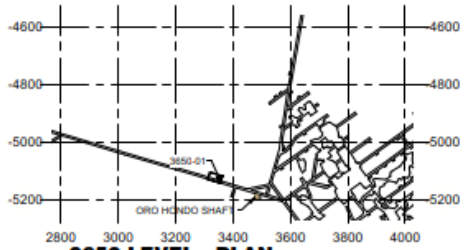
30% overview

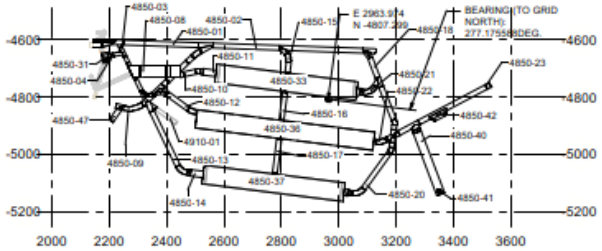
EXC drawings

Room dimensions



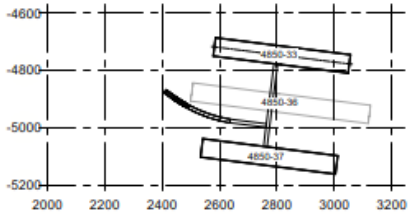
3650 LEVEL - PLAN

SCALE: 1" = 200'-0"



4850 LEVEL - PLAN

SCALE: 1" = 200'-0"



BELOW 4850 LEVEL - PLAN

SCALE: 1" = 200'-0"

Excavated Dimensions

ID	DESCRIPTION	Width or Diameter (ft)	Nominal Height (ft)	Length (ft)	Springline (ft)	Finished Floor Area (ft²)	Cross Section Area (ft²)	Volume (ft³)	Width or Diameter (m)	Nominal Height (m)	Length (m)	Springline (m)	Finished Floor Area (m²)	Cross Section Area (m²)	Volume (m³)	In-situ Cubic Yards	Broken Cubic Yards	Tonnes
01. ACCESS DRIFTS																		
4850-01	ROSS SHAFT DRIFT 1	17.1	19.7	309.0	16.4	5,284	325	80,655	5.2	6.0	94.2	5.0	490	30	2,284	2,987	4,780	6,440
4850-02	ROSS SHAFT DRIFT 2	17.1	19.7	600.1	16.4	10,262	325	156,648	5.2	6.0	182.9	5.0	951	30	4,436	5,802	9,283	12,509
4850-03	WASTE ACCESS DRIFT 1	12.5	13.3	183.3	10.8	2,291	157	28,744	3.8	4.1	55.9	3.3	212	14	814	1,065	1,703	2,295
4850-04	WASTE ACCESS DRIFT 2	12.5	13.25	40.3	10.83	504	157	6328	3.8	4.05	12	3.3	47	14	178	234	375	505
4850-09	WEST ACCESS DRIFT	17.1	19.7	352.7	16.4	6,031	325	92,062	5.2	6.0	107.5	5.0	559	30	2,607	3,410	5,456	7,351
4850-10	CHAMBER 1 ACCESS DRIFT	17.1	19.7	94.5	16.4	1,616	325	30,714	5.2	6.0	28.8	5.0	150	30	870	1,138	1,820	2,453
4850-11	CHAMBER 1 ENTRANCE	22.7	28.7	55.0	21.8	1,191	596	30,389	6.9	8.7	16.8	6.6	111	55	861	1,126	1,801	2,427
4850-12	CUC ACCESS DRIFT-WEST	17.1	19.7	129.7	16.4	2,217	325	42,139	5.2	6.0	39.5	5.0	205	30	1,193	1,561	2,497	3,365
4850-13	CHAMBER 3 ACCESS DRIFT	17.1	19.7	292.1	16.4	4,996	325	94,951	5.2	6.0	89.0	5.0	463	30	2,689	3,517	5,627	7,582
4850-14	CHAMBER 3 ENTRANCE	22.7	28.7	55.0	21.8	1,191	596	30,389	6.9	8.7	16.8	6.6	111	55	861	1,126	1,801	2,427
4850-15	CENTER ACCESS DRIFT 1	17.1	19.7	95.2	16.4	1,628	325	30,952	5.2	6.0	29.0	5.0	151	30	876	1,146	1,834	2,472
4850-16	CENTER ACCESS DRIFT 2	17.1	19.7	101.2	16.4	1,731	325	32,895	5.2	6.0	30.8	5.0	160	30	931	1,218	1,949	2,627
4850-17	CENTER ACCESS DRIFT 3	17.1	19.7	124.5	16.4	2,129	325	40,468	5.2	6.0	38.0	5.0	197	30	1,146	1,499	2,398	3,231
4850-18	EAST ACCESS DRIFT 1	17.1	19.7	314.8	16.4	5,383	325	102,319	5.2	6.0	96.0	5.0	499	30	2,897	3,790	6,063	8,170
4850-20	CHAMBER 4 ACCESS DRIFT	17.1	19.7	263.8	16.4	4,511	325	85,734	5.2	6.0	80.4	5.0	418	30	2,428	3,175	5,081	6,846
4850-20A	CHAMBER 4 ENTRANCE	22.7	28.7	24.0	21.8	488	596	11,898	6.9	8.7	7.3	6.6	45	55	337	441	705	950
4850-21	CHAMBER 2 ACCESS DRIFT	17.1	19.7	73.3	16.4	1,253	325	23,814	5.2	6.0	22.3	5.0	116	30	674	882	1,411	1,902
4850-21A	CHAMBER 2 ENTRANCE	22.7	28.7	24.0	21.8	488	596	11,898	6.9	8.7	7.3	6.6	45	55	337	441	705	950
4850-22	CUC ACCESS DRIFT-EAST	17.1	19.7	71.2	16.4	1,217	325	23,128	5.2	6.0	21.7	5.0	113	30	655	857	1,371	1,847
4850-23	VENTILATION DRIFT	17.1	19.7	384.7	16.4	6,578	325	125,025	5.2	6.0	117.2	5.0	610	30	3,540	4,631	7,409	9,983
Total				3,588		60,989		1,081,151			1,093.7		5,654		30,613	40,043	64,068	86,332
02 OTHER EXCAVATIONS																		
3650-01	VENTILATION RAISE ACCESS CHAMBER	26.2	21.3	46.0	14.7	1,205	517	23,796	8.0	6.5	14.0	4.5	112	48	674	881	1,410	1,900
4850-31	#6 WINZE WASTE DRIFT	31.4	20.5	34.4	11.8	939	598	17,868	9.6	6.2	10.5	3.6	87	56	506	662	1,059	1,427
4850-40	SPRAY CHAMBER	28.5	19.3	257.9	14.7	7,337	558	143,979	8.7	5.9	78.6	4.5	682	52	4,077	5,333	8,532	11,497
4850-41	VENTILATION RAISE	12.0		1200.0			113	135,717	3.7		365.8			11	3,843	5,027	8,042	10,837
4850-42	GENERATOR ROOM	13.8	20.5	54.0	10.9	745	924	15,147	4.2	6.2	16.5	3.3	69	86	429	561	898	1,210
4850-43	ROSS SHAFT BROW	27.6	51.0	65.0		1,591	Varies	40,895	8.4	15.5	19.8		148	Varies	1,158	1,515	2,423	3,266
4850-47	CONCRETE SUPPLY CHAMBER	17.1	19.7	49.0	16.4	838	325	15,926	5.2	6.0	14.9	5.0	78	30	451	590	944	1,272
4850-08	SUBSTATION CAVERN	42.7	39.3	157.4	30.0	6,716	1563	206,522	13.0	26.9	48.0	9.1	624	145	5,848	7,649	12,238	16,491
Total				1,863.7		19,372		599,849			568		1,800		16,986	22,217	35,547	47,899
03 EXPERIMENT CAVERNS																		
4850-33	NORTH CAVERN (CHAMBERS 1 & 2)	65.7	93.9	493.8	77.0	32,428	5,830	2,839,563	20.0	28.6	150.5	23.5	3,013	542	80,407	105,169	168,270	226,744
4850-36	CENTRAL UTILITY CAVERN (CUC)	64.0	37.3	624.0	20.3	39,936	2,064	1,287,751	19.5	11.4	190.2	6.2	3,710	192	36,465	47,694	76,311	102,829
4850-37	SOUTH CAVERN (CHAMBERS 3 & 4)	65.7	93.9	493.8	77.0	32,428	5,830	2,839,563	20.0	28.6	150.5	23.5	3,013	542	80,407	105,169	168,270	226,744
Total				1611.7		104,793		6,966,877			491.2		9,736		197,280	258,032	412,852	556,318
04. MUCKING RAMPS																		
4910-01	MUCKING RAMP	12.5	13.3	438.0	10.8	5,475	157	68,701	3.8	4.1	133.5	3.3	507	14	1,928	2,544	4,071	5,486
4910-02	MUCKING RAMP NORTH CAVERN (CHAMBERS 1 & 2) ACCESS	12.5	13.3	133.0	10.8	1,663	157	20,861	3.8	4.1	40.5	3.3	154	14	586	773	1,236	1,666
4910-03	MUCKING RAMP SOUTH CAVERN (CHAMBERS 3 & 4) ACCESS	12.5	13.3	157.0	10.8	1,963	157	24,626	3.8	4.1	47.9	3.3	182	14	691	912	1,459	1,966
Total				728.0		9,100		114,188			221.9		843		3,205	4,229	6,767	9,118
Grand total: 34				7791.7		194,253		8,762,065			2374.9		18,032		248,084	324,521	519,233	699,667

NOTES:

*AN ADDITIONAL 10,000ft³ OF EXCAVATION SHOULD BE ADDED AS AN ALLOWANCE FOR SMALL EQUIPMENT NICHES SUCH AS CABINETS.
**VALUES ARE APPROXIMATE

1. FOR GENERAL NOTES AND ABBREVIATIONS, REFER TO DRAWING UG-FD-C-001.
2. AREA OF EXISTING DRIFTS IS ASSUMED AS 86 FT^2 (8 m^2) AND IS DEDUCTED FROM ENLARGED DRIFTS.
3. HEIGHT OF EXISTING EXCAVATIONS IS ASSUMED AS 9.8 FT. (3m).
4. AVERAGE DENSITY OF 176 PCF (2.82 TONNES/m^3) HAS BEEN CONSIDERED IN THE TABLE.

REV.	DATE	DESCRIPTION
1	07/13/18	30% FD SUBMISSION

REVISIONS

ARUP

McMILLEN JACOBS ASSOCIATES

consulting

PROJECT NORTH

W E S

SCALE: 1"=200'-0"

