PHASE 1
TABLE 1
24-INCH WATER TRANSMISSION MAIN, NEW CASTLE ROAD, STA 10+00 TO 88+59.02

STATION	DWG #	ITEM/TEST STATION TYPE	DETAIL	DESCRIPTION	FOREIGN PIPELINE
10+00 TO 88+59	6 TO 13	JOINT BONDS	1/CP-4, 2/CP-4	ALL NON-WELDED, FERROUS METAL, PIPE JOINTS (EXCEPT FOR INSULATING JOINTS)	–
10+00	6	IJTSA	1/CP-2	INSTALL IJ & TEST STATION W/(2)-32LB ANODES. INSTALL TEST STATION AT EP	–
11+70	6	ICS, IU, A & PE	3/CP-5	INSTALL INSULATING CORPORATION STOP ON ARV LATERAL & INSULATING UNION INSTALL (1)-5LB ANODE ON ARV LATERAL INSTALL POLYETHYLENE SLEEVE ON ARV LATERAL	6" GAS
18+50	6	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION AT EP	–
25+58	7	BLANKET	6/CP-2	INSTALL INSULATING BLANKET FOR 12-INCH LATERAL	6" GAS
27+00	7	ICS, IU, A & PE	3/CP-5	INSTALL INSULATING CORPORATION STOP ON ARV LATERAL & INSULATING UNION INSTALL (1)-5LB ANODE ON ARV LATERAL INSTALL POLYETHYLENE SLEEVE ON ARV LATERAL	6" GAS
28+50	7	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION AT EP	–
38+50	8	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL ANODES NORTHWARD INSTALL TEST STATION AT EP	–
48+50	9	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION AT EP	–
58+50	10	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION AT EP	–
62+73.73	11	ICS, IU, A & PE	3/CP-5	INSTALL INSULATING CORPORATION STOP ON ARV LATERAL & INSULATING UNION INSTALL (1)-5LB ANODE ON ARV LATERAL INSTALL POLYETHYLENE SLEEVE ON ARV LATERAL	–
68+50	11	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION AT EP	–
78+50	12	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION AT EP	–
87+10	13	ICS, IU, A & PE	3/CP-5	INSTALL INSULATING CORPORATION STOP ON ARV LATERAL & INSULATING UNION INSTALL (1)-5LB ANODE ON ARV LATERAL INSTALL POLYETHYLENE SLEEVE ON ARV LATERAL	–
88+55	13	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION AT EP	–

GENERAL CATHODIC PROTECTION NOTES:

1. THE PIPELINE AND ELEMENTS THAT ARE THE SUBJECT OF THIS CATHODIC PROTECTION SYSTEM ARE THE 24-INCH DUCTILE IRON TRANSMISSION MAIN, 36, 30, 16, 12, & 4-INCH STUB OUTS AND 4-INCH BLOW OFF PIPING, THE 16 & 12-INCH DUCTILE IRON TRANSMISSION MAIN, 16 AND & 4-INCH STUB OUTS, 6-INCH FIRE HYDRANTS AND 4-INCH BLOW OFF PIPING, THE TWO STEEL CASINGS, AND THE BURIED COPPER PRESSURE PIPING OF THE AIR RELEASE VALVES. WRAP ALL BURIED DUCTILE IRON PIPE, VALVES, ADAPTERS, FITTINGS, HARDWARE, AND APPURTENANCES WITH A MINIMUM 12 INCH OVERLAP OF 8-MIL POLYETHYLENE ENCASEMENT IN ACCORDANCE WITH AWWA C-105. COAT ALL SERVICE SADDLES AND ANY BRASS PLUGS WITH BITUMASTIC. ENCASE ALL BURIED COPPER PIPING OF THE AIR RELEASE VALVES IN 6-MIL POLYETHYLENE SLEEVES.

