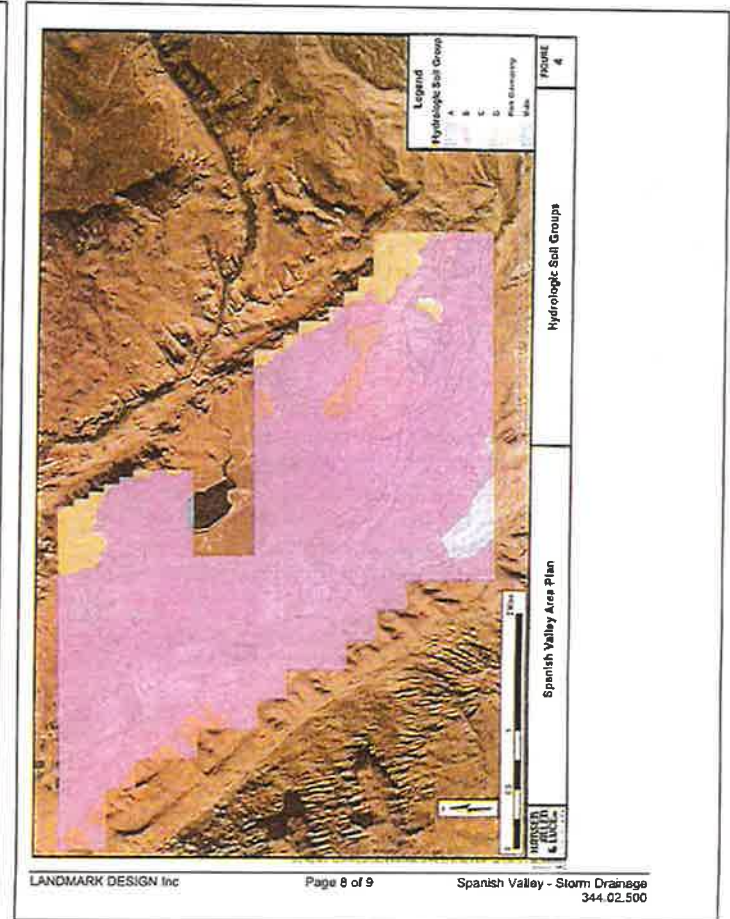
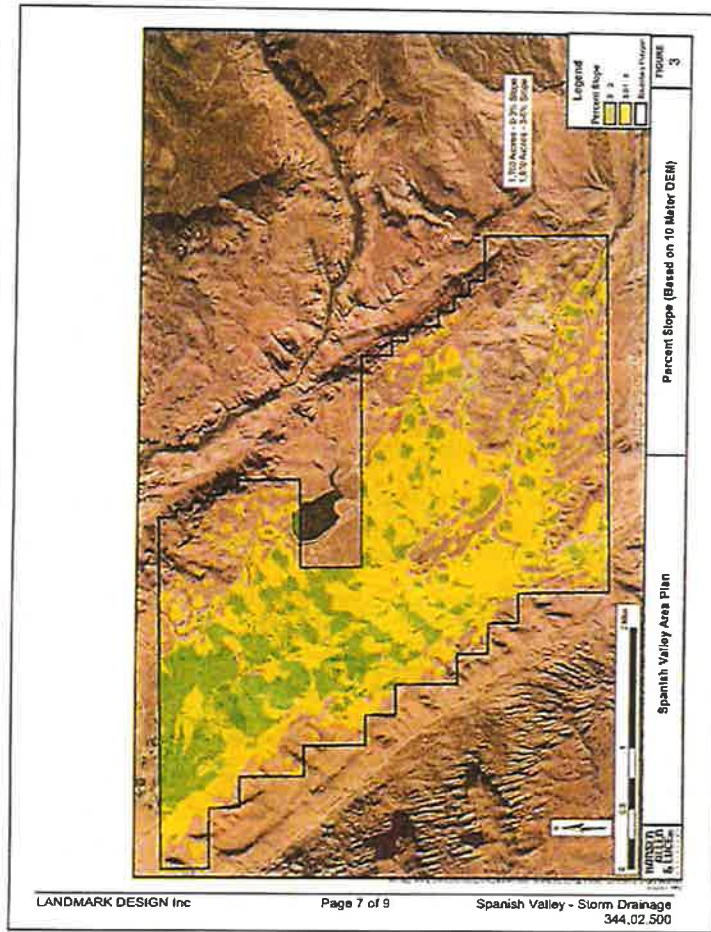


APPENDIX D



SPANISH VALLEY STORM DRAINAGE MEMO

000314

SUMMARY OF DEVELOPMENT DRAINAGE PLANNING REQUIRMENTS

Careful planning and implementation are needed to successfully manage storm water in Spanish Valley. Following is a summary of recommendations.

- Pack Creek serves as the storm runoff outlet from Spanish Valley and is tributary to Mill Creek which flows to the Colorado River. Potential development impacts on storm water quality and quantity should be mitigated. It is recommended that mitigation of storm water effects be planned and implemented as close to the source of the change as possible. It is recommended that the flood plain associated with Pack Creek be delineated and that FEMA guidelines for flood plain management be implemented.
- We recommend that the minor drainage system (storm drains and roadside conveyances) be designed for the 10-year storm runoff event (event with a 10% chance of being equalled or exceeded in any given year) to control nuisance flooding.
- Design the major drainage system to convey the 100-year event (event with a 1% chance of being equalled or exceeded in any given year) with the objective of protecting homes from flooding.
- Utilize the NOAA Atlas 14 web based point precipitation frequency estimates to define the design rainfall depths.
- Use the NRCS methods for defining the design rainfall distribution based on the NOAA Atlas 14 precipitation-frequency data.
- Plan and implement as appropriate low impact development (LID) methods to assist with controlling storm water quality and quantity effects at or near the source of runoff.
- Provide detention, including swales, to reduce peak storm runoff flows for the 2-year, 10-year, and 100-year events back to historic (pre-development) values.

APPENDIX

- NOAA 14 POINT PRECIPITATION-FREQUENCY ESTIMATE FOR SELECTED LOCATION
- NRCS DESIGN STORM DISTRIBUTION BASED ON NOAA 14

APPENDIX D

LANDMARK DESIGN Inc

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Spanish Valley - Storm Drainage
344.02.500



NOAA Atlas 14, Volume 1, Version 5
Location name: Moab, Utah, USA*
Latitude: 38.4658°, Longitude: -109.4237°
Elevation: 5211.91 ft**
*Source: USGS
**Source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Genie Perica, Sarah Davis, Sarah Hove, Lillian Hove, Kaszuba Matarska, Deborah Maden, Sandra Poretsky, Lillian Ray, Carl Tysinski, Dale Linn, Fenglin Yao, Michael Yocco, Tim Zhou, Geoffrey Brown, David Brown, Li-Chuan Chen, Tye Pappas, John Yarnsman

NOAA, National Weather Service, Silver Spring, Maryland
PF tabular | PF graphical | Maps & aerials

PF tabular

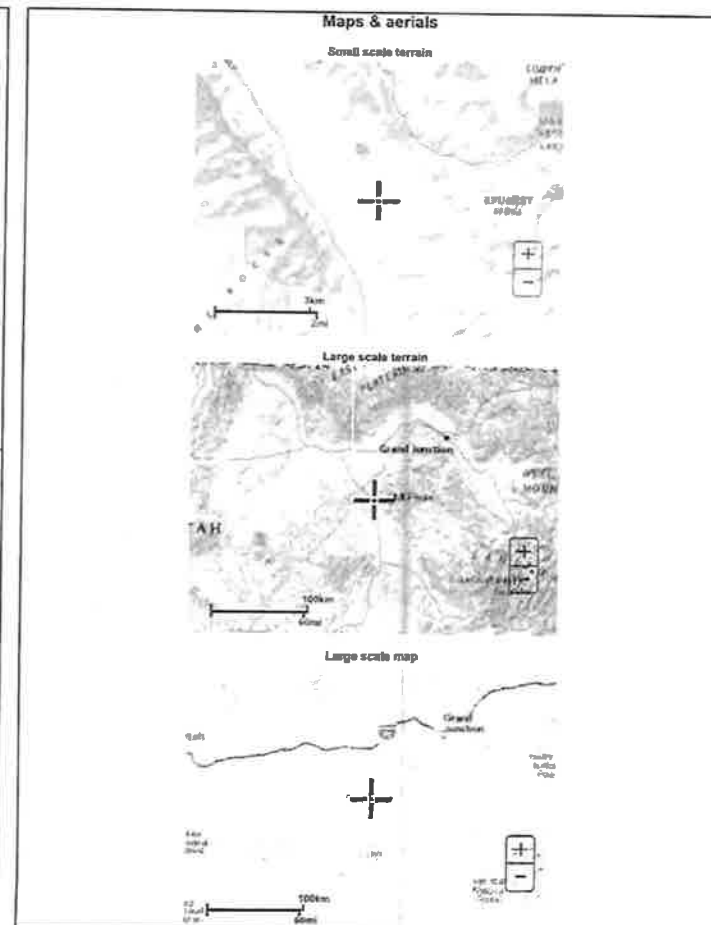
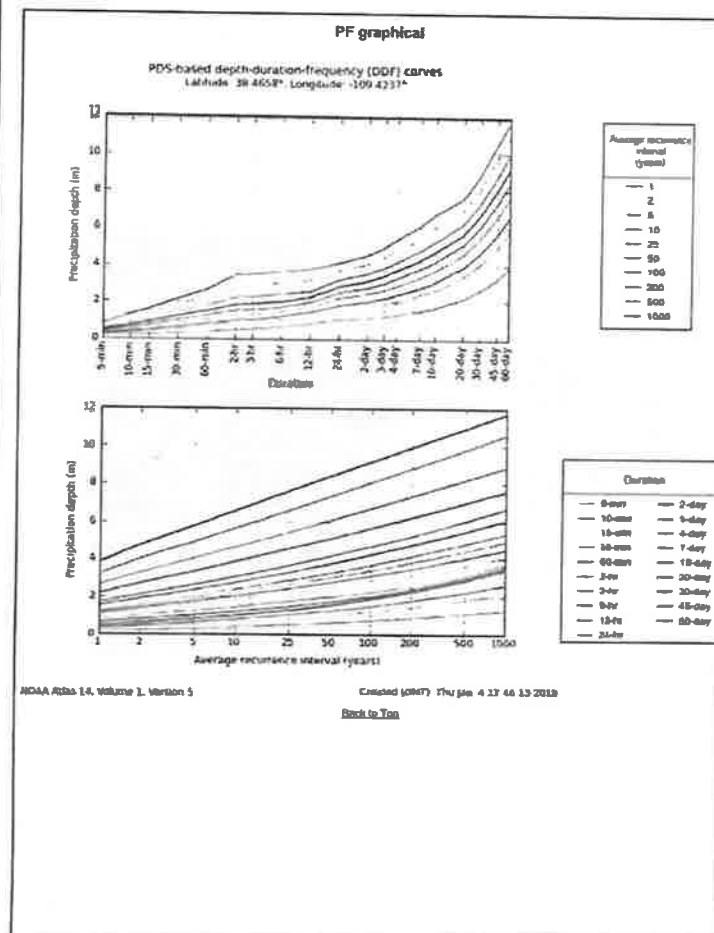
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.115 (0.104-0.130)	0.161 (0.146-0.179)	0.265 (0.193-0.345)	0.253 (0.228-0.357)	0.328 (0.256-0.599)	0.334 (0.352-0.666)	0.471 (0.415-0.601)	0.562 (0.453-0.739)	0.701 (0.604-0.969)	0.827 (0.701-1.20)
10-min	0.179 (0.156-0.210)	0.239 (0.207-0.271)	0.312 (0.276-0.388)	0.384 (0.347-0.491)	0.580 (0.483-0.807)	0.603 (0.586-0.747)	0.717 (0.727-1.17)	0.854 (0.791-1.17)	1.07 (0.918-1.48)	1.26 (1.07-1.82)
15-min	0.222 (0.185-0.260)	0.305 (0.257-0.356)	0.386 (0.345-0.459)	0.478 (0.431-0.572)	0.743 (0.586-0.793)	0.743 (0.664-0.900)	0.839 (0.789-1.12)	1.06 (0.935-1.33)	1.22 (1.14-1.83)	1.56 (1.32-2.38)
30-min	0.299 (0.253-0.350)	0.384 (0.345-0.452)	0.528 (0.454-0.614)	0.644 (0.580-0.775)	0.834 (0.749-1.01)	1.08 (0.895-1.34)	1.50 (1.07-1.53)	1.43 (1.25-1.88)	1.78 (1.53-2.45)	2.10 (1.78-2.95)
60-min	0.370 (0.329-0.423)	0.475 (0.429-0.559)	0.643 (0.594-0.780)	0.797 (0.718-0.925)	1.03 (0.927-1.25)	1.24 (1.11-1.53)	1.48 (1.32-1.68)	1.77 (1.55-2.22)	2.26 (1.90-3.05)	2.60 (2.20-3.77)
2-hr	0.456 (0.410-0.528)	0.578 (0.511-0.663)	0.772 (0.684-0.886)	0.959 (0.833-1.08)	1.26 (1.07-1.42)	1.51 (1.27-1.79)	1.83 (1.59-2.11)	2.21 (1.79-2.58)	2.82 (2.15-3.38)	3.40 (2.51-4.12)
3-hr	0.511 (0.459-0.576)	0.640 (0.571-0.724)	0.830 (0.741-0.932)	1.06 (0.891-1.13)	1.29 (1.13-1.45)	1.55 (1.34-1.78)	1.87 (1.58-2.13)	2.25 (1.85-2.59)	2.87 (2.28-3.42)	3.45 (2.65-4.19)
6-hr	0.639 (0.565-0.707)	0.793 (0.720-0.878)	1.00 (0.811-1.15)	1.18 (1.07-1.31)	1.46 (1.21-1.62)	1.79 (1.51-1.89)	1.98 (1.79-2.23)	2.37 (2.03-2.69)	3.00 (2.49-3.45)	3.57 (2.90-4.24)
12-hr	0.793 (0.723-0.872)	0.985 (0.908-1.09)	1.22 (1.03-1.32)	1.42 (1.20-1.57)	1.72 (1.55-1.90)	1.96 (1.78-2.17)	2.29 (1.97-2.48)	2.53 (2.21-2.94)	3.14 (2.69-3.58)	3.72 (3.14-4.38)
24-hr	0.998 (0.912-1.10)	1.24 (1.13-1.35)	1.55 (1.41-1.70)	1.81 (1.64-2.00)	2.16 (1.95-2.42)	2.48 (2.18-2.79)	2.81 (2.45-3.26)	3.16 (2.70-3.67)	3.66 (3.05-4.37)	4.08 (3.31-6.00)
2-day	1.12 (1.00-1.22)	1.39 (1.27-1.52)	1.72 (1.57-1.89)	2.01 (1.81-2.20)	2.41 (2.15-2.67)	2.74 (2.41-3.07)	3.10 (2.68-3.53)	3.48 (2.95-4.06)	4.03 (3.32-4.84)	4.48 (3.60-6.00)
3-day	1.21 (1.13-1.42)	1.50 (1.37-1.69)	1.87 (1.70-2.05)	2.16 (1.97-2.40)	2.63 (2.35-3.03)	2.99 (2.64-3.26)	3.39 (2.93-3.85)	3.81 (3.24-4.43)	4.42 (3.64-5.32)	4.92 (3.96-5.11)
4-day	1.29 (1.18-1.42)	1.61 (1.47-1.77)	2.02 (1.84-2.22)	2.36 (2.13-2.59)	2.85 (2.54-3.17)	3.24 (2.86-3.64)	3.67 (3.19-4.19)	4.13 (3.51-4.83)	4.89 (3.97-5.77)	5.38 (4.31-6.00)
7-day	1.50 (1.37-1.63)	1.87 (1.71-2.09)	2.35 (2.13-2.57)	2.74 (2.47-3.01)	3.29 (2.84-3.65)	3.74 (3.30-4.18)	4.22 (3.66-4.81)	4.74 (4.03-5.50)	5.47 (4.52-6.55)	6.07 (4.90-7.51)
10-day	1.68 (1.54-1.84)	2.09 (1.83-2.39)	2.62 (2.39-2.88)	3.05 (2.77-3.30)	3.66 (3.29-4.06)	4.15 (3.68-4.63)	4.67 (4.08-5.26)	5.22 (4.49-6.01)	6.03 (5.04-7.15)	6.68 (5.46-8.15)
20-day	2.16 (1.97-2.37)	2.70 (2.46-2.97)	3.38 (3.04-3.81)	3.86 (3.49-4.25)	4.56 (4.09-5.05)	5.16 (4.59-5.70)	5.65 (4.95-6.41)	6.22 (5.36-7.15)	7.00 (5.90-8.72)	7.66 (6.30-9.10)
30-day	2.63 (2.41-2.87)	3.29 (3.00-3.58)	4.04 (3.63-4.41)	4.64 (4.21-5.08)	5.48 (4.90-6.01)	6.06 (5.41-6.74)	6.69 (5.90-7.59)	7.33 (6.37-8.37)	8.29 (6.97-9.55)	8.96 (7.42-10.5)
45-day	3.21 (2.90-3.50)	4.00 (3.66-4.37)	4.91 (4.48-5.36)	5.63 (5.13-6.15)	6.59 (5.94-7.27)	7.31 (6.54-8.13)	8.05 (7.11-9.04)	8.80 (7.67-10.0)	9.80 (8.28-11.4)	10.5 (8.90-12.8)
60-day	3.80 (3.47-4.15)	4.73 (4.32-5.16)	5.77 (5.25-6.30)	6.57 (5.95-7.19)	7.61 (6.85-8.36)	8.38 (7.49-9.23)	9.15 (8.11-10.2)	9.92 (8.70-11.2)	10.9 (9.42-12.6)	11.7 (9.93-13.6)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates for a given duration and average recurrence interval will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not credited against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

