FUSCOE
ENGINEERING

NEWLAND-SIERRA
PDS2015-GPS,-SP,-REZ-001
PDS2015-TM-5597
DESIGN EXCEPTION REQUESTS
JUNE 2017

6/7/17

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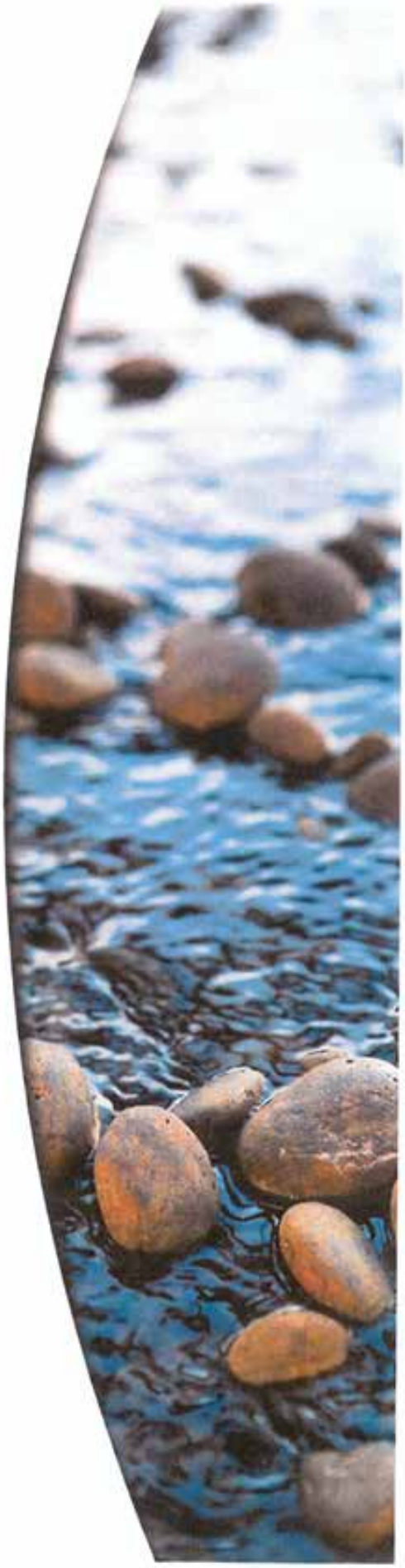
full circle thinking®



Newland Sierra Design Exception Summary

June 2017

Item	Road Section	Classification	Maximum ADT	Approx. Length (Ft.)	Design Exception Requests
1	A1	(4.2A) Blvd. w/ Raised Median	19,560	1,200	A. Reduce (2) 8' Shoulders to (2) 5' Bike Lanes with No Parking B. Reduce (1) 14' Parkway to 5, (1) to 12'.
2	A2	(4.2B) Blvd. w/ Intermittent Turn Lanes	19,560	1,200	A. Delete (2) 8' Shoulders, Reduce (2) 6' Bike Lanes to (2) 5' Bike Lanes with No Parking B. Reduce (1) 14' Parkway to 4'. C. Delete Center Crown D. Increase Maximum Desirable Grade from 9% to 12%. E. Reduce min. lane Width to 10.5'.
3	B1	(2.2E) Light Collector w/ No Median	5,040	1,500	A. Reduce (1) 12' Parkway to 5'. B. Modify (2) 8' Shoulders to (2) Joint-Use Shoulder/Bike Lanes with No Parking C. Reduce Design Speed for Horizontal Curve Constraints D. Reduce Design Speed for Vertical Curve Constraints
4	B2	(2.2F)Light Collector w/ Reduced Shoulder	11,640	20,000	A. Reduce (2) 8' Shoulders to (2) 5' Bike Lanes with No Parking B. Reduce (1) 12' Parkway to 5'. C. Delete Center Crown D. Increase Maximum Desirable Grade from 9% to 12%. Street 89
5	C1	Residential Collector	<4,500	5,800	A. Reduce Minimum Horizontal Curve from 300' to 100'.
6	C2	Residential Collector	3,700	18,000	A. Delete Center Crown B. Reduce Minimum Horizontal Curve from 300' to 200'.
7	C3	Residential Collector	3,700	18,000	A. Reduce Minimum Horizontal Curve from 300' to 150'. B. Remove 8' shoulder on one side, make a one-way street.
8	D1	Residential Road	<4,500	6,500	A. Reduce Minimum Horizontal Curve from 200' to 100'.
9	D2	Residential Road	3,300	12,000	A. Delete Center Crown
10	D3	Residential Road	<4,500	4,400	A. Reduce Minimum Horizontal Curve from 200' to 100'.
11	D4	Residential Loop	200	1,050	A. Reduce Minimum Horizontal Curve from 200' to 100'.
12	E1	Residential Road	<4,500	5,200	A. Reduce (2) 10' Parkways to 5'. B. Reduce Minimum Horizontal Curve from 200' to 100'.
13	E2	Residential Road	<4,500	3,300	A. Reduce (1) 10' Parkway to 5'. B. Reduce Minimum Horizontal Curve from 200' to 100'.
14	F1	Hillside Residential Street	320	4,800	A. Reduce (1) 5' Parkway to 4'. B. Reduce 50' Right of Way to 44'.
15	F2	Hillside Residential Street	320	3,200	A. Reduce 5' Parkways to 4'. B. Reduce 50' Right of Way to 40'. C. Base Intersection Sight Distance on Prevailing Speed Survey value of 25MPH.
16	Alt. F2	Hillside Residential Street	320	3,200	A. Reduce 5' Parkways to 'Varies 5 ft. to 2ft.'. B. Reduce 50' Right of Way to 40'. C. Reduce minimum horizontal radius from 150' to 100'. D. Post speed as 20 MPH and incorporate measures such as lighting and signage acceptable to the Director of Public Works. E. Base Intersection Sight Distance on Prevailing Speed Survey value of 25MPH.
-	G	Private Street	296	1,100	-None-
17	H1	(2.1B) Community Collector w/ Continuous Left Turn Lane	27,760	7,200	A. Provide no pedestrian provision within the southerly parkway. B. Reduce Minimum Horizontal Radius to 750' with a design speed of 45MPH. C. 'No Parking' for the two 8' shoulders. D. Reduce 14' Painted Median to ' Variable Width12' to 2'.
18	H2	(4.1A) Major Road w/ Raised Median	32,440	2,700	A. Provide no pedestrian provision within an 8' parkway on the southerly side. B. Revise Horizontal Curve Radius from 1,200' Min. to 750 and Revise Design Speed from 55 MPH to 45 MPH. C. Provide 'No Parking' for the two 8' shoulders.
19	H3	(4.1B) Major Road with Intermittent Turn Lanes " Note: This Section is an Alternate to Section H1	27,760	7,200	A. Provide no pedestrian provision within the southerly parkway. B. Reduce Minimum Horizontal Radius to 750' with a design speed of 45MPH. C. 'No Parking' for the two 8' shoulders. D. Reduce 14' Painted Median to ' Variable Width14' to 2'.
20		Intersection Spacing	<4,500	n/a	Reduce Intersection Spacing at 16 Locations per Key Map provided
21		Minimum Curve Radii	<4,500	n/a	Reduce Minimum Curve Radii at 9 Locations per Key Map provided.

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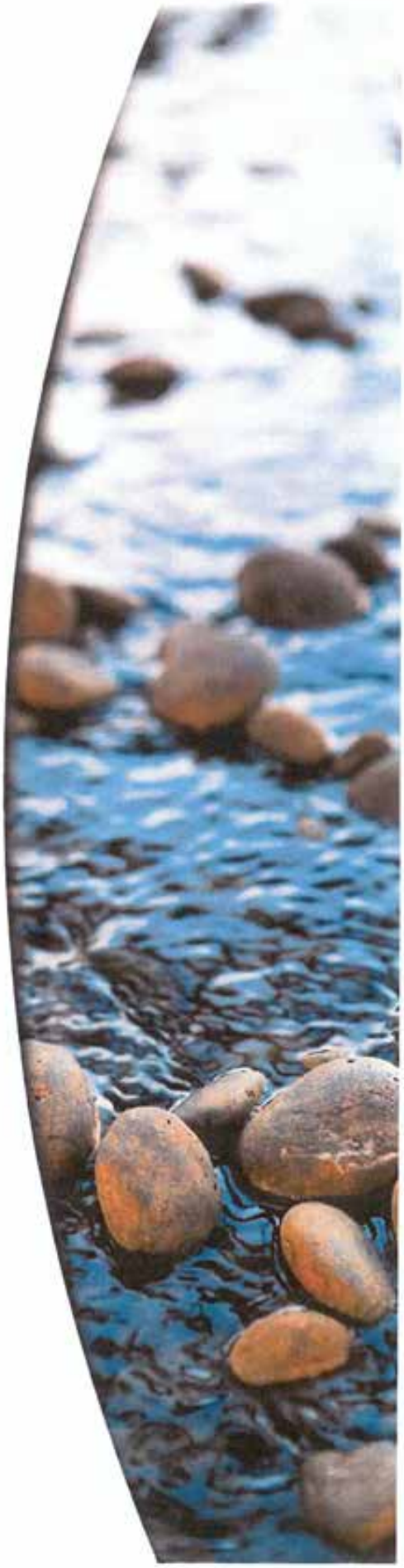

DEPARTMENT OF PUBLIC WORKS

Request for a Design Exception to a Road Standard and/or Modification to Project Conditions

Project Number: _____ Date of Request: November 18, 2013

Project Location: Northwest of Deer Springs Road and Interstate 15

Thos. Bros. Map/Grid: 1089 C-6 APN: See attached

Requestor Name: Fuscoe Engineering Telephone: 858-554-1500

Address: 6390 Greenwich Dr. Suite 170, San Diego, CA 92122

Requested Design Exception (attach engineering sketches showing existing layout, details and notes):
See attached request

Reason for requested Design Exception (provide attachment if additional space is required):
See attached request

List alternatives that could mitigate the requested Design Exception (attach engineering sketches showing proposed layouts, details and notes):

Describe the hardship(s) to the property owner(s) and/or neighbor(s) if the request is not approved (see note 3. on reverse):

Provide Design and Cost Estimate for meeting the Condition (see note 3. on reverse):

See reverse for directions and important information.

Revised: Aug 20, 2010

ASSESSOR'S PARCEL NUMBERS (Legal Parcels)

172-091-07
172-220-14
172-220-16
172-220-18
174-190-12
174-190-13
174-190-20
174-190-41
174-190-43
174-190-44
174-210-01
174-210-05
174-210-07
174-210-08
174-210-17
174-210-18
174-211-04
174-211-05
174-211-06
174-211-07
174-280-11
174-280-14
174-290-02
178-100-05
178-100-26
178-101-01
178-101-16
178-101-17
178-101-25
178-101-26
178-101-27
178-101-28
178-221-09
178-222-16
182-020-28
182-020-29
182-040-36
182-040-69
186-250-13
186-611-01
186-611-07
186-611-08
186-611-09
186-611-11
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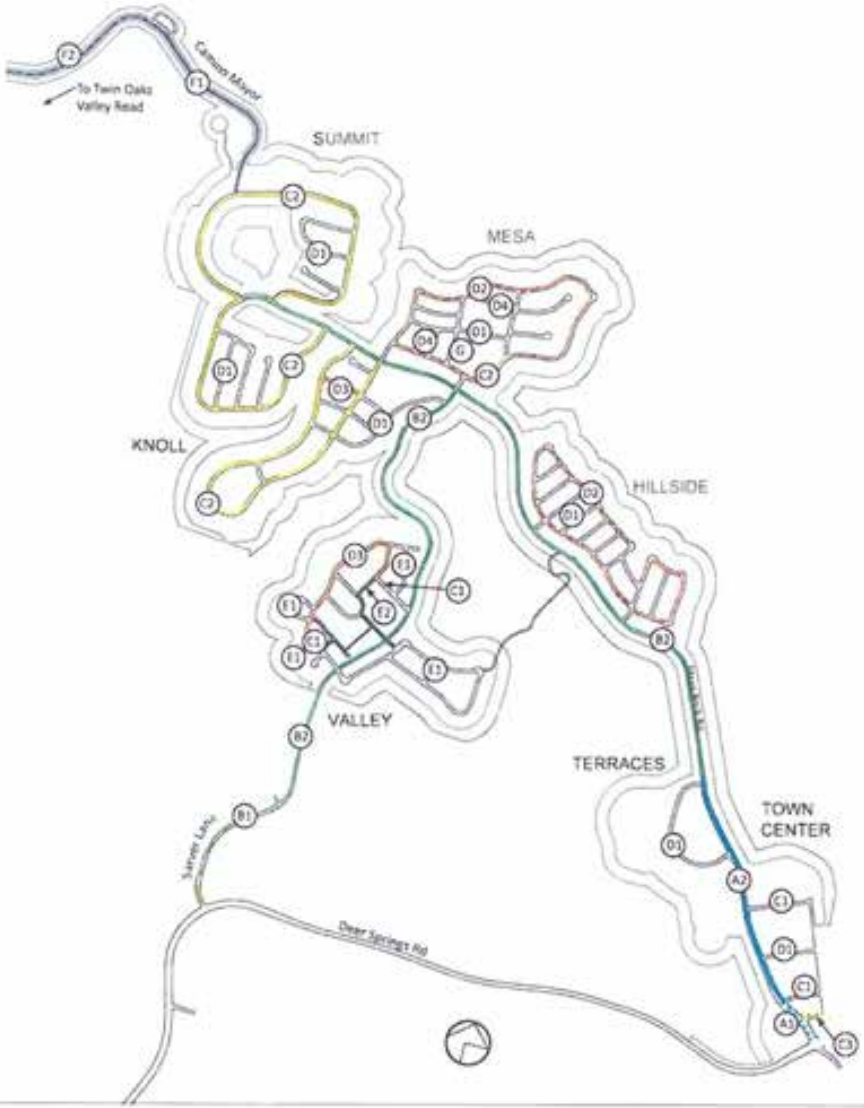
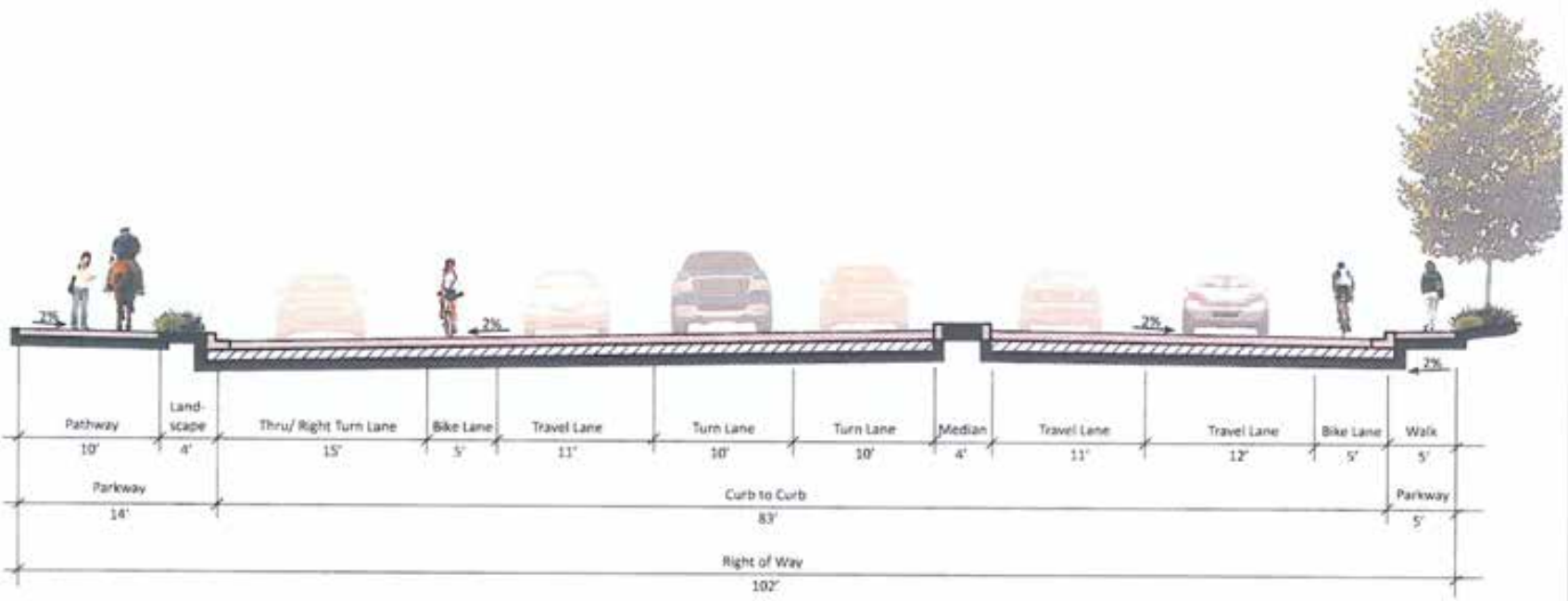
187-540-50
187-540-51



Road Section	Road Classification	Public/ Private	Proposed # Lanes / Lane Width	Proposed ROW
A1	Modified Boulevard w/ Raised Median	Public	6/varies	102'
A2	Modified Boulevard w/ Intermittent Turn Lane	Public	4/10.5'	89'
B1	Modified Light Collector w/ No Median	Public	2/11'	60'
B2	Modified Light Collector w/ Reduced Shoulder	Public	2/11'	66'
C1 no symbol	Residential Collector	Public	2/12'	60'
C2	Modified Residential Collector	Public	2/12'	69'-73'
C3	Modified Residential Collector	Public	2/12'	52'
D1 no symbol	Residential Road	Public	2/12'	56'
D2	Modified Residential Road	Public	2/12'	65'
D3	Modified Residential Road w/ Parkway	Public	2/12'	61'
D4 no symbol	Residential Loop	Public	2/12'	52'
E1 no symbol	Modified Residential Road	Public	2/12'	46'
E2	Modified Residential Road w/ Parkway	Public	2/12'	56'
F1	Camino Mayor - Modified Hillside Residential Street w/ Parkway	Public	2/14'	44'
F2	Camino Mayor - Modified Hillside Residential Street	Private	2/14'	40'
no symbol				

FIGURE
Road Sections Key Map

Newland Sierra Specific Plan



A1

FIGURE
Public Modified Boulevard with Raised Median

Newland Sierra Specific Plan

PUBLIC ROAD DESIGN EXCEPTION REQUESTS:

ITEM 1
SECTION A1 MODIFIED BOULEVARD WITH RAISED MEDIAN

Location: Mesa Rock Road north of Deer Springs Road
Approximate Length: 1,200'
Proposed ADT: 19,560

REQUEST:

We propose a cross section with the same design criteria as a "Boulevard with Raised Median 4.2A" per Table 2A of the County Public Road Standards with the following exceptions:

A. We request to use two 5' bike lanes with parking restriction per Appendix A of the County Public Road Standards rather than two 8' shoulders. The 5' width request is consistent with the "Bike Lane with Parking Restrictions" Option of the Bicycle Facilities Graphic within the Mobility Element Standards, but less than the 6' width typical to the Boulevard with Intermittent Turn Lane Standard 4.2B.
B. We request that the pavement width be offset in the right-of-way as shown in Section A1 with a 5 ft parkway on one side and 14' on the other, rather than 14' on both sides. We request that the Right of Way be decreased from 106' to 102' accordingly.
C. We request that two of the lane widths be reduced from 12' to 11'.

REASON:

Proposed Modification Requests A and B to the "Boulevard with Raised Median 4.2A" standard provide the opportunity to have 5' bike lanes that do not compete for space with parked cars as well as an opportunity for a 10' Pathway buffered by landscape on one side. The reduced Right of Way resulting from Modification Requests A and B allows the project to provide all these amenities while minimizing impacts to the oak groves which abut the roadway. A tabulation of roadway radius, superelevation, and vertical curve design is attached.

Due to the 700 ft. horizontal radius, this roadway segment has a design speed of 37 MPH and so will require a Design Exception from the 40 MPH standard. To support

the request, this segment is located at the signalized intersection with Deer Springs Road where few vehicles will make the through move.

ALTERNATIVES:

Alternatives have been studied to minimize oak grove impacts while providing proper intersection separation from the freeway off ramp to the east and achieving proper alignment for though traffic to and from Mesa Rock Road to the south. These alternatives all had greater impacts to oak grove, the mobile home park to the south and the intersection angle of Mesa Rock Road at Deer Springs Road.

HARDSHIP:

Denial of this request would preclude the project from providing a continuous Pathway from Deer Springs Road to other Pathways/Trails within the Project without impact to the abutting oak grove.

COST ESTIMATE:

Cost is not a factor presented with this Design Exception Request.

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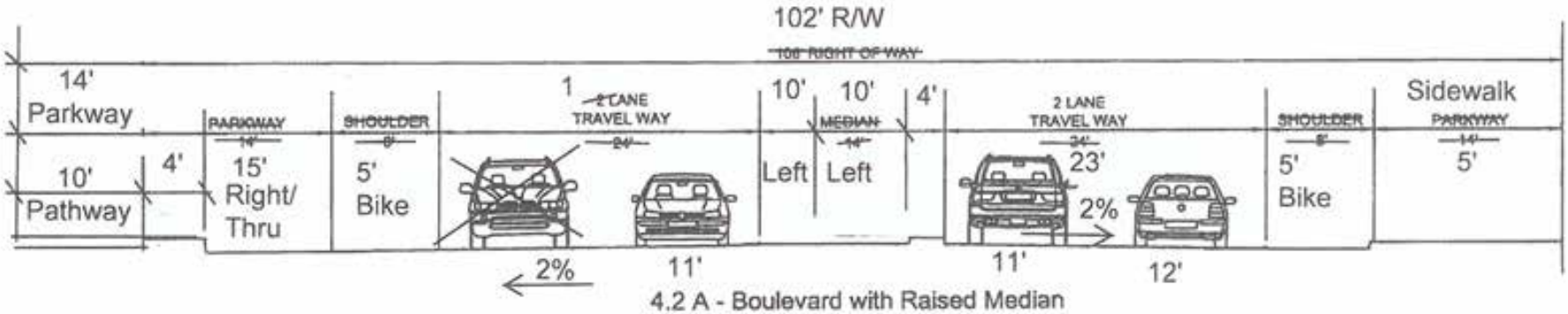
MESA ROCK ROAD
VERTICAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Length	Algebraic Difference	Crest (Min. K = 44)	Sag (Min. K =64)	Design Exception Required?	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
19+99	21+31	132	3%	44		No		6	A1	
25+15	30+91	576	9%		64	No		6	A2	
31+05	32+80	176	4%	44		No		6	A2	
33+42	35+98	256	4%		64	No		6	A2	
37+83	39+59	176	4%	44		No		6	A2	
41+01	43+56	256	4%		64	No		6	A2	
45+15	47+79	264	6%	44		No		7	A2	
59+89	64+73	484	11%	44		No		8	B2	
74+77	76+77	200	1%		200	No		8	B2	
78+88	86+56	768	12%		64	No		8	B2	
87+91	91+44	352	8%	44		No		8	B2	
95+43	99+43	400	1%		505	No		8	B2	
105+87	111+70	583	3%		200	No		9	B2	
114+24	117+49	325	4%		75	No		9	B2	
124+39	127+33	294	6%		49**	Yes	35 MPH Design Speed	10	B2	Residential Location
127+94	129+68	174	6%	29*		Yes	35 MPH Design Speed	10	B2	Residential Location
133+34	133+38	304	10.5%	29*		Yes	35 MPH Design Speed	10	B2	Residential Location

*K=29=35MP **K=49=35 MPH
H (Crest) (Sag)

MESA ROCK ROAD
HORIZONTAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Radius	Super-elevation	Design Speed	Design Exception Required?	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
15+90	19+11	700	Std. crown	37	Yes	35 MPH Design Speed	6	A1	Tee intersection
19+87	23+35	700	Std. crown	40	No		6	A1	
29+76	32+03	1000	2% to 1 side	48	No		6	A2	
36+19	39+70	1000	2% to 1 side	43	No		6	A2	
40+34	45+29	5000	2% to 1 side	80	No		7	A2	
45+52	48+25	1000	2% to 1 side	48	No		7	A2	
60+73	67+57	650	Std. crown	40	No		8	A2	
69+53	72+05	650	2% to 1 side	33	No		8	B2	
74+01	75+41	1000	2% to 1 side	48	No		8	B2	
77+65	82+14	1000	2% to 1 side	43	No		8	B2	
84+15	92+12	800	2% to 1 side	44	No		8	B2	
96+03	101+89	650	2% to 1 side	40	No		8	B2	
107+97	111+20	1000	2% to 1 side	48	No		9	B2	
114+82	117+87	1000	2% to 1 side	43	No		9	B2	
123+83	125+55	1000	2% to 1 side	48	No		10	B2	
128+42	129+52	1000	2% to 1 side	43	No		10	B2	
131+48	134+75	350	2% to 1 side	27	Yes	25 MPH Design Speed	11	B2	Residential Location
135+75	138+69	350	2% to 1 side	27	Yes	25 MPH Design Speed	11	C2	Residential Location
146+64	150+40	225	2% to 1 side	25	Yes	25 MPH Design Speed	11	C2	Residential Location
155+26	159+29	320	2% to 1 side	26	Yes	25 MPH Design Speed	11	C2	Residential Location
161+22	164+57	400	2% to 1 side	33	Yes	25 MPH Design Speed	11	C2	Residential Location
164+89	166+54	300	2% to 1 side	26	Yes	25 MPH Design Speed	11	C2	Residential Location



4.2 A - Boulevard with Raised Median

Proposed Section (A1)

From:
County Public Road Standards
Appendix A

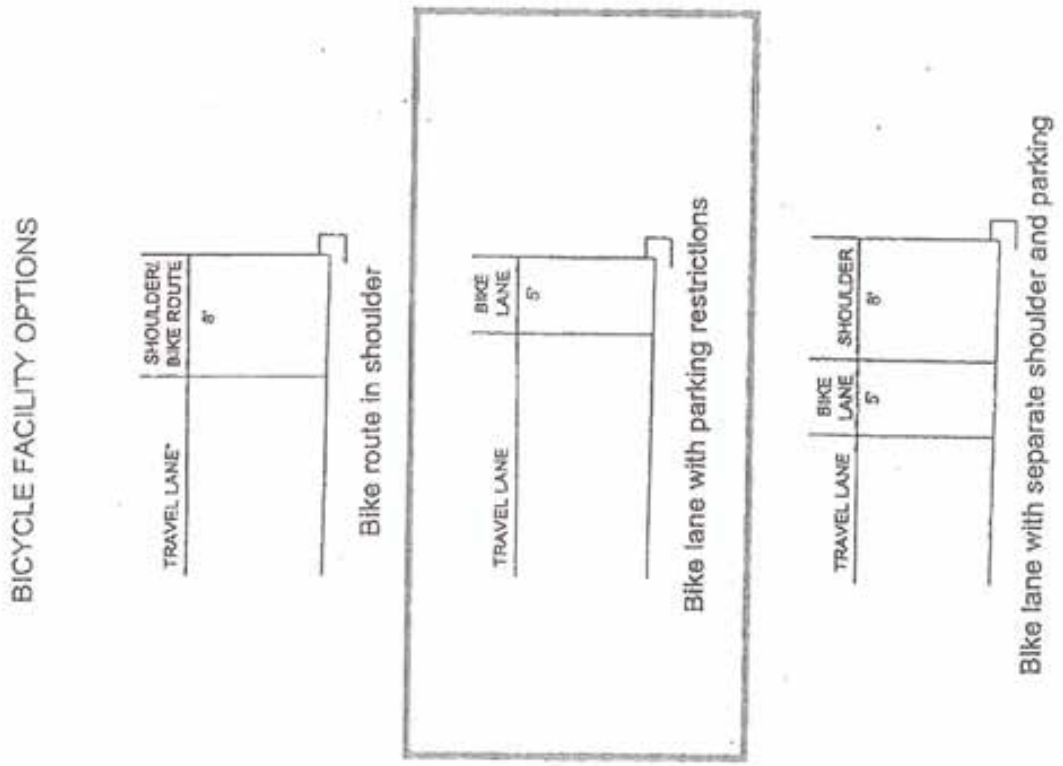


TABLE 2A: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

MOBILITY ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDERS (# / WIDTH)	PARKWAY WIDTH	MIN. CURVE RADIUS	MAX. DESIRABLE GRADE	MIN. DESIGN SPEED (MPH)
Expressway (6.1)	6 / 12'	34'	126'	146'	2 / 10'	10'	1,700'	6%	65
Prime Arterial (6.2)	6 / 12'	14'	102'	122'	2 / 8'	10'	1,700'	6%	65
Major Road									
With Raised Median (4.1A)	4 / 12'	14'	78'	98'	2 / 8'	10'	1,200'	7%	55
With Intermittent Turn Lanes (4.1B)	4 / 12'	-	64' - 78'	84' - 98'	2 / 8'	10'	1,200'	7%	55
Boulevard									
With Raised Median (4.2A)	4 / 12'	14'	78'	106'	2 / 8'	14'	500'	9%	40
With Intermittent Turn Lanes (4.2B)	4 / 12'	-	64' - 78'	92' - 106'	2 / 8'	14'	500'	9%	40
Community Collector									
With Raised Median (2.1A)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Continuous Left Turn Lane (2.1B)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Intermittent Turn Lanes (2.1C)	2 / 12'	-	40' - 54'	60' - 74'	2 / 8'	10'	700'	9%	45
With Improvement Options (2.1D)	2 / 12'	-	40' - 54'	84'	2 / 8'	15' - 22'	700'	9%	45
No Median (2.1E)	2 / 12'	-	40'	60'	2 / 8'	10'	700'	9%	45
Light Collector									
With Raised Median (2.2A)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Continuous Left Turn Lane (2.2B)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Intermittent Turn Lanes (2.2C)	2 / 12'	-	40' - 54'	64' - 78'	2 / 8'	12'	500'	9%	40
With Improvement Options (2.2D)	2 / 12'	-	40' - 54'	88'	2 / 8'	17' - 24'	500'	9%	40
No Median (2.2E)	2 / 12'	-	40'	64'	2 / 8'	12'	500'	9%	40
With Reduced Shoulder (2.2F)	2 / 12'	-	28'	52'	2 / 2'	12'	500'	9%	40
Minor Collector									
With Raised Median (2.3A)	2 / 12'	14'	54'	82'	2 / 8'	14'	350'	12%	35
With Intermittent Turn Lanes (2.3B)	2 / 12'	-	40' - 54'	68' - 82'	2 / 8'	14'	350'	12%	35
No Median (2.3C)	2 / 12'	-	40'	68'	2 / 8'	14'	350'	12%	35

NOTES:

1 Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above.

2 The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.

3 The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.

4 For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.

5 Additional pavement and ROW may be required for ME Boulevards / Community Collectors (4 feet) and Light Collectors (12 feet) in Industrial/Commercial Zones.

6 ME roads needing additional turn or passing lanes will require an additional 12 to 14 feet of pavement and ROW for each lane.

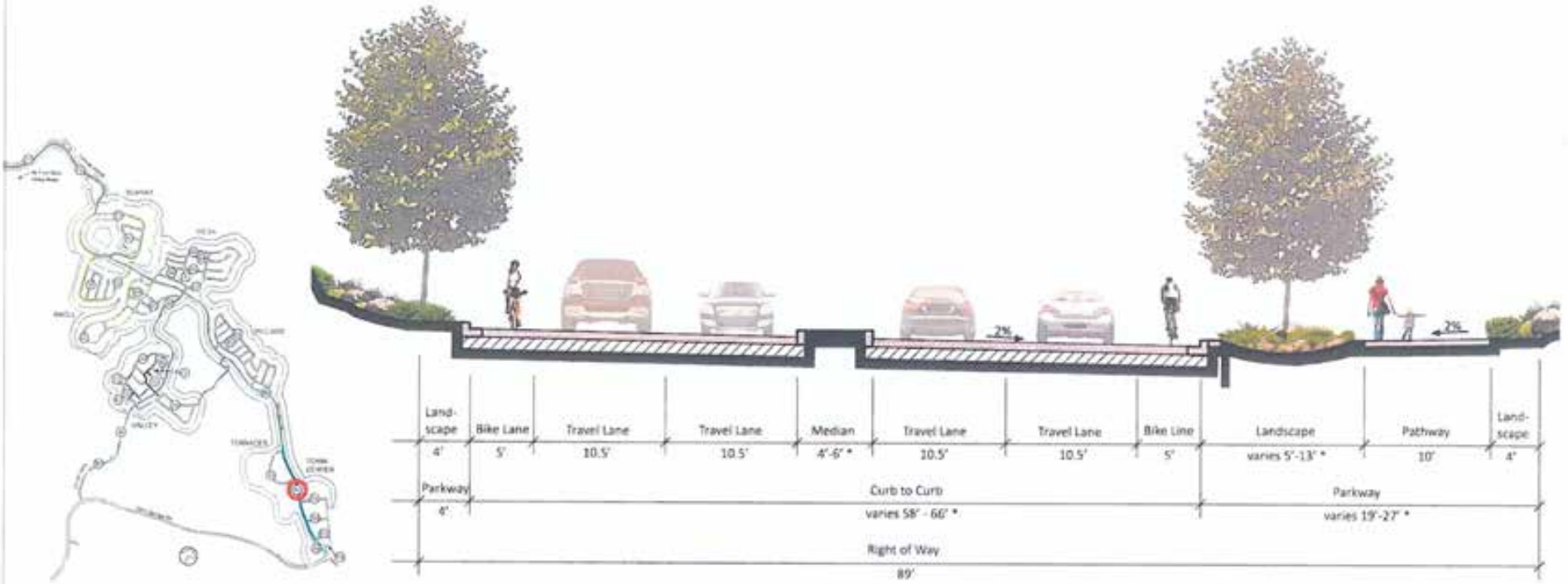
7 The maximum superelevation allowed on ME roads is 6%. Superelevation is not normally required on Non-ME roads.

8 ME roads designated with Bike Lanes will require an additional 10 feet of pavement and ROW. This may be increased to 12' for four-lane roads and above based upon the provisions in Section 7.3 of these standards.

9 The minimum curve radii, shown in the table above, are based on the design speed with 6% superelevation.

10 Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

11 Road surfacing widths include median width.



* Varies as required for turn lane. See Tentative Map #5597 for reference.

A2

FIGURE

Public Modified Boulevard with Intermittent Turn Lane

Newland Sierra Specific Plan

ITEM 2
SECTION A2 MODIFIED BOULEVARD WITH INTERMITTENT TURN LANE

Location: Mesa Rock Road north of Deer Springs Road
Approximate Length: 1,200'
Proposed ADT: 19,560

REQUEST:
We propose a cross section with the same design criteria as a "Boulevard with Intermittent Turn Lane 4.2B" per Table 2A of the County Public Road Standards with the following exceptions:

A. We request to use two delete two 8' shoulders.
   We request to use two 5' bike lanes with parking restriction per Appendix A of the County Public Road Standards rather than two 6' bike lanes, but less than the 6' width typical to the Boulevard with Intermittent Turn Lane Standard 4.2B.
B. We request that the pavement width be offset in the right-of-way as shown in Section A2 with a 4 ft parkway on one side and 26' on the other, rather than 14' on both sides. We request that the Right of Way be decreased from 92'-106' to 89' accordingly.
C. We request that street cross-fall be continuous from curb to curb rather than crowned at the centerline. Raised medians with gutter and curb inlets will be provided to intercept drainage from the high side of the roadbed. The introduction of median drainage reduces pavement width for drainage calculations purposes to 26 feet, less than the 32' to 37' half- width of a standard Boulevard A2. This As part of this request we propose that regularly spaced curb openings be incorporated into the low-side curbing to allow pavement runoff to be directed to the parkway for water quality treatment.
D. We request that the Maximum Desirable Grade be increased from 9% to 12% to minimize the graded footprint and maximize undisturbed land for dedication as Biological Open Space.
E. We request minimum lane widths of 10.5' as a traffic calming measure.

A tabulation of roadway radius, superelevation, and vertical curve design is attached. No geometric design exceptions are requested.

REASON:
Proposed Modification Requests A through D to the "Boulevard with Intermittent Turn Lane 4.2B" standard provide the opportunity to have 5' bike lanes that do not compete for space with parked cars as well an opportunity for a 10' pathway buffered by landscape and/or bioswale on one side. This roadway will meet the standards for a 40 mph design speed. A tabulation of roadway radius, superelevation, and vertical curve design is attached. No geometric design exceptions are requested.

Due to the minimum width required to construct a bio-swale of adequate capacity (See Roadside Bio-Swale Plan and Sections attached) Modification Request E will allow the roadway design to comply with the requirements of the Standard Urban Stormwater Mitigation Plan (SUSMP) adopted by the County for incorporation of Low Impact Development (LID) features (Integrated Management Practices: IMPs).

ALTERNATIVES:
Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes.
As an alternative to the Design Speed exception requested in the upper reaches of the project, that roadway segment could be designated a Residential Road

HARDSHIP:
Denial of this request would result in an increased graded footprint for the roadway, decreasing the opportunity to dedicate as much contiguous land as possible for biological open space.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.

NEWLAND SIERRA

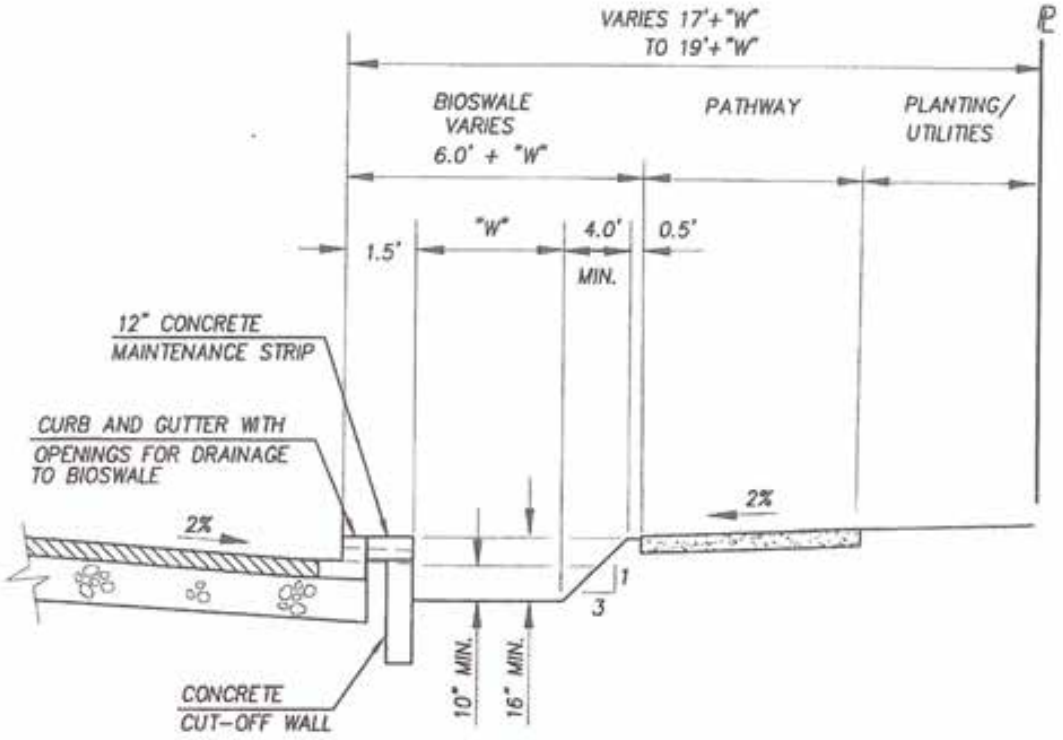
MESA ROCK ROAD
VERTICAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Length	Algebraic Difference	Crest (Min. K = 44)	Sag (Min. K =64)	Design Exception Required?	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
19+99	21+31	132	3%	44		No		6	A1	
25+15	30+91	576	9%		64	No		6	A2	
31+05	32+80	176	4%	44		No		6	A2	
33+42	35+98	256	4%		64	No		6	A2	
37+83	39+59	176	4%	44		No		6	A2	
41+01	43+56	256	4%		64	No		6	A2	
45+15	47+79	264	8%	44		No		7	A2	
59+89	64+73	484	11%	44		No		8	B2	
74+77	76+77	200	1%		200	No		8	B2	
78+88	86+56	768	12%		64	No		8	B2	
87+91	91+44	352	8%	44		No		8	B2	
95+43	99+43	400	1%		505	No		9	B2	
105+87	111+70	583	3%		200	No		9	B2	
114+24	117+49	325	4%		75	No		9	B2	
124+39	127+33	294	6%		49**	Yes	35 MPH Design Speed	10	B2	Residential Location
127+94	129+68	174	6%	29*		Yes	35 MPH Design Speed	10	B2	Residential Location
133+34	133+38	304	10.5%	29*		Yes	35 MPH Design Speed	10	B2	Residential Location

*K=29=35MP H (Crest) **K=49=35 MPH (Sag)

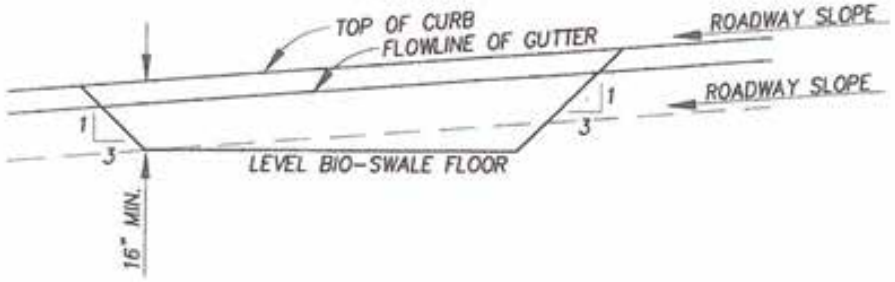
MESA ROCK ROAD
HORIZONTAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Radius	Super-elevation	Design Speed	Design Exception Required?	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
15+90	19+11	700	Std. crown	37	Yes	35 MPH Design Speed	6	A1	Tee intersection
19+87	23+35	700	Std. crown	40	No		6	A1	
29+76	32+03	1000	2% to 1 side	48	No		6	A2	
36+19	39+70	1000	2% to 1 side	43	No		6	A2	
40+34	45+29	5000	2% to 1 side	80	No		7	A2	
45+52	48+25	1000	2% to 1 side	48	No		7	A2	
60+73	67+57	650	Std. crown	40	No		8	A2	
69+53	72+05	650	2% to 1 side	33	No		8	B2	
74+01	75+41	1000	2% to 1 side	48	No		8	B2	
77+65	82+14	1000	2% to 1 side	43	No		8	B2	
84+15	92+12	800	2% to 1 side	44	No		8	B2	
96+03	101+89	650	2% to 1 side	40	No		8	B2	
107+97	111+20	1000	2% to 1 side	48	No		9	B2	
114+82	117+87	1000	2% to 1 side	43	No		9	B2	
123+83	125+55	1000	2% to 1 side	48	No		10	B2	
128+42	129+52	1000	2% to 1 side	43	No		10	B2	
131+46	134+75	350	2% to 1 side	27	Yes	25 MPH Design Speed	11	B2	Residential Location
135+75	138+69	350	2% to 1 side	27	Yes	25 MPH Design Speed	11	C2	Residential Location
146+64	150+40	725	2% to 1 side	35	Yes	25 MPH Design Speed	11	C2	Residential Location
155+26	159+29	320	2% to 1 side	26	Yes	25 MPH Design Speed	11	C2	Residential Location
161+22	164+57	400	2% to 1 side	33	Yes	25 MPH Design Speed	11	C2	Residential Location
164+89	166+54	300	2% to 1 side	26	Yes	25 MPH Design Speed	11	C2	Residential Location



ROADSIDE BIOSWALE

CROSS- SECTION NOT TO SCALE



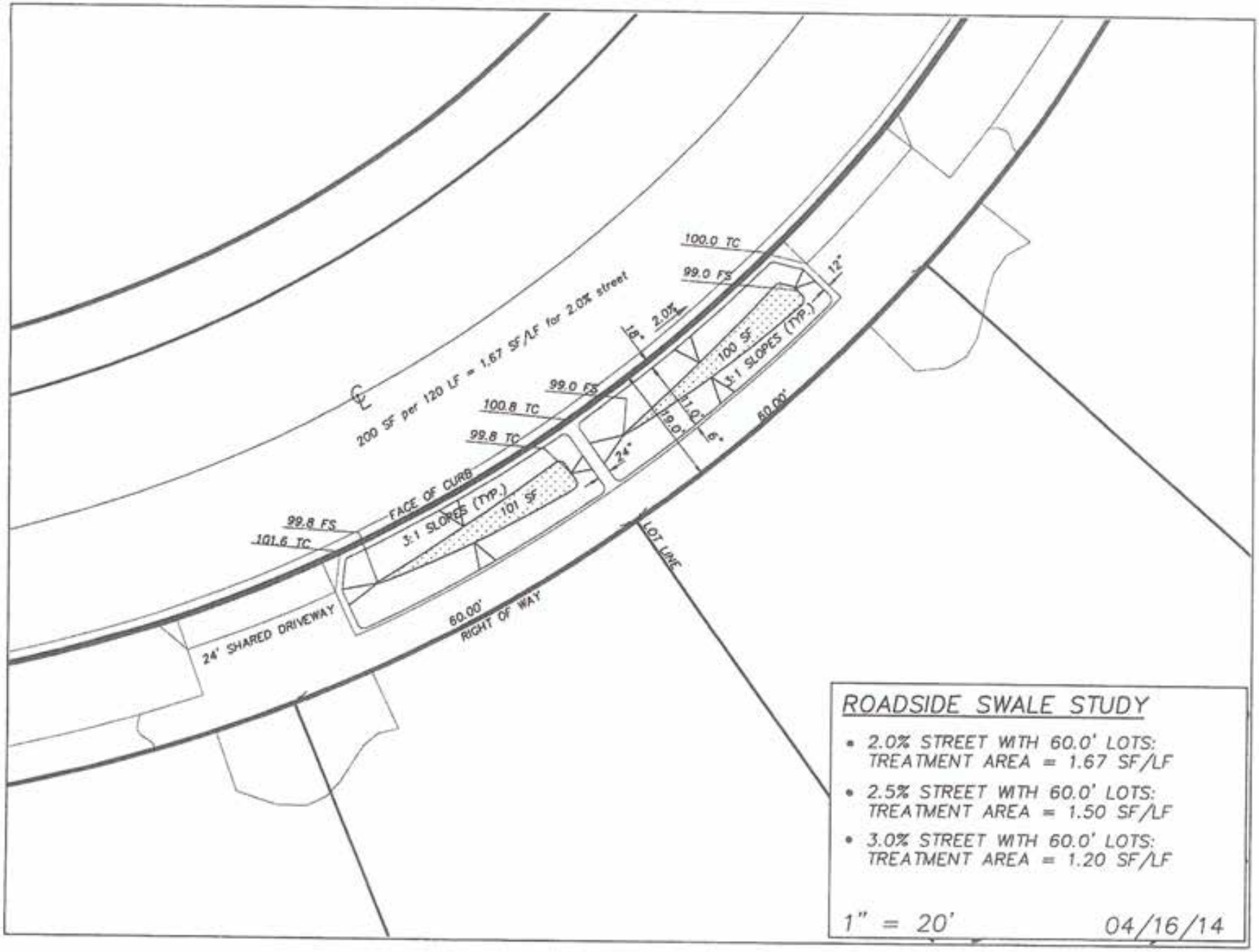
ROADSIDE BIOSWALE

PROFILE NOT TO SCALE

ROADSIDE BIOSWALE STUDY FOR 36' CURB TO CURB STREET

- FOR 36' WIDE STREET x 4% TREATMENT REQUIRED = 1.44 SF/LF REQUIRED.

