SAN DIEGO GAS & ELECTRIC COMPANY

CLEVELAND NATIONAL FOREST POWER LINE REPLACEMENT PROJECTS ACCESS ROAD CONDITION EVALUATION AND REPAIR DESIGN REPORT

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SDGE

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LIST OF ATTACHMENTS

1 – INTRODUCTION

This Access Road Condition Evaluation and Repair Design Report (Report) describes the recent evaluation of access roads by San Diego Gas & Electric Company (SDG&E) and its contractors for the Cleveland National Forest Power Line Replacement Projects (Project). The Project includes a variety of activities in support of the following construction components:

- replacement of approximately 1,400 existing wood poles with fire-resistant, weathered steel poles;
- undergrounding of approximately 26 miles of existing 12 kilovolt (kV) distribution lines;
- removal of approximately 30 miles of existing 12 kV and 19 miles of existing 69 kV overhead facilities; and
- closure of approximately 24 miles of access roads.

This Report was prepared in accordance with Mitigation Measure (MM) HYD-4 as described in the Project's Final Environmental Impact Report/Environmental Impact Statement's Mitigation Monitoring, Compliance, and Reporting Program (MMCRP) for the Project. This Report provides the methodology that will be used as a general framework to evaluate the condition of access roads on the entire Project. This Report also provides engineering recommendations to reduce or minimize off-site sedimentation associated with any areas meeting the criteria established in MM HYD-4. Attachment A: Access Road Evaluation by Transmission Line provides the access road condition evaluation results for each transmission line segment. Site-specific recommendations to reduce the erosion potential or repair the access roads are provided in Attachment B: Access Road Recommendations and Repair. Engineered solutions to be implemented in accordance with United States Forest Service (USFS) Handbook 2509.22 are provided in Attachment C: USFS Handbook References. Maps of the evaluated access roads are provided in Attachment D: Detailed Route Map.

Access roads are being evaluated sequentially according to the construction schedule. As of June 2017, Transmission Line (TL) 625B, TL629E, TL6931, and TL682 have been evaluated, and the results are presented in Attachment A: Access Road Evaluation by Transmission Line, Attachment B: Access Road Recommendations and Repair, and Attachment D: Detailed Route Map. These attachments will be updated to include evaluation results and repair recommendations for the remainder of the construction segments and will be submitted to the California Public Utilities Commission (CPUC) and the USFS for review and approval prior to construction on subsequent segments.

2 – OBJECTIVES

The purpose of this Report is to provide a narrative description of how MM HYD-4 will be satisfied, including the specific solutions to be implemented if chronic erosion and drainage issues are identified during access road evaluations. The evaluation and recommendations in this Report accomplish the following objectives:

- Identify existing SDG&E-maintained access roads with planned grading and repair activities that must be complete prior to the start of construction of each Project segment.

- Identify where sedimentation could adversely affect water quality as a result of soil erosion on existing SDG&E-maintained access roads that exceed 15-percent grade for a length greater than 100 feet, that are located in Riparian Conservation Areas (RCAs), or that are located in sediment-sensitive watersheds (as defined by the State Water Resources Control Board [SWRCB]).

- Provide the evaluation results from a Professional Engineer (PE) for access roads maintained by SDG&E within the Project area and that meet the aforementioned criteria.

- Prescribe site-specific solutions in accordance with USFS Handbook 2509.22 for areas identified by the PE as needing an engineered solution to reduce potential water quality impacts caused by chronic erosion and drainage issues.

3 – MITIGATION MEASURE

The full text of MM HYD-4 is provided as follows:

HYD-4: <u>Access Road Condition Evaluation and Repair Design Report</u>

"Planned grading and repair activities along SDG&E exclusive-use access roads that a) exceed grades of 15% (over a minimum distance of 100 feet), b) are within RCAs, or c) are anywhere within a sediment-sensitive watershed (as defined by the SWRCB) shall be evaluated by a qualified professional (e.g., PG, PE, or CEG contracted by SDG&E and reviewed and approved by the CPUC and the Forest Service) prior to initiating construction on the associated segment, who will identify areas experiencing chronic erosion and drainage issues. At a minimum, segments shall include, but are not limited to, the following:

- TL626 south of Eagle Creek Road and north of Boulder Creek Road
- TL625 in the Vicinity of Barber Mountain Road
- TL625 north of Lyons Valley Road and south of Carveacre Road
- C442 east of Oak Valley and south of I-8, on the western flanks of Long Peak
- Short segments of TL629 on either side of Cameron Valley and east of Pine Valley

The qualified professional shall design an engineered solution(s) to be implemented within the existing access roadway disturbance area in accordance with Forest Service standards, as described in Forest Service Handbook 2509.22 (Section 12.2), for each area determined to experience chronic erosion and/or drainage issues prior to beginning work on those facilities associated with the problematic access road. The designed solution(s) shall be included into the approved project to ensure the avoidance or minimization of substantial damage or soil loss along the identified road segments.

Examples of such solutions could include, but are not limited to the following:

- Crowning road sections with gentle slopes to prevent standing water on the road
- Outsloping roads at 3%-5% wherever possible

- Where required for proper maneuvering and safety, insloping roads at 3-5% into properly designed ditches
- Installing rolling dips, ditch relief culverts, and/or water bars at intervals appropriate for the road-grade and the soil erosivity
- Minimizing the number of water crossings, and maintaining crossings as close to a 90-degree angle as possible to the streambed.
- Constructing perennial and seasonal/ephemeral stream crossings so as not to change the cross-sectional area of the stream channel or impede fish migration.
- Constructing perennial and seasonal/ephemeral stream crossings with materials that will not degrade water quality (e.g., concrete, coarse rock, riprap and/or gabions)
- Surfacing roads with erosion-resistant materials such as rock or asphalt concrete.

The Access Road Condition Evaluation and Repair Design Report shall identify locations, if any, where no feasible and/or effective solutions can be implemented to adequately handle runoff or comply with Forest Service soil and water quality management standards as contained in Forest Service Handbook 2509.22 (Section 12.2). The report will be updated for each construction segment according to SDG&E's final construction schedule.

In these locations, the qualified professional shall recommend options for access road removal (i.e., requiring access by helicopter) or realignment (e.g., to achieve a lower slope) that would still achieve project objectives.

Construction of each segment shall not proceed until the report section pertaining to that segment has been reviewed and approved by CPUC and Forest Service. In the event there are disputes regarding specific problem locations, CPUC and Forest Service will allow construction to proceed on those portions of the construction segment not impacted by access roads requiring evaluation under this measure; however, SDG&E shall not work in areas under dispute until resolution is achieved."

4 – METHODOLOGY

For purposes of this Report, "access road" is defined as any existing access road that is maintained by SDG&E, that will be used during construction of the Project, and that is not subject to the Access Road Decommissioning Plan requirements discussed in MM HYD-3 as defined in the Project MMRCP. Roads that are not maintained by SDG&E (e.g., county roads or access routes that are only used for overland travel) were not evaluated under MM HYD-4. The steps taken to evaluate chronic erosion and drainage issues on Project access roads are described in the following subsections.

4.0 PRELIMINARY FIELD REVIEW AND DESKTOP ANALYSIS

In accordance with MM HYD-4, SDG&E submitted the PE's resume to the CPUC and USFS on August 15, 2016 for approval. The PE was approved by the CPUC on August 18, 2016, and by the USFS on August 19, 2016. The PE reviewed and evaluated TL625B and TL629E in April and May 2016, TL6931 in September and October 2016, and TL682 in October 2016 to determine whether any of the access roads exhibited the three evaluation criteria described in

Section 3 – Mitigation Measure. This included an evaluation of access roads where SDG&E had previously installed erosion control devices. The PE also consulted with SDG&E's Transmission Construction and Maintenance (TCM) team members to incorporate their observations and experience maintaining these access roads into this Report. The TCM team members provided feedback on whether there were any access road areas where chronic erosion and drainage issues existed, as described in the Project's Final Environmental Impact Report/Environmental Impact Statement (EIR/EIS) (CPUC 2015).