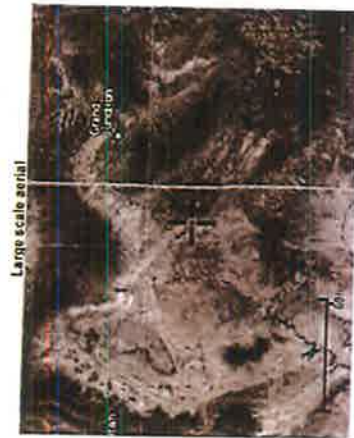
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SPANISH VALLEY STORM
DRAINAGE MEMO

APPENDIX D



APPENDIX D

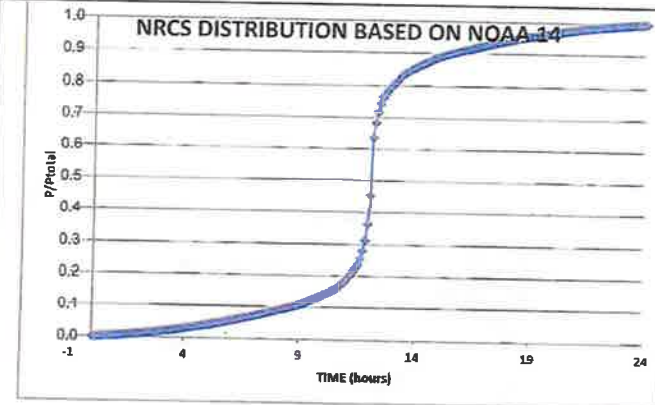


Large scale aerial

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U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1375 East-West Highway
Silver Spring, MD 20910
Questions? HDSC.Dan@noaa.gov

[Disclaimer](#)



TIME Hours	Proportion to total rainfall depth p/Ptotal
0	0.00000
0.1	0.00036
0.2	0.00073
0.3	0.00112
0.4	0.00154
0.5	0.00197
0.6	0.00242
0.7	0.00289
0.8	0.00338
0.9	0.00389
1	0.00442
1.1	0.00496
1.2	0.00553
1.3	0.00611
1.4	0.00672
1.5	0.00734
1.6	0.00798
1.7	0.00864
1.8	0.00932
1.9	0.01002
2	0.01074

SPANISH VALLEY STORM
DRAINAGE MEMO

APPENDIX D

TIME	Proportion to total rainfall depth
2.1	0.01148
2.2	0.01224
2.3	0.01301
2.4	0.01381
2.5	0.01462
2.6	0.01546
2.7	0.01631
2.8	0.01718
2.9	0.01807
3	0.01898
3.1	0.01991
3.2	0.02086
3.3	0.02182
3.4	0.02281
3.5	0.02382
3.6	0.02484
3.7	0.02588
3.8	0.02695
3.9	0.02803
4	0.02913
4.1	0.03025
4.2	0.03139
4.3	0.03255
4.4	0.03372
4.5	0.03492
4.6	0.03614
4.7	0.03737
4.8	0.03862
4.9	0.03990
5	0.04119
5.1	0.04250
5.2	0.04383
5.3	0.04518
5.4	0.04655
5.5	0.04794
5.6	0.04934
5.7	0.05077
5.8	0.05221
5.9	0.05368
6	0.05516
6.1	0.05666
6.2	0.05818
6.3	0.05972
6.4	0.06128

TIME	Proportion to total rainfall depth
6.5	0.06286
6.6	0.06446
6.7	0.06608
6.8	0.06771
6.9	0.06937
7	0.07104
7.1	0.07274
7.2	0.07445
7.3	0.07618
7.4	0.07793
7.5	0.07970
7.6	0.08149
7.7	0.08330
7.8	0.08512
7.9	0.08697
8	0.08884
8.1	0.09072
8.2	0.09262
8.3	0.09455
8.4	0.09649
8.5	0.09845
8.6	0.10043
8.7	0.10243
8.8	0.10445
8.9	0.10648
9	0.10854
9.1	0.11158
9.2	0.11466
9.3	0.11778
9.4	0.12094
9.5	0.12414
9.6	0.12738
9.7	0.13066
9.8	0.13398
9.9	0.13735
10	0.14075
10.1	0.14419
10.2	0.14767
10.3	0.15120
10.4	0.15476
10.5	0.15836
10.6	0.16363
10.7	0.16947
10.8	0.17587

SPANISH VALLEY STORM
DRAINAGE MEMO

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APPENDIX D

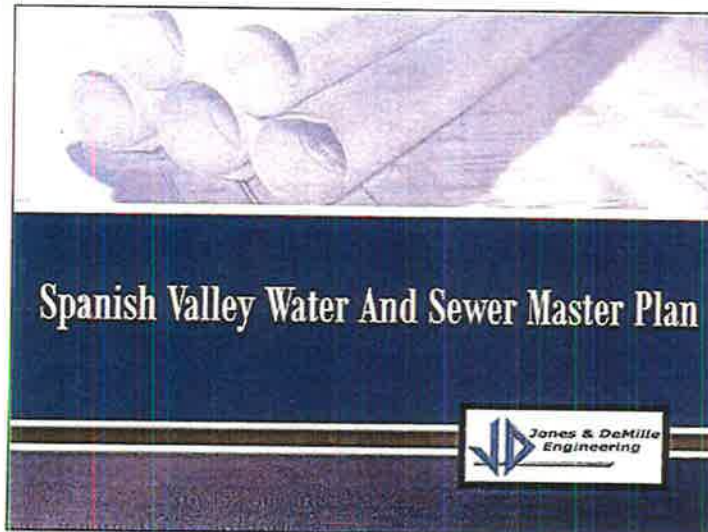
TIME	Proportion to total rainfall depth	TIME	Proportion to total rainfall depth
10.9	0.18285	15.3	0.89757
11	0.19039	15.4	0.89957
11.1	0.19851	15.5	0.90155
11.2	0.20719	15.6	0.90351
11.3	0.21644	15.7	0.90545
11.4	0.22626	15.8	0.90738
11.5	0.23665	15.9	0.90928
11.6	0.25683	16	0.91116
11.7	0.28170	16.1	0.91303
11.8	0.31601	16.2	0.91488
11.9	0.36512	16.3	0.91670
12	0.45480	16.4	0.91851
12.1	0.63488	16.5	0.92030
12.2	0.68399	16.6	0.92207
12.3	0.71830	16.7	0.92382
12.4	0.74317	16.8	0.92555
12.5	0.76335	16.9	0.92726
12.6	0.77374	17	0.92896
12.7	0.78356	17.1	0.93063
12.8	0.79281	17.2	0.93229
12.9	0.80149	17.3	0.93392
13	0.80961	17.4	0.93554
13.1	0.81715	17.5	0.93714
13.2	0.82413	17.6	0.93872
13.3	0.83053	17.7	0.94028
13.4	0.83637	17.8	0.94182
13.5	0.84164	17.9	0.94334
13.6	0.84524	18	0.94484
13.7	0.84880	18.1	0.94632
13.8	0.85233	18.2	0.94779
13.9	0.85581	18.3	0.94923
14	0.85925	18.4	0.95066
14.1	0.86265	18.5	0.95206
14.2	0.86602	18.6	0.95345
14.3	0.86934	18.7	0.95482
14.4	0.87262	18.8	0.95617
14.5	0.87586	18.9	0.95750
14.6	0.87906	19	0.95881
14.7	0.88222	19.1	0.96010
14.8	0.88534	19.2	0.96138
14.9	0.88842	19.3	0.96263
15	0.89146	19.4	0.96386
15.1	0.89352	19.5	0.96508
15.2	0.89555	19.6	0.96628

SPANISH VALLEY STORM
DRAINAGE MEMO

APPENDIX D

TIME	Proportion to total rainfall depth
19.7	0.96745
19.8	0.96861
19.9	0.96975
20	0.97087
20.1	0.97197
20.2	0.97305
20.3	0.97412
20.4	0.97516
20.5	0.97618
20.6	0.97719
20.7	0.97818
20.8	0.97914
20.9	0.98009
21	0.98102
21.1	0.98193
21.2	0.98282
21.3	0.98369
21.4	0.98454
21.5	0.98538
21.6	0.98619
21.7	0.98699
21.8	0.98776
21.9	0.98852
22	0.98926
22.1	0.98998
22.2	0.99068
22.3	0.99136
22.4	0.99202
22.5	0.99266
22.6	0.99328
22.7	0.99389
22.8	0.99447
22.9	0.99504
23	0.99558
23.1	0.99611
23.2	0.99662
23.3	0.99711
23.4	0.99758
23.5	0.99803
23.6	0.99846
23.7	0.99888
23.8	0.99927
23.9	0.99964
24	1.00000

APPENDIX E



Purpose & Need

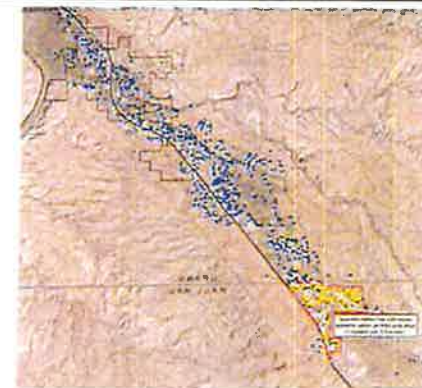
San Juan Spanish Valley Sewer Service District (SSD) hired Jones and DeMille Engineering to evaluate:

- o Existing Condition of Water and Wastewater Systems (Wells & Septic)
- o Future Growth (Proactive vs. Reactive)
- o Culinary Water System Alternatives
- o Sanitary Sewer System Alternatives

Existing Conditions

- Individual Water Wells
 - o Do not provide sufficient fire protection
 - o Costly (high maintenance)
 - o Limits growth
 - o Limited water right availability
- Individual Septic Systems
 - o Limits residential development to 1-acre per resident
 - o High concentration for small area

Underground Wells / Septic Systems



Future Growth

POPULATION PROJECTIONS FOR THE STUDY AREA - SPANISH VALLEY, SAN JUAN COUNTY, UTAH
PROJECTIONS AT CONSTANT 2.0% ANNUAL GROWTH RATE

YEAR	2015	2025	2035
POPULATION (Persons)**	575	701	854
EQUIVALENT RESIDENTIAL CONNECTIONS (ERC)*	229	279	340
EQUIVALENT RESIDENTIAL CONNECTIONS (ERC) at 6% growth	229	417	760

Selected Alternative (Culinary Water)



- Stand Alone System
- Significantly Lower Cost
- NO Impact Fee to GWSSA

Selected Alternative (Sanitary Sewer)



- Combined System with Moab and Grand Water & Sewer Service Agency (GWSSA)
- Lower O&M cost
- Lower capital cost
- Shared cost for treatment plant

Selected Alternative (Sanitary Sewer)



APPENDIX E

Cost Estimates

System	Construction	Land & Capacity	Professional Services	TOTAL
Culinary Water	\$4,510,000	\$30,000	\$560,000	\$5,100,000
Sanitary Sewer	\$3,600,000	\$950,000	\$450,000	\$5,000,000

Funding

- State, Federal and Private sources of money for public infrastructure projects:
 - Utah Permanent Community Impact Board (CIB)
 - Utah Division of Drinking Water (DDW)
 - Utah Department of Water Quality (DWQ)
 - USDA Rural Development
 - Private Loans and bonding
- Those that offer some form of grant money have a calculation to determine how much grant to give.
- DWQ, CIB, DDW use a percentage of the Median Adjusted Gross Income (MAGI) as an indication of what's affordable.

% of MAGI (\$31,922)

- WATER** - The State of Utah recommends that an affordable water bill be no more than 1.75% of the community's median adjusted gross income (MAGI). The maximum affordable water bill for the SSD based on 1.75% of the SSD's MAGI is **\$45.63** per month.
- SEWER** - The State of Utah recommends that an affordable sewer bill be no more than 1.40% of the community's median adjusted gross income (MAGI). The maximum affordable sewer bill for the SSD based on 1.40% of the SSD's MAGI is **\$36.51** per month.
- Needed **80% Grant** 20% Loan to ensure SSD could charge no more than these rates.

