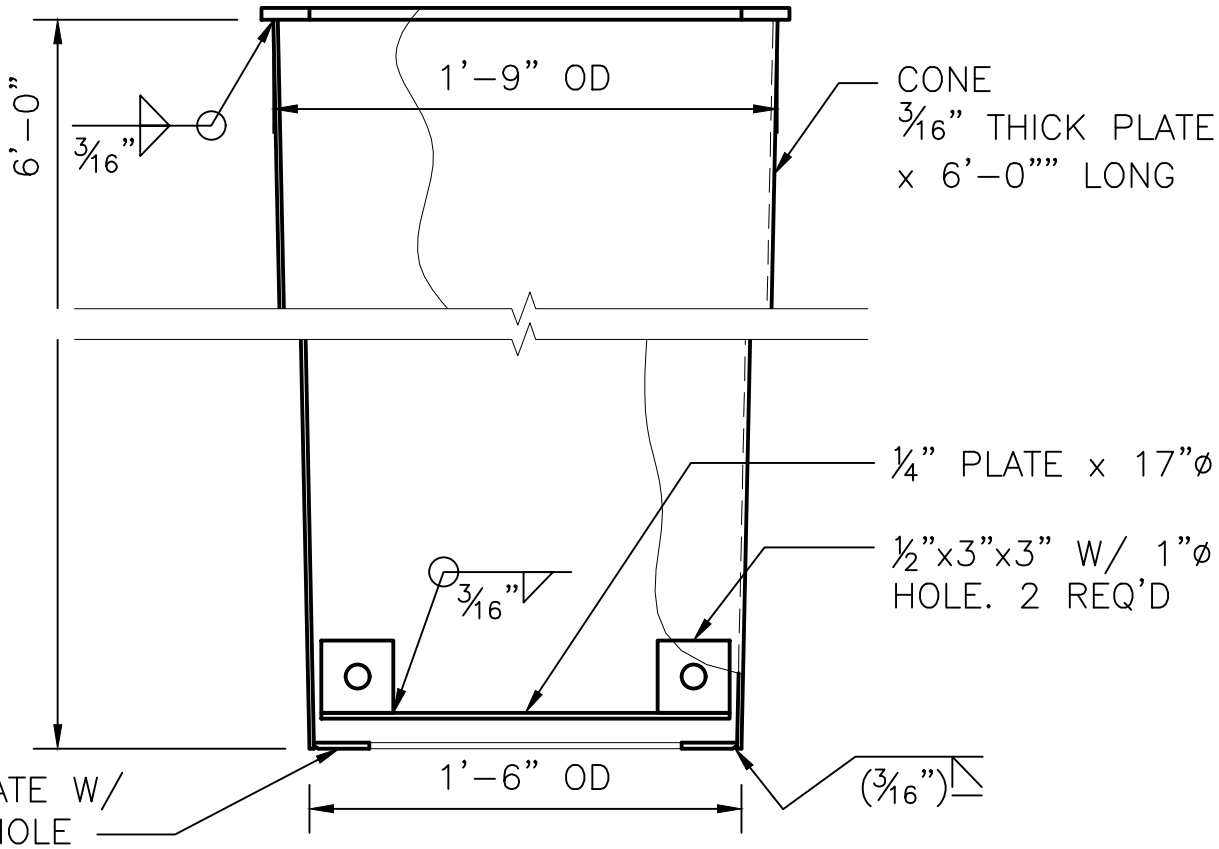
DATE: 03/2022
STD DET NO: SA-212
SHT NO: 4 OF 6



PLAN VIEW

NOTE:

ALL MATERIAL SHALL BE ASTM A36.



ELEVATION VIEW

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

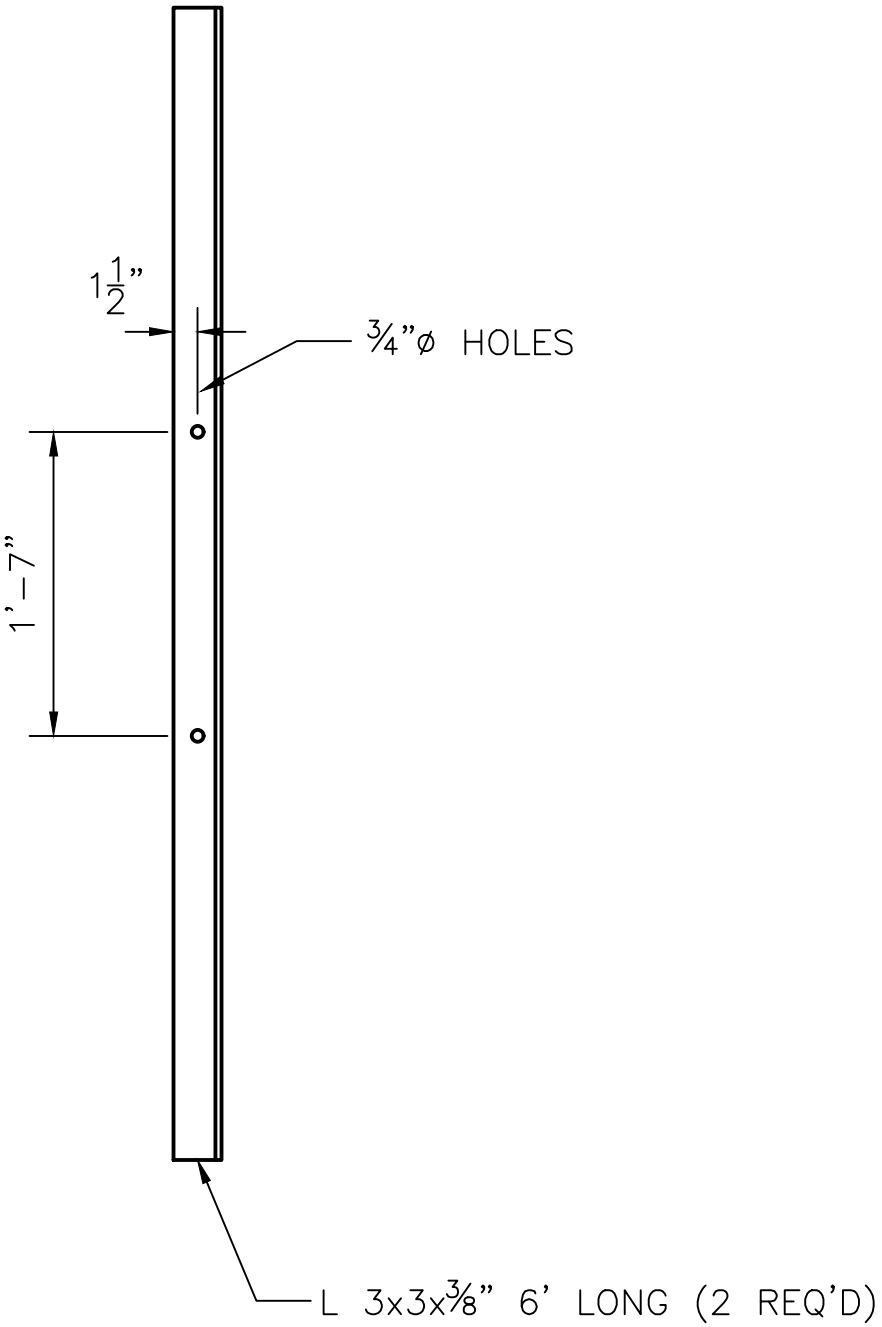
EMBEDDED STEEL POLE FOUNDATION
INTERIOR CONE FORM

DATE: 03/2021
STD DET NO: SA-212
SHT NO: 5 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-212.1-6.dwg | Layout: SA-212.5
PLOTTED: Mar 18, 2021-08:21:00am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

NOTE:

MATERIAL SHALL BE ASTM A36.



No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

APPROVED: P. ENG

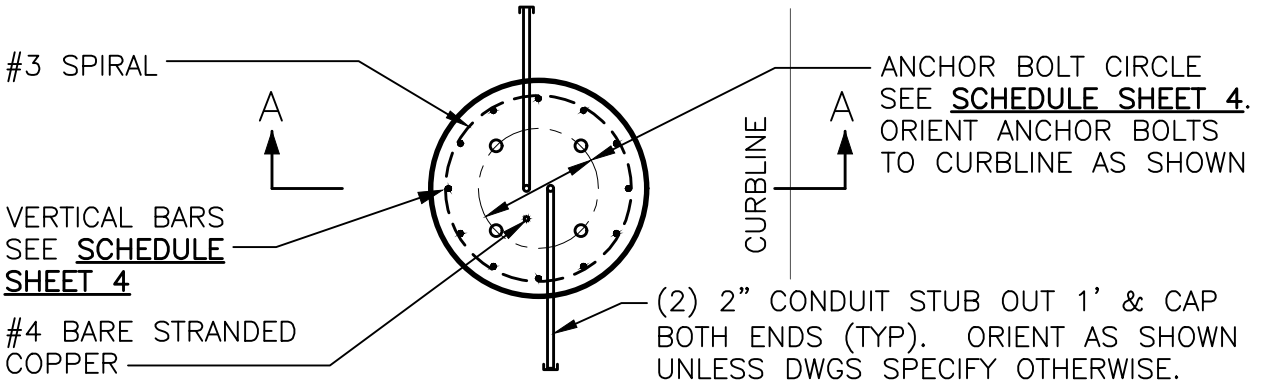
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

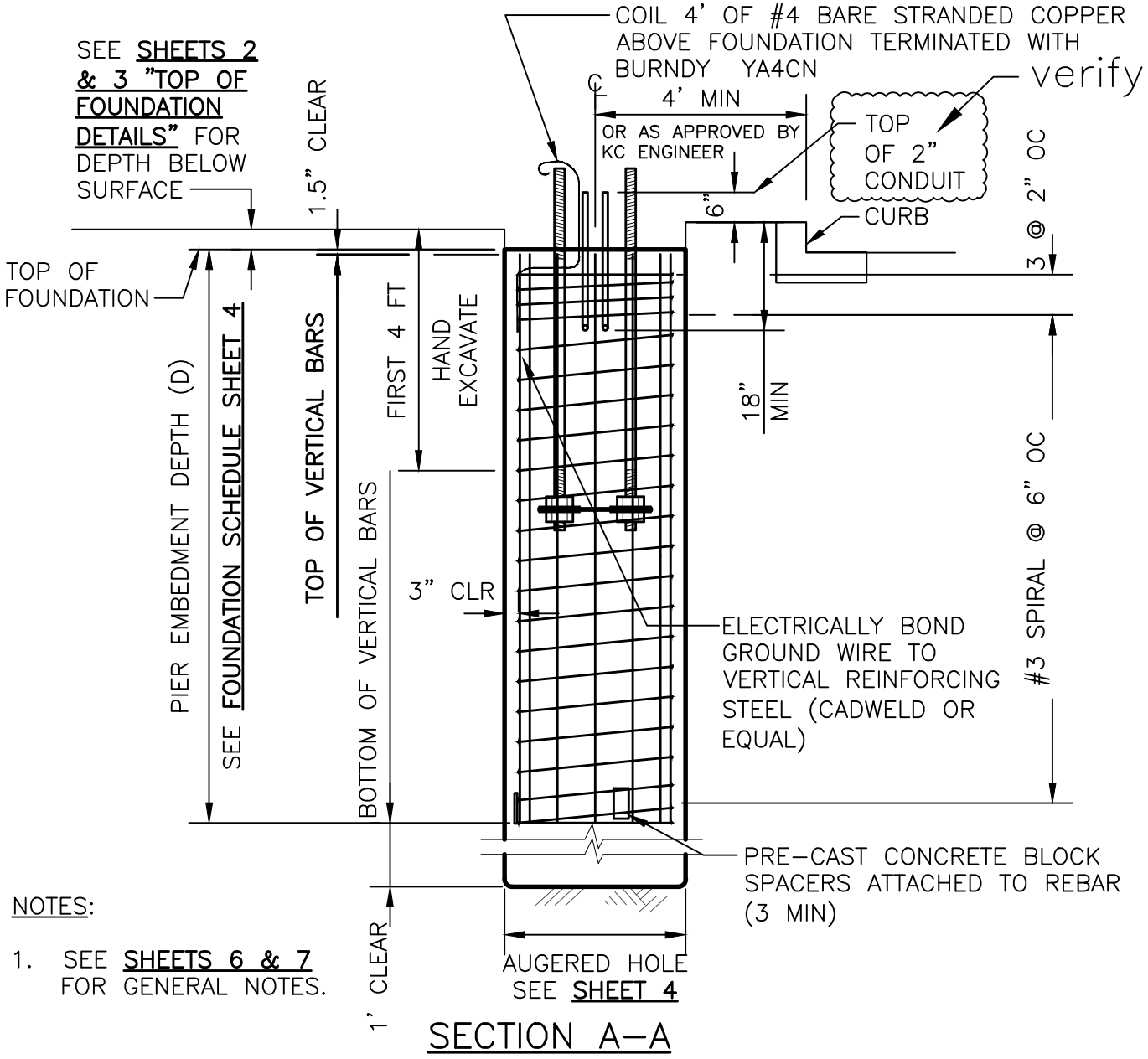
EMBEDDED STEEL POLE FOUNDATION INTERIOR CONE FORM

DATE: 03/2021
STD DET NO: SA-212
SHT NO: 6 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-212.1-6.dwg | Layout: SA-212.6
PLOTTED: Mar 18, 2021-08:21:05am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN VIEW



SECTION A–A

NOTES:

1. SEE SHEETS 6 & 7 FOR GENERAL NOTES.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

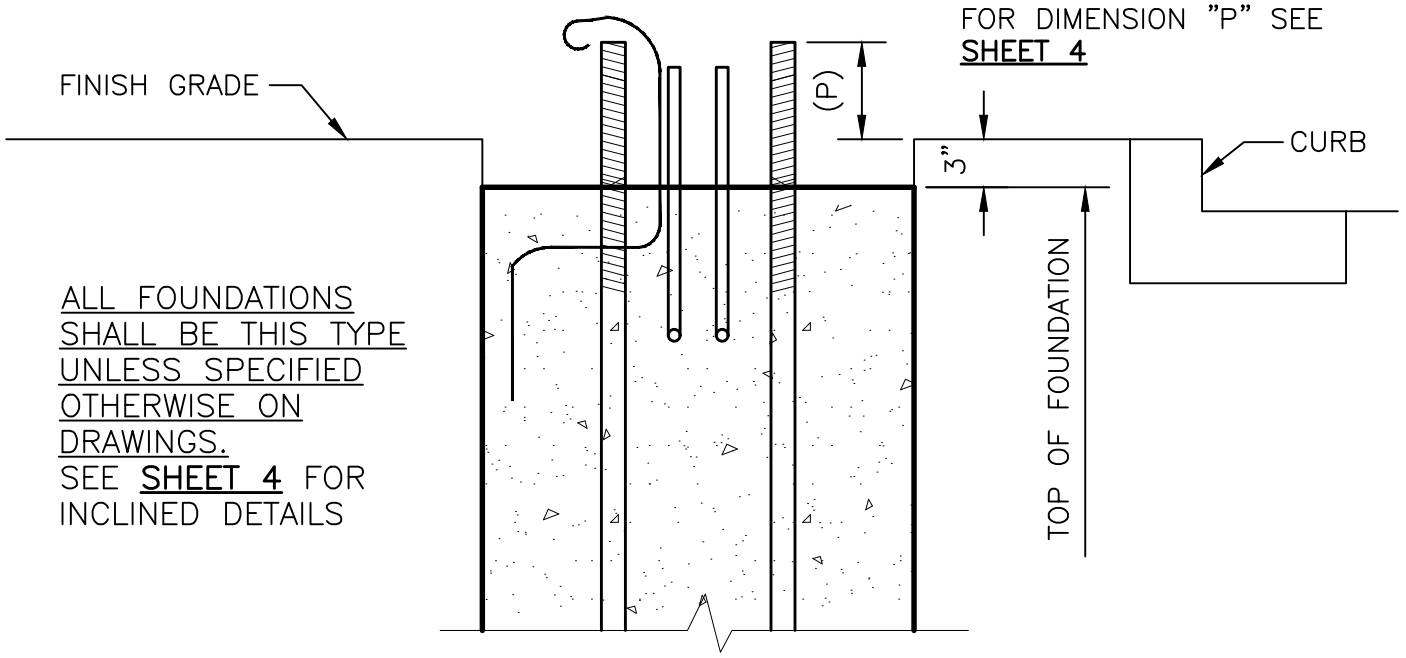
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

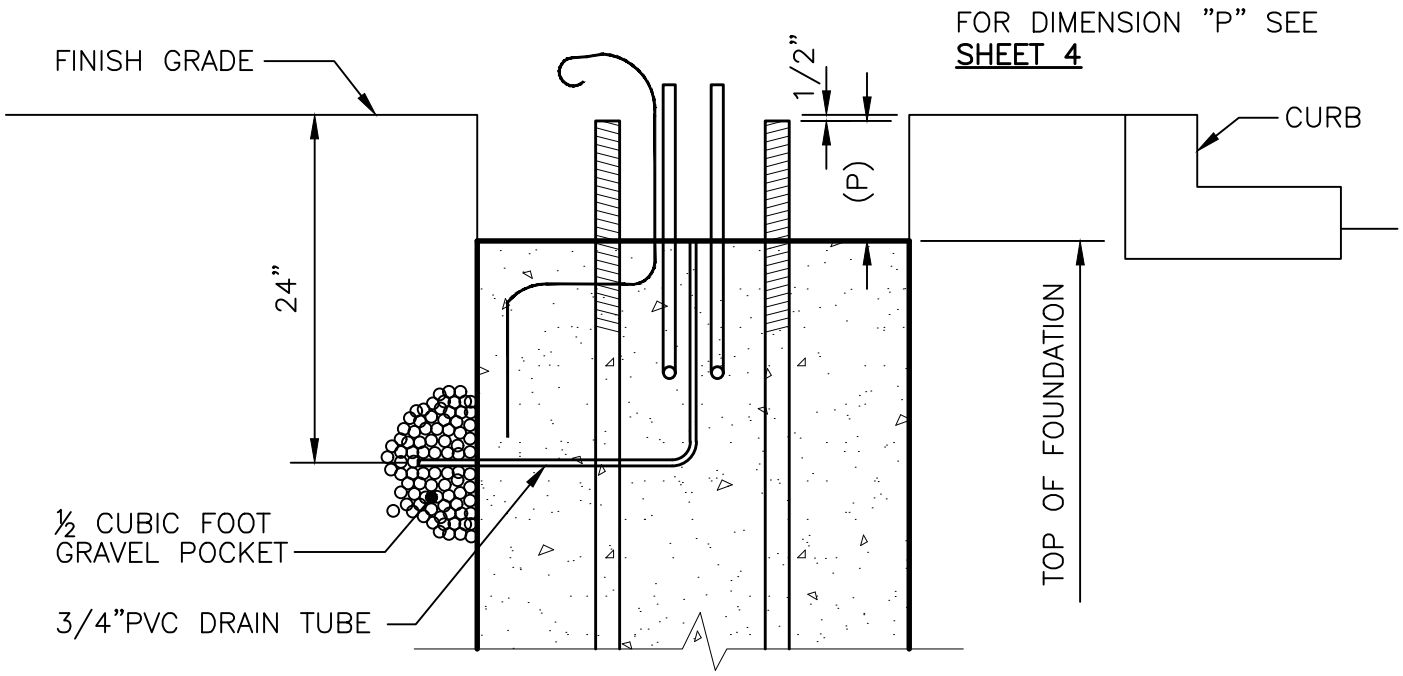
ANCHOR BASE STEEL POLE (STANDARD FOUNDATION)

DATE: 03/2021
STD DET NO: SA-213
SHT NO: 1 OF 7

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-213 1-7.dwg | Layout: SA-213.1
PLOTTED: Mar 18, 2021-08:21:15am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



STANDARD CONDITION
TOP OF FOUNDATION DETAILS



BURIED CONDITION
TOP OF FOUNDATION DETAILS
SEE SHEET 4 FOR INCLINED DETAILS

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

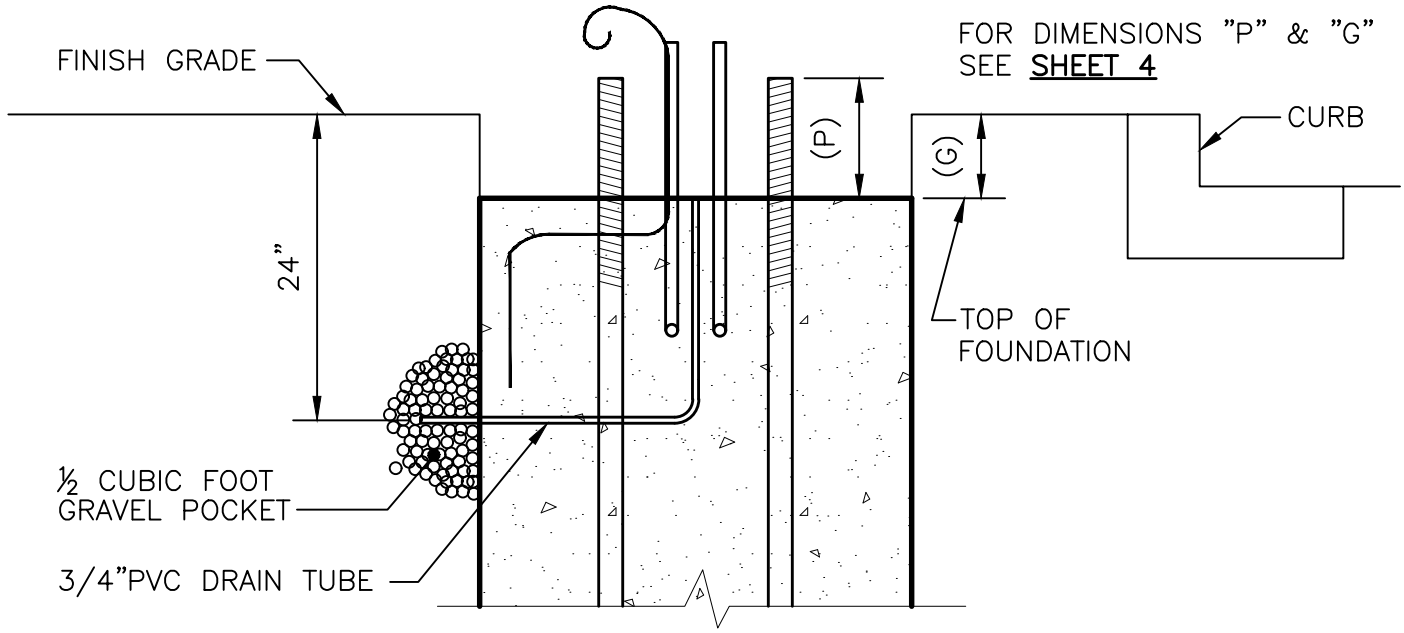
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

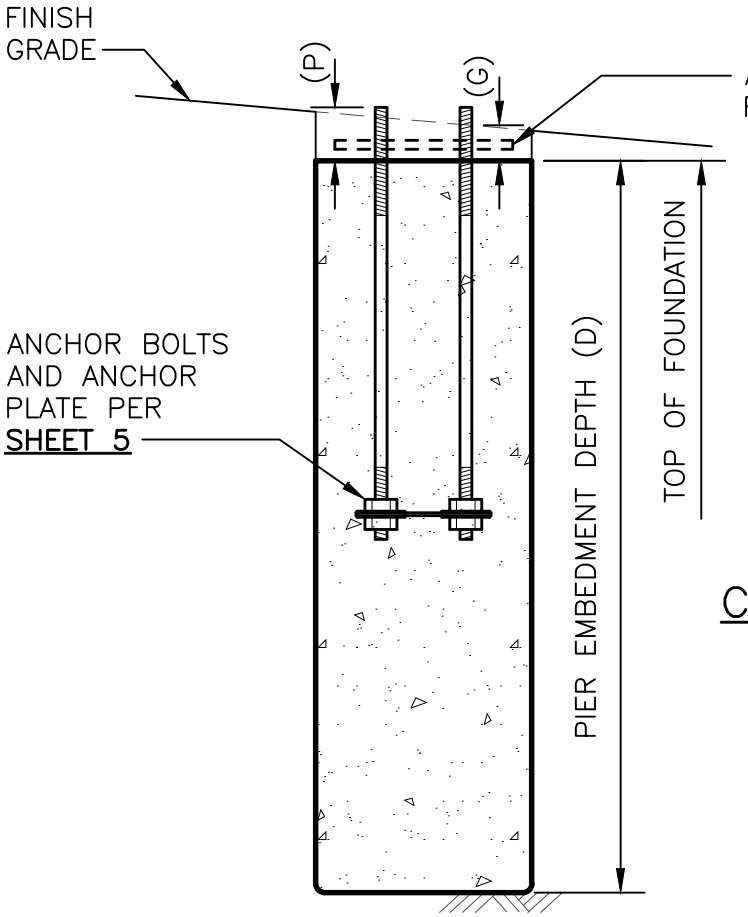
ANCHOR BASE STEEL POLE
(STANDARD FOUNDATION)

DATE: 03/2021
STD DET NO: SA-213
SHT NO: 2 OF 7

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-213 1-7.dwg | Layout: SA-213.2
PLOTTED: Mar 18, 2021-08:21:20am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



CHIEF SEATTLE CONDITION
TOP OF FOUNDATION DETAILS
USE ONLY WHERE NOTED ON DRAWINGS



CHIEF SEATTLE CONDITION
INCLINED DETAILS
REBAR NOT SHOWN FOR CLARITY

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

ANCHOR BASE STEEL POLE
(STANDARD FOUNDATION)

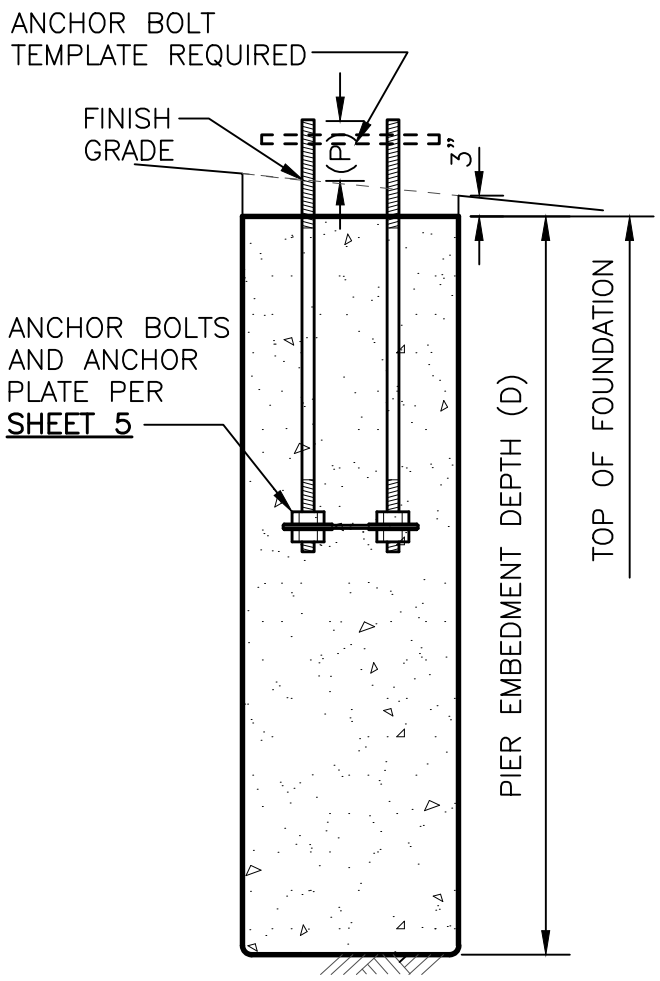
DATE: 03/2021
STD DET NO: SA-213
SHT NO: 3 OF 7

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-213 1-7.dwg | Layout: SA-213.3
PLOTTED: Mar 18, 2021-08:21:24am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

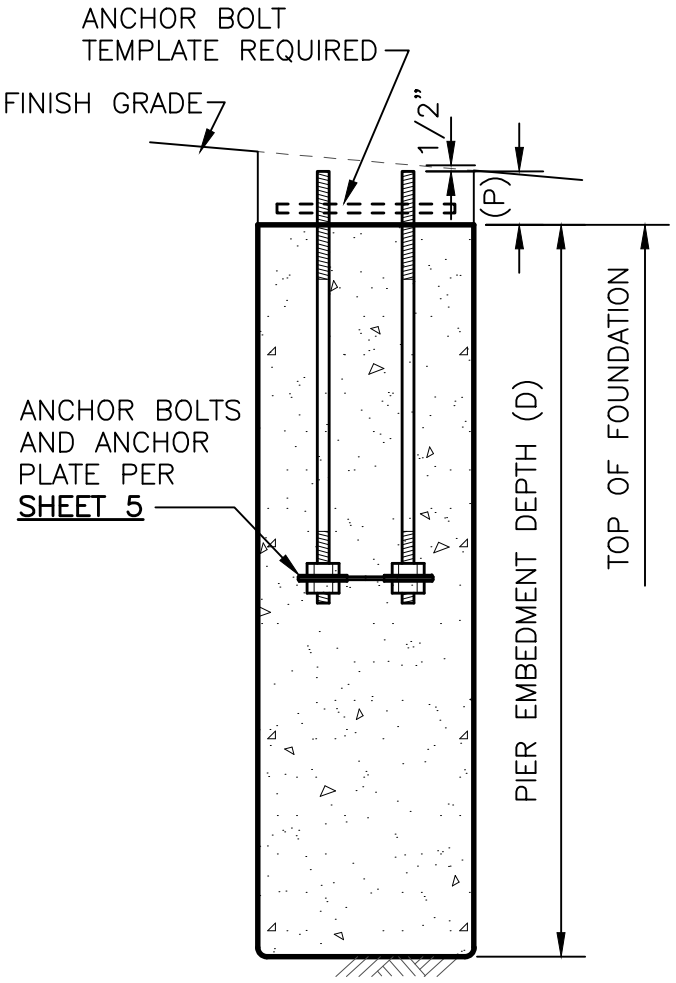
ANCHOR BASE FOUNDATION SCHEDULE

FOUNDATION TYPE	POLE My STANDARD/ MAXIMUM (KIP–FT)	PIER EMBEDMENT DEPTH (D)		PIER DIAMETER (FEET)	REBAR REQUIREMENTS		BOLT CIRCLE ANCHOR	BOLT PROJ ANCHOR	ONLY CHIEF SEATTLE
		4 BLOWS PER FT	2 BLOWS PER FT		VERTICAL*	CONTINUOUS TIES		"P"	"G"
SA–213–A	110/180	9	14	3'–0"	8–#8	#3	15"	8.5"	6"
SA–213–B	110/180	9	14	3'–0"	8–#8	#3	18"	9"	6.5"
SA–213–D	180/270	10.5	16	3'–0"	12–#8	#3	20"	10"	7"
SA–213–F	330/400	13	19	3'–0"	12–#9	#3	22"	11.5"	8"
SA–213–H	600/600	15.5	21	3'–6"	14–#9	#3	24"	12"	8.5"

*ADD (1) #8 VERTICAL FOR GROUNDING



STANDARD CONDITION
INCLINED DETAILS
REBAR NOT SHOWN FOR CLARITY



BURIED CONDITION
INCLINED DETAILS
REBAR NOT SHOWN FOR CLARITY

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

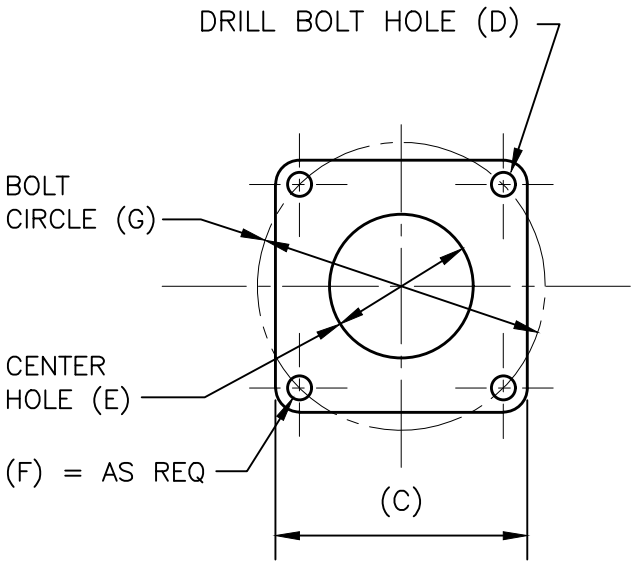
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

ANCHOR BASE STEEL POLE (STANDARD FOUNDATION)

DATE: 03/2021
STD DET NO: SA-213
SHT NO: 4 OF 7

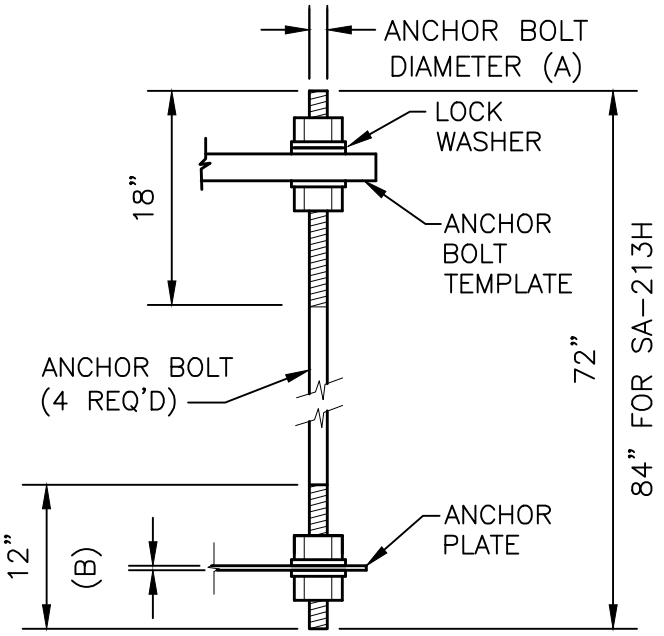
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-213 1-7.dwg | Layout: SA-213.4
PLOTTED: Mar 18, 2021-08:21:29am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

FOUNDATION TYPE	ANCHOR BOLT DIAMETER (INCHES) (A)	ANCHOR PLATE DIMENSIONS (INCHES)					
		PLATE THICKNESS (B)	PLATE WIDTH (C)	BOLT HOLE (D)	CENTER HOLE (E)	CORNER RADIUS (F)	BOLT CIRCLE (G)
SA–213–A	1 1/2	3/8	16 X 16	1 5/8	10 1/2	1 1/2	15
SA–213–B	1 3/4	3/8	16 X 16	1 7/8	12 1/2	1 5/8	18
SA–213–D	2	3/8	18 X 18	2 1/8	14	2	20
SA–213–F	2 1/2	3/8	20 X 20	2 5/8	15	2 1/4	22
SA–213–H	2 1/2	3/8	24.5 X 24.5	2 5/8	16 1/2	2 1/2	24



ANCHOR PLATE DETAIL

SEE GENERAL NOTES SHEETS 6 & 7



TYPICAL ANCHOR BOLT

COMPLETE WITH 4 NUTS 4 FLAT WASHERS & 1 LOCK WASHER.

SEE GENERAL NOTES/SHEETS 6 & 7

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

ANCHOR BASE STEEL POLE (STANDARD FOUNDATION)

DATE: 03/2021
STD DET NO: SA-213
SHT NO: 5 OF 7

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-213 1-7.dwg | Layout: SA-213.5
PLOTTED: Mar 18, 2021-08:21:35am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

GENERAL NOTES

1. CONCRETE AND REINFORCING STEEL

   1.1 ALL WORK SHALL BE DONE PER CITY OF SEATTLE BOARD OF PUBLIC 0.11 WORKS RULES:

   CHAPTER 40.4 - STREET AND SIDEWALK PAVEMENT OPENING AND RESTORATION RULES IF IN STREET RIGHT OF WAY.

   1.2 CONCRETE SHALL BE CITY OF SEATTLE CLASS 4000P AIR ENTRAINED, 3/8" MAX AGGREGATE, AND WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.

   1.3 ALL REINFORCING BARS SHALL BE DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60.

   1.4 MINIMUM CLEAR CONCRETE COVER SHALL BE 3 INCHES.

   1.5 REINFORCING DETAILS AND FABRICATION SHALL BE AS RECOMMENDED IN ACI 315 "DETAILS & DETAILING OF CONCRETE REINFORCEMENT."

   1.6 NO CONSTRUCTION COLD JOINTS SHALL BE PERMITTED.

   1.7 FOR MEMBERS THAT DO NOT UTILIZE FORMWORK, CONCRETE SHALL NOT FREE FALL MORE THAN 5 FEET DURING PLACEMENT. TO AVOID EXCEEDING THIS DISTANCE, A TREMIE OR A PUMP MAY BE USED.

   1.8 DURING CONCRETE PLACEMENT, THE CONCRETE IN THE TOP 8 FEET OF THE POLE BASE MUST BE VIBRATED WITH A HAND-HELD VIBRATOR. DO NOT OVER VIBRATE AND CAUSE AGGREGATE SEPARATION.

2. ANCHOR PLATES, BOLTS, NUTS AND WASHERS

   2.1 ANCHOR BOLTS INCLUDING NUTS AND FLAT WASHERS SHALL CONFORM TO ASTM F1554-07 GRADE 105 CLASS 2A INCLUDING SUPPLEMENTARY REQUIREMENTS S2, S3 AND S5. THREADS SHALL CONFORM TO THE ANSI STANDARD B1.1 FOR UNC THREAD. ANCHOR BOLTS SHALL HAVE 18 INCHES OF THREAD ON EXPOSED END AND 12 INCHES OF THREAD ON THE EMBEDDED END.

   2.2 ANCHOR PLATES SHALL CONFORM TO ASTM A36.

3. GALVANIZING

   3.1 ANCHOR PLATES, ANCHOR BOLTS, ANCHOR BOLT NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED IN CONFORMANCE TO ASTM A153 OR ASTM A123.

4. SOIL

   4.1 EMBEDMENT DEPTH IS ADEQUATE FOR THREE TIMES THE WORKING MOMENT IN COHESIVE SOILS OF C=1000PSF AND Ø=0° OR BETTER AND COHESIONLESS SOILS OF C=0PSF AND Ø=26° OR BETTER.

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: E. TU
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS

ANCHOR BASE STEEL POLE (STANDARD FOUNDATION)

DATE: 03/2022
STD DET NO: SA-213
SHT NO: 6 OF 7

GENERAL NOTES

(Continued from sheet 6 of 7)

5. SUBMITTALS

5.1 Reinforcing steel shop drawings and certificate of compliance.

5.2 Concrete mix proportions, admixtures and slump.

5.3 Anchor plate, anchor bolt, anchor bolt nuts and washers certificates of compliance.

5.4 A test report shall be provided in accordance with ASTM F1554–07 and supplementary requirements. (continued, sheet 7 of 7)

6. INSPECTION

6.1 Concrete shall not be placed until the King County Project Representative has inspected the excavation, the grounding, the anchor bolts, and the placement of the reinforcing bar cage.

7. ANCHOR BOLT SETTING

7.1 Cover exposed anchor bolt threads and nuts with at least 3 layers of plastic tap before placing concrete

7.2 Anchor bolt template shall be used temporarily at the top of anchor bolts for accurate positioning and aligning.

7.3 Anchor bolts shall not exceed 1/8" from vertical over the entire length of bolt upon completion of foundation.

8. CONDUIT

8.1 Conduit from foundation shall be schedule 80 PVC. Conduit bends shall have a minimum radius of 12".

9, COMPRESSION CONNECTION

9.1 Compression connection shall be Burndy YA4CN. One–Hole HYlug/Code Conductor–long Barrel installed per manufacturer's specifications.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

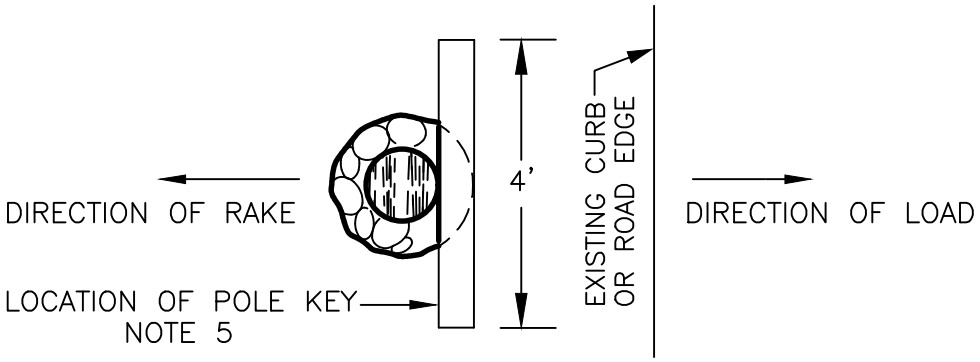
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

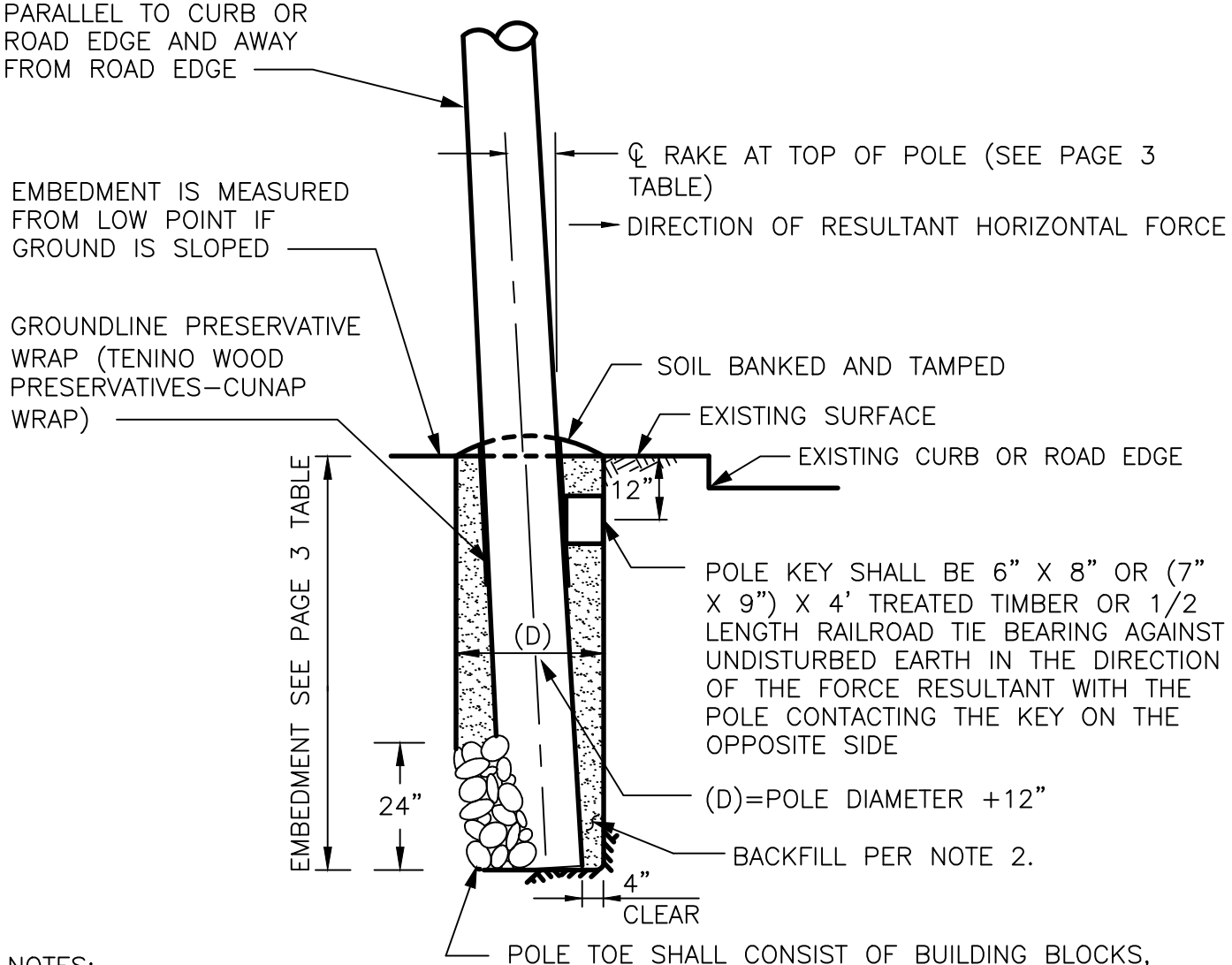
ANCHOR BASE STEEL POLE (STANDARD FOUNDATION)

DATE: 03/2021
STD DET NO: SA-213
SHT NO: 7 OF 7

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-213 1-7.dwg | Layout: SA-213.7
PLOTTED: Mar 18, 2021-08:21:44am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN



NOTES:

1. SEE SHEET 3 FOR GENERAL NOTES.

ELEVATION

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

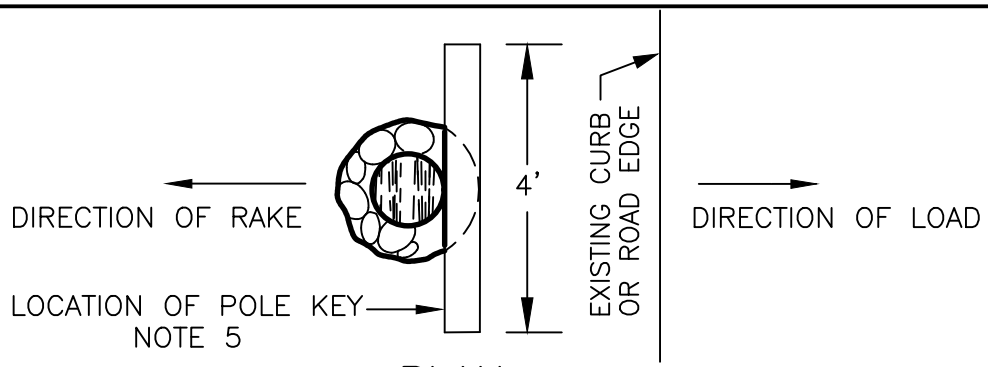
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

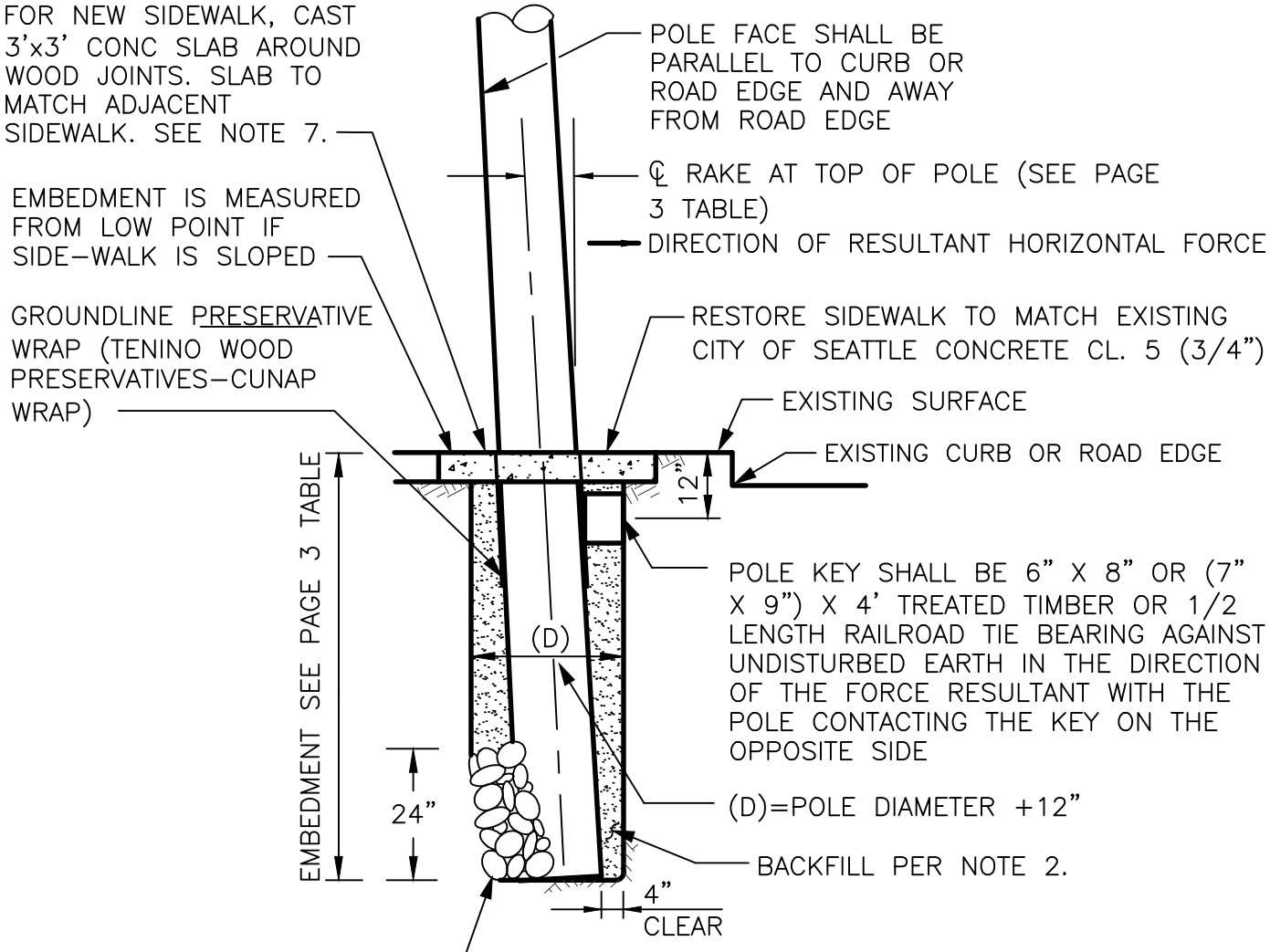
WOOD POLE SETTING STANDARD (WITHOUT SIDEWALK)

DATE: 03/2021
STD DET NO: SA-214
SHT NO: 1 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-214,1-3.dwg | Layout: SA-214.1
PLOTTED: Mar 18, 2021-08:21:54am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN



NOTES:

1. SEE SHEET 3 FOR GENERAL NOTES.

ELEVATION

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
WOOD POLE SETTING STANDARD (WITH SIDEWALK)

DATE: 03/2021
STD DET NO: SA-214
SHT NO: 2 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-214,1-3.dwg | Layout: SA-214.2
PLOTTED: Mar 18, 2021-08:22:00am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

NOTES:

1. THIS DETAIL APPLIES TO SOIL FREE OF PEAT, MUCK OR OTHER ORGANIC MATTER. SOILS HAVING THE ABOVE MENTIONED QUALITIES SHALL REQUIRE SPECIAL INVESTIGATION.

2. SOIL USED FOR BACKFILL SHALL BE WELL GRADED SAND AND GRAVEL MIX FREE FROM SOD, GRASS, WEEDS AND ALL SIMILAR ORGANIC MATERIALS AND SUITABLY DRY FOR COMPACTION. SAND AND GRAVEL MIX CAN BE EITHER EXCAVATED SOIL OR IMPORTED.

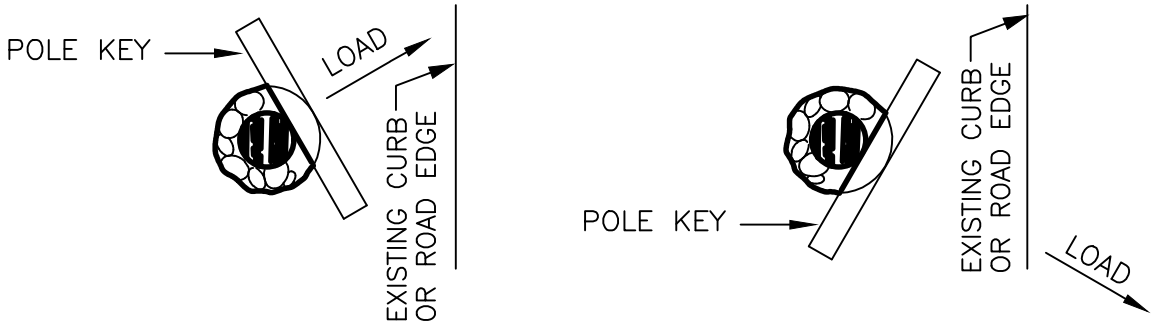
3. ALL WATER IN HOLE SHALL BE REMOVED BEFORE SETTING AND TAMPING THE HOLE.

4. IN BACKFILLING, THE SAND AND GRAVEL MIX SHALL BE REPLACED IN EVEN LAYERS APPROXIMATELY 6" THICK AND FIRMLY AND THROUGHLY TAMPED TO A DRY DENSITY NOT LESS THAN THE NATURAL IN-PLACE DRY DENSITY OF THE SURROUNDING EARTH. IF HAND TAMPING BARS ARE USED, NOT MORE THAN ONE PERSON SHALL SHOVEL WHILE THREE PERSONS ARE TAMPING.

5. POLE KEY SHALL BE INSTALLED PERPENDICULAR TO DIRECTION OF LOAD, AND MAY NOT BE PARALLEL TO EXISTING CURB OR ROAD EDGE. SEE PLAN EXAMPLES BELOW

6. DELETE POLE KEY & POLE TOE IF POLE IS GUYED WITH SA-231, SA-232, OR SA-233.

7. FOR AN EXISTING SIDEWALK, SAWCUT 3'x3' AROUND A POLE OR AT NEAREST CONSTRUCTION JOINT AS DIRECTED BY COS ENGINEER.



EMBEDMENT AND RAKE SCHEDULE

POLE LENGTH (ft)	EMBEDMENT (ft)	RAKE		
		UNGUYED	GUYED	BRACKET ARM
35	8'-0"	17"	7"	7"
40	8'-0"	20"	8"	8"

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

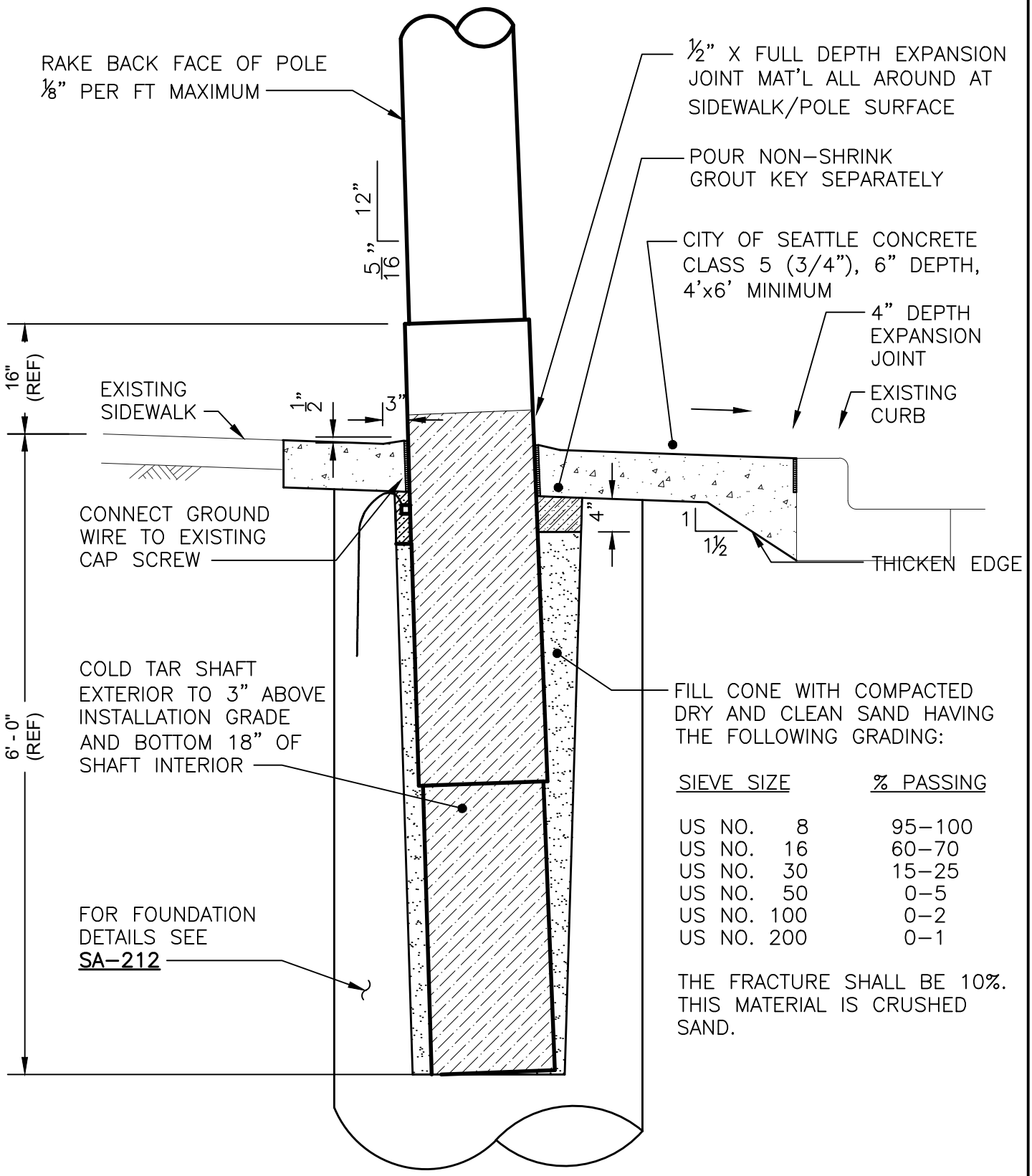
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

WOOD POLE SETTING STANDARD

DATE: 03/2021
STD DET NO: SA-214
SHT NO: 3 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-214,1-3.dwg | Layout: SA-214.3
PLOTTED: Mar 18, 2021-08:22:05am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



SIEVE SIZE	% PASSING
US NO. 8	95–100
US NO. 16	60–70
US NO. 30	15–25
US NO. 50	0–5
US NO. 100	0–2
US NO. 200	0–1

THE FRACTURE SHALL BE 10%. THIS MATERIAL IS CRUSHED SAND.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

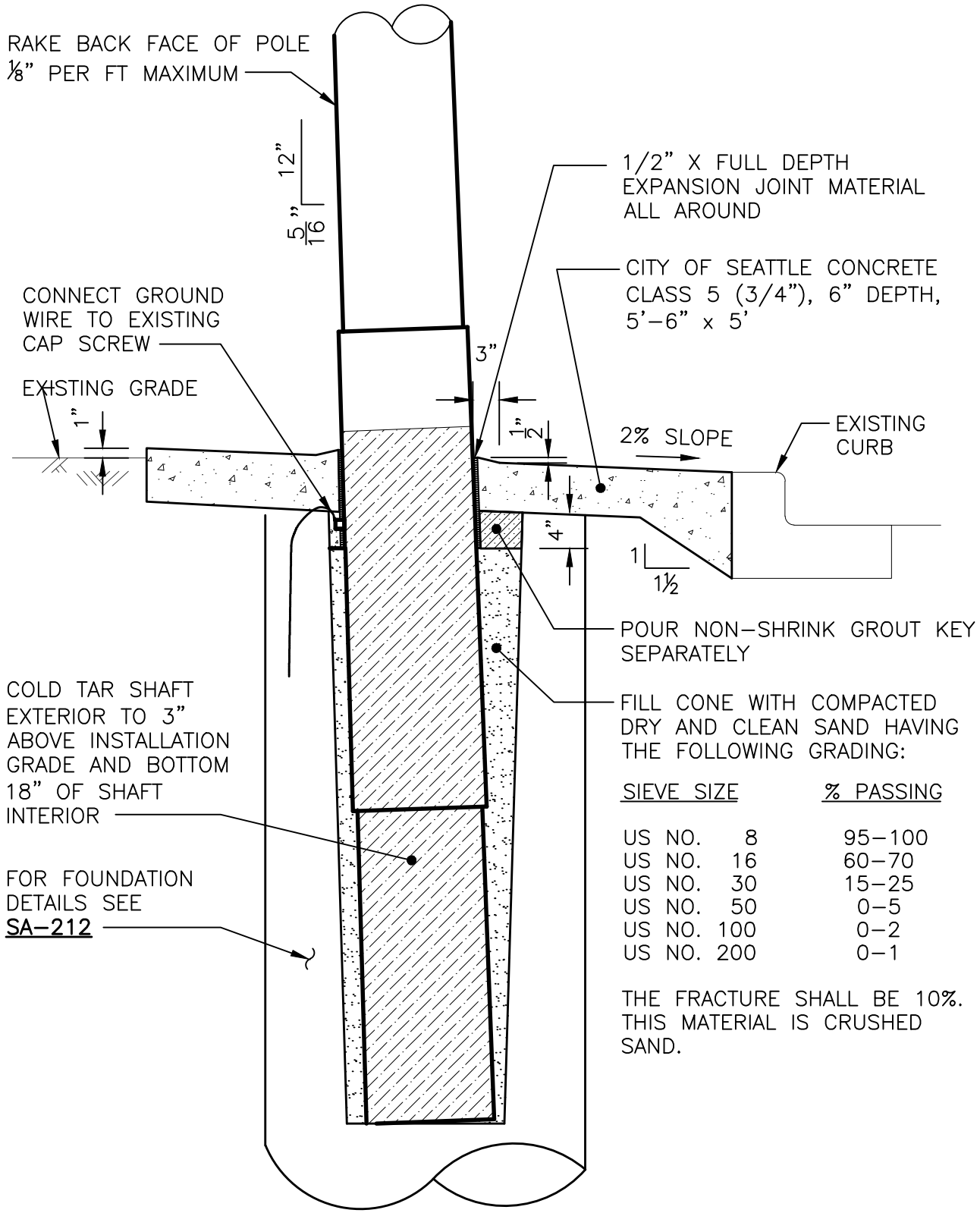
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

EMBEDDED STEEL POLE INSTALLATION (WITH SIDEWALK)

DATE: 03/2021
STD DET NO: SA-215
SHT NO: 1 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-215,1-3.dwg | Layout: SA-215.1
PLOTTED: Mar 18, 2021-08:22:14am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



SIEVE SIZE	% PASSING
US NO. 8	95–100
US NO. 16	60–70
US NO. 30	15–25
US NO. 50	0–5
US NO. 100	0–2
US NO. 200	0–1

THE FRACTURE SHALL BE 10%. THIS MATERIAL IS CRUSHED SAND.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

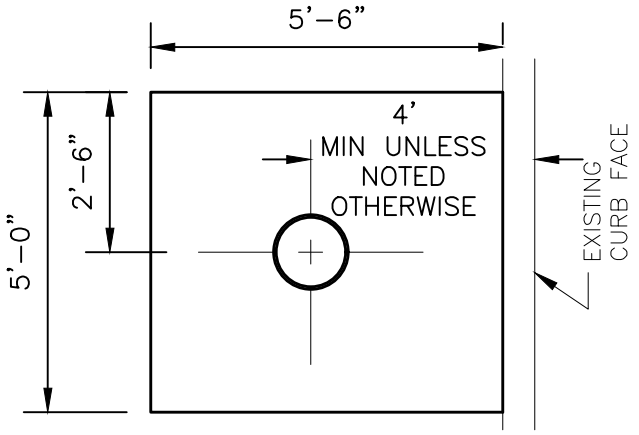
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

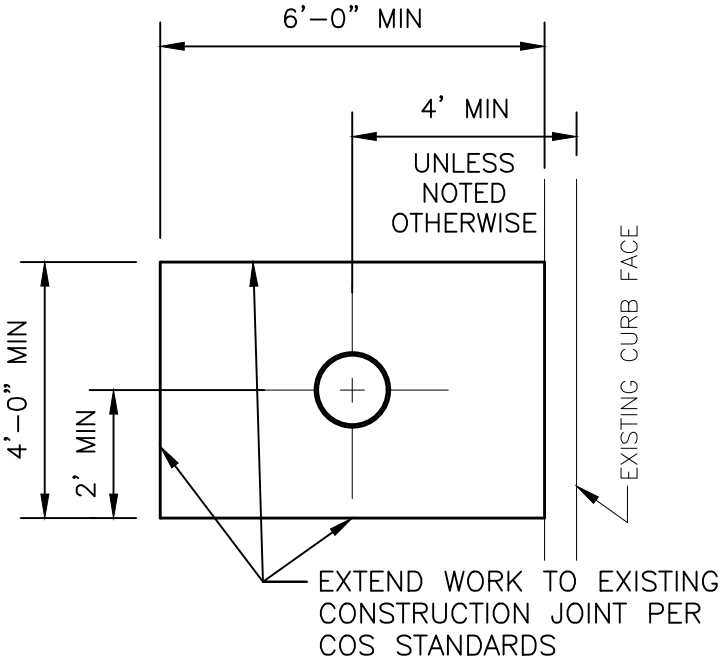
EMBEDDED STEEL POLE INSTALLATION (WITHOUT SIDEWALK)

DATE: 03/2021
STD DET NO: SA-215
SHT NO: 2 OF 3

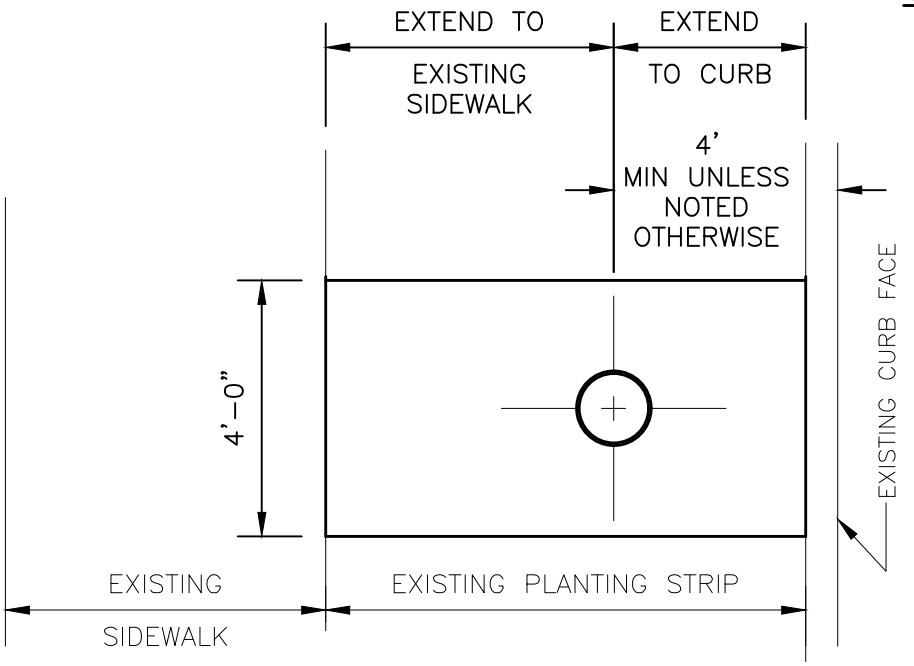
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-215,1-3.dwg | Layout: SA-215.2
PLOTTED: Mar 18, 2021-08:22:20am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NO SIDEWALK CONDITION



EXISTING SIDEWALK CONDITION



EXISTING SIDEWALK & PLANTING STRIP CONDITION

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

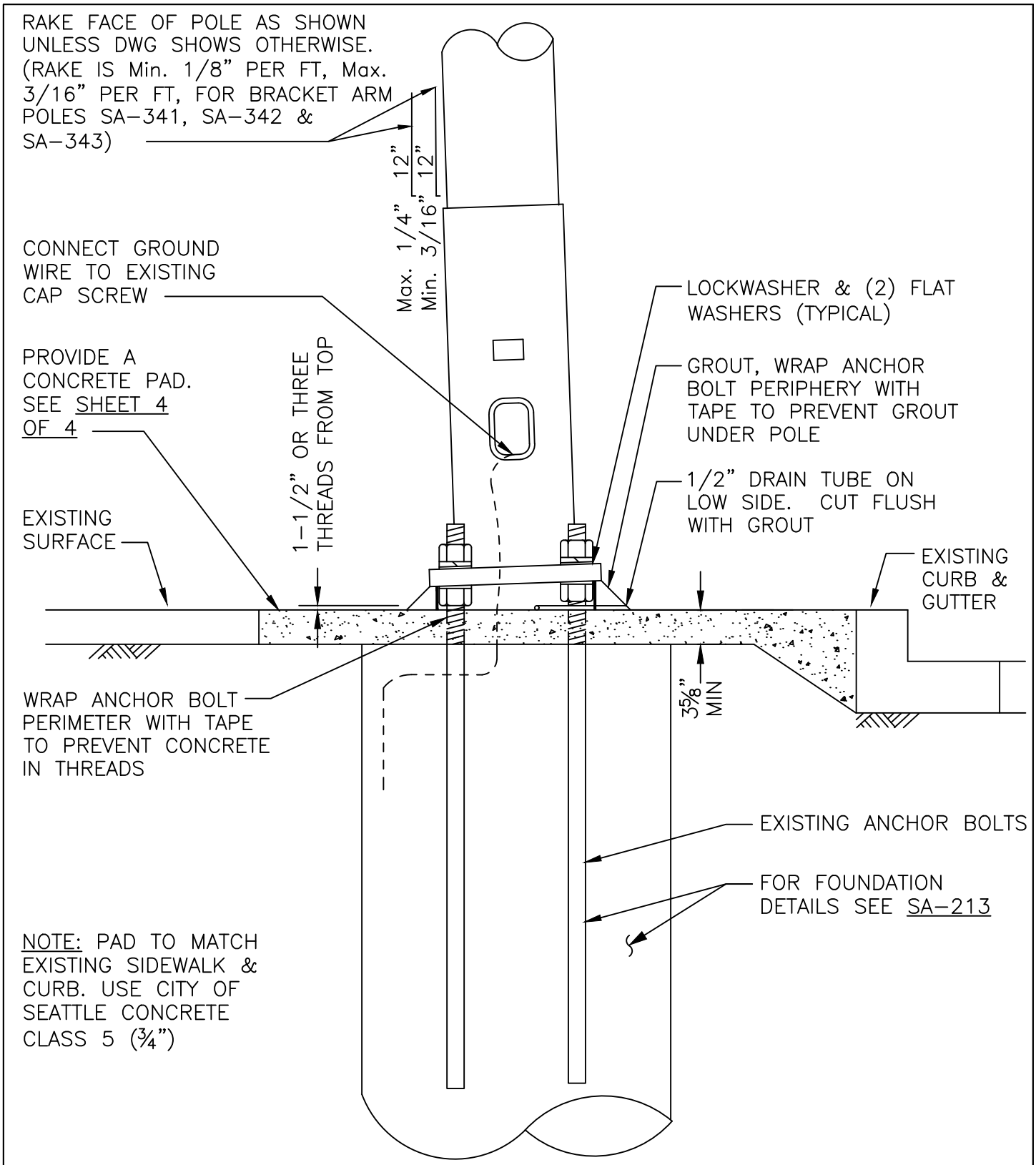
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