2. THE CATHODIC PROTECTION SYSTEM FOR THE DUCTILE IRON TRANSMISSION MAINS AND EACH EPOXY COATED STEEL CASING SHALL CONSIST OF 32-LB, PREPACKAGED, H-1 ALLOY, MAGNESIUM ANODES INSTALLED THROUGH A FLUSH-GRADE TEST STATION. THE NUMBER OF ANODES AT EACH TEST STATION SHALL BE AS SHOWN IN THE SCHEDULES IN TABLES 1, 2, &3 ON SHEET CP-1. THE ANODES FOR THE DUCTILE IRON TRANSMISSION MAIN SHALL BE INSTALLED PARALLEL TO THE TRANSMISSION MAIN, A MINIMUM OF 5 FEET OFF THE EDGE OF THE PIPE IN NATIVE SOIL. INSTALL THE ANODES FOR THE 24-INCH TRANSMISSION MAIN FOR STATION 10+00 TO 58+50 ON THE WEST SIDE OF THE PIPELINE. INSTALL THE ANODES FOR THE 16 & 12-INCH TRANSMISSION MAIN FOR STATION 9+86 TO 61+45 ON THE EAST SIDE OF THE PIPELINE. INSTALL THE ANODES FOR THE FIRE HYDRANTS 3 FEET OFF THE HYDRANT BURIES. THE ANODES FOR EACH CASING SHALL BE INSTALLED PARALLEL TO THE CARRIER TRANSMISSION MAIN, A MINIMUM OF 2 FEET OFF THE EDGE OF THE CASING IN NATIVE SOIL. THE ANODES SHALL BE INSTALLED ON A #8 AWG/THNN (BLACK) HEADER CABLE. THE HEADER CABLE SHALL BE LOOPED BACK FROM THE LAST ANODE TO THE TEST STATION, WITHOUT SPLICES, FOR REDUNDANCY.

3. THE CATHODIC PROTECTION SYSTEM FOR THE THE BURIED COPPER PRESSURE PIPING OF THE AIR RELEASE VALVES SHALL CONSIST OF 5-LB, PREPACKAGED, H-1 ALLOY, MAGNESIUM ANODES CONNECTED DIRECTLY TO THE COPPER PIPE, WITHOUT ANY TEST STATION. THE ANODES FOR THE COPPER PIPING SHALL BE INSTALLED AT A DEPTH OF 5 FEET, PARALLEL TO THE COPPER PIPE, A MINIMUM OF 2 FEET OFF THE EDGE OF THE PIPE IN NATIVE SOIL.

4. ALL BURIED, NON-WELDED, NON-INSULATING JOINTS SHALL BE BONDED WITH HMWPE INSULATED COPPER CABLES FOR ELECTRICAL CONTINUITY OF EACH DUCTILE IRON TRANSMISSION MAIN ALONG WITH ITS STUB OUTS AND BLOW OFFS. PIPE JOINTS OF 12-INCH THROUGH 24-INCH ø SHALL HAVE TWO #6 AWG BOND CABLES. PIPE JOINTS OF 4-INCH THROUGH 10-INCH ø SHALL HAVE ONE #6 AWG BOND CABLE. 30-INCH THROUGH 36-INCH ø PIPE JOINTS SHALL HAVE TWO #4 AWG BOND CABLES.

5. THE EXTERIOR OF THE STEEL CASINGS SHALL BE COATED WITH AN ABRASION RESISTANT COATING PRIOR TO THE JACK AND BORE OPERATION-SEE SPECIFICATION SECTION 16000 FOR DETAILS.

6. THE PIPE INSIDE OF THE CASING SHALL BE MADE ELECTRICALLY CONTINUOUS BY INSTALLING BOND CABLES ACROSS THE JOINTS OF THE CARRIER PIPING. ENCASE THE PIPE IN POLYETHYLENE, PRIOR TO INSTALLING THE INSULATING RUNNERS AND INSERTING THE DUCTILE IRON CARRIER PIPING INTO THE CASING. DO NOT BOND CARRIER PIPE TO CASING; MAINTAIN ELECTRICAL ISOLATION BETWEEN THE CARRIER PIPE AND THE CASING.

7. THE NEW DUCTILE IRON TRANSMISSION MAIN SHALL BE ELECTRICALLY ISOLATED FROM EACH NEW CASING AND ALL EXISTING METALLIC STRUCTURES, SUCH AS REBAR, COPPER PIPE, GROUNDING CLAMPS, EXISTING PIPE, ETC. INSULATING CORPORATION STOPS SHALL BE INSTALLED TO ISOLATE THE NEW DUCTILE IRON TRANSMISSION MAIN FROM THE NEW COPPER PIPING OF THE AIR RELEASE VALVE. INSULATING JOINTS SHALL BE INSTALLED AT ALL CONNECTIONS TO EXISTING PIPELINES. INSULATING RUNNERS SHALL BE INSTALLED ON THE PIPE INSIDE OF THE CASING AND SPACED PER DETAIL ON SHEET 5.

