DRAINAGE TECHNICAL REPORT FOR THE BLEDSOE CREEK STORM DRAIN AND SLOPE REPAIR PROJECT

CITY OF UPLAND, CALIFORNIA

SUBMITTED TO
AND
PREPARED FOR:

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Submitted: December 14, 2021

This report has been prepared by or under the direction of the following registered civil engineer who attests to the technical information contained herein. The registered civil engineer has also judged the qualifications of any employees that have provided data and calculations upon which the recommendations, conclusions, and decisions are based.

_____ _____

Ceazar V. Aguilar, PE 41679 Date

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I. INTRODUCTION

The purpose of this Drainage Technical Report is to evaluate the damage to the existing 48-inch plastic pipe outlet of the Bledsoe Creek Storm Drain (Line "A") and extents of the erosion damage to the surrounding side slope of Bledsoe Creek adjacent to the existing residential lot in order to develop a mitigation and repair plan that would improve the existing drainage condition and slope stability under the 100-year flood event. The project is located in the City of Highland at the Springlake Clubhouse, located westerly along Cloverhill Drive, southerly of Highland Avenue (see Figure 1 and Figure 2).

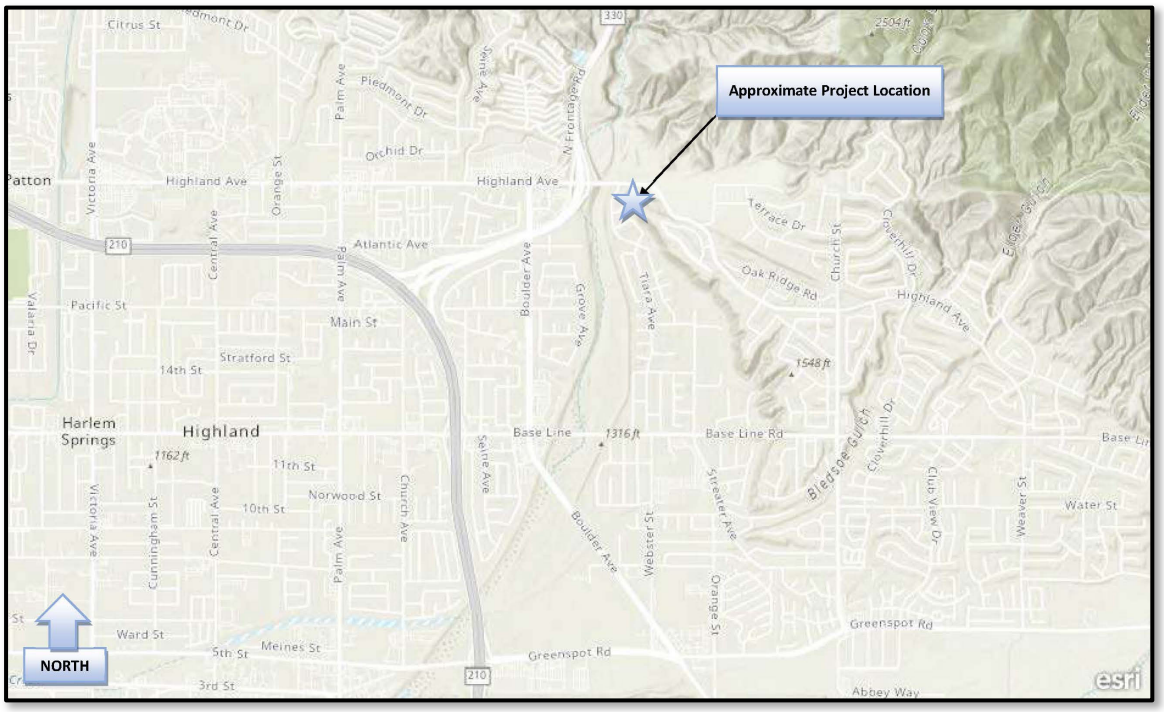


Figure 1: Project Vicinity Map

II. STUDY SCOPE

The scope of the study includes the following:

1. Development of drainage mitigation measures for stabilizing the pipe outlet and preventing major erosion and undermining of the pipe outlet and the side slope of Bledsoe Creek adjacent to the existing residential lot during future flood events.

2. Determination of the size and alignment of the proposed underground storm drain required without adversely impacting the existing drainage conditions and patterns of the adjacent area. This scope includes hydraulic calculations based on the WSPG Hydraulic Model Program for determining the flow capacity and hydraulic parameters of the proposed storm drain line.

3. Development of the storm drain repair plan and preparation of the Drainage Technical Report.

III. PROJECT SITE OVERVIEW

Figure 2: Project Location Map

The Bledsoe Creek Storm Drain and Slope Repair Project is located at the upstream end of Bledsoe Creek, southwest of the Springlake Clubhouse (see Figure 2). The existing Line "A" storm drain is a 290-foot-long, 48-inch underground RCP (Ref. 1) that was installed in 2002 between the community center and Bledsoe Gulch to convey the tributary drainage within the East Highlands Ranch subdivision, as part of the subdivision development from just north of Highland Avenue. The existing pipe outlets approximately 50 feet downstream of the Bledsoe Gulch head, near the top of the slope embankment. The depth of the RCP ranges from 4 feet to 5 feet below ground surface between the existing community center and the Bledsoe Gulch outlet. A 75-foot long by 20-foot wide grouted riprap pad (0.03-acre) was also constructed along the existing slope embankment down to the bottom of the slope on a very steep slope of approximately 2:1.

Over time, the slope embankment area surrounding the RCP outlet has been severely eroded by high flow velocity flows coming from the RCP outfall, resulting in significant erosion along the creek sideslopes and invert, to currently an approximately 1.5:1 slope,

which is threatening the backyards of the adjacent homes that are situated along the west embankment, along Rockspring Lane. The existing grouted riprap pad below the RCP has also sustained damaged from the high flow velocity and is no longer providing erosion protection for the slope embankment and the RCP.

In 2012, a remedial repair was performed by lining an approximate 0.02-acre area of the creek head near the RCP outlet with concrete and extending the existing RCP downstream using a 20-foot long, 48-inch plastic pipe (Ref. 2). However, this limited repair did not stop the erosion of the creek head or adjacent embankment slope, and continual lateral erosion of the slope embankment caused structural cracking at the pipe joint of the RCP near the existing inlet riser. Currently, the creek head invert is approximately 58 feet below the top of the slope over a distance of approximately 120 feet, yielding an approximate slope of approximately 1.5:1.

The Project will replace a portion of the existing 48-inch RCP and entire 48-inch plastic pipe with a new 48-inch RCP within the same alignment but at depths up to approximately 15 feet below ground surface which will promote positive flow given the severely eroded creek head, base, and sideslopes and reduce creek erosion. The Project will add approximately 100 feet of new underground storm drain RCP along the existing invert of Bledsoe Gulch, and the head, toe and sideslopes will be regraded to mitigate the overly steep invert. The new 48-inch RCP is sized to convey the tributary 100-year storm flow of 257.7 CFS, which was obtained from the as-built plans provided by the City of Highland.

In general, the work includes: replacing the existing underground storm drain lines between the EHR clubhouse and the upstream terminus of Bledsoe Gulch; relocating the Line "A" storm drain pipeline section between the Bledsoe Gulch head and base to approximately 10 feet below the invert so the newly relocated line will outlet at the same elevation as the current creek base elevation; replacing the concrete apron at the base of Bledsoe Gulch; re-grading Bledsoe Gulch from the head to the base and slopes which is severely eroded and threatening adjacent homes; and constructing a paved access road on top of the newly re-graded slope between the Bledsoe Gulch head and base.

IV. HYDROLOGY

The 100-year design flow rate of 10.1 CFS and 257.7 CFS was obtained from the City of Highland as shown on the As-Built Plans for "Drainage Improvement Plan, East Highlands Ranch, Highland Avenue, Line "A", prepared by Sitetech, Inc. (Ref. 1). The 100-year flow rate of 0.57 CFS for Lateral "A-1" was calculated using the Rational Method for San Bernardino County.

V. RECOMMENDED PLAN AND HYDRAULIC ANALYSIS

The drainage repair plan as shown on Exhibit "A" proposes an underground storm drain that carries storm flows conveyed by the existing Line "A" 48-inch RCP safely from the top of the slope, extending down to the toe, and discharging the flows safely onto a riprap pad below to protect against scour. The main focus of the plan was to create a stabilized outlet for Line

"A" while protecting the slopes of the bluff against potential erosive storm flows.

The existing 48-inch plastic pipe, existing 42-inch riser, the existing 48-inch RCP segment downstream of the existing riser, the existing riprap down the slope, and the existing concrete apron will be removed. All undocumented fill within the limits of the proposed grading improvements as shown on Sheet 7 of Exhibit "A" will be removed.

The hydraulic calculations in support of the proposed storm drain improvements are included in Appendix "A". The hydraulic analysis was performed using the WSPG Hydraulic Computer Model. Additionally, the following are provided to describe the results of the hydraulic analysis and description of the proposed drainage improvements.

1. WSPG Hydraulic Model (Appendix "A")

   - Line "A" – this WSPG model extends from the proposed grouted riprap pad upstream to station 13+00 of the existing Line "A" underground 48-inch RCP. The 100-year design flow rate used in the analysis ranges from 247.6 CFS to 257.7 CFS. The model reflects the proposed underground RCP that is 48-inches in diameter which joins the existing 48-inch RCP at Station 11+98.88. An N-value of 0.013 was used for the RCP sections and a value of 0.035 was used for the riprap pad. The results of the hydraulic analysis indicate that the entire pipe system runs under an open channel condition.

     The maximum flow velocity is 49.5 FPS. In order to mitigate against the high flow velocities discharging from Line "A", a 1/2-ton, 5-foot-deep grouted riprap pad will be constructed in order to slow down the erosive velocities exiting the pipe outlet by dissipating the energy carried by the storm flows down from the top of the slope. The velocity of storm flows decreases to 1.65 FPS upon impact of the riprap pad. A 10-foot-deep cutoff wall at a slope of 1:1 will also be constructed on the downstream side of the riprap pad to ensure storm flows do not undermine the riprap pad.

   - Lateral "A-1" – this WSPG model extends from the proposed Line "A" at Station 11+19.57 up to its upstream terminus at the GCP Pipe Inlet. The 100-year design flow rate used in the analysis is 0.57 CFS. The model reflects the proposed RCP that is 18 inches in diameter. The N-value used in the model is 0.013, which is suitable for RCPs. The results of the hydraulic analysis indicate that the entire pipe system runs under an open channel condition. The maximum flow velocity is 13.0 FPS. A French Drain Connection will be installed at the upstream end of the proposed GCP pipe inlet that will be capped for future construction by EHR.

VI. REFERENCES

1. Sitetech, Inc., *"Drainage Improvement Plan, East Highlands Ranch, Highland Avenue, Line "A" thru "D""*, February 2002

2. Engineering Resources of Southern California (ERSC), Inc., *"Storm Drain Line "A", Outlet Repair"*, November 2013

APPENDICES

APPENDIX "A": WSPG HYDRAULIC MODEL

BLEDSOE CREEK
LINE "A"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El.	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
969.340	1576.610	4.000	1580.610	257.70	1.65	.04	1580.65	.00	1.26	46.97	6.740	30.970	2.00	0 .0
TRANS STR	.0104							4.00	.16		.035	.00	2.00	TRAP
992.500	1576.850	.427	1577.277	257.70	38.07	22.51	1599.79	.00	1.91	16.71	2.150	15.000	2.00	0 .0
WALL	EXIT													
992.500	1576.850	.451	1577.301	257.70	38.10	22.54	1599.84	.00	2.00	15.00	2.000	15.000	.00	0 .0
TRANS STR	.0107					.4691	6.57	.45	10.00		.015	.00	.00	BOX
1006.500	1577.000	.678	1577.678	257.70	47.51	35.04	1612.72	.00	3.18	8.00	6.440	8.000	.00	0 .0
WALL	EXIT													
1006.500	1577.000	1.795	1578.795	257.70	47.17	34.55	1613.35	.00	3.94	3.98	4.000	.000	.00	1 .0
20.000	.0320					.2004	4.01	1.79	7.09	3.29	.013	.00	.00	PIPE
1026.500	1577.640	1.731	1579.371	257.70	49.46	37.99	1617.36	.00	3.94	3.96	4.000	.000	.00	1 .0
19.468	.2999					.2061	4.01	1.73	7.60	1.58	.013	.00	.00	PIPE
1045.968	1583.479	1.764	1585.243	257.70	48.22	36.10	1621.34	.00	3.94	3.97	4.000	.000	.00	1 .0
28.443	.2999					.1869	5.32	1.76	7.33	1.58	.013	.00	.00	PIPE
1074.410	1592.010	1.830	1593.841	257.70	45.97	32.82	1626.66	.00	3.94	3.99	4.000	.000	.00	1 .0
5.590	.3001					.1722	.96	1.83	6.83	1.58	.013	.00	.00	PIPE
1080.000	1593.688	1.846	1595.534	257.70	45.45	32.08	1627.61	.00	3.94	3.99	4.000	.000	.00	1 .0
20.221	.3001					.1593	3.22	1.85	6.72	1.58	.013	.00	.00	PIPE