Funding Package (Culinary Water)

	Amount	Rate	Term	Annual Payment
UDW Principal Forgiveness (grant)	\$765,000	N/A	N/A	\$0
UDW Loan	\$1,785,000	0%	30	\$58,500
OB Grant	\$1,912,000	N/A	N/A	\$0
CIB Loan	\$638,000	3.50%	30	\$30,500
Total	\$5,100,000			\$90,000

	2017	2018	2019	2020
User Fee at 1.75% of MAGI	\$46.50	\$47.00	\$47.50	\$48.00
Total Estimated Water System Users	230	235	240	245
Annual User Fee Payments	\$128,340	\$128,720	\$131,100	\$132,480

53% Grant 47% loan

APPENDIX E

Funding Package (Sanitary Sewer)

Table 5: Spanish Valley Funding Authorized	Amount	Rate	Term	Annual Payment
UWQB Principal Forgiveness (grant)	\$1,547,000	N/A	N/A	\$0
UWQB Loan	\$648,000	0%	30	\$32,267 (variable)
CIB Grant	\$1,750,000	N/A	N/A	\$0
CIB Loan	\$750,000	0.00%	30	\$21,000
Total	\$5,015,000		Total	\$57,267

Table 6: User Fee Summary	2017	2018	2019	2020
User Fee at 1.66% of MAGI	\$37.50	\$38.00	\$38.50	\$39.00
Total Estimated Water System Users	230	235	240	245
Annual User Fee Payments	\$102,500	\$104,800	\$106,360	\$107,640

66% Grant 34% loan

O&M Budget (Water)

Table 4: 4 Year Budget Projections	Current Year Budget	Year 2 Projected	Year 3 Projected	Year 4 Projected
1. Beginning Cash on Hand	\$0.00	\$11,618.44	\$22,351.42	\$33,322.57
2. Cash Receipts:				
a. Interest Water Revenue	\$118,345.00	\$129,720.00	\$131,100.00	\$132,480.00
b. Total Water Revenue (2a)	\$118,345.00	\$129,720.00	\$131,100.00	\$132,480.00
c. Impact Fees	\$18,300.00	\$18,300.00	\$18,300.00	\$18,300.00
d. Total Cash Receipts (2a + 2c)	\$136,645.00	\$148,020.00	\$149,400.00	\$150,780.00
e. Transfers Institutional Rev Received	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00
f. Total Cash Receipts (2d + 2e)	\$176,645.00	\$188,020.00	\$189,400.00	\$190,780.00
g. Total Cash Available (1 + f)	\$176,645.00	\$199,638.44	\$211,751.42	\$224,102.57
3. Operating Expenses:				
a. Salaries and wages	\$22,000.00	\$23,000.00	\$23,500.00	\$24,000.00
b. Purchase Power	\$22,000.00	\$23,000.00	\$23,500.00	\$24,000.00
c. Materials and Supplies	\$11,000.00	\$11,000.00	\$11,000.00	\$11,000.00
d. Contract Services - Engineering	\$1,500.00	\$1,500.00	\$1,500.00	\$1,500.00
e. Transportation Expenses	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00
f. Insurance	\$250.00	\$250.00	\$250.00	\$250.00
g. Miscellaneous	\$10,000.00	\$10,000.00	\$10,000.00	\$10,000.00
h. Total Cash O&M Expenses (3a - 3g)	\$49,250.00	\$51,250.00	\$51,750.00	\$52,250.00
i. Total O&M Expenditures (3h)	\$49,250.00	\$51,250.00	\$51,750.00	\$52,250.00
j. Loan Principal/Interest Payments	\$0.00	\$0.00	\$0.00	\$0.00
k. Debt Service Reserve Fund Payments	\$14,300.00	\$14,300.00	\$14,300.00	\$14,300.00
l. Total Cash Paid Out (3i + 3j)	\$63,550.00	\$65,550.00	\$66,050.00	\$66,550.00
m. Ending Cash Position (1 + f) - (l)	\$113,095.00	\$134,088.44	\$145,701.42	\$157,552.57
n. End of Year Operating Cash (1 - l)	\$113,095.00	\$134,088.44	\$145,701.42	\$157,552.57
o. Debt Service Reserve	\$14,300.00	\$14,300.00	\$14,300.00	\$14,300.00
Total Reserve	\$14,300.00	\$14,300.00	\$14,300.00	\$14,300.00

O&M Budget (Sewer)

Table 4: 4 Year Budget Projections	Current Year Budget	Year 2 Projected	Year 3 Projected	Year 4 Projected
1. Beginning Cash on Hand	\$0.00	\$16,710.00	\$32,421.00	\$49,132.00
2. Cash Receipts:				
a. Interest Water Revenue	\$181,500.00	\$193,800.00	\$195,200.00	\$196,600.00
b. Total Water Revenue (2a)	\$181,500.00	\$193,800.00	\$195,200.00	\$196,600.00
c. Impact Fees	\$18,300.00	\$18,300.00	\$18,300.00	\$18,300.00
d. Total Cash Receipts (2a + 2c)	\$199,800.00	\$212,100.00	\$213,500.00	\$214,900.00
e. Transfers Institutional Rev Received	\$40,000.00	\$40,000.00	\$40,000.00	\$40,000.00
f. Total Cash Receipts (2d + 2e)	\$239,800.00	\$252,100.00	\$253,500.00	\$254,900.00
g. Total Cash Available (1 + f)	\$239,800.00	\$268,810.00	\$295,921.00	\$324,032.00
3. Operating Expenses:				
a. Salaries and wages	\$20,000.00	\$21,000.00	\$21,500.00	\$22,000.00
b. Purchase Power	\$20,000.00	\$21,000.00	\$21,500.00	\$22,000.00
c. Materials and Supplies	\$10,000.00	\$10,000.00	\$10,000.00	\$10,000.00
d. Contract Services - Engineering	\$1,500.00	\$1,500.00	\$1,500.00	\$1,500.00
e. Transportation Expenses	\$2,500.00	\$2,500.00	\$2,500.00	\$2,500.00
f. Insurance	\$250.00	\$250.00	\$250.00	\$250.00
g. Miscellaneous	\$10,000.00	\$10,000.00	\$10,000.00	\$10,000.00
h. Total Cash O&M Expenses (3a - 3g)	\$44,250.00	\$46,250.00	\$46,750.00	\$47,250.00
i. Total O&M Expenditures (3h)	\$44,250.00	\$46,250.00	\$46,750.00	\$47,250.00
j. Loan Principal/Interest Payments	\$0.00	\$0.00	\$0.00	\$0.00
k. Debt Service Reserve Fund Payments	\$14,300.00	\$14,300.00	\$14,300.00	\$14,300.00
l. Total Cash Paid Out (3i + 3j)	\$58,550.00	\$60,550.00	\$61,050.00	\$61,550.00
m. Ending Cash Position (1 + f) - (l)	\$181,250.00	\$208,260.00	\$234,871.00	\$262,482.00
n. End of Year Operating Cash (1 - l)	\$181,250.00	\$208,260.00	\$234,871.00	\$262,482.00
o. Debt Service Reserve	\$14,300.00	\$14,300.00	\$14,300.00	\$14,300.00
Total Reserve	\$14,300.00	\$14,300.00	\$14,300.00	\$14,300.00

SITLA Partnership

- A Funding Package of 80% Grant and 20% Loan Needed
- San Juan County was able to obtain 60% Grant and 40% Loan.
- In order to make the 80% grant and 20% loan, \$2,000,000 worth of sewer and water connections were sold to the School Institutional Trust Lands Administration (SITLA).

APPENDIX E

APPENDIX E

Impact Fees

• Culinary Water System

Table 3: Impact Fee Component	System Cost	Potential Number of Connections	Cost / Connection
Source	\$581,600	835	\$690
Storage	\$799,500	800	\$999
Distribution	\$3,768,900	1750	\$2,150
Total Water Impact Fee			\$3,700

• Sanitary Sewer System

Table 6: Impact Fee Component	System Cost	Potential Number of Connections	Cost / Connection
SSD Sewer Collection	\$5,000,000	1900	\$2,630
GWSSA Sewer Collection	N/A	N/A	\$1,953
Moab Sewer Collection	N/A	N/A	\$842
Moab Sewer Treatment	N/A	N/A	\$610
Total Sewer Impact Fee			\$5,735

What Is It Going To Cost Me?

• Existing Homes/Businesses in the Valley

- Impact Fees: Waived
- Connection Fees: Owner's Responsibility; San Juan County Loan Program

Table 7: Up-Front Cost Per Connection	
Septic System Abandonment	\$1,000
Sewer Service Connection to R/W	\$2,000
Total Per Connection	\$3,000
10 Year Loan from San Juan County	\$23/month
Total for Systems (230 connections)	\$596,000

- Monthly User Fee

• Platted Lots up to 230 Connections

- Impact Fees: Waived
- Connection Fees: Owners Responsibility
- Monthly User Fee even if not in use

• Future Connections above 230

- Impact Fees: Water \$3,700; Sewer \$5,735
- Connection Fees: TBD, estimated to be \$2,000 for both water and sewer
- Monthly User Fee when connection is made

Schedule Moving Forward

- SJSVSSD Board Approval: Spring of 2017
- Engineering Design, Permitting: Spring of 2017
- Bidding and Construction of Water System: Late 2017
- Bidding and Construction of Sewer System: Early 2018

FAQ's

• Will I be required to connect to the system?

- The SSD is required to have 230 connections so they can financially afford the system. We are hopeful that a great majority of residents will elect to connect because of the benefits. If 230 current residents and platted lots do not connect, then developers will be offered the connections with impact fees waived. If the SSD is still short, then they will be required to have existing residents to connect.

• What will happen with my existing well?

- Each home owner will be allowed to keep their existing well and water right and use it for irrigation, etc.

• Who will operate the system?

- SJSVSSD will operate the system either through their own operator or a contract with GWSSA.

• When will I have to start paying water and sewer bills?

- As soon as the system is completely operational.

• Will I be able to split my 1+ acre lot?

- The County is planning on rezoning the entire SV area. Many areas zoned for 1 acre lots will be zoned for a higher density (quarter acre and half acre lots). Additional master planning with public input will take place via the San Juan County Planning Commission over the next few months.

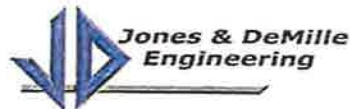
SAN JUAN SPANISH VALLEY SSD 40-YEAR WATER RIGHT PLAN WATER RIGHT: 09-2349

NOVEMBER 2017

PREPARED FOR:

San Juan Spanish Valley SSD

PREPARED BY:



1-800-748-5275
Project #: 1503-060

RICHFIELD • PRICE • MANTI • ROOSEVELT • UTAH VALLEY • ST. GEORGE • MONTICELLO • VERNAL

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San Juan Spanish Valley SSD 40-Year Water Right Plan Water Right:
09-2349
[Owner]

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APPENDIX F

APPENDIX F

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San Juan Spanish Valley SSD 40 Year Water Right Plan Water Right
09-2349
(Crown)

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1. INTRODUCTION

The San Juan Spanish Valley SSD is a local district located in northern San Juan County, Figure 1. Spanish Valley has a population of about 500. Spanish Valley is near several major visitor attractions, Arches National Park, Canyonlands National Park, the Colorado and Green Rivers. The San Juan Spanish Valley SSD was created for the purpose of serving the residents, helping in conserving and developing water for multiple uses and developing a municipal water system for the area of Spanish Valley.

San Juan Spanish Valley SSD has contracted with Jones & DeMille Engineering to produce this 40 Year Water Right Plan. This plan will project the beneficial water use of water right 09-2349 through a 40-year period. The Plan period will only evaluate the next 40 years and will need updates as required to make water right decisions for all future development. This Plan will answer how much water right the San Juan Spanish Valley SSD will have to manage and how much water right is required from a developer before any individual new project approval.




Figure 1. Spanish Valley

San Juan Spanish Valley SSD 40 Year Water Right Plan Water
Right: 09-2349

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1.1. PROJECTED GROWTH RATES

For the next 40 years, the Utah Governor's Office of Management and Budget (GOMB) projects that San Juan County will experience an annual growth rate of 0.3%. However, it is reasonable to expect that Spanish Valley will develop and grow faster than what the GOMB projects for the rest of the county.

There are several indicators that Spanish Valley will develop quite rapidly in the near future. One such indicator is that tourism in Moab, Arches National Park, and Canyonlands is increasing greatly. As tourism increases, the need for more restaurants, hotels, and other tourism related infrastructure increases, as well as the need for more housing to accommodate new employees and residents. Arches National Park and Canyonlands National Park have experienced a tremendous increase in the number of visitors over the last few years. The attractiveness for less expensive development places Spanish Valley in a favorable position for future development to accommodate increasing tourism.

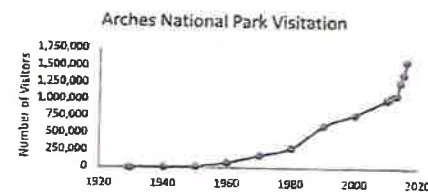


Figure 2 Arches National Park Visitation¹



Figure 3 Canyonlands National Park Visitation²

¹ <https://www.nps.gov/arch/learn/management/statistics.htm>
² <https://www.nps.gov/cany/learn/management/statistics.htm>
San Juan Spanish Valley SSD 40-Year Water Right Plan Water
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Another indicator for higher growth for Spanish Valley is the planned construction of the culinary water and sanitary sewer system in 2018. Similar cities have experienced a large growth related to a low cost of development and after a sewer or water system was constructed; one such city is Nibley City, Utah. Nibley City experienced a large increase in population shortly after the city had a sewer system construction. Nibley was primarily rural and much of the land within the city was open pastures prior to 2000. When the sewer system was under construction many developers came to Nibley to build single family homes because of the relatively low cost to develop. Nibley City experienced an almost 13% annual growth rate per year between 2000 and 2005, almost doubling the population.¹

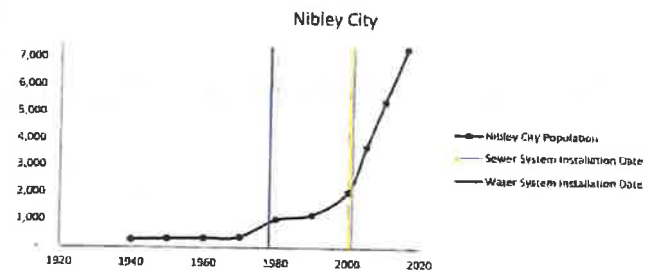


Figure 4 Nibley City Development

Based on increasing tourism, and large development occurring during and after the construction of the water and sewer systems, Spanish Valley may experience a similar, if not greater, boost in development.

1.1.1. DEVELOPMENT CAPACITY

The development capacity of Spanish Valley is related to the amount of area that can be developed. The amount of developable area is based mainly on terrain conditions. Areas that are hilly, steep, or that contain washes are not considered part of this developable area. Other excluded areas are LeGrand Johnson's mining pit, Ken's Lake, and the BLM campground south of Ken's Lake. The developable area was chosen using Google Earth Imagery, Figure 5. In Spanish Valley there are about 4,000 acres that can be developed.