SDG&E identified all existing SDG&E-maintained access roads within the Project area, as shown in Attachment D: Detailed Route Map. Next, SDG&E identified the access roads with planned grading or repair activities that are necessary for construction of the Project. Then SDG&E determined which areas along the access roads were within an RCA or a sediment-sensitive watershed, as defined by the SWRCB.[1] For access roads where the slopes were unknown, SDG&E also engaged a survey contractor to perform a centerline survey to identify access roads that exceeded grades of 15 percent over a minimum distance of 100 feet. Finally, any areas known to have potential chronic erosion and drainage issues were identified. This information is included in Attachment A: Access Road Evaluation by Transmission Line.

4.1 FINAL FIELD REVIEW AND IDENTIFICATION OF SOLUTIONS

Subsequent to the desktop evaluation, SDG&E conducted a reconnaissance-level field survey to evaluate access roads along each transmission line segment with the PE, a team of engineers, erosion control specialists, and personnel with historic records and experience maintaining the roads. Following the reconnaissance-level field survey, the evaluation spreadsheet and detailed route maps were updated to depict the access roads that meet the criteria listed in Section 3 – Mitigation Measure. The maps are included in Attachment D: Detailed Route Map and Attachment E: AutoCAD Profile Drawings of Road Segments.

The PE then conducted site-specific evaluations for each mapped access road that potentially met the aforementioned criteria to prescribe site-specific remedies where it was deemed necessary. Chronic erosion is defined as recurrent, accelerated weathering of soil and rock particles that result in increased turbidity levels in downstream waterbodies. Access roads experiencing chronic erosion exhibit degraded roadway prisms that cannot be mitigated through existing best management practices (BMPs). This definition is consistent with the Final EIR/EIS, which states that a chronic erosion area "essentially means periodically importing soil material to fill in and compact ruts, potholes, and other erosional features…. [with] the primary consideration in determining the severity of the issue is the degree to which erosional features are connected to intermittent/perennial creeks and/or high-order drainages." Where erosion was noted, but the access roads did not experience chronic issues (e.g., where sedimentation was limited to the road prism or the waterbar energy dissipaters were functioning as designed), no site-specific recommendations are provided. In addition, if erosion control devices were already installed on

[1] A sediment-sensitive watershed drains into a receiving waterbody that is listed on the United States Environmental Protection Agency's Clean Water Act Section 303(d) list for sedimentation/siltation, turbidity, or an approved sediment Total Maximum Daily Load. In addition, a sediment-sensitive watershed can have SPAWN, MIGRATORY, or COLD beneficial uses, as defined in the Water Quality Control Plan for the region.

the access roads and required only maintenance-related activities[2] to resolve the observed erosion, then site-specific design solutions are not provided in this Report. Instead, Attachment A: Access Road Evaluation by Transmission Line notes that additional maintenance is required in that area. These maintenance items will be addressed during construction and through SDG&E's Operations and Maintenance Plan that will be reviewed and approved by the USFS; however, these maintenance items are not covered by this Report based on the evaluation criteria established in MM HYD-4.

For locations that exhibited chronic erosion and/or drainage issues that could adversely affect water quality, the PE determined whether there is a feasible and/or effective solution that can be implemented and has prepared site-specific engineering solutions consistent with the BMPs described in Section 12.2 of USFS Handbook 2509.22 where appropriate. Site-specific recommendations to reduce the erosion potential or repair the access roads are provided in Attachment B: Access Road Recommendations and Repair. If necessary, engineered solutions to be implemented are provided in Attachment C: USFS Handbook References.

Typically, SDG&E's access roads are approximately 14 feet wide, but they may be up to 20 feet wide for sharp turns. A minimum of 12 feet is necessary for most vehicles and equipment, which precludes implementation of some BMPs that would reduce the access road width. The recommendations proposed in this Report consider the space requirements for safe passage, BMPs that do not require additional land authorizations, the necessary functional width of the road prism, and disturbance of sensitive or native habitat.

5 – REPORT RESULTS, RECOMMENDATIONS, AND IMPLEMENTATION

The recommendations contained within this Report will be implemented by SDG&E's construction contractors if needed to access construction sites, or if road repairs are performed during regular maintenance activities, as described in the following subsections.

5.0 RESULTS AND RECOMMENDATIONS

The results of the access road evaluation are provided in Attachment A: Access Road Evaluation by Transmission Line, and site-specific solutions for areas identified as having chronic erosion and drainage issues are contained in Attachment B: Access Road Recommendations and Repair.

5.1 IMPLEMENTATION

SDG&E's contractors will use this Report to implement access road repairs during the construction and restorations phases of the Project. Any existing BMPs (e.g., waterbars and associated rock dissipaters) will be repaired to pre-construction conditions or better once construction on each individual segment is complete. In addition, any recommended repairs, reinstallation, and new BMPs (as discussed in Table 1: Access Road Evaluation Table of Attachment A: Access Road Evaluation by Transmission Line) will be completed during the

[2] Maintenance-related activities include activities such as grading roads to smooth out rills and ruts, recontouring waterbars, removing sediment from energy dissipaters, adding riprap to energy dissipaters, installing additional waterbars, and increasing the size of energy dissipaters.

restoration phase of the Project. Any areas with chronic erosion that required a more robust engineering solution (as defined in Attachment B: Access Road Recommendations and Repair) will also be implemented during the restoration phase of the Project. SDG&E's Contract Administrators, Environmental Inspectors, and/or the PE will monitor the installation and implementation of all maintenance, repairs, and designed solutions.

6 – REFERENCES

CPUC. 2015. Final Environmental Impact Report/Environmental Impact Statement: Master Special Use Permit and Permit to Construction Power Line Replacement Projects. Online. http://www.cpuc.ca.gov/environment/info/dudek/CNF/MSUP-PTC_PowerLineReplacementProject_Vol1P1_Final_EIR-EIS.pdf. Site visited September 9, 2015.

USFS. 2011. Forest Service Hand Book Southwest Region (Region 5) Vallejo, CA. R5 FSH 2509.22 – Soil and Water Conservation Handbook, Amendment Number 2509.22-2011-1.

USFS. 2012. National Best Management Practices for Water Quality Management on National Forest System Lands. Volume 1: National Core BMP Technical Guide.

ATTACHMENT A: ACCESS ROAD EVALUATION BY TRANSMISSION LINE

FUSCOE ENGINEERING

TL682 Access Road Evaluation Summary

A geographic information system desktop evaluation of Transmission Line (TL) 682 access roads was conducted by Fuscoe Engineering in order to map riparian conservation areas (RCAs), sediment-sensitive watersheds (as defined by the State Water Resources Control Board), and other geographic properties in the area prior to conducting field investigations. In addition, San Diego Gas & Electric Company (SDG&E) Transmission Construction and Maintenance (TCM) team members were consulted to incorporate their observations and experiences maintaining these access roads. TCM also provided feedback regarding whether there were any access road areas that experienced chronic erosion as defined in the Cleveland National Forest Master Special Use Permit and Permit to Construct Powerline Replacement Projects Final Environmental Impact Report/Environmental Impact Statement (FEIR/EIS).

Subsequently, a field survey to determine roadway slope was performed over SDG&E's exclusive use access roads for TL682. Access road reaches that appeared to approach a centerline slope of 15% were surveyed by a field crew, and survey data was then reviewed to determine precise locations where roadway slopes exceeded 15 percent over a distance of 100 feet.

A site investigation was scheduled for access road reaches that were located within RCAs and where roadway slopes exceeded 15 percent over a distance of 100 feet. For TL682, no access roads are located within sediment-sensitive watersheds. Site investigations for TL682 were limited to access road reaches where roadway slopes exceeded 15 percent over a distance of 100 feet or were within RCAs.

