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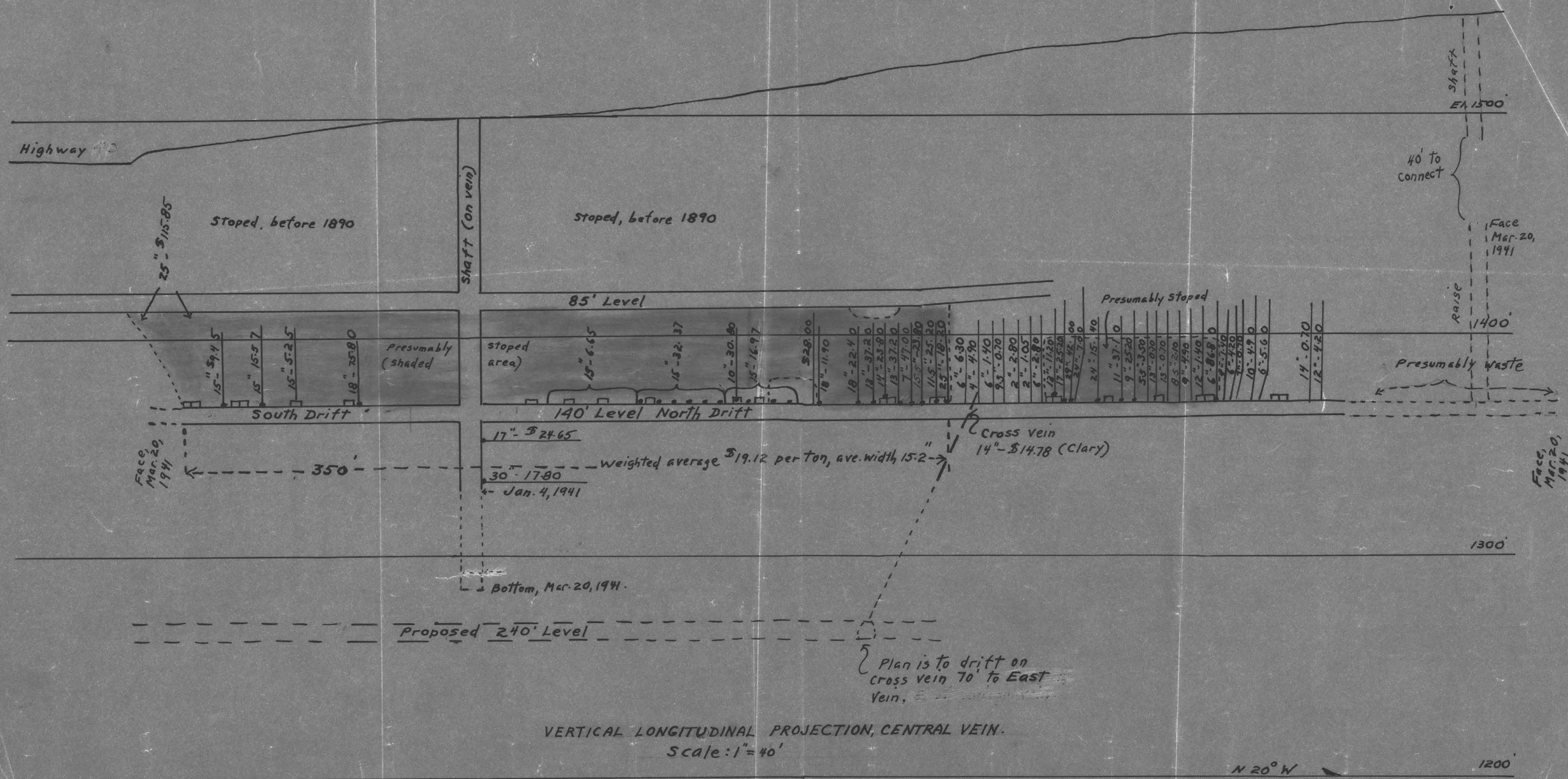
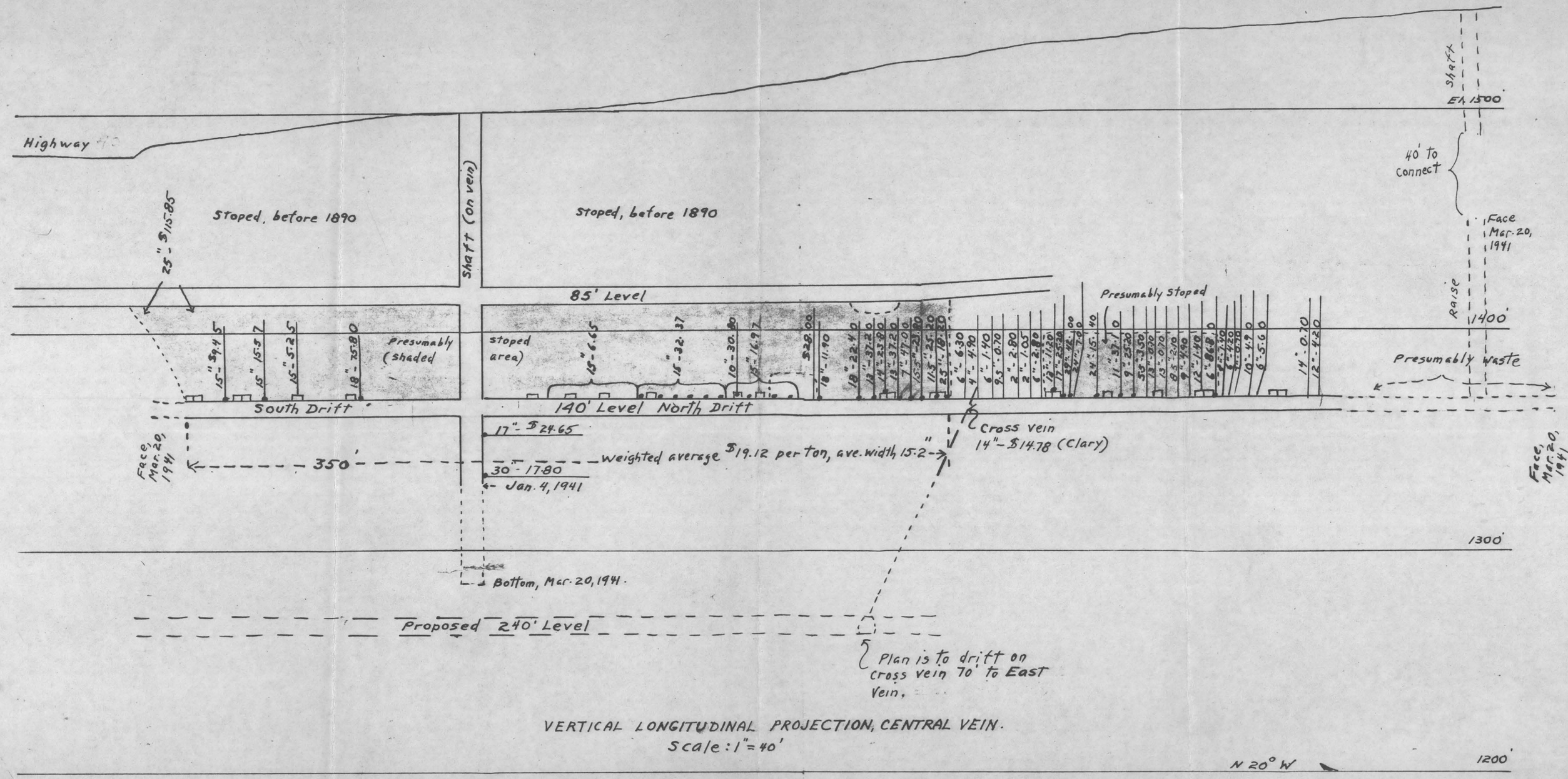