EMBEDDED STEEL POLE INSTALLATION

DATE: 03/2021
STD DET NO: SA-215
SHT NO: 3 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-215,1-3.dwg | Layout: SA-215.3
PLOTTED: Mar 18, 2021-08:22:24am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



STANDARD CONDITION

ALL FOUNDATIONS SHALL BE THIS TYPE, UNLESS NOTED OTHERWISE ON DRAWINGS

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

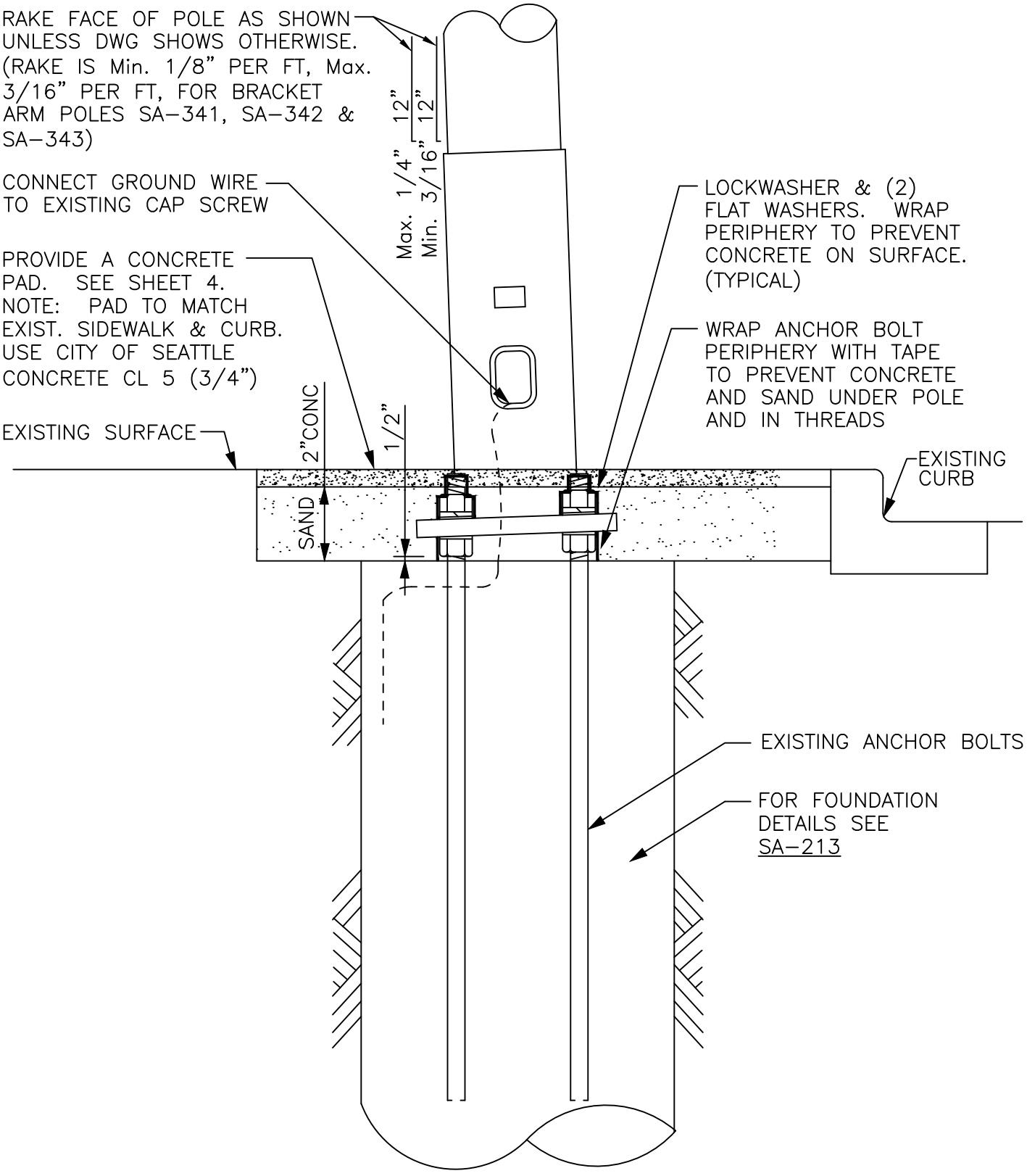
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

ANCHOR BASE STEEL POLE INSTALLATION

DATE: 03/2021
STD DET NO: SA-216
SHT NO: 1 OF 4

C:\Users\anderls\AppData\Local\Temp\AcPublish_16380\SA-216.1-4.dwg | Layout: SA-216.1
PLOTTED: Nov 22, 2021-05:08:01pm By AnderLS
XREFS:
IMAGES:



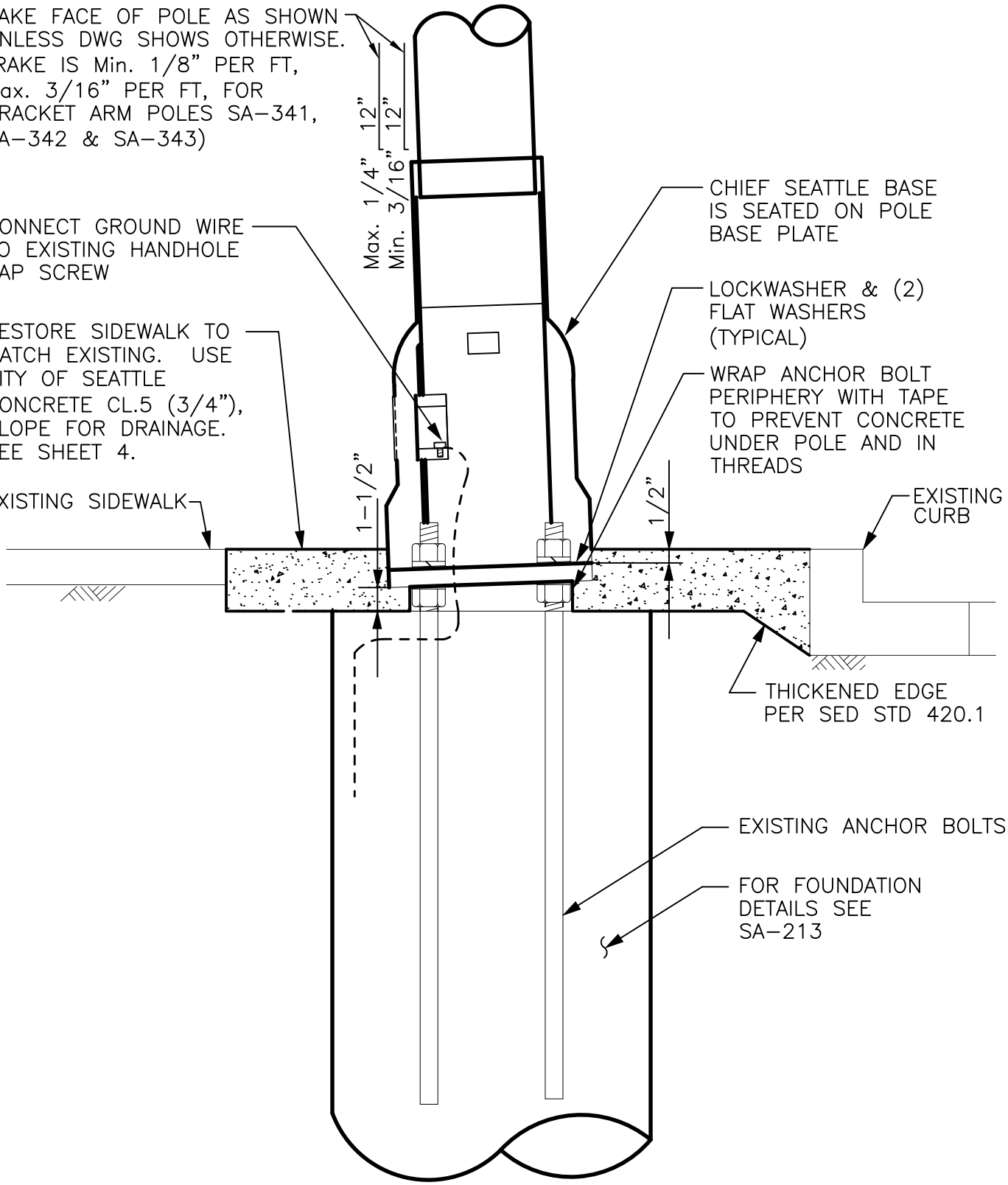
BURIED CONDITION

USE ONLY WHERE NOTED ON DWGS

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW	APPROVED: P. ENG	METRO TRANSIT CAPITAL DIVISION TROLLEY STANDARD DETAILS ANCHOR BASE STEEL POLE INSTALLATION (BURIED CONDITION)	DATE: 03/2021
DRAWN: L. ANDERSON	King County METRO		STD DET NO: SA-216
CHECKED: J. DAVIS			SHT NO: 2 OF 4

C:\Users\anderls\AppData\Local\Temp\AcPublish_16380\SA-216.1-4.dwg | Layout: SA-216.2
PLOTTED: Nov 22, 2021-05:08:01pm By AnderLS
XREFS:
IMAGES:



CHIEF SEATTLE CONDITION

USE ONLY WHERE NOTED ON DWGS

No.	REVISION	BY	APP'D	DATE

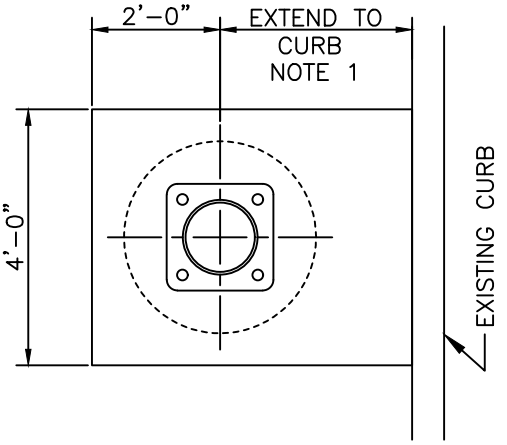
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

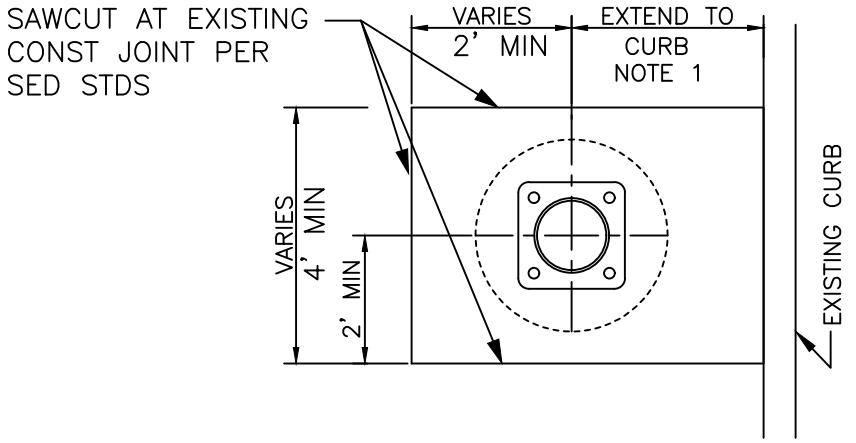
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
ANCHOR BASESTEEL POLE INSTALLATION (CHIEF SEATTLE BASE)

DATE: 03/2021
STD DET NO: SA-216
SHT NO: 3 OF 4

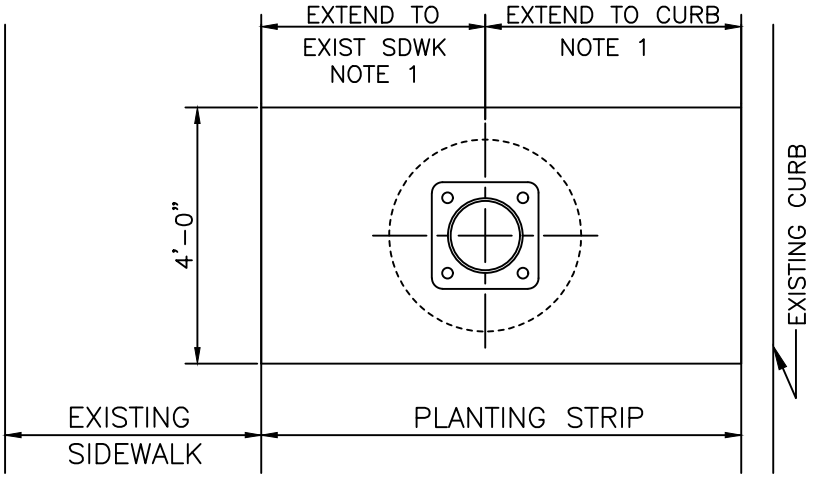
C:\Users\anderls\AppData\Local\Temp\AcPublish_16380\SA-216.1-4.dwg | Layout: SA-216.3
PLOTTED: Nov 22, 2021-05:08:02pm By AnderLS
XREFS:
IMAGES:



NO SIDEWALK CONDITION



EXISTING SIDEWALK CONDITION



EXISTING SIDEWALK & PLANTING STRIP CONDITION

NOTE 1: 2 FT MIN DIMENSION MAY BE USED IF DIMENSION EXCEEDS 6 FT.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

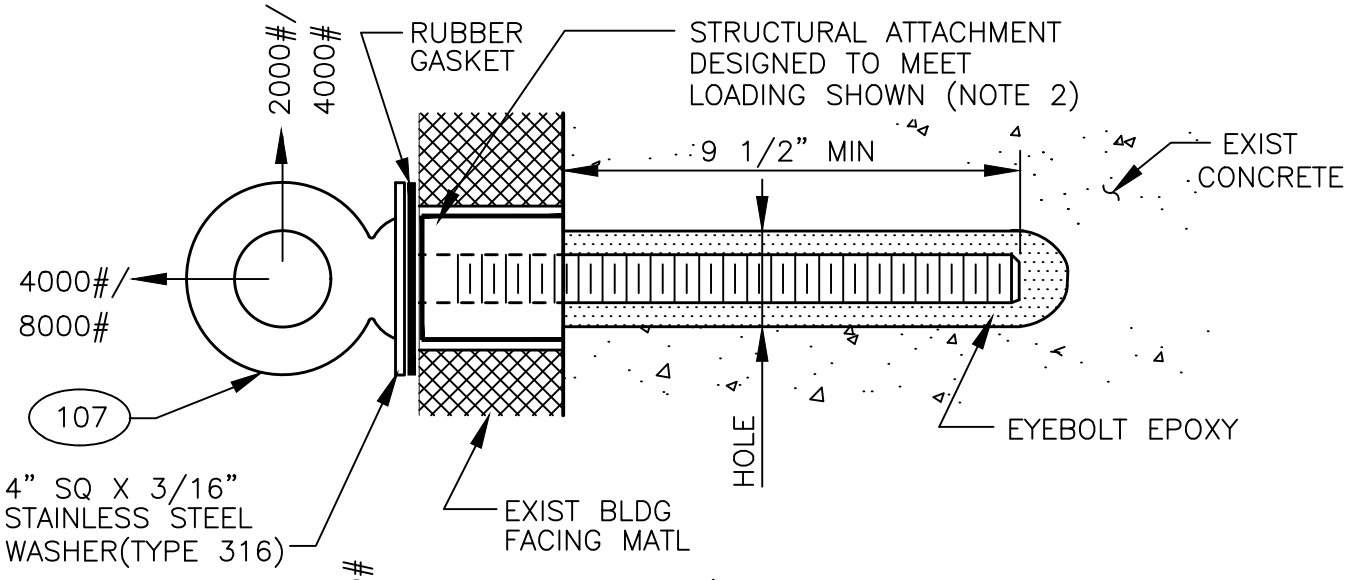
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

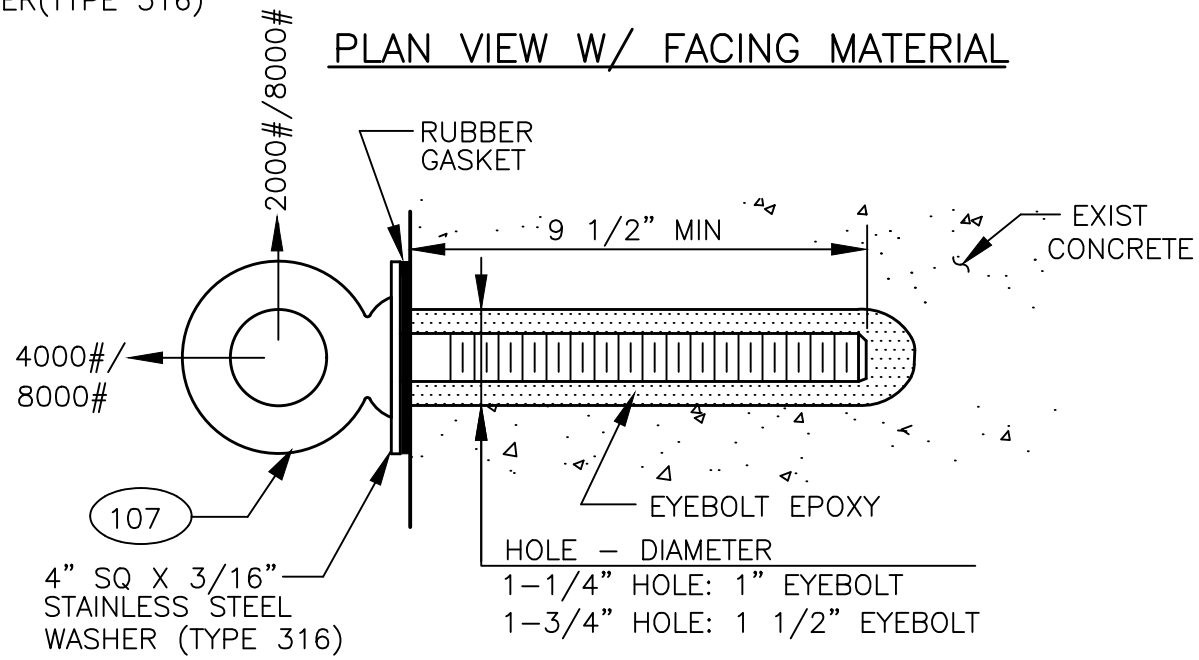
ANCHOR BASESTEEL
POLE INSTALLATION

DATE: 03/2021
STD DET NO: SA-216
SHT NO: 4 OF 4

C:\Users\anderls\AppData\Local\Temp\AcPublish_16380\SA-216_1-4.dwg | Layout: SA-216.4
PLOTTED: Nov 22, 2021-05:08:02pm By AnderLS
XREFS:
IMAGES:



PLAN VIEW W/ FACING MATERIAL



PLAN VIEW

NOTES:

1. INSTALL EYEBOLT EYE IN A HORIZONTAL ORIENTATION.
2. USE ITW RAMSET/REDHEAD EPCON EPOXY ANCHORING SYSTEM TO SET THE EYEBOLT. AN EPCON E101 HAND TOOL INJECTOR WITH AN E24 NOZZLE SHALL BE USED TO INJECT CERAMIC 6 EPOXY. INSTALL PER THE MANUFACTURES RECOMMENDATIONS.
3. TO PREVENT SPALLING, DEFLECTION RESULTING FROM SHEAR LOADING SHALL NOT ALLOW THE EYEBOLT TO CONTACT BUILDING FACING MATERIAL.
4. EYEBOLT SHOULDER SHALL BE SEATED.
5. A TWO FOOT MINIMUM SPACING IS REQUIRED BETWEEN EYEBOLTS.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

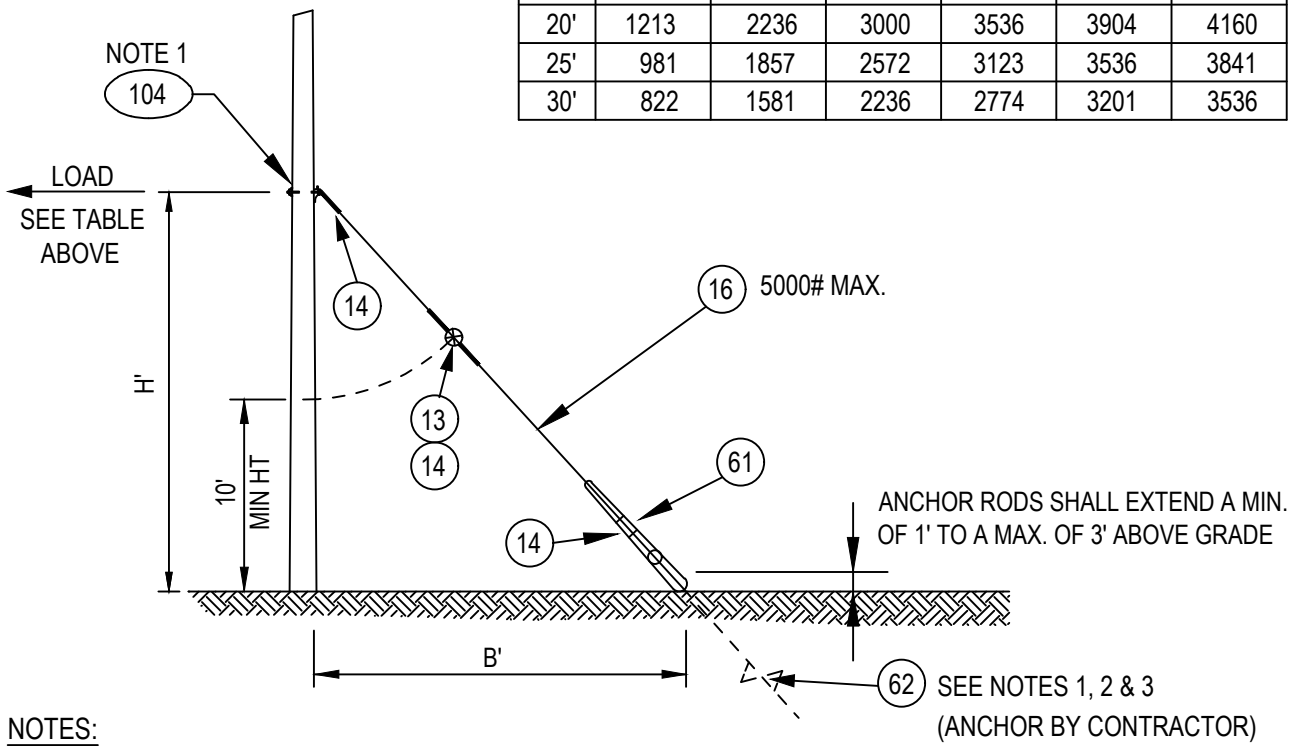
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
BUILDING EYEBOLT INSTALLATION (EXISTING CONCRETE STRUCTURE)

DATE: 03/2021
STD DET NO: SA-221
SHT NO: 1 OF 5

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-221.1-5.dwg | Layout: SA-221.1
PLOTTED: Nov 22, 2021-07:43:20pm By Anderl.S
XREFS:
IMAGES:

ALLOWABLE LOADS / ITEM 16						
H \ B	5'	10'	15'	20'	25'	30'
15'	1581	2774	3536	4000	4287	4472
20'	1213	2236	3000	3536	3904	4160
25'	981	1857	2572	3123	3536	3841
30'	822	1581	2236	2774	3201	3536



NOTES:

1. INSTALLATION HEIGHT AND LOCATION OF ANCHOR IS INDICATED ON THE OVERHEAD DWGS.

2. SCREW ANCHOR SHALL HAVE TWO 8" HELIXES FOR GLACIAL TILL WITH A 1-1 1/2" HUB CAPABLE OF DEVELOPING 7000 FT-LBS MAXIMUM WORKING TORQUE. THE ANCHOR ROD SHALL BE 1" DIA. WITH A TRIPLE EYE.

3. MINIMUM INSTALLATION TORQUE FOR THE SCREW ANCHORS SHALL BE 3500 FOOT-LBS . THIS TORQUE VALUE WILL REQUIRE THE USE OF 7 SHEAR PINS FOR USE WITH THE A.B. CHANCE TORQUE INDICATOR, CATALOG # C303-044.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
13	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO	506
14	4	GUY GRIP DEADEND	PREFORMED	CDE-3115
16	VARIES	GUY STRAND	COPPERWELD	16M
61	1	GUY GUARD - 8 FT FOR USE ON 3/16" TO 1/2" STRAND	PREFORMED	PG 5518
62	1	POWER INSTALLED SCREW ANCHOR	CHANCE	E102-1219
104	VARIES	WOOD POLE DOWNGUY ASSEMBLY	METRO STD	SA-104

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

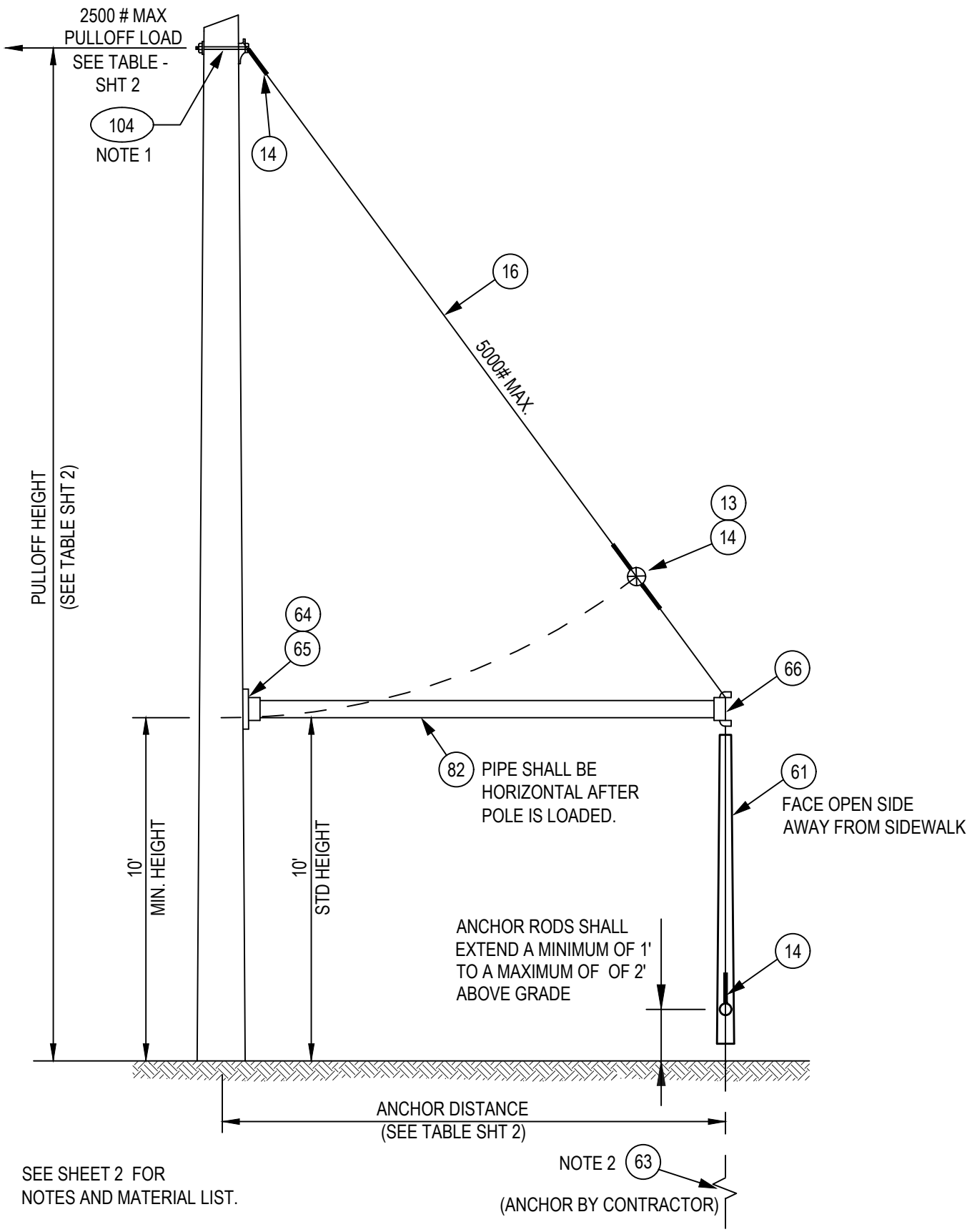
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

DOWN GUY

DATE: 03/2021
STD DET NO: SA-231
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-231.dwg | Layout: SA-231
PLOTTED: Nov 19, 2021-07:52:42pm By AnderLS
XREFS:
IMAGES:



SEE SHEET 2 FOR NOTES AND MATERIAL LIST.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

SIDEWALK GUY

DATE: 03/2021
STD DET NO: SA-232
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-232.1-2.dwg | Layout: SA-232.1
PLOTTED: Nov 22, 2021-07:58:47pm By AnderLS
XREFS:
IMAGES:

NOTES:

1. INSTALLATION HEIGHT AND LOCATION OF ANCHOR IS INDICATED ON THE OVERHEAD DRAWINGS.

2. SCREW ANCHOR SHALL HAVE TWO 8" HELIXES FOR GLACIAL TILL WITH A 1 1/2" HUB CAPABLE OF DEVELOPING 7000 FT-LBS MAX. WORKING TORQUE. THE ANCHOR ROD SHALL BE 1" DIAMETER WITH A TRIPLE EYE. MINIMUM INSTALLATION TORQUE FOR SCREW ANCHORS SHALL BE 3500 FT-LBS. THIS TORQUE VALUE WILL REQUIRE THE USE OF 7 SHEAR PINS FOR USE WITH THE A.B. CHANCE TORQUE INDICATOR, CAT. # C303-0044.

ALLOWABLE PULLOFF LOADING PER GUY

PULLOFF HEIGHT	ANCHOR DISTANCE 5'	6'	7'	8'	9'	10'	11'	12'
16'	*	*	*	*	*	*	*	*
18'	2500	*	*	*	*	*	*	*
20'	2236	2500	*	*	*	*	*	*
22'	1923	2236	2500	2500	*	*	*	*
24'	1682	1970	2236	2480	2500	*	*	*
26'	1491	1756	2004	2236	2451	2500	*	*
28'	1338	1581	1812	2030	2236	2428	2500	*
30'	1213	1437	1652	1857	2052	2236	2410	2500

* = MAXIMUM LOAD OF 2500 # APPLIES.

MATERIAL LIST

ITEM#	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
13	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO	506
14	4	GUY GRIP DEADEND	PREFORMED	CDE-3115
16	VARIES	GUY STRAND	COPPERWELD	16M
61	1	GUY GUARD, 8 FT, FOR USE ON 3/16" TO 1/2" STRAND	PREFORMED	PG 5518
63	1	POWER INSTALLED SCREW ANCHOR	CHANCE	C102-1260
64	1	POLE PLATE, 2 1/2" PIPE	JOSLYN	J0521
65	4	LAG SCREW, FETTER DRIVE, 1/2" x 4"	JOSLYN	J8754
66	1	END FITTING, 2 1/2" PIPE	COOPER POWER SYSTEM	DG5G1
82	VARIES	2 1/2" DIA. ASTM A53 GRB STD. WT. GALV STEEL PIPE		
104	VARIES	WOOD POLE DOWNGUY ASSEMBLY	METRO STD	SA-104

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

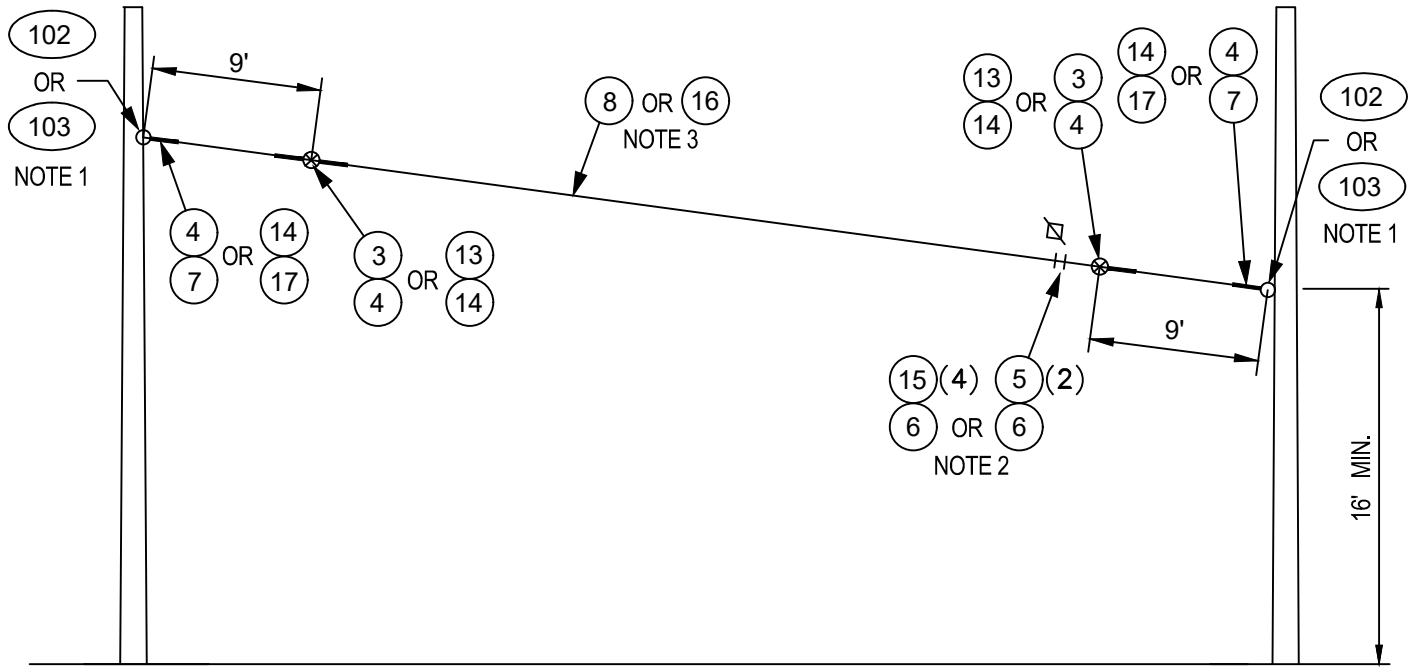
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

SIDEWALK GUY

DATE: 03/2021
STD DET NO: SA-232
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-232.1-2.dwg | Layout: SA-232.2
PLOTTED: Nov 22, 2021-08:01:43pm By Anderl.S
XREFS:
IMAGES:



NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠"
3. SEE SA-167 FOR INSULATED GUY CRITERIA. GUY TENSION IS INDICATED ON THE OVERHEAD DRAWINGS.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
SA-233L	- - - - - - -	GUY TENSIONS 0 - 2500 LBS		
03	1	GUY STRAIN INSUL.	WABCO	31504-3060
04	3	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M - NOTE 3
SA-233H	- - - - - - -	GUY TENSIONS 2500 - 5000 LBS		
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
13	2	GUY STRAIN INSUL.	WABCO	31506-3060
14	5	GUY GRIP DEADEND	PREFORMED	CDE-3115
15	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M - NOTE 3
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
ALSO	- - - - - - - -	SA-233L & SA-233H		
102	VARIES	STEEL POLE COLLAR	METRO STD.	SA-102
103	VARIES	WOOD POLE EYEBOLT	METRO STD.	SA-103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

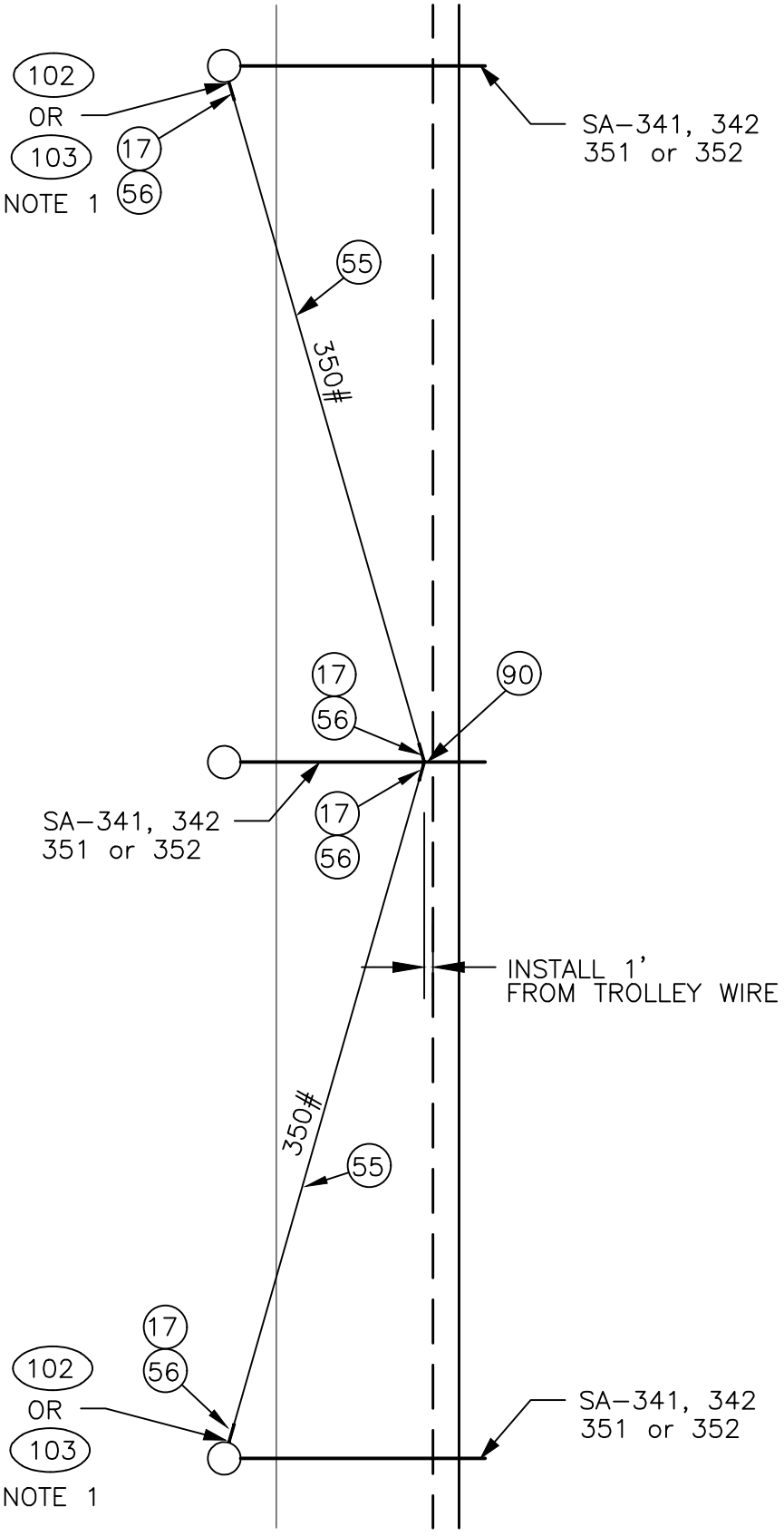
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

STANDARD HEAD GUY

DATE: 03/2021
STD DET NO: SA-233
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-233.dwg | Layout: SA-233
PLOTTED: Nov 19, 2021-01:56:22pm By AnderLS
XREFS:
IMAGES:



No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

BRACKET ARM GUY

DATE: 03/2021
STD DET NO: SA-234
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-234,1-2.dwg | Layout: SA-234,1
PLOTTED: Mar 18, 2021-08:24:04am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
17	4	THIMBLE, ½" XHD, OPEN	CROSBY	G414
55	VARIES	PHILLYSTRAN (⅜")	PHILLYSTRAN INC	HPTG 67001
56	4	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC	PLP2755
90	1	HEAVY PIPE CLAMP, GALV 3" IPS	GRINNELL	FIG. 216
102	VARIES	FORGED 3–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD EYEBOLT	METRO STD	SA–103

NOTE:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103. INSTALLATION HEIGHT IS 1 FOOT ABOVE THE BRACKET ARM UNLESS SRAWINGS SPECIFY OTHERWISE.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

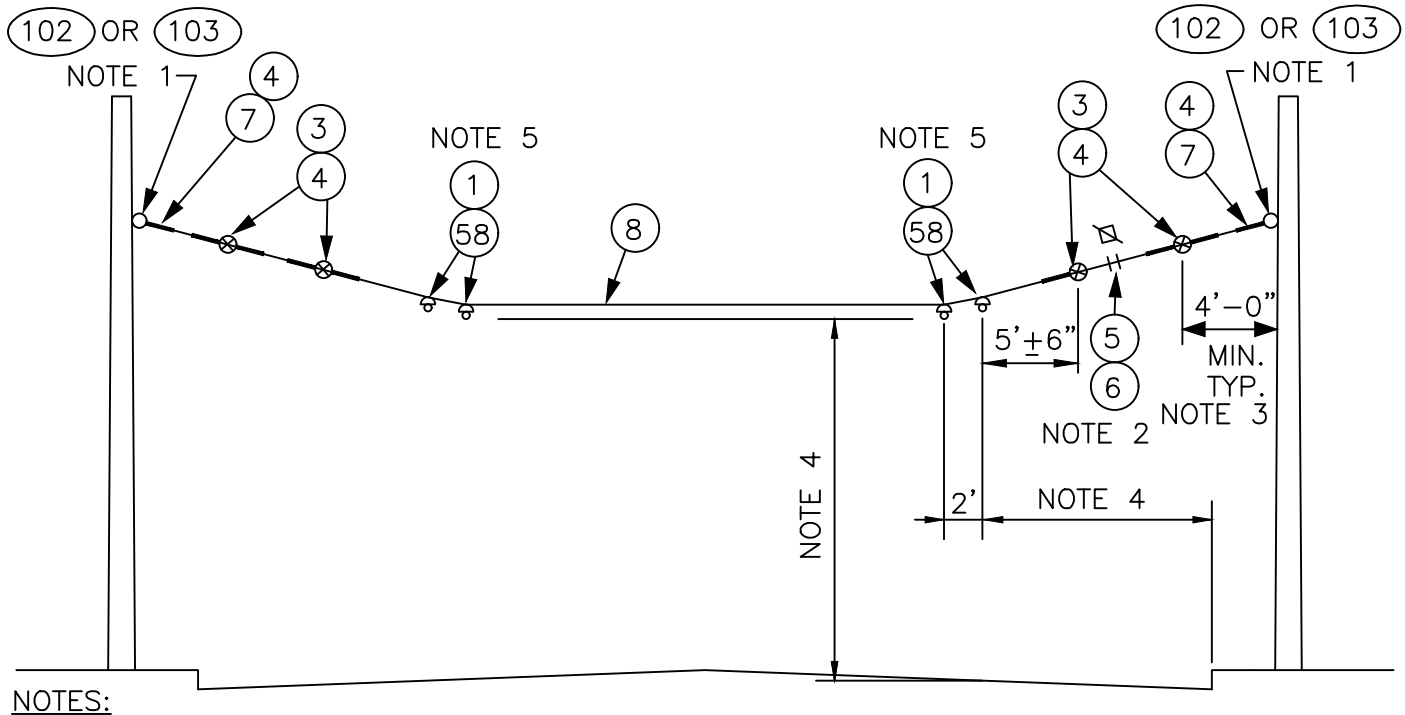
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

BRACKET ARM GUY

DATE: 03/2021
STD DET NO: SA-234
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-234,1-2.dwg | Layout: SA-234,2
PLOTTED: Mar 18, 2021-08:24:10am By dbennett
XREFS:
IMAGES:



NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

3. SEE SA–370 FOR LIMITED SPACE VARIANCES.

4. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

5. MAXIMUM ANGLE IS 0.5°. SEE SA–307, PLAN VIEW.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293–3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	9	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
58	2	TANGENT SPAN HANGER	K & M	C–1728–01
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

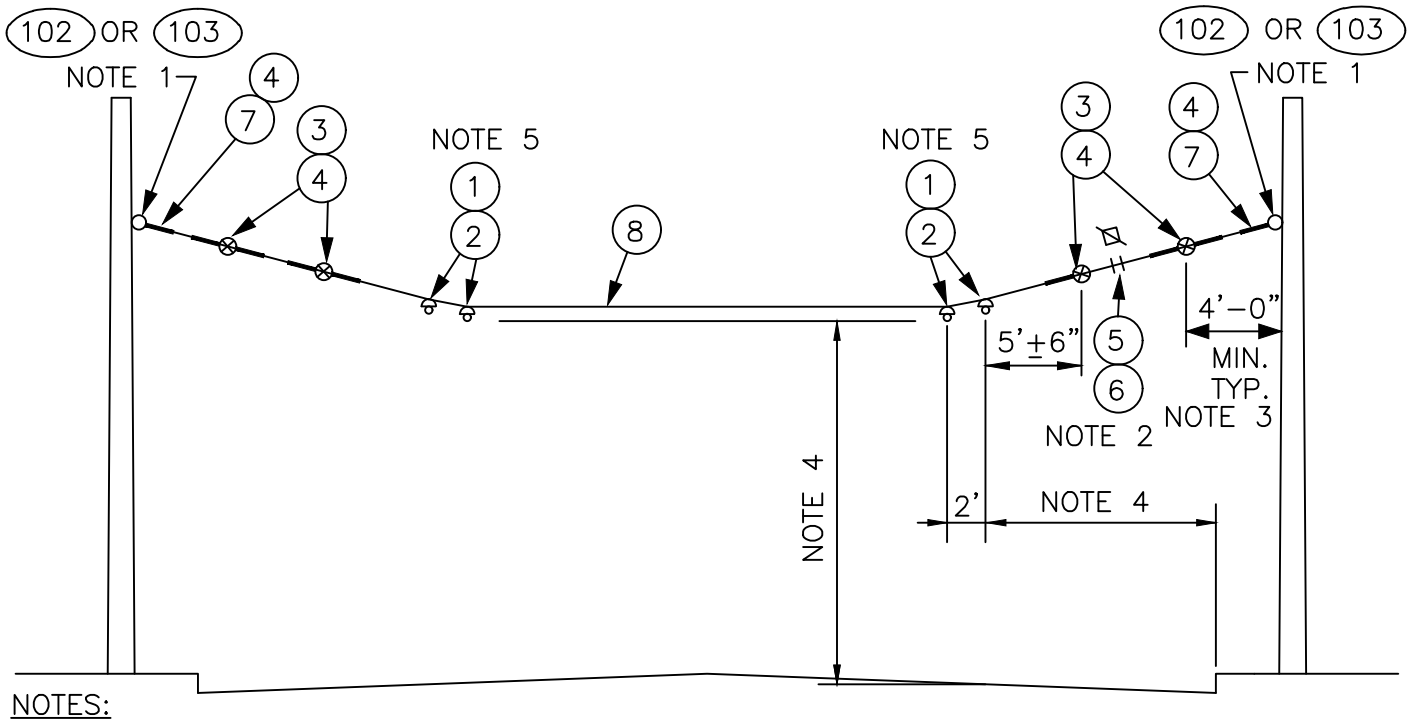
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

TANGENT SPAN
TWO WAY TRAFFIC
W/ K & M HANGERS

DATE: 03/2021
STD DET NO: SA-300
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-300-309.dwg | Layout: SA-300
PLOTTED: Mar 18, 2021-08:24:19am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⧄". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

3. SEE SA–370 FOR LIMITED SPACE VARIANCES.

4. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

5. MAXIMUM ANGLE IS 0.5°. SEE SA–307, PLAN VIEW.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293–3007
02	4	AGC TANGENT SPAN HANGER	WABCO	19360–2000
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	9	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

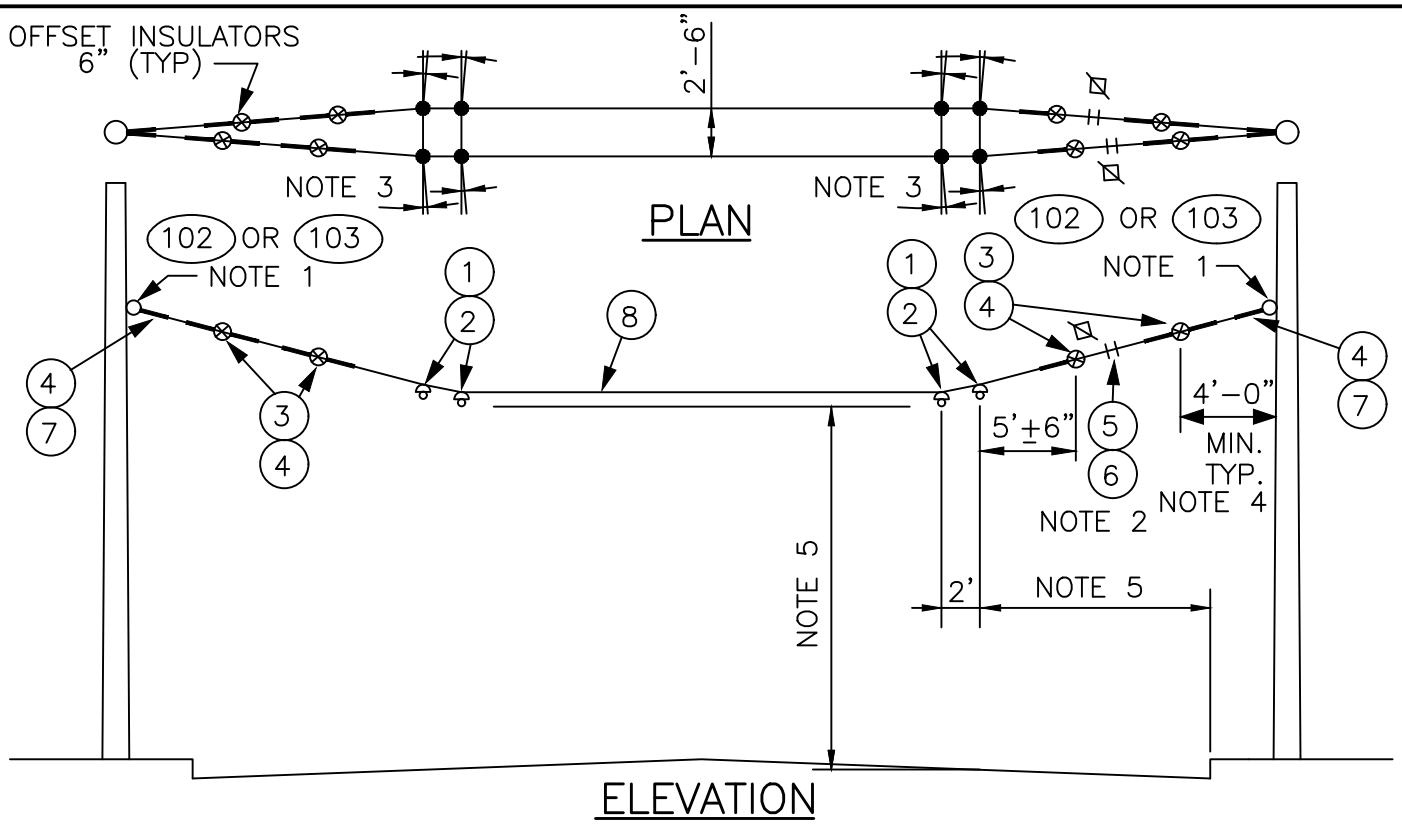
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

TANGENT SPAN
TWO WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-301
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-300-309.dwg | Layout: SA-301
PLOTTED: Mar 18, 2021-08:24:24am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



ELEVATION

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⧄". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. MAXIMUM ANGLE 1°, 0.5° PER SPAN HANGER.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	8	DETROIT CLAMP ASSY	WABCO	19293-3007
02	8	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	8	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	18	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.	REVISION	BY	APP'D	DATE

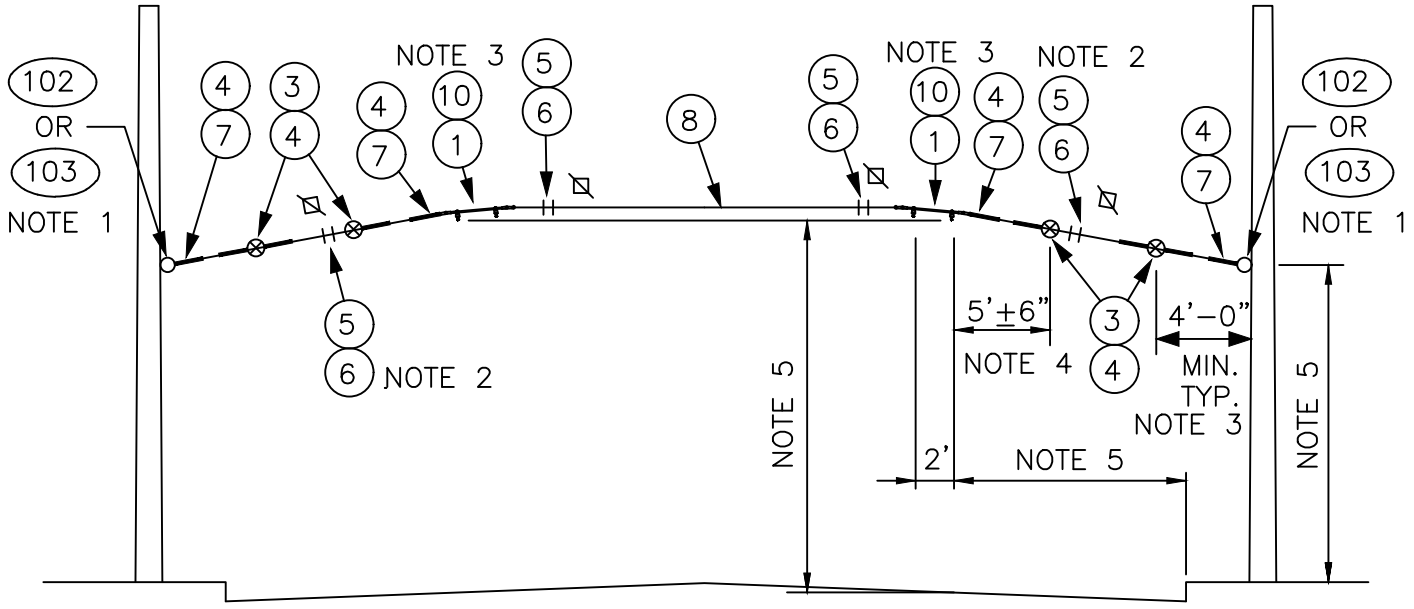
DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
HOLDUP
TANGENT SPAN
BRACKET ARM GUY

DATE: 03/2021
STD DET NO: SA-302
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-300-309.dwg | Layout: SA-302
PLOTTED: Mar 18, 2021-08:24:29am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⧄". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

3. MAXIMUM ANGLE 0.5 DEGREE. SEE SA–307, PLAN VIEW.

4. SEE SA–370 FOR LIMITED SPACE VARIANCES.

5. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293–3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	8	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	2	HI–LITE DOUBLE CURVE HANGER	WABCO	54962–3001
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

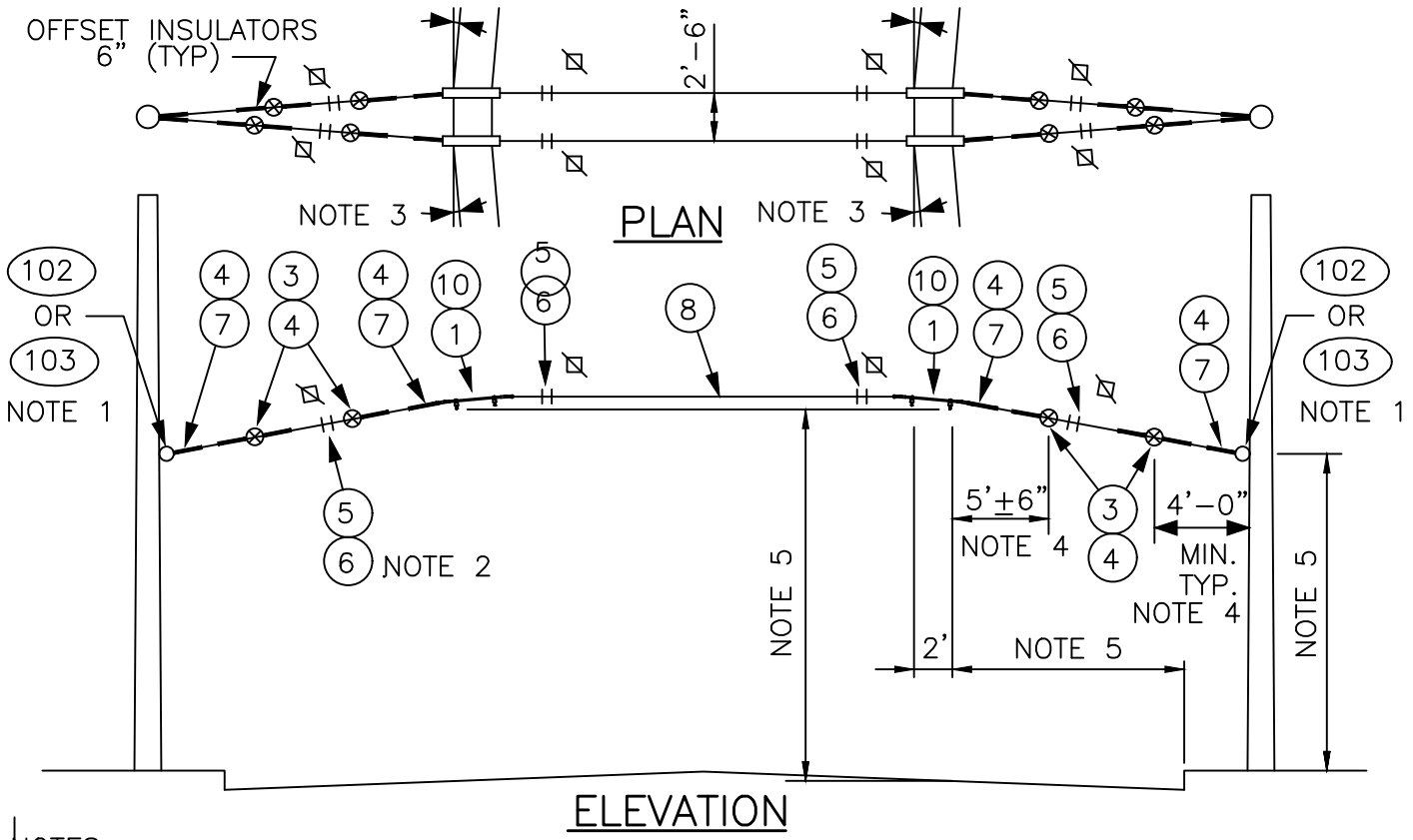
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

INVERTED TANGENT SPAN
TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-303
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-300-309.dwg | Layout: SA-303
PLOTTED: Mar 18, 2021-08:24:34am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. MAXIMUM ANGLE 1°, 0.5° PER DOUBLE CURVE HANGER.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	8	DETROIT CLAMP ASSY	WABCO	19293-3007
03	8	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	20	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	16	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	8	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	4	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

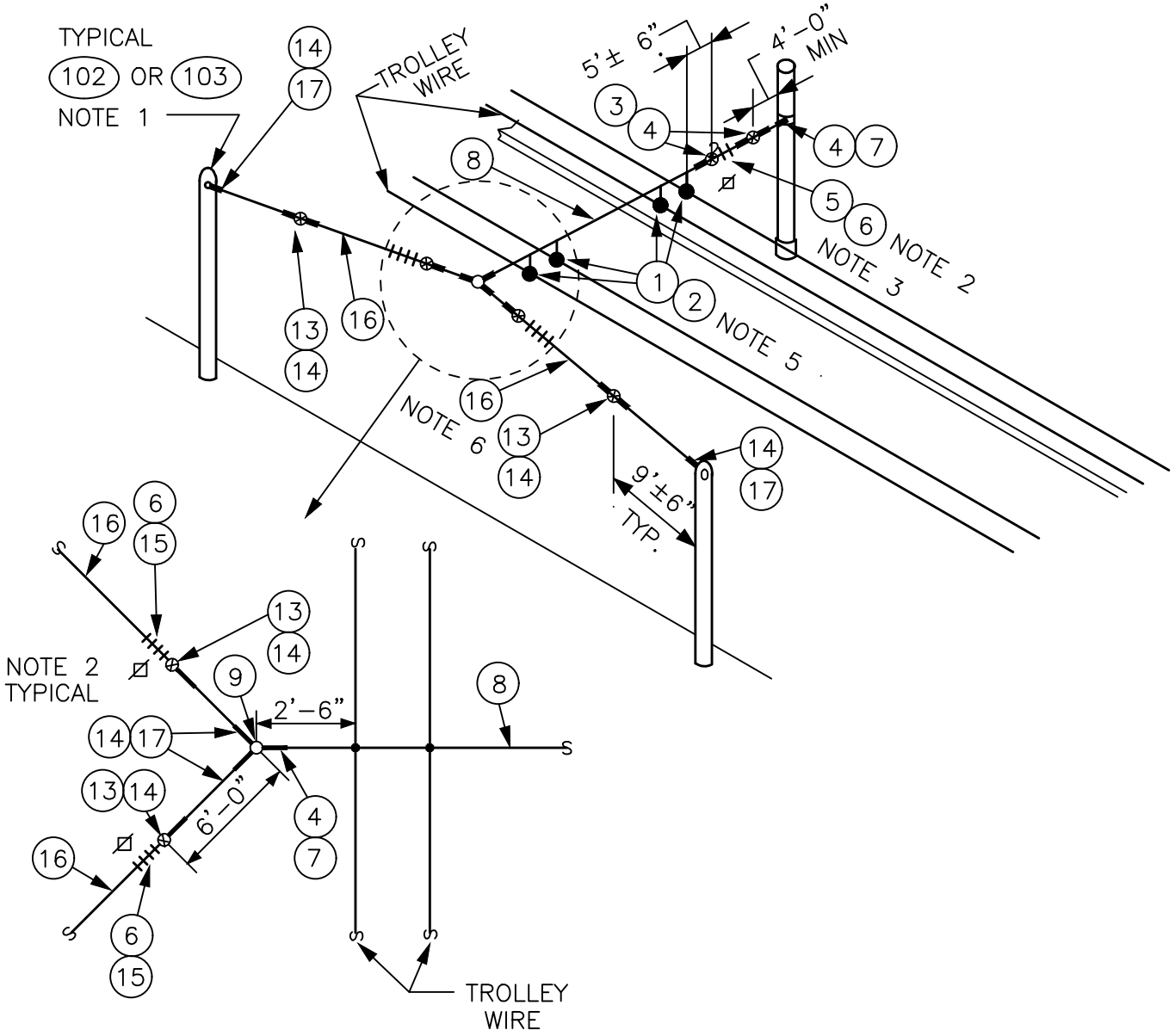
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

HOLDDOWN TANGENT SPAN
TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-304
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-300-309.dwg | Layout: SA-304
PLOTTED: Mar 18, 2021-08:24:39am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

BRIDLE TANGENT SPAN
TWO WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-305
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-300-309.dwg | Layout: SA-305.1
PLOTTED: Mar 18, 2021-08:24:44am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293–3007
02	4	AGC TANGENT SPAN HANGER	WABCO	19360–2000
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	1	BULL RING	WABCO	18567–2000
13	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	VARIES	GUY GRIP DEADEND	PREFORMED	CDE–3115
15	VARIES	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M
17	VARIES	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⧄". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

3. SEE SA–370 FOR LIMITED SPACE VARIANCES.

4. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

5. MAXIMUM ANGLE IS 0.5°. SEE SA–307, PLAN VIEW.

6. IF LOAD SHOWN ON OVERHEAD DRAWINGS IS LESS THAN 2500 LBS, THEN ITEM 8 MAY BE USED INSTEAD OF ITEM 16. THE ASSOCIATED ITEMS SHALL ALSO BE CHANGED I.E. 3 FOR 13, 4 FOR 14, 5 FOR 15 AND 7 FOR 17.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

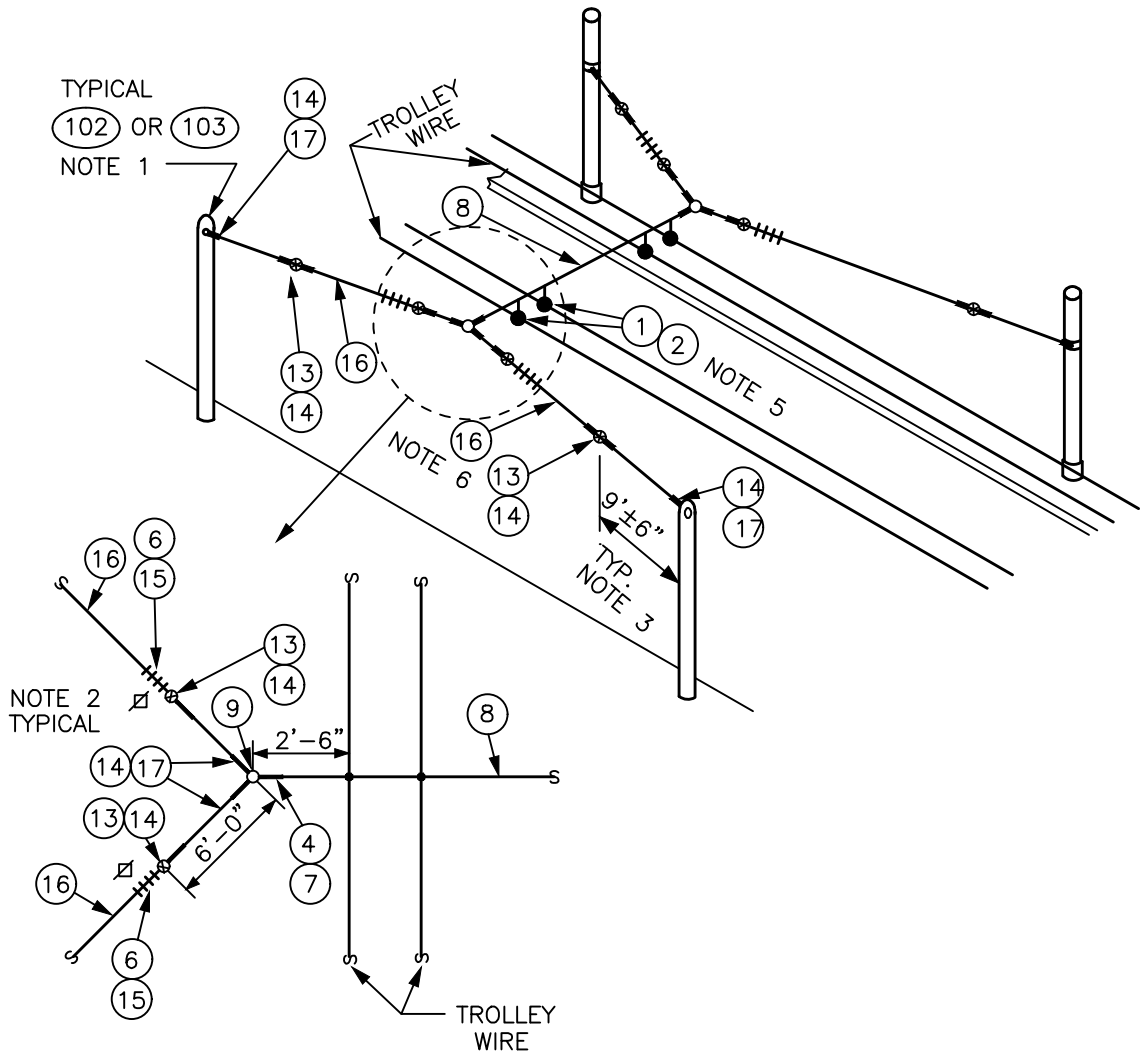
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

BRIDLE TANGENT SPAN
TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-305
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-306-309.dwg | Layout: SA-305.2
PLOTTED: Mar 18, 2021-08:24:49am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

DOUBLE BRIDLE TANGENT SPAN TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-306
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-306-309.dwg | Layout: SA-306.1
PLOTTED: Mar 18, 2021-08:24:54am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293–3007
02	4	AGC TANGENT SPAN HANGER	WABCO	19360–2000
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	2	BULL RING	WABCO	18567–2000
13	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	VARIES	GUY GRIP DEADEND	PREFORMED	CDE–3115
15	VARIES	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M
17	VARIES	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⧄". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

3. SEE SA–370 FOR LIMITED SPACE VARIANCES.

4. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

5. MAXIMUM ANGLE IS 0.5°. SEE SA–307, PLAN VIEW.

6. IF LOAD SHOWN ON OVERHEAD DRAWINGS IS LESS THAN 2500 LBS, THEN ITEM 8 MAY BE USED INSTEAD OF ITEM 16. THE ASSOCIATED ITEMS SHALL ALSO BE CHANGED I.E. 3 FOR 13, 4 FOR 14, 5 FOR 15 AND 7 FOR 17.