BLEDSOE CREEK
LINE "A"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El.	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch

1100.221	1599.757	1.915	1601.672	257.70	43.34	29.16	1630.83	.00	3.94	4.00	4.000	.000	.00	1	.0
16.120	.3001					.1402	2.26	1.92	6.26	1.58	.013	.00	.00	PIPE	
1116.341	1604.595	1.988	1606.583	257.70	41.32	26.51	1633.09	.00	3.94	4.00	4.000	.000	.00	1	.0
13.209	.3001					.1235	1.63	1.99	5.83	1.58	.013	.00	.00	PIPE	
1129.550	1608.560	2.065	1610.625	257.70	39.40	24.10	1634.73	.00	3.94	4.00	4.000	.000	.00	1	.0
2.102	.3001					.1144	.24	2.06	5.43	1.58	.013	.00	.00	PIPE	
1131.652	1609.191	2.078	1611.269	257.70	39.06	23.69	1634.96	.00	3.94	4.00	4.000	.000	.00	1	.0
10.700	.3001					.1064	1.14	2.08	5.36	1.58	.013	.00	.00	PIPE	
1142.352	1612.403	2.159	1614.562	257.70	37.25	21.54	1636.10	.00	3.94	3.99	4.000	.000	.00	1	.0
9.086	.3001					.0939	.85	2.16	4.98	1.58	.013	.00	.00	PIPE	
1151.438	1615.130	2.243	1617.373	257.70	35.51	19.58	1636.96	.00	3.94	3.97	4.000	.000	.00	1	.0
7.780	.3001					.0829	.64	2.24	4.63	1.58	.013	.00	.00	PIPE	
1159.218	1617.465	2.333	1619.798	257.70	33.86	17.80	1637.60	.00	3.94	3.94	4.000	.000	.00	1	.0
6.716	.3001					.0733	.49	2.33	4.30	1.58	.013	.00	.00	PIPE	
1165.933	1619.480	2.428	1621.908	257.70	32.28	16.18	1638.09	.00	3.94	3.91	4.000	.000	.00	1	.0
5.829	.3001					.0649	.38	2.43	3.98	1.58	.013	.00	.00	PIPE	
1171.763	1621.230	2.528	1623.758	257.70	30.78	14.71	1638.47	.00	3.94	3.86	4.000	.000	.00	1	.0
5.073	.3001					.0576	.29	2.53	3.68	1.58	.013	.00	.00	PIPE	

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1176.835	1622.752	2.635	1625.387	257.70	29.35	13.37	1638.76	.00	3.94	3.79	4.000	.000	.00	1	.0
4.426	.3001					.0512	.23	2.64	3.40	1.58	.013	.00	.00	PIPE	
1181.261	1624.081	2.749	1626.830	257.70	27.98	12.16	1638.99	.00	3.94	3.71	4.000	.000	.00	1	.0
3.859	.3001					.0456	.18	2.75	3.13	1.58	.013	.00	.00	PIPE	
1185.120	1625.239	2.872	1628.111	257.70	26.68	11.05	1639.16	.00	3.94	3.60	4.000	.000	.00	1	.0
3.361	.3001					.0408	.14	2.87	2.87	1.58	.013	.00	.00	PIPE	
1188.482	1626.248	3.005	1629.253	257.70	25.44	10.05	1639.30	.00	3.94	3.46	4.000	.000	.00	1	.0

	2.909	.3001				.0366	.11	3.01	2.62	1.58	.013	.00	.00	PIPE			
1191.390	1627.121	3.152	1630.273	257.70	24.26	9.14	1639.41	.00	3.94	3.27	4.000	.000	.00	1	.0		
	2.490	.3001				.0331	.08	3.15	2.37	1.58	.013	.00	.00	PIPE			
1193.880	1627.868	3.318	1631.186	257.70	23.13	8.30	1639.49	.00	3.94	3.01	4.000	.000	.00	1	.0		
JUNCT STR	.0684				.0443	.22	3.32	2.12			.015	.00	.00	PIPE			
1198.880	1628.210	3.026	1631.236	247.60	24.27	9.15	1640.38	.00	3.93	3.43	4.000	.000	.00	1	.0		
	12.250	.0516				.0345	.42	3.03	2.48	2.61	.013	.00	.00	PIPE			
1211.130	1628.842	3.068	1631.910	247.60	23.93	8.89	1640.80	.00	3.93	3.38	4.000	.000	.00	1	.0		
	33.815	.0516				.0323	1.09	3.07	2.41	2.61	.013	.00	.00	PIPE			
1244.944	1630.588	3.223	1633.811	247.60	22.82	8.09	1641.90	.00	3.93	3.16	4.000	.000	.00	1	.0		
	25.122	.0516				.0293	.74	3.22	2.17	2.61	.013	.00	.00	PIPE			

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1270.066	1631.885	3.398	1635.283	247.60	21.76	7.35	1642.63	.00	3.93	2.86	4.000	.000	.00	1	.0		
	18.601	.0516				.0270	.50	3.40	1.92	2.61	.013	.00	.00	PIPE			
1288.667	1632.845	3.609	1636.454	247.60	20.74	6.68	1643.14	.00	3.93	2.38	4.000	.000	.00	1	.0		
	11.333	.0516				.0264	.30	3.61	1.63	2.61	.013	.00	.00	PIPE			
1300.000	1633.430	3.932	1637.362	247.60	19.78	6.07	1643.44	.00	3.93	1.03	4.000	.000	.00	1	.0		

BLEDSOE CREEK
LATERAL "A-1"

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1001.850	1606.810	.770	1607.580	.57	.62	.01	1607.59	.00	.28	1.50	1.500	.000	.00	1 .0
.050	.5588					.0001	.00	.77	.14	.09	.013	.00	.00	PIPE
1001.900	1606.838	.741	1607.579	.57	.65	.01	1607.59	.00	.28	1.50	1.500	.000	.00	1 .0
.047	.5588					.0001	.00	.74	.15	.09	.013	.00	.00	PIPE
1001.948	1606.865	.714	1607.579	.57	.69	.01	1607.59	.00	.28	1.50	1.500	.000	.00	1 .0
.045	.5588					.0001	.00	.71	.16	.09	.013	.00	.00	PIPE
1001.993	1606.890	.688	1607.578	.57	.72	.01	1607.59	.00	.28	1.49	1.500	.000	.00	1 .0
.026	.5588					.0002	.00	.69	.17	.09	.013	.00	.00	PIPE
1002.019	1606.905	.664	1607.569	.57	.75	.01	1607.58	.00	.28	1.49	1.500	.000	.00	1 .0
HYDRAULIC JUMP														
1002.019	1606.905	.091	1606.996	.57	12.95	2.60	1609.60	.00	.28	.72	1.500	.000	.00	1 .0
18.689	.5588					.5591	10.45	.09	9.20	.09	.013	.00	.00	PIPE
1020.708	1617.348	.091	1617.439	.57	12.95	2.60	1620.04	.00	.28	.72	1.500	.000	.00	1 .0
6.604	.5588					.5456	3.60	.09	9.20	.09	.013	.00	.00	PIPE
1027.312	1621.039	.092	1621.131	.57	12.73	2.51	1623.65	.00	.28	.72	1.500	.000	.00	1 .0
3.706	.5588					.4979	1.85	.09	8.99	.09	.013	.00	.00	PIPE
1031.018	1623.110	.095	1623.205	.57	12.13	2.29	1625.49	.00	.28	.73	1.500	.000	.00	1 .0
1.642	.5588					.4340	.71	.10	8.43	.09	.013	.00	.00	PIPE

BLEDSOE CREEK
LATERAL "A-1"

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch

1032.660	1624.027	.098	1624.125	.57	11.57	2.08	1626.20	.00	.28	.74	1.500	.000	.00	1	.0
1.029	.5588					.3781	.39	.10	7.91	.09	.013	.00	.00	PIPE	
1033.689	1624.602	.101	1624.703	.57	11.03	1.89	1626.59	.00	.28	.75	1.500	.000	.00	1	.0
.735	.5588					.3292	.24	.10	7.42	.09	.013	.00	.00	PIPE	
1034.424	1625.013	.104	1625.117	.57	10.52	1.72	1626.83	.00	.28	.76	1.500	.000	.00	1	.0
.560	.5588					.2873	.16	.10	6.95	.09	.013	.00	.00	PIPE	
1034.984	1625.326	.108	1625.434	.57	10.03	1.56	1627.00	.00	.28	.78	1.500	.000	.00	1	.0
.451	.5588					.2506	.11	.11	6.53	.09	.013	.00	.00	PIPE	
1035.435	1625.578	.111	1625.689	.57	9.56	1.42	1627.11	.00	.28	.79	1.500	.000	.00	1	.0
.367	.5588					.2184	.08	.11	6.12	.09	.013	.00	.00	PIPE	
1035.802	1625.783	.115	1625.898	.57	9.12	1.29	1627.19	.00	.28	.80	1.500	.000	.00	1	.0
.308	.5588					.1908	.06	.12	5.74	.09	.013	.00	.00	PIPE	
1036.110	1625.955	.119	1626.074	.57	8.69	1.17	1627.25	.00	.28	.81	1.500	.000	.00	1	.0
.262	.5588					.1666	.04	.12	5.39	.09	.013	.00	.00	PIPE	
1036.372	1626.101	.123	1626.224	.57	8.29	1.07	1627.29	.00	.28	.82	1.500	.000	.00	1	.0
.225	.5588					.1453	.03	.12	5.05	.09	.013	.00	.00	PIPE	
1036.596	1626.227	.127	1626.354	.57	7.90	.97	1627.32	.00	.28	.84	1.500	.000	.00	1	.0
.195	.5588					.1267	.02	.13	4.74	.09	.013	.00	.00	PIPE	

BLEDSOE CREEK
LATERAL "A-1"

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1036.791	1626.336	.131	1626.467	.57	7.53	.88	1627.35	.00	.28	.85	1.500	.000	.00	1	.0
.170	.5588					.1104	.02	.13	4.44	.09	.013	.00	.00	PIPE	
1036.961	1626.431	.135	1626.566	.57	7.18	.80	1627.37	.00	.28	.86	1.500	.000	.00	1	.0
.147	.5588					.0963	.01	.14	4.16	.09	.013	.00	.00	PIPE	
1037.108	1626.513	.140	1626.653	.57	6.85	.73	1627.38	.00	.28	.87	1.500	.000	.00	1	.0
.131	.5588					.0841	.01	.14	3.91	.09	.013	.00	.00	PIPE	
1037.239	1626.586	.144	1626.730	.57	6.53	.66	1627.39	.00	.28	.88	1.500	.000	.00	1	.0

.114	.5588					.0733	.01	.14	3.66	.09	.013	.00	.00	PIPE					
1037.352	1626.649	.149	1626.798	.57	6.23	.60	1627.40	.00	.28	.90	1.500	.000	.00	1	.0				
.100	.5588					.0640	.01	.15	3.44	.09	.013	.00	.00	PIPE					
1037.453	1626.705	.154	1626.859	.57	5.94	.55	1627.41	.00	.28	.91	1.500	.000	.00	1	.0				
.089	.5588					.0558	.00	.15	3.22	.09	.013	.00	.00	PIPE					
1037.542	1626.755	.159	1626.914	.57	5.66	.50	1627.41	.00	.28	.92	1.500	.000	.00	1	.0				
.079	.5588					.0487	.00	.16	3.02	.09	.013	.00	.00	PIPE					
1037.621	1626.799	.164	1626.963	.57	5.40	.45	1627.42	.00	.28	.94	1.500	.000	.00	1	.0				
.068	.5588					.0425	.00	.16	2.83	.09	.013	.00	.00	PIPE					
1037.689	1626.837	.170	1627.007	.57	5.15	.41	1627.42	.00	.28	.95	1.500	.000	.00	1	.0				
.062	.5588					.0371	.00	.17	2.66	.09	.013	.00	.00	PIPE					

BLEDSOE CREEK
LATERAL "A-1"