VERTICAL LONGITUDINAL PROJECTION, CENTRAL VEIN.
Scale: 1" = 40'



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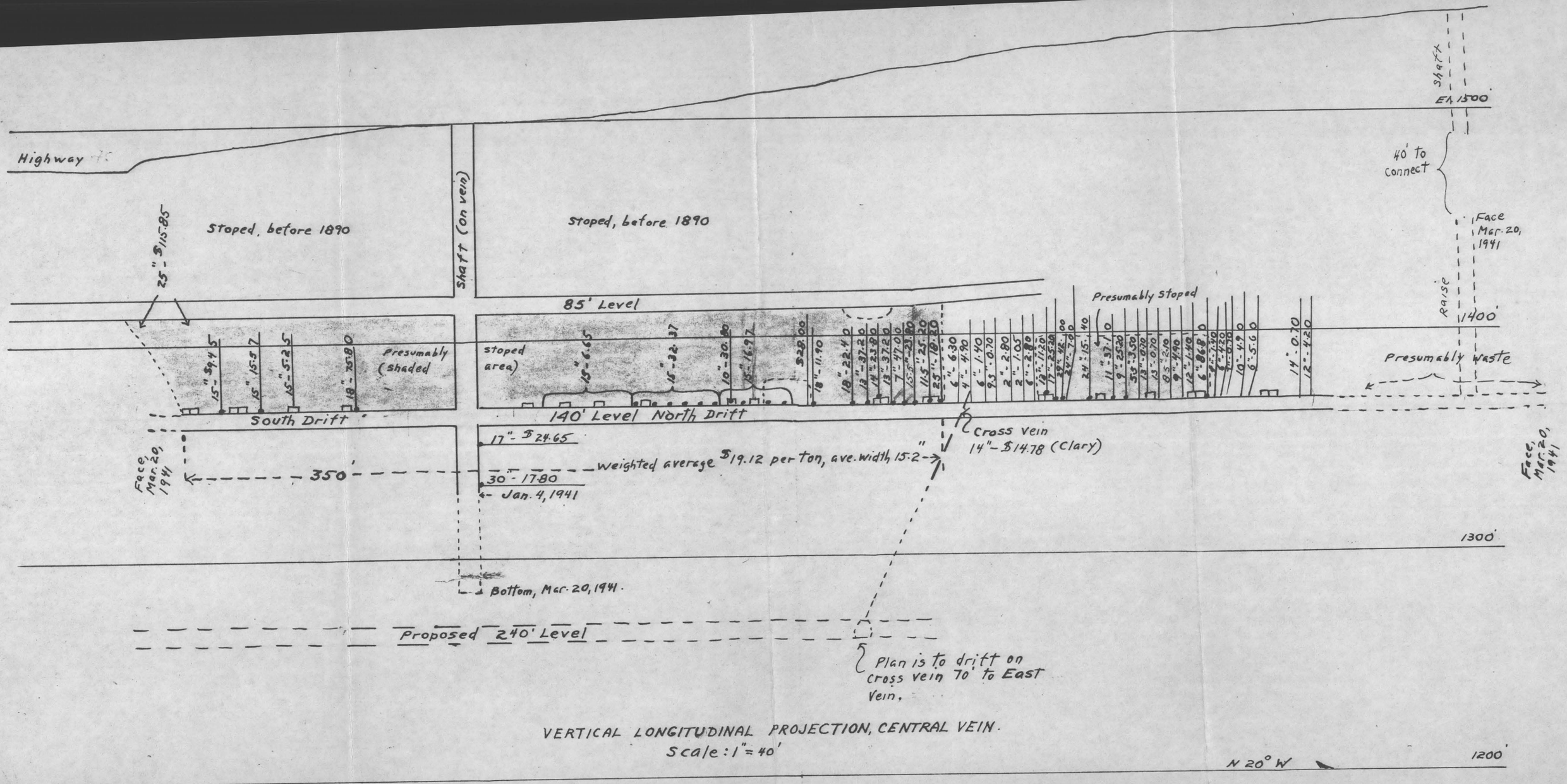