  ASSUME "W"=3.0':
- 2.0% STREET WITH 60.0' LOTS
  TREATMENT AREA = 1.67 SF/LF
- 2.5% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.50 SF/LF
- 3.0% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.20 SF/LF


100.0 TC
99.0 FS
12"
18"
2.0%
100 SF
3:1 SLOPES (TYP.)
200 SF per 120 LF = 1.67 SF/LF for 2.0% street
99.0 FS
100.8 TC
99.8 TC
11.0'
19.0'
6"
60.00'
24"
FACE OF CURB
99.8 FS
101.6 TC
3:1 SLOPES (TYP.)
101 SF
LOT LINE
24' SHARED DRIVEWAY
60.00'
RIGHT OF WAY
ROADSIDE SWALE STUDY
• 2.0% STREET WITH 60.0' LOTS:
TREATMENT AREA = 1.67 SF/LF
• 2.5% STREET WITH 60.0' LOTS:
TREATMENT AREA = 1.50 SF/LF
• 3.0% STREET WITH 60.0' LOTS:
TREATMENT AREA = 1.20 SF/LF
1" = 20'
04/16/14

Bioretention Swale

Description

Bioretention swales are shallow, open channels that are designed to reduce runoff volume through infiltration. Additionally, bioretention swales remove pollutants such as trash and debris by filtering water through vegetation within the channel. Swales can serve as conveyance for stormwater and can be used in place of traditional curbs and gutters; however, when compared to traditional conveyance systems the primary objective of a bioretention swale is infiltration and water quality enhancement rather than conveyance. In addition to reducing the mass of pollutants in runoff, properly maintained bioretention swales can enhance the aesthetics of a site.

Treatment Efficiency			
Runoff Volume	High (unlined)/ Low (lined)	Bacteria	High
Sediment	High	Nutrients	Medium
Trash/ debris	High	Heavy Metals	High
Organics	High	Oil & Grease	High

Siting and Suitability

Bioretention swales are highly versatile stormwater IMPs that effectively reduce pollutants. With a narrow width, bioretention swales can be integrated into site plans with various configurations and components. Ideal sites for bioretention swales include the right-of-way of linear transportation corridors and along borders or medians of parking lots. In heavily trafficked areas, curb cuts can be used to delineate boundaries. Bioretention swales can be combined with other basic and stormwater runoff BMPs to form a treatment train, reducing the required size of a single IMP unit. See Section 3 for details.

Drainage Area: Less than 2 acres and fully stabilized.

Head Requirements: Bioretention swale typically requires a minimum of 2.5 to 3.5 ft of elevation difference between the inlet and outlet to the receiving storm drain network.

Slopes: Slopes draining to bioretention swale should be 15% or less, side slopes should be 3:1 (H:V) or flatter, and check dams should be used to provide longitudinal bed slopes of 2.5% (average slope should not exceed 4% from inlet to outlet).

Setbacks: Provide 10-ft setback from structures/foundations, 100-ft setback from septic fields and water supply wells, and 50-ft setback from steep slopes.

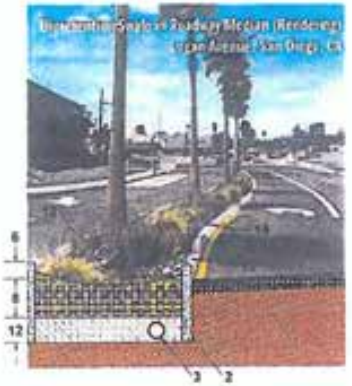
Water Table & Bedrock: At least 10 ft separation must be provided between bottom of cut (subgrade) and seasonal high water table, bedrock, or other restrictive features.

Soil Type: Bioretention swale can be used in any soils. If subsoil infiltration is less than 0.5 in/hr, an underdrain should be installed. A liner may be needed if subsoils contain expansive clays or calcareous minerals.

Areas of Concern: Infiltration is not allowed at sites with known soil contamination or hot spots, such as gas stations. An appropriate impermeable liner must be used in areas of concern.

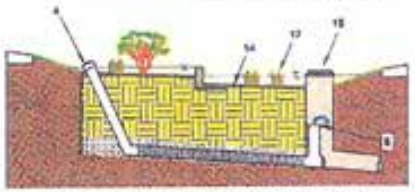
Design Considerations & Specifications *(see Appendices A & G for details)*

		Design Component	General Specification
IMP Function	1	Impermeable liner	If non-infiltrating (per geotechnical investigation), use clay liner, geomembrane liner, or concrete.
	2	Lateral hydraulic restriction barriers	May use concrete or geomembrane to restrict lateral seepage to adjacent subgrades, foundations, or utilities.
	3	Underdrain/ Infiltration	Underdrain required if subsoil infiltration < 0.5 in/hr. Schedule 40 PVC pipe with perforations (slots or holes) every 6 inches. If design is fully infiltrating, ensure that subgrade compaction is minimized.
	4	Cleanouts/ Observation Wells	Provide 6-inch diameter cleanout ports/observation wells for each underdrain pipe.
	5	Internal Water Storage (IWS)	If using underdrain, the underdrain outlet can be elevated to create a sump for additional moisture retention or promote plant survival and treatment. Top of IWS should be greater than 18 inches below surface.
	6	Temporary Ponding Depth	Use check dams to provide 6–18 inches (6–12 inches near schools or in residential areas); average ponding depth of 9 inches is recommended.
	7	Drawdown Time	Surface drawdown: 12-96 hrs. Subsurface dewatering: 48 hrs.
Soil Media	8	Soil Media Depth	3–4 feet (deeper for better pollutant removal, hydrologic benefits, and deeper rooting depths).
	9	Soil Media Composition	65% sand, 20% sandy loam, and 15% compost (Non-vegetation-based feedstock; animal wastes or by-products should not be applied) by volume.
	10	Media Permeability	5 in/hr infiltration rate for the flow-based SUSMP method (1–8 in/hr for alternative designs, as approved by local jurisdiction)
	11	Chemical Analysis	Total phosphorus < 11 ppm, pH 6–8, CEC >5 meq/100 g soil. Organic Matter Content <1% by weight
	12	Drainage Layer	Separate media from underdrain with 2 to 4 inches of washed coarse sand (ASTM C-33), followed by 2 inches of choking stone (ASTM No. 8) over a 1.5 ft envelope of ASTM No. 57 stone.
Routing	13	Inlet/Pretreatment	Provide stabilized inlets at least 12 inches wide and energy dissipation. Install rock armored forebay for concentrated flows, gravel fringe and vegetated filter strip for sheet flows.
	14	Slope and Grade Control	If necessary, use check dams to maintain maximum 2.5% bed slope. Check dams should extend sufficiently deep to prevent piping (undercutting) below the check dam.
	15	Outlet Configuration	Online: All runoff is routed through system—install an elevated overflow structure or weir at the elevation of maximum ponding. Offline: Only treated volume is diverted to system—install a diversion structure or allow bypass of high flows.
Landscape	16	Mulch	Dimensional chipped hardwood or triple shredded, well-aged hardwood mulch 3-inches deep.
	17	Vegetation	Native, deep rooting, drought tolerant plants.
	18	Multi-Use Benefits	Provide educational signage, artwork, or wildlife amenities.



This rendering demonstrates the application of bioretention swales as green street retrofits. Runoff enters the bioretention swale through curb cuts and is filtered vertically through the soil media. Lateral hydraulic restriction layers protect adjacent infrastructure from lateral seepage while allowing infiltration from the bottom of the bioretention swale. The underdrain is offset to avoid roots of existing vegetation.

Typical Bioretention Swale Profile



This schematic shows the major design elements of a bioretention swale. IWS is incorporated for enhanced infiltration and water quality treatment by upturning the underdrain in the outlet structure. Check dams ensure capture of the water quality volume and slow surface flow during larger storms.

Maintenance Considerations *(see Appendix D for detailed checklist)*

Task	Frequency	Indicator Maintenance is Needed	Maintenance Notes
Catchment inspection	Weekly or biweekly with routine property maintenance	Excessive sediment, trash, yard/or debris accumulation on the surface of bioretention swale	Permanently stabilize any exposed soil and remove any accumulated sediment. Adjacent pervious areas may need to be regraded.
Inlet inspection		Internal erosion or excessive sediment, trash, and/or debris accumulation	Check for sediment accumulation to ensure that flow into the bioretention swale is as designed. Remove any accumulated sediment.
Litter/leaf removal and misc. upkeep		Accumulation of litter and debris within bioretention swale area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the bioretention area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
Pruning	1-2 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Nutrients in runoff often cause bioretention vegetation to flourish.
Mowing	3-12 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Frequency depends on location and desired aesthetic appeal and type of vegetation.
Outlet inspection	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.
Mulch removal and replacement	1 time/2-3 years	2/3 of mulch has decomposed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches
Remove and replace dead plants	1 time/year	Dead plants	Within the first year, 10 percent of plants can die. Survival rates increase with time.
Temporary Watering	1 time/2 -3 days for first 1-2 months	Until establishment and during severely drought weather	Watering after the initial year might be required.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

TETRA TECH

Rock Infiltration Swale

Description

Rock infiltration swales are shallow, open channels that are designed to reduce runoff volume through infiltration. Rock infiltration swales are identical to bioretention swales except the surface is typically covered by cobble rather than mulch and vegetation. Rock infiltration swales can serve as conveyance for stormwater and can be used in place of traditional curbs and gutters; however, when compared to traditional conveyance systems the primary objective of a rock infiltration swale is infiltration and water quality enhancement rather than conveyance. In addition to reducing the mass of pollutants in runoff, properly maintained rock infiltration swales can enhance the aesthetics of a site.

Treatment Efficiency			
Runoff Volume	High (unlined)/ Low (lined)	Bacteria	High
Sediment	High	Nutrients	Medium
Trash/ debris	High	Heavy Metals	High
Organics	High	Oil & Grease	High

Siting and Suitability

Rock infiltration swales are highly versatile stormwater IMPs that effectively reduce pollutants. With a narrow width, rock infiltration swales can be integrated into site plans with various configurations and components. Ideal sites for rock infiltration swales include the right-of-way of linear transportation corridors and along borders or medians of parking lots. In heavily trafficked areas, curb cuts can be used to delineate boundaries. Rock infiltration swales can be combined with other basic and stormwater runoff BMPs to form a treatment train, reducing the required size of a single IMP unit. See Section 3 for details.

Drainage Area: Less than 2 acres and fully stabilized.

Head Requirements: Rock infiltration swale typically requires a minimum of 2.5 to 3.5 ft of elevation difference between the inlet and outlet to the receiving storm drain network.

Slopes: Slopes draining to rock infiltration swale should be 15% or less, side slopes should be 3:1 (H:V) or flatter, and check dams should be used to provide longitudinal bed slopes of 2.5% (average slope should not exceed 4% from inlet to outlet).

Setbacks: Provide 10-ft setback from structures/foundations, 100-ft setback from septic fields and water supply wells, and 50-ft setback from steep slopes.

Water Table & Bedrock: At least 10 ft separation must be provided between bottom of cut (subgrade) and seasonal high water table, bedrock, or other restrictive features.

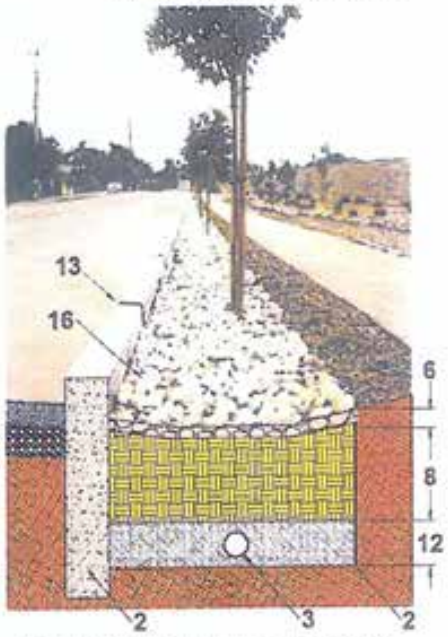
Soil Type: Rock infiltration swale can be used in any soils. If subsoil infiltration is less than 0.5 in/hr, an underdrain should be installed. A liner may be needed if subsoils contain expansive clays or calcareous minerals.

Areas of Concern: Infiltration is not allowed at sites with known soil contamination or hot spots, such as gas stations. An appropriate impermeable liner must be used in areas of concern.

Design Considerations & Specifications *(see Appendices A & G for details)*

		Design Component	General Specification
IMP Function	1	Impermeable liner	If non-infiltrating (per geotechnical investigation), use clay liner, geomembrane liner, or concrete.
	3	Lateral hydraulic restriction barriers	May use concrete or geomembrane to restrict lateral seepage to adjacent subgrades, foundations, or utilities.
	2	Underdrain/ Infiltration	Underdrain required if subsoil infiltration < 0.5 in/hr. Schedule 40 PVC pipe with perforations placed no more than every 6 inches. If design is fully-infiltrating, ensure that subgrade compaction is minimized.
	4	Cleanouts/ Observation Wells	Provide 6 inch diameter cleanout ports/observation wells for each underdrain pipe.
	5	Internal Water Storage (IWS)	If using underdrain, the underdrain outlet can be elevated to create a sump for additional moisture retention treatment. Top of IWS should be greater than 18 inches below surface.
	6	Temporary Ponding Depth	Use check dams to provide 6-18 inches (6-12 inches near schools or in residential areas); average ponding depth of 9 inches is recommended.
	7	Drawdown Time	Surface drawdown: 12-96 hrs. Subsurface dewatering: 48 hrs.
Soil Media	8	Soil Media Depth	2-4 feet (deeper for better pollutant removal, hydrologic benefits, and deeper rooting depths).
	9	Soil Media Composition	65% sand, 20% sandy loam, and 15% compost (from vegetation-based feedstock; animal wastes or by-products should not be applied) by volume.
	10	Media Permeability	5 in/hr infiltration rate for the flow-based SUSMP method (1-5 in/hr for alternative designs, as approved by local jurisdiction).
	11	Chemical Analysis	Total phosphorus < 15 ppm, pH 6-8, CEC >5 meq/100 g soil. Organic Matter Content >5% by weight.
	12	Drainage Layer	Separate media from underdrain with 2 to 4 inches of washed concrete sand (ASTM C-33), followed by 2 inches of choking stone (ASTM No. 8) over a 1.5 ft envelope of ASTM No. 57 stone.
Routing	13	Inlet/Pretreatment	Provide stabilized inlets at least 12 inches wide and energy dissipation. Install rock armored forebay for concentrated flows, gravel fringe and vegetated filter strip for sheet flows.
	14	Slope and Grade Control	If necessary, use check dams to maintain maximum 2.5% bed slope. Check dams should extend sufficiently deep to prevent piping (undercutting) below the check dam.
	15	Outlet Configuration	Online: All runoff is routed through system—install an elevated overflow structure or weir at the elevation of maximum ponding. Offline: Only treated volume is diverted to system—install a diversion structure or allow bypass of high flows.
Landscape	16	Surface	Armor surface with cobble. If planted (optional), install drought-tolerant, low-maintenance trees and shrubs.
	17	Multi-Use Benefits	Provide educational signage, artwork, or wildlife amenities.

Rock Infiltration Swale Cross Section, Encinitas, CA

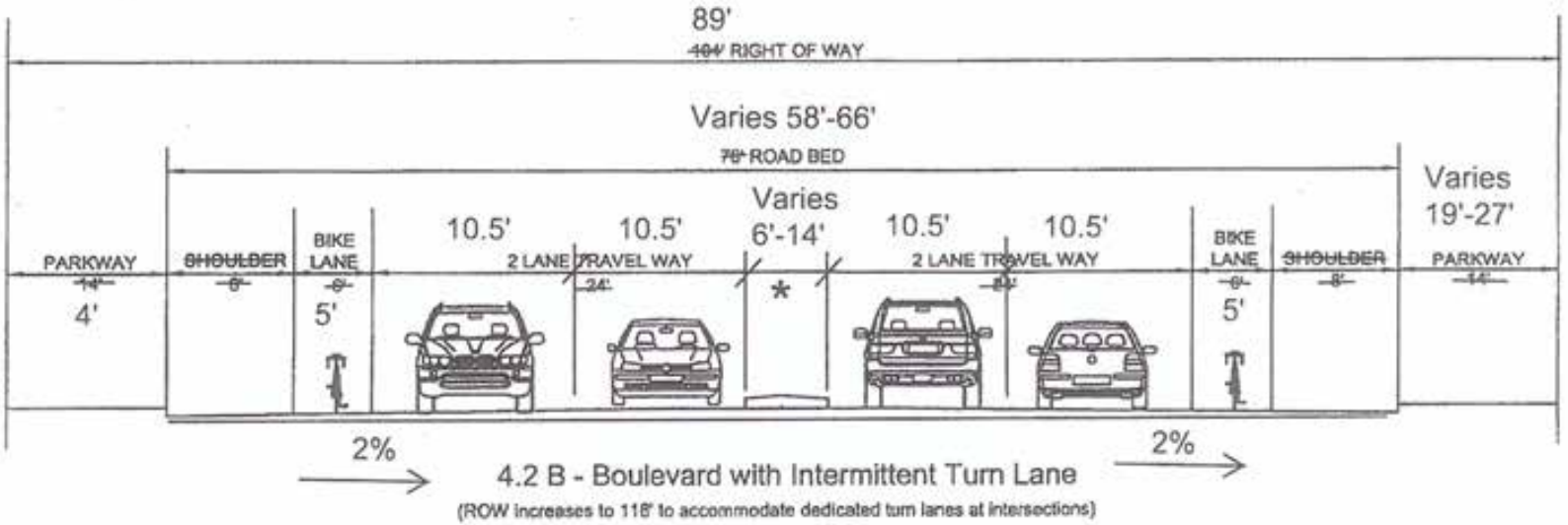


This schematic shows the major components of a rock infiltration swale. The rock infiltration swale in the photograph intercepts roadway runoff through curb cuts and filters it through subsurface soil media.

Maintenance Considerations *(see Appendix D for detailed checklist)*

Task	Frequency	Indicator Maintenance is Needed	Maintenance Notes
Catchment inspection	Weekly or biweekly with routine property maintenance	Excessive sediment, trash, and/or debris accumulation on the surface of rock infiltration swale	Permanently stabilize any exposed soil and remove any accumulated sediment in a manner that does not cause an illegal discharge. Adjacent pervious areas may need to be regraded.
Inlet inspection		Internal erosion or excessive sediment, trash, and/or debris accumulation	Check for sediment accumulation to ensure that flow into the rock infiltration swale is as designed. Remove any accumulated sediment.
Litter/leaf removal and misc. upkeep		Accumulation of litter and debris within rock infiltration swale area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the bioretention area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
Outlet inspection	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.
Temporary Watering	1 time/2-3 days for first 1-2 months	Until establishment and during severely drought weather	Watering after the initial year might be required.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

TETRA TECH



4.2 B - Boulevard with Intermittent Turn Lane

(ROW increases to 116' to accommodate dedicated turn lanes at intersections)

Proposed Section (A2)

* Varies from 6' Median, No Turn Lane to 4' Median Plus 10' Turn Lane, NB or SB

From:
County Public Road Standards
Appendix A

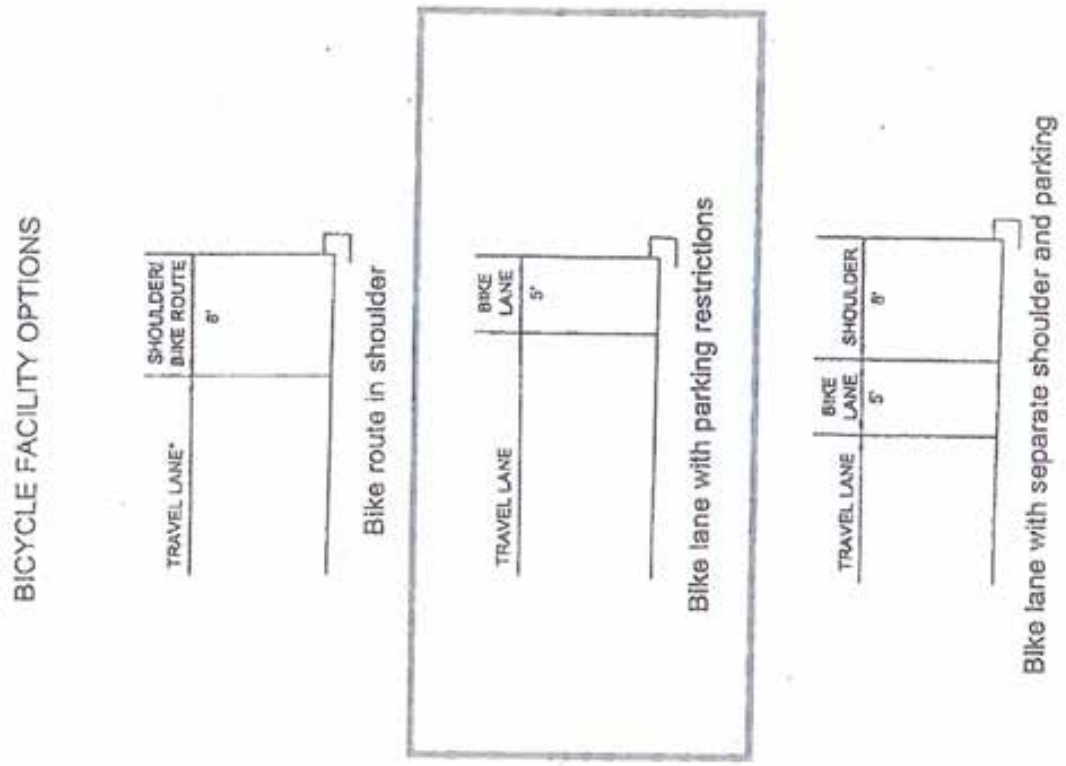


TABLE 2A: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

MOBILITY ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDERS (# / WIDTH)	PARKWAY WIDTH	MIN. CURVE RADIUS	MAX. DESIRABLE GRADE	MIN. DESIGN SPEED (MPH)
Expressway (6.1)	6 / 12'	34'	126'	146'	2 / 10'	10'	1,700'	6%	65
Prime Arterial (6.2)	6 / 12'	14'	102'	122'	2 / 8'	10'	1,700'	6%	65
Major Road									
With Raised Median (4.1A)	4 / 12'	14'	78'	98'	2 / 8'	10'	1,200'	7%	55
With Intermittent Turn Lanes (4.1B)	4 / 12'	-	64' - 78'	84' - 98'	2 / 8'	10'	1,200'	7%	55
Boulevard									
With Raised Median (4.2A)	4 / 12'	14'	78'	106'	2 / 8'	14'	500'	9%	40
With Intermittent Turn Lanes (4.2B)	4 / 12'	-	64' - 78'	92' - 106'	2 / 8'	14'	500'	9%	40
Community Collector									
With Raised Median (2.1A)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Continuous Left Turn Lane (2.1B)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Intermittent Turn Lanes (2.1C)	2 / 12'	-	40' - 54'	60' - 74'	2 / 8'	10'	700'	9%	45
With Improvement Options (2.1D)	2 / 12'	-	40' - 54'	84'	2 / 8'	15' - 22'	700'	9%	45
No Median (2.1E)	2 / 12'	-	40'	60'	2 / 8'	10'	700'	9%	45
Light Collector									
With Raised Median (2.2A)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Continuous Left Turn Lane (2.2B)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Intermittent Turn Lanes (2.2C)	2 / 12'	-	40' - 54'	64' - 78'	2 / 8'	12'	500'	9%	40
With Improvement Options (2.2D)	2 / 12'	-	40' - 54'	88'	2 / 8'	17' - 24'	500'	9%	40
No Median (2.2E)	2 / 12'	-	40'	64'	2 / 8'	12'	500'	9%	40
With Reduced Shoulder (2.2F)	2 / 12'	-	28'	52'	2 / 2'	12'	500'	9%	40
Minor Collector									
With Raised Median (2.3A)	2 / 12'	14'	54'	82'	2 / 8'	14'	350'	12%	35
With Intermittent Turn Lanes (2.3B)	2 / 12'	-	40' - 54'	68' - 82'	2 / 8'	14'	350'	12%	35
No Median (2.3C)	2 / 12'	-	40'	68'	2 / 8'	14'	350'	12%	35

NOTES:

1 Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above.

2 The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.

3 The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.

4 For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.

5 Additional pavement and ROW may be required for ME Boulevards / Community Collectors (4 feet) and Light Collectors (12 feet) in Industrial/Commercial Zones.

6 ME roads needing additional turn or passing lanes will require an additional 12 to 14 feet of pavement and ROW for each lane.

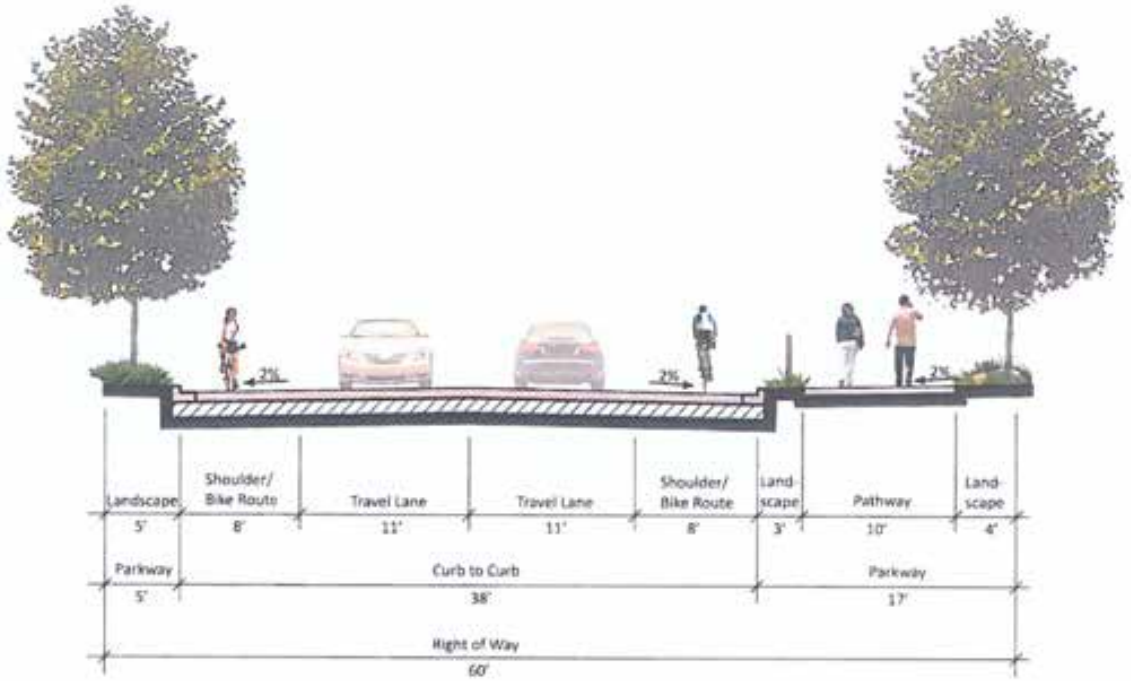
7 The maximum superelevation allowed on ME roads is 6%. Superelevation is not normally required on Non-ME roads.

8 ME roads designated with Bike Lanes will require an additional 10 feet of pavement and ROW. This may be increased to 12' for four-lane roads and above based upon the provisions in Section 7.3 of these standards.

9 The minimum curve radii, shown in the table above, are based on the design speed with 6% superelevation.

10 Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

11 Road surfacing widths include median width.



B1

FIGURE
Public Modified Light Collector with No Median

ITEM 3
SECTION B1 MODIFIED LIGHT COLLECTOR WITH NO MEDIAN

Location: Sarver Lane North of Deer Springs Road
Approximate Length: 1,500'
Proposed ADT: 5,040

REQUEST:
We propose a cross section with the same design criteria as a "Light Collector with No Median 2.2E" per Table 2A of the County Public Road Standards with the following exceptions:

A. We request that the parkway width be modified from two 12' parkways to a 5' parkway on one side and a 17' parkway on the other. We request that the Right of Way be decreased from to 64' to 60' accordingly.
B. We request that the 8' shoulders on each side become joint-use 8' Shoulder/Bike Route. This will require "No Parking" on both sides.
C. We request Reduced Design Speed within the existing neighborhood at the Southern end of Sarver Lane due to Horizontal Curve constraints of existing parcels and dedications, and to fit existing topography at the north end.
D. We request Reduced Design Speed at the Northern end of Sarver Lane for one Vertical Curve at the tee-intersection with Mesa Rock Road due constraints of existing topography.
E. We request that lane widths be reduced from 12' to 11'.

A tabulation of roadway radius, superelevation, and vertical curve design is attached.

REASON:
These Modification Requests to the "Light Collector with No Median 2.2E" standard will provide the opportunity for an 10' pathway on one side while imposing the minimum graded footprint, providing the opportunity to preserve existing trees and creek bed on the westerly side and impose the minimum impact on abutting owners on the easterly side who made previous dedications and I.O.D.s in reliance upon the 60' right of way required for a "Residential Collector" standard of the Circulation Element of the previous General Plan. This roadway will carry an anticipated 5,040 ADT.

ALTERNATIVES:

Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to adjacent owners, and to the existing trees and creek on the west side of the road.

HARDSHIP:

Denial of this request would result in an increased graded footprint for the roadway, increasing the difficulty to maintain the existing trees and creek bed on the westerly side, increasing the impact on adjacent owners, and decreasing the ability to dedicate undisturbed biological open space.

COST ESTIMATE:

Cost is not a factor presented with this Design Exception Request.

NEWLAND SIERRA

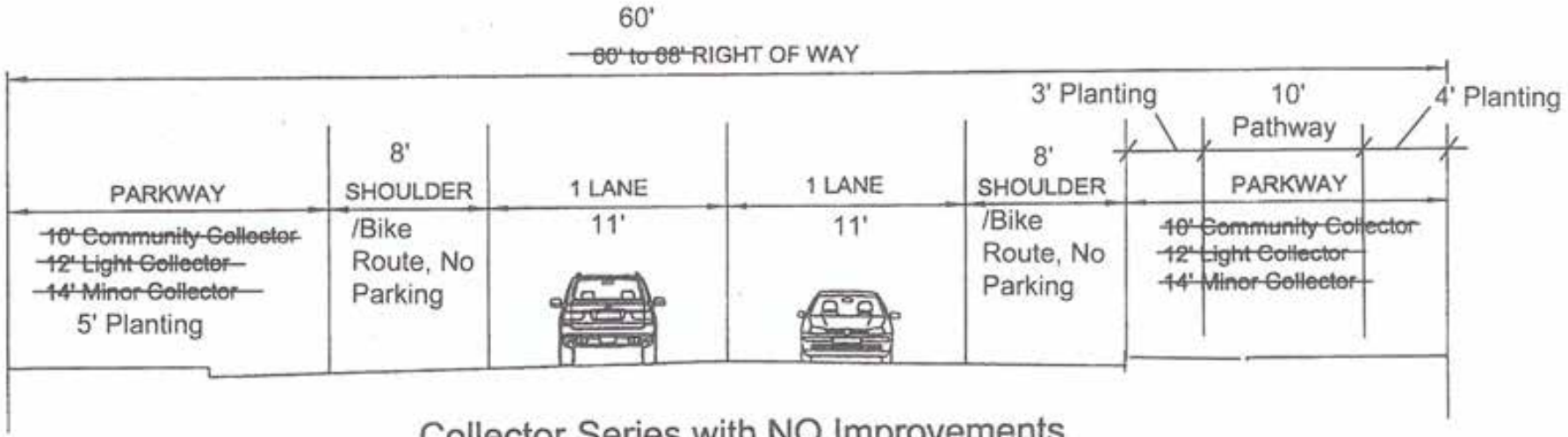
SARVER LANE
VERTICAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Length	Algebraic Difference	Crest (Min. K = 44)	Sag (Min. K =64)	Design Exception Required?	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
14+80	16+01	121	2%		64	No		13	B2	
19+70	22+18	248	4%		64	No		13	B2	
23+30	26+16	286	6.5%	44		No		13	B2	
32+49	33+77	128	2%		64	No		12	B2	
47+90	53+40	550	8.5%		64	No		12	B2	
76+01	79+01	300	10%	30*		Yes	35 MPH Design Speed	12	B2	Tee Intersection

*K=29=35MPH (Crest)

SARVER LANE
HORIZONTAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Radius	Super-elevation	Design Speed	Design Exception	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
2+04	4+80	350	Std. Crown	27	Yes	25 MPH Design Speed	13	B1	Tee Intersection
7+26	13+08	635	Std. Crown	37	Yes	35 MPH Design Speed	13	B1	Replaces 60' Raduis
17+33	21+32	400	1% to 1 side	32	Yes	30 MPH Design Speed	13	B2	Replaces 300' Raduis
25+99	27+14	800	1% to 1 side	43	No		13	B2	
32+25	36+42	600	1% to 1 side	40	No		12	B2	
41+48	48+05	900	1% to 1 side	44	No		12	B2	
50+79	51+94	500	1% to 1 side	35	Yes	35 MPH Design Speed	11	B2	
52+01	59+95	500	1% to 1 side	35	Yes	35 MPH Design Speed	11	B2	
60+16	67+666	500	1% to 1 side	35	Yes	35 MPH Design Speed	11	B2	
70+00	74+24	500	1% to 1 side	35	Yes	35 MPH Design Speed	11	B2	

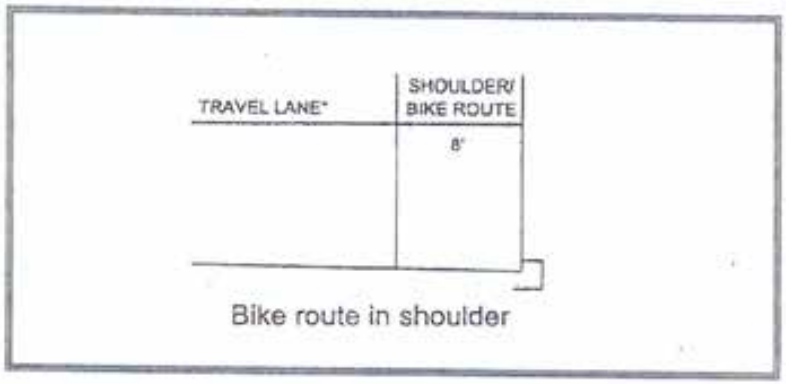


Collector Series with NO Improvements

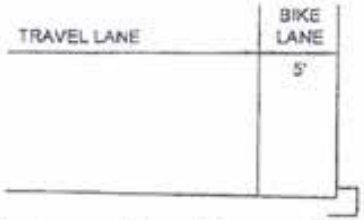
[Cross section with Intermittent Turn Lanes is similar except at intersections, which contain a 14' dedicated turn lane that produces a wider ROW]

Proposed Section (B1)

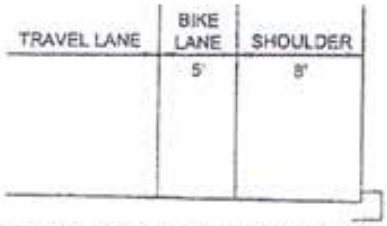
BICYCLE FACILITY OPTIONS



Bike route in shoulder



Bike lane with parking restrictions



Bike lane with separate shoulder and parking

TABLE 2A: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

MOBILITY ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDERS (# / WIDTH)	PARKWAY WIDTH	MIN. CURVE RADIUS	MAX. DESIRABLE GRADE	MIN. DESIGN SPEED (MPH)
Expressway (6.1)	6 / 12'	34'	126'	146'	2 / 10'	10'	1,700'	6%	65
Prime Arterial (6.2)	6 / 12'	14'	102'	122'	2 / 8'	10'	1,700'	6%	65
Major Road									
With Raised Median (4.1A)	4 / 12'	14'	78'	98'	2 / 8'	10'	1,200'	7%	55
With Intermittent Turn Lanes (4.1B)	4 / 12'	-	64' - 78'	84' - 98'	2 / 8'	10'	1,200'	7%	55
Boulevard									
With Raised Median (4.2A)	4 / 12'	14'	78'	106'	2 / 8'	14'	500'	9%	40
With Intermittent Turn Lanes (4.2B)	4 / 12'	-	64' - 78'	92' - 106'	2 / 8'	14'	500'	9%	40
Community Collector									
With Raised Median (2.1A)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Continuous Left Turn Lane (2.1B)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Intermittent Turn Lanes (2.1C)	2 / 12'	-	40' - 54'	60' - 74'	2 / 8'	10'	700'	9%	45
With Improvement Options (2.1D)	2 / 12'	-	40' - 54'	84'	2 / 8'	15' - 22'	700'	9%	45
No Median (2.1E)	2 / 12'	-	40'	60'	2 / 8'	10'	700'	9%	45
Light Collector									
With Raised Median (2.2A)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Continuous Left Turn Lane (2.2B)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Intermittent Turn Lanes (2.2C)	2 / 12'	-	40' - 54'	64' - 78'	2 / 8'	12'	500'	9%	40
With Improvement Options (2.2D)	2 / 12'	-	40' - 54'	88'	2 / 8'	17' - 24'	500'	9%	40
No Median (2.2E)	2 / 12'	-	40'	64'	2 / 8'	12'	500'	9%	40
With Reduced Shoulder (2.2F)	2 / 12'	-	28'	52'	2 / 2'	12'	500'	9%	40
Minor Collector									
With Raised Median (2.3A)	2 / 12'	14'	54'	82'	2 / 8'	14'	350'	12%	35
With Intermittent Turn Lanes (2.3B)	2 / 12'	-	40' - 54'	68' - 82'	2 / 8'	14'	350'	12%	35
No Median (2.3C)	2 / 12'	-	40'	68'	2 / 8'	14'	350'	12%	35

NOTES:

1 Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above.

2 The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.

3 The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.

4 For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.

5 Additional pavement and ROW may be required for ME Boulevards / Community Collectors (4 feet) and Light Collectors (12 feet) in Industrial/Commercial Zones.

6 ME roads needing additional turn or passing lanes will require an additional 12 to 14 feet of pavement and ROW for each lane.