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1037.751	1626.872	.175	1627.047	.57	4.91	.37	1627.42	.00	.28	.96	1.500	.000	.00	1	.0				
.053	.5588					.0323	.00	.18	2.49	.09	.013	.00	.00	PIPE					
1037.804	1626.901	.181	1627.083	.57	4.68	.34	1627.42	.00	.28	.98	1.500	.000	.00	1	.0				
.047	.5588					.0282	.00	.18	2.33	.09	.013	.00	.00	PIPE					
1037.851	1626.928	.187	1627.115	.57	4.46	.31	1627.42	.00	.28	.99	1.500	.000	.00	1	.0				
.039	.5588					.0247	.00	.19	2.19	.09	.013	.00	.00	PIPE					
1037.890	1626.950	.194	1627.144	.57	4.25	.28	1627.42	.00	.28	1.01	1.500	.000	.00	1	.0				
.036	.5588					.0215	.00	.19	2.05	.09	.013	.00	.00	PIPE					
1037.927	1626.970	.200	1627.170	.57	4.05	.26	1627.43	.00	.28	1.02	1.500	.000	.00	1	.0				
.030	.5588					.0188	.00	.20	1.92	.09	.013	.00	.00	PIPE					
1037.957	1626.987	.207	1627.194	.57	3.87	.23	1627.43	.00	.28	1.03	1.500	.000	.00	1	.0				
.026	.5588					.0164	.00	.21	1.80	.09	.013	.00	.00	PIPE					
1037.983	1627.001	.214	1627.215	.57	3.69	.21	1627.43	.00	.28	1.05	1.500	.000	.00	1	.0				

.022	.5588				.0143	.00	.21	1.69	.09	.013	.00	.00	PIPE		
1038.005	1627.014	.221	1627.235	.57	3.51	.19	1627.43	.00	.28	1.06	1.500	.000	.00	1	.0
.019	.5588				.0125	.00	.22	1.59	.09	.013	.00	.00	PIPE		
1038.024	1627.024	.228	1627.253	.57	3.35	.17	1627.43	.00	.28	1.08	1.500	.000	.00	1	.0
.014	.5588				.0109	.00	.23	1.49	.09	.013	.00	.00	PIPE		

Program Package Serial Number: 7354

WATER SURFACE PROFILE LISTING Date:11-12-2021 Time:10: 3:41

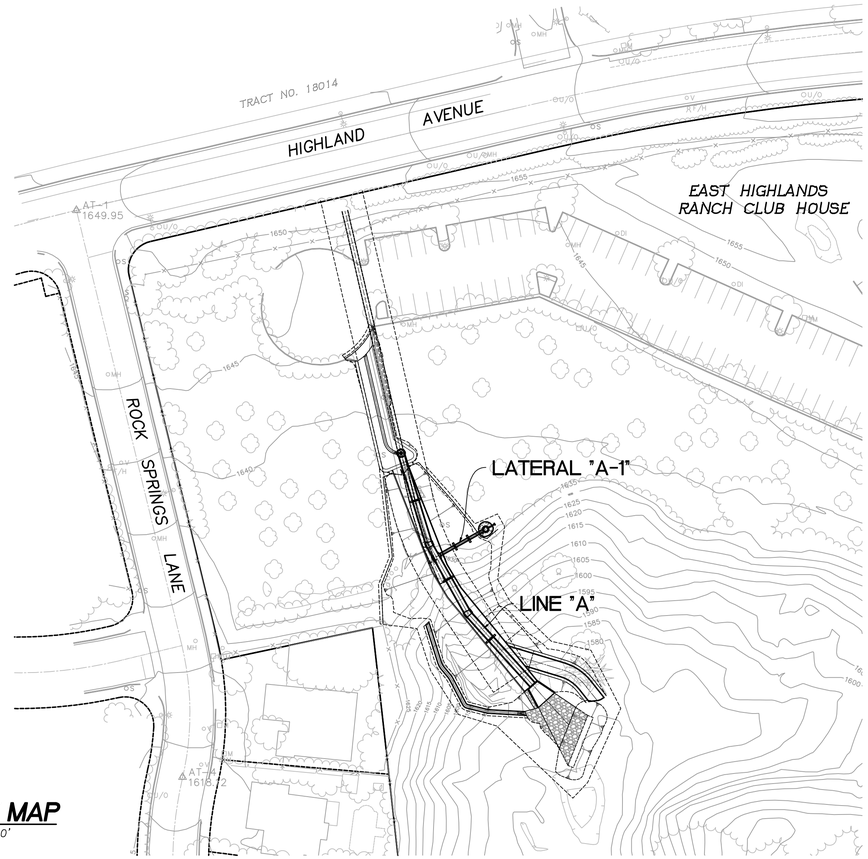
BLEDSOE CREEK
LATERAL "A-1"

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1038.038	1627.032	.236	1627.269	.57	3.20	.16	1627.43	.00	.28	1.09	1.500	.000	.00	1	.0
.012	.5588				.0095	.00	.24	1.39	.09	.013	.00	.00	PIPE		
1038.050	1627.039	.244	1627.283	.57	3.05	.14	1627.43	.00	.28	1.11	1.500	.000	.00	1	.0
.009	.5588				.0083	.00	.24	1.31	.09	.013	.00	.00	PIPE		
1038.059	1627.044	.252	1627.296	.57	2.90	.13	1627.43	.00	.28	1.12	1.500	.000	.00	1	.0
.007	.5588				.0073	.00	.25	1.22	.09	.013	.00	.00	PIPE		
1038.066	1627.048	.260	1627.308	.57	2.77	.12	1627.43	.00	.28	1.14	1.500	.000	.00	1	.0
.003	.5588				.0063	.00	.26	1.15	.09	.013	.00	.00	PIPE		
1038.070	1627.050	.269	1627.319	.57	2.64	.11	1627.43	.00	.28	1.15	1.500	.000	.00	1	.0
.000	.5588				.0055	.00	.27	1.07	.09	.013	.00	.00	PIPE		
1038.070	1627.050	.280	1627.330	.57	2.50	.10	1627.43	.00	.28	1.17	1.500	.000	.00	1	.0
WALL	ENTRANCE														
1038.070	1627.050	1.280	1628.330	.57	.09	.00	1628.33	.00	.08	4.71	7.450	4.710	.00	0	.0

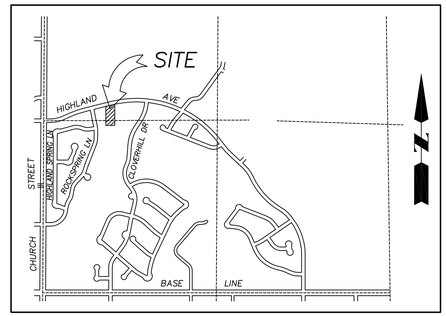
EXHIBITS

EXHIBIT "A:" PROJECT STORM DRAIN IMPROVEMENT PLANS

CITY OF HIGHLAND, CALIFORNIA
STORM DRAIN IMPROVEMENT PLANS
BLEDSOE CREEK STORM DRAIN (LINE "A") AND SLOPE REPAIR



INDEX MAP
1"=50'



VICINITY MAP
NOT TO SCALE

GENERAL NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THESE PLANS, THE STANDARD DRAWINGS OF THE CITY OF HIGHLAND AND THE COUNTY OF SAN BERNARDINO, AND THE GREENBOOK STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FAMILIARIZE HIMSELF WITH THE JOB SITE AND THE LOCATION OF ALL UNDERGROUND FACILITIES SHOWN OR NOT SHOWN ON THESE PLANS. THE CITY OF HIGHLAND WILL NOT BE RESPONSIBLE FOR ANY DAMAGE TO UNDERGROUND FACILITIES.
3. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL NECESSARY PERMITS.
4. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CALL THE CITY ENGINEER'S OFFICE AT (909) 864-8732, EXT. 240 FOR INSPECTION 24 HOURS PRIOR TO PERFORMING ANY WORK. WORK PERFORMED WITHOUT CALLING FOR INSPECTION SHALL BE REJECTED AND SHALL BE REMOVED SOLELY AT THE CONTRACTOR'S EXPENSE.
5. UTILITY CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING COMPACTION TESTS OF ALL TRENCH BACKFILL AND STREET SUBGRADES AND SUBMITTING THEM TO THE CITY ENGINEER FOR APPROVAL. NOTIFY CITY ENGINEER'S OFFICE AT (909) 864-8732, EXT. 240, 24-HOURS PRIOR TO TESTS.
6. CONTRACTOR TO CONTACT GARY LEOBOLD OF EAST HIGHLANDS RANCH MHOA AT (909) 864-0215 AND COORDINATE CONSTRUCTION SCHEDULE AND OPERATION.
7. THE STRUCTURAL SECTIONS SHOWN ON THESE PLANS ARE TENTATIVE. AT THE COMPLETION OF ROUGH GRADING, A MATERIAL REPORT AND THE PROPOSED STRUCTURAL SECTION SHALL BE SUBMITTED BY THE DESIGN ENGINEER TO THE CITY ENGINEER FOR REVIEW AND EVALUATION, APPROVAL WILL BE GIVEN WHEN ALL STRUCTURAL SECTION REQUIREMENTS PREVAILING AT TIME OF SUBMITTAL HAVE BEEN MET. CURRENT MINIMUM STRUCTURAL SECTION IS 3" AC OVER 4" CLASS II AB. IT SHALL BE THE DESIGN ENGINEER'S RESPONSIBILITY TO CONTACT THE CITY ENGINEER'S OFFICE TO OBTAIN THE LATEST STRUCTURAL SECTION REQUIREMENTS.
8. LOCATIONS OF DRIVEWAY APPROACHES SHALL BE ADDED TO THE PRECISE GRADING PLAN IF NOT ON ORIGINAL STREET PLANS. ANY WATER OR SEWER LATERALS CONSTRUCTED WITHIN DRIVEWAY APPROACHES SHALL BE RELOCATED AT THE CONTRACTOR'S EXPENSE. NOTE THAT 4' OF SIDEWALK AT A 2% SLOPE SHALL BE MAINTAINED AROUND DRIVE APPROACHES IN ACCORDANCE WITH STATE AND FEDERAL REQUIREMENTS.
9. THE CONTRACTOR SHALL SATISFY HIMSELF THAT ESTIMATED QUANTITIES SHOWN ARE CORRECT BEFORE BIDDING ON ANY ITEM.
10. THE CONTRACTOR SHALL MAINTAIN DUST CONTROL AT ALL TIMES. WORK SITE AND EXTERIOR STREETS SHALL BE IN A NEAT, CLEAN, HAZARD FREE, ORDERLY STATE THROUGHOUT CONSTRUCTION. SITE SHALL BE CLEANED UPON REQUEST OF THE INSPECTOR.
11. ALL EXISTING PAVEMENT TO BE REMOVED SHALL BE SAWCUT OR WHEELCUT AND REMOVED TO CLEAN STRAIGHT LINES.
12. AT ALL LOCATIONS WHERE NEW PAVEMENT JOINS EXISTING, THE EXISTING PAVEMENT SHALL BE COATED WITH AN ASPHALTIC EMULSION.
13. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL UTILITY VALVES, BOXES AND COVERS, AND ADJUSTING OF ALL WATER VALVE BOXES AND COVERS TO FINISH GRADE.
14. CONTRACTOR SHALL IMPLEMENT SAFE AND EFFECTIVE WATER CONTROL PRACTICES DURING CONSTRUCTION TO ADDRESS EXISTING PIPE AND SURFACE FLOWS FROM EXISTING LINE "A" STORM DRAIN AND LOCAL TRIBUTARY DRAINAGE AREAS. IF PIPES, AC LINING, INLETS, OUTLET STRUCTURE, RIPRAP, CONCRETE PATH AND CURB, SLOPE, TRENCH, AND OTHER TEMPORARY AND PERMANENT IMPROVEMENTS BECOME DAMAGED AND DESTROYED DURING A FLOOD, THEY SHALL BE PROMPTLY REPAIRED AND/OR REPLACED BY THE CONTRACTOR AT IT'S OWN EXPENSE.
15. THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR THE ACCURACY AND ACCEPTABILITY OF THE WORK HEREON. IN THE EVENT OF DISCREPANCIES ARISING DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL OF THE CITY ENGINEER.
16. THE CONTRACTOR SHALL CALL IN A LOCATION REQUEST TO UNDERGROUND SERVICE ALERT (USA), PHONE NUMBER 811, TWO WORKING DAYS BEFORE DIGGING. NO INSPECTION WILL BE PROVIDED BY THE CITY ENGINEER'S OFFICE, AND NO CONSTRUCTION PERMIT ISSUED INVOLVING EXCAVATION FOR UNDERGROUND FACILITIES WILL BE VALID UNLESS THE APPLICANT HAS BEEN PROVIDED AN INQUIRY IDENTIFICATION NUMBER BY USA.
17. ALL IRRIGATION LINES ENCOUNTERED DURING CONSTRUCTION SHALL BE REPLACED WITH 12 GAUGE MINIMUM DIPPED AND WRAPPED-WELDED STEEL PIPE.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ALL LANDSCAPING AND OTHER EXISTING IMPROVEMENTS IN KIND (UNLESS OTHERWISE NOTED) WITHIN THE CONSTRUCTION LIMITS THAT ARE DISRUPTED BY CONTRACTOR'S OPERATION. CONTRACTOR SHALL EXERCISE CAUTION TO PREVENT DISRUPTION OF THE EAST HIGHLANDS RANCH CLUB HOUSE OPERATION.
19. WHEN IMPROVEMENTS ARE TO BE PLACED ON NATIVE SOIL WHICH CONSISTS OF A ROCKY MATERIAL, THE SUB-GRADE SHALL BE PREPARED BY REMOVING ALL ROCKS WHICH PROTRUDE ABOVE THE SUB-GRADE AND ALL VOIDS OR DEPRESSIONS SHALL BE FILLED WITH A FINE GRADE MATERIAL OF A QUALITY BETTER THAN THE NATIVE MATERIAL.
20. NO WORK SHALL COMMENCE WITHIN PUBLIC RIGHT OF WAY WITHOUT OBTAINING A PUBLIC IMPROVEMENTS PERMIT AND NOTIFYING THE CITY INSPECTOR TO SCHEDULE A PRECONSTRUCTION MEETING 24-HOURS PRIOR TO START OF WORK.
21. ASPHALT CONCRETE SHALL BE SPREAD AND COMPACTED IN AT LEAST TWO LIFTS, WITH EACH LIFT NO THICKER THAN 2". THE CITY PREFERS THAT THE FINAL LIFT NOT BE PLACED PRIOR TO THE COMPLETION OF CONSTRUCTION OF THE RESIDENCES/BUILDINGS WITHIN THE DEVELOPMENT. SHOULD THE DEVELOPER CHOOSE TO PAVE THE FULL DEPTH OF A.C. PAVEMENT PRIOR TO THE COMPLETION OF BUILDING CONSTRUCTION, NO FINAL INSPECTION OF THE PAVEMENT SURFACE SHALL BE PERFORMED. UPON THE COMPLETION OF BUILDING CONSTRUCTION, A FINAL INSPECTION OF THE PAVEMENT SURFACE SHALL BE PERFORMED AND ANY NOTED DEFICIENCIES SHALL BE REPAIRED IN ACCORDANCE WITH THE CITY'S PAVEMENT REPAIR POLICY.