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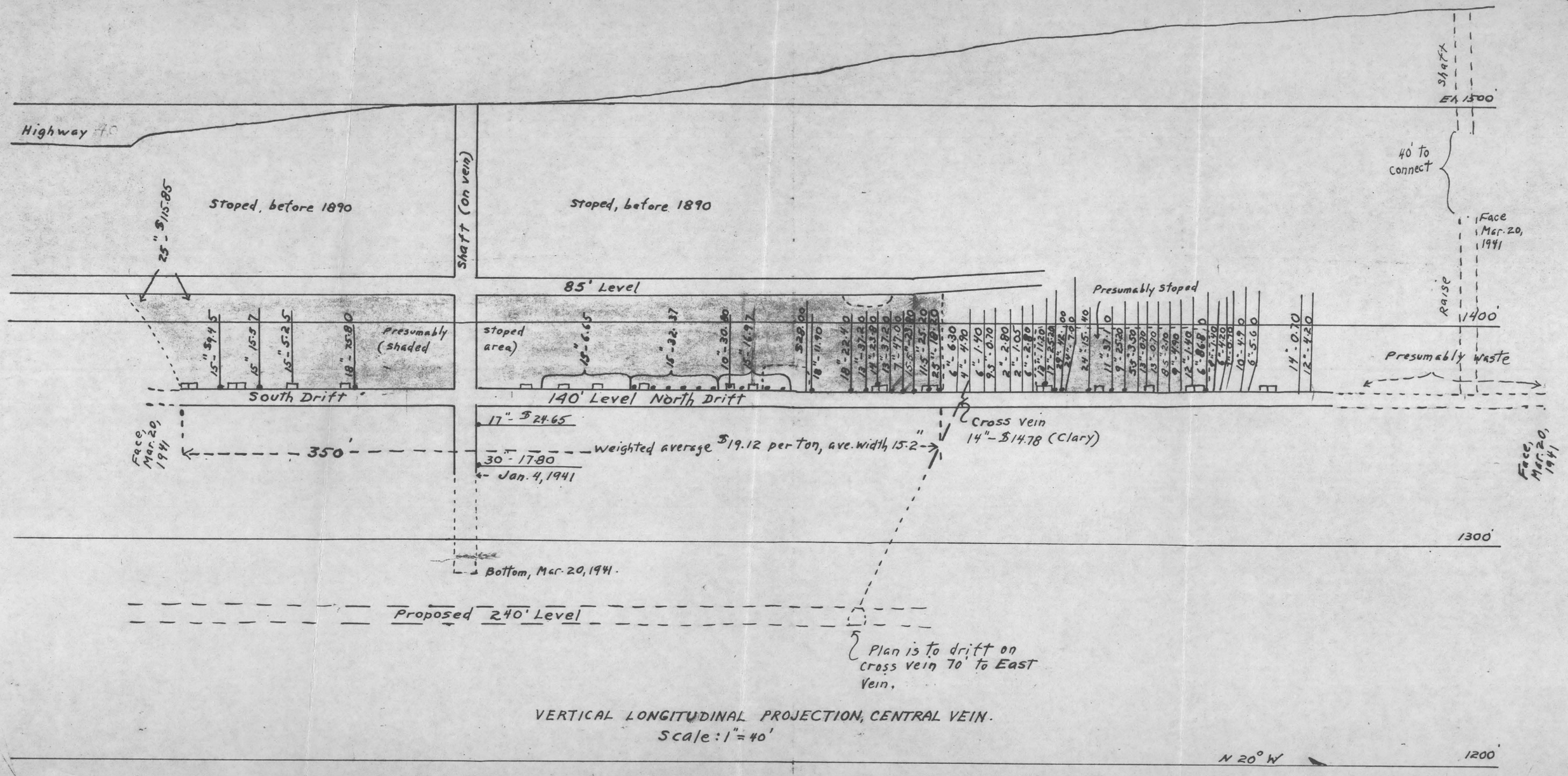

VERTICAL LONGITUDINAL PROJECTION, CENTRAL VEIN.
Scale: 1" = 40'

MINT RECEIPTS RE: HIGHWAY FORTY MINE.

LOT #1	April 29th, 1940	$704.21	
LOT #2	MAY 6th, 1940	$1125.50	
LOT #3	MAY 17th, 1940	712.02	
LOT #4	JUNE 5th, 1940	1237.42	
LOT #5	JUNE 14th, 1940	724.76	
LOT #6	JULY 3rd. 1940	1411.85	
LOT #7	JULY 12th, 1940	375.97	
LOT #8	JULY 24th, 1940	769.54	
LOT #9	AUG. 5th, 1940	818.70	
LOT #10	AUG. 16, 1940	$803.75	
LOT #11	AUG. 26, 1940	713.64	
LOT #12	SEPT. 5, 1940	888.14	
LOT #13	SEPT. 12, 1940	742.38	
LOT #14	SEPT. 24, 1940	554.02	
LOT #15	OCT. 3 1940	981.11	
LOT #16	OCT. 15, 1940	1268.96	
LOT #17	OCT. 24, 1940	767.02	
LOT #18	NOV. 4, 1940	1141.65	

MINT RECEIPTS RE: HIGHWAY FORTY MINE.