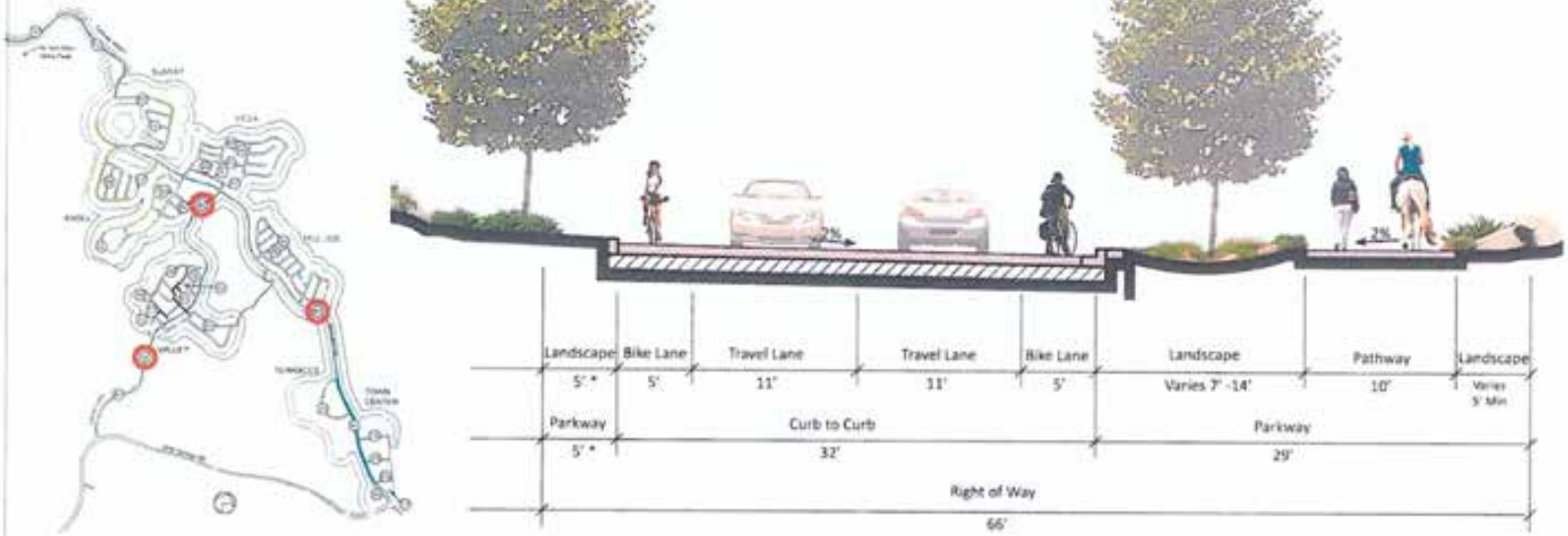
7 The maximum superelevation allowed on ME roads is 6%. Superelevation is not normally required on Non-ME roads.

8 ME roads designated with Bike Lanes will require an additional 10 feet of pavement and ROW. This may be increased to 12' for four-lane roads and above based upon the provisions in Section 7.3 of these standards.

9 The minimum curve radii, shown in the table above, are based on the design speed with 6% superelevation.

10 Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

11 Road surfacing widths include median width.



* Between street H2 and proposed trailhead the southerly parkway shall be a 10' pathway. Overall ROW increases to 71' for this segment only. See Tentative Map #5597 for reference.

B2

FIGURE

Public Modified Light Collector with Reduced Shoulder

Newland Sierra Specific Plan

ITEM 4
SECTION B2 MODIFIED LIGHT COLLECTOR WITH REDUCED SHOULDER

Location: Mesa Rock Road north of Terraces neighborhood and Sarver Lane north of the Sierra Farms Park parcels.
Approximate Length: 20,000' (3.8 miles)
Proposed ADT: 11,640 Maximum

REQUEST:
We propose a cross section with the same design criteria as a "Light Collector with Reduced Shoulder 2.2F" per Table 2A of the County Public Road Standards with the following exceptions:

A. We request to reduce two 8' shoulders to two 5' bike lanes with parking restriction per Appendix A of the County Public Road Standards, but less than the 6' width typical to the Boulevard with Intermittent Turn Lane Standard 4.2B.

B. We request that the pavement width be offset in the right-of-way as shown in Section B2 with a 5 ft parkway on one side and 29' on the other, rather than 12' on both sides.

C. We request that street cross-fall be continuous from curb to curb rather than crowned at the centerline. As part of this request we propose that regularly spaced curb openings be incorporated into the low-side curbing to allow pavement runoff to be directed to the parkway for water quality treatment.

D. We request that the Maximum Desirable Grade be increased from 9% to 12% to minimize the graded footprint and maximize undisturbed land for dedication as Biological Open Space.

E. A tabulation of roadway radius, superelevation, and vertical curve design is attached. No geometric design exceptions are requested. At approximately Station 124+00 this roadway (Mesa Rock Road) ADT for this roadway reduces to 1,500' radius at approximately station 134+00 the Typical section changes from "B2" a "Modified Light Collector" to "C2" a "Modified Residential Collector" and lots begin taking direct access. In this region a Design

Exception is requested for a design speed of 25 MPH. Vertical curve design in this area is adequate for 35 MPH.

F. We request that lane widths be reduced from 12' to 11'.

REASON:
Proposed Modification Requests A and B to the "Light Collector with Reduced Shoulder 2.2F" standard will provide the opportunity for a 10' pathway buffered by landscape and/or bioswale on one side.

Due to the minimum width required to construct a bio-swale of adequate capacity (See Roadside Bio-Swale Plan and Sections attached) Modification Request C will allow the roadway design to comply with the requirements of the Standard Urban Stormwater Mitigation Plan (SUSMP) adopted by the County for incorporation of Low Impact Development (LID) features (Integrated Management Practices: IMPs).

The "Preliminary Drainage Study for Newland Sierra, October 2014" has been prepared as part of the Tentative Map submittal. The report analyzes the project's capacity to comply with the requirements of the County Drainage Manual, including depth, width and velocity of street flow for the 100-year storm. Even neglecting any capacity of the median swale, this cross-section complies with all criteria.
As a representative check, please see the data for Node 2117 to 2116 below and the map that follows.
W=9.10' (dry pavement during 100-year storm= 24')
D=0.31' for 100-year storm, Requirement = 0.4' max. for 50-year storm
D x V=1.07 ft^2ps, less than the 6.0 ft^2ps requirement

P-25-1.TXT

AES Report:
Roadway Section
B2

```
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.610
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      1.22
 TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      1.22

****************************************************************************
 FLOW PROCESS FROM NODE   2217.00 TO NODE   2216.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1342.00  DOWNSTREAM ELEVATION(FEET) = 1331.00
 STREET LENGTH(FEET) =   410.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.30
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    9.10
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.48
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
 STREET FLOW TRAVEL TIME(MIN.) =   1.96   Tc(MIN.) =    4.57
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .5500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.601
 SUBAREA AREA(ACRES) =    0.82      SUBAREA RUNOFF(CFS) =    4.16
 TOTAL AREA(ACRES) =       1.0       PEAK FLOW RATE(CFS) =       5.38

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.22
 FLOW VELOCITY(FEET/SEC.) =  3.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
 LONGEST FLOWPATH FROM NODE   2218.00 TO NODE   2216.00 =     490.00 FEET.

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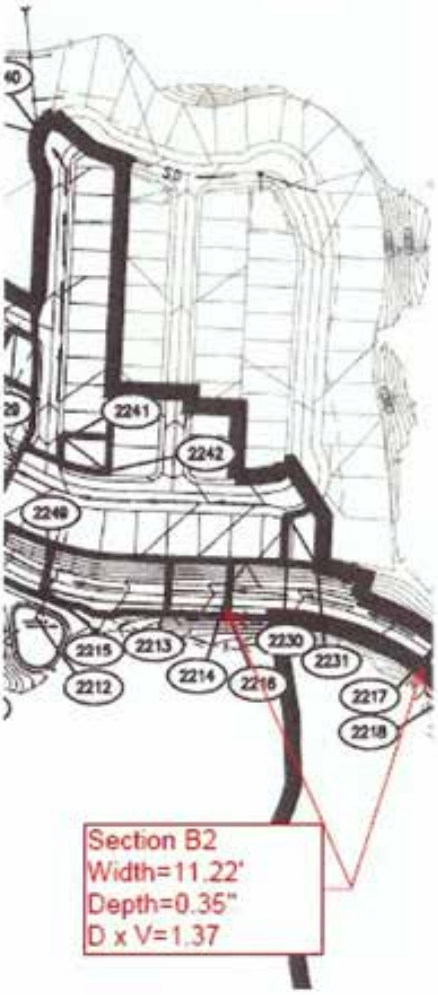


In addition to standard "Flooded Width" calculations, the proposed modifications to roadway crown and maximum desirable grade have been analyzed for potential susceptibility to hydroplaning and found to comply with the guidelines of the AASHTO Drainage Manual, Section 13.2.9 and the National Highway Cooperative Research Program reference document "Proposed Guidelines for Reducing Hydroplaning on New and Rehabilitated Pavements." Calculations supporting this finding have been submitted separately to DPW, reviewed and approved.

ALTERNATIVES:

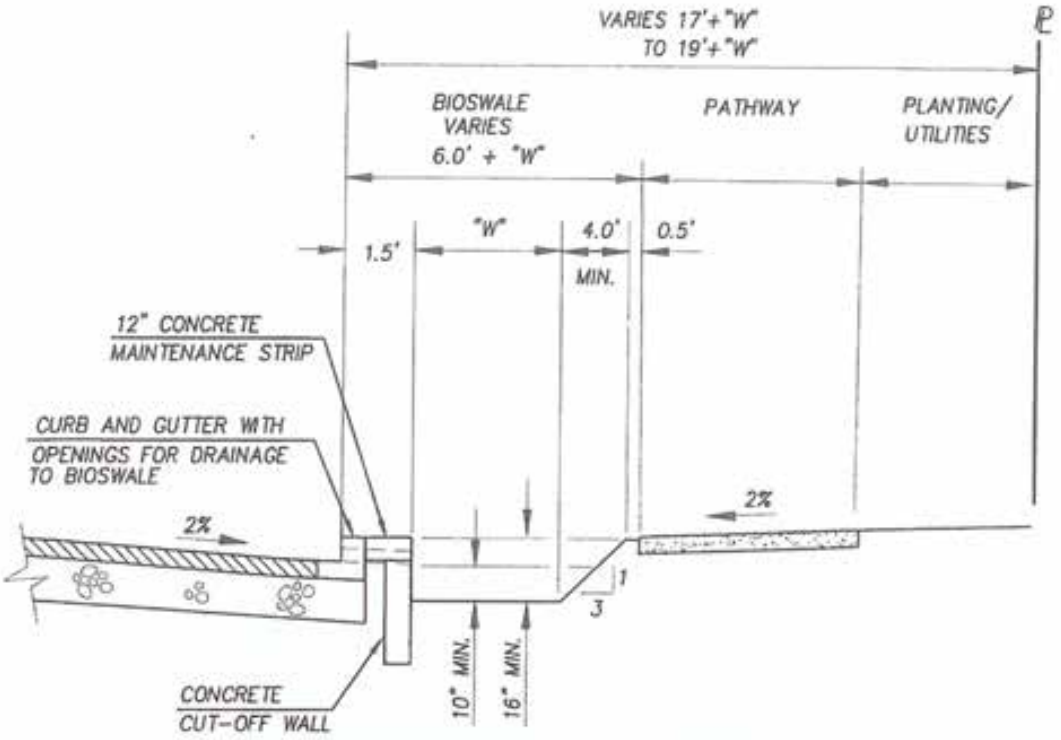
Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes.

HARDSHIP:

Denial of this request would result in both increased graded footprint and slope heights for the roadway, decreasing the opportunity to provide a pathway for the community and to decreasing the land available for dedication as open space.

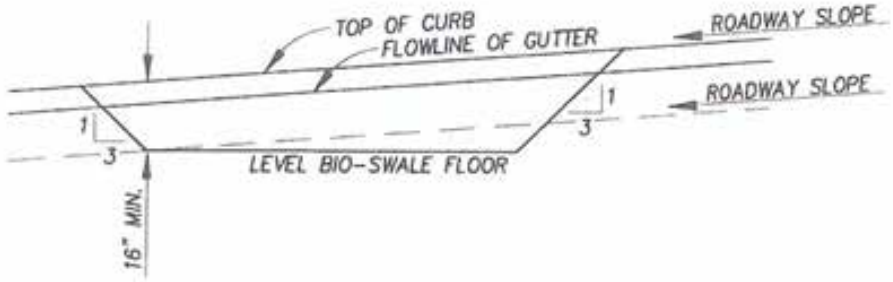
COST ESTIMATE:

Cost is not a factor presented with this Design Exception Request.



ROADSIDE BIOSWALE

CROSS- SECTION NOT TO SCALE

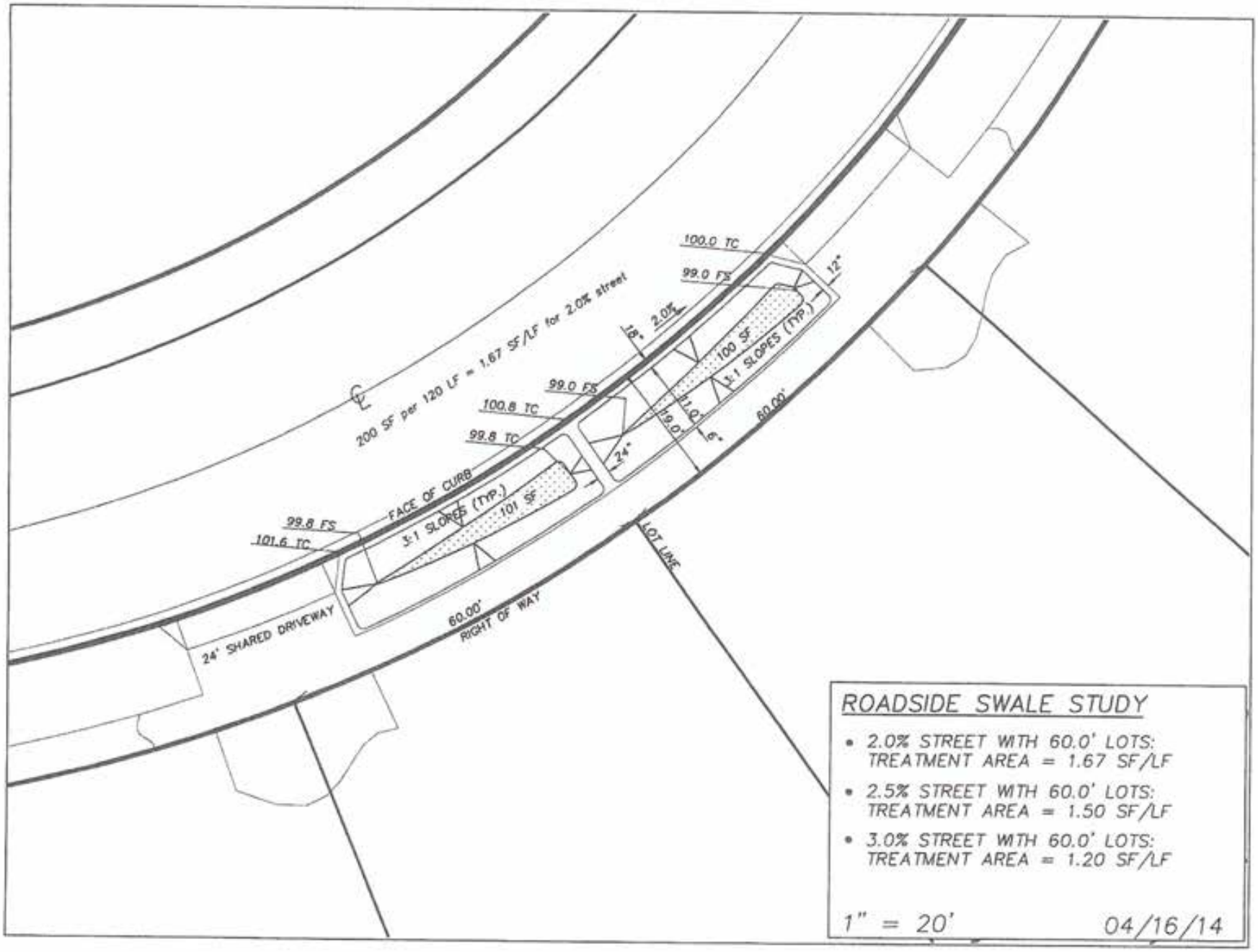


ROADSIDE BIOSWALE

PROFILE NOT TO SCALE

ROADSIDE BIOSWALE STUDY FOR 36' CURB TO CURB STREET

- FOR 36' WIDE STREET x 4% TREATMENT REQUIRED = 1.44 SF/LF REQUIRED.
  ASSUME "W"=3.0':
- 2.0% STREET WITH 60.0' LOTS
  TREATMENT AREA = 1.67 SF/LF
- 2.5% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.50 SF/LF
- 3.0% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.20 SF/LF


200 SF per 120 LF = 1.67 SF/LF for 2.0% street
100.0 TC
99.0 FS
12"
18"
2.0%
100 SF
3:1 SLOPES (TYP.)
99.0 FS
100.8 TC
99.8 TC
11.0'
19.0'
6"
24"
60.00'
FACE OF CURB
99.8 FS
101.6 TC
3:1 SLOPES (TYP.)
101 SF
LOT LINE
24' SHARED DRIVEWAY
60.00'
RIGHT OF WAY
ROADSIDE SWALE STUDY
• 2.0% STREET WITH 60.0' LOTS: TREATMENT AREA = 1.67 SF/LF
• 2.5% STREET WITH 60.0' LOTS: TREATMENT AREA = 1.50 SF/LF
• 3.0% STREET WITH 60.0' LOTS: TREATMENT AREA = 1.20 SF/LF
1" = 20'
04/16/14

Bioretention Swale

Description

Bioretention swales are shallow, open channels that are designed to reduce runoff volume through infiltration. Additionally, bioretention swales remove pollutants such as trash and debris by filtering water through vegetation within the channel. Swales can serve as conveyance for stormwater and can be used in place of traditional curbs and gutters; however, when compared to traditional conveyance systems the primary objective of a bioretention swale is infiltration and water quality enhancement rather than conveyance. In addition to reducing the mass of pollutants in runoff, properly maintained bioretention swales can enhance the aesthetics of a site.

Treatment Efficiency			
Runoff Volume	High (unlined)/ Low (lined)	Bacteria	High
Sediment	High	Nutrients	Medium
Trash/ debris	High	Heavy Metals	High
Organics	High	Oil & Grease	High

Siting and Suitability

Bioretention swales are highly versatile stormwater IMPs that effectively reduce pollutants. With a narrow width, bioretention swales can be integrated into site plans with various configurations and components. Ideal sites for bioretention swales include the right-of-way of linear transportation corridors and along borders or medians of parking lots. In heavily trafficked areas, curb cuts can be used to delineate boundaries. Bioretention swales can be combined with other basic and stormwater runoff BMPs to form a treatment train, reducing the required size of a single IMP unit. See Section 3 for details.

Drainage Area: Less than 2 acres and fully stabilized.

Head Requirements: Bioretention swale typically requires a minimum of 2.5 to 3.5 ft of elevation difference between the inlet and outlet to the receiving storm drain network.

Slopes: Slopes draining to bioretention swale should be 15% or less, side slopes should be 3:1 (H:V) or flatter, and check dams should be used to provide longitudinal bed slopes of 2.5% (average slope should not exceed 4% from inlet to outlet).

Setbacks: Provide 10-ft setback from structures/foundations, 100-ft setback from septic fields and water supply wells, and 50-ft setback from steep slopes.

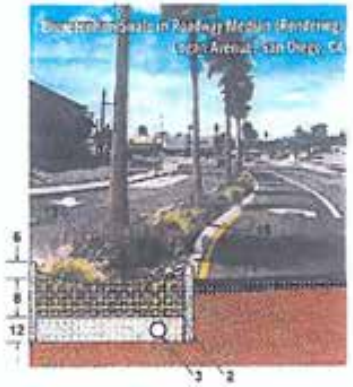
Water Table & Bedrock: At least 10 ft separation must be provided between bottom of cut (subgrade) and seasonal high water table, bedrock, or other restrictive features.

Soil Type: Bioretention swale can be used in any soils. If subsoil infiltration is less than 0.5 in/hr, an underdrain should be installed. A liner may be needed if subsoils contain expansive clays or calcareous minerals.

Areas of Concern: Infiltration is not allowed at sites with known soil contamination or hot spots, such as gas stations. An appropriate impermeable liner must be used in areas of concern.

Design Considerations & Specifications *(see Appendices A & G for details)*

		Design Component	General Specification
IMP Function	1	Impermeable liner	If non-infiltrating (per geotechnical investigation), use clay liner, geomembrane liner, or concrete.
	2	Lateral hydraulic restriction barriers	May use concrete or geomembrane to restrict lateral seepage to adjacent subgrades, foundations, or utilities.
	3	Underdrain/ Infiltration	Underdrain required if subsoil infiltration < 0.5 in/hr. Schedule 40 PVC pipe with perforations (slots or holes) every 6 inches. If design is fully-infiltrating, ensure that subgrade compaction is minimized.
	4	Cleanouts/ Observation Wells	Provide 6-inch diameter cleanout ports/observation wells for each underdrain pipe.
	5	Internal Water Storage (IWS)	If using underdrain, the underdrain outlet can be elevated to create a sump for additional moisture retention to promote plant survival and treatment. Top of IWS should be greater than 18 inches below surface.
	6	Temporary Ponding Depth	Use check dams to provide 6-18 inches (6-12 inches near schools or in residential areas); average ponding depth of 9 inches is recommended.
	7	Drawdown Time	Surface drawdown: 12-96 hrs. Subsurface dewatering: 48 hrs.
Soil Media	8	Soil Media Depth	2-4 feet (deeper for better pollutant removal, hydrologic benefits, and deeper rooting depths).
	9	Soil Media Composition	65% sand, 20% sandy loam, and 15% compost (from vegetation-based feedstock; animal wastes or by-products should not be applied) by volume.
	10	Media Permeability	5 in/hr infiltration rate for the flow-based SUSMP method (1–8 in/hr for alternative designs, as approved by local jurisdiction)
	11	Chemical Analysis	Total phosphorus < 15 ppm, pH 6–8, CEC > 5 meq/100 g soil. Organic Matter Content <5% by weight.
	12	Drainage Layer	Separate media from underdrain with 2 to 4 inches of washed concrete sand (ASTM C-33), followed by 2 inches of choking stone (ASTM No. 8) over a 1.5 ft envelope of ASTM No. 57 stone.
Routing	13	Inlet/Pretreatment	Provide stabilized inlets at least 12 inches wide and energy dissipation. Install rock armored forebay for concentrated flows, gravel fringe and vegetated filter strip for sheet flows.
	14	Slope and Grade Control	If necessary, use check dams to maintain maximum 2.5% bed slope. Check dams should extend sufficiently deep to prevent piping (undercutting) below the check dam.
	15	Outlet Configuration	Online: All runoff is routed through system—install an elevated overflow structure or weir at the elevation of maximum ponding. Offline: Only treated volume is diverted to system—install a diversion structure or allow bypass of high flows.
Landscape	16	Mulch	Dimensional chipped hardwood or triple shredded, well-aged hardwood mulch 3-inches-deep.
	17	Vegetation	Native, deep rooting, drought tolerant plants.
	18	Multi-Use Benefits	Provide educational signage, artwork, or wildlife amenities.



This rendering demonstrates the application of bioretention swales as green street retrofits. Runoff enters the bioretention swale through curb cuts and is filtered vertically through the soil media. Lateral hydraulic restriction layers protect adjacent infrastructure from lateral seepage while allowing infiltration from the bottom of the bioretention swale. The underdrain is offset to avoid roots of existing vegetation.

Typical Bioretention Swale Profile

This schematic shows the major design elements of a bioretention swale. IWS is incorporated for enhanced infiltration and water quality treatment by upturning the underdrain in the outlet structure. Check dams ensure capture of the water quality volume and slow surface flow during larger storms.

Maintenance Considerations *(see Appendix D for detailed checklist)*

Task	Frequency	Indicator Maintenance is Needed	Maintenance Notes
Catchment inspection	Weekly or biweekly with routine property maintenance	Excessive sediment, trash, and/or debris accumulation on the surface of bioretention swale	Permanently stabilize any exposed soil and remove any accumulated sediment. Adjacent pervious areas may need to be regraded.
Inlet inspection		Internal erosion or excessive sediment, trash, and/or debris accumulation	Check for sediment accumulation to ensure that flow into the bioretention swale is as designed. Remove any accumulated sediment.
Litter/leaf removal and misc. upkeep		Accumulation of litter and debris within bioretention swale area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the bioretention area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
Pruning	1-2 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Nutrients in runoff often cause bioretention vegetation to flourish.
Mowing	2-12 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Frequency depends on location and desired aesthetic appeal and type of vegetation.
Outlet inspection	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.
Mulch removal and replacement	1 time/2-3 years	2/3 of mulch has decomposed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches
Remove and replace dead plants	1 time/year	Dead plants	Within the first year, 10 percent of plants can die. Survival rates increase with time.
Temporary Watering	1 time/2-3 days for first 1-2 months	Until establishment and during severely drought weather	Watering after the initial year might be required.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

TETRA TECH

Rock Infiltration Swale

Description

Rock infiltration swales are shallow, open channels that are designed to reduce runoff volume through infiltration. Rock infiltration swales are identical to bioretention swales except the surface is typically covered by cobble rather than mulch and vegetation. Rock infiltration swales can serve as conveyance for stormwater and can be used in place of traditional curbs and gutters; however, when compared to traditional conveyance systems the primary objective of a rock infiltration swale is infiltration and water quality enhancement rather than conveyance. In addition to reducing the mass of pollutants in runoff, properly maintained rock infiltration swales can enhance the aesthetics of a site.

Treatment Efficiency			
Runoff Volume	High (unlined)/ Low (lined)	Bacteria	High
Sediment	High	Nutrients	Medium
Trash/ debris	High	Heavy Metals	High
Organics	High	Oil & Grease	High

TETRA TECH

Siting and Suitability

Rock infiltration swales are highly versatile stormwater IMPs that effectively reduce pollutants. With a narrow width, rock infiltration swales can be integrated into site plans with various configurations and components. Ideal sites for rock infiltration swales include the right-of-way of linear transportation corridors and along borders or medians of parking lots. In heavily trafficked areas, curb cuts can be used to delineate boundaries. Rock infiltration swales can be combined with other basic and stormwater runoff BMPs to form a treatment train, reducing the required size of a single IMP unit. See Section 3 for details.

Drainage Area: Less than 2 acres and fully stabilized.

Head Requirements: Rock infiltration swale typically requires a minimum of 2.5 to 3.5 ft of elevation difference between the inlet and outlet to the receiving storm drain network.

Slopes: Slopes draining to rock infiltration swale should be 15% or less, side slopes should be 3:1 (H:V) or flatter, and check dams should be used to provide longitudinal bed slopes of 2.5% (average slope should not exceed 4% from inlet to outlet).

Setbacks: Provide 10 ft setback from structures/foundations, 100 ft setback from septic fields and water supply wells, and 50-ft setback from steep slopes.

Water Table & Bedrock: At least 10 ft separation must be provided between bottom of cut (subgrade) and seasonal high water table, bedrock, or other restrictive features.

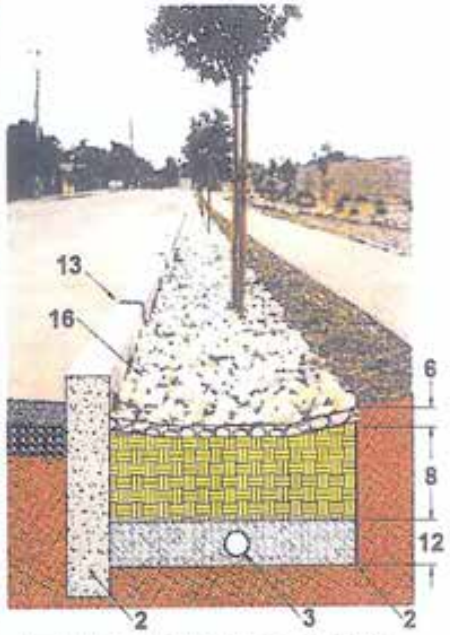
Soil Type: Rock infiltration swale can be used in any soils. If subsoil infiltration is less than 0.5 in/hr, an underdrain should be installed. A liner may be needed if subsoils contain expansive clays or calcareous minerals.

Areas of Concern: Infiltration is not allowed at sites with known soil contamination or hot spots, such as gas stations. An appropriate impermeable liner must be used in areas of concern.

Design Considerations & Specifications *(see Appendices A & G for details)*

		Design Component	General Specification
IMP Function	1	Impermeable liner	If non-infiltrating (per geotechnical investigation), use clay liner, geomembrane liner, or concrete.
	2	Lateral hydraulic restriction barriers	May use concrete or geomembrane to restrict lateral seepage to adjacent subgrades, foundations, or utilities.
	3	Underdrain/ Infiltration	Underdrain required if subsoil infiltration < 0.5 in/hr. Schedule 40 PVC pipe with perforations (slots or holes) every 6 inches. If design is fully-infiltrating, ensure that subgrade compaction is minimized.
	4	Cleanouts/ Observation Wells	Provide 6-inch diameter cleanout ports/observation wells for each underdrain pipe.
	5	Internal Water Storage (IWS)	If using underdrain, the underdrain outlet can be elevated to create a sump for additional moisture retention treatment. Top of IWS should be greater than 18 inches below surface.
	6	Temporary Ponding Depth	Use check dams to provide 6-18 inches (6-12 inches near schools or in residential areas); average ponding depth of 9 inches is recommended.
	7	Drawdown Time	Surface drawdown: 12-96 hrs; Subsurface dewatering: 48 hrs.
Soil Media	8	Soil Media Depth	2-4 feet (deeper for better pollutant removal, hydrologic benefits, and deeper rooting depths)
	9	Soil Media Composition	65% sand, 20% sandy loam, and 15% compost (non-vegetation-based feedstock; animal wastes or by-products should not be applied) by volume.
	10	Media Permeability	5 in/hr infiltration rate for the flow-based SWMM method (5-6 in/hr for alternative designs, as approved by local jurisdiction).
	11	Chemical Analysis	Total phosphorus < 15 ppm; pH 6–8; CEC > 5 meq/100 g soil. Organic Matter Content < 5% by weight.
	12	Drainage Layer	Separate media from underdrain with 2 to 4 inches of washed concrete sand (ASTM C-33), followed by 2 inches of choking stone (ASTM No. 8) over a 1.5 ft envelope of ASTM No. 57 stone.
Routing	13	Inlet/Pretreatment	Provide stabilized inlets at least 12 inches wide and energy dissipation. Install rock armored forebay for concentrated flows, gravel fringe and vegetated filter strip for sheet flows.
	14	Slope and Grade Control	If necessary, use check dams to maintain maximum 2.5% bed slope. Check dams should extend sufficiently deep to prevent piping (undercutting) below the check dam.
	15	Outlet Configuration	Online: All runoff is routed through system—install an elevated overflow structure or weir at the elevation of maximum ponding. Offline: Only treated volume is diverted to system—install a diversion structure or allow bypass of high flows.
Landscape	16	Surface	Armor surface with cobble. If planted (botanical), install drought-tolerant, low-maintenance trees and shrubs.
	17	Multi-Use Benefits	Provide educational signage, artwork, or wildlife amenities.

Rock Infiltration Swale Cross Section, Encinitas, CA

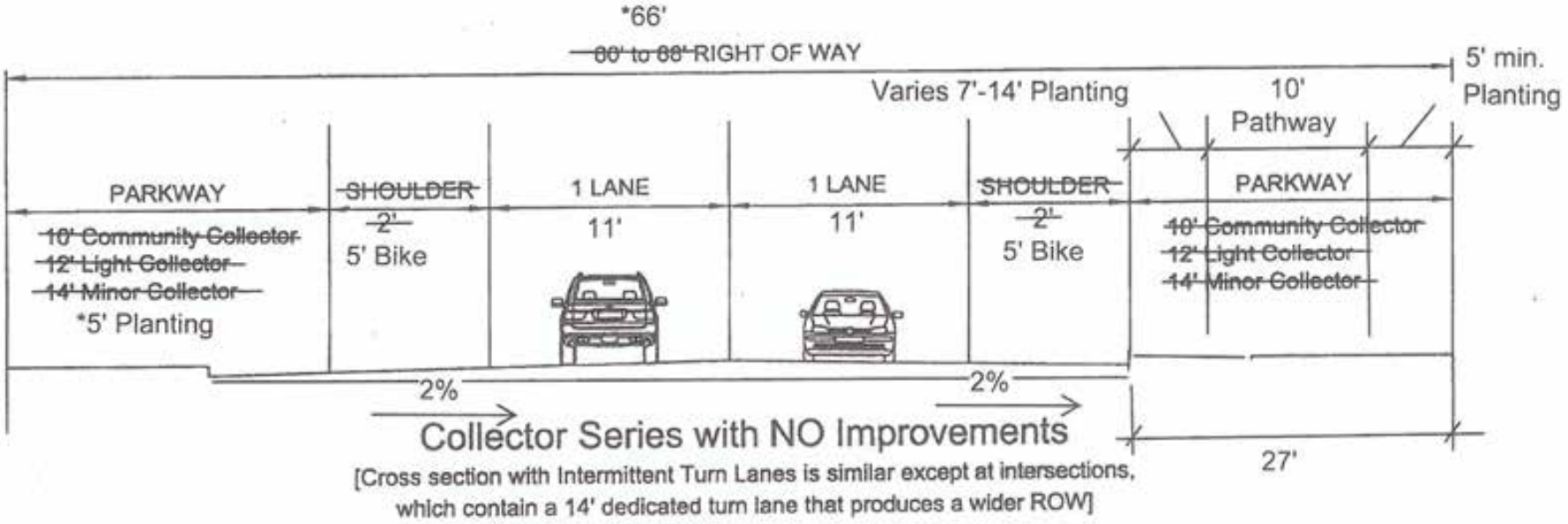


This schematic shows the major components of a rock infiltration swale. The rock infiltration swale in the photograph intercepts roadway runoff through curb cuts and filters it through subsurface soil media.

Maintenance Considerations *(see Appendix D for detailed checklist)*

Task	Frequency	Indicator Maintenance is Needed	Maintenance Notes
Catchment inspection	Weekly or biweekly with routine property maintenance	Excessive sediment, trash, and/or debris accumulation on the surface of rock infiltration swale	Permanently stabilize any exposed soil and remove any accumulated sediment in a manner that does not cause an illegal discharge. Adjacent pervious areas may need to be regraded.
Inlet inspection		Internal erosion or excessive sediment, trash, and/or debris accumulation	Check for sediment accumulation to ensure that flow into the rock infiltration swale is as designed. Remove any accumulated sediment.
Litter/leaf removal and misc. upkeep		Accumulation of litter and debris within rock infiltration swale area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the bioretention area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
Outlet inspection	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.
Temporary Watering	1 time/2–3 days for first 1–2 months	Until establishment and during severely drought weather	Watering after the initial year might be required.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

* Between Street H2 and the proposed trailhead approximately 400' Easterly: The southerly Parkway shall be a 10' wide Pathway. Overall ROW width increases to 71' for this segment only.



Collector Series with NO Improvements

[Cross section with Intermittent Turn Lanes is similar except at intersections, which contain a 14' dedicated turn lane that produces a wider ROW]

Proposed Section (B2)

From:
County Public Road Standards
Appendix A

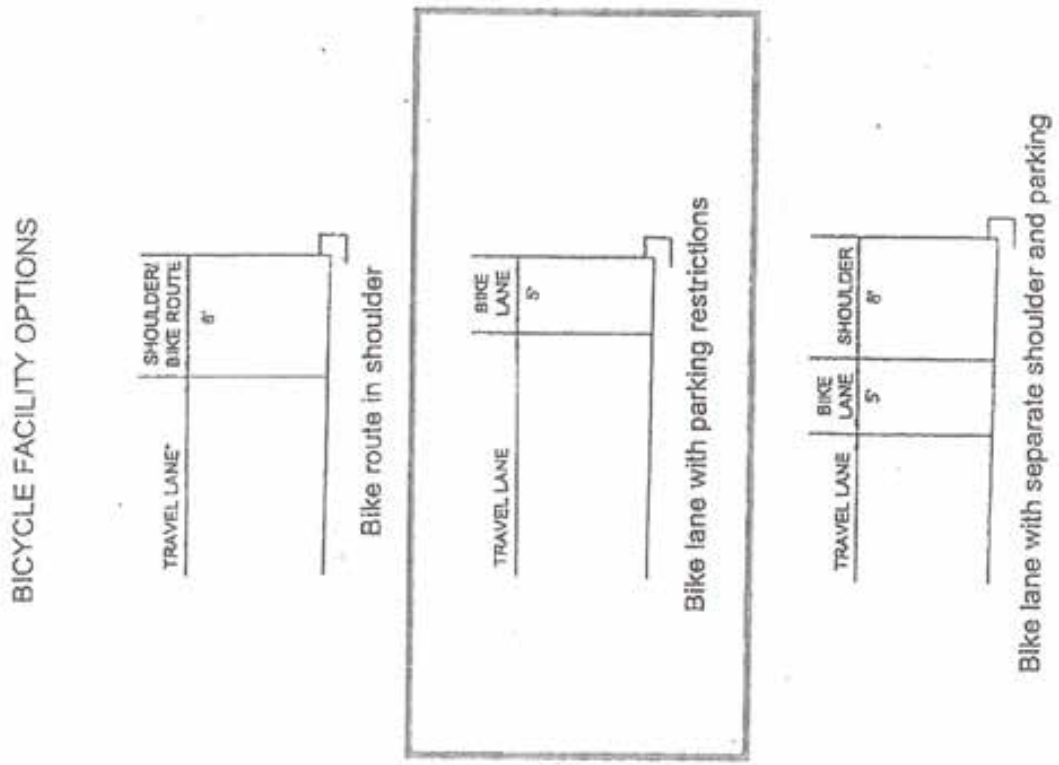


TABLE 2A: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

MOBILITY ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDERS (# / WIDTH)	PARKWAY WIDTH	MIN. CURVE RADIUS	MAX. DESIRABLE GRADE	MIN. DESIGN SPEED (MPH)
Expressway (6.1)	6 / 12'	34'	126'	146'	2 / 10'	10'	1,700'	6%	65
Prime Arterial (6.2)	6 / 12'	14'	102'	122'	2 / 8'	10'	1,700'	6%	65
Major Road									
With Raised Median (4.1A)	4 / 12'	14'	78'	98'	2 / 8'	10'	1,200'	7%	55
With Intermittent Turn Lanes (4.1B)	4 / 12'	-	64' - 78'	84' - 98'	2 / 8'	10'	1,200'	7%	55
Boulevard									
With Raised Median (4.2A)	4 / 12'	14'	78'	106'	2 / 8'	14'	500'	9%	40
With Intermittent Turn Lanes (4.2B)	4 / 12'	-	64' - 78'	92' - 106'	2 / 8'	14'	500'	9%	40
Community Collector									
With Raised Median (2.1A)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Continuous Left Turn Lane (2.1B)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Intermittent Turn Lanes (2.1C)	2 / 12'	-	40' - 54'	60' - 74'	2 / 8'	10'	700'	9%	45
With Improvement Options (2.1D)	2 / 12'	-	40' - 54'	84'	2 / 8'	15' - 22'	700'	9%	45
No Median (2.1E)	2 / 12'	-	40'	60'	2 / 8'	10'	700'	9%	45
Light Collector									
With Raised Median (2.2A)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Continuous Left Turn Lane (2.2B)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Intermittent Turn Lanes (2.2C)	2 / 12'	-	40' - 54'	64' - 78'	2 / 8'	12'	500'	9%	40
With Improvement Options (2.2D)	2 / 12'	-	40' - 54'	88'	2 / 8'	17' - 24'	500'	9%	40
No Median (2.2E)	2 / 12'	-	40'	64'	2 / 8'	12'	500'	9%	40
With Reduced Shoulder (2.2F)	2 / 12'	-	28'	52'	2 / 2'	12'	500'	9%	40
Minor Collector									
With Raised Median (2.3A)	2 / 12'	14'	54'	82'	2 / 8'	14'	350'	12%	35
With Intermittent Turn Lanes (2.3B)	2 / 12'	-	40' - 54'	68' - 82'	2 / 8'	14'	350'	12%	35
No Median (2.3C)	2 / 12'	-	40'	68'	2 / 8'	14'	350'	12%	35

NOTES:

1 Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above.

2 The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.

3 The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.

4 For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.

5 Additional pavement and ROW may be required for ME Boulevards / Community Collectors (4 feet) and Light Collectors (12 feet) in Industrial/Commercial Zones.

6 ME roads needing additional turn or passing lanes will require an additional 12 to 14 feet of pavement and ROW for each lane.

7 The maximum superelevation allowed on ME roads is 6%. Superelevation is not normally required on Non-ME roads.

8 ME roads designated with Bike Lanes will require an additional 10 feet of pavement and ROW. This may be increased to 12' for four-lane roads and above based upon the provisions in Section 7.3 of these standards.

9 The minimum curve radii, shown in the table above, are based on the design speed with 6% superelevation.

10 Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

11 Road surfacing widths include median width.

NEWLAND SIERRA

MESA ROCK ROAD
VERTICAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Length	Algebraic Difference	Crest (Min. K = 44)	Sag (Min. K =64)	Design Exception Required?	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
19+99	21+31	132	3%	44		No		6	A1	
25+15	30+91	576	9%		64	No		6	A2	
31+05	32+80	176	4%	44		No		6	A2	
33+42	35+98	256	4%		64	No		6	A2	
37+83	39+59	176	4%	44		No		6	A2	
41+01	43+56	256	4%		64	No		6	A2	
45+15	47+79	264	6%	44		No		7	A2	
50+89	64+73	484	11%	44		No		8	B2	
74+77	76+77	200	1%		200	No		8	B2	
78+68	86+56	768	12%		64	No		8	B2	
87+91	91+44	352	8%	44		No		8	B2	
95+43	99+43	400	1%		505	No		8	B2	
105+87	111+70	583	3%		200	No		9	B2	
114+24	117+49	325	4%		75	No		9	B2	
124+39	127+33	294	6%		49**	Yes	35 MPH Design Speed	10	B2	Residential Location
127+94	129+68	174	6%	29*		Yes	35 MPH Design Speed	10	B2	Residential Location
133+34	133+38	304	10.5%	29*		Yes	35 MPH Design Speed	10	B2	Residential Location

*K=29<35MP **K=49<35 MPH
H (Crest) (Sag)

MESA ROCK ROAD
HORIZONTAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Radius	Super-elevation	Design Speed	Design Exception Required?	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
15+90	19+11	700	Std. crown	37	Yes	35 MPH Design Speed	6	A1	Tee Intersection
19+87	23+35	700	Std. crown	40	No		6	A1	
29+76	32+03	1000	2% to 1 side	48	No		6	A2	
36+19	39+70	1000	2% to 1 side	43	No		5	A2	
40+34	45+29	5000	2% to 1 side	80	No		7	A2	
45+52	48+25	1000	2% to 1 side	48	No		7	A2	
60+73	67+57	650	Std. crown	40	No		8	A2	
69+53	72+05	650	2% to 1 side	33	No		8	B2	
74+01	75+41	1000	2% to 1 side	48	No		8	B2	
77+65	82+14	1000	2% to 1 side	43	No		8	B2	
84+15	92+12	800	2% to 1 side	44	No		8	B2	
96+03	101+89	650	2% to 1 side	40	No		8	B2	
107+97	111+20	1000	2% to 1 side	48	No		9	B2	
114+82	117+87	1000	2% to 1 side	43	No		9	B2	
123+83	125+55	1000	2% to 1 side	48	No		10	B2	
128+42	129+52	1000	2% to 1 side	43	No		10	B2	
131+46	134+75	350	2% to 1 side	27	Yes	25 MPH Design Speed	11	B2	Residential Location
135+75	138+69	350	2% to 1 side	27	Yes	25 MPH Design Speed	11	C2	Residential Location
146+64	150+40	225	2% to 1 side	25	Yes	25 MPH Design Speed	11	C2	Residential Location
155+26	159+29	320	2% to 1 side	26	Yes	25 MPH Design Speed	11	C2	Residential Location
161+22	164+57	400	2% to 1 side	33	Yes	25 MPH Design Speed	11	C2	Residential Location
164+89	166+54	300	2% to 1 side	26	Yes	25 MPH Design Speed	11	C2	Residential Location

NEWLAND SIERRA

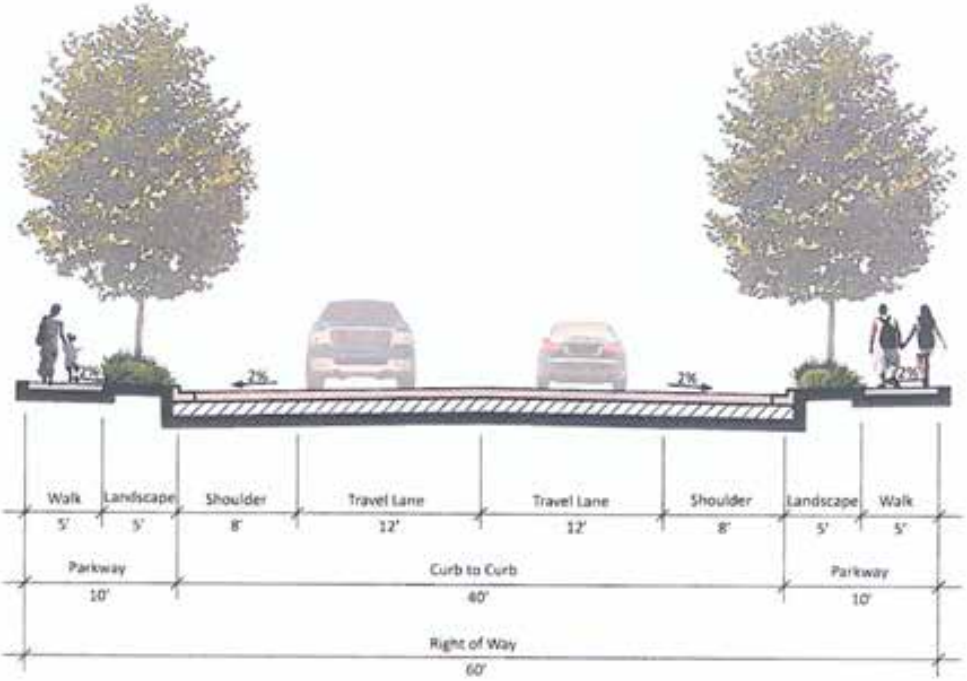
SARVER LANE
VERTICAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Length	Algebraic Difference	Crest (Min. K = 44)	Sag (Min. K =64)	Design Exception Required?	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
14+80	16+01	121	2%		64	No		13	B2	
19+70	22+18	248	4%		64	No		13	B2	
23+30	26+16	286	6.5%	44		No		13	B2	
32+49	33+77	128	2%		64	No		12	B2	
47+90	53+40	550	8.5%		64	No		12	B2	
76+01	79+01	300	10%	30*		Yes	35 MPH Design Speed	12	B2	Tee Intersection

*K=29=35MPH (Crest)

SARVER LANE
HORIZONTAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Radius	Super-elevation	Design Speed	Design Exception	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
2+04	4+80	350	Std. Crown	27	Yes	25 MPH Design Speed	13	B1	Tee Intersection
7+26	13+08	635	Std. Crown	37	Yes	35 MPH Design Speed	13	B1	Replaces 60' Raduis
17+33	21+32	400	1% to 1 side	32	Yes	30 MPH Design Speed	13	B2	Replaces 300' Raduis
25+99	27+14	800	1% to 1 side	43	No		13	B2	
32+25	36+42	600	1% to 1 side	40	No		12	B2	
41+48	48+05	900	1% to 1 side	44	No		12	B2	
50+79	51+94	500	1% to 1 side	35	Yes	35 MPH Design Speed	11	B2	
52+01	59+95	500	1% to 1 side	35	Yes	35 MPH Design Speed	11	B2	
60+16	67+666	500	1% to 1 side	35	Yes	35 MPH Design Speed	11	B2	
70+00	74+24	500	1% to 1 side	35	Yes	35 MPH Design Speed	11	B2	



C1

FIGURE
Public Residential Collector

Newland Sierra Specific Plan

ITEM 5
SECTION C1 RESIDENTIAL COLLECTOR

Location: Residential Neighborhoods throughout the project.
Radius Location: See Curve 4 on the Curve Radius Design Exception Key Map
Proposed ADT: 3,700 ADT

REQUEST:
We propose a cross section with the same design criteria as a "Residential Collector" classification per Table 2B of the County Public Road Standards with the following exception:

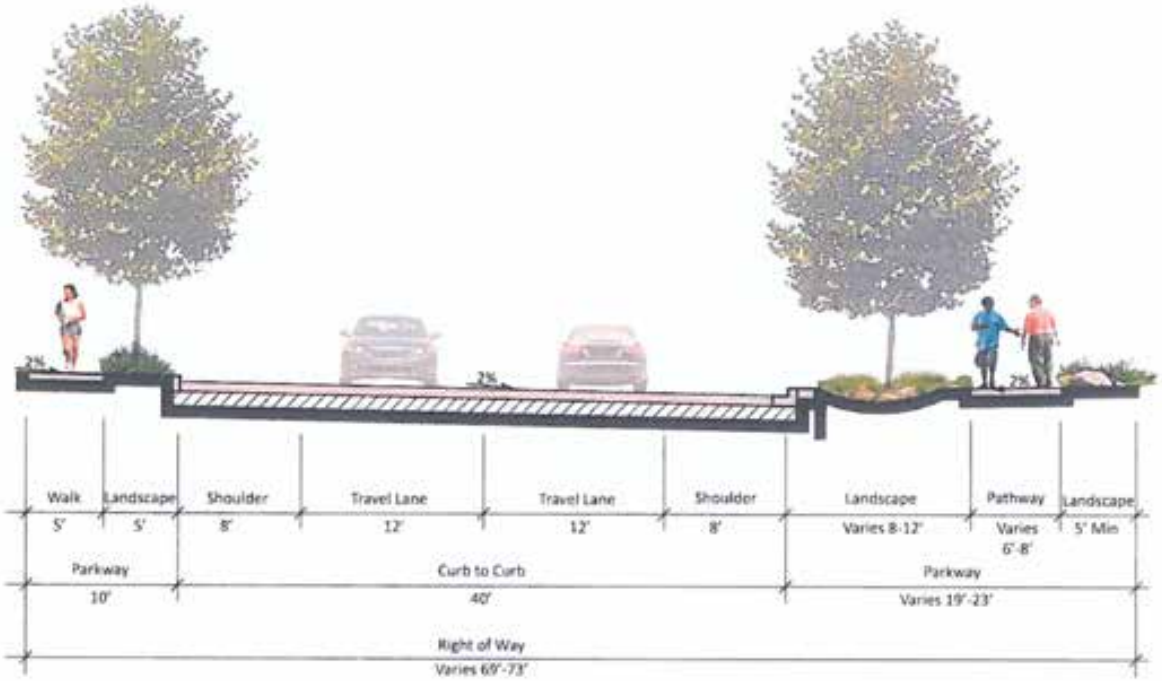
A. We request that the minimum horizontal curve radius be revised from 300' to 100'.

A.
REASON:
At one location in the Valley Neighborhood (See Curve 4 on the Curve Radius Design Exception Key Map) a curve radius of 100' is requested. This curve is located at a tee intersection adjacent to a proposed park. Site design will accommodate adequate sight distance. No other design exceptions are requested.

ALTERNATIVES:
Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes.

HARDSHIP:
Denial of this request would result in both increased graded footprint and slope heights, decreasing the opportunity for dedication of undisturbed land as open space.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.



C2

FIGURE
Public Modified Residential Collector

Newland Sierra Specific Plan

ITEM 6
SECTION C2 MODIFIED RESIDENTIAL COLLECTOR

Location: Residential Neighborhoods throughout the project.
Approximate Length: 18,000' (3.4 miles)
Proposed ADT: 3,700 Maximum

REQUEST:
We propose a cross section with the same design criteria as a "Residential Collector" classification per Table 2B of the County Public Road Standards with the following exceptions:

A. We request that street cross-fall be continuous from curb to curb rather than crowned at the centerline. As part of this request we propose that regularly spaced curb openings be incorporated into the low-side curbing to allow pavement runoff to be directed to the parkway for water quality treatment.
B. We request that the minimum horizontal curve radius be reduced from 300' to 200'. This request applies at various locations throughout the Upper and Lower Knoll loop roads as a traffic calming measure. A Curve Radius Design Exception Key Map is included at the rear of this document.

REASON:

Due to the minimum width required to construct a bio-swale of adequate capacity (See Roadside Bio-Swale Plan and Sections attached) Modification Request B will allow the roadway design to comply with the requirements of the Standard Urban Stormwater Mitigation Plan (SUSMP) adopted by the County for incorporation of Low Impact Development (LID) features (Integrated Management Practices: IMPs).

The "Preliminary Drainage Study for Newland Sierra, October 2014" has been prepared as part of the Tentative Map submittal. The report analyzes the project's capacity to comply with the requirements of the County Drainage Manual, including depth, width and velocity of street flow for the 100-year storm. Even neglecting any capacity of the median swale, this cross-section complies with all criteria.

As a representative check, please see the data for Node 2226 to 2228 below and the map that follows.

W=10.09' (dry pavement during 100-year storm= 30')
D=0.33' for 100-year storm, Requirement = 0.4' max. for a 50-year storm
D x V=1.58 f^2ps, less than the 6.0 f^2ps requirement

AES Report
Roadway Section
C2