CONTRACTORS STATEMENT

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE CITY, THE OWNER, AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR ENGINEER.

LEGEND

STORM DRAIN LINE	
	– INDICATES STREET CENTERLINE
	– INDICATES CURB LINE
	– INDICATES PROPERTY LINE
	– INDICATES EXISTING R/W
BOT	– BOTTOM
CL – C/L	– CENTERLINE
D/W	– DRIVEWAY
TC	– TOP OF CURB
FL	– FLOW LINE
FS	– FINISH SURFACE
INV	– INVERT
HW	– HEADWALL
SW	– SIDEWALK
ESMT	– EASEMENT
R/W	– RIGHT OF WAY
GB	– GRADE BREAK
HP	– HIGH POINT

EARTHWORK QUANTITY ESTIMATE:

RAW CUT	1,416	RAW FILL	726
		SUBSIDENCE XX AC @ X.XX'	–
		XX% LOSS IN SHRINKAGE	–
OVER EXCAVATION	4,311		4,311
		XX% LOSS IN SHRINKAGE (OVER EXCAVATION)	–
RAW TOTAL CUT	5,727 CY	RAW TOTAL FILL	5,037 CY
RAW EXPORT TOTAL =	690 CY		

NOTE:
SEE SOILS REPORT FOR ACCURATE SOILS RESPONSE FACTORS. QUANTITIES SHOWN ABOVE ARE ESTIMATES ONLY.

ENGINEER:

AGUILAR CONSULTING INC.
2155 CHICAGO AVENUE, SUITE 304
RIVERSIDE, CA. 92507

COMPANIES AND AGENCIES SERVICING THIS PROJECT ARE AS FOLLOWS:

WATER/SEWER:
EAST VALLEY WATER DISTRICT
31111 GREENSPOT ROAD
HIGHLAND, CA. 92346
PH: (909) 888-8986

POWER:
SOUTHERN CALIFORNIA EDISON CO.
287 TENNESSEE STREET
REDLANDS, CA. 92373
PH: (909) 307-6767

GAS:
SOUTHERN CALIFORNIA GAS CO.
155 SOUTH "G" STREET
SAN BERNARDINO, CA. 92401
PH: (909) 335-7928

TELEPHONE:
ATT
2828 E. CORONADO ST., 2ND FLOOR
ANAHEIM, CA. 92807
PH: (714) 666-5415

CABLE:
TIME WARNER CABLE
1722 ORANGETREE LANE
REDLANDS, CA. 92374
PH: (909) 798-3588

SCHOOL DISTRICT:
REDLANDS UNIFIED SCHOOL DISTRICT
20 WEST LUGONIA AVENUE
REDLANDS, CA. 92374
PH: (909) 793-2301

SOILS ENGINEER'S STATEMENT:

I, THE UNDERSIGNED SOILS ENGINEER, HAVE REVIEWED THESE PLANS AND AM SATISFIED THAT THEY ARE IN COMPLIANCE WITH THE RECOMMENDATIONS CONTAINED IN THE SOILS REPORT PREPARED FOR THIS SITE, PROJECT NO. _____.

BY: _____

COMPANY NAME: LOR GEOTECHNICAL, INC.

REGISTRATION NO.: GE2030

PRINT NAME: JOHN P. LEUER

PHONE: (951) 653-1760

REGISTERED PROFESSIONAL ENGINEER – JOHN P. LEUER – NO. 2030 Exp. 9/30/2023 – GEOTECHNICAL – STATE OF CALIFORNIA

SHEET INDEX

CONSTRUCTION NOTES / QUANTITY ESTIMATES

1	CONSTRUCT 48" RCP STORM DRAIN (D-LOAD=1350). SEE PIPE BEDDING DETAIL ON SHEET 6.	187 LF
2	CONSTRUCT 18" RCP STORM DRAIN (CLASS IV). SEE PIPE BEDDING DETAIL ON SHEET 6.	35 LF
3	CONSTRUCT 60"ø TYPE GCP CONCRETE PIPE INLET PER CALTRANS 2018 STD. PLAN D75B USING "CONE SHAPED" GRATE ASSEMBLY PER DETAIL ON SHEET 6.	1 EA
4	CONSTRUCT HEADWALL WING TYPE PER SAN BERNARDINO COUNTY STD. 209 AND PER DETAIL "A" ON SHEET 6.	1 EA
5	CONSTRUCT 1/2-TON GROUTED RIPRAP (CLASS VIII) (T=5') WITH THE UPPER 6" TO 9" EXPOSED, D50=9" FILTER MATERIAL (T=12") AND FILTER FABRIC PER SECTION "F"-"F" ON SHEET 6 & CALTRANS SPECS 72.	1,170 SF
6	CONSTRUCT 4" AC OVER COMPACTED NATIVE.	2,711 SF
7	CONSTRUCT 6" ASPHALT CONCRETE DIKE PER SAN BERNARDINO COUNTY STD. 117.	182 LF
8	CONSTRUCT 6" CONCRETE WEDGE CURB PER DETAIL ON SHEET 6.	193 LF
9	CONSTRUCT 2"X6" REDWOOD HEADER WITH 2"X4"X24" REDWOOD STAKE @30" O.C.	324 LF
10	INSTALL 6-FOOT HIGH CHAIN LINK FENCE PER S.P.P.W.C. STD. DWG. NO. 600-3.	197 LF
11	INSTALL 14-FOOT DOUBLE DRIVE GATE PER S.P.P.W.C. STD. PLAN 600-3.	1 EA
12	CONSTRUCT 36"ø TYPE GCP CONCRETE PIPE INLET PER CALTRANS 2018 STD. PLAN D75B USING "CONE SHAPED" GRATE ASSEMBLY PER DETAIL ON SHEET 6.	1 EA
13	REMOVED EXISTING CONCRETE ACCESS ROAD AND REPLACE WITH 6" THICK PCC ACCESS DRIVEWAY.	940 SF
14	CONSTRUCT 6" THICK PCC RIBBON GUTTER PER SECTION "C"-"C" ON SHEET 6.	74 LF
15	CONSTRUCT 1' DEEP DOWN DRAIN PER DETAIL ON SHEET 6.	106 LF
16	CONSTRUCT TYPE 2 CASE "A" CURB RAMP PER S.P.P.W.C. STD. PLAN 111-4.	1 EA
17	CONSTRUCT JUNCTION STRUCTURE PER S.P.P.W.C. STD. PLAN 331-3	1 EA
18	CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4.	2 EA
19	CONSTRUCT PIPE ANCHOR PER S.P.P.W.C. STD. PLAN 221-2.	5 EA
20	REMOVE AND DISPOSE EXISTING CURB.	49 LF
21	REMOVE AND DISPOSE EXISTING RIPRAP.	3,137 SF
22	REMOVE AND DISPOSE INTERFERING PORTION OF EXISTING 48" SD PIPE.	96 LF
23	REMOVE AND DISPOSE EXISTING HEADWALL.	1 EA
24	REMOVE AND DISPOSE EXISTING 44" DIAMETER GRATE INLET.	1 EA
25	PROTECT IN PLACE.	
26	RELOCATE EXISTING SYMBOL SIGN.	4 EA
27	REMOVE EXISTING TREES TO FACILITATE CONSTRUCTION OF PROPOSED IMPROVEMENTS.	9 EA
28	REMOVE AND DISPOSE EXISTING 6" THICK PCC PAVEMENT.	1,731 SF
29	REMOVE AND DISPOSE EXISTING PCC CURB RAMP.	118 SF
30	REMOVE EXISTING VEGETATION TO FACILITATE CONSTRUCTION OF PROPOSED IMPROVEMENTS.	14,290 SF
31	REMOVE AND SALVAGE EXISTING POST.	4 EA
32	PROTECT EXISTING FENCE IN PLACE.	
33	INSTALL GRAVEL BAG ENERGY DISSIPATOR PER CASQA BMP SE-6 AND DETAIL ON SHEET 8.	396 LF
34	INSTALL FIBER ROLLS PER CASQA BMP SE-5 OR SANDBAGS (3 HIGH) PER CASQA BMP SE-8 AT TOP OR TOE OF SLOPE. PERIODIC SEDIMENT REMOVAL IS REQUIRED.	822 LF
35	CONSTRUCT 4" THICK CONCRETE LINING.	75 SF
36	INSTALL 6" PERFORATED PVC SUBDRAIN (SCH. 40) AND PLUG END WITH PLASTIC CAP PER DETAIL ON SHEET 6.	6 LF
37	CONSTRUCT 6" TO MEET EXISTING CURB FACE TRANSITION.	23 LF
38	SAWCUT & REMOVE EXISTING A.C. PAVEMENT.	32 LF
39	GRIND MIN. 0.10' EX. A.C. PAVING, OVERLAY WITH MIN. 0.10' A.C. PAVING PER CITY OF HIGHLAND TYPICAL PAVEMENT JOIN DETAIL STD. DWG. NO. 214 AND DETAIL ON SHEET 6.	59 SF

95% PLAN SUBMITTAL

Underground Service Alert of Southern California
Call: TOLL FREE
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TWO WORKING DAYS BEFORE YOU DIG

SEAL: REGISTERED PROFESSIONAL ENGINEER – CEZAR V. AGUILAR – No. 41679 – Exp. 03/31/22 – CIVIL – STATE OF CALIFORNIA

PLAN PREPARED UNDER THE SUPERVISION OF:
ACI AGUILAR CONSULTING INC.
2155 CHICAGO AVENUE, SUITE 304
RIVERSIDE, CA 92507
PH. (951) 300-1431 FAX (951) 300-1435

BENCH MARK:
CITY OF HIGHLAND BM NO. 00558
MONUMENT: 1-1/2" BRASS CAP IN SOUTH END OF CONCRETE CATCH BASIN. 78' NORTH OF CENTERLINE OF GREENSPOT ROAD AND 32.5' EAST OF CENTERLINE OF CHURCH STREET.
ELEVATION = 1327.363 DATUM: NAVD29