Fermilab
Long-Baseline Neutrino Facility

DESIGNED	AV	ARUP
DRAWN	ES	ARUP
CHECKED	JH	ARUP

LBNF - FSCF - EXCAVATION

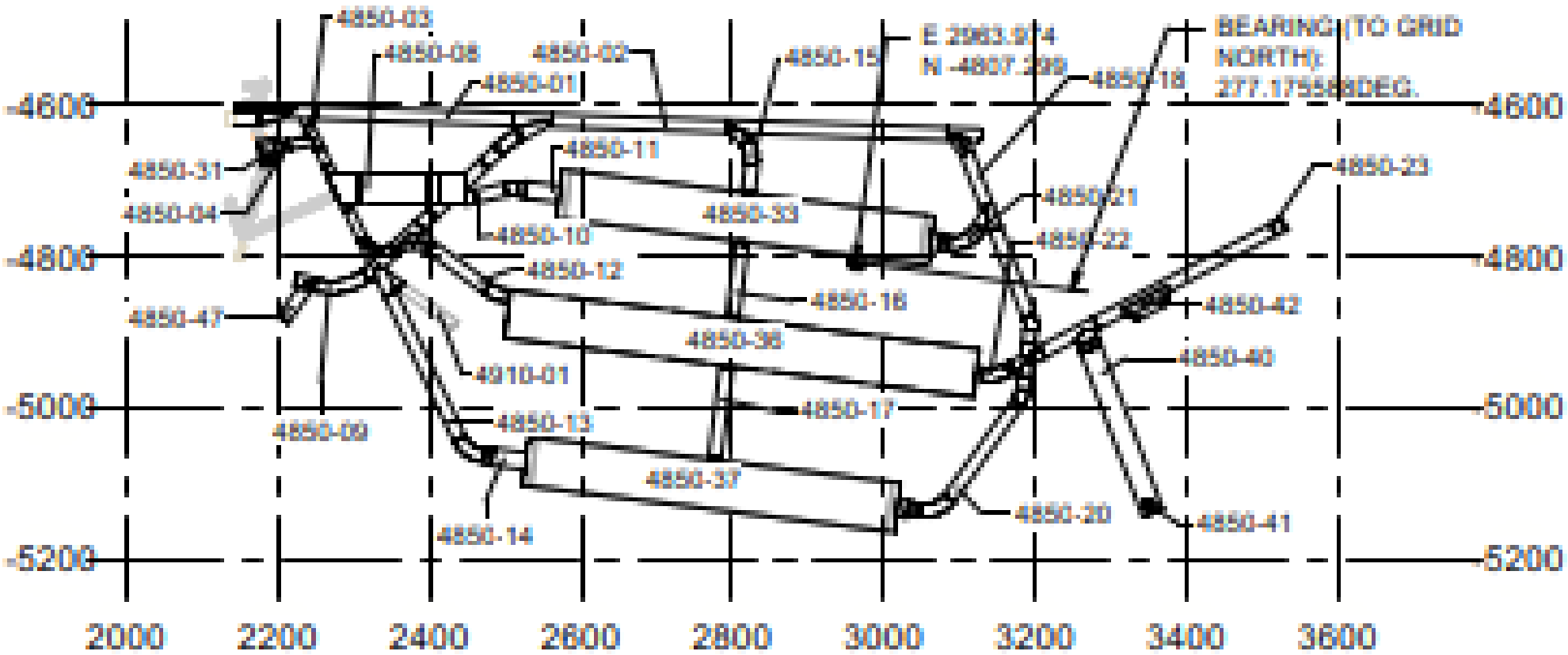
PLAN

DRAWING NO. 15-1-6F UG-FD-C-102 REV. 1

08/26/15 07/13/18

Excavated Dimensions

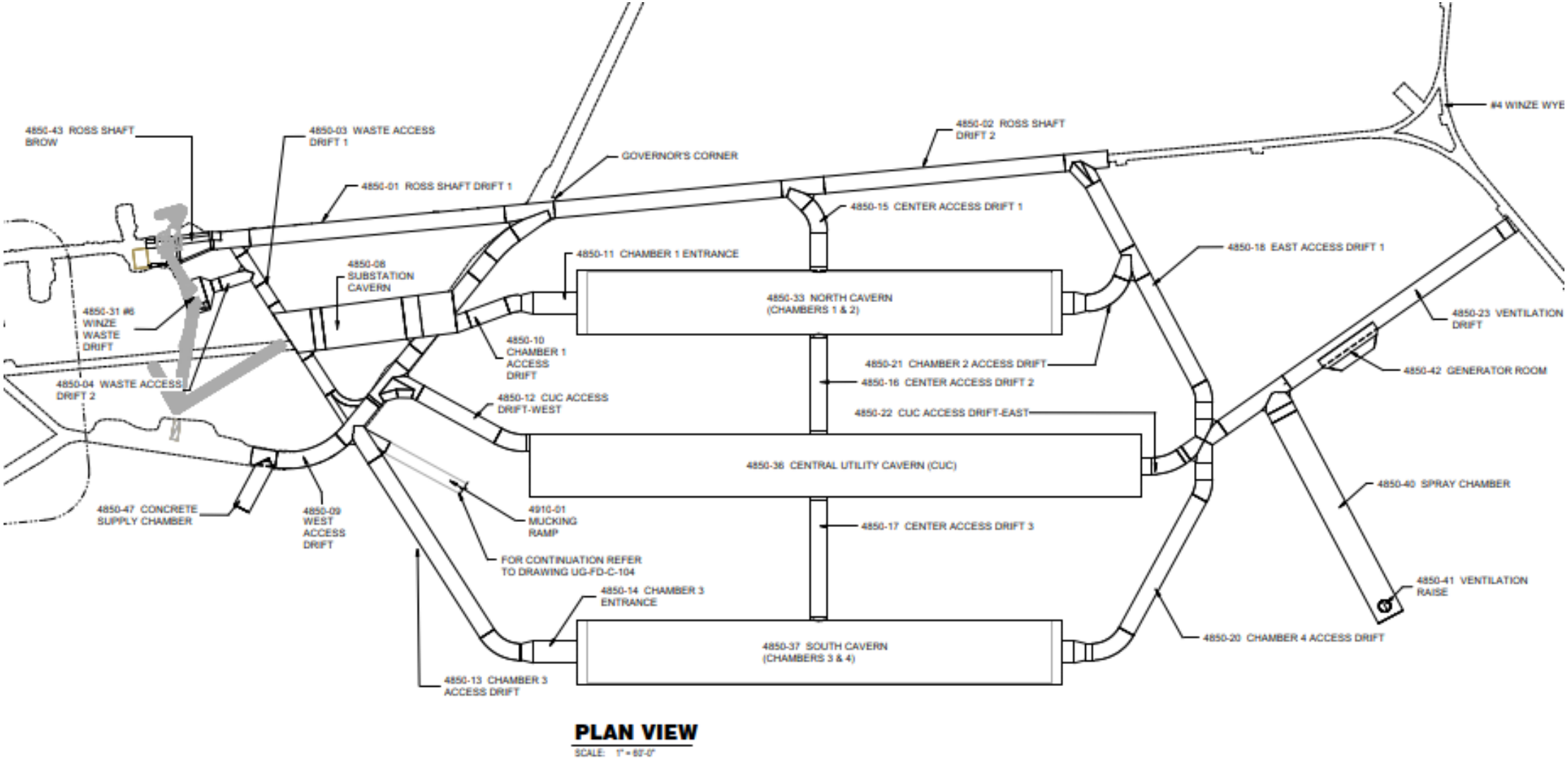
ID	DESCRIPTION	Width or Diameter (ft)	Nominal Height (ft)	Length (ft)	Springline (ft)	Finished Floor Area (ft^2)	Cross Section Area (ft^2)	Volume (ft^3)	Width or Diameter (m)	Nominal Height (m)	Length (m)	Springline (m)	Finished Floor Area (m^2)	Cross Section Area (m^2)	Volume (m^3)	In-situ Cubic Yards	Broken Cubic Yards	Tonnes
01. ACCESS DRIFTS																		
4850-01	ROSS SHAFT DRIFT 1	17.1	19.7	309.0	16.4	5,284	325	80,655	5.2	6.0	94.2	5.0	490	30	2,284	2,987	4,780	6,440
4850-02	ROSS SHAFT DRIFT 2	17.1	19.7	600.1	16.4	10,262	325	156,648	5.2	6.0	182.9	5.0	951	30	4,436	5,802	9,283	12,509
4850-03	WASTE ACCESS DRIFT 1	12.5	13.3	183.3	10.8	2,291	157	28,744	3.8	4.1	55.9	3.3	212	14	814	1,065	1,703	2,295
4850-04	WASTE ACCESS DRIFT 2	12.5	13.25	40.3	10.83	504	157	6328	3.8	4.05	12	3.3	47	14	178	234	375	505
4850-09	WEST ACCESS DRIFT	17.1	19.7	352.7	16.4	6,031	325	92,062	5.2	6.0	107.5	5.0	559	30	2,607	3,410	5,456	7,351
4850-10	CHAMBER 1 ACCESS DRIFT	17.1	19.7	94.5	16.4	1,616	325	30,714	5.2	6.0	28.8	5.0	150	30	870	1,138	1,820	2,453
4850-11	CHAMBER 1 ENTRANCE	22.7	28.7	55.0	21.8	1,191	596	30,389	6.9	8.7	16.8	6.6	111	55	861	1,126	1,801	2,427
4850-12	CUC ACCESS DRIFT-WEST	17.1	19.7	129.7	16.4	2,217	325	42,139	5.2	6.0	39.5	5.0	205	30	1,193	1,561	2,497	3,365
4850-13	CHAMBER 3 ACCESS DRIFT	17.1	19.7	292.1	16.4	4,996	325	94,951	5.2	6.0	89.0	5.0	463	30	2,689	3,517	5,627	7,582
4850-14	CHAMBER 3 ENTRANCE	22.7	28.7	55.0	21.8	1,191	596	30,389	6.9	8.7	16.8	6.6	111	55	861	1,126	1,801	2,427
4850-15	CENTER ACCESS DRIFT 1	17.1	19.7	95.2	16.4	1,628	325	30,952	5.2	6.0	29.0	5.0	151	30	876	1,146	1,834	2,472
4850-16	CENTER ACCESS DRIFT 2	17.1	19.7	101.2	16.4	1,731	325	32,895	5.2	6.0	30.8	5.0	160	30	931	1,218	1,949	2,627
4850-17	CENTER ACCESS DRIFT 3	17.1	19.7	124.5	16.4	2,129	325	40,468	5.2	6.0	38.0	5.0	197	30	1,146	1,499	2,398	3,231
4850-18	EAST ACCESS DRIFT 1	17.1	19.7	314.8	16.4	5,383	325	102,319	5.2	6.0	96.0	5.0	499	30	2,897	3,790	6,063	8,170
4850-20	CHAMBER 4 ACCESS DRIFT	17.1	19.7	263.8	16.4	4,511	325	85,734	5.2	6.0	80.4	5.0	418	30	2,428	3,175	5,081	6,846
4850-20A	CHAMBER 4 ENTRANCE	22.7	28.7	24.0	21.8	488	596	11,898	6.9	8.7	7.3	6.6	45	55	337	441	705	950
4850-21	CHAMBER 2 ACCESS DRIFT	17.1	19.7	73.3	16.4	1,253	325	23,814	5.2	6.0	22.3	5.0	116	30	674	882	1,411	1,902
4850-21A	CHAMBER 2 ENTRANCE	22.7	28.7	24.0	21.8	488	596	11,898	6.9	8.7	7.3	6.6	45	55	337	441	705	950
4850-22	CUC ACCESS DRIFT-EAST	17.1	19.7	71.2	16.4	1,217	325	23,128	5.2	6.0	21.7	5.0	113	30	655	857	1,371	1,847
4850-23	VENTILATION DRIFT	17.1	19.7	384.7	16.4	6,578	325	125,025	5.2	6.0	117.2	5.0	610	30	3,540	4,631	7,409	9,983
Total				3,588		60,989		1,081,151			1,093.7		5,654		30,613	40,043	64,068	86,332
02 OTHER EXCAVATIONS																		
3650-01	VENTILATION RAISE ACCESS CHAMBER	26.2	21.3	46.0	14.7	1,205	517	23,796	8.0	6.5	14.0	4.5	112	48	674	881	1,410	1,900
4850-31	#6 WINZE WASTE DRIFT	31.4	20.5	34.4	11.8	939	598	17,868	9.6	6.2	10.5	3.6	87	56	506	662	1,059	1,427
4850-40	SPRAY CHAMBER	28.5	19.3	257.9	14.7	7,337	558	143,979	8.7	5.9	78.6	4.5	682	52	4,077	5,333	8,532	11,497
4850-41	VENTILATION RAISE	12.0		1200.0			113	135,717	3.7		365.8			11	3,843	5,027	8,042	10,837
4850-42	GENERATOR ROOM	13.8	20.5	54.0	10.9	745	924	15,147	4.2	6.2	16.5	3.3	69	86	429	561	898	1,210
4850-43	ROSS SHAFT BROW	27.6	51.0	65.0		1,591	Varies	40,895	8.4	15.5	19.8		148	Varies	1,158	1,515	2,423	3,266
4850-47	CONCRETE SUPPLY CHAMBER	17.1	19.7	49.0	16.4	838	325	15,926	5.2	6.0	14.9	5.0	78	30	451	590	944	1,272
4850-08	SUBSTATION CAVERN	42.7	39.3	157.4	30.0	6,716	1563	206,522	13.0	26.9	48.0	9.1	624	145	5,848	7,649	12,238	16,491
Total				1,863.7		19,372		599,849			568		1,800		16,986	22,217	35,547	47,899
03 EXPERIMENT CAVERNS																		
4850-33	NORTH CAVERN (CHAMBERS 1 & 2)	65.7	93.9	493.8	77.0	32,428	5,830	2,839,563	20.0	28.6	150.5	23.5	3,013	542	80,407	105,169	168,270	226,744
4850-36	CENTRAL UTILITY CAVERN (CUC)	64.0	37.3	624.0	20.3	39,936	2,064	1,287,751	19.5	11.4	190.2	6.2	3,710	192	36,465	47,694	76,311	102,829
4850-37	SOUTH CAVERN (CHAMBERS 3 & 4)	65.7	93.9	493.8	77.0	32,428	5,830	2,839,563	20.0	28.6	150.5	23.5	3,013	542	80,407	105,169	168,270	226,744
Total				1611.7		104,793		6,966,877			491.2		9,736		197,280	258,032	412,852	556,318
04. MUCKING RAMPS																		
4910-01	MUCKING RAMP	12.5	13.3	438.0	10.8	5,475	157	68,701	3.8	4.1	133.5	3.3	507	14	1,928	2,544	4,071	5,486
4910-02	MUCKING RAMP NORTH CAVERN (CHAMBERS 1 & 2) ACCESS	12.5	13.3	133.0	10.8	1,663	157	20,861	3.8	4.1	40.5	3.3	154	14	586	773	1,236	1,666
4910-03	MUCKING RAMP SOUTH CAVERN (CHAMBERS 3 & 4) ACCESS	12.5	13.3	157.0	10.8	1,963	157	24,626	3.8	4.1	47.9	3.3	182	14	691	912	1,459	1,966
Total				728.0		9,100		114,188			221.9		843		3,205	4,229	6,767	9,118
Grand total: 34				7791.7		194,253		8,762,065			2374.9		18,032		248,084	324,521	519,233	699,667

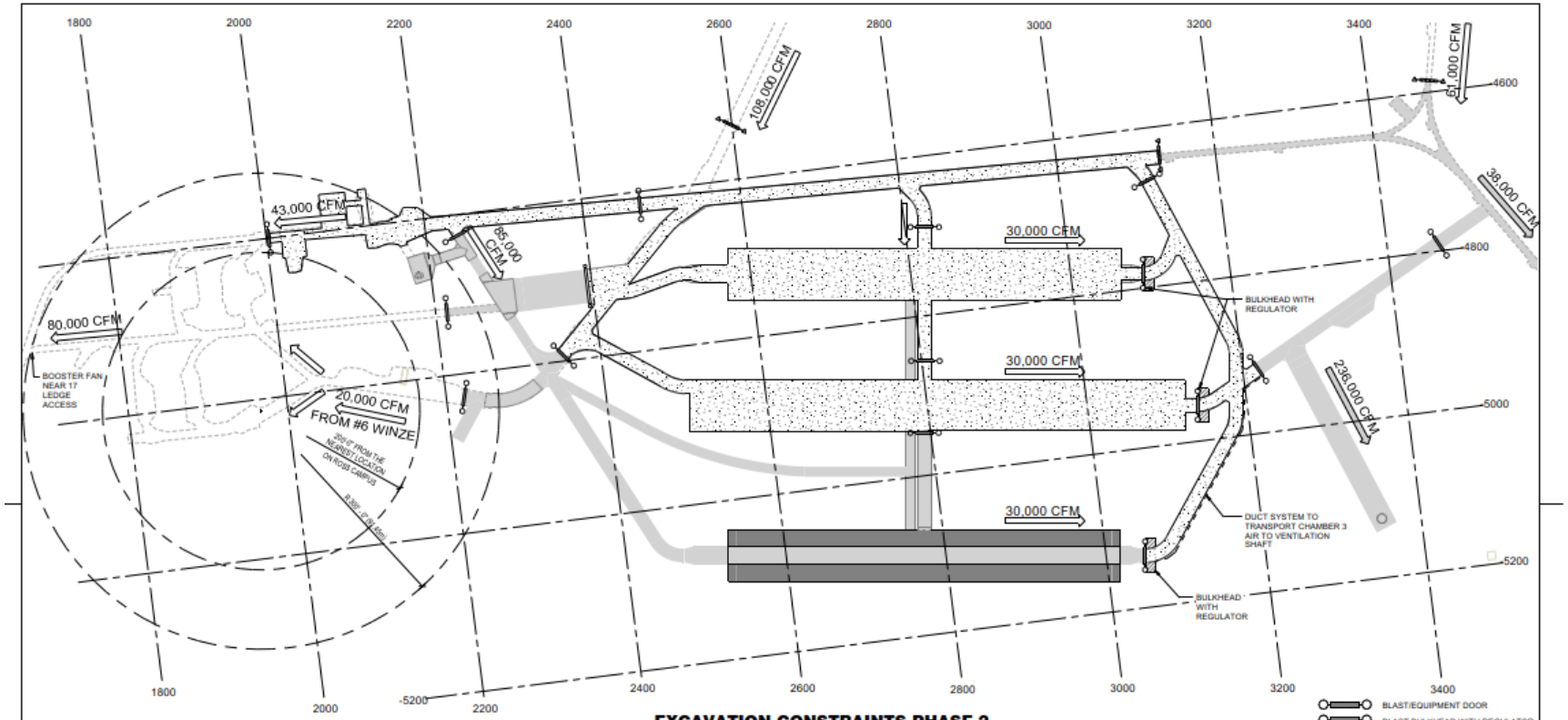


4850 LEVEL - PLAN

SCALE: 1" = 200'-0"

Drift and cavern naming





EXCAVATION CONSTRAINTS PHASE 2

SCALE: 1" = 60'-0"

BLAST/EQUIPMENT DOOR
BLAST BULKHEAD WITH REGULATOR
FIRE DOOR
SECURITY DOOR
EXCAVATION IN THIS PHASE (4850 LEVEL)
EXCAVATION IN THIS PHASE (LOWER LEVEL)
AREA UNDER CONTROL OF CONTRACTOR
SCIENCE AREA ONLY
AIR FLOW (CLEAN)
AIR FLOW (DIRTY)

INTERFACE ASSUMPTIONS:

A. GENERAL WALKING ACCESS IS NOT ALLOWED THROUGH SHADED AREA UNLESS FOR:

1. EMERGENCY EGRESS FROM ROSS CAMPUS TO YATES SHAFT, OR
2. DAVIS CAMPUS TO ROSS SHAFT VIA EITHER WEST OR EAST LABORATORY DRIFT.