No.	REVISION	BY	APP'D	DATE

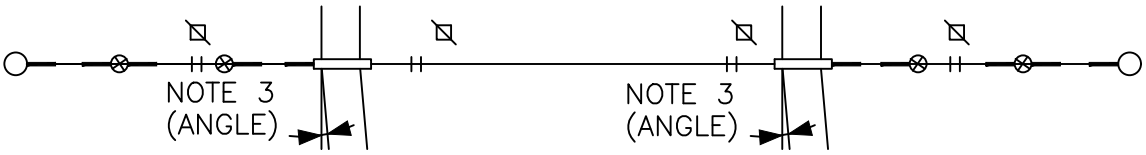
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

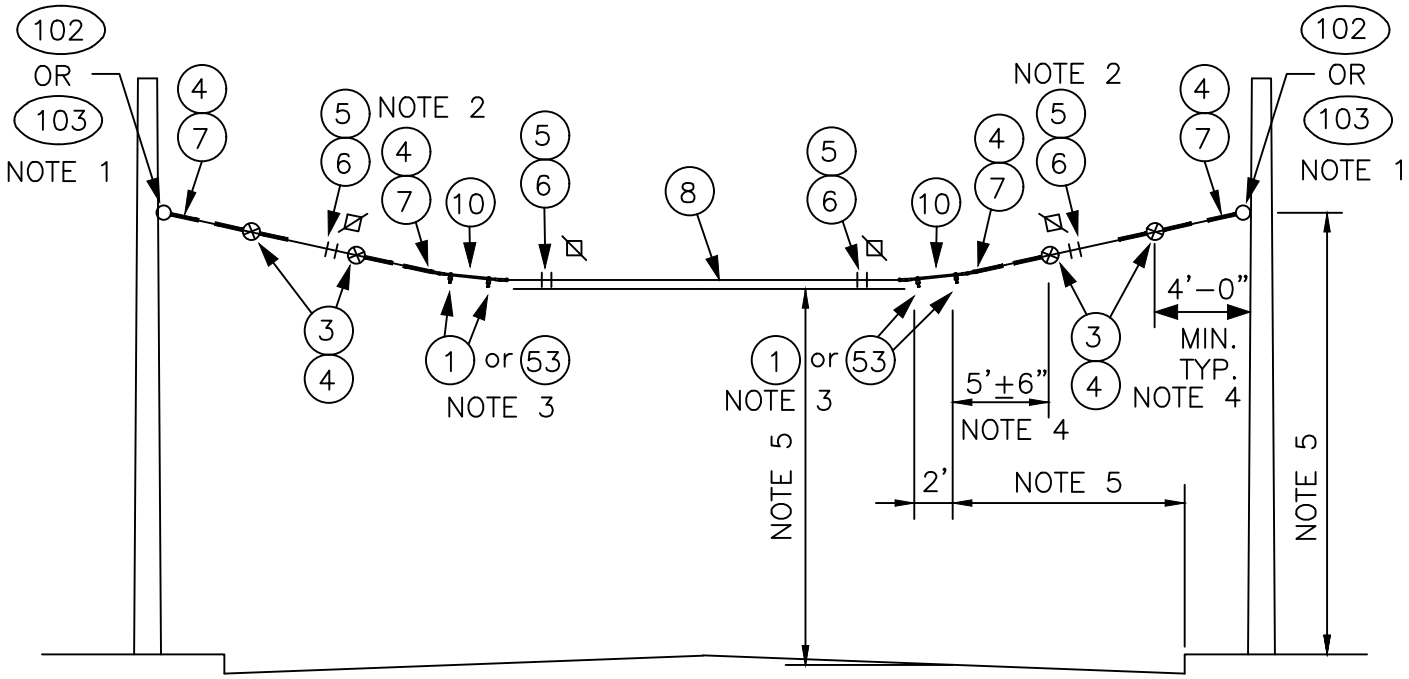
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
DOUBLE BRIDLE
TANGENT SPAN
TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-306
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-306-309.dwg | Layout: SA-306_2
PLOTTED: Mar 18, 2021-08:24:59am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN



ELEVATION

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⧄". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

3. ANGLE VARIES FROM 1° TO 5°. USE ITEM 1 FOR 1° TO 2.5° ANGLE. USE ITEM 53 FOR 3° TO 5° ANGLE.

4. SEE SA–370 FOR LIMITED SPACE VARIANCES.

5. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
1° TO 5° CURVE SPAN
WITH 2 FOOT CURVE RAILS
TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-307
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-300-309.dwg | Layout: SA-307.1
PLOTTED: Mar 18, 2021-08:25:04am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	VARIES	DETROIT CLAMP ASSY	WABCO	19293–3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	8	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	2	HI–LITE DOUBLE CURVE HANGER	WABCO	54962–3001
53	VARIES	CURVE RAIL (3° TO 5° 2 FT LG)	K & M	851 B412/0
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

No.	REVISION	BY	APP'D	DATE

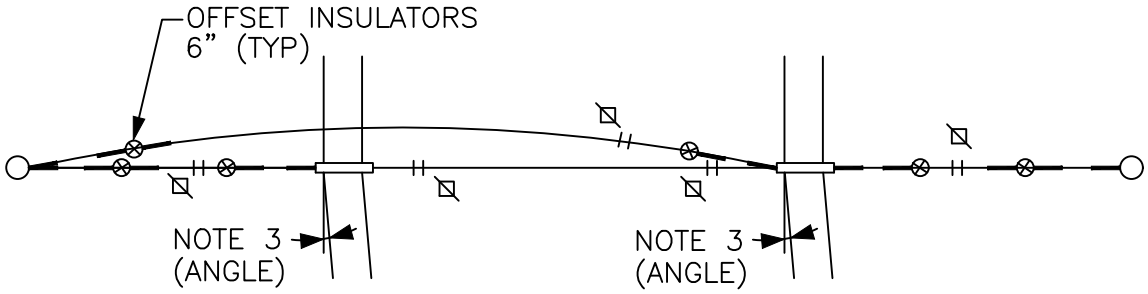
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

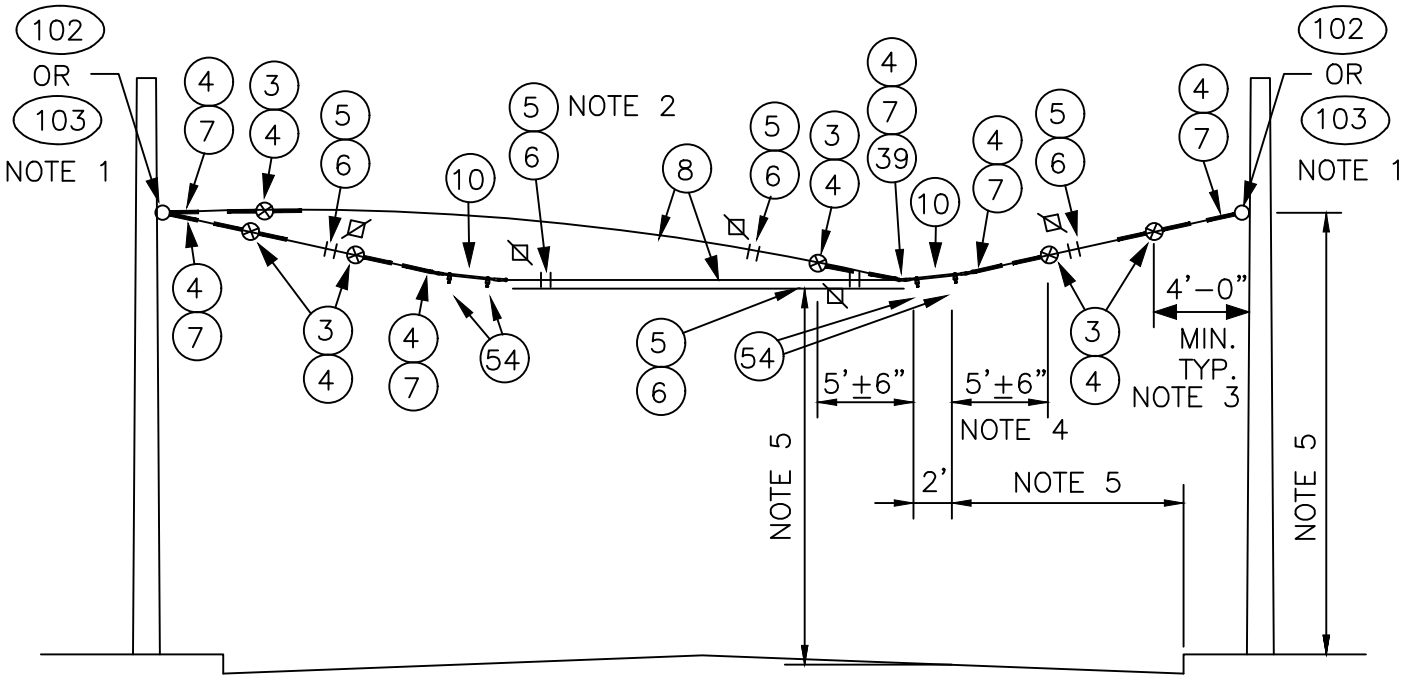
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
1° TO 5° CURVE SPAN
WITH 2 FOOT CURVE RAILS
TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-307
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-306-309.dwg | Layout: SA-307.2
PLOTTED: Mar 18, 2021-08:25:09am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN



ELEVATION

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.

3. ANGLE VARIES FROM 5.5° TO 7.5°.

4. SEE SA-370 FOR LIMITED SPACE VARIANCES. SEE SA-167 FOR INSULATED GUY CRITERIA.

5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
5.5° TO 7.5° CURVE SPAN WITH 4 FOOT CURVE RAILS TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-308
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-300-309.dwg | Layout: SA-308.1
PLOTTED: Mar 18, 2021-08:25:14am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	6	GUY STRAIN INSUL, CABLE OD MAX: 1/2"	PORCELAIN 504 PRODUCTS CO.	
04	15	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	10	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	6	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	2	HI–LITE DOUBLE CURVE HANGER		54962–3001
39	1	5/8" SHACKLE	WABCO	13722–2000
54	VARIES	CURVE RAIL (5.5° TO 7.5° 4 FT LG)	K&M	851 B412/1
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	VARIES
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

No.	REVISION	BY	APP'D	DATE

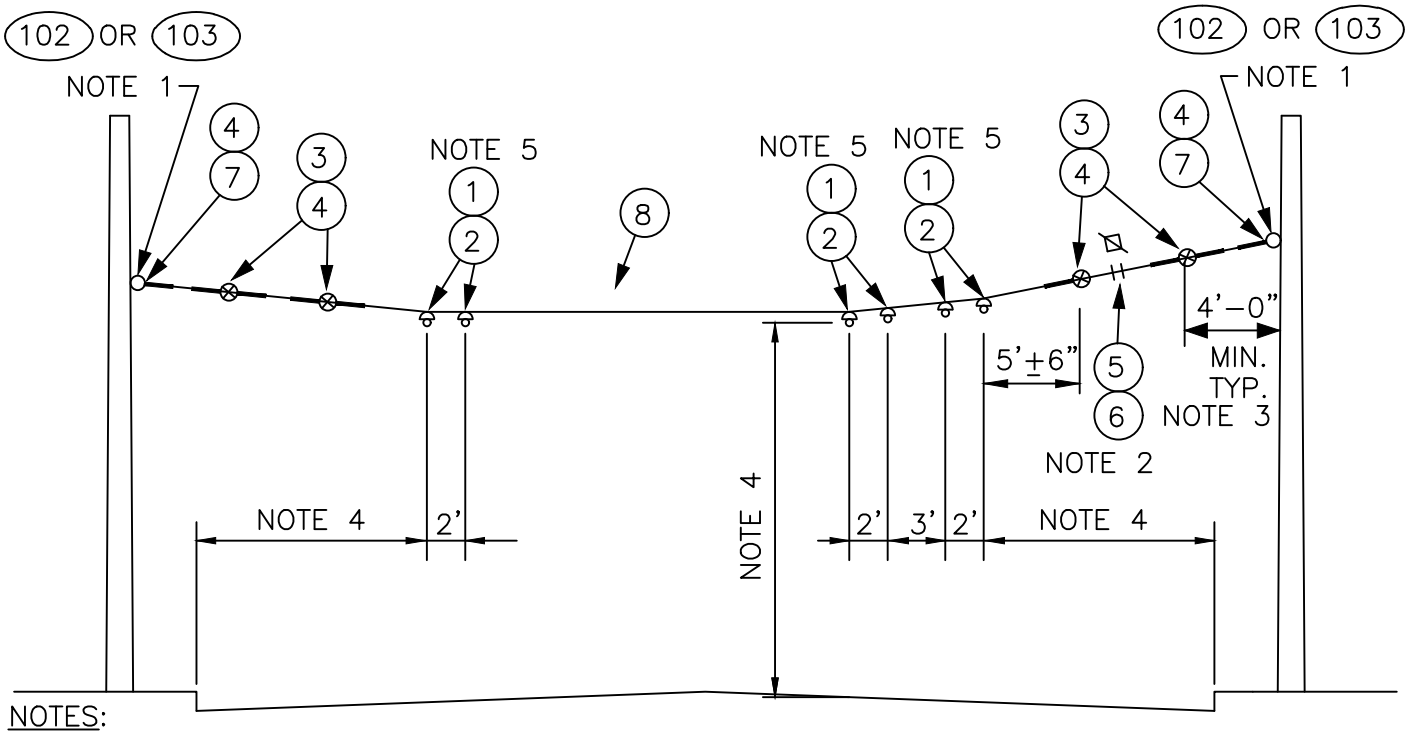
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
5.5° TO 7.5° CURVE SPAN WITH 4 FOOT CURVE RAILS TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-308
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-306-309.dwg | Layout: SA-308.2
PLOTTED: Mar 18, 2021-08:25:19am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⧄". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

3. SEE SA–370 FOR LIMITED SPACE VARIANCES.

4. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

5. MAXIMUM ANGLE IS 0.5°. SEE SA–307, PLAN VIEW.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	6	DETROIT CLAMP ASSY	WABCO	19293–3007
02	6	AGC TANGENT SPAN HANGER	WABCO	19360–2000
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	9	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

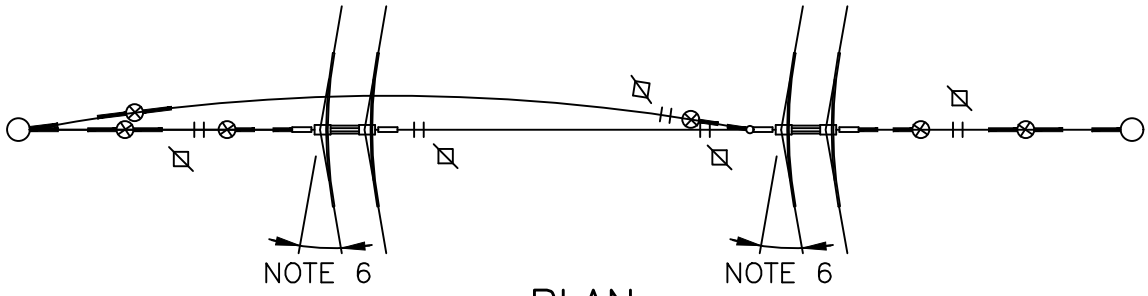
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

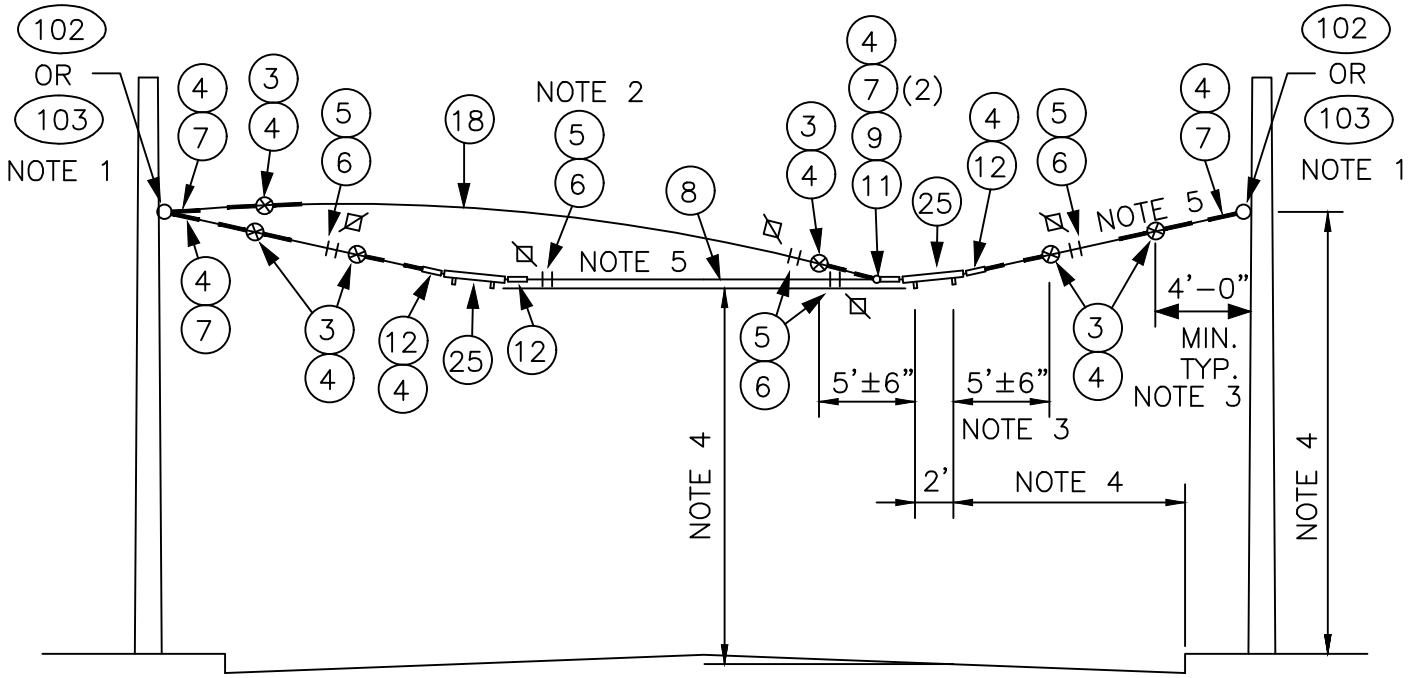
TANGENT SPAN
THREE TRACKS

DATE: 03/2021
STD DET NO: SA-309
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-300-309.dwg | Layout: SA-309
PLOTTED: Mar 18, 2021-08:25:24am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN



ELEVATION

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⧄". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

3. SEE SA–371 FOR LIMITED SPACE VARIANCES. SEE SA–167 FOR INSULATED GUY CRITERIA.

4. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

5. INSIDE PULLOFF MAY NOT BE REQUIRED, SEE DRAWINGS FOR EACH INSTALLATION.

6. ANGLE VARIES FROM 8° TO 30°.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
8° TO 30° CURVE SPAN WITH CURVE SEGMENTS TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-310
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-310.1-318.dwg | Layout: SA-310.1
PLOTTED: Mar 18, 2021-08:25:37am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	6	GUY STRAIN INSUL	PORCELAIN	504
04	15	GUY GRIP DEADEND	PRODUCTS CO PREFORMED	CDE–3106
05	10	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS	FRICTION TAPE, 3/4" (6 WRAPS)		
07	REQD	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	VARIES	BULL RING	WABCO	18567–2000
11	1	7/8 TRANSLITE STRAIN INSUL CL–CL	WABCO	54975–6120
12	3	7/8 TRANSLITE STRAIN INSUL CL–EYE	WABCO	55339–6120
18	VARIES	GUY STRAND, COVERED	COPPERWELD	8M
25	VARIES	CURVE SEGMENT 8–12 DEG TYPE C	WABCO	22301–3014
	VARIES	CURVE SEGMENT 13–27 DEG TYPE C	WABCO	22302–3005
	SEE	CURVE SEGMENT 28–47 DEG TYPE C	WABCO	22303–3005
102	PLAN VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

No.	REVISION	BY	APP'D	DATE

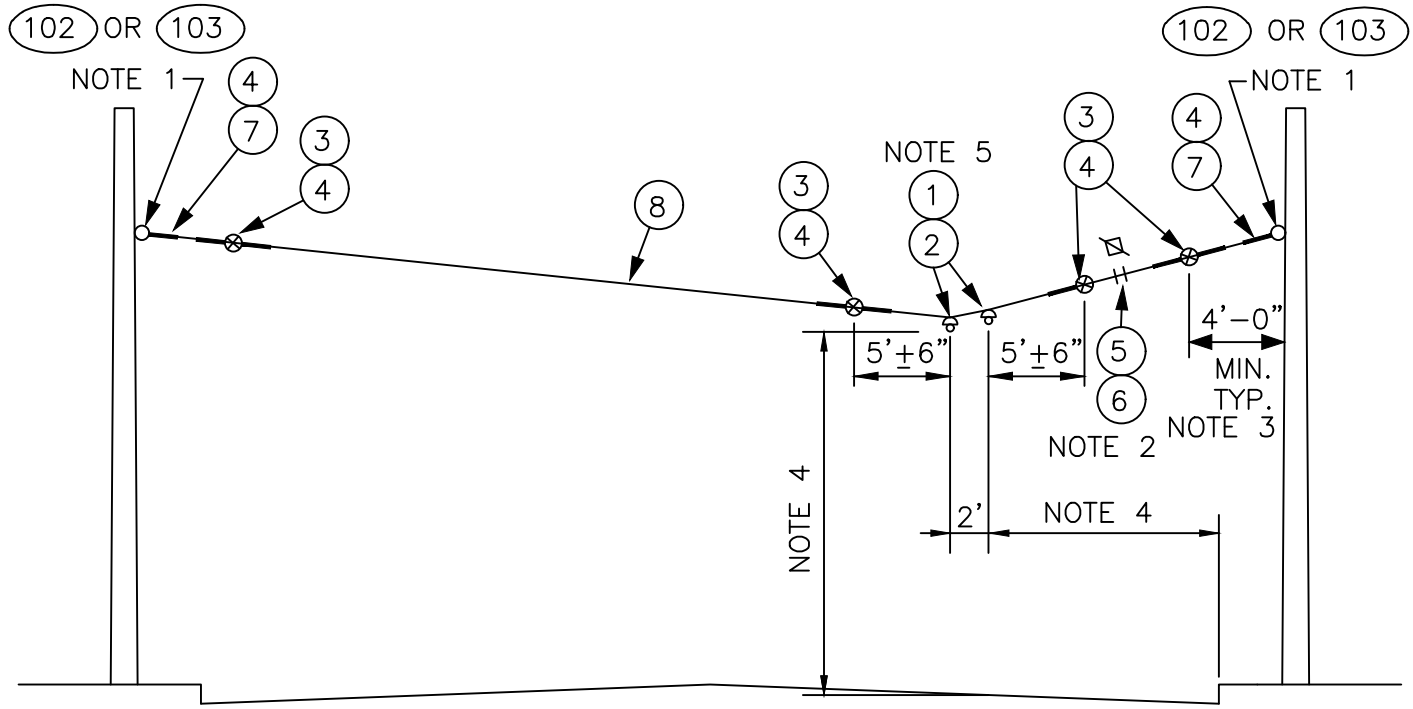
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
8° TO 30° CURVE SPAN WITH CURVE SEGMENTS TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-310
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-310,1-318.dwg | Layout: SA-310.2
PLOTTED: Mar 18, 2021-08:25:40am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



ELEVATION

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⧄". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.
3. SEE SA–370 FOR LIMITED SPACE VARIANCES.
4. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.
5. MAXIMUM ANGLE IS 0.5°. SEE SA–317 PLAN VIEW.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
02	2	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	9	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

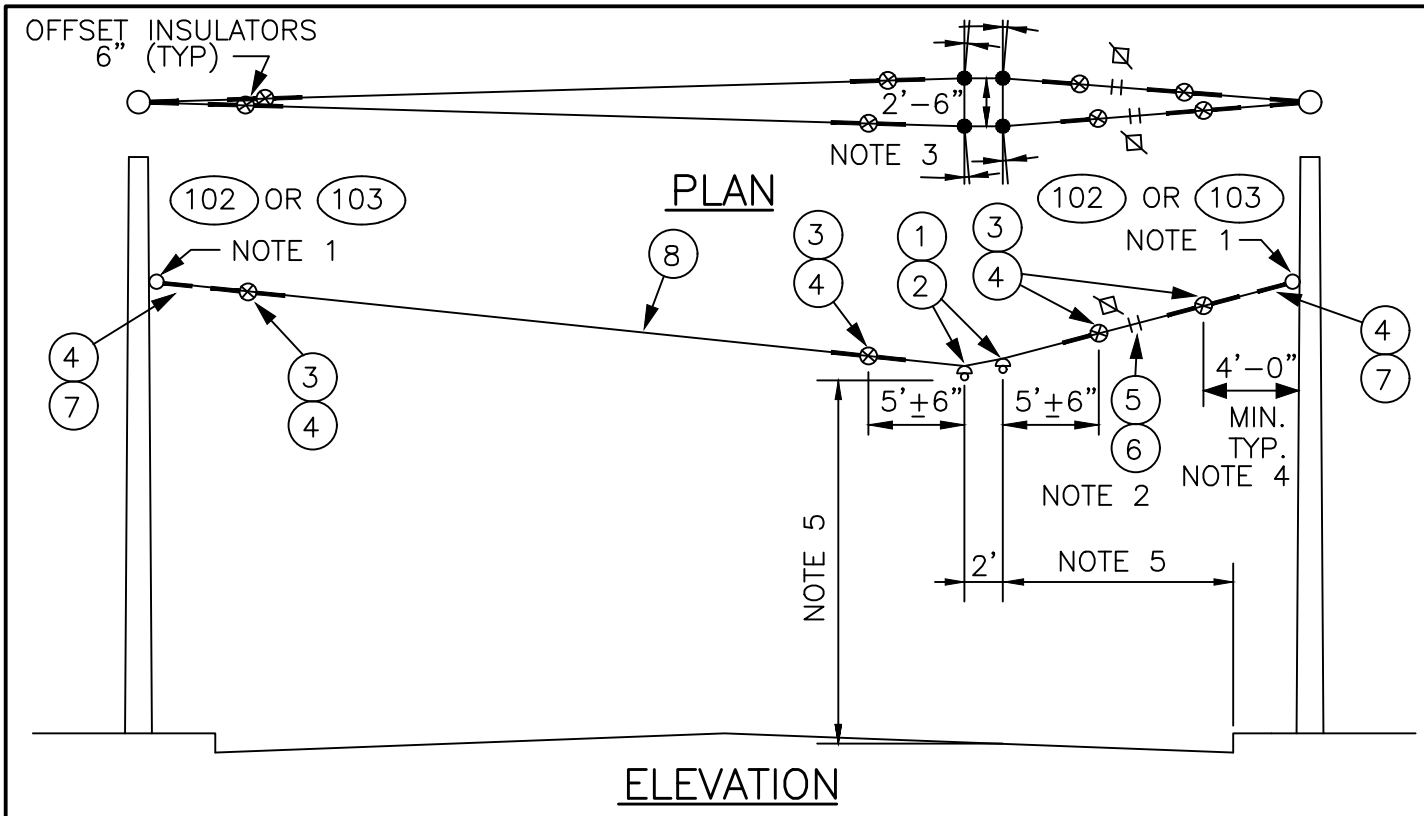
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

TANGENT SPAN
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-311
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-310,1-318.dwg | Layout: SA-311
PLOTTED: Mar 18, 2021-08:25:46am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



ELEVATION

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. MAXIMUM ANGLE 1°, 0.5° PER SPAN HANGER.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293-3007
02	4	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	8	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	18	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

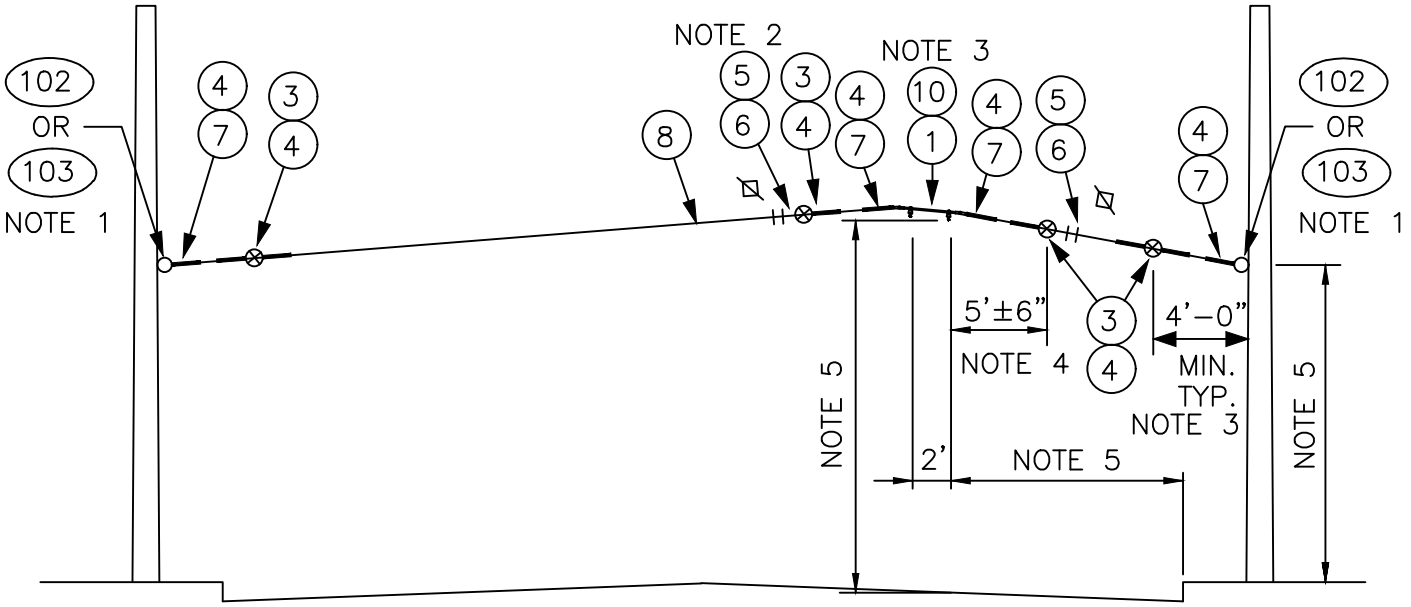
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

HOLDUP TANGENT SPAN
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-312
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-310,1-318.dwg | Layout: SA-312
PLOTTED: Mar 18, 2021-08:25:50am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



ELEVATION

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

3. MAXIMUM ANGLE 0.5°. SEE SA–317, PLAN VIEW.

4. SEE SA–370 FOR LIMITED SPACE VARIANCES.

5. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	1	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

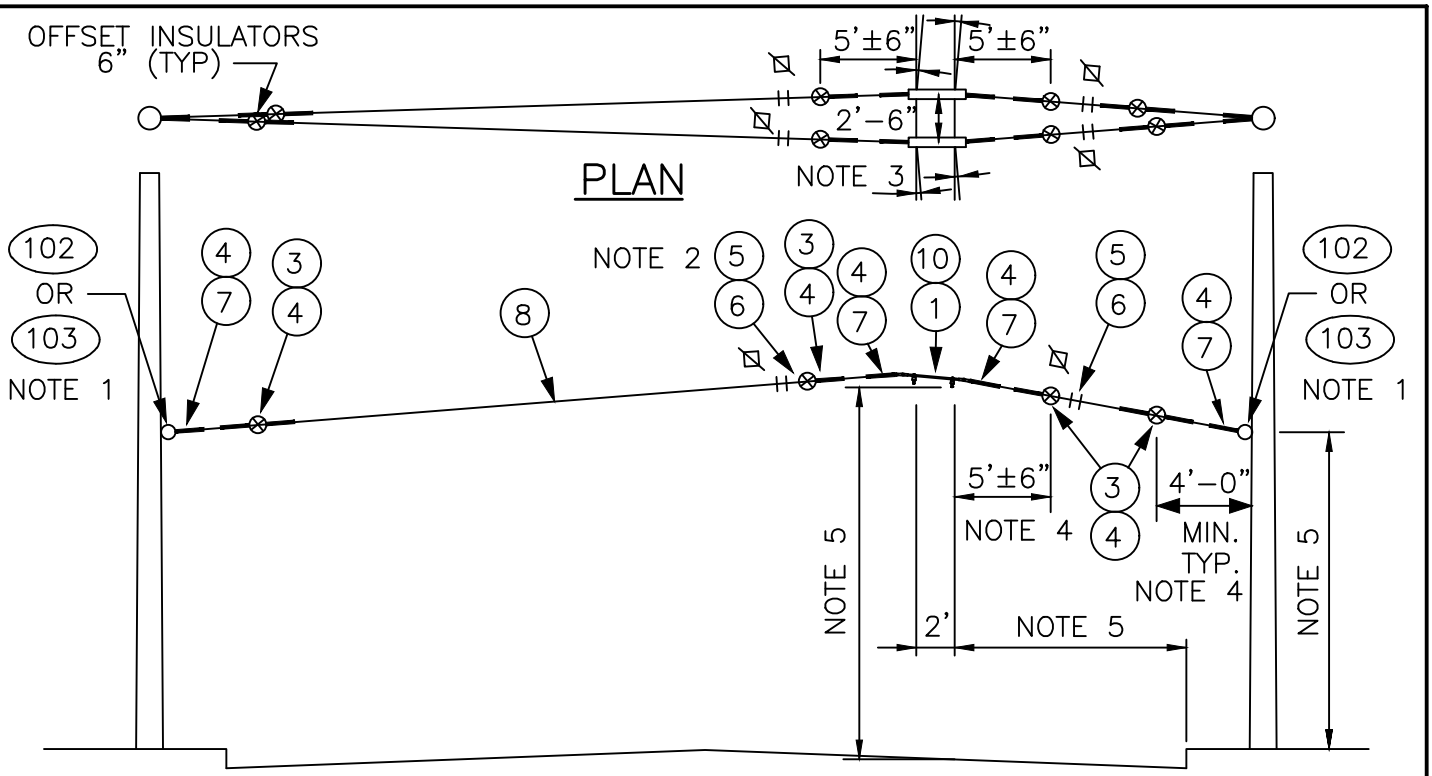
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

INVERTED TANGENT SPAN
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-313
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-310,1-318.dwg | Layout: SA-313
PLOTTED: Mar 18, 2021-08:25:55am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⧄". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. MAXIMUM ANGLE 1 DEGREE, 0.5° PER DOUBLE CURVE HANGER.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSY	WABCO	19293-3007
03	8	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	20	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	8	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	8	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	2	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

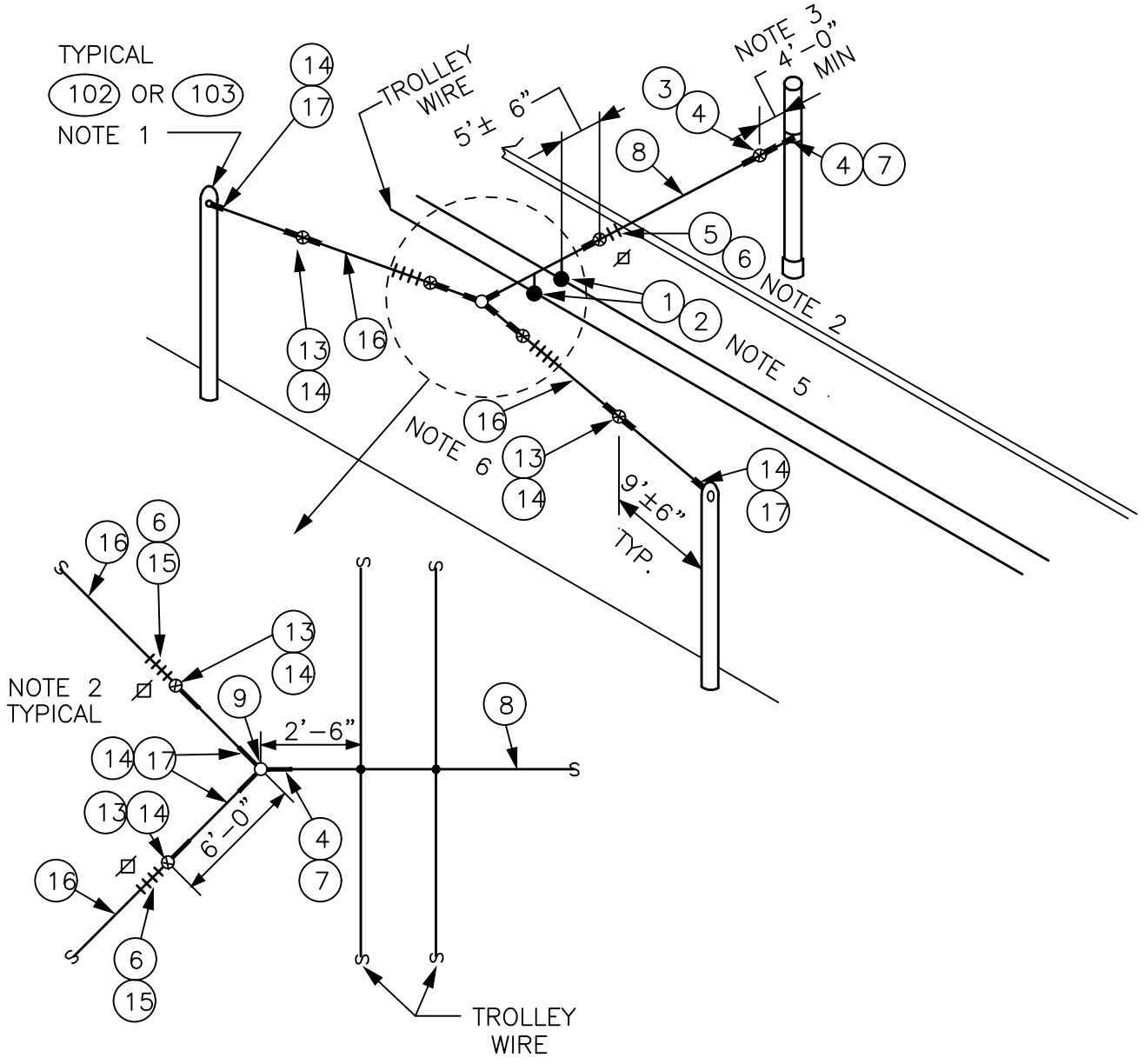
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

HOLDDOWN TANGENT SPAN
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-314
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-310,1-318.dwg | Layout: SA-314
PLOTTED: Mar 18, 2021-08:26:01am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

BRIDLE TANGENT SPAN
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-315
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-310,1-318.dwg | Layout: SA-315.1
PLOTTED: Mar 18, 2021-08:26:05am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
02	2	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	1	BULL RING	WABCO	18567-2000
13	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3115
15	VARIES	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M
17	VARIES	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⧄". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.

3. SEE SA-370 FOR LIMITED SPACE VARIANCES.

4. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

5. MAXIMUM ANGLE IS 0.5°. SEE SA-307, PLAN VIEW.

6. IF LOAD SHOWN ON OVERHEAD DRAWINGS IS LESS THAN 2500 LBS, THEN ITEM 8 MAY BE USED INSTEAD OF ITEM 16. THE ASSOCIATED ITEMS SHALL ALSO BE CHANGED I.E. 3 FOR 13, 4 FOR 14, 5 FOR 15 AND 7 FOR 17.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

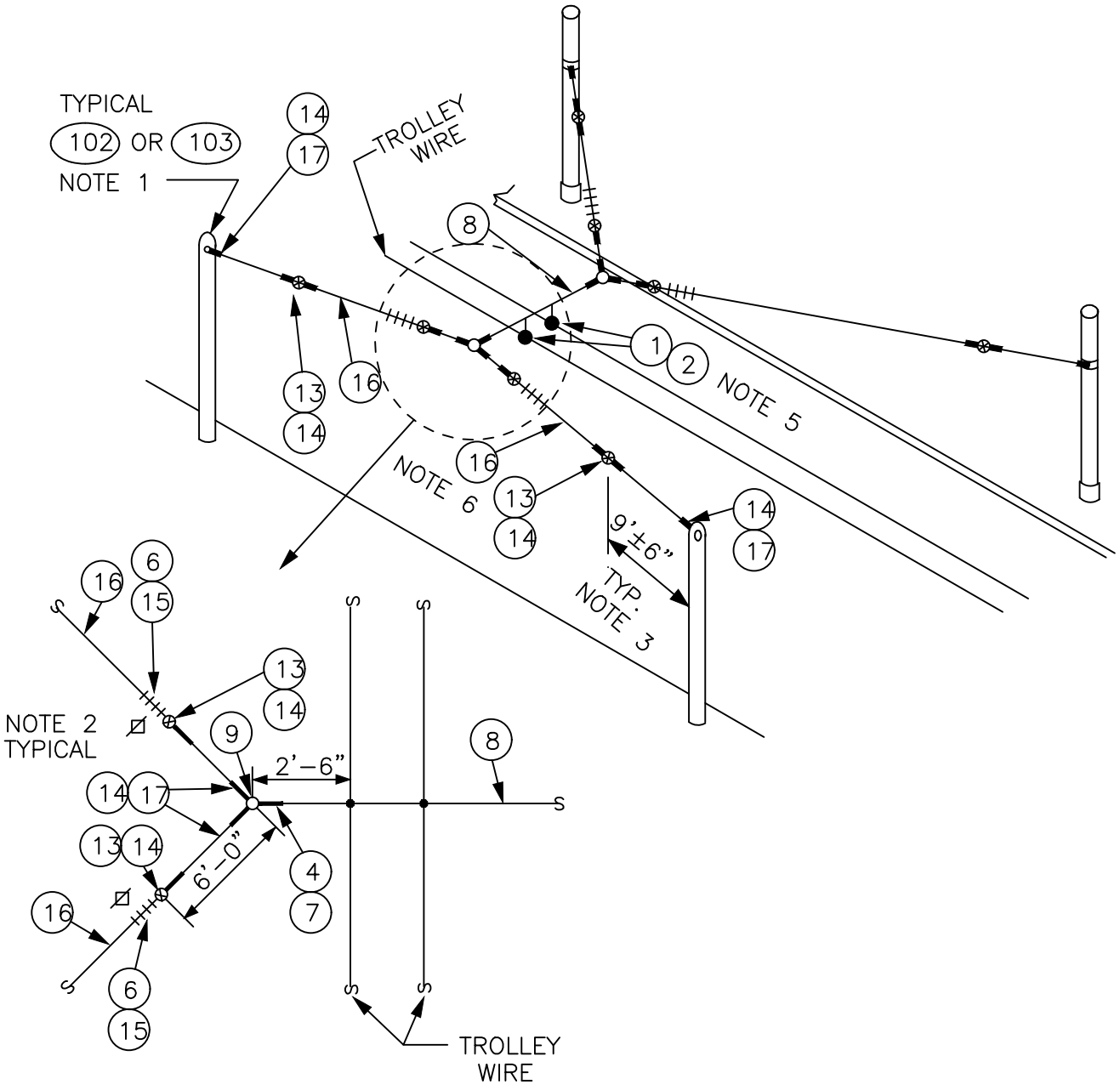
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

BRIDLE TANGENT SPAN
ONW-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-315
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-310,1-318.dwg | Layout: SA-315.2
PLOTTED: Mar 18, 2021-08:26:10am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
DOUBLE BRIDLE
TANGENT SPAN
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-316
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-310,1-318.dwg | Layout: SA-316,1
PLOTTED: Nov 21, 2021-11:21:09pm By Anderl,S
XREFS:
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
02	2	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	2	BULL RING	WABCO	18567-2000
13	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3115
15	VARIES	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M
17	VARIES	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.

3. SEE SA-370 FOR LIMITED SPACE VARIANCES.

4. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

5. MAXIMUM ANGLE IS 0.5°. SEE SA-307, PLAN VIEW.

6. IF LOAD SHOWN ON OVERHEAD DRAWINGS IS LESS THAN 2500 LBS, THEN ITEM 8 MAY BE USED INSTEAD OF ITEM 16. THE ASSOCIATED ITEMS SHALL ALSO BE CHANGED I.E. 3 FOR 13, 4 FOR 14, 5 FOR 15 AND 7 FOR 17.

No.	REVISION	BY	APP'D	DATE

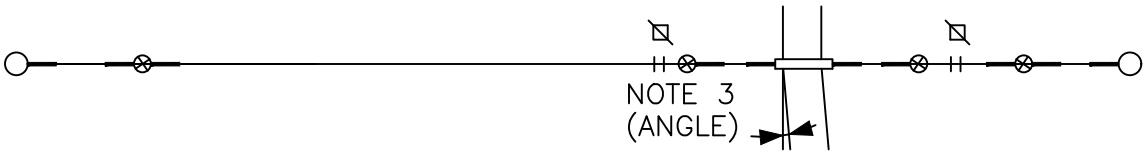
DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

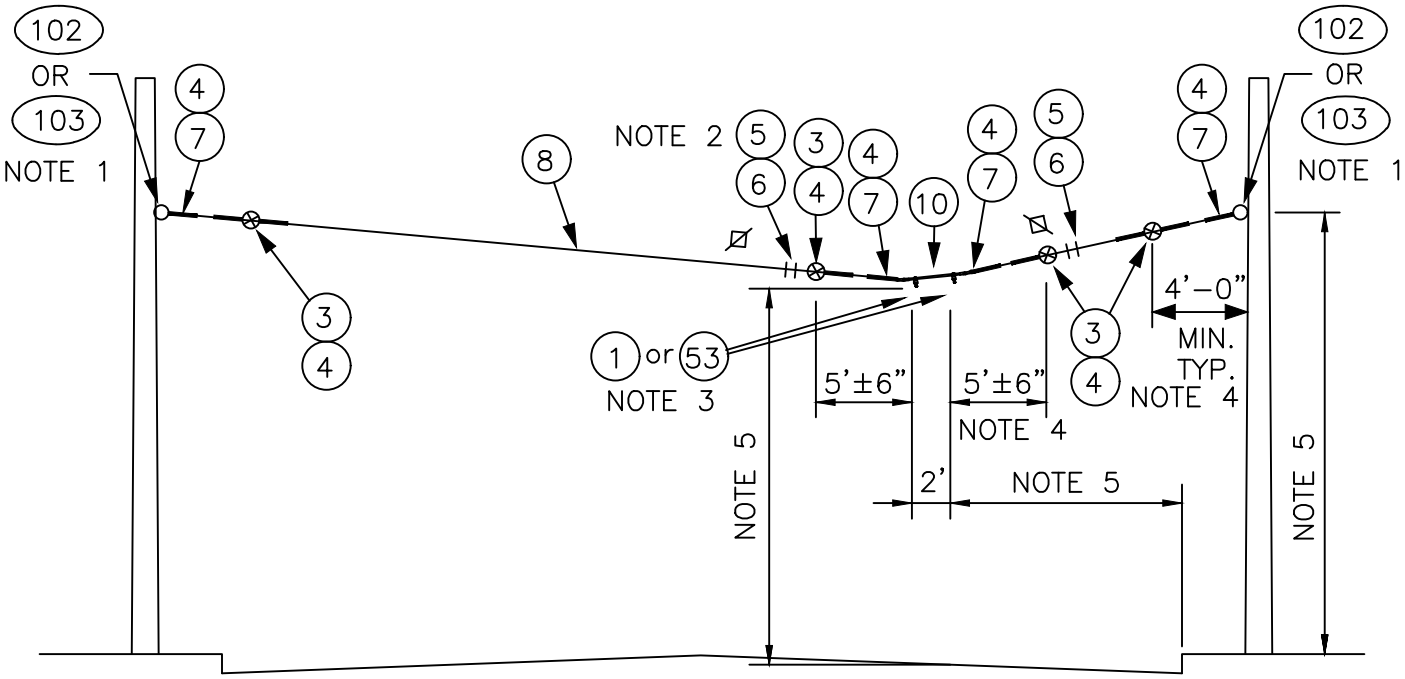
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
DOUBLE BRIDLE
TANGENT SPAN
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-316
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-310,1-318.dwg | Layout: SA-316.2
PLOTTED: Mar 18, 2021-08:26:20am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN



ELEVATION

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

3. ANGLE VARIES FROM 1° TO 5°. USE ITEM 1 FOR 1° TO 2.5° ANGLE. USE ITEM 53 FOR 3° TO 5° ANGLE.

4. SEE SA–370 FOR LIMITED SPACE VARIANCES.

5. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
1° TO 5° CURVE SPAN
WITH 2 FOOT CURVE RAILS
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-317
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-310,1-318.dwg | Layout: SA-317,1
PLOTTED: Nov 21, 2021-11:22:39pm By AndersL
XREFS:
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	VARIES	DETROIT CLAMP ASSY	WABCO	19293-3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	1	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
53	VARIES	CURVE RAIL (1° TO 5° 2 FT LG)	K & M	851 B412/0
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.	REVISION	BY	APP'D	DATE

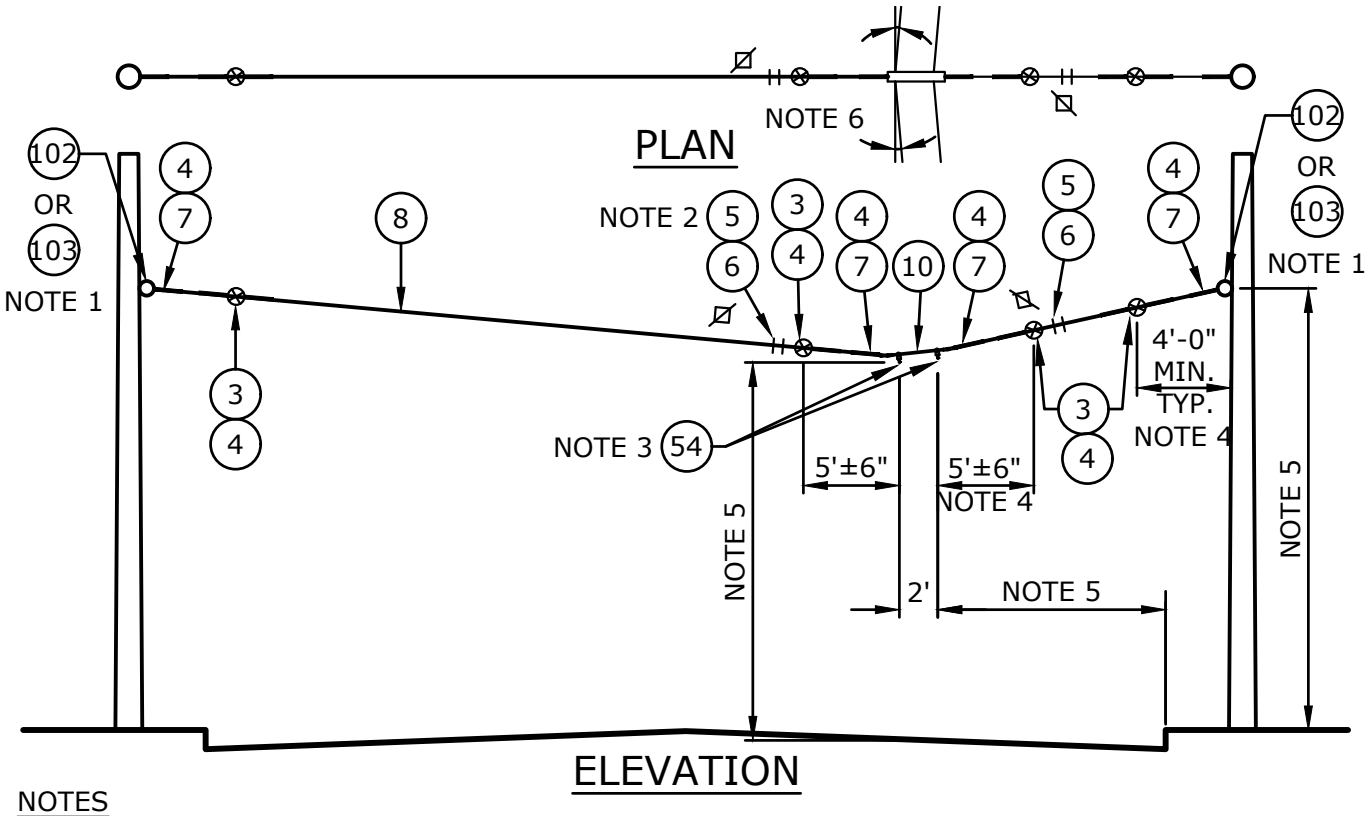
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
1° TO 5° CURVE SPAN
WITH 2 FOOT CURVE RAILS
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-317
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-310,1-318.dwg | Layout: SA-317.2
PLOTTED: Nov 21, 2021-11:23:44pm By AndersL
XREFS:
IMAGES:



NOTES

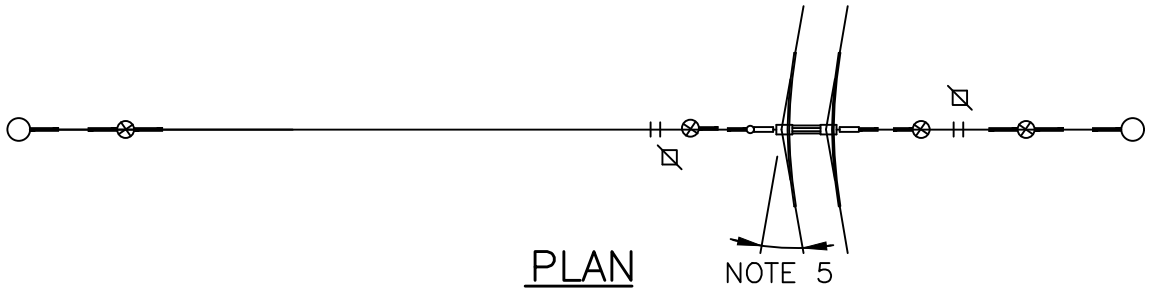
1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. ANGLE VARIES FROM 5.5° TO 7.5°.
4. SEE SA-370 FOR LIMITED SPACE VARIANCES.
5. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

MATERIAL LIST

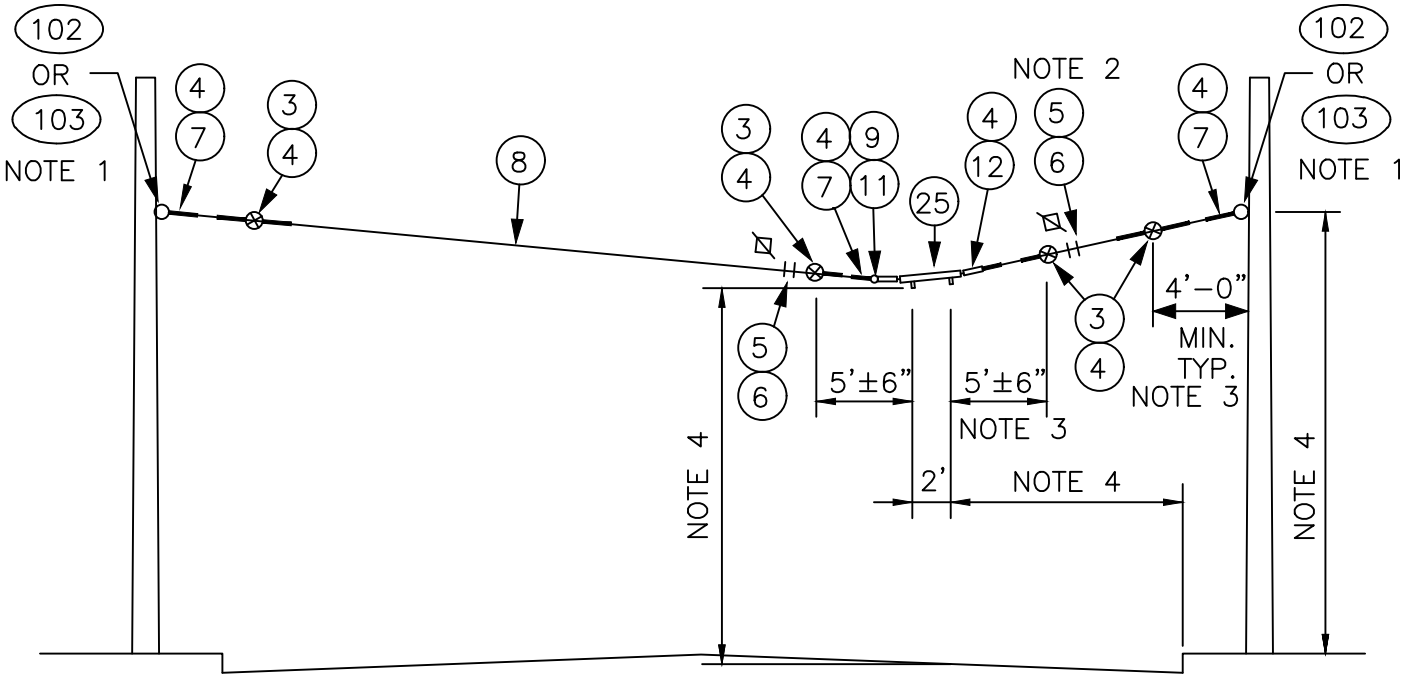
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	1	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
54	VARIES	CURVE RAIL (5.5° TO 7.5° 4' LG)	K & M	851 B412/1
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
APPROVED: C. REYNOLDS
DRAWN: E. TU
CHECKED: J. DAVIS
King County METRO
METRO TRANSIT CAPITAL DIVISION
TROLLEY BUS OCS & SUPPORT STRUCTURE STANDARD DETAILS
5.5° TO 7.5° CURVE SPAN WITH 4 FOOT CURVE RAILS ONE-WAY TRAFFIC
DATE: 03/2022
STD DET NO: SA-318
SHT NO: 1 OF 1



PLAN



ELEVATION

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.

3. SEE SA–370 FOR LIMITED SPACE VARIANCES.

4. SEE SA–164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

5. ANGLE VARIES FROM 8° TO 30°.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
8' TO 30' CURVE SPAN WITH CURVE SEGMENT ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-320
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-320,1-325.dwg | Layout: SA-320.1
PLOTTED: Mar 18, 2021-08:26:45am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
12	1	7/8 TRANSLITE STRAIN INSUL CL–EYE	WABCO	55339–6120
25	VARIES (SEE PLAN)	CURVE SEGMENT 8–12 DEG TYPE C CURVE SEGMENT 13–27 DEG TYPE C CURVE SEGMENT 28–47 DEG TYPE C	WABCO WABCO WABCO	22301–3014 22302–3005 22303–3005
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103

No.	REVISION	BY	APP'D	DATE

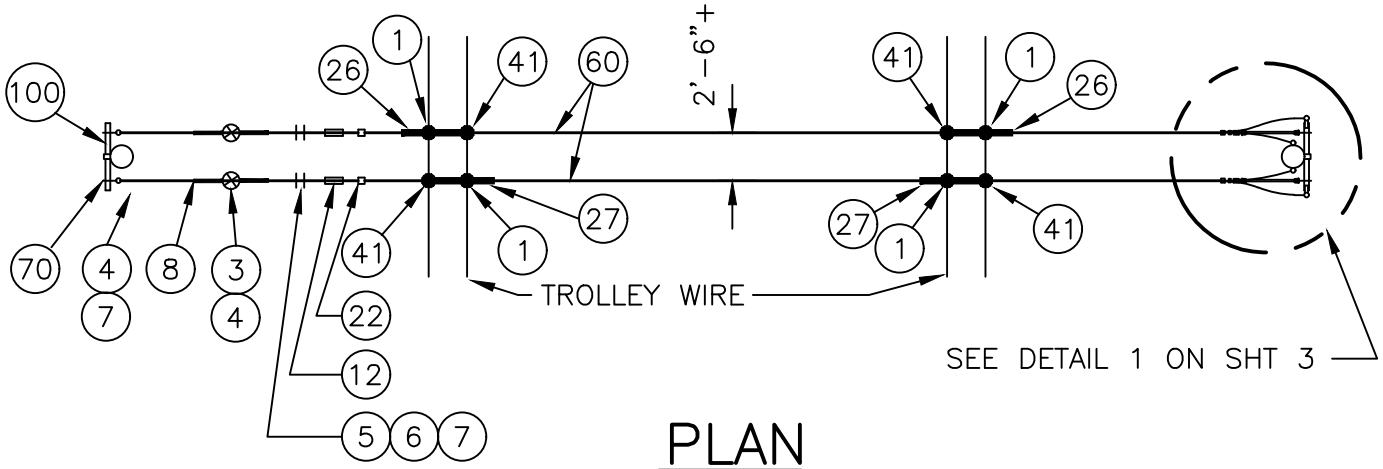
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

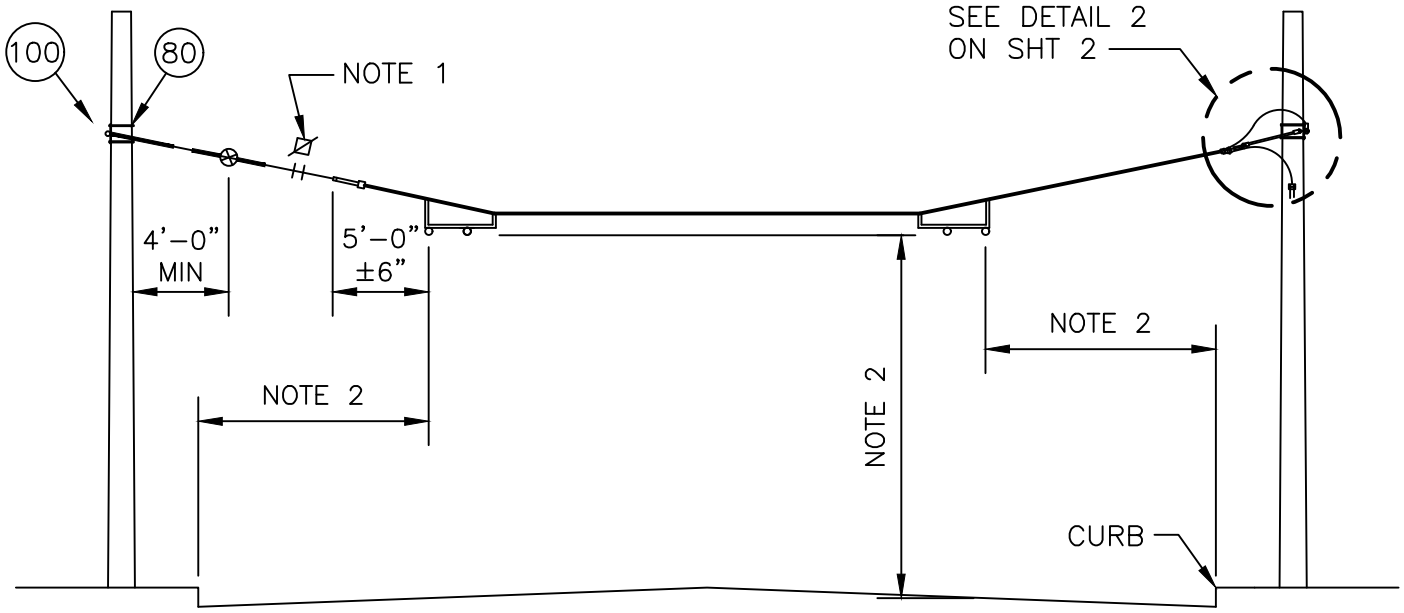
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
8' TO 30' CURVE SPAN WITH CURVE SEGMENT ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-320
SHT NO: 2 OF 5

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-320,1-325.dwg | Layout: SA-320.2
PLOTTED: Mar 18, 2021-08:26:50am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN



ELEVATION

NOTES:

1. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
2. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
3. CONNECT FEEDER RISER TO FEED SPAN. SEE SA-402.
4. INSTALL LIGHTNING ARRESTERS PER SA-401.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

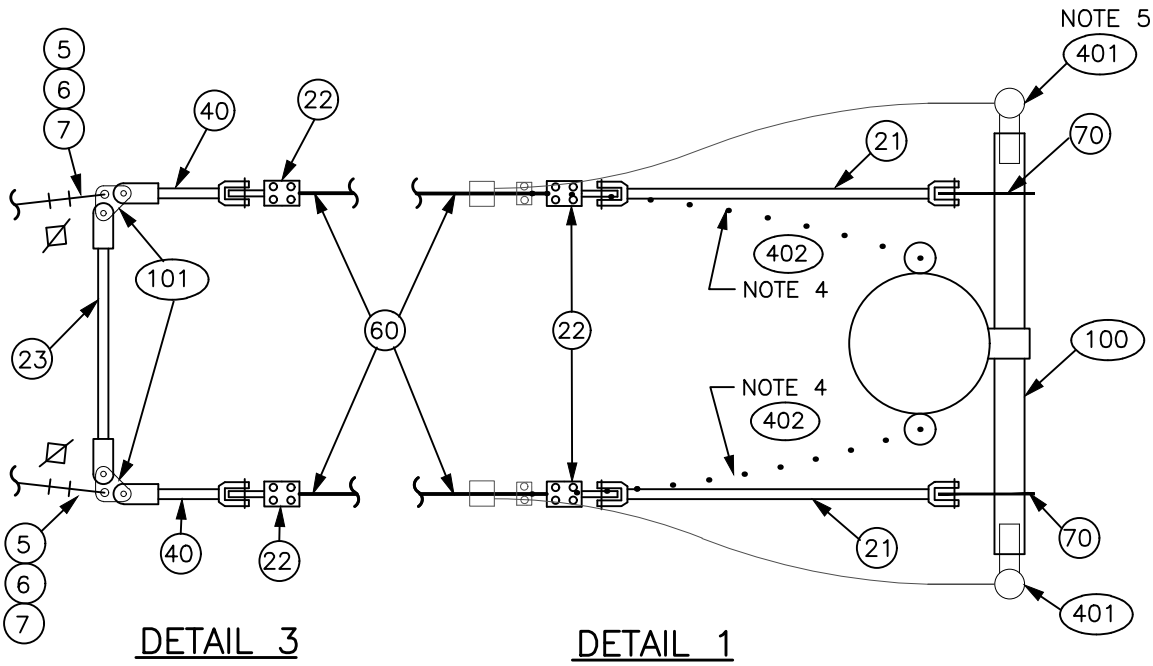
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

DOUBLE FEEDER SPAN
TWO-WAY TRAFFIC

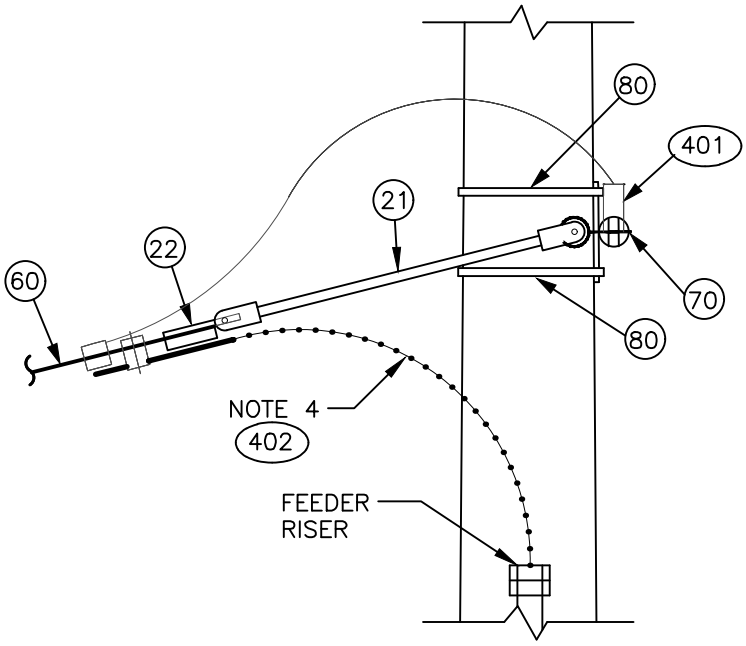
DATE: 03/2021
STD DET NO: SA-321
SHT NO: 1 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-320,1-325.dwg | Layout: SA-321.1
PLOTTED: Mar 18, 2021-08:26:55am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