LOT #19	NOV. 14th, 1940.....	$1201.51
LOT #20	NOV. 22nd, 1940.....	691.64
LOT #21	DEC. 4th , 1940.....	398.07

WARD & WARD

Auburn, April 20, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	ozs.	value	ozs.	value	
				@ 77¢	
Conc.	7.40	215.25	6.15	4.25	
Ore	0.50	17.50	1.25	.95	
Tail	0.015	.42	.30	.23	

WARD & WARD

June 4th, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	Ozs.	Value	ozs.	Value	
				@77¢	
Concentrate #117	53.82	1883.70			
			22.28	17.15	
No, #12 Drift 194ft. 13"wide	0.92	32.20	3.88	2.98	
I am not satisfied with the results on #117 and will run it again tomorrow					

WARD & WARD

JUNE 6, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	ozs.	value	ozs.	value	
Heads #118	0.38	13.30	1.62	1.24	
Tails #119	0.005	.18	.20	0.15	
#117 Conc. 6/4		2184.70			

WARD & WARD

Auburn, June 7, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	Ozs.	Value	ozs.	Value	
Conc #120	1.52	53.20	16.88	12.99	
#14 No. Drift 200Ft. North 17"	1.20	42.00	3.00	2.31	

W. Thompkins, Assayer

WARD & WARD

Auburn , June 8, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	Ozs.	Value	ozs.	Value	
				at 77¢	
Sample #15 No. Drift 150 Ft. level 205' 22"	0.68	23.80	1.12	0.86	
Conc. #120 (Recut) float.	3.20	112.00	34.80	26.79	

WARD & WARD

Auburn, June 12, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	Ozs.	Value	ozs.	Value	
Sample #16 No. Drift 150' level 211' 24"	0.72	25.20	0.88	at 77¢ 0.68	

WARD & WARD

June 17, 1940

HIGHWAY 40 MINE Mr. Kangas

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	Ozs.	Value	ozs.	Value @ 77¢	
#17 No. Drift 217' North 19"	0.52	18.20	1.48	1.13	
#18 No. Stope #5 Chute 24" stope	0.88	30.80	2.12	1.63	

WARD & WARD

Auburn, June 21, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton ozs.	Gold Per Ton value	Silver Per Ton ozs.	Silver Per Ton value	Total Per Ton Value
Heads #121	0.64	22.40			
Tails #122	0.01	0.35			
Tails #123	0.01	0.35			

WARD & WARD

Auburn, April 30, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton ozs.	Gold Per Ton Value	Silver Per Ton ozs.	Silver Per Ton Value @ 77¢	Total Per Ton Value
Owens grab sampe	1.14	39.90	16.06	12.36	
Waste Dump	trace		0.80	0.62	

WARD & WARD

Auburn May 4, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	ozs.	value	ozs.	value	
Concs. float	4.90	172.55	33.92	@77¢ 26.11	

WARD & WARD

Auburn, May 18, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	ozs.	value	ozs.	value	
#8A North Drift 156' 31"	.80	28.00	4.40	@77¢ 3.38	

WARD & WARD

Auburn, May 21, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	Ozs.	Value	ozs.	Value @ 77¢	
Conc. Float	4.40	154.00	31.20	24.02	
Heads	0.52	18.20	2.28	1.75	
Tails	0.005	.17	0.49	0.37	

WARD & WARD

Auburn, May 31, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	Ozs.	Value	ozs.	Value	
			At	77¢	
#9 177' North Drift 18"	0.64	22.40	1.36	1.04	
#10 183' North Drift 13"	0.92	32.20	2.88	2.21	

H. R WARD , Assayer

WARD & WARD

Auburn, June 3, 1940

HIGHWAY 40 MINE

OWNER'S MARK	Gold Per Ton		Silver Per Ton		Total Per Ton Value
	Ozs.	Value	ozs.	Value	
#11 N. Drift 189' 13"	0.68	23.80	1.52	@ 77¢ 1.17	
#12 New Stope N. Drift vein 10" -15"	0.64	22.40	2.16	1.16	

NOTES ON HIGHWAY FORTY MINE, PLACER CO.,CALIF.

(Formerly Old Lawrence Mine).

1. Report by C.T.Palladine, Mining Engineer, August 8,1940.

Property and Location.- On west side of State Highway 40, one mile west of Newcastle, Placer Co., Calif.

59 acres, described by metes and bounds, in Section 24 and 25, Township 12 North, Range 7 East, Mt. Diablo Base and Meridian. Mine lies in the low rolling hills adjoining the Sacramento Valley; elev. 1000'. Pacific Gas & Electric power; mine equipped with a new line, current supplied at comparatovely low rates. Water also available from P.G.& E. ditches. Mine supplies at present part of water used for milling;supply will increase as workings extended.