B. EXISTING RAIL TO BE REMOVED FROM CONTRACTOR ONLY AREA DURING CONSTRUCTION.

C. SECURITY DOORS ARE INTENDED TO LIMIT ACCESS TO THE CONSTRUCTION AREA.

D. BLAST DOORS/BULKHEADS ARE INTENDED TO LIMIT BLASTING OVER PRESSURE ON NEARBY FACILTIES.

E. BLAST VIBRATION SHALL BE LIMITED TO 2.0 in/sec PPV AT THE NEAREST LOCATION ON ROSS CAMPUS. BLAST OVERPRESSURE SHALL BE LIMITED TO 134dB AT ROSS CAMPUS AND SCIENCE ONLY AREA.

REV.	DATE	DESCRIPTION
1	07/12/18	35% FD SUBMISSION

REVISIONS

ARUP

McMILLEN JACOBS ASSOCIATES

mk consulting

PROJECT NORTH

SCALE: 1"=60'-0"

Fermilab
Long-Baseline Neutrino Facility

DESIGNED	MH	MJA
DRAWN	ES	ARUP
CHECKED	JH	ARUP

LBNF - FSCF - EXCAVATION

4850 LEVEL

EXCAVATION CONSTRAINTS

PHASE 2

DRAWING NO. 15-1-6F UG-FD-C-305 REV. 1

07/13/18 08/25/15

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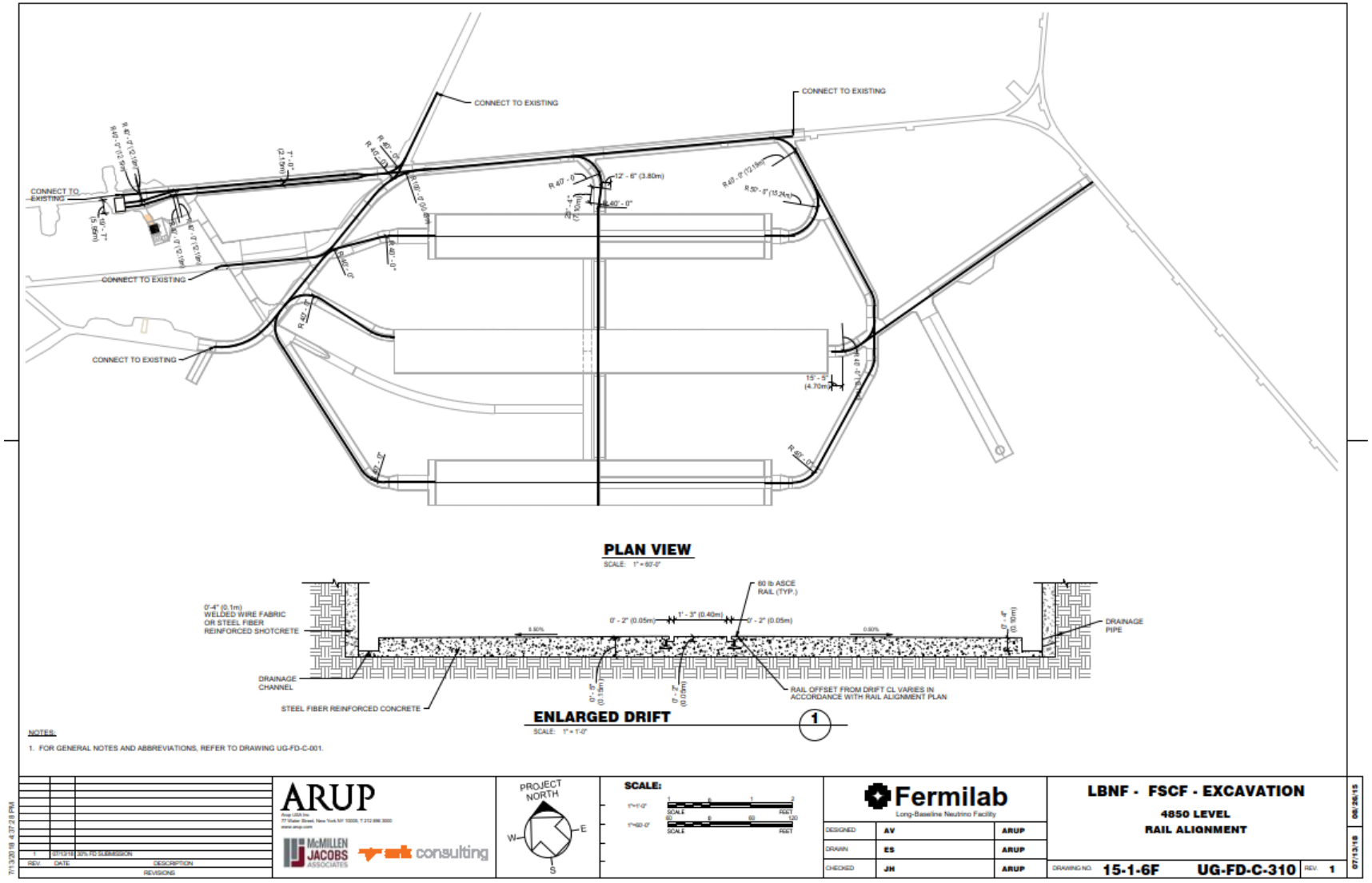
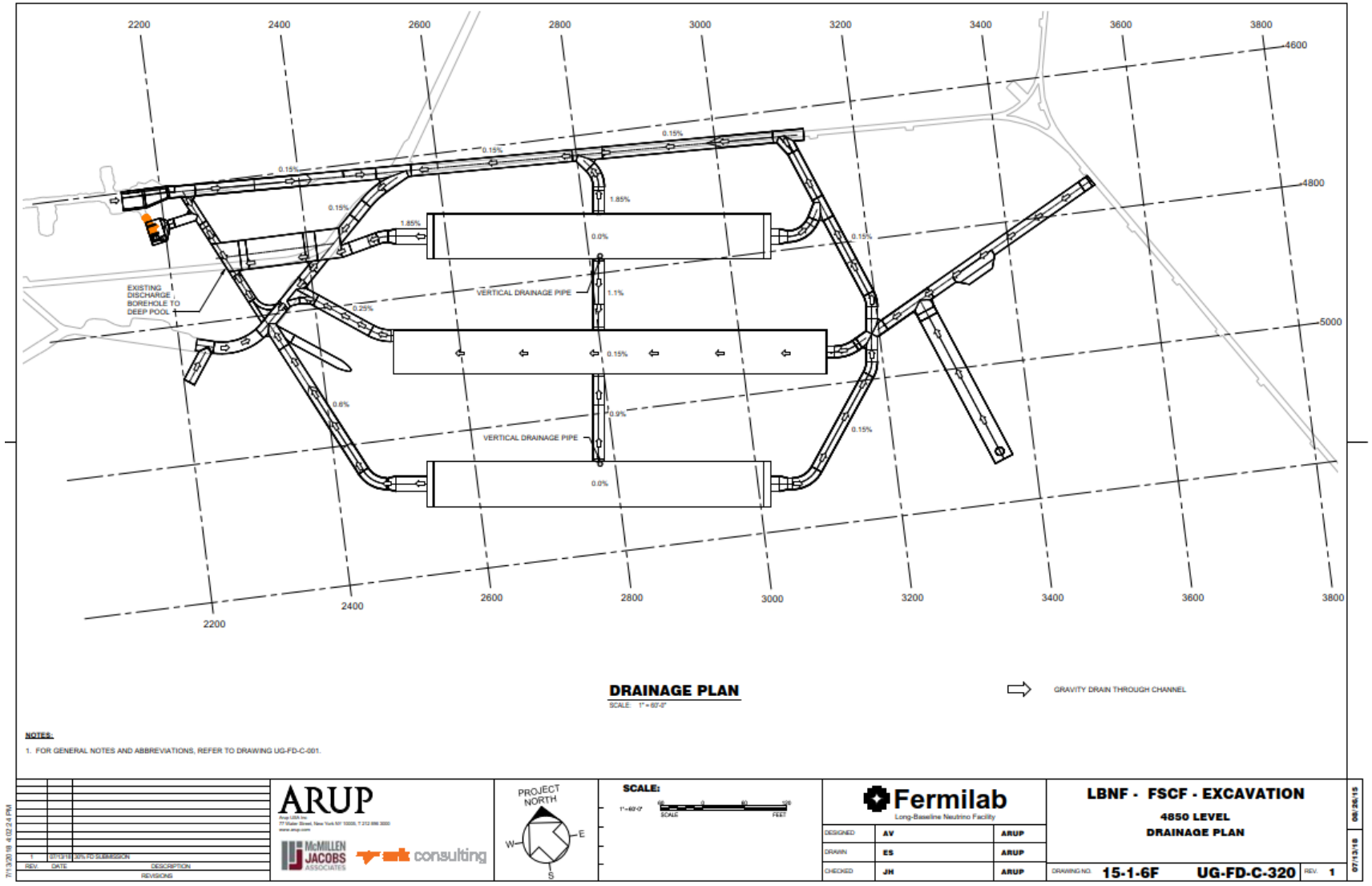
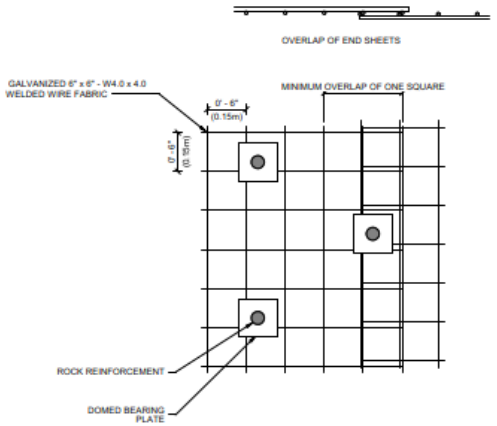
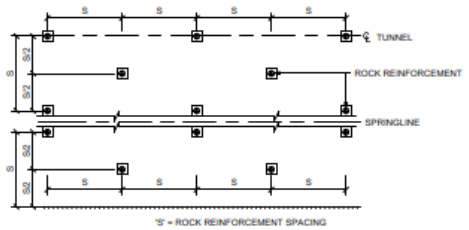

CONNECT TO EXISTING
CONNECT TO EXISTING
CONNECT TO EXISTING
CONNECT TO EXISTING
CONNECT TO EXISTING
PLAN VIEW
SCALE: 1" = 60'-0"
60 lb ASCE RAIL (TYP.)
0'-4" (0.1m) WELDED WIRE FABRIC OR STEEL FIBER REINFORCED SHOTCRETE
DRAINAGE CHANNEL
STEEL FIBER REINFORCED CONCRETE
DRAINAGE PIPE
RAIL OFFSET FROM DRIFT CL VARIES IN ACCORDANCE WITH RAIL ALIGNMENT PLAN
ENLARGED DRIFT
SCALE: 1" = 1'-0"
NOTES:
1. FOR GENERAL NOTES AND ABBREVIATIONS, REFER TO DRAWING UG-FD-C-001.
ARUP
McMILLEN JACOBS ASSOCIATES
mk consulting
PROJECT NORTH
SCALE:
Fermilab
Long-Baseline Neutrino Facility
LBNF - FSCF - EXCAVATION
4850 LEVEL
RAIL ALIGNMENT
DRAWING NO. 15-1-6F UG-FD-C-310 REV. 1


2200
2400
2600
2800
3000
3200
3400
3600
3800
4600
4800
5000
0.15%
1.85%
0.0%
1.1%
0.25%
0.6%
0.9%
VERTICAL DRAINAGE PIPE
EXISTING DISCHARGE BOREHOLE TO DEEP POOL
DRAINAGE PLAN
SCALE: 1" = 60'-0"
GRAVITY DRAIN THROUGH CHANNEL
NOTES:
1. FOR GENERAL NOTES AND ABBREVIATIONS, REFER TO DRAWING UG-FD-C-001.
ARUP
McMILLEN JACOBS ASSOCIATES
consulting
PROJECT NORTH
SCALE:
Fermilab
Long-Baseline Neutrino Facility
DESIGNED AV ARUP
DRAWN ES ARUP
CHECKED JH ARUP
LBNF - FSCF - EXCAVATION
4850 LEVEL
DRAINAGE PLAN
DRAWING NO. 15-1-6F UG-FD-C-320 REV. 1
REV. DATE DESCRIPTION
1 07/13/18 30% FD SUBMISSION
REVISIONS



WELDED WIRE FABRIC SPLICE (4)

SCALE: N.T.S.



