

FILED
Date: 10-19-2010 By: JC
This survey consists of:
Map: ST. HWY
Narrative: 19-024
Corner Rpt: 8-46
DOUGLAS COUNTY
SURVEYOR

686+45.10 PS THROUGH 230+78.20 (EQUATION STATION 714+62.71 PT BK = 209+77.09 P.O.T. AH) CENTERLINE RESOLVE (SHEETS 18 THRU 21)

WITHIN ALIGNMENT 4 IN ALIGNMENT REPORT, PRIMARY MONUMENT LOCATIONS THROUGH THIS SECTION ARE LOCATED ALONG THE SPIRAL AT RECORD OFFSETS. THESE CANNOT BE CHECKED AGAINST RECORD DATA UNTIL THE SPIRAL IS CREATED; THE TANGENT BETWEEN STA 209+77.09 (EQUATION LOCATION) AND STA 230+78.20 P.S. WAS ESTABLISHED BY HOLDING RECORD DISTANCE OFF FOUND MONUMENT 1101 AND RECORD DISTANCE OFF FOUND MONUMENT 1068. THIS CALCULATED TANGENT OF 2101.19' WAS COMPARED TO RECORD OF 2101.11'. THIS DIFFERENCE IS ALSO SUBJECT TO CHANGE ONCE THE SPIRAL CURVE IS CREATED.

SPIRAL CURVE; P.S. STA 686+43.96 THROUGH P.T. STA 714+61.46 (EQUATION LOCATION); HOLDING BOTH TANGENTS CREATED ABOVE, THE RECORD DELTA COULD BE COMPARED, RECORD TD=92*42', CALCULATED TD= 92*42'15". THE SPIRAL CURVE WAS THEN PLACED OFF OF THE TANGENTS AND THE RECORD DATA COMPARED ON THE TANGENT LENGTHS. THE TANGENT WITH RECORD LENGTH OF 4134.56' RE-MEASURED AT 4135.70'. THIS LENGTH IS NOW LOCKED IN BETWEEN TWO SPIRALS THAT FIT TO FOUND MONUMENTATION. THE TANGENT WITH RECORD LENGTH OF 2101.11' RE-MEASURED AT 2101.19' (UNCHANGED). THE FOUND MONUMENTS IDENTIFIED ALONG THE SPIRAL ARE THEN REVIEWED TO PROVE THE CALCULATED CENTERLINE:

- MONUMENT 1105 THRU 1102: RECORD 131.76 FEET, CALCULATED 131.67 FEET
- MONUMENT 1105 TO CL: RECORD 64.97 FEET, CALCULATED 65.17 FEET
- MONUMENT 1102 TO CL: RECORD 66.79 FEET, CALCULATED 66.50 FEET
- MONUMENT 1106 THRU 1107: RECORD 105.52 FEET, CALCULATED 105.51 FEET
- MONUMENT 1106 TO CL: RECORD 52.50 FEET, CALCULATED 52.37 FEET
- MONUMENT 1107 TO CL: RECORD 53.02', CALCULATED 53.14 FEET
- MONUMENT 1069 13/32 1070: RECORD 138.77 FEET, CALCULATED 137.80 FEET
- MONUMENT 1069 TO CL: RECORD 63.46', CALCULATED 62.61 FEET
- MONUMENT 1070 TO CL: RECORD 75.31', CALCULATED 75.19 FEET
- MONUMENT 1068 TO CL: RECORD 75.28', CALCULATED 75.28 FEET

230+78.28 P.S. THROUGH 296+67.13 P.T. CENTERLINE RESOLVE (SHEETS 23 THRU 26)