General Geology.- Granodiorite mass, 18 miles N-S, 9 miles E-W (larger); Ophir district,and those being operated around Penryn in the Newcastle district,in which the Highway 40 mine is located,are along the eastern border of this mass,most of them not far from the amphibolite schist contact.

Veins.- Three closely-spaced veins (75-100' apart),almost parallel, traverse the property for 2500'. These strike about N20°W, dip 77°E. The Chicago is the principal vein; mine workings are on this. Dips almost vertically; ranges from a few inches to 16" in width,swelling and pinching,but averages 12-14" wide. 50' north of the shaft a 10" vein,striking N50°E crosses the Chicago.

Ore white quartz,gold and silver almost wholly in the pyrite and galena;minor sphalerite. (This may refer to the 10" vein, to the Chicago, or to all three or four veins on the property.Not clear whether the 10" vein is one of the three,but it is assumed not to be,since it strikes almost at right angles to the Chicago,and the 3 veins are said to be nearly parallel). The East vein is known in the district as the ~~Chicago~~ Elizabeth, center vein, as the Chicago, West vein as the Jennie Len. (No description of any but the Chicago and 10" veins).

Operations since the 1860's,first on oxidized ores. Nearby properties(south of Highway 40): Julian mine,mined to 900' depth; Auburn Chicago mine,mined down 700', $700,000 recovered in 5 years. In the Highway 40 mine, all ore above the 80'(85') level was mined and milled before 1890.

Development, Values.- The shaft,which is on the Chicago vein, now extends to about 10' below the 150' (140') level (now said to extend about 75' below the 140,or 20-25' above proposed 240' level). At the time of Palladine's report, 140' level N drift was in 256'(now much longer, see section), south drift 110' (about that now-125').

The 110' South drift,140' level.averages "about 14" wide, $18.69 per ton (gold @ $35/oz.,silver @ $0.77/oz.) The north drift,beyond the present stopes averages better than $20 per ton from progress samples taken during drifting. Vein at bottom of shsft assays $24.83 over 17". Stope samples run better than $20/ton,average width 13",

Available Ore.- (Not completely blocked). Estimated at about 1000 tons at $20/ton; mill heads will be lower because of "some dilution". I assume that this ore is above the 140' level; Palladine doesn't say where it is.

Mining and Milling Costs.-Granodiorite is hard,but extra cost of drilling compensated by lack of any need for timber except for chutes and shaft timbers. Mine makes about 250 gals./hr. Cost per ton of ore produced "have not exceeded $5.00 per ton for mining as per operation to date."

Mill flowsheet comprises crushing, ball mill, jigs and flotation. The jig concentrates are reground and amalgamated,this removing "a very large percentage of the gold". The jig tails and the flotation concentrate are shipped to the smelter. Cost of milling should not exceed $2.00/ton.

Operation.- Assumes mining cost $5.00/ton,milling $2.00/ton, "overhead,depreciation, amortization, obsolescence, " $4.00/ton. Including a ten% royalty on net smelter returns,net profit from operation $8.00/ton on the ore in place, assuming $20/ton ore and a metallurgical loss of 5%.

Recommendations.- Continue drifting north on 140' level;raise on ore;at 300' north of shaft raise to surface for ventilation. Sink shaft to 300' level. Drift north on 300' level, raise to connect with surface raise.

Conclusion.- Sufficient ore available,blocked and to be made available by development "to assist in the expenditures necessary for comtemplated improvements, equipment, and development of the property."

Present Operation.- For the past 5 months about 200 tons per month have been milled showing an operating profit of about $5.00/ton. This could be brought to $8.00 by installing new hoist and opening up and mining new ore, and increasing the mill capacity to 15 tons a day or 450 tons per month. This will reduce the cost per ton of ore mined and milled.

Partial list of equipment on hand.-

Equipment.	Cost new.		
25 ton ball mill, drive	$1565.00		
Classifier, drive	525.00		
Crusher, drive	575.00		
Feeder, drive	230.00		
Amalgamating barrel, drive	625.00		
Flotation cells, drive	1695.00		
	$5215.00	Less 20%:	$4172.00
Buildings	$1500.00	Concrete water tank, installation	$500.00
Excavation	500.00	Lumber	723.00
Power line(2485')	1200.00	Pipe,rails,mine and dump	500.00
Tailings dam	125.00	Hose, drill steel	350.00
Installation, operation,mill	1200.00	Cochise drill,steel	500.00
1 mid-pump	56.00	Small tools,retort,shop	150.00
Conveyor equip.	100.00	Headframe, bins	455.00
			$12,031.00

2. Letter, Cecil M. Clary to Harry M.Gardiser,465 California St.,S.F. March 20th,1941.

Progress Report,development work since incorporation.