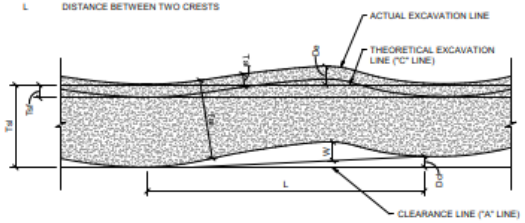
ROCK REINFORCEMENT PATTERN (TYP.)

SCALE: N.T.S.

Tsf DESIGN THICKNESS OF FLASHCOAT LAYER (AS APPLICABLE)
Taf ACTUAL THICKNESS OF FLASTCOAT LAYER (AS APPLICABLE)
Tsl DESIGN THICKNESS OF SHOTCRETE LINING
Tal ACTUAL THICKNESS OF SHOTCRETE LINING

De DEVIATION FROM THEORETICAL EXCAVATION LINE
Dcl DEVIATION FROM CLEARANCE LINE

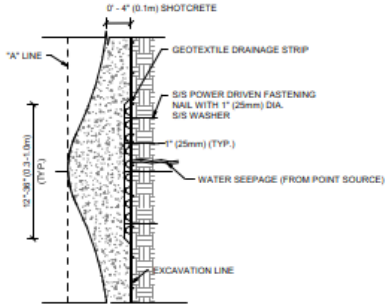
W WAVINESS OF LINING
L DISTANCE BETWEEN TWO CRESTS



CRITERIA
1. Tal >= Tsl
2. 0" <= Dcl <= 24"
3. W < L/5
4. De >= 0"

GENERAL SHOTCRETE SMOOTHNESS CRITERIA (5)

SCALE: N.T.S.



GEOTEXTILE DRAINAGE STRIP TYPICAL SECTION (6)

SCALE: N.T.S.

NOTES:

1. FOR GENERAL NOTES AND ABBREVIATIONS, REFER TO DRAWING UG-FD-C-001.
2. GEOTEXTILE DRAINAGE STRIPS SHALL BE PLACED WHEREVER MINOR SEEPAGE INFLOW IS OBSERVED (>1 GPM.). STRIPS SHALL EXTEND DOWNWARDS FROM POINT SOURCE LOCATION DIRECTING FLOW INTO INVERT DRAINAGE CHANNELS.
3. IN THE EVENT SHOTCRETE MUST BE APPLIED TO EXPOSED AND WET GROUND IMMEDIATELY, DRAINAGE STRIPS SHALL BE PLACED AFTER INITIAL 2" SHOTCRETE FLASHCOAT. DRILLED 2" DIA. x 5'-0" LONG WEEPHOLES SHALL BE SPACED AT 6'-0" INTERVALS SO AS TO PROVIDE A FLOWPATH TO THE GEOTEXTILE.
4. REFER TO SECTION 317116 FOR GEOTEXTILE DRAINAGE DETAILS

REV.	DATE	DESCRIPTION
1	07/13/18	30% FD SUBMISSION

REVISIONS

ARUP — McMILLEN JACOBS ASSOCIATES — mt consulting

SCALE:

Fermilab — Long-Baseline Neutrino Facility

DESIGNED	AV	ARUP
DRAWN	ES	ARUP
CHECKED	JH	ARUP

LBNF - FSCF - EXCAVATION

4850 LEVEL

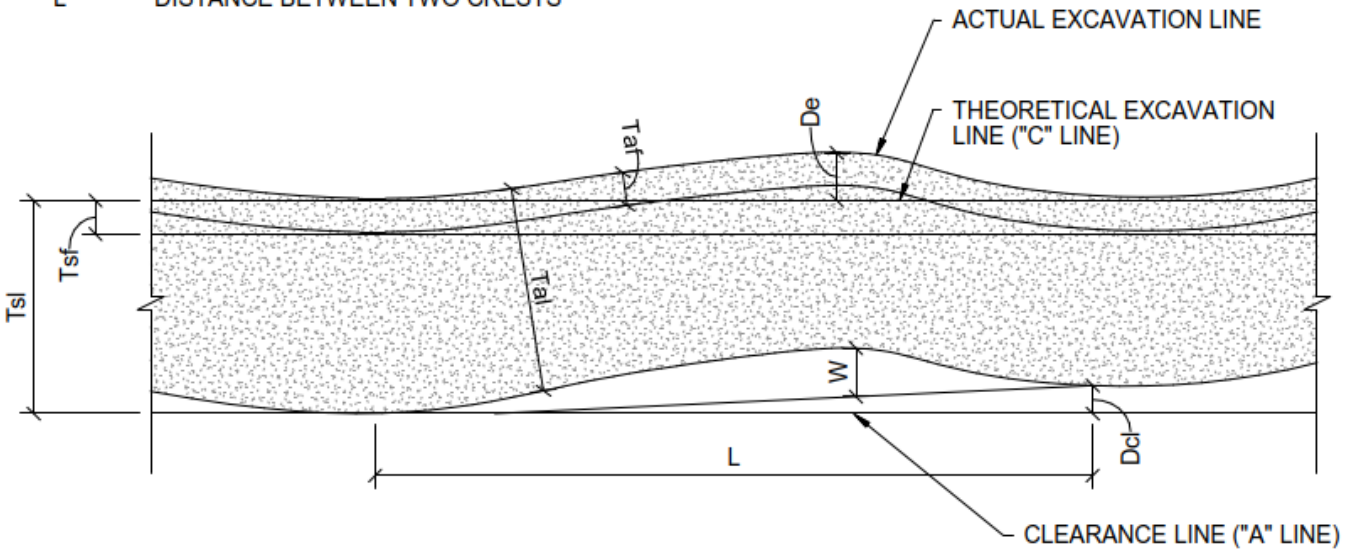
GROUND SUPPORT DETAILS SHEET 2 OF 2

DRAWING NO. 15-1-6F UG-FD-C-501 REV. 1

08/26/15 — 07/13/18

7/13/2018 4:03:07 PM

Tsf	DESIGN THICKNESS OF FLASHCOAT LAYER (AS APPLICABLE)
Taf	ACTUAL THICKNESS OF FLASTCOAT LAYER (AS APPLICABLE)
Tsl	DESIGN THICKNESS OF SHOTCRETE LINING
Tal	ACTUAL THICKNESS OF SHOTCRETE LINING
De	DEVIATION FROM THEORETICAL EXCAVATION LINE
Dcl	DEVIATION FROM CLEARANCE LINE
W	WAVINESS OF LINING
L	DISTANCE BETWEEN TWO CRESTS

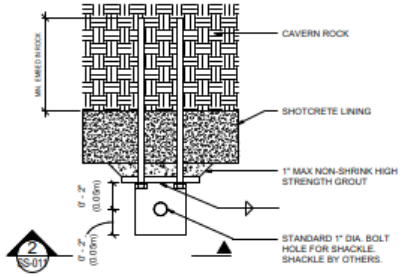


CRITERIA
1. Tal >= Tsl
2. 0" <= Dcl <= 24"
3. W < L/5
4. De >= 0"

GENERAL SHOTCRETE SMOOTHNESS CRITERIA

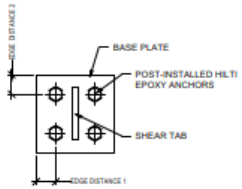
5

SCALE: N.T.S.



STAND-ALONE LIFTING EYE CROSS SECTION (1)

SCALE: 3" = 1'-0"



LIFTING EYE BASE PLATE (2)

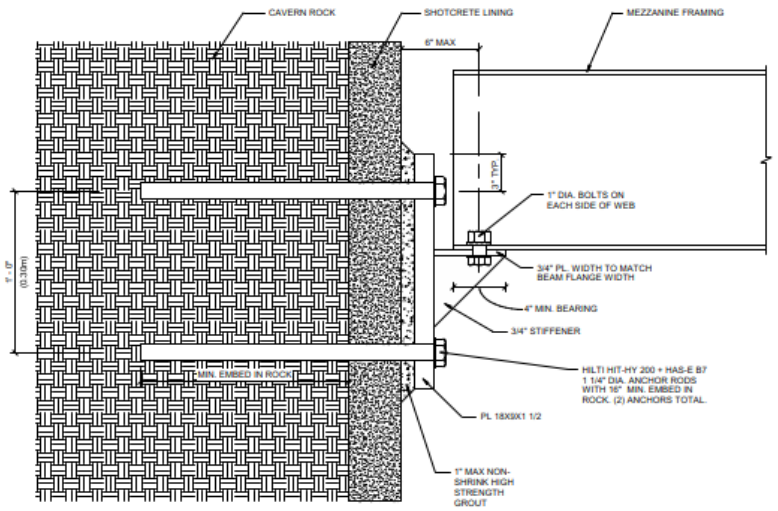
SCALE: 3" = 1'-0"

NOTES:

1. SEE DRAWINGS UG-FD-C-200 TO 203 FOR LOCATIONS OF HANGERS, LIFTING EYES AND MEZZANINE SUPPORT.
2. SEE DRAWING UG-FD-C-500 FOR ROCK ANCHOR DETAILS

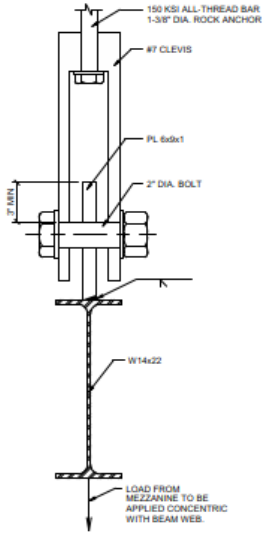
LIFTING EYE SCHEDULE

LIFTING EYE LOCATION	BASE PLATE	SHEAR TAB	EDGE DISTANCE 1	EDGE DISTANCE 2	ANCHOR	ANCHOR EMBED
OVER MEZZANINE	15x15x3/4	4x4x3/4	2"	2"	HILTI HIT-HY 200 + HAS-E 1 1/4" ANCHOR ROD	10"
OVER LAr PUMPS	6x6x1/2	4x4x1/2	1 1/2"	1 1/2"	HILTI HIT-HY 200 + HAS-E 1/2" ANCHOR ROD	10"



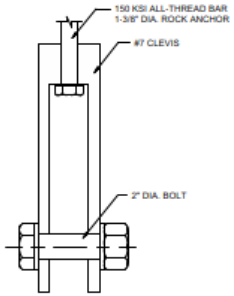
MEZZANINE SUPPORT CROSS SECTION (3)

SCALE: 3" = 1'-0"



MEZZANINE HANGAR CROSS SECTION (4)

SCALE: 3" = 1'-0"



LIFTING EYE INTEGRATED WITH ROCK ANCHOR (5)

SCALE: 3" = 1'-0"