WITHIN ALIGNMENT 4 IN .ALG REPORT PRIMARY MAPPING USED FOR THIS SEGMENT AND MONUMENTS FOUND AND HELD ARE IDENTIFIED ON CS 077-97, PREPARED BY OTAK INCORPORATED DATED 7/29/97. ALL MONUMENTS FOUND ARE SET 5/8" ALUMINUM ROD W/ 2" ALUMINUM CAP INSCRIBED WITH STATION AND OFFSET. ALL MONUMENTS CALLED FOR WERE LOCATED IN GOOD SHAPE. TWO MONUMENTS IN QUESTION ARE 1030 AT STA 287+82.64, (RECORD OFFSET 53.00 FEET MEASURED 43.93 FEET), AND 1051 AT STA 283+82.64, (RECORD OFFSET 59.00 FEET MEASURED 42.95 FEET). THE OPPOSING MONUMENT ACROSS THE ALIGNMENTS FROM THESE TWO MONUMENTS FELL WITHIN 0.10 FEET OF RECORD FROM CENTERLINE. THIS INDICATES THAT OVER THE LENGTH OF THIS SECTION COVERED BY CS 077-97, 16 MONUMENTS FELL WITHIN 0.10 FEET OF RECORD. CS 077-97 RECORD ALIGNMENT WAS THE SAME ALIGNMENT AS DEFINED ON ODOT 88-29-21 AND COULD THEN BE CALCULATED THROUGH ALL FOUND MONUMENTATION. A FINAL ALIGNMENT WAS RUN THROUGH THE RECORD 4 SPIRALS AND THIS SEGMENT WAS FOUND TO BE 6588.85 FEET, MATCHING RECORD LENGTH ENDING THIS SEGMENT AT STA 296+67.05.

NB STA 296+67.13 P.T. THROUGH 346+17.58 P.T. CENTERLINE RESOLVE (SHEETS 26 THRU 28)

WITHIN ALIGNMENT 4 & 5 IN .ALG REPORT THIS IS THE FINAL SEGMENT OF THE RESOLVE TO BE COMPLETED DUE TO THE TOTAL LACK OF MONUMENTATION BOTH ON CENTERLINE AND RIGHT-OF-WAY. TWO SPIRAL SEGMENTS ARE INCLUDED IN THIS PORTION OF RESOLVE AND THE RECORD DATA WAS HELD AND MOVED ONTO THE BACK TANGENT AT STATION 296+67.13 AND FIT TO THE TANGENT STATION 346+17.58. THE ADJUSTMENT MADE TO GET THE TWO TANGENTS TO NOT CHANGE IN LENGTH WAS TO ALTER THE ALIGNMENT SHIFT AT STATION 322+71.51. THE RECORD OFFSET IS 21' AND THE ALTERED OFFSET IS NOW 20.19'. CONFIRMATION OF THIS ALIGNMENT IS SHOWN AT THE ONLY MONUMENT FOUND ALONG THE RESOLVE AT STATION 332+38.16 PT TO FOUND MONUMENT 1111. THE RECORD OFFSET IS 30' AT THE PT AND THE FOUND MONUMENT FALLS 30.06' OFF CENTERLINE AT STATION 332+37.55, 0.61' OFF STATION.

NB 346+17.58 PT THROUGH NB 386+20.23 CENTERLINE RESOLVE (SHEETS 28 THRU 30)

WITHIN ALIGNMENT 5 IN .ALG REPORT USING THE FOUR CENTERLINE OFFSET FOUND MONUMENTS LOCATED (1110, 1113 THRU 1115), THE 1253.42 FOOT TANGENT WAS FIRST RESOLVED. THE LENGTH WAS ESTABLISHED TO BE 1253.26 FEET PRIOR TO THE CALCULATION OF THE SPIRAL CURVE BETWEEN STA 358+70.90 AND 370+50.48. THE SPIRAL AND TANGENT INFORMATION FROM NB STA 370+50.48 THROUGH NB STA 386+20.23 HAD TO BE ESTABLISHED USING THE RIGHT-OF-WAY FOUND MONUMENTS 1008 13/32 1010, FOUND MONUMENT 1039 (PER CS 038-2006) AND FOUND 1/4 CORNER SECTION 2 & 3, MONUMENT 1038. USING THESE FOUND MONUMENTS THE CALCULATED CS 038-2006 COULD BE ESTABLISHED. THE MONUMENTS FIT ALL RECORD DISTANCES AND WITH THIS RESOLUTION THE CENTERLINE PER THE CS 038-2006 COULD THEN BE PLACED IN THE DRAWING. AFTER THIS WAS RESOLVED THE RIGHT-OF-WAY OFFSETS COULD BE RESOLVED AND COMPARED TO ADDITION RIGHT-OF-WAY MONUMENTATION (1013, 1014) AND THE P.O.S.T. MONUMENT LOCATED AT STATION 375+55.85. THIS COMPARED TO BE WITHIN 0.13 FEET AT THE PI OF THE SPIRAL. THE FINAL TANGENT TO THE PS STATION 386+20.23 WAS ESTABLISHED BUT THE FINAL CALCULATED LENGTH WILL BE DETERMINED ONCE THE MULTI SPIRAL CALCULATIONS ARE COMPLETED IN THE NEXT SEGMENT.