```
                                P-26-10.TXT
 SUBAREA RUNOFF(CFS) =      0.37
 TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.37
****************************************************************************
 FLOW PROCESS FROM NODE    2694.00 TO NODE    2693.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
----------------------------------------------------------------------------
 UPSTREAM ELEVATION(FEET) = 1452.50  DOWNSTREAM ELEVATION(FEET) = 1447.00
 STREET LENGTH(FEET) =  250.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-walk Flow Section =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.91
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.21
   HALFSTREET FLOOD WIDTH(FEET) =    4.53
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.53
 STREET FLOW TRAVEL TIME(MIN.) =   1.62   Tc(MIN.) =    8.79
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.485
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .5200
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.520
 SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.07
 TOTAL AREA(ACRES) =       0.6       PEAK FLOW RATE(CFS) =       1.40

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.03
 FLOW VELOCITY(FEET/SEC.) =  2.74   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE   2695.00 TO NODE   2693.00 =     325.00 FEET
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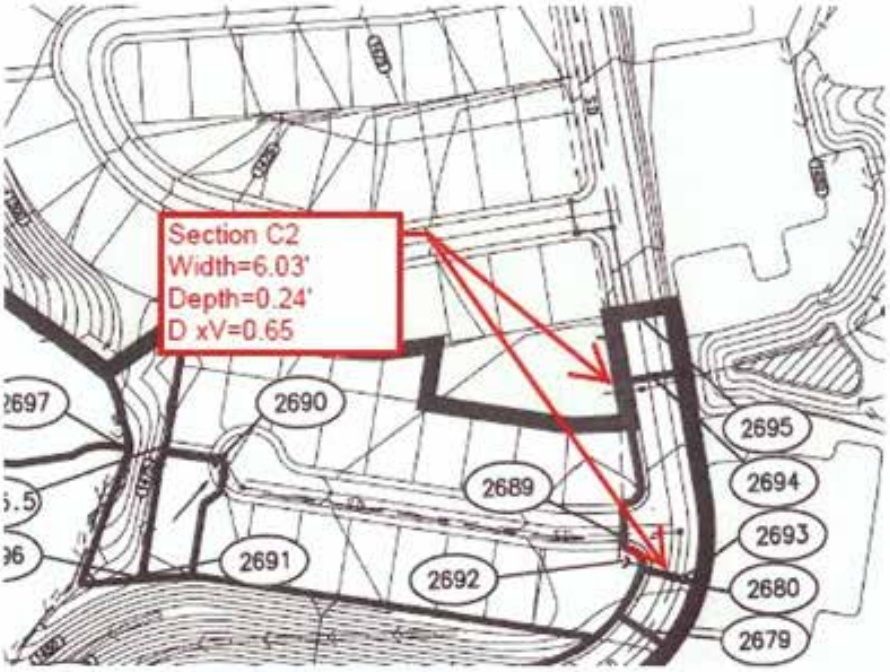
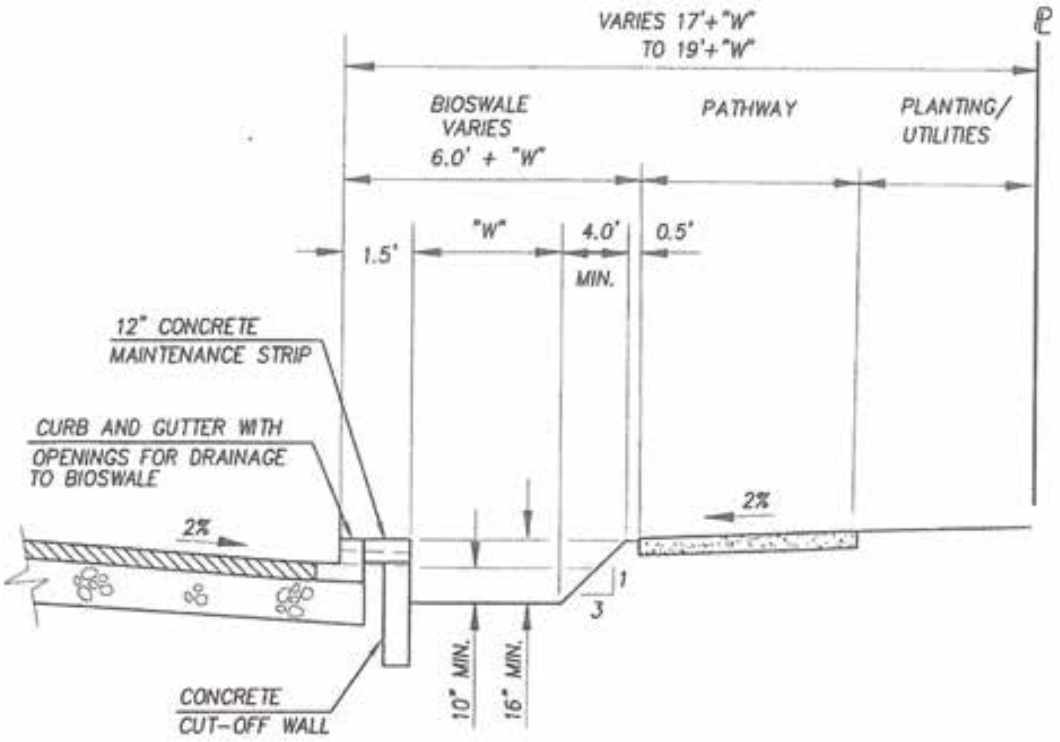


In addition to standard "Flooded Width" calculations, the proposed modifications to roadway crown and maximum desirable grade have been analyzed for potential susceptibility to hydroplaning and found to comply with the guidelines of the AASHTO Drainage Manual, Section 13.2.9 and the National Highway Cooperative Research Program reference document "Proposed Guidelines for Reducing Hydroplaning on New and Rehabilitated Pavements." Calculations supporting this finding have been submitted separately to DPW, reviewed and approved.

ALTERNATIVES:
Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes.

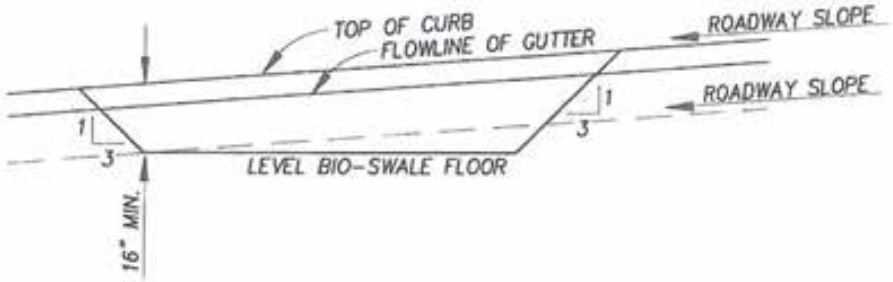
HARDSHIP:
Denial of this request would result in both increased graded footprint and slope heights for the roadway, decreasing the opportunity to provide a pathway for the community and to decreasing the land available for dedication as open space.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.



ROADSIDE BIOSWALE

CROSS- SECTION NOT TO SCALE

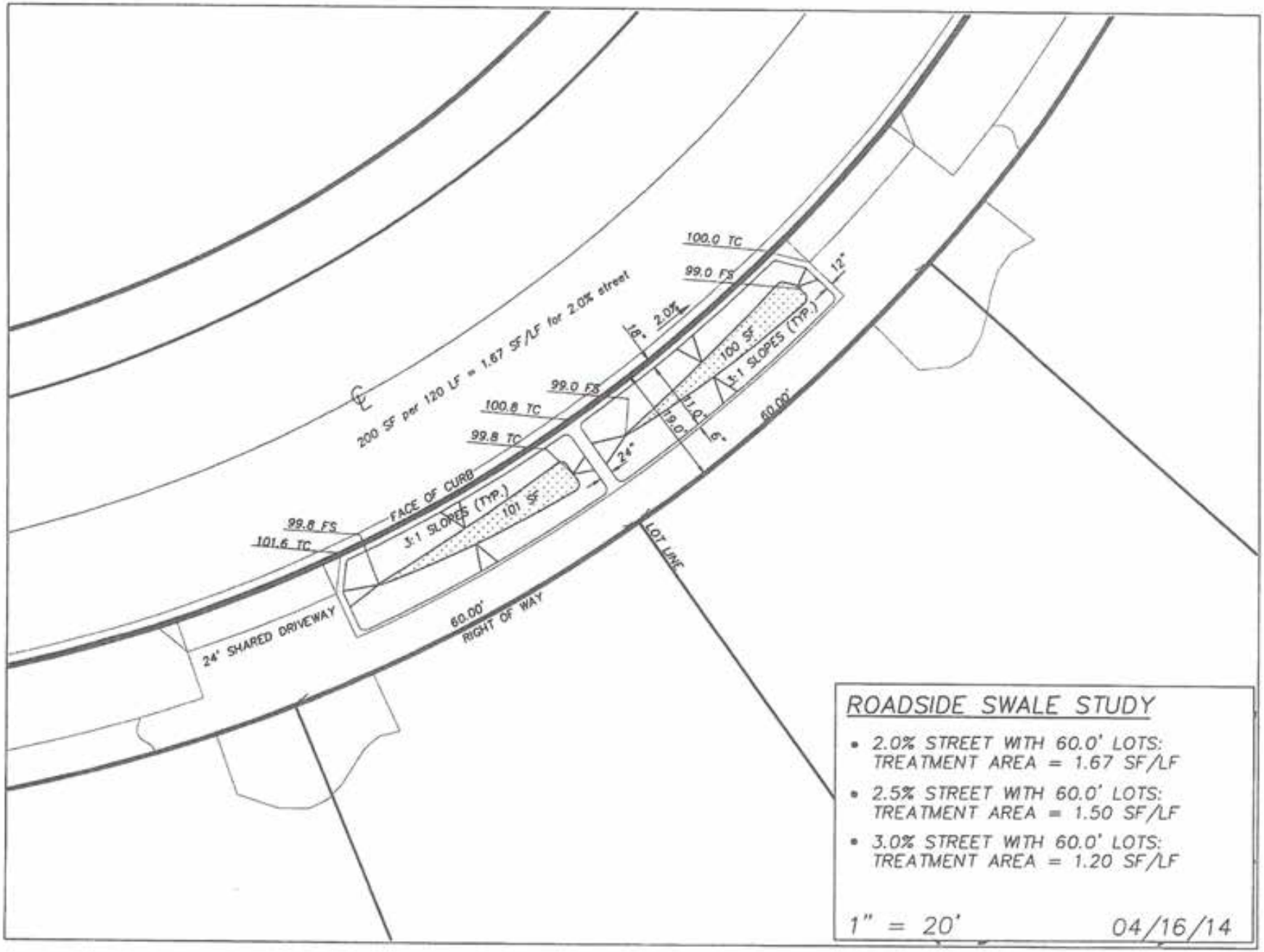


ROADSIDE BIOSWALE

PROFILE NOT TO SCALE

ROADSIDE BIOSWALE STUDY FOR 36' CURB TO CURB STREET

- FOR 36' WIDE STREET x 4% TREATMENT REQUIRED = 1.44 SF/LF REQUIRED.
  ASSUME "W"=3.0':
- 2.0% STREET WITH 60.0' LOTS
  TREATMENT AREA = 1.67 SF/LF
- 2.5% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.50 SF/LF
- 3.0% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.20 SF/LF



ROADSIDE SWALE STUDY

- 2.0% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.67 SF/LF
- 2.5% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.50 SF/LF
- 3.0% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.20 SF/LF

1" = 20'

04/16/14

Bioretention Swale

Description

Bioretention swales are shallow, open channels that are designed to reduce runoff volume through infiltration. Additionally, bioretention swales remove pollutants such as trash and debris by filtering water through vegetation within the channel. Swales can serve as conveyance for stormwater and can be used in place of traditional curbs and gutters; however, when compared to traditional conveyance systems the primary objective of a bioretention swale is infiltration and water quality enhancement rather than conveyance. In addition to reducing the mass of pollutants in runoff, properly maintained bioretention swales can enhance the aesthetics of a site.

Treatment Efficiency			
Runoff Volume	High (unlined)/ Low (lined)	Bacteria	High
Sediment	High	Nutrients	Medium
Trash/ debris	High	Heavy Metals	High
Organics	High	Oil & Grease	High

Siting and Suitability

Bioretention swales are highly versatile stormwater IMPs that effectively reduce pollutants. With a narrow width, bioretention swales can be integrated into site plans with various configurations and components. Ideal sites for bioretention swales include the right-of-way of linear transportation corridors and along borders or medians of parking lots. In heavily trafficked areas, curb cuts can be used to delineate boundaries. Bioretention swales can be combined with other basic and stormwater runoff BMPs to form a treatment train, reducing the required size of a single IMP unit. See Section 3 for details.

Drainage Area: Less than 2 acres and fully stabilized.

Head Requirements: Bioretention swale typically requires a minimum of 2.5 to 3.5 ft of elevation difference between the inlet and outlet to the receiving storm drain network.

Slopes: Slopes draining to bioretention swale should be 15% or less, side slopes should be 3:1 (H:V) or flatter, and check dams should be used to provide longitudinal bed slopes of 2.5% (average slope should not exceed 4% from inlet to outlet).

Setbacks: Provide 10-ft setback from structures/foundations, 100-ft setback from septic fields and water supply wells, and 50-ft setback from steep slopes.

Water Table & Bedrock: At least 10 ft separation must be provided between bottom of cut (subgrade) and seasonal high water table, bedrock, or other restrictive features.

Soil Type: Bioretention swale can be used in any soils. If subsoil infiltration is less than 0.5 in/hr, an underdrain should be installed. A liner may be needed if subsoils contain expansive clays or calcareous minerals.

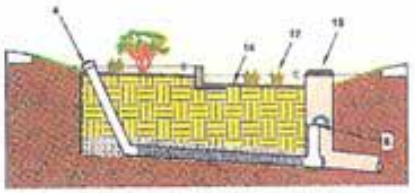
Areas of Concern: Infiltration is not allowed at sites with known soil contamination or hot spots, such as gas stations. An appropriate impermeable liner must be used in areas of concern.

Design Considerations & Specifications *(see Appendices A & G for details)*

		Design Component	General Specification
IMP Function	1	Impermeable liner	If non-infiltrating (per geotechnical investigation), use clay liner, geomembrane liner, or concrete.
	2	Lateral hydraulic restriction barriers	May use concrete or geomembrane to restrict lateral seepage to adjacent subgrades, foundations, or utilities.
	3	Underdrain/ Infiltration	Underdrain required if subsoil infiltration < 0.5 in/hr. Schedule 40 PVC pipe with perforations (slots or holes) every 6 inches. If design is fully-infiltrating, ensure that subgrade compaction is minimized.
	4	Cleanouts/ Observation Wells	Provide 6-inch diameter cleanout ports/observation wells for each underdrain pipe.
	5	Internal Water Storage (IWS)	If using underdrain, the underdrain outlet can be elevated to create a sump for additional moisture retention to promote plant survival and treatment. Top of IWS should be greater than 18 inches below surface.
	6	Temporary Ponding Depth	Use check dams to provide 6-18 inches (6-12 inches near schools or in residential areas); average ponding depth of 9 inches is recommended.
	7	Drawdown Time	Surface drawdown: 12-96 hrs. Subsurface dewatering: 48 hrs.
Soil Media	8	Soil Media Depth	3-4 feet (deeper for better pollutant removal, hydrologic benefits, and deeper rooting depths).
	9	Soil Media Composition	65% sand, 20% sandy loam, and 15% compost (from vegetation-based feedstock; animal wastes or by-products should not be applied) by volume.
	10	Media Permeability	5 in/hr infiltration rate for the flow-based SUSMP method (1-6 in/hr for alternative designs, as approved by local jurisdiction)
	11	Chemical Analysis	Total phosphorous < 15 ppm, pH 6-8, CEC >5 meq/100 g soil Organic Matter Content: <5% by weight.
	12	Drainage Layer	Separate media from underdrain with 2 to 4 inches of washed concrete sand (ASTM C-33), followed by 2 inches of choking stone (ASTM No. 8) over a 1.5 ft envelope of ASTM No. 57 stone.
Routing	13	Inlet/Pretreatment	Provide stabilized inlets at least 12 inches wide and energy dissipation. Install rock armored forebay for concentrated flows, gravel fringe and vegetated filter strip for sheet flows.
	14	Slope and Grade Control	If necessary, use check dams to maintain maximum 2.5% bed slope. Check dams should extend sufficiently deep to prevent piping (undercutting) below the check dam.
	15	Outlet Configuration	Online: All runoff is routed through system—install an elevated overflow structure or weir at the elevation of maximum ponding. Offline: Only treated volume is diverted to system—install a diversion structure or allow bypass of high flows.
Landscape	16	Mulch	Dimensional chipped hardwood or triple shredded, well-aged hardwood mulch 3 inches deep.
	17	Vegetation	Native, deep rooting, drought tolerant plants.
	18	Multi-Use Benefits	Provide educational signage, artwork, or wildlife amenities.

This rendering demonstrates the application of bioretention swales as green street retrofits. Runoff enters the bioretention swale through curb cuts and is filtered vertically through the soil media. Lateral hydraulic restriction layers protect adjacent infrastructure from lateral seepage while allowing infiltration from the bottom of the bioretention swale. The underdrain is offset to avoid roots of existing vegetation.

Typical Bioretention Swale Profile



This schematic shows the major design elements of a bioretention swale. IWS is incorporated for enhanced infiltration and water quality treatment by upturning the underdrain in the outlet structure. Check dams ensure capture of the water quality volume and slow surface flow during larger storms.

Maintenance Considerations *(see Appendix D for detailed checklist)*

Task	Frequency	Indicator Maintenance is Needed	Maintenance Notes
Catchment inspection	Weekly or biweekly with routine property maintenance	Excessive sediment, trash, and/or debris accumulation on the surface of bioretention swale	Permanently stabilize any exposed soil and remove any accumulated sediment. Adjacent pervious areas may need to be regraded.
Inlet inspection		Internal erosion or excessive sediment, trash, and/or debris accumulation	Check for sediment accumulation to ensure that flow into the bioretention swale is as designed. Remove any accumulated sediment.
Litter/leaf removal and misc. upkeep		Accumulation of litter and debris within bioretention swale area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the bioretention area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
Pruning	1-2 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Nutrients in runoff often cause bioretention vegetation to flourish.
Mowing	2-12 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Frequency depends on location and desired aesthetic appeal and type of vegetation.
Outlet inspection	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.
Mulch removal and replacement	1 time/2-3 years	2/3 of mulch has decomposed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches.
Remove and replace dead plants	1 time/year	Dead plants	Within the first year, 10 percent of plants can die. Survival rates increase with time.
Temporary Watering	1 time/2-3 days for first 3-7 months	Until establishment and during severely drought weather	Watering after the initial year might be required.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

TETRA TECH

Rock Infiltration Swale

Description

Rock infiltration swales are shallow, open channels that are designed to reduce runoff volume through infiltration. Rock infiltration swales are identical to bioretention swales except the surface is typically covered by cobble rather than mulch and vegetation. Rock infiltration swales can serve as conveyance for stormwater and can be used in place of traditional curbs and gutters; however, when compared to traditional conveyance systems the primary objective of a rock infiltration swale is infiltration and water quality enhancement rather than conveyance. In addition to reducing the mass of pollutants in runoff, properly maintained rock infiltration swales can enhance the aesthetics of a site.

Treatment Efficiency			
Runoff Volume	High (unlined)/ Low (lined)	Bacteria	High
Sediment	High	Nutrients	Medium
Trash/ debris	High	Heavy Metals	High
Organics	High	Oil & Grease	High

Siting and Suitability

Rock infiltration swales are highly versatile stormwater IMPs that effectively reduce pollutants. With a narrow width, rock infiltration swales can be integrated into site plans with various configurations and components. Ideal sites for rock infiltration swales include the right-of-way of linear transportation corridors and along borders or medians of parking lots. In heavily trafficked areas, curb cuts can be used to delineate boundaries. Rock infiltration swales can be combined with other basic and stormwater runoff BMPs to form a treatment train, reducing the required size of a single IMP unit. See Section 3 for details.

Drainage Area: Less than 2 acres and fully stabilized.

Head Requirements: Rock infiltration swale typically requires a minimum of 2.5 to 3.5 ft of elevation difference between the inlet and outlet to the receiving storm drain network.

Slopes: Slopes draining to rock infiltration swale should be 15% or less, side slopes should be 3:1 (H:V) or flatter, and check dams should be used to provide longitudinal bed slopes of 2.5% (average slope should not exceed 4% from inlet to outlet).

Setbacks: Provide 10-ft setback from structures/foundations, 100-ft setback from septic fields and water supply wells, and 50-ft setback from steep slopes.

Water Table & Bedrock: At least 10 ft separation must be provided between bottom of cut (subgrade) and seasonal high water table, bedrock, or other restrictive features.

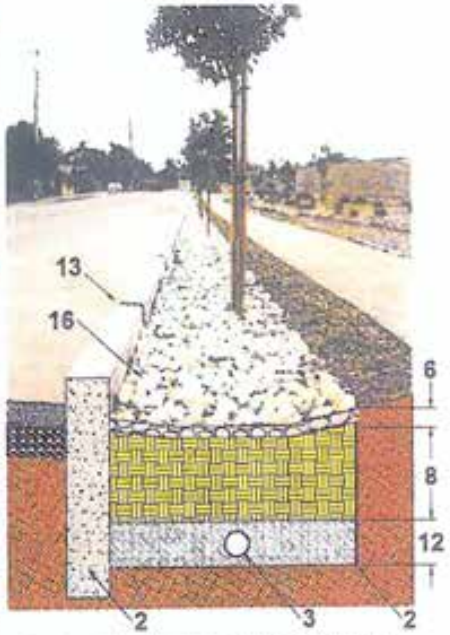
Soil Type: Rock infiltration swale can be used in any soils. If subsoil infiltration is less than 0.5 in/hr, an underdrain should be installed. A liner may be needed if subsoils contain expansive clays or calcareous minerals.

Areas of Concern: Infiltration is not allowed at sites with known soil contamination or hot spots, such as gas stations. An appropriate impermeable liner must be used in areas of concern.

Design Considerations & Specifications *(see Appendices A & G for details)*

		Design Component	General Specification
IMP Function	1	Impermeable liner	If non-infiltrating (per geotechnical investigation), use clay liner, geomembrane liner, or concrete.
	2	Lateral hydraulic restriction barriers	May use concrete or geomembrane to restrict lateral seepage to adjacent subgrades, foundations, or utilities.
	3	Underdrain/ Infiltration	Underdrain required if subsoil infiltration < 0.5 in/hr. Schedule 40 PVC pipe with perforations (slots or holes) every 6 inches. If design is fully-infiltrating, ensure that subgrade compaction is minimized.
	4	Cleanouts/ Observation Wells	Provide 6-inch diameter cleanout ports/observation wells for each underdrain pipe.
	5	Internal Water Storage (IWS)	If using underdrain, the underdrain outlet can be elevated to create a sump for additional moisture retention treatment. Top of IWS should be greater than 18 inches below surface.
	6	Temporary Ponding Depth	Use check dams to provide 6-18 inches (6-12 inches near schools or in residential areas); average ponding depth of 9 inches is recommended.
	7	Drawdown Time	Surface drawdown: 12-96 hrs. Subsurface dewatering: 48 hrs.
Soil Media	8	Soil Media Depth	2-4 feet (deeper for better pollutant removal, hydrologic benefits, and deeper rooting depths).
	9	Soil Media Composition	65% sand, 20% sandy loam, and 15% compost (from vegetation-based feedstock; animal wastes or by-products should not be applied) by volume.
	10	Media Permeability	5 in/hr infiltration rate for the flow-based SIZIMP method (1-8 in/hr for alternative designs, as approved by local jurisdiction).
	11	Chemical Analysis	Total phosphorus < 15 ppm, pH 6-8, CEC >5 meq/100 g soil. Organic Matter Content: <5% by weight.
	12	Drainage Layer	Separate media from underdrain with 2 to 4 inches of washed concrete sand (ASTM C-33), followed by 2 inches of choking stone (ASTM No. 8) over a 1.5 ft envelope of ASTM No. 57 stone.
Routing	13	Inlet/Pretreatment	Provide stabilized inlets at least 12 inches wide and energy dissipation. Install rock armored forebay for concentrated flows, gravel hinge and vegetated filter strip for sheet flows.
	14	Slope and Grade Control	If necessary, use check dams to maintain maximum 2.5% bed slope. Check dams should extend sufficiently deep to prevent piping (undercutting) below the check dam.
	15	Outlet Configuration	Online: All runoff is routed through system—install an elevated overflow structure or weir at the elevation of maximum ponding. Offline: Only treated volume is diverted to system—install a diversion structure or allow bypass of high flows.
Landscape	16	Surface	Armor surface with cobble. If planted (optional), install drought-tolerant, low-maintenance trees and shrubs.
	17	Multi-Use Benefits	Provide educational signage, artwork, or wildlife amenities.

Rock Infiltration Swale Cross Section, Encinitas, CA

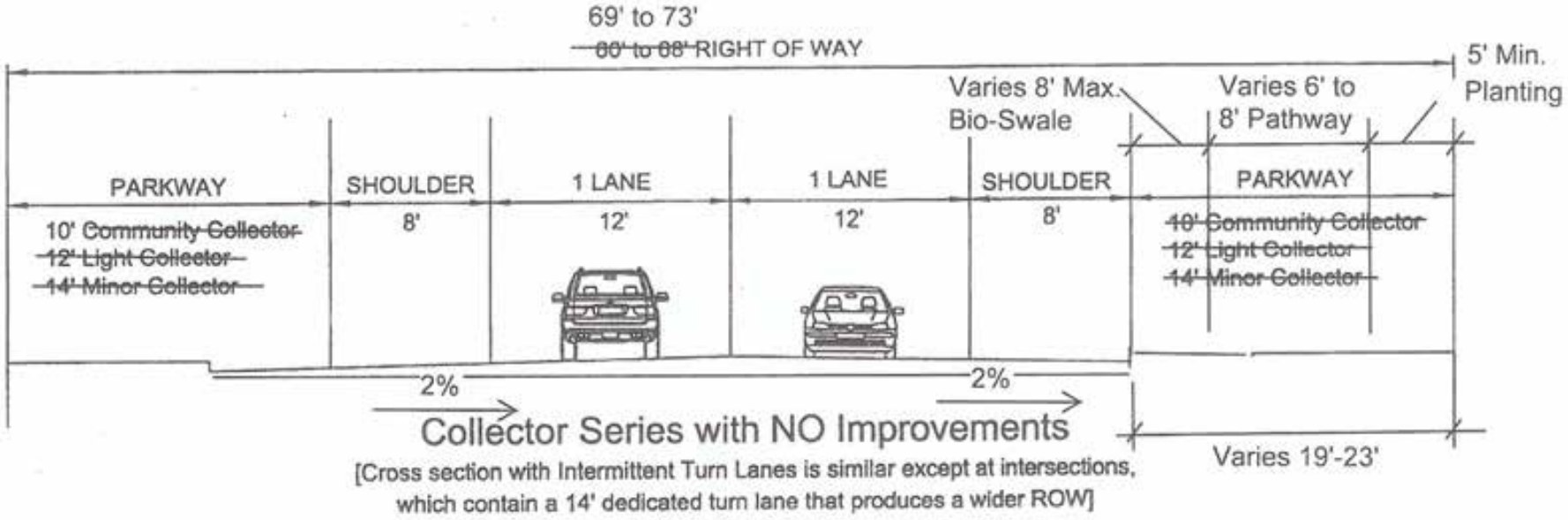


This schematic shows the major components of a rock infiltration swale. The rock infiltration swale in the photograph intercepts roadway runoff through curb cuts and filters it through subsurface soil media.

Maintenance Considerations *(see Appendix D for detailed checklist)*

Task	Frequency	Indicator Maintenance is Needed	Maintenance Notes
Catchment Inspection	Weekly or biweekly with routine property maintenance	Excessive sediment, trash, and/or debris accumulation on the surface of rock infiltration swale	Permanently stabilize any exposed soil and remove any accumulated sediment in a manner that does not cause an illegal discharge. Adjacent pervious areas may need to be replaced.
Inlet Inspection		Internal erosion or excessive sediment, trash, and/or debris accumulation	Check for sediment accumulation to ensure that flow into the rock infiltration swale is as designed. Remove any accumulated sediment.
Litter/leaf removal and misc. upkeep		Accumulation of litter and debris within rock infiltration swale area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the bioretention area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
Outlet Inspection	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.
Temporary Watering	1 time/2-3 days for first 1-2 months	Until establishment and during severely drought weather	Watering after the initial year might be required.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

TETRA TECH



Collector Series with NO Improvements

[Cross section with Intermittent Turn Lanes is similar except at intersections, which contain a 14' dedicated turn lane that produces a wider ROW]

Proposed Section (C2)

NEWLAND SIERRA

MESA ROCK ROAD
VERTICAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Length	Algebraic Difference	Crest (Min. K = 44)	Sag (Min. K =64)	Design Exception Required?	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
19+93	21+31	132	3%	44		No		6	A1	
25+15	30+91	576	9%		64	No		6	A2	
31+05	32+80	176	4%	44		No		6	A2	
33+42	35+98	256	4%		64	No		6	A2	
37+83	39+59	176	4%	44		No		6	A2	
41+01	43+56	256	4%		64	No		6	A2	
45+15	47+79	264	6%	44		No		7	A2	
59+89	64+73	484	11%	44		No		8	B2	
74+77	76+77	200	1%		200	No		8	B2	
78+88	86+56	768	12%		64	No		8	B2	
87+91	91+44	352	8%	44		No		8	B2	
95+43	99+43	400	1%		505	No		8	B2	
105+87	111+70	583	3%		200	No		9	B2	
114+24	117+49	325	4%		75	No		9	B2	
124+39	127+33	294	6%		49**	Yes	35 MPH Design Speed	10	B2	Residential Location
127+94	129+68	174	6%	29*		Yes	35 MPH Design Speed	10	B2	Residential Location
133+34	133+38	304	10.5%	29*		Yes	35 MPH Design Speed	10	B2	Residential Location

*K=29=35MP **K=49=35 MPH
H (Crest) (Sag)

MESA ROCK ROAD
HORIZONTAL CURVE DESIGN EXCEPTION REQUESTS

Begin Station	End Station	Curve Radius	Super-elevation	Design Speed	Design Exception Required?	Design Exception Requested	TM Sheet Number	Road Sections	Notes:
15+90	19+11	700	Std. crown	37	Yes	35 MPH Design Speed	6	A1	Tee Intersection
19+87	23+35	700	Std. crown	40	No		6	A1	
29+76	32+03	1000	2% to 1 side	48	No		6	A2	
36+19	39+70	1000	2% to 1 side	43	No		6	A2	
40+34	45+29	5000	2% to 1 side	80	No		7	A2	
45+52	48+25	1000	2% to 1 side	48	No		7	A2	
60+73	67+57	650	Std. crown	40	No		8	A2	
69+53	72+05	650	2% to 1 side	33	No		8	B2	
74+01	75+41	1000	2% to 1 side	48	No		8	B2	
77+65	82+14	1000	2% to 1 side	43	No		8	B2	
84+15	92+12	800	2% to 1 side	44	No		8	B2	
96+03	101+89	650	2% to 1 side	40	No		8	B2	
107+97	111+20	1000	2% to 1 side	48	No		9	B2	
114+82	117+87	1000	2% to 1 side	43	No		9	B2	
123+83	125+55	1000	2% to 1 side	48	No		10	B2	
128+42	129+52	1000	2% to 1 side	43	No		10	B2	
131+46	134+75	350	2% to 1 side	27	Yes	25 MPH Design Speed	11	B2	Residential Location
135+75	138+69	350	2% to 1 side	27	Yes	25 MPH Design Speed	11	C2	Residential Location
146+64	150+40	225	2% to 1 side	25	Yes	25 MPH Design Speed	11	C2	Residential Location
155+26	159+29	320	2% to 1 side	28	Yes	25 MPH Design Speed	11	C2	Residential Location
161+22	164+57	400	2% to 1 side	33	Yes	25 MPH Design Speed	11	C2	Residential Location
164+89	166+54	300	2% to 1 side	26	Yes	25 MPH Design Speed	11	C2	Residential Location

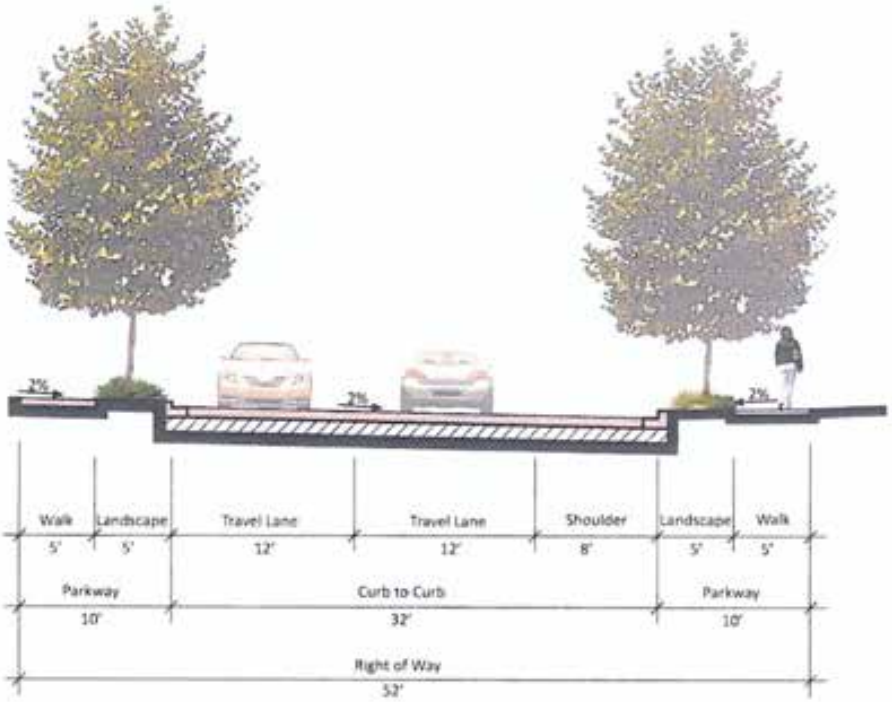
TABLE 2B: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

NON-MOBILITY ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDERS (# / WIDTH)	PARKWAY WIDTH	MINIMUM CURVE RADIUS	MAXIMUM DESIRABLE GRADE	MINIMUM DESIGN SPEED (MPH)
Residential Collector	2 / 12'	-	40'	60'	2 / 8'	10'	300'	12%	30
Rural Residential Collector *	2 / 12'	-	28'	48'	2 / 2'	10'	300'	12%	30
Residential Road	2 / 12'	-	36'	56'	2 / 6'	10'	200'	15%	30
Rural Residential Road *	2 / 12'	-	28'	48'	2 / 2'	10'	200'	15%	30
Residential Cul-de-sac	2 / 12'	-	32'	52'	2 / 4'	10'	200'	15%	30
Residential Loop	2 / 12'	-	32'	52'	2 / 4'	10'	200'	15%	30
Industrial/Commerical Collector	4 / 12'	-	68'	88'	2 / 10'	10'	300'	8%	30
Industrial/Commerical	2 / 16'	-	52'	72'	2 / 10'	10'	200'	8%	30
Industrial/Commercial Cul-de-sac	2 / 16'	-	52'	72'	2 / 10'	10'	200	8%	30
Frontage	2 / 12'	-	32' min	52' min	1 / 8'	10'	See above	See above	-
Alley	2 / 10'	-	20-30'	20-30'	None	None	50'	12%	n/a
Hillside Residential	See NOTE 4	-	-	-	-	-	-	-	-

NOTES:
1. Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above.
2. The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.
3. The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.
4. For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.
5. The minimum curve radii, shown in the table above are based on the design speed with 6% superelevation.
6. Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

LEGEND: * Serves lots > 2 acres in size w/ no demand for on-street parking



C3

FIGURE
Public Modified Residential Collector

Newland Sierra Specific Plan

ITEM 7
SECTION C3 RESIDENTIAL COLLECTOR

Location: Town Center, first intersection with Mesa Rock Road north of Deer Springs Road.
Radius Location: See Curve 1 on the Curve Radius Design Exception Key Map
Proposed ADT: 3,700 ADT

REQUEST:
We propose a cross section with the same design criteria as a "Residential Collector" classification per Table 2B of the County Public Road Standards with the following exceptions:

A. We request that the minimum horizontal curve radius be revised from 300' to 150'.
B. We request approval of one-way traffic flow and deletion of the 8' shoulder on one side for a 200-foot long road segment in the Town Center area.