DETAIL 3

DETAIL 1



DETAIL 2

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

DOUBLE FEEDER SPAN
TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-321
SHT NO: 2 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-320,1-325.dwg | Layout: SA-321.2
PLOTTED: Mar 18, 2021-08:27:00am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	4	DETROIT CLAMP ASSEMBLY	WABCO	19293–3007
03	2	GUY STRAIN INSULATOR	PORCELAIN PRODUCTS CO	504
04	6	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQ'D	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" x HD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
12	2	7/8 TRANSLITE STRAIN INSULATOR CL–CL	WABCO	55339–6120
21	2	7/8 TRANSLITE STRAIN INSULATOR CL–CL	WABCO	54975–6360
22	4	CLAMP STRAIN EYE	WABCO	10571–2000
26	2	TYPE PH–4 POSITIVE FEED SPAN HANGER	WABCO	54937–3002
27	2	TYPE PH–5 NEGATIVE FEED SPAN HANGER	WABCO	54936–3002
41	4	HSP FEEDER CLAMP ASSEMBLY, BRONZE	WABCO	19879–2000
60	AS REQ'D	FEED SPAN CABLE 500 KCM CU, UNSHIELDED, 5 KV EPR W/ PVC JACKET		
70	4	EYEBOLT, 5/8"x6" W/ 2 NUTS & LOCKWASHER		
80	AS REQ'D	3/4" x 0.030" SS BANDING TYPE 201	BAND–IT	C206
100	2	EPOXIROD DEADEND ARM	CHANCE	C653–1023
401	AS REQ'D	LIGHTNING ARRESTER	METRO STANDARD	SA–401
402	AS REQ'D	FEEDER RISER	METRO STANDARD	SA–402

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

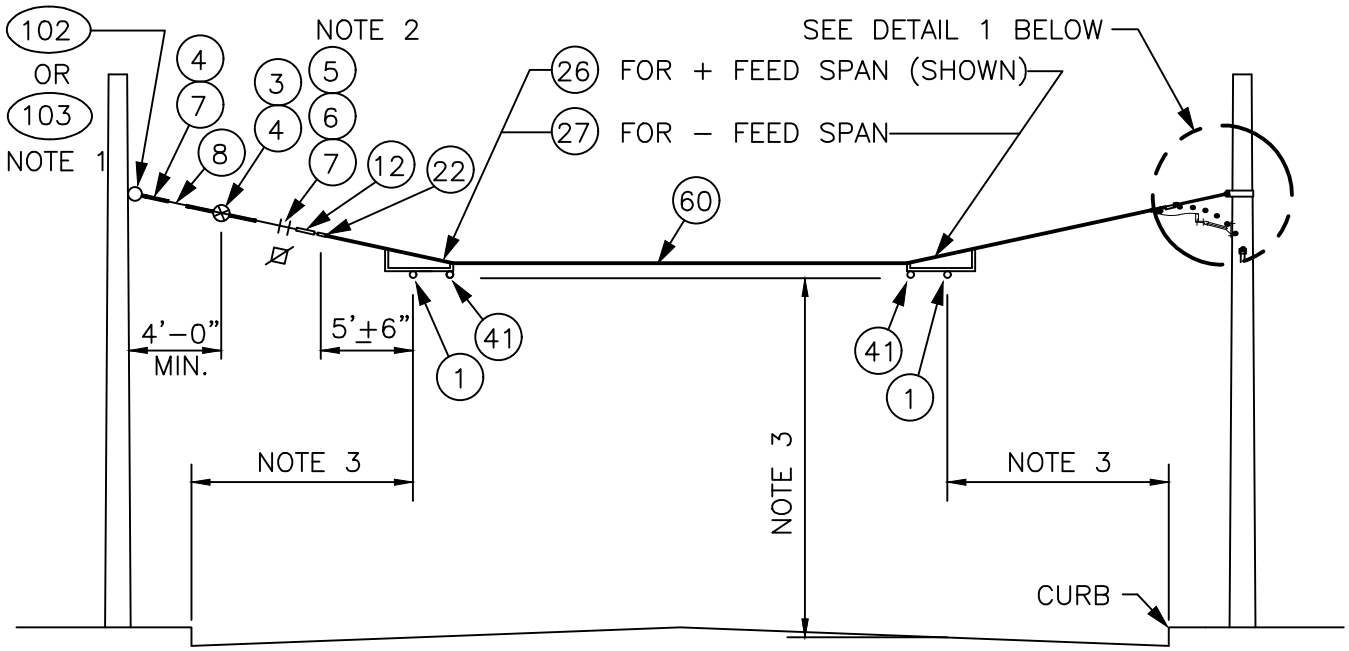
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

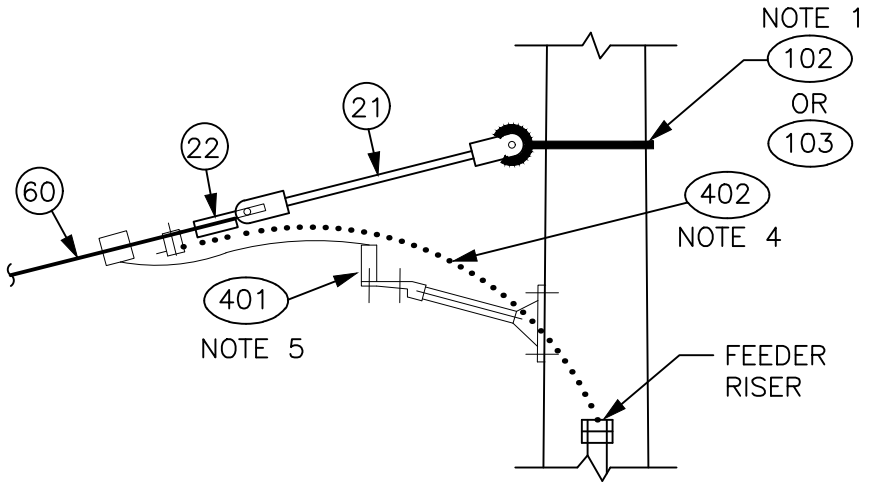
DOUBLE FEEDER SPAN
TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-321
SHT NO: 3 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-320,1-325.dwg | Layout: SA-321.3
PLOTTED: Mar 18, 2021-08:27:05am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



ELEVATION



DETAIL 1

NOTES:

1. A POLE COLLAR, OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.
3. SEE SA–164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. CONNECT FEEDER RISER TO FEED SPAN. SEE SA–402.
5. INSTALL LIGHTNING ARRESTERS PER SA–401.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

SINGLE FEEDER SPAN
TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-322
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-320,1-325.dwg | Layout: SA-322.1
PLOTTED: Mar 18, 2021-08:27:10am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293–3007
03	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO	504
04	3	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
12	1	7/8 TRANSLITE STRAIN INSUL CL–EYE	WABCO	55339–6120
21	1	7/8 TRANSLITE STRAIN INSUL CL–CL	WABCO	54975–6360
22	2	CLAMP STRAIN EYE	WABCO	10571–2000
26	2/0	TYPE PH–4 POS FEED SPAN HANGER	WABCO	54937–3002
27	0/2	TYPE PH–5 NEG FEED SPAN HANGER	WABCO	54936–3002
41	2	H.S.P. FEEDER CLAMP ASSY, BRONZE	WABCO	19879–2000
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UNSHIELDED 5 KV EPR W/ PVC JACKET		
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103
401	AS REQD	LIGHTNING ARRESTER	METRO STD	SA–401
402	AS REQD	FEEDER RISER	METRO STD	SA–402

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

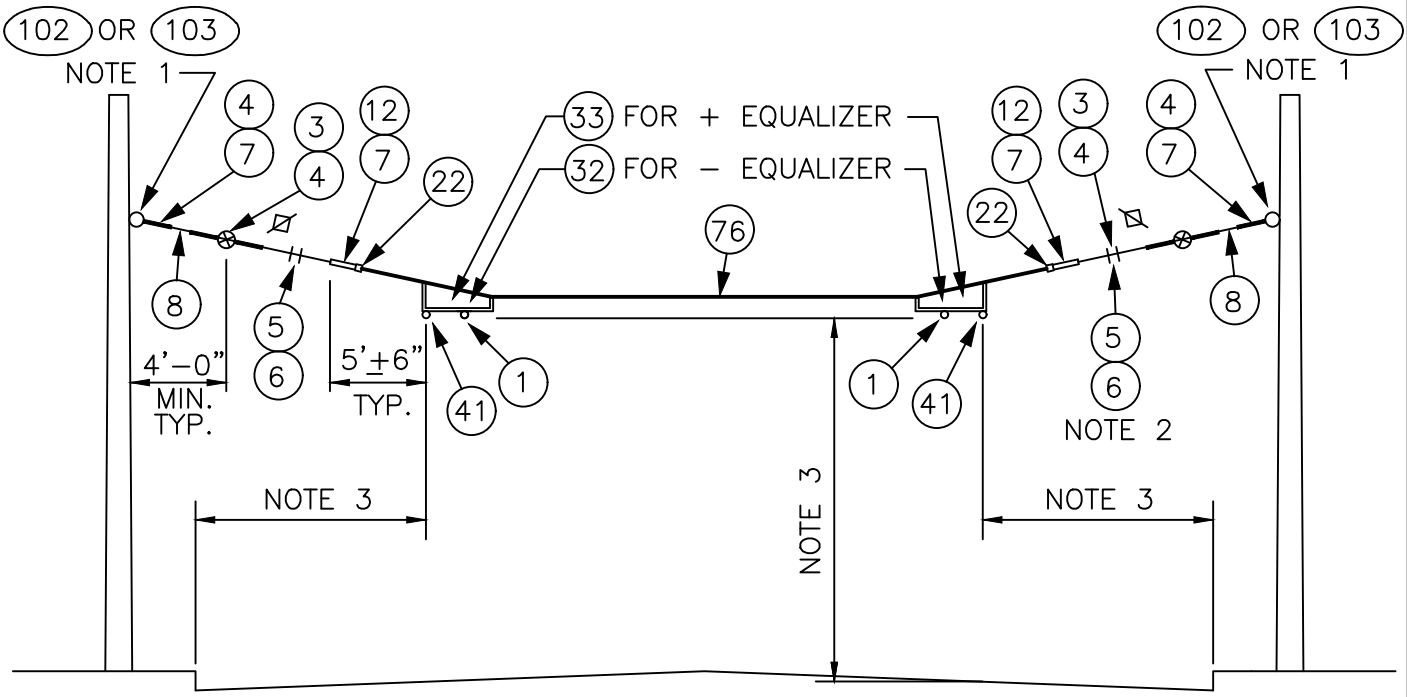
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

SINGLE FEEDER SPAN
TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-322
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-320,1-325.dwg | Layout: SA-322.2
PLOTTED: Mar 18, 2021-08:27:15am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA−102 OR SA−103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA−166.
3. SEE SA−164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293−3007
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO	504
04	6	GUY GRIP DEADEND	PREFORMED	CDE−3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
12	2	7/8 TRANSLITE STRAIN INSUL CL−EYE	WABCO	55339−6120
22	2	CLAMP STRAIN EYE	WABCO	10571−2000
32	2/0	TYPE PH−4 POS FEED SPAN HANGER	WABCO	54936−3001
33	0/2	TYPE PH−5 NEG FEED SPAN HANGER	WABCO	54937−3001
41	2	HSP FEEDER CLAMP ASSY, BRONZE	WABCO	19879−2000
76	AS REQD	4/0 STRANDED INSUL CABLE		
102	VARIES	FORGED THREE−PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA−103

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

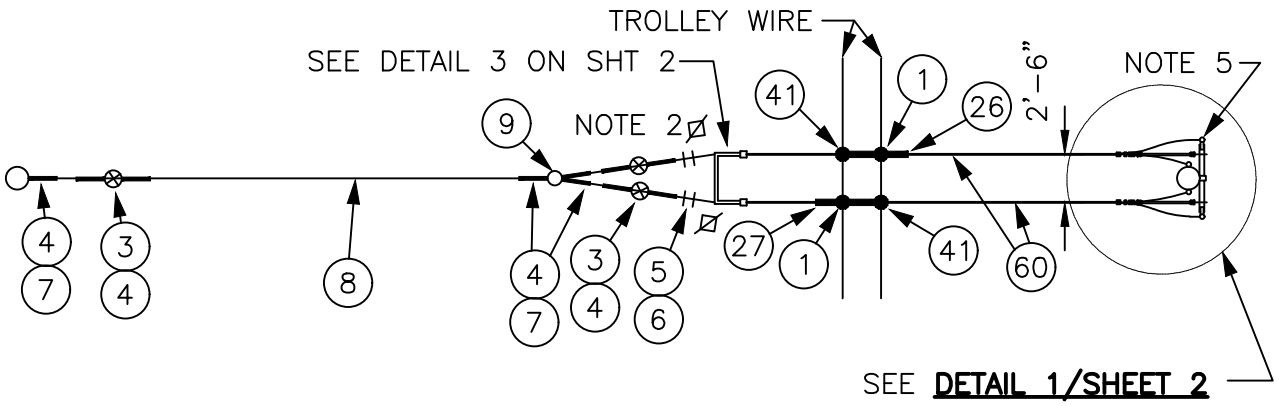
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

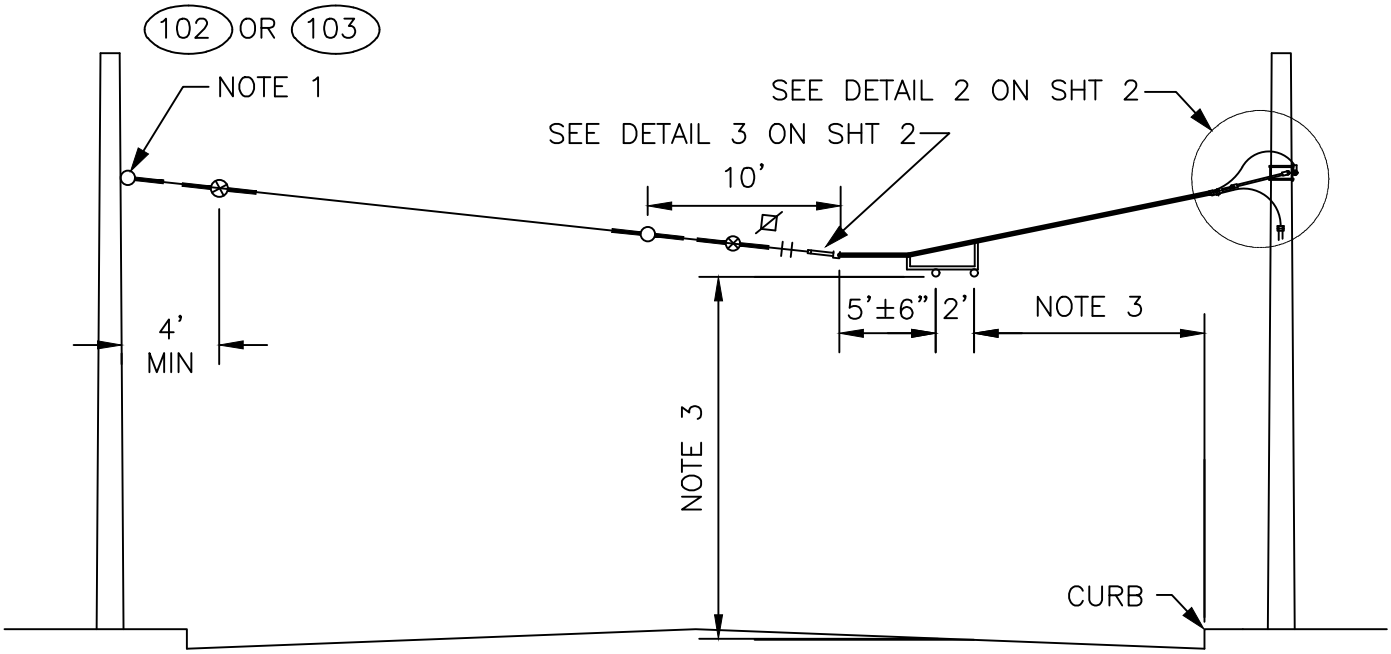
EQUALIZER SPAN
TWO-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-325
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-320,1-325.dwg | Layout: SA-325
PLOTTED: Mar 18, 2021-08:27:21am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN



ELEVATION

NOTES:

1. A POLE COLLAR, OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⌀". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.
3. SEE SA–164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. CONNECT FEEDER RISER TO FEED SPAN. SEE SA–402.
5. INSTALL LIGHTNING ARRESTERS PER SA–401.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

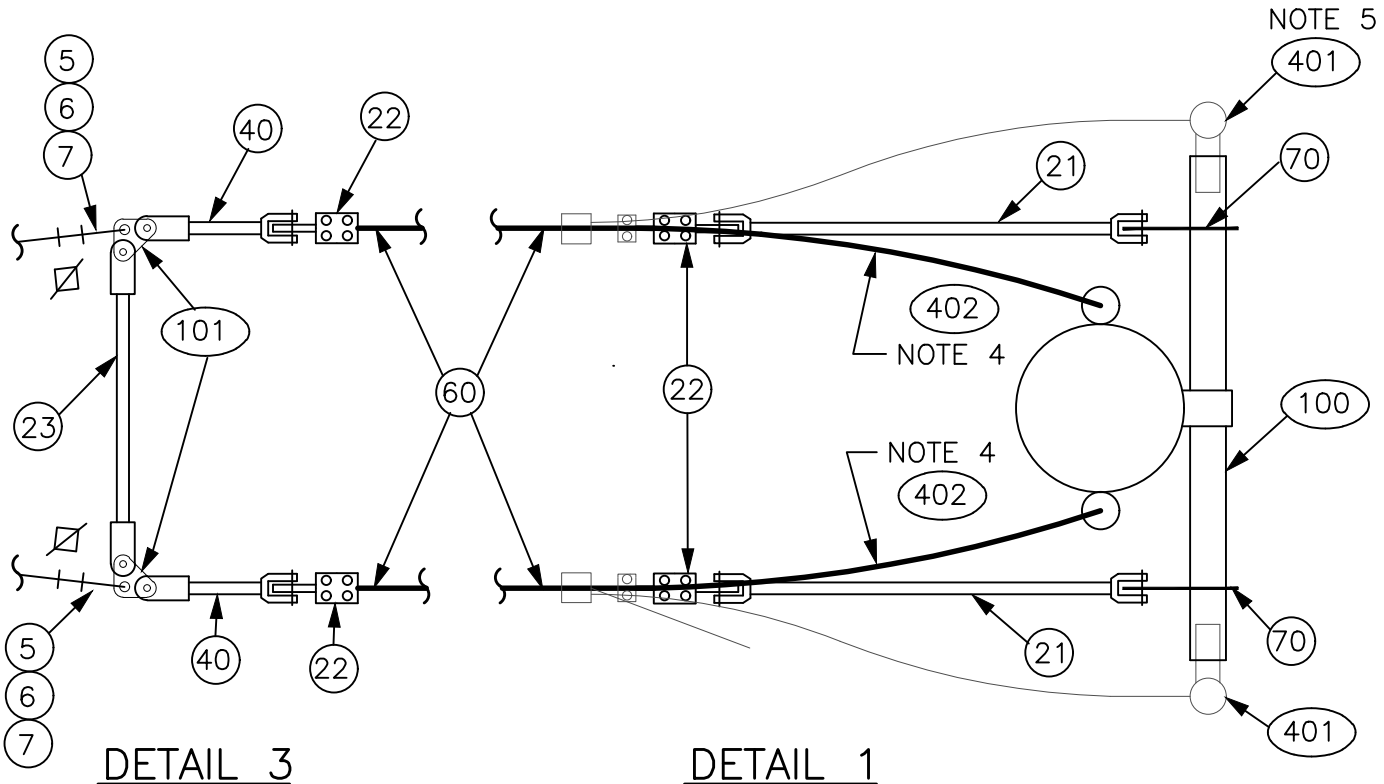
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

DOUBLE FEEDER SPAN
ONE-WAY TRAFFIC

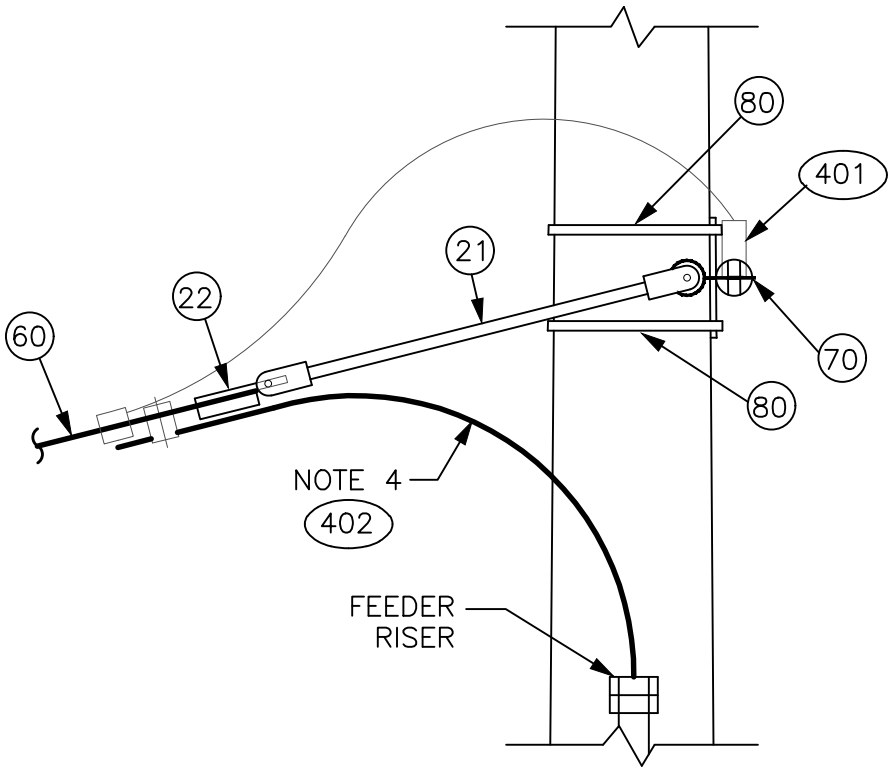
DATE: 03/2021
STD DET NO: SA-331
SHT NO: 1 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-331,1-3.dwg | Layout: SA-331.1
PLOTTED: Mar 18, 2021-08:27:30am By dbennett
XREFS: TTB A SIZE.dwg
IMAGES:



DETAIL 3

DETAIL 1



DETAIL 2

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

DOUBLE FEEDER SPAN
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-331
SHT NO: 2 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-331,1-3.dwg | Layout: SA-331.2
PLOTTED: Mar 18, 2021-08:27:35am By dbennett
XREFS: TTB A SIZE.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293–3007
03	3	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE–3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	6	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	1	BULL RING	WABCO	18567–2000
21	2	7/8 TRANSLITE STRAIN INSUL CL–CL	WABCO	54975–6360
22	4	CLAMP STRAIN EYE	WABCO	10571–2000
23	1	7/8 TRANSLITE STRAIN INSUL CL–CL	WABCO	54975–6260
26	1	TYPE PH–4 POS FEED SPAN HANGER	WABCO	54937–3002
27	1	TYPE PH–5 NEG FEED SPAN HANGER	WABCO	54936–3002
40	2	7/8 TRANSLITE STRAIN INSUL CL–90	WABCO	54995–6120
41	2	H.S.P. FEEDER CLAMP ASSY, BRONZE	WABCO	19879–2000
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UNSHIELDED, 5KV EPR W/ PVC JACKET		
70	2	EYEBOLT, 5/8" x 6", WITH 2 NUTS & LOCKWASHER		
80	AS REQD	3/4" x 0.03" SS BANDING TYPE 201	BAND–IT	C206
100	VARIES	EPOXIROD DEADEND ARM	CHANCE	C653–1023
101	2	STRAIN PLATE	METRO STD	SA–101
102	VARIES	FORGED THREE–PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA–103
401	AS REQD	LIGHTNING ARRESTER	METRO STD	SA–401
402	AS REQD	FEEDER RISER	METRO STD	SA–402

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

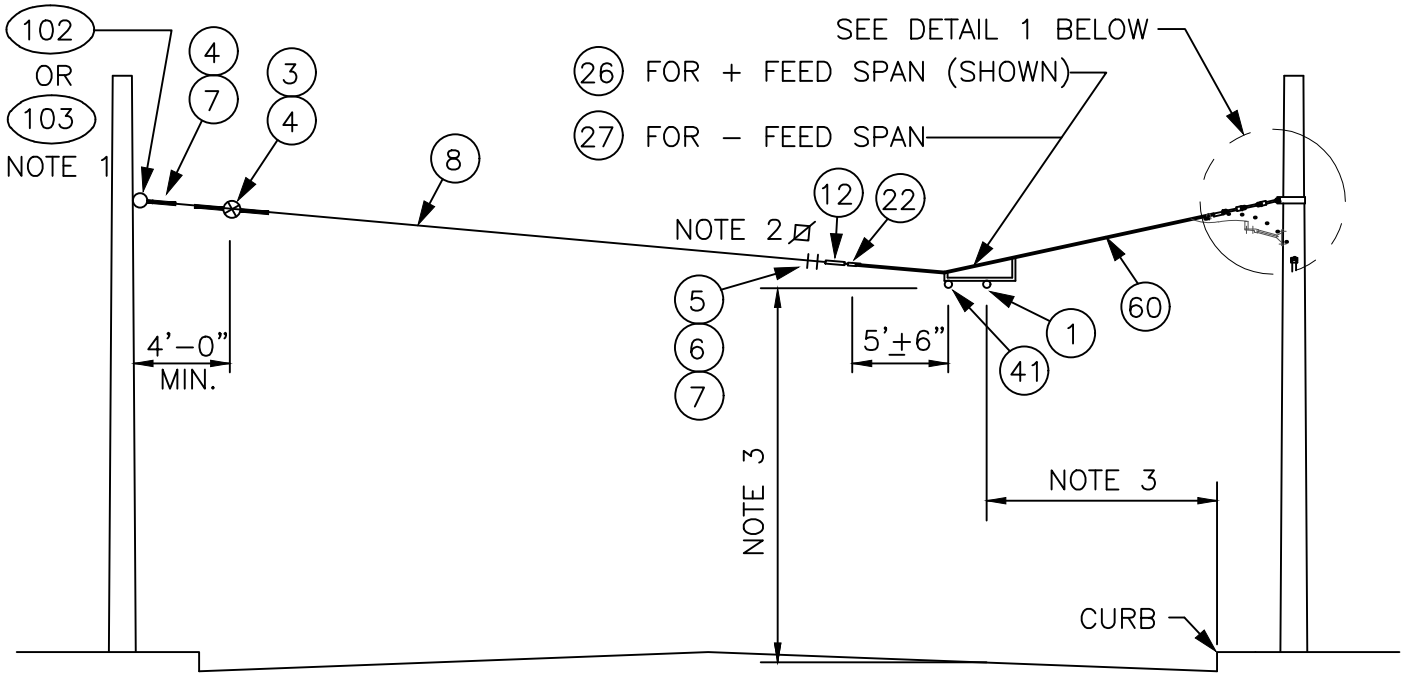
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

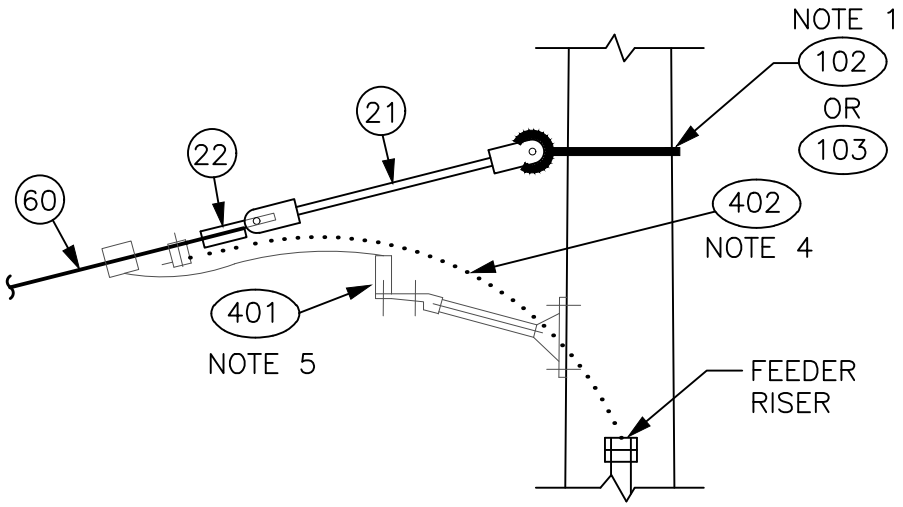
DOUBLE FEEDER SPAN
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-331
SHT NO: 3 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-331,1-3.dwg | Layout: SA-331.3
PLOTTED: Mar 18, 2021-08:27:40am By dbennett
XREFS: TTB A SIZE.dwg
IMAGES:



ELEVATION



DETAIL 1

NOTES:

1. A POLE COLLAR, OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.
3. SEE SA–164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. CONNECT FEEDER RISER TO FEED SPAN. SEE SA–402.
5. INSTALL LIGHTNING ARRESTERS PER SA–401.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

SINGLE FEEDER SPAN
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-332
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-332,1-2.dwg | Layout: SA-332,1
PLOTTED: Mar 18, 2021-08:27:49am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

5. INSTALL LIGHTNING ARRESTERS PER SA-401.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	1	DETROIT CLAMP ASSY	WABCO	19293-3007
03	1	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	3	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
12	1	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
21	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6360
22	2	CLAMP STRAIN EYE	WABCO	10571-2000
26	1/0	TYPE PH-4 POS FEED SPAN HANGER	WABCO	54937-3002
27	0/1	TYPE PH-5 NEG FEED SPAN HANGER	WABCO	54936-3002
41	1	H.S.P. FEEDER CLAMP ASSY, BRONZE	WABCO	19879-2000
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UNSHIELDED, 5KV EPR W/ PVC JACKET		
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103
401	AS REQD	LIGHTNING ARRESTER	METRO STD	SA-401
402	AS REQD	FEEDER RISER	METRO STD	SA-402

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

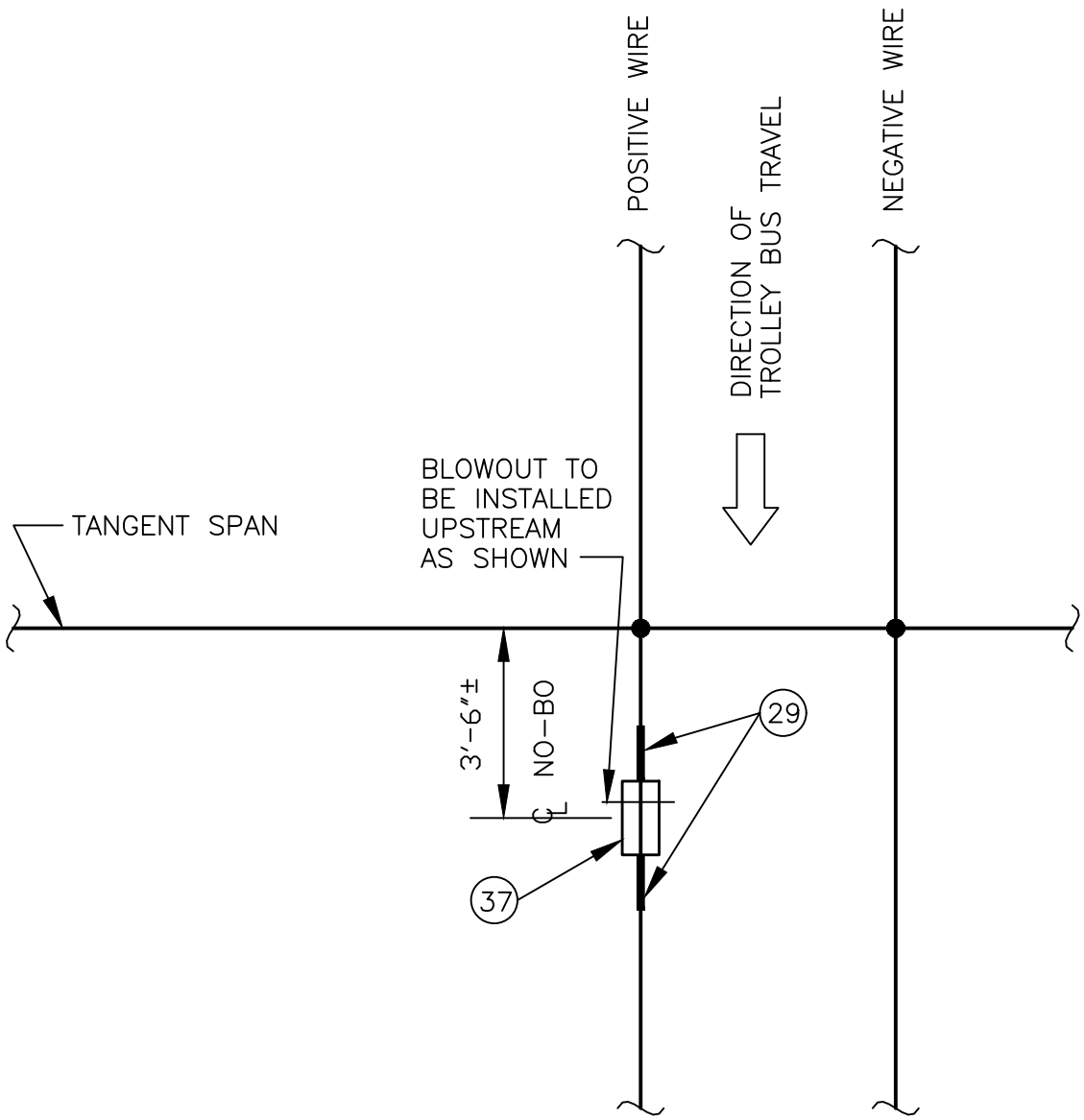
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

SINGLE FEEDER SPAN
ONE-WAY TRAFFIC

DATE: 03/2021
STD DET NO: SA-332
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-332,1-2.dwg | Layout: SA-332.2
PLOTTED: Mar 18, 2021-08:27:55am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
29	2	TYPE TCL CLEVIS TIP 4/0	WABCO	54950-3002
37	1	NO-BO SECTION INSUL	WABCO	55025-3001

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

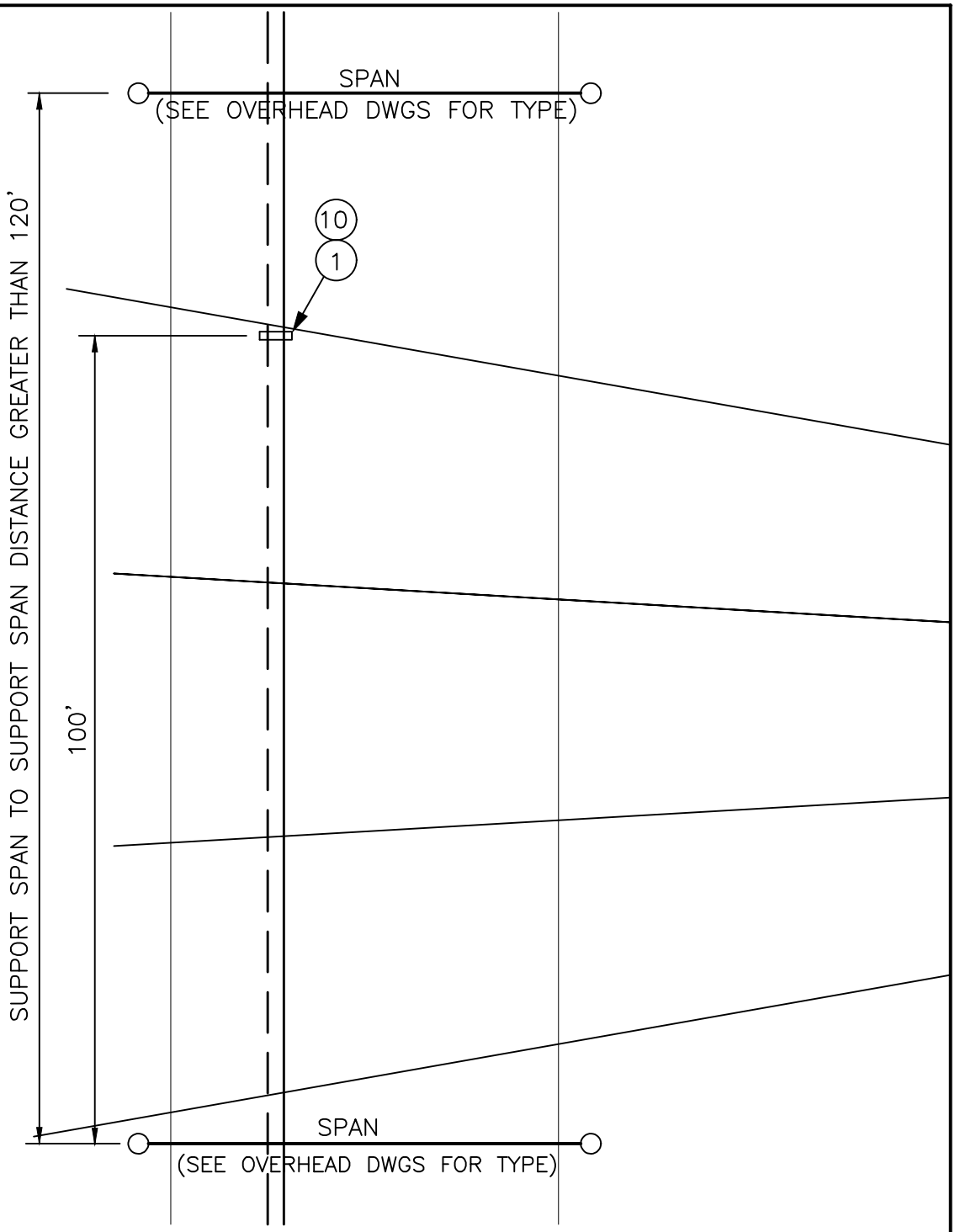
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

SECTIONALIZING SPAN
ONE-WAY TRAFFICT

DATE: 02/2021
STD DET NO: SA-333
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-333.dwg | Layout: SA-333
PLOTTED: Mar 18, 2021-08:28:05am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
10	1	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

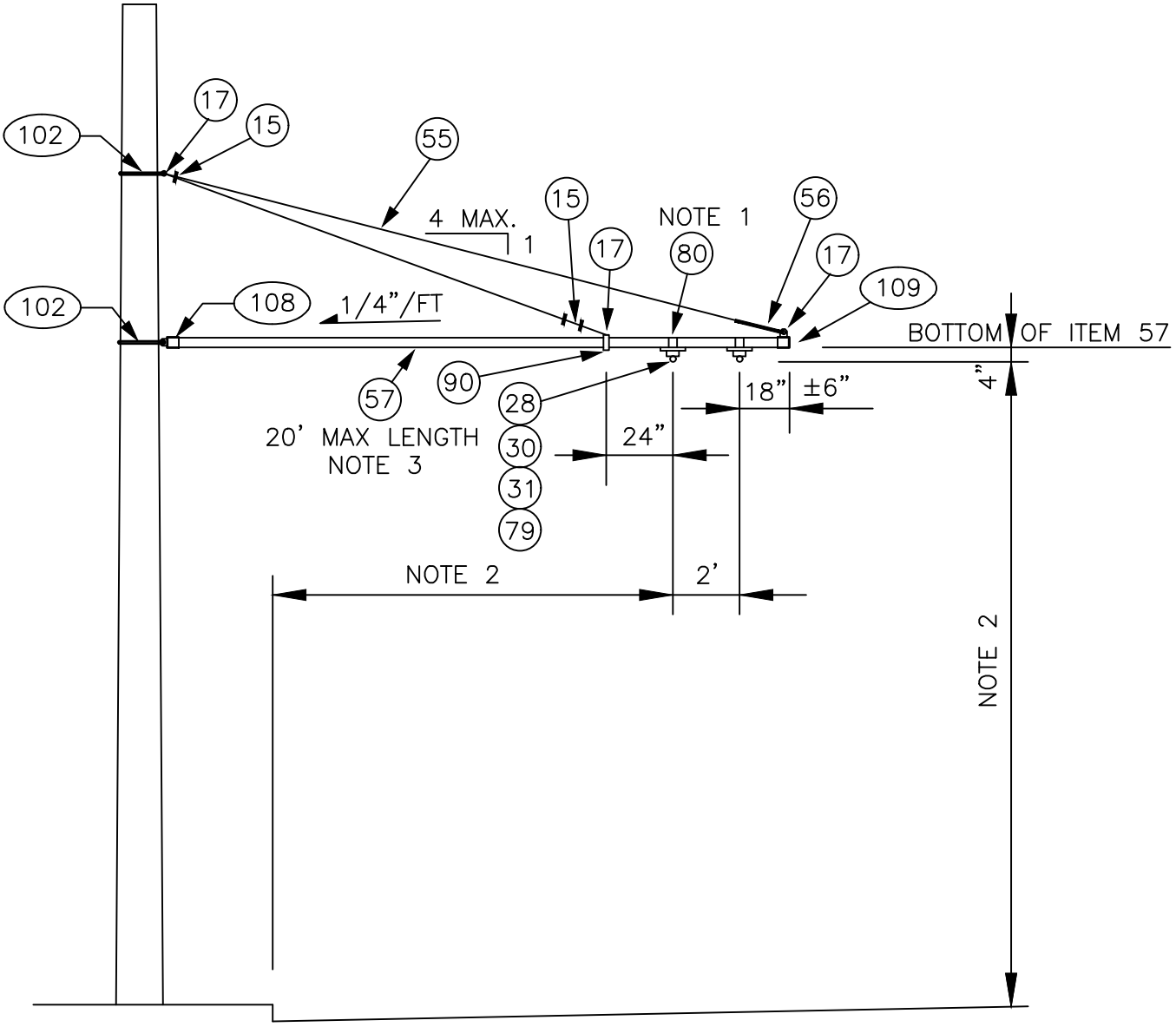
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

TROLLEY WIRE
SPREADER BAR

DATE: 03/2021
STD DET NO: SA-334
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-334.dwg | Layout: SA-334
PLOTTED: Mar 18, 2021-08:28:14am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND ITEM 57 PRIOR TO CLAMPING.
2. SEE SA–164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
3. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 109 FOR INSERTION OF 3/8" SS BOLT.

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL POLE
BRACKET ASSEMBLY
TANGENT CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-341
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-341,1-2.dwg | Layout: SA-341.1
PLOTTED: Mar 18, 2021-08:28:24am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	3	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	2	INSULATOR SPOOL	WABCO	16835-2000
30	2	TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31	2	SPRING DETROIT CLAMP	WABCO	54959-3001
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" Ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
79	2	5/8"-11 UNC X 1 3/8" STUD		
80	VARIES	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
90	1	HEAVY PIPE CLAMP, GALV, 3" IPS	GRINNELL	FIG. 216
102	2	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
109	1	MAST ARM ARM END CAP	METRO STD	SA-109

No.	REVISION	BY	APP'D	DATE

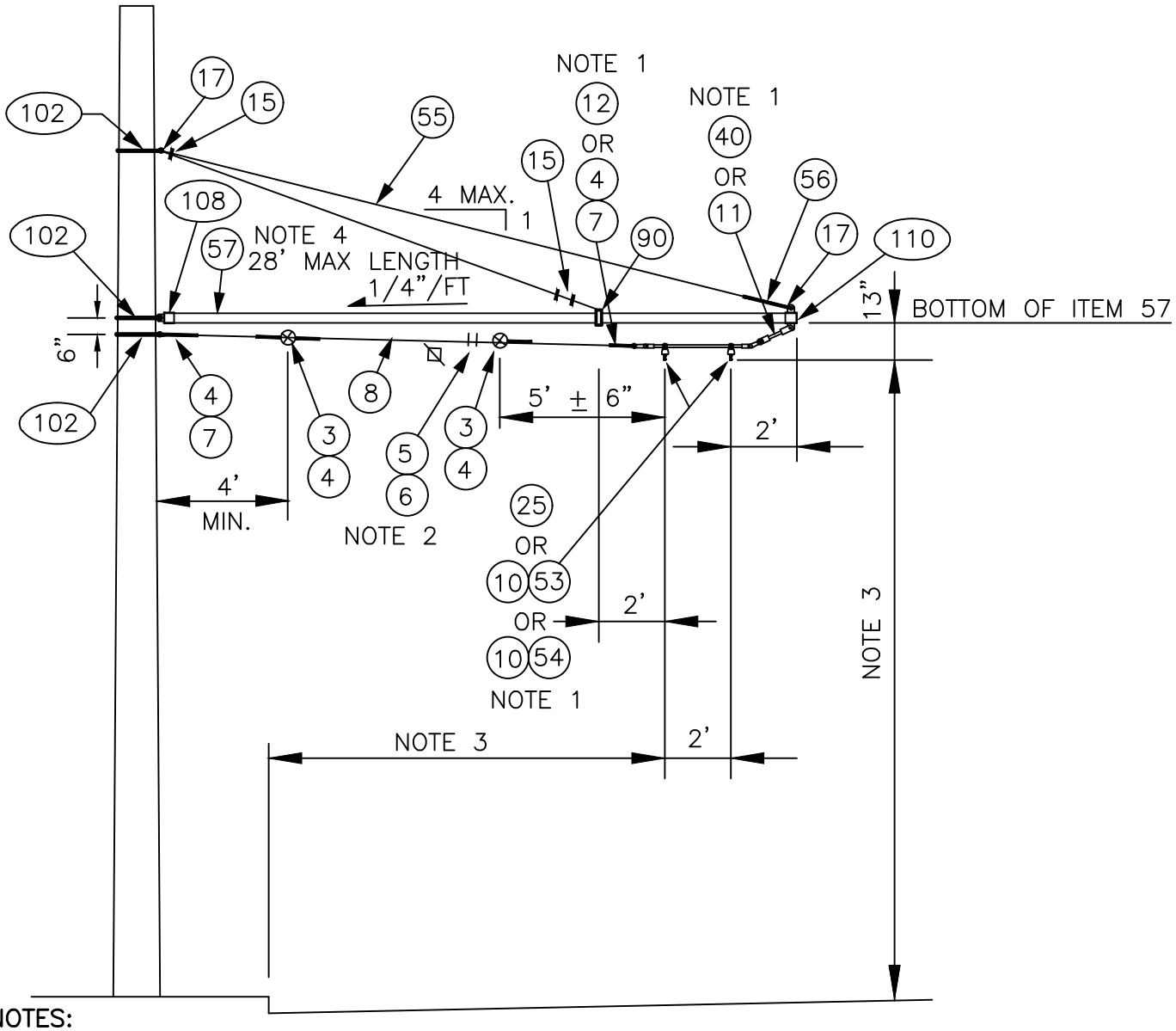
DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL POLE
BRACKET ASSEMBLY
TANGENT CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-341
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-341,1-2.dwg | Layout: SA-341.2
PLOTTED: Mar 18, 2021-08:28:32am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. USE ITEMS 4,7,10,11 & 53 WHEN ANGLE VARIES FROM 1° TO 5°. USE ITEMS 4,7, 10,11 & 54 WHEN ANGLE VARIES FROM 5° TO 7.5°. USE ITEMS 12, 25, & 40 WHEN ANGLE IS GREATER THAN 8°. SEGMENTS SHALL NOT BE USED FOR ANGLES GREATER THAN 12° WHEN POLE IS ON INSIDE OF CURVE.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.
3. SEE SA–164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 110 FOR INSERTION OF 3/8" SS BOLT.
5. LEVEL CURVE HANGER (ITEM 10) BY ADJUSTING HANGER ARMS.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

STEEL BRACKET ASSEMBLY CURVE CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-342
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-342,1-2.dwg | Layout: SA-342.1
PLOTTED: Mar 18, 2021-08:28:40am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	VARIES	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
11	VARIES	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	VARIES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
25	VARIES SEE PLAN	CURVE SEGMENT 8-12 DEG TYPE C CURVE SEGMENT 13-27 DEG TYPE C CURVE SEGMENT 28-47 DEG TYPE C	WABCO WABCO WABCO	22301-3014 22302-3005 22303-3005
40	VARIES	7/8 TRANSLITE STRAIN INSUL CL-90	WABCO	54995-6120
53	VARIES	CURVE RAIL (1° TO 5° 2 FT LG)	K & M	851 B412/0
54	VARIES	CURVE RAIL (5.5° TO 7.5° 4 FT LG)	K & M	851 B412/1
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" ø X 1/4"	STRONGWELL	EXTREN SERIES 525
90	1	HEAVY PIPE CLAMP, GALV	GRINNELL	FIG. 216
102	3	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110

No.	REVISION	BY	APP'D	DATE

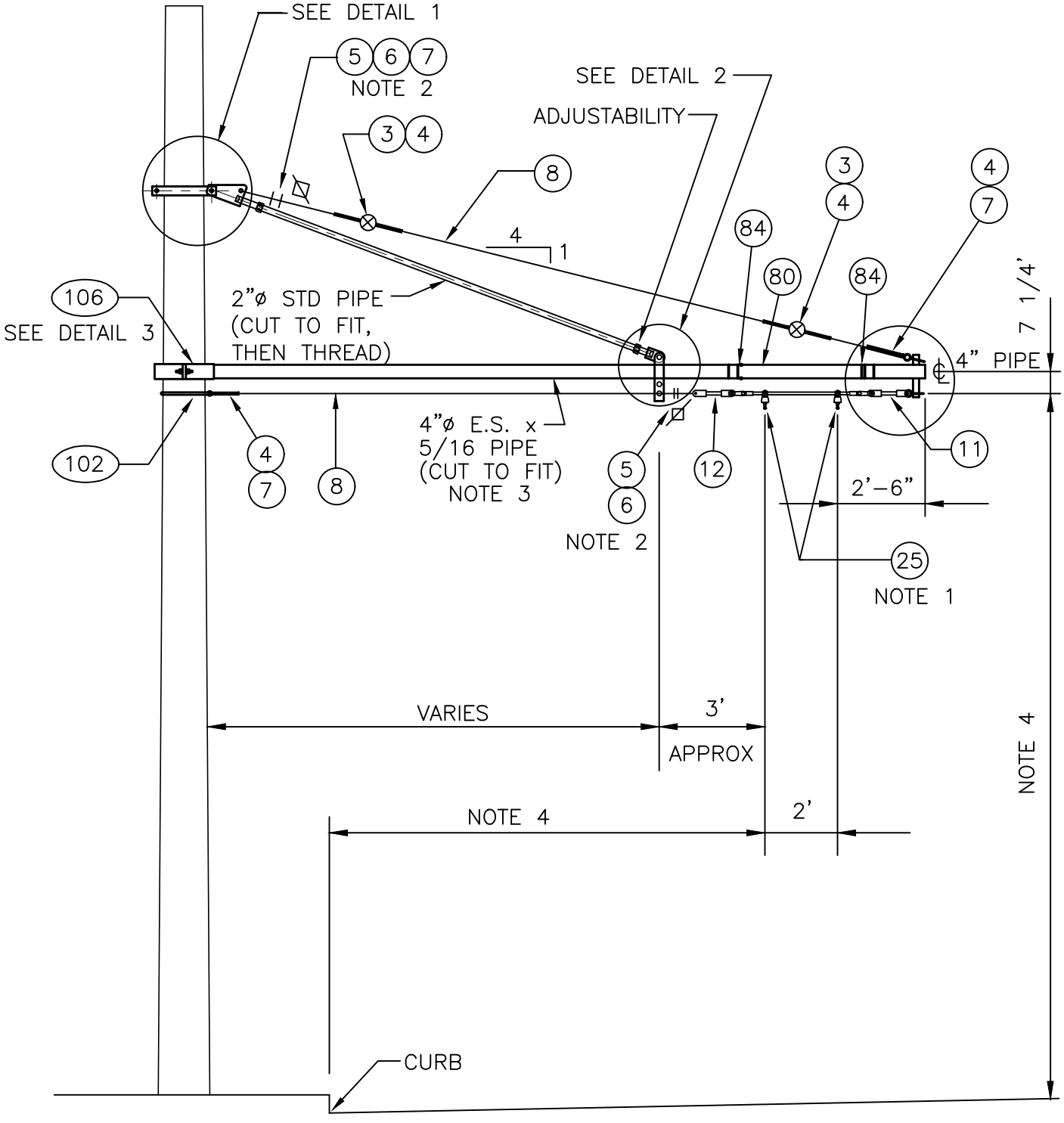
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL BRACKET ASSEMBLY
CURVE CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-342
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-342,1-2.dwg | Layout: SA-342.2
PLOTTED: Mar 18, 2021-08:28:45am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

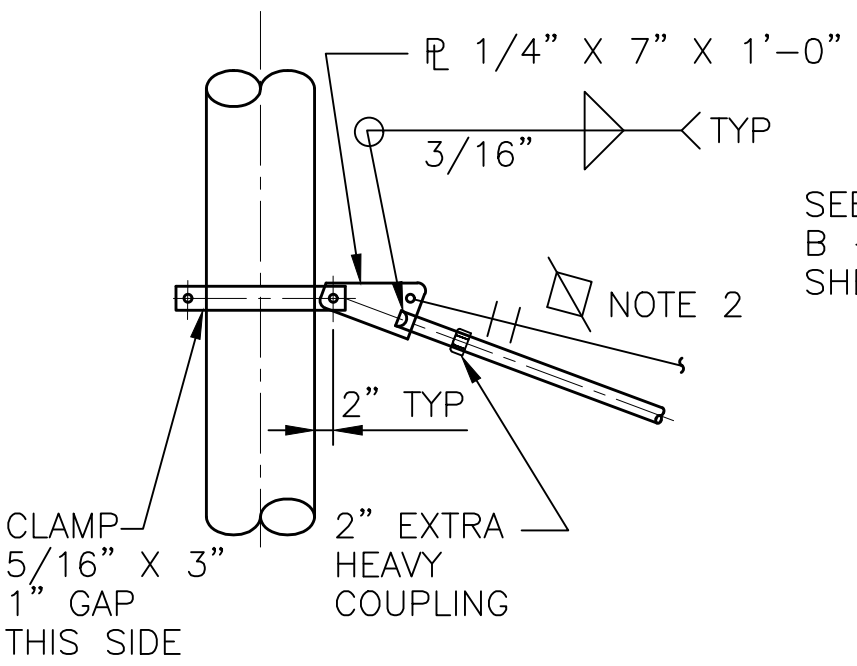
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

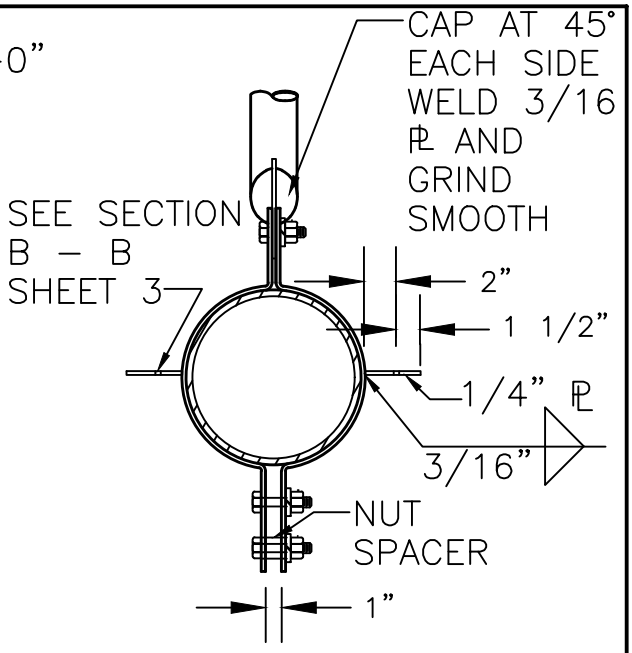
STEEL POLE BRACKET ASSEMBLY COMPRESSION TYPE

DATE: 03/2021
STD DET NO: SA-343
SHT NO: 1 OF 4

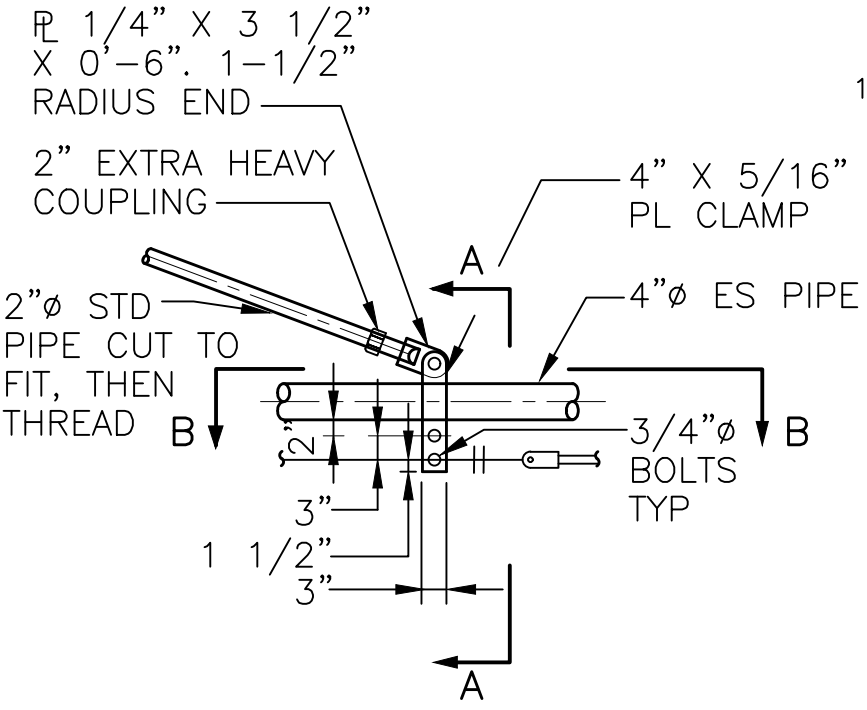
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-343,1-4.dwg | Layout: SA-343.1
PLOTTED: Mar 18, 2021-08:28:54am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



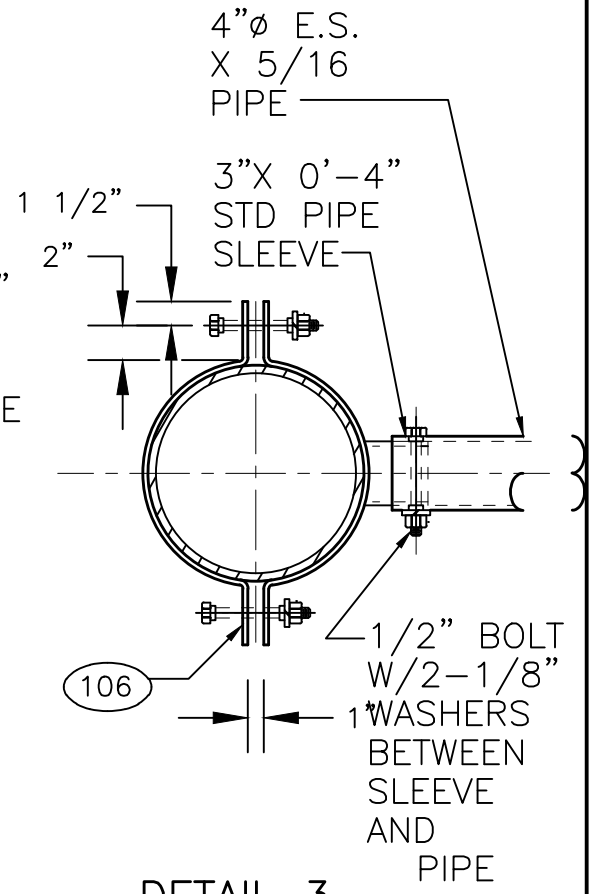
DETAIL 1



SECTION A–A



DETAIL 2



DETAIL 3

No.	REVISION	BY	APP'D	DATE

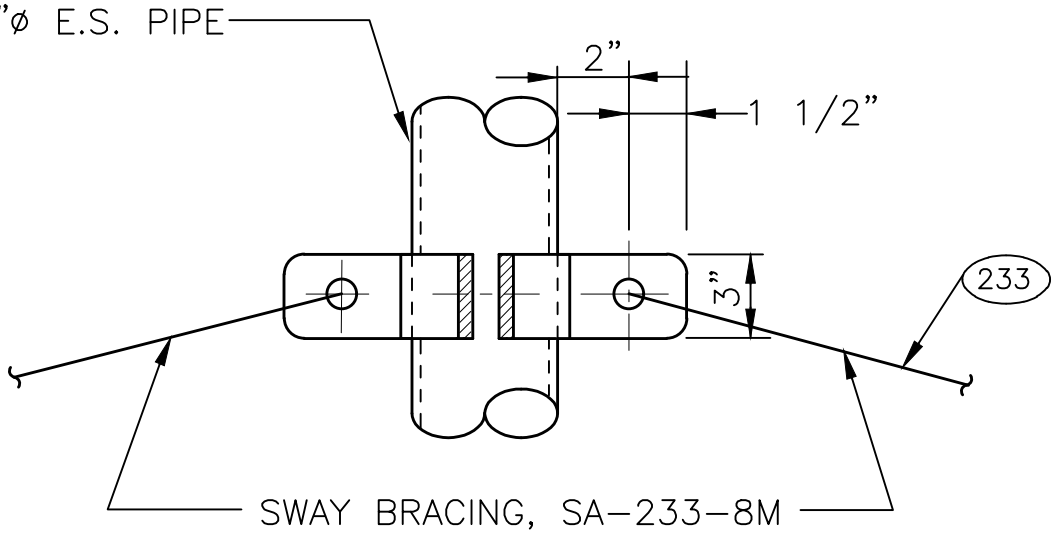
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

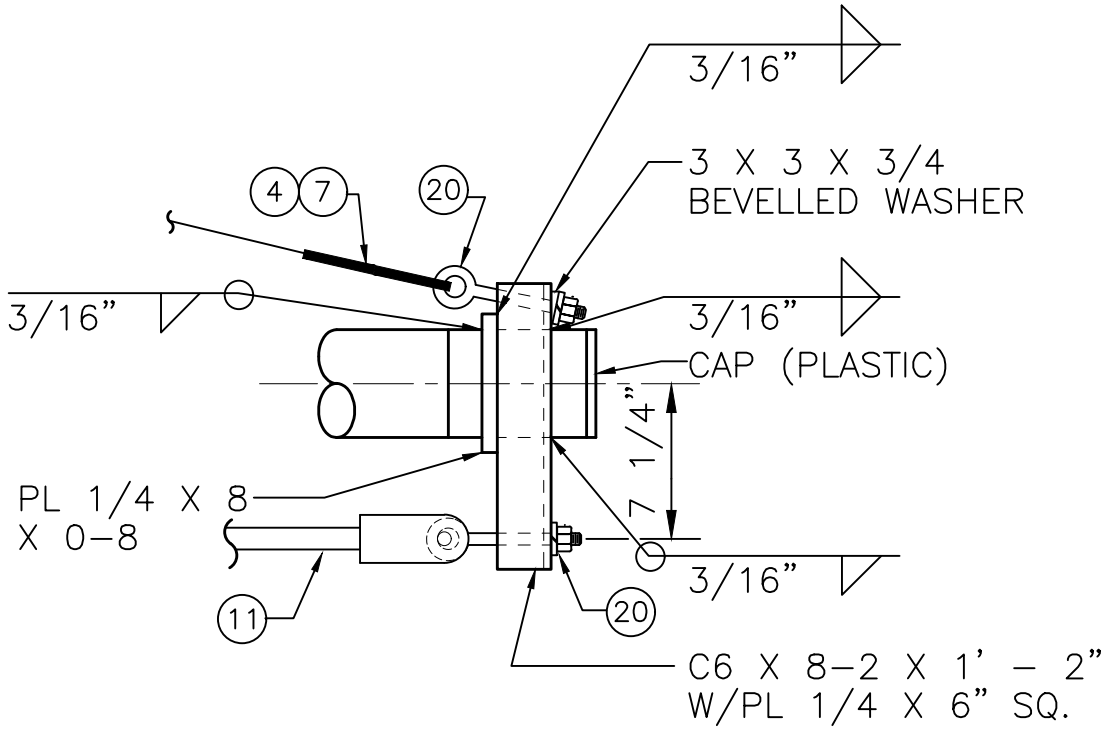
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL POLE
BRACKET ASSEMBLY
COMPRESSION TYPE

DATE: 03/2021
STD DET NO: SA-343
SHT NO: 2 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-343,1-4.dwg | Layout: SA-343.2
PLOTTED: Mar 18, 2021-08:29:01am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



SECTION B-B



DETAIL 4

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL POLE
BRACKET ASSEMBLY
COMPRESSION TYPE

DATE: 03/2021
STD DET NO: SA-343
SHT NO: 3 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-343_1-4.dwg | Layout: SA-343.3
PLOTTED: Mar 18, 2021-08:29:05am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST				
ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	6	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	3	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	1	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
20	2	EYEBOLT	WABCO	11933-2000
80	VARIES	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
84	4 LF	SCHED 40 PVC, GREY, SPLIT		
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
106	1	COMPRESSION POLE BRACKET COLLAR	METRO STD	SA-106
233	2	SWAY BRACING, SA-233-8M	METRO STD	SA-233

NOTES:

1. OVERHEAD DRAWINGS TO INDICATE CURVE SEGMENT TO BE INSTALLED. MAXIMUM ANGLE OF CURVE SEGMENT IS 35 DEGREES. MAXIMUM CHANGE IN STREET GRADIENT IS ±5%

2. PROVIDE TENSION ADJUSTMENT POINT AT LOCATION INDICATED BY "□". PROVIDE WIRE ROPE CLIPS AT THIS LOCATION. SEE SA-166.

3. THE PIPE BRACKET SHALL BE 4" DIAMETER EXTRA STRONG ASTM A53, GRADE B GALVANIZED STEEL PIPE.

   MAXIMUM PIPE LENGTH IS 18 FT.

4. SEE SA-164 FOR HORIZONTAL AND VERTICAL DIMENSIONS TO THE TROLLEY WIRE.

No.	REVISION	BY	APP'D	DATE

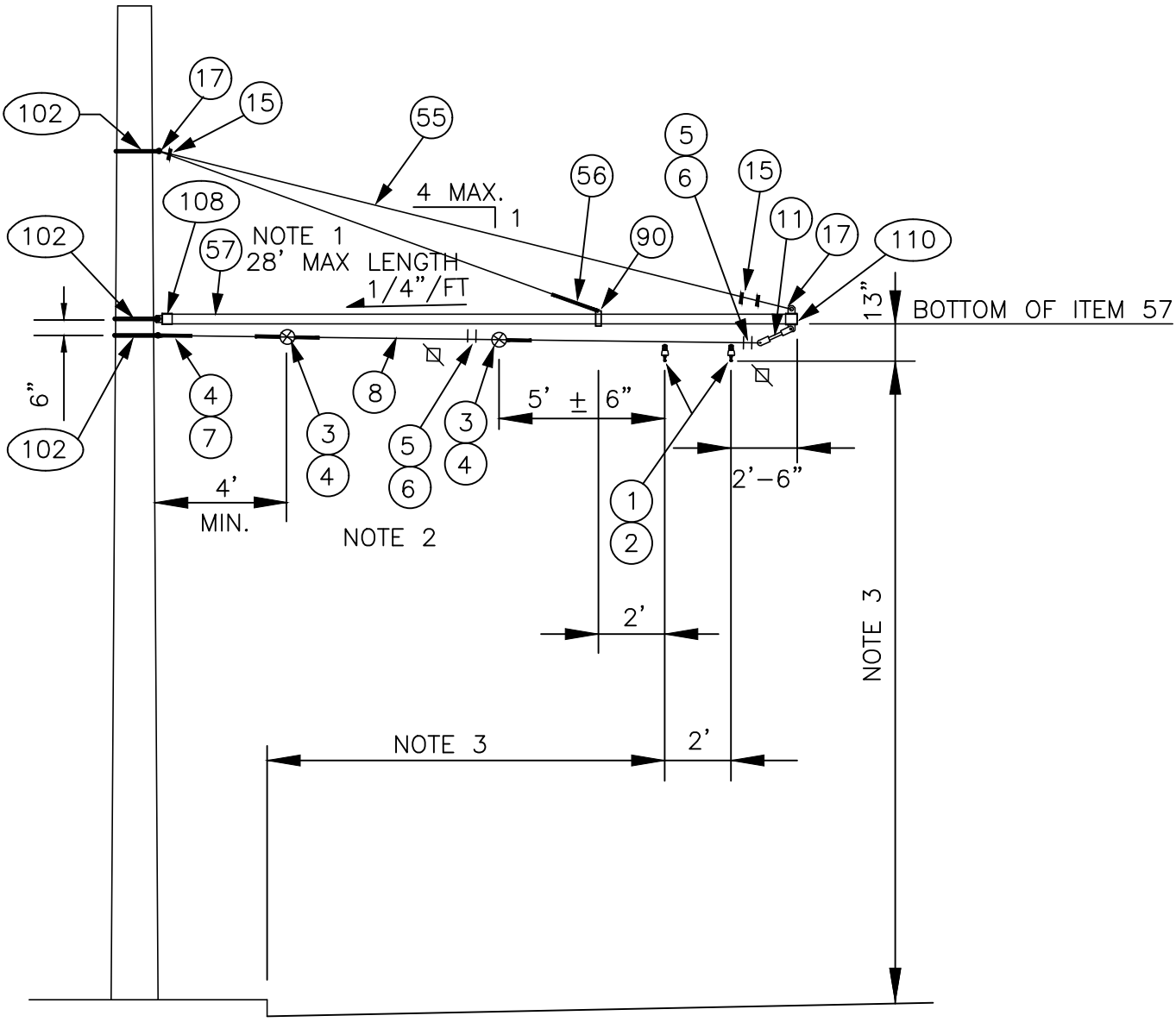
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL POLE BRACKET ASSEMBLY COMPRESSION TYPE

DATE: 03/2021
STD DET NO: SA-343
SHT NO: 4 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-343,1-4.dwg | Layout: SA-343.4
PLOTTED: Mar 18, 2021-08:29:10am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 110 FOR INSERTION OF 3/8" SS BOLT.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. HANG CLAMP (ITEM 1) VERTICAL BY ADJUSTING SPAN HANGER (ITEM 2).