NB 386+20.23 THROUGH END OF PROJECT (413+00) AND THROUGH TO NB 426+00 (SHEETS 30 THRU 33)

WITHIN ALIGNMENT 5 IN THE ALIGNMENT REPORT THIS SEGMENT IS CONFUSING AS THE MULTIPLE SPIRALS CHANGED SOME RECORD DATA. MONUMENTATION BEYOND THE END OF THE PROJECT (413+00) WAS LOCATED IN ORDER TO RESOLVE THE FINAL TANGENT SECTION OF THE CENTERLINE FROM STATION 421+52.45 THROUGH THE EQUATION (413+50.69 POT AH= 414+10.20 POT BK). FOUND MONUMENTS 1124, 1125, AND 1126 WERE HELD AT THE RECORD OFFSETS FROM CENTERLINE PER ODOT 88-29-21. HOLDING FOUND MONUMENT 1124 AT 100 FEET AND 1126 AT 250 FEET FROM CENTERLINE, THE RESULTING OFFSET TO 1125 CALCULATED AT 99.83 FEET AS COMPARED TO RECORD 100 FEET. USING THE NOW CALCULATED CENTERLINE AND RECORD OFFSETS PER ODOT 88-29-21, ADDITIONAL OFFSET COMPARISONS WERE THEN COMPLETED. FOR FOUND MONUMENT 1034, THE ANGLE POINT IN THE RIGHT-OF-WAY AT STATION 415+00 OF 220 FEET WAS CREATED, RIGHT-OF-WAY LINES COULD THEN BE DRAWN FROM THIS ANGLE POINT TO THE RECORD OFFSET LINE BETWEEN FOUND MONUMENTS 1125 AND 1124. THE RESULTING LINE PASSED THROUGH FOUND MONUMENT 1034 WITHIN 0.07'. THIS WAS ENOUGH TO VERIFY THE MONUMENTS AND CALCULATED CENTERLINE TANGENT WAS CORRECT. THE FOUND MONUMENTS 1124 & 1125 WERE DETERMINED TO BE AT THE CORRECT RECORD OFFSETS WITHIN 0.05' BUT IN CONCLUSION, FOUND MONUMENT 1125 IS AT STATION 416+99.27 (0.73 FEET OFF RECORD). THE PT OF THE SPIRAL AT STATION 412+52.45 WAS THEN CALCULATED FROM RECORD STATIONING OF 419+50 (OFFSET 250 FEET FROM FOUND MONUMENT 1126). THE ENTIRE TANGENT DISTANCE BETWEEN PT STATION 412+52.45 TO 426+00 (TAKING INTO ACCOUNT THE EQUATION STATION) BY RECORD IS 1407.76 FEET, THE MEASURED TANGENT PER RECORD MONUMENTS IS 1407.06 FEET, A DIFFERENCE OF 0.70 FEET AS INDICATED AT MONUMENT 1125. THIS ERROR WAS THROWN INTO THE END OF THE TANGENT AS IT IS BEYOND THE END OF THE PROJECT LIMITS AND WOULD NOT AFFECT THE SPIRAL TO BE CALCULATED OFF OF THE PT STATION 412+52.45. ANOTHER MONUMENT THAT PROVED THE TANGENT TO BE CORRECT WAS FOUND MONUMENT 1035, PER RECORD ODOT 88-29-21 THIS SET MONUMENT ALONG THE TANGENT AT 462.95 FEET 21.70 FEET OFF THE ALIGNMENT. THIS MEASURED BETWEEN THE NOW CALCULATED PT STATION 412+52.45 TO BE 463.78 FEET, A DIFFERENCE OF 0.83 FEET BUT DIRECTLY ON LINE WITH THE TANGENT. THIS FLOATING DIFFERENCE OF 0.83 & 0.70 FEET WILL BE EXPLAINED AT THE END OF THIS RESOLVE WITH THE FINAL CALCULATION OF THE MULTI SPIRAL CALCULATIONS.

