Report on
Spectral IP/Resistivity Surveys
Opawica South Property – Matachewan Area
Ontario

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Maps

The results of the survey are presented as plan maps and stacked pseudosections at 1:2500. Plan maps include the survey grid, line and station numbers, posted values, a UTM grid (NAD83, Z17N), latitude and longitude co-ordinates and a base that shows drainage, claim boundaries and claim numbers from the claimap3 website of the Ministry of Northern Development and Mines (copyright Queen's Printer for Ontario). Plan map types are

Mx chargeability (n=2), colour + line contours
Apparent resistivity (n=2), colour + line contours
Compilation map

There is one set of plan maps for the North grid and a separate set for lines 0+15E / 0+16E.

Stacked pseudosections show colour + line contoured pseudosections of apparent resistivity, Mx chargeability and the spectral parameters MIP and tau. There is one stacked pseudosection for each of the 12 lines surveyed (0+05W to 0+14W on the North grid plus 0+15E and 0+16E).

Spectral IP/Resistivity Surveys
Opawica South Property, Matachewan Area, Ontario
Opawica Explorations Inc.

Spectral IP/resistivity surveys were done on the Opawica South property near Matachewan, Ontario. The work was done for Opawica Explorations Inc. by JVX Ltd. under JVX job numbers 7-69 and 7-75. Work under 7-69 was done on the North grid (lines 0+05W to 0+14W). 7-75 involved two lines (0+15E and 0+16E) in the eastern part of the property. The field work was done in the period August 21 to September 2, 2007. Total coverage was 10,450 m of which 7,375 m is from the North grid (7-69) and 3,075 m is from lines 0+15E and 0+16E (7-75).

The Opawica South property is immediately north of Northgate Minerals Young-Davidson property and the Young-Davidson mine (figure 1). The layout and local setting of the North grid and lines 0+15E / 0+16E are shown in figure 2.

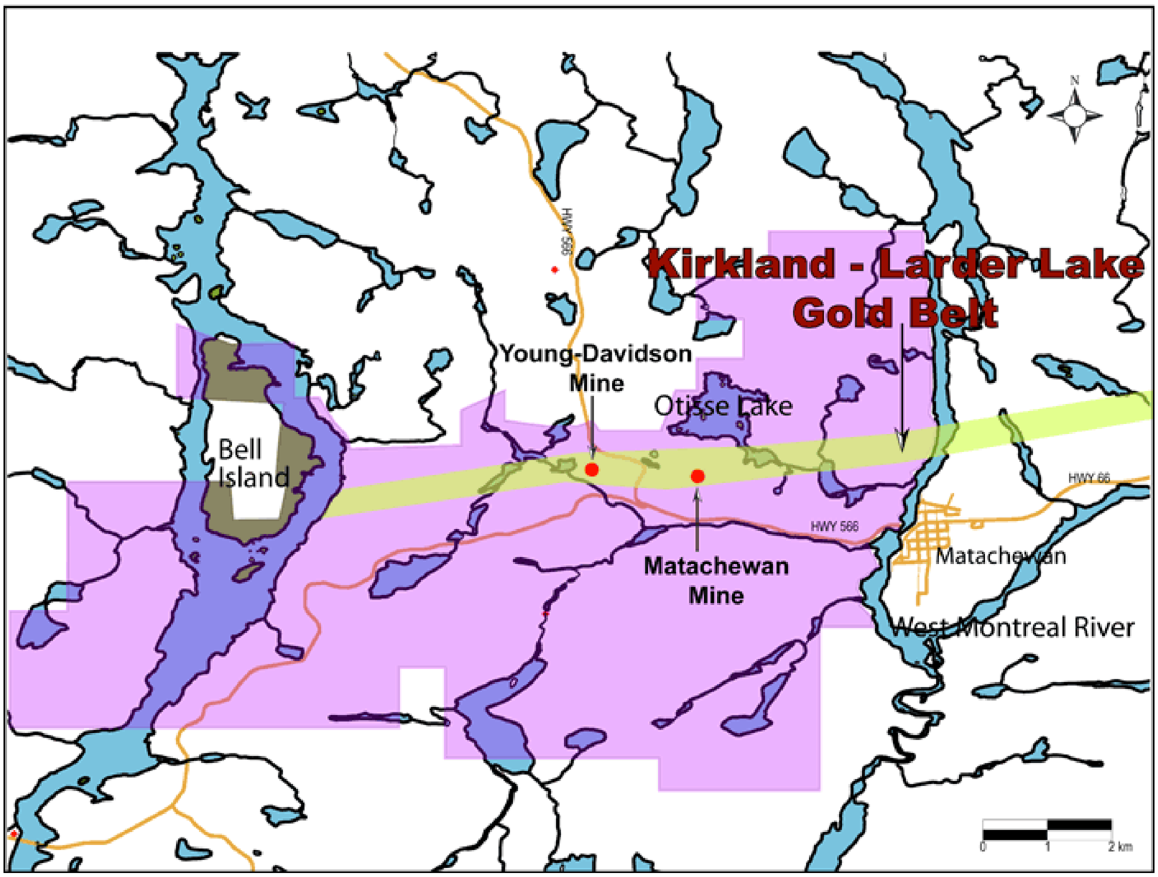

Figure 1. Young-Davidson Properties (from www.northgateminerals.com)

The North grid covers all or part of claims 374242, 374243, 387779, 387780 and 1206013. Lines 0+15E and 0+16E cover all or part of claims 511489, 511490, 531568, 531815 and 531816.

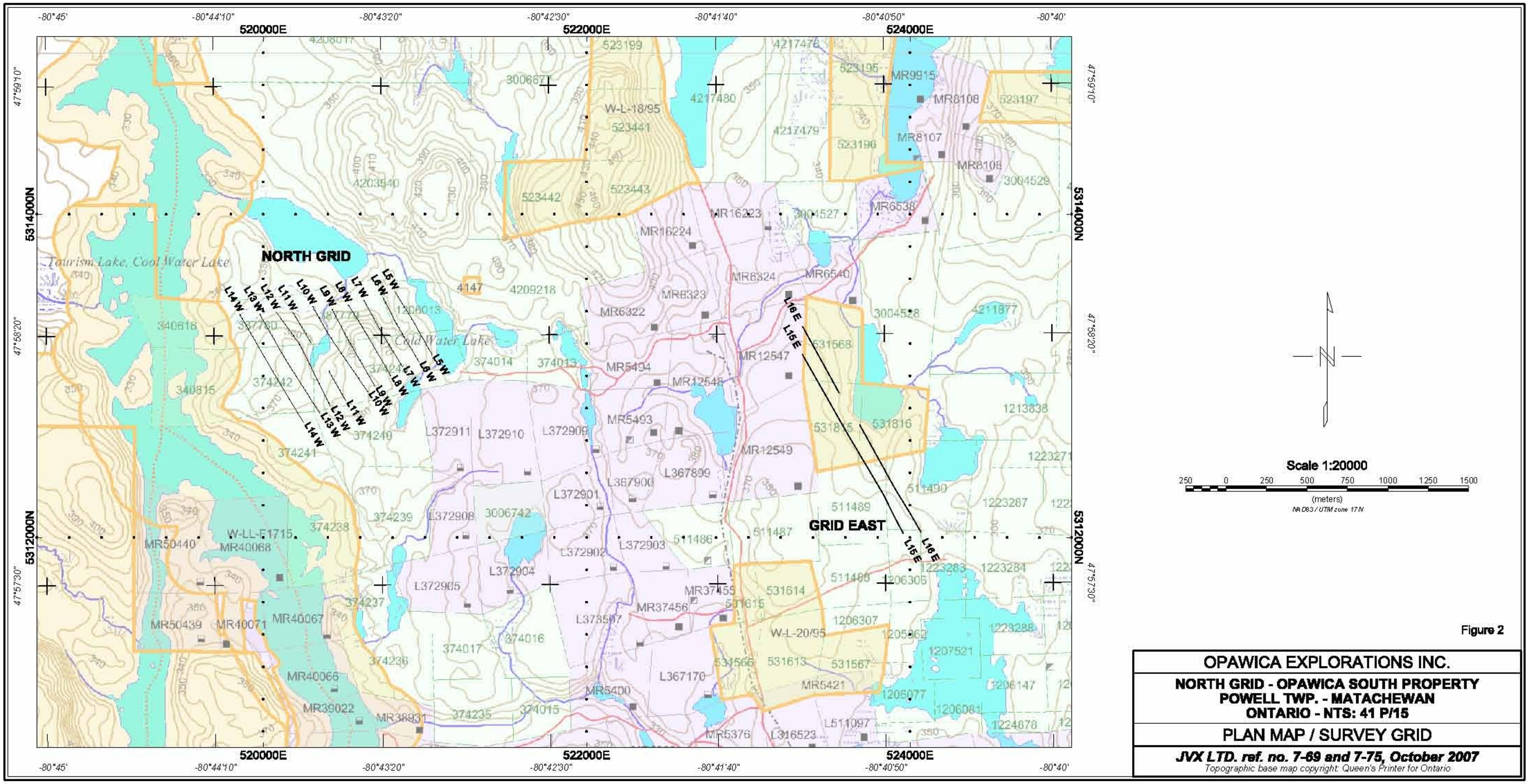

Figure 2: Plan Map – Survey Grid

The North grid is made up of 10 lines (0+05W to 0+14W) oriented 30° west of north. The survey was done in time domain with a pole-dipole array (‘a’ = 25 m, n=1,5/6). The results have been presented as stacked pseudosections and plan maps at 1:2500.

Production summaries, the survey grid, survey methods, operator notes, instrumentation, data processing, presentation and archives are described in Appendix 1. Appendix 2 contains the IP anomaly listings. A short note on IP anomaly forms and instrument specification sheets are attached. The results of the survey are discussed below.

1. Presentation

The results of the survey are presented as plan maps and stacked pseudosections at 1:2500. Plan maps include the survey grid, line and station numbers, posted values, a UTM grid (NAD83, Z17N), latitude and longitude co-ordinates and a base that shows drainage, claim boundaries and claim numbers from the claimap3 website of the Ministry of Northern Development and Mines (copyright Queen’s Printer for Ontario). Plan map types are

- Mx chargeability (n=2), colour + line contours
- Apparent resistivity (n=2), colour + line contours
- Compilation map

The plan map of Mx chargeability (n=2) for the North grid is reproduced below as figure 3. The plan map of Mx chargeability (n=2) for lines 0+15E and 0+16E is reproduced below as figure 4.

Stacked pseudosections show colour / line contoured pseudosections of apparent resistivity, Mx chargeability and the spectral parameters MIP and tau. There is one stacked pseudosection for each of the 12 lines surveyed (0+05W to 0+14W and 0+15E plus 0+16E).

Digital results (this report, raw and processed ASCII data files, Geosoft database and map and AutoCAD map or drawing files) are archived on CD.

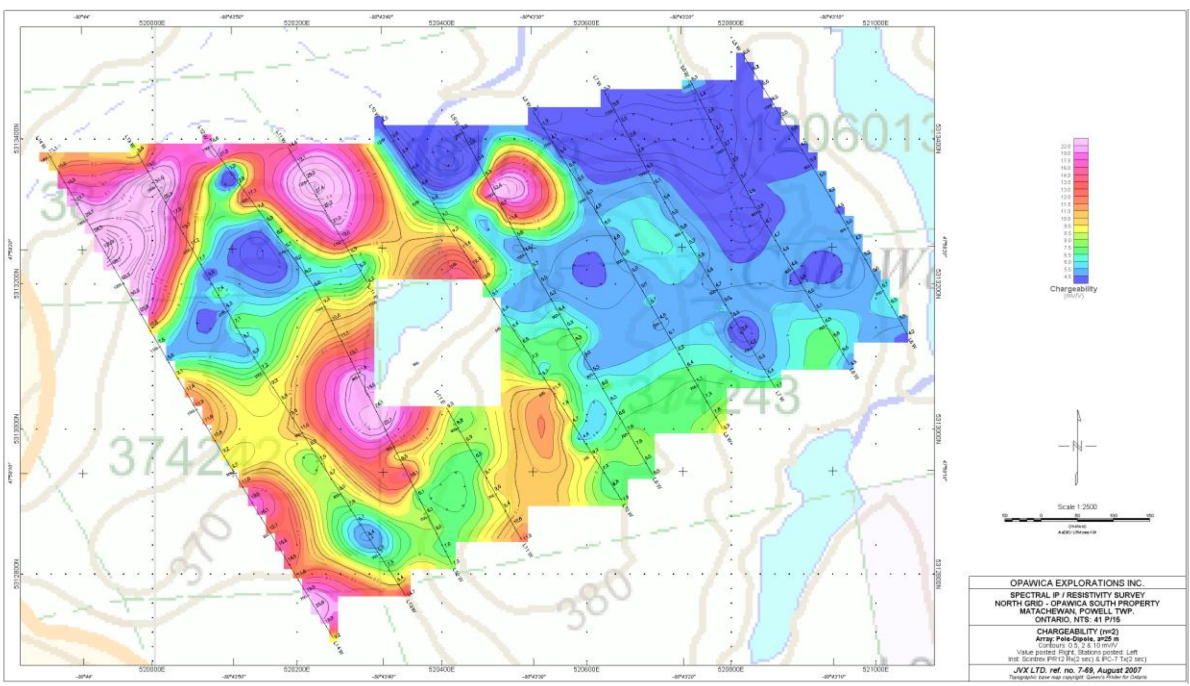

Figure 3. Mx chargeability, North Grid

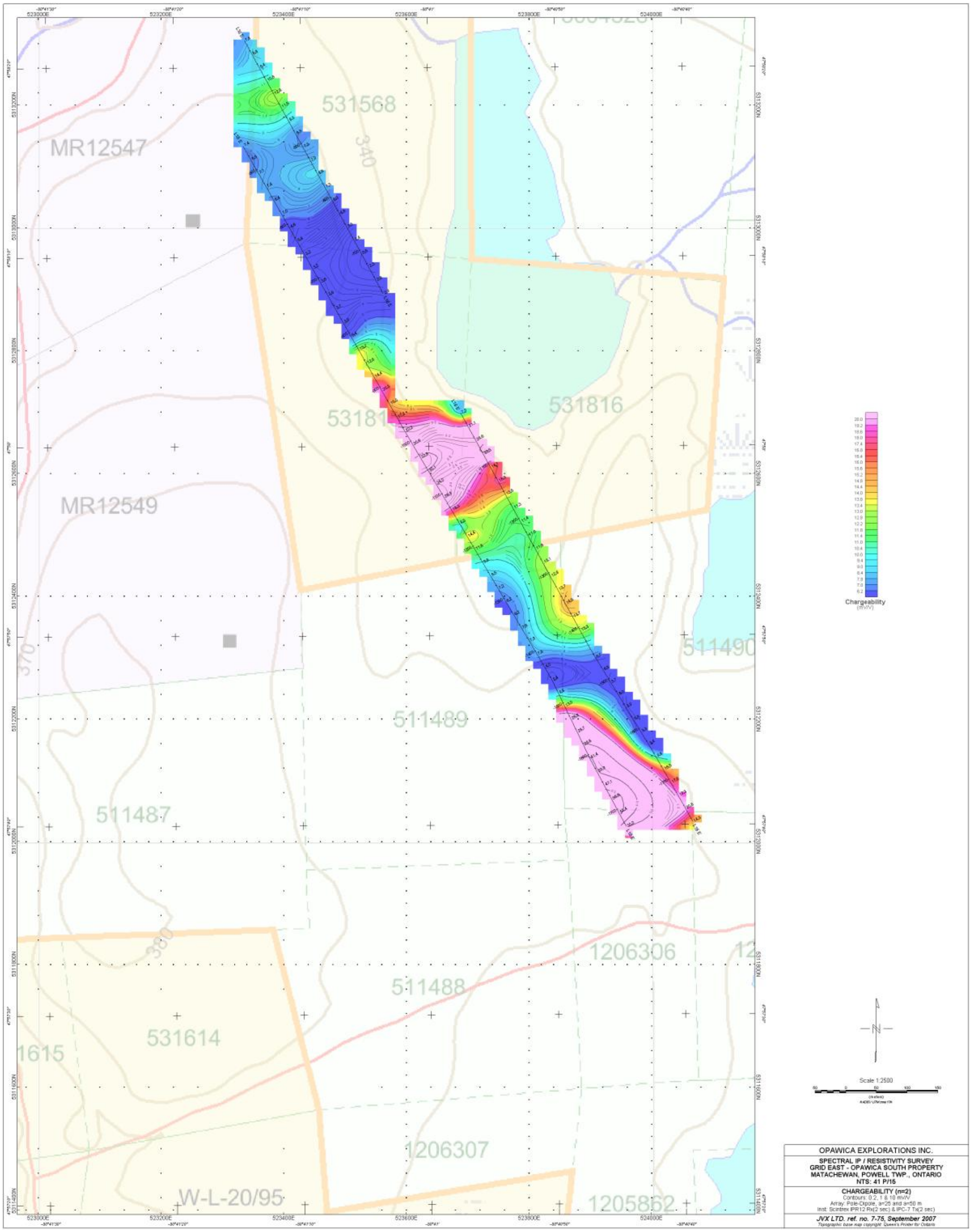

Figure 4. Mx chargeability. Lines 0+15E and 0+16E

2. Background

Reading from the history of the Young-Davidson mine at www.northgateminerals.com -

Prior to the consolidation of the property by Young-Davidson, various claims were held by a number of parties and in the 1930s through the early 1950s two separate mines were operated by Ventures Ltd. and Hollinger Mines, producing a total of almost one million ounces of gold from almost 10 million tonnes of ore. The underground ore bodies exploited by these historic operators had exceptionally low cost structures brought about by the low-cost bulk mining configuration of the ore, excellent ground conditions and high gold recoveries (93%) through a simple metallurgical process and environmentally benign waste rock and tailings.

Reading from April 3 and May 28, 2007 news releases at www.opawica.com –

Opawica Explorations Inc. has received regulatory consent and made the requisite payments pursuant to the acquisition agreements for Walker, Welsh and Stanwick properties located near Matachewan, Ontario and which are contiguous to the northern border of Northgate Minerals Corporations' Young-Davidson gold property.

As a result of recent surface trenching, sampling and the deep Titan geophysical survey, a drill program has been recommended on Opawica's Matachewan properties. A program of surface back-hoe stripping is in progress to evaluate the near surface Titan anomalies that will be followed by diamond drilling. It appears that the Camking Gold Zone and the Walker copper-gold zones have associated Titan anomalies.

The Walker Zone is a copper-gold-silver zone associated with quartz veining, pyrite and chalcopyrite mineralization in a syenite dike and Temiskaming sediments as a roof pendant over a strike length of 600 meters striking east-west. Shallow and deep Titan anomalies are associated with this zone over a strike length of 600 meters. The zone currently being explored is situated approximately 900 meters north of the Young Davidson gold zone currently being explored by Northgate.

3. Survey Results : General Comments

The mean of all 358 (North grid plus lines 0+15E and 0+16E) n=1 apparent resistivities is 9556 ohm.m. Range is 107 to 44,251 ohm.m. The distribution of these surficial apparent resistivities is shown in figure 5.

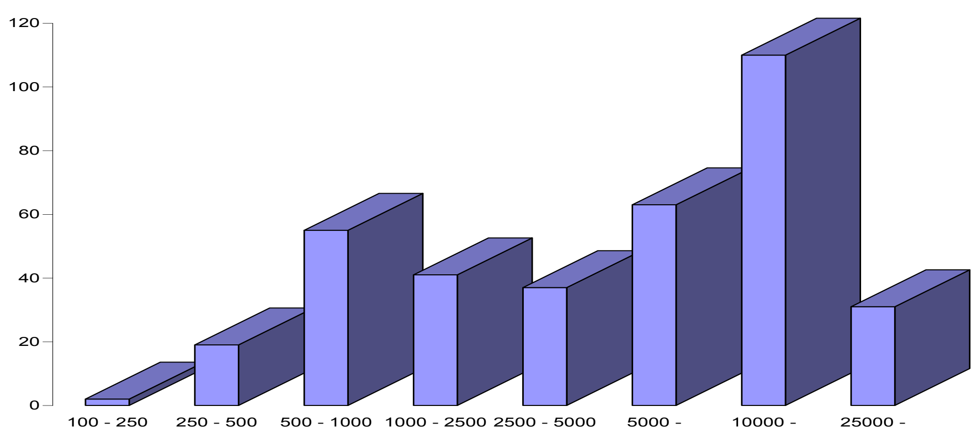

Figure 5. n=1 apparent resistivities

Only 21 of these readings are less than 500 ohm.m (appreciable thickness of conductive overburden). 96 or 27% are in the range of 500 to 2500 ohm.m (some thickness of moderately conductive overburden). 141 or 39% are more than 10,000 ohm.m (thin and resistive overburden, subcrop or outcrop).

Where the overburden resistivity is less than 2500 ohm.m, the amplitude of the IP anomalies from underlying chargeable bodies will be suppressed. As long as the overburden is thin (relative to the 'a' spacing), anomaly shape is unaffected. Areas with surficial resistivities of 2500 to 10,000 ohm.m may be of greater exploration interest. Access to bedrock is limited and the exploration record may be unfairly sparse but the overburden is not so thick or conductive that the IP survey is badly compromised.

Resistivities on the North grid show variations common to glaciated Archean terrain without large areas of thicker and more conductive overburden (swamps, topographic lows, lakes, river valleys). Overall resistivities on lines 0+15E and 0+16E are lower and access to bedrock is expected to be more difficult. The north end of both lines show unusually uniform low resistivities (all dipoles) of around 500 ohm.m. At times, resistivities decrease with depth. These features suggest very thick overburden (200 m ?).

Three erratic Mx readings have been dummied out. The mean of the remaining 1964 Mx chargeability readings is 10.6 mV/V – a moderate to high average value. Range is 0.1 to 120.9. 23 % are less than 5 mV/V. 37 % are in the range of 5 to 10 mV/V (possible weak IP anomaly), 29 % are in the range of 10 to 20 mV/V (possible moderate IP anomaly) and 11 % are more than 20 mV/V (possible strong IP anomaly). 20 Mx values are more than 40 mV/V.

Of the 1967 IP decays (North grid and lines 0+15E, 0+16E), 96.4 % were judged to be of sufficient amplitude and quality to yield spectral parameters. Under ideal conditions, 90 % acceptance is possible. 80 % is a good performance number for most surveys in a glaciated Archean terrain. The numbers achieved in this survey are excellent.

4. IP Anomalies

The IP/resistivity pseudosections are reviewed. IP anomalies that are thought to represent a discrete body of chargeable material are identified. The location and extent of the anomaly centre-top, IP anomaly amplitude, dipole number of the centre–top, spectral IP features and the resistivity setting and expression are taken from the stacked pseudosections. IP anomalies are classed as weak, moderate or strong. The results are tabled in appendix 2.

All IP anomalies with consistent amplitudes of at least 5 mV/V are picked. Locations are stations of the nearest potential electrode and therefore 6.25 m ('a' = 25 m) north (North grid) or south (lines 0+15E and 0+16E) of the pseudosection plot point.

A total of 79 IP anomalies have been picked. They have been ranked as weak (40), moderate (23) and strong (16). This is a generous number of moderate and strong IP anomalies.

19 of the IP anomalies show a coincident resistivity high. 14 show a coincident resistivity low (possible bedrock conductor). Two of these resistivity lows + chargeability highs at the north end of line 0+14W are the strongest candidates for bedrock conductors. Most of the IP anomalies (64) have centre tops in the first dipole. The pseudosection plot point depth for the first dipole is 19 m.

5. Compilation Map

Selected features have been extracted from the pseudosections and plan maps and drafted onto compilation maps. Features shown are

- IP anomalies. Tops of chargeable bodies as picked on the pseudosections. Shown as an orange bar parallel to and above the survey line. Bar thickness is an indicator of anomaly strength. Symbols are

  Strong, Mx ≥ 20 mV/V
  Moderate, 10 ≤ Mx < 20 mV/V
  Weak, Mx < 10 mV/V

  The length of IP anomaly symbols is an integral multiple of the dipole spacing.

- Attached to the IP anomaly symbol are an anomaly identifier, the MIP peak value (mV/V), the spectral time constant range as Short, Medium or Mixed and Long, and the 'n' value that best characterizes the top of the IP anomaly.

- Surficial resistivity lows. These represent overburden conditions. Classification is based on the value of the apparent resistivity in the first dipole. Shown as a bar under the survey line with bar symbols

  $\rho_a \leq 500$ ohm.m
  $500 < \rho_a < 2500$ ohm.m

- Possible bedrock conductors. Resistivity anomalies (lows) of appropriate shape with a coincident chargeability high. Shown as a black bar under the survey line with bar symbol

- IP zones. Two or more IP anomalies on neighbouring lines connected into zones. Isolated IP anomalies or near-neighbours of uncertain connection are not shown as part of an IP zone.

- IP anomalies (or anomaly sets) of interest. Circled.

6. Discussion

Based solely on the survey results, the best IP targets may be defined by a clear and well formed IP anomaly made up of strong Mx and MIP chargeabilities in the first dipole. For examination by backhoe stripping, moderate to high n=1 resistivities are best (more than 5000 ohm.m).

Very high n=1 resistivities (> 20,000 ohm.m) suggest outcrop and earlier examination. They also mean little overburden masking and the largest possible anomaly amplitude.

Low n=1 resistivities with no indication of a bedrock conductor may indicate some thickness of conductive overburden. The IP target may be better than it looks – overburden masking has suppressed IP amplitudes. But the target is probably out or reach from backhoe stripping. Low n=1 resistivities with a low resistivity expression of or near the IP anomaly may indicate a coincident or nearby bedrock conductor. The target may be a candidate for backhoe stripping.

In all cases, IP anomaly forms are consistent with chargeable bodies that are tabular with a dip that is within ± 45° of vertical. Dip or even dip sense must be presumed to be unknown. As in any profile IP survey, dip must be taken from the geology or other geophysical methods. When these sources are unavailable or ambiguous and where backhoe stripping fails to explain the target, allowance may have to be made for drill testing from both sides of the target.

North Grid

Moderate (Mx 10 to 20 mV/V) and strong (Mx more than 20 mV/V) IP anomalies with centre tops in the first dipole are listed below (table 1). Shown are the line, anomaly identifier, station, Mx peak value (n=1 dipole), class, apparent resistivity (n=1 dipole) and resistivity expression of the IP anomaly. Station is the station of the nearest P1 electrode and 6.25 m north of the pseudosection plot point. Rho is the resistivity expression of the IP anomaly. Low may suggest a coincident or nearby conductor although the interpretation is often ambiguous. There are 13 IP anomalies in this class of which 6 are rated as moderate and 7 as strong.

Line	ID	Station	Mx	C	n=1 resistivity	rho
0+10W	D	10+00N – 10+25N	10.3 – 12.1	M	7022 – 8274	low
0+11W	F	11+25N – 12+50N	18.6 – 30.9	S	1375 – 17591	low
0+12W	C	8+50N – 9+00N	16.1 – 27.9	S	4250 – 10811	low
	F	12+25N	16.2	M	14205	low
	G	13+00N – 13+25N	17.1 – 18.6	M	5029	low
0+13W	J	13+25N	28.9	S	5646	-
0+14W	A	6+75N - 7+00N	18.7 – 25.4	S	7382 – 12764	low
	C	8+00N – 8+25N	14.7 – 18.3	M	9760 – 9851	low
	D	8+75N	17.2	M	10049	-
	E	10+00N – 10+50N	11.1 – 13.6	M	20324 – 33922	high
	F	11+75N – 12+25N	21.9 – 33.1	S	8503 – 12983	low
	G	12+50N – 13+00N	37.1 – 69.9	S	177 – 733	low
	H	13+25N – 13+50N	18.4 – 36.0	S	107 – 1901	low

Table 1. Moderate to Strong IP anomalies (centre tops in the first dipole)

All of the moderate to strong shallow IP anomalies are in the western part of the grid. The strongest IP zone trends east/west in the northern part of the grid (lines 0+11W to 0+14W, stations 11+25N to 13+25N). This feature holds the highest n=1 chargeabilities and the lowest n=1 resistivities. Bedrock conductors are probable.

Six of the seven strong IP anomalies listed above are associated with local resistivity lows (possible or probable bedrock conductor). Overall absolute n=1 resistivities remain moderate to high in most cases however and these are candidates for backhoe stripping. Only 2 have low to very low n=1 resistivities and these values are probably due to bedrock conductors.

Five of the 7 strong IP anomalies from table 1 are highlighted below. They are F on 0+11W, C on 0+12W and F/G/H on 0+14W.

Line 0+11W. IP anomaly F. 11+25N to 12+50N. Figure 6

This wide zone is probably made up of at least 2 IP targets. Centre tops are at 11+50N (n=1 Mx 24.3, resistivity 6552) and 12+00N (n=1 Mx 30.9, resistivity 1375). Based on the simple concepts used here, 11+50N is the better candidate for backhoe stripping. If the low n=1 resistivity at 12+00N is due to a bedrock conductor, this becomes the better candidate.

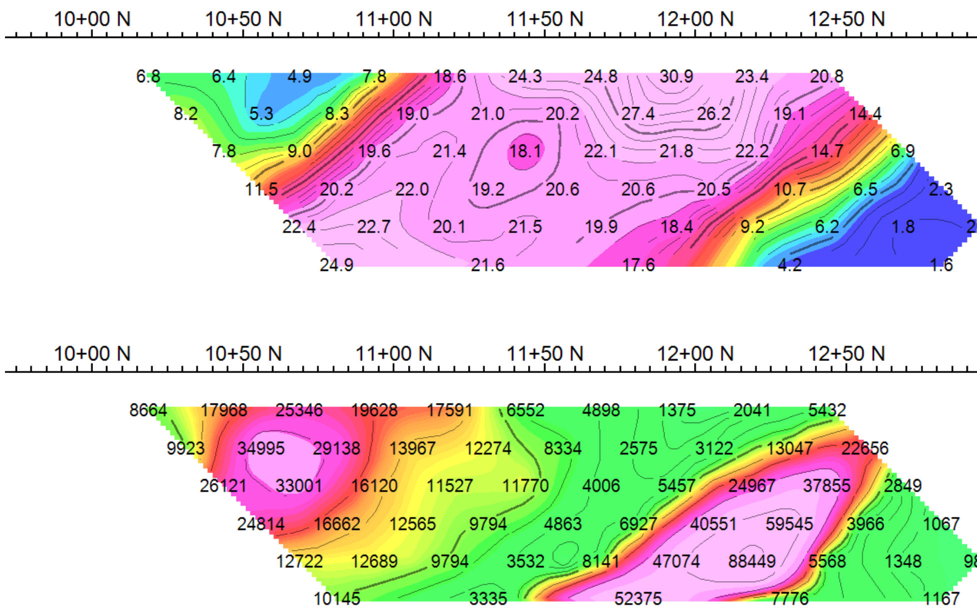

Figure 6. Mx chargeability and apparent resistivity. Line 0+11W

Line 0+12W. IP anomaly C. 8+50N to 9+00N. Figure 7

There are two places over this target where backhoe stripping might be used. Centre tops are at 8+50N (n=1 Mx 27.9, resistivity 4250) and 9+00N (n=1 Mx 23.4, resistivity 10611). Anomaly shapes suggest both targets are part of the same 50 m wide chargeable and weakly conductive zone.

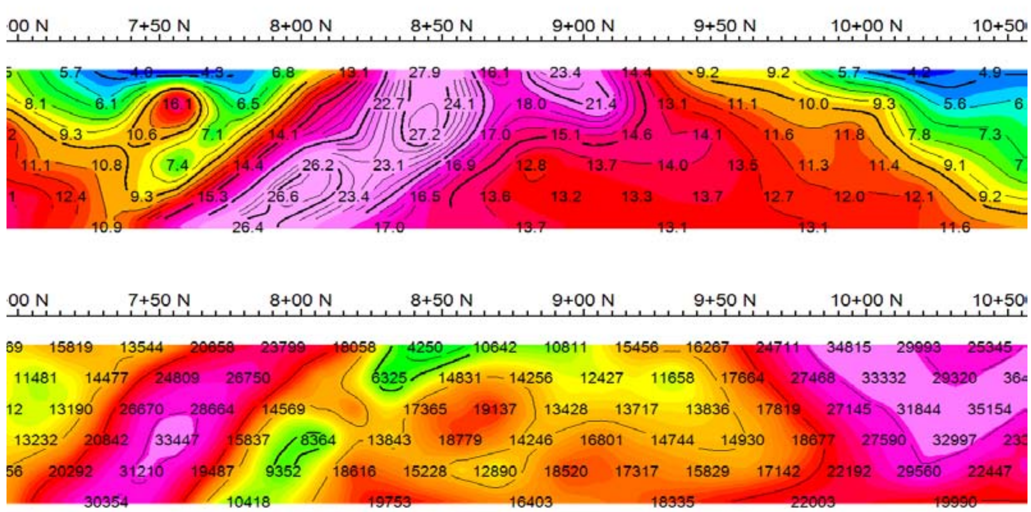

Figure 7. Mx chargeability and apparent resistivity. Line 0+12W

Line 0+14W. IP anomalies F, G and H. 11+75N to 13+50N. Figure 8

Probable conductors have centre tops at 12+75N and 13+50N. Possible IP targets are at 12+00N (n=1 Mx 33.1, resistivity 8503), 12+75N (n=1 Mx 69.9, resistivity 177) and 13+25N (n=1 Mx 36.0, resistivity 1901). The second target offers the best evidence for a bedrock conductor. The offset between the chargeability peak and the presumed bedrock conductor at the third target is unexplained.

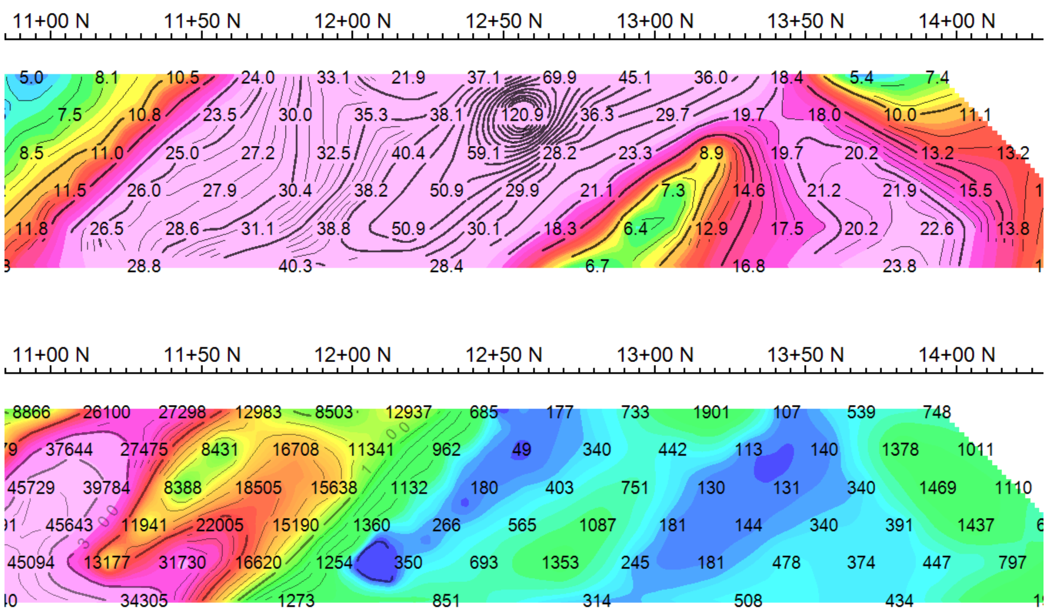

Figure 8. Mx chargeability and apparent resistivity. Line 0+14W

Lines 0+15E and 0+16E

The IP results on these 2 lines are dominated by strong IP zones at the south end and in the middle (9+00S to 11+00S) of both lines. By an easy margin, the strongest IP anomaly is at the south end of line 0+15E.

Moderate (Mx 10 to 20 mV/V) and strong (Mx more than 20 mV/V) IP anomalies with centre tops in the first dipole are listed below (table 2). There are 8 strong and 4 moderate IP anomalies of this type. Of the 8 strong IP anomalies, 4 are associated with a resistivity high, 2 are associated with a resistivity low and 2 have no clear resistivity expression. Moderate to high n=1 resistivities over many of the 8 strong IP anomalies support backhoe stripping.

Six of the 8 strong IP targets are highlighted below. They are A, B and C on line 0+15E and G, H and J on line 0+15E.

Line	ID	Station	Mx	C	n=1 resistivity	rho
0+15E	A	17+25S – 16+50S	28.3 – 51.5	S	7396 – 12342	-
	B	16+00S	34.6	S	3797	low
	C	15+75S – 15+25S	30.5 – 32.6	S	3204 – 5647	-
	G	11+25S	18.4	S	1962	high
	H	10+75S – 10+25S	18.5 – 29.5	S	427 – 2603	low

	J	9+50S – 8+75S	19.7 – 24.0	S	1458 – 4089	high
	K	8+50S	14.5	M	935	-
0+16E	A	18+75S	21.5	S	18203	high
	B	17+75S – 17+50S	18.9 – 19.7	M	8806 – 12788	high
	C	17+00S	16.6	M	6038	-
	D	14+00S – 13+00S	10.8 – 12.7	M	452 – 1018	-
	G	11+00S – 10+50S	22.2 – 27.9	S	1429 – 2030	high

Table 2. Moderate to Strong IP anomalies (centre tops in the first dipole)

Line 0+15E. IP anomalies A, B and C. 17+25S to 15+25S. Figure 9

The best points to test this wide and strong IP zone are at 17+00S to 16+75S (n=1 Mx 51.3/51.5, resistivtiy 7396/8436), at 16+00S (n=1 Mx 34.6, resistivity 3797) and 15+50S (n=1 Mx 30.5, resistivity 5647). Lower chargeabilities and resistivities at depth under the first target are unexplained. The second target is associated with a resistivity low (possible bedrock conductor). The third target is associated with a resistivity high.

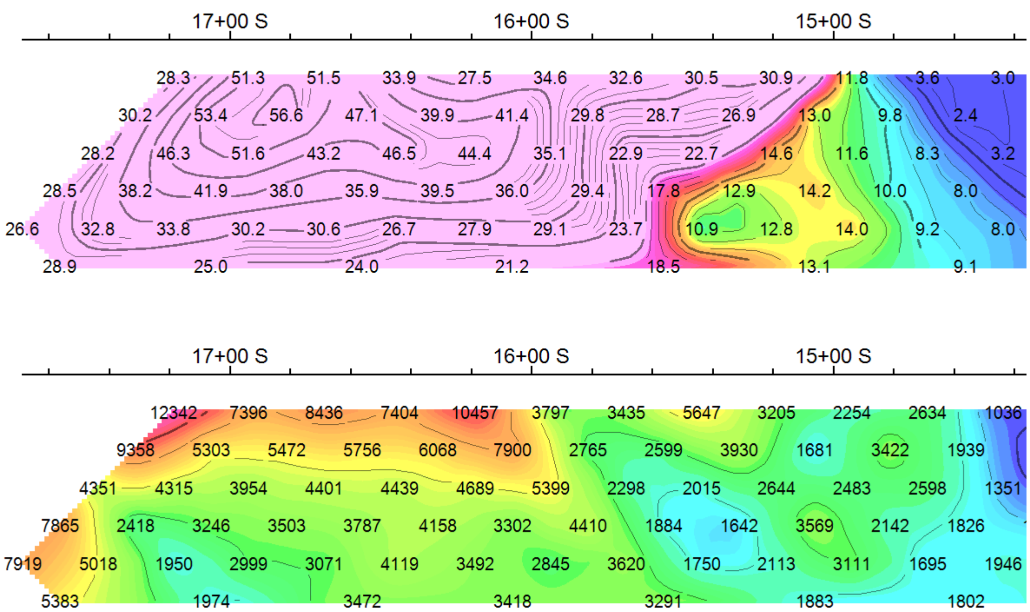

Figure 9. Mx chargeability and apparent resistivity. Line 0+15E

Line 0+15E. IP anomalies G, H and J. 11+25S to 8+75S. Figure 10

The best points to test this wide IP zone are at 11+25S (n=1 Mx 18.4, resistivity 1962), 10+50S to 10+75S(n=1 Mx 29.5/26.3, resistivity 815/427) and 9+25S (n=1 Mx 19.7, resistivity 3512). The centre top of the first target may be in the second dipole (plot point depth 31 m) and therefore less attractive for backhoe stripping. The first and third targets are associated with resistivity highs. The second is associated with a resistivity low. Lower chargeabilities and resistivities at depth under the third target are unexplained and reduce value.

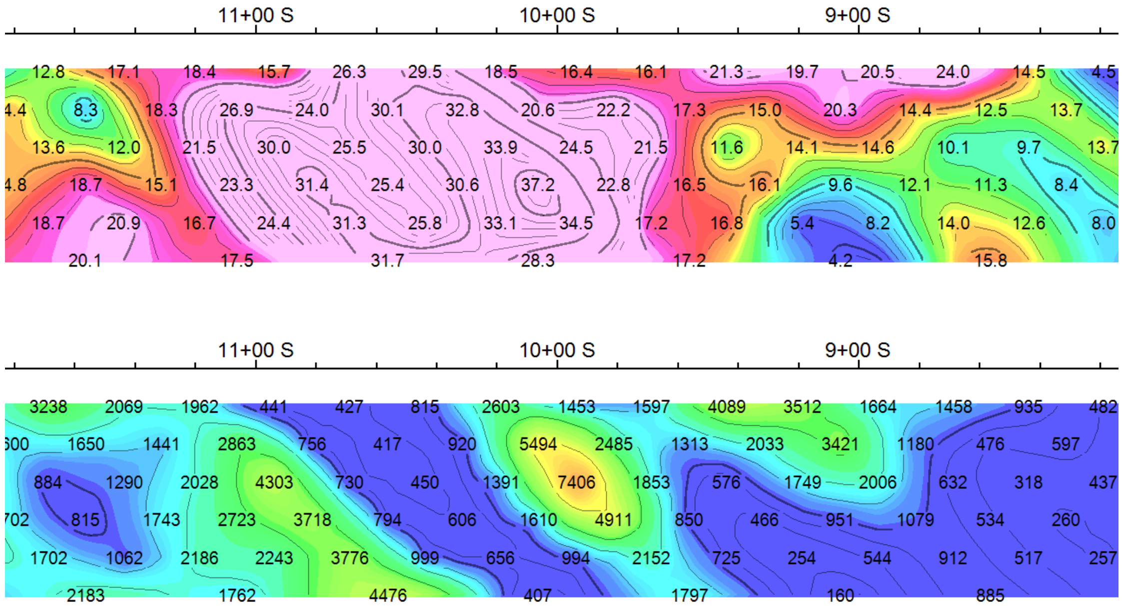

Figure 10. Mx chargeability and apparent resistivity. Line 0+15E

7. Conclusions

A total of 79 IP anomalies have been picked. They have been ranked as weak (40), moderate (23) and strong (16). Of the 15 strong IP anomalies with centre tops in the first dipole, 5 on the North grid and 6 on lines 0+15E/0+16E have been highlighted. 7 of these 11 highlighted IP targets have an associated local resistivity low that may imply a coincident or nearby bedrock conductor. Moderate to high absolute resistivities over many of these targets support backhoe stripping. Low absolute resistivities in other cases may be explained by strong shallow bedrock conductors.

Ian Johnson Ph.D., P.Eng. Blaine Webster, B.Sc., P. Geo.
October 3, 2007

Certificate of Qualifications

Blaine Webster
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I, Blaine Webster, B. Sc., P. Geo., do hereby certify that

1. I graduated with a Bachelor of Science degree in Geophysics from the University of British Columbia in 1970.

2. I am a member of the Association of Professional Geoscientists of Ontario.

3. I have worked as a geophysicist for a total of 36 years since my graduation from university and have been involved in minerals exploration for base, precious and noble metals and uranium throughout much of the world.

4. I am partly responsible for the overall preparation of this report. Most of the technical information in this report is derived from geophysical surveys conducted by JVX Ltd. for Opawica Explorations Inc. and information provided by Opawica Explorations Inc.

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Blaine Webster, B. Sc., P. Geo.

Certificate of Qualifications

Ian Johnson
R R 2 Aylmer, Ontario N5H 2R2
Tel : (519) 773-2932 Email : ianjohnson@auracom.com

I, Ian Johnson, Ph. D., P. Eng., do hereby certify that

1. I graduated with a Bachelor of Science degree in Geophysics from the University of Western Ontario in 1968 and a Doctorate degree in Geophysics from the University of British Columbia in 1972.

2. I am a member of the Association of Professional Engineers of Ontario.

3. I have worked as a geophysicist for a total of 31 years since my graduation from university and have been involved in minerals exploration for base, precious and noble metals and uranium throughout North America and South America.

4. I am partly responsible for the overall preparation of this report. Most of the technical information in this report is derived from geophysical surveys conducted by JVX Ltd. for Opawica Explorations Inc. and information provided by Opawica Explorations Inc.

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Ian Johnson, Ph. D., P. Eng.

Appendix 1
Survey, Data Processing, Presentation and Archives

Spectral IP/resistivity surveys were done on the Opawica South property near Matachewan, Ontario. The work was done for Opawica Explorations Inc. by JVX Ltd. under JVX job numbers 7-69 and 7-75. Work under 7-69 was done on the North grid (lines 0+05W to 0+14W). 7-75 involved two lines (0+15E and 0+16E) in the eastern part of the property. The field work was done in the period August 21 to September 2, 2007.

Survey were done with a pole-dipole array with ‘a’ = 25 m, n=1,5/6. Total coverage was 10,450 m (table 1) of which 7,375 m is from 7-69 and 3,075 m is from 7-75. Coverage is measured from the station of the first current electrode to the station of the last potential electrode (ideal grid).

Line	IP-From	IP-To	Separation	Date	Job Number
0+05W	6+00N	12+00N	600	August 28, 2007	7-69
0+06W	6+00N	12+25N	625	August 28, 2007	7-69
0+07W	6+00N	12+50N	650	August 27, 2007	7-69
0+08W	6+00N	12+75N	675	August 26, 2007	7-69
0+09W	6+00N	13+25N	725	August 26, 2007	7-69
0+10W	6+00N	13+50N	750	August 24, 2007	7-69
0+11W	6+00N	9+50N	350	August 24, 2007	7-69
	10+00N	13+75N	375	August 25, 2007	7-69
0+12W	6+00N	14+25N	825	August 23, 2007	7-69
0+13W	6+00N	14+75N	875	August 21/22/23, 2007	7-69
0+14W	6+00N	15+25N	925	August 21, 2007	7-69
0+15E	4+25S	18+50S	1425	September 1, 2007	7-75
0+16E	2+75S	8+75S	600	August 30, 2007	7-75
	9+75S	20+25S	1050	September 2, 2007	7-75
		Total	**10,450 m**		

Table 1. Production Summary

Grid

The North grid (7-69) is made up of 10 traverse lines at 100 m numbered 0+5W to 0+14W. Nominal line orientation is 30° west of north. Lines 0+15E and 0+16E are in the eastern part of the property. The property is northwest of the Young-Davidson mine and west northwest of Matachewan, Ontario.

Selected grid points were surveyed by JVX with a Garmin Etrex Legend GPS receiver. This unit is equipped with WAAS – Wide Area Augmentation System. At any control point, readings were averaged until convergence for an x/y accuracy of around ± 5 m, better in open ground. Coordinates (NAD83, Z17N) of many of these points are listed in table 2.

Line	Station	UTM e	UTM n	elevation
0+05W	6+00N	521059	5313103	348
	8+75N	520924	5313343	368
	12+00N	520753	5313617	385

Line	Station	UTM e	UTM n	elevation
0+06W	6+00N	520978	5313064	374
	9+25N	520826	5313319	350
	12+25N	520689	5313587	385
0+07W	6+00N	520876	5313032	425
	9+25N	520720	5313291	364
	12+50N	520567	5313569	389
0+08W	6+00N	520804	5312973	389
	9+75N	520614	5313299	395
	12+75N	520467	5313531	348
0+09W	6+00N	520706	5312912	376
	9+75N	520527	5313220	385
	13+25N	520374	5313513	393
0+10W	6+00N	520666	5312874	429
	10+25N	520407	5313252	355
	13+50N	520250	5313528	370
0+11W	6+00N	520527	5312818	390
	9+50N	520344	5313139	391
	10+00N	520312	5313177	351
	13+75N	520129	5313487	338
0+12W	6+00N	520429	5312783	379
	10+25N	520226	5313193	430
	14+25N	520016	5313480	339
0+13W	6+00N	520367	5312743	382
	10+25N	520140	5313099	418
	14+75N	519920	5313484	344
0+14W	6+00N	520266	5312685	380
	10+25N	520048	5313048	372
	15+25N	519795	5313485	381
0+15E	4+25S	523318	5313161	326
	10+00S	523607	5312652	352
	14+50S	523835	5312268	379
0+16E	3+00S	523333	5313310	387
	9+00S	523619	5312790	370
	9+75S	523673	5312726	
	14+50S	523905	5312305	335

Table 2. GPS Control Points.

Personnel

Rob St. Michel, senior geophysical operator from JVX acted as party chief. He was responsible for all technical aspects of the field survey. Helpers included Dean McNichol, Todd Huard, Sonny Pomerleau, Scott Friedrich and Devon Bellefeuille. Data processing and plotting was handled Lily Manoukian at the JVX office in Richmond Hill, Ontario.

Surveys

Readings are taken at the pickets. Chainage or picketing errors, if present, are noted. The IP/resistivity survey was done in time domain with a Scintrex IPR12 receiver. A 2 second current pulse was used. The pole dipole array with ‘a’ = 25 m, n=1,5/6 was used on all lines.

Alternating between 5 and 6 dipoles yields marked improvements in productivity with a marginal loss of information.

The shape of IP anomalies in pole-dipole surveys depends on the orientation of the array and the current – potential electrode orientation is fixed for any survey grid or grid section. The current electrode was always grid south of the potential electrodes for the North grid and north of the potential electrodes for lines 0+15E and 0+16E.

Operator Notes

Picketing was off by 25 m on lines 0+15E and 0+16E. This is based on pickets on the southern extensions of these two lines. Station 10+00S for example, should read 9+75S. Raw field data station labels should be corrected by subtracting 25. The correction has been made for processed data and final maps.

Line 0+05W
Line 0+06W
Line 0+07W
    6+50N reads 6+75N, all pickets off by 25 m
    pickets back on track at 9+75N
    swamp, 10+65N to 11+75N
Line 0+08W
Line 0+09W
    cedar swamp, 12+00N to 13+25N
Line 0+10W
    cedar swamp, 11+90N to 13+10N
Line 0+11W
    swamp, 9+50N to 10+50N
    cedar swamp starts 13+00N
Line 0+12W
    wet spot, 13+50N to 14+15N
Line 0+13W
    wet spot, 6+75N to 8+00N
    line bends 75 m west at 6+75N
    pickets are off by 25 m from 7+75N to 8+75N
Line 0+14W

Line 0+15E
    road at 16+00S
Line 0+16E
    road at 15+60S

Instrumentation

Scintrex IPR12 time domain receiver.

For each potential electrode pair, the IPR12 measures the primary voltage (Vp) and the ratio of secondary to primary voltages (Vs/Vp) at 11 points on the IP decay (2 second current pulse). These 11 points (slices or windows) are labeled M4 to M14. There is the option for an additional user defined slice (Mx). Units of measurement are millivolts for Vp and milliVolts/Volt (mV/V) for M4 to M14 and Mx. Time settings are

Vp : 200 to 1600 msec

M4 centered at 60 msec (50 to 70)
M5 centered at 90 msec (70 to 110)
M6 centered at 130 msec (110 to 150)
M7 centered at 190 msec (150 to 230)
M8 centered at 270 msec (230 to 310)
M9 centered at 380 msec (310 to 450)
M10 centered at 520 msec (450 to 590)
M11 centered at 705 msec (590 to 820)
M12 centered at 935 msec (820 to 1050)
M13 centered at 1230 msec (1050 to 1410)
M14 centered at 1590 msec (1410 to 1770)
Mx centered at 870 msec (690 to 1050)

The apparent resistivity is calculated from Vp, the transmitted current and the appropriate geometric or K factors. M4 to M14 define the IP decay curve. The M12 or Mx slice is commonly presented in contoured pseudosections.

JVX has chosen the above settings for Mx in order to better reflect an IP measurement from the older Scintrex IPR11 time domain receiver. In IPR11 surveys from the 1980s, this chargeability window was most often plotted and experience gained is based in part on this measurement.

The IPR12 also calculates the theoretical decay that best fits the measured decay. The theoretical decay is based on the Cole-Cole impedance model developed for applied geophysical surveys in the 1970s. The fit is based on a set of theoretical master curves with restrictions that limit the value of the calculation. JVX uses a different method to calculate impedance parameters (see below).

Scintrex IPC7 2.5 kW / TSQ3 3 kW time domain transmitters

These transmitters are powered by an 8 or 10 hp motor generator and produce a commutated square wave current output with current on times of 2, 4, 8, or 16 seconds. A 2 second current pulse was used (base frequency of .125 Hz). Output current is stabilized to within ±0.1% for up to 50% external load or ± 10% input voltage variations. Voltage, current and circuit resistance are displayed in analog and digital form.

Data Processing and Presentation

Grid

GPS control points are taken into a Geosoft database (normally called gps.gdb). UTM coordinates of line / stations in other databases (IP/resistivity, magnetics, etc.) are taken from gps.gdb using a lookup procedure. Values for intermediate stations are interpolated or extrapolated. Where there are less than 2 GPS control points on any survey line, synthetic control points are added.

On the North grid, occasional picketing errors were noted in the field but ignored during routine advances of the IP array. On lines 0+15E and 0+16E, all stations were adjusted for picketing errors by subtracting 25 m during processing.

Base Map

A topographic base map has been downloaded from the claimap3 website of the Ontario Ministry of Northern Development and Mines. These maps show drainage, elevation contours, claim boundaries and claim numbers. See www.mndm.gov.on.ca/

mndm/mines/lands/claimap3/. Copyright Queen's Printer for Ontario. Unless otherwise noted, registration is based on the NAD83 (WGS84) datum.

IP/Resistivity

At the end of every survey day, the IP/resistivity data are dumped from the IPR12 to a PC. Output is an ASCII *.dmp file with the date as the file name. Raw data from each survey line are collected in an ASCII *.i12 file with the line number as the file name. The data are checked for quality and quantity. The data are archived for transfer to JVX Ltd. in Toronto.

Office data processing is based largely on Geosoft Oasis Montaj v6.3 (see www.geosoft.com). Impedance modelling software (see below) is based on a suite of programs developed by JVX for the IPR12. The compilation map is prepared using AutoCAD drafting software (see www.autodesk.com).

Data in the *.i12 files are taken into a Geosoft database and are merged with the position data in gps.gdb. The IP decays are analysed for spectral content (see below). Stacked pseudosections and plan maps of the n=2 Mx chargeability and apparent resistivity are prepared with Oasis montaj. Random gridding is used in all cases.

Pseudosections assume an ideal survey line. Plan maps show the true grid layout (GPS surveyed), station numbers, posted values and line + colour contours. Plan maps of n=2 chargeability and apparent resistivity show tick marks at n=2 plot points.

Erratic Mx chargeability values may be removed after preview of the stacked pseudosections. In such cases, the Mx value is dummied out in the database. M4 to M14 are retained however and the offending Mx value may be estimated by interpolation.

Colour contour intervals are decided by an equal area distribution of all of the chargeability or apparent resistivity readings. These colour contour intervals are then applied to all pseudosections. They may or may not be used for the n=2 Mx plan map.

Impedance Modelling

The Cole-Cole impedance model was developed in the 1970s after it became clear that chargeability is a complex property that includes amplitude, grain size and grain size uniformity. In this model, the low frequency electrical impedance $Z(\omega)$ of rocks and soils is defined by 4 parameters. They are

r_0 : DC resistivity in ohm.m
m : true chargeability amplitude in V/V (also called MIP)
τ : tau - time constant in seconds
c : exponent

The form of the model is

$$Z(\omega) = r_0 \{1 - m [1 - (1+(i\omega\tau)^c)^{-1}]\} \text{ ohm.m}$$

where ω is the angular frequency ($2\pi f$).

The true chargeability (m or MIP) is a better measure of the volume percent electronic conductors (some metallic sulphides, magnetite, graphite). The time constant is a measure of the square of the average grain size. The exponent is a measure of the uniformity of the grain size. Common or possible ranges are 0 to 1 (m), .01 to 100 seconds (tau) and .1 to .5 (c).

In time domain IP surveys, impedance model parameters may be estimated using a best fit between theoretical and measured decays. The simplest approach (and the one used here) is to use a set of master decay curves, pre-calculated for selected values of time constant and exponent. For a 2 second current pulse, the master curve set is for time constant values of .01, .03, .1, .3, 1, 3, 10, 30 and 100 seconds and exponent values of 0.1, 0.2, 0.3, 0.4 and 0.5. This gives a total of 45 master curves.

The spectral analysis program operates on decays exported from the Geosoft database. Output from the spectral analysis program are two text files : one that contains the spectral parameters (.sip extension) and a report (.rpt extension). The report file shows the total number of decays, the number that have returned spectral parameters and the number of negative and bipolar decays. It also shows the c / tau distribution of all spectral parameters.

All decays that give an RMS fit between measured and master decay of less than 5% yield spectral parameters. Spectral parameters are taken from decays that are all negative and give an RMS fit of better than 5 %. In this case, the true chargeability is negative. Bipolar decays are not analyzed for spectral content.

Under ideal conditions, more than 90 % of the IP decays in any survey are of sufficient amplitude and quality to yield spectral parameters. 80 % is probably average for most surveys. The most common reason for the lack of spectral parameters is very low decay amplitudes – often seen in areas of thick and/or conductive overburden. Instrumentation and/or noise problems can occur over long sections of outcrop or at an abrupt boundary between outcrop and conductive ground.

Pseudosections

The pseudosections are plotted using standard depth and position conventions. The plot position for any measured quantity for the n^{th} potential dipole pair is (n+½)a/2 m forward of and below the current electrode. Pole-dipole anomaly shapes depend on array orientation. The array sketch shown with each pseudosection shows the correct array orientation.

These plot forms have been found to give a reasonable image of target-top location, width and depth where 1) the anomalously chargeable and/or resistive body is an isolated, tabular body with a dip that is within ± 45° of vertical), 2) where background chargeabilities and resistivities (overburden and host rock) are uniform and 3) where the terrain is relatively flat. They are more difficult to interpret for irregular or nearby chargeable bodies and where there is any amount of conductive cover or topographic relief. Forward or inverse modelling may be useful in such cases.

For Mx, MIP and apparent resistivity, colour contour intervals in the pseudosections are taken from equal area distribution for the whole grid. Colour assignments for the spectral 'tau' are fixed.

Archives

The results of the survey are archived on CD. Included on the CD is the Oasis Montaj viewer. File types include

ASCII *.dmp – original instrument dumps
ASCII *.i12 – IPR12 collated raw data dumps
ASCII *.sip, *.rpt – spectral analysis results
*.gdb - Geosoft databases
*.map – Geosoft format maps included with this report
MS WORD *.doc – report
Image files*.jpg - figures in the report

Appendix 2
IP Anomaly Listings

IP anomalies are manually picked from pseudosections of Mx chargeability. The spectral IP amplitude may be used when the Mx anomaly is confused or poorly defined. Overlying resistivities and any coincident resistivity expression of the IP anomaly are taken from the pseudosection of apparent resistivity. The spectral time constant and MIP amplitude are added.

IP anomaly characteristics are

1. ID : anomaly identifier
2. Centre-Top : centre-top of the IP anomaly and best estimate for location of the centre-top of the chargeable body.
3. Mx : peak Mx chargeabilities at and near centre-top, mV/V
4. C : classification by Mx peak amplitudes – w or weak (Mx ≤ 10 mV/V), M or Moderate (10 < Mx ≤ 20 mV/V) and S or Strong (Mx > 20 mV/V).
5. n : dipole number of IP anomaly top
6. MIP : peak spectral chargeability amplitude at anomaly centre-top, mV/V
7. TC : spectral time constant range as S or Short (0.01 to 0.1 sec.), M or Moderate or Mixed and L or Long (10 to 100 sec.).
8. Rho1 : n=1 apparent resistivity at or over IP anomaly centre-top, ohm.m.
9. Resis. : coincident relative resistivity anomaly (if any)

A blank entry means the results were incomplete, inconclusive or unavailable. A question mark means the quantity is uncertain or the anomaly is at the end of line and not fully defined. The centre-top location is the station of the nearest P1 potential electrode and therefore 6.25 m (‘a’ = 25 m) or 12.5 m (‘a’ = 50 m) from the standard pole-dipole plot point.

Line	ID	Centre-Top	Mx	C	n	MIP	TC	Rho1	Resis
0+05W	A	6+75N	5.8	w	1	80	S	5003	-
	B	7+25N – 7+50N	5.9	w	3	150	S	7058 – 7140	-
	C	8+75N – 9+00N	4.7 – 4.8	w	1	114	S	8677 – 10145	high
0+06W	A	6+75N – 7+00N	6.0	w	1	138	S	3481 – 5120	-
	B	7+50N	5.5	w	2	88	S	5130	high
0+07W	A	6+50N	7.3	w	1	78	S	9020	-
	B	8+00N	5.3	w	1	102	S	12418	-
	C	8+75N	5.5	w	1	106	S	17021	-
	D	10+00N	5.1	w	1	99	S	44358	high
0+08W	A	6+25N	8.2	w	1	169	S	14398	-
	B	7+25N	6.7	w	1	171	S	20351	-
	C	8+50N	5.5	w	1	141	S	22880	high
	D	9+75N	6.0	w	1	96	S	37840	-
	E	10+25N	5.0	w	1	130	S	35843	-
	F	10+75N	4.8	w	1	97	S	5539	-
0+09W	A	6+75N – 7+00N	5.9 – 6.4	w	1	233	M	3240 – 5563	-
	B	8+00N	5.6	w	1	142	S	22824	-

Appendix 2 JVX 7-69,75. IP Anomaly Listings

Line	ID	Centre-Top	Mx	C	n	MIP	TC	Rho1	Resis
	C	8+75N	5.1	w	1	82	M	29633	high
0+10W	A	7+25N	8.3	w	1	189	S	19823	-
	B	7+50N	7.4	w	1	170	M	26238	-
	C	8+25N	6.2	w	1	159	M	26766	high
	D	10+00N – 10+25N	10.3 – 12.1	M	1	392	M	7022 – 8274	low
0+11W	A	6+25N	11.6	M	1	209	M	14212	-
	B	7+00N – 7+25N	9.1 – 9.5	w	2	329	M	14809 – 30337	high
	C	8+00N	10.8	w	1	136	L	7631	-
	D	9+00N – 9+25N	13.6 – 14.0	M	-	480	S	-	-
	E	10+25N	6.8	w	1	142	S	8664	-
	F	11+25N – 12+50N	18.6 – 30.9	S	1	461	L	1375 – 17591	low
0+12W	A	6+75N – 7+00N	12.4 – 13.2	M	3	420	M	12969 – 13117	-
	B	7+50N	10.6	w	3	362	M	13544	-
	C	8+50N – 9+00N	16.1 – 27.9	S	1	427	L	4250 – 10811	low
	D	9+50N – 9+75N	9.2	w	1	349	M	16267 – 24711	-
	E	11+50N	5.2	w	1	109	S	20400	-
	F	12+25N	16.2	M	1	497	M	14205	low
	G	13+00N – 13+25N	17.1 – 18.6	M	1	298	L	5029	low
0+13W	A	6+25N – 6+50N	10.4 – 10.9	M	1	389	M	13685 – 19348	high
	B	8+00N – 8+25N	6.9 – 7.2	w	1	166	S	5518 – 5654	-
	C	8+75N	10.8	M	3	400	S	23070	low
	D	9+25N	8.5	w	1	327	S	28337	-
	E	9+75N	9.2	w	2	337	S	18797	low
	F	11+00N	6.1	w	1	128	S	13151	-
	G	11+50N	8.5	w	1	300	S	12564	high
	H	12+00N	10.0	w	1	344	M	13445	high
	I	12+50N – 12+75N	10.2 – 14.0	M	1	367	L	9656 – 12688	-
	J	13+25N	28.9	S	1	443	L	5646	-
0+14W	A	6+75N - 7+00N	18.7 – 25.4	S	1	684	L	7382 – 12764	low
	B	7+50N – 7+75N	14.3	M	2	487	M	10716 – 14633	high
	C	8+00N – 8+25N	14.7 – 18.3	M	1	525	M	9760 – 9851	low
	D	8+75N	17.2	M	1	512	L	10049	-
	E	10+00N – 10+50N	11.1 – 13.6	M	1	444	S	20324 – 33922	high
	F	11+75N – 12+25N	21.9 – 33.1	S	1	480	L	8503 – 12983	low
	G	12+50N – 13+00N	37.1 – 69.9	S	1	600	L	177 – 733	low
	H	13+25N – 13+50N	18.4 – 36.0	S	1	524	L	107 – 1901	-
	I	14+50N	13.2	M	-	456	M	-	-
0+15E	A	17+25S – 16+50S	28.3 – 51.5	S	1	774	L	7396 – 12342	-
	B	16+00S	34.6	S	1	496	L	3797	low
	C	15+75S – 15+25S	30.5 – 32.6	S	1	746	L	3204 – 5647	-
	D	14+00S	6.6	w	1	147	M	881	high
	E	12+00S	8.7	w	1	180	S	1455	low
	F	11+75S – 11+50S	12.8 – 17.1	M	1	529	M	2069 – 3238	-

Appendix 2 JVX 7-69,75. IP Anomaly Listings

Line	ID	Centre-Top	Mx	C	n	MIP	TC	Rho1	Resis
	G	11+25S	18.4	S	1	616	L	1962	high
	H	10+75S – 10+25S	18.5 – 29.5	S	1	706	L	427 – 2603	low
	I	9+75S	22.2	S	2	707	S	1597	-
	J	9+50S – 8+75S	19.7 – 24.0	S	1	676	S	1458 – 4089	high
	K	8+50S	14.5	M	1	287	S	935	-
	L	5+75S	7.0	w	2	254	S	706	-
	M	5+50S – 5+25S	7.8	w	2	197	S	559	-
	N	4+75S	6.2	w	1	159	S	838	-
0+16E	A	18+75S	21.5	S	1	666	S	18203	high
	B	17+75S – 17+50S	18.9 – 19.7	M	1	569	M	8806 – 12788	high
	C	17+00S	16.6	M	1	569	S	6038	-
	D	14+00S – 13+00S	10.8 – 12.7	M	1	278	S	452 – 1018	-
	E	12+25S – 12+00S	11.0 – 11.4	M	2	254	S	563 – 711	high
	F	11+25S	15.1	M	1	296	M	379	-
	G	11+00S – 10+50S	22.2 – 27.9	S	1	612	L	1429 – 2030	high
	H	10+00S	10.2	w	1	252	M	372	-
	I	5+50S – 5+25S	10.4 - 10.8	M	3	240	S	725	-
	J	4+25S	15.0	M	3	526	S	548	-
	K	4+00S	9.7	w	1	367	M	640	-

IP Anomalies

The results from most surface IP/resistivity surveys are boiled down to a set of IP and resistivity anomalies. These anomalies are picked from pseudosections, graded by clarity, quality and strength and drafted onto a compilation map. The best IP anomalies are highlighted for follow up.

Drill testing is based on best estimates of location and depth and some idea about dip or dip direction. This information is extracted from IP/resistivity anomaly forms with varying levels of confidence with dip as the biggest problem. This note has been prepared to illustrate these and other issues basic to IP anomaly selection, ranking and drill testing.

Most of this note applies to glaciated Archean terrain with little or no topographic relief. Unless otherwise noted, all modeling is based on time domain surveys with a pole-dipole array (‘a’ = 25 m, n=1,6). In all model profiles, the current is on the left.

Survey # 1

Figure 1 is from a time domain, pole-dipole survey for Goldeye Explorations Ltd. in north central Ontario. ‘a’ = 50 m, n=1,6. The current is left (south) of the potentials. The area is sand covered with little outcrop.

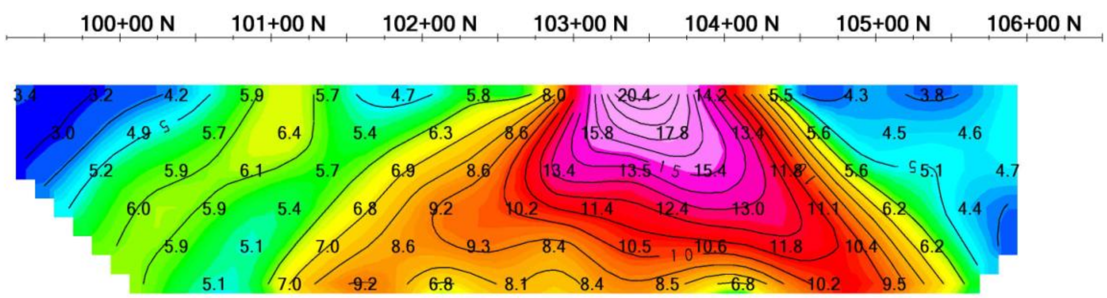


Figure 1. Contoured Mx chargeabilty. Courtesy Goldeye Explorations Ltd.

The IP anomaly centered at 103+50N is clear and well formed. Coincident n=1 apparent resistivities are 7,500 to 15,000 ohm.m. The cause looks shallow and may have appreciable width. Most of the anomaly features may be explained by a vertical tabular body under 10 m of resistive overburden. To explain the lower chargeabilities at depth, the body has to be more conductive than the host. This is not seen in the apparent resistivities. The higher chargeabilities on the potential side of the anomaly can not explained by simple models.

This IP anomaly was drill tested from the north. The collar was at station 104+35N. Drill inclination was -50°. Below the 8.5 m of overburden, most of this hole passed through mafic and felsic volcanics (80 %). There were two intersections of intrusives (total 13 %) and one of metasediments (7 %). The drill intersected 1 to 4 % pyrite in volcanics (162.8 to 170.6 m) and graphitic metasediments (170.6 to 182.6 m). End of hole is at 191 m. The drill results suggest the target dips at 80° to the south.

Survey # 2

The pseudosections of chargeability and resistivity in figure 2 have been provided by Goldeye Explorations Ltd. They are from a time domain, pole-dipole survey in north central Ontario. ‘a’ = 25 m, n=1,6. The current is right (north) of the potentials. Most of the area is covered by sandy overburden. There is no outcrop.

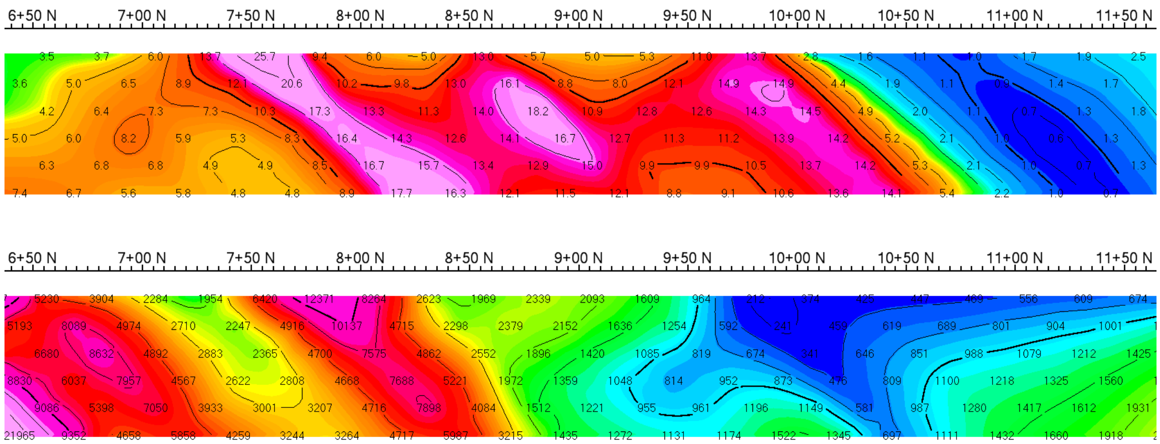


Figure 2. IP and resistivity pseudosections. Courtesy Goldeye Explorations Ltd.

Three IP anomaly tops are centered at 7+50N, 8+50N and 9+75N. Under standard classification, they would be ranked as strong, moderate and moderate. Their resistivity expressions are flanking a high, neutral and low. The low resistivities at 9+75N suggest a coincident bedrock conductor. This was confirmed by an HLEM survey that showed at bedrock conductor at 9+87.5N with dip 75° south, depth 25 m and conductance 3 S.

The IP anomaly forms suggest dips to the north. This would be incorrect – pole-dipole IP anomalies nearly always show a stronger leg on the current side. Without further work, the dip of these three chargeable zones must be assumed to be unknown. The HLEM results suggest at least one zone has a steep dip to the south.

Two holes were drilled to test these three IP anomalies ; BL06-02 collared at 7+00N and BL06-03 collared at 8+35N. Azimuth grid north and inclination -50° in both cases. Under 10 m of overburden, BL06-02 encountered rhyolite/tuff and feldspar porphyry, both units mineralized with pyrite to the end of hole at 127 m. BL06-03 encountered tuff, sediments (including graphitic argillite, 56-64 m) and a large package of feldspar porphyry. The sediments carried most of the mineralization with vuggy bands of pyrite. If the graphitic argillite centered around 60 m is the main cause of the IP anomaly at 8+50N, it dips to the north.

Physical Properties - Resistivity and Chargeability

The electrical resistivity of most rocks and soils is determined by their porosity, water content, resistivity of that water and the volume percent clays. This is because most minerals are insulators; electrical currents pass through the ground water as an electrolyte. The exception is a small set of minerals that are electronic conductors (e.g. pyrrhotite, pyrite, magnetite, graphite, specular hematite).

In most glaciated Archean terrain, the resistivity of water saturated overburden is in the range of 100 to 1000 ohm.m. Wet clays can reduce this to less than 10 ohm.m. Dry sandy soils and glacial till can have resistivities of 10,000 ohm.m.

The resistivity of most crystalline bedrock is in the range of 25,000 to 75,000 ohm.m. Massive pyrrhotite and graphite have resistivities on the order of 10^{-4} ohm.m. Although magnetite has a high crystal conductivity, in polycrystalline or even massive form, it is rarely considered a good conductor.

The IP method was developed in the 1950s to explore for porphyry copper deposits – large volumes of disseminated sulphides. It responds equally well to conductors. The IP effect or chargeability is measured in time domain as mV/V or in frequency domain as phase. In time domain surveys, the measured chargeability is normally taken around 1 second after shut-off of a 2 second current pulse.

In time domain IP surveys, the measured chargeability for overburden is usually 2 mV/V or less. It is characteristically uniform when the overburden is thick. Background chargeabilities of crystalline rock are usually in the range of 3 to 5 mV/V. Anything above this may constitute an anomaly. IP anomalies are commonly classed as weak (up to 10 mV/V), moderate (10 to 20 mV/V) and strong (more than 20 mV/V).

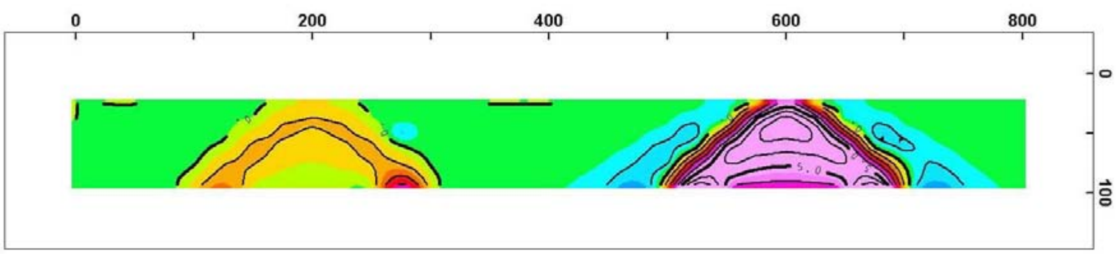


Figure 3. IP Model Results, Targets of Different Grain Size

Spectral IP was introduced in the 1970s. In time domain, it means analyzing the IP decay to extract three physical properties – amplitude, time constant (grain size) and exponent (grain size uniformity). Amplitude is better than measured chargeability as an estimate for the volume % metallic sulphides.

Model IP anomalies (dipole-dipole array) for two chargeable bodies are shown in figure 3. All parameters for the two bodies are the same except for the grain size. The body on the left is made up of fine grained disseminated sulphides. The body on the right is made up of coarse grained disseminated to semi-massive sulphides. The measured IP anomaly of the coarse grained body is at least 5 times that of the fine grained body. Spectral analysis would show that IP amplitudes are the same for both targets.

Overburden

Thick and/or conductive overburden suppresses the IP response of any underlying chargeable body. In extreme cases, the IP response may be extinguished and no IP anomaly will be recorded.

Apparent resistivities for 10 m of overburden with resistivities of 62.5 to 4000 ohm.m over crystalline basement rocks of 25,000 ohm.m are listed in table 1. A pole-dipole array with ‘a’ = 25 m is assumed. These numbers would apply to other ‘a’ spacings if overburden thickness is scaled accordingly.

Resistivity	n=1	n=2	N=3	n=4	n=5	n=6	Ratio 1/6
4000	9488	13395	15953	17744	19046	20046	0.473
2000	5580	8560	10840	12640	14120	15360	0.363
1000	3080	4980	6600	8000	9220	10320	0.298
500	1620	2720	3700	4600	5430	6200	0.261
250	835	1425	1970	2485	2975	3440	0.242
125	424	728	1016	1290	1557	1813	0.234
62.5	213	368	514	656	793	928	0.230

Table 1. Apparent Resistivities, Layered Earth Model

It turns out that apparent resistivities for 10 m of 500 ohm.m ground are the same as those for 5 m of 250 ohm.m ground and 20 m of 1000 ohm.m ground. Overburden resistivity and/or thickness up to 25 m cannot be recovered from the measured apparent resistivities. This is a fundamental limitation of the array that cannot be overcome by modeling or inversion.

Overburden conductivity x thickness product can be recovered however and may be useful as a measure of IP amplitude attenuation. For any IP/resistivity survey segment, the conductivity x thickness product can be estimated using the ratio of segment averages of the n=1 to n=6 apparent resistivities. From the appropriate set in table 1, all resistivities are scaled to fit the measured apparent resistivities. The conductivity * thickness product is then 10 / (the scaled resistivity).

Applied to the north end of figure 2, this method returns a conductance estimate of 20/140 over a substratum of 6000 ohm.m. The overburden could be 10 m of 70 ohm.m ground, 20 m of 140 ohm.m ground or 40 m of 280 ohm.m ground. The substrate is probably more overburden. In this segment, bedrock is outside the range of the array used.

Location and Amplitude

The chargeable body is centered under the peak of the anomaly top as seen in a pseudosection plot. This is true for a variety of target depths, dips and widths, overburden thickness and resistivity. Location uncertainty is about half the ‘a’ spacing – more for deep targets. The width of the target top is taken from the width of the anomaly top.

IP anomaly amplitudes are a complicated function of array geometry, target and host properties. The most important target properties are size, depth, chargeability and spectral characteristics. The most important host properties are overburden thickness and resistivity. Ranking IP anomalies is relatively easy where the overburden is thin and resistive. It is more difficult where overburden thickness or conductivity varies. Amplitudes corrected for overburden conductivity x thickness product may help.

Depth

IP anomaly amplitudes for a standard target in a homogeneous earth (no overburden) at depths of 5 to 60 m are shown in figure 4. The target is 10 m wide x 200 m strike length x 200 m length and is vertical. It has the same resistivity as the host rock. A normalized plot of the 1/depth curve (dashed line) is included for comparison.

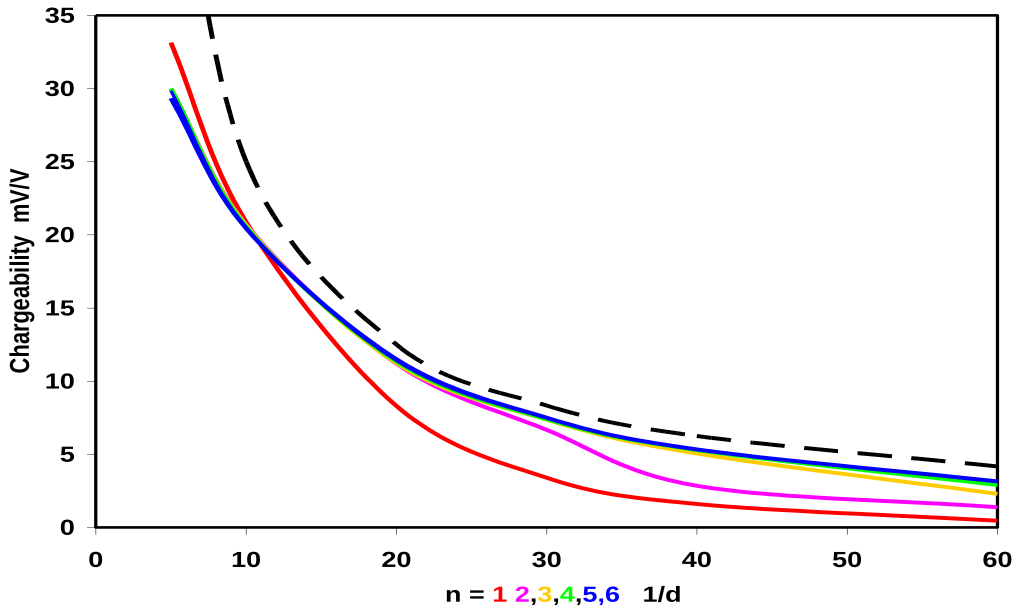


Figure 4. IP anomaly amplitudes vs. depth of burial

Over most of this range, IP anomaly amplitudes fall off as 1/depth. Doubling the depth reduces anomaly amplitudes by a factor of 2.

IP anomalies from targets at 10, 20 and 40 m are shown in figure 5. To correct for depth of burial, amplitudes have been multiplied by 2 for the target at 20 m and by 4 for the target at 40 m. Targets are centered at 300, 700 and 1100 m.

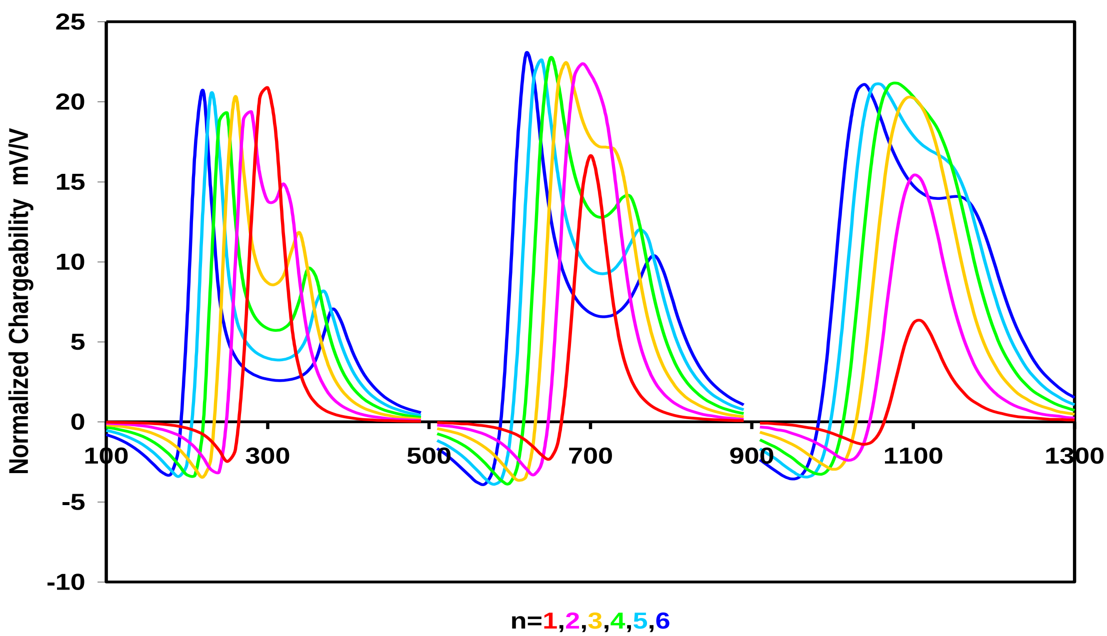


Figure 5. IP anomalies from targets at 10, 20 and 40 m depth.

At greater depths, the anomaly widens somewhat, the central low disappears and the response in the early dipoles is less. The last may be used to estimate depth.

Relative peak amplitudes for a standard target at varying depths are listed in table 2. These numbers are for a half space (no overburden). All differences from unity are less for any amount of conductive overburden. 20 m of 2000 ohm.m ground for example changes the relative n=1 dipole response from 0.74 to 0.88.

Depth	n=1	n=2	n=3	n=4	n=5	n=6
5	1.14	1	1	1	1	1
10	1.04	1	1	1	1	1
15	0.90	1	1	1	1	1
20	0.74	1	1	1	1	1
30	0.46	0.90	1	1	1	1
40	0.30	0.74	1	1	1	1
50	0.21	0.57	0.87	1	1	1
60	0.15	0.46	0.76	1	1	1

Table 2. Relative Peak Amplitudes, Varying Target Depth

These numbers may be used to derive a rough estimate of depth. Based on these simple rules, the IP anomalies in survey #2 would have depths to target of less than 5 m (7+50N), 15 to 20 m (8+50N) and 10 to 15 m (9+75N). All three IP anomalies were shown on the compilation map with the IP anomaly top at n=1.

Dip

As seen in survey #2, pole-dipole IP anomalies show higher values on the current side of the target even when the target dips the other way. Pole-dipole anomalies from a tabular body at 10 m depth are shown in figure 6. The target dips at 60° to the left (at 300), is vertical (at 700) and dips at 60° to the right (at 1100). The target is in a 25,000 ohm.m half space under 5 m of moderately conductive overburden (1000 ohm.m). The current is left of the potentials.

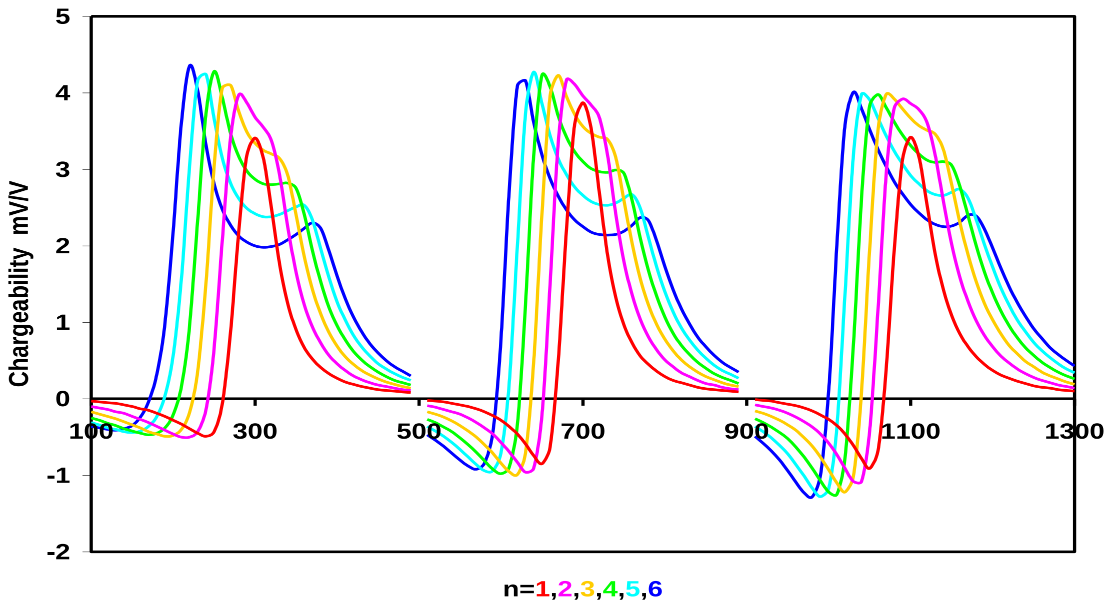


Figure 6. Pole-dipole anomalies, variable dip.

There is very little difference in these profiles. The relative n=6 down-dip peak is higher when the target dips towards the current electrode but this would be difficult to see in all but the best cases. These differences are also small when compared to the effects of depth of burial (figure 5) and different overburden resistivity (figure 8). There is little chance of recovering a sense of dip direction, let alone dip, from pole-dipole IP anomaly forms. Inversion will not help. If not available from area outcrop or other means, drilling should allow for a 50 – 50 uncertainty in target dip.

Dipole-dipole is a better array for dip direction. Dipole-dipole IP anomalies favour the down dip side and this is not affected by depth of burial or overburden resistivity.

Dipole-dipole apparent resistivities and chargeabilities can be reconstructed from any pole-dipole survey. The reconstructed dipole-dipole IP results for survey #1 suggest the target has a steep dip to the south. Reconstructed dipole-dipole IP results for survey #2 suggests a steep dip to the north at 7+50N and 8+50N and vertical or a steep dip to the south at 9+75N. These results are consistent with the drilling.

Overburden Masking

IP anomalies in figure 5 (left) and figure 6 (centre) are for the same chargeable body. The only difference is overburden – none in figure 5 and a thin layer (5 m) of moderately conductive overburden (1000 ohm.m) in figure 6. For this target, the overburden reduces IP anomaly amplitudes by a factor of 5. Without allowance for overburden masking, the two anomalies would be ranked as strong and weak. The strong anomaly would be drilled first. The weak anomaly might be ignored. Yet they represent identical geophysical targets.

This illustrates the sensitivity of IP anomaly amplitudes to overburden resistivity. IP anomaly peak amplitudes for a standard target under 5, 10, 20 and 40 m thick overburden of varying resistivity are shown in figure 7. With no overburden, peak chargeabilities are 33.1 mV/V (t=5 m), 20.9 mV/V (t=10 m), 11.5 mV/V (t=20 m) and 5.3 mV/V (t=40 m).

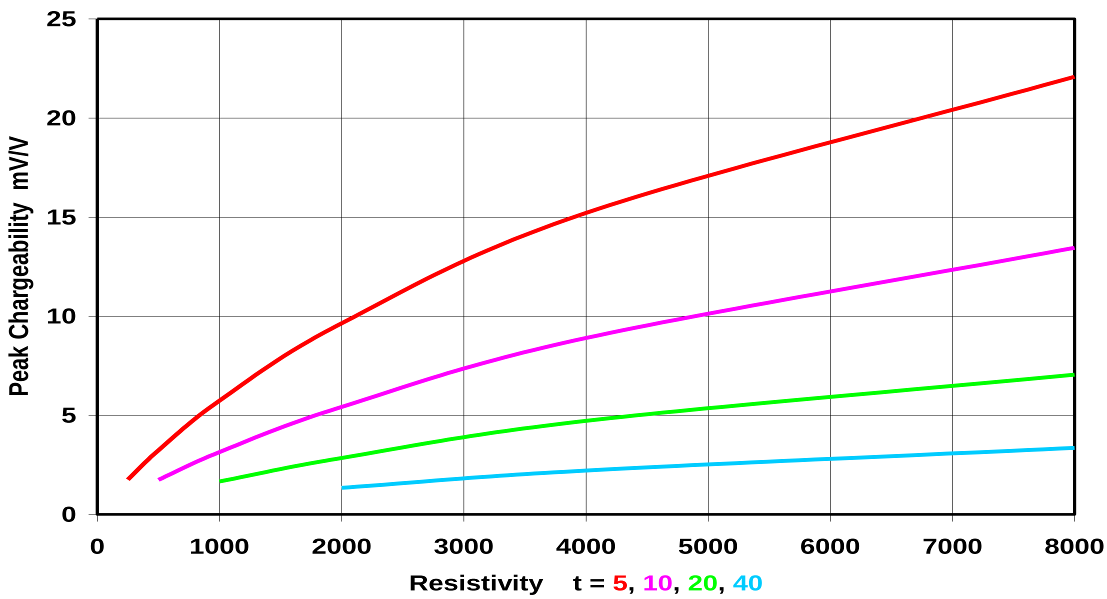


Figure 7. Anomaly amplitude for a target under different overburden

For overburden of fixed thickness, IP amplitudes roughly double as the resistivity is doubled. The effect is similar to halving the depth of burial. Combining these two forms of attenuation, IP anomaly amplitudes are roughly the same for this target under 5 m of 250 ohm.m, 10 m of 500 ohm.m, 20 m of 1000 ohm.m and 40 m of 2000 ohm.m. In other words, they are the same for the same overburden conductivity x thickness product.

IP anomalies from a vertical tabular body under 10 m of overburden are shown in figure 8. Overburden resistivities from left to right are 25,000 ohm.m (same as host rock), 4000 and 1000 ohm.m. The IP anomaly under 4000 ohm.m overburden has been multiplied by 2.35. The anomaly under 1000 ohm.m overburden has been multiplied by 6.65.

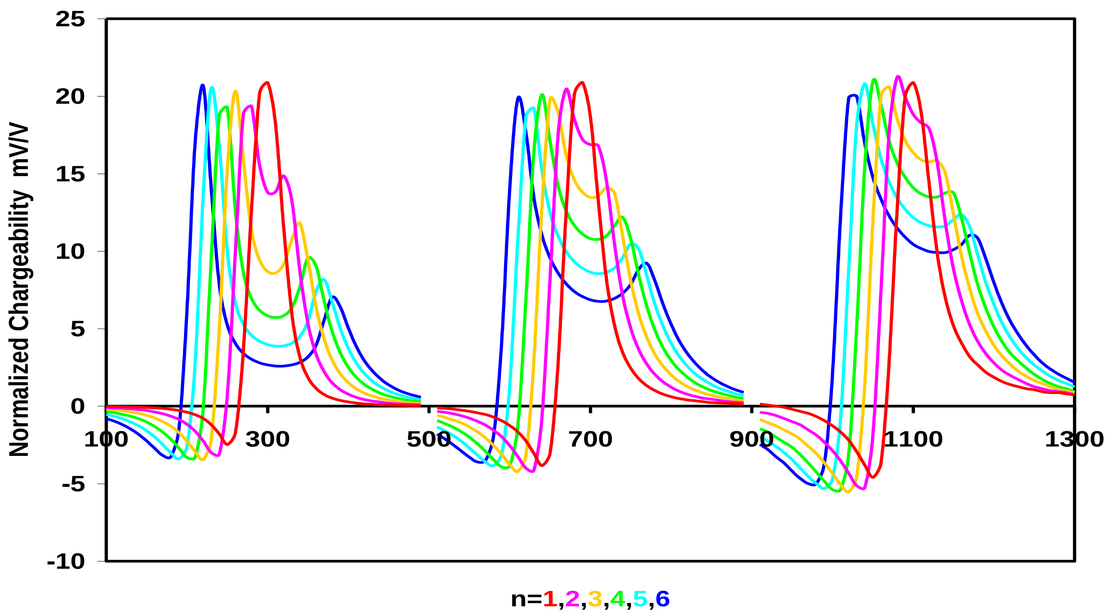


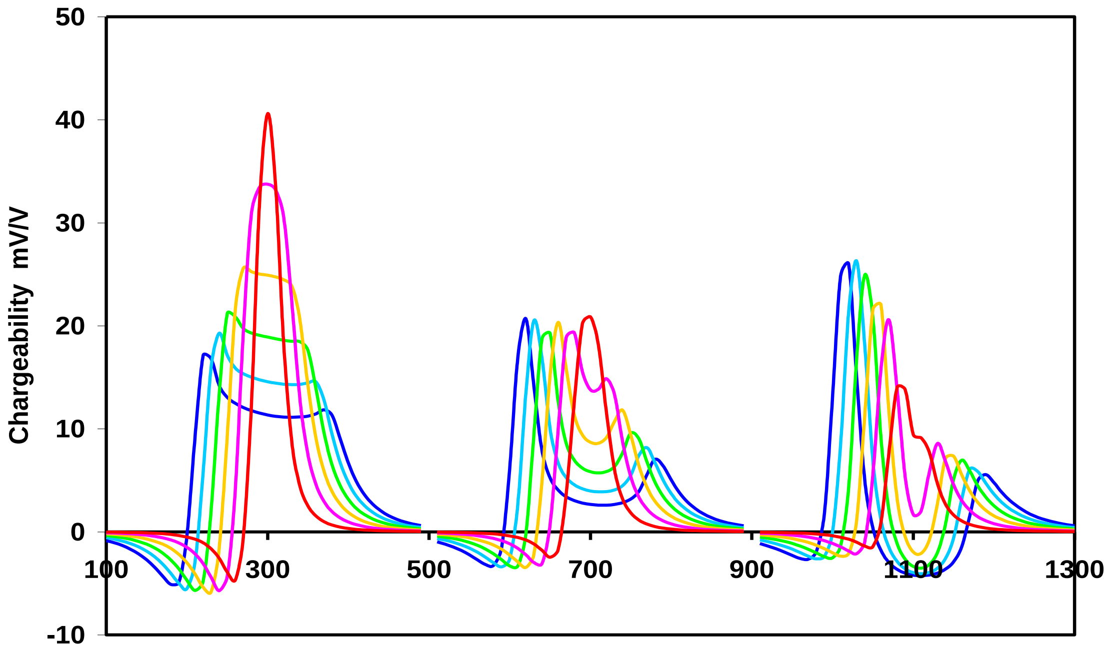
Figure 8. IP anomalies, Different overburden resistivity.

The form of the anomaly is largely unaffected by changes in overburden resistivity. Differences are in the later dipoles - a higher central low and less difference between outside peaks as overburden resistivity decreases.

Resistive and Conductive IP Targets

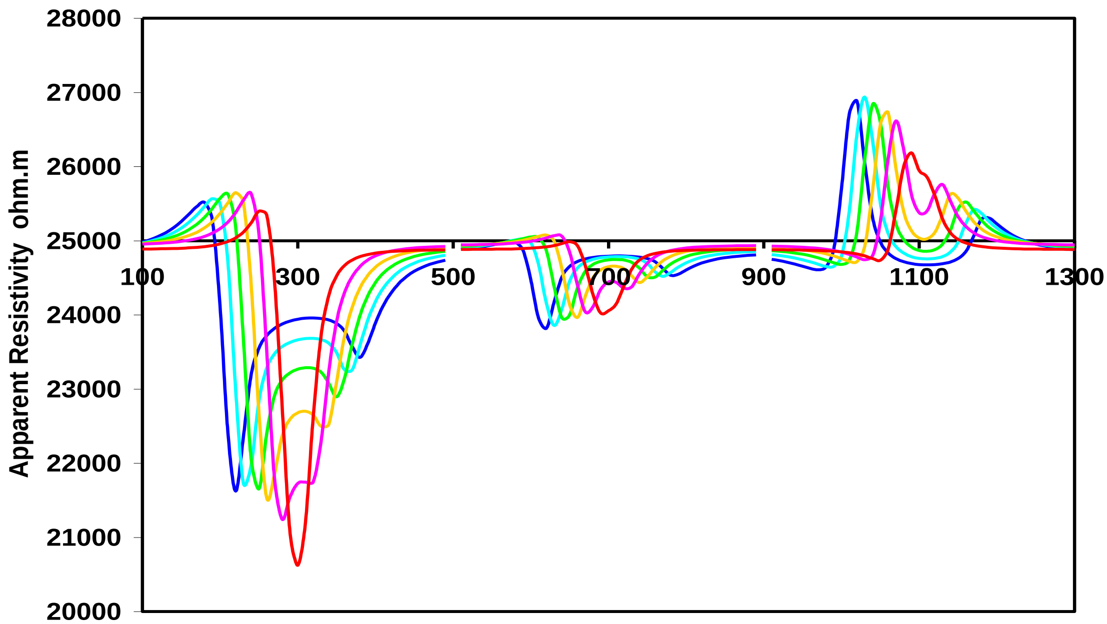
All targets considered to this point have the same resistivity as the host rock. This is often not the case – target resistivities more or less than the host are important. IP anomalies over three targets that differ only in the resistivity of the target are shown in figure 9. The target is at 10 m depth in a 25,000 ohm.m earth (no overburden). The centre anomaly at 7+00 is for the target with the same resistivity as the host rock. The target is less resistive (12,500 ohm.m) on the left and more resistive (50,000 ohm.m) on the right.

The more conductive target produces higher IP amplitudes in the early dipoles and amplitudes that fall off with depth. This was noted for the IP anomaly in survey #1. The more resistive target produces lower amplitudes in the early dipoles, a central low and amplitudes that increase with depth. These are distinct anomaly forms, regardless of what is seen in the apparent resistivities.



n=1,2,3,4,5,6

Figure 9. IP anomalies for targets of different resistivity.



n=1,2,3,4,5,6

Figure 10. Apparent resistivity profiles for targets in figure 9.

Apparent resistivities for the three targets in figure 9 are shown in figure 10. The lower apparent resistivity over the centre target (same resistivity as the host) is because resistivity in the modelling program is the theoretical DC resistivity. The measured resistivity includes both resistivity and IP effects.

Summary

Pole-dipole IP anomalies are asymmetric pant-leg forms with a top over the body top-centre and stronger chargeabilities in the later dipoles on the current side. These basic features change little for different depths, dip and overburden resistivity.

Standard compilations normally provide an overview of IP targets with estimates of location, depth and amplitude. Before target selection and ranking, some attempt could be made to correct IP amplitudes for overburden masking. Before drilling, a more detailed analysis with modelling is suggested.

1. Location

The anomaly peak or top in the chargeability pseudosection is a good estimate of location for the top-centre of the chargeable body. Where the anomaly top is unusually wide, width is added to the interpretation. For weak IP anomalies, location and width may be better defined in the pseudosection of the spectral chargeability amplitude.

2. Depth

Depth is estimated from relative peak amplitudes in the early and late dipoles. It should be consistent with overburden conductance estimates. Depth may be represented as the dipole number that best represents the target top.

3. Dip Direction

In general, dip or even dip direction cannot be extracted from pole-dipole IP anomalies. The best way to get some sense of dip direction from pole-dipole IP anomalies alone is to look at the reconstructed dipole-dipole anomaly. This may fail however – dip should be taken from the geology or other means. If not available, drilling should assume a 50 – 50 chance on dip.

4. Amplitude

IP anomaly amplitudes are determined by array geometry, target width, depth, chargeability, grain size and resistivity, overburden thickness and resistivity and the resistivity of the host rock. Corrections for grain size are done through spectral analysis. The effects of relative overburden masking may be compensated using the conductivity x thickness product.

5. Resistivity

Any coincident resistivity response is of interest. A coincident resistivity low, no matter how feeble, may suggest a bedrock conductor. A resistivity high may indicate silicification. Even where there is no coincident resistivity response, IP anomaly forms may indicate a coincident resistivity high or low.

6. Grain Size

In some applications, the spectral chargeability amplitude and grain size are distinctive features that change target ranking. These are taken from spectral analysis.

Ian Johnson
February, 2007

Modelling

Modelling is based on Emigma V6.4 from PetrosEikon.

All model results are for a time domain IP survey where the chargeability is measured in mV/V 1 second after shutoff of a 2 second current pulse. A pole-dipole array with an potential electrode spacing of 25 m, n=1,6 is used. The current electrode is always left of the potential electrodes.

The plot point is midway between the moving current and the nearest potential electrode. The plot point in the survey examples is midway between the moving current and the centre of the potential dipole. The difference is a/4 m.

The general model consists of a uniform overburden layer over bedrock. There is no topography. The target is a tabular body within the bedrock. The target is assumed to be 10 m wide x 200 m strike length x 200 m depth extent. The survey line runs across the middle of and normal to the target.

Chargeability is defined by the spectral IP parameters amplitude (0.5 V/V), time constant (1 second) and exponent (0.5). For all models, host rock resistivity is 25,000 ohm.m.

SCINTREX
A DIVISION OF LRS

ELECTRICAL METHODS

IPR-12

Induced Polarization

IPR-12 SPECIFICATIONS

Inputs
1 to 8 dipoles are measured simultaneously.

Input Impedance
16 Megohms

SP Bucking
± 10 volt range. Automatic linear correction operating on a cycle by cycle basis.

Input Voltage (Vp) Range
50 µvolt to 14 volt.

Chargeability (M) Range
0 to 300 millivolt/volt.

Tau Range
60 microseconds to 2000 seconds.

Reading Resolution of Vp, SP and M
Vp, 10 microvolt; SP, 1 millivolt; M, 0.01 millivolt/volt.

Absolute Accuracy of Vp, Sp and M
Better than 1% .

Common Mode Rejection
At input more than 100db.

Vp Integration Time
10% to 80% of the current on time.

IP Transient Program
Total measuring time keyboard selectable at 1,2,4,8,16 or 32 seconds. Normally 14 windows except that the first four are not measured on the 1 second timing, the first three are not measured on the 2 second timing and the first is not measured on the 4 second timing. An additional transient slice of minimum 10 ms width, and 10 ms steps, with delay of at least 40 ms is keyboard selectable. Programmable windows also available.

Transmitter Timing
Equal on and off times with polarity change each half cycle. On/off times of 1,2,4,8,16 or 32 seconds. Timing accuracy of ±100 ppm or better is required.

External Circuit Test
All dipoles are measured individually in sequence, using a 10 Hz square wave. The range is 0 to 2 Mohm with 0.1 kohm resolution. Circuit resistances are displayed and recorded.

Filtering
RF filter, 10 Hz 6 pole low pass filter, statistical noise spike removal.

Internal Test Generator
1200 mV of SP; 807 mV of Vp and 30.28 mV/V of M.

Analog Meter
For monitoring input signals; switchable to any dipole via keyboard.

Keyboard
17 key keypad with direct one key access to the most frequently used functions.

Display
16 lines by 40 characters, 128 x 240 dots, Backlit SuperTwist Liquid Crystal Display. Displays instrument status and data during and after reading. Alphanumeric and graphic displays.

Display Heater
Available for below -15°C operation.

Memory Capacity
Stores approximately 400 dipoles of information when 8 dipoles are measured simultaneously.

Real Time Clock
Data is recorded with year, month, day, hour, minute and second.

Digital Data Output
Formattted serial data output for printer and PC, etc. Data output in 7 or 8 bit ASCII, one start, one stop bit, no parity format. Baud rate is keyboard selectable for standard rates between 300 baud and 57.6 kBaud. Selectable carriage return delay to accommodate slow peripherals. Hand-shaking is done by X-on/X-off.

Standard Rechargeable Batteries
Eight rechargeable Ni-Cad D cells. Supplied with a charger, suitable for 100/230V, 50 to 60 Hz, 10W. More than 20 hours service at +25°C, more than 8 hours at -30°C.

Ancillary Rechargeable Batteries
An additional eight rechargeable Ni-Cad D cells may be installed in the console along with the Standard Rechargeable Batteries. Used to power the Display Heater or as backup power. Supplied with a second charger. More than 6 hours service at -30°C.

Use of Non-Rechargeable Batteries
Can be powered by D size Alkaline batteries, but rechargeable batteries are recommended for lower cost over time.

Operating Temperature Range
-30°C to +50°C.

Storage Temperature Range
-30°C to +50°C.

Dimensions
Console: 355 x 270 x 165 mm
Charger: 120 x 95 x 55 mm

Weights
Console: 5.8 kg
Batteries: 1.3 kg
Charger: 1.1 kg

Transmitters Available
GGT-3 GGT-10

An ISO 9001:2000 registered company

* All specifications are subject to change without notice.

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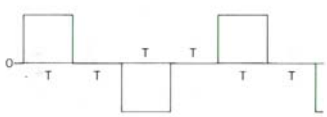
Fax: +1 303 828 3288
e-mail: info@microglacoste.com
website: www.microglacoste.com

Technical Description of IPC-7/2.5 kW Transmitter System

Complete 2.5kW induced polarization system including motor-generator, reels with wire, tool kit, porous pots, simulator circuit, copper sulphate, IPR-8 receiver, dummy load, transmitter, electrodes and clips.

IPC-7 / 2.5kW transmitter console with lid and dummy load.



Time Domain Waveform

Transmitter Console	
Maximum Output Power	1.85 kW maximum, defined as VI when current is on, into a resistive load
Output Current	10 amperes maximum
Output Voltage	Switch selectable up to 1210 volts DC
Automatic Cycle Timing	T:T:T:T; on:off:on:off
Automatic Polarity Change	Each 2T
Pulse Durations	Standard: T = 2,4 or 8 seconds, switch selectable Optional: T = 1,2,4 or 8 seconds, switch selectable Optional: T = 8,16,32 or 64 seconds, switch selectable
Voltage Meter	1500 volts full scale logarithmic
Current Meter	Standard: 10.0 A full scale logarithmic Optional: 0.3, 1.0, 3.0 or 10.0 A full scale linear, switch selectable
Period Time Stability	Crystal controlled to better than .01%
Operating Temperature Range	-30°C to +55°C
Overload Protection	Automatic shut-off at output current above 10.0 A
Open Loop Protection	Automatic shut-off at current below 100 mA
Undervoltage Protection	Automatic shut-off at output voltage less than 95 V
Dimensions	280 mm x 460 mm x 310 mm
Weight	30 kg
Shipping Weight	41 kg includes reusable wooden crate
Motor Generator	
Maximum Output Power	2.5 kVA, single phase
Output Voltage	110 V AC
Output Frequency	400 Hz
Motor	4 stroke, 8 HP Briggs & Stratton
Weight	59 kg
Shipping Weight	90 kg includes reusable wooden crate

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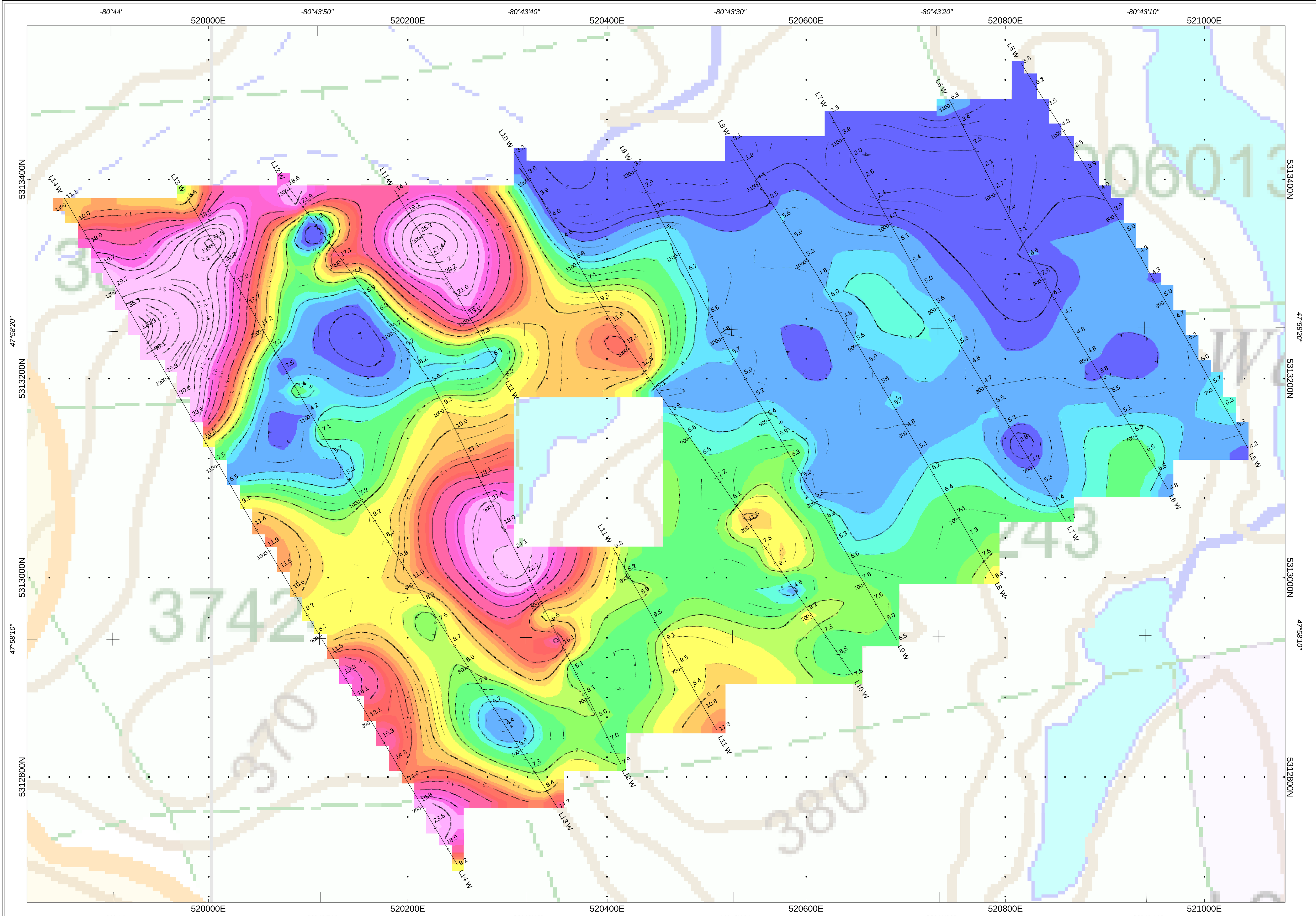
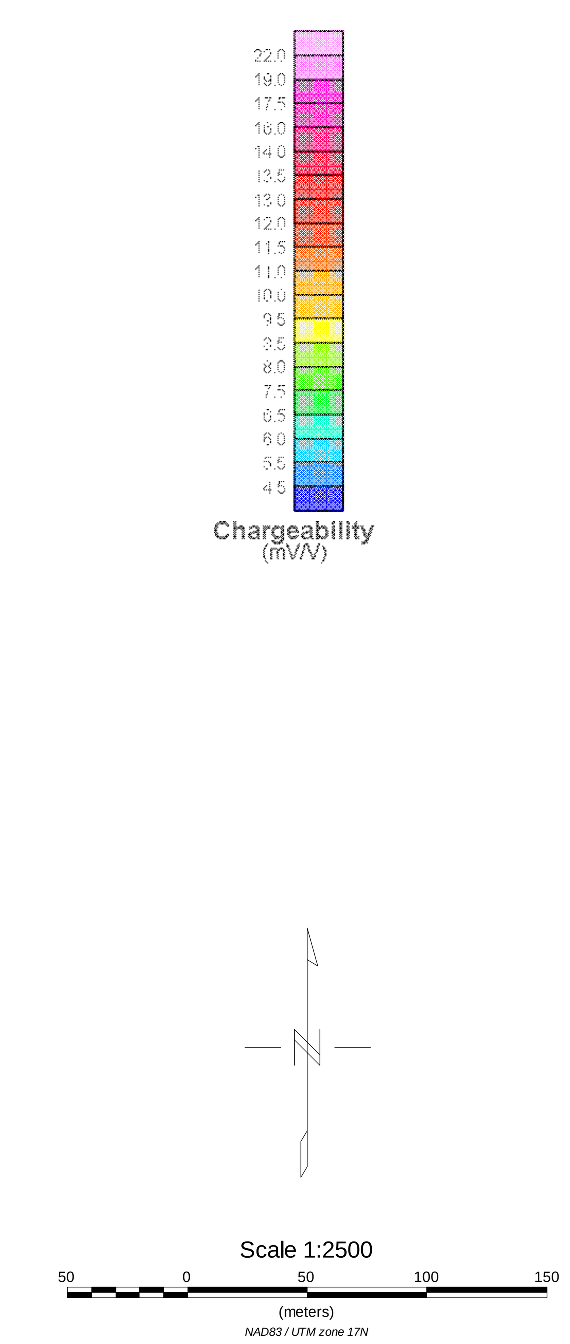
Telex: 06-964570

Geophysical and Geochemical
Instrumentation and Services



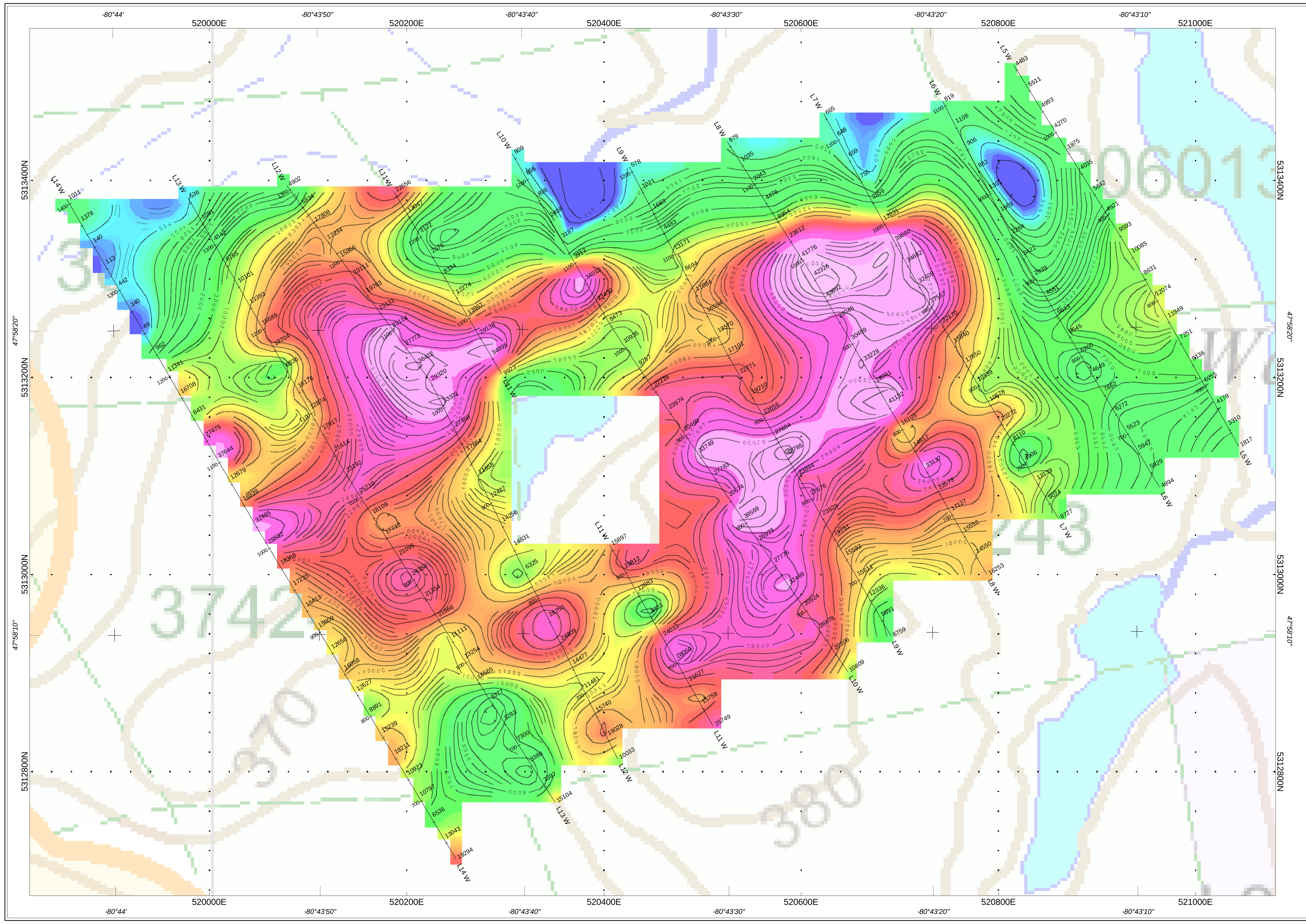


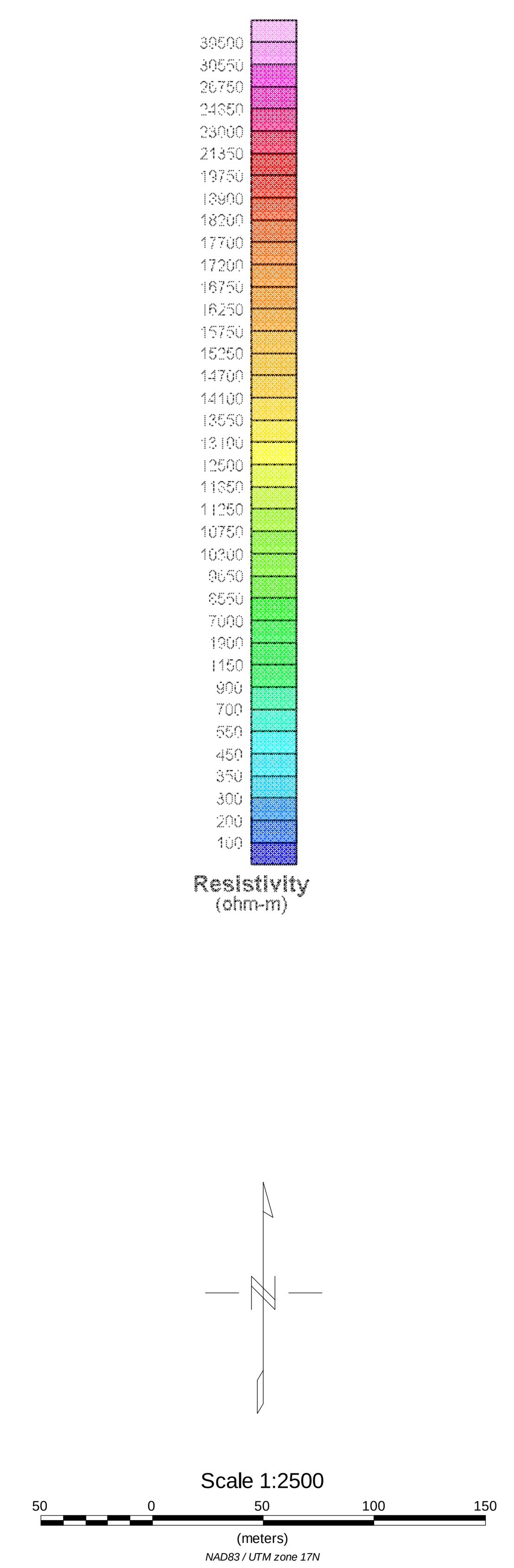
OPAWICA EXPLORATIONS INC.

SPECTRAL IP / RESISTIVITY SURVEY
NORTH GRID - OPAWICA SOUTH PROPERTY
MATACHEWAN, POWELL TWP.
ONTARIO, NTS: 41 P/15

CHARGEABILITY (n=2)
Array: Pole-Dipole, a=25 m
Contours: 0.5, 2 & 10 mV/V
Value posted: Right, Stations posted: Left
Inst: Scintrex IPR12 Rx(2 sec) & IPC-7 Tx(2 sec)

JVX LTD. ref. no. 7-69, August 2007
Topographic base map copyright: Queen's Printer for Ontario





OPAWICA EXPLORATIONS INC.

SPECTRAL IP / RESISTIVITY SURVEY
NORTH GRID - OPAWICA SOUTH PROPERTY
MATACHEWAN, POWELL TWP.
ONTARIO, NTS: 41 P/15

RESISTIVITY (n=2)
Array: Pole-Dipole, a=25 m
Contours: 50, 500 & 2000 ohm-m
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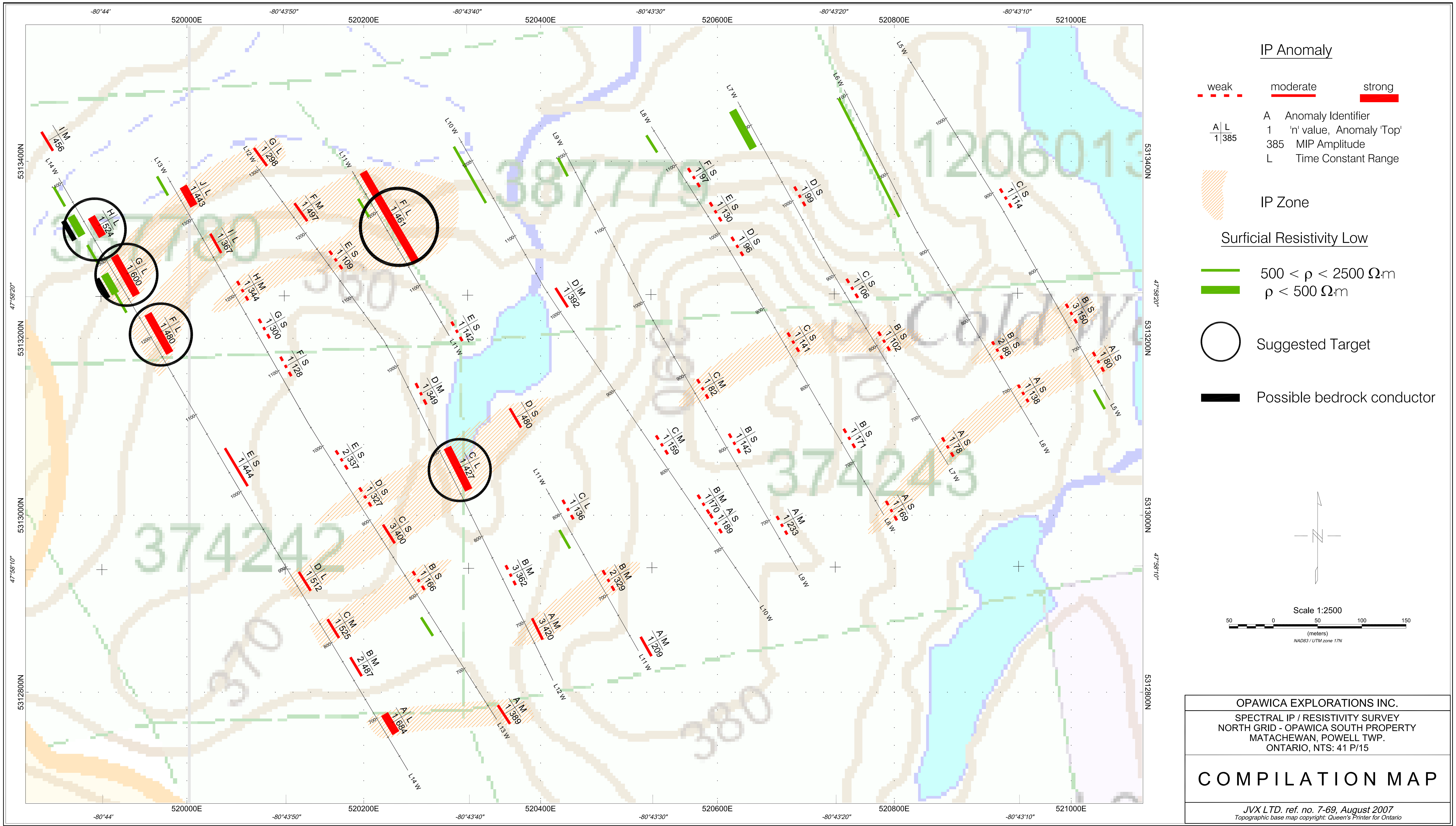
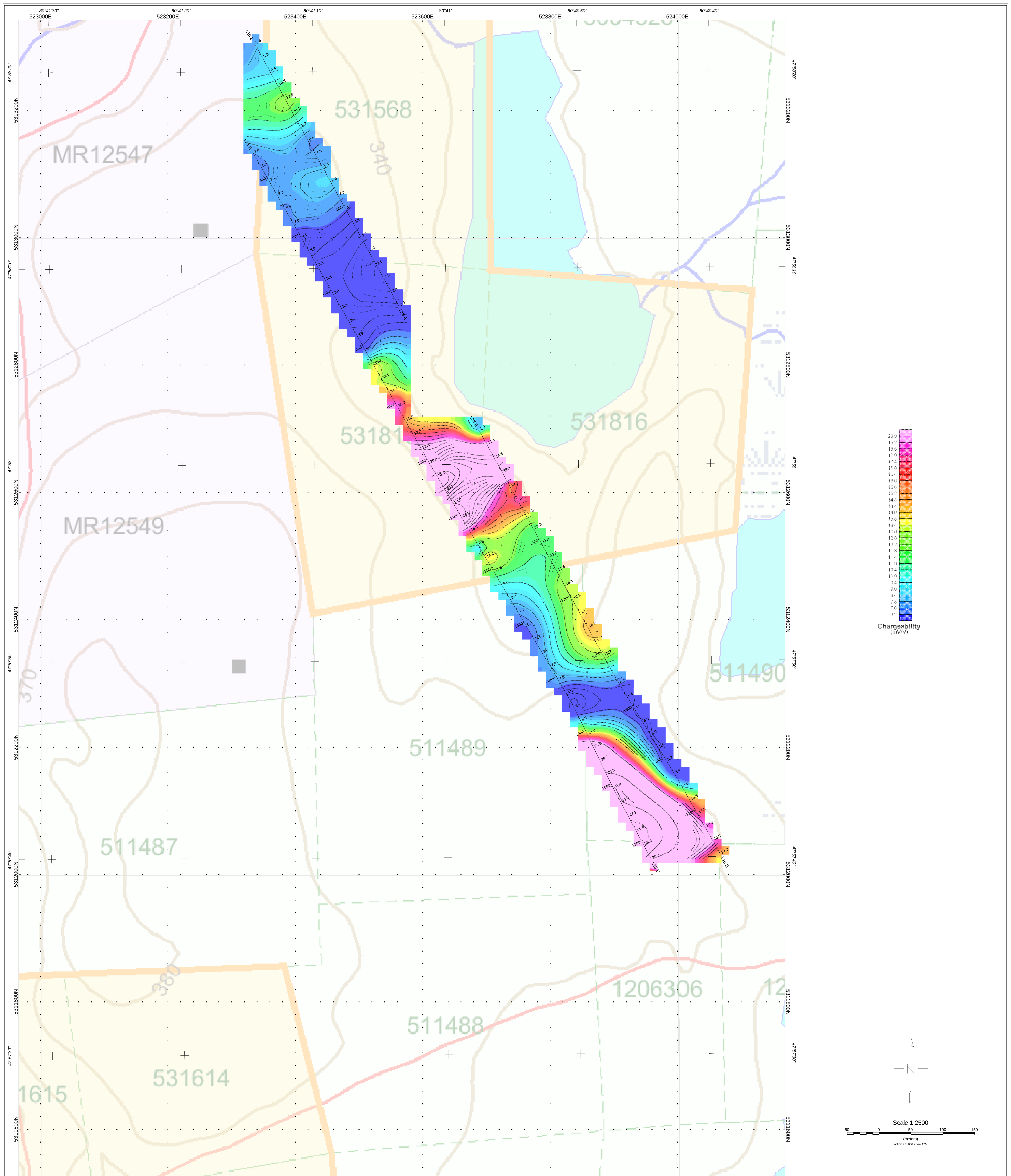
Inst: Scintrex IPR12 Rx(2 sec) & IPC-7 Tx(2 sec)

JVX LTD. ref. no. 7-69, August 2007



IP Anomaly
weak
moderate
strong
A Anomaly Identifier
1 'n' value, Anomaly 'Top'
385 MIP Amplitude
L Time Constant Range
IP Zone
Surficial Resistivity Low
500 < ρ < 2500 Ω·m
ρ < 500 Ω·m
Suggested Target
Possible bedrock conductor
Scale 1:2500
(meters)
NAD83 / UTM zone 17N
OPAWICA EXPLORATIONS INC.
SPECTRAL IP / RESISTIVITY SURVEY
NORTH GRID - OPAWICA SOUTH PROPERTY
MATACHEWAN, POWELL TWP.
ONTARIO, NTS: 41 P/15
COMPILATION MAP
JVX LTD. ref. no. 7-69, August 2007
Topographic base map copyright: Queen's Printer for Ontario

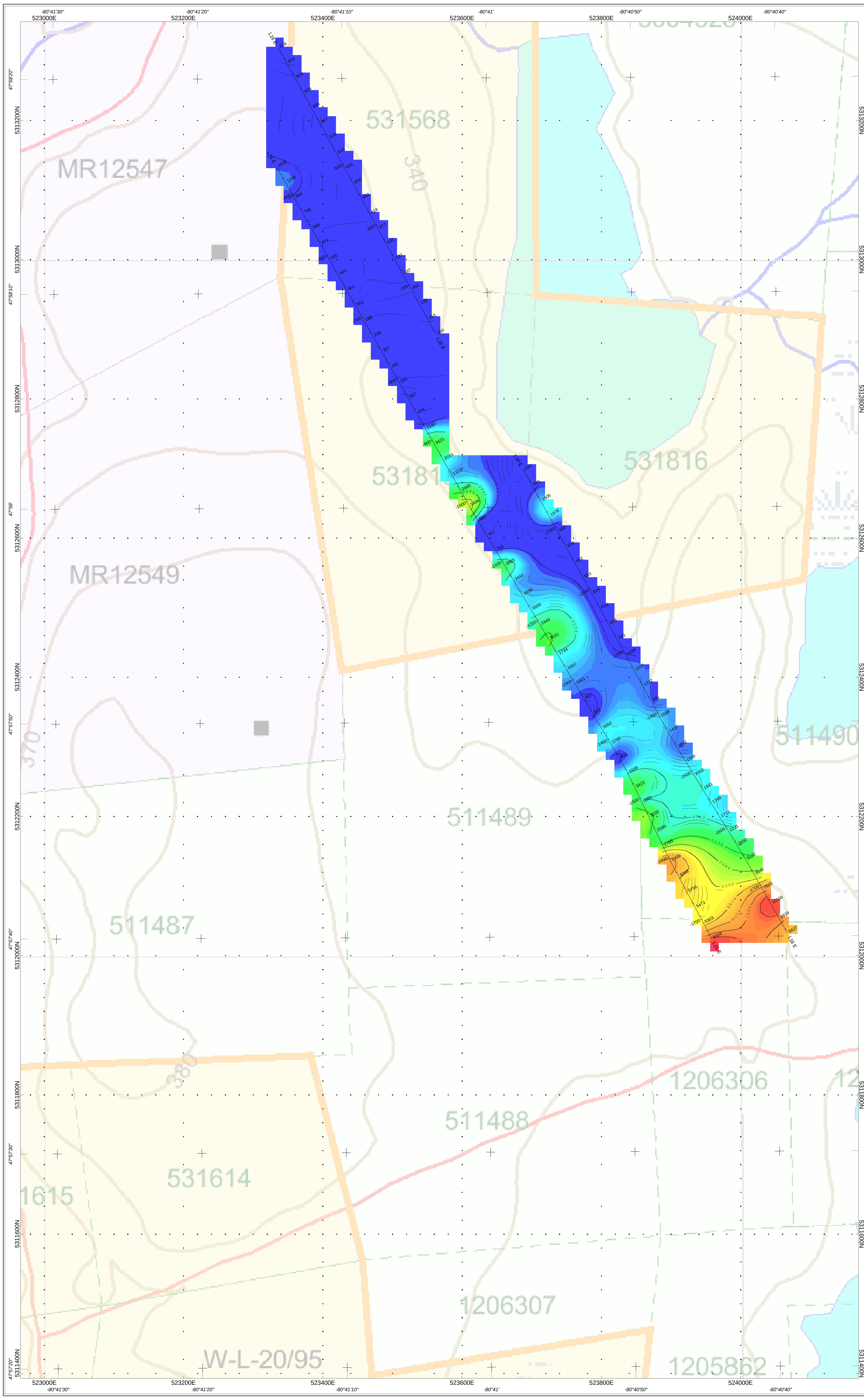


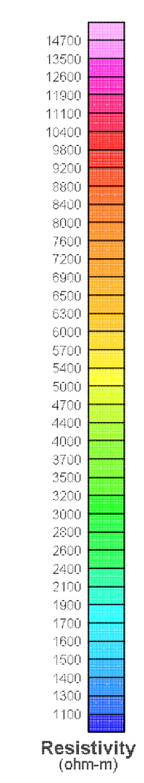
OPAWICA EXPLORATIONS INC.

SPECTRAL IP / RESISTIVITY SURVEY
GRID EAST - OPAWICA SOUTH PROPERTY
MATACHEWAN, POWELL TWP., ONTARIO
NTS: 41 P/15

CHARGEABILITY (n=2)
Contours: 0.2, 1 & 10 mV/V
Array: Pole-Dipole, a=25 and a=50 m
Inst: Scintrex IPR12 Rx(2 sec) & IPC-7 Tx(2 sec)

JVX LTD. ref. no. 7-75, September 2007





Scale 1:2500

50 0 50 100 150

(meters)

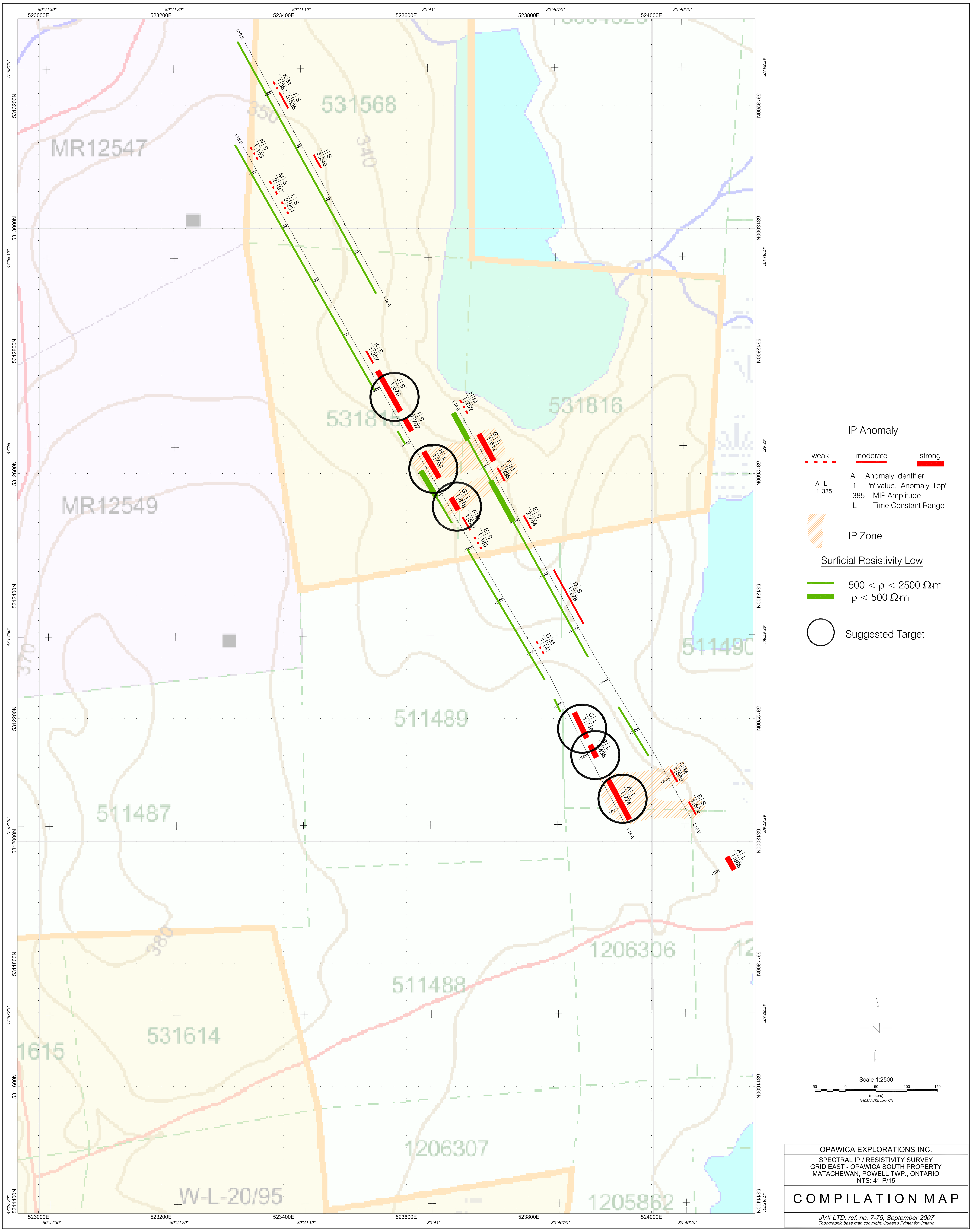
NAD83 / UTM zone 17N

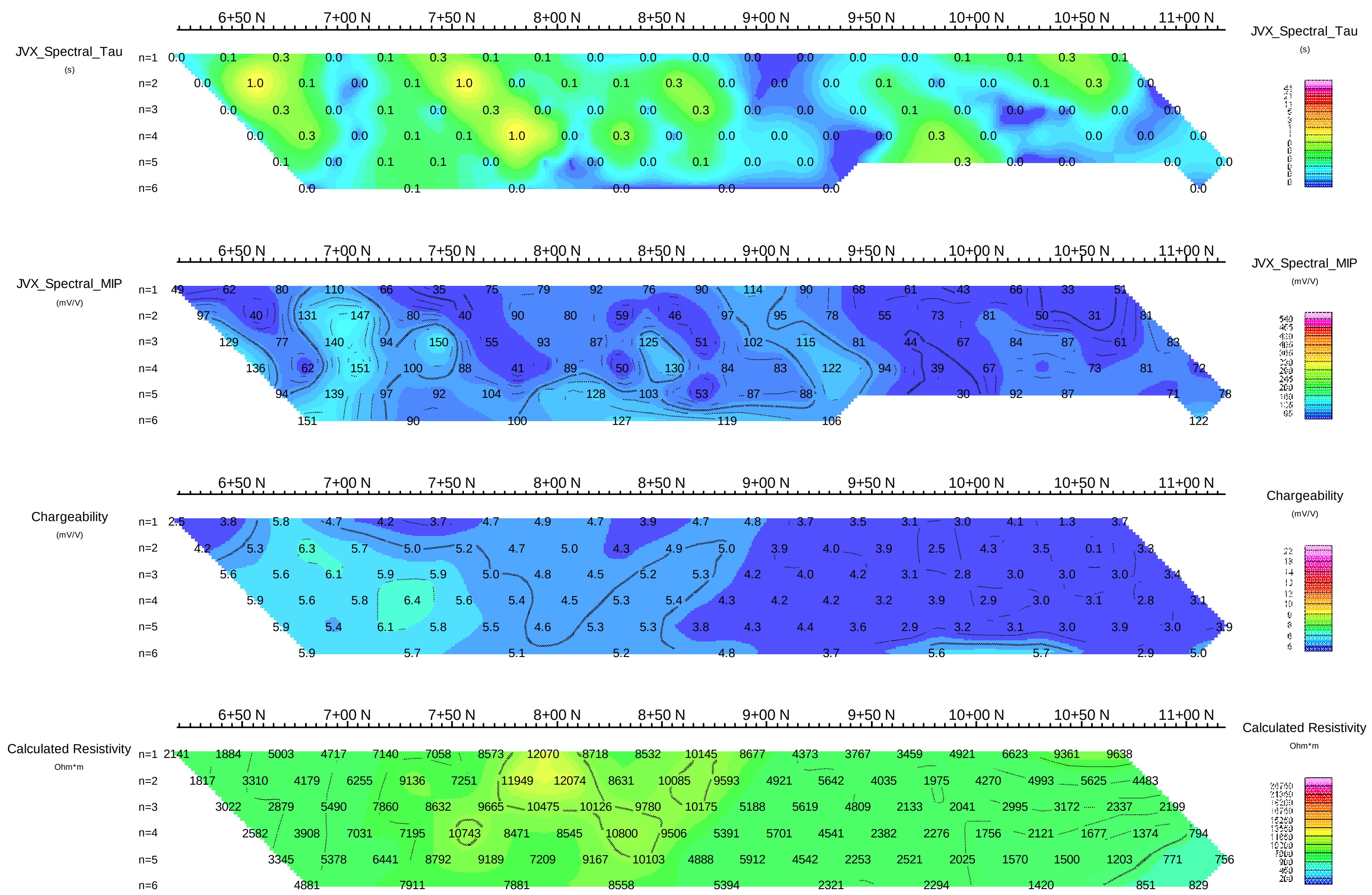
OPAWICA EXPLORATIONS INC.

SPECTRAL IP / RESISTIVITY SURVEY
GRID EAST- OPAWICA SOUTH PROPERTY
MATACHEWAN, POWELL TWP., ONTARIO
NTS: 41 P/15

RESISTIVITY (n=2)
Contours: 100, 1000 & 5000 ohm-m
Array: Pole-Dipole, a=25 and a=50 m
Inst: Scintrex IPR12 Rx(2 sec) & IPC-7 Tx(2 sec)

JVX LTD. ref. no. 7-75, September 2007

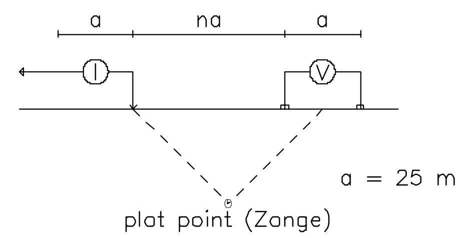

IP Anomaly
weak
moderate
strong
A Anomaly Identifier
1 'n' value, Anomaly 'Top'
385 MIP Amplitude
L Time Constant Range
IP Zone
Surficial Resistivity Low
500 < ρ < 2500 Ω·m
ρ < 500 Ω·m
Suggested Target
Scale 1:2500
(meters)
NAD83 / UTM zone 17N
531568
531816
MR12547
MR12549
511489
511487
511488
531614
1206306
1206307
1205862
W-L-20/95
OPAWICA EXPLORATIONS INC.
SPECTRAL IP / RESISTIVITY SURVEY
GRID EAST - OPAWICA SOUTH PROPERTY
MATACHEWAN, POWELL TWP., ONTARIO
NTS: 41 P/15
COMPILATION MAP
JVX LTD. ref. no. 7-75, September 2007
Topographic base map copyright: Queen's Printer for Ontario

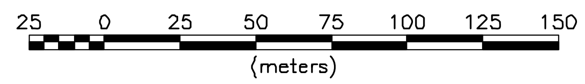


Pseudo Section Plot

0+05 W

Pole-Dipole Array



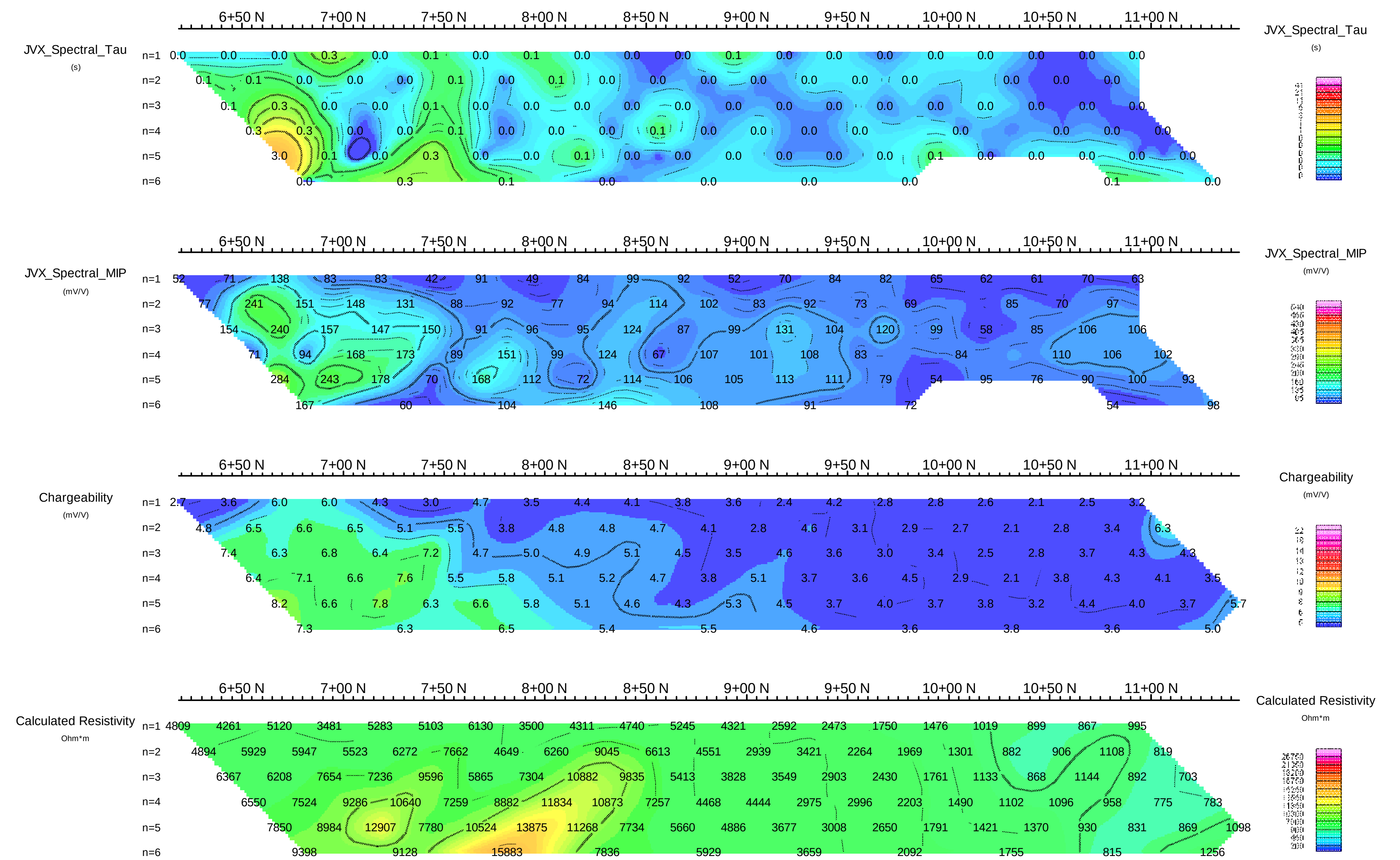


OPAWICA EXPLORATIONS INC.

NORTH GRID – OPAWICA SOUTH PROPERTY
MATACHEWAN – ONTARIO
NTS: 41 P/15

Date: 29/08/2007
Instrument: Rx (2 sec): Scintrex IPR12. Tx (2 sec): Scintrex IPC-7

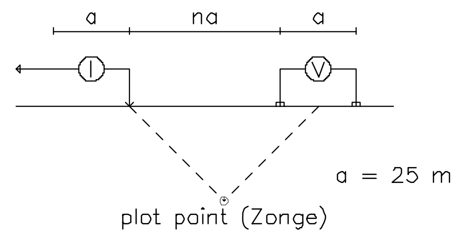
JVX LTD., ref. 7-69



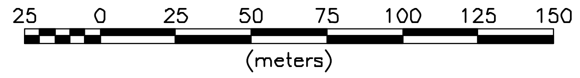
Pseudo Section Plot

0+06 W

Pole–Dipole Array



Scale 1:2500

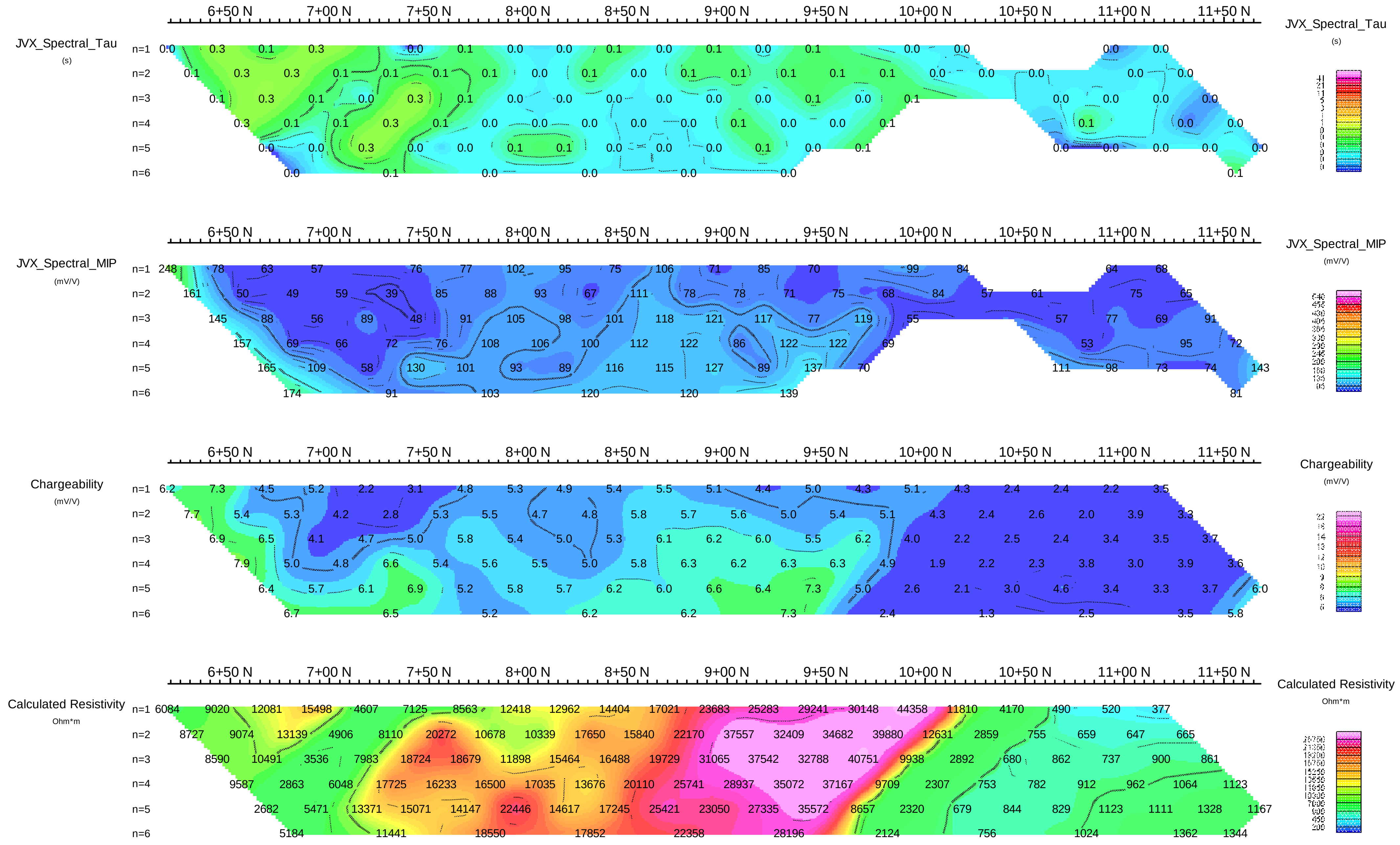


OPAWICA EXPLORATIONS INC.

NORTH GRID – OPAWICA SOUTH PROPERTY
MATACHEWAN – ONTARIO
NTS: 41 P/15

Date: 29/08/2007
Instrument: Rx (2 sec): Scintrex IPR12, Tx (2 sec): Scintrex IPC-7

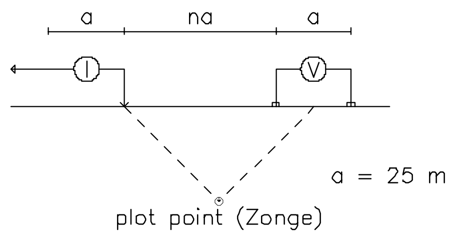
JVX LTD., ref. 7-69



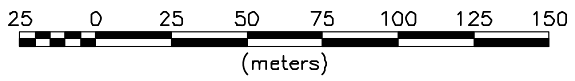
Pseudo Section Plot

0+07 W

Pole-Dipole Array



Scale 1:2500

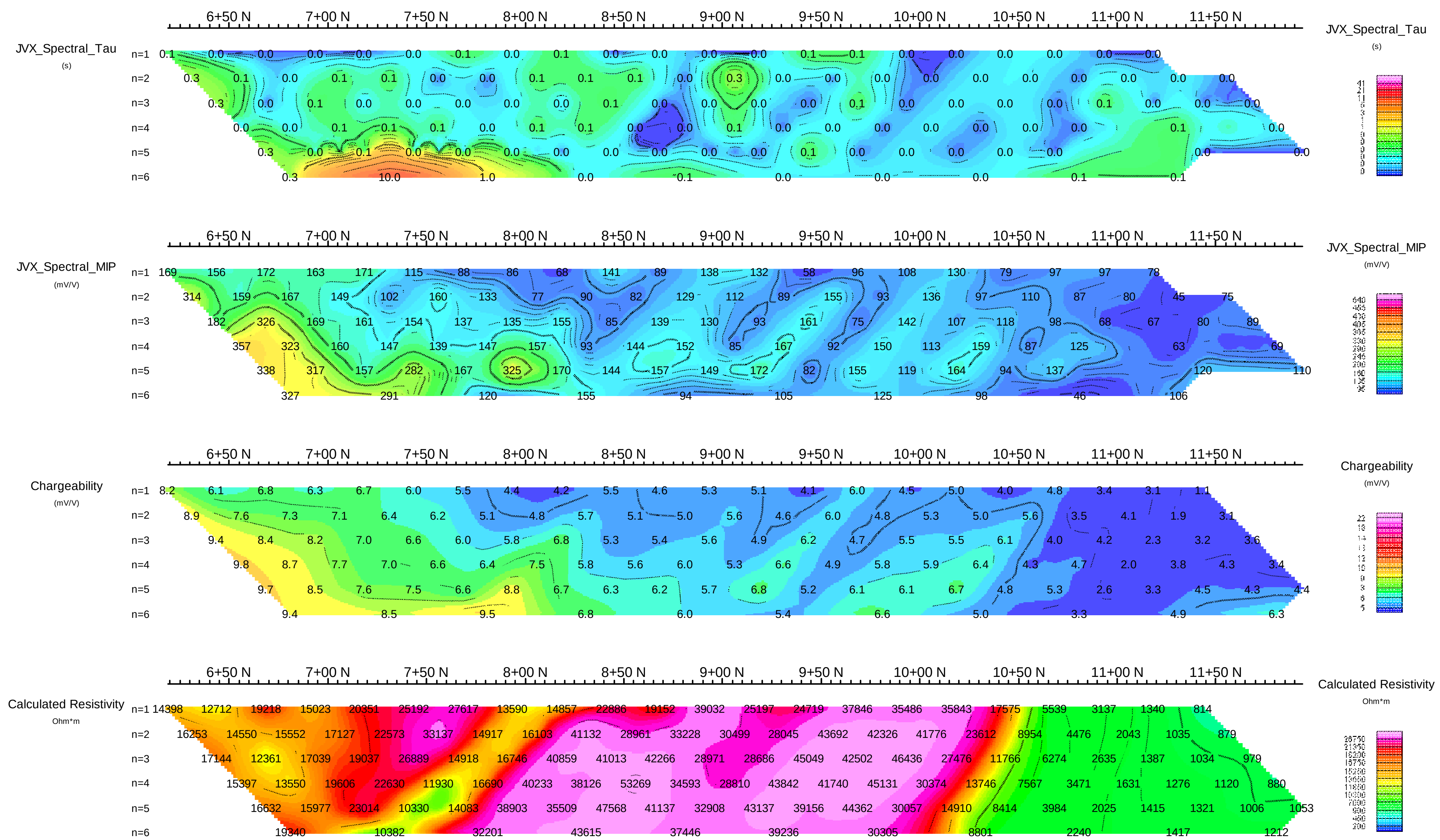


OPAWICA EXPLORATIONS INC.

NORTH GRID – OPAWICA SOUTH PROPERTY
MATACHEWAN – ONTARIO
NTS: 41 P/15

Date: 28/08/2007
Instrument: Rx (2 sec): Scintrex IPR12, Tx (2 sec): Scintrex IPC-7

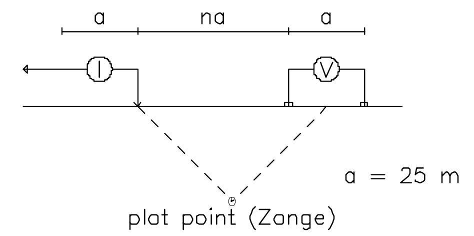
JVX LTD., ref. 7-69



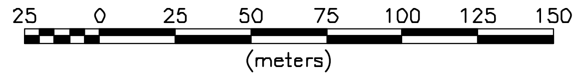
Pseudo Section Plot

0+08 W

Pole-Dipole Array



Scale 1:2500

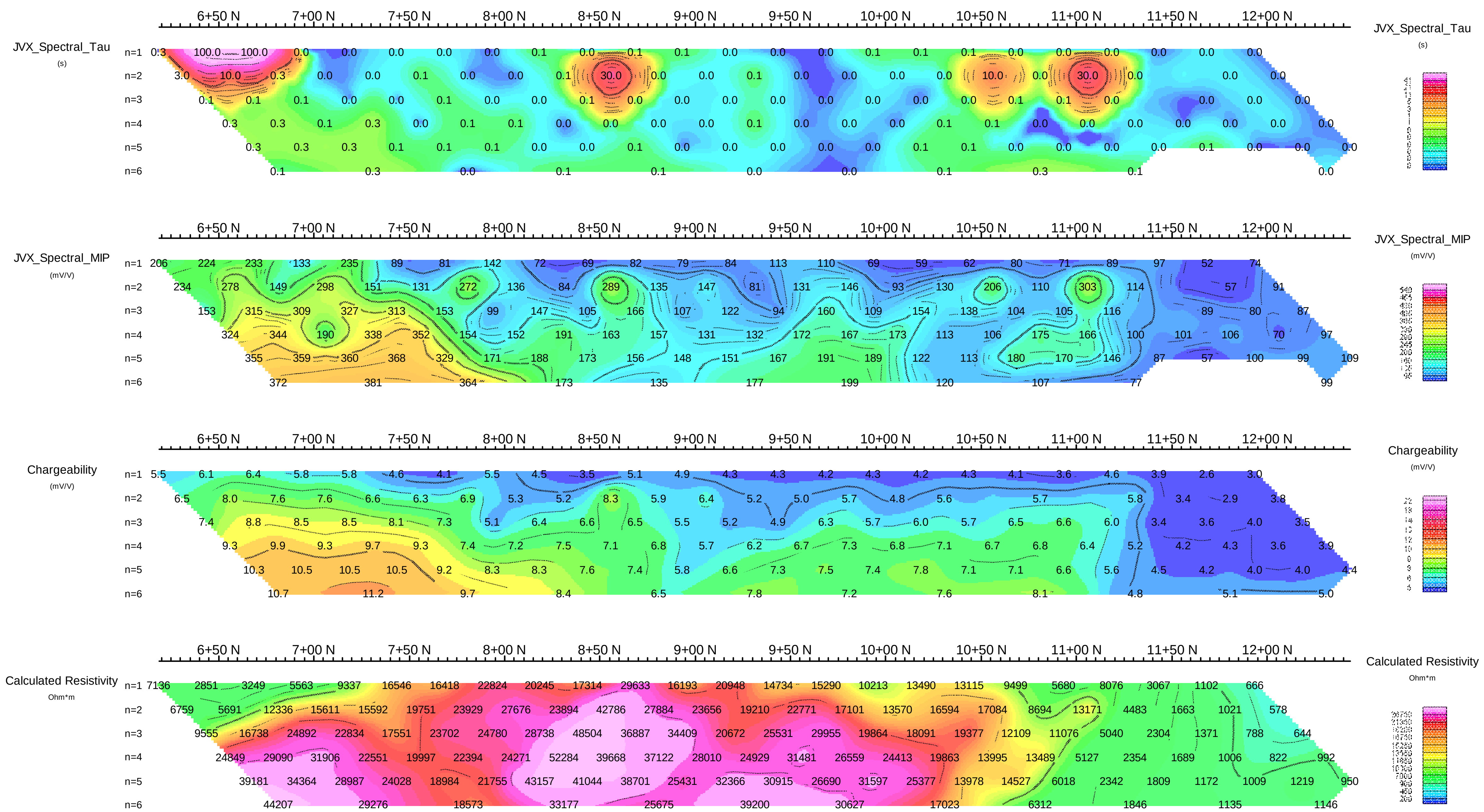


OPAWICA EXPLORATIONS INC.

NORTH GRID – OPAWICA SOUTH PROPERTY
MATACHEWAN – ONTARIO
NTS: 41 P/15

Date: 27/08/2007
Instrument: Rx (2 sec): Scintrex IPR12, Tx (2 sec): Scintrex IPC-7

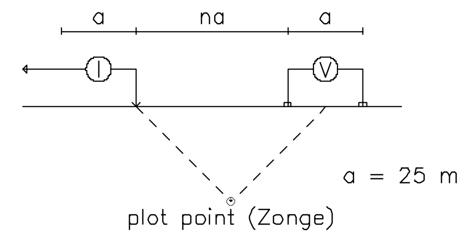
JVX LTD., ref. 7-69



Pseudo Section Plot

0+09 W

Pole-Dipole Array



Scale 1:2500

25 0 25 50 75 100 125 150

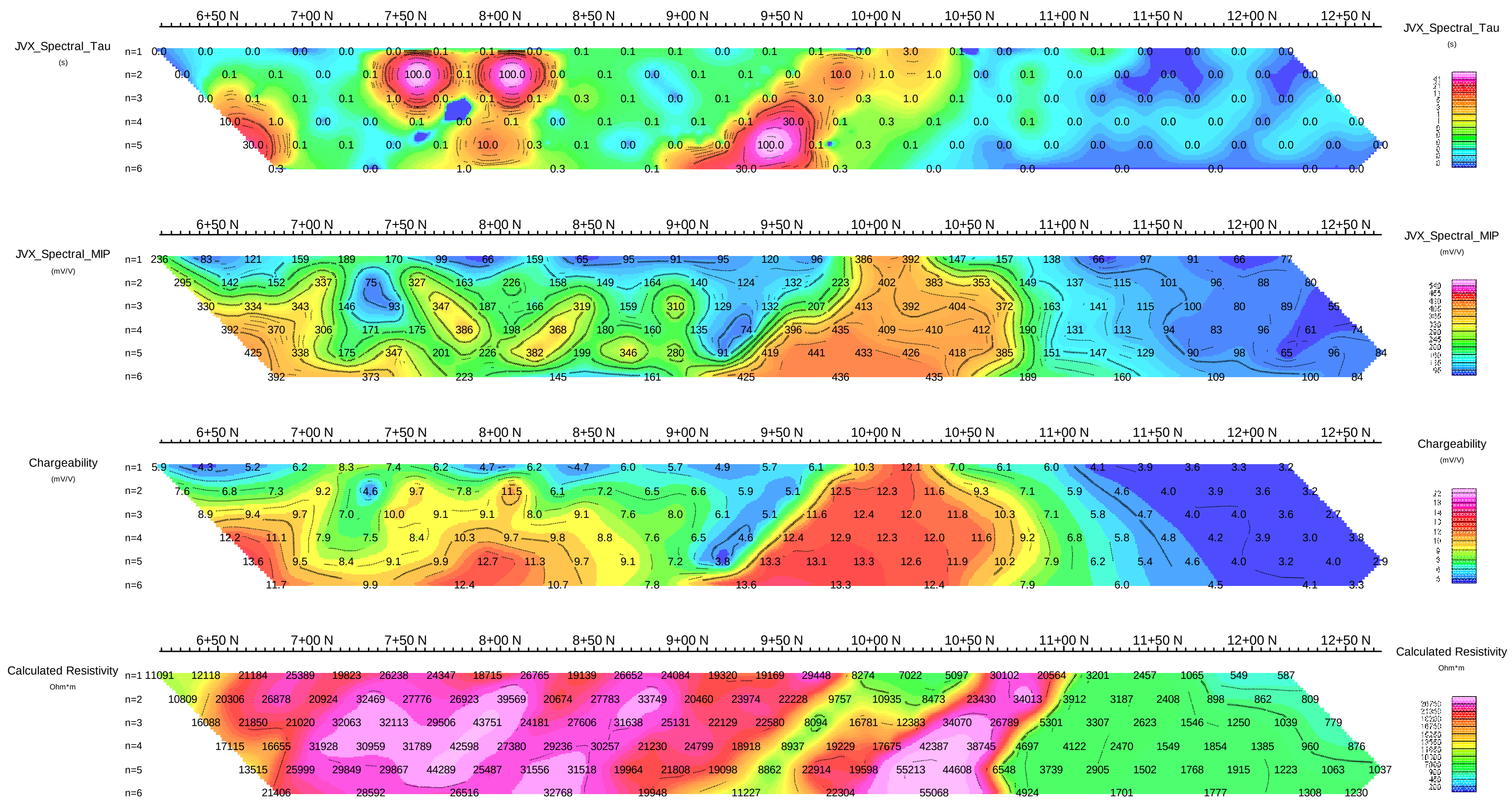
(meters)

OPAWICA EXPLORATIONS INC.

NORTH GRID - OPAWICA SOUTH PROPERTY
MATACHEWAN - ONTARIO
NTS: 41 P/15

Date: 19/09/2007
Instrument: Rx (2 sec): Scintrex IPR12, Tx (2 sec): Scintrex IPC-7

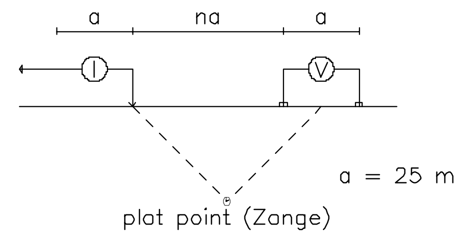
JVX LTD., ref. 7-69



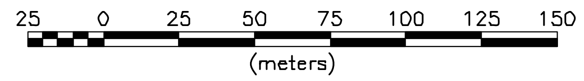
Pseudo Section Plot

0+10 W

Pole–Dipole Array



Scale 1:2500

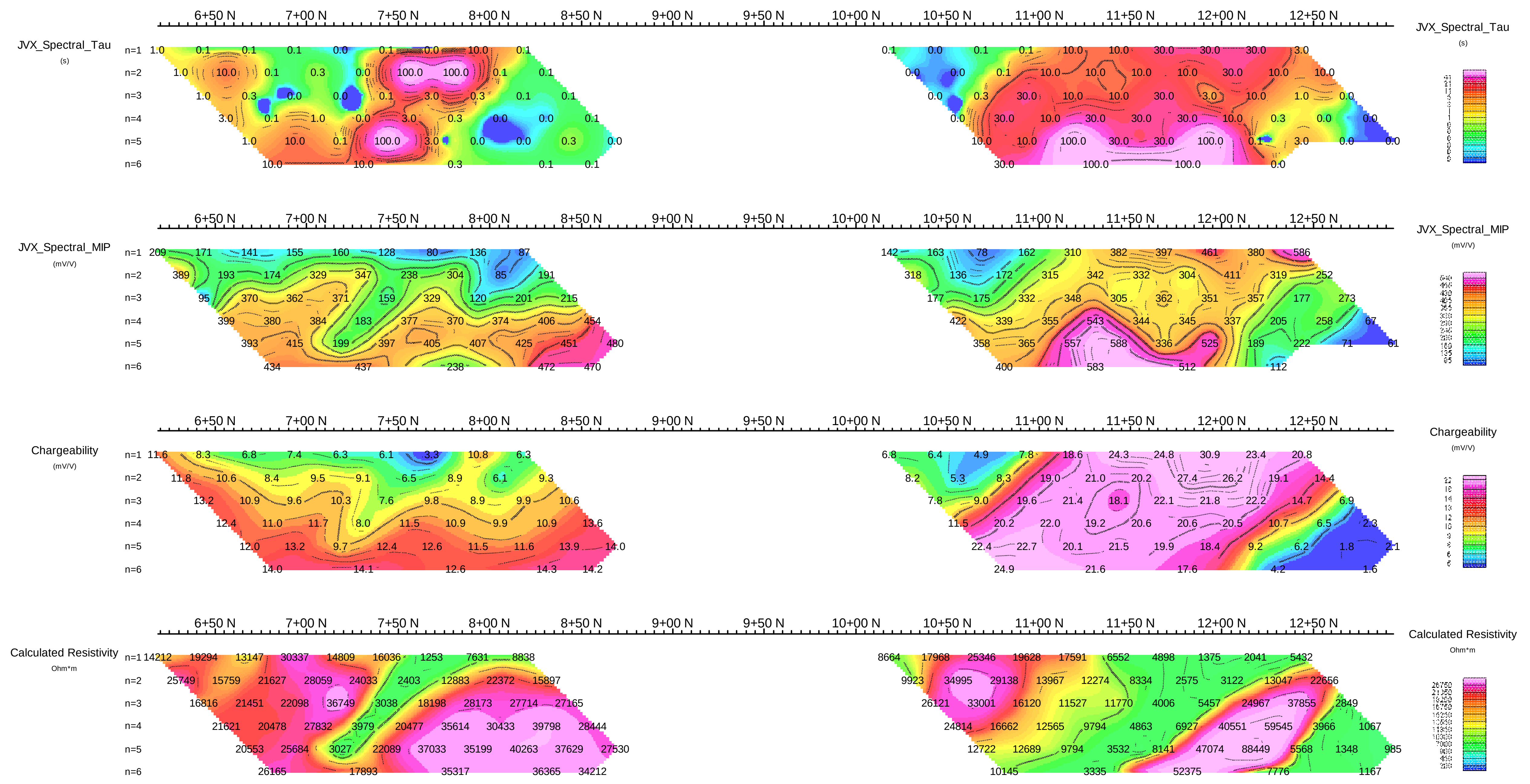


OPAWICA EXPLORATIONS INC.

NORTH GRID – OPAWICA SOUTH PROPERTY
MATACHEWAN – ONTARIO
NTS: 41 P/15

Date: 27/08/2007
Instrument: Rx (2 sec): Scintrex IPR12, Tx (2 sec): Scintrex IPC-7

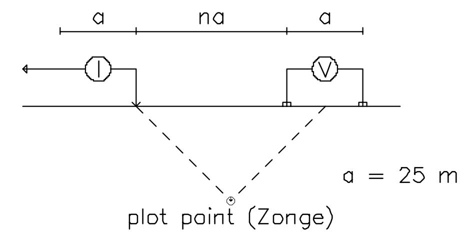
JVX LTD., ref. 7-69



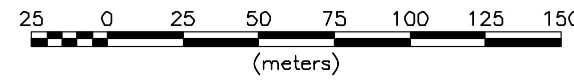
Pseudo Section Plot

0+11 W

Pole-Dipole Array



Scale 1:2500

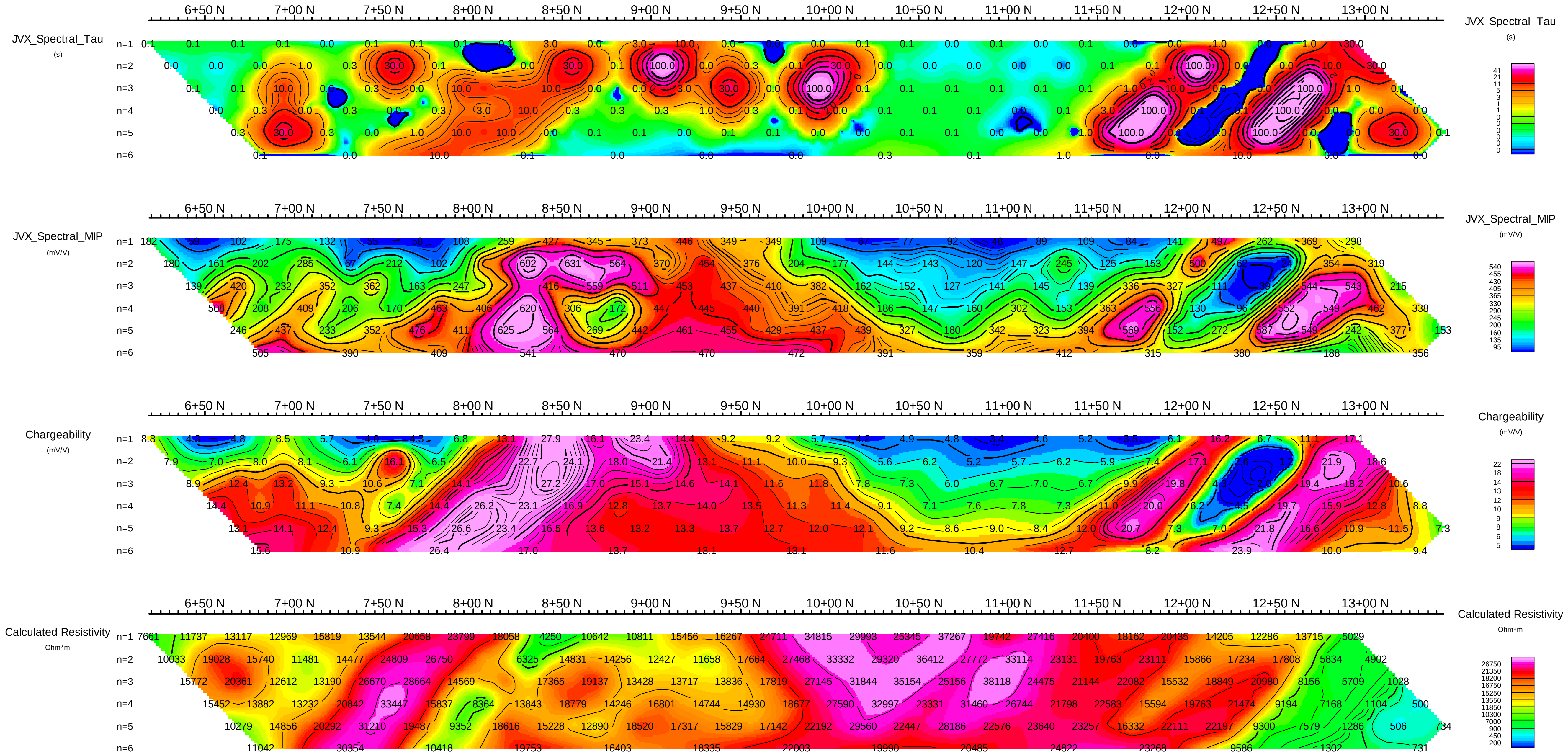


OPAWICA EXPLORATIONS INC.

NORTH GRID – OPAWICA SOUTH PROPERTY
MATACHEWAN – ONTARIO
NTS: 41 P/15

Date: 27/08/2007
Instrument: Rx (2 sec): Scintrex IPR12, Tx (2 sec): Scintrex IPC-7

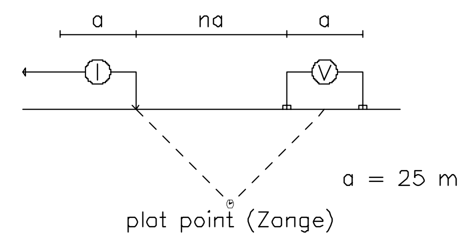
JVX LTD., ref. 7-69



Pseudo Section Plot

0+12 W

Pole-Dipole Array



Scale 1:2500

25 0 25 50 75 100 125 150

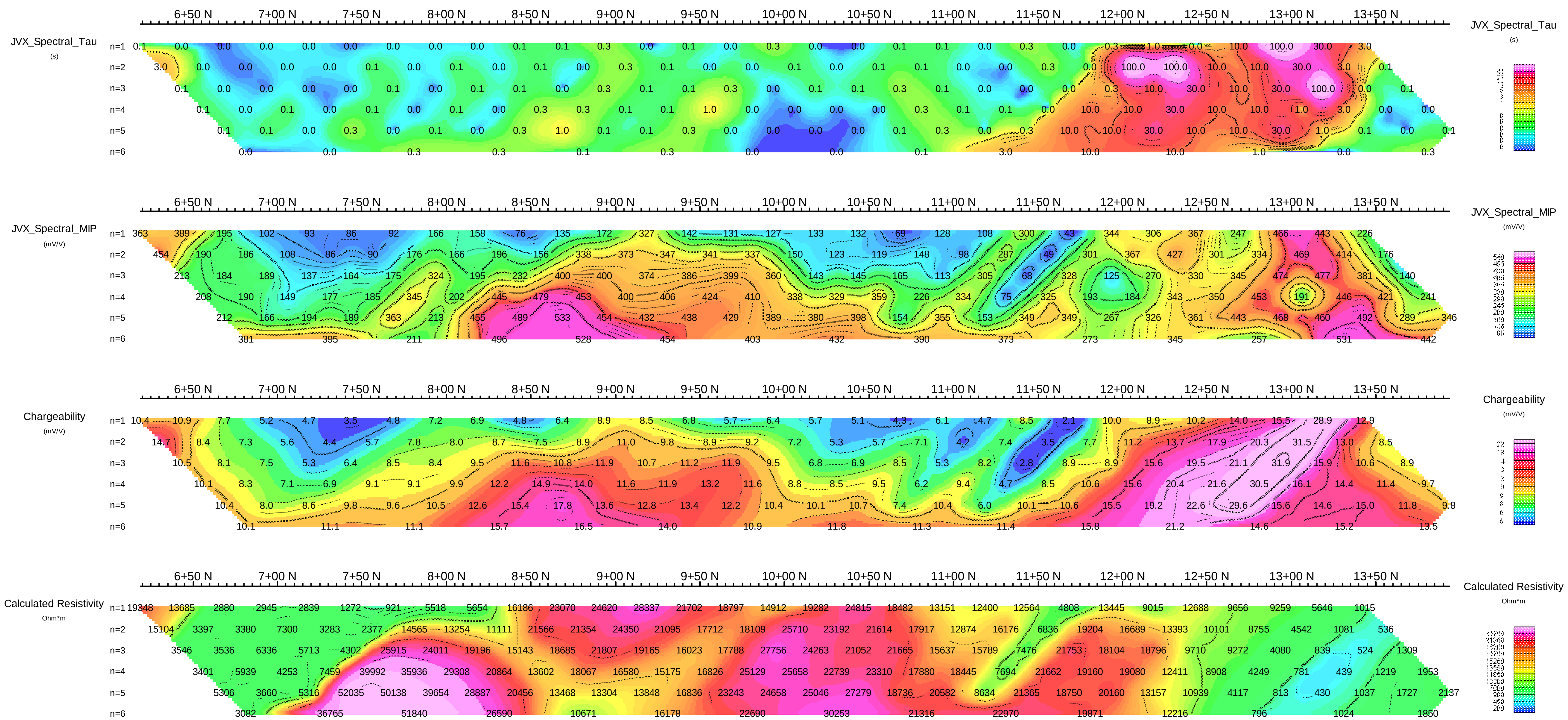
(meters)

OPAWICA EXPLORATIONS INC.

NORTH GRID – OPAWICA SOUTH PROPERTY
MATACHEWAN – ONTARIO
NTS: 41 P/15

Date: 27/08/2007
Instrument: Rx (2 sec): Scintrex IPR12, Tx (2 sec): Scintrex IPC-7

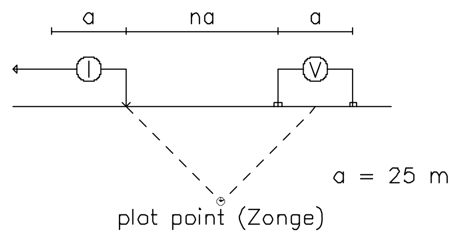
JVX LTD., ref. 7-69



Pseudo Section Plot

0+13 W

Pole-Dipole Array



Scale 1:2500

25 0 25 50 75 100 125 150

(meters)

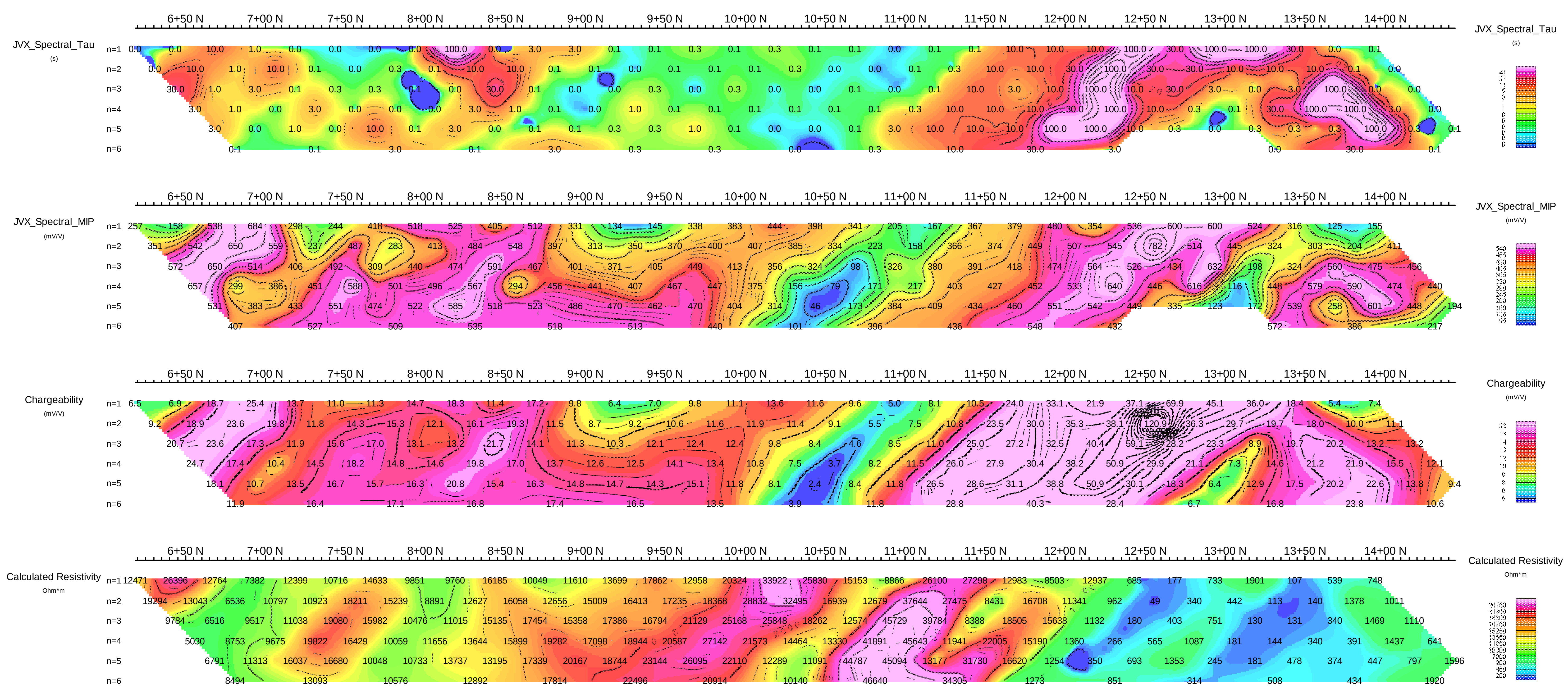
OPAWICA EXPLORATIONS INC.

NORTH GRID – OPAWICA SOUTH PROPERTY
MATACHEWAN – ONTARIO
NTS: 41 P/15

Date: 27/08/2007

Instrument: Rx (2 sec): Scintrex IPR12, Tx (2 sec): Scintrex IPC-7

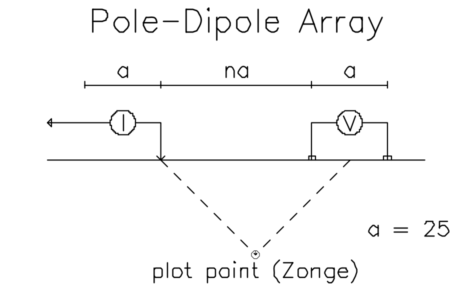
JVX LTD., ref. 7-69



Pseudo Section Plot

0+14 W

Pole-Dipole Array



Scale 1:2500

25 0 25 50 75 100 125 150

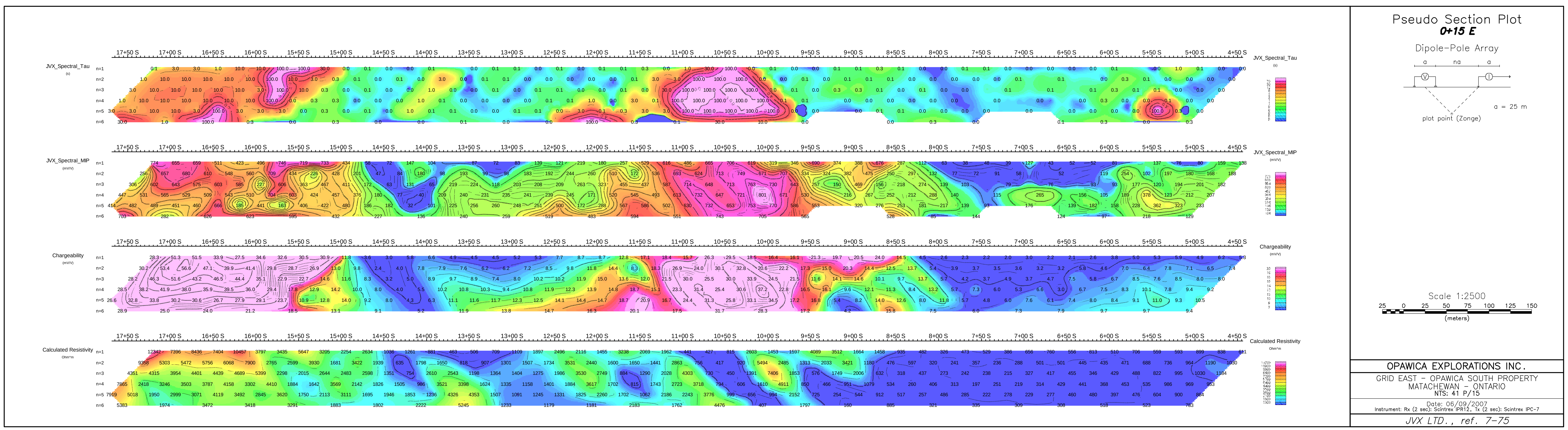
(meters)

OPAWICA EXPLORATIONS INC.

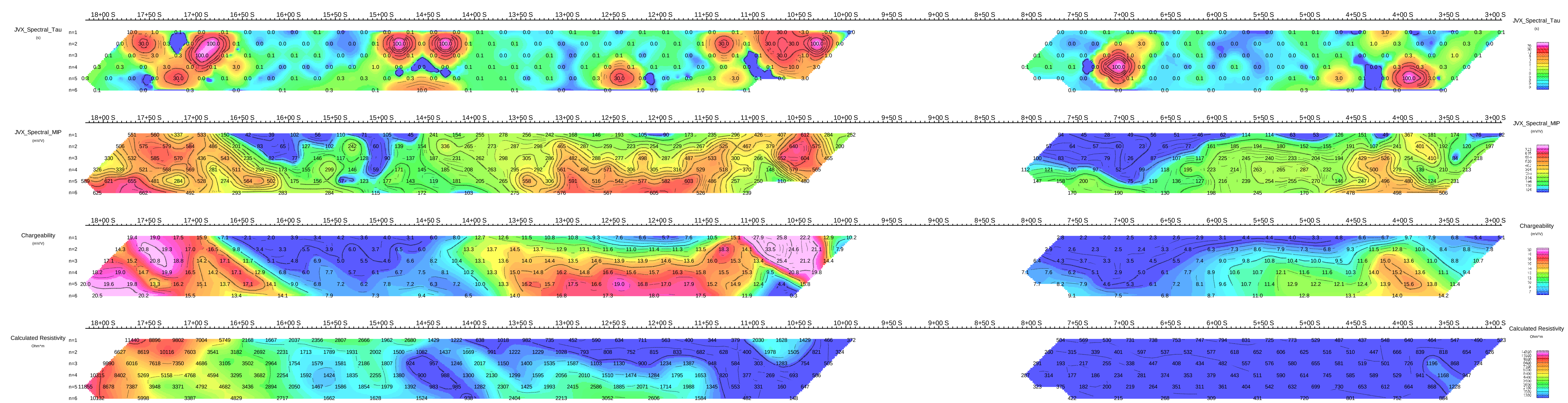
NORTH GRID - OPAWICA SOUTH PROPERTY
MATACHEWAN - ONTARIO
NTS: 41 P/15

Date: 27/08/2007
Instrument: Rx (2 sec): Scintrex IPR12, Tx (2 sec): Scintrex IPC-7

JVX LTD., ref. 7-69



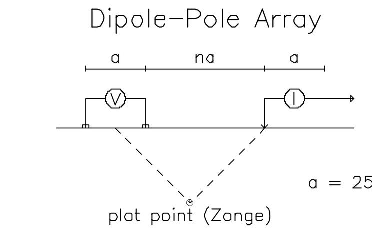
JVX_Spectral_Tau
JVX_Spectral_MIP
Chargeability
Calculated Resistivity
17+50 S
17+00 S
16+50 S
16+00 S
15+50 S
15+00 S
14+50 S
14+00 S
13+50 S
13+00 S
12+50 S
12+00 S
11+50 S
11+00 S
10+50 S
10+00 S
9+50 S
9+00 S
8+50 S
8+00 S
7+50 S
7+00 S
6+50 S
6+00 S
5+50 S
5+00 S
4+50 S
n=1
n=2
n=3
n=4
n=5
n=6
Pseudo Section Plot
0+15 E
Dipole-Pole Array
a
na
a
a = 25 m
plot point (Zonge)
Scale 1:2500
25 0 25 50 75 100 125 150
(meters)
OPAWICA EXPLORATIONS INC.
GRID EAST - OPAWICA SOUTH PROPERTY
MATACHEWAN - ONTARIO
NTS: 41 P/15
Date: 06/09/2007
Instrument: Rx (2 sec): Scintrex IPR12, Tx (2 sec): Scintrex IPC-7
JVX LTD., ref. 7-75



Pseudo Section Plot

0+16 E

Dipole–Pole Array



Scale 1:2500

25 0 25 50 75 100 125 150

(meters)

OPAWICA EXPLORATIONS INC.

GRID EAST- OPAWICA SOUTH PROPERTY
MATACHEWAN – ONTARIO
NTS: 41 P/15

Date: 19/09/2007
Instrument: Rx (2 sec): Scintrex IPR12, Tx (2 sec): Scintrex IPC-7

JVX LTD., ref. 7-75

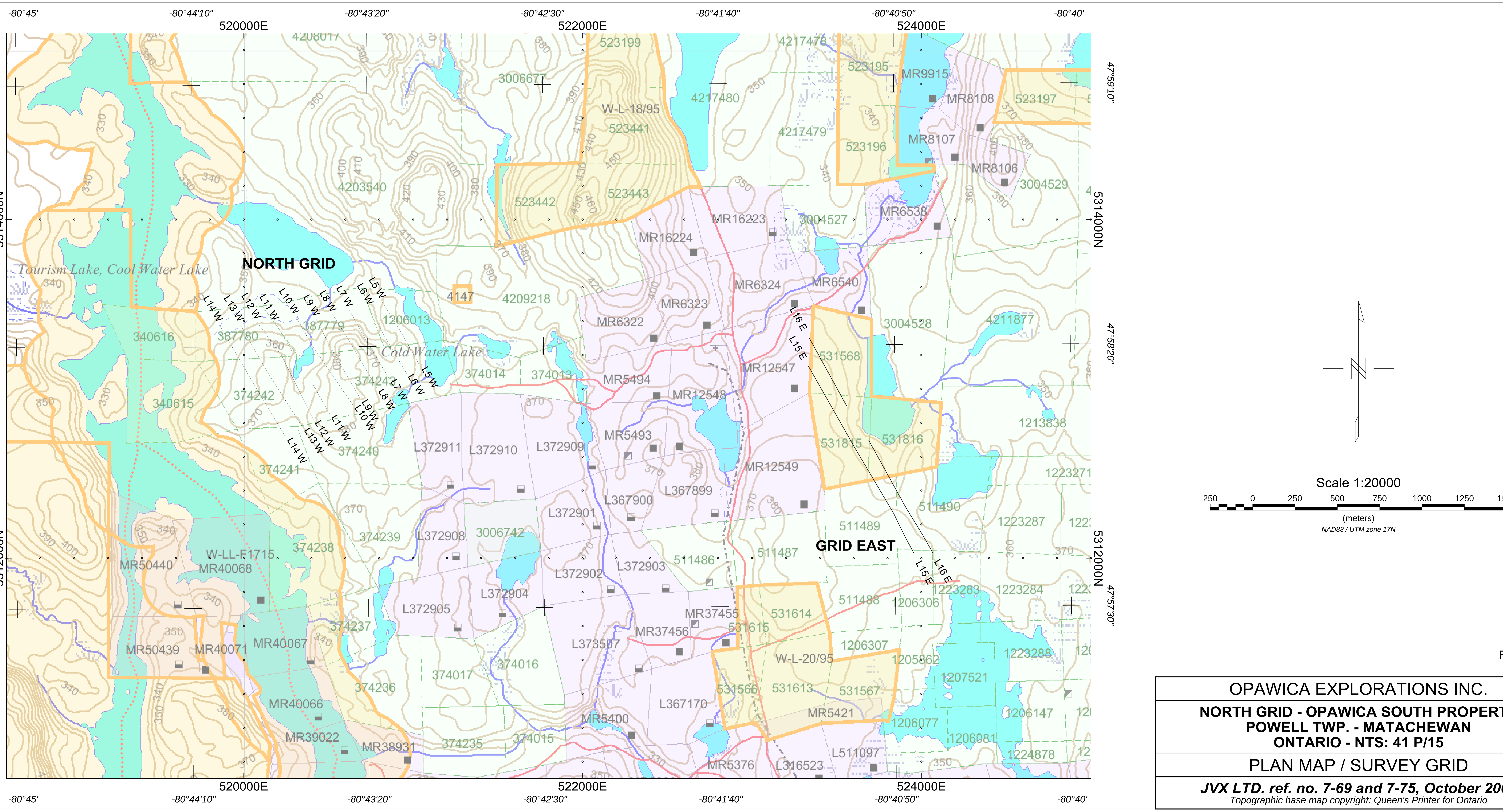


Figure 2

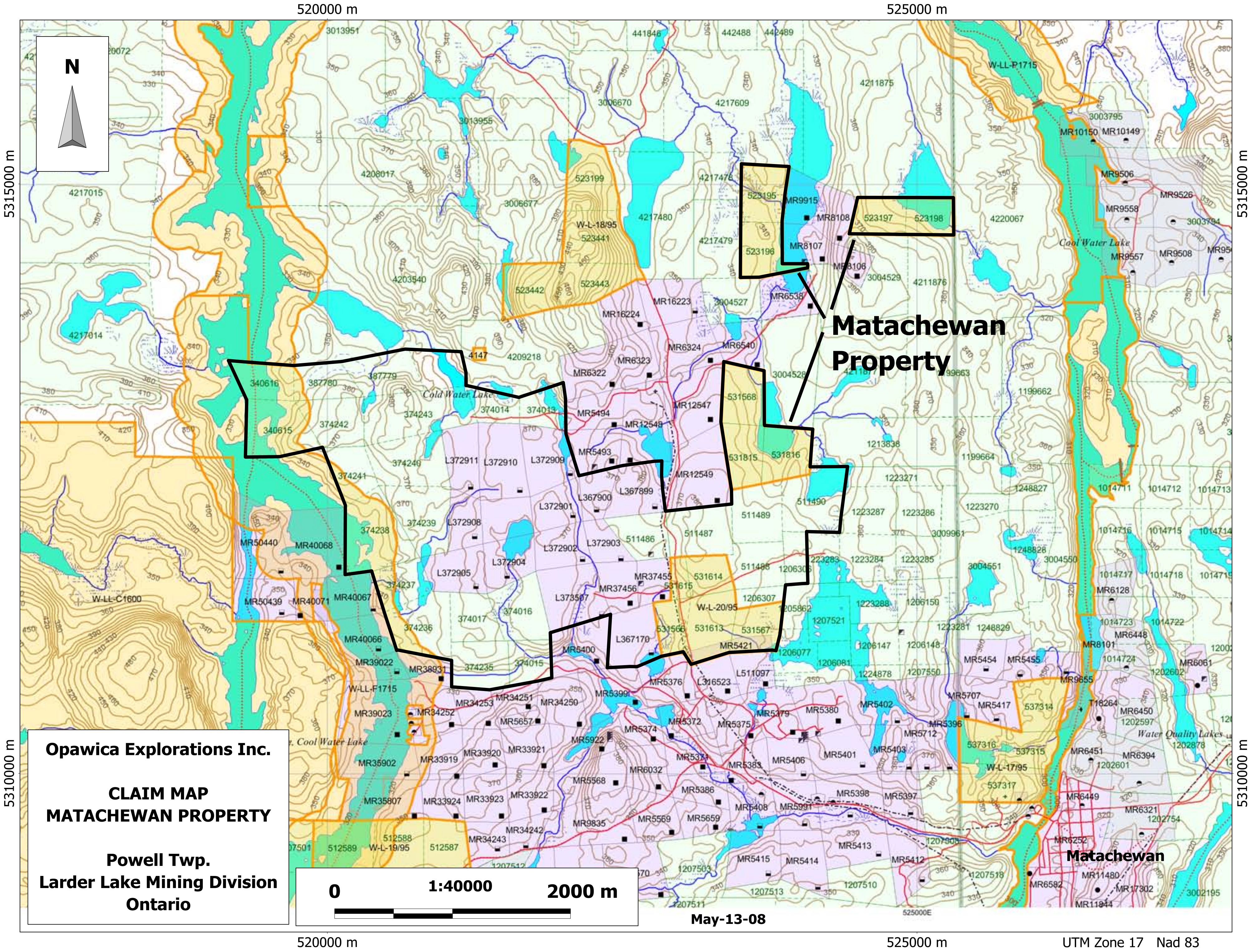
OPAWICA EXPLORATIONS INC.

NORTH GRID - OPAWICA SOUTH PROPERTY
POWELL TWP. - MATACHEWAN
ONTARIO - NTS: 41 P/15

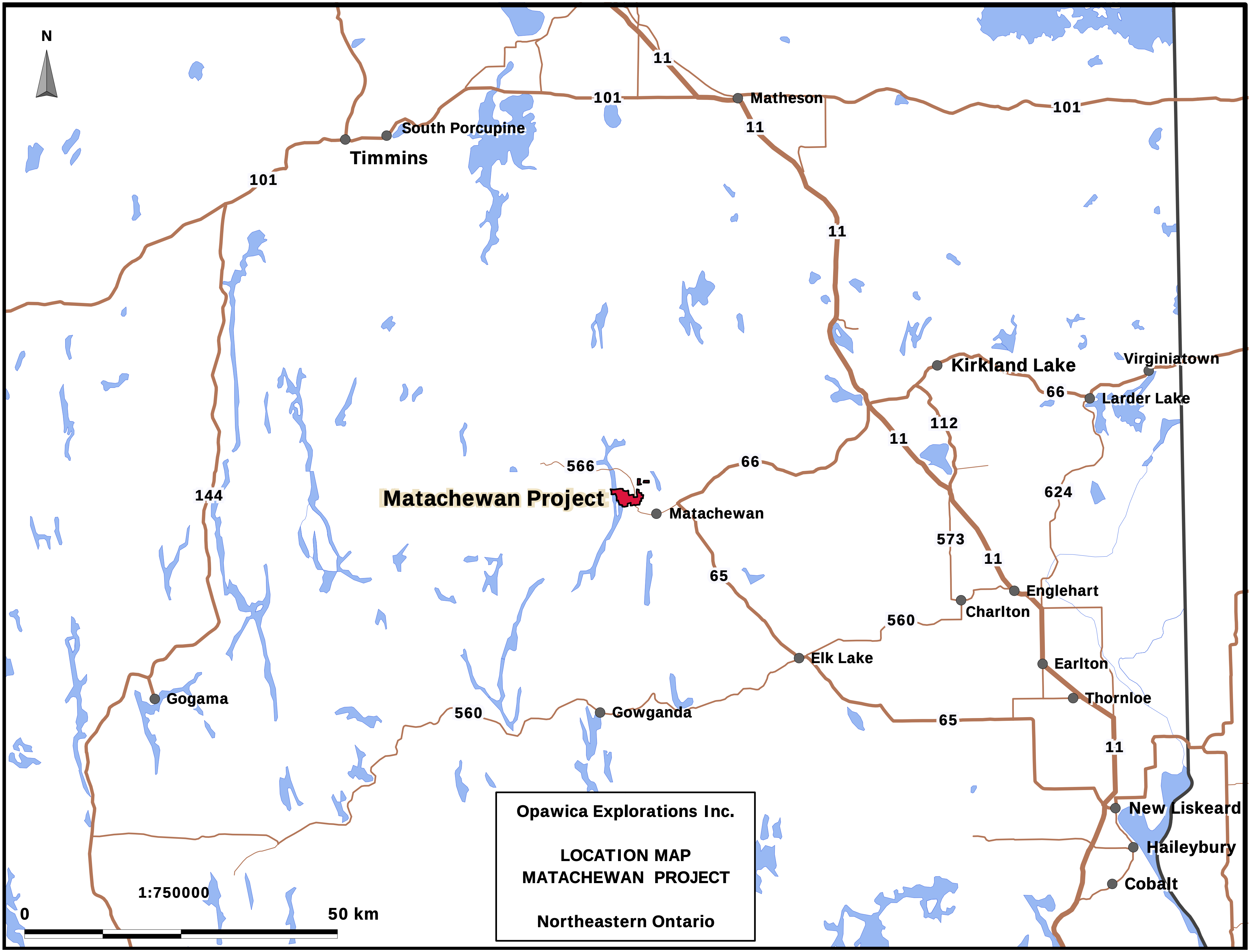
PLAN MAP / SURVEY GRID

JVX LTD. ref. no. 7-69 and 7-75, October 2007

Topographic base map copyright: Queen's Printer for Ontario



520000 m
525000 m
N
5315000 m
5310000 m
Matachewan Property
Cold Water Lake
Cool Water Lake
Water Quality Lakes
Matachewan
Opawica Explorations Inc.
CLAIM MAP
MATACHEWAN PROPERTY
Powell Twp.
Larder Lake Mining Division
Ontario
0
1:40000
2000 m
May-13-08
UTM Zone 17 Nad 83


N
11
101
Matheson
101
South Porcupine
Timmins
11
101
11
Kirkland Lake
Virginiatown
66
Larder Lake
112
11
566
66
144
Matachewan Project
Matachewan
624
573
11
65
Englehart
Charlton
560
Elk Lake
Earlton
Gogama
Thornloe
560
Gowganda
65
11
New Liskeard
Haileybury
Cobalt
1:750000
0
50 km
Opawica Explorations Inc.
LOCATION MAP
MATACHEWAN PROJECT
Northeastern Ontario


OPAWICA EXPLORATIONS INC.
Matachewan Project
GRID LOCATION PLAN
NORTH GRID AND GRID EAST
Powell Twp.
Matachewan Area, Northeastern Ontario
May-13-08
UTM Zone 17 N Nad 83
1:5000
0
800 m
N
North Grid
Grid East
Ryan Lake Mine
Ryan Lake
Little Hawley Lake
Mistinikon Lake
Bell Island
Otisse Lake
YD
MCM
HWY 566
520000 m
521000 m
522000 m
523000 m
524000 m
5313000 m
5312000 m
5311000 m
5310000 m
340616
340615
387780
387779
1206013
374243
374242
374241
374240
374014
374013
L372911
L372910
L372909
L367900
L367899
L372901
374239
374238
L372908
3006742
L372902
L372903
511486
511487
511489
511490
531568
531815
531816
L372904
L372905
374237
MR37455
MR37456
531615
531614
511488
1206306
1206307
L373507
374016
374017
374236
531566
531613
531567
L367170
MR5421
374235
374015
L 5W
L 6W
L 7W
L 8W
L 9W
L 10W
L 11W
L 12W
L 13W
L 14W
L 15E
L 16E