A.

REASON:
At this location in Town Center (See Curve 1 on the Curve Radius Design Exception Key Map) a curve radius of 150' is requested to fit abutting Caltrans geometry. This street, "Mesa Rock Way" is approximately 200 feet in length with Tee-Intersections at each end. There is not opportunity to achieve the design speed of 30MPH. Adequate Sight distance is available.

ALTERNATIVES:
Alternatives have been studied to minimize impacts to traffic flow to the existing commercial property on existing Mesa Rock Way. These alternatives did not provide acceptable levels of intersection operation, and had greater impacts to proposed open space, proposed park and ride, level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community.

HARDSHIP:
Denial of this request would result in both increased graded footprint and reduced level of service, decreasing the opportunity for dedication of undisturbed land as open space and land available for expansion of the existing park and ride.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.

B.

REASON:

At this same location in Town Center (See Curve 1 on the Curve Radius Design Exception Key Map) a modification is requested to make traffic one-way (east-bound) and so eliminate the need for one 8- shoulder. The paved width and right of way width will reduce correspondingly from 40'/60' to 32'/52'. This one-way traffic flow will simplify circulation for vehicles exiting the existing gas station and mini-mart which abuts the project boundary. The elimination of the shoulder allows for less impervious surface and increased pervious surface within the proposed lot to the north. To discourage wrong-way drivers, a bulb-out will be provided at the easterly end of the road, narrowing the curb-to-curb width to 24'.

ALTERNATIVES:

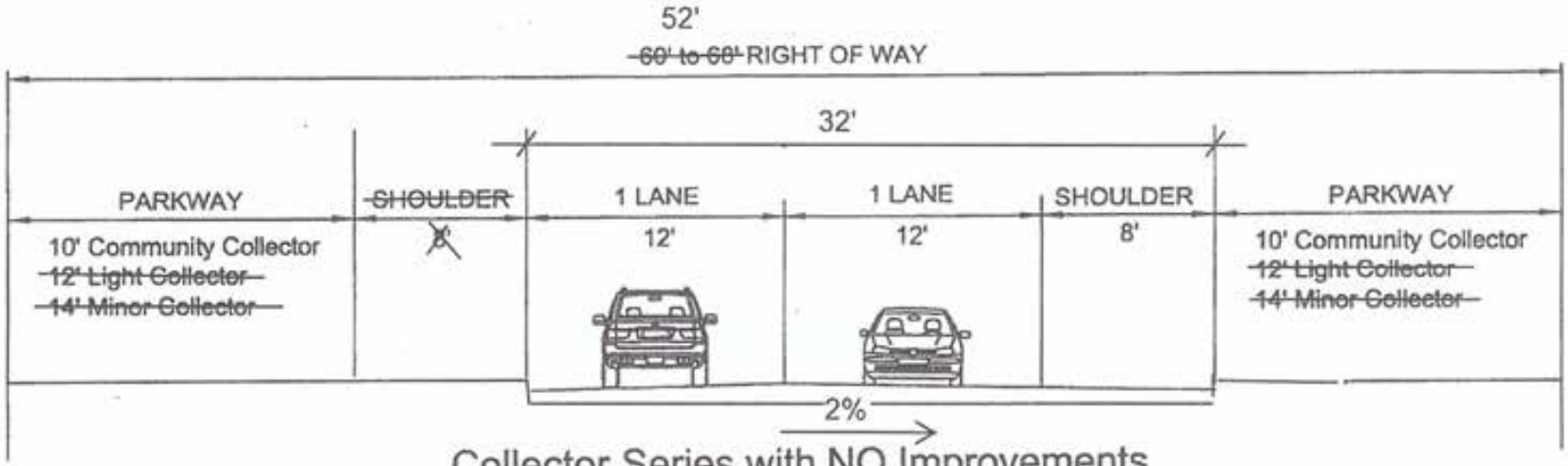
Alternatives have been studied to maximize efficiency of circulation from Deer Springs Road to the existing gas station and the return path for vehicles to Deer Springs Road. These alternatives all added greater complexity to intersection phasing, longer stacking distances and an increase of left turns.

HARDSHIP:

Denial of this request would result in reduced intersection efficiency, longer stacking distances and an increase of left turns by vehicles exiting the existing gas station and mini-mart.

COST ESTIMATE:

Cost is not a factor presented with this Design Exception Request.



Collector Series with NO Improvements

[Cross section with Intermittent Turn Lanes is similar except at intersections, which contain a 14' dedicated turn lane that produces a wider ROW]

Proposed Section (C3)

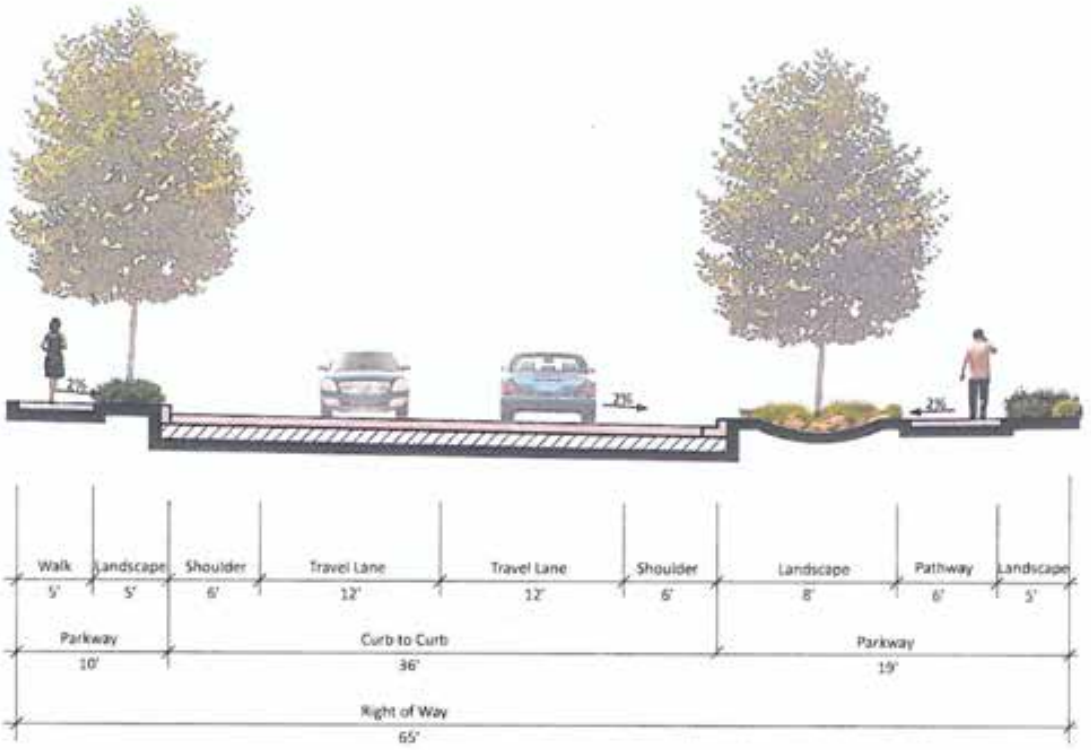
TABLE 2B: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

NON-MOBILITY ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDERS (# / WIDTH)	PARKWAY WIDTH	MINIMUM CURVE RADIUS	MAXIMUM DESIRABLE GRADE	MINIMUM DESIGN SPEED (MPH)
Residential Collector	2 / 12'	-	40'	60'	2 / 8'	10'	300'	12%	30
Rural Residential Collector *	2 / 12'	-	28'	48'	2 / 2'	10'	300'	12%	30
Residential Road	2 / 12'	-	36'	56'	2 / 6'	10'	200'	15%	30
Rural Residential Road *	2 / 12'	-	28'	48'	2 / 2'	10'	200'	15%	30
Residential Cul-de-sac	2 / 12'	-	32'	52'	2 / 4'	10'	200'	15%	30
Residential Loop	2 / 12'	-	32'	52'	2 / 4'	10'	200'	15%	30
Industrial/Commerical Collector	4 / 12'	-	68'	88'	2 / 10'	10'	300'	8%	30
Industrial/Commerical	2 / 16'	-	52'	72'	2 / 10'	10'	200'	8%	30
Industrial/Commercial Cul-de-sac	2 / 16'	-	52'	72'	2 / 10'	10'	200	8%	30
Frontage	2 / 12'	-	32' min	52' min	1 / 8'	10'	See above	See above	-
Alley	2 / 10'	-	20-30'	20-30'	None	None	50'	12%	n/a
Hillside Residential	See NOTE 4	-	-	-	-	-	-	-	-

NOTES:
1. Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above
2. The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent
3. The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed
4. For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.
5. The minimum curve radii, shown in the table above are based on the design speed with 6% superelevation
6. Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

LEGEND: * Serves lots > 2 acres in size w/ no demand for on-street parking



D2

FIGURE
Public Modified Residential Road

Newland Sierra Specific Plan

ITEM 9
SECTION D2 MODIFIED RESIDENTIAL ROAD

Location: Residential Neighborhoods throughout the project.
Approximate Length: 12,000' (2.2 miles)
Proposed ADT: 3,300 Maximum

REQUEST:
We propose a cross section with the same design criteria as a "Residential Road" classification per Table 2B of the County Public Road Standards with the following exceptions:

A. We request that street cross-fall be continuous from curb to curb rather than crowned at the centerline. As part of this request we propose that regularly spaced curb openings be incorporated into the low-side curbing to allow pavement runoff to be directed to the parkway for water quality treatment.

REASON:

We request Exception A due to the minimum width required to construct a bio-swale of adequate capacity (See Roadside Bio-Swale Plan and Sections attached) Proposed Modification Request A to the "Residential Road" classification will allow the roadway design to comply with the requirements of the Standard Urban Stormwater Mitigation Plan (SUSMP) adopted by the County for incorporation of Low Impact Development (LID) features (Integrated Management Practices: IMPs).

The "Preliminary Drainage Study for Newland Sierra, October 2014" has been prepared as part of the Tentative Map submittal. The report analyzes the project's capacity to comply with the requirements of the County Drainage Manual, including depth, width and velocity of street flow for the 100-year storm. Even neglecting any capacity of the median swale, this cross-section complies with all criteria.

As a representative check, please see the data for Node 2226 to 2228 below and the map that follows.

W=13.16' (dry pavement during 100-year storm= 26')
D=0.39' for 100-year storm, Requirement = 0.4' max. for 50-year storm
D x V=2.17 f^2ps, less than the 6.0 f^2ps requirement

AES Report:
Roadway Section
D2

P-25-2.TXT

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**********************************************************************
FLOW PROCESS FROM NODE   2226.00 TO NODE   2228.00 IS CODE =  62
----------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
======================================================================
 UPSTREAM ELEVATION(FEET) = 1293.00  DOWNSTREAM ELEVATION(FEET) = 1274.00
 STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.46
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =   10.09
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.80
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.58
 STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =    7.73
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.964
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .5700
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.570
 SUBAREA AREA(ACRES) =    2.49      SUBAREA RUNOFF(CFS) =    9.88
 TOTAL AREA(ACRES) =       2.6       PEAK FLOW RATE(CFS) =      10.32