SPIRAL CALCULATIONS STATIONS 386+20.23 THROUGH PT 412+52.45 (SHEETS 30 THRU 32)

THE SPIRAL DATA THROUGH THESE CURVES WERE HELD AS CLOSELY AS POSSIBLE TO RECORD. THE INFORMATION OF THESE WERE TO BE CALCULATED THROUGH A 375 FEET SPIRAL-437.22 FOOT CURVE-450 FOOT SPIRAL- 870 FOOT CURVE ENDING ON A 500 FOOT SPIRAL, WITH NO TANGENT LENGTH BETWEEN THE SPIRAL P.S.C. THE FIRST OF THE SPIRALS TO BE CALCULATED WAS FROM THE PT STATION 412+52.45 BACK STATION USING THE 500 FOOT SPIRAL AND THE 870 FOOT CURVE. THIS SPIRAL WAS CALCULATED FIRST, AS THE END OF THE 870 FOOT CURVE HAD TWO FOUND MONUMENTS (1011 & 1036) TO VERIFY THE CALCULATIONS AND RECORD DATA. THESE TWO MONUMENTS ARE SHOWN TO BE 21 FEET (1036) AND 48 FEET (1011) OFF THE PSC STATION 398+82.45. AS A RESULT, THE PREVIOUS TANGENT AND HOLDING THE RECORD CURVE DATA, THESE MONUMENTS MEASURED AT 21.13 FEET (1036) AND 47.79 FEET (1011). AS A SIDE BAR THE RECORD DISTANCE BETWEEN THESE MONUMENTS ARE 69.0 FEET AND THE FIELD INVERSE IS 68.92 FEET, 0.08 FEET OFF RECORD. THE SPIRAL AHEAD STATION FROM PS 386+20.23 WAS THEN CALCULATED THROUGH THE 375 FOOT SPIRAL, 437.22 FOOT CURVE AND THE 450 FOOT SPIRAL. THE PSC AT STATION 398+82.45 WAS COMPARED AGAINST THE SAME TWO FOUND MONUMENTS (1011 & 1036) AND MISSED THE PREVIOUSLY CALCULATED STATION PSC 398+82.45 BY 31.14 FEET. THIS INDICATED THERE IS A BUST IN SOME PART OF THE MULTI-SPIRAL RECORD INFORMATION. MULTIPLE VARIATIONS OF THESE SPIRAL AND CENTRAL CURVE CALCULATIONS WERE MADE, AND THE FINAL CONCLUSION WAS TO HOLD THE ENTIRE SPIRAL AND CENTRAL CURVE DATA. THIS WAS THE CENTRAL CURVE LENGTH BETWEEN STATIONS PSC 389+95.23 THROUGH PSC 394+32.45. THE RECORD CENTRAL CURVE LENGTH WAS 437.22 FEET, BUT THE FINAL LENGTH THAT WORKED IN THE CALCULATIONS RESULTED AT 422.72 FEET, A DIFFERENCE OF 14.50 FEET. AFTER CORRECTING THE CENTRAL CURVE BY THE 14.50', CHANGING THE CENTRAL ANGLE FROM 6*33'30" TO 6*20'27" AND HOLDING THE TANGENT CREATED AT 386+20.23, THE TWO CALCULATED SPIRAL TO CURVE LOCATIONS CONNECTED WITHIN 0.67 FEET AT STATION 398+82.45. TO MAKE THESE 5 SPIRAL PARTS MEET AND BE CONGRUENT, THE SPIRAL AND CURVE PORTION HAD TO BE MOVED TO MEET THE END OF THE 450 FOOT SPIRAL BY MOVING IT ALONG THE TANGENT, MOVING THE PT, AND SHORTING THE FINAL TANGENT LENGTH THE 0.70 FEET PREVIOUSLY MENTIONED. THE RESULTING OFFSETS TO THE FOUND MONUMENTATION 1036 IS 21.64 FEET (21' RECORD) AND 1036 IS 47.29 FEET (48' RECORD). THIS ALSO LENGTHENED THE INCOMING TANGENT AT STATION 386+20.23 FROM A TOTAL LENGTH OF 545.29 FEET TO 560.49 FEET; AGAIN THE 14.50 FEET TURNS UP. MULTIPLE VARIATIONS WERE TRIED TO MAKE ALL RECORD DATA WORK, BUT WITH THE FOUND MONUMENTATION ALONG THE CENTERLINE, AND NOW COMPARING THE RECORD OFFSETS TO THE RIGHT-OF-WAY LINE, THE FOUND MONUMENTATION WITHIN THIS SEGMENT HELD AND THE CONCLUSIONS MADE WERE DETERMINED TO BE FINAL. FOUND MONUMENT 1010, ON THE NORTHWESTERLY RIGHT-OF-WAY WAS 125.09 FEET OFF THE RECORD DISTANCE (125 FEET), BUT FELL THE AFOREMENTIONED 14.50' BACK STATION FROM THE NEWLY CALCULATED PS AT STATION 386+20.23; IT SUPPORTED THE 545.29' TANGENT. FOUND MONUMENT 1037 WAS HELD TO SUPPORT THE AHEAD TANGENT FROM PS 386+20.23, HOWEVER THE STATIONING WHICH RECORD INDICATED TO BE 392+04.01 WAS MEASURED AT 391+87.54, A DIFFERENCE OF 16.47'. THIS WAS HELD FOR DIRECTION BUT THE STATIONING COULD NOT BE CORRECTED TO MATCH RECORD. FOUND MONUMENT 1012 WAS LOCATED AT THE PT OF THE NOW 422.72' CURVE, RECORD OFFSET FROM CENTERLINE IS 210', MEASURED DISTANCE IS 209.76', 0.43' OFF STATION.