REV.	DATE	DESCRIPTION
1	07/13/18	30% FD SUBMISSION

REVISIONS

ARUP

McMILLEN JACOBS ASSOCIATES

mk consulting

SCALE: 3"=1'-0" SCALE FEET

Fermilab
Long-Baseline Neutrino Facility

DESIGNED	JP	ARUP
DRAWN		ARUP
CHECKED	IB	ARUP

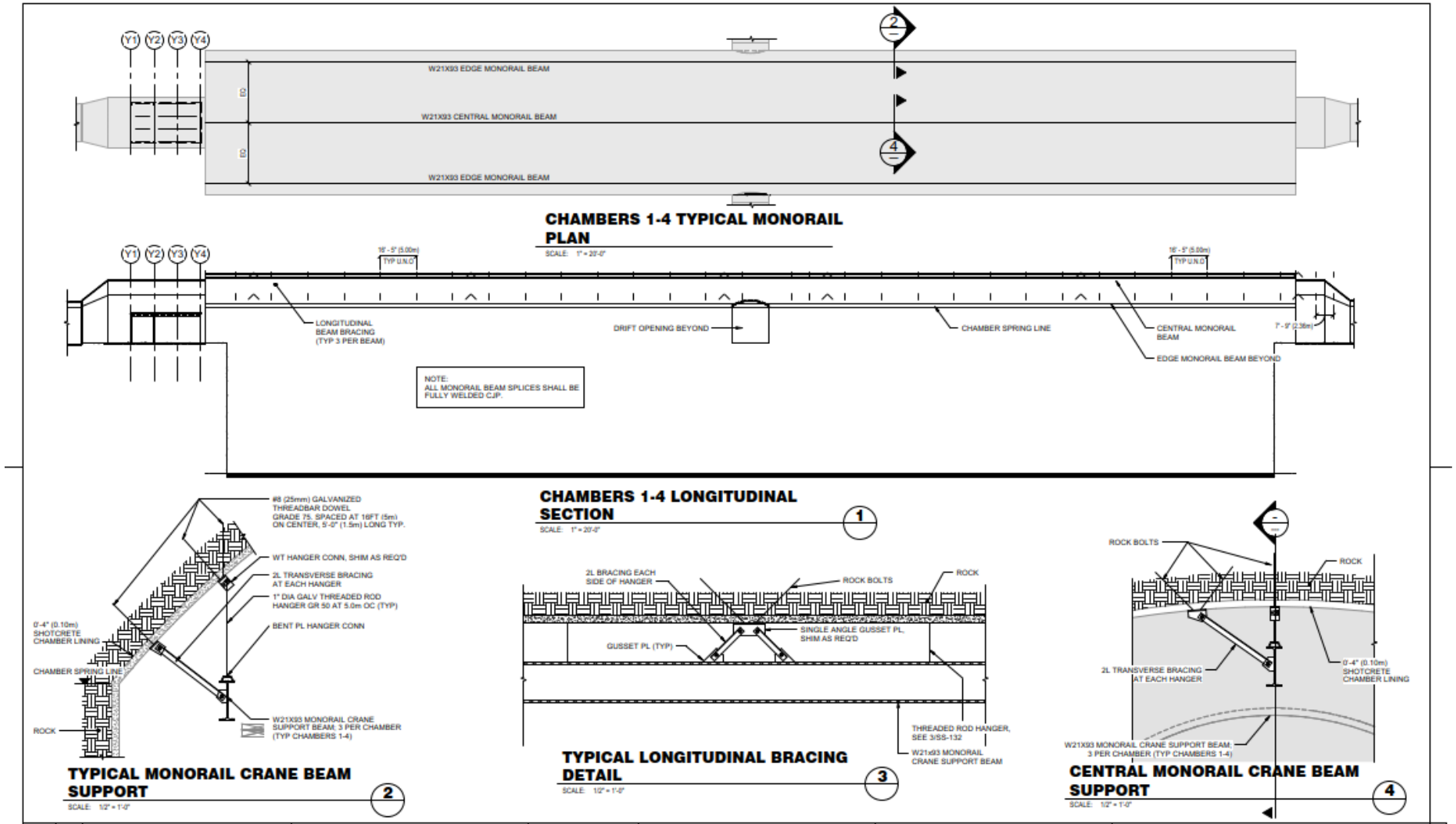
LBNF - FSCF - EXCAVATION

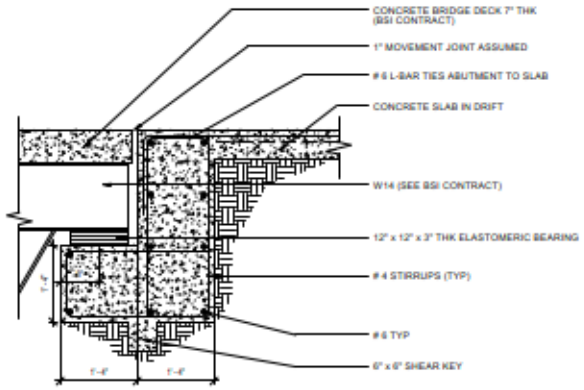
4850 LEVEL

STRUCTURAL DETAILS

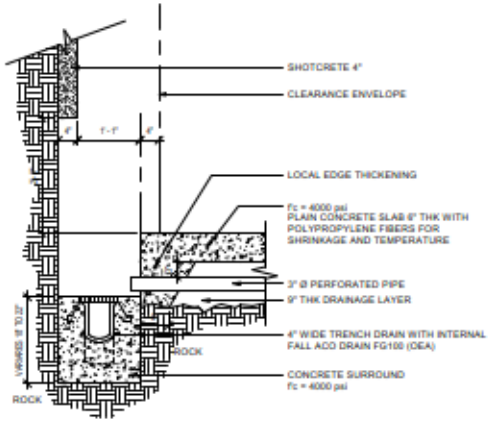
DRAWING NO. 15-1-6F UG-FD-SS-011 REV. 1

07/13/18

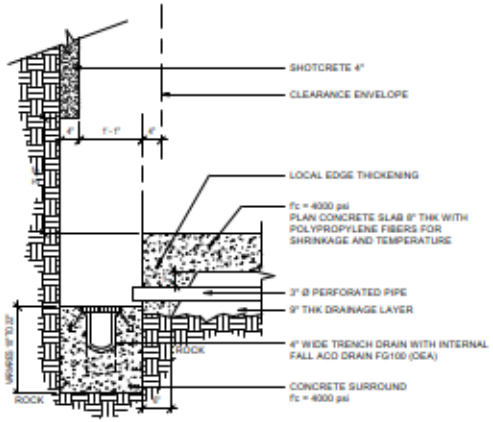

Y1
Y2
Y3
Y4
W21X93 EDGE MONORAIL BEAM
W21X93 CENTRAL MONORAIL BEAM
W21X93 EDGE MONORAIL BEAM
CHAMBERS 1-4 TYPICAL MONORAIL PLAN
SCALE: 1" = 20'-0"
16' - 5" (5.00m) TYP U.N.O.
LONGITUDINAL BEAM BRACING (TYP 3 PER BEAM)
DRIFT OPENING BEYOND
CHAMBER SPRING LINE
CENTRAL MONORAIL BEAM
EDGE MONORAIL BEAM BEYOND
7' - 9" (2.36m)
NOTE:
ALL MONORAIL BEAM SPLICES SHALL BE FULLY WELDED CJP.
CHAMBERS 1-4 LONGITUDINAL SECTION
SCALE: 1" = 20'-0"
#8 (25mm) GALVANIZED THREADBAR DOWEL GRADE 75, SPACED AT 16FT (5m) ON CENTER, 5'-0" (1.5m) LONG TYP.
WT HANGER CONN, SHIM AS REQ'D
2L TRANSVERSE BRACING AT EACH HANGER
1" DIA GALV THREADED ROD HANGER GR 50 AT 5.0m OC (TYP)
BENT PL HANGER CONN
0'-4" (0.10m) SHOTCRETE CHAMBER LINING
CHAMBER SPRING LINE
ROCK
W21X93 MONORAIL CRANE SUPPORT BEAM, 3 PER CHAMBER (TYP CHAMBERS 1-4)
TYPICAL MONORAIL CRANE BEAM SUPPORT
SCALE: 1/2" = 1'-0"
2L BRACING EACH SIDE OF HANGER
ROCK BOLTS
ROCK
SINGLE ANGLE GUSSET PL, SHIM AS REQ'D
GUSSET PL (TYP)
THREADED ROD HANGER, SEE 3/SS-132
W21x93 MONORAIL CRANE SUPPORT BEAM
TYPICAL LONGITUDINAL BRACING DETAIL
SCALE: 1/2" = 1'-0"
ROCK BOLTS
ROCK
2L TRANSVERSE BRACING AT EACH HANGER
0'-4" (0.10m) SHOTCRETE CHAMBER LINING
W21X93 MONORAIL CRANE SUPPORT BEAM 3 PER CHAMBER (TYP CHAMBERS 1-4)
CENTRAL MONORAIL CRANE BEAM SUPPORT
SCALE: 1/2" = 1'-0"
ARUP
McMILLEN JACOBS ASSOCIATES
consulting
PROJECT NORTH
W
E
S
SCALE:
1"=20'-0"
1/2"=1'-0"
Fermilab
Long-Baseline Neutrino Facility
DESIGNED JP ARUP
DRAWN ARUP
CHECKED IB ARUP
LBNF - FSCF - EXCAVATION
EXC 4850 LEVEL
TYPICAL CHAMBER MONORAIL
PLAN AND SECTIONS
DRAWING NO. 15-1-6F UG-FD-SS-132
REV. 1
07/13/18
REV. DATE DESCRIPTION
REVISIONS



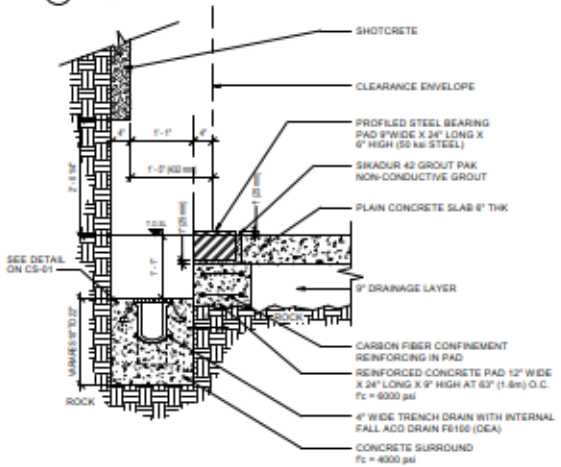
1 BRIDGE ABUTMENT SECTION AT 4500L



2 TYPICAL DETAIL OF EXPERIMENT CAVERN SLAB BETWEEN PADS



3 TYPICAL DETAIL OF CUC SLAB AND EXPERIMENT CAVERN SLAB BELOW SEPTUM BRIDGE



4 DETAIL AT CONCRETE PADS IN EXPERIMENT CAVERN

REV.	DATE	DESCRIPTION
1	07/13/18	90% PD SUBMISSION

REVISIONS

ARUP

McMILLEN JACOBS ASSOCIATES

sk consulting

SCALE:

Fermilab
Long-Baseline Neutrino Facility

DESIGNED	JP	
DRAWN		
CHECKED	IB	

LBNF - FSCF - EXCAVATION

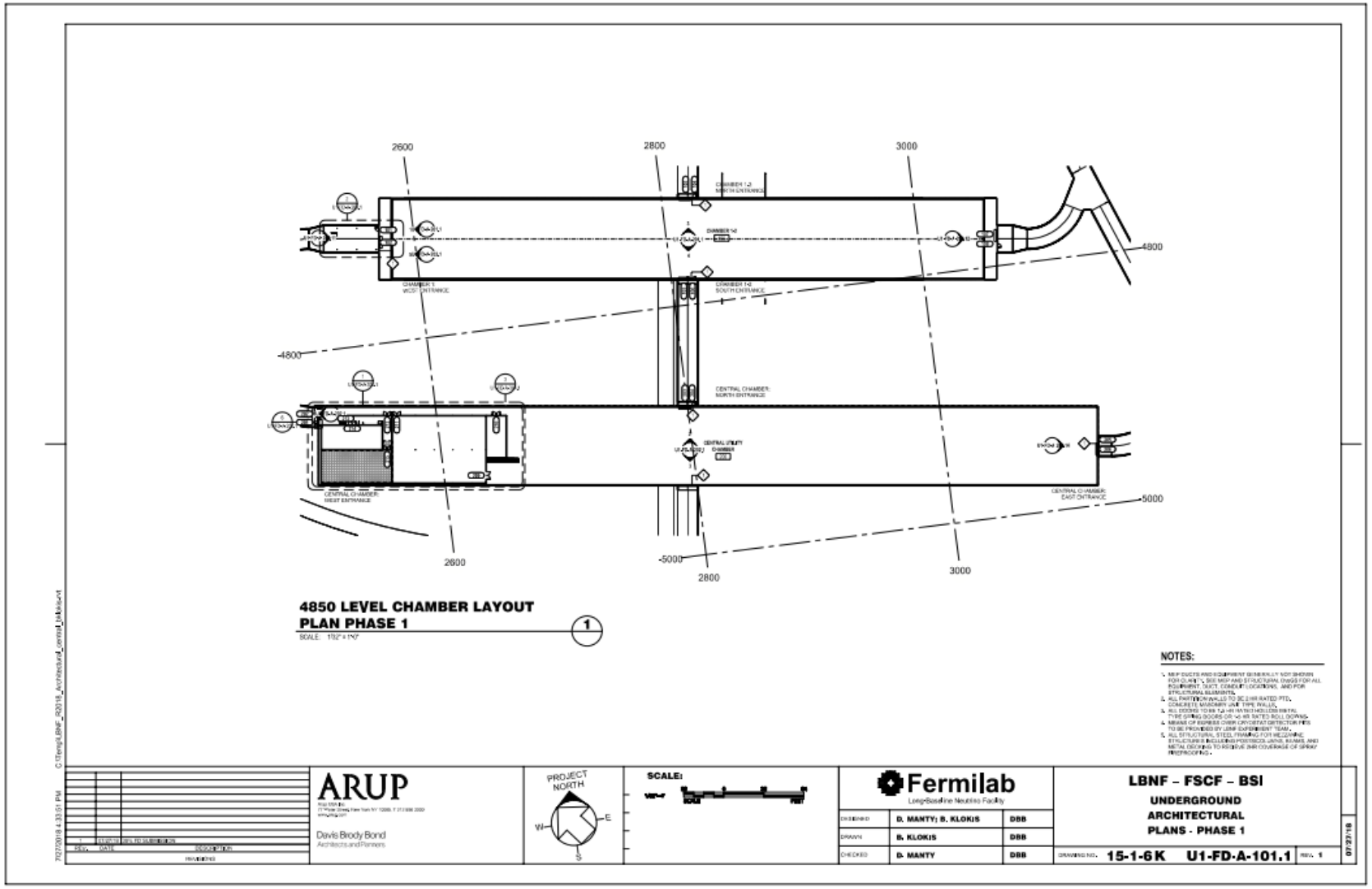
4850 LEVEL

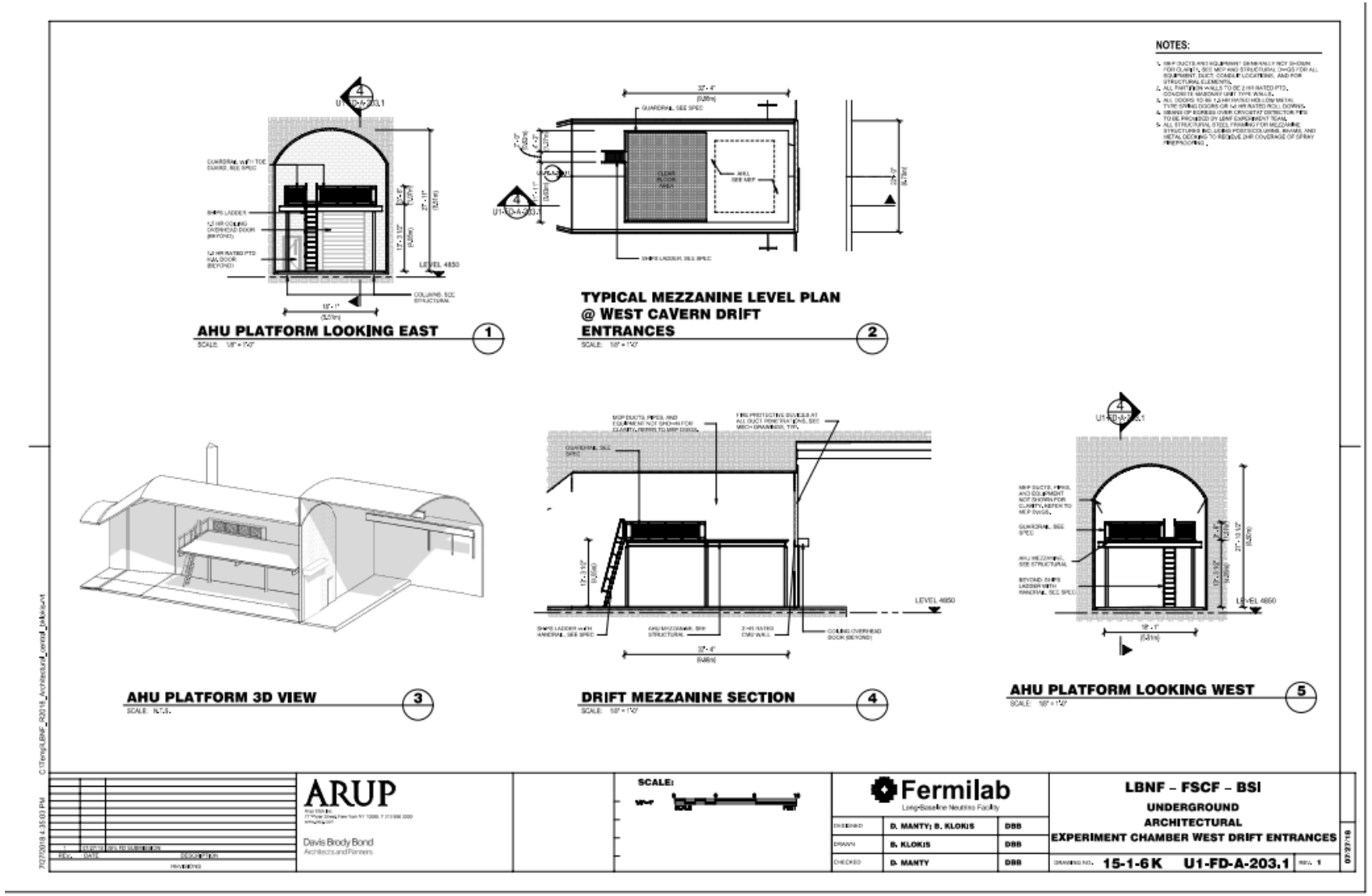
CONCRETE SLAB DETAILS

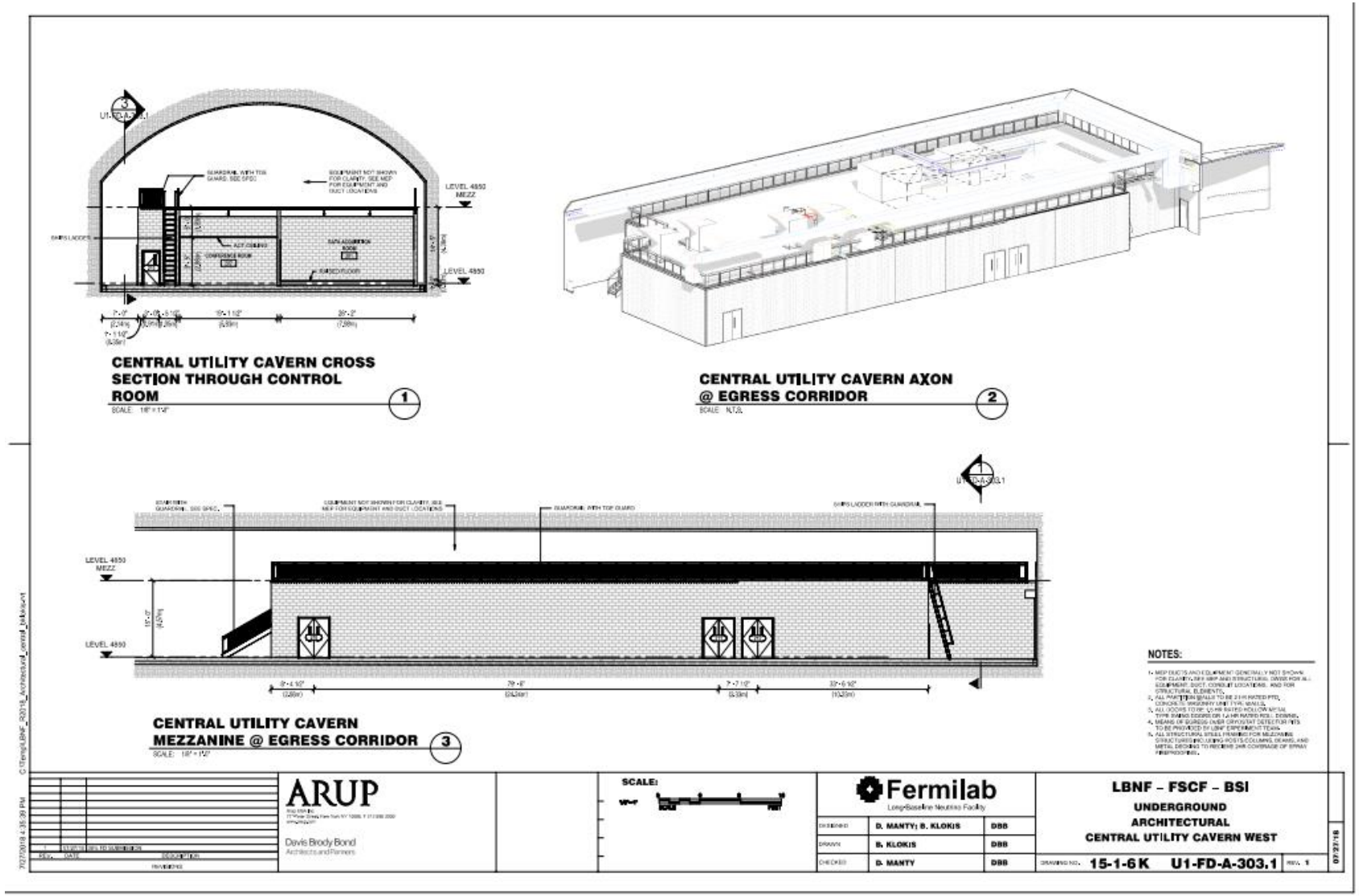
DRAWING NO. **15-1-6F** **UG-FD-SS-510** REV. **1**

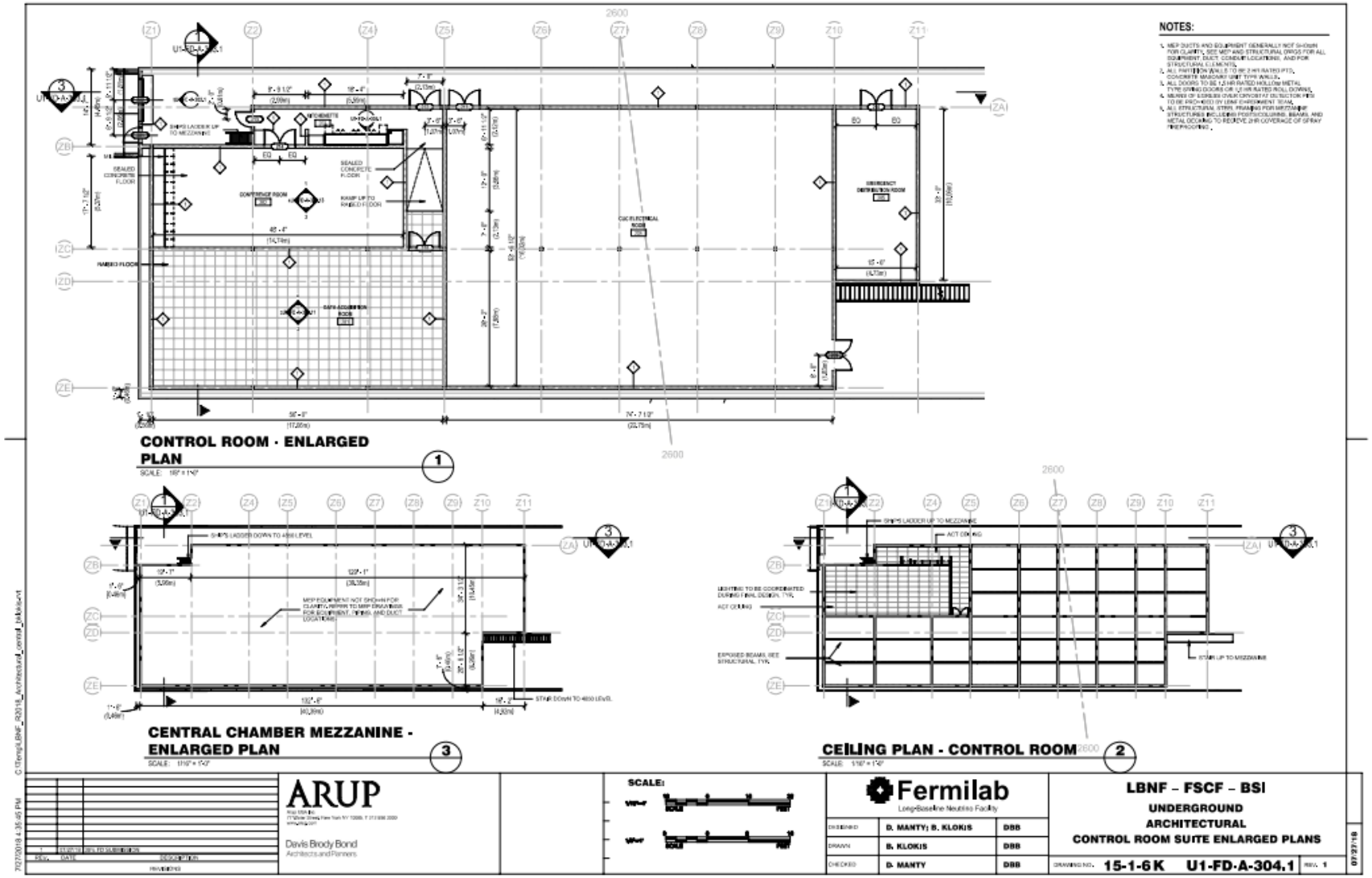
07/13/18

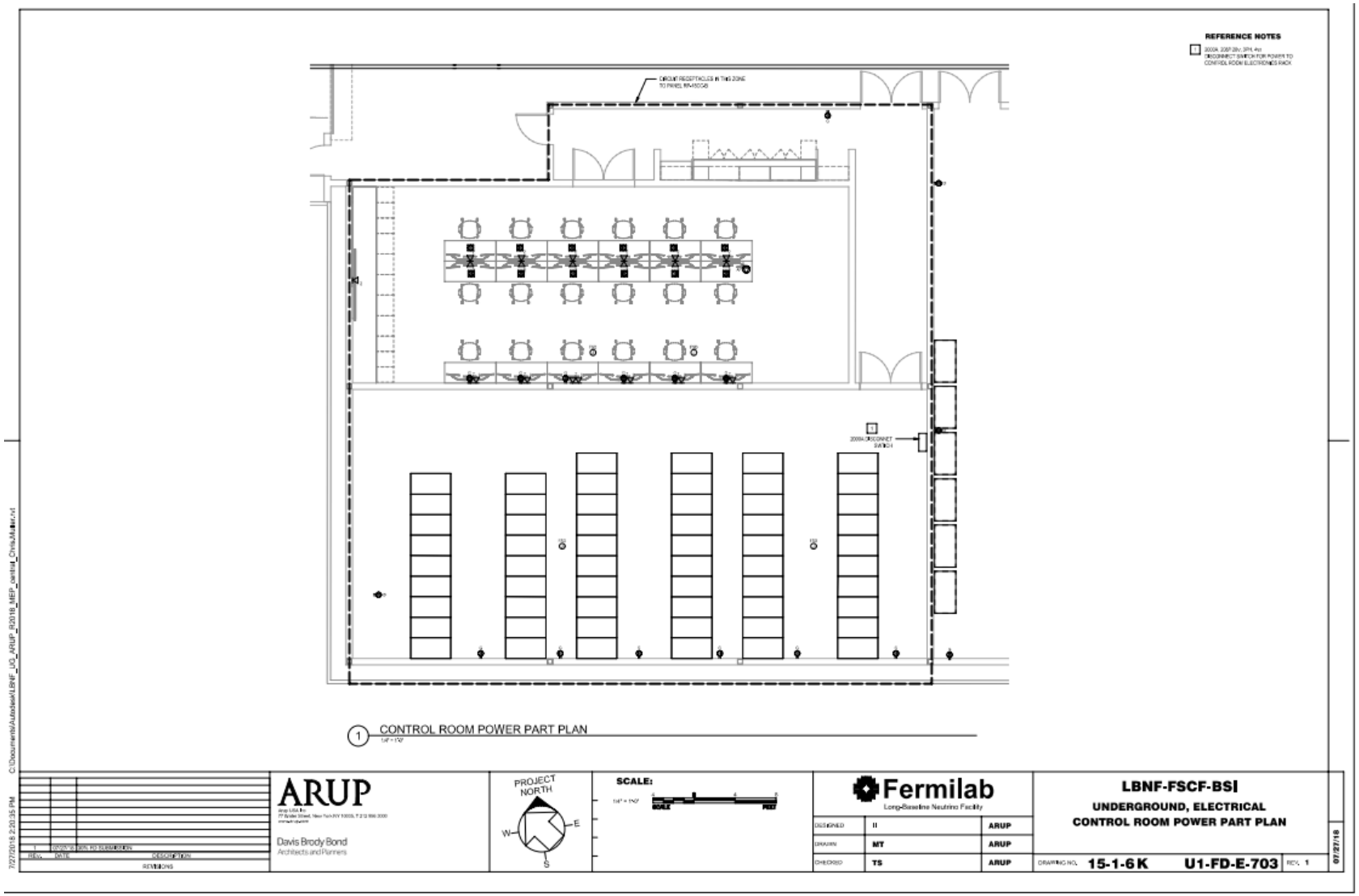
BSI drawings Phase 1

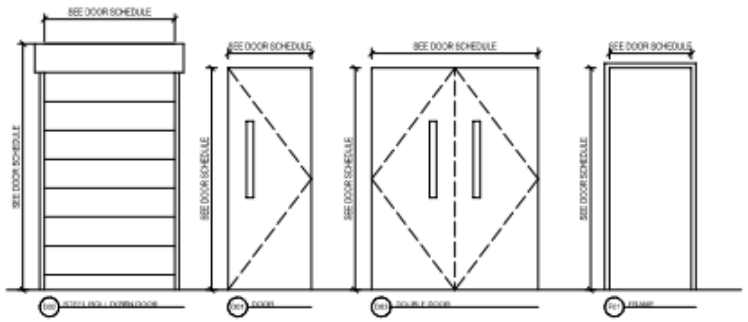

2600
2800
3000
4800
-4800
5000
-5000
CHAMBER 1-2 NORTH ENTRANCE
CHAMBER 1-2
CHAMBER 1 WEST ENTRANCE
CHAMBER 1-2 SOUTH ENTRANCE
CENTRAL CHAMBER: NORTH ENTRANCE
CENTRAL UTILITY CHAMBER
CENTRAL CHAMBER: WEST ENTRANCE
CENTRAL CHAMBER: EAST ENTRANCE
4850 LEVEL CHAMBER LAYOUT
PLAN PHASE 1
SCALE: 1/32" = 1'-0"
1
NOTES:
1. MEP DUCTS AND EQUIPMENT GENERALLY NOT SHOWN FOR CLARITY. SEE MEP AND STRUCTURAL DWGS FOR ALL EQUIPMENT, DUCT, CONDUIT LOCATIONS, AND FOR STRUCTURAL ELEMENTS.
2. ALL PARTITION WALLS TO BE 2HR RATED PTD. CONCRETE MASONRY UNIT TYPE WALLS.
3. ALL DOORS TO BE 1-HR RATED HOLLOW METAL TYPE SWING DOORS OR 1-HR RATED ROLL DOORS.
4. MEANS OF EGRESS OVER CRYOSTAT DETECTOR PITS TO BE PROVIDED BY LBNF EXPERIMENT TEAM.
5. ALL STRUCTURAL STEEL FRAMING FOR MEZZANINE STRUCTURE INCLUDING POSTS/COLUMNS, BEAMS, AND METAL DECKING TO RECEIVE 2HR COVERAGE OF SPRAY FIREPROOFING.
ARUP
Davis Brody Bond
Architects and Planners
PROJECT NORTH
W
E
S
SCALE:
Fermilab
Long-Baseline Neutrino Facility
DESIGNED D. MANTY; B. KLOKIS DBB
DRAWN B. KLOKIS DBB
CHECKED D. MANTY DBB
LBNF – FSCF – BSI
UNDERGROUND
ARCHITECTURAL
PLANS - PHASE 1
DRAWING NO. 15-1-6K U1-FD-A-101.1
REV. 1
07/27/18
REV. DATE DESCRIPTION
REVISIONS
7/27/2018 4:33:51 PM C:\Temp\LBNF_42018_Architectural_normal_nikkis.rvt