Fuscoe Engineering performed an access road field investigation on October 4, 2016. During the site investigation, the condition of SDG&E access roads associated with TL682 between Cuca Loop East and Henshaw Road near Lake Henshaw was reviewed to determine locations of chronic erosion and/or drainage issues in accordance with Mitigation Measure HYD-4 of the FEIR/EIS. This access road segment is approximately 11.0 miles long and generally runs southeast along State Route 76 (SR-76) through private land and tribal land (La Jolla Reservation) before entering Cleveland National Forest (CNF) land west of Lake Henshaw. Approximately 4.3 miles of access road are located within private land, 3.9 miles within are tribal land, and 2.8 miles within CNF land. The condition of the access roads was photo-documented, as well as the presence of best management practices, such as waterbars and riprap energy dissipaters.

Table 1: TL682 Access Road Evaluation Table provides a summary of the access road evaluation for TL682. During the site visit, chronic erosion was noted west of the access road between Pole Z118060 and Z118061. Runoff has created a channel varying from 2'-5' in depth approximately 2'-3' wide west of the access road. Waterbars and riprap are performing as designed in the area and chronic erosion was not occurring within the road prism. However, after flowing through the riprap outlet, storm water runoff concentrates and increases in velocity downstream of the

dissipation device, within unvegetated areas outside the road prism that are comprised of erosive soils. As a result, incised channels have formed outside the road prism. The incised channels are upstream of and hydrologically connected to an existing natural drainage course and ephemeral streams that are tributary to La Jolla Creek. It is recommended that the waterbars are reconstructed in accordance with standard specifications for waterbar installation during construction.

In addition, to reduce the potential for further incision of the channels that have formed west of the access road, it is recommended that catch basins be added along the westerly side of the road and a new storm drain be installed to convey runoff to a discharge point near Pole Z118061. The installation of these drainage improvements will reduce the flow rate of runoff in the channels to reduce or eliminate further incision and associated transport of sediment to downstream receiving waters. See Attachment B for additional information.

For the remaining portions of TL682, where SDG&E exclusive use access roads were reviewed in accordance with the requirements of mitigation measure HYD-4, only minor rilling was observed within the road prism as noted in Table 1. Waterbar spacing was adequate and effective outlets are available along remaining roadway segments. The effectiveness of some waterbars was limited due to sediment accumulation that has occurred, while others showed signs of vehicle tire damage. Most waterbars displayed evidence that they were diverting water off the road as designed; however, failed waterbars should be re-constructed and enhanced to increase their effectiveness of dissipating overland flow and diverting runoff. Accumulated sediment should be cleaned out as necessary so that waterbars continue to function as intended. Throughout the remaining, reviewed portions of TL682, waterbars discharged into well-vegetated areas outside the road prism and were subsequently not susceptible to erosion in the manner as the unvegetated areas west of the road between Pole Z118060 and Z118061. As such, improvements are not necessary or recommended for the remaining reviewed portions of TL682.

Erosion and sediment control structures need maintenance to function properly in the future. For this reason, general recommendations for maintenance or enhancement have been included where appropriate. Included in Table 1 is reference to site photographs taken during the site visit. Representative site photographs are provided following Table 1.

Contour data developed from USGS data is provided on the Detailed Route Maps in Attachment D. As mentioned above, supplemental field survey was performed on access road reaches that approached the threshold of greater than 15 percent for a distance of 100 feet. Profiles of surveys are provided following site photographs. Note that profiles are provided for all road reaches surveyed, some of which did not meet the threshold of greater than 15 percent for a distance of 100 feet.

Table 1: TL682 Access Road Evaluation Table

SDG&E Exclusive Use Access Road Segment Start		SDG&E Exclusive Use Access Road Segment Stop		Jurisdiction	Within Sediment-Sensitive Watershed?	Within RCA?	Exceeds 15% for More Than 100 Feet?	Exhibits Chronic Erosion and Drainage Issues?	Photo #	Profile Road Reach #	Notes
GPS Coordinates	Physical Reference	GPS Coordinates	Physical Reference								
33° 16' 58.23"N 116° 52' 48.06"W	Access rd (Z118059-Z118060) split, north of Z118059	33° 16' 57.47"N 116° 52' 46.44"W	North of Z118059	Private	No	No	Yes	No	TL682-01a, TL682-01b	1	Minor braiding, approximately 3” deep and 4” wide, noted throughout the access road. Waterbar at mid reach has accumulated sediment and is missing rock at outlet and shall be added during construction and maintained under SDG&E’s operation and maintenance (O&M) program.
33° 16' 56.48"N 116° 52' 45.52"W	Z118059	33° 16' 55.17"N 116° 52' 45.57"W	Z118060 (End of access rd for Z118059 - Z118060)	Private	No	No	Yes	No	TL682-01a, TL682-02b	1	Minor braiding throughout reach, approximately 4” deep and 6” wide. The waterbar and rip rap installed at the top and middle of the slope are functional and in good condition.
33° 16' 55.66"N 116° 52' 47.32"W	North of Z118061, west of Z118059 on parallel road	33° 16' 51.35"N 116° 52' 44.21"W	~100’ north Z118061	Private	No	No	Yes	Yes	TL682-03a, TL682-03b, TL682-04a, TL682-04b	2	Within the road prism, rilling noted, approximately 4” deep and 6” wide. The waterbar and rip rap installed are functional and generally in good condition. Some waterbars along reach have accumulated sediment at outlet and shall be cleared during construction and maintained under SDG&E’s O&M program. Outside the road prism, chronic erosion noted in the form of an incised channels up to 3’ wide and 5’ deep. Channels are upstream of and connected to natural drainage courses and ephemeral streams that are tributary to La Jolla Creek. See Attachment B for recommended improvement.
33° 16' 50.54"N 116° 52' 43.95"W	Access rd split to Z118061	33° 16' 48.93"N 116° 52' 41.80"W	~75’ north of Z118062	Private	No	No	Yes	No	TL682-05a, TL682-05b	2	Minor braiding, approximately 2” deep and 4” wide, noted along the reach. Waterbar at mid reach has accumulated sediment and is missing rock at outlet and shall be cleaned and added during construction and maintained under SDG&E’s O&M program.
33° 16' 48.35"N 116° 52' 39.44"W	~175’ south of Z118062	33° 16' 46.74"N 116° 52' 38.02"W	~150’ north of Z118063	Private	No	No	Yes	No	TL682-06a, TL682-06b	2	Minor rilling is occurring throughout the reach mostly on the west side and approximately 1” deep 4” wide. The waterbar at the bottom of the reach is functional and in good condition.
33° 16' 44.70"N 116° 52' 37.35"W	~125’ south of Z118063	33° 16' 41.72"N 116° 52' 36.68"W	~430’ south of Z118063	Private	No	No	Yes	No	TL682-07a, TL682-07b	2	Minor rilling, approximately 1” deep and 4” wide, noted at mid slope. Multiple waterbars throughout reach are functional but have minor tire damage and shall be fixed during construction and maintained under SDG&E’s O&M program.
33° 15' 07.63"N 116° 45' 19.50"W	~175’ off Henshaw Rd split to access rd to Z118167	33° 15' 08.32"N 116° 45' 21.71"W	End of access rd to Z118167	United States Forest Service (USFS)	No	No	Yes	No	TL682-08a, TL682-08b	12	Minor braiding and rilling occurring throughout reach, approximately 2” deep and 4” wide. Sediment accumulation is occurring at the waterbar located at mid reach.

