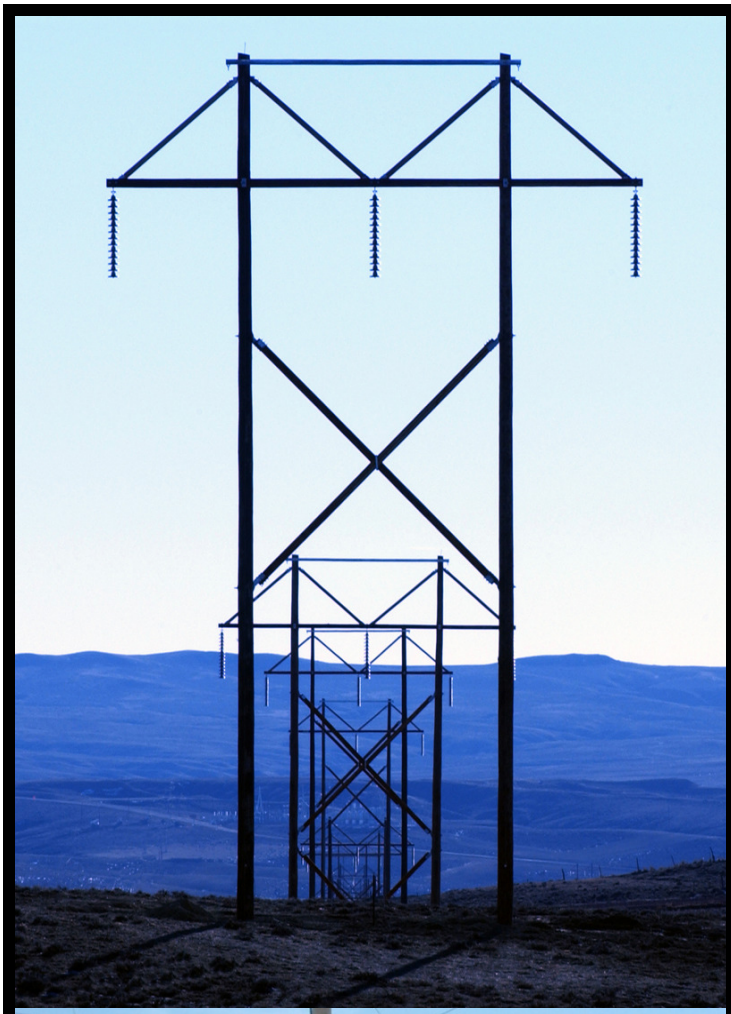

Cold Springs Ranch

High Level Electrical Master Plan

September 2016

Intermountain Consumer Professional Engineers, Inc.
1145 East South Union Avenue
Midvale, Utah 84047

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COLD SPRINGS RANCH

High Level Electrical Master Plan

PURPOSE

The purpose of this report is to develop an estimate of the load that can be expected for the proposed Cold Springs Ranch development. Also included are recommendations for a new substation and the associated main trunk feeders that would be required to serve the development. The information provided is based on the current Land Use Plan developed by LEI.

LOAD ESTIMATES

Load estimates were based on the unit counts and densities shown on the Land Use Plan dated 9/20/16. Additional information was also obtained from discussions with LEI and Gardner Company. The location of apartments, townhomes, and single family dwellings were identified. Area MD #1 was identified as the location of a stake center. It was indicated that a hospital would be installed in commercial area Comm #1. The other two commercial areas are assumed to be a mix of small retail stores and office buildings, but specifics were not available at this time.

Typical unit loads (kW/unit) were used for the various load types. Loads for each development area were developed. Table 1 provides a summary of the anticipated load level for each area as well as the overall development. It should be noted that two load levels are identified. The first is for the "Low Range" unit counts indicated on the land use plan and the second is for the "High Range" unit counts. As can be seen a load range of between approximately 7 MW and 13 MW can be expected for the complete development of the area.

Area MD #1 is shown as a Stake Center for purposes of load estimation since it was indicated a stake center would be the most likely use of the property. There is also the chance that the area would be single family homes. Single family homes on the "Low Range" plan would be a smaller load than what is shown. Single family homes on the "High Range" plan would be similar to the load of the Stake Center.

A new substation is proposed to be built in area HD #5. For purposes of load estimation, two acres of area HD #5 have been shown for the substation.

The estimated loads are general in nature and are to be used for initial planning purposes only. As additional plans and details become available the load levels in each area should be reevaluated. Loads may be higher or lower than what is indicated based on the final building types that are constructed.