NOTES:
AHU PLATFORM LOOKING EAST
SCALE: 1/8" = 1'-0"
TYPICAL MEZZANINE LEVEL PLAN
@ WEST CAVERN DRIFT
ENTRANCES
SCALE: 1/8" = 1'-0"
AHU PLATFORM 3D VIEW
SCALE: N.T.S.
DRIFT MEZZANINE SECTION
SCALE: 1/8" = 1'-0"
AHU PLATFORM LOOKING WEST
SCALE: 1/8" = 1'-0"
ARUP
Davis Brody Bond
Architects and Planners
SCALE:
Fermilab
Long-Baseline Neutrino Facility
DESIGNED D. MANTY; B. KLOKIS DBB
DRAWN B. KLOKIS DBB
CHECKED D. MANTY DBB
LBNF – FSCF – BSI
UNDERGROUND
ARCHITECTURAL
EXPERIMENT CHAMBER WEST DRIFT ENTRANCES
DRAWING NO. 15-1-6K U1-FD-A-203.1
REV. 1
07/27/18


CENTRAL UTILITY CAVERN CROSS SECTION THROUGH CONTROL ROOM
1
CENTRAL UTILITY CAVERN AXON @ EGRESS CORRIDOR
2
CENTRAL UTILITY CAVERN MEZZANINE @ EGRESS CORRIDOR
3
LEVEL 4850 MEZZ
LEVEL 4850
NOTES:
ARUP
Davis Brody Bond
Fermilab
Long Baseline Neutrino Facility
D. MANTY; B. KLOKIS
B. KLOKIS
D. MANTY
DBB
LBNF – FSCF – BSI
UNDERGROUND
ARCHITECTURAL
CENTRAL UTILITY CAVERN WEST
15-1-6K U1-FD-A-303.1
07/27/18

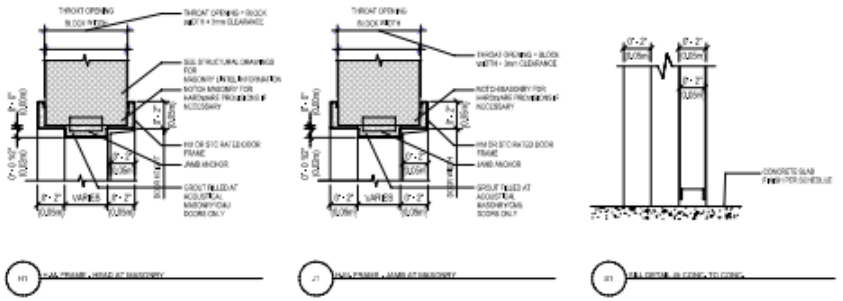

NOTES:
CONTROL ROOM · ENLARGED PLAN
CENTRAL CHAMBER MEZZANINE - ENLARGED PLAN
CEILING PLAN - CONTROL ROOM
ARUP
Davis Brody Bond
Fermilab
Long-Baseline Neutrino Facility
LBNF – FSCF – BSI
UNDERGROUND
ARCHITECTURAL
CONTROL ROOM SUITE ENLARGED PLANS
DRAWING NO. 15-1-6K U1-FD-A-304.1
REV. 1
DESIGNED D. MANTY; B. KLOKIS DBB
DRAWN B. KLOKIS DBB
CHECKED D. MANTY DBB


REFERENCE NOTES
CIRCUIT RECEPTACLES IN THIS ZONE TO PANEL RP-R0C08
CONTROL ROOM POWER PART PLAN
ARUP
Davis Brody Bond
Architects and Planners
PROJECT NORTH
SCALE:
Fermilab
Long-Baseline Neutrino Facility
LBNF-FSCF-BSI
UNDERGROUND, ELECTRICAL
CONTROL ROOM POWER PART PLAN
DRAWING NO. 15-1-6K U1-FD-E-703
REVISIONS



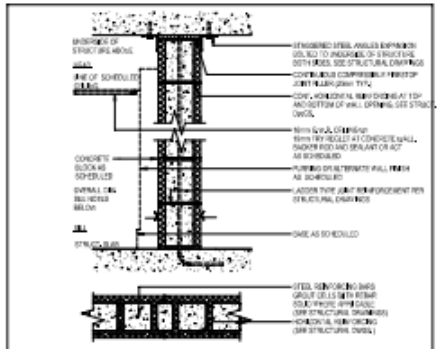
DOOR FRAME AND ELEVATIONS (2)

SCALE: N.T.S



DOOR HEAD JAM & SILL DETAILS (1)

SCALE: 3" = 1'-0"



1 CONCRETE BLOCK WALL 7-5/8" BLOCK

NOTE: DEFLECTION NOT TO EXCEED L/360 UNLESS NOTED OTHERWISE.

TYPE	OVR. DIM. (mm)	FIRE RATING	UL LISTING	MAX. HEIGHT (mm)	BACKING	DESIGN LOAD	ACOUSTICAL STC	ACOUSTICAL TEST REF.	REMARKS
1	194	2 HR	2000				45		SEE DETAILS IN STRUCTURAL DWGS.
2	194	2 HR	2000				45		SEE DETAILS IN STRUCTURAL DWGS. ACOUSTICAL BLOCK WALL @ GENERATOR ROOM. SEE SPEC

DOOR SCHEDULE LBNF PHASE 1

WT	ROOM	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR SIZE THKNS	DOOR TYPE	DOOR MATL	DOOR FIN	FRAME TYPE	FRAME MATL	FRAME FIN	FRAME DETAIL HEAD	FRAME DETAIL JAMB	FRAME DETAIL SILL	FIRE RATING	HARDWARE SET	REMARKS
101	CHAMBER 1 - WEST ENTRANCE	8'-0"	10'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	2	
102	CHAMBER 1 - WEST ENTRANCE	8'-0 1/2"	10'-0"	0'-2"	D02	STL	PTD	F02	STL	PTD	H02	J02	S02	1.5 HR	1	
103	CHAMBER 1 - NORTH ENTRANCE	8'-0 1/2"	10'-0"	0'-2"	D02	STL	PTD	F02	STL	PTD	H02	J02	S02	1.5 HR	1	
104	CHAMBER 1 - NORTH ENTRANCE	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	2	
105	CHAMBER 1 - SOUTH ENTRANCE	8'-0 1/2"	10'-0"	0'-2"	D02	STL	PTD	F02	STL	PTD	H02	J02	S02	1.5 HR	1	
106	CHAMBER 1 - SOUTH ENTRANCE	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	2	
107	CHAMBER 1 - EAST ENTRANCE	8'-0 1/2"	10'-0"	0'-2"	D02	STL	PTD	F02	STL	PTD	H02	J02	S02	1.5 HR	1	
108	CHAMBER 1 - EAST ENTRANCE	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	2	
201	MAINTENANCE SHOP	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	2	
202	CENTRAL CHAMBER - WEST ENTRANCE	8'-0 1/2"	10'-0"	0'-2"	D02	STL	PTD	F02	STL	PTD	H02	J02	S02	1.5 HR	1	
203	CENTRAL CHAMBER - NORTH ENTRANCE	8'-0 1/2"	10'-0"	0'-2"	D02	STL	PTD	F02	STL	PTD	H02	J02	S02	1.5 HR	1	
204	CENTRAL CHAMBER - NORTH ENTRANCE	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	2	
205	CENTRAL CHAMBER - EAST ENTRANCE	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	2	
206	CENTRAL CHAMBER - EAST ENTRANCE	8'-0 1/2"	10'-0"	0'-2"	D02	STL	PTD	F02	STL	PTD	H02	J02	S02	1.5 HR	1	
209	CUC ELECTRICAL ROOM	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	5	
210	EMERGENCY DISTRIBUTION ROOM	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	5	
211	CUC ELECTRICAL ROOM	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	5	
212	CONTROL ROOM	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	6	
213	ELECTRICAL ROOM	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	4	
215	CONFERENCE ROOM	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	7	
216	COMMS ROOM	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	3	
301	FUEL OIL TANK	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	9	
402	EMERGENCY GENERATOR	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	9	
403	SUBSTATION ELECTRICAL ROOM	8'-0"	8'-0"	0'-2"	D01	HM	PTD	F01	HM	PTD	H01	J01	S01	1.5 HR	4	

NAME	NUMBER	WALL FINISH	FLOOR FINISH	CEILING FINISH
CHAMBER 1-2	110	SHOTCRETE	SEALED CONCRETE SLAB	SHOTCRETE
CENTRAL UTILITY CHAMBER	208	SHOTCRETE	SEALED CONCRETE SLAB	SHOTCRETE
DATA ACQUISITION ROOM	201	SHOTCRETE/ANTI-FAR COATING	ACCESSIBLE FLOOR SYSTEM	EXPOSED STEEL DECK
CONFERENCE ROOM	202	SHOTCRETE/ANTI-FAR COATING	SEALED CONCRETE SLAB	SUSPENDED CEILING SYSTEMS
SITE HEALTH	203	SHOTCRETE/ANTI-FAR COATING	SEALED CONCRETE SLAB	EXPOSED STEEL DECK
CUC ELECTRICAL ROOM	204	SHOTCRETE/ANTI-FAR COATING	SEALED CONCRETE SLAB	EXPOSED STEEL DECK
EMERGENCY DISTRIBUTION ROOM	205	SHOTCRETE/ANTI-FAR COATING	SEALED CONCRETE SLAB	EXPOSED STEEL DECK
SPRAY CHAMBER	101	SHOTCRETE/EPOXY COATING	SEALED CONCRETE SLAB	SHOTCRETE
EMERGENCY GENERATOR ROOMS	402	SHOTCRETE/ANTI-FAR COATING	SEALED CONCRETE SLAB	SHOTCRETE
SUBSTATION ELECTRICAL ROOM	401	SHOTCRETE/ANTI-FAR COATING	SEALED CONCRETE SLAB	SHOTCRETE

LOUVER SCHEDULE LBNF PHASE 1

LOUVER NO.	PHASE	LOCATION	HEIGHT	WIDTH	REMARKS

REV.	DATE	DESCRIPTION
1	03.22.16	PRE-EXCAVATION 30% FINAL ISSUED FOR REVIEW

REVISIONS

ARUP

Davis Brody Bond
Architects and Planners

SCALE: AS NOTED

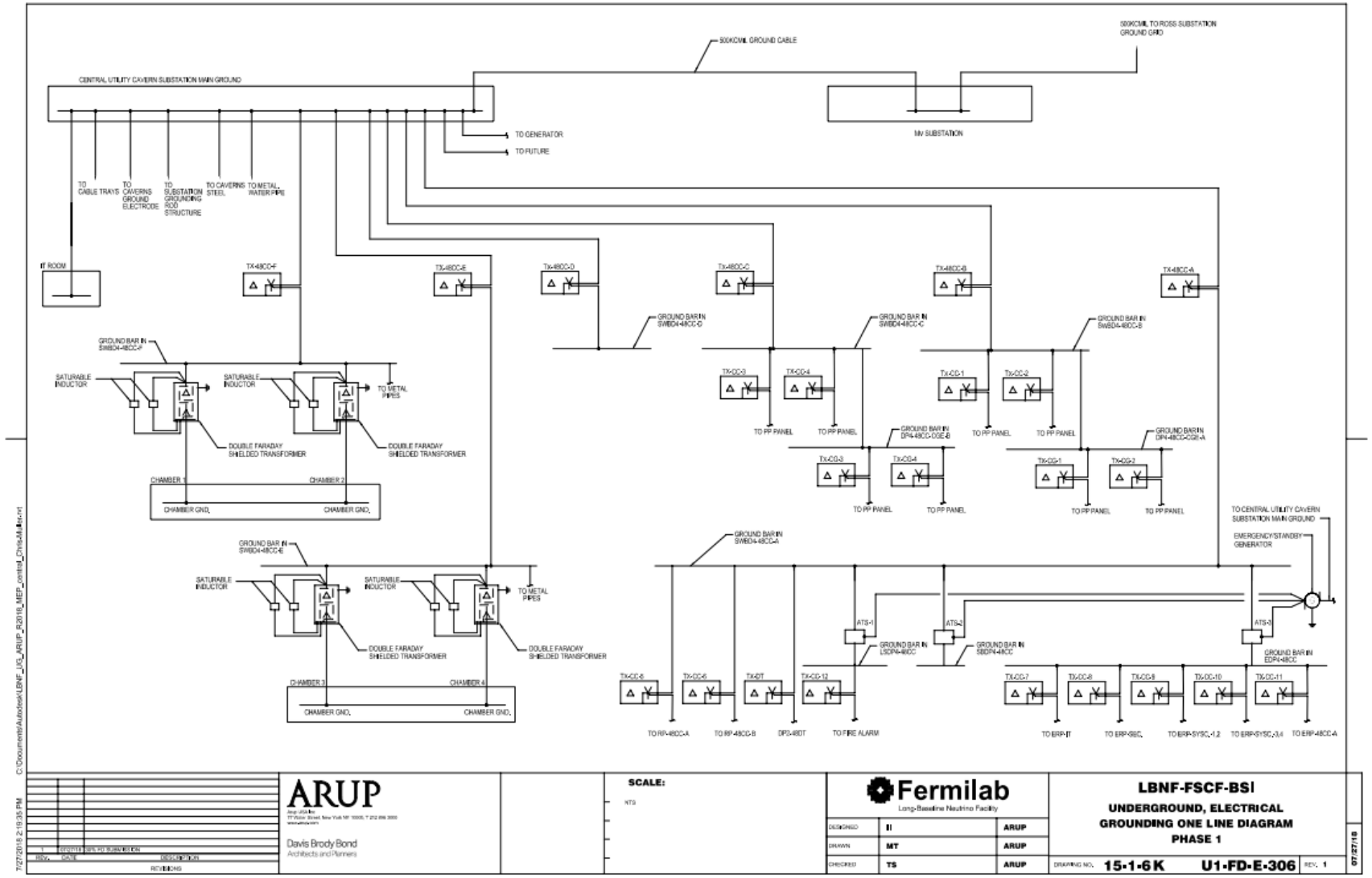
Fermilab
Long-Baseline Neutrino Facility