SDG&E Exclusive Use Access Road Segment Start		SDG&E Exclusive Use Access Road Segment Stop		Jurisdiction	Within Sediment-Sensitive Watershed?	Within RCA?	Exceeds 15% for More Than 100 Feet?	Exhibits Chronic Erosion and Drainage Issues?	Photo #	Profile Road Reach #	Notes
GPS Coordinates	Physical Reference	GPS Coordinates	Physical Reference								
											Recommend clean up during construction and maintained under SDG&E's O&M program.
33° 15' 14.71"N 116° 45' 16.06"W	~175' off Henshaw Rd on access rd Z118169	33° 15' 14.52"N 116° 45' 17.14"W	~180' south of Z118169/end of access rd	Private	No	No	Yes	No	TL682-09a, TL682-09b	15	Minor rilling and braiding, approximately 2" deep and 4" wide, noted at the top of the reach. Waterbars are present and functional at the top and bottom of the reach.
33° 15' 14.30"N 116° 45' 17.50"W	~125' South of Z118169/end of access rd, start of large curve	33° 15' 14.87"N 116° 45' 18.32"W	20' south of Z118169	Private	No	No	Yes	No	TL682-10a-TL682-10b	15	Minor rilling and braiding, approximately 2" deep and 4" wide, noted towards the bottom of the reach. Waterbars are present and functional at the top and bottom of the reach.
33° 14' 53.05"N 116° 45' 37.98"W	405' east of Z118161	33° 14' 53.53"N 116° 45' 37.49"W	455' east of Z118161	USFS	No	Yes	No	No	TL682-11a-TL682-11b	6	This reach of access rd is relatively flat with no waterbars and no signs of erosion.
32° 39' 43.66"N 116° 17' 41.34"W	160' South Z118162	32° 39' 43.57"N 116° 17' 37.39"W	300' East of Z118162	USFS	No	Yes	No	No	TL682-12a-TL682-12b	7&8	Minor rilling, approximately 2" deep and 4" wide, noted towards the end of RCA area. Waterbar near the end of RCA is functioning but sediment accumulation is occurring and shall be cleaned up during construction and maintained under SDG&E's O&M program.
33° 15' 30.42"N 116° 45' 13.07"W	75' East of Henshaw Truck Trail and off road access rd	33° 15' 26.77"N 116° 45' 07.58"W	645' Southeast of Henshaw Truck Trail and off road access rd	Private	No	Yes	No	No	TL682-13a, TL682-13b	19	This reach of access road has a minor slope with multiple waterbars that are functional and in good condition.
33° 15' 26.82"N 116° 45' 07.46"W	730' South of Z118173	33° 15' 28.32"N 116° 45' 06.19"W	260' Northeast of Beginning of reach	Private	No	Yes	No	No	TL682-14a-TL682-14b	18	Minor rilling, approximately 2" deep and 4" wide, noted at the top of the reach. Waterbar near the top of the reach is functioning but sediment accumulation is occurring and shall be cleaned up during construction and maintained under SDG&E's O&M program.
33° 15' 28.34"N 116° 45' 06.18"W	580' South of Z118173	33° 15' 55.35"N 116° 44' 50.70"W	185' South of Z118180	Private	No	Yes	No	No	TL682-15a-TL682-15b	N/A	This reach of access road has a minor slope with multiple waterbars that are functional but sediment accumulation is occurring and shall be cleaned up during construction and maintained under SDG&E's O&M program.
33° 15' 55.69"N 116° 44' 50.36"W	150' South of Z118180	33° 15' 55.11"N 116° 44' 58.87"W	35' West of Z118178	Private	No	Yes	No	No	TL682-16a-TL682-16b	23&24	Minor rilling and braiding, approximately 2" deep and 4" wide, noted throughout reach. Waterbars are functional but sediment accumulation is occurring and shall be cleaned up during construction and maintained under SDG&E's O&M

SDG&E Exclusive Use Access Road Segment Start		SDG&E Exclusive Use Access Road Segment Stop		Jurisdiction	Within Sediment-Sensitive Watershed?	Within RCA?	Exceeds 15% for More Than 100 Feet?	Exhibits Chronic Erosion and Drainage Issues?	Photo #	Profile Road Reach #	Notes
GPS Coordinates	Physical Reference	GPS Coordinates	Physical Reference								
											program.
33° 15' 50.04"N 116° 45' 01.05"W	Pole Z118177	33° 15' 44.52"N 116° 45' 01.57"W	175’ East of Z118176	Private	No	Yes	Yes	No	TL682-17a-TL682-17b	22	Minor rilling and braiding, approximately 2” deep and 4” wide, noted throughout reach. Waterbars are functional but sediment accumulation is occurring and shall be cleaned up during construction and maintained under SDG&E’s O&M program.
33° 15' 44.15"N 116° 45' 03.70"W	90’ South of Z118176	33° 15' 42.60"N 116° 44' 57.65"W	570’ East of Z118176	Private	No	Yes	No	No	TL682-18a-TL682-18b	21	Minor braiding, approximately 2” deep and 4” wide, noted at the top of reach. Waterbars are functional and in good condition.
33° 15' 45.05"N 116° 45' 03.60"W	Pole Z118176	33° 15' 34.01"N 116° 45' 08.69"W	Pole Z118173	Private	No	Yes	No	No	TL682-19a-TL682-19b	21&20	Minor braiding and rilling, approximately 2” deep and 4” wide, noted at the beginning of reach. Waterbars are functional and in good condition.
33° 15' 39.19"N 116° 45' 06.57"W	60’ South of Z118175	33° 15' 38.06"N 116° 44' 59.45"W	600’ East of Z118175	Private	No	Yes	No	No	TL682-20a-TL682-20b	20	This reach of access road is relatively flat with no waterbars. No erosion was noted.

ATTACHMENT B: ACCESS ROAD RECOMMENDATIONS AND REPAIR

FUSCOE
ENGINEERING

TL682 Access Road Improvement Recommendation

Based upon site investigations for TL682 that were performed in accordance with mitigation measure HYD-4, it has been determined that chronic erosion is present outside the road prism along one reach of SDG&E maintained access road between Pole Z118060 and Z118061. Within this reach of access road, chronic erosion was noted observed within the road prism, only outside the road prism within unvegetated areas comprised of erosive soils. Throughout the remaining portions of access road for TL 682 that were evaluated in accordance with mitigation measure HYD-4, chronic erosion was not observed. See Attachment A for additional information.

Figure 1 is provided to illustrate a conceptual repair recommended to collect runoff from the access road and convey it through a storm drain to reduce the amount of runoff within the channels that have formed west of the access road. The existing waterbars will be reconstructed during construction, but instead of discharging through rip rap to the channels, runoff will be directed to Type F catch basins. Runoff collected in the catch basins will be conveyed through an 18" RCP storm drain and discharged through a rip rap energy dissipator near Pole Z118061, where the natural drainage course is well vegetated.

See Table 1 for the location of the proposed improvement. Referenced standards are provided following the Conceptual Repair Plan.

Table 1: TL682 Access Road Repair Recommendation

SDG&E Exclusive Use Access Road Segment Start		SDG&E Exclusive Use Access Road Segment Stop		Jurisdiction	Exhibits Chronic Erosion and Drainage Issues?	Recommendation to be Implemented
GPS Coordinates	Physical Reference	GPS Coordinates	Physical Reference			
33° 16' 55.66"N 116° 52' 47.32"W	North of Z118061, west of Z118059 on parallel road	33° 16' 51.35"N 116° 52' 44.21"W	~100' north Z118061	Private	Yes	Reconstruct waterbars after construction. Modify outlets of waterbars to direct runoff into Type F Catch Basin. Convey runoff via 18" RCP storm drain through rip rap energy dissipator at discharge point in well vegetated channel near Pole Z118061.