EXISTING LEHI AND RMP ELECTRICAL FACILITIES

RMP has two double circuit transmission lines that cross through the development just west of area LD #1. The line on the west is a double circuit 345 kV line and the line on the east is a double circuit 138 kV line.

There is a Lehi City 12.47 kV double circuit distribution line which runs along the north side of 2100 North. Future circuits would feed the area between Cold Springs Ranch and 2100 North and eventually provide tie points to those circuits. Across the river to the east and southeast there are Lehi City 12.47 kV distribution circuits. Two circuits feeding Cold Springs Ranch would cross the river and have tie points with those circuits in the future. The western boundary of Cold Springs Ranch is the Lehi City limits. The west half of the southern boundary of Cold Springs Ranch is the Lehi City limits. The existing Lehi circuits to the east that are closest to Cold Springs Ranch are near capacity and do not have capacity to serve the Cold Springs Ranch load.

REQUIRED FACILITY ADDITIONS

Substation

With the above in mind a new substation would be required to serve the development. The substation is proposed to be located in area HD #5. The substation is proposed to be fed from a new 138 kV line running parallel to the west

side of the existing RMP right of way. The new 138 kV line would need to be installed from the substation to a new substation that is planned just north of 2100 North. The substation would be configured as a two bay (transformer) substation with capability to have 6 to 8 distribution circuits feeding from the substation. A configuration similar to the recently completed Littlefield substation would be anticipated for this location.

Distribution Circuits
Three main underground distribution circuits from the new substation would be used to feed Cold Springs Ranch. Two of the circuits would also be used to feed future load across the river to the east and southeast of the development and to provide ties to existing circuits in those areas. Three additional future circuits would be used to feed future load north of Cold Springs Ranch up to 2100 North and would provide ties to circuits near 2100 North.

Drawing E100 shows the proposed main feeder or "backbone" circuits that would be required to serve Cold Springs Ranch. It is assumed that the main circuits indicated would be 600 A, 12.47Y/7.2 kV feeders. The layout provides for tie points between circuits to allow for contingency or maintenance circuit configurations. Table 2 is a load estimate by circuit and development area. Three distribution circuits are planned to serve the Cold Springs Ranch area.

Additional internal single and three phase feeders would be required within each development area. The design for these areas would be determined as part of the detailed development and plat approval process.

TIMING OF REQUIRED IMPROVEMENTS

It has been indicated that the hospital in commercial area Comm #1 would be installed first. The order in which to develop the residential areas and the other commercial areas has yet to be determined. The economy and the demand for various types of development would determine the development sequence. Close coordination with Lehi will be required as the development process progresses to assure the proper level of service is maintained to the customers.

As has been previously discussed above there is little if any capacity in the circuits which currently feed areas near Cold Springs Ranch. As such the substation would need to be completed as soon as practical to serve the new development. The substation would typically take 12-18 months to complete and put into service. In the interim Lehi may be willing to serve a small amount of load in Cold Springs Ranch.

SUMMARY

The estimated load for the new Cold Springs Ranch development would be between approximately 7 MW and 13 MW depending on final densities and building types served. There is little if any capacity in the Lehi circuits which currently feed areas near Cold Springs Ranch. As such a new substation would be required to be constructed as soon as development is started. Three distribution circuits would be required to meet the load demands of the development.