REVISIONS

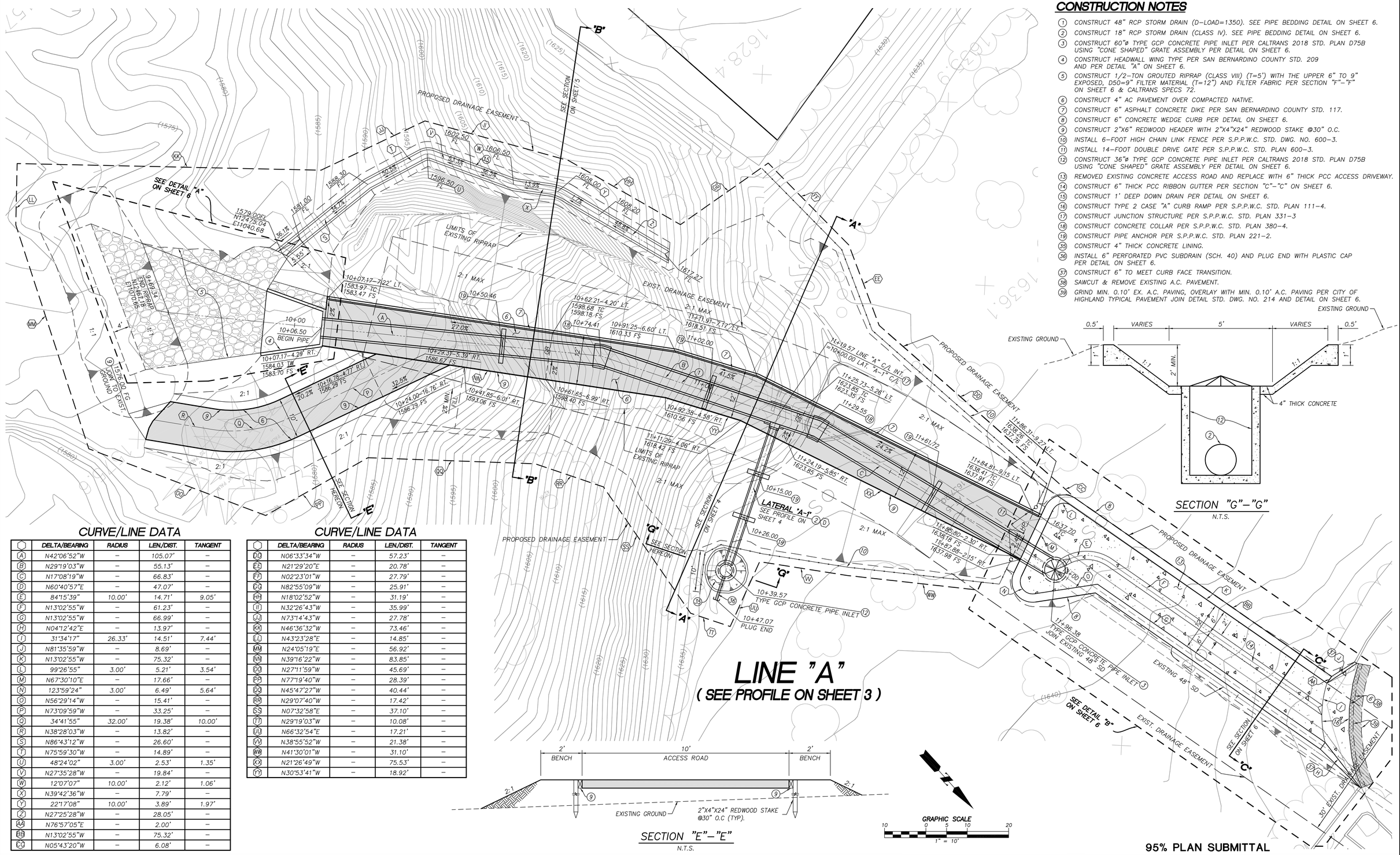
CITY OF HIGHLAND
DRAWN: RVB | DESIGNED: LVB | CHECKED: CVA
RECOMMENDED BY: CARLOS ZAMANO DATE RCE _____, EXP. __/__/__
APPROVED BY: ERNEST WONG, CITY ENGINEER DATE RCE 37413, EXP. 6/30/22

STORM DRAIN IMPROVEMENT PLANS
BLEDSOE CREEK STORM DRAIN (LINE "A") AND SLOPE REPAIR TITLE SHEET

W.O.
SCALE:
FILE NO.
SHEET 1 OF 8

CONSTRUCTION NOTES

1. CONSTRUCT 48" RCP STORM DRAIN (D-LOAD=1350). SEE PIPE BEDDING DETAIL ON SHEET 6.
2. CONSTRUCT 18" RCP STORM DRAIN (CLASS IV). SEE PIPE BEDDING DETAIL ON SHEET 6.
3. CONSTRUCT 60"ø TYPE GCP CONCRETE PIPE INLET PER CALTRANS 2018 STD. PLAN D75B USING "CONE SHAPED" GRATE ASSEMBLY PER DETAIL ON SHEET 6.
4. CONSTRUCT HEADWALL WING TYPE PER SAN BERNARDINO COUNTY STD. 209 AND PER DETAIL "A" ON SHEET 6.
5. CONSTRUCT 1/2-TON GROUTED RIPRAP (CLASS VIII) (T=5') WITH THE UPPER 6" TO 9" EXPOSED, D50=9" FILTER MATERIAL (T=12") AND FILTER FABRIC PER SECTION "F"-"F" ON SHEET 6 & CALTRANS SPECS 72.
6. CONSTRUCT 4" AC PAVEMENT OVER COMPACTED NATIVE.
7. CONSTRUCT 6" ASPHALT CONCRETE DIKE PER SAN BERNARDINO COUNTY STD. 117.
8. CONSTRUCT 6" CONCRETE WEDGE CURB PER DETAIL ON SHEET 6.
9. CONSTRUCT 2"X6" REDWOOD HEADER WITH 2"X4"X24" REDWOOD STAKE @30" O.C.
10. INSTALL 6-FOOT HIGH CHAIN LINK FENCE PER S.P.P.W.C. STD. DWG. NO. 600-3.
11. INSTALL 14-FOOT DOUBLE DRIVE GATE PER S.P.P.W.C. STD. PLAN 600-3.
12. CONSTRUCT 36"ø TYPE GCP CONCRETE PIPE INLET PER CALTRANS 2018 STD. PLAN D75B USING "CONE SHAPED" GRATE ASSEMBLY PER DETAIL ON SHEET 6.
13. REMOVED EXISTING CONCRETE ACCESS ROAD AND REPLACE WITH 6" THICK PCC ACCESS DRIVEWAY.
14. CONSTRUCT 6" THICK PCC RIBBON GUTTER PER SECTION "C"-"C" ON SHEET 6.
15. CONSTRUCT 1' DEEP DOWN DRAIN PER DETAIL ON SHEET 6.
16. CONSTRUCT TYPE 2 CASE "A" CURB RAMP PER S.P.P.W.C. STD. PLAN 111-4.
17. CONSTRUCT JUNCTION STRUCTURE PER S.P.P.W.C. STD. PLAN 331-3
18. CONSTRUCT CONCRETE COLLAR PER S.P.P.W.C. STD. PLAN 380-4.
19. CONSTRUCT PIPE ANCHOR PER S.P.P.W.C. STD. PLAN 221-2.
35. CONSTRUCT 4" THICK CONCRETE LINING.
36. INSTALL 6" PERFORATED PVC SUBDRAIN (SCH. 40) AND PLUG END WITH PLASTIC CAP PER DETAIL ON SHEET 6.
37. CONSTRUCT 6" TO MEET CURB FACE TRANSITION.
38. SAWCUT & REMOVE EXISTING A.C. PAVEMENT.
39. GRIND MIN. 0.10' EX. A.C. PAVING, OVERLAY WITH MIN. 0.10' A.C. PAVING PER CITY OF HIGHLAND TYPICAL PAVEMENT JOIN DETAIL STD. DWG. NO. 214 AND DETAIL ON SHEET 6.



SECTION "G"-"G"
N.T.S.

SECTION "E"-"E"
N.T.S.

GRAPHIC SCALE
10 0 5 10 20
1" = 10'

LINE "A"
(SEE PROFILE ON SHEET 3)

95% PLAN SUBMITTAL

CURVE/LINE DATA

	DELTA/BEARING	RADIUS	LEN/DIST.	TANGENT
A	N42°06'52"W	-	105.07'	-
B	N29°19'03"W	-	55.13'	-
C	N17°08'19"W	-	66.83'	-
D	N60°40'57"E	-	47.07'	-
E	84°15'39"	10.00'	14.71'	9.05'
F	N13°02'55"W	-	61.23'	-
G	N13°02'55"W	-	66.99'	-
H	N04°12'42"E	-	13.97'	-
I	31°34'17"	26.33'	14.51'	7.44'
J	N81°35'59"W	-	8.69'	-
K	N13°02'55"W	-	75.32'	-
L	99°26'55"	3.00'	5.21'	3.54'
M	N67°30'10"E	-	17.66'	-
N	123°59'24"	3.00'	6.49'	5.64'
O	N56°29'14"W	-	15.41'	-
P	N73°09'59"W	-	33.25'	-
Q	34°41'55"	32.00'	19.38'	10.00'
R	N38°28'03"W	-	13.82'	-
S	N86°43'12"W	-	26.60'	-
T	N75°59'30"W	-	14.89'	-
U	48°24'02"	3.00'	2.53'	1.35'
V	N27°35'28"W	-	19.84'	-
W	12°07'07"	10.00'	2.12'	1.06'
X	N39°42'36"W	-	7.79'	-
Y	22°17'08"	10.00'	3.89'	1.97'
Z	N27°25'28"W	-	28.05'	-
AA	N76°57'05"E	-	2.00'	-
BB	N13°02'55"W	-	75.32'	-
CC	N05°43'20"W	-	6.08'	-

CURVE/LINE DATA

	DELTA/BEARING	RADIUS	LEN/DIST.	TANGENT
DD	N06°33'34"W	-	57.23'	-
EE	N21°29'20"E	-	20.78'	-
FF	N02°23'01"W	-	27.79'	-
GG	N82°55'09"W	-	25.91'	-
HH	N18°02'52"W	-	31.19'	-
II	N32°26'43"W	-	35.99'	-
JJ	N73°14'43"W	-	27.78'	-
KK	N46°36'32"W	-	73.46'	-
LL	N43°23'28"E	-	14.85'	-
MM	N24°05'19"E	-	56.92'	-
NN	N39°16'22"W	-	83.85'	-
OO	N27°11'59"W	-	45.69'	-
PP	N77°19'40"W	-	28.39'	-
QQ	N45°47'27"W	-	40.44'	-
RR	N29°07'40"W	-	17.42'	-
SS	N07°32'58"E	-	37.10'	-
TT	N29°19'03"W	-	10.08'	-
UU	N66°32'54"E	-	17.21'	-
VV	N38°55'52"W	-	21.38'	-
WW	N41°30'01"W	-	31.10'	-
XX	N21°26'49"W	-	75.53'	-
YY	N30°53'41"W	-	18.92'	-

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SEAL:
REGISTERED PROFESSIONAL ENGINEER
CEAZAR V. AGUILAR
No. 41679
Exp. 03/31/22
CIVIL
STATE OF CALIFORNIA

PLAN PREPARED UNDER THE SUPERVISION OF:
ACI AGUILAR CONSULTING INC.
2155 CHICAGO AVENUE, SUITE 304
RIVERSIDE, CA 92507
PH. (951) 300-1431 FAX (951) 300-1435

BENCH MARK:
CITY OF HIGHLAND BM NO. 00558
MONUMENT: 1-1/2" BRASS CAP IN SOUTH END OF CONCRETE CATCH BASIN. 78' NORTH OF CENTERLINE OF GREENSPOT ROAD AND 32.5' EAST OF CENTERLINE OF CHURCH STREET.
ELEVATION = 1327.363 DATUM: NAVD29

REVISIONS

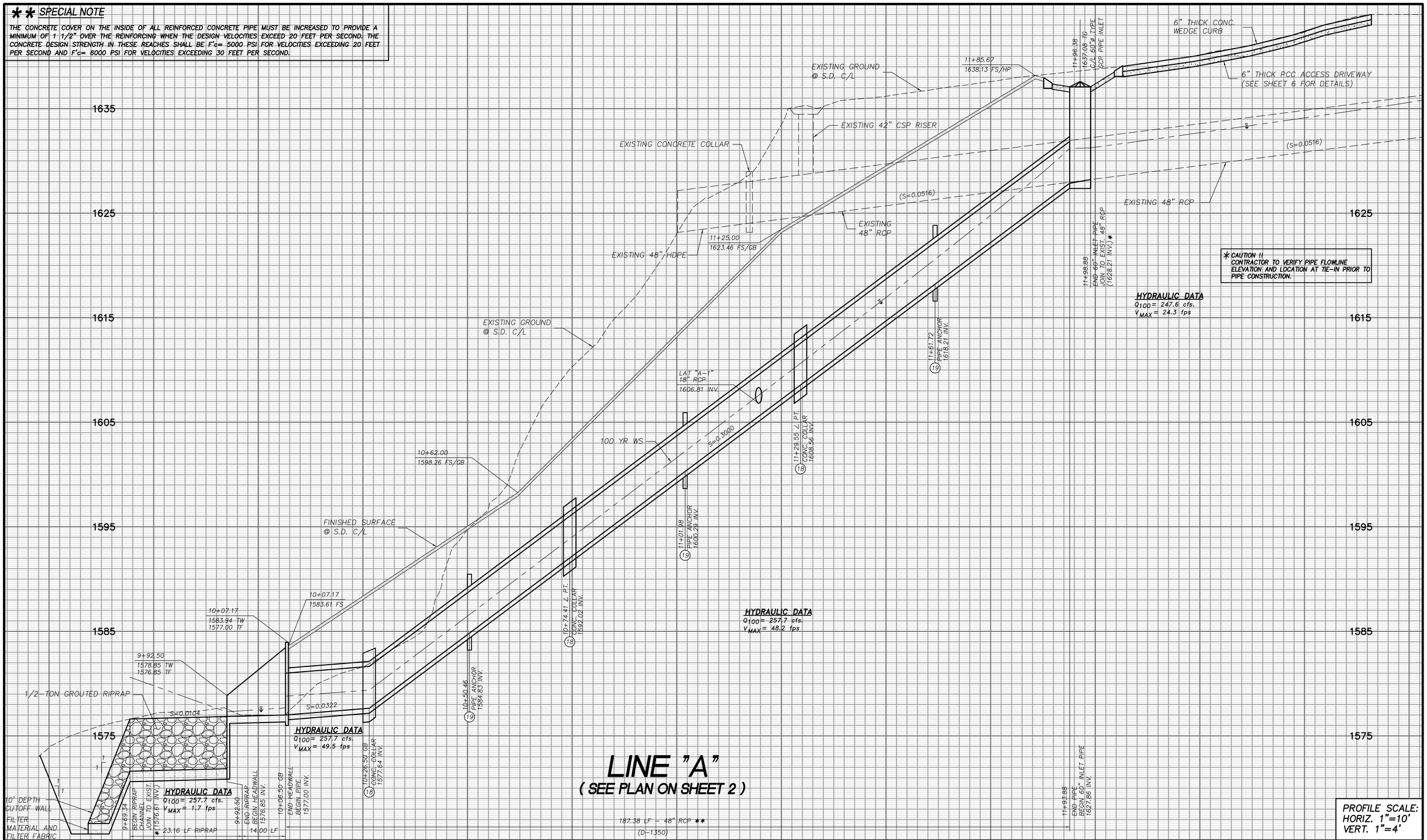
CITY OF HIGHLAND
DRAWN: RVB DESIGNED: LVB CHECKED: CVA
RECOMMENDED BY:
CARLOS ZAMANO DATE
RCE _____, EXP. __/__/__
APPROVED BY:
ERNEST WONG, CITY ENGINEER DATE
RCE 37413, EXP. 6/30/22