¹ <http://population.us/ut/nibley/>
San Juan Spanish Valley SSD 40-Year Water Right Plan Water
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APPENDIX F



Figure 5. Developable Area - Spanish Valley

1.1.2. RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL GROWTH

To reflect the short-term surge in growth, the residential annual growth rate is patterned similar to Nibley City's historical growth rate is expected to be as high as 13% until 2025. From that point on, the annual growth will then decline to a steady growth rate. The projected population and number of equivalent residential connections (ERC's), based on an average 2.8 people per home, can be seen in Table 1.

Table 1. Residential Annual Growth

Year	2017	2018	2025	2030	2040	2050	2055	2057
Residential Annual Growth	-	1%	13%	8%	8%	5%	2%	2%
Population	500	503	1,184	1,740	3,757	6,120	6,757	7,030
Number of ERC's	179	180	423	621	1,342	2,186	2,413	2,511

San Juan Spanish Valley SSD 40-Year Water Right Plan Water
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Commercial growth is usually slower than or lags residential growth and therefore will have a different growth rate. Spanish Valley currently has two RV parks with 17 pads total, a seven-cabin resort and 34 office buildings. Most likely, the majority of future commercial growth in Spanish Valley will be RV parks, hotels, motels, restaurants, and office/business establishment as seen in Table 2.

Table 2. Commercial Annual Growth

	2017	2018	2025	2030	2040	2050	2055	2057
Commercial Annual Growth		1%	10%	6%	4%	1%	1%	1%
RV Parks (Total Number of Pads)	17	18	36	49	73	81	86	88
Motels/Hotels (Total Number of Rooms)	7	8	16	22	33	37	39	40
Restaurants	0	0	1	2	3	4	5	6
Offices	34	35	69	93	138	153	161	165

Lastly, Spanish Valley's water right allows for surface water to be diverted from the Green River. Nearby is a large potash mine which uses water from the Green River for its evaporation beds. A likely industry to use this part of Spanish Valley's water right is mining. Industrial growth is more likely to occur later and is very likely to occur within the next 40 years.

2. CURRENT/PROJECTED FUTURE WATER REQUIREMENTS

2.1. CURRENT WATER RIGHTS & SHARES

Currently, San Juan Spanish Valley SSD owns water right 09-2349, which allows the district to divert 5,000 ac-ft. of water per year or an average daily use of 4,463,696 gallons. The district does not have any irrigation shares at this time.

2.2. CURRENT WATER USE & FUTURE WATER REQUIREMENTS

Spanish Valley is in development and will be receiving a municipal water distribution system. The system in development will initially use one or two wells to supply water to the area. As Spanish Valley grows and expands, new wells or springs will need to be developed to supply water to new growth in the south end of the valley.

San Juan Spanish Valley SSD 40-Year Water Right Plan Water
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APPENDIX F

To best estimate water use for Spanish Valley the following assumptions have been made and are based on engineering judgement and Utah Code.

1. For conservative purposes, residential water use will be based on the Peak Day Demand of 800 gallons per day per connection, see Table 3.
2. Agricultural use is based on 0.1 irrigated acres per connection, see Figure 6 and Table 4.
 - a. Spanish Valley is in Map Zone 5 and therefore Irrigation use is 4.52 gallons per minute per irrigated acre as the peak day demand.
3. Any industry that uses Spanish Valley's water right is assumed to use three cubic feet per second or about 1,938,571 gallons per day.
4. All offices or building establishment, present and future, do not or will not have a cafeteria, see Table 5.
5. All new restaurants will be ordinary (not 24-hour and have an average of 72 seats, see Table 5.

Table 3. Source Demand for Indoor Use^a

TABLE 3-1 Source Demand for Indoor Use		
Type of Connection	Peak Day Demand	Average Yearly Demand
Year-round use		
Residential	800 gpd/conn	146,000 gal./conn (400 gal./conn)
Equivalent Residential Connection (ERC)	800 gpd/ERC	146,000 gal./ERC (400 gal./ERC)
Hotel, Motel, and Resort	150 gpd/unit	54,750 gal./unit
RV Park	100 gpd/pad	36,500 gal./pad

^a <https://rules.utah.gov/publicat/code/r309/r309-510.htm>
San Juan Spanish Valley SSD 40-Year Water Right Plan Water
Right: 09-2349

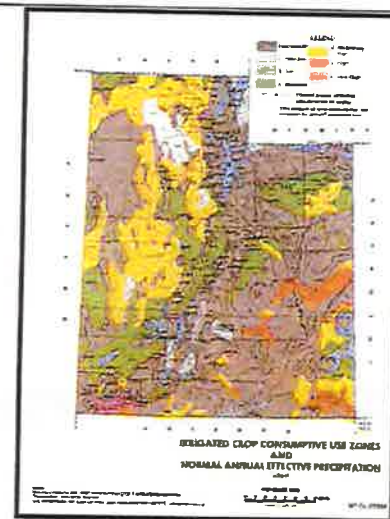


Figure 6. Irrigated Crop Consumptive Use Zones^a

Table 4. Source Demand for Irrigation^a

TABLE 4-1 Source Demand for Irrigation	
Map Zone	Peak Day Demand (gpm/irrigated acre)
1	2.26
2	2.80
3	3.39
4	3.96
5	4.52
6	4.90

^a https://deq.utah.gov/Topics/Water/Irrigation/images/irrigation_map_2322x3240.gif

^b <https://rules.utah.gov/publicat/code/r309/r309-510.htm>
San Juan Spanish Valley SSD 40-Year Water Right Plan Water
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Table 5: Source Demand for Individual Establishments¹

TABLE 510-2	
Source Demand for Indoor Use ^a	
Type of Establishment	Peak Day Demand (gpd)
Office Buildings and Business Establishments, per shift, per employee	
a. with cafeteria	25
b. with no cafeteria	15
Restaurants	
a. ordinary restaurants (not 24-hour service)	35 per seat
b. 24-hour service	50 per seat
c. single service customer utensils only	2 per customer
d. or, per customer served (includes toilet and kitchen wastes)	10 per customer served

¹ <https://rules.utah.gov/publicat/code/r309/r309-510.htm>
San Juan Spanish Valley SSD 40-Year Water Right Plan Water Right: 09-2349

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The total agricultural use was calculated with the following equation:

$$Ag. Water Use = 4.53 \frac{gal}{min \cdot irrigated acres} \cdot 60 \frac{min}{hr} \cdot 24 \frac{hr}{day} \cdot 0.1 \frac{irrigated acres}{ERC} \cdot \# of ERC's$$

Agricultural water use also makes up about half of the total water use initially. Table 7 shows agricultural water use through the 40-year period.

Table 7: Agricultural Water Use

	2017	2018	2025	2030	2040	2050	2055	2057
Irrigated Acres	18	18	42	62	134	219	241	251
Agricultural Water Use (gallons)	116,229	116,925	275,229	404,475	873,341	1,422,638	1,570,713	1,634,174

Commercial water use was calculated by taking the type of business and multiplying the number of units by the respected source demand. Table 8 shows commercial water use through the 40-year period.

Table 8: Commercial Water Use

	2017	2018	2025	2030	2040	2050	2055	2057
RV Park Water Use	1,700	1,800	3,600	4,900	7,300	8,100	8,600	8,800
Motels/Hotels Water Use	1,050	1,200	2,400	3,300	4,950	5,550	5,850	6,000
Restaurants Water Use (72 seats per restaurant)	-	-	2,520	5,040	7,560	10,080	12,600	15,120
Office/Business Establishment Water Use (gallons)	1,020	1,050	2,070	2,790	4,140	4,590	4,830	4,950
Total Commercial Water Use (gallons)	3,770	4,050	10,590	16,030	23,950	28,320	31,880	34,870

San Juan Spanish Valley SSD 40-Year Water Right Plan Water Right: 09-2349

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Industrial water use for the 40-year period can be seen in Table 9. Again, as mentioned in the assumptions, Industrial use has been converted from 3 cubic feet per second to gallons per day

Table 9: Industrial Water Use

	2017	2018	2025	2030	2040	2050	2055	2057
Industrial Water Use (gallons)	0	0	0	0	1,938,571	1,938,571	1,938,571	1,938,571

The combined water use for the year period can be seen in Table 10.

Table 10: Total Water Use

	2017	2018	2025	2030	2040	2050	2055	2057
Residential Water Use (gallons)	142,857	143,714	338,286	497,143	1,073,429	1,748,571	1,930,571	2,008,571
Agricultural Water Use (gallons)	116,229	116,926	275,229	404,475	873,341	1,422,638	1,570,713	1,634,174
Total Commercial Water Use (gallons)	3,770	4,050	10,590	16,030	23,950	28,320	31,880	34,670
Industrial Water Use (gallons)	0	0	0	0	1,938,571	1,938,571	1,938,571	1,938,571
Total Water Use (gallons)	262,856	264,690	624,105	917,648	3,909,291	5,138,109	5,471,736	5,616,996
Current Average Daily Available Water (gallons)	4,463,712	4,463,712	4,463,712	4,463,712	4,463,712	4,463,712	4,463,712	4,463,712
Surplus/Deficit	4,200,856	4,199,021	3,839,607	3,546,063	554,420	-574,399	-1,008,024	-1,152,475

By the end of the 40-year period, Spanish Valley will use the entirety of their current water right and have a deficit, as seen in the red highlighted cells of Table 10. To ensure that there is sufficient water for development past the 40-year period, the district should procure additional water rights or shares.

APPENDIX A: BOARD MEMBER INFORMATION

San Juan Spanish Valley SSD Board Members

Name	Position	Term Expires
Frank Darcey	Chairman	
William Johnston	Vice Chair	
Kerry Behanin	Board Member	
Jared Shumway	Board Member	
Mike Bynum	Board Member	12/13/2020

Contact Information:

San Juan Spanish Valley SSD
117 South Main
Monticello, UT 84535

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April 17, 2018

San Juan County Spanish Valley Area Plan

30

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SAN JUAN SPANISH VALLEY
SSD 40-YEAR WATER RIGHT
PLAN-WATER RIGHT: 09-2349

APPENDIX F

10/13/2017 CHPRINT (437400)

Water will be taken in flow when storage tank is full, subject to it within limits of the water right.

Water Right Description: 09-2349

Water Right Holder: San Juan County

Water Right Location: San Juan County

Water Right Type: Storage

Water Right Volume: 100 cfs

Water Right Term: 40 years

Water Right Priority: 1st

Water Right Status: Active

Water Right Comments: This water right is for the purpose of storing water for use in the future. It is subject to the provisions of the Water Rights Act.

Water Right History: This water right was created on 10/13/2017. It was last modified on 10/13/2017.

Water Right Contact: San Juan County, 100 Main Street, Santa Fe, NM 87501. Phone: (505) 988-1234. Email: water@sanjuancounty.gov

Water Right URL: <https://www.waterrights.sanjuan.gov/lookup/print.asp?formnum=37400>

10/13/2017 CHPRINT (437400)

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000334

U.S. 191 Corridor Preservation Study

Milepost 112 – 123.4

Prepared for Utah Department of Transportation



InterPlan Project Number 150405
November 4, 2015

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APPENDIX G

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Introduction

Background

The Utah Department of Transportation (UDOT) is concerned about access management along State Route U.S. 191. To assist UDOT in its current and long range transportation planning, InterPlan was hired to conduct an access management study along the corridor, in coordination with Grand County, San Juan County, and Moab City (hereinafter referred to as "the participating entities") and to determine the location of future signals, street accesses, and driveway accesses. The study area includes U.S. 191 from milepost (MP) 112 to 123.4. The goal of this study is for the participating entities to enter into a corridor agreement for U.S. 191. This agreement will give the participating entities a better tool to manage this corridor in the future. The study utilizes principles found in the Transportation Research Board's (TRB) Access Management Manual, UDOT's R930-6 Access Management, and the American Association of State Highway and Transportation Officials (AASHTO) Policy on Geometric Design of Highways and Streets, latest editions.

Description of U.S. 191

The U.S. 191 study area is 11.4 miles long, directly south of Moab City. This portion of U.S. 191 is a two lane rural highway with intermittent passing lanes. The speed limit in the northern portion of the corridor is 55 miles per hour (mph), rising to 65 mph at approximately MP 121.2. Along the study corridor land uses vary from commercial and light industrial to residential and vacant land. Development and development pressures are generally more intense on the north end of the corridor.

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Existing Conditions

Land Use

Land use along the corridor varies greatly. Most of the developed portions are to the north in Grand County with some development occurring in the northernmost portion of San Juan County. Development is primarily low intensity commercial and industrial uses with some residential. Larger residential areas are accessed from the corridor via collector roads. Additionally, to the south various recreational resources are accessed from the corridor, including some popular recreational trails.

Capacity and Traffic Volumes

Along the study corridor, U.S. 191 is a two-lane highway with intermittent passing lanes. The capacity along the facility varies, from 11,500 vehicles at level of service (LOS) C at the rural south end to 25,500 vehicles at LOS D at the urban northern end. LOS is defined as how well a road operates based on levels A through F. Level A represents the best operating conditions and level F the worst. Annual average daily traffic (AADT) currently peaks in the study area at a volume of 13,295 at the northern end of the corridor. This represents approximately 69 percent of capacity. Table 1 shows historical AADTs for the segments of the study area.

Table 1: Historical Annual Average Daily Traffic

Begin Milepost	End Milepost	Description	Annual Average Daily Traffic		
			2013	2012	2011
103.45	117.89	Spanish Valley to La Sal Loop Road	4,260	4,225	4,215
117.89	123.19	La Sal Loop Road to Milcreek Drive	6,455	6,370	6,550
123.19	124.48	Milcreek Drive to 400 East	13,295	13,125	13,085

Existing Access Management Categories

UDOT Administrative Rule R930-6, *Accommodation of Utilities and the Control and Protection of State Highway Rights of Way*, establishes the access management policies for state roads. According to R930-6, access to U.S. 191 in the study area is defined as Category 2 – System Priority Rural from the southern extent of the study area to just south of Lemon Lane and Category 4 – Regional Rural from just south of Lemon Lane to the north end of the study limits. As shown in the following table, Category 2 minimum signal spacing is 5,280 feet, minimum street spacing is 1,000 feet, and minimum driveway spacing is 1,000 feet. Category 4 minimum signal spacing is 2,640 feet, minimum street spacing is 660 feet, and minimum driveway spacing is 500 feet.

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Table 2: Rule R930-6 Access Management Standards

State Highway Access Management Standards						
Category	Minimum Signal Spacing (feet)	Minimum Street Spacing (feet)	Minimum Access Spacing (feet)	Minimum Interchange to Crossroad Access Spacing (feet)		
				To 1 st Right-In Right-out	To 1 st Intersection	From last Right-In Right-out
1	I	Interstate/Freeway Standards Apply				
2	S-R	5,280	1,000	1,000	1,320	1,320
3	S-U	2,640	No Unsignalized Access Permitted		1,320	1,320
4	R-R	2,640	660	500	660	1,320
5	R-PU	2,640	660	350	660	500
6	R-U	1,320	350	200	500	500
7	C-R	1,320	300	150	Not Applicable	
8	C-U	1,320	300	150		
9	O	1,320	300	150		

Source: UDOT Administrative Rule R930-6, August 2013 Edition

Currently, U.S. 191 does not meet the UDOT access management standards along both the Category 2 and Category 4 sections within the study area. Access management standards were adopted with pre-existing deficiencies. The Administrative Rule requires permission for access or a modification to access from UDOT if it is a new access, a change of land use type, or a change of intensity of land use. Pre-existing deficiencies are not affected by the rule unless or until development is proposed, thus triggering UDOT approval.