FIELD OBSERVATION NOTES

[A] WATERBAR DISCHARGE TO WELL VEGETATED AREA, NO EROSION NOTED, NO IMPROVEMENT PROPOSED

[B] WATERBAR DISCHARGE TO SPARSELY VEGETATED AREA, INCISED CHANNEL NOTED, IMPROVEMENT PROPOSED

[C] RUNOFF DRAINS TO EAST/INBOARD SIDE OF ROAD, NO IMPROVEMENT PROPOSED

[D] INCISED CHANNELS FORMED WITHIN AREAS OF MINIMAL VEGETATION

[E] "CHRONIC EROSION" NOT NOTED, NO IMPROVEMENTS PROPOSED ALONG ROADWAY

[F] EXISTING CULVERT DISCHARGING TO WELL VEGETATED AREA

CONSTRUCTION NOTES

(1) PROPOSED TYPE F CATCH BASIN PER SDRSD D-7

(2) PROPOSED 18" RCP STORM DRAIN, TRENCH PER SDRSD D-60, Q_{MAX} = 50 CFS

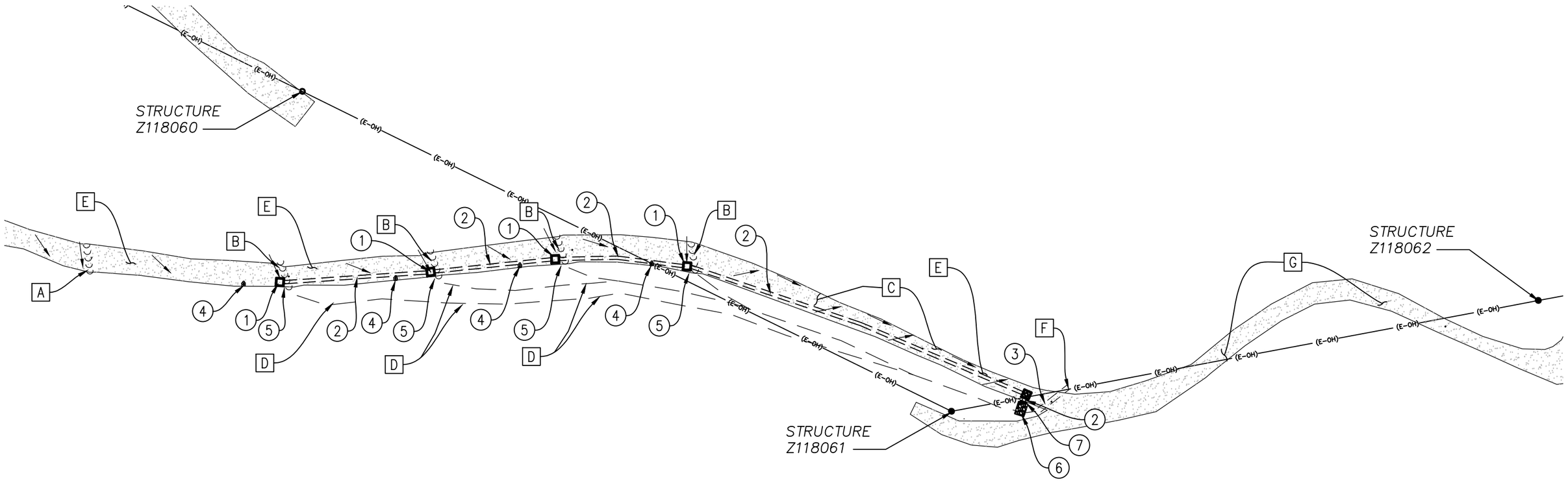
(3) PROPOSED TYPE A STORM DRAIN CLEANOUT PER SDRSD D-9

(4) PROPOSED VELOCITY CHECK DAM PER SDG&E BMP FOR MAINTENANCE ROADS DETAIL 2.2.2

(5) FINE GRADE SPOILS FROM CATCH BASIN TO REMOVE OUTLET FROM WATERBAR

(6) PROPOSED 5'X6' RIP RAP ENERGY DISSIPATOR PER SDRSD D-40

(7) PROPOSED STRAIGHT HEADWALL TYPE B PER SDRSD D-32



SCALE : 1"= 60'

60 30 0 60 120 130

GRAPHIC SCALE IN FEET

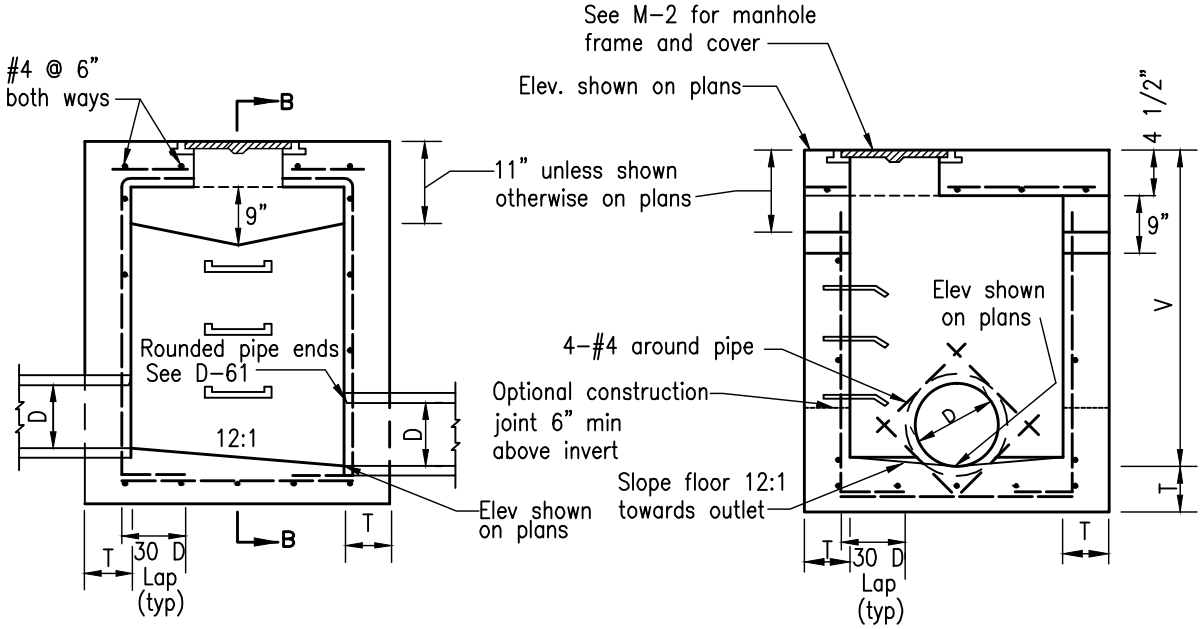
TL 682 ACCESS ROAD CONCEPTUAL REPAIR

FIGURE 1

DATE: JUNE 2017

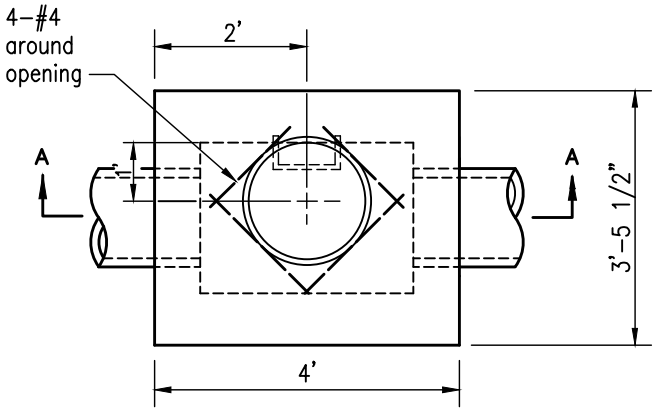
SHEET 1 OF 1

FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 ◦ fax 858.597.0335
www.fuscoe.com



SECTION A–A

SECTION B–B

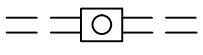


PLAN

NOTES

1. See D–11A & 11B for additional notes and details.
2. When V exceeds 4' steps shall be installed. See D–11A for details.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. Construct openings on both sides unless otherwise shown on plans.
5. Maintain 1–1/2" clear spacing between reinforcing and concrete surface.
6. Install 1" steel protection bar across opening.
7. Diameter "D" shall be 18" max, for larger diameter pipes this drawing must be modified. Pipe diameters to be shown on plans.
8. If constructed adjacent to sidewalk, the surface of the top slab of the catch basin shall match the sidewalk slope and finish.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09
Edited	S.S.	T. Regello	03/11