STORM DRAIN IMPROVEMENT PLANS
BLEDSOE CREEK STORM DRAIN (LINE "A") AND SLOPE REPAIR PLAN

W.O.
SCALE:
FILE NO.
SHEET 2 OF 8

**** SPECIAL NOTE**

THE CONCRETE COVER ON THE INSIDE OF ALL REINFORCED CONCRETE PIPE MUST BE INCREASED TO PROVIDE A MINIMUM OF 1 1/2" OVER THE REINFORCING WHEN THE DESIGN VELOCITIES EXCEED 20 FEET PER SECOND. THE CONCRETE DESIGN STRENGTH IN THESE REACHES SHALL BE F'c= 5000 PSI FOR VELOCITIES EXCEEDING 20 FEET PER SECOND AND F'c= 6000 PSI FOR VELOCITIES EXCEEDING 30 FEET PER SECOND.



LINE "A"

(SEE PLAN ON SHEET 2)

187.38 LF - 48" RCP **
(D-1350)

PROFILE SCALE:
HORIZ. 1"=10'
VERT. 1"=4'

95% PLAN SUBMITTAL

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CITY OF HIGHLAND
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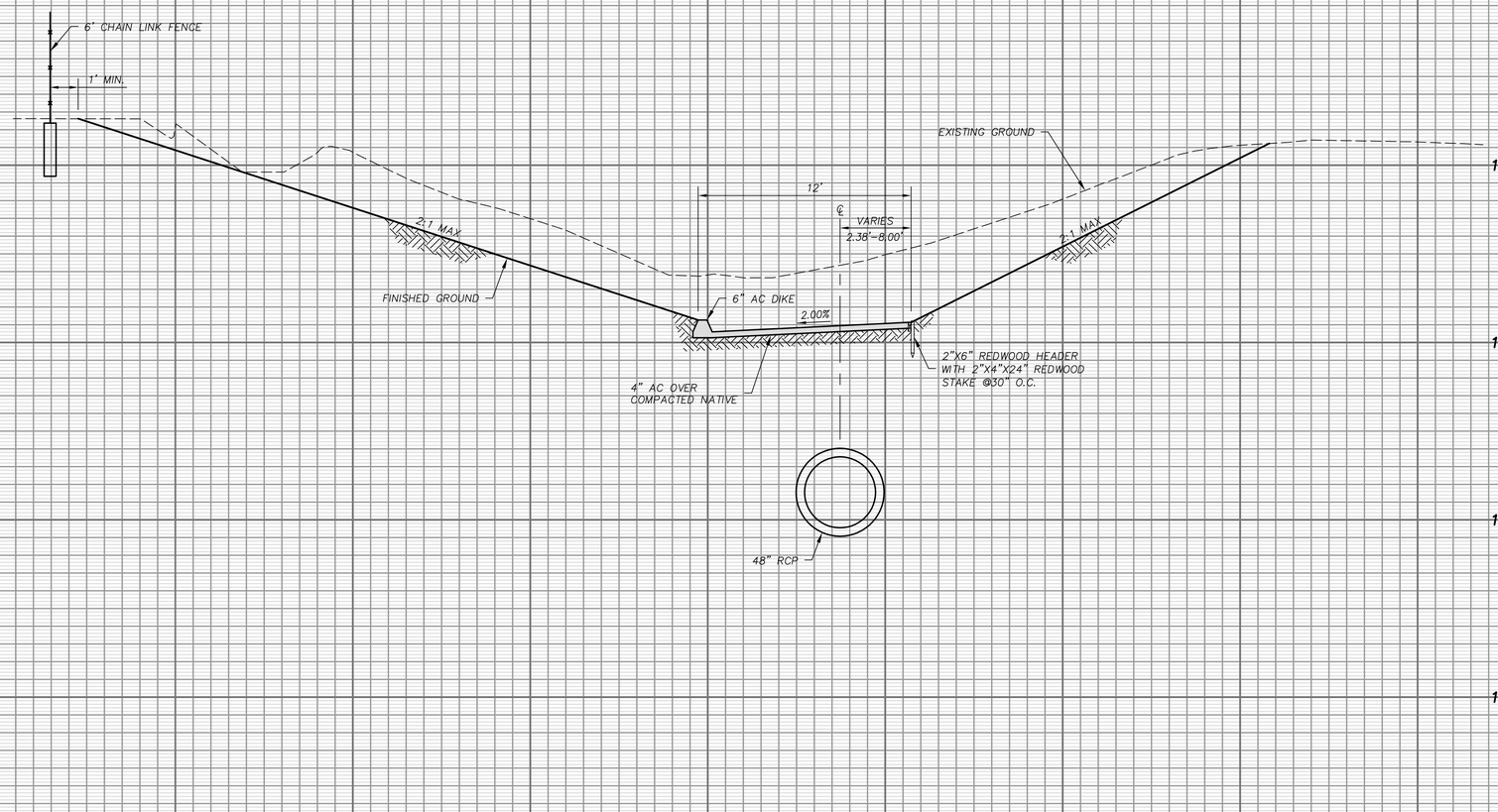
RCE _____, EXP. __/__/__
APPROVED BY:
ERNEST WONG, CITY ENGINEER DATE
RCE 37413, EXP. 6/30/22

STORM DRAIN IMPROVEMENT PLANS
BLEDSOE CREEK
STORM DRAIN (LINE "A") AND SLOPE REPAIR
PROFILE
STA. 9+69.34 TO STA. 11+98.88

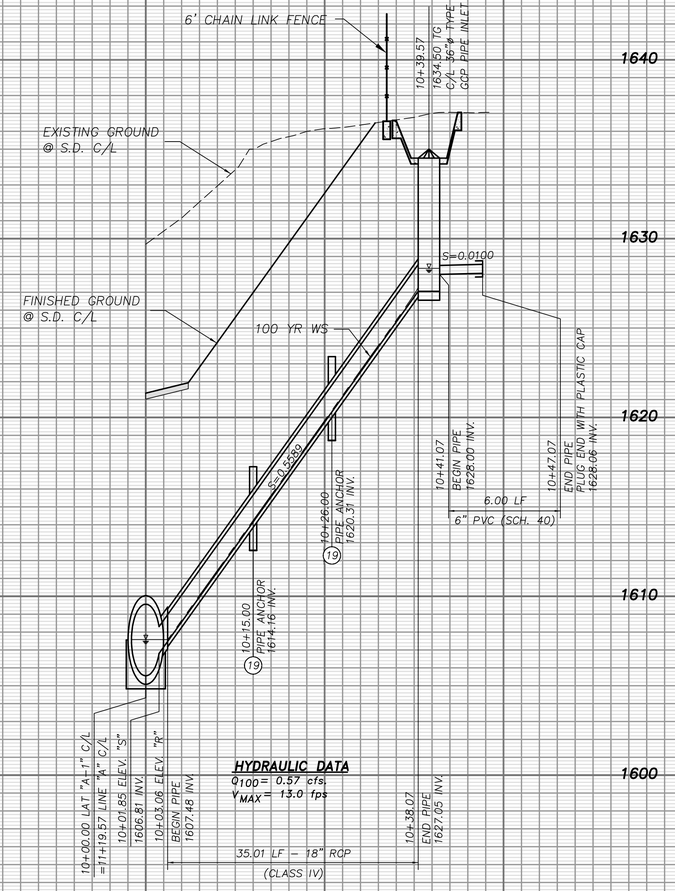
W.O.
SCALE:
FILE NO.
SHEET 3 OF 8



SECTION "A"-"A"

(SEE PLAN ON SHEET 2)

SCALE:
HORIZ. 1"=4'
VERT. 1"=4'



LATERAL "A-1"

(SEE PLAN ON SHEET 2)

PROFILE SCALE:
HORIZ. 1"=10'
VERT. 1"=4'

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ELEVATION = 1327.363 DATUM: NAVD29

REVISIONS

CITY OF HIGHLAND

DRAWN: RVB | DESIGNED: LVB | CHECKED: CVA

RECOMMENDED BY:

CARLOS ZAMANO DATE
RCE _____, EXP. __/__/__

APPROVED BY:

ERNEST WONG, CITY ENGINEER DATE
RCE 37413, EXP. 6/30/22

STORM DRAIN IMPROVEMENT PLANS

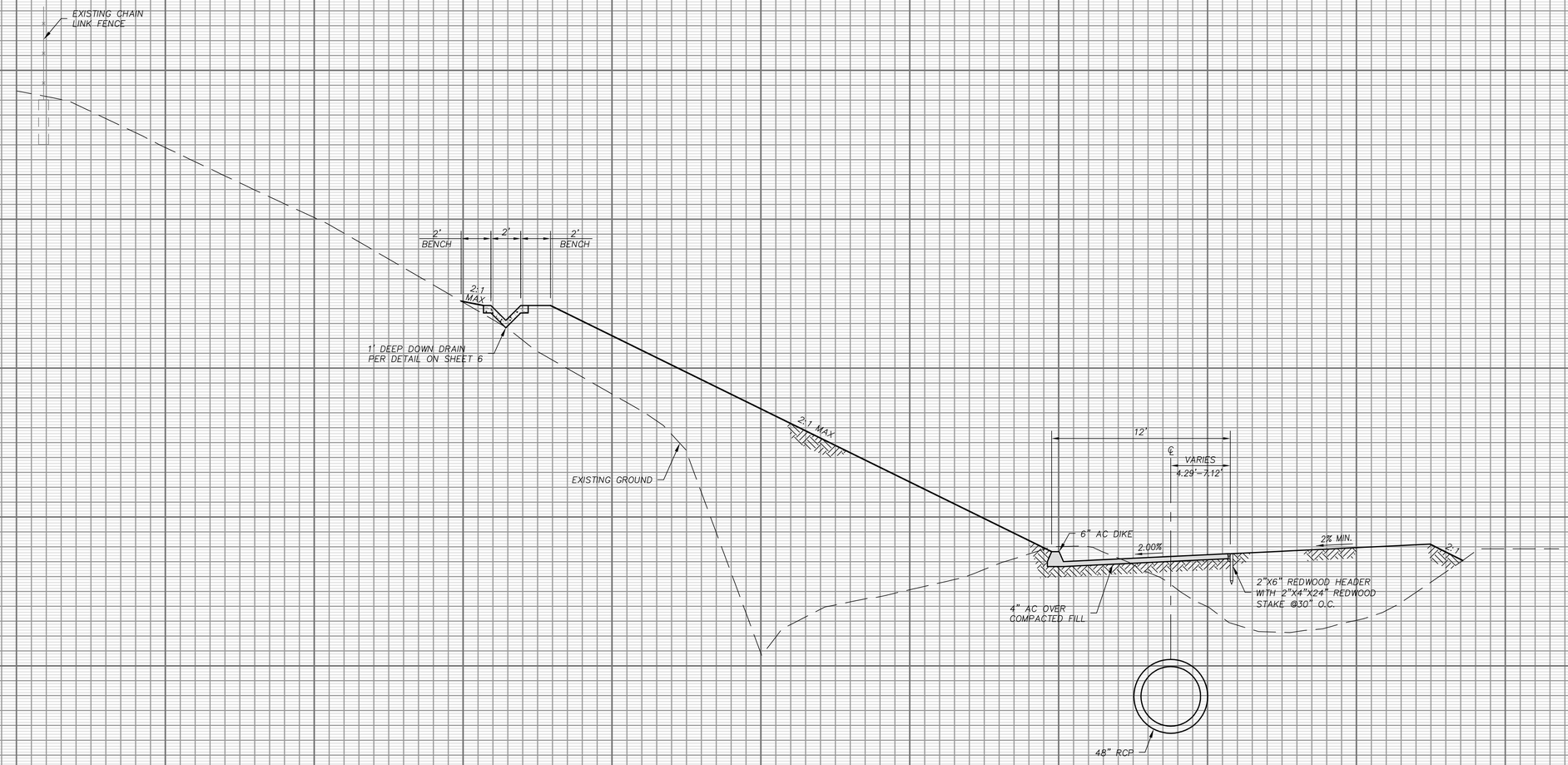
BLEDSOE CREEK
STORM DRAIN (LINE "A") AND SLOPE REPAIR
LATERAL "A-1" PROFILE AND SECTION "A"-"A"

W.O.