The table below shows the existing U.S. 191 access management compliance throughout the study area. Although the access management standards were adopted after deficiencies such as driveways existed, UDOT can still work with developers and property owners to limit future driveways to meet UDOT access management standards.

Table 3: Existing Access Compliance

	All Segments		Northbound		Southbound	
	Driveway	Street	Driveway	Street	Driveway	Street
Category 2	37%	60%	22%	50%	64%	100%
Category 4	4%	71%	6%	75%	3%	67%
All Categories	16%	65%	13%	58%	21%	77%

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Measurement of Spacing

In Section 3.0, Definitions of UDOT's Administrative Rule R930-6, specifications are given on how to measure the spacing of signals, streets, and private accesses/driveways and are set forth as follows:

1. **Signal Spacing** – "Signal spacing is measured from the centerline of the existing or future signalized intersection cross street to the centerline of the next existing or future signalized intersection cross street."
2. **Street Spacing** – "Street spacing is measured as the distance from leaving point of tangent to receiving point of tangent."
3. **Access Spacing** – "Access is measured as the distance from the inside point of curvature of the radius of an intersection or driveway to the inside point of curvature of the next intersection or driveway radius."
4. **Driveway Spacing** – "means the distance between adjacent driveways on the side of the roadway as measured from the near edge."

In order to determine the number of signals, streets, and accesses/driveways along U.S. 191, an aerial map of the study area was used along with on-site inspection of the roadway. The project technical advisory committee also provided input. The table below shows the number of existing signals, streets, and accesses/driveways along U.S. 191.

Table 4: Existing Access, U.S. 191, MP 112 to MP 123.4

Number of Traffic Signals	Number of Streets	Number of Accesses/Driveways
0	34	110

Existing access points along the corridor are displayed in exhibits one through six in the appendix.

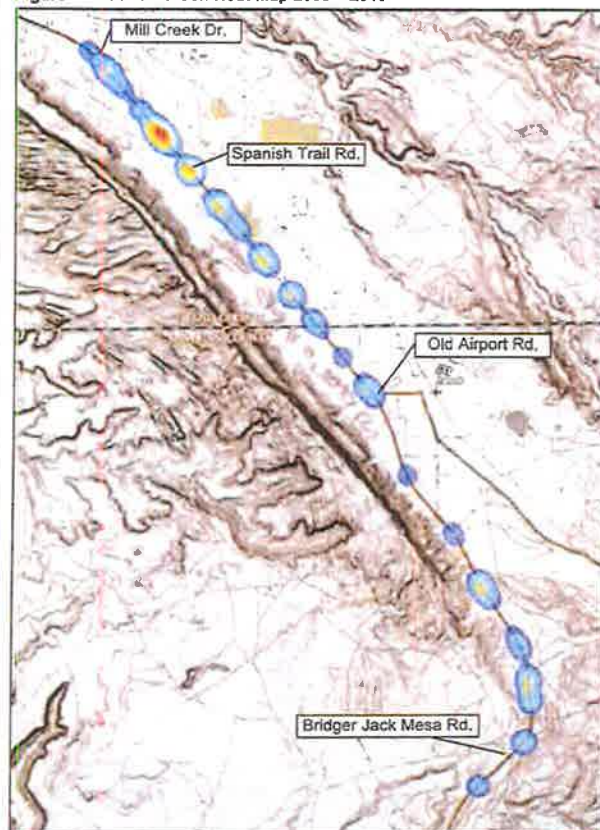
Safety Analysis

There were a total of 107 crashes on U.S. 191 within the study area from 2009 to 2013. Of these, 32 involved wild animal collision, comprising 30 percent of the total. Eleven crashes were severe, including three pedestrian, two DUI's, two no seatbelts, one drowsy driver, one weather related, and one speed related crash. Figure 1 below depicts a heat map, which displays crash activity concentrations. Crashes occur more frequently to the north of the study area, particularly at the intersections of San Jose Road and Spanish Trail Road.

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Figure 1: U.S. 191 Crash Heat Map 2009 – 2013



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Future Conditions

Land Use

Existing land use patterns are expected to continue, spreading into existing vacant developable land. The most notable known change in the future is the Utah State University (USU) campus that is expected to be located just west of the corridor near milepost 123 at the north end of the study limits. In addition to the campus, supporting housing and retail development is anticipated in the surrounding areas. These developments will likely change the dynamic of traffic patterns along the U.S. 191 corridor.

Traffic Volumes

Using the Utah Statewide Travel Model, future 2040 traffic conditions were forecasted. Although significant increases are projected with daily volumes peaking at 18,170, this growth is more than accommodated by the capacity of existing and planned infrastructure. It is important to note that these volumes do not reflect tourist peak season conditions and do not account for the new USU campus. The table below shows the existing and future traffic volumes.

Table 5: Forecasted 2040 Traffic Volumes

Begin Milepost	End Milepost	Description	Annual Average Daily Traffic	
			2013	2040
103.45	117.89	Spanish Valley to LaSal Loop Road	4,260	11,200
117.89	123.19	LaSal Loop Road to Millcreek Drive	6,455	11,200
123.19	124.48	Millcreek Drive to 400 East	13,295	18,170

Future Street Network

The street network surrounding the study corridor should be expected to change in the future. The anticipated changes include the realignment of Millcreek Drive and new roadway connections to the west to provide access to the future USU campus. These anticipated changes are shown in exhibits one through six in the appendix.

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Access Management

What is Access Management?

Access management is a way of preserving the safe performance of the road for the flow of traffic at posted speeds by controlling driveway and cross street access to that roadway. Access management on Utah's state roads is administered by UDOT through the Utah Administrative Rule R930-6. Access management maintains the longer term functionality of a state road that is critical to the maintenance of a quality transportation system. Specifically, access management limits the number of traffic signals, intersections and access points so that traffic flows at the speed and capacity designed for the road classification.

Importance of Access Management

Access management is necessary to achieve public safety on Utah's roadways. Through access management techniques, accident rate reduction is typically achieved, while modest improvements in capacity and travel speeds can also occur. Starting with the design of a roadway, engineers plan for limited access along the roadway in order to limit performance reduction. With many intersections, traffic signals and driveways, the potential for congestion is increased along with the potential for a decline in automobile speed that often causes delays. Goals of access management include:

1. Reduction in traffic conflicts and accidents
2. Reduced traffic congestion and increased mobility
3. Preservation of traffic capacity and level of service
4. Improved economic benefits to business
5. Potential reduction in air pollution from vehicle exhaust

According to the National Cooperative Highway Research Program's (NCHRP) Report 420 *Impacts of Access Management Techniques* there are numerous access management techniques than can be used to preserve the intended performance of a roadway. These techniques range from adopting policies to designing roadway features. One known policy technique will be the corridor agreement that is proposed to be signed between the participating entities. This agreement provides specific policy direction on the spacing of future traffic signals, location of streets, and driveway access spacing with an overall goal of limiting the number of access points along a particular roadway. According to UDOT's Administrative Rule R930.6, a corridor agreement supersedes other access category designations and becomes the governing rule on permitting future driveways. Similar corridor agreements have been created in all four UDOT Regions.

Study Process

Public Participations Efforts

InterPlan completed the following tasks in order to provide UDOT with an access management plan:

1. Organized a technical advisory committee (TAC) to work with the consultant team to provide local knowledge and subject matter expertise.
2. Collected existing conditions data and reviewed pertinent data regarding relevant future planning efforts.
3. Conducted two public open houses with the TAC on August 18, 2015 and September 30, 2015.

Technical Advisory Committee

As mentioned earlier, a TAC was formed to provide local knowledge and subject matter expertise in the development of the access management plan and the corridor agreement between the participating entities. The TAC was charged with the responsibility for reviewing the technical analysis completed by the consultant team and considering public input before moving forward with a preferred access management alternative.



Table 6: Technical Advisory Committee Members

Name	Organization
Troy Torgersen	UDOT
Robert Dowell	UDOT
Dale Stapley	UDOT
Rhett Amell	UDOT
Anne Ogden	UDOT
Bill Jackson	Grand County
Zacharis Levine	Grand County
Scott Christensen	San Juan County
Jeff Foster	Moab City
Philip Bowman	Moab City
Eliase Erler	SITLA
Rock Smith	BLM
Vern Keastlar	InterPlan
Kai Tchinaka	InterPlan
Michael Baker	InterPlan

Public Open Houses

Two public open houses were held with the general public along the corridor on August 18, 2015 and September 30, 2015. Both open houses were noticed through an advertisement in the Moab Times Independent. At the meetings, participants were informed of the status of the project through slideshow presentations and they were invited to an open discussion with the consultant team and staff over large study area maps. Participants were also invited to submit comments through a comment form (see Appendix for comment forms and comments from both public meetings).



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Corridor Access Management Plan

Signal Control Plan

Planning the future signalization for the study corridor was an iterative process where multiple scenarios were considered and reviewed. The signalization recommendations were determined through a review of existing conditions, TAC recommendations, and public comment. The identified potential future signal locations are described below:

1. Old Spanish Trail Arena (MP 120.6)
This road acts as primary access for the Old Spanish Trail Arena, as well as agricultural uses to the east. Increasing usage of the developing arena may warrant a signal in the future.
2. Spanish Trail Road (MP 121.5)
Located at approximately 121.5, Spanish Trail Road extends northeast, acting as a major collector road to Spanish Valley Drive. The intersection extends to the southwest directly into a RV park.
3. Millcreek Drive (MP 123.2)
Located at the very northern portion of the study corridor at approximately MP 123.2, the junction of U.S. 191 and Millcreek Drive currently operates as two separate one way T intersections. There are currently plans to redesign this intersection as a single T intersection located slightly to the north of its current location. Millcreek Drive will access development to the north and east of U.S. 191 and acts as an alternative route to U.S. 191 to the north.

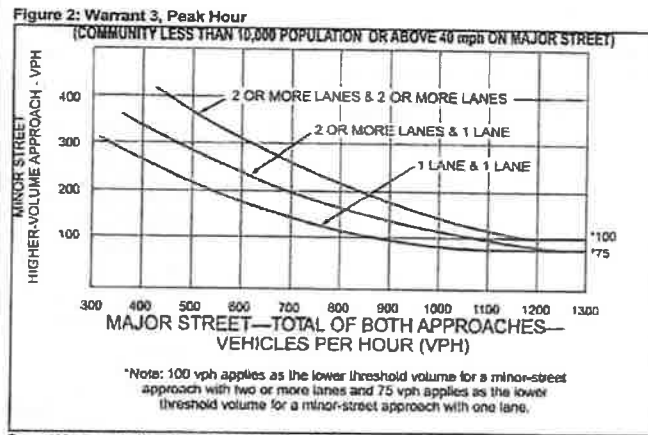
In the future, signals may be installed if signal warrants are met. The *Manual on Uniform Traffic Control Devices* (MUTCD) is the national standard for all traffic control devices on all public roads open to public travel in accordance with 23 U.S.C. 109(d) and 402(a). The MUTCD states that the need for a traffic control signal shall include an analysis of the applicability of any of nine standard warrants based on a study of the existing operation and safety. These warrants are:

Table 7: Traffic Control Signal Warrants

MUTCD Traffic Control Signal Warrants	
Warrant 1: Eight-Hour Vehicular Volume	Warrant 6: Coordinated Signal System
Warrant 2: Four-Hour Vehicular Volume	Warrant 7: Crash Experience
Warrant 3: Peak Hour	Warrant 8: Roadway Network
Warrant 4: Pedestrian Volume	Warrant 9: Intersection Near at-grade Railroad Crossing
Warrant 5: School Crossing	

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The peak hour warrant is often the most likely leading indicator of a need for a traffic signal, and is easiest to estimate. In addition, where cross traffic is concentrated at a few major points, the peak hour warrant is met sooner than where cross traffic might be dispersed over a larger number of smaller intersecting streets.



Source: Manual on Uniform Traffic Control Devices, US Department of Transportation, December 2000.

Access Corridor Control Plan

Existing accesses along U.S. 191 were reviewed and analyzed with input from the TAC and the public to identify opportunities to increase compliance with the UDOT access management categories. Possible future changes to increase compliance include: street realignments, driveway consolidation, driveway closures, and construction of frontage roads. Exhibits one through six in the appendix display the identified possible future changes.

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When compared to Table 3, Table 8 below shows the improvement in access spacing compliance if all identified changes are implemented. It is important to note that all existing accesses are established and legal and that UDOT can only implement these improvements if there is a change in the type of land use, a change in intensity of land use, or in cooperation with the land owner.

Table 8: Potential Future Access Compliance

	All Segments		East Side		West Side	
	Driveway	Street	Driveway	Street	Driveway	Street
Category 2	63%	79%	43%	71%	100%	100%
Category 4	38%	68%	37%	100%	100%	85%
All Categories	49%	83%	40%	83%	81%	85%

Next Steps: Corridor Agreement

The next steps include all four jurisdictions signing the corridor agreement and having Grand County, San Juan County, and Moab City adopt the corridor agreement as part of their transportation master plans and proceed with implementation by coordinating with UDOT.

About InterPlan:

InterPlan is a Utah owned and operated company located in Midvale, Utah and dedicated to transportation planning and traffic engineering services. The firm was founded on the concept of providing high quality technical work, attention to client needs, and open and honest communication.

InterPlan

 Transportation Planning
 7719 South Main Street
 Midvale, Utah 84047
 801-307-3400

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Appendix

1. Technical Advisory Committee Meeting Agendas for July 16, August 19, and September 30, 2015
2. Public Comments Forms for August 19, and September 30, 2015
3. Moab Times Public Meeting Advertisements of August 19, and September 30, 2015
4. Public Comments dated August 5, August 11, August 14, August 19, September 24, and October 1, 2015
5. Exhibits 1-6

U.S. 191 Corridor Preservation Study Technical Advisory Committee Meeting Agenda

Date: Thursday, July 16, 2015

Time: 1:00 p.m. to 3:00 p.m.