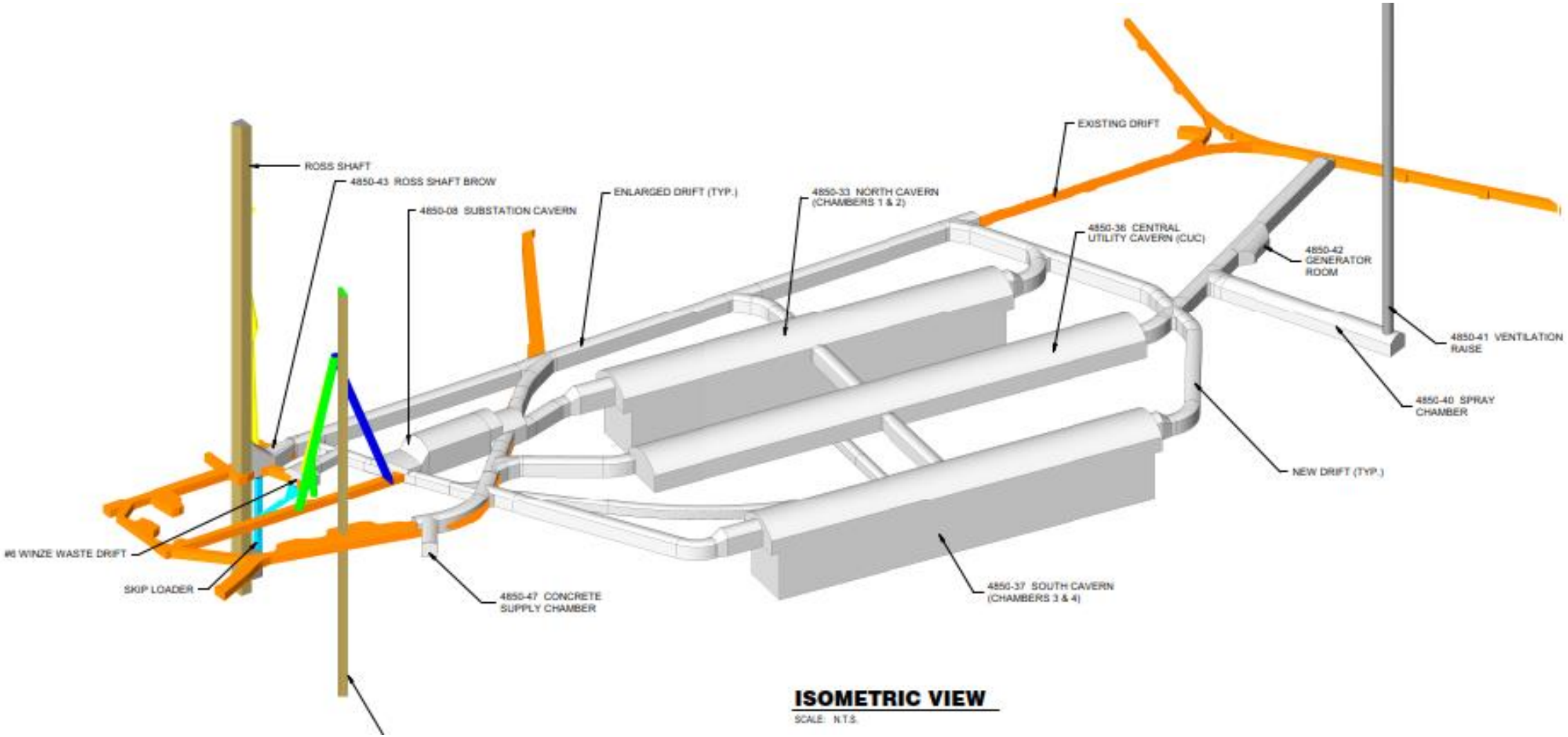
DESIGNED	D. MANTY; B. KLOKIS	DBB
DRAWN	B. KLOKIS	DBB
CHECKED	D. MANTY	DBB

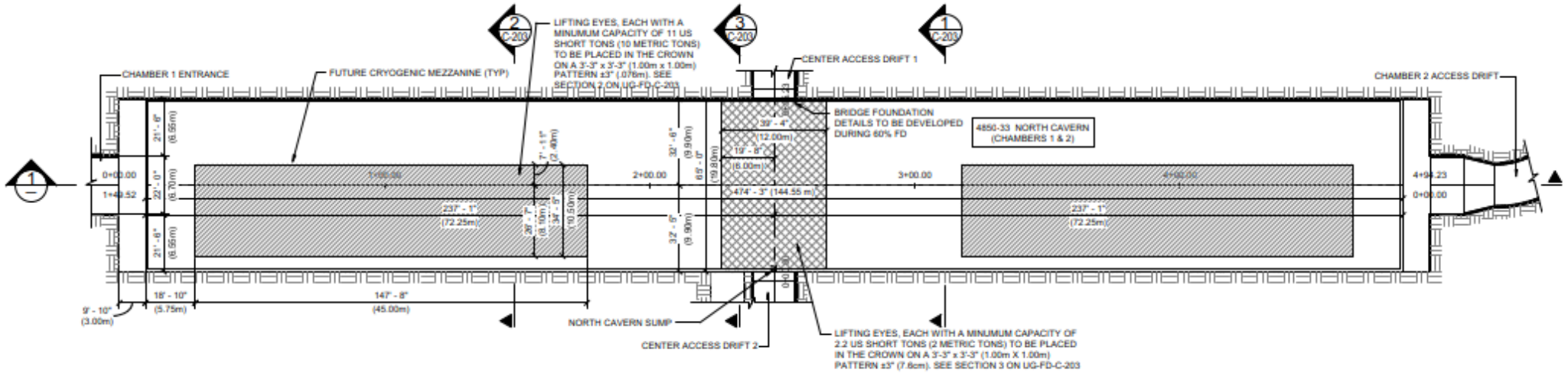
LBNF – FSCF – BSI
UNDERGROUND ARCHITECTURAL
DOOR, LOUVER + PARTITION SCHEDULE & DETAILS PHASE 1

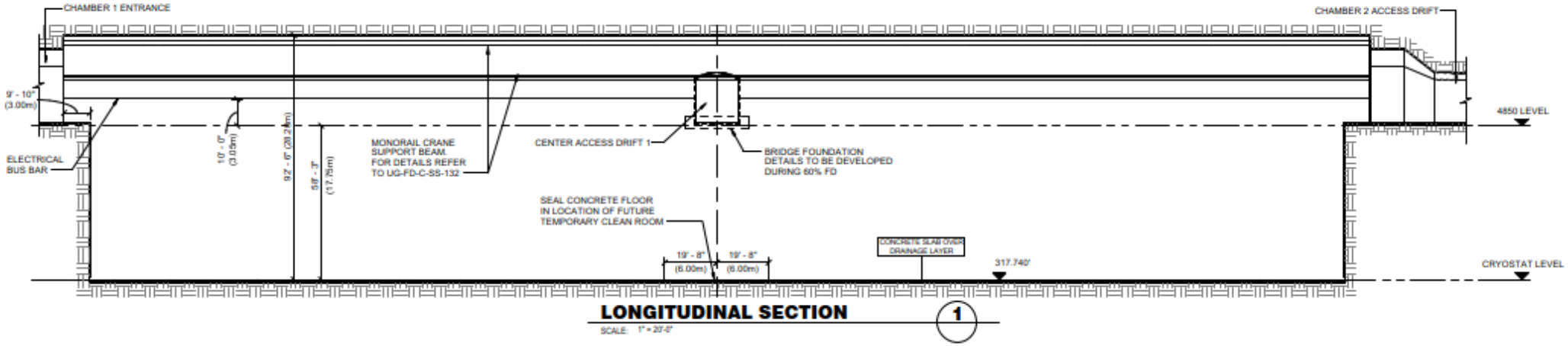
DRAWING NO. 15-1-6K U1-FD-A-401.1 REV. 1

03.22.16


500KCMIL GROUND CABLE
500KCMIL TO ROSS SUBSTATION GROUND GRID
CENTRAL UTILITY CAVERN SUBSTATION MAIN GROUND
MV SUBSTATION
TO GENERATOR
TO FUTURE
TO CABLE TRAYS
TO CAVERNS GROUND ELECTRODE
TO SUBSTATION GROUNDING ROD STRUCTURE
TO CAVERNS STEEL
TO METAL WATER PIPE
IT ROOM
TX-48CC-F
TX-48CC-E
TX-48CC-D
TX-48CC-C
TX-48CC-B
TX-48CC-A
GROUND BAR IN SWBD4-48CC-D
GROUND BAR IN SWBD4-48CC-C
GROUND BAR IN SWBD4-48CC-B
GROUND BAR IN SWBD4-48CC-F
SATURABLE INDUCTOR
TO METAL PIPES
DOUBLE FARADAY SHIELDED TRANSFORMER
CHAMBER 1
CHAMBER 2
CHAMBER GND.
TX-CC-3
TX-CC-4
TX-CC-1
TX-CC-2
TO PP PANEL
GROUND BAR IN DP4-48CC-CGE-B
GROUND BAR IN DP4-48CC-CGE-A
TX-CG-3
TX-CG-4
TX-CG-1
TX-CG-2
GROUND BAR IN SWBD4-48CC-E
GROUND BAR IN SWBD4-48CC-A
CHAMBER 3
CHAMBER 4
TO CENTRAL UTILITY CAVERN SUBSTATION MAIN GROUND
EMERGENCY/STANDBY GENERATOR
ATS-1
ATS-2
ATS-3
GROUND BAR IN LSDP4-48CC
GROUND BAR IN SSDP4-48CC
GROUND BAR IN EDP4-48CC
TX-CC-5
TX-CC-6
TX-DT
TX-CC-12
TX-CC-7
TX-CC-8
TX-CC-9
TX-CC-10
TX-CC-11
TO RP-48CC-A
TO RP-48CC-B
DP3-48DT
TO FIRE ALARM
TO ERP-IT
TO ERP-SSC
TO ERP-SYSC-1,2
TO ERP-SYSC-3,4
TO ERP-48CC-A
C:\Documents\Autodesk\LBNF_JIS_ARUP_R2018_MEP_central_Chris.dwg
7/27/2018 2:19:35 PM
ARUP
Davis Brody Bond
Architects and Planners
REV. DATE DESCRIPTION
REVISIONS
SCALE:
NTS
Fermilab
Long-Baseline Neutrino Facility
DESIGNED II ARUP
DRAWN MT ARUP
CHECKED TS ARUP
LBNF-FSCF-BSI
UNDERGROUND, ELECTRICAL
GROUNDING ONE LINE DIAGRAM
PHASE 1
DRAWING NO. 15-1-6K U1-FD-E-306 REV. 1
07/27/18


ROSS SHAFT
4850-43 ROSS SHAFT BROW
4850-08 SUBSTATION CAVERN
ENLARGED DRIFT (TYP.)
4850-33 NORTH CAVERN (CHAMBERS 1 & 2)
EXISTING DRIFT
4850-36 CENTRAL UTILITY CAVERN (CUC)
4850-42 GENERATOR ROOM
4850-41 VENTILATION RAISE
4850-40 SPRAY CHAMBER
NEW DRIFT (TYP.)
#6 WINZE WASTE DRIFT
SKIP LOADER
4850-47 CONCRETE SUPPLY CHAMBER
4850-37 SOUTH CAVERN (CHAMBERS 3 & 4)
ISOMETRIC VIEW
SCALE: N.T.S.


CHAMBER 1 ENTRANCE
FUTURE CRYOGENIC MEZZANINE (TYP)
LIFTING EYES, EACH WITH A MINIMUM CAPACITY OF 11 US SHORT TONS (10 METRIC TONS) TO BE PLACED IN THE CROWN ON A 3'-3" x 3'-3" (1.00m x 1.00m) PATTERN ±3" (.076m). SEE SECTION 2 ON UG-FD-C-203
CENTER ACCESS DRIFT 1
CHAMBER 2 ACCESS DRIFT
BRIDGE FOUNDATION DETAILS TO BE DEVELOPED DURING 60% FD
4850-33 NORTH CAVERN (CHAMBERS 1 & 2)
NORTH CAVERN SUMP
CENTER ACCESS DRIFT 2
LIFTING EYES, EACH WITH A MINUMUM CAPACITY OF 2.2 US SHORT TONS (2 METRIC TONS) TO BE PLACED IN THE CROWN ON A 3'-3" x 3'-3" (1.00m X 1.00m) PATTERN ±3" (7.6cm). SEE SECTION 3 ON UG-FD-C-203
PLAN VIEW
SCALE: 1" = 20'-0"


CHAMBER 1 ENTRANCE
CHAMBER 2 ACCESS DRIFT
4850 LEVEL
ELECTRICAL BUS BAR
MONORAIL CRANE SUPPORT BEAM. FOR DETAILS REFER TO UG-FD-C-SS-132
CENTER ACCESS DRIFT 1
BRIDGE FOUNDATION DETAILS TO BE DEVELOPED DURING 60% FD
SEAL CONCRETE FLOOR IN LOCATION OF FUTURE TEMPORARY CLEAN ROOM
CONCRETE SLAB OVER DRAINAGE LAYER
317.740'
CRYOSTAT LEVEL
LONGITUDINAL SECTION
SCALE: 1" = 20'-0"