TABLE 1

COLD SPRINGS RANCH

Electrical Load Estimate

9/22/2016

				Less Dense Plan				More Dense Plan			
Area	Description	Type/Notes	Acres	Est. Density	Est. # of Units	Est. Avg. kW/Unit	Est. Load (kW)	Est. Density	Est. # of Units	Est. Avg. kW/Unit	Est. Load (kW)
Comm #1	Commercial	Hospital	19.97		1	1,500.0	1,500		1	2,000.0	2,000
Comm #2	Commercial	Retail/Office	23.12	0.3	7	100.0	700	0.5	12	100.0	1,200
Comm #3	Commercial	Retail/Office	8.40	0.3	3	100.0	300	0.5	4	100.0	400
VHD #1	Very High Density	Apartments	12.76	12.0	153	5.5	840	20.0	255	5.5	1,400
VHD #2	Very High Density	Apartments	4.71	12.0	57	5.5	310	20.0	94	5.5	520
HD #1	High Density	Townhomes	12.21	7.0	85	6.0	510	12.0	147	6.0	880
HD #2	High Density	Townhomes	8.66	7.0	61	6.0	370	12.0	104	6.0	620
HD #3	High Density	Townhomes	4.64	7.0	32	6.0	190	12.0	56	6.0	340
HD #4	High Density	Townhomes	10.70	7.0	75	6.0	450	12.0	128	6.0	770
*HD #5	High Density	Townhomes	7.66	7.0	54	6.0	320	12.0	92	6.0	550
	Substation	Substation	2.00		1	30.0	30		1	50.0	50
**MD #1	Stake Center	Stake Center	5.05		1	200.0	200		1	250.0	250
MD #2	Medium Density	Single Family	20.43	3.0	61	6.5	400	8.0	163	6.5	1,060
MD #3	Medium Density	Single Family	7.49	3.0	22	6.5	140	8.0	60	6.5	390
MD #4	Medium Density	Single Family	16.51	3.0	50	6.5	330	8.0	132	6.5	860
MD #5	Medium Density	Single Family	21.49	3.0	64	6.5	420	8.0	172	6.5	1,120
LD #1	Low Density	Single Family	22.85	2.0	46	7.5	350	4.0	91	7.5	680
Public OS	Public Open Space	Park	48.40		1	30.0	30		1	50.0	50
Private OS	Private Open Space	Club House/Park	11.35		1	30.0	30		1	50.0	50
TOTALS			268.40		775		7,420		1,515		13,190

*A new substation is proposed to be built in area HD #5. For purposes of load estimation, two acres of area HD #5 have been shown for the substation.

**MD #1 is shown as a stake center, but it could possibly be single family homes. Single family homes on the "Low Range" plan would be a smaller load. Single family homes on the "High Range" plan would be similar to the load of the stake center.

TABLE 2
Estimated Circuit Loadings (kW)

Circuit 1 - New URD

Area	Less Dense	More Dense
Comm #1	1,500	2,000
Comm #2	700	1,200
VHD #1	840	1,400
VHD #2	310	520
HD #1	510	880
MD #1	200	250
MD #3	140	390
Total	4,200	6,640

Circuit 2 - New URD

Area	Less Dense	More Dense
Comm #3	300	400
HD #2	370	620
HD #3	190	340
HD #4	450	770
MD #2	400	1,060
Total	1,710	3,190

Circuit 2 would also cross the river to the southeast to feed future load and tie into existing Lehi circuits.

Circuit 3 - New URD

Area	Less Dense	More Dense
HD #5	350	600
MD #4	330	860
MD #5	420	1,120
LD #1	350	680
Public OS	30	50
Private OS	30	50
Total	1,510	3,360

Circuit 3 would also cross the river to the southeast to feed future load and tie into existing Lehi circuits.

Circuit 4 - Future

Circuit 4 would feed future load to the northwest and tie into Lehi circuits along 2100 North.