SCALE:

FILE NO.

SHEET 4 OF 8



SECTION "B"-"B"

(SEE PLAN ON SHEET 2)

PROFILE SCALE:
HORIZ. 1"=4'
VERT. 1"=4'

95% PLAN SUBMITTAL

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SEAL:

REGISTERED PROFESSIONAL ENGINEER
CEAZAR V. AGUILAR
No. 41679
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ELEVATION = 1327.363 DATUM: NAVD29

REVISIONS

CITY OF HIGHLAND

DRAWN: RVB | DESIGNED: LVB | CHECKED: CVA

RECOMMENDED BY:

CARLOS ZAMANO DATE
RCE _____ EXP. __/__/__

APPROVED BY:

ERNEST WONG, CITY ENGINEER DATE
RCE 37413, EXP. 6/30/22

STORM DRAIN IMPROVEMENT PLANS

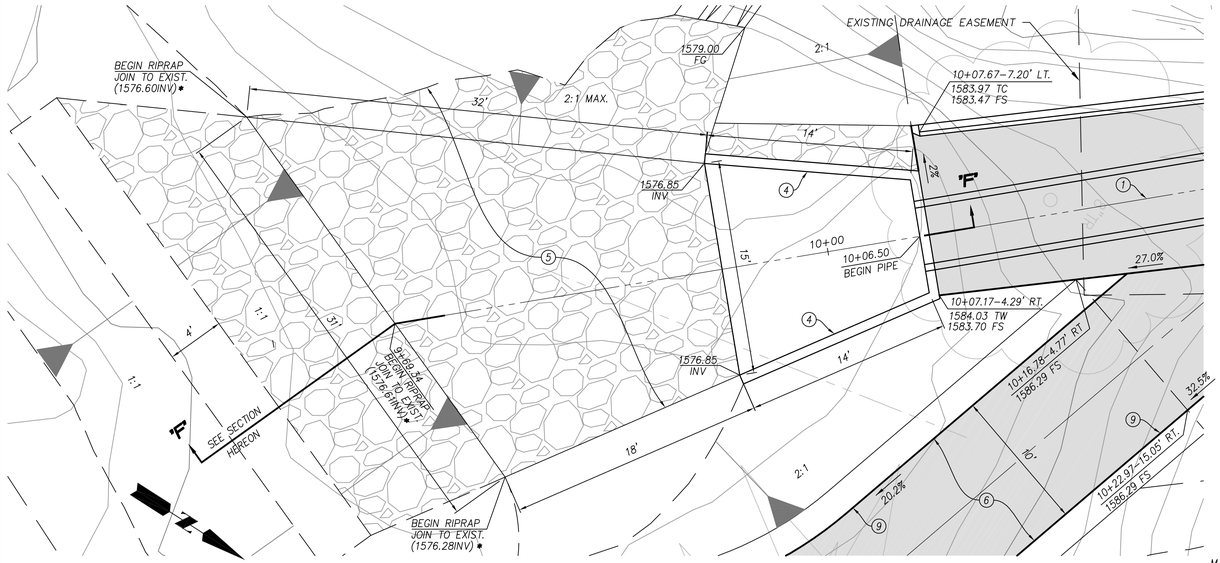
BLEDSOE CREEK
STORM DRAIN (LINE 'A') AND SLOPE REPAIR
SECTION "B"-"B"

W.O.

SCALE:

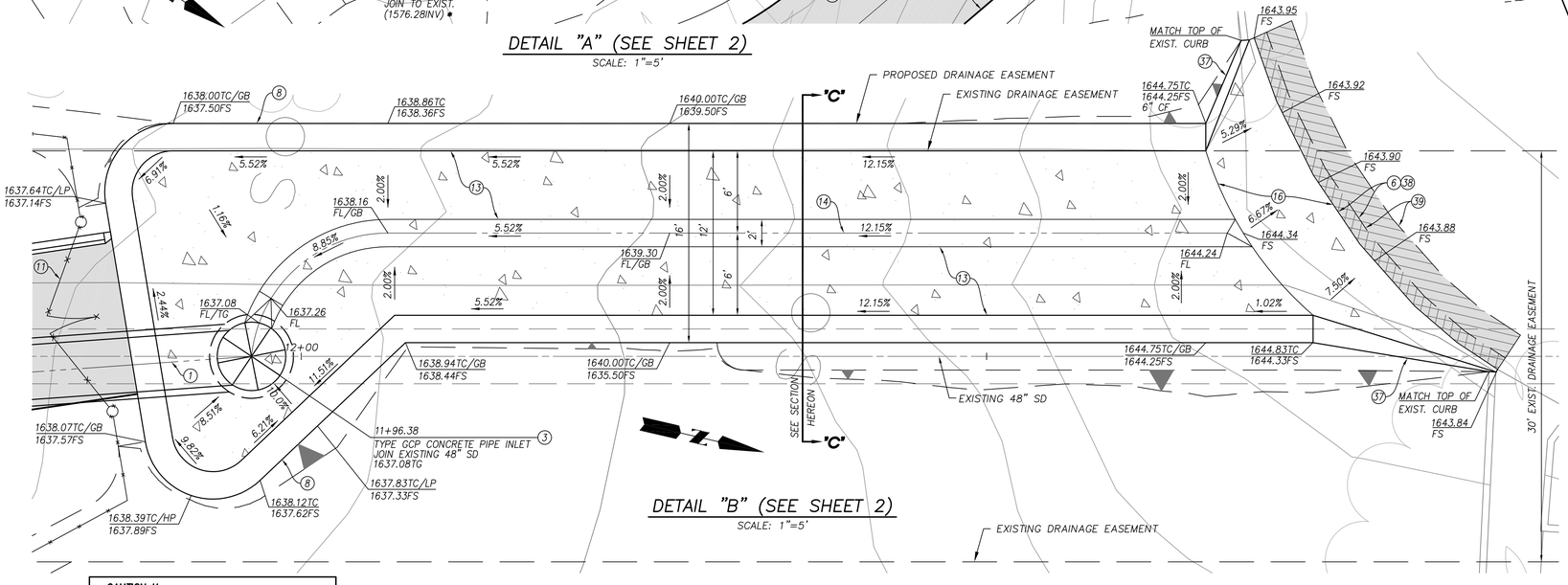
FILE NO.

SHEET 5 OF 8



DETAIL "A" (SEE SHEET 2)

SCALE: 1"=5'



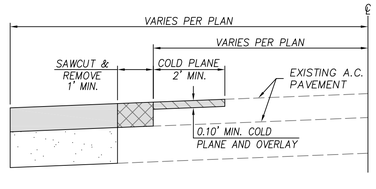
DETAIL "B" (SEE SHEET 2)

SCALE: 1"=5'

CAUTION !!
CONTRACTOR TO VERIFY PIPE FLOWLINE ELEVATION AND LOCATION AT TIE–IN PRIOR TO PIPE CONSTRUCTION.

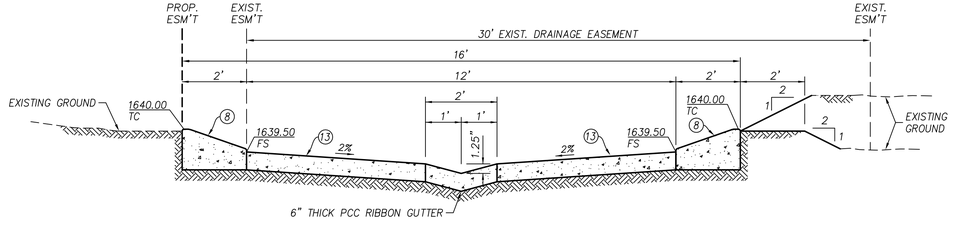
LEGEND

- LIMITS OF NEW PAVEMENT
- EXISTING PAVING TO BE REMOVED
- LIMITS OF PAVEMENT GRIND AND OVERLAY



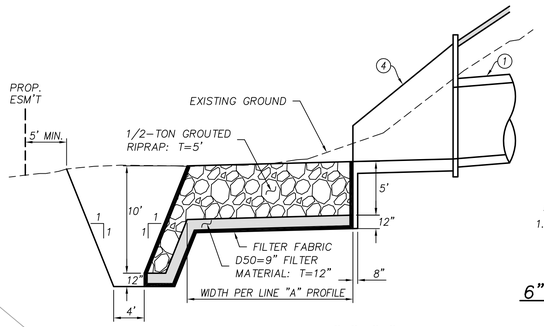
(39) PAVEMENT JOIN DETAIL

N.T.S.



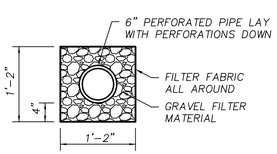
SECTION "C"–"C"

N.T.S.



SECTION "F"–"F"

N.T.S.

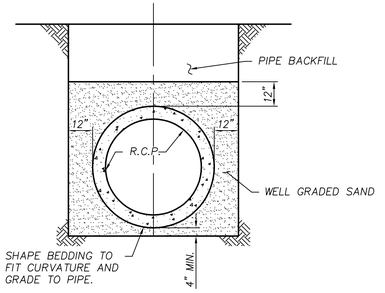


NOTES:

1. DRAIN PIPE OUTLETS SHALL BE COVERED WITH 2" MESH GALVANIZED SCREEN, ANCHORED IN CONCRETE A MINIMUM OF 4 INCHES, OF 16 GAGE WIRE OR HEAVIER.

6" PERFORATED PVC SUBDRAIN

N.T.S.



NOTES:

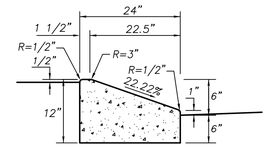
1. BEDDING A SHALL BE COMPOSED OF FINE SAND, NO. 3 OR NO. 4 CRUSHED ROCK OR GRAVEL PER STANDARD SPECIFICATIONS (GREENBOOK).
2. BACKFILL SHALL BE PER SECTION 306–1.3 OF THE STANDARD SPECIFICATIONS.
3. THIS BEDDING DETAIL SHALL ONLY BE USED FOR RCP OR AS APPROVED BY ENGINEER OF RECORD.

R.C.P. TRENCH DETAIL

N.T.S.

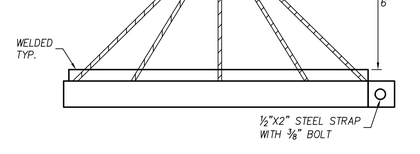
CONSTRUCTION NOTES

1. CONSTRUCT 48" RCP STORM DRAIN (D–LOAD=1350). SEE PIPE BEDDING DETAIL HEREON.
3. CONSTRUCT 60"ø TYPE GCP CONCRETE PIPE INLET PER CALTRANS 2018 STD. PLAN D75B USING "CONE SHAPED" GRATE ASSEMBLY PER DETAIL HEREON.
4. CONSTRUCT HEADWALL WING TYPE PER SAN BERNARDINO COUNTY STD. 209 AND PER DETAIL "A" HEREON.
5. CONSTRUCT 1/2–TON GROUTED RIPRAP (CLASS VIII) (T=5') WITH THE UPPER 6" TO 9" EXPOSED, D50=9" FILTER MATERIAL (T=12") AND FILTER FABRIC PER SECTION "F"–"F" HEREON & CALTRANS SPECS 72.
6. CONSTRUCT 4" AC OVER COMPACTED NATIVE.
8. CONSTRUCT 6" CONCRETE WEDGE CURB PER DETAIL HEREON.
9. CONSTRUCT 2"X6" REDWOOD HEADER WITH 2"X4"X24" REDWOOD STAKE @30" O.C.
11. INSTALL 14–FOOT DOUBLE DRIVE GATE PER S.P.P.W.C. STD. PLAN 600–3.
13. REMOVED EXISTING CONCRETE ACCESS ROAD AND REPLACE WITH 6" THICK PCC ACCESS DRIVEWAY.
14. CONSTRUCT 6" THICK PCC RIBBON GUTTER PER SECTION "C"–"C" HEREON.
16. CONSTRUCT TYPE 2 CASE "A" CURB RAMP PER S.P.P.W.C. STD. PLAN 111–4.
37. CONSTRUCT 6" TO MEET EXISTING CURB FACE TRANSITION.
38. SAWCUT & REMOVE EXISTING A.C. PAVEMENT.
39. GRIND MIN. 0.10' EX. A.C. PAVING, OVERLAY WITH MIN. 0.10' A.C. PAVING PER CITY OF HIGHLAND TYPICAL PAVEMENT JOIN DETAIL STD. DWG. NO. 214 AND DETAIL HEREON.