SAN DIEGO REGIONAL STANDARD DRAWING

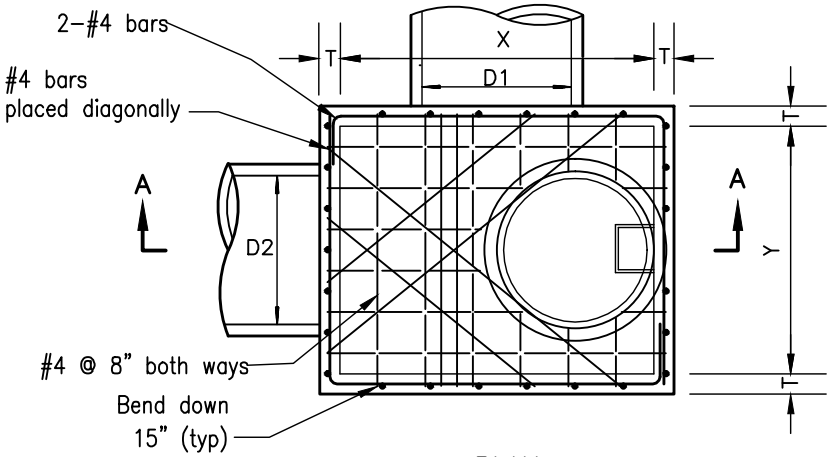
CATCH BASIN - TYPE F

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

7/26/2012

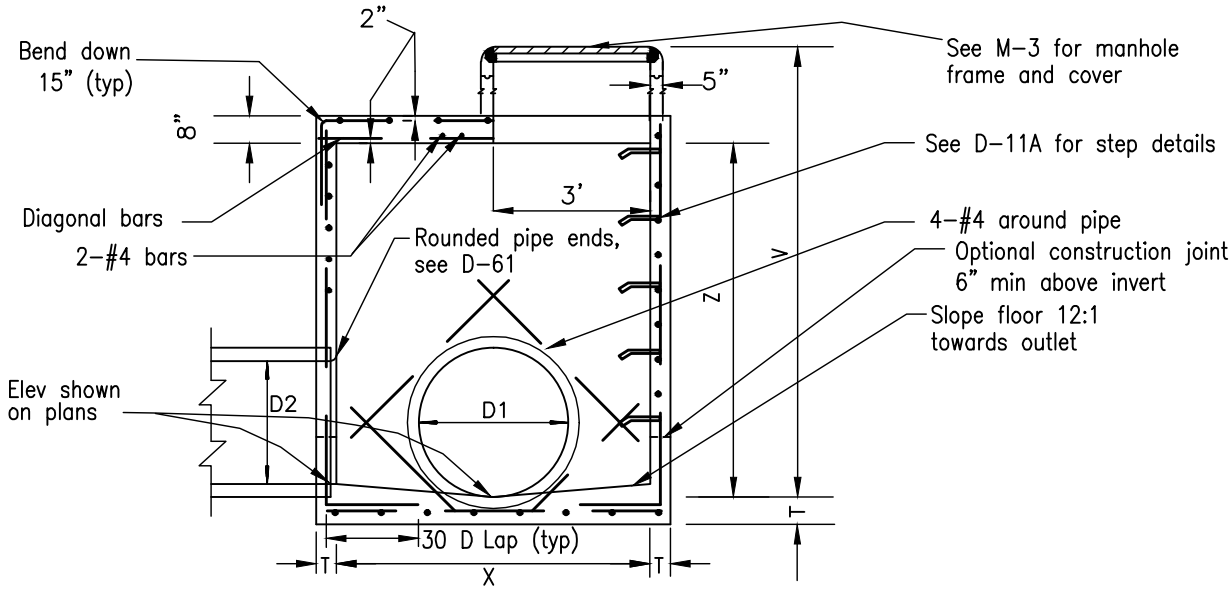
Chairperson R.C.E. 19246 Date

DRAWING NUMBER **D-07**



PLAN

TYPE	PIPE DIAMETER (D1)	X	Y (See Note 8)	Z
A4	up to 39"	4'	4'	6'
A5	42" to 48"	5'	4'	6'
A6	51" to 60"	6'	4'	6'
A7	63" to 66"	7'	4'	7'
A8	69" to 78"	8'	4'	8'

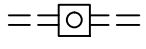


SECTION A–A

NOTES

1. See D–11A & D–11B for additional notes and details.
2. Concrete base shall be 560–C–3250.
3. All precast components shall be reinforced with 1/4" diameter steel, wound spirally on 4" centers.
4. All joints shall be set in Class C mortar.
5. Maintain 1–1/2" clear spacing between reinforcing and concrete surface unless otherwise noted.
6. Exposed edges of concrete shall be rounded with a radius of 1/2".
7. Manhole cover to be marked "Storm Drain".
8. Modifications to "Y" dimension required if pipe (D2) exceeds 39".
9. If constructed adjacent to sidewalk, top of manhole to match sidewalk slope.

LEGEND ON PLANS



Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09
Edited	S.S.	T. Regello	03/11

SAN DIEGO REGIONAL STANDARD DRAWING

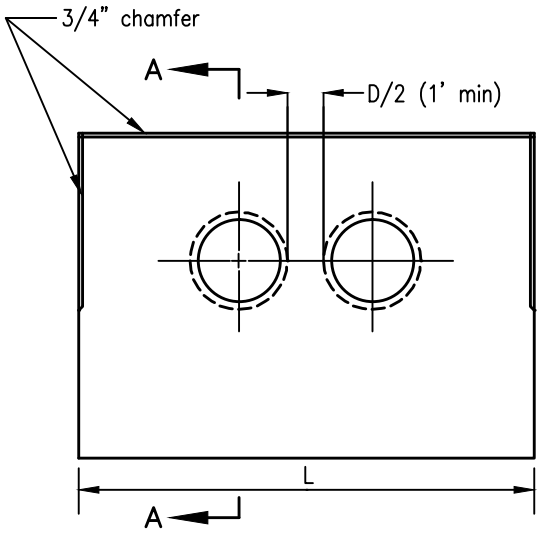
STORM DRAIN CLEANOUT - TYPE A

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

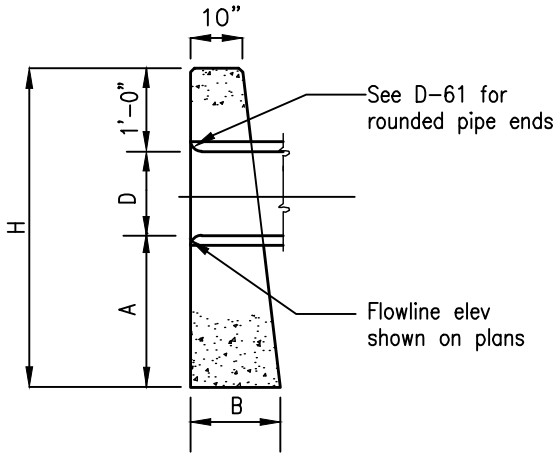
7/26/2012

Chairperson R.C.E. 19246 Date

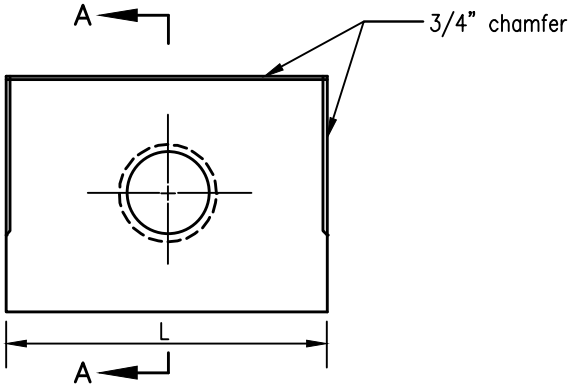
DRAWING NUMBER **D-09**



DOUBLE PIPE
ELEVATION



SECTION A–A



SINGLE PIPE
ELEVATION

D	A	B	H	SINGLE		DOUBLE	
				L	Concrete C.Y.	L	Concrete C.Y.
12"	2'	1'	4'	4'	0.45	5'-8"	.62
15"	2'	1'-1"	4'-3"	5'	0.63	7'-1"	.85
18"	2'	1'-2"	4'-6"	6'	0.83	8'-6"	1.12
24"	2'-6"	1'-5"	5'-6"	8'	1.54	11'-4"	2.09
30"	2'-6"	1'-9"	6'	10'	2.41	14'-2"	3.26
36"	3'	2'	7'	12'	3.74	17'	5.05