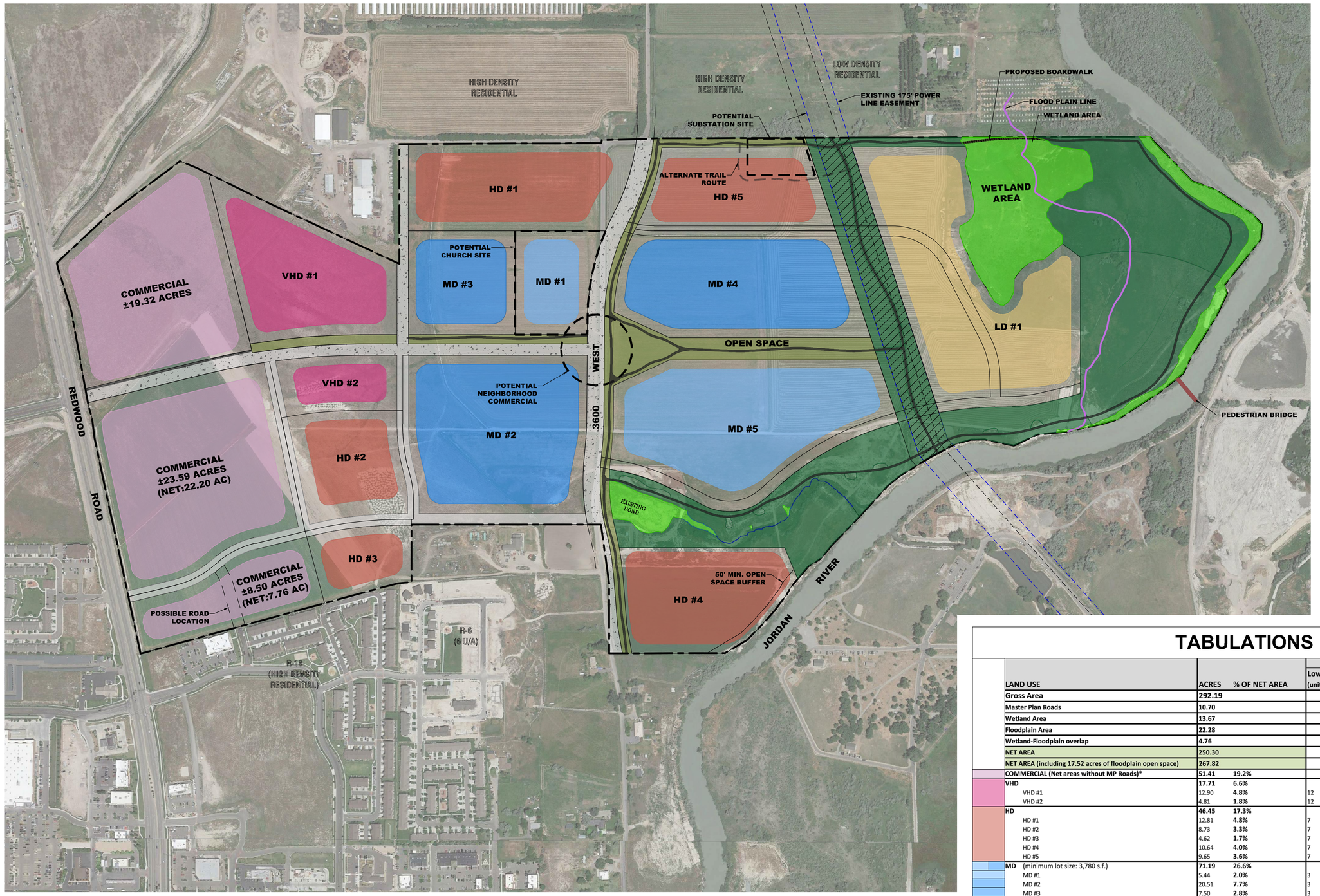
Circuit 5 - Future

Circuit 5 would feed future load to the north and tie into Lehi circuits along 2100 North.

Circuit 6 - Future

Circuit 6 would feed future load to the northeast and tie into Lehi circuits along 2100 North.

Drawings



NORTH

SCALE: 1" = 250'

250 125 0 250

NOTES:

1. UNUSED ERUs IN EACH LAND USE AREA MAY BE TRANSFERRED TO OTHER AREAS, BUT THE MAXIMUM ERUs IN EACH LAND USE AREA WILL NOT EXCEED THE MAX ERUs IDENTIFIED IN THE TABLE.
2. TOTAL EQUIVALENT RESIDENTIAL UNITS FOR THE ENTIRE PARCEL WILL NOT EXCEED 1150 RESIDENTIAL ERU'S, 150 COMMERCIAL ERU'S, AND APPROXIMATELY 15 ACRES OF CIVIC USES.
3. RESIDENTIAL UNITS MAY BE TRANSFERRED TO THE COMMERCIAL ZONE FROM VHD, MIN 8 UNITS PER ACRE. MUST MAINTAIN 70% OF COMMERCIAL AREA.
4. ANY AREA THAT IS NOT DEVELOPED TO BE LEFT OR RETURNED TO ORIGINAL CONDITION.
5. IF THE NEIGHBORHOOD COMMERCIAL ZONE IS NOT USED THE UNDERLYING ZONING APPLIES.
6. LOCAL ROADS SHOWN ARE CONCEPTUAL AND FINAL LOCATION MAY VARY.
7. ADDITIONAL 12 UNITS PROVIDED FOR CONSTRUCTION OF PEDESTRIAN BRIDGE.
8. OVERALL DENSITY MAY BE INCREASED AT THE CITY'S DISCRETION FROM OTHER DEVELOPABLE AREAS WITHIN LEHI CITY. DENSITY RANGES WITHIN EACH LAND USE AREA SHALL REMAIN AS SHOWN IN THE TABLE OR AS APPROVED BY AREA PLAN AMENDMENTS.