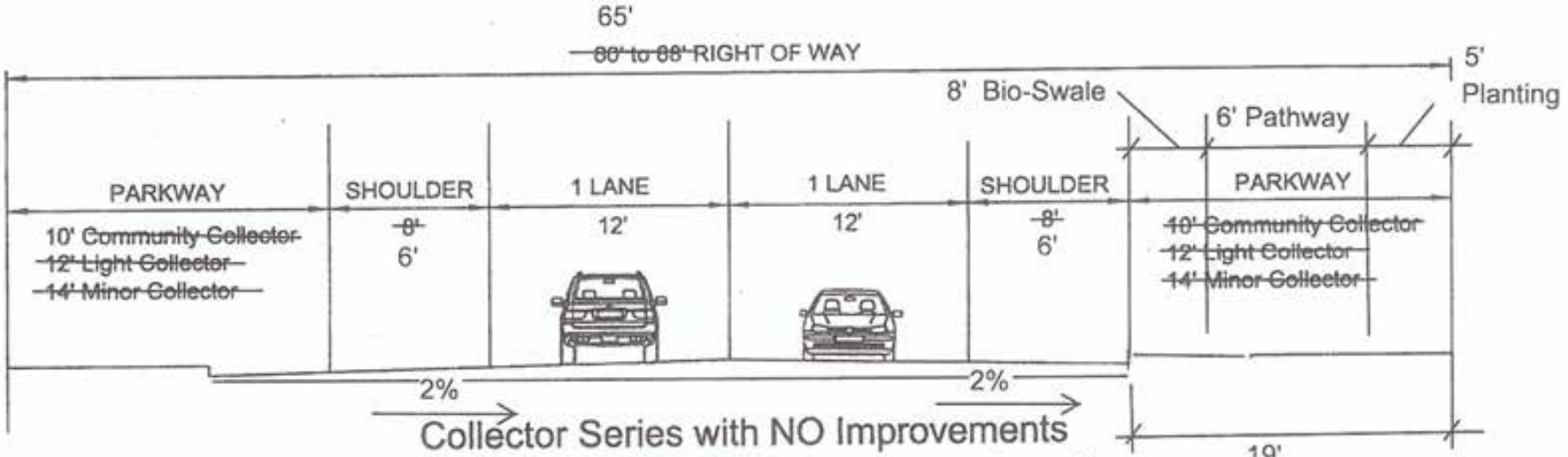
 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.16
 FLOW VELOCITY(FEET/SEC.) =  5.58   DEPTH*VELOCITY(FT*FT/SEC.) =   2.17
 LONGEST FLOWPATH FROM NODE   2227.00 TO NODE   2228.00 =     495.00 FEET.
**********************************************************************
```

In addition to standard "Flooded Width" calculations, the proposed modifications to roadway crown and maximum desirable grade have been analyzed for potential susceptibility to hydroplaning and found to comply with the guidelines of the AASHTO Drainage Manual, Section 13.2.9 and the National Highway Cooperative Research Program reference document "Proposed Guidelines for Reducing Hydroplaning on New and Rehabilitated Pavements." Calculations supporting this finding have been submitted separately to DPW, reviewed and approved.

ALTERNATIVES:
Alternatives have been studied to minimize impacts to proposed open space while complying with water quality treatment regulations, providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes.

HARDSHIP:
Denial of this request would result in both increased graded footprint and slope heights for this neighborhood, decreasing the opportunity to provide a pathway for the community and to decreasing the land available for dedication as open space.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.



Collector Series with NO Improvements

[Cross section with Intermittent Turn Lanes is similar except at intersections, which contain a 14' dedicated turn lane that produces a wider ROW]

Proposed Section (D2)

TABLE 2B: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

NON-MOBILITY ELEMENT ROAD CLASSIFICATIONS

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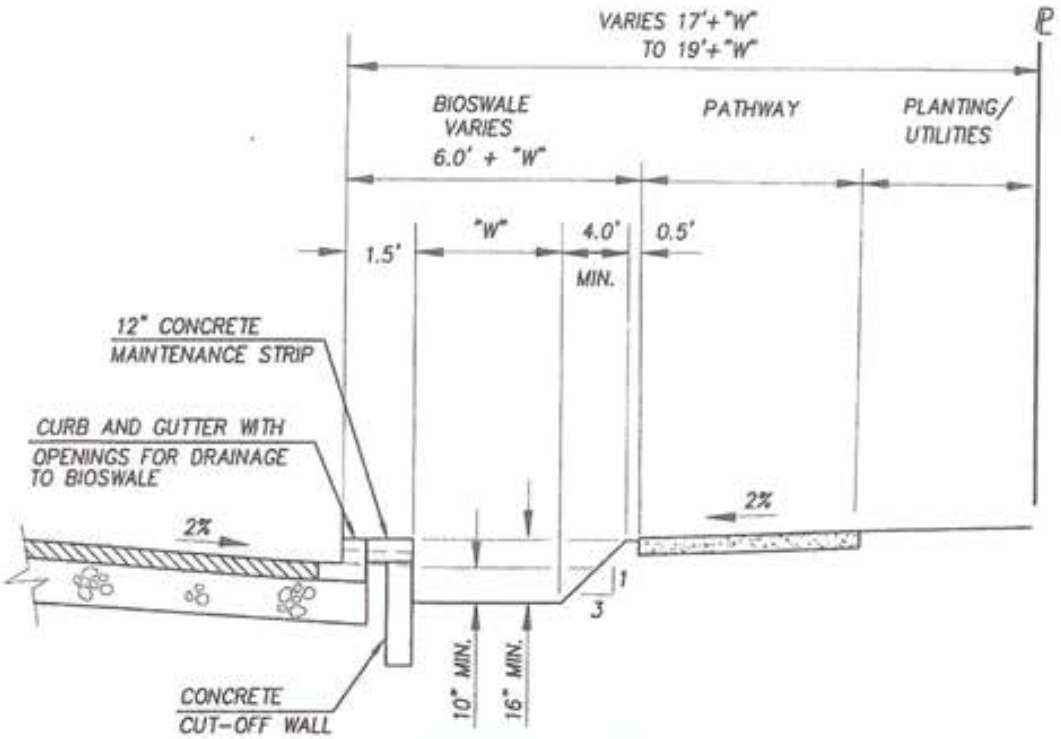
Rural Residential Collector *	2 / 12'	-	28'	48'	2 / 2'	10'	300'	12%	30
Residential Road	2 / 12'	-	36'	56'	2 / 6'	10'	200'	15%	30
Rural Residential Road *	2 / 12'	-	28'	48'	2 / 2'	10'	200'	15%	30
Residential Cul-de-sac	2 / 12'	-	32'	52'	2 / 4'	10'	200'	15%	30
Residential Loop	2 / 12'	-	32'	52'	2 / 4'	10'	200'	15%	30
Industrial/Commerical Collector	4 / 12'	-	68'	88'	2 / 10'	10'	300'	8%	30
Industrial/Commerical	2 / 16'	-	52'	72'	2 / 10'	10'	200'	8%	30
Industrial/Commercial Cul-de-sac	2 / 16'	-	52'	72'	2 / 10'	10'	200	8%	30
Frontage	2 / 12'	-	32' min	52' min	1 / 8'	10'	See above	See above	-
Alley	2 / 10'	-	20-30'	20-30'	None	None	50'	12%	n/a
Hillside Residential	See NOTE 4	-	-	-	-	-	-	-	-

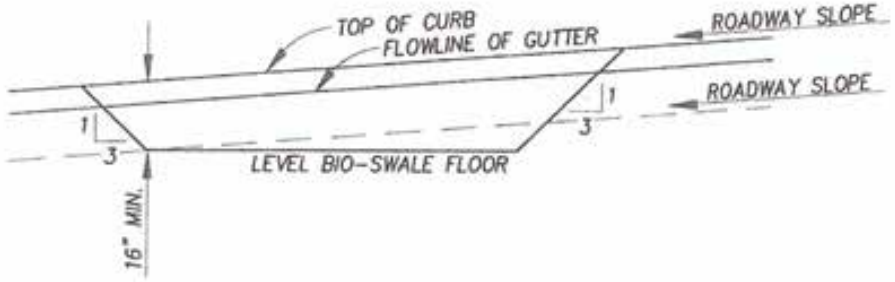
NOTES:
1. Minimum longitudinal gradient shall be 1.0 percent for all road classifications shown above.
2. The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.
3. The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.
4. For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.
5. The minimum curve radii, shown in the table above, are based on the design speed with 6% superelevation.
6. Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

LEGEND: * Serves lots > 2 acres in size w/ no demand for on-street parking



ROADSIDE BIOSWALE

CROSS- SECTION NOT TO SCALE

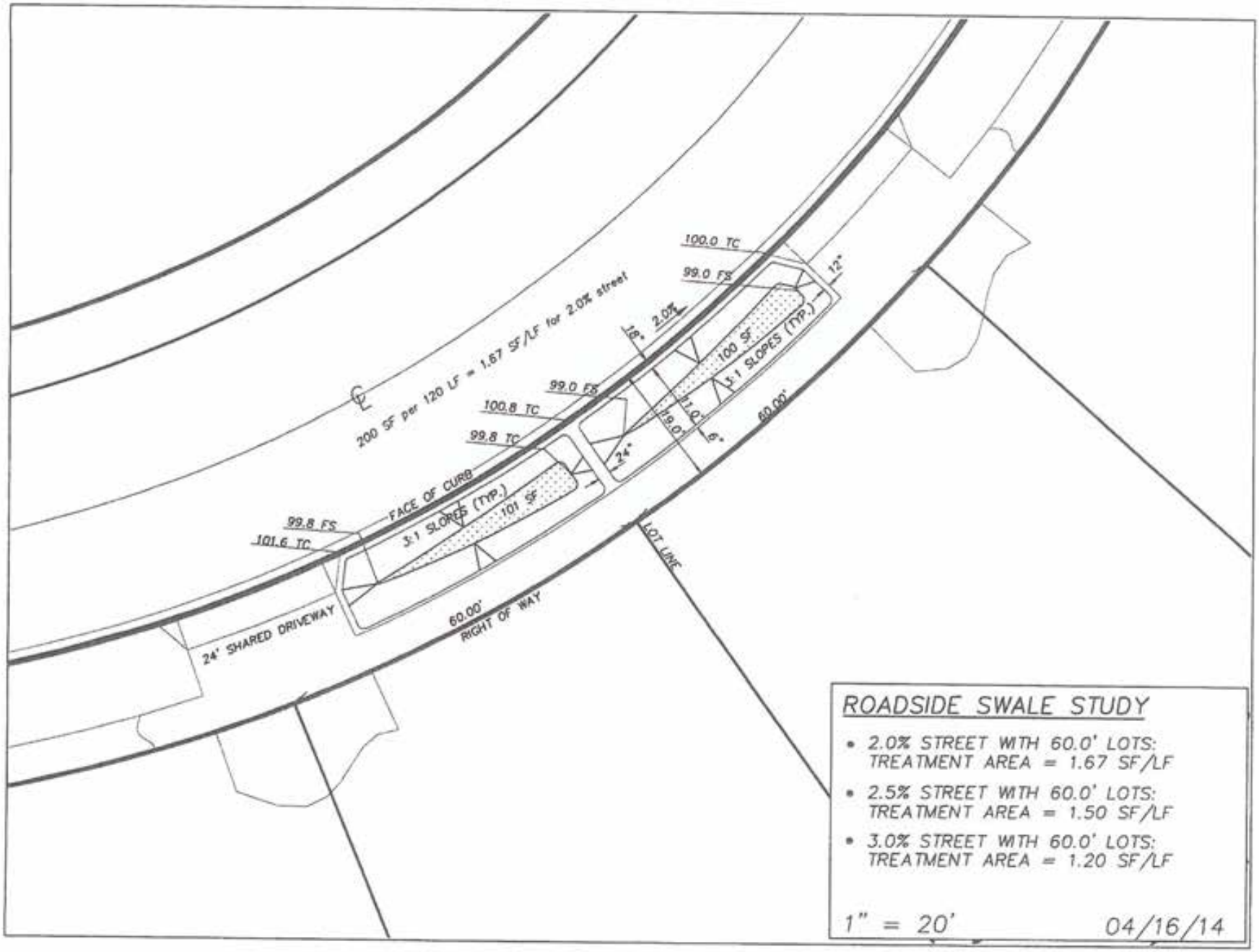


ROADSIDE BIOSWALE

PROFILE NOT TO SCALE

ROADSIDE BIOSWALE STUDY FOR 36' CURB TO CURB STREET

- FOR 36' WIDE STREET x 4% TREATMENT REQUIRED = 1.44 SF/LF REQUIRED.
  ASSUME "W"=3.0':
- 2.0% STREET WITH 60.0' LOTS
  TREATMENT AREA = 1.67 SF/LF
- 2.5% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.50 SF/LF
- 3.0% STREET WITH 60.0' LOTS:
  TREATMENT AREA = 1.20 SF/LF


200 SF per 120 LF = 1.67 SF/LF for 2.0% street
100.0 TC
99.0 FS
18"
2.0%
12"
100 SF
3:1 SLOPES (TYP.)
99.0 FS
100.8 TC
99.8 TC
11.0'
19.0'
6"
24"
60.00'
FACE OF CURB
99.8 FS
101.6 TC
3:1 SLOPES (TYP.)
101 SF
LOT LINE
24' SHARED DRIVEWAY
60.00'
RIGHT OF WAY
ROADSIDE SWALE STUDY
• 2.0% STREET WITH 60.0' LOTS:
TREATMENT AREA = 1.67 SF/LF
• 2.5% STREET WITH 60.0' LOTS:
TREATMENT AREA = 1.50 SF/LF
• 3.0% STREET WITH 60.0' LOTS:
TREATMENT AREA = 1.20 SF/LF
1" = 20'
04/16/14

Bioretention Swale

Description

Bioretention swales are shallow, open channels that are designed to reduce runoff volume through infiltration. Additionally, bioretention swales remove pollutants such as trash and debris by filtering water through vegetation within the channel. Swales can serve as conveyance for stormwater and can be used in place of traditional curbs and gutters; however, when compared to traditional conveyance systems the primary objective of a bioretention swale is infiltration and water quality enhancement rather than conveyance. In addition to reducing the mass of pollutants in runoff, properly maintained bioretention swales can enhance the aesthetics of a site.

Treatment Efficiency			
Runoff Volume	High (unlined)/ Low (lined)	Bacteria	High
Sediment	High	Nutrients	Medium
Trash/ debris	High	Heavy Metals	High
Organics	High	Oil & Grease	High

Siting and Suitability

Bioretention swales are highly versatile stormwater IMPs that effectively reduce pollutants. With a narrow width, bioretention swales can be integrated into site plans with various configurations and components. Ideal sites for bioretention swales include the right-of-way of linear transportation corridors and along borders or medians of parking lots. In heavily trafficked areas, curb cuts can be used to delineate boundaries. Bioretention swales can be combined with other basic and stormwater runoff BMPs to form a treatment train, reducing the required size of a single IMP unit. See Section 3 for details.

Drainage Area: Less than 2 acres and fully stabilized.

Head Requirements: Bioretention swale typically requires a minimum of 2.5 to 3.5 ft of elevation difference between the inlet and outlet to the receiving storm drain network.

Slopes: Slopes draining to bioretention swale should be 15% or less, side slopes should be 3:1 (H:V) or flatter, and check dams should be used to provide longitudinal bed slopes of 2.5% (average slope should not exceed 4% from inlet to outlet).

Setbacks: Provide 10-ft setback from structures/foundations, 100-ft setback from septic fields and water supply wells, and 50-ft setback from steep slopes.

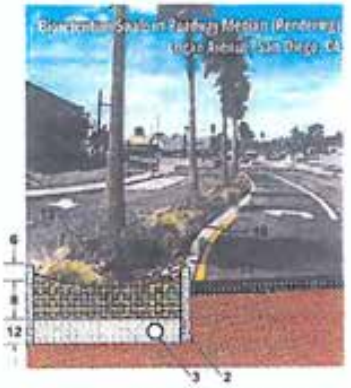
Water Table & Bedrock: At least 10 ft separation must be provided between bottom of cut (subgrade) and seasonal high water table, bedrock, or other restrictive features.

Soil Type: Bioretention swale can be used in any soils. If subsoil infiltration is less than 0.5 in/hr, an underdrain should be installed. A liner may be needed if subsoils contain expansive clays or calcareous minerals.

Areas of Concern: Infiltration is not allowed at sites with known soil contamination or hot spots, such as gas stations. An appropriate impermeable liner must be used in areas of concern.

Design Considerations & Specifications *(see Appendices A & G for details)*

		Design Component	General Specification
IMP Function	1	Impermeable Liner	If non-infiltrating (per geotechnical investigation), use clay liner, geomembrane liner, or concrete.
	2	Lateral Hydraulic Restriction Barriers	May use concrete or geomembrane to restrict lateral seepage to adjacent subgrades, foundations, or utilities.
	3	Underdrain/ Infiltration	Underdrain required if subsoil infiltration < 0.5 in/hr. Schedule 40 PVC pipe with perforations (slots or holes) every 6 inches. If design is fully infiltrating, ensure that subgrade compaction is minimized.
	4	Cleanouts/ Observation Wells	Provide 6-inch diameter cleanout ports/observation wells for each underdrain pipe.
	5	Internal Water Storage (IWS)	If using underdrain, the underdrain outlet can be elevated to create a sump for additional moisture retention to promote plant survival and treatment. Top of IWS should be greater than 18 inches below surface.
	6	Temporary Ponding Depth	Use check dams to provide 6-18 inches (6-12 inches near schools or in residential areas); average ponding depth of 9 inches is recommended.
	7	Drawdown Time	Surface drawdown: 12-96 hrs. Subsurface dewatering: 48 hrs.
Soil Media	8	Soil Media Depth	3-4 feet (deeper for better pollutant removal, hydrologic benefits, and deeper rooting depths).
	9	Soil Media Composition	65% sand, 20% sandy loam, and 15% compost (from vegetation-based feedstock; animal wastes or by-products should not be applied) by volume.
	10	Media Permeability	5 in/hr infiltration rate for the flow-based SUSMP method (1-6 in/hr for alternative designs, as approved by local jurisdiction).
	11	Chemical Analysis	Total phosphorus < 10 ppm, pH 6-8, CEC > 5 meq/100 g soil. Organic Matter Content <5% by weight.
	12	Drainage Layer	Separate media from underdrain with 2 to 4 inches of washed concrete sand (ASTM C-33), followed by 2 inches of choking stone (ASTM No. 8) over a 3.5 ft envelope of ASTM No. 57 stone.
Routing	13	Inlet/Pretreatment	Provide stabilized inlets at least 12 inches wide and energy dissipation. Install rock armored forebay for concentrated flows, gravel fringe and vegetated filter strip for sheet flows.
	14	Slope and Grade Control	If necessary, use check dams to maintain maximum 2.5% bed slope. Check dams should extend sufficiently deep to prevent piping (undercutting) below the check dam.
	15	Outlet Configuration	Online: All runoff is routed through system—install an elevated overflow structure or weir at the elevation of maximum ponding. Offline: Only treated volume is diverted to system—install a diversion structure or allow bypass of high flows.
Landscape	16	Mulch	Dimensional chipped hardwood or triple shredded, well-aged hardwood mulch 3 inches deep.
	17	Vegetation	Native, deep rooting, drought tolerant plants.
	18	Multi-Use Benefits	Provide educational signage, artwork, or wildlife amenities.



This rendering demonstrates the application of bioretention swales as green street retrofits. Runoff enters the bioretention swale through curb cuts and is filtered vertically through the soil media. Lateral hydraulic restriction layers protect adjacent infrastructure from lateral seepage while allowing infiltration from the bottom of the bioretention swale. The underdrain is offset to avoid roots of existing vegetation.

Typical Bioretention Swale Profile

This schematic shows the major design elements of a bioretention swale. IWS is incorporated for enhanced infiltration and water quality treatment by upturning the underdrain in the outlet structure. Check dams ensure capture of the water quality volume and slow surface flow during larger storms.

Maintenance Considerations *(see Appendix D for detailed checklist)*

Task	Frequency	Indicator Maintenance is Needed	Maintenance Notes
Catchment inspection	Weekly or biweekly with routine property maintenance	Excessive sediment, trash, and/or debris accumulation on the surface of bioretention swale	Permanently stabilize any exposed soil and remove any accumulated sediment. Adjacent pervious areas may need to be regraded.
Inlet inspection		Internal erosion or excessive sediment, trash, and/or debris accumulation	Check for sediment accumulation to ensure that flow into the bioretention swale is as designed. Remove any accumulated sediment.
Litter/leaf removal and misc. upkeep		Accumulation of litter and debris within bioretention swale area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the bioretention area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
Pruning	1-2 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Nutrients in runoff often cause bioretention vegetation to flourish.
Mowing	2-12 times/year	Overgrown vegetation that interferes with access, lines of sight, or safety	Frequency depends on location and desired aesthetic appeal and type of vegetation.
Outlet inspection	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.
Mulch removal and replacement	1 time/2-3 years	2/3 of mulch has decomposed	Remove decomposed fraction and top off with fresh mulch to a total depth of 2 inches.
Remove and replace dead plants	1 time/year	Dead plants	Within the first year, 10 percent of plants can die. Survival rates increase with time.
Temporary Watering	1 time/2-3 days for first 1-2 months	Until establishment and during severely drought weather	Watering after the initial year might be required.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

TETRA TECH

Rock Infiltration Swale

Description

Rock infiltration swales are shallow, open channels that are designed to reduce runoff volume through infiltration. Rock infiltration swales are identical to bioretention swales except the surface is typically covered by cobble rather than mulch and vegetation. Rock infiltration swales can serve as conveyance for stormwater and can be used in place of traditional curbs and gutters; however, when compared to traditional conveyance systems the primary objective of a rock infiltration swale is infiltration and water quality enhancement rather than conveyance. In addition to reducing the mass of pollutants in runoff, properly maintained rock infiltration swales can enhance the aesthetics of a site.

Treatment Efficiency			
Runoff Volume	High (unlined)/ Low (lined)	Bacteria	High
Sediment	High	Nutrients	Medium
Trash/ debris	High	Heavy Metals	High
Organics	High	Oil & Grease	High

Siting and Suitability

Rock infiltration swales are highly versatile stormwater IMPs that effectively reduce pollutants. With a narrow width, rock infiltration swales can be integrated into site plans with various configurations and components. Ideal sites for rock infiltration swales include the right-of-way of linear transportation corridors and along borders or medians of parking lots. In heavily trafficked areas, curb cuts can be used to delineate boundaries. Rock infiltration swales can be combined with other basic and stormwater runoff BMPs to form a treatment train, reducing the required size of a single IMP unit. See Section 3 for details.

Drainage Area: Less than 2 acres and fully stabilized.

Head Requirements: Rock infiltration swale typically requires a minimum of 2.5 to 3.5 ft of elevation difference between the inlet and outlet to the receiving storm drain network.

Slopes: Slopes draining to rock infiltration swale should be 15% or less, side slopes should be 3:1 (H:V) or flatter, and check dams should be used to provide longitudinal bed slopes of 2.5% (average slope should not exceed 4% from inlet to outlet).

Setbacks: Provide 10-ft setback from structures/foundations, 100-ft setback from septic fields and water supply wells, and 50-ft setback from steep slopes.

Water Table & Bedrock: At least 10 ft separation must be provided between bottom of cut (subgrade) and seasonal high water table, bedrock, or other restrictive features.

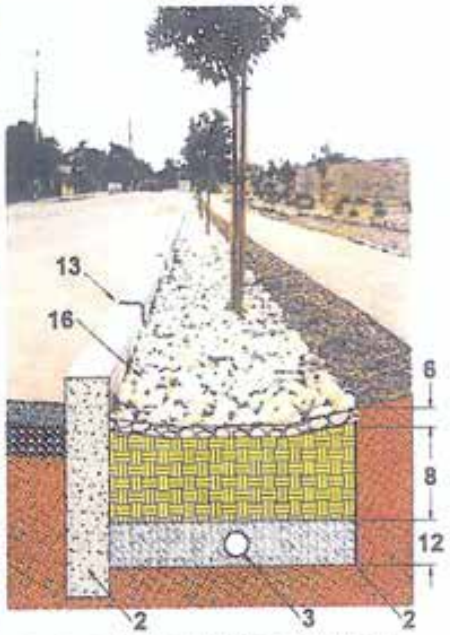
Soil Type: Rock infiltration swale can be used in any soils. If subsoil infiltration is less than 0.5 in/hr, an underdrain should be installed. A liner may be needed if subsoils contain expansive clays or calcareous minerals.

Areas of Concern: Infiltration is not allowed at sites with known soil contamination or hot spots, such as gas stations. An appropriate impermeable liner must be used in areas of concern.

Design Considerations & Specifications *(see Appendices A & G for details)*

		Design Component	General Specification
IMP Function	1	Impermeable liner	If non-infiltrating (per geotechnical investigation), use clay liner, geomembrane liner, or concrete.
	2	Lateral hydraulic restriction barriers	May use concrete or geomembrane to restrict lateral seepage to adjacent subgrades, foundations, or utilities.
	3	Underdrain/ Infiltration	Underdrain required if subsoil infiltration < 0.5 in/hr. Schedule 40 PVC pipe with perforations (slots or holes) every 6 inches. If design is fully-infiltrating, ensure that subgrade compaction is minimized.
	4	Cleanouts/ Observation Wells	Provide 6-inch diameter cleanout ports/observation wells for each underdrain pipe.
	5	Internal Water Storage (IWS)	If using underdrain, the underdrain outlet can be elevated to create a sump for additional moisture retention treatment. Top of IWS should be greater than 18 inches below surface.
	6	Temporary Ponding Depth	Use check dams to provide 6-18 inches (6-12 inches near schools or in residential areas); average ponding depth of 9 inches is recommended.
	7	Drawdown Time	Surface drawdown: 12-96 hrs. Subsurface drawdown: 48 hrs.
Soil Media	8	Soil Media Depth	2-4 feet (deeper for better pollutant removal, hydrologic benefits, and deeper rooting depths).
	9	Soil Media Composition	55% sand, 20% sandy loam, and 15% compost (non-vegetation-based feedstock; animal wastes or by-products should not be applied) by volume.
	10	Media Permeability	5 in/hr infiltration rate for the flow-based SUSMP method (1-8 in/hr for alternative designs, as approved by local jurisdiction).
	11	Chemical Analysis	Total phosphorus <15 ppm; pH 6-8; CEC >5 meq/100 g soil. Organic Matter Content <5% by weight.
	12	Drainage Layer	Separate media from underdrain with 2 to 4 inches of washed concrete sand (ASTM C 33), followed by 2 inches of choking stone (ASTM No. 8) over a 1.5 ft envelope of ASTM No. 57 stone.
Routing	13	Inlet/Pretreatment	Provide stabilized inlets at least 12 inches wide and energy dissipators, install rock armored forebay for concentrated flows, gravel fringe and vegetated filter strip for sheet flows.
	14	Slope and Grade Control	If necessary, use check dams to maintain maximum 2.5% bed slope. Check dams should extend sufficiently deep to prevent piping (undercutting) below the check dam.
	15	Outlet Configuration	Online: All runoff is routed through system—install an elevated overflow structure or weir at the elevation of maximum ponding. Offline: Only treated volume is diverted to system—install a diversion structure or allow bypass of high flows.
Landscape	16	Surface	Armor surface with cobble. If planted (optional), install drought-tolerant, low-maintenance trees and shrubs.
	17	Multi-Use Benefits	Provide educational signage, artwork, or wildlife amenities.

Rock Infiltration Swale Cross Section, Encinitas, CA

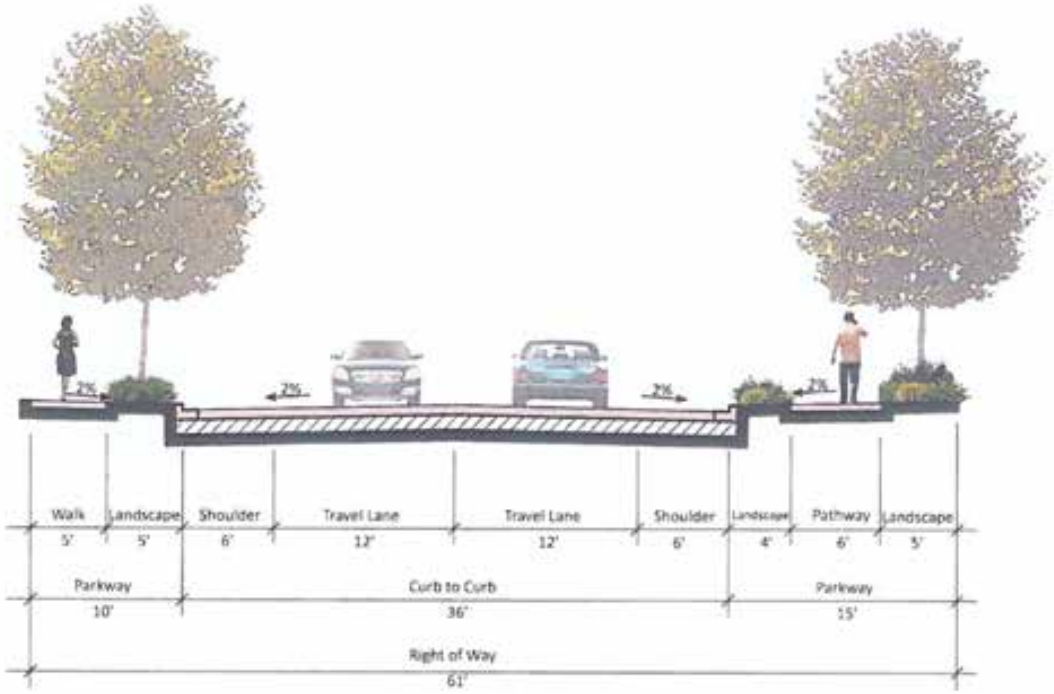


This schematic shows the major components of a rock infiltration swale. The rock infiltration swale in the photograph intercepts roadway runoff through curb cuts and filters it through subsurface soil media.

Maintenance Considerations *(see Appendix D for detailed checklist)*

Task	Frequency	Indicator Maintenance is Needed	Maintenance Notes
Catchment inspection	Weekly or biweekly with routine property maintenance	Excessive sediment, trash, and/or debris accumulation on the surface of rock infiltration swale	Permanently stabilize any exposed soil and remove any accumulated sediment in a manner that does not cause an illegal discharge. Adjacent pervious areas may need to be regraded.
Inlet inspection		Internal erosion or excessive sediment, trash, and/or debris accumulation	Check for sediment accumulation to ensure that flow into the rock infiltration swale is as designed. Remove any accumulated sediment.
Litter/leaf removal and misc. upkeep		Accumulation of litter and debris within rock infiltration swale area, mulch around outlet, internal erosion	Litter, leaves, and debris should be removed to reduce the risk of outlet clogging, reduce nutrient inputs to the bioretention area, and to improve facility aesthetics. Erosion should be repaired and stabilized.
Outlet inspection	1 time/year	Erosion at outlet	Remove any accumulated mulch or sediment.
Temporary Watering	1 time/2-3 days for first 1-2 months	Until establishment and during severely drought weather	Watering after the initial year might be required.
Fertilization	1 time initially	Upon planting	One-time spot fertilization for first year vegetation.

TETRA TECH



D3

FIGURE

Public Modified Residential Road with Parkway

Newland Sierra Specific Plan

ITEM 10
SECTION D3 RESIDENTIAL ROAD

Location: Residential Neighborhoods throughout the project.
Radius Location: See Curve 6 on the Curve Radius Design Exception Key Map
Proposed ADT: 200 ADT

REQUEST:
We propose a cross section with the same design criteria as a "Residential Road" classification per Table 2B of the County Public Road Standards with the following exception:

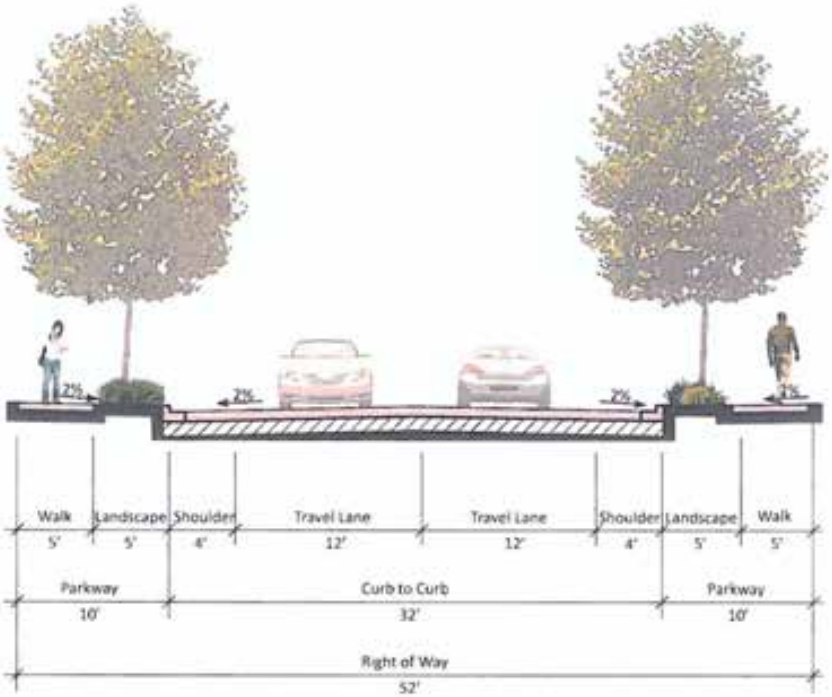
A. We request that the minimum horizontal curve radius be revised from 200' to 100'.

REASON:
At one location in the Valley Neighborhood (See Curve 6 on the Curve Radius Design Exception Key Map) a curve radius of 100' is requested. This curve is at the northeastern portion of the neighborhood, in an area planned for 41condominium units and 5 small detached single family lots. Site design will accommodate adequate sight distance. No other design exceptions are requested.

ALTERNATIVES:
Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes.

HARDSHIP:
Denial of this request would result in both increased graded footprint and slope heights, decreasing the opportunity for dedication of undisturbed land as open space.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.



D4

FIGURE
Public Residential Loop

Newland Sierra Specific Plan

ITEM 11
SECTION D4 RESIDENTIAL LOOP

Location: Residential Neighborhoods throughout the project.
Radius Location: See Curve 2 on the Curve Radius Design Exception Key Map
Proposed ADT: 208 ADT

REQUEST:
We propose a cross section with the same design criteria as a "Residential Loop" classification per Table 2B of the County Public Road Standards with the following exception:

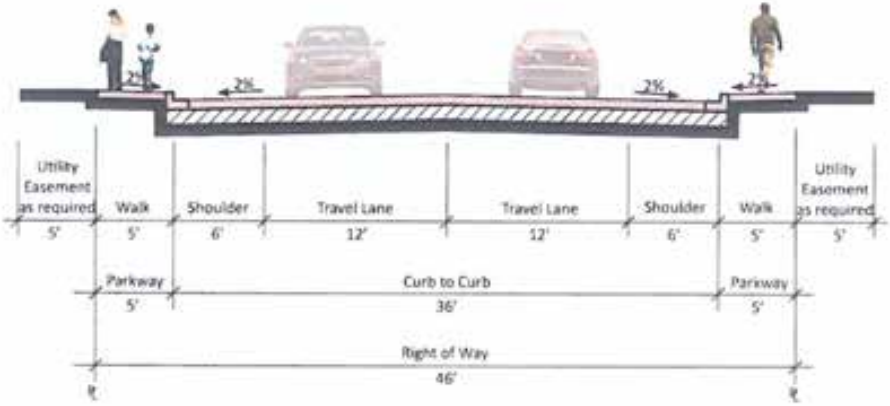
A. We request that the minimum horizontal curve radius be revised from 200' to 100'.

REASON:
At one location in the Mesa Neighborhood (See Curve 2 on the Curve Radius Design Exception Key Map) a curve radius of 100' is requested. This curve is adjacent to a Tee Intersection, in an area planned for 26 condominium units. Site design will accommodate adequate sight distance. No other design exceptions are requested.

ALTERNATIVES:
Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes.

HARDSHIP:
Denial of this request would result in both increased graded footprint and slope heights, decreasing the opportunity for dedication of undisturbed land as open space.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.



E1

FIGURE

Public Modified Residential Road

Newland Sierra Specific Plan

ITEM 12
SECTION E1 MODIFIED RESIDENTIAL ROAD

Location: Valley Neighborhood
Approximate Length: 3,500'
Proposed ADT: 1,500

REQUEST:
We propose a cross section with the same design criteria as a "Residential Road" per Table 2B of the County Public Road Standards with the following exceptions:

A. We request that the parkway width be modified from two 10' Parkways to two 5' Parkways. We request that the Right of Way be decreased from to 56' to 46' accordingly.
B. We request that the minimum horizontal curve radius be revised from 200' to 100'. (See Curves 3, 7 and 8 on the Curve Radius Design Exception Key Map).

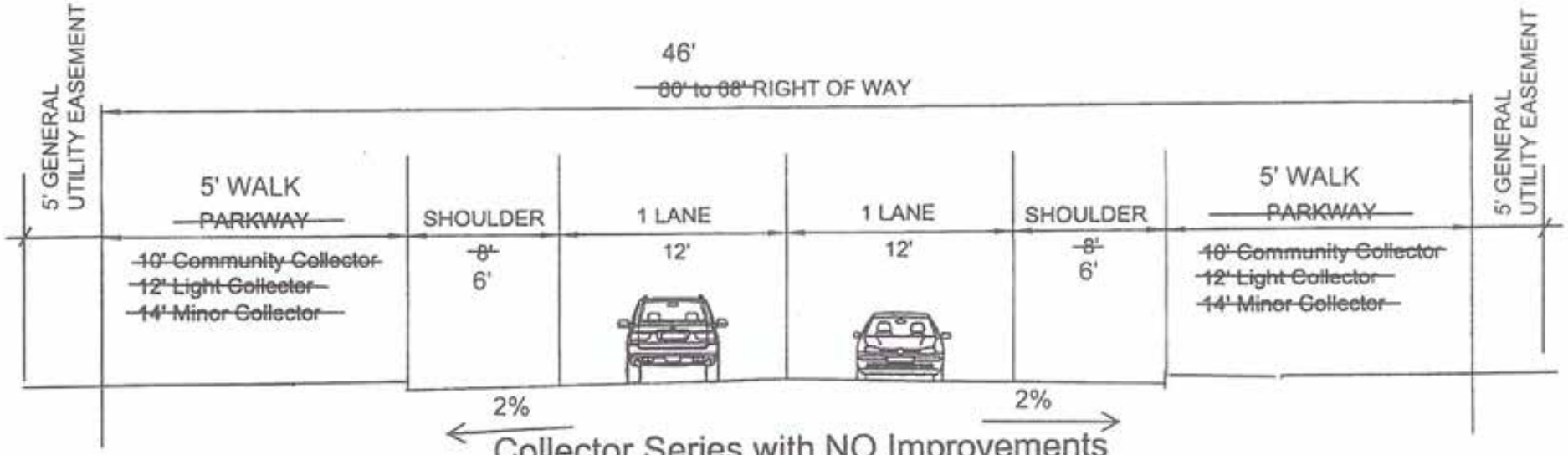
REASON:
These Modification Requests to the "Residential Road" standard will provide the opportunity for a 36' curb to curb width public road while imposing the minimum graded footprint, providing the opportunity to preserve existing slopes in the narrow "Valley" of the existing topography. To maximize unobstructed walkway width, 5' wide utility easements will be provided adjacent to the right of way as required.

Requests for reduced horizontal curve radii occur at three locations within the Valley Neighborhood. Site design will accommodate adequate sight distance.

ALTERNATIVES:
Alternatives have been studied to minimize impacts to the existing slopes while providing the level of service and level of emergency access that will benefit the community. These alternatives all had greater impacts.

HARDSHIP:
Denial of this request would result in an increased graded footprint for the roadway, increasing the impact to existing slopes.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.



Collector Series with NO Improvements