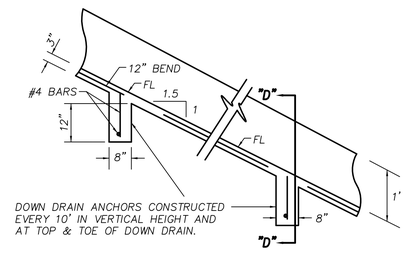
(8) 6" WEDGE CURB DETAIL

N.T.S.



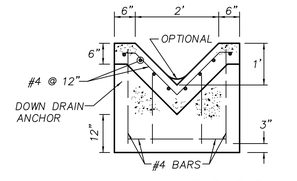
"CONE SHAPED" GRATE ASSEMBLY DETAIL

N.T.S.



(15) DOWN DRAIN LONGITUDINAL SECTION

N.T.S.



DOWN DRAIN ANCHOR SECTION "D"–"D"

N.T.S.

NOTES:

1. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH AT 28 DAYS OF 3000 PSI. CONCRETE MAY BE PNEUMATICALLY PLACED AND SHALL CONFORM TO SECTION 2621 OF THE UNIFORM BUILDING CODE.
2. REINFORCING SHALL BE 6"x6" – W 1.4 x W 1.4 WELDED WIRE MESH (W.W.M.) OR APPROVED EQUAL.
3. GROUND SHALL BE PRE–WETTED TO THE SATISFACTION OF THE ENGINEER PRIOR TO PLACEMENT OF CONCRETE. MOISTURE LOSS RETARDANT SHALL BE USED WHEN REQUIRED BY THE ENGINEER.

95% PLAN SUBMITTAL

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SEAL:
REGISTERED PROFESSIONAL ENGINEER — CEAZAR V. AGUILAR — No. 41679 — Exp. 03/31/22 — CIVIL — STATE OF CALIFORNIA

PLAN PREPARED UNDER THE SUPERVISION OF:
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2155 CHICAGO AVENUE, SUITE 304
RIVERSIDE, CA 92507
PH. (951) 300–1431 FAX (951) 300–1435

BENCH MARK:
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MONUMENT: 1–1/2" BRASS CAP IN SOUTH END OF CONCRETE CATCH BASIN. 78' NORTH OF CENTERLINE OF GREENSPOT ROAD AND 32.5' EAST OF CENTERLINE OF CHURCH STREET.
ELEVATION = 1327.363 DATUM: NAVD29

REVISIONS

CITY OF HIGHLAND

DRAWN: RVB | DESIGNED: LVB | CHECKED: CVA

RECOMMENDED BY:
CARLOS ZAMANO DATE
RCE _____, EXP. __/__/__

APPROVED BY:
ERNEST WONG, CITY ENGINEER DATE
RCE 37413, EXP. 6/30/22

STORM DRAIN IMPROVEMENT PLANS

BLEDSOE CREEK STORM DRAIN (LINE "A") AND SLOPE REPAIR DETAILS AND SECTIONS

W.O.
SCALE:
FILE NO.
SHEET 6 OF 8

LEGEND

- REMOVE AND DISPOSE EXISTING PCC PAVEMENT
  REMOVE AND DISPOSE EXISTING CONCRETE RIBBON GUTTER
- REMOVE AND DISPOSE EXISTING PCC CURB RAMP
- REMOVE AND DISPOSE EXISTING GROUTED RIPRAP, CONCRETE MATERIAL, ROCK, UNGROUTED RIPRAP AND TRASH MATERIALS
- LIMITS OF PROPOSED GRADING IMPROVEMENTS AND WORK AREA

CONSTRUCTION NOTES

(20) REMOVE AND DISPOSE EXISTING CURB.
(21) REMOVE AND DISPOSE EXISTING RIPRAP.
(22) REMOVE AND DISPOSE INTERFERING PORTION OF EXISTING 48" SD PIPE.
(23) REMOVE AND DISPOSE EXISTING HEADWALL.
(24) REMOVE AND DISPOSE EXISTING 44" DIAMETER GRATE INLET.
(25) PROTECT IN PLACE.
(26) RELOCATE EXISTING SYMBOL SIGN.
(27) REMOVE EXISTING TREES TO FACILITATE CONSTRUCTION OF PROPOSED IMPROVEMENTS.
(28) REMOVE AND DISPOSE EXISTING 6" THICK PCC PAVEMENT.
(29) REMOVE AND DISPOSE EXISTING PCC CURB RAMP.
(30) REMOVE EXISTING VEGETATION TO FACILITATE CONSTRUCTION OF PROPOSED IMPROVEMENTS.
(31) REMOVE AND SALVAGE EXISTING POST.
(32) PROTECT EXISTING FENCE IN PLACE.

GRAPHIC SCALE
10 0 5 10 20
1" = 10'

95% PLAN SUBMITTAL

Underground Service Alert of Southern California
Call: TOLL FREE
8-1-1
TWO WORKING DAYS BEFORE YOU DIG

SEAL:
REGISTERED PROFESSIONAL ENGINEER
CEAZAR V. AGUILAR
No. 41679
EXP. 03/31/22
CIVIL
STATE OF CALIFORNIA

PLAN PREPARED UNDER THE SUPERVISION OF:
ACI AGUILAR CONSULTING INC.
2155 CHICAGO AVENUE, SUITE 304
RIVERSIDE, CA 92507
PH. (951) 300-1431 FAX (951) 300-1435

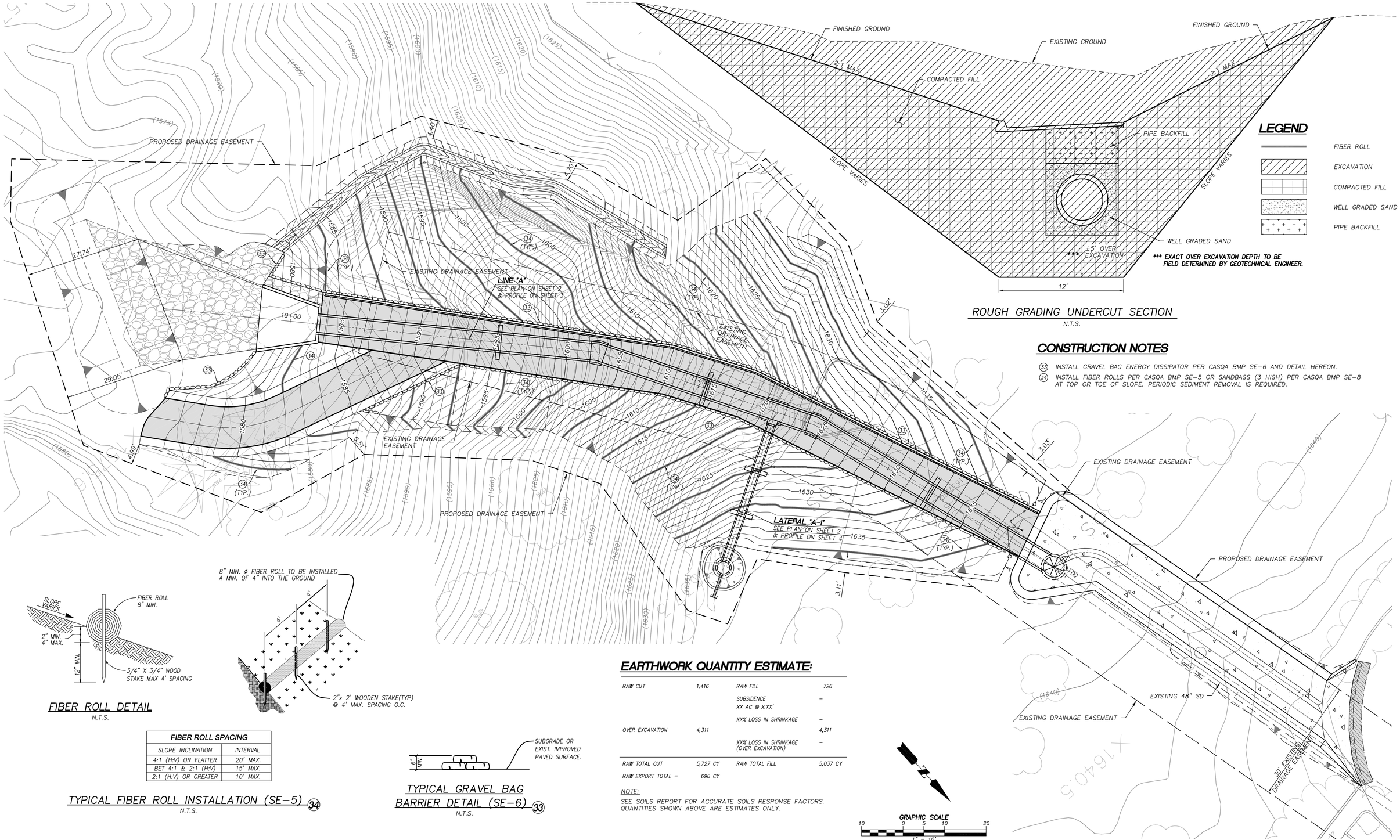
BENCH MARK:
CITY OF HIGHLAND BM NO. 00558
MONUMENT: 1-1/2" BRASS CAP IN SOUTH END OF CONCRETE CATCH BASIN. 78' NORTH OF CENTERLINE OF GREENSPOT ROAD AND 32.5' EAST OF CENTERLINE OF CHURCH STREET.
ELEVATION = 1327.363 DATUM: NAVD29

REVISIONS

CITY OF HIGHLAND
DRAWN: RVB DESIGNED: LVB CHECKED: CVA
RECOMMENDED BY:
CARLOS ZAMANO DATE
RCE _____ EXP. __/__/__
APPROVED BY:
ERNEST WONG, CITY ENGINEER DATE
RCE 37413, EXP. 6/30/22

STORM DRAIN IMPROVEMENT PLANS
BLEDSOE CREEK STORM DRAIN (LINE 'A') AND SLOPE REPAIR
REMOVAL AND DEMOLITION PLAN

W.O.
SCALE:
FILE NO.
SHEET 7 OF 8



ROUGH GRADING UNDERCUT SECTION
N.T.S.

LEGEND
- FIBER ROLL
- EXCAVATION
- COMPACTED FILL
- WELL GRADED SAND
- PIPE BACKFILL

CONSTRUCTION NOTES
(33) INSTALL GRAVEL BAG ENERGY DISSIPATOR PER CASQA BMP SE-6 AND DETAIL HEREON.

(34) INSTALL FIBER ROLLS PER CASQA BMP SE-5 OR SANDBAGS (3 HIGH) PER CASQA BMP SE-8 AT TOP OR TOE OF SLOPE. PERIODIC SEDIMENT REMOVAL IS REQUIRED.

FIBER ROLL DETAIL
N.T.S.

FIBER ROLL SPACING	
SLOPE INCLINATION	INTERVAL
4:1 (H:V) OR FLATTER	20' MAX.
BET 4:1 & 2:1 (H:V)	15' MAX.
2:1 (H:V) OR GREATER	10' MAX.

TYPICAL FIBER ROLL INSTALLATION (SE-5) (34)
N.T.S.

TYPICAL GRAVEL BAG BARRIER DETAIL (SE-6) (33)
N.T.S.

EARTHWORK QUANTITY ESTIMATE:

RAW CUT	1,416	RAW FILL	726
		SUBSIDENCE XX AC @ X.XX'	–
		XX% LOSS IN SHRINKAGE	–
OVER EXCAVATION	4,311		4,311
		XX% LOSS IN SHRINKAGE (OVER EXCAVATION)	–
RAW TOTAL CUT	5,727 CY	RAW TOTAL FILL	5,037 CY
RAW EXPORT TOTAL =	690 CY		

NOTE:

SEE SOILS REPORT FOR ACCURATE SOILS RESPONSE FACTORS. QUANTITIES SHOWN ABOVE ARE ESTIMATES ONLY.

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STORM DRAIN IMPROVEMENT PLANS

BLEDSOE CREEK STORM DRAIN (LINE 'A') AND SLOPE REPAIR ROUGH GRADING AND EROSION CONTROL PLAN

W.O.
SCALE:
FILE NO.
SHEET 8 OF 8