TABULATIONS

LAND USE	ACRES	% OF NET AREA	PROPOSED DENSITY Low Range (units/acre)	PROPOSED DENSITY High Range (units/acre)	PROPOSED UNITS Low Range (Units)	PROPOSED UNITS High Range (Units)
Gross Area	**292.19**					
Master Plan Roads	**10.70**					
Wetland Area	**13.67**					
Floodplain Area	**22.28**					
Wetland-Floodplain overlap	**4.76**					
NET AREA	**250.30**					
NET AREA (including 17.52 acres of floodplain open space)	**267.82**					
COMMERCIAL (Net areas without MP Roads)*	**51.41**	**19.2%**				150
VHD	**17.71**	**6.6%**				
VHD #1	12.90	**4.8%**	12	20	155	258
VHD #2	4.81	**1.8%**	12	20	58	96
HD	**46.45**	**17.3%**				
HD #1	12.81	**4.8%**	7	12	90	154
HD #2	8.73	**3.3%**	7	12	61	105
HD #3	4.62	**1.7%**	7	12	32	55
HD #4	10.64	**4.0%**	7	12	74	128
HD #5	9.65	**3.6%**	7	12	68	116
MD (minimum lot size: 3,780 s.f.)	**71.19**	**26.6%**				
MD #1	5.44	**2.0%**	3	8	16	44
MD #2	20.51	**7.7%**	3	8	62	164
MD #3	7.50	**2.8%**	3	8	23	60
MD #4	16.40	**6.1%**	3	8	49	131
MD #5	21.34	**8.0%**	3	8	64	171
LD	**23.18**	**8.7%**				
LD #1	23.18	**8.7%**	2	4	46	93
TOTAL OPEN SPACE AREA	**57.88**	**21.6%**				
Public Open Space	46.80	**17.5%**				
Private Open Space	11.08	**4.1%**				
TOTAL EQUIVALENT RESIDENTIAL UNITS ALLOWED**		**1300**				