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL POLE BRACKET ASSEMBLY UNDERSLING CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-345
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-345,1-2.dwg | Layout: SA-345.1
PLOTTED: Mar 18, 2021-08:29:19am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
02	2	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	4	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	1	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" ø X 1/4"	STRONGWELL	EXTREN SERIES 525
90	1	HEAVY PIPE CLAMP, GALV	GRINNELL	FIG. 216
102	3	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110

No.	REVISION	BY	APP'D	DATE

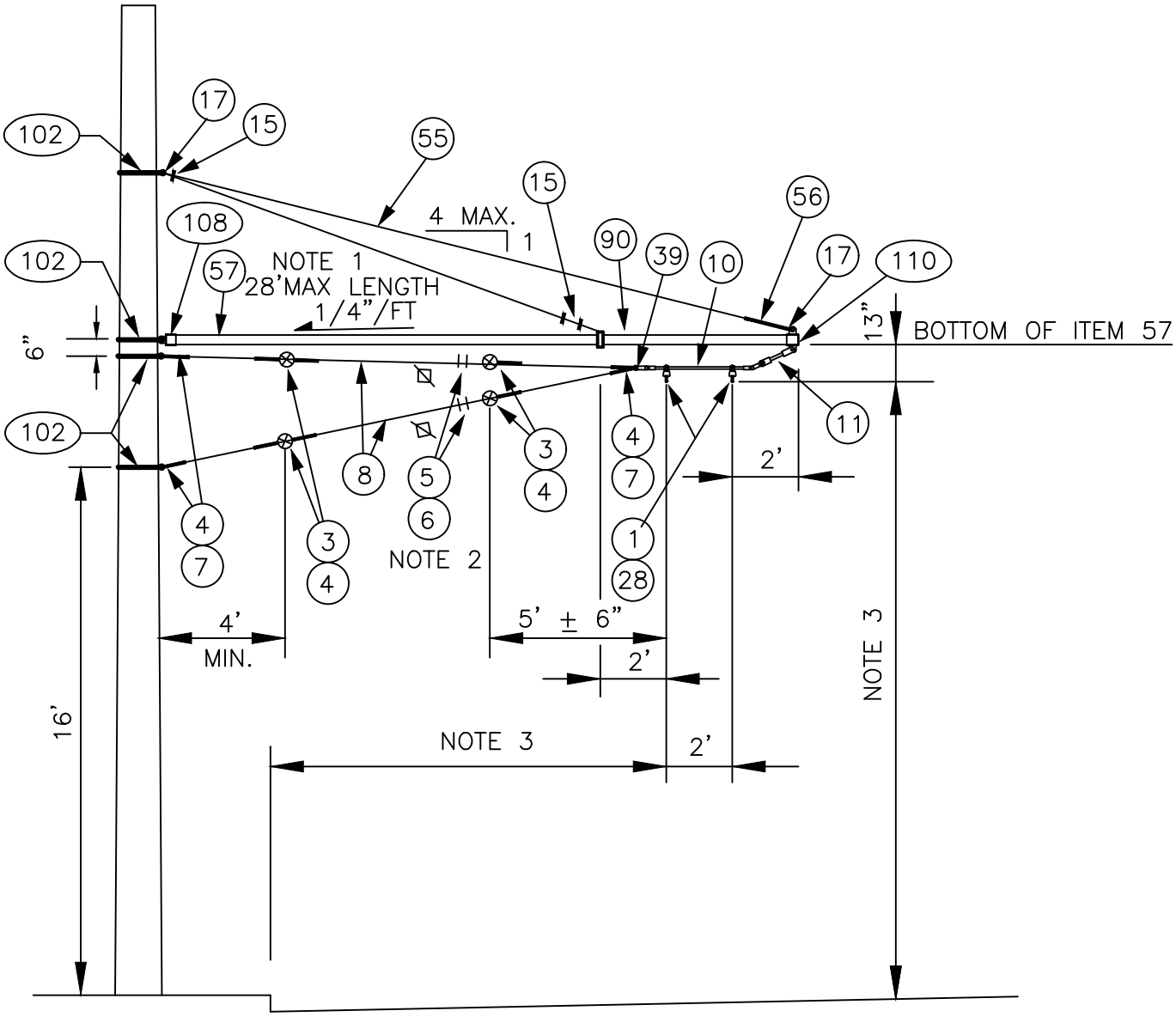
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL POLE BRACKET ASSEMBLY UNDERSLING CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-345
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-345,1-2.dwg | Layout: SA-345.2
PLOTTED: Mar 18, 2021-08:29:25am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 110 FOR INSERTION OF 3/8" SS BOLT.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.
3. SEE SA–164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. LEVEL CURVE HANGER(ITEM 10) BY ADJUSTING HANGER ARMS.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL POLE HOLDDOWN BRACKET ASSEMBLY TANGENT CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-348
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-348.1-2.dwg | Layout: SA-348.1
PLOTTED: Mar 18, 2021-08:29:34am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	1	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	2	INSULATOR SPOOL	WABCO	16835-2000
39	1	5/8" SHACKLE	WABCO	13722-2000
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" ø X 1/4"	STRONGWELL	EXTREN SERIES 525
90	1	HEAVY PIPE CLAMP, GALV	GRINNELL	FIG. 216
102	4	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110

No.	REVISION	BY	APP'D	DATE

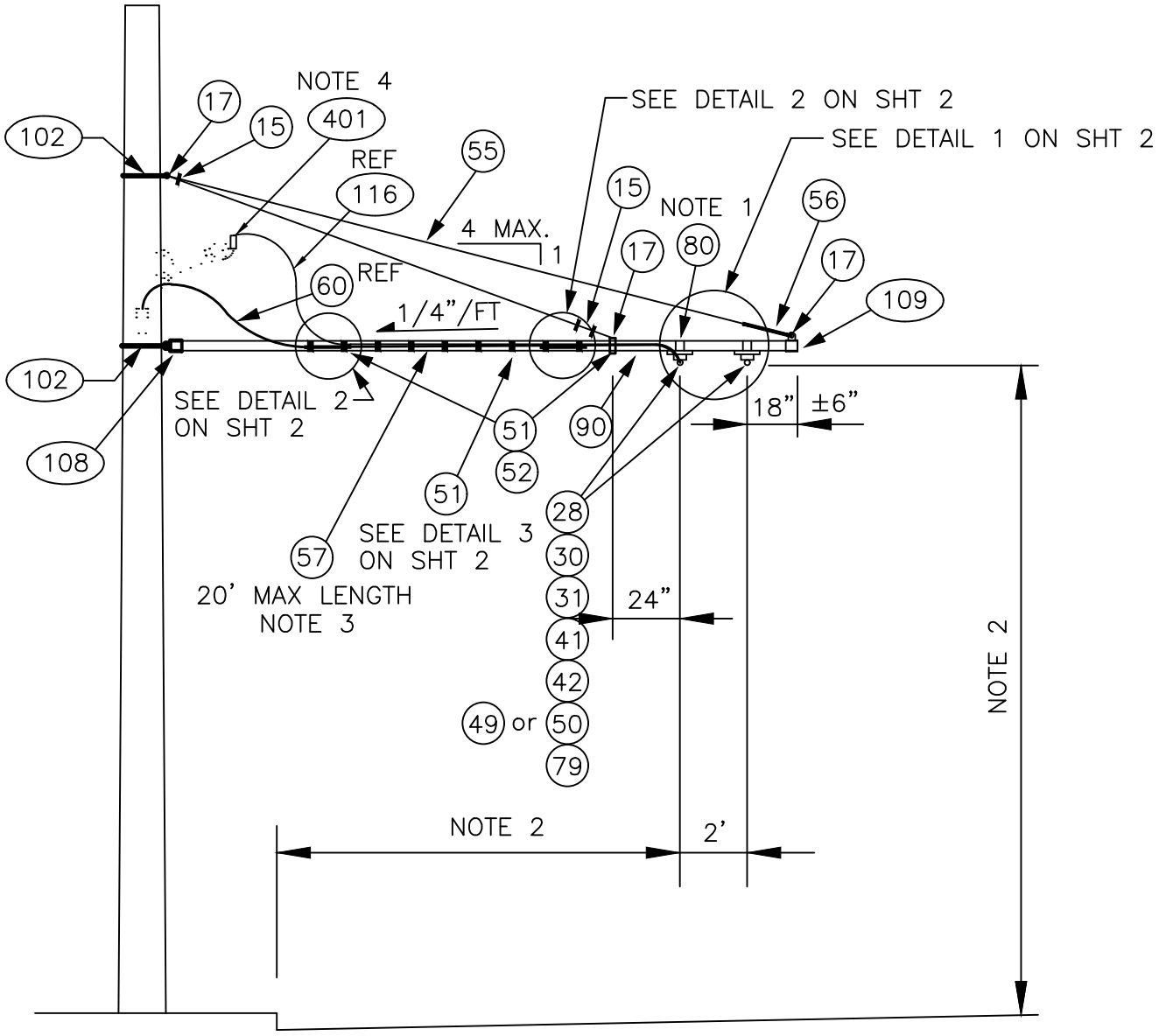
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL POLE HOLDDOWN BRACKET ASSEMBLY TANGENT CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-348
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-348.1-2.dwg | Layout: SA-348.2
PLOTTED: Mar 18, 2021-08:29:40am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND ITEM 57 PRIOR TO CLAMPING.
2. SEE SA–164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
3. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 109 FOR INSERTION OF 3/8" SS BOLT.
4. 60, 116 & 401 SHOWN FOR REFERENCE ONLY, SEE SA–401 FOR DETAILS. DOUBLE NEGATIVE FEEDER REQUIRES ONLY ONE SA–401.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

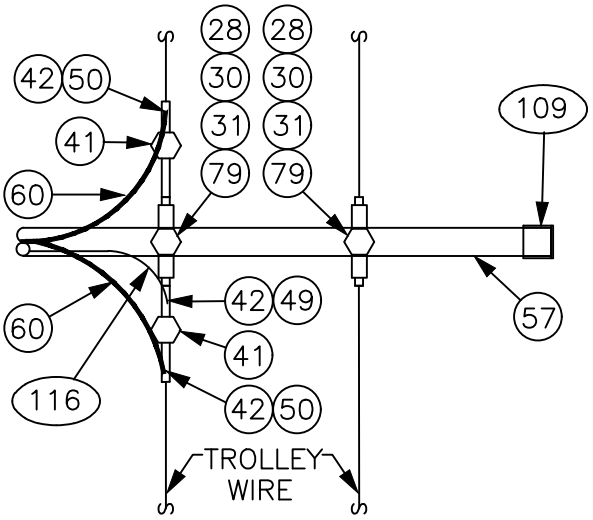
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

STEEL POLE TANGENT FEEDER BRACKET ASSEMBLY

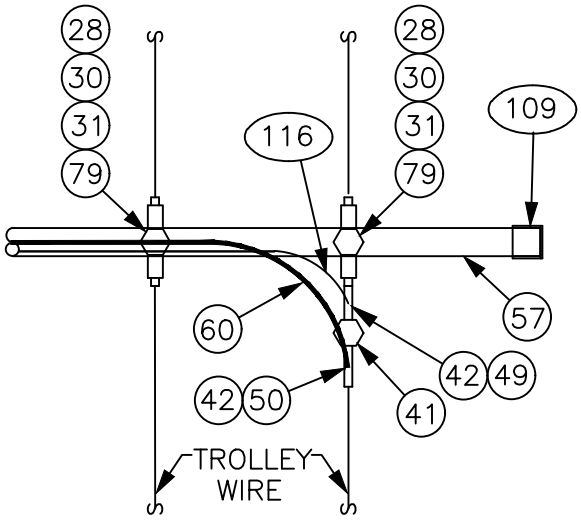
DATE: 03/2021
STD DET NO: SA-349
SHT NO: 1 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-349_1-3.dwg | Layout: SA-349.1
PLOTTED: Mar 18, 2021-08:29:49am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



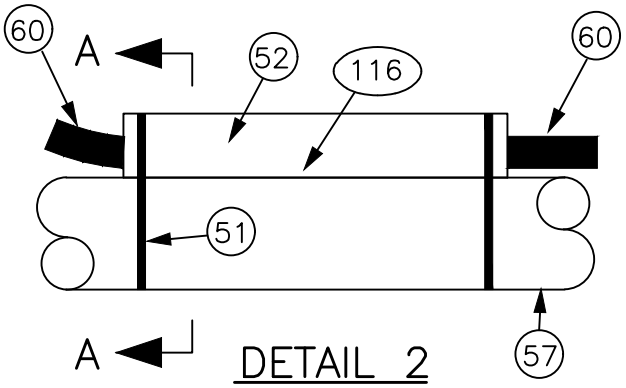
DETAIL 1

DOUBLE FEEDER

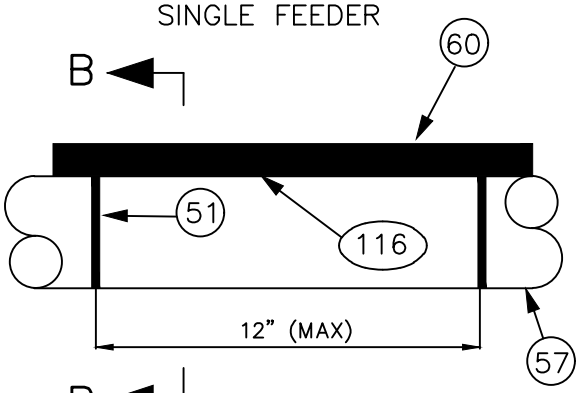


DETAIL 1

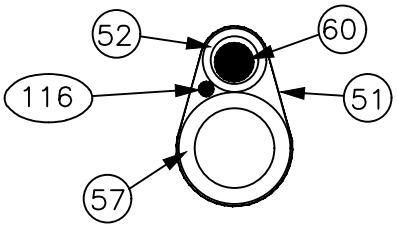
SINGLE FEEDER



DETAIL 2

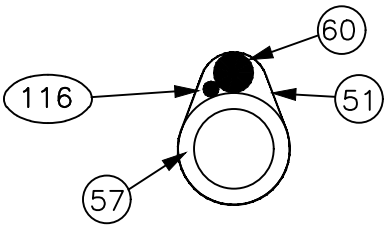


DETAIL 3



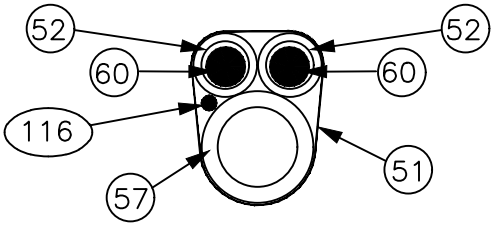
VIEW A–A

SINGLE FEEDER



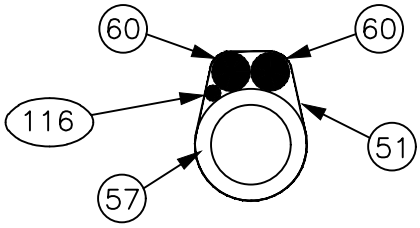
VIEW B–B

SINGLE FEEDER



VIEW A–A

DOUBLE FEEDER



VIEW B–B

DOUBLE FEEDER

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL POLE
TANGENT FEEDER
BRACKET ASSEMBLY

DATE: 03/2021
STD DET NO: SA-349
SHT NO: 2 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-349,1-3.dwg | Layout: SA-349,2
PLOTTED: Mar 18, 2021-08:29:55am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	3	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	2	INSULATOR SPOOL	WABCO	16835-2000
30	2	TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31	2	SPRING DETROIT CLAMP	WABCO	54959-3001
41	VARIES	H.S.P. FEEDER CLAMP ASSY, BRONZE	WABCO	19880-2000
42	VARIES	FEEDER CLAMP, BRONZE	WABCO	19790-4004
49	VARIES	COMPRESSION CONNECTOR COPPER-LONG BARREL-TIN PLATED-FLARED	ANDERSON/ SQUARE D	VHCL-2/0-12BNF
50	VARIES	COMPRESSION CONNECTOR COPPER-LONG BARREL-TIN PLATED-FLARED	ANDERSON/ SQUARE D	VHCL-500-12BNF
51	AS REQD	MULTI-LOK TIES (18") NYLON COATED	BAND-IT	AE714
52	2 12" PIECES	TUF NEOPRENE AIR HOSE SLEEVE 1.5" ID X 2.0625" OD (BLACK)	MCMASTER-CARR	3 BRAID
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UN-SHIELDED, 5 KV EPR W/ PVC JACKET		
79	2	5/8"-11 UNC X 1 3/8" STUD		
80	VARIES	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
90	1	HEAVY PIPE CLAMP, GALV, 3" IPS	GRINNELL	FIG. 216
102	2	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
109	1	MAST ARM ARM END CAP	METRO STD	SA-109
116	VARIES	WIRE, 2 OR 5 KV, #4 AWG CU, JACKETED, UNSHIELDED		

No.	REVISION	BY	APP'D	DATE

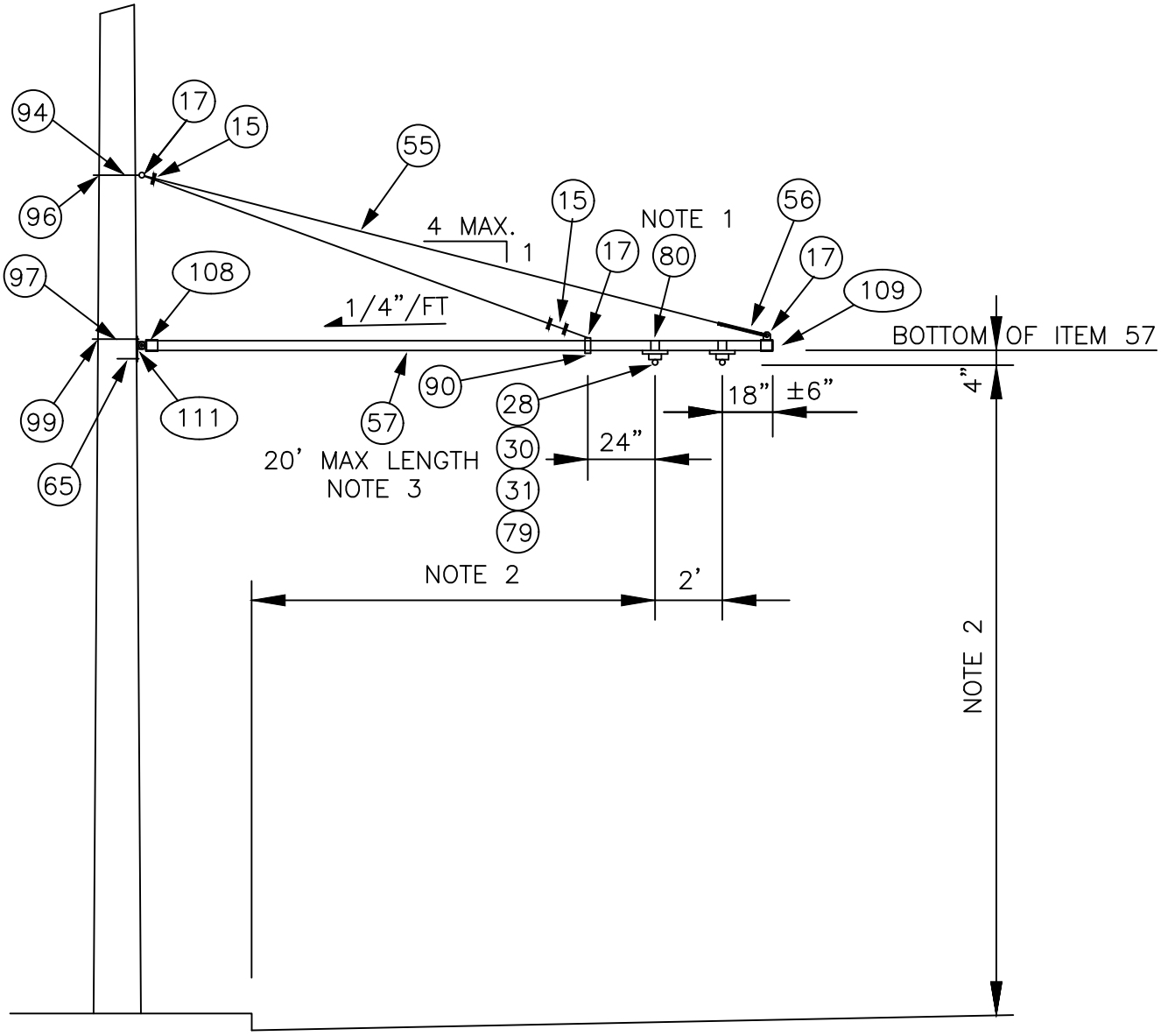
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STEEL POLE
TANGENT FEEDER
BRACKET ASSEMBLY

DATE: 03/2021
STD DET NO: SA-349
SHT NO: 3 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-349,1-3.dwg | Layout: SA-349.3
PLOTTED: Mar 18, 2021-08:30:01am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND ITEM 57 PRIOR TO CLAMPING.
2. SEE SA–164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
3. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 109 FOR INSERTION OF 3/8" SS BOLT.

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
WOOD POLE
BRACKET ASSEMBLY
TANGENT CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-351
SHT NO: 1 OF 2

C:\Users\anderls\AppData\Local\Temp\AcPublish_9444\SA-351,1-2.dwg | Layout: SA-351.1
PLOTTED: Nov 19, 2021-08:14:17pm By AnderLS
XREFS:
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	3	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	2	INSULATOR SPOOL	WABCO	16835-2000
30	2	TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31	2	SPRING DETROIT CLAMP	WABCO	54959-3001
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 3 1/2" ø X 1/2"	MORRISON MOLDED FG	EXTREN SERIES 525
65	1	LAG SCREW, FETTER DRIVE, 1/2"X 4"	JOSLYN	J8754
79	2	5/8"-11 UNC X 1 3/8" STUD		
80	VARIES	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
90	1	HEAVY PIPE CLAMP, GALV, 3" IPS	GRINNELL	FIG. 216
94	1	5/8" OVAL EYEBOLT W/ NUT	JOSLYN	J94XX
96	1	SQ CURVED WASHER 3" X 3" X 1/4", 11/16" DIA	JOSLYN	J113
97	1	3/4" MACHINE BOLT	JOSLYN	J89XX
99	1	SQ CURVED WASHER 3" X 3" X 1/4", 13/16" DIA	JOSLYN	J6823
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
109	1	MAST ARM ARM END CAP	METRO STD	SA-109
111	1	WOOD POLE MOUNTING BRACKET	METRO STD	SA-111

No.	REVISION	BY	APP'D	DATE

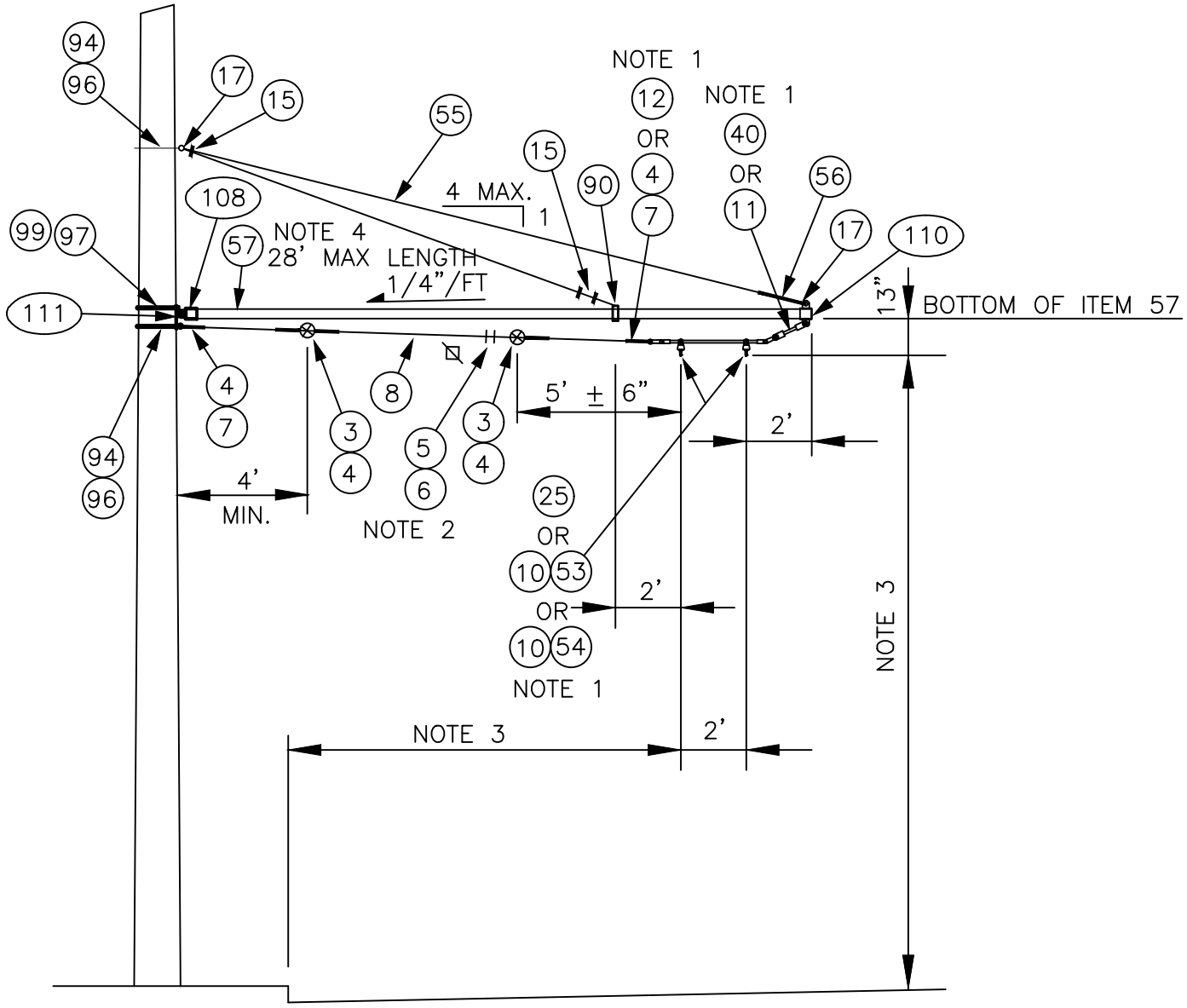
DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
WOOD POLE BRACKET ASSEMBLY MATERIAL LIST

DATE: 03/2021
STD DET NO: SA-351
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-351.1-2.dwg | Layout: SA-351.2
PLOTTED: Nov 19, 2021-08:10:36am By AndersL
XREFS:
IMAGES:



NOTES:

1. USE ITEMS 4,7,10,11 & 53 WHEN ANGLE VARIES FROM 1° TO 5°. USE ITEMS 4,7, 10,11 & 54 WHEN ANGLE VARIES FROM 5° TO 7.5°. USE ITEMS 12, 25, & 40 WHEN ANGLE IS GREATER THAN 8°. SEGMENTS SHALL NOT BE USED FOR ANGLES GREATER THAN 12° WHEN POLE IS ON INSIDE OF CURVE.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.
3. SEE SA–164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 110 FOR INSERTION OF 3/8" SS BOLT.
5. LEVEL CURVE HANGER (ITEM 10) BY ADJUSTING HANGER ARMS.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
WOOD POLE
BRACKET ASSEMBLY
CURVE CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-352
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-352,1-2.dwg | Layout: SA-352.1
PLOTTED: Mar 18, 2021-08:30:25am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	2	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	VARIES	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
11	VARIES	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	VARIES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
25	VARIES SEE PLAN	CURVE SEGMENT 8-12 DEG TYPE C CURVE SEGMENT 13-27 DEG TYPE C CURVE SEGMENT 28-47 DEG TYPE C	WABCO WABCO WABCO	22301-3014 22302-3005 22303-3005
40	VARIES	7/8 TRANSLITE STRAIN INSUL CL-90	WABCO	54995-6120
53	VARIES	CURVE RAIL (1° TO 5° 2 FT LG)	K & M	851 B412/0
54	VARIES	CURVE RAIL (5.5° TO 7.5° 4 FT LG)	K & M	851 B412/1
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" ø X 1/4"	MORRISON MOLDED FG	EXTREN SERIES 525
90	1	HEAVY PIPE CLAMP, GALV	GRINNELL	FIG. 216
94	2	5/8" OVAL EYEBOLT W/ NUT	JOSLYN	J94XX
96	2	SQ CURVED WASHER 3" X 3" X 1/4", 11/16" DIA	JOSLYN	J113
97	1	3/4" MACHINE BOLT	JOSLYN	J89XX
99	1	SQ CURVED WASHER 3" X 3" X 1/4", 13/16" DIA	JOSLYN	J6823
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110
111	1	WOOD POLE MOUNTING BRACKET	METRO STD	SA-111
125	1	5/8" MACHINE BOLT	JOSLYN	J88XX

No.	REVISION	BY	APP'D	DATE

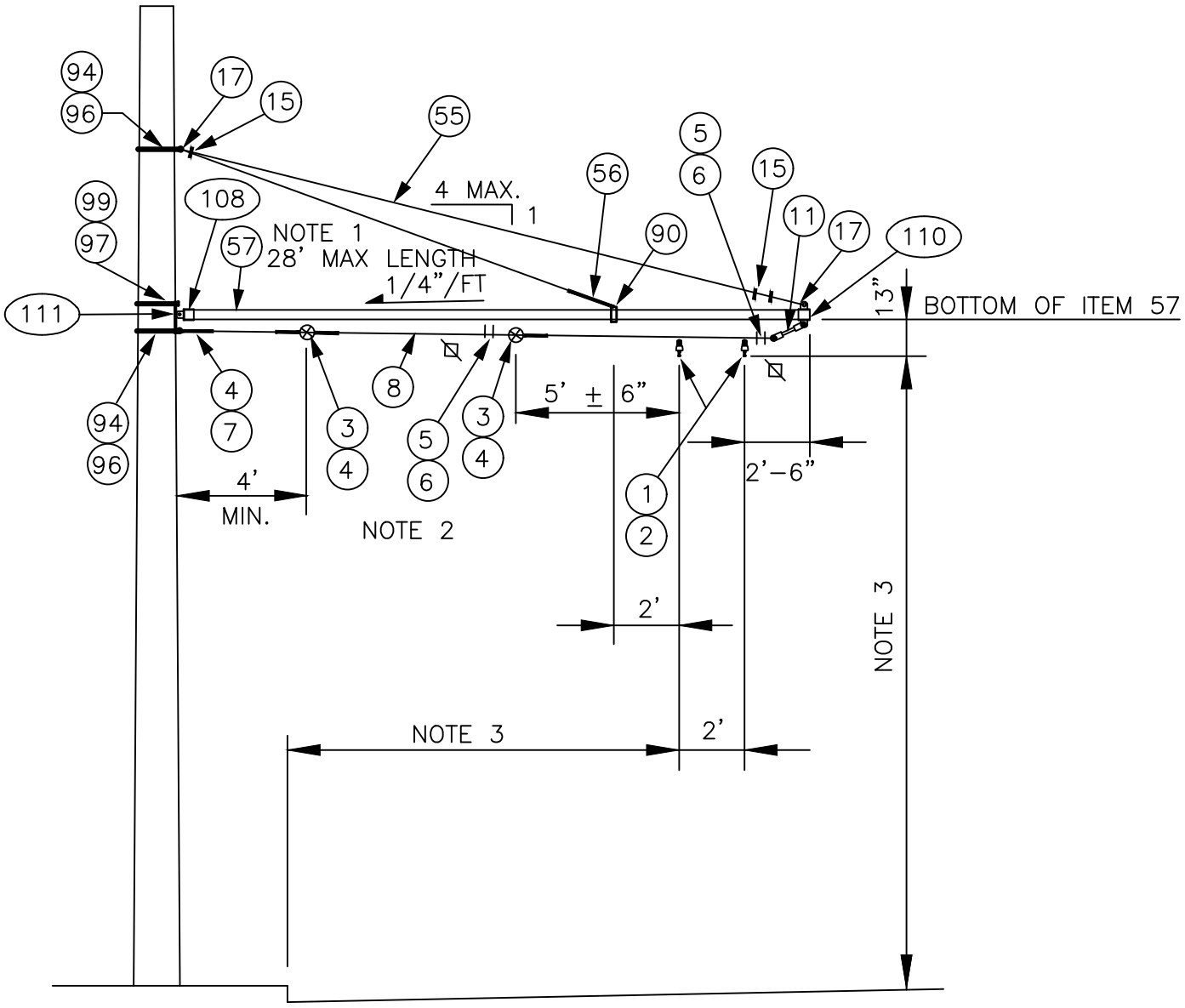
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
WOOD POLE
BRACKET ASSEMBLY
CURVE CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-352
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-352,1-2.dwg | Layout: SA-352.2
PLOTTED: Mar 18, 2021-08:30:31am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 110 FOR INSERTION OF 3/8" SS BOLT.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. HANG CLAMP (ITEM 1) VERTICAL BY ADJUSTING SPAN HANGER (ITEM 2).

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
WOOD POLE BRACKET ASSEMBLY UNDERSLING CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-355
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-355,1-2.dwg | Layout: SA-355.1
PLOTTED: Mar 18, 2021-08:30:38am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
02	2	AGC TANGENT SPAN HANGER	WABCO	19360-2000
03	4	GUY STRAIN INSULATOR	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" ø X 1/4"	STRONGWELL	EXTREN SERIES 525
90	1	HEAVY PIPE CLAMP, GALV	GRINNELL	FIG. 216
94	2	5/8" OVAL EYEBOLT WITH NUT	JOSLYN	J94XX
96	2	SQ CURVED WASHER 3"x3"x1/4" 11/16" DIA	JOSLYN	J113
97	1	3/4" MACHINE BOLT	JOSLYN	J89XX
99	1	SQ CURVED WASHER 3"x3"x1/3" 13/16" DIA	JOSLYN	J6823
102	3	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110
111	1	WOOD POLE MOUNTING BRACKET	METRO STD	SA-111
125	1	3/4" MACHINE BOLT	JOSLYN	J88XX

No.	REVISION	BY	APP'D	DATE

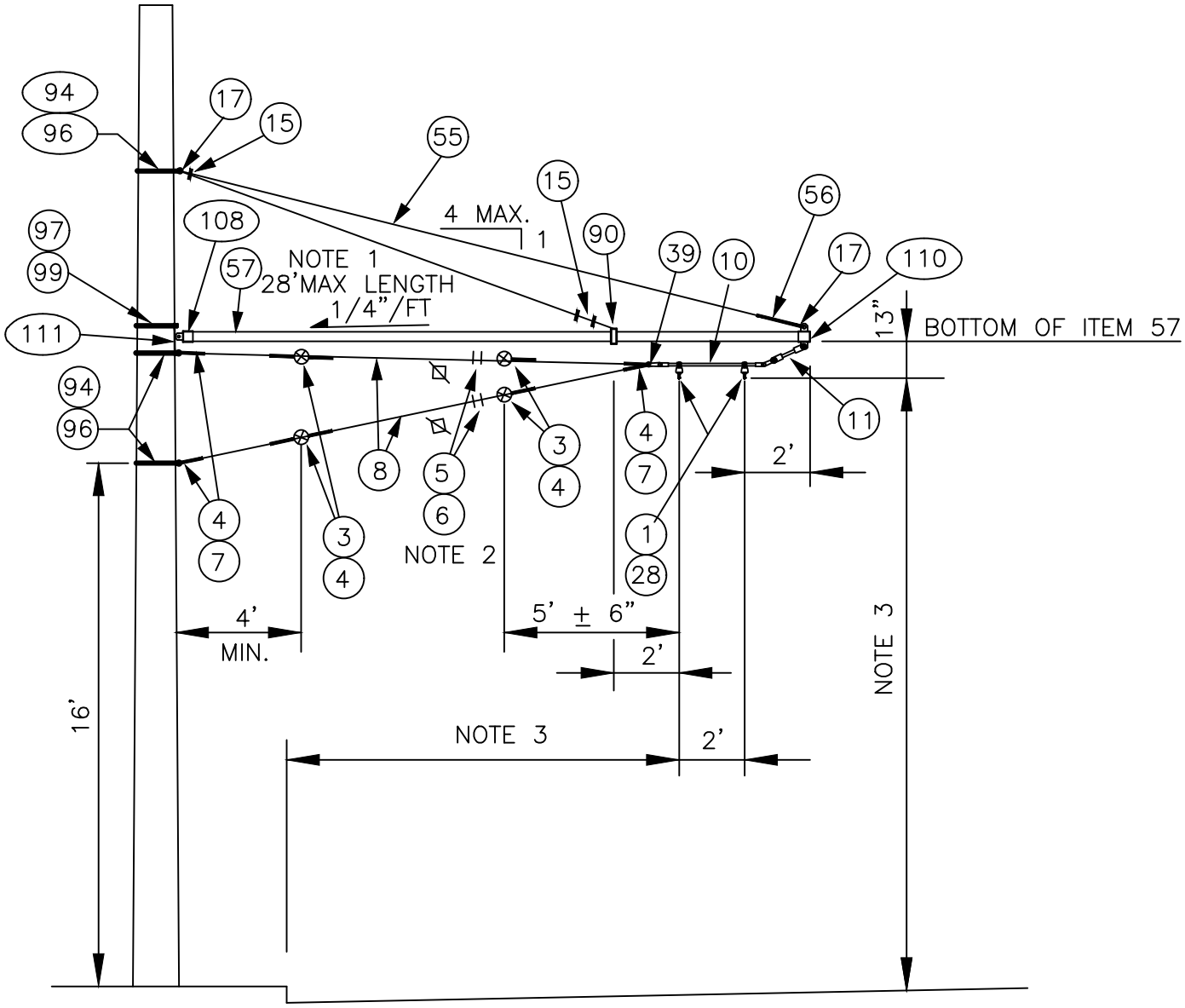
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
WOOD POLE HOLDDOWN BRACKET ASSEMBLY TANGENT CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-355
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-355,1-2.dwg | Layout: SA-355.2
PLOTTED: Mar 18, 2021-08:30:40am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. DRILL 1/2" HOLE IN TUBE TO MATCH HOLE IN ITEMS 108 & 109 FOR INSERTION OF 3/8" SS BOLT.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.
3. SEE SA–164 FOR HORIZONTAL & VERTICAL DIMENSIONS TO TROLLEY WIRE.
4. LEVEL CURVE HANGER(ITEM 10) BY ADJUSTING HANGER ARMS.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
WOOD POLE HOLDDOWN BRACKET ASSEMBLY TANGENT CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-358
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-358,1-2.dwg | Layout: SA-358,1
PLOTTED: Mar 18, 2021-08:30:48am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
01	2	DETROIT CLAMP ASSY	WABCO	19293-3007
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	10	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	4	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	4	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	1	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
15	3	WIRE ROPE CLIP, 3/8"	CROSBY	G450
17	2	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
28	2	INSULATOR SPOOL	WABCO	16835-2000
39	1	5/8" SHACKLE	WABCO	13722-2000
55	VARIES	PHILLYSTRAN (3/8")	PHILLYSTRAN INC.	HPTG 6700I
56	1	PHILLYSTRAN BIG GRIP	PHILLYSTRAN INC.	PLP 2755
57	VARIES	FIBERGLASS REINFORCED PLASTIC (FRP) TUBE 5" ø X 1/4"	STRONGWELL	EXTREN SERIES 525
90	1	HEAVY PIPE CLAMP, GALV	GRINNELL	FIG. 216
94	3	5/8" OVAL EYEBOLT WITH NUT	JOSLYN	J94XX
96	3	SQ CURVED WASHER 3"x3"x1/4" 11/16" DIA	JOSLYN	J113
97	1	3/4" MACHINE BOLT	JOSLYN	J89XX
99	1	WOOD POLE MOUNTING BRACKET	METRO STD	SA-111
102	3	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
108	1	MAST ARM POLE END CAP	METRO STD	SA-108
110	1	MAST ARM UNDERSLING END CAP	METRO STD	SA-110

No.	REVISION	BY	APP'D	DATE

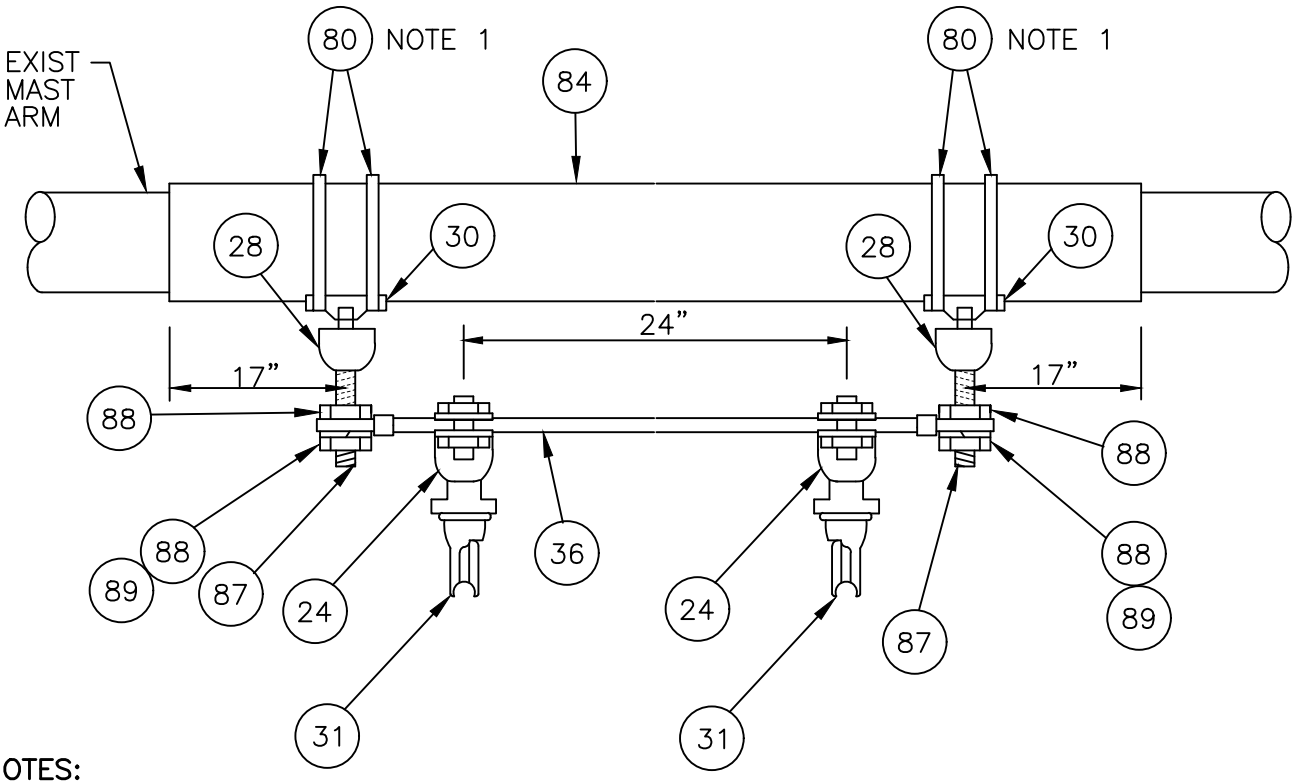
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
WOOD POLE HOLDDOWN BRACKET ASSEMBLY TANGENT CONSTRUCTION

DATE: 03/2021
STD DET NO: SA-358
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-358.1-2.dwg | Layout: SA-358.2
PLOTTED: Mar 18, 2021-08:30:49am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NOTES:

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND POLE COVERING MATERIAL PRIOR TO CLAMPING.
2. MATERIAL FOR THREADED RODS AND NUTS SHALL BE ASTM CLASS A–307 STEEL.
3. HOT DIP GALVANIZE ALL METAL AFTER FABRICATION.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
24	2	TROLLEY WIRE SUPPORT ASSY	WABCO	54962-3003
28	2	INSULATOR SPOOL	WABCO	16835-2000
30	2	TROLLEY SUPPORT-LARGE PIPE ARMS	WABCO	54940-4001
31	2	SPRING DETROIT CLAMP	WABCO	54959-3001
36	1	7/8 TRANSLITE STRAIN INSUL W/ ADJUST END FITTINGS	WABCO	54980-6385
80	AS REQD	3/4" STAINLESS STEEL BANDING	BAND-IT	TYPE 201
84	6 LF	SCHED 40 PVC, GREY, SPLIT		
87	2	5/8"-11 UNC X 6" THREADED ROD, GALV, ASTM A36		
88	4	5/8"-11 UNC HVY HEX JAM NUT, GALV, ASTM A563 GRA		
89	2	11/16" LOCKWASHER		

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

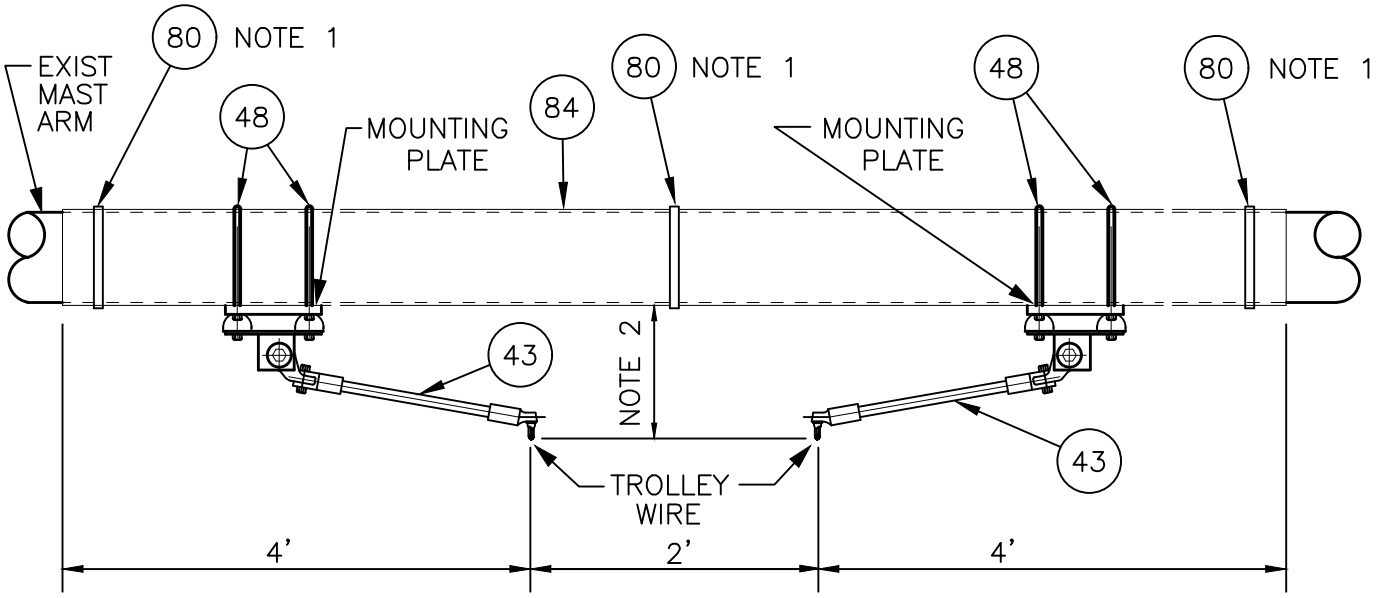
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

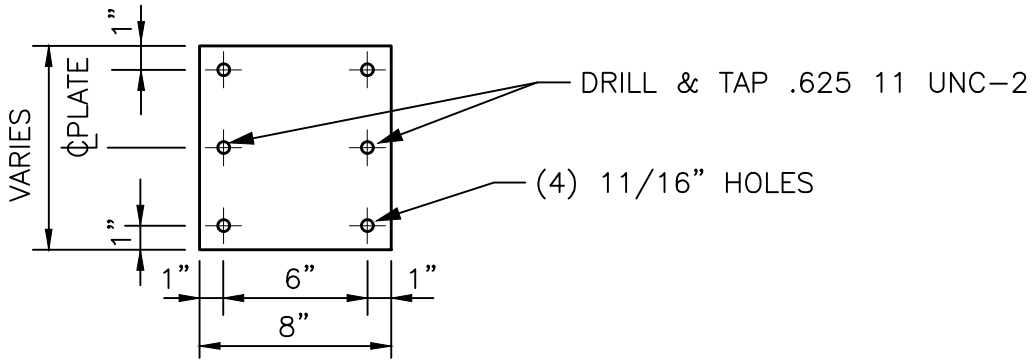
TRAFFIC MAST ARM TROLLEY SUPPORT

DATE: 03/2021
STD DET NO: SA-361
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-361.dwg | Layout: SA-361
PLOTTED: Mar 18, 2021-08:31:01am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



OUTBOARD MOUNTING



3/4" MOUNTING PLATE

(2 REQ'D)

NOTES:

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND POLE COVERING MATERIAL PRIOR TO CLAMPING. PLACE SPLIT DOWN ON ITEM 84.
2. DISTANCE VARIES. ITEMS 43 & 48 NOT REQ'D WHEN GREATER THAN 18". USE OFFSET MOUNTING (SHEET 2) WHEN SPACE LIMITS USE OF OUTBOARD MOUNTING.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
43	2	TROLLEY WIRE SUPPORT ASSY	WABCO	59690-3001
48	4	5/8" U-BOLT GALV		
80	AS REQD	3/4" X 0.030" SS BANDING TYPE 201	BAND-IT	C206
84	10 LF	SCHED 40 PVC, GREY, SPLIT		

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

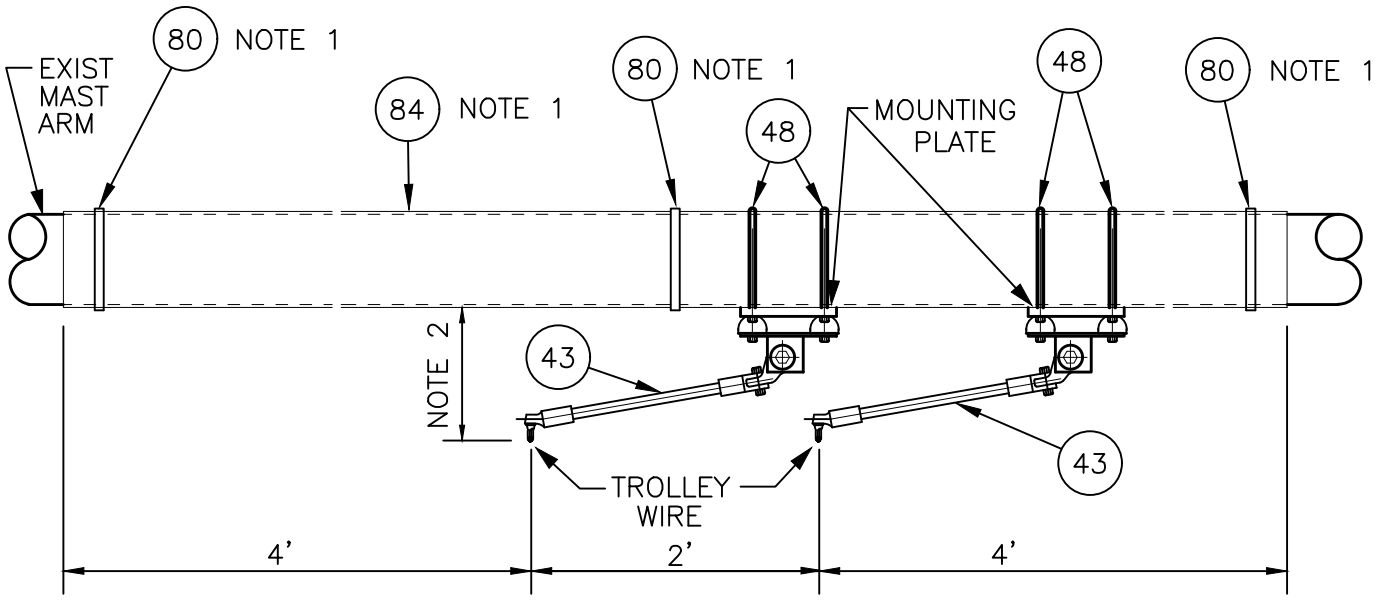
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

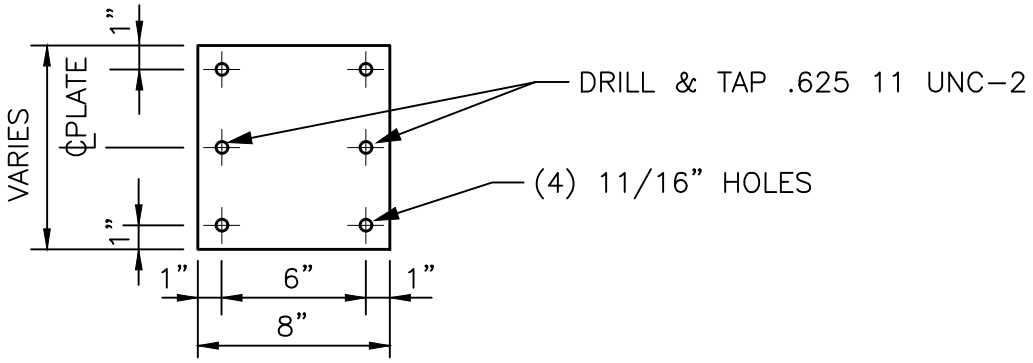
TRAFFIC MAST ARM TROLLEY SUPPORT

DATE: 03/2021
STD DET NO: SA-362
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-362,1-2.dwg | Layout: SA-362.1
PLOTTED: Mar 18, 2021-08:31:09am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



OFFSET MOUNTING



3/4" MOUNTING PLATE

(2 REQ'D)

NOTES:

1. STAINLESS STEEL BANDING SHALL BE WRAPPED DOUBLE THICKNESS AROUND POLE COVERING MATERIAL PRIOR TO CLAMPING. PLACE SPLIT DOWN ON ITEM 84.
2. DISTANCE VARIES. ITEMS 43 & 48 NOT REQ'D WHEN GREATER THAN 18". USE OUTBOARD MOUNTING (SEE PAGE 1) WHEN LESS THAN 9", OR ROTATE ONE ITEM 43 15° OUT OF THE PAPER & ONE ITEM 43 15° INTO THE PAPER.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
43	2	TROLLEY WIRE SUPPORT ASSY	WABCO	59690-3001
48	4	5/8" U-BOLT GALV	VARIES	VARIES
80	AS REQD	3/4" X 0.030" SS BANDING TYPE 201	BAND-IT	C206
84	10 LF	SCHED 40 PVC, GREY, SPLIT		

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

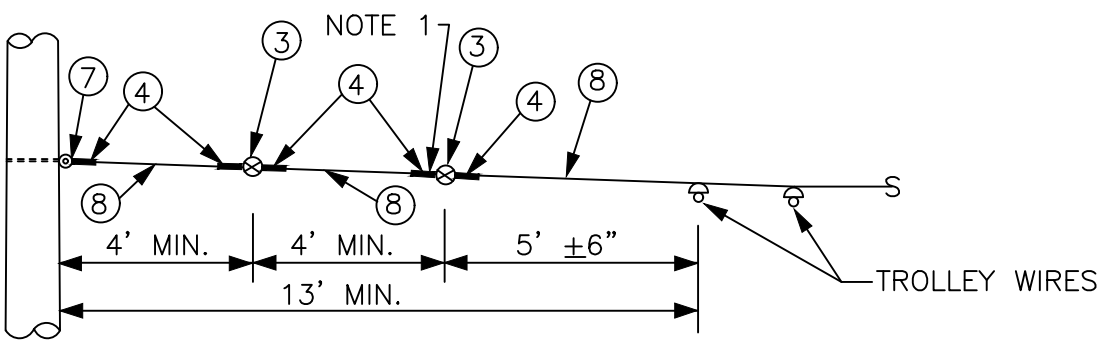
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

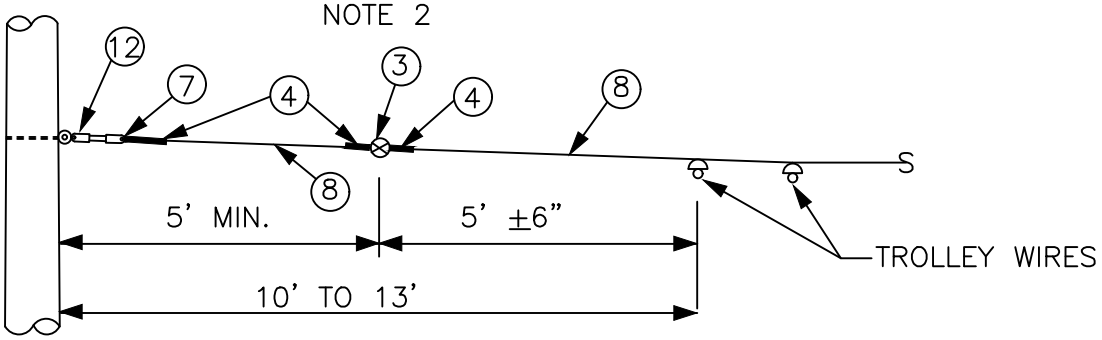
TRAFFIC MAST ARM TROLLEY SUPPORT

DATE: 03/2021
STD DET NO: SA-362
SHT NO: 2 OF 2

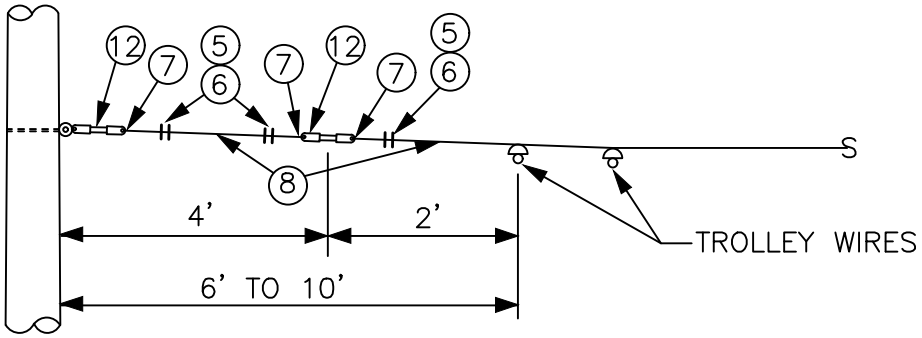
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-362,1-2.dwg | Layout: SA-362.2
PLOTTED: Mar 18, 2021-08:31:16am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NORMAL SPAN



ALTERNATE SPAN A



ALTERNATE SPAN B

NOTES:

1. WHERE ADJUSTABILITY IS REQUIRED, REPLACE GUY GRIP DEADEND (ITEM 4) WITH WIRE ROPE CLIPS (ITEM 5 & 6). SEE SA-166.
2. INCLUDES SA-301, SA-302, SA-305, SA-311, SA-312 & SA-315.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
12	VARIES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120

No.	REVISION	BY	APP'D	DATE

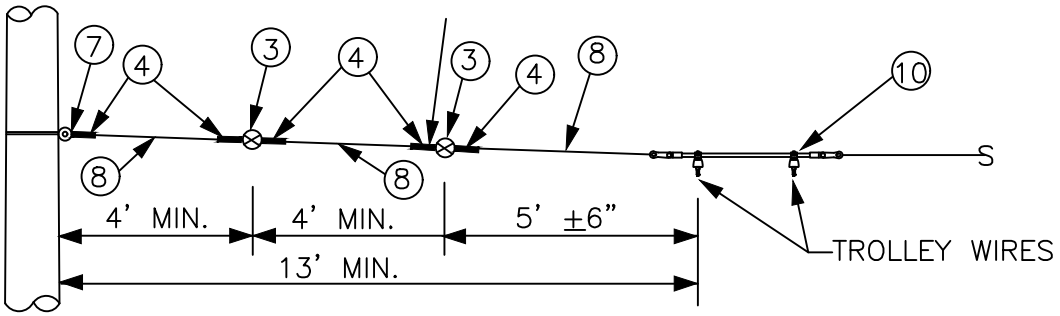
DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

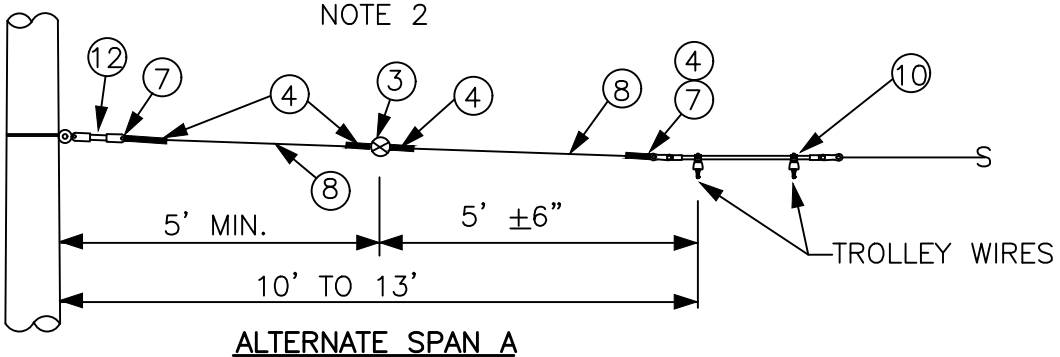
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SPAN WIRES
LIMITED SPACE
TYPICAL VARIANCES

DATE: 03/2021
STD DET NO: SA-370
SHT NO: 1 OF 2

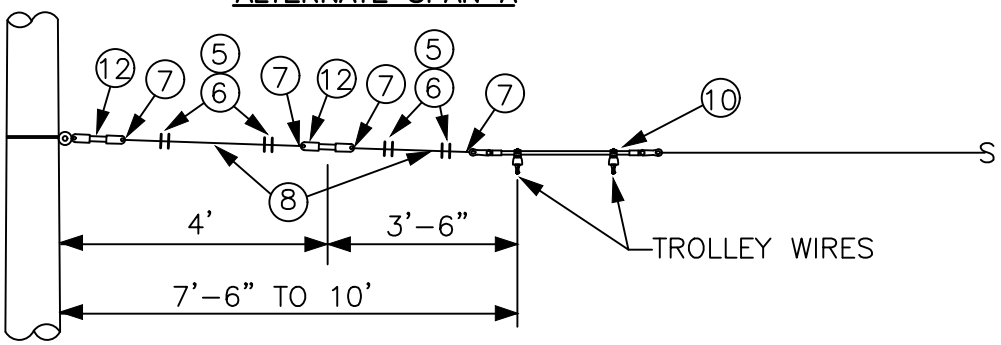
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-370,1-2.dwg | Layout: SA-370.1
PLOTTED: Mar 18, 2021-08:31:24am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



NORMAL SPAN
NOTE 2



ALTERNATE SPAN A



ALTERNATE SPAN B

NOTES:

1. WHERE ADJUSTABILITY IS REQUIRED, REPLACE GUY GRIP DEADEND (ITEM 4) WITH WIRE ROPE CLIPS (ITEM 5 & 6). SEE SA-166.

2. INCLUDES SA-303, SA-304, SA-307, SA-308, SA-313 & SA-314, SA-317 & SA-318.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	VARIES	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
12	VARIES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120

No.	REVISION	BY	APP'D	DATE

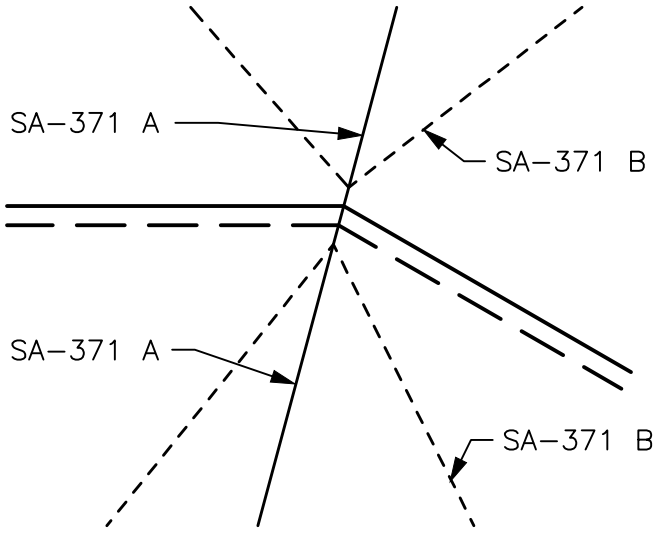
DESIGNED: DPG/AW
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

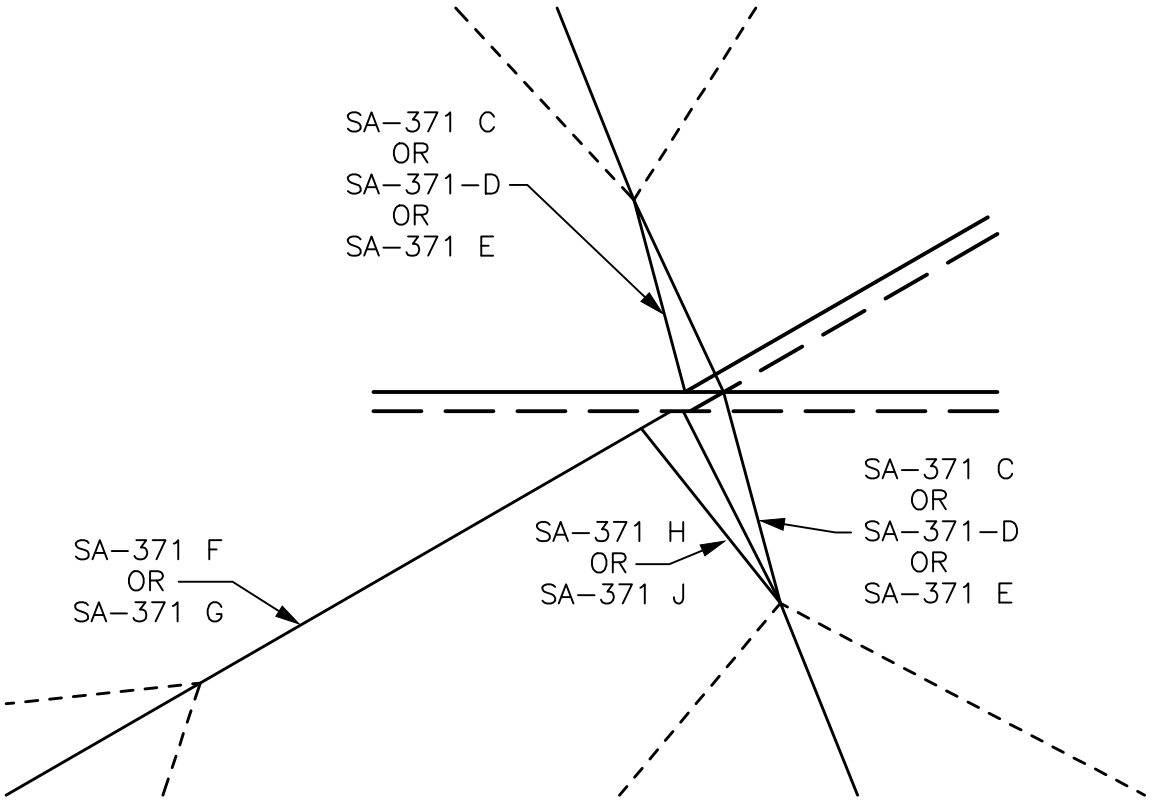
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SPAN WIRES
LIMITED SPACE
TYPICAL VARIANCES

DATE: 03/2021
STD DET NO: SA-370
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-370,1-2.dwg | Layout: SA-370.2
PLOTTED: Mar 18, 2021-08:31:31am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



CURVE SEGMENT PULLOFFS



SWITCH PULLOFFS

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SWITCH AND CURVE SEGMENT PULLOFFS

DATE: 03/2021
STD DET NO: SA-371
SHT NO: 1 OF 9

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-371,1-9.dwg | Layout: SA-371.1
PLOTTED: Mar 18, 2021-08:31:39am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

NOTES

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.

2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.

3. LOCATION OF ADJUSTMENT POINT, INSULATORS AND USE OF INSULATED GUY STRAND GUY STRAND SHALL MEET SA-167 REQUIREMENTS.

4. OUTSIDE PULLOFFS ARE SHOWN FOR CURVE SEGMENTS, INSIDE PULLOFFS ARE SIMILAR. INSIDE PULLOFFS ARE SHOWN FOR SWITCHES, OUTSIDE PULLOFFS ARE SIMILAR.

5. TROLLEY WIRE TO STRUCTURAL ATTACHMENT DISTANCE DETERMINES IF A SHORT, MEDIUM OR LONG VERSION IS USED FOR SA-371 A THROUGH SA-371 E.