LEGEND ON PLANS

NOTES

1. Concrete shall be 560-C-3250.
2. Exposed corners shall be 3/4" chamfered.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited		T. Stanton	02/09
Edited	S.S.	T. Regello	03/11

SAN DIEGO REGIONAL STANDARD DRAWING

STRAIGHT HEADWALL - TYPE B
(CIRCULAR PIPE)

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

7/26/2012

Chairperson R.C.E. 19246 Date

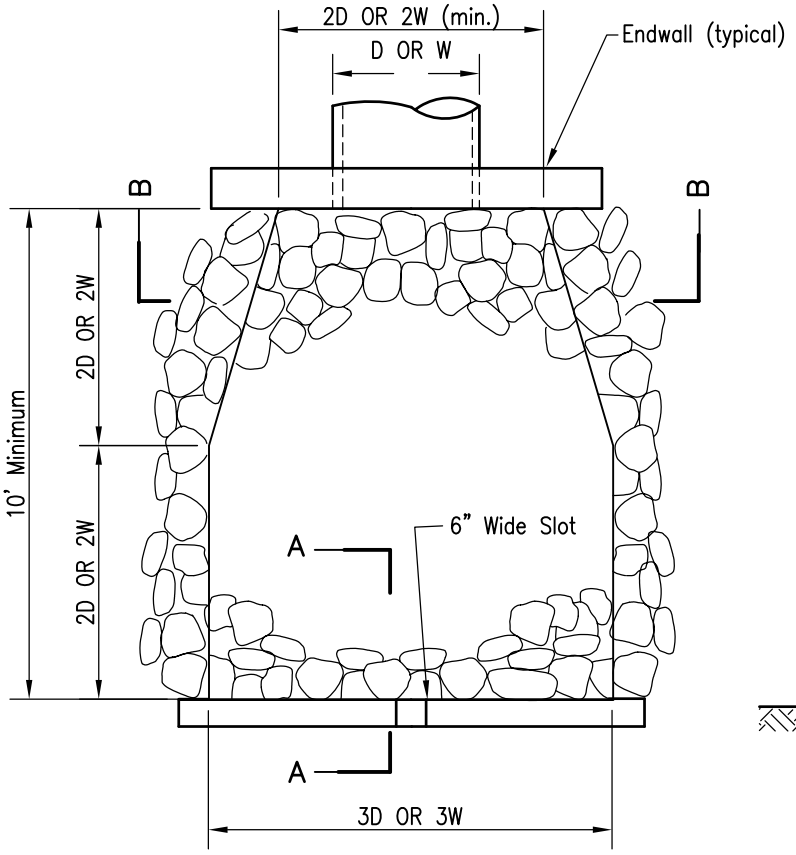
DRAWING NUMBER **D-32**

Table 7–1 (below) per July 2005
San Diego County Drainage Design Manual

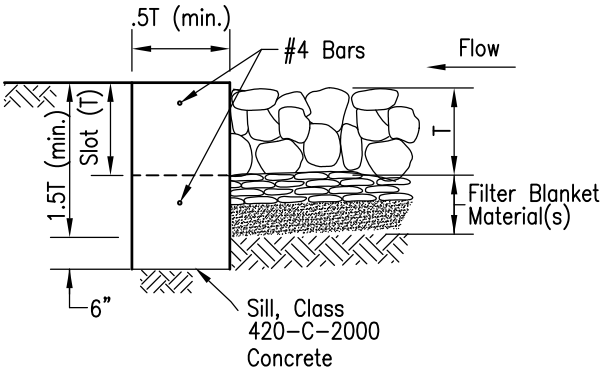
Design Velocity ft/sec*	Rock Class	Rip–Rap Thickness "T" (min)
6–10	No. 2 backing	1.1ft
10–12	1/4 ton	2.7ft
12–14	1/2 ton	3.5ft
14–16	1 ton	4.4ft
16–18	2 ton	5.4ft

*over 20 ft/sec requires special design

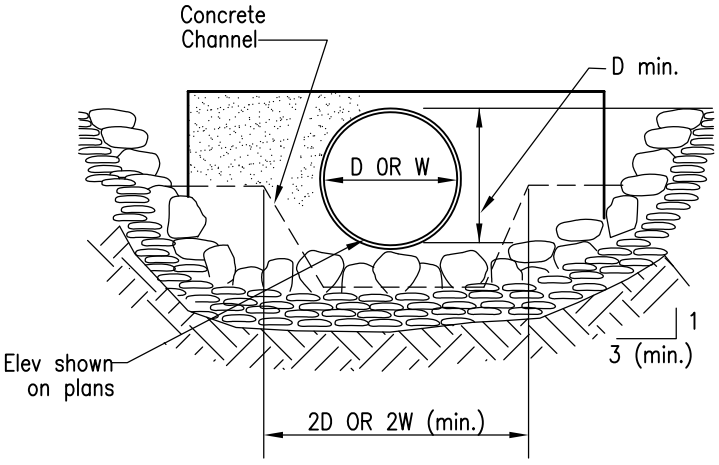
D = Pipe Diameter
W = Bottom Width of Channel



PLAN



SECTION A–A



SECTION B–B

NOTES

1. Plans shall specify:
   (A) Rock Class and rip–rap thickness (T). T shall be at least 1.5 times the nominal equivalent diameter of stone (d_{50}) of the specified rip–rap.
   (B) Filter blanket material, number of layers and thickness.
2. Rip rap shall be either quarry stone or broken concrete (if shown on the plans). Cobbles are not acceptable.
3. Rip rap shall be placed over filter blanket material, which may be either granular material or non–woven geotextile filter fabric; material at weight specified in plans or specifications.
4. See Table 200–1.7 in San Diego Regional Supplement to Greenbook for selection of filter blanket.
5. Rip rap energy dissipaters shall be designated as either Type 1 or Type 2. Type 1 shall be with concrete sill; Type 2 shall be without sill.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Add Rip Rap Table		S. Brady	04/06
Edited		T. Stanton	02/09
Edited	S.S.	T. Regello	03/11