Place: Conference Room - Moab City Office, 217 East Center Street, Moab City

Technical Advisory Committee (TAC)

Troy Torgersen, UDOT Region 4
Bill Jackson, Grand County
Scott Christensen, San Juan County
Jeff Foster, Moab City
Elise Eric, SUTLA
Beth Ransel, BLM
Vern Keeslar, InterPlan
Kai Tohinaka, InterPlan
Michael Baker, InterPlan

Agenda

1. Introduction
 - a. TAC Introductions
 - b. Purpose of corridor study
 - c. Access management principles
2. Existing Conditions
 - a. UDOT access spacing standards
 - b. Existing access compliance
3. Public Engagement
 - a. Future TAC and Public Meetings
 - August 11 - Review existing conditions
 - September 9 - Review recommendations
 - b. Stakeholder list
 - c. Meeting notice

**U.S. 191 Corridor Preservation Study
Technical Advisory Committee Meeting Agenda**

Date: Wednesday, August 19, 2015
Time: 2:00 p.m. to 4:00 p.m.
Place: The Grand Center, 162 North 500 West, Moab, Utah

Technical Advisory Committee (TAC)

Troy Torgersen, UDOT
Robert Dowell, UDOT
Dale Stapley, UDOT
Darryle Friant, UDOT
Rhett Arnell, UDOT
Anne Ogden, UDOT
Bill Jackson, Grand County
Zacharia Levine, Grand County
Scott Christensen, San Juan County
Jeff Foster, Moab City
Eric Johanson, Moab City
Elise Erier, SITLA
Brian Torgerson, SFTLA
Beth Ransel, BLM
Rock Smith, BLM
Vern Keeslar, InterPlan
Kai Tohinska, InterPlan
Michael Baker, InterPlan

Agenda

1. Introduction
 - a. TAC introductions
 - b. Study update
2. Existing Conditions
 - a. Identified private driveways, private roads, and public roads
3. Future Conditions
 - a. Identified private driveways that could be closed or consolidated
 - b. Identified private/public roads that could be consolidated, realigned, or constructed

4. Public Engagement

- a. Future TAC and Public Meetings
 - September 30 – Review recommendations
- b. Meeting notice – Advertised in the Moab Times-Independent on August 6 & 13, 2015. Requested to be on the websites of Grand County, San Juan County, and Moab City. Requested to be on Community Calendar website.

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**U.S. 191 Corridor Preservation Study
Technical Advisory Committee Meeting Agenda**

Date: Wednesday, September 30, 2015
Time: 2:00 p.m. to 4:00 p.m.
Place: The Grand Center, 182 North 500 West, Moab, Utah

Technical Advisory Committee (TAC)

Troy Torgersen, UDOT
Robert Dowell, UDOT
Dale Stapley, UDOT
Darryle Friant, UDOT
Rhett Amell, UDOT
Anne Ogden, UDOT
Bill Jackson, Grand County
Zacharia Levine, Grand County
Scott Christensen, San Juan County
Jeff Foster, Moab City
Eric Johanson, Moab City
Elise Ester, SITLA
Brian Torgerson, SITLA
Beth Ransel, BLM
Rock Smith, BLM
Vern Keestlar, InterPlan
Kai Tohinaka, InterPlan
Michael Baker, InterPlan

Agenda

1. Introduction
 - a. TAC introductions
 - b. Study update
2. Future Conditions
 - a. Identified private driveways that could be closed or consolidated
 - b. Identified private/public roads that could be consolidated, realigned, or constructed
3. Story Board Review
 - a. Information for public to be placed on website of Grand County, Moab City, San Juan County, UDOT, and InterPlan.

4. Public Meeting for September 30, 2015
 - a. Show presentation
 - b. Allow for review of Corridor Preservation Plan
 - c. Allow for written public comments
5. Next Steps
 - a. Consider new comments from public meeting
 - b. Write a draft Corridor Agreement
 - c. Send to Grand County, Moab City, San Juan County, and UDOT for review

APPENDIX G

US 191 CORRIDOR
PRESERVATION STUDY

APPENDIX G

U.S. 191 Corridor Preservation Study
Public Meeting, August 19, 2015
Public Comment Form

1. What are your comments about the public meeting held tonight?
2. Is there adequate private access to the properties fronting U.S. 191?
Circle No or Yes. Please explain.
3. Is there adequate public street access for properties not fronting U.S. 191?
Circle No or Yes. Please explain.
4. Are there traffic signals needed on U.S. 191 in the study area?
Circle No or Yes. If yes, please indicate where and why.
5. Please provide any additional comments you have about the U.S. 191 Corridor Preservation Study.

Please submit all comment forms at the public meeting or by August 31, 2015 to Vern Eerslev, InterPlan Planning Manager, by email at verne@interplan.org or by mail at 7719 South Main Street, Midvale, Utah 84047.



U.S. 191 Corridor Preservation Study
Public Meeting, September 30, 2015
Public Comment Form

1. How did you hear about tonight's public meeting?
2. What are your comments about the public meeting held tonight?
3. In the proposed plan, will there be adequate private access to the properties fronting U.S. 191? Circle No or Yes. Please explain.
4. In the proposed plan, will there be adequate public street access for properties not fronting U.S. 191? Circle No or Yes. Please explain.
5. In the proposed plan, are the future traffic signals located where they will be needed? Circle No or Yes. If yes, please indicate where and why.
6. Please provide any additional comments you have about the U.S. 191 Corridor Preservation Study.

Please submit all comment forms at the public meeting or by October 7, 2015 to Vern Eerslev, InterPlan Planning Manager, by email at verne@interplan.org or by mail at 7719 South Main Street, Midvale, Utah 84047.



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APPENDIX G



PUBLIC MEETING

Attention Property Owners along US-191

The Utah Department of Transportation (UDOT) seeks public comment on the US-191 Corridor Preservation Study. This project spans 11.5 miles from approximately Sage Drive in Moab to Bridger Jack Mesa Road, 1.5 miles north of the Kane Springs Rest Area in San Juan County.

To improve safety along the corridor, the study will guide the placement of future public streets and private driveways on US-191.

Please join us for a public meeting to learn more about this study and to review the existing conditions!

DATE: Wednesday, August 19, 2015

WHEN: 6:00 - 8:00 PM

**WHERE: The Grand Center
182 North 500 West in Moab**

If you have any comments, questions, or suggestions please contact:
Vern Keeslar, InterPlan Planning Manager.
801-307-3400 or vern@interplanco.com



PUBLIC MEETING

Attention Property Owners along US-191

The Utah Department of Transportation (UDOT) seeks public comment on the US-191 Corridor Preservation Study. This project spans 11.5 miles from approximately Sage Drive in Moab to Bridger Jack Mesa Road, 1.5 miles north of the Kane Springs Rest Area in San Juan County.

To improve safety along the corridor, the study will guide the placement of future public streets and private driveways on US-191.

Please join us for our second public meeting to learn more about this study and to review possible changes!

DATE: Wednesday, September 30, 2015

WHEN: 6:00 - 8:00 PM

**WHERE: The Grand Center
182 North 500 West in Moab**

If you have any comments, questions, or suggestions please contact:
Vern Keeslar, InterPlan Planning Manager.
801-307-3400 or vern@interplanco.com

US 191 CORRIDOR
PRESERVATION STUDY

Vern Keeslar

From: Kara Dohrenwend <kara@evveg.org>
Sent: Wednesday, August 05, 2015 10:53 AM
To: vern@interplanco.com
Subject: Hwy 191 Through Moab

Hello Mr Keeslar

I just saw a flier publicizing the US-191 corridor preservation study for a public meeting on August 19th. I will be out of town most of the month so I unfortunately will miss that meeting. I do not have property in that stretch of 191, however I would like to suggest a bike path (just a lane but a path) be considered for part of the ROW on the Spanish Valley Drive side of the highway. This community desperately needs a safe path for pedestrians and bicycles from the turn off to Kent's Lake to at least Mill Creek Drive. My understanding is that the UDOT ROW is very wide through this section. Locating a two way bike path set at least 50 to 100 feet off the highway could be a good way of keeping pedestrians and bicycles off the highway itself.

I know there have been several pedestrian/high speed vehicle accidents (one resulting in death of a child) in the past 10 years. I had the misfortune to be right behind a vehicle that hit a pedestrian a few years ago. There is more slow speed traffic along this corridor than may be apparent.

I appreciate your consideration of this comment, and would be happy to provide more detail or answer any questions. I can be reached at this email address, or by phone at 435-220-0003.

Thank you!

Kara Dohrenwend
Wildland Scapes LLC
P.O. Box 672
Moab Utah 84032

Vern Keeslar

From: Don <don@canyonvoyages.com>
Sent: Tuesday, August 11, 2015 11:33 AM
To: vern@interplanco.com
Subject: Aug. 19th Moab Meeting

Vern,

I will not be able to make your upcoming Access Management meeting in Moab. I own a warehouse at 1521 S. Hwy 191 within the project area. We rely on the current driveway/apron for access. We do not anticipate any changes in use in the future. Also, there is another apron to the North providing access to a dirt extension of Arnel Lane. We have granted an easement for this road to cross the corner of our property but have no other involvement. Please keep me on the property owners list and forward any information from this meeting and any future meetings.

Thank you,

Don Oblak

Don Oblak
Canyon Voyages Adventure Co.
435-269-0007
email: don@canyonvoyages.com
website: <http://canyonvoyages.com/>

Living well requires an adventurous spirit!

APPENDIX G

US 191 CORRIDOR
PRESERVATION STUDY

Vern Keeslar

From: Kris Harburt <kehvigt@hotmail.com>
Sent: Friday, August 14, 2015 6:07 PM
To: vern@interplanco.com
Subject: Community meeting in Moab

Hi Vern:

I am the president of the Bridger Jack Property Owner's Association. We are very happy to have a chance to provide input regarding safety along Highway 191. Things sure are changing with a marked and prolonged increase in tourism and commercial traffic.

While a number of residents plan on attending I am putting together a list of their observations and potential solutions to improve safety around MP 112 on Highway 191. Some will provide input directly to you but we thought it would be helpful and efficient to get some consensus amongst our membership to present at the meeting.

The input so far is quite good. I think UDOT will be pleased with some of the observations and recommendations. The residents are the ones who travel the 11.5 miles all year so they know that stretch of road better than most anyone.

Thank you again for holding this meeting. We will see you and/or your colleagues on the 19th. Please contact me if you have any questions. I know it's always a challenge to put on a community meeting without knowing who might attend. So far six or seven from BJPA have said they will be there.

Kris Harburt
435.260.8824

Sent from my iPad.

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Vern Keeslar

From: Jeff Hennier <jhennier@gmail.com>
Sent: Friday, August 14, 2015 1:37 PM
To: vern@interplanco.com
Subject: Public comment on the US-191 Corridor

Hello Vern - I own property in the Bridger Jack Mesa subdivision that is accessed from US-191 in San Juan County.

I respectfully offer the comment that safety for the ingress and egress to BJM Road would be considerably improved if UDOT would install turn lanes at the intersection. The current conditions present a driving hazard to those using the road and to those passers-by/visitors who are not aware the road is present until they are very close to the road.

Thanks,

Jeff Hennier
393 E 100 S

Moab, UT 84532
cell 415.497.2918

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000348

HIGHWAY 191 SAFETY ISSUES - MP112 - 124 for UDOT Community Meeting August 19, 2015

Bridge Jack Mesa Property Owners' Association is comprised of owners of the 40 lots comprising the subdivision. The subdivision was established in the early 1980s. The first owner was the Property Owners' Association. The subdivision was established near the 1980s and has no history of the subdivision. The only access to the subdivision is via the property tracks, easement roads, driveway tracks, etc. in the Bridge Jack Trail. Many gas pipelines run through the subdivision and these pipelines have a perpetual easement. At times there are vehicles associated with repairs, maintenance and replacement to the pipeline along the road as well. It is known that well over 1000 2000-watt trucks per day travel on this section of Hwy 191. Local traffic has increased considerably and the amount of heavy truck traffic has exploded. The addition of US 191 on Black Ridge Road has increased the number of off road vehicles on the stretch of highway. The existing power corridor for 2000 or 1000 is also expanding.

These concerns result from a consensus reached by members of the Bridge Jack Mesa Property Owners' Association and are presented to UDOT in the spirit of improving safety along this corridor:

1. Drivers may be unaware of the road turning onto Bridge Jack Trail. It is marked from both north and south. In addition there is other signage that may distract drivers from noticing UDOT.

Solution: Comprehensive and consistent signage along the stretch between Blue Hill Road and Kane Creek Canyon; and signage indicating an intersection is coming up could increase drivers' awareness of potential slowing or emerging vehicles. Lower speed limit.

2. After crossing Blue Hill, northbound traffic begins to exit back out by merging onto one lane and accelerating. Almost immediately there are two intersections - one at Pelican Canyon/Black Ridge Road, and Bridge Jack Trail. The signage for Bridge Jack Trail does not exist as it does at the other intersections so drivers may be unaware that vehicles may be slowing, turning, or entering the highway. The same phenomenon occurs southbound as vehicles exit Kane Creek Canyon, merge into one lane, and accelerate. If there is no coming traffic a vehicle turning left onto Bridge Jack Trail needs to stop at the pinch point.

Solution: Signage, lower speed limit, extend two lanes northbound in the double lane of Blue Hill.

3. Most traffic turning into Bridge Jack Trail approaches from the north. There is nowhere to slow down just as traffic has accelerated to 45 mph.

Solution: Extend two lanes, reduce speed limit.

4. The short turn lane onto Bridge Jack Mesa Subdivision is not marked. Frequently drivers are using that as a pullout and parking strip from both the north and south, and even a place to stop for breakfast. At least one trucker collected that space to pull over and sleep. This makes it even more dangerous to turn onto Bridge Jack Trail and limits visibility for both entering and emerging traffic.

Solution: Mark terminal lane with signage and striping (turn lane indicators, no parking sign, etc.).

5. The stretch of Hwy 191 along Bridge Jack Mesa encompasses a passing lane used both for northbound and southbound traffic. Northbound vehicles pull up out of the canyon and try to get ahead of slower vehicles as everyone is merging into one lane. Southbound vehicles, or those crossing Blue Hill, merge into one lane and accelerate downhill, often attempting to pass before the canyon. Visibility can also be limited by vehicles and by the sign warning southbound traffic of the upcoming canyon. The risk of a head-on collision seems high on this stretch.

Solution: Make the stretch of road between Blue Hill and Kane Creek Canyon a no-passing zone. Reduce speed limit. Move a SB sign as it is not interfering in visibility of emerging traffic from Bridge Jack Trail and northbound traffic.

Notes

RHS HURBURN, BJA ROA
435.260.5524
6/1/15

Vern Keenlar

From: Constance Jones
Sent: Thursday, August 19, 2015 11:46 AM
To: vern@slrplano.com
Subject: Public comment on Hwy 191

We are unable to attend your session tonight due to work schedule with our small seasonal business. Realize there are a multitude of issues with this important transportation artery. Safety should be the number one concern. Roadside attractions such as Hole in the Rock with adjacent Rest Area and Wilson Arch roadside attraction between Moab and Canyonlands Needles District should have better signage warning travelers with flashing solar powered CAUTION light. "CONGESTED AREA AHEAD" SLOW DOWN! A very dangerous situation exists in these locations. Also question the sanity of having a Jeep tethered to top of cliff above Hole-in-Rock to garner attention (and a distraction for drivers taking eyes off blind intersection—where some even suddenly pulling over and taking photos); it could come crashing down in middle of highway! Many times we encounter people walking on blind side of road from rest area to tourist attraction. Also a train-railing bump across the entire west side of southbound lane approaching Rest Area on north side of Hole-in-the-Rock should be addressed—it is so bad, drivers yepcurve into oncoming lane of traffic to avoid it. More damaged surface with large potholes in same southbound lane near entrance to attraction. A 45 or even 50mph near approaches to these heavy traffic areas will save lives, fuel and reduce noise pollution especially in Wilson Arch Resort Community. Entering and exiting our small development at Wilson Arch without losing lanes off of S. Hwy 191 is also very dangerous. Law enforcement could be writing lots of tickets in all of these locations. Thank you for your time and thoughtful consideration. Respectfully, Larry & Constance Jones, Canyonlands Shuttle, Moab UT, (435-210-4757) w/ (435-656-2586) hm



APPENDIX G

SAN JUAN COUNTY SPANISH VALLEY COMMERCIAL DEVELOPMENT ANALYSIS

A primary objective of the County is to determine the appropriate amount of commercial zoning within the Spanish Valley area. Important demographics to help evaluate this objective include income, population growth, historic taxable sales, and estimated new growth.