* Includes to CL of Non-master plan roads

**** Includes commercial area of 150 ERU's**

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NOT FOR CONSTRUCTION

COLD SPRING RANCH

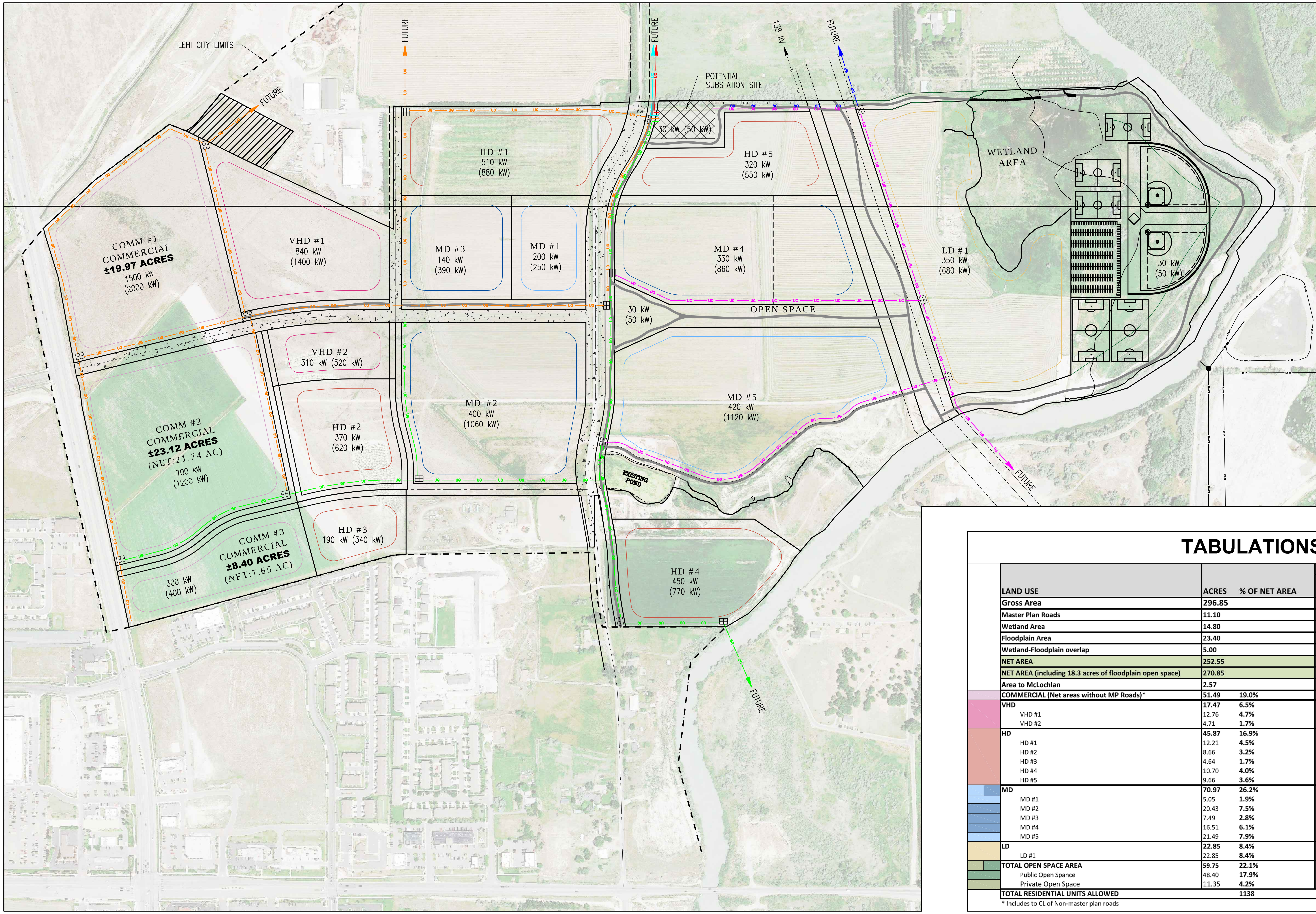
LEHI, UTAH

LAND USE PLAN

REVISIONS
1 -
2 -
3 -
4 -
5 -

LEI PROJECT #: 2015-0125
DRAWN BY: BAP
CHECKED BY: BTG
SCALE: 1" = 250'
DATE: 1/11/2018

SHEET L1



TABULATIONS

LAND USE	ACRES	% OF NET AREA	PROPOSED DENSITY Low Range (units/acre)	PROPOSED DENSITY High Range (units/acre)	PROPOSED UNITS Low Range (Units)	PROPOSED UNITS High Range (Units)
Gross Area	**296.85**					
Master Plan Roads	**11.10**					
Wetland Area	**14.80**					
Floodplain Area	**23.40**					
Wetland-Floodplain overlap	**5.00**					
NET AREA	**252.55**					
NET AREA (including 18.3 acres of floodplain open space)	**270.85**					
Area to McLochlan	**2.57**					
COMMERCIAL (Net areas without MP Roads)*	**51.49**	**19.0%**				
VHD	**17.47**	**6.5%**				
VHD #1	12.76	**4.7%**	12	20	153	255
VHD #2	4.71	**1.7%**	12	20	57	94
HD	**45.87**	**16.9%**				
HD #1	12.21	**4.5%**	7	12	85	147
HD #2	8.66	**3.2%**	7	12	61	104
HD #3	4.64	**1.7%**	7	12	32	56
HD #4	10.70	**4.0%**	7	12	75	128
HD #5	9.66	**3.6%**	7	12	68	116
MD	**70.97**	**26.2%**				
MD #1	5.05	**1.9%**	3	8	15	40
MD #2	20.43	**7.5%**	3	8	61	163
MD #3	7.49	**2.8%**	3	8	22	60
MD #4	16.51	**6.1%**	3	8	50	132
MD #5	21.49	**7.9%**	3	8	64	172
LD	**22.85**	**8.4%**				
LD #1	22.85	**8.4%**	2	4	46	91
TOTAL OPEN SPACE AREA	**59.75**	**22.1%**				
Public Open Spance	48.40	**17.9%**				
Private Open Space	11.35	**4.2%**				
TOTAL RESIDENTIAL UNITS ALLOWED		**1138**				

* Includes to CL of Non-master plan roads

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CONFIDENTIAL

REVISIONS

No.	Description	By	Date	App.
A	PRELIMINARY	KAC	09/21/16	MF

Title: COLD SPRINGS RANCH
LEHI, UTAH
SITE PLAN

Dwn.	KAC	Date	09/21/16	Engr.	MF	Date	09/21/16
Chk.	RLH	Date	09/22/16	App.	SRN	Date	–
Proj. No:	545-001	Scale	NTS				

Drawing No. E100
Rev. A

545-001_E100.DWG
9/27/16 KCarlson