SAN DIEGO REGIONAL STANDARD DRAWING

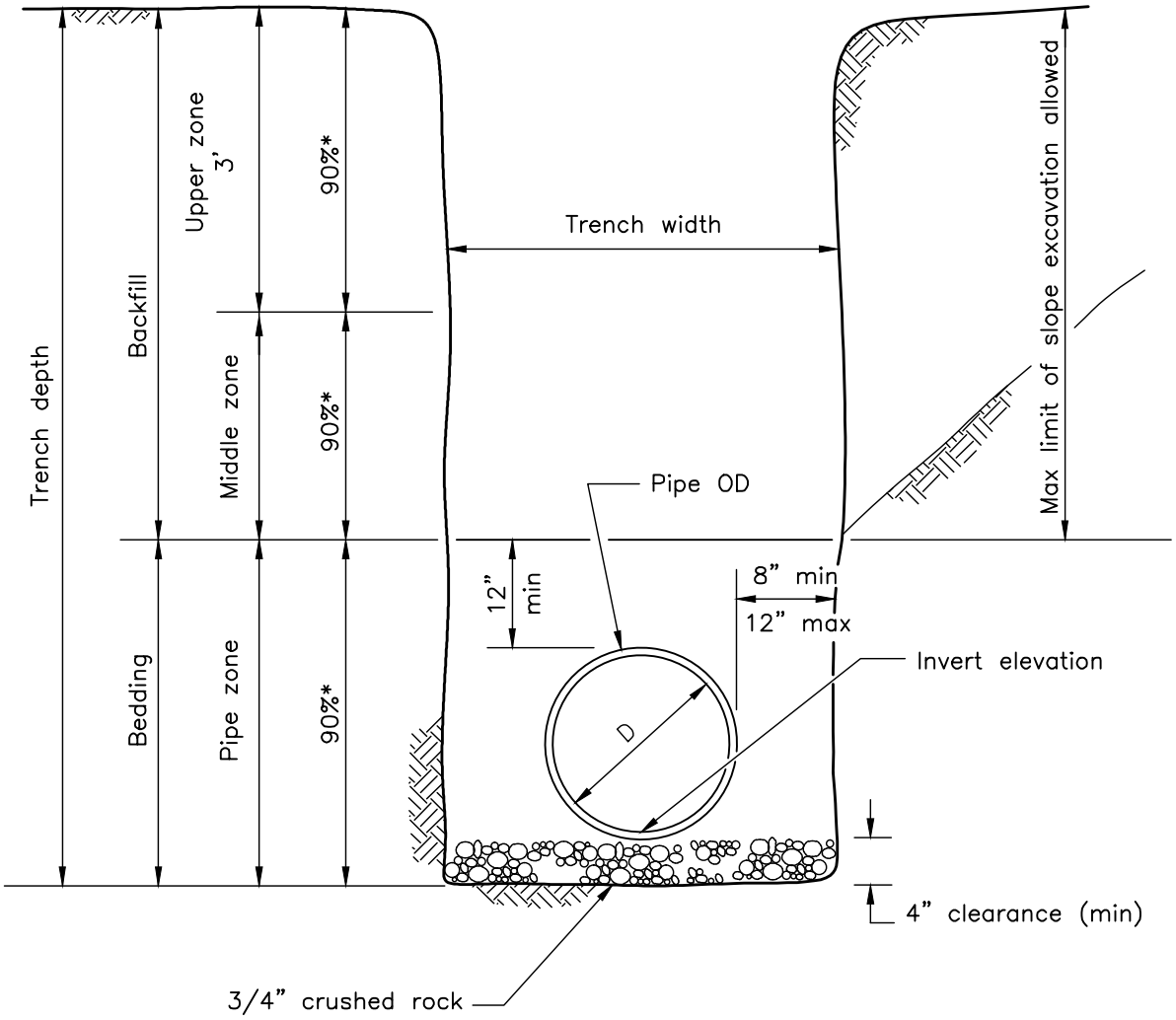
RIP RAP
ENERGY DISSIPATER

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

7/26/2012

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **D-40**



SECTION

NOTES

1. See G-24A and G-24B or G-25 for resurfacing details on improved streets.
2. (*) indicates minimum relative compaction.
3. Top 12" of trench backfill in street section shall be 95% relative compaction unless specified otherwise.

Revision	By	Approved	Date
ORIGINAL		Parkinson	2/95
Add Metric		T. Stanton	03/03
Reformatted		T. Stanton	04/06
Edited	S.S.	T. Regello	03/11

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE BEDDING AND TRENCH BACKFILL FOR STORM DRAINS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

7/26/2012

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **D-60**

2.2.2 Velocity Dissipation Measures

Description and Purpose

Velocity controls and energy dissipaters, also called check dams, are used to slow the water flowing through ditches and swales. The reduced water speed reduces erosion and gullying in the channel and allows sediments to settle out behind the check dam. They may be built from 6”-8” minus rip rap, burlap gravel bags, or other durable products such as *snakebags*. In extreme cases the implementation of rice hay bales can be used, see photo right. Straw hay bales are not recommended. They are effective at keeping sediment and other debris from reaching and plugging culverts. Where temporary channels or permanent channels are not yet stabilized, velocity controls must be used. Use only for watershed areas less than 2 acres.

Example of rice hay bales effectively reducing runoff velocity and settling out debris and sediment.

Suitable Applications

Velocity controls and energy dissipaters can be used in drainage ditches and swales and at locations with a watershed area less than 2 acres.

Limitations

Velocity controls and energy dissipaters should generally not be used in existing rills or gullies. This is somewhat counter intuitive however think of this, runoff drainage during rain events will always use the path of least resistance. If the runoff comes in contact with a strong gravel bag berm and native soil, the water will create eddies at the corners of the berm and begin to erode away the native soil. Over time the berm will remain in place and the native soil will be eroded around the berm, see photo right.

Example of eddies causing erosion around the rock berm.

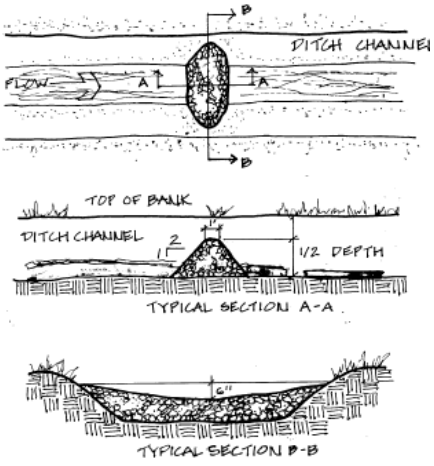
Implementations

- Locate in ditch channel or near culvert outlet.
- Construct dams and dikes no higher than 2 feet.
- Clear sediment out from behind dams when half full.
- Monitor all check dams for performance and clean sediments and debris regularly, especially after rainstorms.

Rock Check Dams

Rock check dams provide a more permanent structure and may consist of several options including 6”-8” minus rock, burlap gravel bags and synthetic gravel bags such as *snakebags*. They are good at preventing rill and gully erosion in ditches and create volume for settling out sediments.

- Construct with stone large enough to handle the expected velocity of water, generally 4” to 8” in size. The smaller the stone size the more sediment removed. The rock must be large enough to stay in place given the expected design flow through the channel.
- Place the rock by hand or with mechanical placement to achieve complete coverage of the ditch or swale. To *ensure that the center of the dam is lower than the edges*, do not dump rock to form dam.
- The dams should be spaced so that the toe of the upstream dam is at the same elevation as the top of the downstream dam.



Typical schematic of rock check dam.

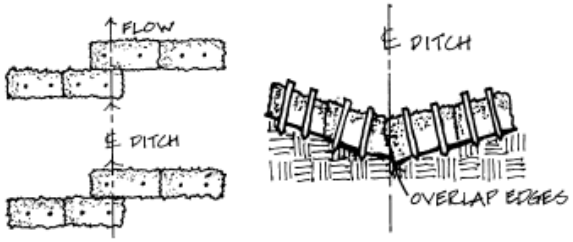
Inspection and Maintenance

- Inspect after rain events greater than 0.5 inches.
- Inspect prior to the rainy season (October 1st) and at the end of the rainy season (May 1st).
- Remove sediment from behind dams when half full.

Rice Hay Bale Check Dams

Rice hay bale check dams are temporary sediment barriers constructed of a row of rice bales tightly butted together, embedded no less than 6 inches into the ground and anchored with t-posts or other means. Properly sited, they decrease the velocity of sheet flows and low-to-moderate level channel flows. The ends of hay bales should be higher than centers such that water will spill over the top of the bales, not around the sides. For maximum sediment removal the rice hay bales should be staggered within the drainage channel. This will allow for the water to meander through the bales, settling the sediment/debris and greatly reducing the effects of eddies and other physical characteristics with high sediment-laden flows.

- Use in smaller ditches to slow water flow and at the toe of a slope.
- Installation technique is critical to proper functioning of a dike: bales must be entrenched and backfilled, first stake in each bale driven toward previous bale to force them together, and gaps between bales should be wound with wire, see photo right.



Typical schematic of rice hay bale check dams.

Inspection and Maintenance

- Inspect after rain events greater than 0.5 inches.
- Inspect prior to the rainy season (October 1st) and at the end of the rainy season (May 1st).
- Maintain and rebuild periodically or as needed.

Resources

Fifield, J.S., 2004, Designing for Effective Sediment and Erosion Control on Construction Sites: p. 6-1 – 6-13.

U.S. Environmental Protection Agency Region 1, 2001, Unpaved Roads BMP Manual: A Guidebook on How to Improve Water Quality While Addressing Common Problems, Massachusetts: p. 21-25.