CURRENT POPULATION

An analysis of absolute population growth shows that the State of Utah increased by 287,332 persons from 2010 through 2016. San Juan County increased by 2,143 persons. The U.S. Census Bureau released a report in March of 2017 indicating San Juan County was the fastest growing county in the nation. Analysts and researchers are unclear why this area of the State is growing so rapidly. Plausible explanations may be the migration of retirement age populations to this area or causes related to Native American reservations.¹

HISTORIC POPULATION

Year	State of Utah	San Juan County	San Juan County % Increase
1930	507,847	3,496	
1940	550,310	4,712	35%
1950	688,862	5,315	13%
1960	900,627	9,040	70%
1970	1,059,273	9,606	6%
1980	1,461,037	12,253	28%
1990	1,722,890	12,621	3%
2000	2,233,169	14,413	14%
2010	2,763,895	14,748	2%
2011	2,816,124	14,787	0%
2012	2,855,782	14,900	1%
2013	2,902,653	14,988	1%
2014	2,941,836	15,208	1%
2015	2,980,832	15,707	3%
2016	3,051,217	16,885	8%

INCOME

The median household income in San Juan County grew at an average annual growth rate (AAGR) of 1.1 percent from \$37,259 in 2010 to \$39,305 in 2015. San Juan County's median household income is the lowest of the reported counties shown below.

Median Household Income

	2010	2011	2012	2013	2014	2015	AAGR
Carbon County	45,244	47,595	47,214	44,594	47,340	47,894	1.1%
Duchesne	51,196	54,973	57,945	61,386	61,976	63,149	3.5%
Emery	51,206	48,745	51,819	52,670	49,709	54,088	1.1%
Grand	38,726	41,410	42,702	42,368	43,344	44,858	2.5%
San Juan	37,259	37,444	38,329	40,327	40,590	39,305	1.1%
Sangre de Cristo	33,899	45,231	43,521	45,338	44,644	46,929	3.3%
Sevier	44,830	43,199	45,243	46,877	46,022	48,711	1.7%
State of Utah	54,740	53,802	57,067	58,715	60,943	62,861	2.8%

HISTORIC TAXABLE SALES

From 2011 through 2016, the total taxable sales declined by an average of five percent. Similar negative trends followed in Duchesne, and Emery Counties, while Sangre de Cristo and Sevier Counties have experienced moderate growth. In 2016, the taxable sales per capita in San Juan County was \$8,385, compared to a high of \$18,242 in Duchesne County.

¹ Bureau of Economic Analysis, San Juan County is fastest growing County in U.S. March 22, 2017.

HISTORIC TAXABLE SALES¹

County	2011	2012	2013	2014	2015	2016	AAGR
Carbon	\$464,569,547	\$420,241,827	\$403,785,813	\$425,403,859	\$390,804,326	\$360,387,060 ²	-5.0%
Duchesne	627,063,475	830,653,352	876,928,271	895,913,545	443,918,766	370,956,620	-19.0%
Emery	178,424,977	142,828,799	127,809,115	130,494,735	127,773,895	135,545,480	-5.3%
San Juan	256,927,506	205,599,060	212,742,858	184,912,573	151,621,469	154,864,660	-5.3%
Sangre de Cristo	196,038,757	209,445,513	211,196,504	228,872,677	237,736,955	246,550,766	4.7%
Sevier	316,777,743	323,362,439	347,301,587	376,568,422	366,563,162	385,140,224	2.9%
Grand	278,397,810	310,201,592	336,296,362	350,250,774	367,744,486	369,875,738	6.9%

HISTORIC TAXABLE SALES PER CAPITA

County	2011	2012	2013	2014	2015	2016	AAGR
Carbon	\$21,781	\$19,784	\$19,288	\$20,592	\$19,129	\$17,567	-4.1%
Duchesne	33,578	43,712	43,825	44,221	21,362	18,242	-11.5%
Emery	16,282	12,007	11,503	13,129	12,343	13,258	-4.0%
Grand	30,143	33,305	38,036	41,430	38,738	40,620	6.2%
San Juan	13,533	13,739	14,184	12,159	9,815	9,215	-7.6%
Sangre de Cristo	8,997	7,481	7,464	8,406	8,854	8,385	3.7%
Sevier	15,181	15,600	16,870	18,088	17,509	17,169	2.5%

SALES GAP ANALYSIS

A sales gap (aka "leakage") analysis is conducted in order to identify economic development opportunities for a community by evaluating the total purchases made by residents inside and outside the community (hence, the term "leakage" for sales lost outside the community). This type of analysis first identifies sales within the State of Utah for each major North American Industry Classification System (NAICS) code category and then calculates the average sales per capita in each category. Per capita sales in the community are compared to average per capita sales statewide in order to estimate what portion of resident purchases are being made within the community, and what amount is leaving the community. Communities with a lower per capita sales figure compared to the State average are experiencing "leakage", whereas communities with a higher ratio are "capturing" higher taxable sales.

CAPTURED & CODED BY SECTOR

A comparison of capture rates by detailed sector illustrates San Juan County has several areas of leakage.

- Build, Material, Garden Equip. & Supplies Dealers
- Clothing & Clothing Accessories Stores
- Electronics & Appliance Stores
- Food & Beverage Stores
- Furniture & Home Furnishings Stores
- General Merchandise Stores
- Health & Personal Care Stores
- Miscellaneous Retail Trade
- Motor Vehicle & Parts Dealers
- Sporting Goods, Hobby, Music & Book Stores
- Wholesale Trade-Durable Goods
- Wholesale Trade-Electronic Markets
- Agriculture, Forestry, Fishing & Hunting
- Manufacturing
- Administrative and Support Services
- Food Services & Drinking Places
- Management of Companies & Enterprises
- Other Services-Except Public Administration
- Professional, Scientific, & Technical Services
- Real Estate, Rental, & Leasing

¹ Data: Tax Commission, Commerce Year Taxable Sales

² 2016 taxable sales reported by the State Tax Commission as of May 1, 2017. This figure excludes two counties of late filings. Provisions to State Code 42-1-101, effective with fiscal year 13 sales tax orders are reported by the Utah State Tax Commission.

APPENDIX H

SAN JUAN COUNTY
SPANISH VALLEY
COMMERCIAL
DEVELOPMENT
ANALYSIS

The overall leakage is likely due to proximity to other markets, specifically Moab. Many of the retail, industry and service categories are provided in Moab, north of San Juan County.

COMPARABLE RETAIL CAPTURE RATES

	Carbon	Sargata	Seyler	Duchess	San Juan	Emery	Grand
Build. Material, Garden Equip. & Supplies Dealers	69%	85%	132%	28%	50%	33%	85%
Clothing & Clothing Accessories Stores	24%	10%	58%	8%	8%	7%	149%
Electronics & Appliance Stores	57%	36%	15%	9%	5%	11%	43%
Food & Beverage Stores	126%	77%	100%	165%	67%	71%	152%
Furniture & Home Furnishings Stores	14%	18%	52%	15%	4%	11%	126%
Gasoline Stations	137%	118%	217%	181%	255%	582%	2,056%
General Merchandise Stores	170%	104%	161%	18%	23%	12%	51%
Health & Personal Care Stores	20%	16%	30%	14%	21%	16%	823%
Miscellaneous Retail Trade	53%	22%	41%	194%	33%	33%	322%
Motor Vehicle & Parts Dealers	163%	52%	94%	86%	13%	39%	116%
Non-store Retailers	101%	57%	109%	111%	80%	176%	130%
Sporting Goods, Hobby, Music, & Book Stores	41%	59%	33%	10%	11%	15%	340%
Wholesale Trade-Durable Goods	117%	31%	112%	167%	35%	40%	112%
Wholesale Trade-Electronic Markets	37%	112%	59%	464%	22%	590%	98%
Wholesale Trade-Nondurable Goods	209%	66%	186%	158%	185%	22%	172%

COMPARABLE INDUSTRY CAPTURE RATES

	Carbon	Sargata	Seyler	Duchess	San Juan	Emery	Grand
Agriculture, Forestry, Fishing & Hunting	0%	226%	385%	425%	272%	567%	0%
Construction	54%	60%	58%	188%	200%	144%	199%
Information	98%	78%	97%	165%	87%	114%	200%
Manufacturing	104%	172%	83%	223%	137%	292%	258%
Mining, Quarrying, & Oil & Gas Extraction	586%	3%	528%	808%	746%	176%	46%
Transportation & Warehousing	237%	7%	190%	97%	540%	54%	2,144%
Utilities	176%	104%	161%	18%	253%	12%	283%

COMPARABLE SERVICES CAPTURE RATE

	Carbon	Sargata	Seyler	Duchess	San Juan	Emery	Grand
Accommodation	60%	19%	137%	22%	432%	237%	3,195%
Admin., Support & Waste Manag. & Remed. Services	77%	7%	56%	49%	217%	16%	148%
Arts, Entertainment, and Recreation	41%	28%	18%	13%	147%	32%	757%
Educational Services	44%	113%	27%	22%	89%	11%	228%
Finance & Insurance	72%	64%	48%	207%	544%	17%	388%
Food Services & Drinking Places	81%	47%	100%	45%	411%	59%	504%
Health Care & Social Assistance	211%	68%	229%	233%	128%	57%	222%
Management Of Companies & Enterprises	5%	289%	1517%	4%	63%	0%	0%
Other Services-Except Public Administration	138%	116%	191%	139%	313%	132%	115%
Professional, Scientific, & Technical Services	44%	31%	25%	23%	112%	36%	91%
Public Administration	441%	281%	39%	56%	194%	149%	16%
Real Estate, Rental, & Leasing	57%	16%	305%	100%	153%	24%	470%

The total capture rate for San Juan County is estimated at 79 percent of the State income adjusted average. This indicates that relative to the State per capita spending, the County is capturing \$0.79 on the dollar in taxable sales, with residents traveling outside the County for many goods and services.

continue to see development in Mining, Quarrying, and Oil and Gas Extraction.

While the County has discussed the potential expansion of distribution and warehouse opportunities, the County's ability to stimulate this type of development may be limited by population and competition from adjacent markets such as Moab. While markets are showing a trend toward expansion of distribution centers in order to keep pace with the growth of online shopping, competition for these facilities is intense.

Official retail sales numbers by the Census Bureau shows a steady growth in sales from Nonstore Retailers.¹ Many communities across Utah and the Nation are in a race to capture this growth, with bids to attract retail giants like Amazon and Walmart. As online shoppers and retailers push for shorter and shorter delivery times, the driving factor for a competitive distribution site is proximity to large population centers and access to major transportation infrastructure. A good example of this is the 1.3 million-square-foot Amazon facility recently constructed in Kent, Washington. The Puget Sound Business Journal reported that General Manager Dave Greyhead indicated "Amazon builds based on demand and that customers want lower cost and quick delivery...the new Kent facility will put more products closer to customers and extend the delivery window to a true two-day delivery...seven days a week."² Additional examples include the expansion of Amazon, Hubbell, and Williams Sonoma into Braselton, Georgia, and the recent success of Salt Lake City, Utah, in attracting an 855,000-square-foot Amazon facility. While the town of Braselton has an estimated population of only 7,511 according to the U.S. Census (2015), its proximity to Interstate 85 allows for quick delivery to Atlanta 50 miles away. Similarly, the site in Salt Lake allows for easy access to I-15, I-80 and the Salt Lake International Airport, making the majority of Utah's population quickly accessible within two days.

Spanish Valley's remote location, limited interstate access and rural population will make it challenging to attract larger distribution centers. Lower population levels or continued sales leakage will result in less commercial acreage within the community. However, if the County allows for greater densities, resulting in an increase in buying power and capture rates, the area could see higher levels of commercial development. Methods to promote increased commercial development include:

- 1. Allow for more residential development and population growth;
- 2. Provide development incentives;
- 3. Promote niche markets that will capture sales from surrounding communities; and
- 4. Promote other types of commercial development (industrial, tech, office, etc.).

¹ Source: 2015 Annual Retail Trade Report <https://www.census.gov/retail/retailtrade.html>

² Source: Puget Sound Business Journal, "Walmart's new Kent facility center is being seen as a delivery to Seattle", by Marcus R. Doran

APPENDIX H

SAN JUAN COUNTY
SPANISH VALLEY
COMMERCIAL
DEVELOPMENT
ANALYSIS

000363

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⁴ Source: 2015 Annual Retail Trade Report <https://www.census.gov/retail/index.html>

⁵ Source: Puget Sound Business Journal, "Amazon's new Kent hubsters center to bring same-day delivery to Seattle", By Marcus P. Doherty.

APPENDIX H

SAN JUAN COUNTY WELL PROTECTION ORDINANCE

000364

2017-01: Source Protection.

(1) Purpose. Establishment of a Source Protection Ordinance for San Juan Spanish Valley Special Service District, hereinafter "District".

(a) This section shall be known as the "San Juan Spanish Valley Special Service District Drinking Water Source Protection Ordinance".

(b) The purpose of this section is to ensure the provision of a safe and sanitary drinking water supply for the District by establishing drinking water source protection zones surrounding the wellhead and collection area for all sources for the District water system and by the designation and regulation of property uses and conditions which may be maintained within such zones.

(2) The following definitions shall apply to this section:

(a) "Animal feeding operations" means a lot or facility where the following conditions occur:

- (i) animals have been or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period;
- (ii) crops, vegetation, forage growth or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility;
- (iii) Two or more animal feeding operations under common ownership are combined to be a single feeding operation if they adjoin each other, if they use a common area, or if they use a common system for the disposal of wastes.

(b) "Animal waste" means:

- (i) the number of slaughter or feeder cattle; plus
- (ii) the number of mature dairy cattle multiplied by 1.4; plus
- (iii) the number of swine over weighing over 55 pounds multiplied by 0.4; plus
- (iv) the number of sheep multiplied by 0.1; plus
- (v) the number of horses multiplied by 2.0.

(c) A contamination control measure means a device or administrative control which is implemented to prevent discharges to the ground water. Spill protection is an example of a contamination control measure. Contamination control measures shall be compliant with the applicable design standards.

(d) "Extremely hazardous substance" means any substance identified in Section 302 (EHS) column of the "Title III List of Lists - Consolidated List of Chemicals Subject to Reporting Under SARA Title III" (EPA 560/9-91-011).