6. TROLLEY WIRE GEOMETRY AS SHOWN ON THE OVERHEAD DRAWINGS DETERMINES WHICH SA-371 A THROUGH SA-371 K TO USE.

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
09	*	BULL RING	WABCO	18567-2000
11	*	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
12	*	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103
	GUY TENSIONS- 0-2700 LBS			
03	*	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	*	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	*	WIRE ROPE CLIP, 5/16"	CROSBY	G450
07	*	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
	GUY TENSIONS- 2700-5000 LBS			
13	*	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	*	GUY GRIP DEADEND	PREFORMED	CDE-3115
15	*	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M
17	*	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
43	*	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	56273-6120

No.	REVISION	BY	APP'D	DATE

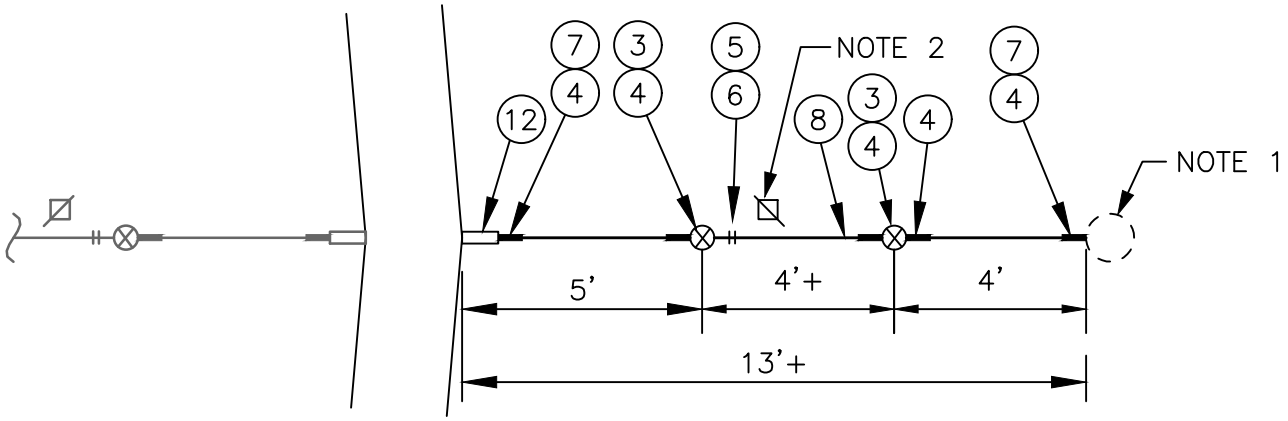
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

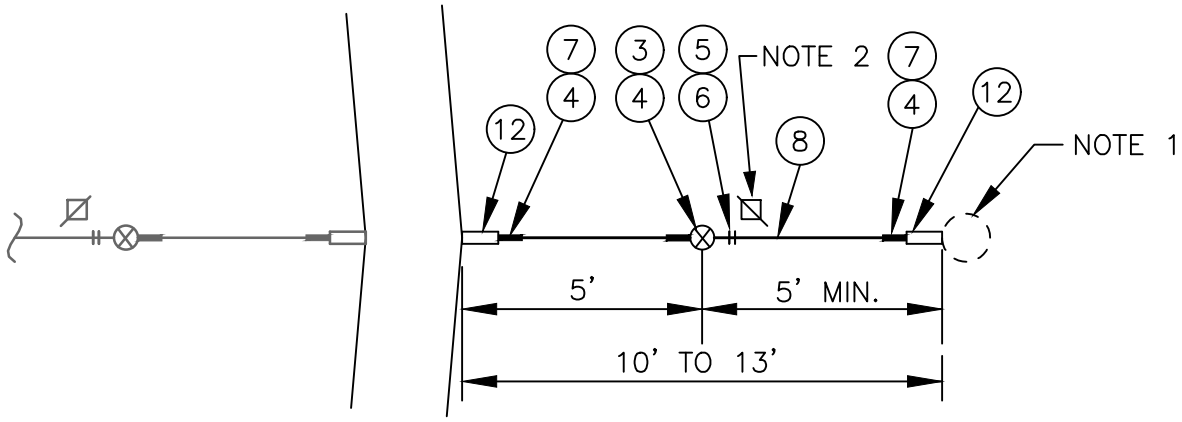
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SWITCH AND CURVE SEGMENT PULLOFFS

DATE: 03/2021
STD DET NO: SA-371
SHT NO: 2 OF 9

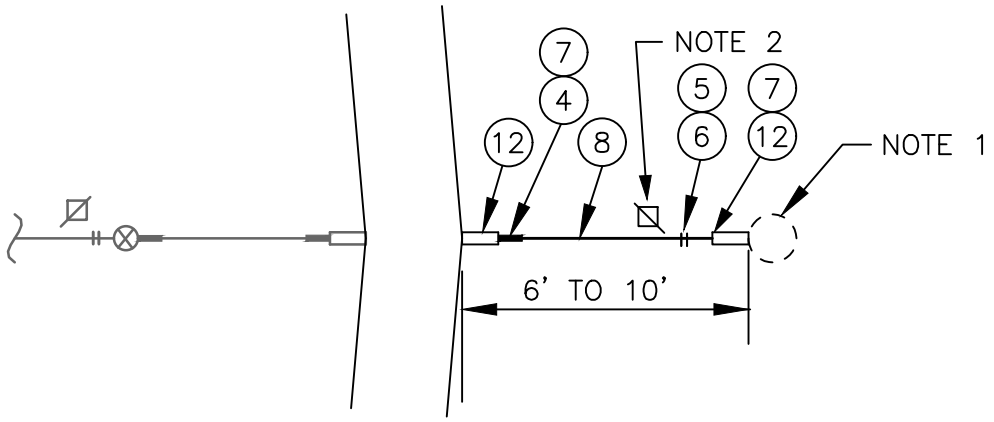
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-371_1-9.dwg | Layout: SA-371.2
PLOTTED: Mar 18, 2021-08:31:45am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



SA–371 A (LONG)



SA–371 A (MEDIUM)



SA–371 A (SHORT)

No.	REVISION	BY	APP'D	DATE

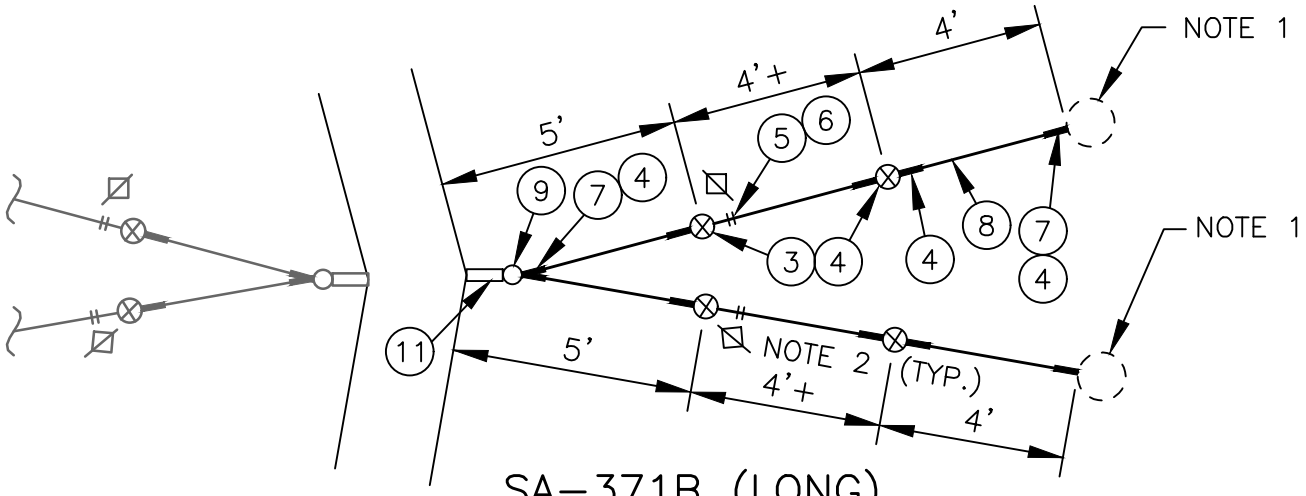
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

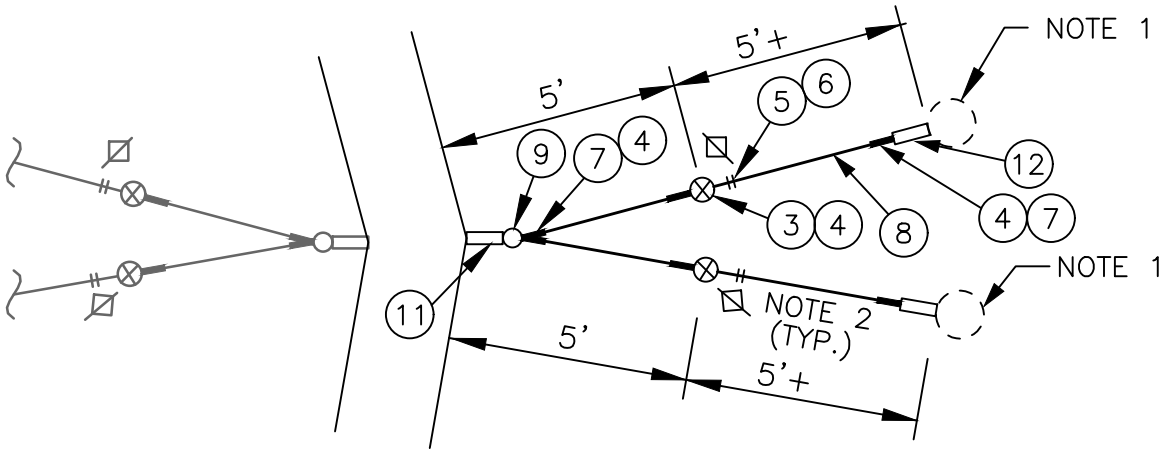
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SWITCH AND CURVE SEGMENT PULLOFFS

DATE: 03/2021
STD DET NO: SA-371
SHT NO: 3 OF 9

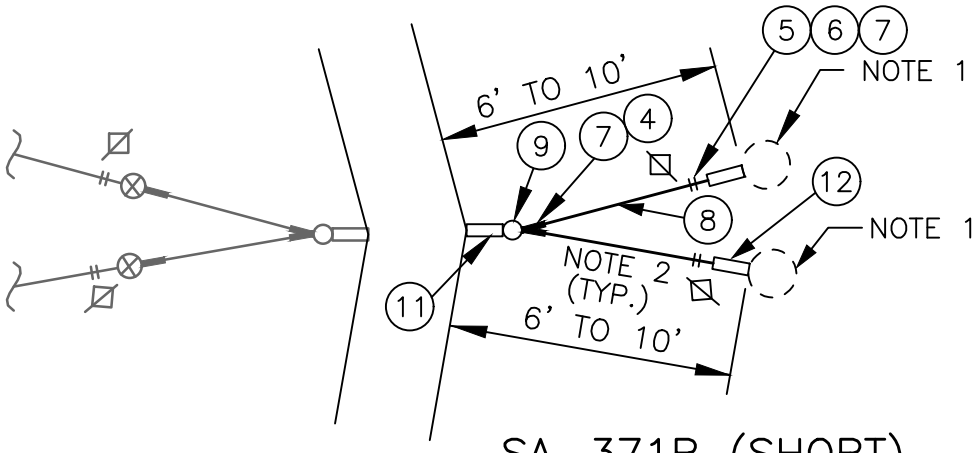
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-371,1-9.dwg | Layout: SA-371.3
PLOTTED: Mar 18, 2021-08:31:50am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



SA–371B (LONG)



SA–371B (MEDIUM)



SA–371B (SHORT)

No.	REVISION	BY	APP'D	DATE

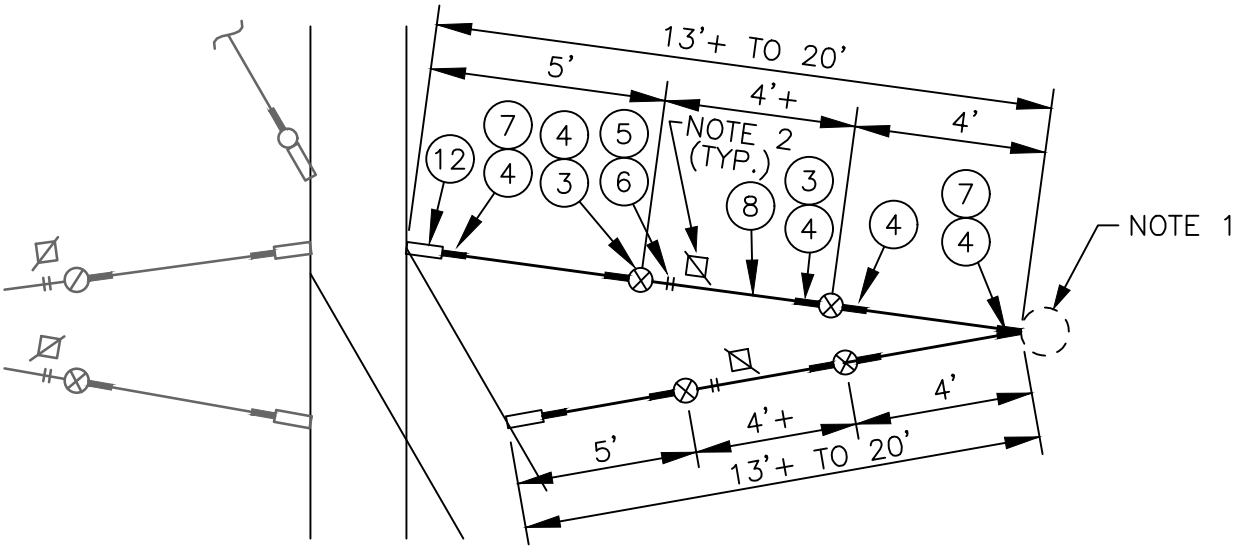
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

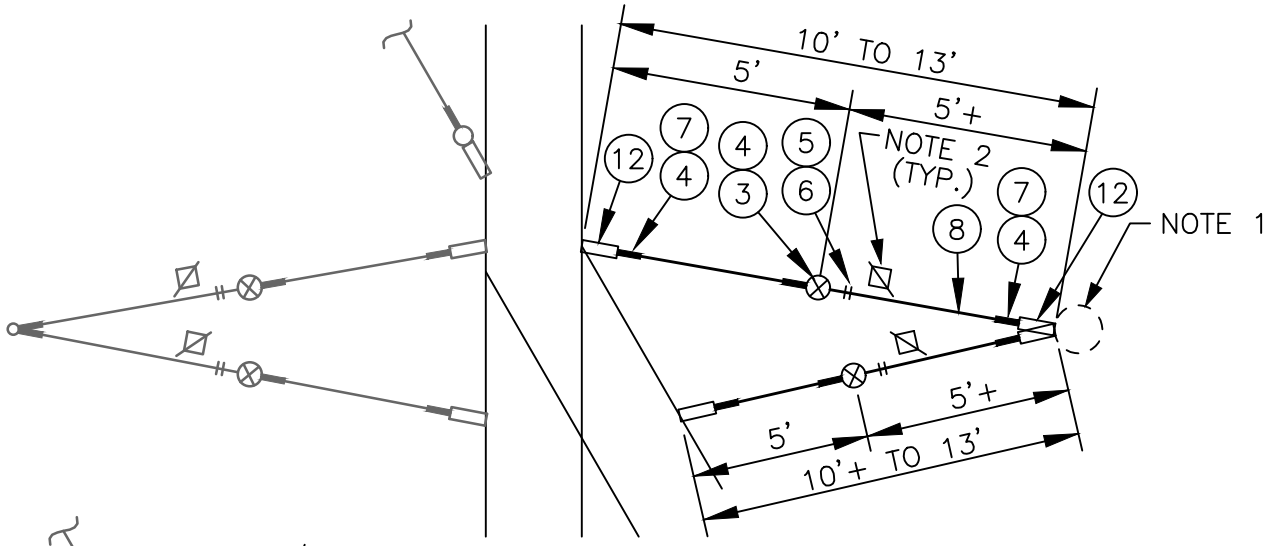
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
SWITCH AND CURVE SEGMENT PULLOFFS

DATE: 03/2021
STD DET NO: SA-371
SHT NO: 4 OF 9

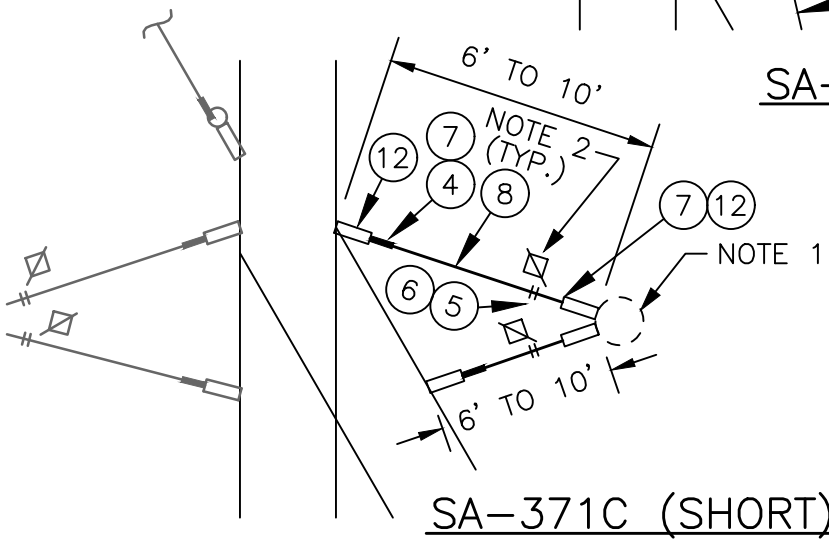
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-371,1-9.dwg | Layout: SA-371-4
PLOTTED: Mar 18, 2021-08:31:56am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



SA–371C (LONG)



SA–371C (MEDIUM)



SA–371C (SHORT)

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

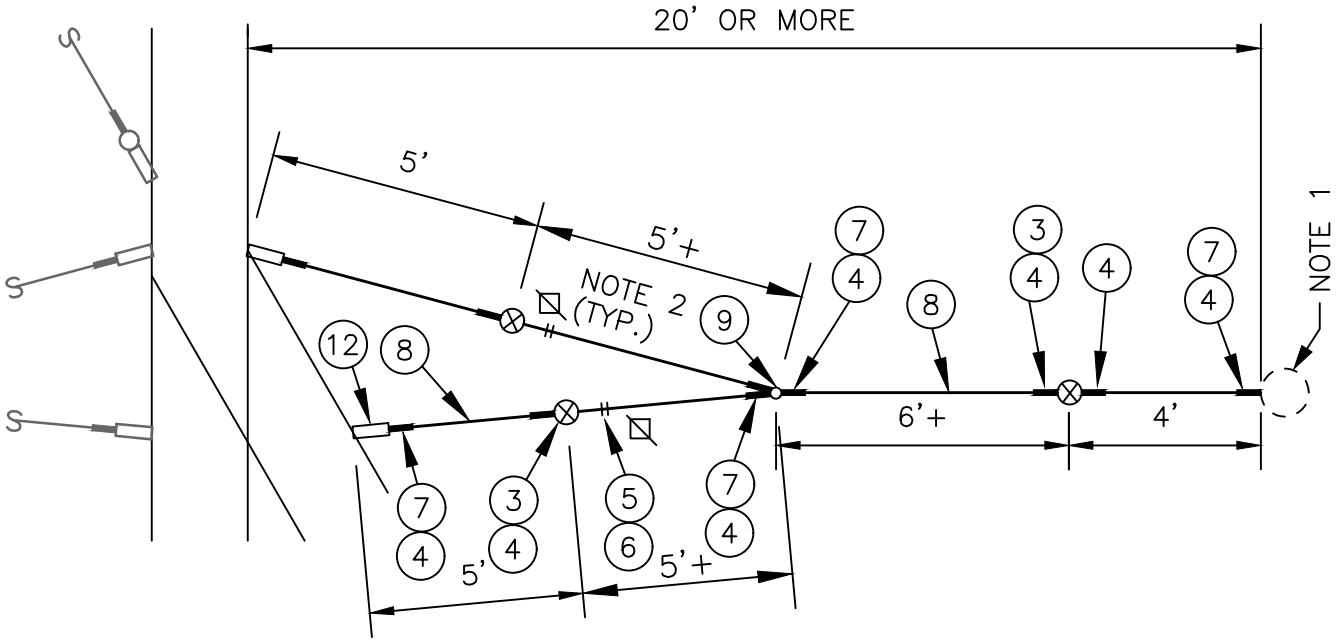
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

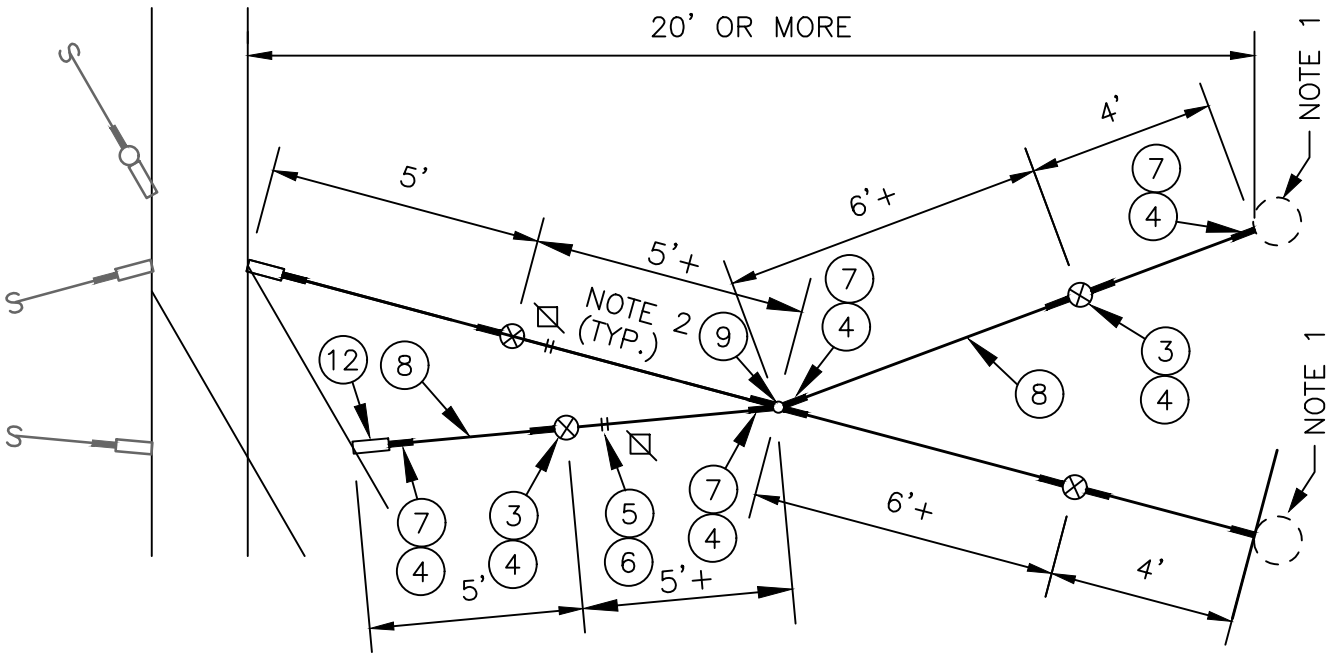
SWITCH PULLOFFS

DATE: 03/2021
STD DET NO: SA-371
SHT NO: 5 OF 9

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-371,1-9.dwg | Layout: SA-371.5
PLOTTED: Mar 18, 2021-08:32:01am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



SA–371D



SA–371E

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

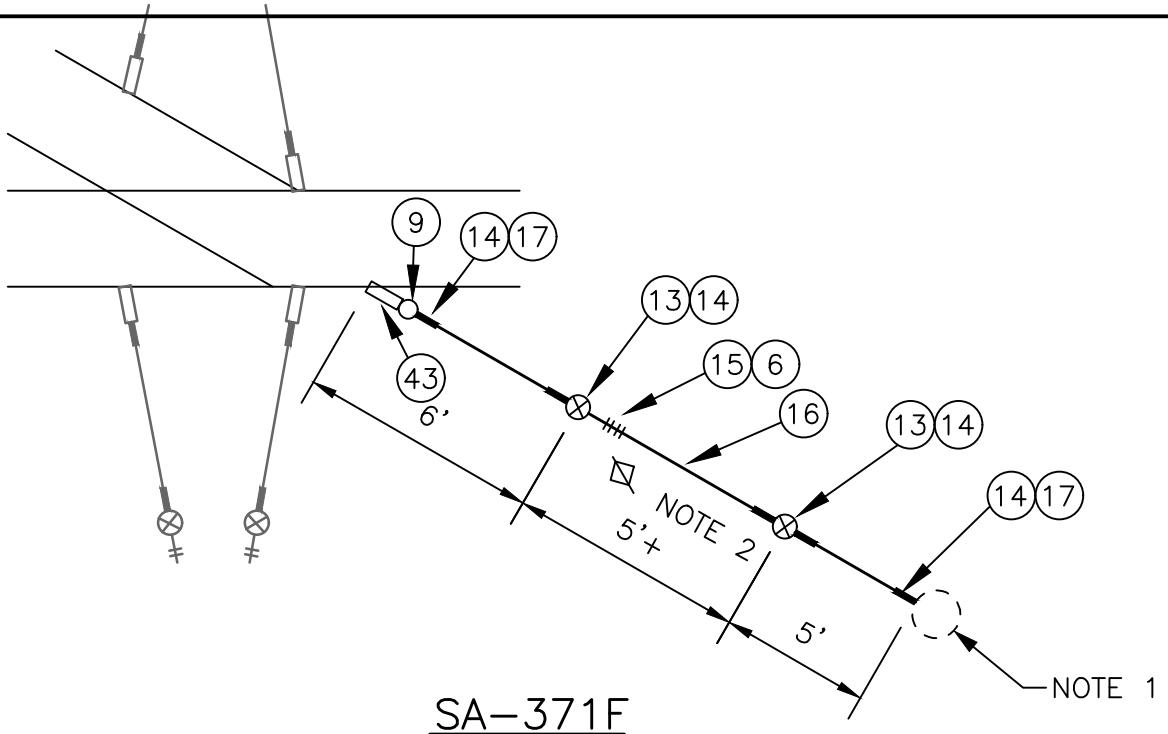
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

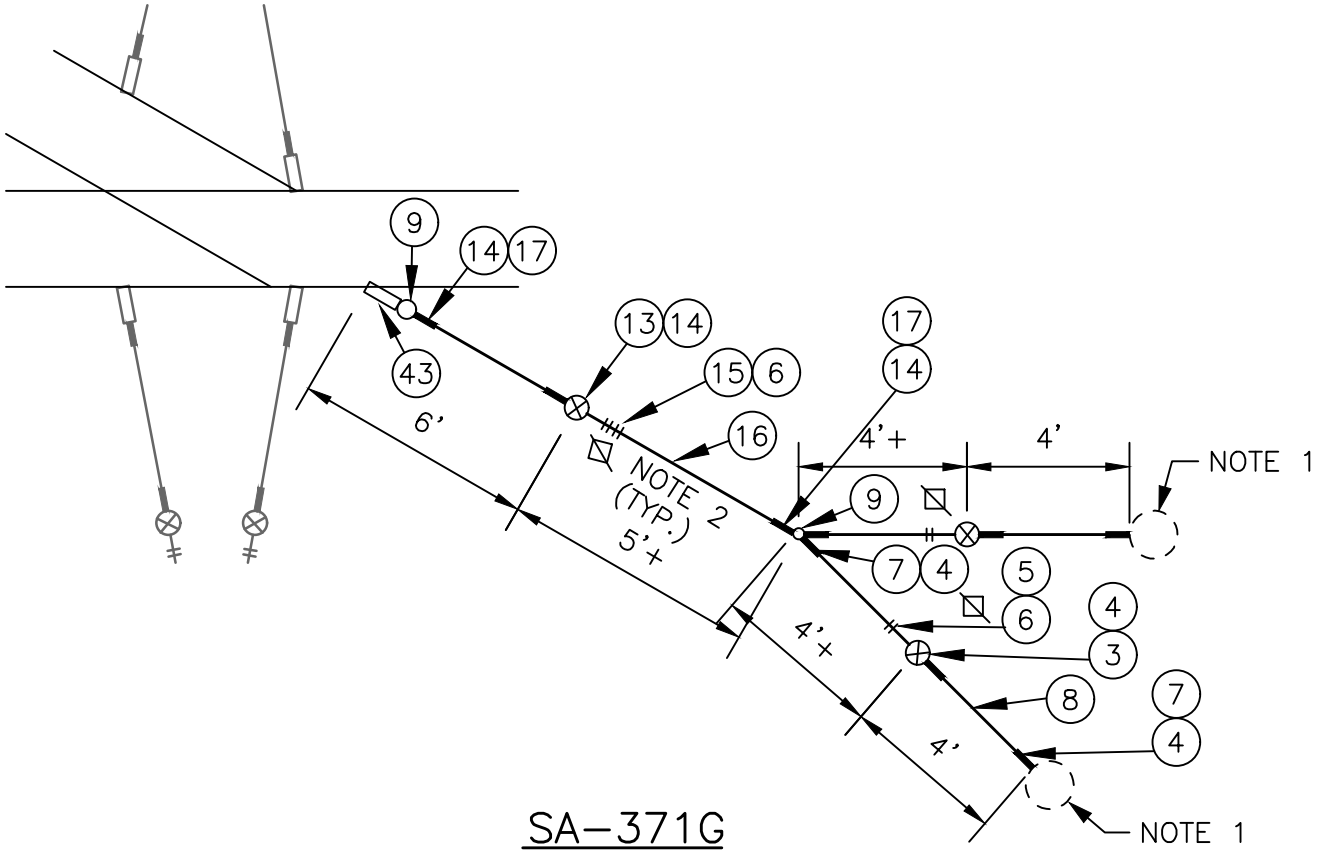
SWITCH PULLOFFS

DATE: 03/2021
STD DET NO: SA-371
SHT NO: 6 OF 9

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-371,1-9.dwg | Layout: SA-371.6
PLOTTED: Mar 18, 2021-08:32:06am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



SA–371F



SA–371G

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

APPROVED: P. ENG

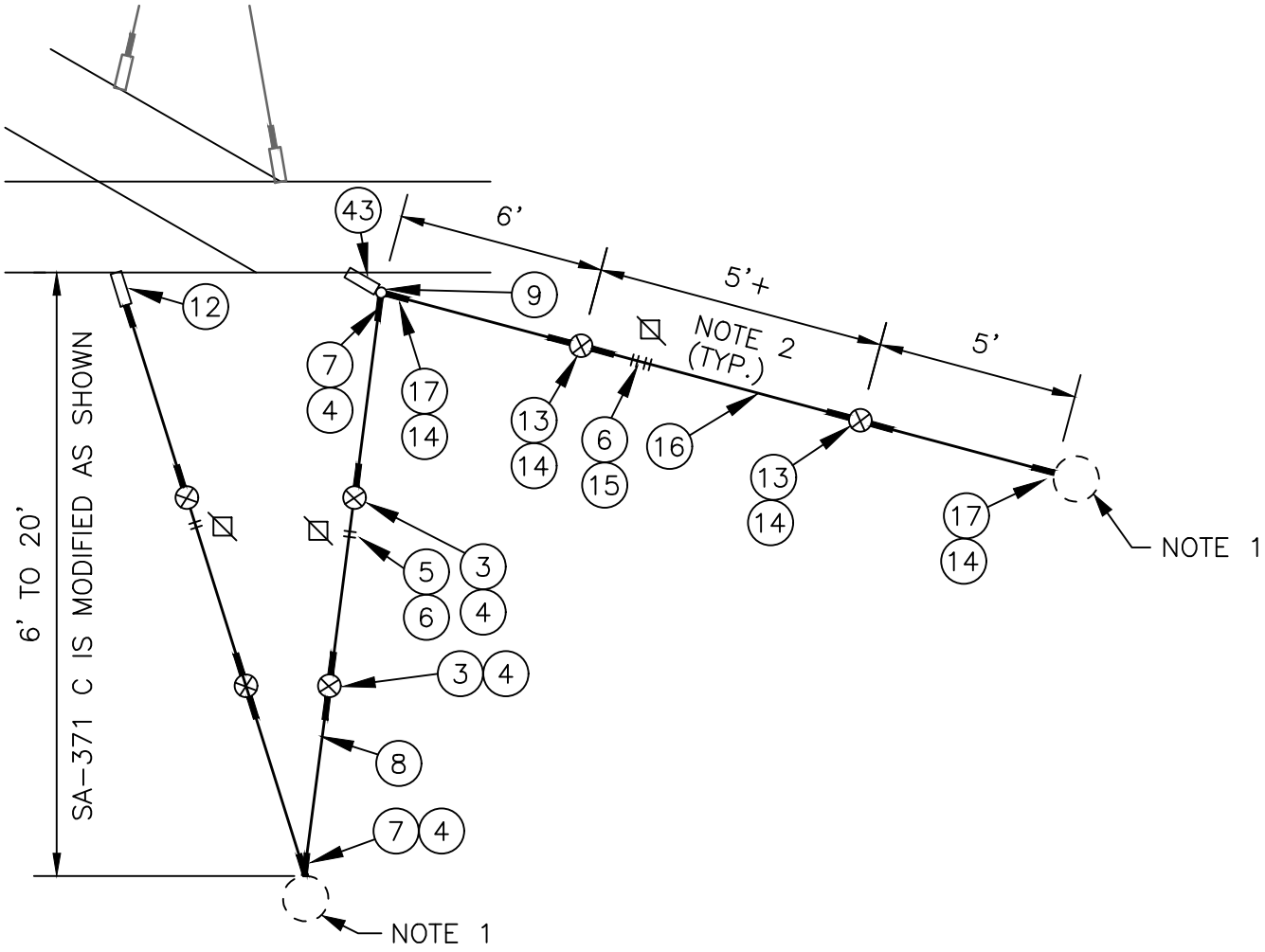
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

SWITCH PULLOFFS

DATE: 03/2021
STD DET NO: SA-371
SHT NO: 7 OF 9

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-371,1-9.dwg | Layout: SA-371.7
PLOTTED: Mar 18, 2021-08:32:11am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



SA-371H

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

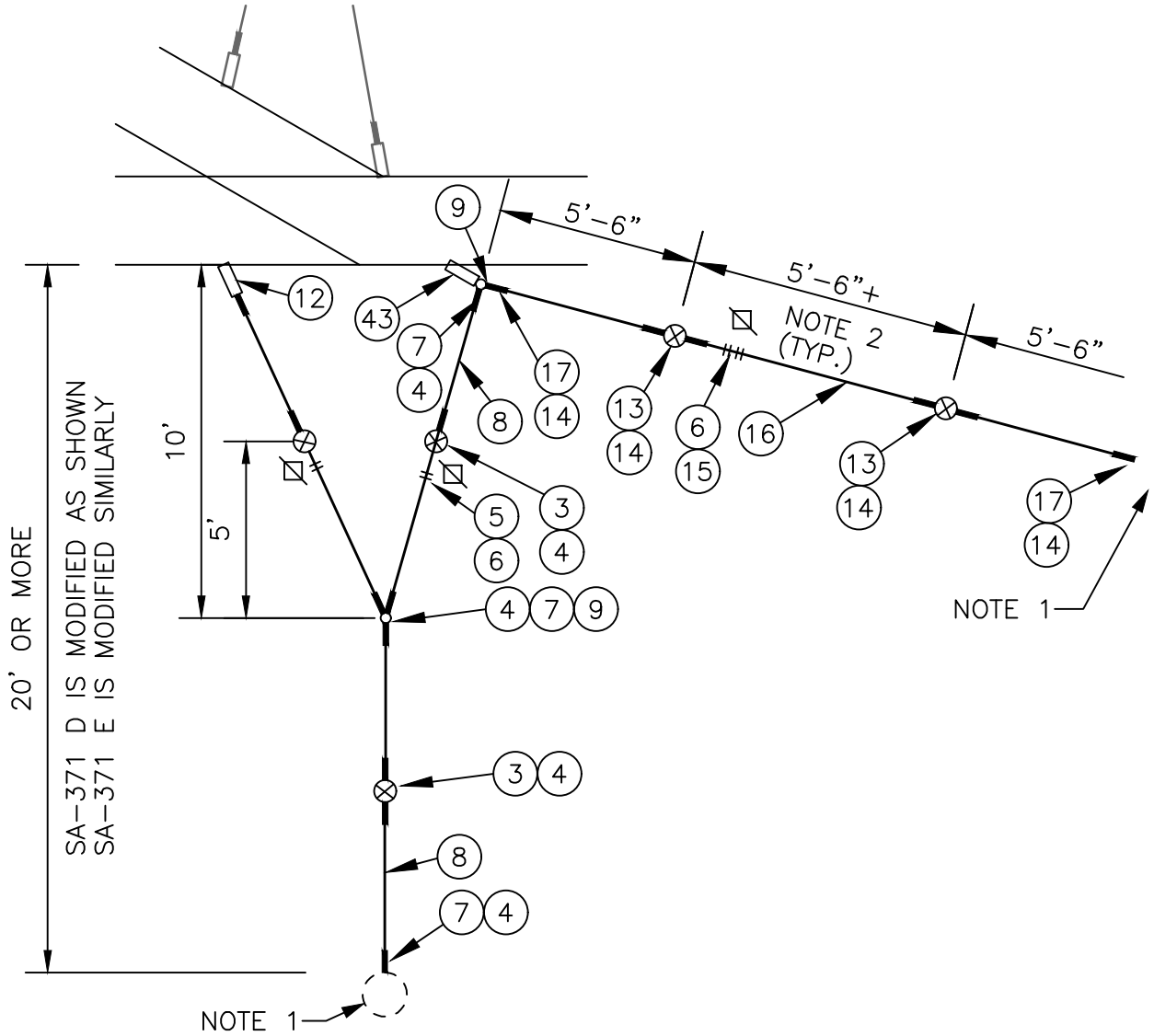
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

SWITCH PULLOFFS

DATE: 03/2021
STD DET NO: SA-371
SHT NO: 8 OF 9

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-371,1-9.dwg | Layout: SA-371.8
PLOTTED: Mar 18, 2021-08:32:15am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



SA-371J

No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

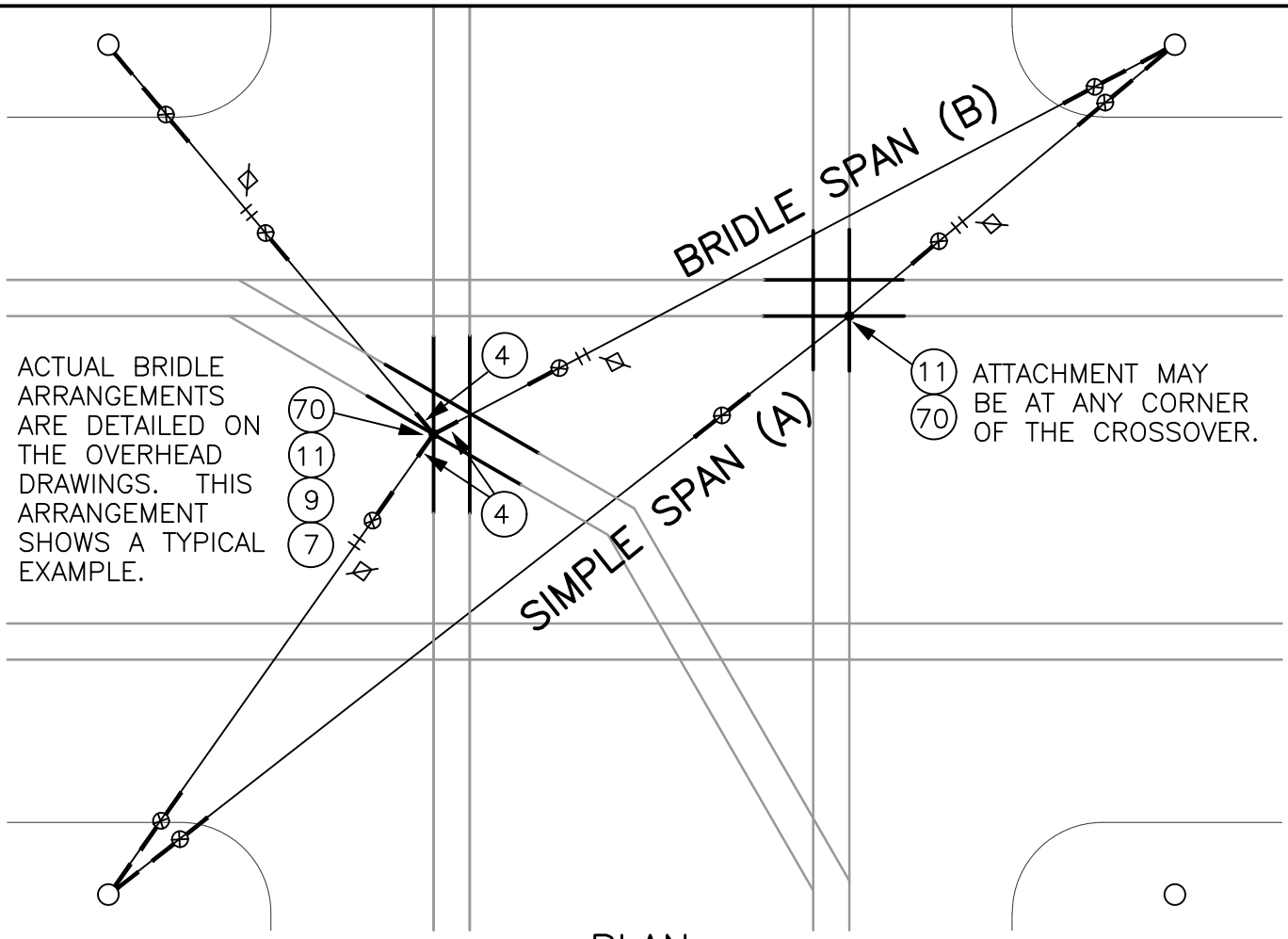
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

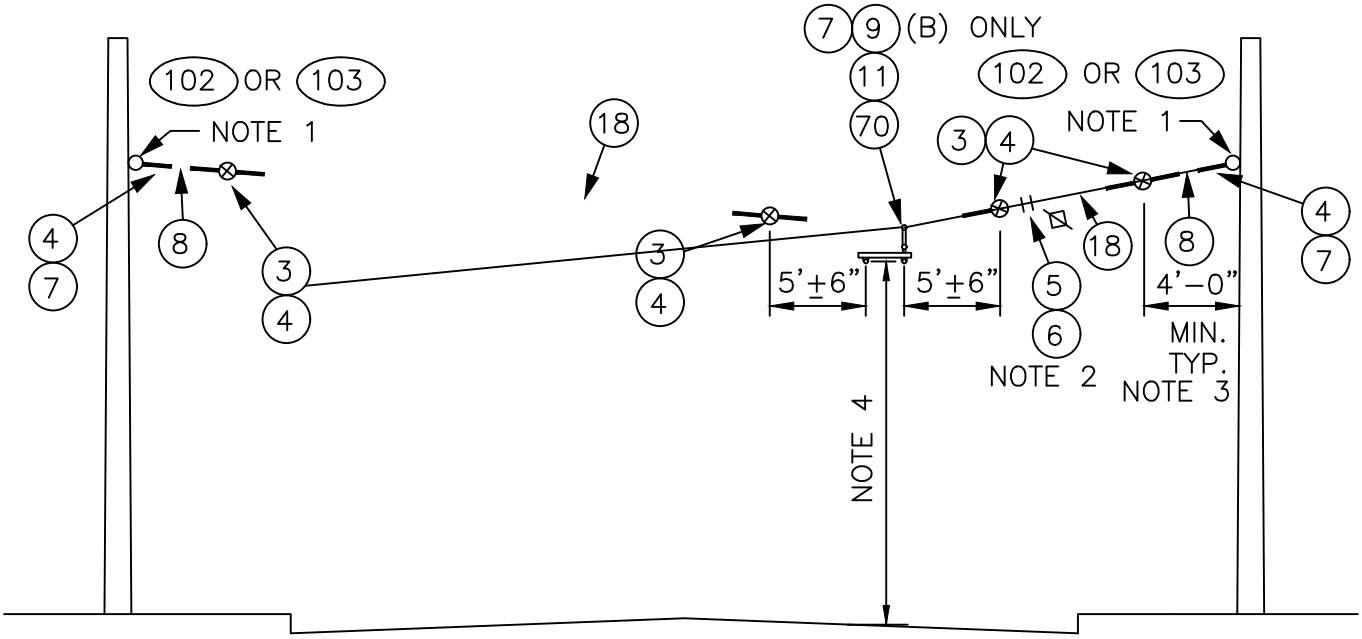
SWITCH PULLOFFS

DATE: 03/2021
STD DET NO: SA-371
SHT NO: 9 OF 9

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-371,1-9.dwg | Layout: SA-371.9
PLOTTED: Mar 18, 2021-08:32:21am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN



No.	REVISION	BY	APP'D	DATE

DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
CROSSOVER HOLDUP
SIMPLE SPAN(A)
BRIDLE SPAN(B)

DATE: 03/2021
STD DET NO: SA-372
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-372,1-2.dwg | Layout: SA-372.1
PLOTTED: Mar 18, 2021-08:32:30am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

NOTES:

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA-102 OR SA-103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA-166.
3. SEE SA-370 FOR LIMITED SPACE VARIANCES. SEE SA-167 FOR INSULATED GUY CRITERIA.
4. SEE SA-164 FOR VERTICAL & HORIZONTAL DIMENSIONS TO TROLLEY WIRE.

MATERIAL LIST (A)

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	4	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	9	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	2	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	2	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
18	VARIES	GUY STRAND, COVERED	COPPERWELD	8MI
70	1	EYEBOLT, 5/8" X 6" W/2 NUTS & LOCKWASHER		
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

MATERIAL LIST (B)

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	6	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	15	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	6	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	6	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
09	1	BULL RING	WABCO	18567-2000
11	1	7/8 TRANSLITE STRAIN INSUL CL-CL	WABCO	54975-6120
18	VARIES	GUY STRAND, COVERED	COPPERWELD	8MI
70	1	EYEBOLT, 5/8" X 6" W/2 NUTS & LOCKWASHER		
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

No.	REVISION	BY	APP'D	DATE

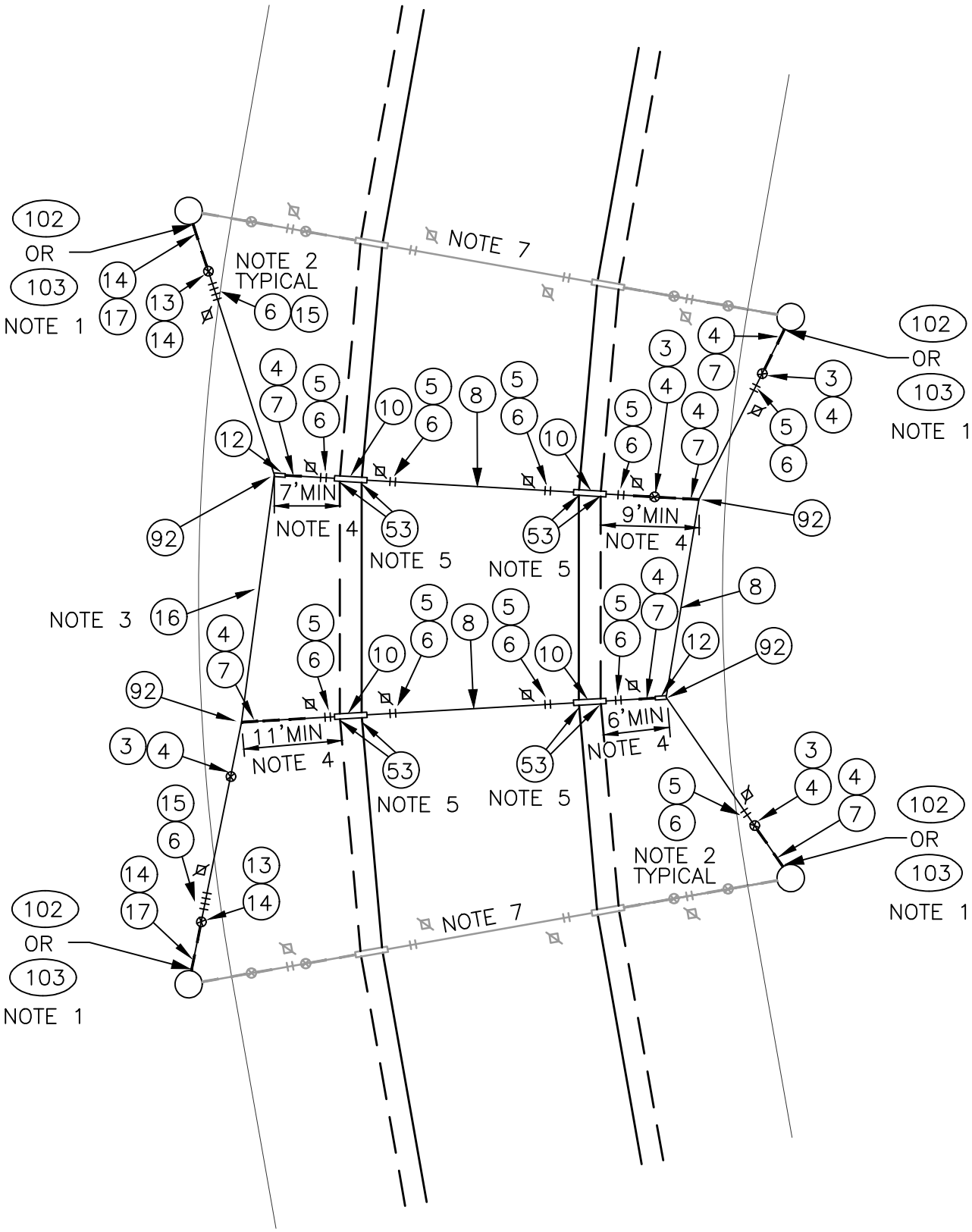
DESIGNED: DPG/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
CROSSOVER HOLDUP SPAN NOTES AND MATERIALS

DATE: 03/2021
STD DET NO: SA-372
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-372.r1-2.dwg | Layout: SA-372.2
PLOTTED: Mar 18, 2021-08:32:35am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



MULTI RAIL CURVE TWO WAY TRAFFIC

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

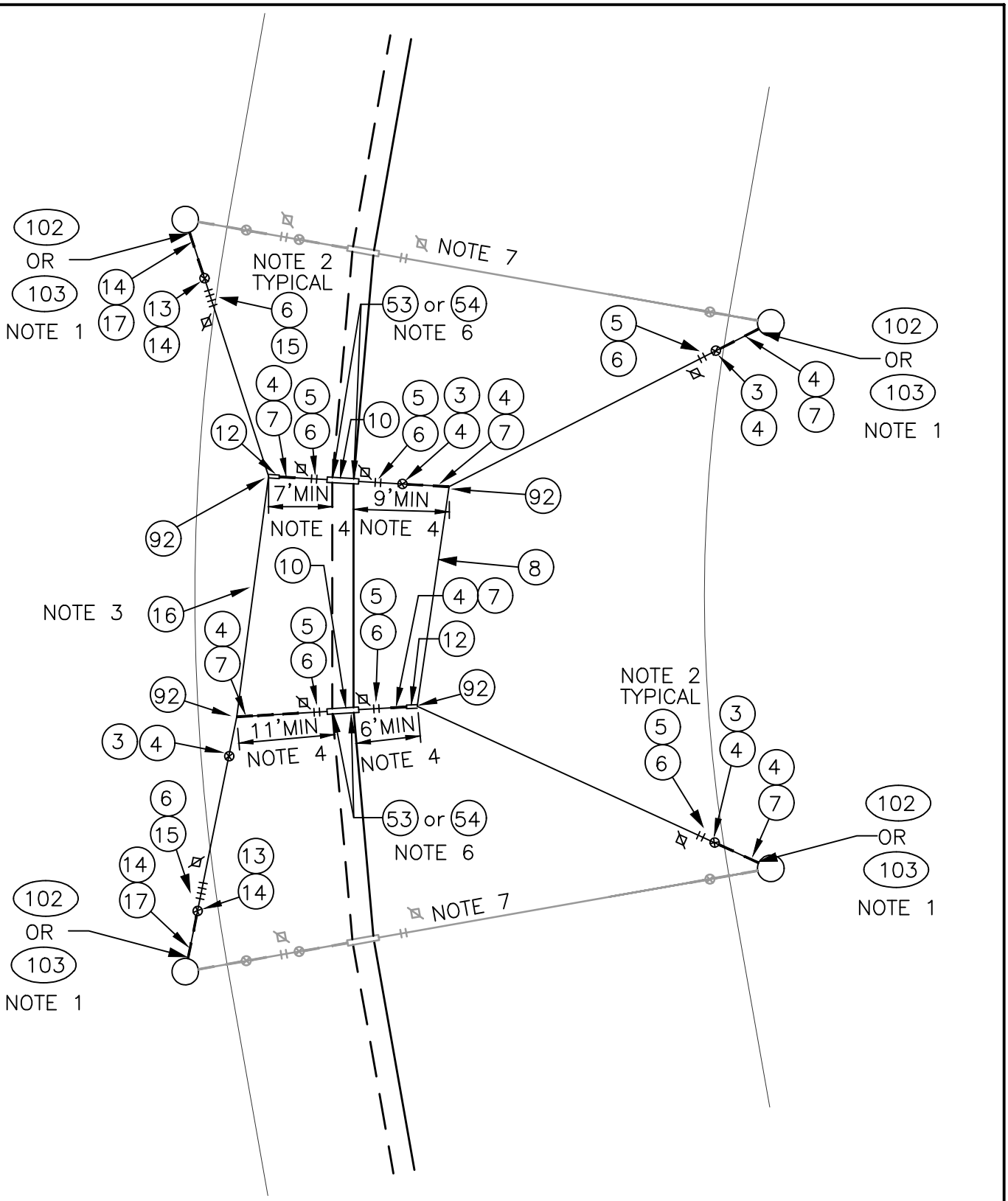
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

CONVENTIONAL CURVE WITH CURVE RAILS

DATE: 03/2021
STD DET NO: SA-373
SHT NO: 1 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-373,1-4.dwg | Layout: SA-373.1
PLOTTED: Mar 18, 2021-08:32:46am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



MULTI RAIL CURVE ONE WAY TRAFFIC

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

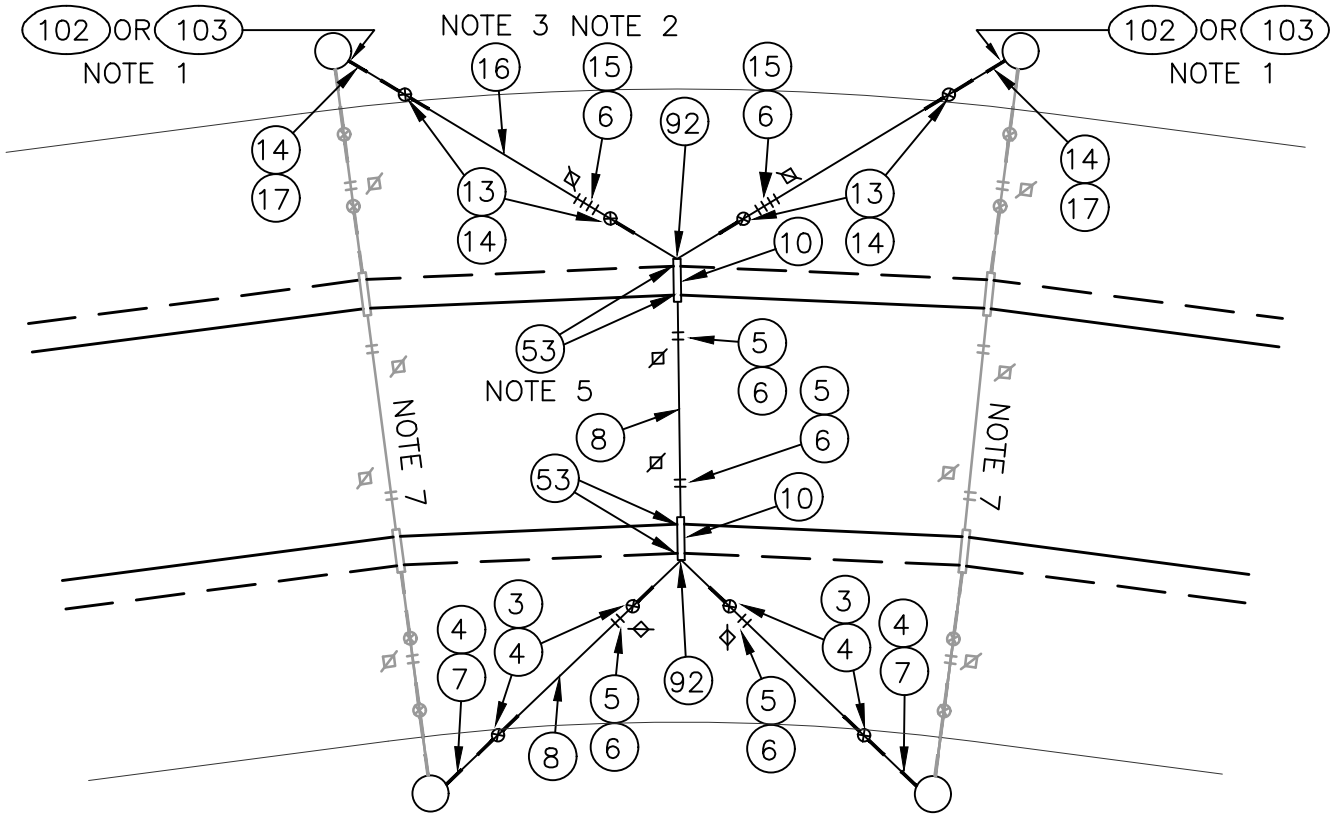
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

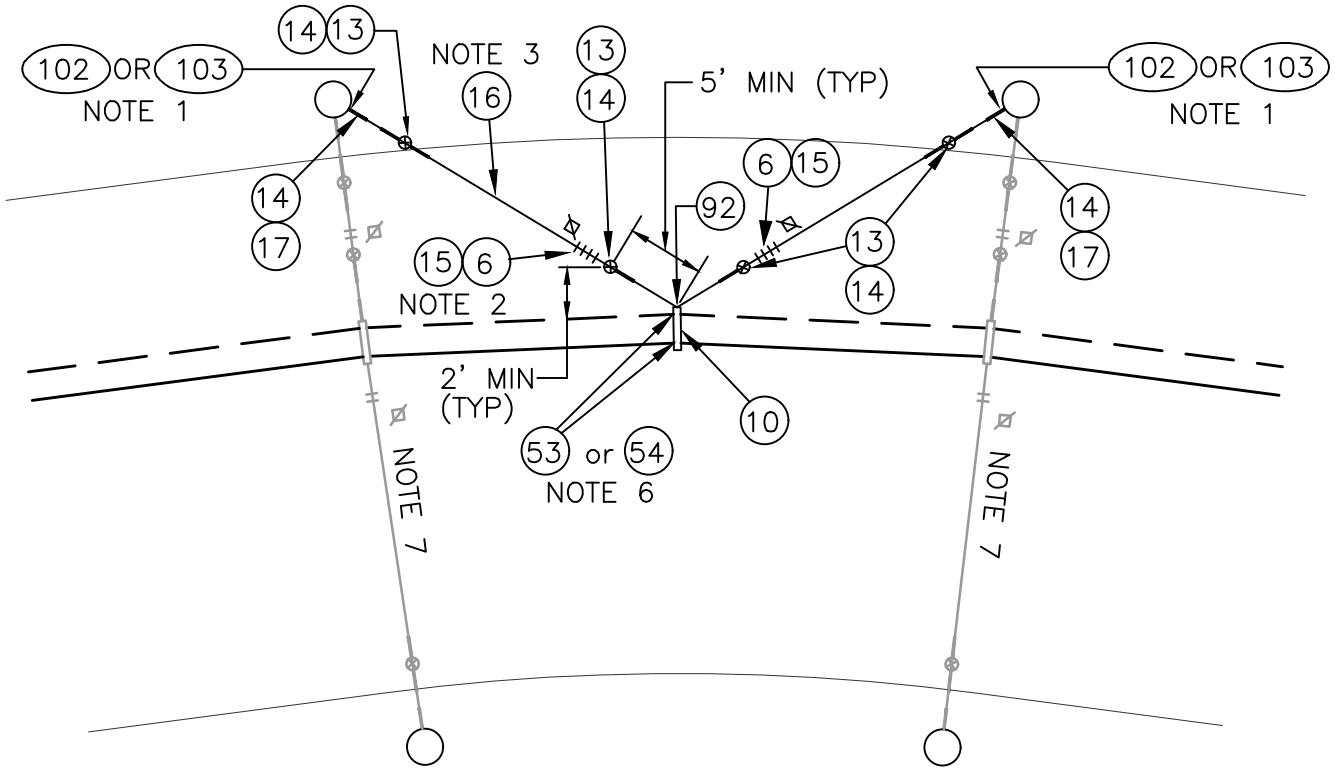
CONVENTIONAL CURVE WITH CURVE RAILS

DATE: 03/2021
STD DET NO: SA-373
SHT NO: 2 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-373,1-4.dwg | Layout: SA-373.2
PLOTTED: Mar 18, 2021-08:32:51am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



SINGLE CURVE RAIL TWO WAY TRAFFIC



SINGLE CURVE RAIL ONE WAY TRAFFIC

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

CONVENTIONAL CURVE WITH CURVE RAILS

DATE: 03/2021
STD DET NO: SA-373
SHT NO: 3 OF 4

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-373,1-4.dwg | Layout: SA-373.3
PLOTTED: Mar 18, 2021-08:32:56am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

MATERIAL LIST

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
03	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	504
04	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3106
05	VARIES	WIRE ROPE CLIP, 5/16"	CROSBY	G450
06	AS REQD	FRICTION TAPE, 3/4" (6 WRAPS)		
07	VARIES	THIMBLE, 3/8" XHD, OPEN	CROSBY	G414
08	VARIES	GUY STRAND	COPPERWELD	8M
10	VARIES	HI-LITE DOUBLE CURVE HANGER	WABCO	54962-3001
12	VARIES	7/8 TRANSLITE STRAIN INSUL CL-EYE	WABCO	55339-6120
13	VARIES	GUY STRAIN INSUL	PORCELAIN PRODUCTS CO.	506
14	VARIES	GUY GRIP DEADEND	PREFORMED	CDE-3115
15	VARIES	WIRE ROPE CLIP, 3/8"	CROSBY	G450
16	VARIES	GUY STRAND	COPPERWELD	16M
17	VARIES	THIMBLE, 1/2" XHD, OPEN	CROSBY	G414
53	VARIES	CURVE RAIL (1° TO 5° 2 FT LG)	K & M	851 B412/0
54	VARIES	CURVE RAIL (>5° TO 7.5° 4 FT LG)	K & M	851 B412/1
92	VARIES	ANGLE CLAMP, DUCTILE IRON	ANDERSON/ SQUARE D	82860-2000
102	VARIES	FORGED THREE-PIECE ADJUSTABLE POLE BAND, ANNEALED & GALVANIZED	KORTICK MFG CO	
103	VARIES	WOOD POLE EYEBOLT	METRO STD	SA-103

NOTES

1. A POLE COLLAR OR POLE EYEBOLT IS REQUIRED PER SA–102 OR SA–103 UNLESS A BUILDING EYEBOLT ATTACHMENT IS USED. INSTALLATION HEIGHT IS INDICATED ON THE OVERHEAD DRAWINGS.
2. PROVIDE TENSION ADJUSTMENT POINTS AT LOCATIONS INDICATED BY "⊠". PROVIDE WIRE ROPE CLIPS AT THESE LOCATIONS. SEE SA–166.
3. IF LOAD SHOWN ON OVERHEAD DRAWINGS IS LESS THAN 2500 LBS, THEN ITEM 8 MAY BE USED INSTEAD OF ITEM 16. THE ASSOCIATED ITEMS SHALL ALSO BE CHANGED I.E. 3 FOR 13, 4 FOR 14, 5 FOR 15 AND 7 FOR 17.
4. THE DISTANCE FROM THE TROLLEY WIRE TO THE SUPPORT CATENARY WIRE SHALL BE AS SHOWN ON THE OVERHEAD DRAWINGS. THE DISTANCES ON SA–373 ARE SHOWN TO DEFINE PARTS REQUIRED FOR DISTANCE RANGES ONLY.
5. ANGLE VARIES FROM 1° TO 5°.
6. USE ITEM 53 WHEN ANGLE VARIES FROM 1° TO 5°. USE ITEM 54 WHEN ANGLE VARIES FROM 5° TO 7.5°. TROLLEY WIRE SHALL NOT BE TIED TOGETHER AS SHOWN ON SHEET 1 WHEN USING ITEM 54. USE SHEET 2, IF TWO WAY TROLLEY WIRE USES ITEM 54, AND TREAT EACH TRACK SEPARATELY.
7. END SPAN SHOWN FOR REFERENCE ONLY, ACTUAL SPAN USED SHALL BE DEFINED ON THE OVERHEAD DRAWINGS.