8. INSULATING BLANKETS SHALL BE INSTALLED AT FOREIGN (NATURAL GAS) PIPELINE CROSSINGS BY LATERALS PER DETAIL 6 ON SHEET 2. A FOREIGN PIPELINE TEST STATION SHALL BE INSTALLED IN PHASE 2 PER DETAIL 5 ON SHEET 2. INSTALLATION OF CABLE-TO-PIPE CONNECTIONS SHALL BE MADE BY FOREIGN PIPELINE OWNER'S TECHNICIAN IN COORDINATION WITH THE FOREIGN PIPELINE OWNER.

9. TEST STATIONS ARE REQUIRED FOR ANODE LOCATIONS ON ALL STEEL CASINGS, AND THE DUCTILE IRON TRANSMISSION MAIN. HOWEVER TEST STATIONS ARE NOT REQUIRED ON COPPER PIPING, ANODES SHALL BE CONNECTED DIRECTLY TO COPPER PIPE AS SHOWN. INSTALL ALL TEST STATIONS AT THE EDGE OF THE ROAD OR OTHER NON-TRAFFIC AREAS, ACCESSIBLE FOR FUTURE TESTING WITHOUT THE NECESSITY OF TRAFFIC CONTROL.

10. AFTER COMPLETION THE SYSTEM SHALL BE TESTED BY THE PROJECT CORROSION ENGINEER [JDH CORROSION CONSULTANTS, INC. (925)927-6630].

PHASE 1
TABLE 2
16-INCH/12-INCH WATER TRANSMISSION MAIN, NEW CASTLE ROAD, STA 9+86.2 TO 61+45

STATION	DWG #	ITEM/TEST STATION TYPE	DETAIL	DESCRIPTION	FOREIGN PIPELINE
9+86.2 TO 61+45	6 TO 11	JOINT BONDS	1/CP-4, 2/CP-4	ALL NON-WELDED, FERROUS METAL, PIPE JOINTS (EXCEPT FOR INSULATING JOINTS)	–
9+86.2	6	IJTSA	1/CP-2	INSTALL IJ & TEST STATION W/(2)-32LB ANODES. INSTALL TEST STATION AT EP	–
10+00	6	FHATS		INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
10+06.17	6	ICS, IU, A & PE	3/CP-5	INSTALL INSULATING CORPORATION STOP ON ARV LATERAL & INSULATING UNION INSTALL (1)-5LB ANODE ON ARV LATERAL INSTALL POLYETHYLENE SLEEVE ON ARV LATERAL	–
13+00	6	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
16+00	6	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
18+55	6	ATS	2/CP-2	INSTALL TEST STATION W/(4)-32LB ANODES. INSTALL TEST STATION AT EP	–
19+00	6	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
22+05	7	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
25+00	7	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
25+53	7	BLANKET	6/CP-2	INSTALL INSULATING BLANKET FOR 16-INCH LATERAL	6" GAS
28+00	7	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
28+55	7	ATS	2/CP-2	INSTALL TEST STATION W/(4)-32LB ANODES. INSTALL TEST STATION AT EP	–
31+00	8	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
34+00	8	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
37+00	8	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
38+55	8	ATS	2/CP-2	INSTALL TEST STATION W/(4)-32LB ANODES. INSTALL ANODES NORTHWARD INSTALL TEST STATION AT EP	–
40+00	8	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
43+00	9	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
46+50	9	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
48+55	9	ATS	2/CP-2	INSTALL TEST STATION W/(4)-32LB ANODES. INSTALL TEST STATION AT EP	–
49+45	9	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
52+00	10	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
55+00	10	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
58+00	10	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
58+55	10	ATS	2/CP-2	INSTALL TEST STATION W/(4)-32LB ANODES. INSTALL TEST STATION AT EP	–
61+00	11	FHATS	6/CP-5	INSTALL TEST STATION W/(1)-17LB ANODE. INSTALL TEST STATION NEXT TO FIRE HYDRANT	–
61+45	11	IJTSA	1/CP-2	INSTALL IJ & TEST STATION W/(2)-32LB ANODES. INSTALL TEST STATION AT EP	–