- AN EQUATION STATION WILL NEED TO BE CREATED AT THE POINT OF SPIRAL, END OF INITIAL TANGENT LENGTH OF 545.29 FEET, NOW 560.49 FEET. THIS EQUATION WILL BE 386+33.51 BK = 386+20.23 AH.
- ANOTHER EQUATION WILL NEED TO BE MADE AT THE END OF THE CENTRAL CURVE WHICH LENGTH CHANGED FROM 437.22 FEET TO 422.72 FEET. THIS EQUATION WILL BE 394+17.95 BK TO RECORD 394+32.45, THIS BRINGS THE STATIONING IN LINE WITH THE REMAINDER OF THE MONUMENTATION TO THE END OF THE PROJECT AND BEYOND TO THE LAST FOUND MONUMENT 1124.
- A RECORD EQUATION IS AT STA 414+10.20 = 413+50.69

THIS IS TO CERTIFY THAT THIS MAP WAS PREPARED USING HP DESIGNJET 1055CM, BLACK C4820d INK ON HP MATTE FILM *51642B.

REGISTERED PROFESSIONAL LAND SURVEYOR

David Evans

OREGON
JULY 11, 2006
JON KENNETH BROADWATER
61360LS
EXPIRES: 12/31/2011

DAVID EVANS AND ASSOCIATES INC.
530 CENTER STREET NE, SUITE 605
SALEM OREGON 97301
PHONE: 503.361.8635

FILE NAME: 16763RET.DGN

OREGON DEPARTMENT OF TRANSPORTATION
HORIZONTAL CONTROL, RECOVERY, AND RETRACEMENT SURVEY
I-5: JUMPOFF JOE-GLENDALE PAVING AND CLIMBING LANES
GLENDALE TO SUNNY VALLEY
JOSEPHINE AND DOUGLAS COUNTIES

ODOT REGION 3 WHITE CITY
100 ANTELOPE ROAD
WHITE CITY, OREGON 97503

SEPTEMBER 28, 2010
SCALE: NO SCALE
SHEET 5 OF 33

ST. HWY. I 5 -024 E.