[Cross section with Intermittent Turn Lanes is similar except at intersections, which contain a 14' dedicated turn lane that produces a wider ROW]

Proposed Section (E1)

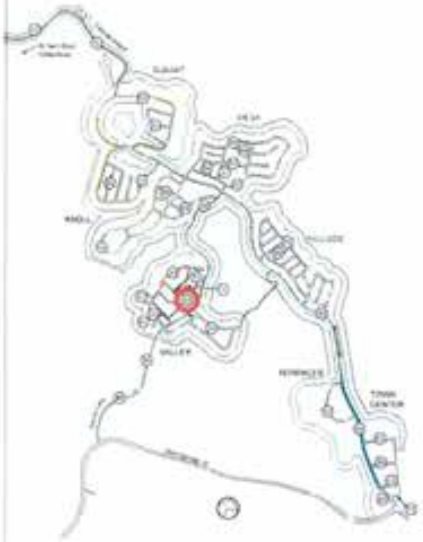
TABLE 2B: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

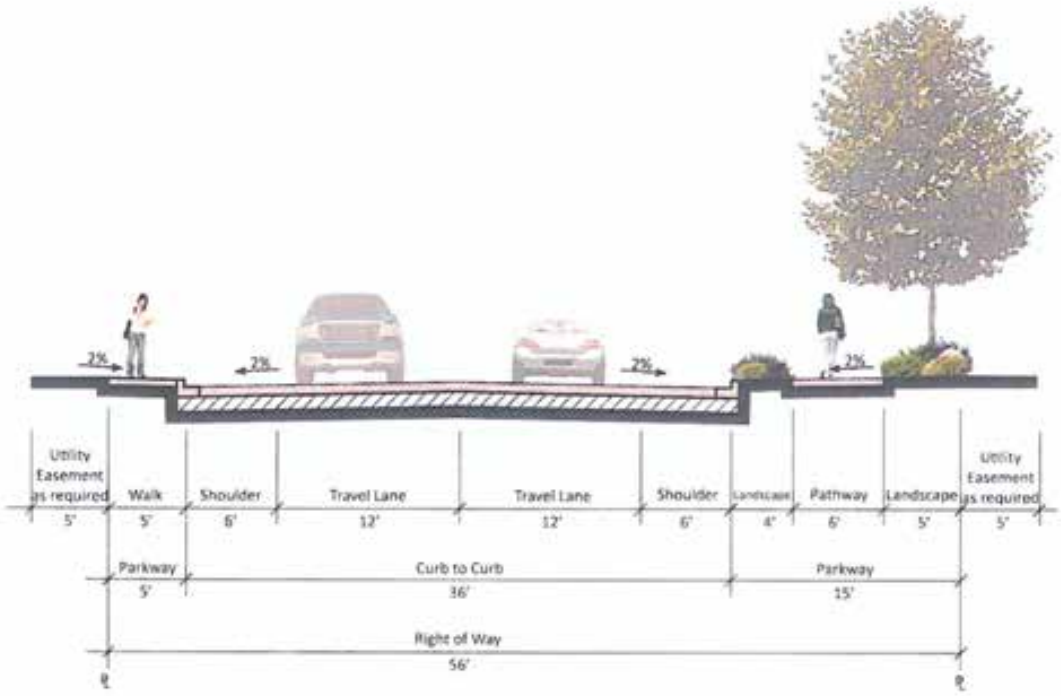
NON-MOBILITY ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDERS (# / WIDTH)	PARKWAY WIDTH	MINIMUM CURVE RADIUS	MAXIMUM DESIRABLE GRADE	MINIMUM DESIGN SPEED (MPH)
Residential Collector	2 / 12'	-	40'	60'	2 / 8'	10'	300'	12%	30
Rural Residential Collector *	2 / 12'	-	28'	48'	2 / 2'	10'	300'	12%	30
Residential Road	2 / 12'	-	36'	56'	2 / 6'	10'	200'	15%	30
Rural Residential Road *	2 / 12'	-	28'	48'	2 / 2'	10'	200'	15%	30
Residential Cul-de-sac	2 / 12'	-	32'	52'	2 / 4'	10'	200'	15%	30
Residential Loop	2 / 12'	-	32'	52'	2 / 4'	10'	200'	15%	30
Industrial/Commerical Collector	4 / 12'	-	68'	88'	2 / 10'	10'	300'	8%	30
Industrial/Commerical	2 / 16'	-	52'	72'	2 / 10'	10'	200'	8%	30
Industrial/Commercial Cul-de-sac	2 / 16'	-	52'	72'	2 / 10'	10'	200	8%	30
Frontage	2 / 12'	-	32' min	52' min	1 / 8'	10'	See above	See above	-
Alley	2 / 10'	-	20-30'	20-30'	None	None	50'	12%	n/a
Hillside Residential	See NOTE 4	-	-	-	-	-	-	-	-

NOTES:
1. Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above.
2. The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.
3. The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.
4. For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.
5. The minimum curve radii, shown in the table above are based on the design speed with 6% superelevation.
6. Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

LEGEND: * Serves lots > 2 acres in size w/ no demand for on-street parking





E2

FIGURE

Public Modified Residential Road with Parkway

Newland Sierra Specific Plan

ITEM 13
SECTION E2 MODIFIED RESIDENTIAL ROAD

Location: Valley Neighborhood
Approximate Length: 1,500'
Proposed ADT: 1,500

REQUEST:
We propose a cross section with the same design criteria as a "Residential Road" per Table 2B of the County Public Road Standards with the following exception:

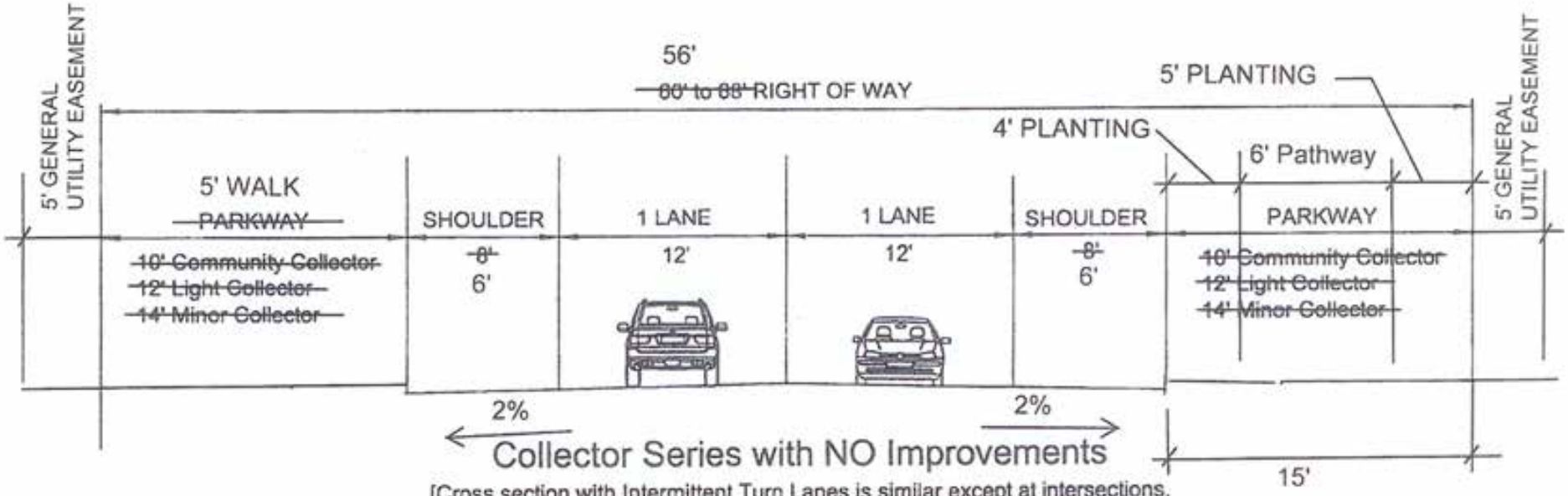
A. We request that the parkway width be modified from two 10' Parkways to one 5' Parkway and one 15' Parkway.
B. We request that the minimum horizontal curve radius be revised from 200' to 100'. (See Curve 5 on the "Curve Radius Design Exception Key Map")

REASON:
These Modification Requests to the "Residential Road" standard will provide the opportunity for a 36' curb to curb width public road a 6' pathway while imposing the minimum graded footprint, providing the opportunity to preserve existing slopes in the narrow "Valley" of the existing topography. To maximize unobstructed pathway width, 5' wide utility easements will be provided adjacent to the right of way as required.

ALTERNATIVES:
Alternatives have been studied to minimize impacts to the existing slopes while providing the level of service, bicycle, level of emergency access, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts.

HARDSHIP:
Denial of this request would result in an increased graded footprint for the roadway, increasing the impact to existing slopes.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.



Collector Series with NO Improvements

[Cross section with Intermittent Turn Lanes is similar except at intersections, which contain a 14' dedicated turn lane that produces a wider ROW]

Proposed Section (E2)

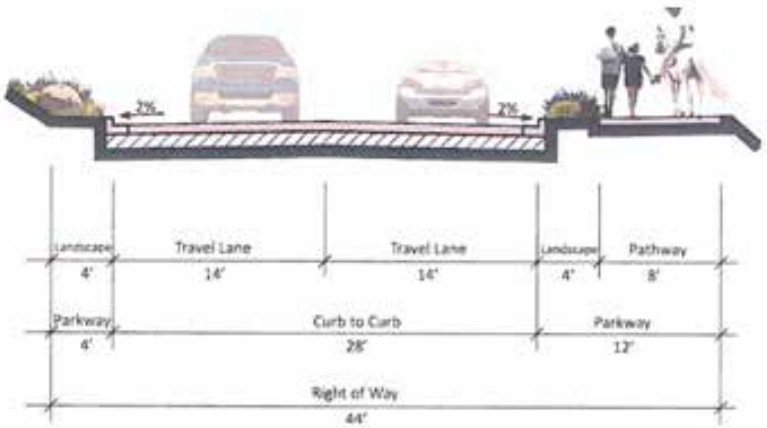
TABLE 2B: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

NON-MOBILITY ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDERS (# / WIDTH)	PARKWAY WIDTH	MINIMUM CURVE RADIUS	MAXIMUM DESIRABLE GRADE	MINIMUM DESIGN SPEED (MPH)
Residential Collector	2 / 12'	-	40'	60'	2 / 8'	10'	300'	12%	30
Rural Residential Collector *	2 / 12'	-	28'	48'	2 / 2'	10'	300'	12%	30
Residential Road	2 / 12'	-	36'	56'	2 / 6'	10'	200'	15%	30
Rural Residential Road *	2 / 12'	-	28'	48'	2 / 2'	10'	200'	15%	30
Residential Cul-de-sac	2 / 12'	-	32'	52'	2 / 4'	10'	200'	15%	30
Residential Loop	2 / 12'	-	32'	52'	2 / 4'	10'	200'	15%	30
Industrial/Commerical Collector	4 / 12'	-	68'	88'	2 / 10'	10'	300'	8%	30
Industrial/Commerical	2 / 16'	-	52'	72'	2 / 10'	10'	200'	8%	30
Industrial/Commercial Cul-de-sac	2 / 16'	-	52'	72'	2 / 10'	10'	200	8%	30
Frontage	2 / 12'	-	32' min	52' min	1 / 8'	10'	See above	See above	-
Alley	2 / 10'	-	20-30'	20-30'	None	None	50'	12%	n/a
Hillside Residential	See NOTE 4	-	-	-	-	-	-	-	-

NOTES:
1. Minimum longitudinal gradient shall be 1.0 percent for all road classifications shown above.
2. The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.
3. The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.
4. For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.
5. The minimum curve radii shown in the table above are based on the design speed with 6% superelevation.
6. Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

LEGEND: * Serves lots > 2 acres in size w/ no demand for on-street parking



F1

FIGURE

Camino Mayor - Public Modified Hillside Residential Street

Newland Sierra Specific Plan

ITEM 14
SECTION F1 MODIFIED HILLSIDE RESIDENTIAL STREET

Location: Camino Mayor, from the Summit Neighborhood to Equestrian Staging Area.
Approximate Length: 2,300'
Proposed ADT: 320 Maximum

REQUEST:
We propose a cross section with the same design criteria as "Hillside Residential Street Alternative No. 1 per San Diego County Design Standard DS-02" with the following exceptions:

A. We request that the parkway widths be decreased from 5' to 4' on one side and increased from 5' to 12' on the other.

B. We request that the Right of Way width be decreased from 50' to 44'.

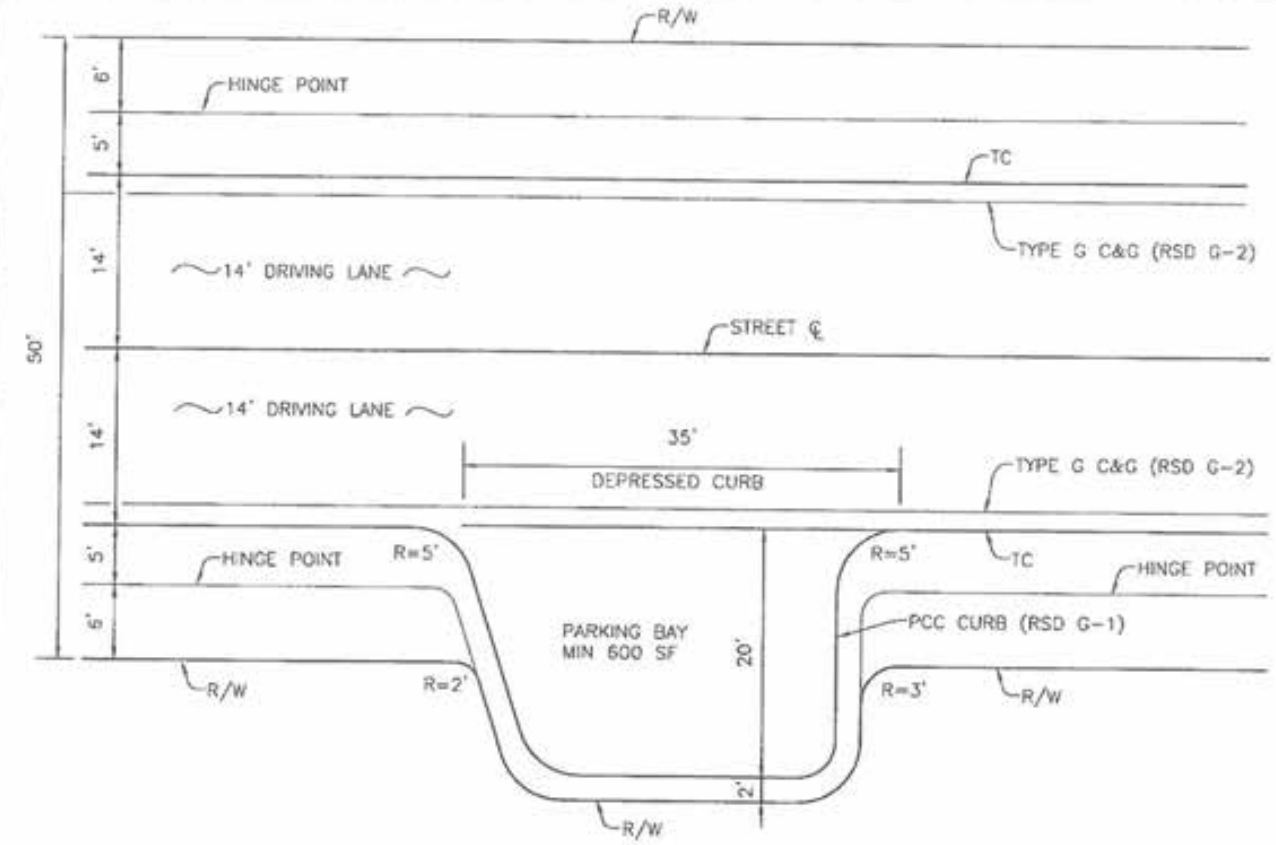
REASON:
These modifications to the "Hillside Residential Street Alternative No. 1 per San Diego County Design Standard DS-02" will provide opportunity for an increased parkway width from the standard 5' to 12' on the opposite side of the road allowing room for an 8' pathway and 4' planting strip, while reducing impacts to abutting parcels and proposed biological open space.

ALTERNATIVES:
Alternatives have been studied but none were found to provide both the proposed increased pavement width and reduced impacts to abutting owners as the alternative requested.

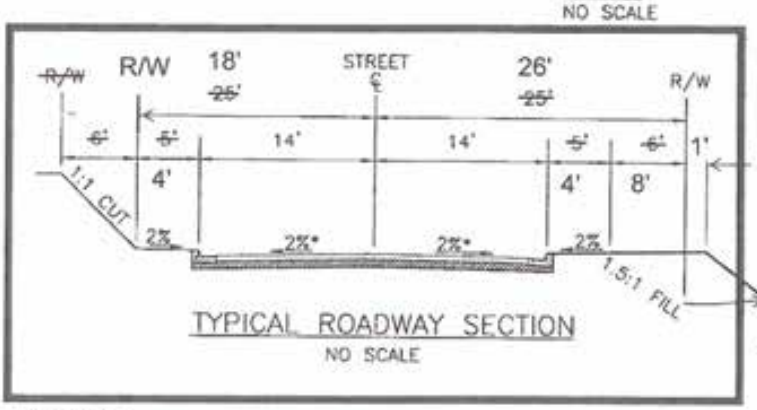
HARDSHIP:
Denial of this request would result in an increased graded footprint for the roadway, increasing impacts to proposed biological open space dedications.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.

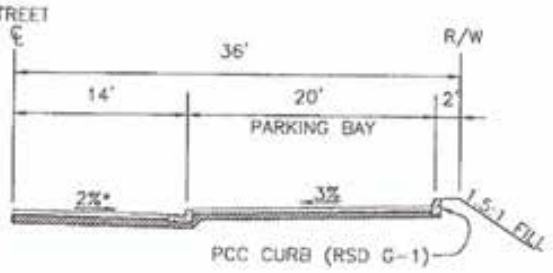
F1



PLAN
NO SCALE



TYPICAL ROADWAY SECTION
NO SCALE



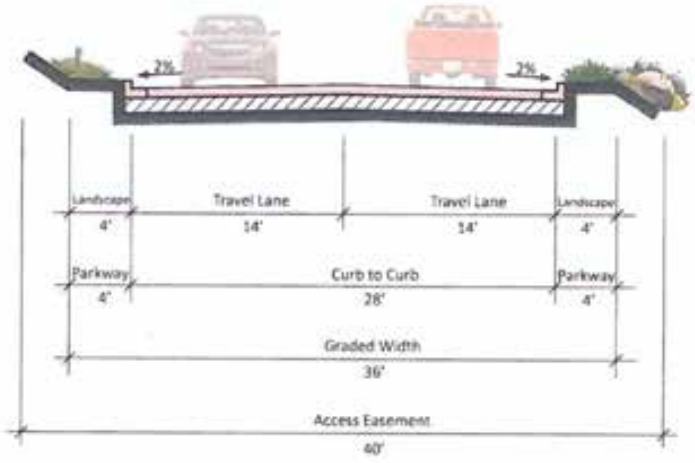
TYPICAL PARKING BAY SECTION
NO SCALE

* MAX 3% CROSSFALL/SUPERELEVATION

NOTES:

1. THIS STANDARD IS APPLICABLE ONLY TO CATEGORY 2 HILLSIDE RESIDENTIAL STREETS AS DEFINED IN COUNTY OF SAN DIEGO PUBLIC ROAD STANDARDS SECTION 4.5 N.
2. USE OF HILLSIDE RESIDENTIAL STREET STANDARDS ARE APPLICABLE ONLY TO NON-CIRCULATION ELEMENT STREETS CLASSIFIED AS RESIDENTIAL, RESIDENTIAL CUL-DE-SAC, OR RESIDENTIAL LOOP STREETS, AND ARE NOT APPLICABLE TO STREETS IN AREAS ZONED FOR COMMERCIAL, INDUSTRIAL OR MULTIPLE RESIDENTIAL USE.
3. CURB AND GUTTER (C&G) SHALL CONFORM TO SAN DIEGO AREA REGIONAL STANDARD DRAWINGS (RSD) AND COUNTY OF SAN DIEGO PUBLIC ROAD STANDARDS.
4. ONE 600 SQUARE FEET PERPENDICULAR PARKING BAY REQUIRED PER LOT. THE COUNTY ENGINEER MAY ALSO ESTABLISH ALTERNATE STANDARD TYPICAL SECTIONS WHICH WILL PROVIDE A MINIMUM OF TWO PARKING STALLS PER LOT.

DRAWN BY: SS	CHECKED BY: LMC	SAN DIEGO COUNTY DESIGN STANDARD	REVISION	APPROVED	DATE
RECOMMENDED BY: JEFF S MOODY					
APPROVED BY: [signature]		HILLSIDE RESIDENTIAL STREET ALTERNATIVE NO. 1			
DOUGLAS M. ISBELL, COUNTY ENGINEER					
RCE # 18634	EXP. 06/2007		DRAWING NUMBER	DS-02	



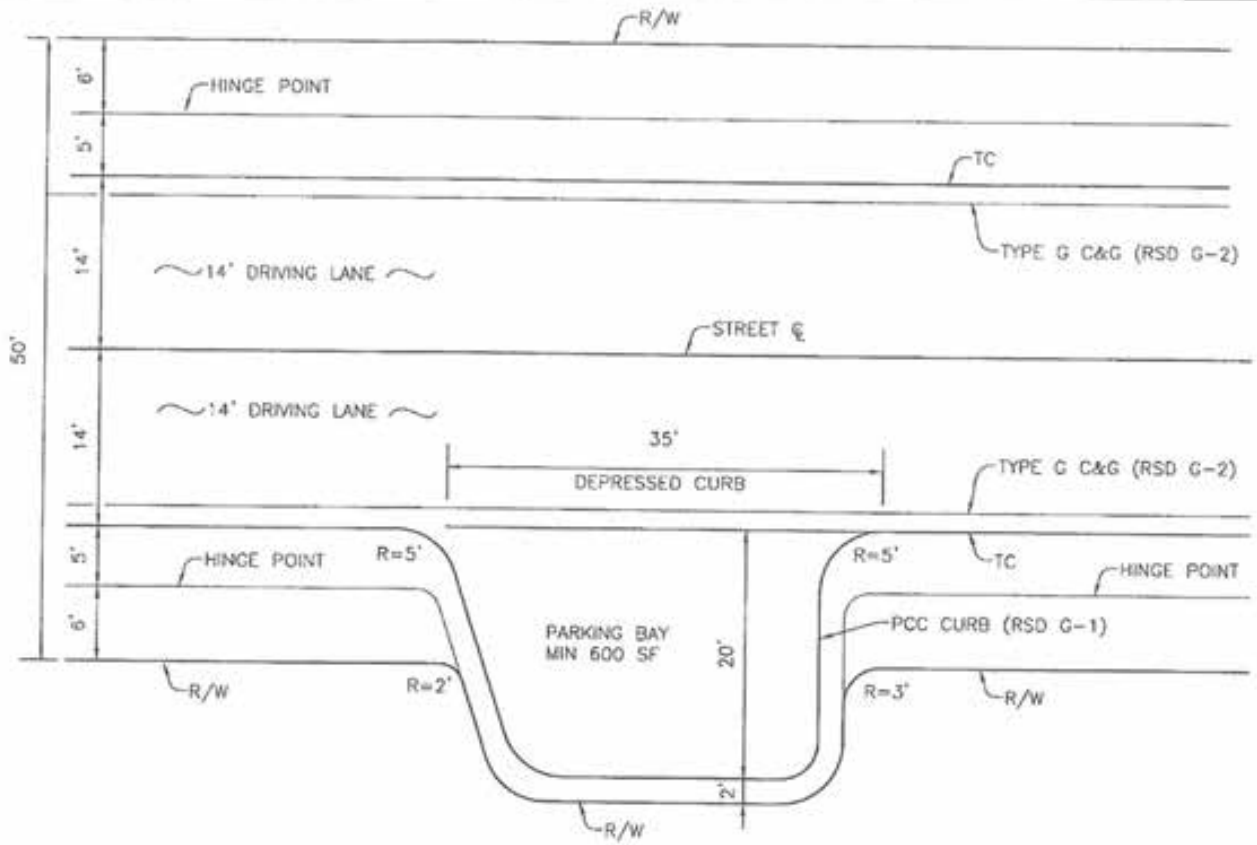
F2

FIGURE

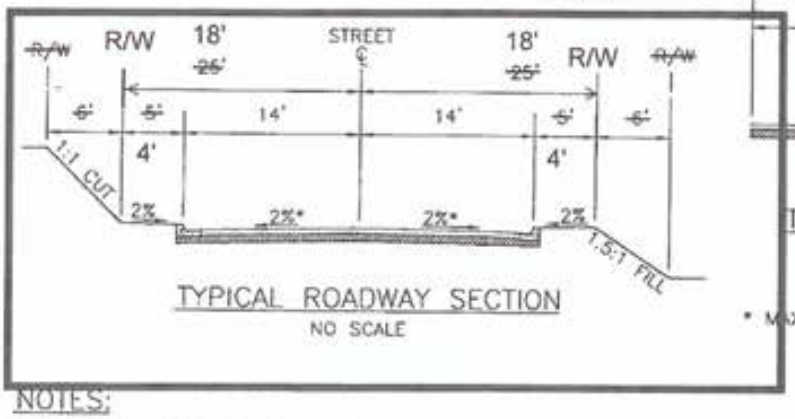
Camino Mayor - Private Modified Hillside Residential Street

Newland Sierra Specific Plan

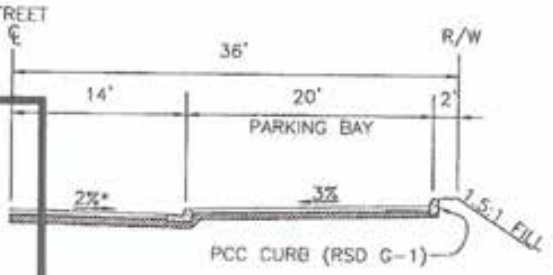
F2



PLAN
NO SCALE



TYPICAL ROADWAY SECTION
NO SCALE



TYPICAL PARKING BAY SECTION
NO SCALE

* MAX 3% CROSSFALL/SUPERELEVATION

NOTES:

1. THIS STANDARD IS APPLICABLE ONLY TO CATEGORY 2 HILLSIDE RESIDENTIAL STREETS AS DEFINED IN COUNTY OF SAN DIEGO PUBLIC ROAD STANDARDS SECTION 4.5 N.
2. USE OF HILLSIDE RESIDENTIAL STREET STANDARDS ARE APPLICABLE ONLY TO NON-CIRCULATION ELEMENT STREETS CLASSIFIED AS RESIDENTIAL, RESIDENTIAL CUL-DE-SAC, OR RESIDENTIAL LOOP STREETS, AND ARE NOT APPLICABLE TO STREETS IN AREAS ZONED FOR COMMERCIAL, INDUSTRIAL OR MULTIPLE RESIDENTIAL USE.
3. CURB AND GUTTER (C&G) SHALL CONFORM TO SAN DIEGO AREA REGIONAL STANDARD DRAWINGS (RSD) AND COUNTY OF SAN DIEGO PUBLIC ROAD STANDARDS.
4. ONE 600 SQUARE FEET PERPENDICULAR PARKING BAY REQUIRED PER LOT. THE COUNTY ENGINEER MAY ALSO ESTABLISH ALTERNATE STANDARD TYPICAL SECTIONS WHICH WILL PROVIDE A MINIMUM OF TWO PARKING STALLS PER LOT.

DRAWN BY: SS	CHECKED BY: LMC	SAN DIEGO COUNTY DESIGN STANDARD	REVISION	APPROVED	DATE
RECOMMENDED BY: JEFF S MOODY					
APPROVED BY: [signature]		HILLSIDE RESIDENTIAL STREET ALTERNATIVE NO. 1			
DOUGLAS M. ISBELL, COUNTY ENGINEER					
RCE # 18634	EXP. 06/2007		DRAWING NUMBER	DS-02	

ITEM 15
SECTION F2 MODIFIED HILLSIDE RESIDENTIAL STREET

Location: From the proposed Equestrian Staging Area to North Twin Oaks Valley Road.
Approximate Length: 2,500'
Proposed ADT: 320 Maximum

REQUEST:
We propose a cross section with the same design criteria as "Hillside Residential Street Alternative No. 1 per San Diego County Design Standard DS-02" with the following exceptions:

A. We request that the parkway widths be decreased from 5' to 4' on both sides.

B. We request that the Right of Way width be decreased from 50' to 40'.

C. We request that the sight-distance at the intersection of Camino Mayor and North Twin Oaks Valley Road be based on the prevailing speed survey (25 MPH) performed at this location on March 12, 2014 rather than the design speed of 40 MPH based on the "Light Collector with Intermittent Turn Lane (2.2C)" roadway classification assigned to the ultimate alignment of this road. (See Sight-Distance Study letter dated April, 11, 2017 attached).

REASONS:
Modifications A and B
These proposed reductions to the "Hillside Residential Street Alternative No. 1 per San Diego County Design Standard DS-02" will provide opportunity for increasing proposed biological open space and reducing impacts to parcels abutting the existing 40' private road easement.

Modification C

The current alignment of North Twin Oaks Valley Road is not consistent with published road classification geometry and has physical constraints in this vicinity which restrict travel speeds to less than those attainable with the future ultimate alignment of this road. For these reasons, we recommend that the 85th Percentile Prevailing Speeds identified in the March 2014 Speed Survey prepared by Linscott, Law and Greenspan Traffic Engineers be used for the intersection sight distance calculations.

Based on the 2014 Speed Survey, the 85th Percentile speeds for traffic at this location are:

Northbound: 24.4 MPH
Southbound: 22.4 MPH

Based on this data, we recommend a value of 25 MPH for corner sight distance calculations at this intersection. A stamped Sight Distance Study letter based on this recommendation is attached to this request.

There are IODs for a future realignment of North Twin Oaks Valley Road which have geometry adequate for its ultimate 40 MPH "Light Collector with Intermittent Turn Lane (2.2C)" design speed. Adequate, unobstructed sight distance from Camino Mayor can be physically provided at the ultimate alignment of North Twin Oaks Valley Road based on its ultimate design speed of 40 MPH.

ALTERNATIVES:

Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes. This Design Exception Request applies to the preferred alternative depicted on the Tentative Map and Preliminary Grading Plan and also the Camino Mayor Northern Alignment Alternative presented in the project EIR.

HARDSHIP:

Denial of this request would result in an increased graded footprint for the roadway, increasing the impact on adjacent owners.

COST ESTIMATE:

Cost is not a factor presented with this Design Exception Request.

FUSCOE ENGINEERING

Irvine
San Diego
Ontario
Los Angeles
El Centro
San Ramon
Mission Hills

April 12, 2017

Mr. Richard E. Crompton, Director
County of San Diego, Department of Public Works
5510 Overland Avenue
San Diego, Ca 92123

Sight Distance Study for: Newland Sierra TM 5597
Camino Mayor at N. Twin Oaks Valley Road

Dear Mr. Crompton,

I, Eric K. Armstrong. RCE 36083 state that physically there will be a minimum adequate unobstructed sight distance in both directions along existing public road "North Twin Oaks Valley Road" per Design Standards of Section 6.1 Table 5 of the March 2012 Update of the County of San Diego Public Road Standards from both future private road "Camino Mayor" and the possible "Camino Mayor Alternate Alignment".

The current alignment of North Twin Oaks Valley Road is not consistent with published road classification geometry and has physical constraints in this vicinity which restrict travel speeds to less than those attainable with the future ultimate "Light Collector with Intermittent turn Lane (2.2C)" classification of this road. For these reasons, we recommend that the 85th Percentile Prevailing Speeds identified in the March 2014 Speed Survey prepared by Linscott, Law and Greenspan Traffic Engineers be used for the intersection sight distance calculations.

Based on the 2014 Speed Survey, the 85th Percentile speeds for traffic at this location are:

Northbound: 24.4 MPH
Southbound: 22.4 MPH

Based on this data, we recommend a value of 25 MPH for corner sight distance calculations at this intersection. Per County Design Standard DS-20 this 25 MPH speed requires 250 feet of sight distance.

There are IODs for a future realignment of North Twin Oaks Valley Road which have geometry adequate for its ultimate "Light Collector" 40 MPH design speed. Adequate, unobstructed sight distance from Camino Mayor can be physically provided at the ultimate alignment of Twin Oaks Valley Road based on its ultimate design speed of 40 MPH.

Sincerely,

Eric Armstrong, PE QSD
Regional Director
Fuscoe Engineering // RCE 36083

REGISTERED PROFESSIONAL ENGINEER
ERIC K. ARMSTRONG
No. 36083
Exp. 6/30/18
CIVIL
STATE OF CALIFORNIA

Encl: Speed Survey Data Sheets (3/12/2014), Intersection Sight Distance Study Plan and Profile (4/11/2017).

LINSCOTT LAW & GREENSPAN engineers

24 Hour Speed Survey

Accurate Video Counts Inc
info@accuratevideocounts.com
(619) 987-5136

Location: Twin Oaks Valley Road s/o Camino Mayor
Direction: *Northbound*
Date *Wednesday, March 12, 2014*
Proj. No: *14-0177*

85th Percentile Speed = 24.4 MPH

Time	0 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75 - 79	80 - 99	Total
0:00 - 1:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1:00 - 2:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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3:00 - 4:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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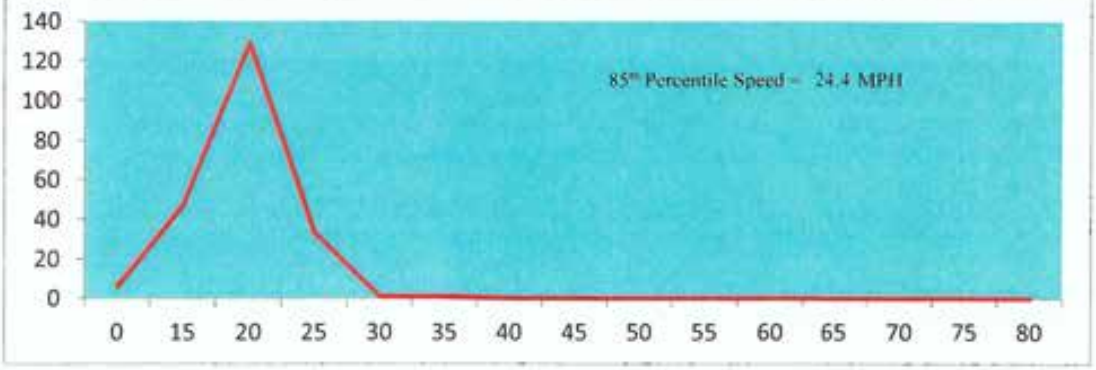
Total	6	47	129	33	1	1	-	-	-	-	-	-	-	-	-	217
Percentage	3%	22%	59%	15%	0%	0%										100%

Average Speed = 23.5 MPH *50th Percentile Speed = 21.2 MPH*



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22:00 - 23:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23:00 - 0:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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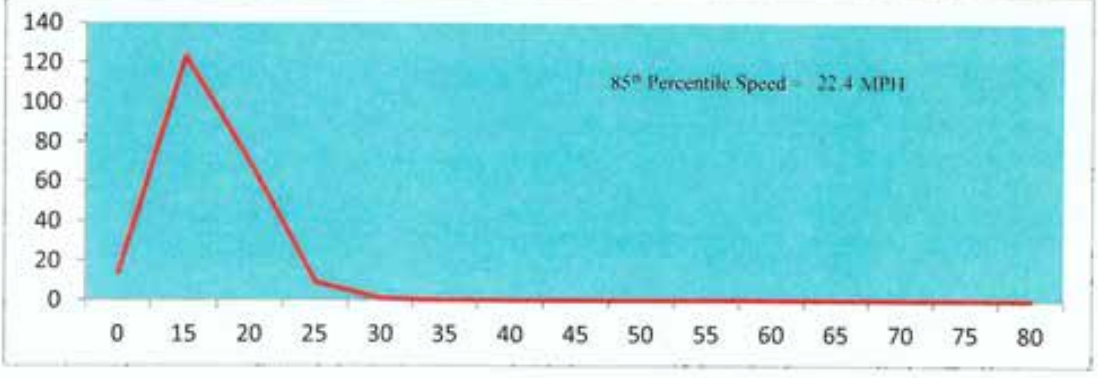
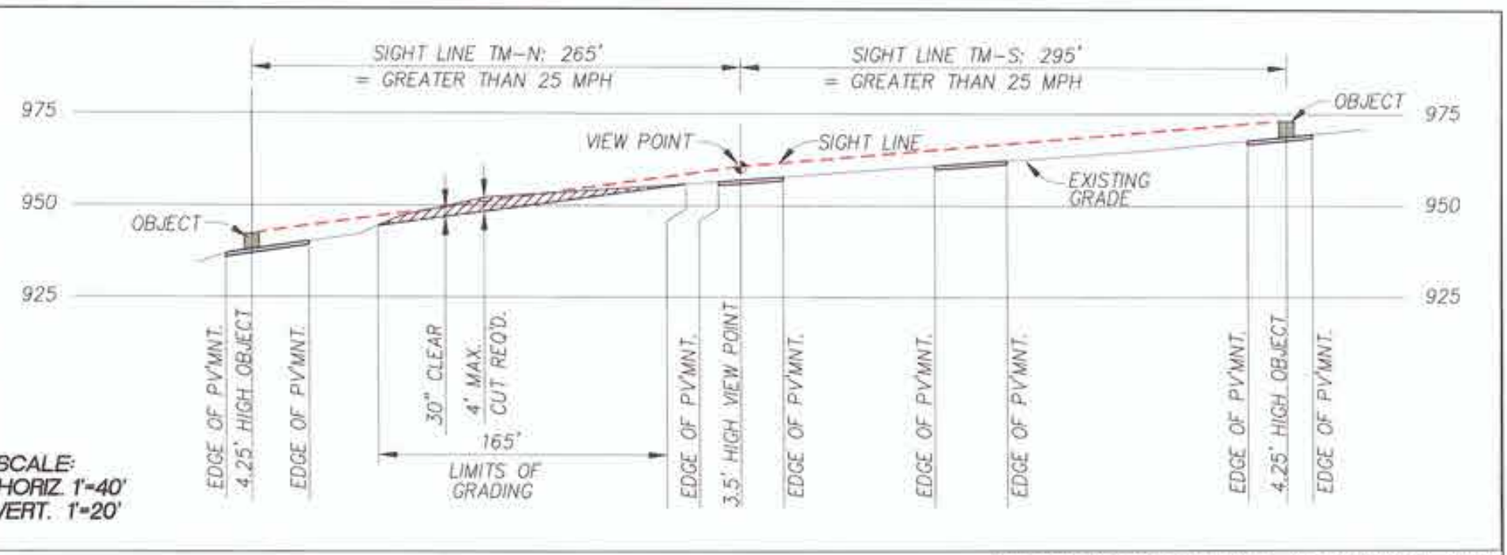
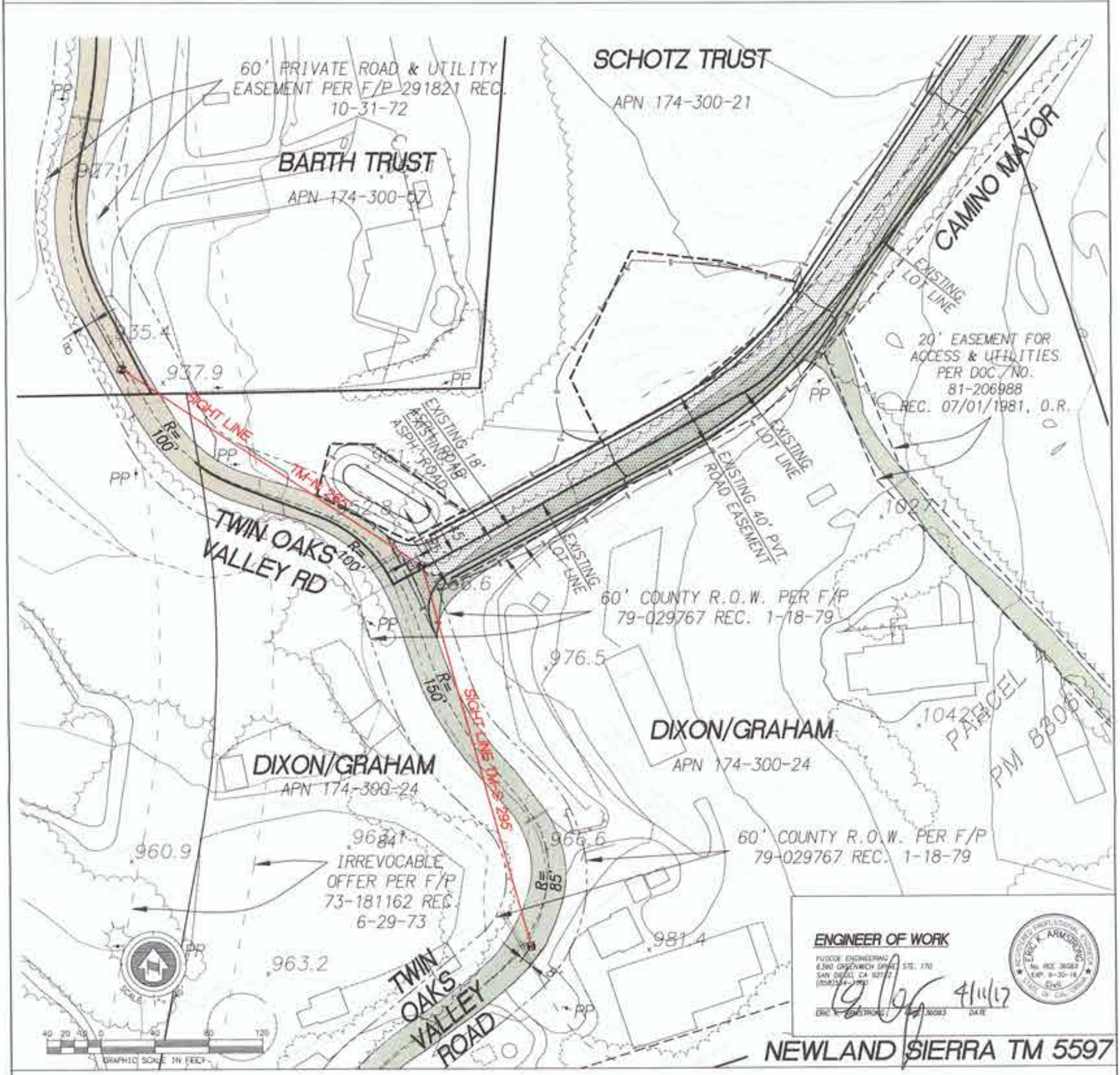
Average Speed = 20.8 MPH **50th Percentile Speed = 17.8 MPH**





TENTATIVE MAP ALIGNMENT



ENGINEER OF WORK

FUSCOE ENGINEERING
6390 GREENWICH DRIVE, STE. 170
SAN DIEGO, CA 92122
(858)554-1500

ERIC K. ARMSTRONG
No. RCE 36083
EXP. 9-30-18
CIVIL
STATE OF CALIFORNIA

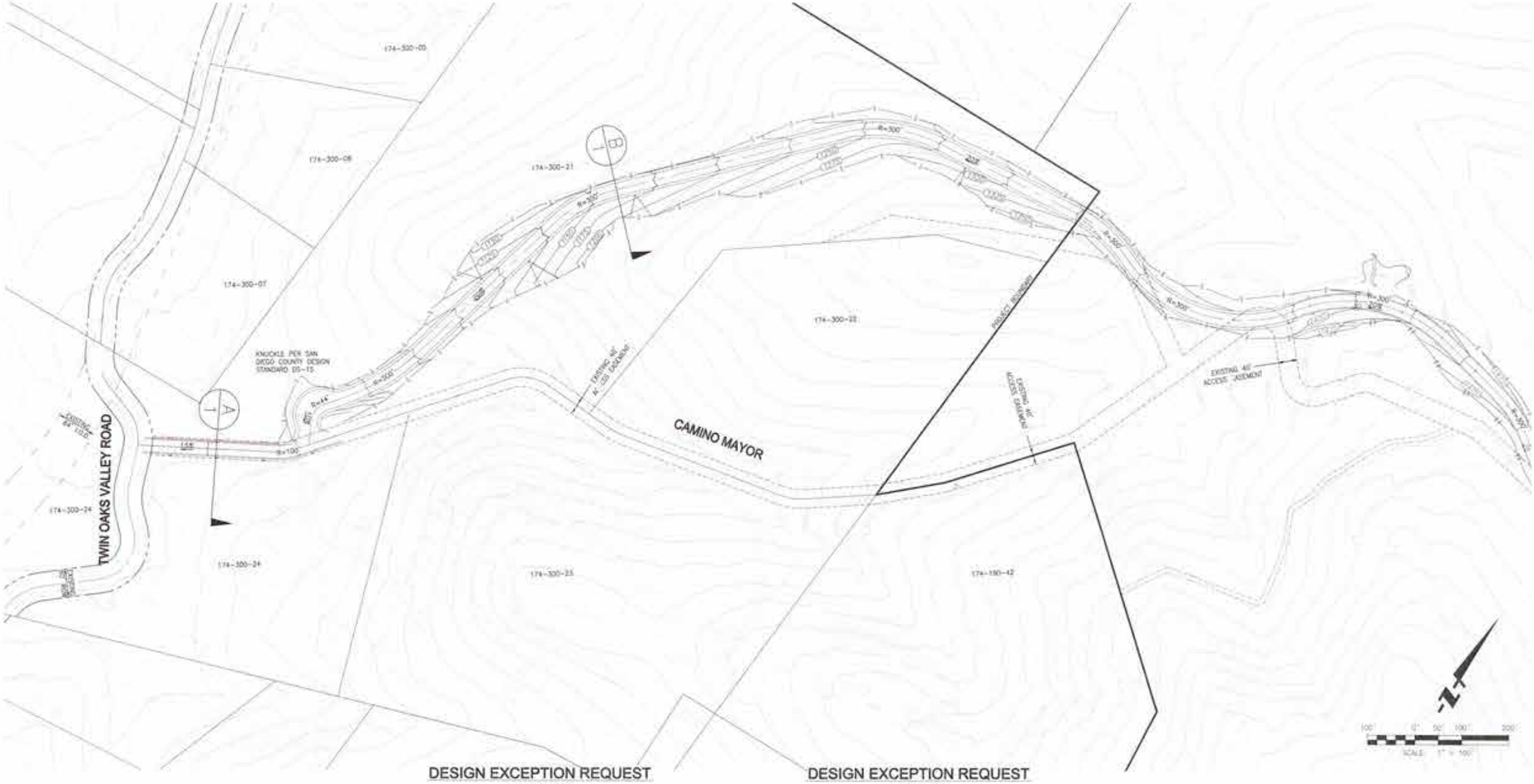
ERIC K. ARMSTRONG | RCE 36083 | DATE 4/11/17

NEWLAND SIERRA TM 5597

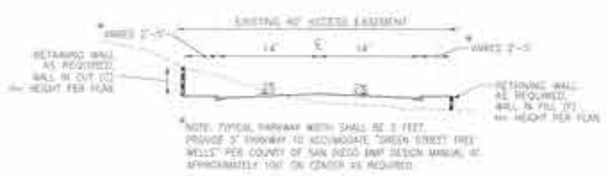
FUSCOE ENGINEERING
6390 Greenwich Drive, Suite 170
San Diego, California 92122
tel 858.554.1500 • fax 858.597.0335
www.fuscoe.com

CAMINO MAYOR

INTERSECTION SIGHT DISTANCE STUDY APRIL 11, 2017

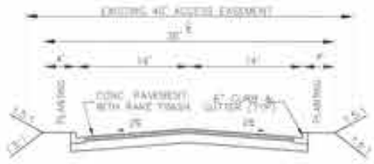


DESIGN EXCEPTION REQUEST
ITEM 16



SECTION A - CAMINO MAYOR
TYPICAL SECTION
NO SCALE

DESIGN EXCEPTION REQUEST
ITEM 15



SECTION B - CAMINO MAYOR
MODIFIED HILLSIDE RESIDENTIAL STREET
NO SCALE

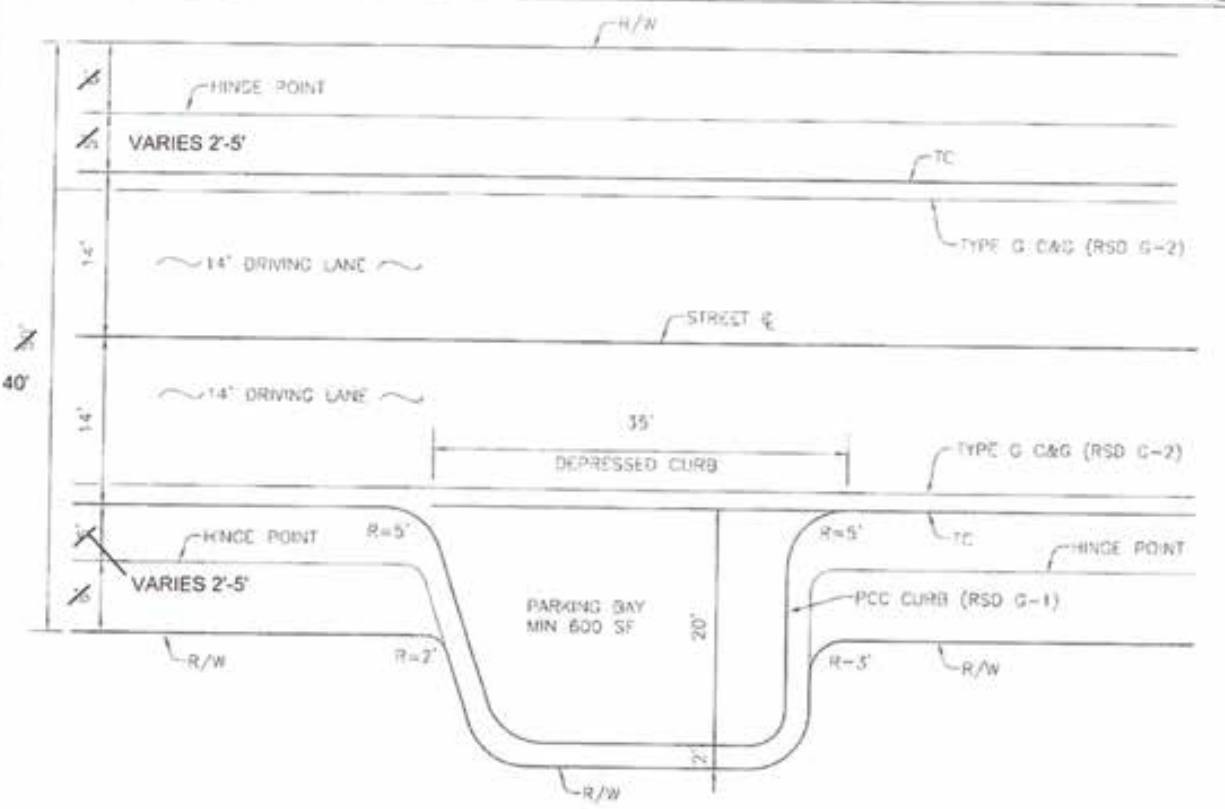
DESIGN EXCEPTION REQUEST
ITEMS 15 AND 16

CAMINO MAYOR

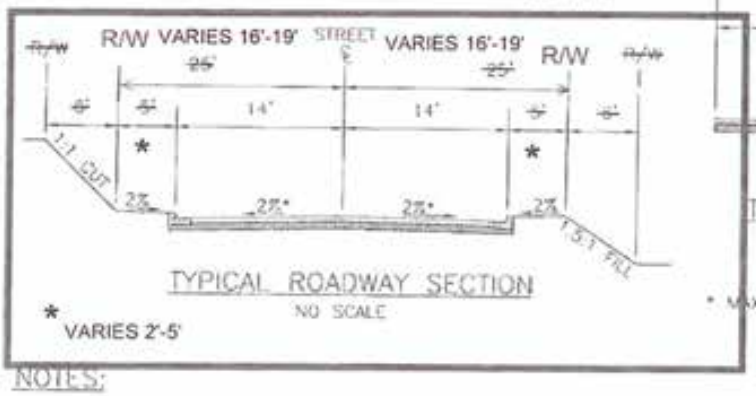
NORTHERN ALTERNATIVE

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

ALTERNATE (F2)

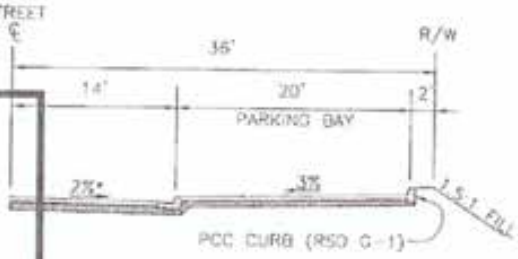


PLAN
NO SCALE



TYPICAL ROADWAY SECTION
NO SCALE

* VARIES 2'-5'



TYPICAL PARKING BAY SECTION
NO SCALE

* MAX 3% CROSSFALL/SUPERELEVATION

NOTES:

1. THIS STANDARD IS APPLICABLE ONLY TO CATEGORY 2 HILLSIDE RESIDENTIAL STREETS AS DEFINED IN COUNTY OF SAN DIEGO PUBLIC ROAD STANDARDS SECTION 4.5 N.
2. USE OF HILLSIDE RESIDENTIAL STREET STANDARDS ARE APPLICABLE ONLY TO NON-CIRCULATION ELEMENT STREETS CLASSIFIED AS RESIDENTIAL, RESIDENTIAL CUL-DE-SAC, OR RESIDENTIAL LOOP STREETS, AND ARE NOT APPLICABLE TO STREETS IN AREAS ZONED FOR COMMERCIAL, INDUSTRIAL OR MULTIPLE RESIDENTIAL USE.
3. CURB AND GUTTER (C&G) SHALL CONFORM TO SAN DIEGO AREA REGIONAL STANDARD DRAWINGS (RSD) AND COUNTY OF SAN DIEGO PUBLIC ROAD STANDARDS.
4. ONE 600 SQUARE FEET PERPENDICULAR PARKING BAY REQUIRED PER LOT. THE COUNTY ENGINEER MAY ALSO ESTABLISH ALTERNATE STANDARD TYPICAL SECTIONS WHICH WILL PROVIDE A MINIMUM OF TWO PARKING STALLS PER LOT.

DRAWN BY: SS	CHECKED BY: LMC	SAN DIEGO COUNTY DESIGN STANDARD	REVISION	APPROVED	DATE
RECOMMENDED BY: JEFF S. MOODY					
APPROVED BY:		HILLSIDE RESIDENTIAL STREET ALTERNATIVE NO. 1			
DOUGLAS M. ISBELL, COUNTY ENGINEER					
RCE # 18534 EXP: 06/2007			DRAWING NUMBER	DS-02	

ITEM 16
ALTERNATE SECTION F2 MODIFIED HILLSIDE RESIDENTIAL STREET
FOR "EASEMENT ONLY" ALTERNATIVE ALINGMENT

Location: From the proposed Equestrian Staging Area to North Twin Oaks Valley Road.
Approximate Length: 2,500'
Proposed ADT: 320 Maximum

REQUEST:
We propose a cross section with the same design criteria as "Hillside Residential Street Alternative No. 1 per San Diego County Design Standard DS-02" with the following exceptions:

A. We request that the parkway widths be decreased to vary from 5' to 2' on both sides.

B. We request that the Right of Way width be decreased from 50' to 40'.

C. We request that the minimum horizontal radius be reduced from 150' to 100'.

D. We request that speed limit signs of 20 MPH be posted and that lighting and signage acceptable to the Director of Public Works be installed.

E. We request that the sight-distance at the intersection of Camino Mayor and North Twin Oaks Valley Road be based on the prevailing speed survey (25 MPH) performed at this location on March 12, 2014 rather than the design speed of 40 MPH based on the "Light Collector with Intermittent Turn Lane (2.2C)" roadway classification assigned to the ultimate alignment of this road. (See Sight-Distance Study letter dated April, 11, 2017 attached).

REASONS:
Modifications A and B
These proposed reductions to the "Hillside Residential Street Alternative No. 1 per San Diego County Design Standard DS-02" are requested only if the "Easement Only

Alternative" alignment is selected. It will allow proposed improvements to Camino Mayor within its current 40-foot wide access easement. Approval of this request will provide opportunity for constructing a roadway with standard pavement width and minimum impacts to private parcels abutting the existing 40' private road easement.

Modifications C and D

This reduction from "Private Road Standard Section 3.1C for private roadways serving 101-750 ADT with no offer of dedication" will allow the proposed road to remain within the existing 40' private access easement which has a minimum radius of 100'. The applicant requests to post the speed limit for this segments as 20 MPH and agrees to provide lighting and signage acceptable to the director of Public Works if the exception is granted.

Modification E

The current alignment of North Twin Oaks Valley Road is not consistent with published road classification geometry and has physical constraints in this vicinity which restrict travel speeds to less than those attainable with the future ultimate alignment of this road. For these reasons, we recommend that the 85th Percentile Prevailing Speeds identified in the March 2014 Speed Survey prepared by Linscott, Law and Greenspan Traffic Engineers be used for the intersection sight distance calculations.

Based on the 2014 Speed Survey, the 85th Percentile speeds for traffic at this location are:

Northbound: 24.4 MPH
Southbound: 22.4 MPH

Based on this data, we recommend a value of 25 MPH for corner sight distance calculations at this intersection. A stamped Sight Distance Study letter based on this recommendation is attached to this request.

There are IODs for a future realignment of North Twin Oaks Valley Road which have geometry adequate for its ultimate 40 MPH "Light Collector with Intermittent Turn Lane (2.2C)" design speed. Adequate, unobstructed sight distance from Camino Mayor can be physically provided at the ultimate alignment of North Twin Oaks Valley Road based on its ultimate design speed of 40 MPH.

ALTERNATIVES:
Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes.

HARDSHIP:
Denial of this request would result in an increased graded footprint for the roadway, increasing the impact on adjacent owners.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request

FUSCOE
ENGINEERING

April 12, 2017

Mr. Richard E. Crompton, Director
County of San Diego, Department of Public Works
5510 Overland Avenue
San Diego, Ca 92123

Sight Distance Study for: Newland Sierra TM 5597
Camino Mayor at N. Twin Oaks Valley Road

Dear Mr. Crompton,

I, Eric K. Armstrong. RCE 36083 state that physically there will be a minimum adequate unobstructed sight distance in both directions along existing public road "North Twin Oaks Valley Road" per Design Standards of Section 6.1 Table 5 of the March 2012 Update of the County of San Diego Public Road Standards from both future private road "Camino Mayor" and the possible "Camino Mayor Alternate Alignment".

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Sincerely,

Eric Armstrong, PE QSD
Regional Director
Fuscoe Engineering // RCE 36083

REGISTERED PROFESSIONAL ENGINEER
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Encl: Speed Survey Data Sheets (3/12/2014), Intersection Sight Distance Study Plan and Profile (4/11/2017).

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AVC

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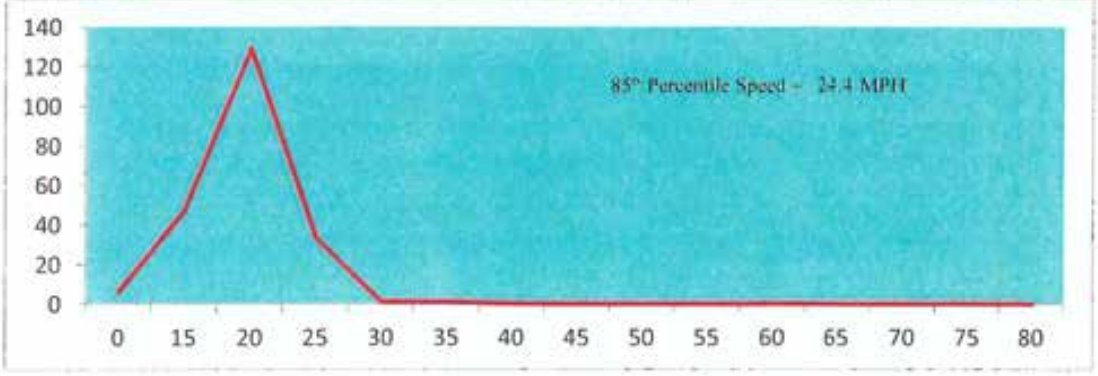

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Time	0 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75 - 79	80 - 99	Total
0:00 - 1:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1:00 - 2:00	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
2:00 - 3:00	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
3:00 - 4:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 - 5:00	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
5:00 - 6:00	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2
6:00 - 7:00	-	4	2	1	-	-	-	-	-	-	-	-	-	-	-	7
7:00 - 8:00	-	3	10	-	-	-	-	-	-	-	-	-	-	-	-	13
8:00 - 9:00	1	13	5	1	-	-	-	-	-	-	-	-	-	-	-	20
9:00 - 10:00	1	10	2	1	-	-	-	-	-	-	-	-	-	-	-	14
10:00 - 11:00	1	16	6	-	-	-	-	-	-	-	-	-	-	-	-	23
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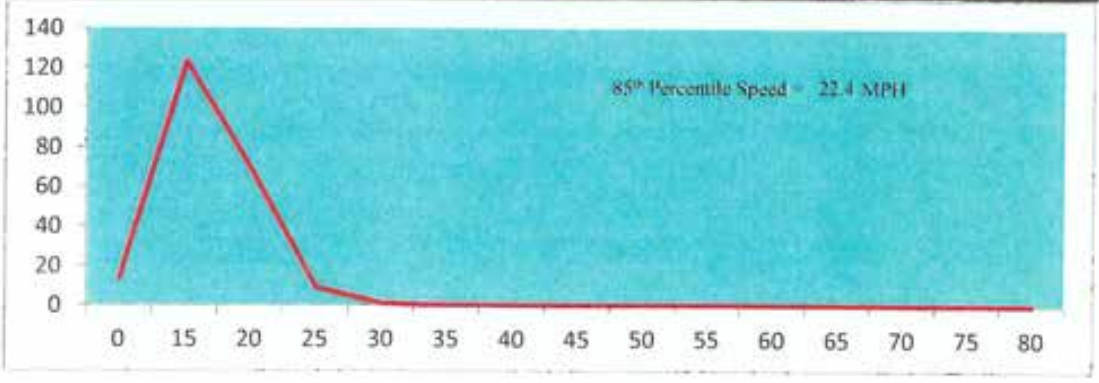
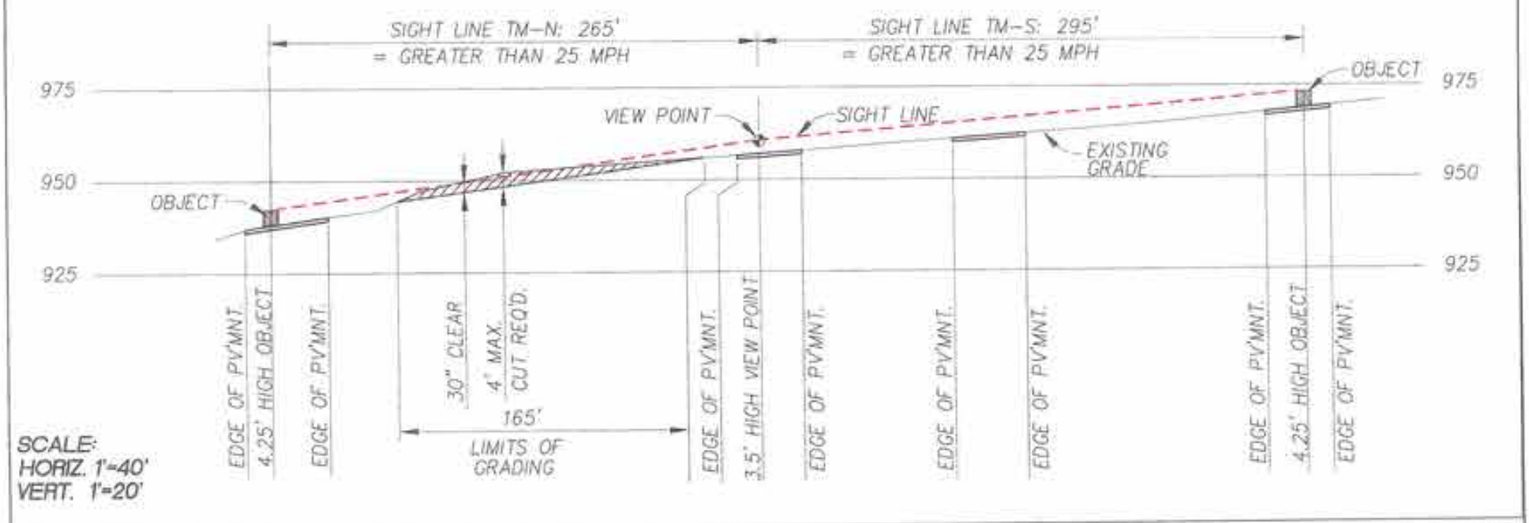