N drift 487' long;at time of incorporation about 150' of this had been completed. At 450' raise with manway put in, now up 87';this designed to connect with shaft from surface, down 55'. 40' to connect. This will give ventilation and a second exit.

At 227' from the shaft in the north drift 14" cross vein encountered with gouge on e ach wall; it dips south, assays $14.78 (over the 14", presumably). Plan is to cut this vein on 250' level and drift along it to a vein parallel to the Chicago,70' to the east (evidently the Elizabeth vein, see Palladine report). The cross ,dipping south,will be nearer the shaft on the 250' level. 250' of backs will be available on the Cross and Elizabeth veins, on the 250' level.

The two compartment shaft has been continued (apparently since incorporation) from the 150' (140') level 80' to the 230' level. Contemplate sinking another 25'. In sinking,vein has decreased (sic) in width to as much as 44";values have likewise increased. Last assay,from bottom of shaft, $24.65 (17"). (Sample at bottom shown on section,170' below collar,reached Jan.4th, 1941, ran $17.80 over 30").

At date of writing were drifting south on 150' level,and had reached 145' from the shaft. Ore in stope face above drift assayed at date of writing $35.00-$115.65, over widths from 18"-24". Eliminating last 80' to the north, 140' level, all samples in the mine average $21.96. Proven ore shoot about 500' long;highest values in stope face above south drift. This shoot rakes to the south ; confident of high grade in south drift.

The 25 ton ball mill mills 21 dry tons in 24 hrs. 1496 tons milled "while doing development work" produced $20,697.02, mint and smelter returns ($18,041.86 in mint receipts, leaving $2655.16 in smelter returns, seems low). Says dilution was bad as they approached within 25' of the old workings (presumably meaning the 85' level) because due to oxidation the wall rock mixed with the ore.

Plan to sink shaft another 25';cost of sinking has been $25.00/ft. Then plan to drift north and south far enough to start stoping. Work up this time has been nearly all development, since they hadonly 45' of backs (140-85' level) for stoping,and 25' of this oxidized.

Ball mill, jigs,and Kraut cells work well, recovery exceeding 98%.

MEMORANDUM ON GOLD MINE, AUBURN DISTRICT, CALIFORNIA.

Introduction.- The writer has not visted this mine. This memorandum is an analysis of data submitted, consisting of a brief engineer's report, a letter from a part-owner, reporting development progress since the report was written, and a longitudinal projection of the principal vein, showing stoping and sampling. Low grade as well as high grade samples are shown; the report andletter appear conservatively written. The general suggestion to this writer is that of an honest presentation. This memorandum is based on the assumption that the data are reliable.

The sole object of the present report is to give a rough idea of the possible tonnage and operating profit to be expected if operations, now stopped, are resumed at the property. Return on investment, amortization etc. are not considered.

General Location, Property etc.-The property lies in the general vicinity of Auburn, Calif. It consists of about 60 acres. Power is in at the mine, and water available from the mine itself (about 250 gals. per hour and from public utility company ditches. There is a mill, 15-20 tons per day capacity, which has been operating until recently. Extraction is said to be over 95%.

General Geology.- The mine lies along the eastern border of a granodiorite mass,the veins being within the granodiorite,which contains several important mining districts as well. While no such proven vertical extent of ore exists as in Grass Valley to the north,a neighboring mine is said to have produced ore to a depth of 900',another to 700'. The outcrops of these two mines and that of the mine described apparently lie at about the same elevation.

Veins.-Three nearly parallel veins, striking N20°W and dipping 77° or more east, traverse the property for 2500';they are 75-100' apart. All known workings are on the central vein. This vein is narrow, averaging perhaps 15" wide, but seems persistent. It consists of white quartz with pyrite,galena and minor sphalerite. The pyrite and galena contain nearly all the gold and silver.

Production.-The central vein was first worked in the 1860s; the ground above the 85' level (see projection) was stoped prior to 1890. Amount of this early production is not stated. From April-December,1940, the mine produced $20,697.02 (mint and smelter returns) from 1496 tons of ore sent to the mill. Allowing for a 95% recovery,this gives an average grade for ore milled of $14.50 per ton. Apparently the mill averaged only 200 tons per mont during this period, lessthan half its rated capacity.