PHASE 2
TABLE 3
24-INCH WATER TRANSMISSION MAIN, NEW CASTLE ROAD, STA 88+59.02 TO 237+17±

STATION	DWG #	ITEM/TEST STATION TYPE	DETAIL	DESCRIPTION	FOREIGN PIPELINE
88+59.02 TO 237+17	13 TO 29	JOINT BONDS	1/CP-4, 2/CP-4	ALL NON-WELDED, FERROUS METAL, PIPE JOINTS (EXCEPT FOR INSULATING JOINTS)	–
96+50	14	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION & BOLLARD	–
104+50	15	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION & BOLLARD	–
112+55	16	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION NEXT TO BOLLARD	–
124+70	17	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION NEXT TO BOLLARD	–
134+50	18	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION & BOLLARD	–
138+71	19	ICS, IU, A & PE	3/CP-5	INSTALL INSULATING CORPORATION STOP ON ARV LATERAL & INSULATING UNION INSTALL (1)-5LB ANODE ON ARV LATERAL INSTALL POLYETHYLENE SLEEVE ON ARV LATERAL	–
139+90	19	CATS	4/CP-2	INSTALL TEST STATION W/(10)-32LB ANODES. INSTALL TEST STATION & BOLLARD	–
142+70	19	CATS	4/CP-2	INSTALL TEST STATION W/(10)-32LB ANODES. INSTALL TEST STATION	–
143+10	19	ICS, IU, A & PE	3/CP-5	INSTALL INSULATING CORPORATION STOP ON ARV LATERAL & INSULATING UNION INSTALL (1)-5LB ANODE ON ARV LATERAL INSTALL POLYETHYLENE SLEEVE ON ARV LATERAL	–
146+25	20	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION NEXT TO EXISTING STAND PIPE	–
156+25	21	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION NEXT TO EXISTING POWER POLE	–
166+30	22	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION NEXT TO EXISTING POWER POLE	–
177+00	23	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION & BOLLARD	–
187+00	24	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION & BOLLARD	–
195+55	25	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION NEXT TO BOLLARD	–
205+60	26	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION & BOLLARD	–
216+45	27	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION NEXT TO BOLLARD	–
224+25	27	CTS	3/CP-2	INSTALL TEST STATION INSTALL TEST STATION & BOLLARD	–
231+95	29	ATS	2/CP-2	INSTALL TEST STATION W/(7)-32LB ANODES. INSTALL TEST STATION NEXT TO BOLLARD	–
233+10	29	CATS	4/CP-2	INSTALL TEST STATION W/(5)-32LB ANODES. INSTALL TEST STATION & BOLLARD	–
234+55	29	CATS	4/CP-2	INSTALL TEST STATION W/(5)-32LB ANODES. INSTALL TEST STATION & BOLLARD	–
236+25±	29	FPTS	5/CP-2	INSTALL TEST STATION W/(2)-32LB ANODES. INSTALL (2) REFERENCE ELECTRODES INSTALL INSULATING BLANKET INSTALL TEST STATION AT EP	24" GAS
236+57.72	29	ICS, IU, A & PE	3/CP-5	INSTALL INSULATING CORPORATION STOP ON ARV LATERAL & INSULATING UNION INSTALL (1)-5LB ANODE ON ARV LATERAL INSTALL POLYETHYLENE SLEEVE ON ARV LATERAL	–
237+16±	29	IJTSA	1/CP-2	INSTALL IJ & TEST STATION W/(3)-32LB ANODES. INSTALL TEST STATION AT EP	–

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REGISTERED PROFESSIONAL ENGINEER JOHN D. HOWARD No. CR 1055 Exp. June 30, 2010 CORROSION STATE OF CALIFORNIA

NEWCASTLE TRANSMISSION MAIN

CATHODIC PROTECTION SCHEDULE & NOTES

REVISION NO.	REVISION	DATE	BY	APRVD. BY

MUNICIPAL UTILITIES DEPARTMENT
CITY OF STOCKTON, CALIFORNIA

SCALE: AS SHOWN
DESIGNED BY: T.H.
DRAWN BY: T.H.
CHECKED BY: J.D.H.
RECORD DWG:

APPROVED BY: DATE: 3/10/10
ASSISTANT DIRECTOR
STOCKTON, CALIFORNIA

SHEET NO. CP-1
OF 34 SHEETS
PROJECT NO. M07004