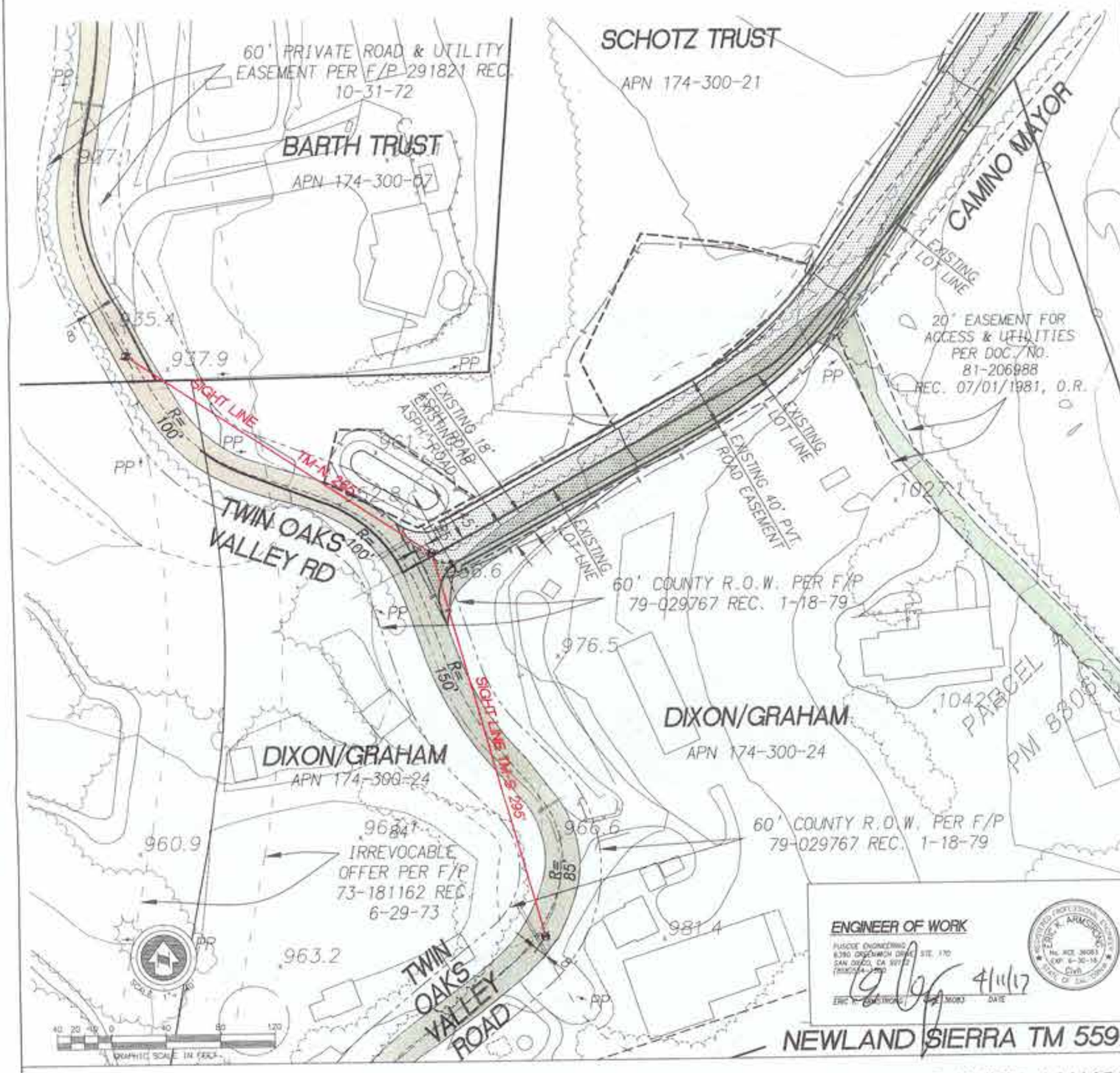
13:00 - 14:00	1	9	11	-	-	-	-	-	-	-	-	-	-	-	-	21
14:00 - 15:00	3	7	3	-	-	-	-	-	-	-	-	-	-	-	-	13
15:00 - 16:00	-	14	5	1	-	-	-	-	-	-	-	-	-	-	-	20
16:00 - 17:00	1	3	5	-	-	-	-	-	-	-	-	-	-	-	-	9
17:00 - 18:00	1	5	1	-	1	-	-	-	-	-	-	-	-	-	-	8
18:00 - 19:00	-	5	4	3	-	-	-	-	-	-	-	-	-	-	-	12
19:00 - 20:00	-	1	5	-	-	-	-	-	-	-	-	-	-	-	-	6
20:00 - 21:00	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	2
21:00 - 22:00	2	3	2	2	-	-	-	-	-	-	-	-	-	-	-	9
22:00 - 23:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23:00 - 0:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	14	123	69	9	1	-	-	-	-	-	-	-	-	-	-	216
Percentage	6%	57%	32%	4%	0%											100%

Average Speed = 20.8 MPH **50th Percentile Speed = 17.8 MPH**

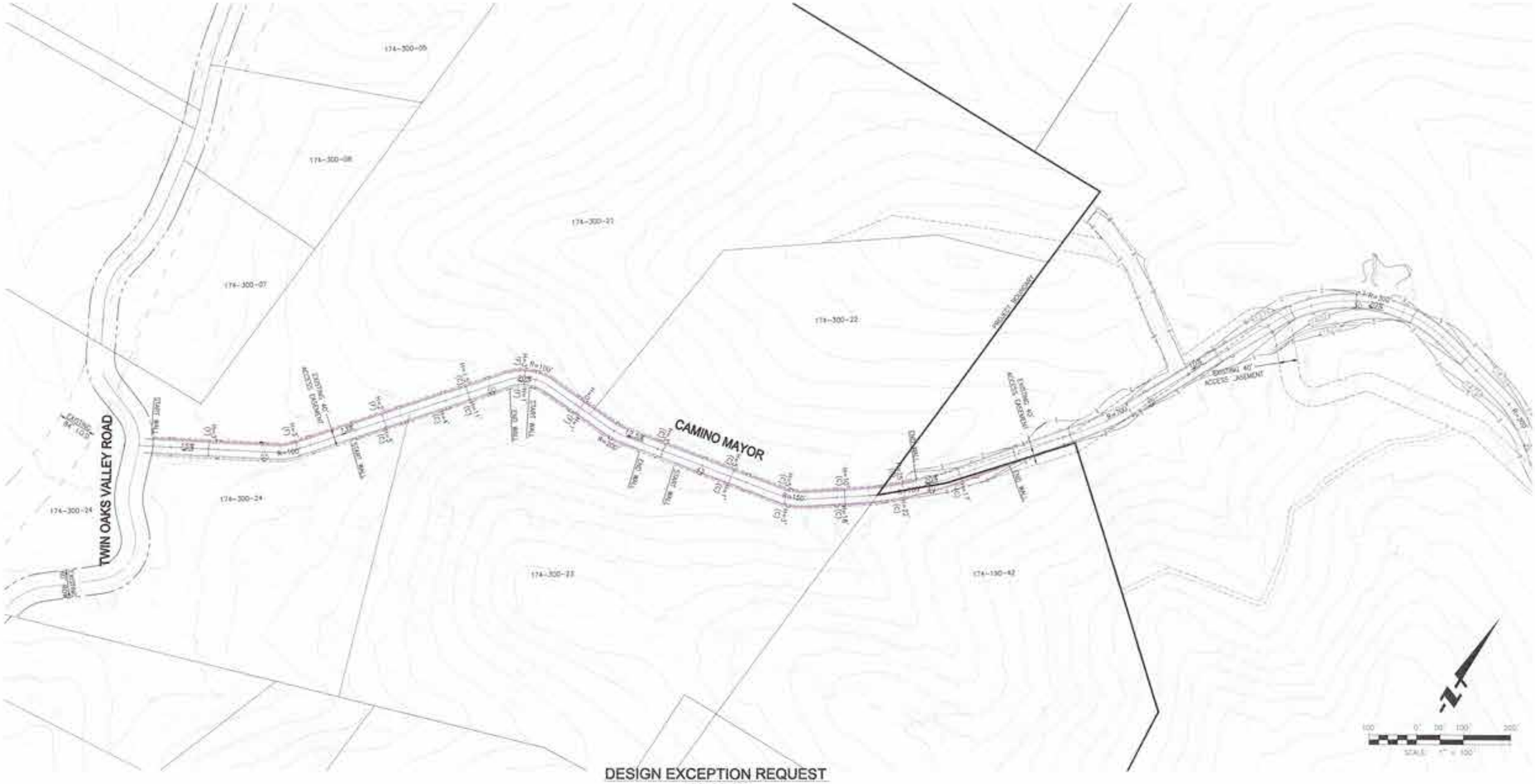




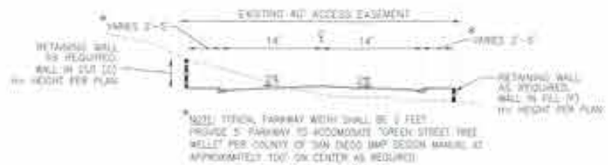
TENTATIVE MAP ALIGNMENT



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



DESIGN EXCEPTION REQUEST
ITEM 16



CAMINO MAYOR
TYPICAL SECTION
NO SCALE

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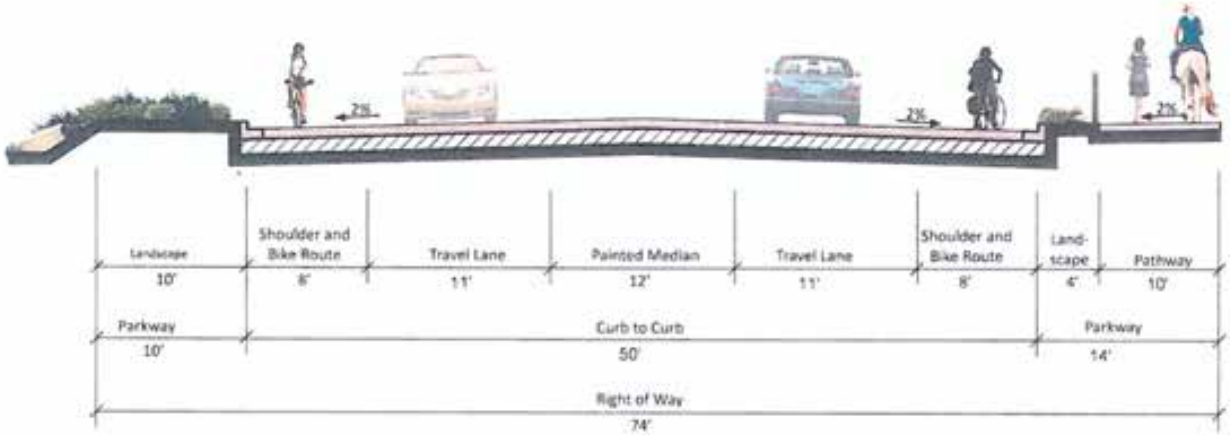
DESIGN EXCEPTION REQUEST
ITEM 16

CAMINO MAYOR

EASEMENT ALTERNATIVE



H1

Deer Springs Road- Community Collector with Continuous Left Turn Lane

DEER SPRINGS ROAD

ITEM 17
SECTION H1 COMMUNITY COLLECTOR WITH CONTINUOUS LEFT TURN LANE 2.1B

Location: Deer Springs Road from Mesa Rock Road to 900' Easterly of Sarver Lane
Approximate Length: 7,200' (1.3 miles)
Proposed ADT: 27,760 Maximum

REQUEST:
We propose a cross section with the same design criteria as a "Community Collector with Continuous Left Turn Lane, 2.1B" per table 2A of the County Public Road Standards with the design exceptions listed below.

A. We request an exception to provide a 12'painted median rather than the standard 14'.
B. We request no pedestrian provisions within the standard 10' parkway on the south side.
C. We request a No Parking provision for the 8' shoulders to be used jointly as a Class II Bikeway in accordance with the bicycle facility option in Appendix A of the Public Road Standards.
D. We request that lane widths be reduced from 12' to 11'.

REASON:
This exception request will provide the opportunity for a 10' Multi-use trail and 4' landscape/utility zone while both maintaining the standard 74' right of way width and minimizing impacts to abutting parcels.

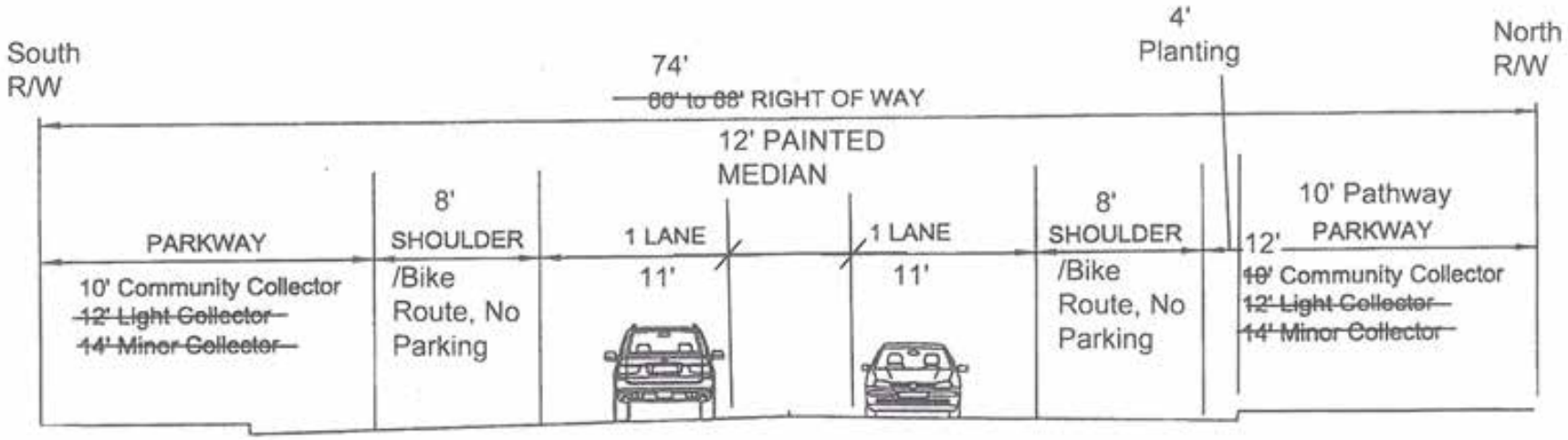
ALTERNATIVES:
Alternatives have been studied to minimize impacts while providing continued driveway access for abutting owners, and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to abutting parcels.

HARDSHIP:

Denial of this request would result in an increased graded footprint for the roadway, increasing grading quantities and slope heights and increasing the impact on adjacent owners, or the elimination of the proposed 10' pathway.

COST ESTIMATE:

Cost is not a factor presented with this Design Exception Request.

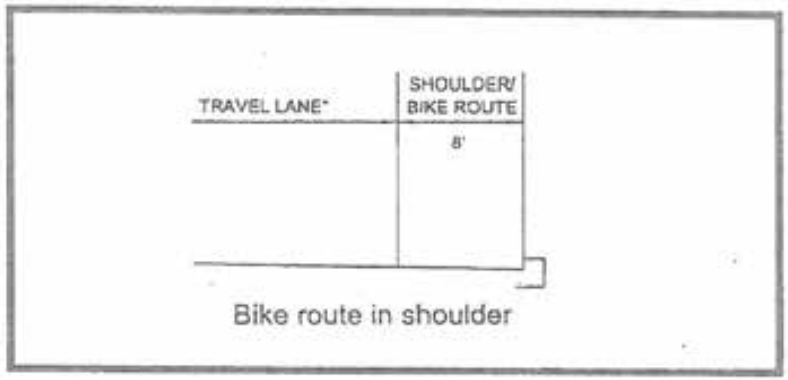


Collector Series with NO Improvements

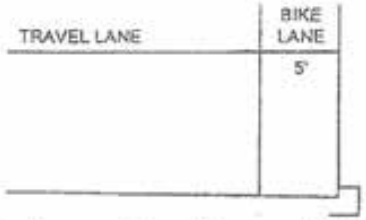
[Cross section with Intermittent Turn Lanes is similar except at intersections, which contain a 14' dedicated turn lane that produces a wider ROW]

Proposed Section (H1)

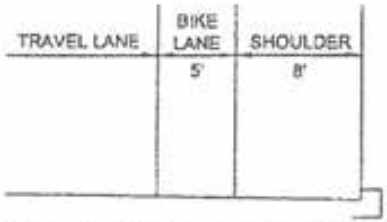
BICYCLE FACILITY OPTIONS



Bike route in shoulder



Bike lane with parking restrictions



Bike lane with separate shoulder and parking

TABLE 2A: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

MOBILITY ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDERS (# / WIDTH)	PARKWAY WIDTH	MIN. CURVE RADIUS	MAX. DESIRABLE GRADE	MIN. DESIGN SPEED (MPH)
Expressway (6.1)	6 / 12'	34'	126'	146'	2 / 10'	10'	1,700'	6%	65
Prime Arterial (6.2)	6 / 12'	14'	102'	122'	2 / 8'	10'	1,700'	6%	65
Major Road									
With Raised Median (4.1A)	4 / 12'	14'	78'	98'	2 / 8'	10'	1,200'	7%	55
With Intermittent Turn Lanes (4.1B)	4 / 12'	-	64' - 78'	84' - 98'	2 / 8'	10'	1,200'	7%	55
Boulevard									
With Raised Median (4.2A)	4 / 12'	14'	78'	106'	2 / 8'	14'	500'	9%	40
With Intermittent Turn Lanes (4.2B)	4 / 12'	-	64' - 78'	92' - 106'	2 / 8'	14'	500'	9%	40
Community Collector									
With Raised Median (2.1A)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Continuous Left Turn Lane (2.1B)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Intermittent Turn Lanes (2.1C)	2 / 12'	-	40' - 54'	60' - 74'	2 / 8'	10'	700'	9%	45
With Improvement Options (2.1D)	2 / 12'	-	40' - 54'	84'	2 / 8'	15' - 22'	700'	9%	45
No Median (2.1E)	2 / 12'	-	40'	60'	2 / 8'	10'	700'	9%	45
Light Collector									
With Raised Median (2.2A)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Continuous Left Turn Lane (2.2B)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Intermittent Turn Lanes (2.2C)	2 / 12'	-	40' - 54'	64' - 78'	2 / 8'	12'	500'	9%	40
With Improvement Options (2.2D)	2 / 12'	-	40' - 54'	88'	2 / 8'	17' - 24'	500'	9%	40
No Median (2.2E)	2 / 12'	-	40'	64'	2 / 8'	12'	500'	9%	40
With Reduced Shoulder (2.2F)	2 / 12'	-	28'	52'	2 / 2'	12'	500'	9%	40
Minor Collector									
With Raised Median (2.3A)	2 / 12'	14'	54'	82'	2 / 8'	14'	350'	12%	35
With Intermittent Turn Lanes (2.3B)	2 / 12'	-	40' - 54'	68' - 82'	2 / 8'	14'	350'	12%	35
No Median (2.3C)	2 / 12'	-	40'	68'	2 / 8'	14'	350'	12%	35

NOTES:

1 Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above.

2 The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.

3 The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.

4 For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.

5 Additional pavement and ROW may be required for ME Boulevards / Community Collectors (4 feet) and Light Collectors (12 feet) in Industrial/Commercial Zones.

6 ME roads needing additional turn or passing lanes will require an additional 12 to 14 feet of pavement and ROW for each lane.

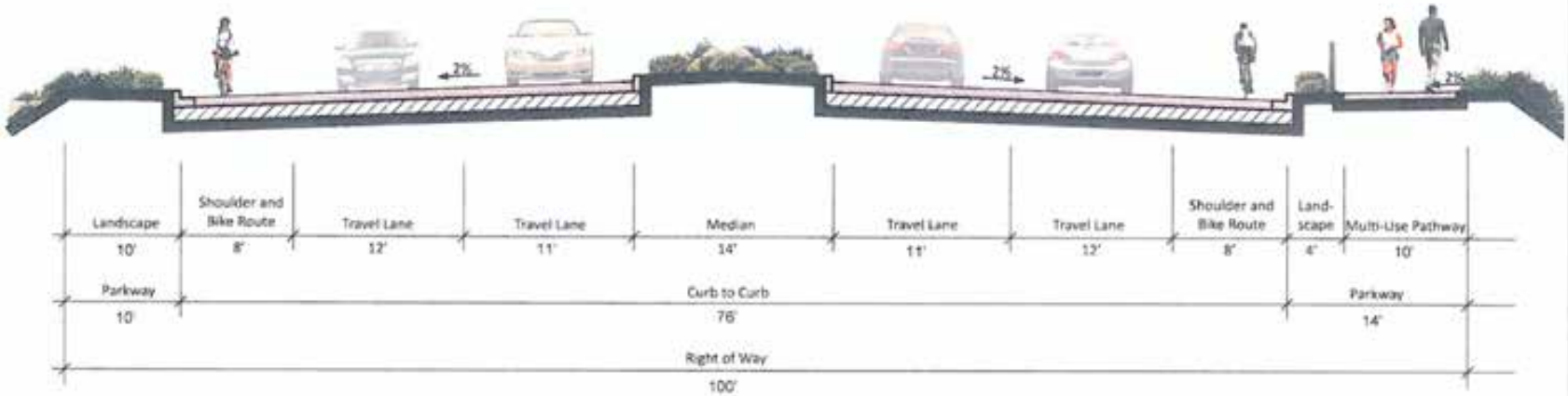
7 The maximum superelevation allowed on ME roads is 6%. Superelevation is not normally required on Non-ME roads.

8 ME roads designated with Bike Lanes will require an additional 10 feet of pavement and ROW. This may be increased to 12' for four-lane roads and above based upon the provisions in Section 7.3 of these standards.

9 The minimum curve radii, shown in the table above, are based on the design speed with 6% superelevation.

10 Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

11 Road surfacing widths include median width.



H2

Deer Springs Road- Major Road with Raised Median

Newland Sierra - Road Sections

ITEM18
SECTION H2 MAJOR ROAD WITH RAISED MEDIAN 4.1A

Location: Deer Springs Road from Sarver Lane to San Marcos City Limits
Approximate Length: 2,700' (0.5 miles)
Proposed ADT: 32,440 Maximum

REQUEST:
We propose a cross section with the same design criteria as a "Major Road with Raised Median, 4.1A" per table 2A of the County Public Road Standards with the design exceptions listed below.

A. We request no pedestrian provisions within a 10' parkway on the south side.
B. We request a minimum horizontal radius of 750' with a design speed of 45 MPH rather than the 1,200' minimum radius and 55 MPH design speed of the "Major Road with Intermittent Turn Lanes (4.1A) per Table2A .
C. We request a No Parking provision for the 8' shoulder be used jointly as a Class II Bikeway in accordance with the bicycle facility option in Appendix A of the Public Road Standards.
D. We request that one lane in each direction be reduced from 12' width to 11'.

REASON:

Modification Requests A and D will allow minimizing impacts to adjacent land owners while providing the opportunity for a 14' parkway (rather than the standard 10') on the opposite side of the road with a 10' pathway and 4' planting/utility structures strip.

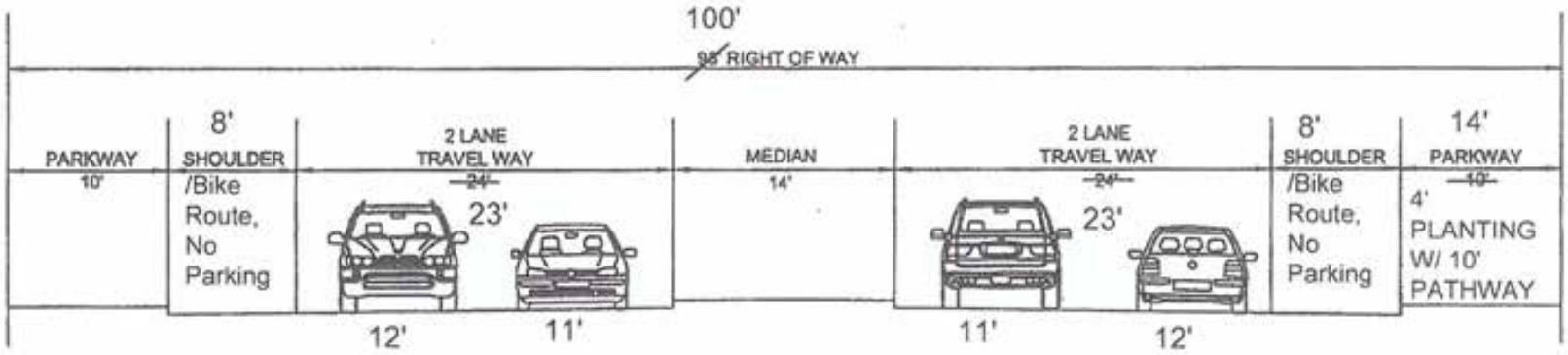
Modification Request B to the "Major Road with Raised Median (4.1A)" standard will reduce right of way impacts to the existing residents and allow for the proposed road grading to match grades at as many of the existing driveways as possible. The applicant acknowledges that theoretical capacity of the proposed roadway section is impacted by this request. The project Traffic Impact Analysis takes these factors into consideration in determining adequacy of the proposed segments.

Modification Request C will allow continuity with bicycle lanes in road segments abutting this segment.

ALTERNATIVES:
Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes.

HARDSHIP:
Denial of this request would result in an increased graded footprint for the roadway, increasing the impact on adjacent owners.

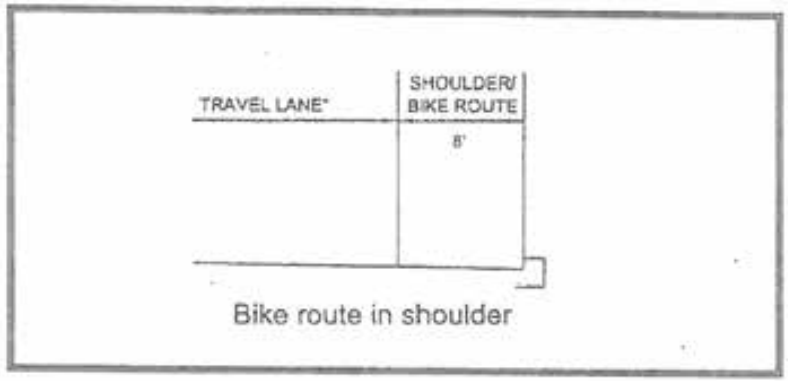
COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.



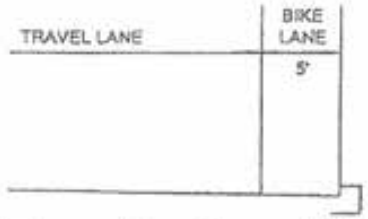
4.1 A - Major Road with Raised Median

Proposed Section (H2)

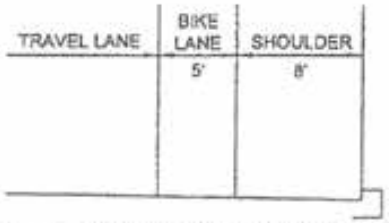
BICYCLE FACILITY OPTIONS



Bike route in shoulder



Bike lane with parking restrictions



Bike lane with separate shoulder and parking

TABLE 2A: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

MOBILITY ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDERS (# / WIDTH)	PARKWAY WIDTH	MIN. CURVE RADIUS	MAX. DESIRABLE GRADE	MIN. DESIGN SPEED (MPH)
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Prime Arterial (6.2)	6 / 12'	14'	102'	122'	2 / 8'	10'	1,700'	6%	65
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With Raised Median (4.1A)	4 / 12'	14'	78'	98'	2 / 8'	10'	1,200'	7%	55
With Intermittent Turn Lanes (4.1B)	4 / 12'	-	64' - 78'	84' - 98'	2 / 8'	10'	1,200'	7%	55
Boulevard									
With Raised Median (4.2A)	4 / 12'	14'	78'	106'	2 / 8'	14'	500'	9%	40
With Intermittent Turn Lanes (4.2B)	4 / 12'	-	64' - 78'	92' - 106'	2 / 8'	14'	500'	9%	40
Community Collector									
With Raised Median (2.1A)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Continuous Left Turn Lane (2.1B)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Intermittent Turn Lanes (2.1C)	2 / 12'	-	40' - 54'	60' - 74'	2 / 8'	10'	700'	9%	45
With Improvement Options (2.1D)	2 / 12'	-	40' - 54'	84'	2 / 8'	15' - 22'	700'	9%	45
No Median (2.1E)	2 / 12'	-	40'	60'	2 / 8'	10'	700'	9%	45
Light Collector									
With Raised Median (2.2A)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Continuous Left Turn Lane (2.2B)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Intermittent Turn Lanes (2.2C)	2 / 12'	-	40' - 54'	64' - 78'	2 / 8'	12'	500'	9%	40
With Improvement Options (2.2D)	2 / 12'	-	40' - 54'	88'	2 / 8'	17' - 24'	500'	9%	40
No Median (2.2E)	2 / 12'	-	40'	64'	2 / 8'	12'	500'	9%	40
With Reduced Shoulder (2.2F)	2 / 12'	-	28'	52'	2 / 2'	12'	500'	9%	40
Minor Collector									
With Raised Median (2.3A)	2 / 12'	14'	54'	82'	2 / 8'	14'	350'	12%	35
With Intermittent Turn Lanes (2.3B)	2 / 12'	-	40' - 54'	68' - 82'	2 / 8'	14'	350'	12%	35
No Median (2.3C)	2 / 12'	-	40'	68'	2 / 8'	14'	350'	12%	35

NOTES:

1 Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above.

2 The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.

3 The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.

4 For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.

5 Additional pavement and ROW may be required for ME Boulevards / Community Collectors (4 feet) and Light Collectors (12 feet) in Industrial/Commercial Zones.

6 ME roads needing additional turn or passing lanes will require an additional 12 to 14 feet of pavement and ROW for each lane.

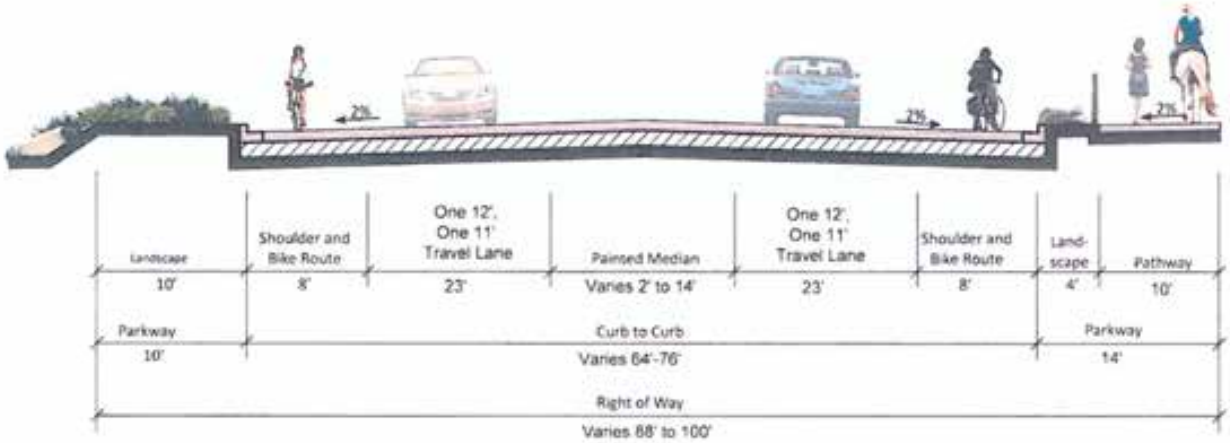
7 The maximum superelevation allowed on ME roads is 6%. Superelevation is not normally required on Non-ME roads.

8 ME roads designated with Bike Lanes will require an additional 10 feet of pavement and ROW. This may be increased to 12' for four-lane roads and above based upon the provisions in Section 7.3 of these standards.

9 The minimum curve radii, shown in the table above, are based on the design speed with 6% superelevation.

10 Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

11 Road surfacing widths include median width.



H3

Deer Springs Road- Major Road with Intermittent Turn Lanes 4.1B

ITEM 19
SECTION H3 MAJOR ROAD WITH INTERMITTENT TURN LANES 4.1B

NOTE: THIS IS AN ALTERNATIVE TO SECTION H1. IT IS SHOWN AS "ALTERNATE B" ON SHEET 16 IN THE PRECISE GRADING SET.

Location: Deer Springs Road from Mesa rock road to 900' easterly of Sarver Lane
Approximate Length: 7,200' (1.3 miles)
Proposed ADT: 27760 Maximum

REQUEST:
We propose a cross section with the same design criteria as a "Major Road with Intermittent Turn Lanes 4.1B" per table 2A of the County Public Road Standards with the design exceptions listed below.

A. We request no pedestrian provisions within a 10' parkway on the south side.
B. We request a minimum horizontal radius of 750' with a design speed of 45 MPH rather than the 1,200' minimum radius and 55 MPH design speed of the "Major Road with Intermittent Turn Lanes (4.1B) per Table2A .
C. We request a No Parking provision for the 8' shoulder be used jointly as a Class II Bikeway in accordance with the bicycle facility option in Appendix A of the Public Road Standards.
D. We request the painted median width vary from the standard 14' to a minimum of 2'. This reduced width will reduce the overall pavement and right of way widths correspondingly.
E. We request that one lane in each direction be reduced from 12' width to 11'.

REASON:

Modification Requests A and E will allow minimizing impacts to adjacent land owners while providing the opportunity for a 14' parkway (rather than the standard 10') on the opposite side of the road with a 10' pathway and 4' planting/utility structures strip.

Modification Request B to the "Major Road with Intermittent Turn Lanes 4.1B" standard will reduce right of way impacts to the existing residents and allow for the proposed road grading to match grades at as many of the existing driveways as possible. The applicant acknowledges that theoretical capacity of the proposed roadway section is impacted by this

request. The project Traffic Impact Analysis takes these factors into consideration in determining adequacy of the proposed segments.

Modification Request C will allow continuity with bicycle lanes in road segments abutting this segment.

Modification Request D will allow a reduction in overall right of way width that will:

- Avoid the taking of an existing private residence on Parcel 187-541-47.
- Reduce impacts to three identified RPO Cultural Resource sites totaling 3,250 square ft.
- Reduce impact to approximately 18,500 square feet (0.4 acres) of land within proposed Open Space Lot 1
- Reduce maximum proposed retaining wall heights from 32' to 27'.
- Reduce proposed roadway cut-slope heights by up to 15'.
- Reduce proposed roadway slope excavation (anticipated as rock-excavation requiring blasting) by 33,000 cubic yards.
- Reduce roadway construction time by two weeks, allowing for a reduction in the period of phased traffic flow on Deer Springs Road.

  Note: The impact to the ability of abutting parcels to utilize the Intermittent Turn Lane for left turns to and from their property will be limited to two parcels. Parcel187-541-47 (with the existing private residence to be saved), and the parcel abutting Deer Springs Road to the south at that location, parcel 187-540-20. That parcel has an access gate to a service road to a nearby County Water Authority easement. Right-in, and right-out access from this parcel will continue to be possible.

ALTERNATIVES:

Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes.

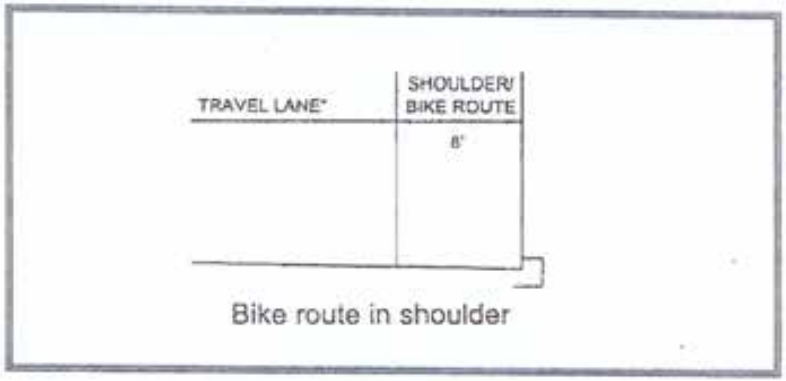
HARDSHIP:

Denial of this request would result in the taking of an existing private home, an increased graded footprint for the roadway, increasing the impact on adjacent owners.

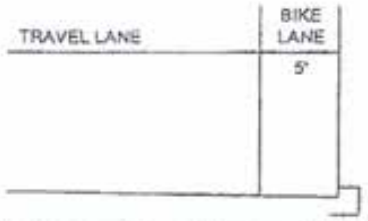
COST ESTIMATE:

Cost is not a factor presented with this Design Exception Request.

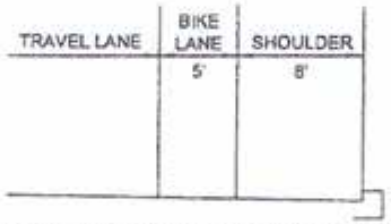
BICYCLE FACILITY OPTIONS



Bike route in shoulder



Bike lane with parking restrictions



Bike lane with separate shoulder and parking

TABLE 2A: COUNTY OF SAN DIEGO - PUBLIC ROAD STANDARDS

MOBILITY ELEMENT ROAD CLASSIFICATIONS

ROAD CLASSIFICATION	# LANES / LANE WIDTH	MEDIAN WIDTH	ROAD SURFACING WIDTH	R.O.W. WIDTH	PAVED SHOULDERS (# / WIDTH)	PARKWAY WIDTH	MIN. CURVE RADIUS	MAX. DESIRABLE GRADE	MIN. DESIGN SPEED (MPH)
Expressway (6.1)	6 / 12'	34'	126'	146'	2 / 10'	10'	1,700'	6%	65
Prime Arterial (6.2)	6 / 12'	14'	102'	122'	2 / 8'	10'	1,700'	6%	65
Major Road									
With Raised Median (4.1A)	4 / 12'	14'	78'	98'	2 / 8'	10'	1,200'	7%	55
With Intermittent Turn Lanes (4.1B)	4 / 12'	-	64' - 78'	84' - 98'	2 / 8'	10'	1,200'	7%	55
Boulevard									
With Raised Median (4.2A)	4 / 12'	14'	78'	106'	2 / 8'	14'	500'	9%	40
With Intermittent Turn Lanes (4.2B)	4 / 12'	-	64' - 78'	92' - 106'	2 / 8'	14'	500'	9%	40
Community Collector									
With Raised Median (2.1A)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Continuous Left Turn Lane (2.1B)	2 / 12'	14'	54'	74'	2 / 8'	10'	700'	9%	45
With Intermittent Turn Lanes (2.1C)	2 / 12'	-	40' - 54'	60' - 74'	2 / 8'	10'	700'	9%	45
With Improvement Options (2.1D)	2 / 12'	-	40' - 54'	84'	2 / 8'	15' - 22'	700'	9%	45
No Median (2.1E)	2 / 12'	-	40'	60'	2 / 8'	10'	700'	9%	45
Light Collector									
With Raised Median (2.2A)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Continuous Left Turn Lane (2.2B)	2 / 12'	14'	54'	78'	2 / 8'	12'	500'	9%	40
With Intermittent Turn Lanes (2.2C)	2 / 12'	-	40' - 54'	64' - 78'	2 / 8'	12'	500'	9%	40
With Improvement Options (2.2D)	2 / 12'	-	40' - 54'	88'	2 / 8'	17' - 24'	500'	9%	40
No Median (2.2E)	2 / 12'	-	40'	64'	2 / 8'	12'	500'	9%	40
With Reduced Shoulder (2.2F)	2 / 12'	-	28'	52'	2 / 2'	12'	500'	9%	40
Minor Collector									
With Raised Median (2.3A)	2 / 12'	14'	54'	82'	2 / 8'	14'	350'	12%	35
With Intermittent Turn Lanes (2.3B)	2 / 12'	-	40' - 54'	68' - 82'	2 / 8'	14'	350'	12%	35
No Median (2.3C)	2 / 12'	-	40'	68'	2 / 8'	14'	350'	12%	35

NOTES:

1 Minimum longitudinal gradient shall be 1.0 percent for all road classificationis shown above.

2 The maximum grade for a permanent cul-de-sac street turning area shall be 6 percent.

3 The maximum grade for a temporary cul-de-sac street turning area shall be that of the classification of the road being constructed.

4 For standards, see County Design Standard Drawing DS-2, DS-3, DS-4, and Section 4.5N of these Standards.

5 Additional pavement and ROW may be required for ME Boulevards / Community Collectors (4 feet) and Light Collectors (12 feet) in Industrial/Commercial Zones.

6 ME roads needing additional turn or passing lanes will require an additional 12 to 14 feet of pavement and ROW for each lane.

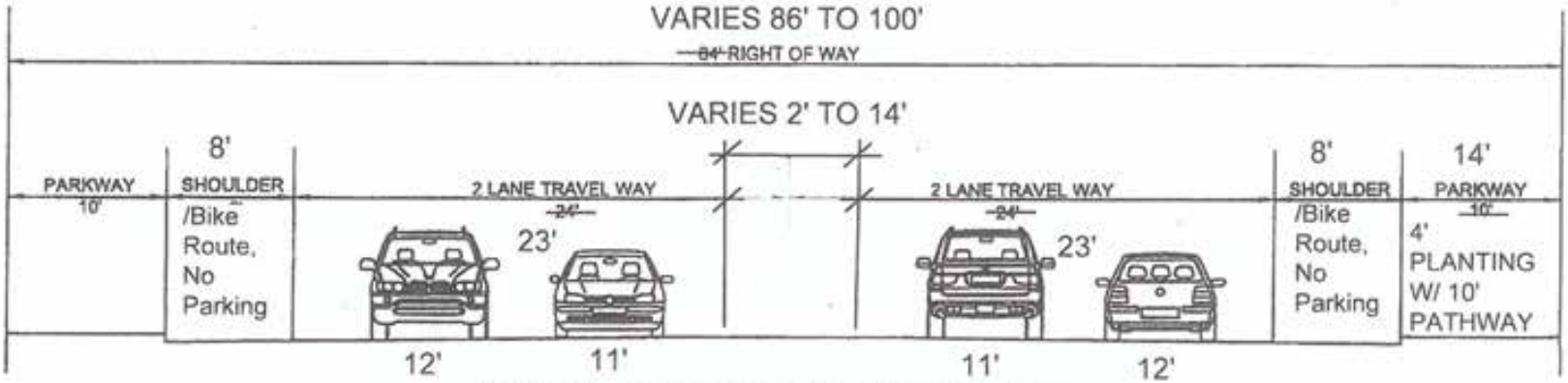
7 The maximum superelevation allowed on ME roads is 6%. Superelevation is not normally required on Non-ME roads.

8 ME roads designated with Bike Lanes will require an additional 10 feet of pavement and ROW. This may be increased to 12' for four-lane roads and above based upon the provisions in Section 7.3 of these standards.

9 The minimum curve radii, shown in the table above, are based on the design speed with 6% superelevation.

10 Interim roads are to be a minimum of 28 feet A.C. within a 40 feet graded roadbed. They may be larger if traffic volumes require more travel lanes.

11 Road surfacing widths include median width.



4.1 B - Major Road with Intermittent Turn Lanes

Proposed Section (H3)

ITEM 20

INTERSECTION SPACING DESIGN EXCEPTION REQUESTS:

REQUEST:

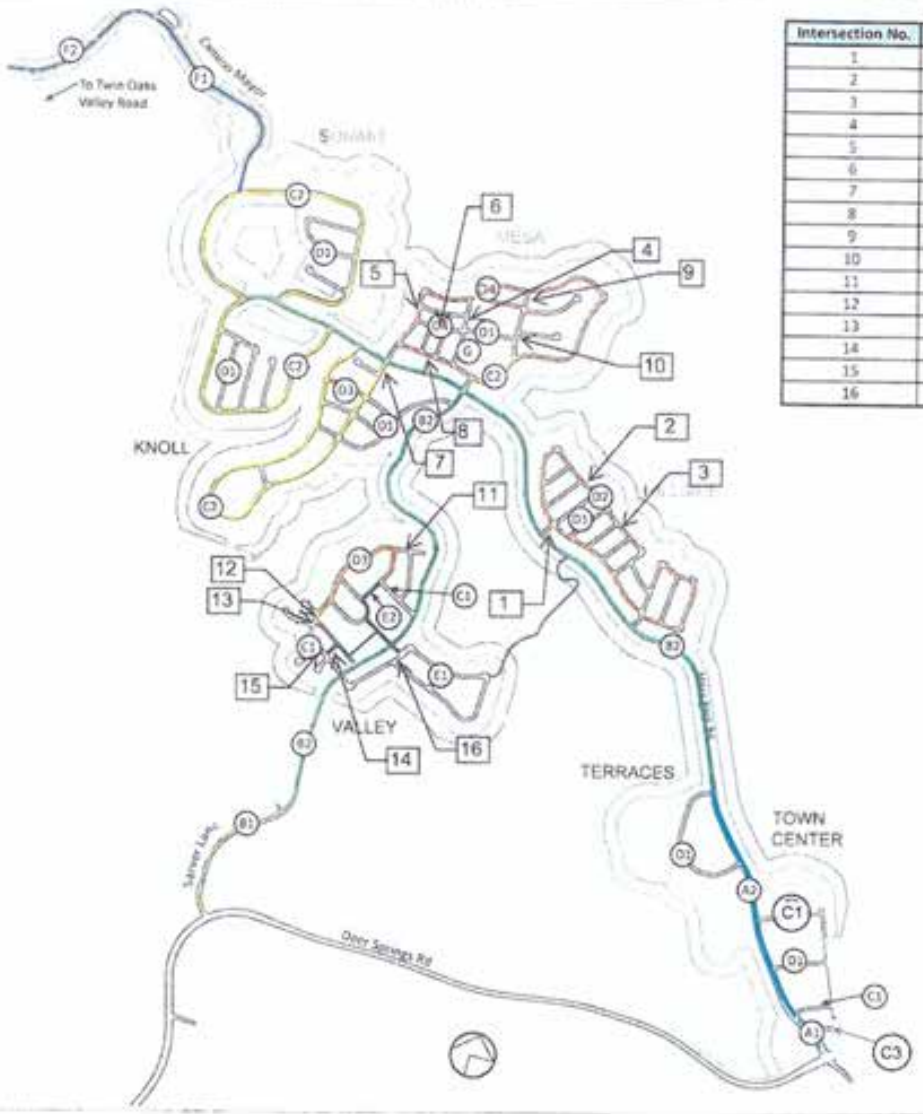
There are several locations where an exception from the 200' minimum intersection spacing is requested. Please see the table below and the Intersection Spacing Key Map on the following page:

Intersection No.	TM Sheet No.	Neighborhood	Intersection 1	Intersection 2	Distance (ft)
1	8	Hillside	"Sierra Parkway"/"H-2"	"H-3"/"H-2"	193
2	8	Hillside	"H-11"/"H-3"	"H-10"/"H-3"	185
3	8	Hillside	"H-9"/"H-3"	"H-8"/"H-3"	190
4	9	Mesa	"M-8"/"M-4"	"M-7"/"M-4"	181
5	9	Mesa	"M-8"/"M-3"	"M-7"/"M-3"	179
6	9	Mesa	"M-6"/"M-7"	"M-5"/"M-7"	168
7	9	Mesa	"M-2"/"M-3"	"M-5"/"M-3"	185
8	9	Mesa	"M-6"/"M-3"	"M-2"/"M-3"	138
9	9	Mesa	"M-9"/"M-1"	"M-11"/"M-1"	29
10	9	Mesa	"M-7"/"M-1"	"M-10"/"M-1"	75
11	12	Valley	"V-2"/"V-1"	"V-4"/"V-1"	193
12	12	Valley	"V-11"/"V-1"	"V-9"/"V-1"	105
13	12	Valley	"V-9"/"V-1"	"V-12"/"V-1"	35
14	12	Valley	"V-9"/"V-10"	"V-1"/"V-10"	191
15	12	Valley	"V-13"/"V-1"	"V-14"/"V-1"	176
16	12	Valley	"V-6"/"V-1"	"V-15"/"V-1"	155

REASON:

A. To meet the project's goal to provide a variety of housing types, some lot sizes are less than the 77' depth required to achieve a 200' intersection separation.

B. To meet the project's goals to minimize graded footprint and conform to existing land-forms, a non-rectilinear street pattern has been developed to provide connectivity and circulation within the neighborhoods which occasionally intersect at less than 200' spacing.



Intersection No.	TM Sheet No.	Neighborhood	Intersection 1	Intersection 2	Distance (ft)
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2	8	Hillside	"H-11"/"H-3"	"H-10"/"H-3"	185
3	8	Hillside	"H-9"/"H-3"	"H-8"/"H-3"	190
4	9	Mesa	"M-8"/"M-4"	"M-3"/"M-4"	181
5	9	Mesa	"M-8"/"M-3"	"M-7"/"M-3"	179
6	9	Mesa	"M-6"/"M-7"	"M-5"/"M-7"	168
7	9	Mesa	"M-2"/"M-3"	"M-5"/"M-3"	185
8	9	Mesa	"M-6"/"M-3"	"M-2"/"M-3"	138
9	9	Mesa	"M-3"/"M-1"	"M-11"/"M-1"	29
10	9	Mesa	"M-7"/"M-1"	"M-10"/"M-1"	75
11	12	Valley	"V-2"/"V-1"	"V-4"/"V-1"	193
12	12	Valley	"V-11"/"V-1"	"V-9"/"V-1"	105
13	12	Valley	"V-9"/"V-1"	"V-12"/"V-1"	35
14	12	Valley	"V-9"/"V-10"	"V-1"/"V-10"	191
15	12	Valley	"V-13"/"V-1"	"V-14"/"V-1"	176
16	12	Valley	"V-6"/"V-1"	"V-15"/"V-1"	155

Intersection Spacing Design Exceptions Key Map

ITEM 21

CURVE RADIUS DESIGN EXCEPTION REQUESTS:

REQUEST:
There are several locations where an exception from the minimum intersection spacing is requested. Please see the table below and the Intersection Spacing Key Map on the following page:

Radius Number	TM Sheet Number	Road Sections	Neighborhood	Street Name	Approximate Location	Radius (FT)
1	7	D1	Town Center	Mesa Rock Way	South of Lot 3	150
2	9	D2	Mesa	M-9	Station 2+00	100
3	12	E1	Valley	V-12	Cul-de-sac/Lot 1000	100
4	12	C1	Valley	V-1	SW Corner of Lot 1067	100
5	12	E2	Valley	V-5/V-7	Intersection with V-6	130
6	12	D3	Valley	V-4	PL of Lots 1038 & 1039	100
7	12	E1	Valley	V-2	East of Lot 1028	100
8	12	E1	Valley	V-15	Station 12+00	130
9	11	C2	Summit/Knoll	S-1/K-1/K-10	Station 12+00	200

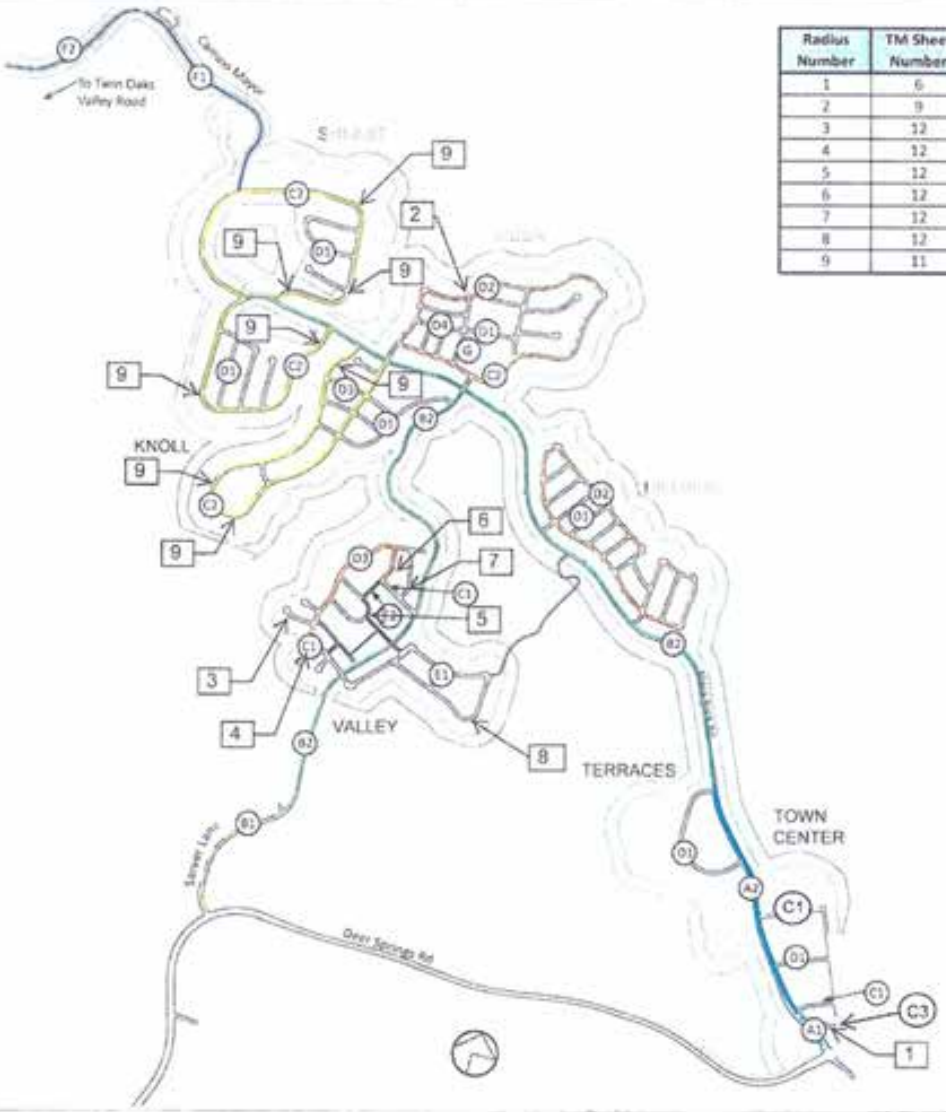
REASON:

A. To meet the project's goals to minimize graded footprint and conform to existing land-forms, a non-rectilinear street pattern has been developed to provide connectivity and circulation within the neighborhoods which occasionally benefit from less than the minimum curve radius. These locations are within low traffic-volume areas and will meet sight distance requirements.

ALTERNATIVES:
Alternatives have been studied to minimize impacts to proposed open space while providing the level of service, level of emergency access and the bicycle, pedestrian and equestrian amenities that will benefit the community. These alternatives all had greater impacts to the proposed open space dedications and roadway slope heights and grading volumes.

HARDSHIP:
Denial of this request would result in an increased graded footprint for the roadway, increasing the impact on adjacent owners and reducing the ability to provide an 8' pathway for the community.

COST ESTIMATE:
Cost is not a factor presented with this Design Exception Request.



Radius Number	TM Sheet Number	Road Sections	Neighborhood	Street Name	Approximate Location	Radius (FT)
1	6	C3	Town Center	Mesa Rock Way	South of Lot 3	150
2	9	D2	Mesa	M-9	Station 2+00	100
3	12	E1	Valley	V-12	Cul-de-sac/Lot 1000	100
4	12	C1	Valley	V-1	SW Corner of Lot 1067	100
5	12	E2	Valley	V-5/V-7	Intersection with V-6	130
6	12	D3	Valley	V-4	PL of Lots 1038 & 1039	100
7	12	E1	Valley	V-2	East of Lot 1028	100
8	12	E1	Valley	V-15	Station 12+00	130
9	11	C2	SUMMIT/KNOLL	S-1/K-1/K-10	VARIOUS LOCATIONS	200

Curve Radius Design Exceptions Key Map