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

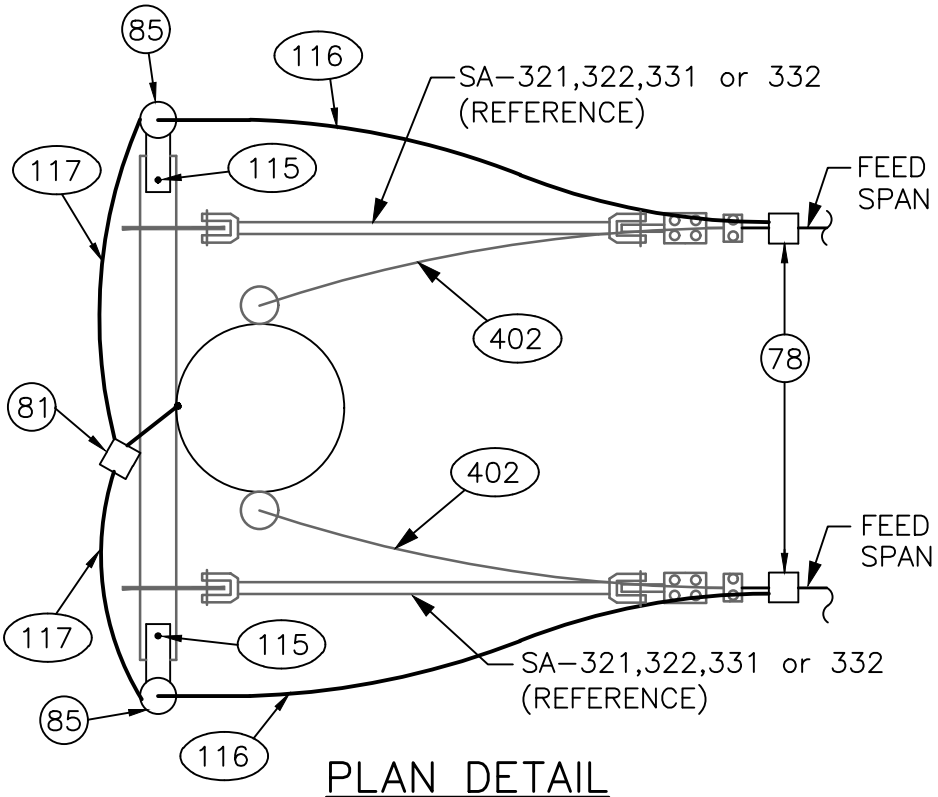
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

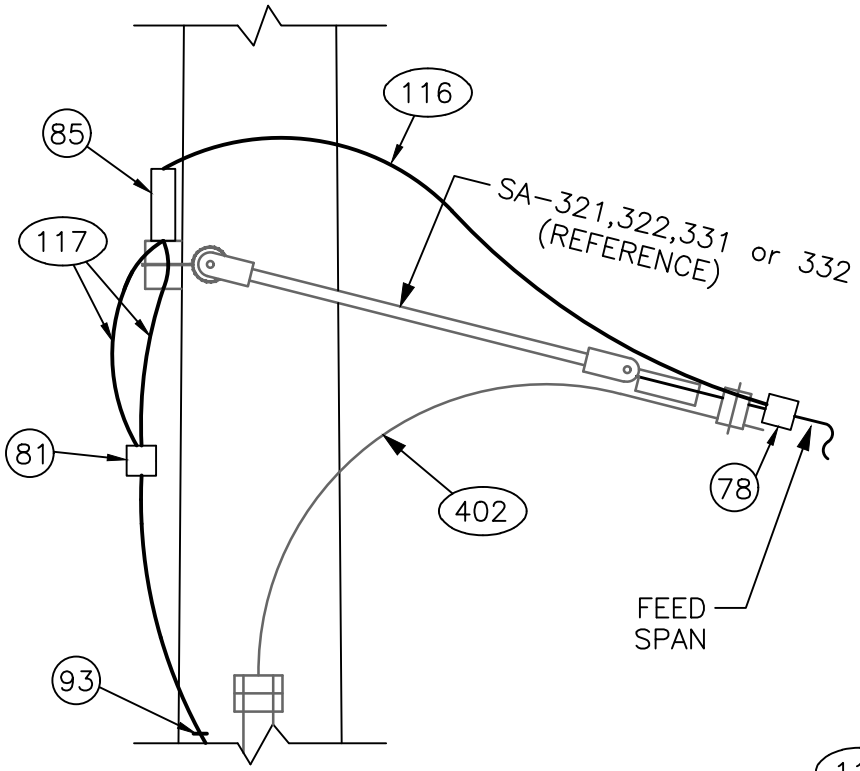
CONVENTIONAL CURVE WITH CURVE RAILS

DATE: 03/2021
STD DET NO: SA-373
SHT NO: 1 OF 4

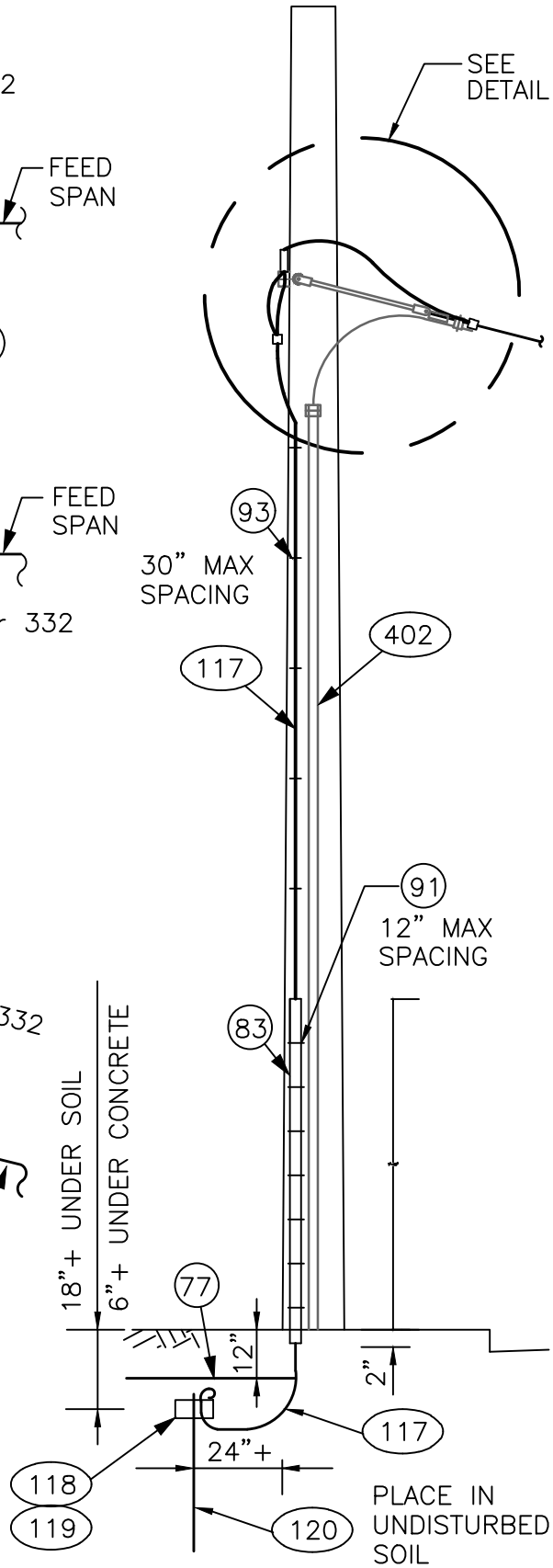
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-373_1-4.dwg | Layout: SA-373.4
PLOTTED: Mar 18, 2021-08:33:01am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN DETAIL



ELEV DETAIL



No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

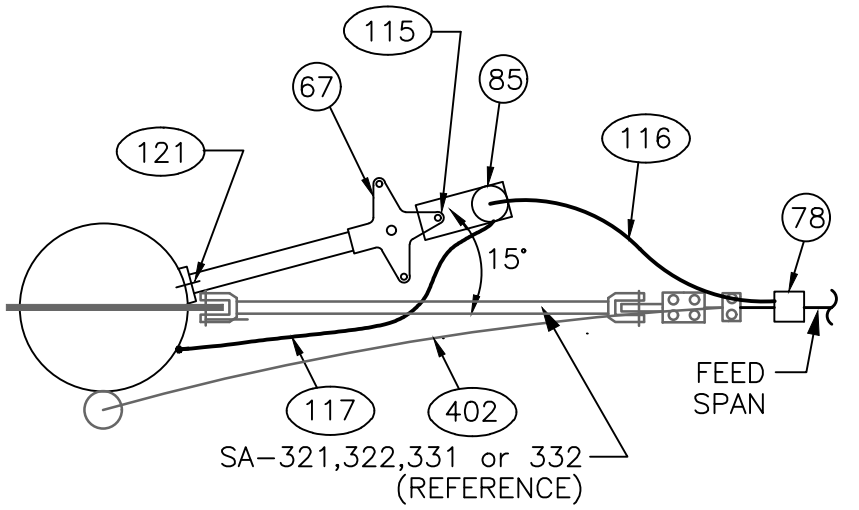
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

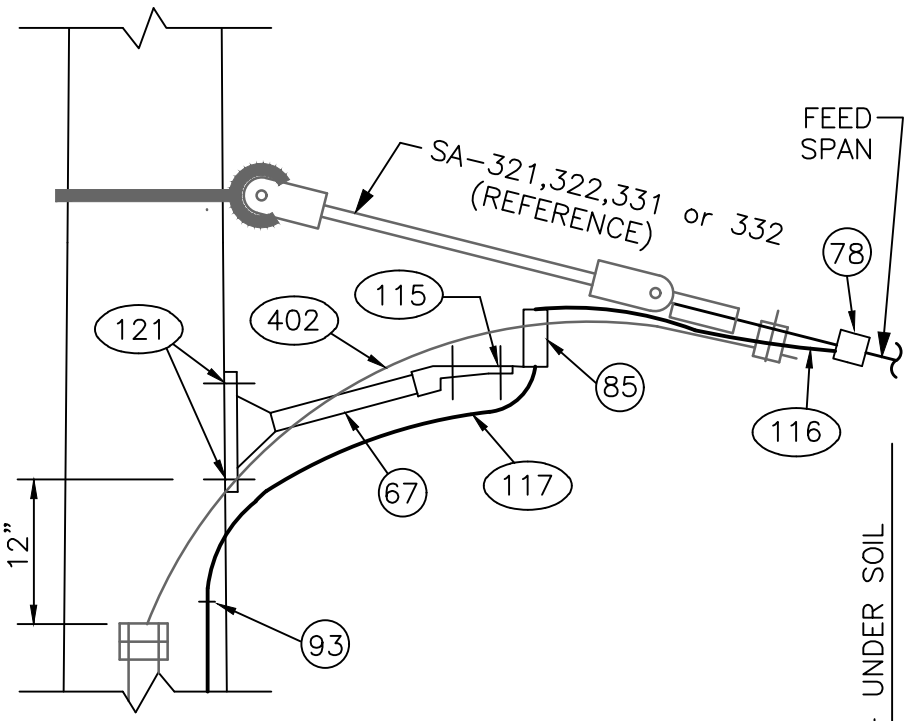
LIGHTNING ARRESTERS DOUBLE FEEDER RISER (WOOD POLE)

DATE: 03/2021
STD DET NO: SA-401
SHT NO: 1 OF 6

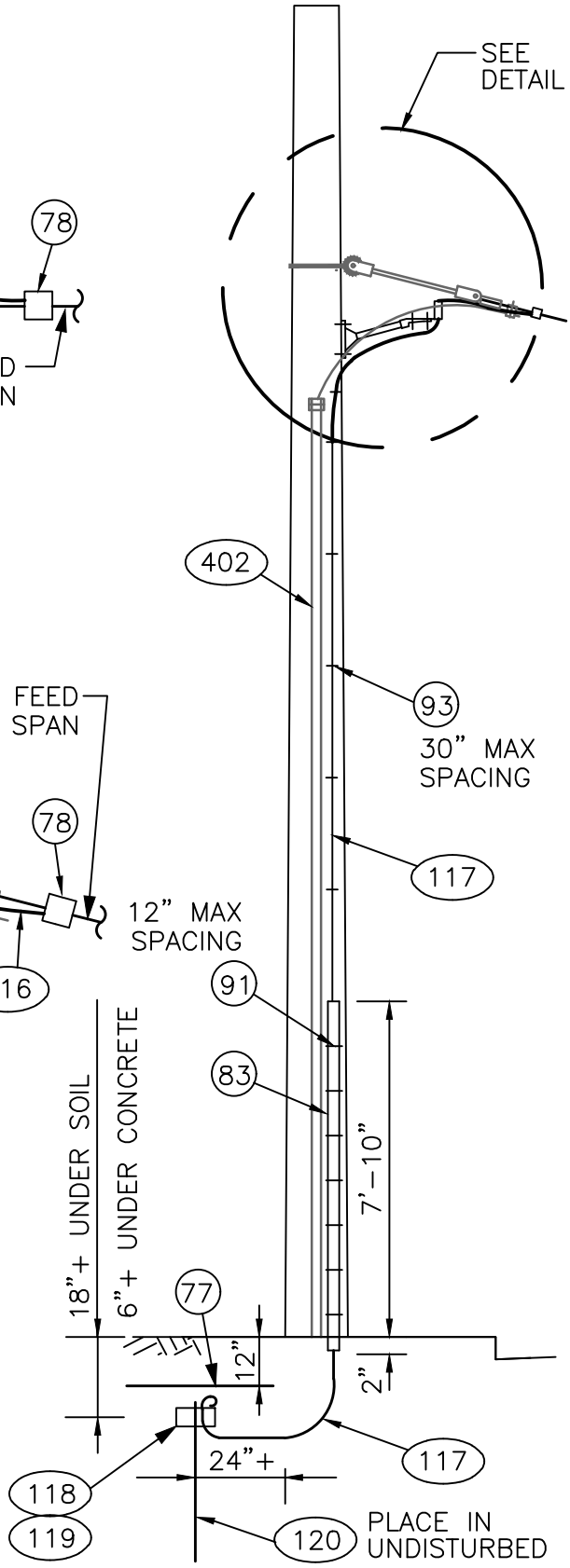
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-401,1-6.dwg | Layout: SA-401.1
PLOTTED: Mar 18, 2021-08:33:10am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN DETAIL



ELEV DETAIL



No.	REVISION	BY	APP'D	DATE

DESIGNED: DG/AWG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

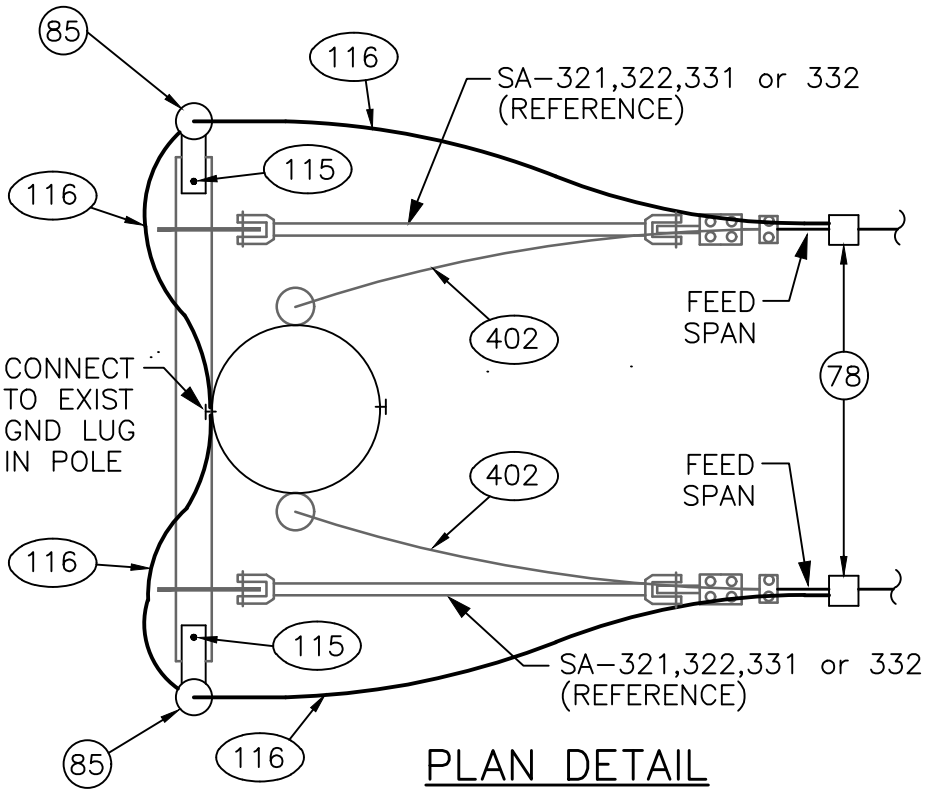
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

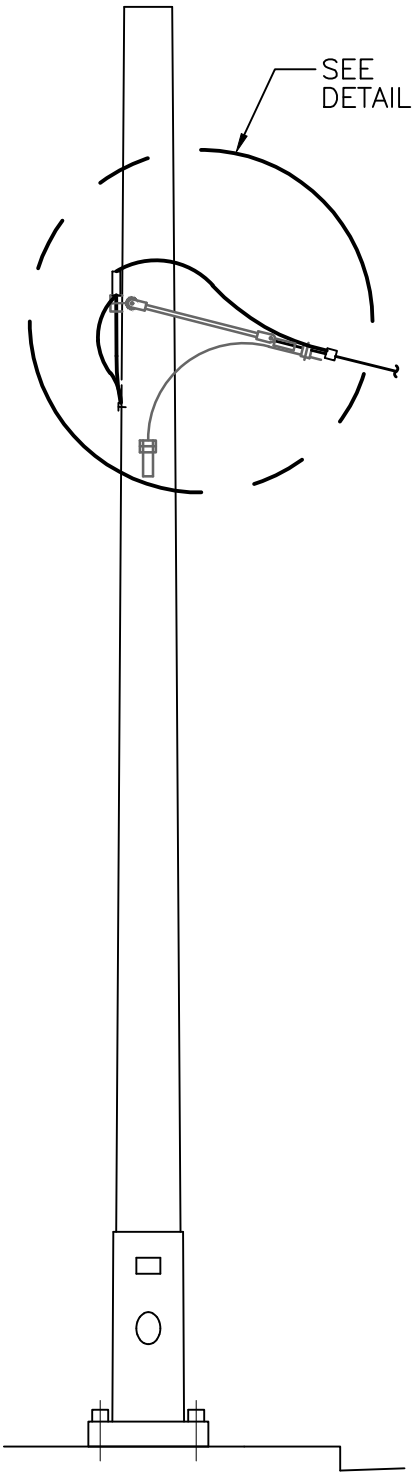
LIGHTNING ARRESTERS DOUBLE FEEDER RISER (WOOD POLE)

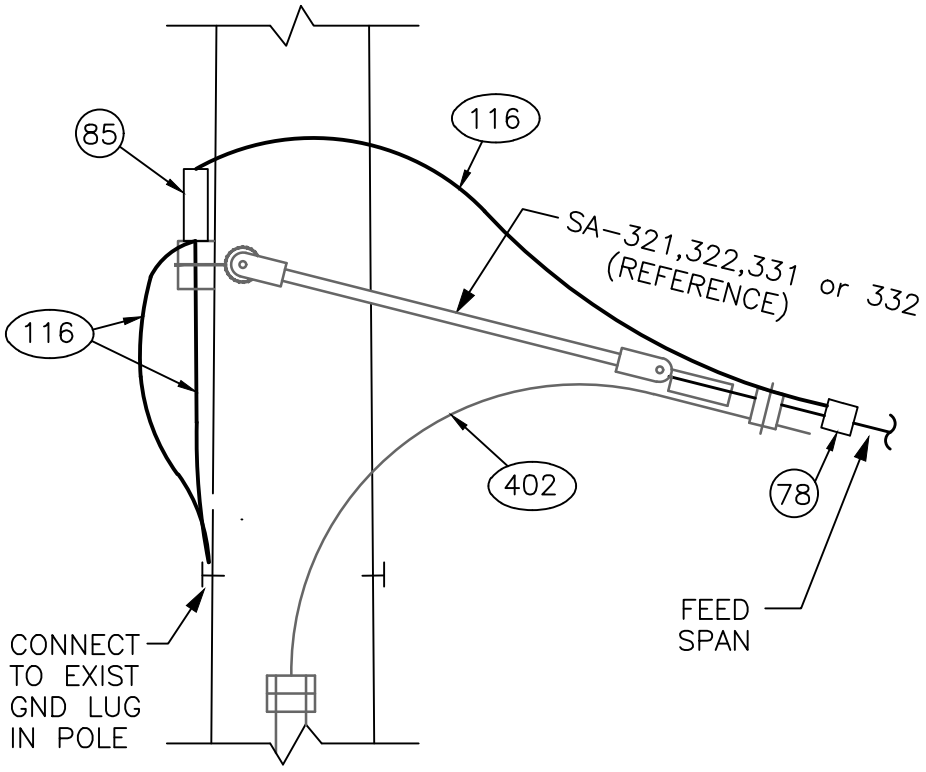
DATE: 03/2021
STD DET NO: SA-401
SHT NO: 2 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-401,1-6.dwg | Layout: SA-401.2
PLOTTED: Mar 18, 2021-08:33:16am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN DETAIL





ELEV DETAIL

No.	REVISION	BY	APP'D	DATE

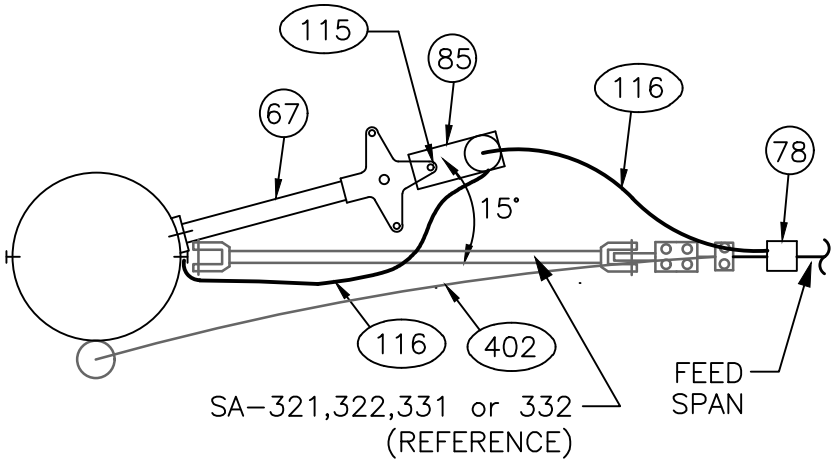
DESIGNED: A. WOLAK
APPROVED: P. ENG
DRAWN: L. ANDERSON
CHECKED: J. DAVIS

King County METRO

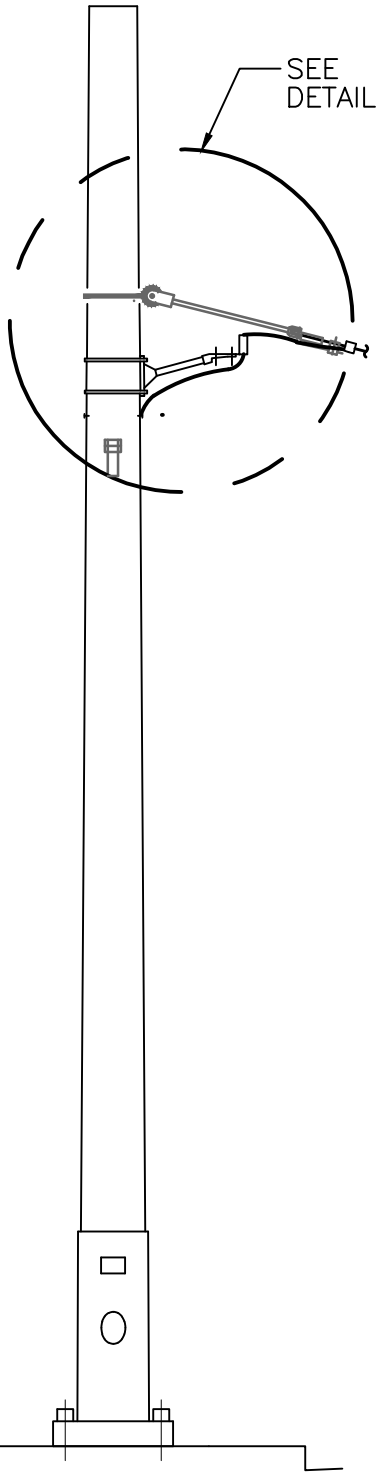
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
LIGHTNING ARRESTERS
DOUBLE FEEDER RISER
(STEEL POLE)

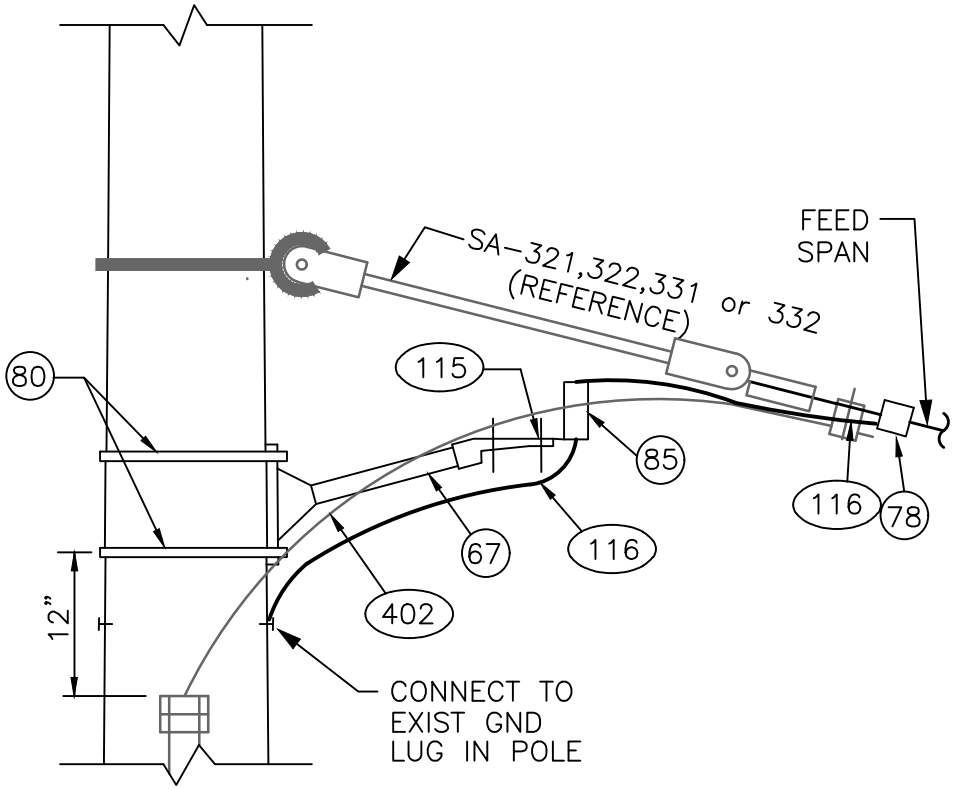
DATE: 03/2021
STD DET NO: SA-401
SHT NO: 3 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-401,1-6.dwg | Layout: SA-401.3
PLOTTED: Mar 18, 2021-08:33:21am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



PLAN DETAIL





ELEV DETAIL

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
LIGHTNING ARRESTERS
SINGLE FEEDER RISER
(STEEL POLE)

DATE: 03/2021
STD DET NO: SA-401
SHT NO: 4 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-401,1-6.dwg | Layout: SA-401.4
PLOTTED: Mar 18, 2021-08:33:26am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

WOOD POLE SINGLE FEEDER MATERIAL LIST (SEE PAGE 2)

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
67	1	CLOVERLEAF EPOXIROD STANDOFF	CHANCE	C653-1038
77	AS REQD	ELEC WARNING TAPE, 6" YELLOW	BRADY	UT 20-Y6
78	1	CONNECTOR, PARALLEL CLAMP	BURNDY	QPX342C
83	1	MOLDING, PLASTIC, GROUND WIRE, 1/2" X 1/16" X 8'	JOSLYN	PM128
85	1	1000 VOLT DC ARRESTOR 970 MCOV	IMPULSE	P/N 1057
91	AS REQD	STAPLES, ROLLED POINT, GALV, 2" X 1/2" X 0.162"	JOSLYN	J156
93	AS REQD	STAPLES, ROLLED POINT, GALV, 1 3/4" X 1/4" X 0.148"	JOSLYN	J1673
115	1	STAINLESS STEEL BOLT WITH WASHERS & LOCK WASHERS		
116	*	WIRE, 2 OR 5 KV, #4 AWG CU, JACKETED, UNSHIELDED		
117	VARIES	WIRE, #4 AWG CU, SOLID, SOFT, 0.031" POLYETHYLENE INSULATED		
118	1	GROUND ROD CLAMP	COPPERWELD	ABH58
119	AS REQD	CONDUCTIVE & ANTI-SEIZE COMPOUND	THOMAS &	CP-8 OR
		(KOPR-SHIELD)	BETTS	CP-16
120	1	GROUND ROD, 5/8" X 10'	COPPERWELD OR JOSLYN	GR5810 J8340
121	2	LAG SCREW, FETTER DRIVE, 5/8"X 5"	JOSLYN	J8765
402	AS REQD	FEEDER RISER	METRO STD	SA-402

STEEL POLE SINGLE FEEDER MATERIAL LIST (SEE PAGE 4)

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
67	1	CLOVERLEAF EPOXIROD STANDOFF	CHANCE	C653-1038
78	1	CONNECTOR, PARALLEL CLAMP	BURNDY	QPX342C
80	AS REQD	3/4" X 0.030" SS BANDING TYPE 201	BAND-IT	C206
85	1	1000 VOLT DC ARRESTOR 970 MCOV	IMPULSE	P/N 1057
115	1	STAINLESS STEEL BOLT WITH WASHERS & LOCK WASHERS		
116	*	WIRE, 2 OR 5 KV, #4 AWG CU, JACKETED, UNSHIELDED		
402	AS REQD	FEEDER RISER	METRO STD	SA-402

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
LIGHTNING ARRESTER SINGLE FEEDER RISER (MATERIAL LIST)

DATE: 03/2021
STD DET NO: SA-401
SHT NO: 5 OF 6

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-401,1-6.dwg | Layout: SA-401.5
PLOTTED: Mar 18, 2021-08:33:31am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

WOOD POLE DOUBLE FEEDER MATERIAL LIST (SEE PAGE 1)

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
77	AS REQD	ELEC WARNING TAPE, 6" YELLOW	BRADY	UT 20-Y6
78	2	CONNECTOR, PARALLEL CLAMP	BURNDY	QPX342C
81	1	CONNECTOR, SERVICE, SPLIT BOLT	BURNDY	KS20
83	1	MOLDING, PLASTIC, GROUND WIRE, 1/2" X 1/16" X 8'	JOSLYN	PM128
85	2	1000 VOLT DC ARRESTOR 970 MCOV	IMPULSE	P/N 1057
91	AS REQD	STAPLES, ROLLED POINT, GALV, 2" X 1/2" X 0.162"	JOSLYN	J156
93	AS REQD	STAPLES, ROLLED POINT, GALV, 1 3/4" X 1/4" X 0.148"	JOSLYN	J1673
115	2	STAINLESS STEEL BOLT WITH WASHERS & LOCK WASHERS		
116	*	WIRE, 2 OR 5 KV, #4 AWG CU, JACKETED, UNSHIELDED		
117	VARIES	WIRE, #4 AWG CU, SOLID, SOFT, 0.031" POLYETHYLENE INSULATED		
118	1	GROUND ROD CLAMP	JOSLYN	J8492
119	AS REQD	CONDUCTIVE & ANTI-SEIZE COMPOUND (KOPR-SHIELD)	THOMAS & BETTS	CP-8 OR CP-16
120	1	GROUND ROD, 5/8" X 10'	JOSLYN	J8340
402	AS REQD	FEEDER RISER	METRO STD	SA-402

STEEL POLE DOUBLE FEEDER MATERIAL LIST (SEE PAGE 3)

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
78	2	CONNECTOR, PARALLEL CLAMP	BURNDY	QPX342C
85	2	1000 VOLT DC ARRESTOR 970 MCOV	IMPULSE	P/N 1057
115	2	STAINLESS STEEL BOLT WITH WASHERS & LOCK WASHERS		
116	*	WIRE, 2 OR 5 KV, #4 AWG CU, JACKETED, UNSHIELDED		
402	AS REQD	FEEDER RISER	METRO STD	SA-402

No.	REVISION	BY	APP'D	DATE

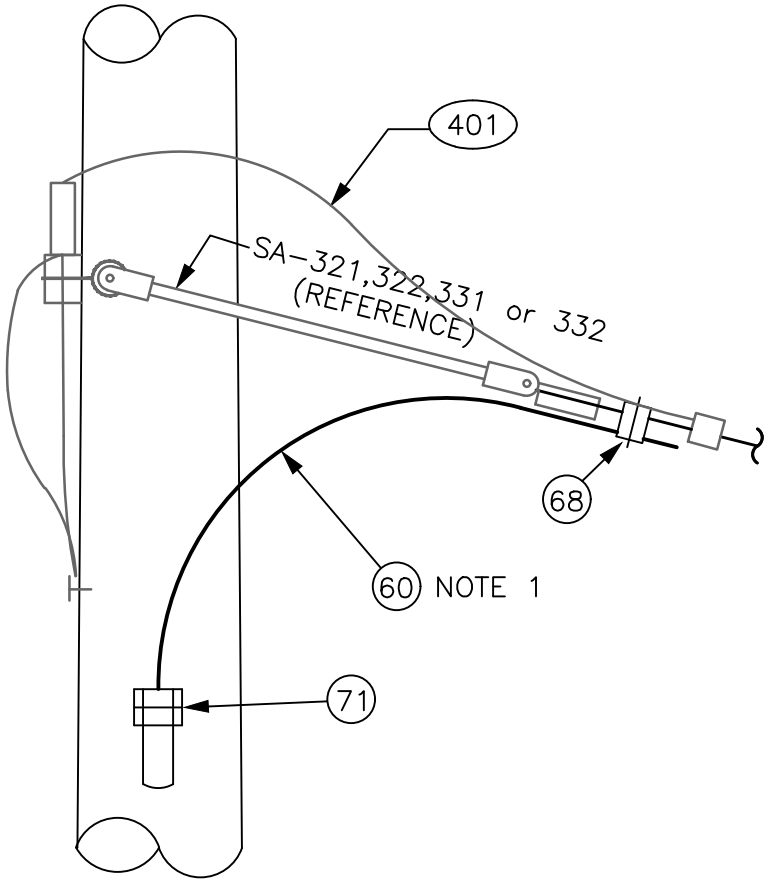
DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

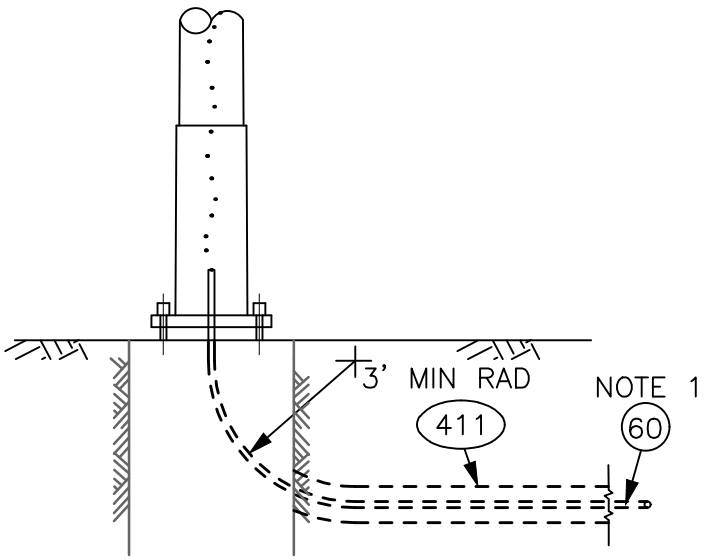
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
LIGHTNING ARRESTERS
DOUBLE FEEDER
(MATERIAL LIST)

DATE: 03/2021
STD DET NO: SA-401
SHT NO: 6 OF 6

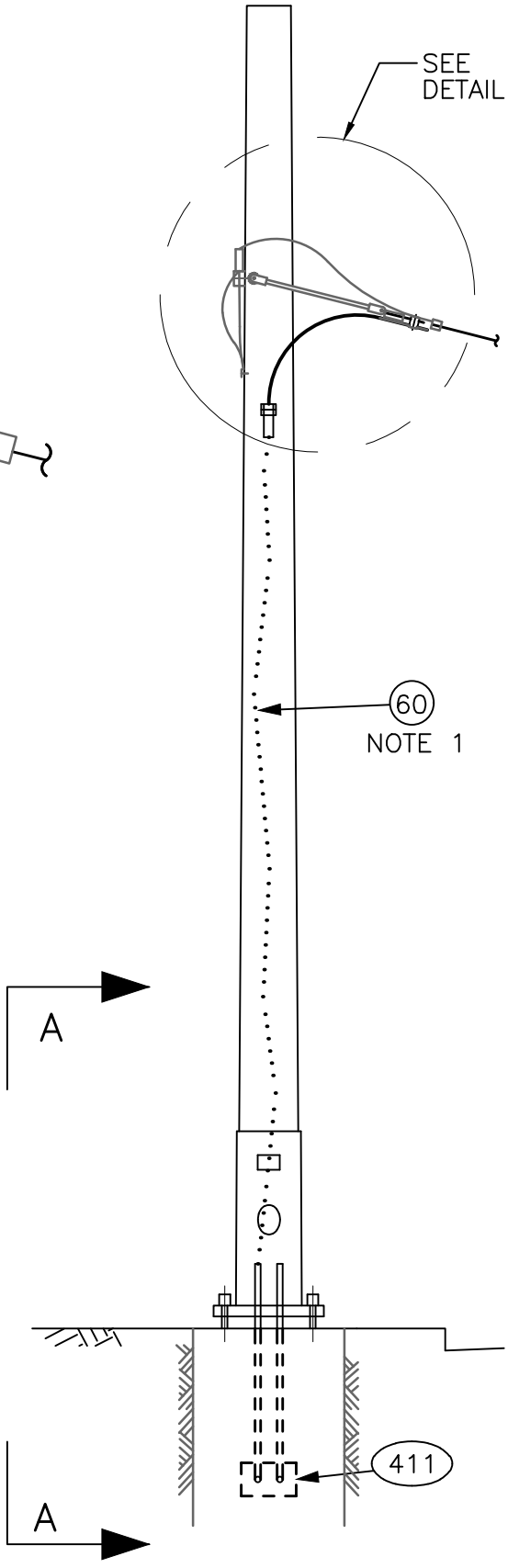
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-401,1-6.dwg | Layout: SA-401.6
PLOTTED: Mar 18, 2021-08:33:36am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



ELEV DETAIL



SECTION A–A



No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

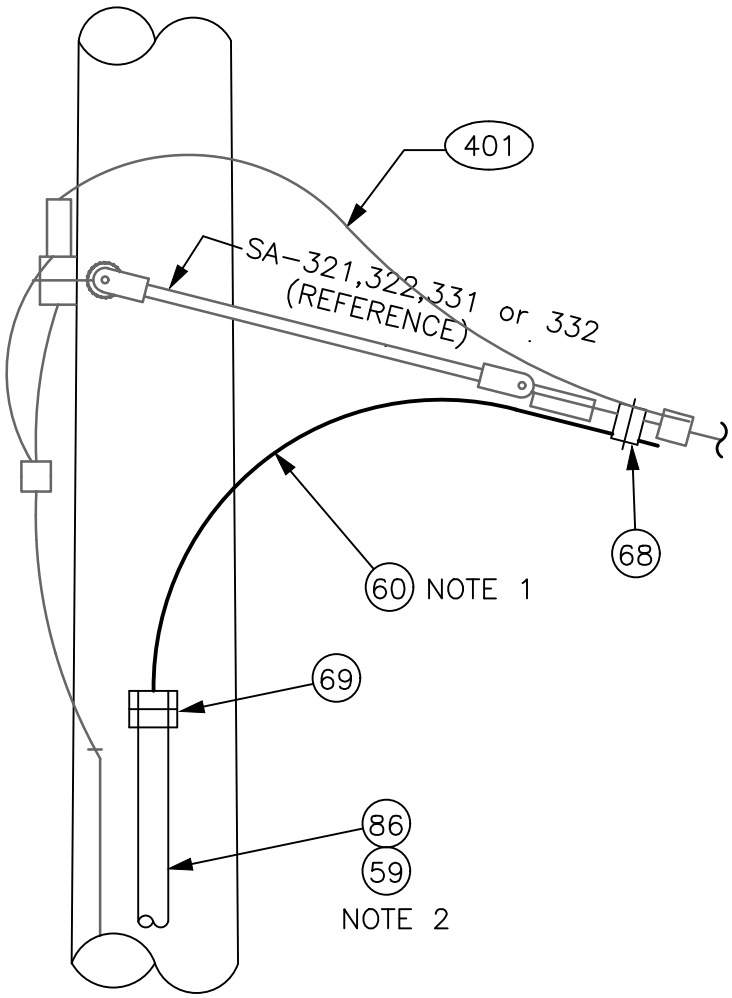
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

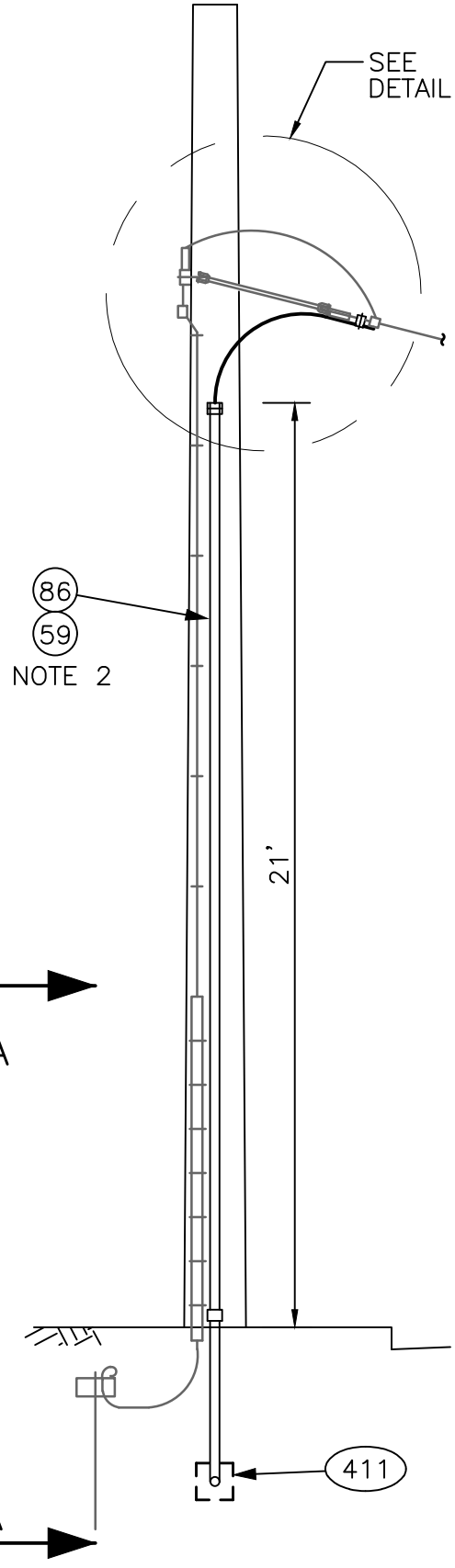
FEEDER RISER
(STEEL POLE)

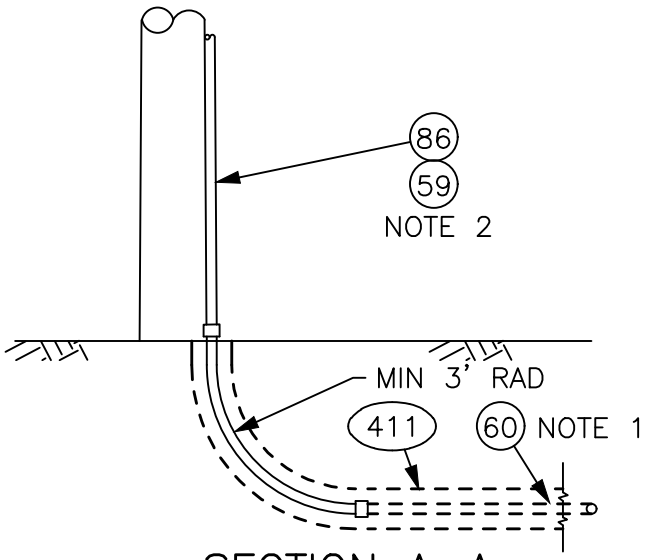
DATE: 03/2021
STD DET NO: SA-402
SHT NO: 1 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-402,1-3.dwg | Layout: SA-402.1
PLOTTED: Mar 18, 2021-08:33:45am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



ELEV DETAIL





SECTION A–A

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

FEEDER RISER
(WOOD POLE)

DATE: 03/2021
STD DET NO: SA-402
SHT NO: 2 OF 3

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-402,1-3.dwg | Layout: SA-402.2
PLOTTED: Mar 18, 2021-08:33:51am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

STEEL POLE MATERIAL LIST (SEE PAGE 1)

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UN-SHIELDED, 5 KV EPR W/ PVC JACKET		
68	1 or 2	UNIVERSAL SERVICE CONNECTOR	BURNDY	KVSU 34
71	1 or 2	WATERTIGHT STR STRAIN RELIEF CONN 1 1/2" CONDUIT	O-Z-GEDNEY	SR 15012 H. D. GALV.
401	AS REQD	LIGHTNING ARRESTER	METRO STD	SA-401
411	AS REQD	DUCTBANK	METRO STD	SA-411

WOOD POLE MATERIAL LIST (SEE PAGE 2)

ITEM #	QTY	DESCRIPTION	MANUFACTURER	CAT. NO.
59	AS REQD	CONDUIT CLAMP W/2" MTG SCREW		
60	AS REQD	FEED SPAN CABLE 500 KCM CU, UN-SHIELDED, 5 KV EPR W/ PVC JACKET		
68	1 or 2	UNIVERSAL SERVICE CONNECTOR	BURNDY	KVSU 34
69	1 or 2	SEALING BUSHING, TYPE KR W/ TYPE M CABLE SUPPORT 2-1/2" CONDUIT	O-Z-GEDNEY	KR250 & RPLG-2001-1
86	AS REQD	GALV RIGID STEEL CONDUIT		
401	AS REQD	LIGHTNING ARRESTER	METRO STD	SA-401
411	AS REQD	DUCTBANK	METRO STD	SA-411

NOTES:

1. ITEM 60 SHALL INCLUDE SUFFICIENT LENGTH TO CONNECT FEED SPAN WITH VAULT SHOWN ON DRAWINGS. COIL 20' AT VAULT END, AND COIL 10' AT FEED SPAN END.
2. ITEMS 59 & 86 TO MEET REQUIREMENTS OF SEATTLE CITY LIGHT SPEC U7-10. SINGLE RISER IS SHOWN, A SECOND CONDUIT SHALL BE ADDED FOR DOUBLE FEED RISER.
3. ITEM 86 & 411 CONDUIT TO BE PLASTIC COATED GALV RIGID STEEL IN BENDS.

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

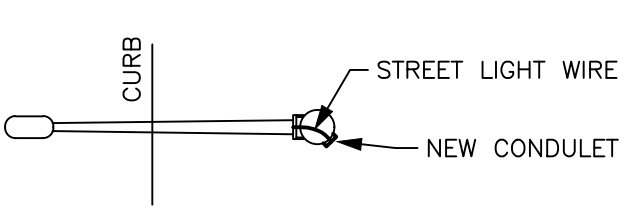
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

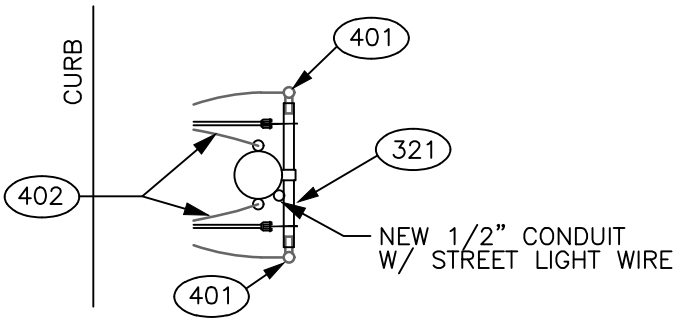
FEEDER RISER
MATERIAL LIST

DATE: 03/2021
STD DET NO: SA-402
SHT NO: 3 OF 3

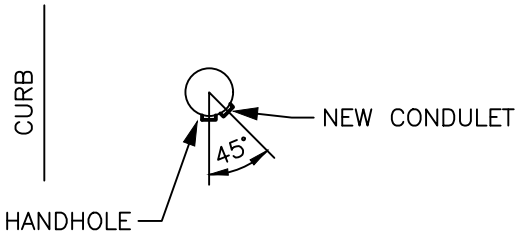
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-402.1-3.dwg | Layout: SA-402.3
PLOTTED: Mar 18, 2021-08:33:56am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



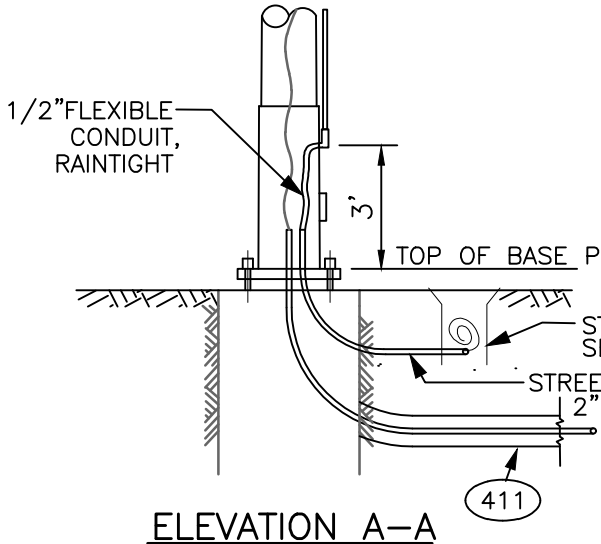
PLAN D–D



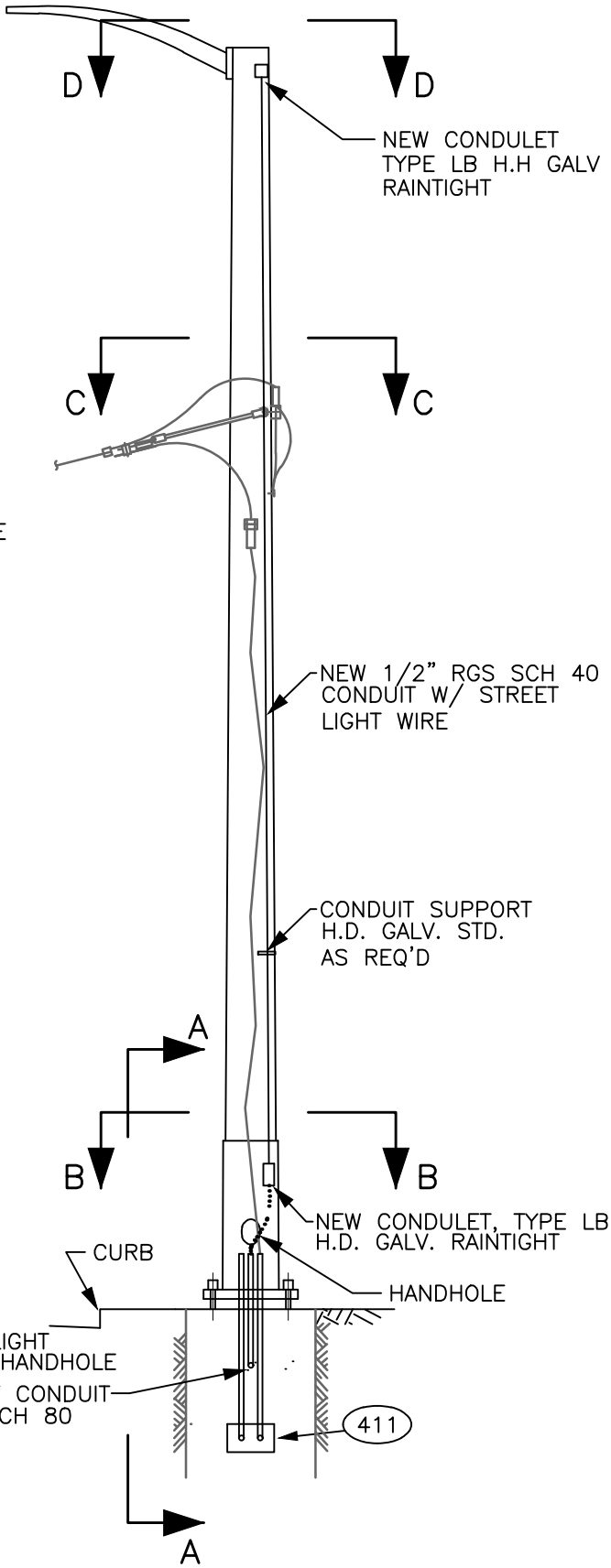
PLAN C–C



PLAN B–B



ELEVATION A–A



No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

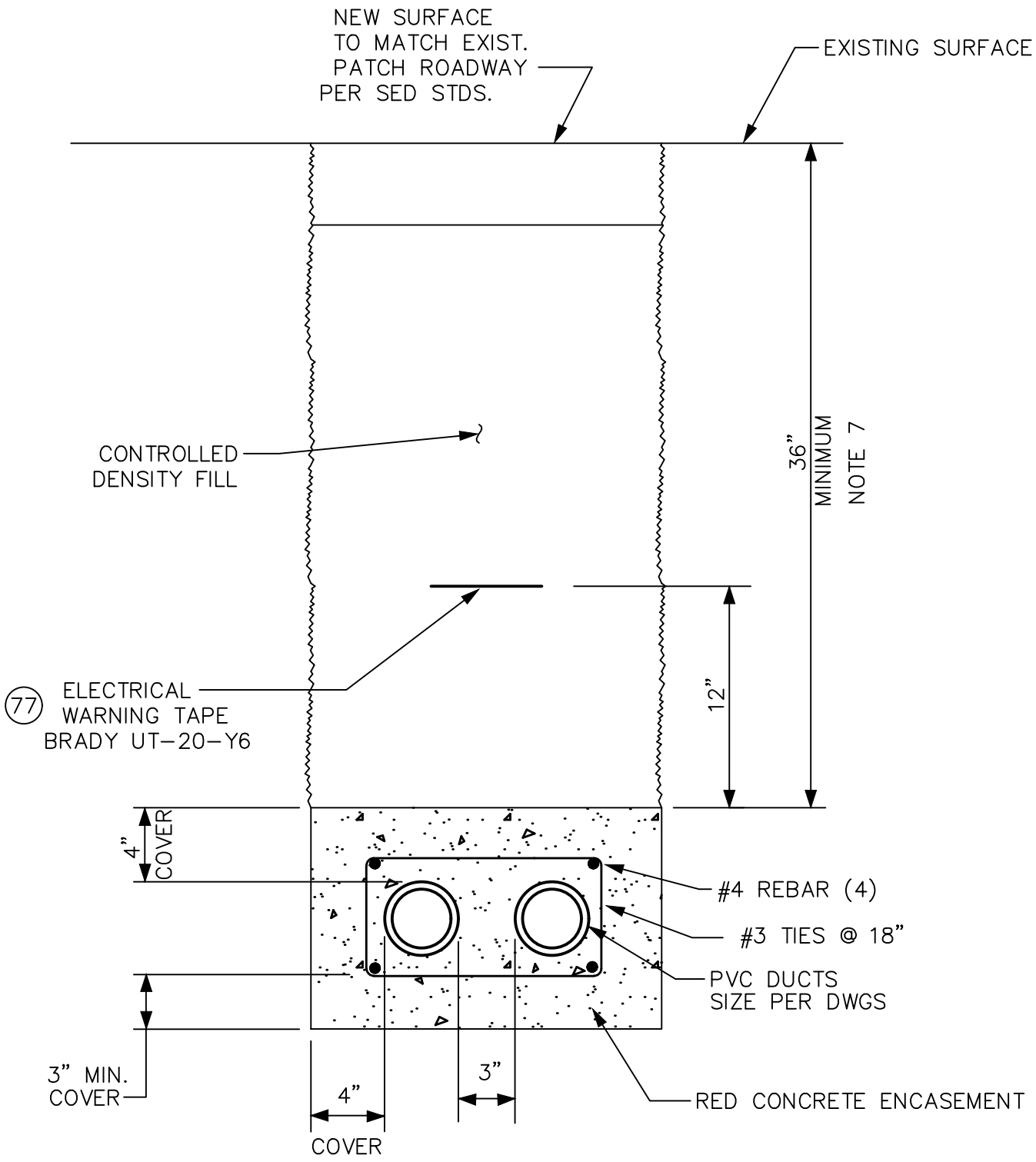
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

STEEL POLE FEEDER RISER WITH STREETLIGHT SPECIAL DETAILS

DATE: 03/2021
STD DET NO: SA-403
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\Detail updates November 2021\SA-403.dwg | Layout: SA-403
XREFS: | IMAGES:
PLOTTED: Nov 22, 2021 - 08:05:04pm By AnderLS



CONCRETE ENCASED DUCTBANK

SCALE: NOT TO SCALE

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

DUCTBANK
CONCRETE ENCASED

DATE: 03/2021
STD DET NO: SA-411
SHT NO: 1 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-411.1-2.dwg | Layout: SA-411.1
PLOTTED: Mar 18, 2021-08:34:14am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

NOTES:

1. PVC conduit, fittings, and solvent shall meet the requirements of USDC Commercial Standard CS 207, UL 651, ASTM 2564, NEMA TC2, NEMA TC6 & NEMA TC9.

2. All work shall meet the requirements of City of Seattle Board of Public Works Rules: Chapter 4.40 – Street and Sidewalk Pavement Opening and Restoration Rules if duct is in Street Right of Way.

3. Concrete for duct shall develop a minimum compressive strength of 3000 PSI at 28 days, and shall be colored red by adding ten pounds of iron oxide per cubic yard of concrete. Max. aggregate size shall be 3/8".

4. All reinforcing bars shall be deformed billet steel and shall meet the requirements of ASTM A615 Grade 60. All detailing of reinforcement shall meet the requirements of the MANUAL OF STANDARD PRACTICE For Detailing Reinforced Concrete Structures ACI–315 current edition.

5. Compacted trench backfill shall be suitable excavated native material, that is acceptable to the engineer. Backfill shall be firmly and through–ly machine tamped to 95% maximum dry density under streets or side–walks, and 90% maximum dry density under landscaped or unimproved areas.

6. Pavement patching shall meet the requirements of City of Seattle Department of Engineering Standard Plan No. 404A, if the duct is in street.

7. Burial depth shall be 48" minimum at street intersections (maximum depth shall be 72"). Maximum grade shall be 10%. Minimum grade shall be 0.25%.

8. Plastic coated GRS conduit shall be used to accomadate horizontal direction changes greater than 15°. The sweep shall be effected with a 12.5 ft minimum radius, and PVC adapter couplings as required. The

No.	REVISION	BY	APP'D	DATE

DESIGNED: A. WOLAK
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
DUCTBANK
CONCRETE ENCASED
NOTES

DATE: 03/2021
STD DET NO: SA-411
SHT NO: 2 OF 2

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SA-411,1-2.dwg | Layout: SA-411.2
PLOTTED: Mar 18, 2021-08:34:21am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:

TROLLEY POLE CONTRACT
PURCHASE REQUIREMENTS

SP–201 DETAIL DRAWINGS

1 STANDARD AND (S) STEEL POLE DETAILS

2 (C) AND (CS) STEEL POLE DETAILS

3 STANDARD STEEL EMBEDDED POLE DETAIL

4 STANDARD STEEL POLE FIXTURE ORIENTATION

5 STANDARD STEEL POLE SCHEDULE & NOTES

6 STANDARD AND (S) STEEL POLE PLATE AND SLEEVE DETAILS

7 (C) AND (CS) STEEL POLE PLATE & SLEEVE DETAILS

8 STANDARD STEEL POLE IDENTIFICATION TAG DETAIL

9 STANDARD STEEL POLE LIGHT MOUNTING DETAIL

10 STANDARD STEEL DAVIT ARM POLE DETAILS

11 STANDARD STEEL POLE RISER OUTLET DETAILS

12 STANDARD STEEL POLE OUTLET DETAILS

13 STANDARD STEEL POLE PEDESTRIAN LIGHT MOUNTING DETAIL–BELLTOWN

14 STANDARD STEEL POLE PEDESTRIAN LIGHT MOUNTING DETAIL–WESTLAKE

15 STANDARD STEEL POLE GENERAL NOTES

16 STANDARD STEEL POLE GENERAL NOTES

17 STANDARD STEEL POLE ANCHOR BASE POLE DETAILS

18 STANDARD STEEL POLE ANCHOR BASE POLE DETAILS

No.	REVISION	BY	APP'D	DATE

DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

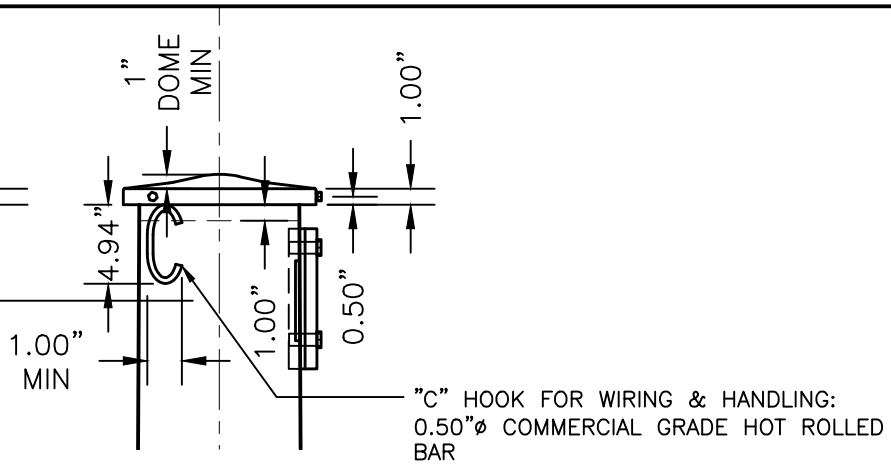
SHEET INDEX

DATE: 03/2021
STD DET NO: G0-01
SHT NO: 1 OF 1

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: INDEX-G0.01
PLOTTED: Mar 18, 2021-08:34:29am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

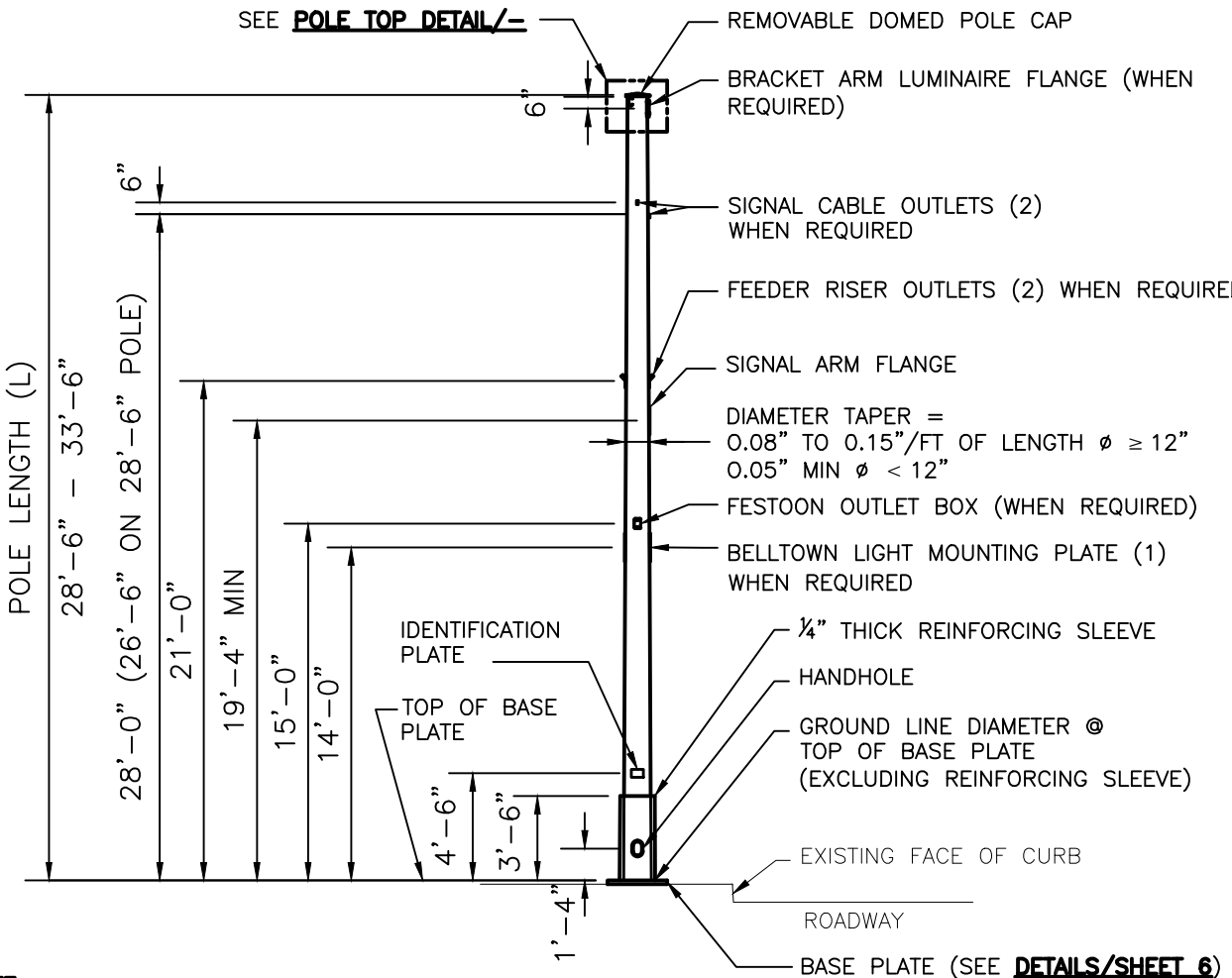
NOTES:

1. CAST POLE TOP CAP HELD IN PLACE W/ (3) ⅜" – 16UNC STAINLESS STEEL SET SCREWS.
2. CAP WILL BE SIZED TO FIT OVER ALADDIN TOP PLATE WHEN REQUIRED
3. STEEL SHALL BE 0.1" MINIMUM THICKNESS.