(e) "Land management strategies" are zoning and site-zoning controls which include, but are not limited to, the following: zoning and subdivision ordinances, site plan reviews, design and operating standards, source prohibitions, purchase of property and development rights, public education programs, ground-water monitoring, household hazardous waste collection programs, water conservation programs, memoranda of understanding, written contracts and agreements.

(f) "Pollution source" means a source of discharges of contaminants to ground water or potential discharges of the liquid forms of extremely hazardous substances which are stored in containers in excess of applicable threshold planning quantities as defined in SARA Title III. Examples of possible pollution sources include, but are not limited to, the following: storage facilities that store the liquid forms of extremely hazardous substances, septic tanks, drain fields, Class V underground injection wells, landfills, open dumps, landfiling of sludge and sewage, manure piles, salt piles, pit privies and animal feeding operations with more than ten animal units.

(g) "Potential contamination source" means any facility or site which employs an activity or process which may potentially contaminate ground water. A pollution source is also a potential contamination source.

(h) "Regulatory agency" means any governmental agency with jurisdiction over hazardous waste.

(i) "Sanitary landfill" means a disposal site where solid wastes, including putrescible wastes, or hazardous wastes, are disposed of on land by placing earth cover thereon.

(j) "Septic tank" and "drain field system" mean a system which is comprised of a septic tank and a drain field which accepts domestic waste water from buildings or facilities for subsurface treatment and disposal. By their design, septic tank and drain field discharges cannot be controlled with control devices or control measures.

(k) "Wellhead" means the upper terminal of a well, including adapters, ports, seals, valves and other attachments.

(3) There are hereby established drinking water source protection zones as be known as Zones One, Two, Three and Four of the drinking water protection area, identified and described as follows:

(a) Zone One is the area within a 100-foot radius of the wellhead.

(b) Zone Two is the area within a 250-foot ground water rise of travel to the wellhead, the boundary of the aquifer or aquifers which supplies water to the ground water source, or the ground water divide, whichever is closer.

(c) Zone Three is the area within a 3-year ground water time of travel to the wellhead, the boundary of the aquifer or aquifers which supplies water to the ground water source, or the ground water divide, whichever is closer.

(d) Zone Four is the area within a 15-year ground water time of travel to the wellhead, the boundary of the aquifer or aquifers which supplies water to the ground water source, or the ground water divide, whichever is closer.

(4) The following land uses shall be permitted within drinking water source protection zones:

(a) Any land use permitted within existing agricultural, single family residential, multi-family residential and commercial districts so long as the land use conforms to the rules and regulations of the regulatory agency with jurisdiction over hazardous waste.

(b) Any other open land use where any building located on the property is incidental and accessory to the primary open land use.

(c) The following land uses or conditions are prohibited within drinking water source protection zones, even if such use or condition may otherwise be lawfully included as part of permitted land use under subsection (4):

(a) Zone One: The location of any uncontrolled potential contamination sources.

(b) Zone Two: The location of a pollution source unless its contaminated discharges can be controlled with measures compliant with design standards.

(c) Zone Three and Zone Four: No restrictions.

(d) The enforcement and penalties for violations of the policies and procedures for administration of the drinking water source protection zones established by this section, including without limitation those applicable to nonconforming uses, shall be the same as provided in the existing zoning ordinance of the District, as the same is now adopted and from time to time amended.

This ordinance shall become effective upon signing.

PASSED AND APPROVED this 21st day of February 2017.

San Juan Spanish Valley SSD Board

By: *Frank Dacey*
Frank Dacey, Board Chairman

VOTING:

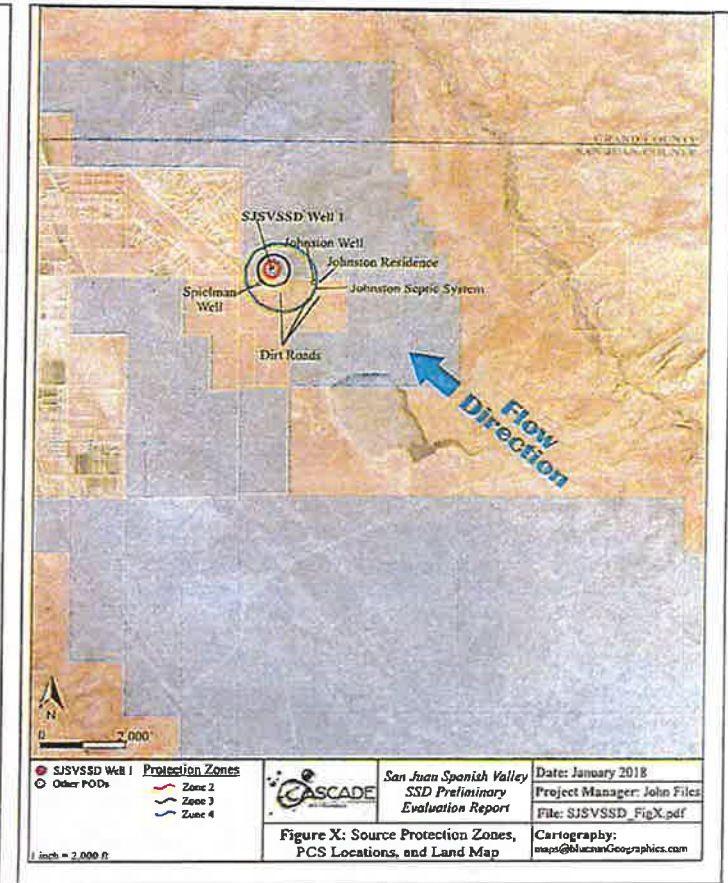
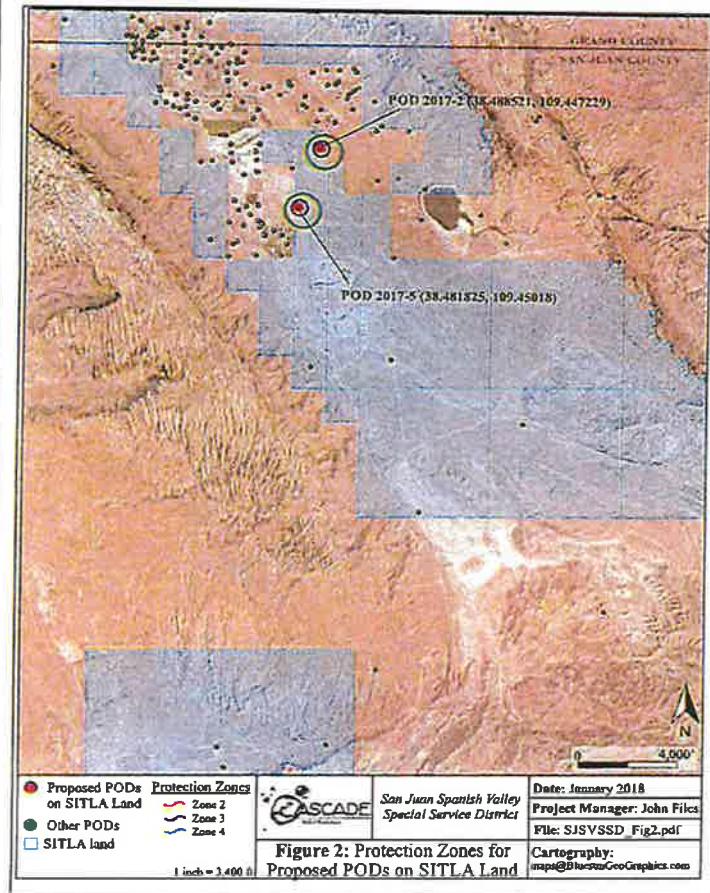
Mike Byrnes- Yes ☒ No ☐ Abs. Dan ☒
Lloyd Wilson- Yes ☒ No ☐
Kerry Dehaan- Yes ☒ No ☐
John Johnston- Yes ☒ No ☐
Frank Dacey- Yes ☒ No ☐

ATTEST: *Kelly Peterson* For Kelly Peterson
Kelly Peterson, San Juan County Administrator

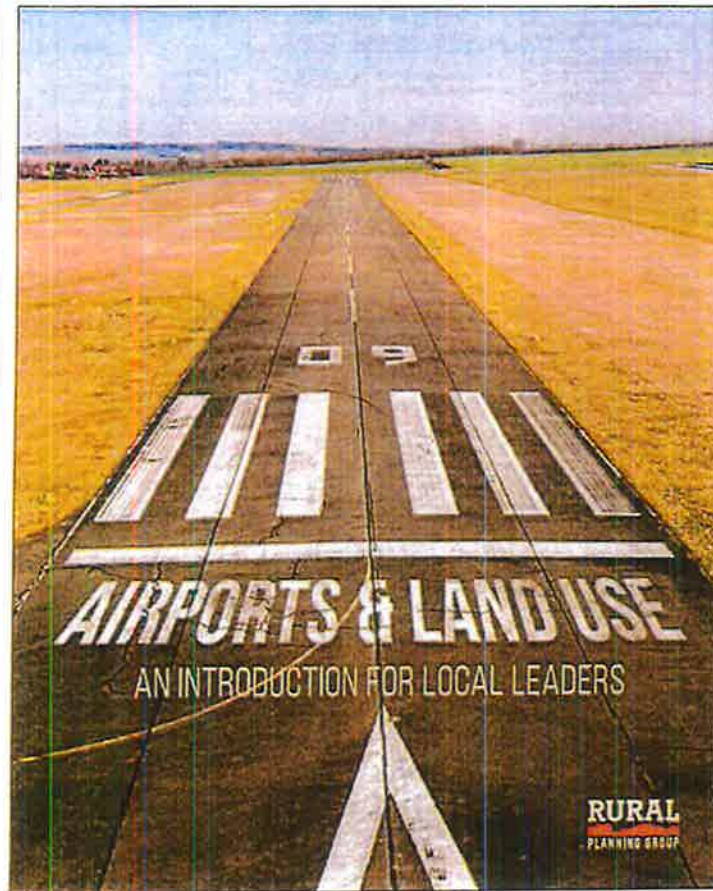
APPENDIX I

KNOWN WELLS &
CONCENTRIC
PROTECTION ZONES

APPENDIX J



APPENDIX K



AIRPORTS & LAND USE

An airport can provide numerous benefits to a community, but only if the community can balance between various local interests. Imbalances between public and private interests can result in overregulation or underregulation that both conflict between airport operators, sponsors, and the public. Finding balance between these interests requires establishing adequate airport land use buffers that keep people and property safe while adopting appropriately flexible regulations that do not overburden or frustrate the community. Although making the right balance will be challenging, this document can help communities integrate common pitfalls associated with land use planning around airports.

This document was expressly created with Utah's rural communities in mind—particularly those communities who already operate or want to operate an airport. It provides a brief introduction to key considerations that local leaders need to understand about land use planning for airports. These considerations are vital for maintaining the long-term benefits of operating an airport and mitigating burdens on the surrounding community. It draws upon the guidelines and best practices promulgated by the U.S. Federal Aviation Administration (FAA), the U.S. Department of Transportation, Division of Aviation (DOT), and leaders in the aviation and aerospace industries.

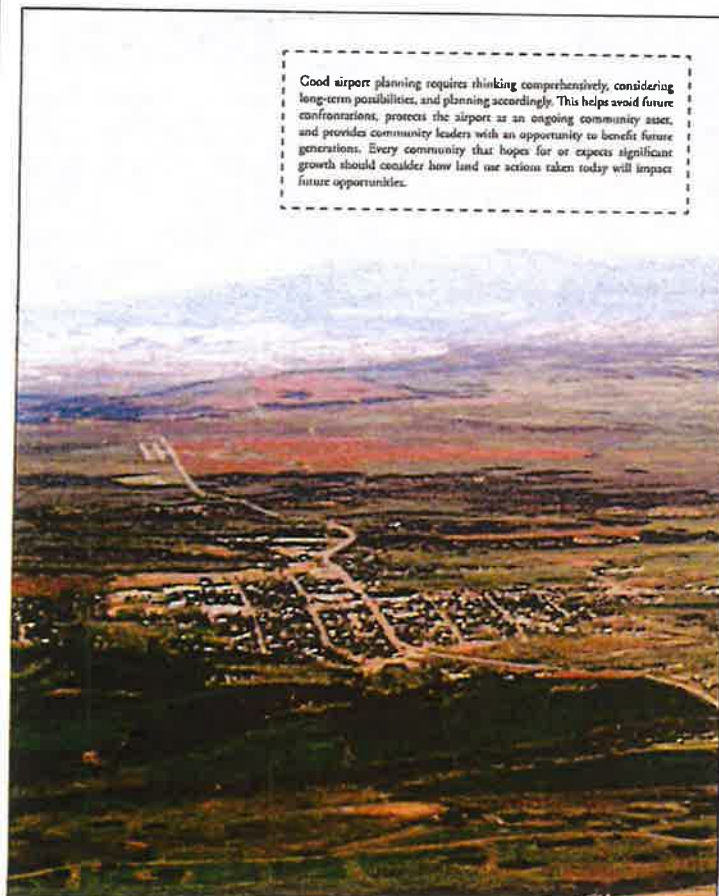
IN UTAH
THERE ARE **46** AIRPORTS

85% OF THESE ARE IN **RURAL** COUNTIES

LAND USE
AIRPORTS
RURAL ISSUE

AIRPORTS & LAND USE

Good airport planning requires thinking comprehensively, considering long-term possibilities, and planning accordingly. This helps avoid future confrontations, protects the airport as an ongoing community asset, and provides community leaders with an opportunity to benefit future generations. Every community that hopes for or expects significant growth should consider how land use actions taken today will impact future opportunities.



APPENDIX K

Airports are generally stable community institutions whose long-term viability is determined by decisions made decades in advance. As a result, good airport plans and land-use decisions require planning well into the future. Most airport master plans contain airport goals and plans for 20-25 years and are updated about every 10 years. When considering land use around an airport, a much longer view even 50-100 years, is required to adequately protect both residents and the airport. This long-term approach is justified by the large amount of property needed to house and maintain an airport along with the potential for friction between airports and landowners. As a result, community leaders should understand what the community would like to become, what the community is likely to become, and how outside forces will affect the community's final outcome. These perspectives can then be applied to a community's unique airport situation.

Operationalizing a "long-term perspective" for your airport means assessing current conditions and long-term ambitions for the airport. Current conditions inform what should be done to protect residents and airport operations as they exist today. Assessing long-term ambitions informs land use designations so that potential conflicts arising from airport expansion are prevented from occurring in the future.

To assist communities and counties as they consider land use regulation surrounding an airport, UDOT and the Mountainous Association of Governments (MAG) put together a reference guide called the *Compatible Land Use Guide for Utah Airports (LUPG)* for airport land use issues in Utah. LUPG lays out planning templates and considers how to address some common airport land use issues.

CURRENT CONDITIONS LONG-TERM AMBITIONS

Factors such as new technological advancements, tourism expansion, regional growth, or an influx of business operations in an area your community could adopt that demand for airport use. These are important considerations for any airport. As communities consider the future of their airports, they should look at demographic trends, consider long-range economic development and growth goals and plans, and determine how the airport fits into community ambitions. This should be a community decision, with input from the community and advice from professionals in the airport and land use fields.



APPENDIX K