Mine Workings.- The shaft, of two compartments, is on the vein. Depth of shaft and length of drifts shown on the projection.

Stoped areas below the 85' level are shown on the projection. The areas total 19,620 square ft. Since tonnage produced from these stopes (neglecting that from drifting) totals 1496,

$$\text{width of vein} = \frac{1496 \times 12.5 \text{ (cu.ft.per ton)}}{19620} = .954' = 11.4".$$

Stated another way, the area shown stoped times the width of vein given, divided by the tonnage factor of 12.5 cu.ft. per ton, equals the total tonnage milled. This checks the data; more important, it shows that sorting was possible, because no stope could have been carried a foot wide. The clean quartz must have been picked from the granodiorite wall rock, either underground or on the surface or both.

Operations ceased, apparently, because shaft sinking and development of ore below the 140' level ceased. A small profit was made, at least at times, from the operation; but nothing was put into development toward the end of the period of production.

Possible Further Ore.- The letter claims an ore shoot (140' level) 500' long. This is possible, but no such length is exposed. Referring to the section, consistent ore assays stop at the north end of the main stope. I have averaged the samples south of this, and find that a shoot 350' long was developed by the 140' lev drift, averaging $19.12 per ton (gold at $35.00/oz.) with an average width of 15.2". Stoping had to cease to the south, I am told, to protect the highway, so that a southward extension of this ore stretch is indicated. It is not possible to estimate the extension, and I have allowed nothing for it.

All but about 400 tons of ore above the 140' level have been stoped. An extension of the shoot below the 140' level is likely. The letter states that the last assay from the bottom of the shaft ran $24.65; presumably this is the bottom shown on the projection, but another assay of $24.65 just below the 140' level casts some doubt on this. At any rate, a sample in the shaft 28' below the 140' level ran $17.80 per ton over 30", which is encouraging.

If the ore shoot continues with a length of 350', an average width of 1.25', ~~xxx xx xxxxxxx xxxxx xf~~ to the proposed 240' level, 3150 tons would exist between the 240 and 140' levels. This allows for no extension south of the south end of the 140' level. It is likely that the operating cost of mining and milling, on a basis of 450 tons milled per month, will not exceed $7.00 per ton. This ought to include the cost of sorting; it includes ordinary overhead, such as superintendent's salary, power etc. If the grade of this possible ore is the same as that on the 140' level, i.e. $19 per ton, then the net operating profit would be $12 per ton, and the total net profit from the block between the 240 and 140' levels would be $37,800. (Dilution would lower the grade but increase the tonnage total gold recovered would be about the same as with no dilution, but with somewhat higher cost).

Presumably mining beneath the highway, below the 140' level, would not affect the highway and would be permitted. A possible extension of the ore shoot to the south under the highway thus enters the possibilities Further, if the ore reaches the 240' level, it should go some distance, at least, lower. Hence, if the shaft were sunk 25' to that level, 350' of drifting done (or more) and ore found, a net profit of $50,000 would not be an unreasonable expectation from this extension of the main ore shoot.

A cross vein was cut in the north drift, 140' level (see projection) 14" wide and assaying $14.78. It is planned to drift on this vein about 70' east to reach the East vein, apparently virgin. Nothing whatever can be said about the chances for ore on the cross vein, or the East Vein. Exploring them sounds like good prospecting, at any rate.

Operating Cost of Doing Proposed Exploration.-

Sinking shaft (with sump) to 240' level,30'@ $35 per ft...	$1050
Drifting north and south, 140' level,350' @ $10 per ft....	$3500
Stope preparation,incidentals (guessed at).....	$1000
	$5550

Summary.- Disregarding the business set-up,assuming single ownership with no obligations, an investment of say $6000 offers what seems a reasonable chance of returning about $50,000, assuming the data correct, and assuming above all, careful, workmanlike operation. The more speculative chances, to the south on the central vein, those on the cross vein, East vein,West vein etc., can not be evaluated. The fact that these speculative chances seem to exist simply make a venture in this property more attractive.

Conclusion.- Provided a satisfactory business deal can be arranged, this property,on the strength of the data presented, seems to offer chances to make a small but rather profitable producer. Certainly the ultimate production,judging by the width of the veins,would not be over 50 tons a day,and no mill above this capacity should be considered.

San Francisco, Calif.
April 8th, 1941.

Edward Wisser
Mining Geologist.