POLE TOP DETAIL

SCALE: 1" = 1'–0"



NOTE:
SPECIAL = (S) OVERSIZED POLE ON EXISTING FOUNDATION

STANDARD AND SPECIAL STEEL POLES

SCALE: ⅛" = 1'–0"

No.	REVISION	BY	APP'D	DATE

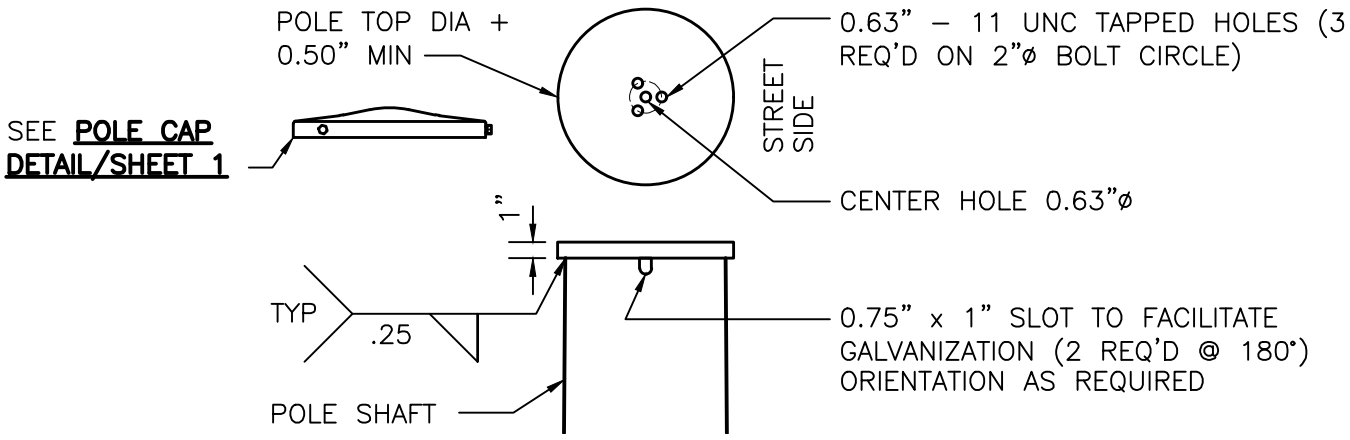
DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD &(S) STEEL POLE PURCHASE REQUIREMENTS POLE DETAILS

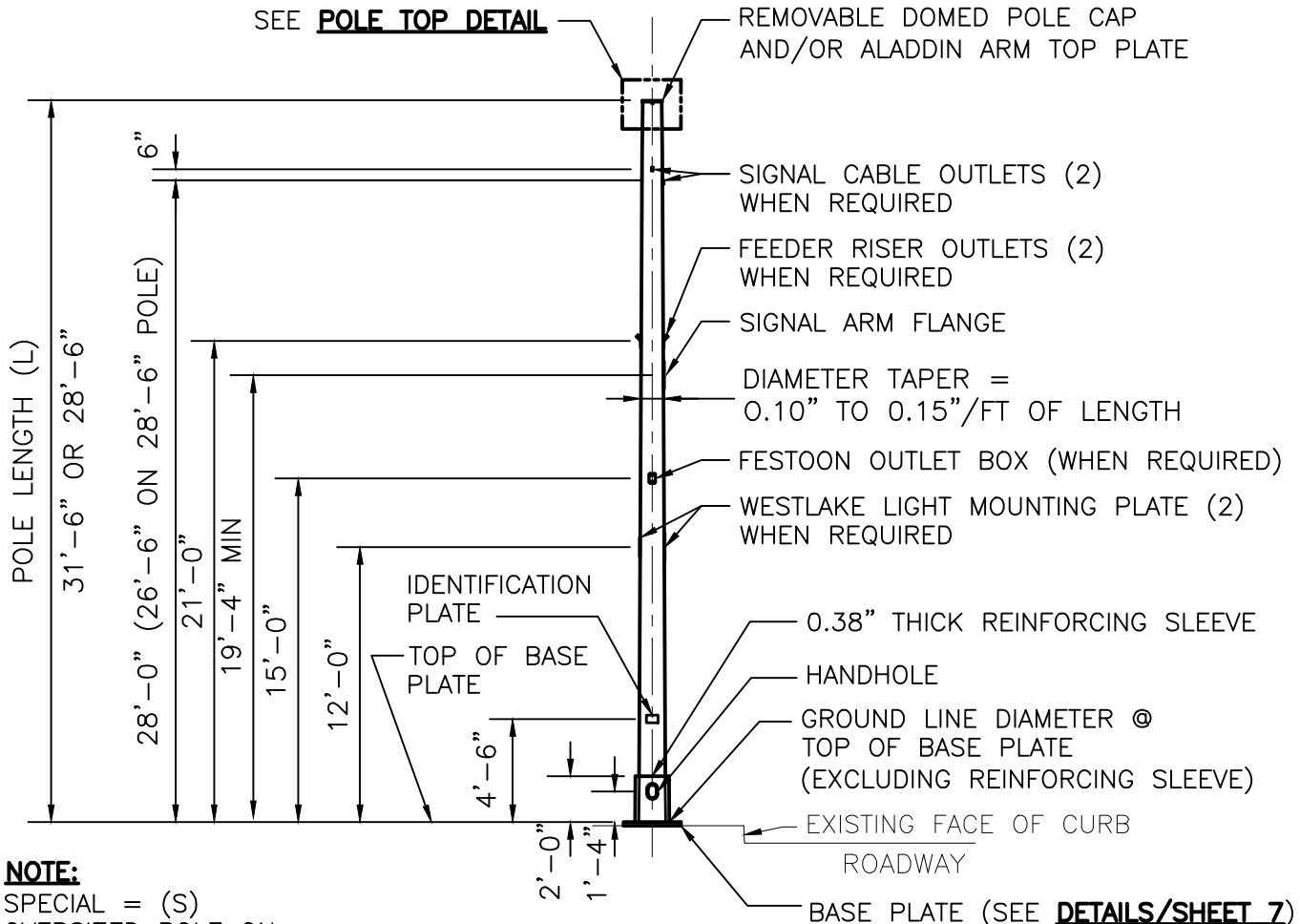
DATE: 03/2021
STD DET NO: SP-201
SHT NO: 1 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.1
PLOTTED: Mar 18, 2021-08:34:35am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



POLE TOP DETAIL

SCALE: 1" = 1'–0"



NOTE:
SPECIAL = (S)
OVERSIZED POLE ON EXISTING FOUNDATION

CHIEF SEATTLE BASE = (C)

CHIEF SEATTLE BASE SPECIAL = (CS)

CHIEF SEATTLE BASE AND CHIEF SEATTLE BASE SPECIAL STEEL POLES

SCALE: ⅛" = 1'–0"

No.	REVISION	BY	APP'D	DATE

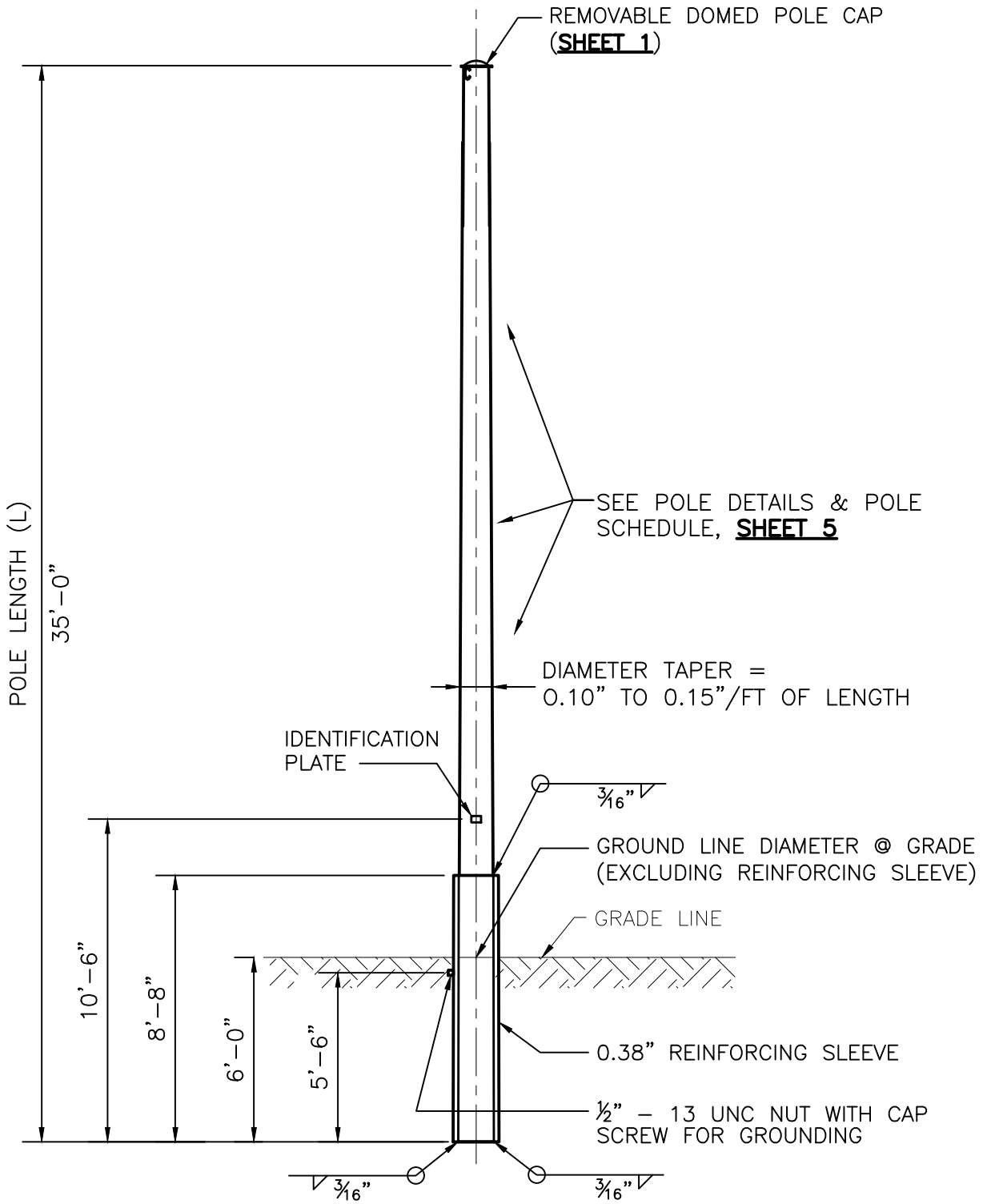
DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
(C)&(CS) STEEL POLE PURCHASE REQUIREMENTS
POLE DETAILS

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 2 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA updates for 2021 publication\03_Review set\SP INDEX G0.01 – SP201.1 - 201.18.dwg | Layout: SP-201.2
PLOTTED: Mar 18, 2021-08:34:40am By dlbennett
XREFS: TTB A Size.dwg
IMAGES:



EMBEDDED STEEL POLE

SCALE: 1" = 5'–0"

No.	REVISION	BY	APP'D	DATE

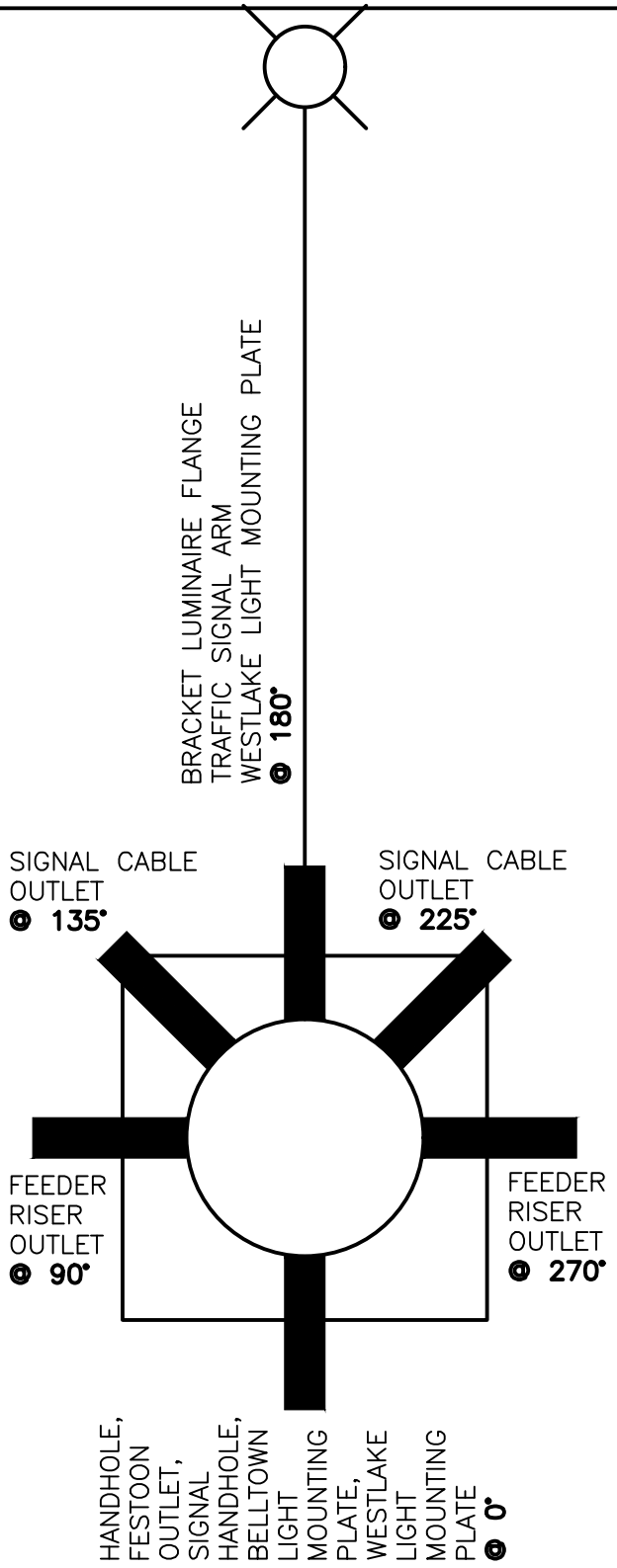
DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

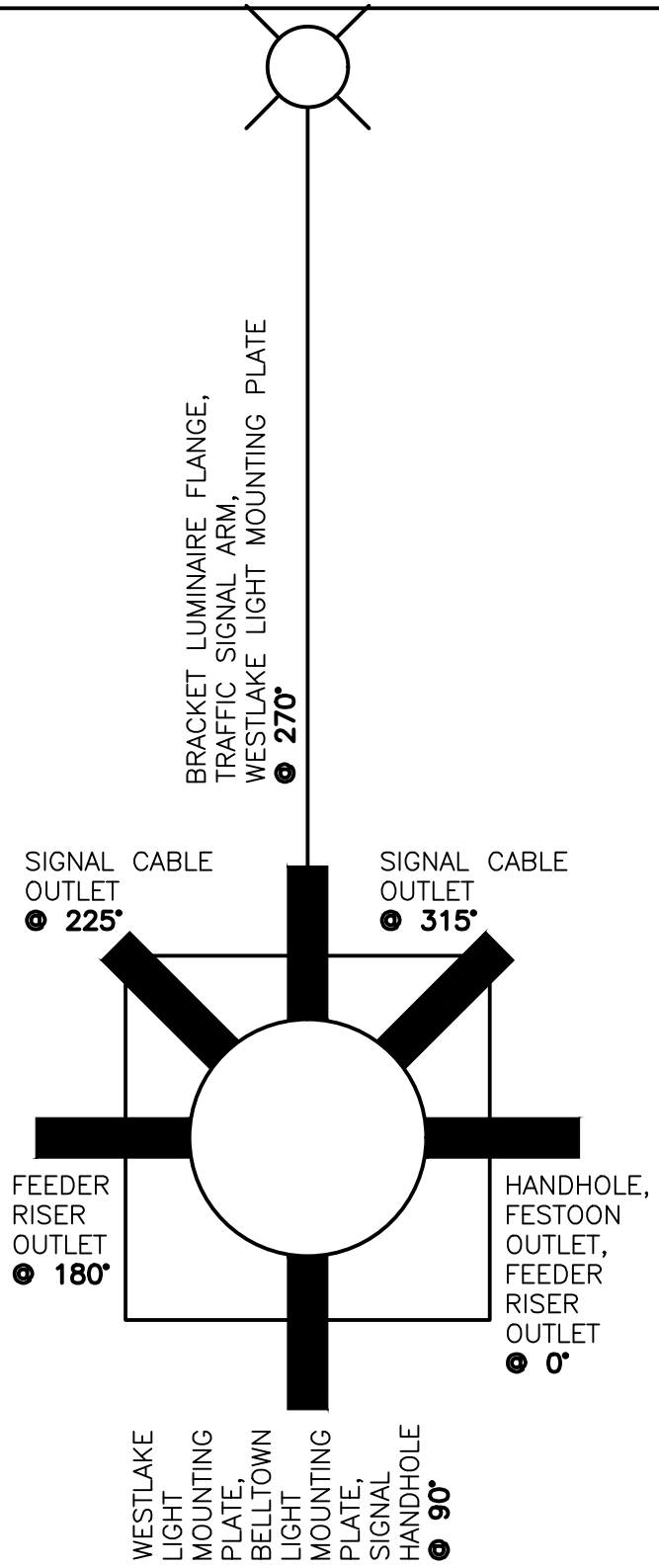
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE PURCHASE REQUIREMENTS
EMBEDDED POLE DETAIL

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 3 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.3
PLOTTED: Mar 18, 2021-08:34:45am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



NON-STANDARD TYPE FIXTURE ORIENTATION



STANDARD TYPE FIXTURE ORIENTATION

No.	REVISION	BY	APP'D	DATE

DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE PURCHASE REQUIREMENTS
FIXTURE ORIENTATION

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 4 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.4
PLOTTED: Mar 18, 2021-08:34:50am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

POLE SCHEDULE (WITHOUT SLEEVES)

POLE TYPE	POLE STYLE	NORMAL LENGTH (L) (FEET)	MAX. GROUND LINE ACROSS FLATS (INCHES)	WORKING LOAD (LB) @25' FOR △D ONLY	(My) GROUND LINE MOMENT (LB–FT)	POLE FOUNDATION TYPE
SA–201H	EMBEDDED	35	12	2200	110,000	SA–212B
SA–201K			14	3600	180,000	SA–212D
SA–201M			15	6600	330,000	SA–212F
SA–203–1	ANCHOR BASE	30	8	1600	80,000	SA–213A
SA–203–2			10	2000	100,000	SA–213A
SA–201V	ANCHOR BASE	28.5 OR 33.5	12	2200	110,000	SA–213B
SA–201X			14	3600	180,000	SA–213D
SA–201X(S)			12½	3600	180,000	SA–213B
SA–201Y(S)			14	5400	270,000	SA–213D
SA–201Z			15	6600	330,000	SA–213F
SA–201ZZ			15	8000	400,000	SA–213F
SA–201ZZZ			16	12,000	600,000	SA–213H
SA–201V(C)	ANCHOR BASE W/ SMALL DIAMETER SHAFT FOR CHIEF SEATTLE CASTING	28.5 OR 31.5	11¾*	2200	110,000	SA–213B
SA–201X(C)			11¾*	3600	180,000	SA–213D
SA–201Y(C)			11¾*	5400	270,000	SA–213F
SA–201X(CS)			11¾*	3600	180,000	SA–213B
SA–201Y(CS)			11¾*	5400	270,000	SA–213D
SA–201Z(C)			11¾*	6600	330,000	SA–213F

△D = DEFLECTION
(S) = SPECIAL: OVERSIZED POLE ON EXISTING FOUNDATION (C) = CHIEF SEATTLE BASE
(CS) = CHIEF SEATTLE BASE, SPECIAL; *12¼"ø ROUND OK AS ALTERNATIVE.

POLE SCHEDULE NOTES

1. POLE MANUFACTURER SHALL DESIGN POLE BASED ON THE DATA SHOWN HERE AND IN CONFORMANCE TO THE SPECIFICATIONS.

2. MINIMUM WALL THICKNESS SHALL BE 3 GAGE. WALL SHALL BE SINGLE PLY AND THE SAME MATERIAL FULL LENGTH.

3. MINIMUM GROUND LINE MOMENT AT YIELD SHALL BE (My).

4. NOT USED

5. THE LATERAL DEFLECTION OF THE TOP OF EACH POLE RESULTING FROM THE WORKING LOAD SHALL NOT EXCEED 2.5% OF THE POLE LENGTH FOR POLE DIAMETERS ≥ 12" AND 3% FOR POLE DIAMETERS < 12"

6. STRENGTH CALCULATIONS SHALL BE BASED ON GROUND LINE DIAMETER ONLY AND SHALL NOT INCLUDE THE REINFORCING SLEEVE.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE PURCHASE REQUIREMENTS
POLE SCHEDULE & NOTES

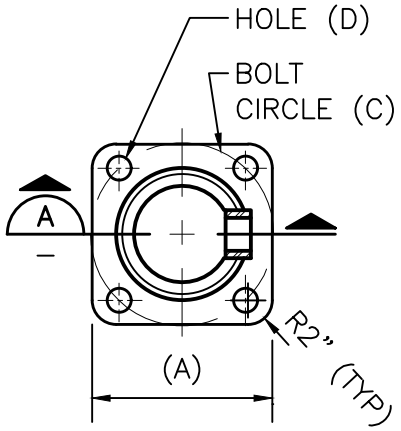
DATE: 03/2021
STD DET NO: SP-201
SHT NO: 5 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.5
PLOTTED: Mar 18, 2021-08:34:55am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

POLE BASE PLATE DIMENSIONS

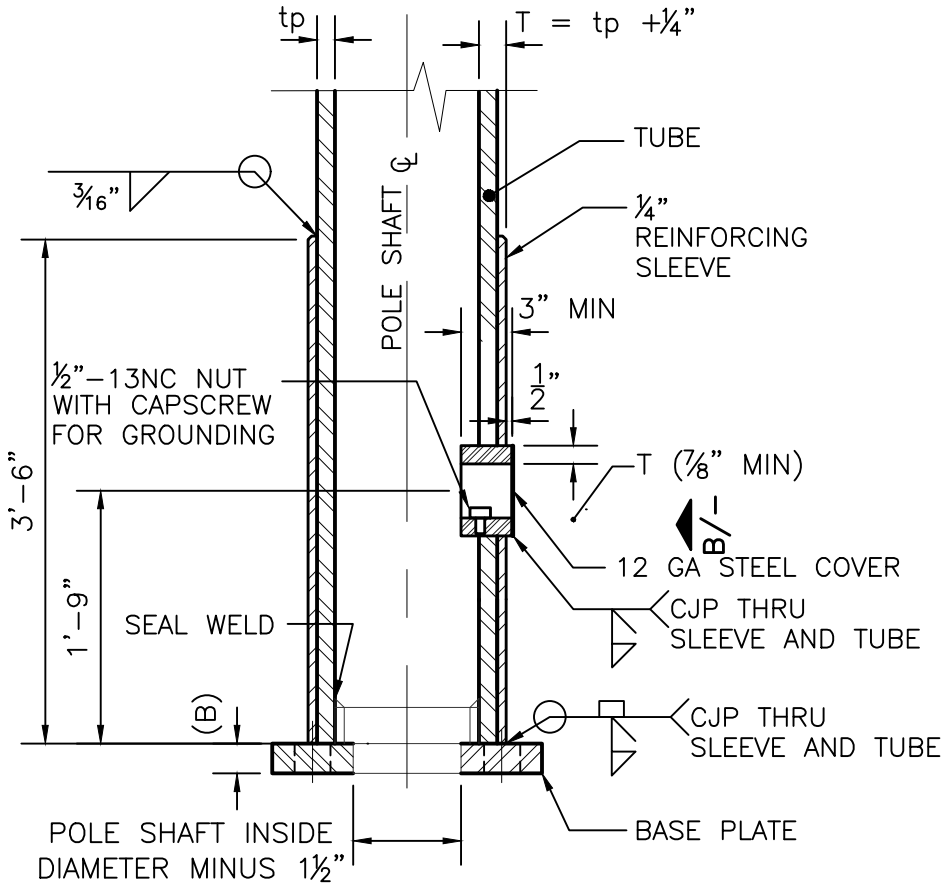
POLE TYPE	PLATE WIDTH x LENGTH (A)	PLATE THICKNESS (B)	BOLT CIRCLE (C)	HOLE DIAMETER (D)
SA–203–1 SA–203–2	14 x 14 16 x 16	1½ 1¾	11½–13½ 14½–16½	1¼–1 13/16 1 11/16–1 13/16
SA–201V	18 x 18	2	18	2 1/16
SA–201X	20 x 20	2	20	2 5/16
SA–201X(S)	20 x 20	2	18	2 1/16
SA–201Y(S)	23 x 23	2¼	20	2 5/16
SA–201Z	23 x 23	2½	22	2 13/16
SA–201ZZ	23 x 23	2½	22	2 13/16
SA–201ZZZ	25 x 25	3	24	3 1/16

(S) = SPECIAL: OVERSIZED POLE ON EXISTING FOUNDATION



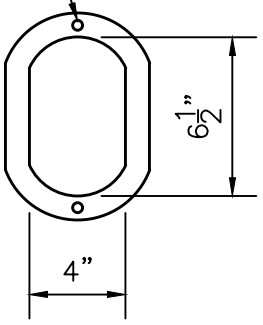
BASE PLATE
NOT TO SCALE

NOTE: SEE GENERAL NOTES



SECTION A
REINFORCING SLEEVE, BASE PLATE, AND HANDHOLE
SCALE: ¾" = 1'–0"

DRILL AND TAP FRAME FOR (2) ¼"– 20 UNC ¾" LONG STAINLESS HEX HEAD CAP SCREWS



ELEVATION B
HANDHOLE
(WITHOUT COVER)
SCALE: 3" = 1'–0"

No.	REVISION	BY	APP'D	DATE

DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD &(S) STEEL POLE PURCHASE REQUIREMENTS PLATE & SLEEVE DETAILS

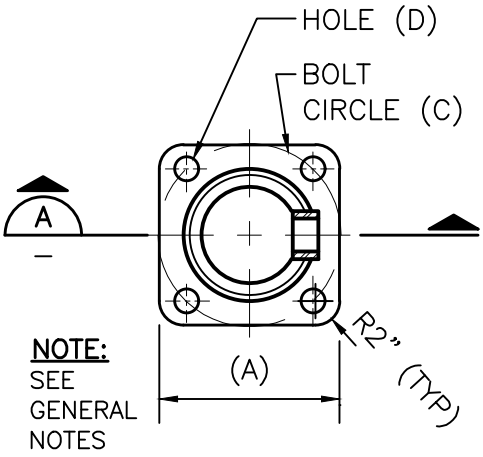
DATE: 03/2021
STD DET NO: SP-201
SHT NO: 6 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.6
PLOTTED: Mar 18, 2021-08:35:00am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

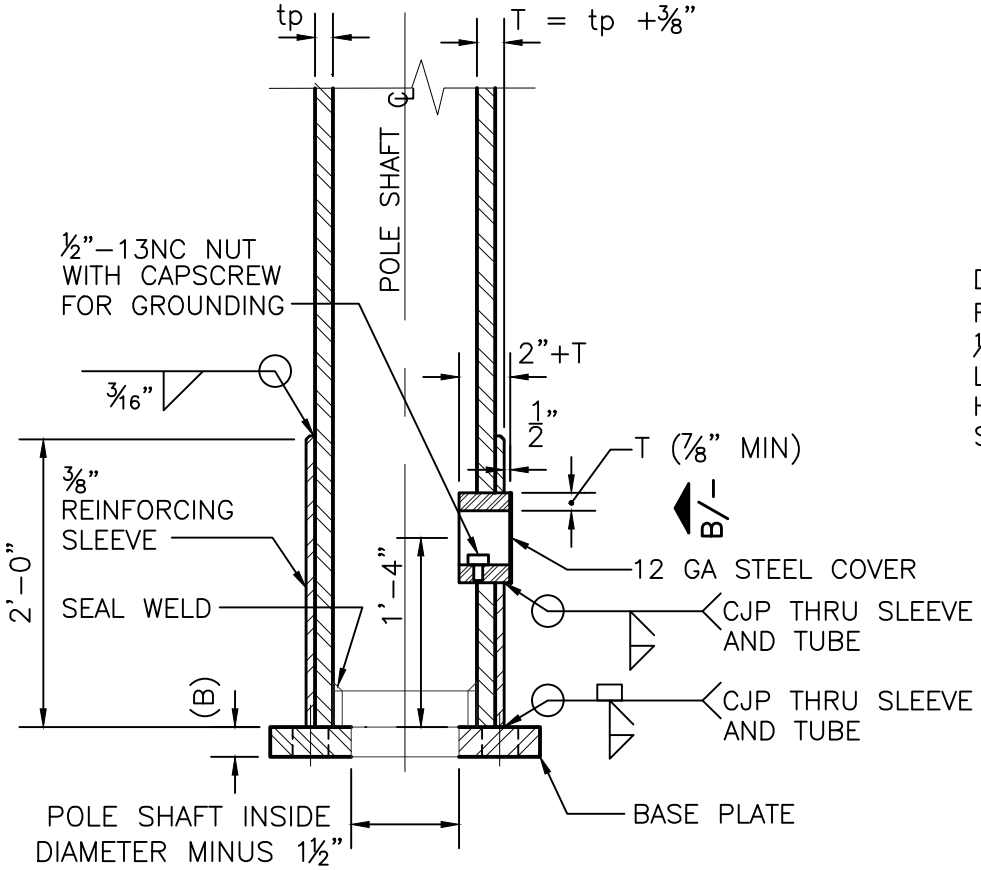
POLE BASE PLATE DIMENSIONS

POLE TYPE	PLATE WIDTH x LENGTH (A)	PLATE THICKNESS (B)	BOLT CIRCLE (C)	HOLE DIA (D)
SA–201V(C)	23 x 23	2	18	2 1/16
SA–201X(C)	23 x 23	2	20	2 5/16
SA–201Y(C)	23 x 23	2 1/4	22	2 13/16
SA–201X(CS)	23 x 23	2	18	2 1/16
SA–201Y(CS)	23 x 23	2 1/4	20	2 5/16
SA–201Z(C)	23 x 23	2 1/2	22	2 13/16

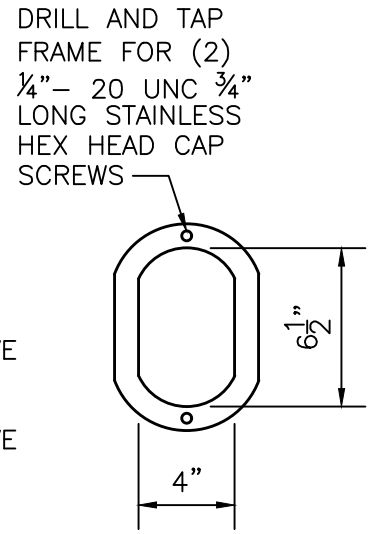
(S) = SPECIAL: OVERSIZED POLE ON EXISTING FOUNDATION
(C) = CHIEF SEATTLE BASE
(CS) = CHIEF SEATTLE BASE, SPECIAL



BASE PLATE
NOT TO SCALE



SECTION A
REINFORCING SLEEVE, BASE PLATE, AND HANDHOLE
SCALE: 3/4" = 1'–0"



ELEVATION B
HANDHOLE (WITHOUT COVER)
SCALE: 3" = 1'–0"

No.	REVISION	BY	APP'D	DATE

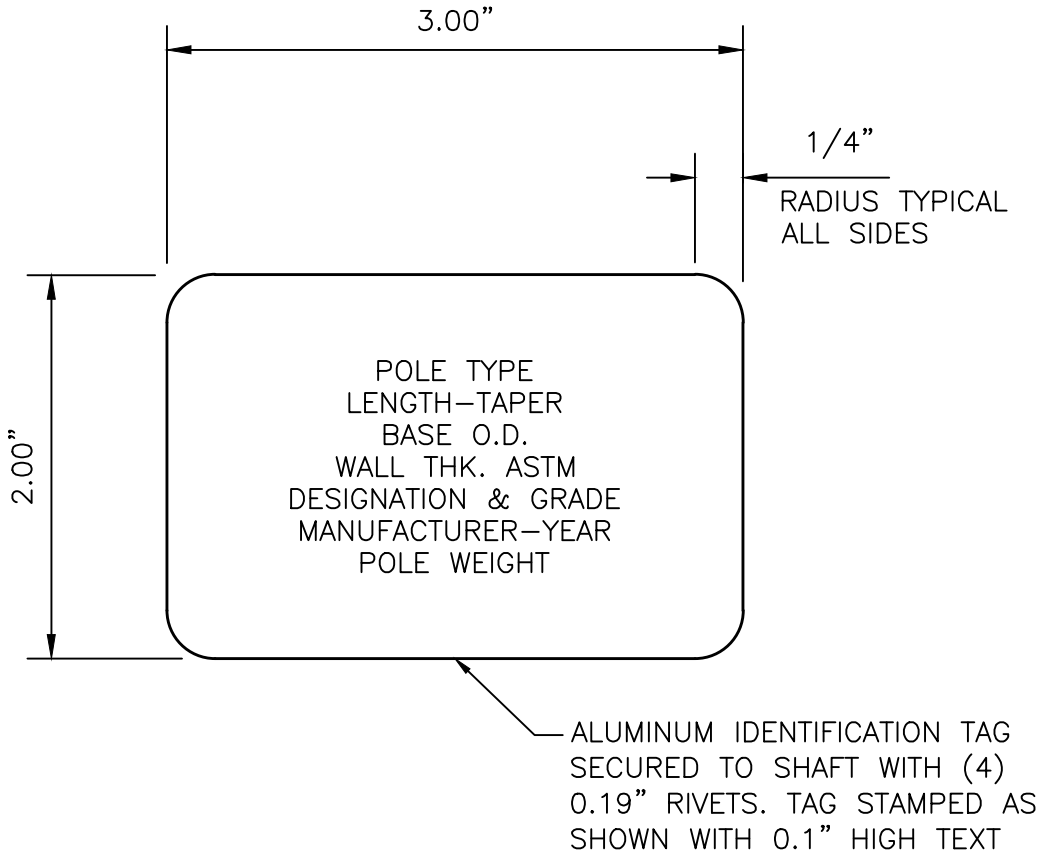
DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
(C) & (CS) STEEL POLE PURCHASE REQUIREMENTS PLATE & SLEEVE DETAILS

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 7 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.7
PLOTTED: Mar 18, 2021-08:35:05am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



POLE IDENTIFICATION TAG DETAIL

No.	REVISION	BY	APP'D	DATE

DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

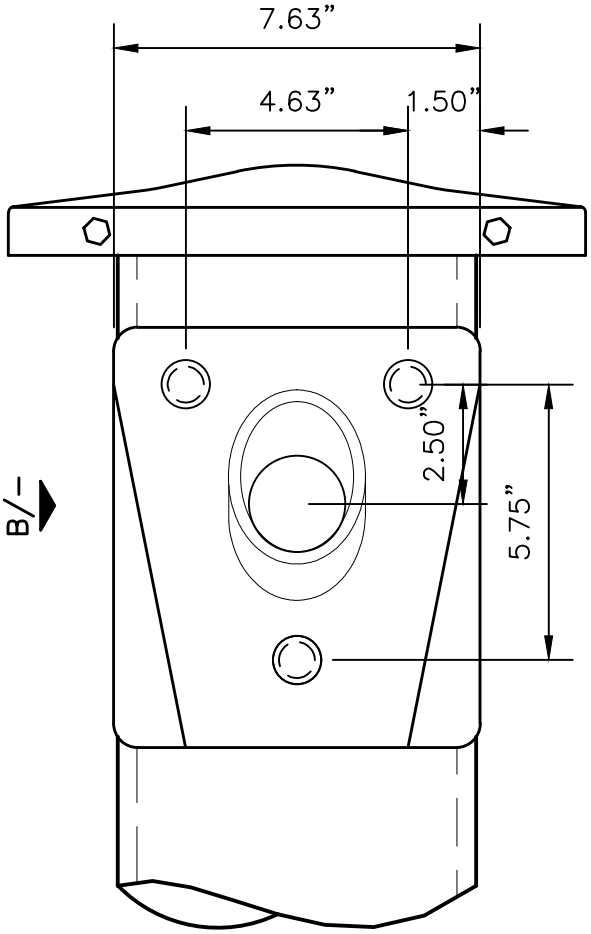
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS

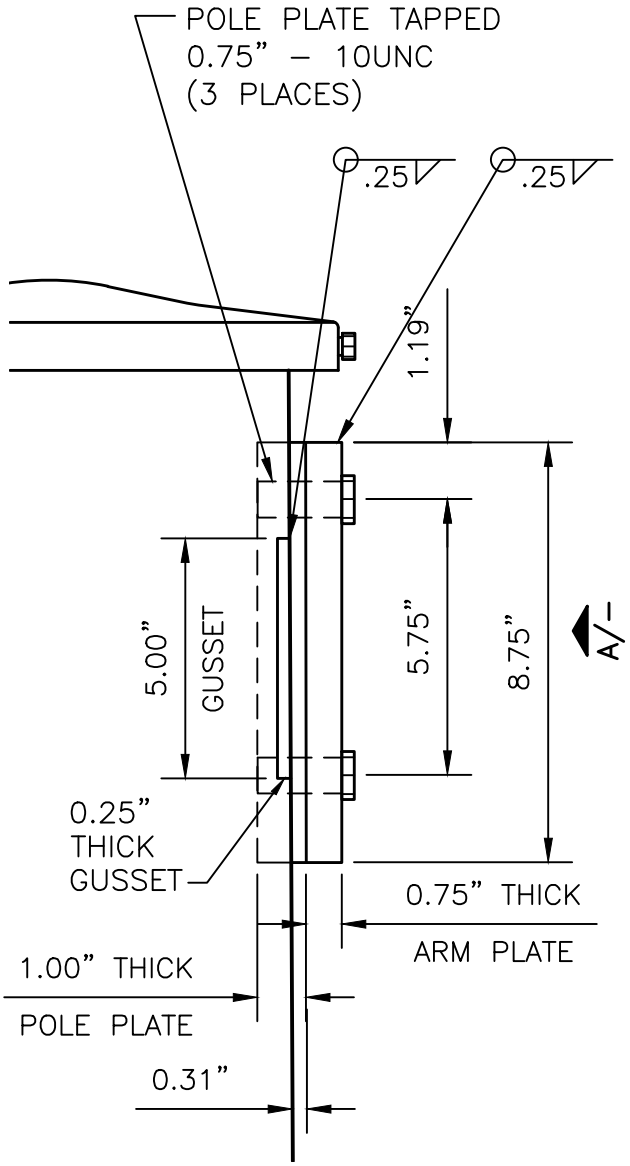
STANDARD STEEL POLE PURCHASE REQUIREMENTS
POLE IDENTIFICATION TAG

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 8 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.8
PLOTTED: Mar 18, 2021-08:35:10am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



SIDE VIEW A



FRONT VIEW B

BRACKET ARM LUMINAIRE FLANGE

SCALE: 3”” = 1’–0”

No.	REVISION	BY	APP'D	DATE

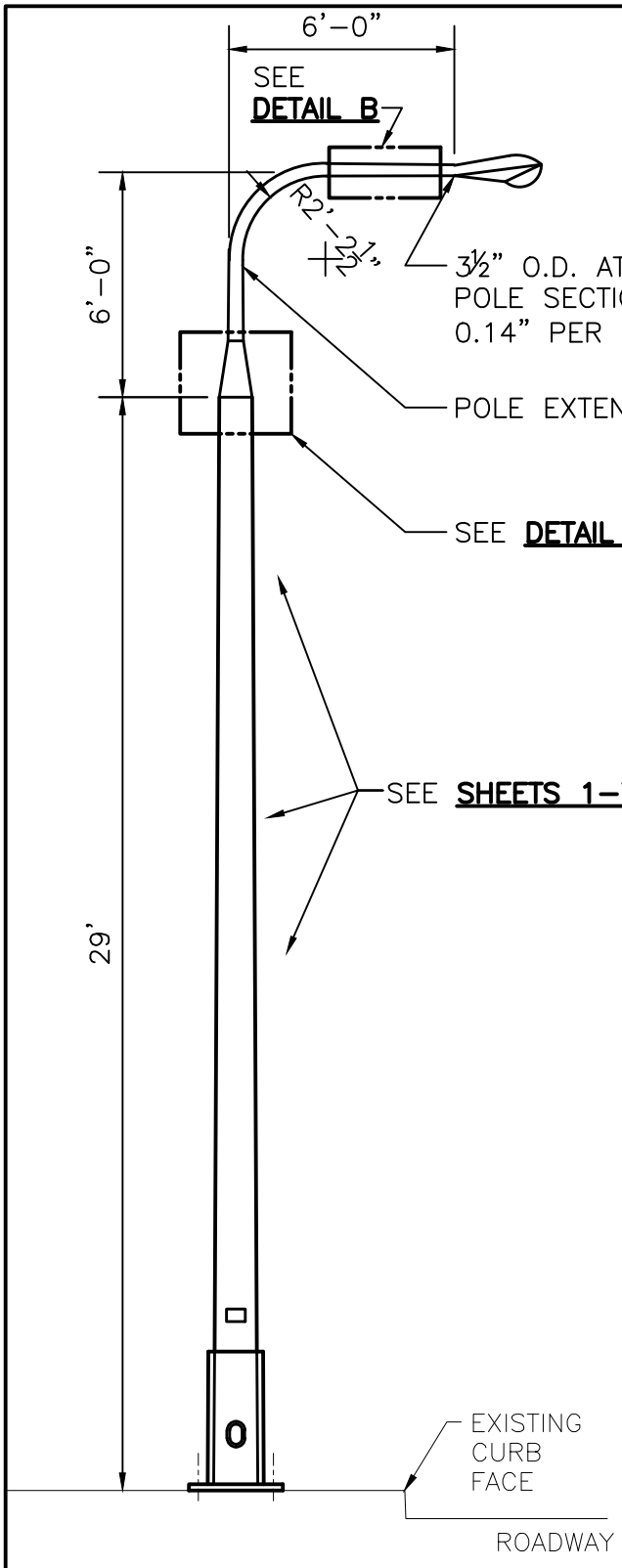
DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

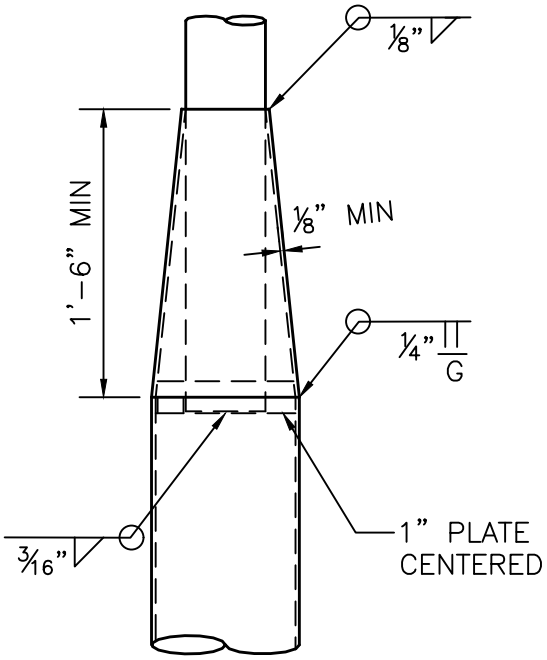
METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE
PURCHASE REQUIREMENTS
LIGHT MOUNTING DETAIL

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 9 OF 18

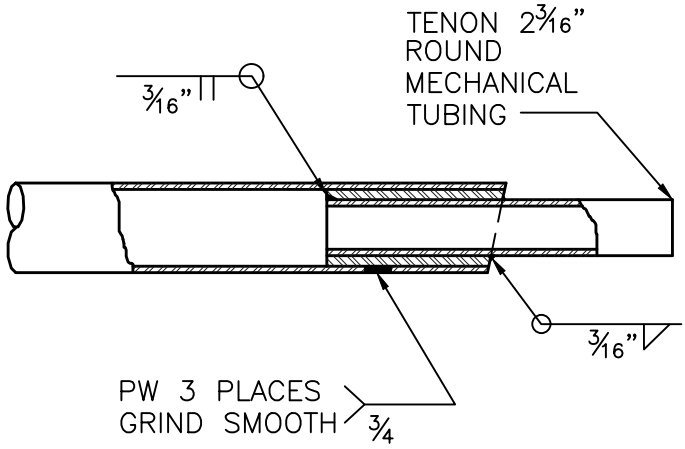
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.9
PLOTTED: Mar 18, 2021-08:35:15am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



DAVIT ARM STEEL POLE
SCALE: 1" = 5'–0"



DETAIL A
REDUCING CONE
SCALE: 1" = 1'–0"



DETAIL B
LUMINAIRE TENON
SCALE: NONE

No.	REVISION	BY	APP'D	DATE

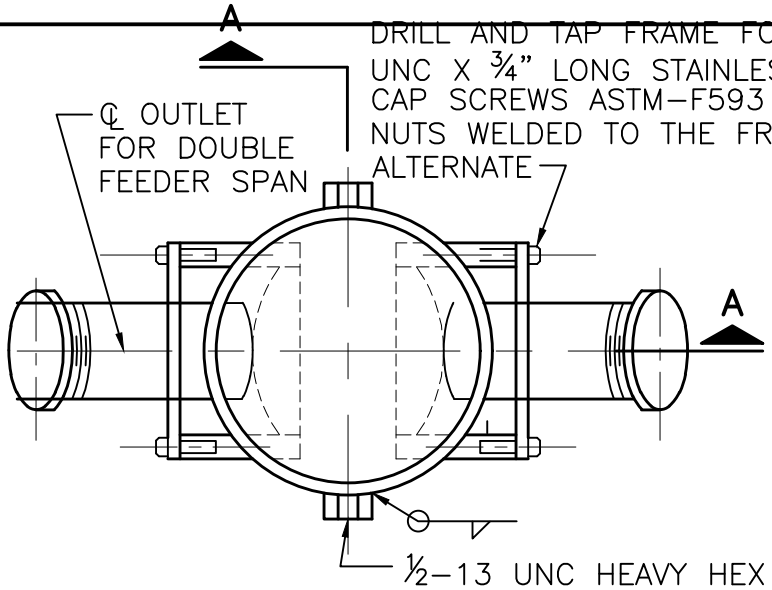
DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

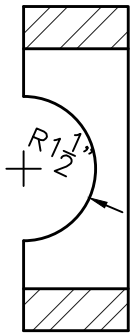
King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE
PURCHASE REQUIREMENTS
DAVIT ARM POLE DETAILS

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 10 OF 18

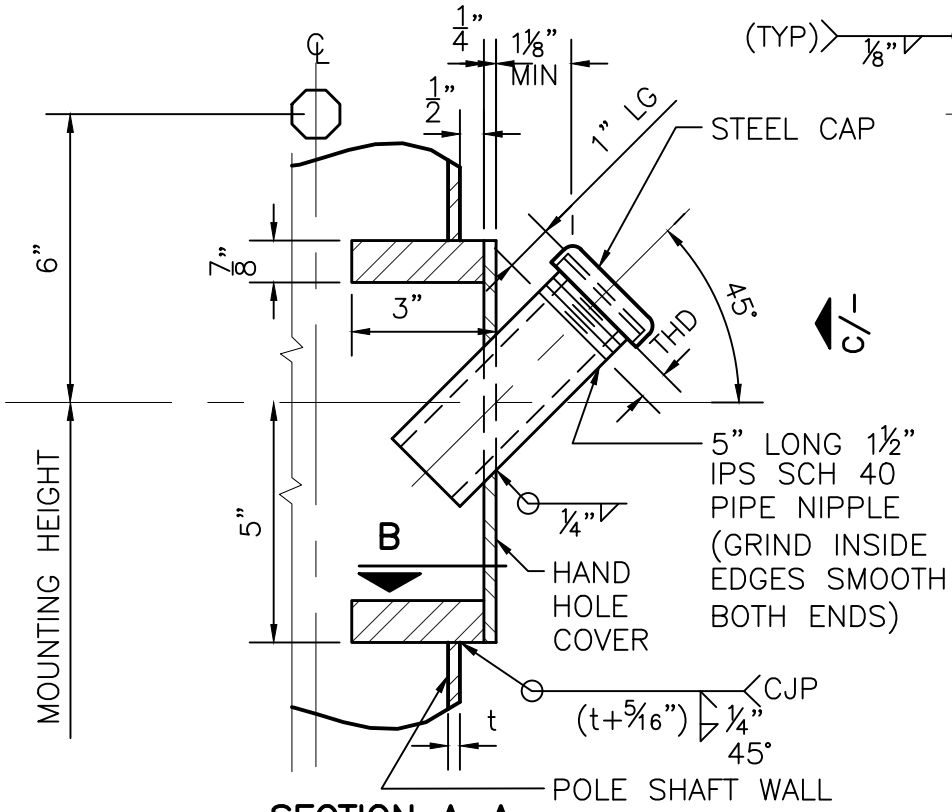
V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.10
PLOTTED: Mar 18, 2021-08:35:20am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



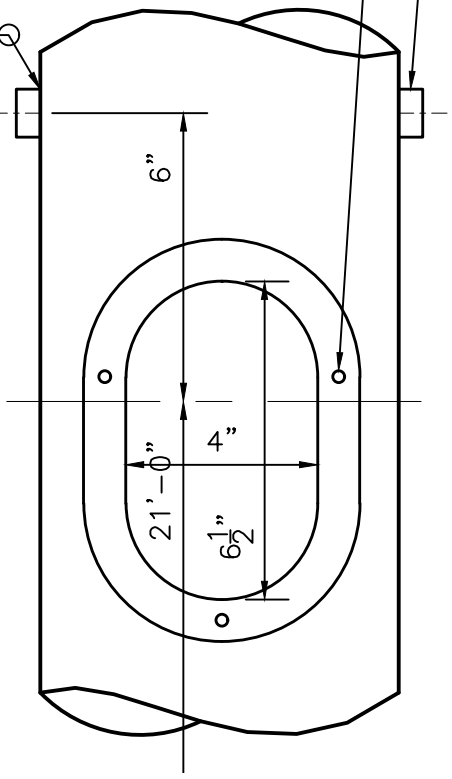


SECTION B
SCALE 3" = 1'–0"

FEEDER OUTLET PLAN
SCALE: 1½" = 1'–0"



SECTION A–A
FEEDER RISER OUTLET DETAIL
SCALE: 3" = 1'–0"



ELEVATION C
OUTLET WITHOUT COVER
SCALE 3" = 1'–0"

No.	REVISION	BY	APP'D	DATE

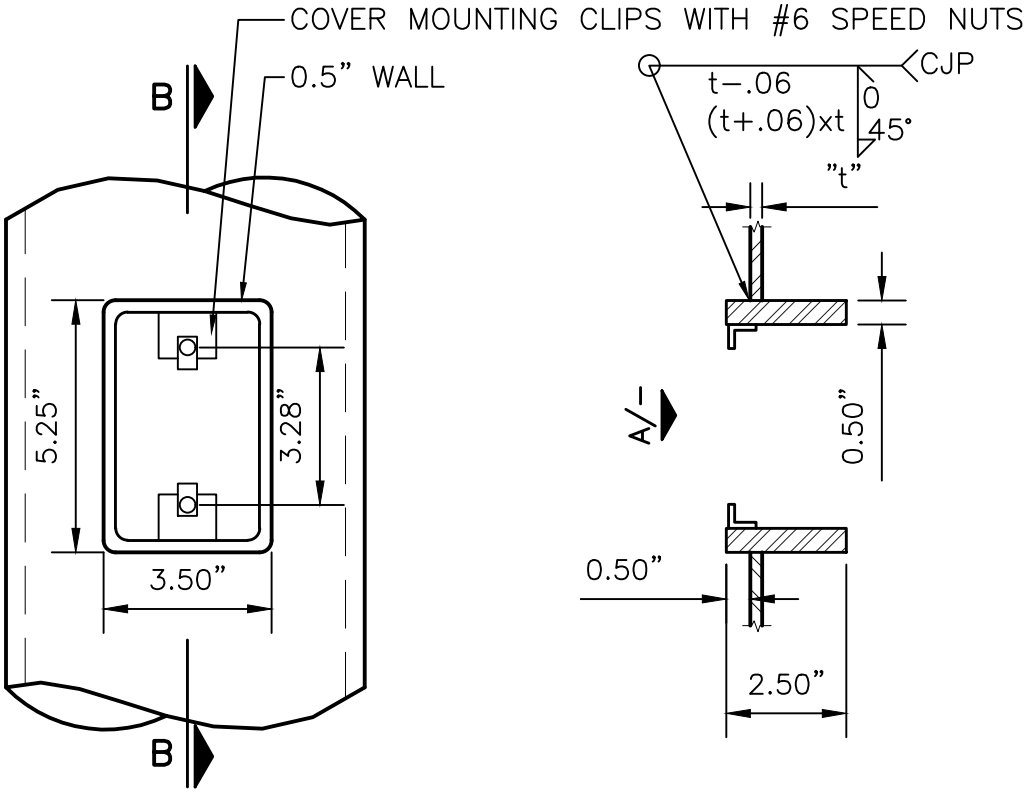
DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE PURCHASE REQUIREMENTS
RISER OUTLET DETAILS

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 11 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.11
PLOTTED: Mar 18, 2021-08:35:25am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

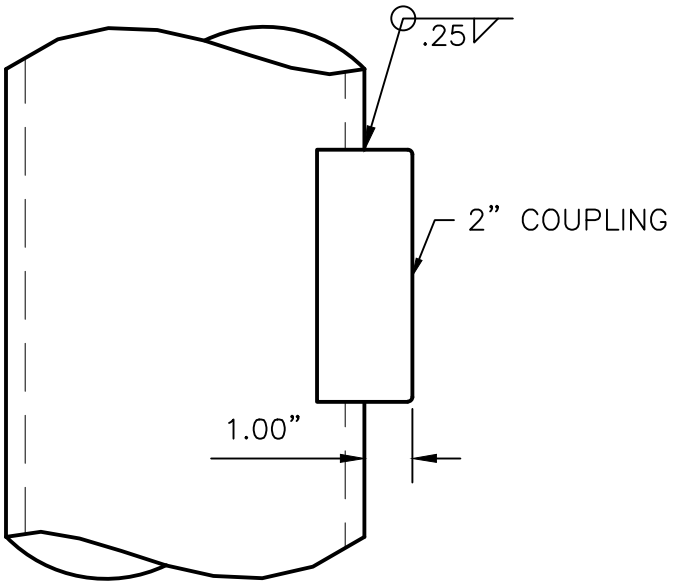


ELEVATION VIEW A

SECTION B

FESTOON OUTLET BOX

SCALE: 3" = 1'−0"



CABLE OUTLET

SCALE: 3" = 1'−0"

No.	REVISION	BY	APP'D	DATE

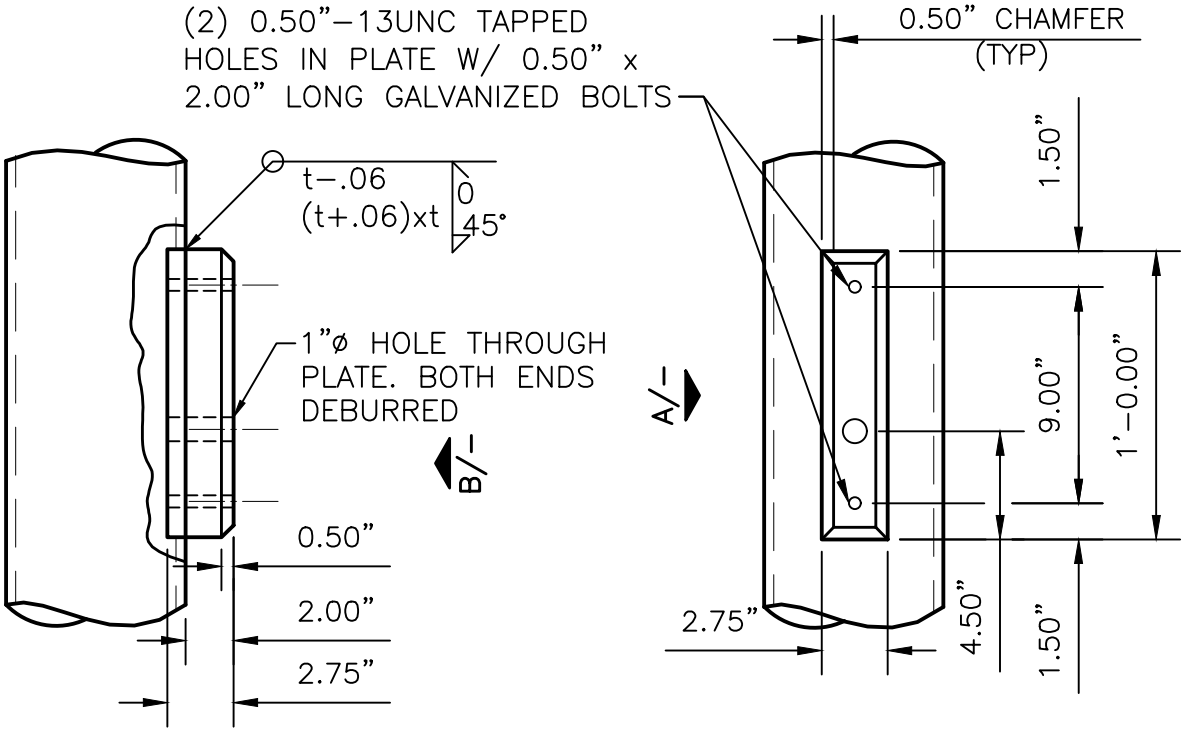
DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE PURCHASE REQUIREMENTS
OUTLET DETAILS

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 12 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.12
PLOTTED: Mar 18, 2021-08:35:30am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



BELLTOWN PEDESTRIAN LIGHT MOUNTING PLATE

SCALE: 1½"" = 1'–0"

No.	REVISION	BY	APP'D	DATE

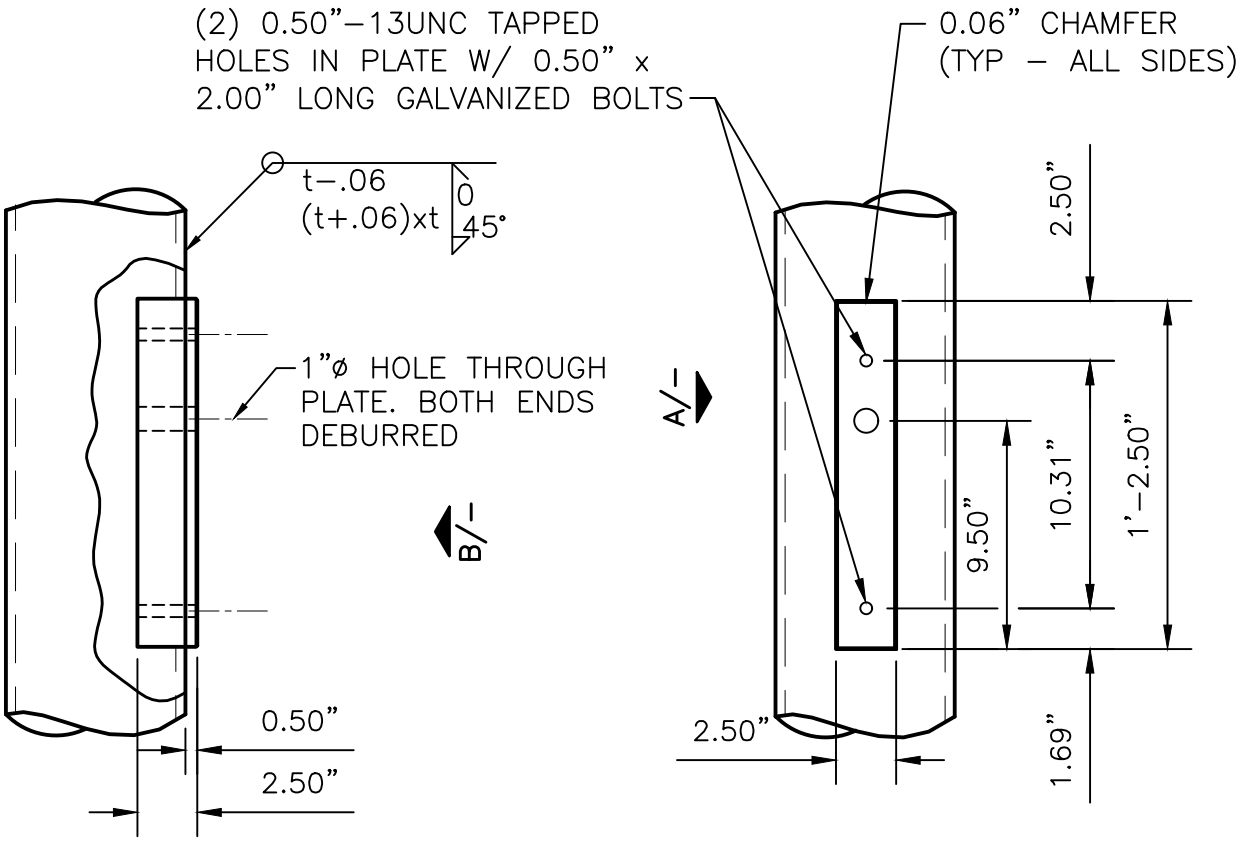
DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE PURCHASE REQUIREMENTS LIGHT MOUNTING DETAIL

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 13 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.13
PLOTTED: Mar 18, 2021-08:35:35am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



SIDE VIEW A

FRONT VIEW B

WESTLAKE PEDESTRIAN LIGHT MOUNTING PLATE

SCALE: 1½"" = 1'–0"

No.	REVISION	BY	APP'D	DATE

DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE PURCHASE REQUIREMENTS LIGHT MOUNTING DETAIL

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 14 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.14
PLOTTED: Mar 18, 2021-08:35:41am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

GENERAL NOTES

1. MATERIALS

A. **POLE SHAFTS, REINFORCING SLEEVES, HANDHOLE FRAMES, FESTOON FRAMES AND FEEDER RISER FRAMES** SHALL COMFORM TO ASTM A595 GRADE A OR B, A572 GRADE 50, 60 OR 65 OR OTHER MATERIAL IN ACCORD WITH AWS D1.1 SECTION 10.2. ASTM A588 AND A242 MATERIALS ARE NOT ALLOWED. HANDHOLE FRAMES AND FEEDER RISER FRAMES SHALL BE FABRICATED FROM PLATE WITH THE SAME YIELD STRENGTH MATERIAL AS THE POLE SHAFT. THE POLE SHAFT AND REINFORCING SLEEVE SHALL BE FABRICATED OF THE SAME MATERIAL TYPE AND YIELD STRENGTH.

B. **BASE PLATES** SHALL CONFORM TO ASTM A572 GRADE 50.

C. **POLE CAPS** SHALL BE CAST ALUMINUM, GALVANIZED CAST IRON OR GALVANIZED PRESSED STEEL, FITTED WITH THREE STAINLESS STEEL SET SCREWS

D. **FEEDER RISER NIPPLES** SHALL BE STANDARD STEEL PIPE CONFORMING TO ASTM A53, GRADE B.

E. **GROUNDING NUTS** SHALL BE ½ INCH X 13 NC. **CAP SCREWS** SHALL BE HEX HEAD STAINLESS STEEL OR BRONZE. TAPPED HOLES IN THE HANDHOLE FRAMES MAY BE FURNISHED IN LIEU OF NUTS WELDED TO THE HANDHOLE FRAMES.

F. **HANDHOLE COVER AND FEEDER RISER SCREWS** SHALL BE STAINLESS STEEL HEX HEAD CAP SCREWS.

G. **IMPACT TOUGHNESS TESTS** SHALL BE PERFORMED FOR ALL STRUCTURAL STEEL MATERIALS OVER 0.5 INCH THICK OR WITH FY>42 KSI. BASE PLATES, HANDHOLE FRAMES, FEEDER RISER FRAMES, POLE SHAFTS AND POLE SLEEVES SHALL BE TESTED IN ACCORDANCE WITH THE CHARPY V–NOTCH TEST AS SPECIFIED IN ASTM A370. THE MINIMUM ENERGY VALUE SHALL BE 15 FT–LBS AT 0 DEGREES FAHRENHEIT.

H. **SILICON CONTENT** IN THE STEEL SHALL BE 0.06% MAXIMUM.

2. FABRICATION

A. **POLES** SHALL BE MINIMUM 8–SIDED WITH 2" MINIMUM BEND RADIUS FOR ALL TYPE C POLES. ALL OTHERS SHALL BE MINIMUM 10–SIDED.

B. **ALL WELDS, MATERIAL, PROCEDURES AND OPERATIONS** SHALL CONFORM TO THE AWS D1.1; SECTION 2, DESIGN OF WELDED CONNECTIONS; SECTION 3, WORKMANSHIP; SECTION 4, TECHNIQUE; AND SECTIONS 8, 9 OR 10.

C. **ALL POLES** SHALL BE FABRICATED PER THE CURRENT EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS.

No.	REVISION	BY	APP'D	DATE

DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE PURCHASE REQUIREMENTS GENERAL NOTES

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 15 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.15
PLOTTED: Mar 18, 2021-08:35:45am By dbennett
XREFS: TTB A Size.dwg
IMAGES:

GENERAL NOTES, CONTINUED

FABRICATION, CONTINUED

COMPLETE PENETRATION WELDS SHALL BE GROUND TO ELIMINATE SURFACE CRACKS, NOTCHES AND OTHER LIKELY STRESS CONCENTRATORS.

CIRCUMFERENTIAL WELDS ON POLE SHAFTS SHALL BE COMPLETE PENETRATION FOR THEIR FULL LENGTH. MAXIMUM NUMBER OF LONGITUDINAL WELDS ON POLE SHAFTS SHALL BE TWO.

REINFORCING SLEEVE WELDED JOINTS SHALL BE WATERTIGHT.

C. HOT–DIP GALVANIZING SHALL BE PERFORMED AFTER FABRICATION. THE POLES, FITTINGS AND ACCESSORIES SHALL BE GALVANIZED INSIDE AND OUT, IN CONFORMANCE WITH ASTM A123 OR ASTM A153 WITH PRECAUTIONS AGAINST EMBRITTLEMENT IN ACCORDANCE WITH ASTM A143. ALL POLE FABRICATIONS SHALL BE GALVANIZED FOR THEIR ENTIRE LENGTH, AT ONE TIME IN A SINGLE HOT–DIP GALVANIZING BATH. GALVANIZING BY SUCCESSIVE DIPPINGS OF PARTIAL POLE LENGTHS WILL NOT BE PERMITTED.

BEFORE GALVANIZING, POLE SHAFT LONGITUDINAL AND CIRCUMFERENTIAL WELDS SHALL BE GROUND FLUSH WITH BASE METAL TO ELIMINATE SURFACE CRACKS. ALL OTHER WELDS AND CUT EDGES SHALL BE GROUND TO ELIMINATE SHARP EDGES AND BURRS.

ZINC REPAIR PAINT SHALL BE IN ACCORDANCE WITH DOD P–21035.

D. A POLE IDENTIFICATION PLATE SHALL BE ATTACHED TO EACH POLE. THE PLATE SHALL SHOW METRO POLE DESIGNATION, POLE LENGTH, WALL THICKNESS, GROUND LINE DIAMETER, TAPER, POLE SHAFT MATERIAL SPECIFICATION AND GRADE, THE MANUFACTURER'S NAME, AND DATE OF MANUFACTURE. THE PLATE DESIGN, STYLE OF LETTERING AND METHOD OF ATTACHMENT SHALL BE REVIEWED BY THE ENGINEER.

No.	REVISION	BY	APP'D	DATE

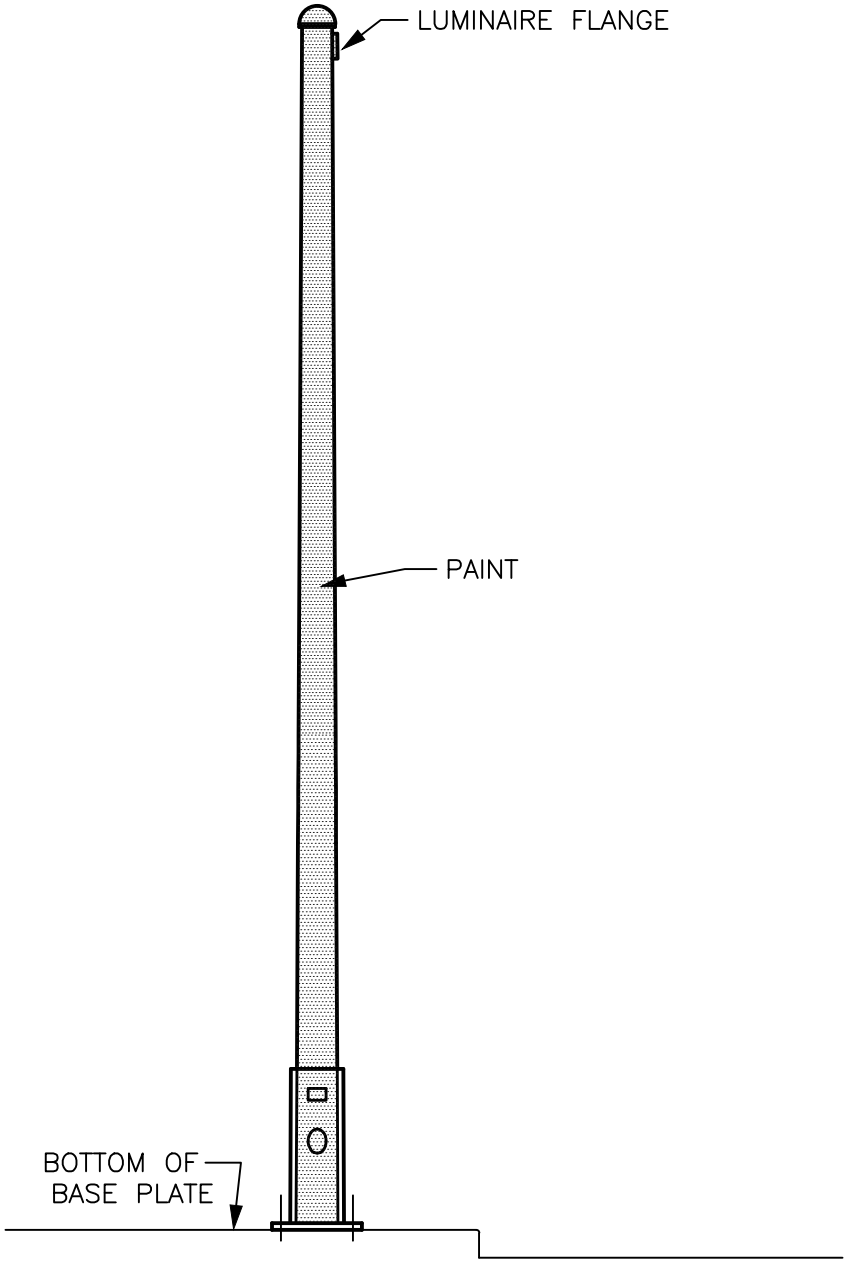
DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE PURCHASE REQUIREMENTS GENERAL NOTES

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 16 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.16
PLOTTED: Mar 18, 2021-08:35:50am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



ITEM 4 POLE PAINTING EXAMPLE

A. COATING MATERIAL: Epoxy primer, polyurethane finish.

B. SURFACE PREPARATION: Wash with a mild solution of detergent and hot water. Rinse complete and allow to dry, prepare for paint application by providing a SSPC SP–2(Hand Tool Clean).

C. COATING:
Primer: One coat of Tnemec's 135 Chembuild, applied at 7–8 mils dry film thickness.
Finish: One coat of Tnemec's Series 74, applied at 4–5 mils dry film thickness.

D. COLOR: As Specified by project requirement.

No.	REVISION	BY	APP'D	DATE

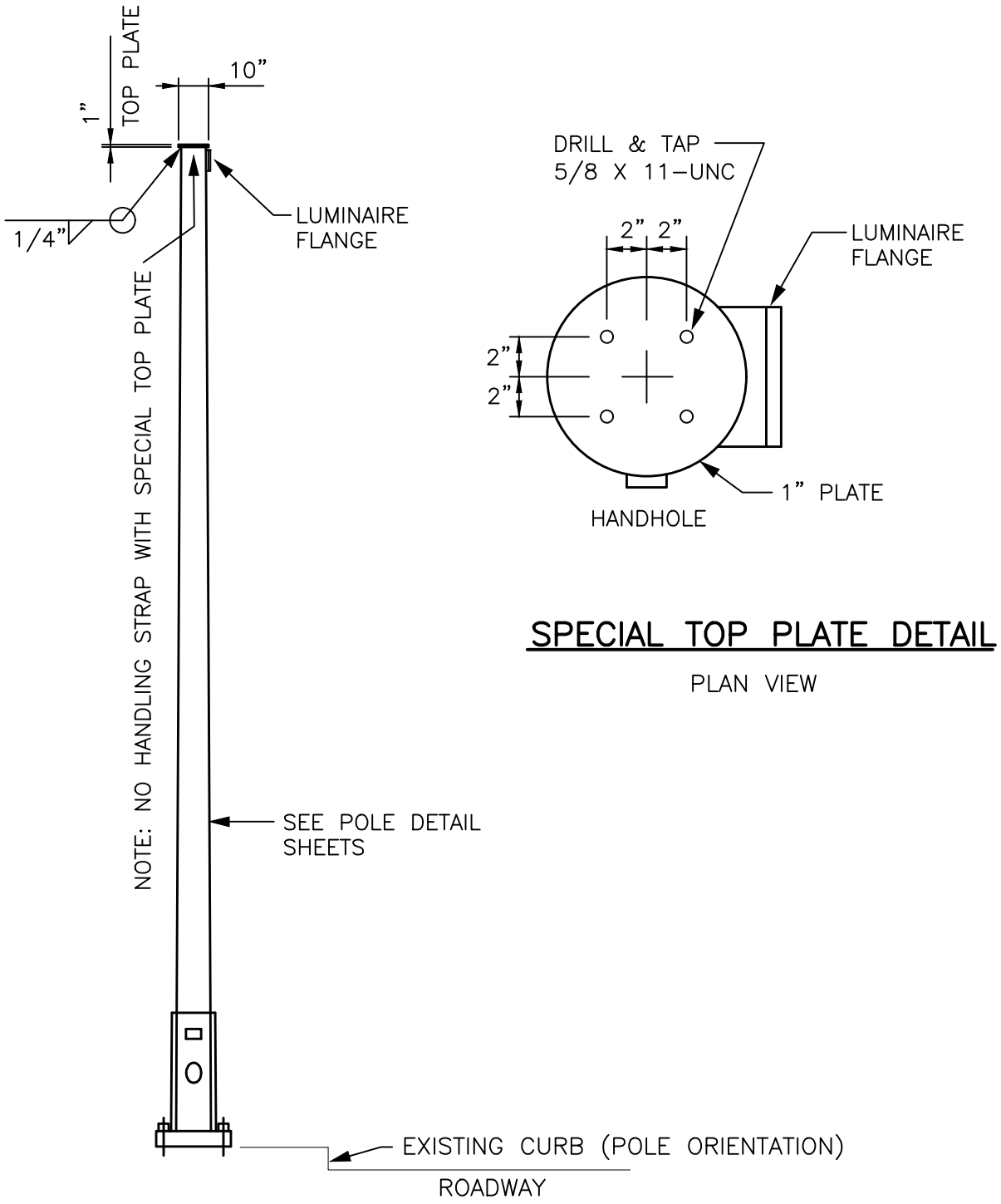
DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE
PURCHASE REQUIREMENTS
ANCHOR BASE POLE DETAIL

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 17 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.17
PLOTTED: Mar 18, 2021-08:35:55am By dbennett
XREFS: TTB A Size.dwg
IMAGES:



SPECIAL TOP PLATE DETAIL

PLAN VIEW

ANCHOR BASE STEEL POLE

SPECIAL TOP PLATE DETAIL

No.	REVISION	BY	APP'D	DATE

DESIGNED: DGP/AW
DRAWN: L. ANDERSON
CHECKED: J. DAVIS
APPROVED: P. ENG

King County METRO

METRO TRANSIT CAPITAL DIVISION
TROLLEY STANDARD DETAILS
STANDARD STEEL POLE
PURCHASE REQUIREMENTS
ANCHOR BASE POLE DETAIL

DATE: 03/2021
STD DET NO: SP-201
SHT NO: 18 OF 18

V:\Library & Standards\Working Documents\Trolley\Details\SA Updates for 2021 publication\03_Review set\SP INDEX G0.01 -- SP201.1 - 201.18.dwg | Layout: SP-201.18
PLOTTED: Mar 18, 2021-08:36:00am By dbennett
XREFS: TTB A Size.dwg
IMAGES: