November 2005 Shadow Flicker Simulations

Project:
030326 Kittitas

Description:
SIEMENS 90m 2.3 MW MkII at 80m hub height
Shadow receptor Pearson North (047flat), Brown (086flat), PTASZYNSKI (900flat), Pearson South (118flat), ENGELSTAD (810flat), JONES (850flat), TATE (820flat)
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
Turbines A-04-07, B-03-07
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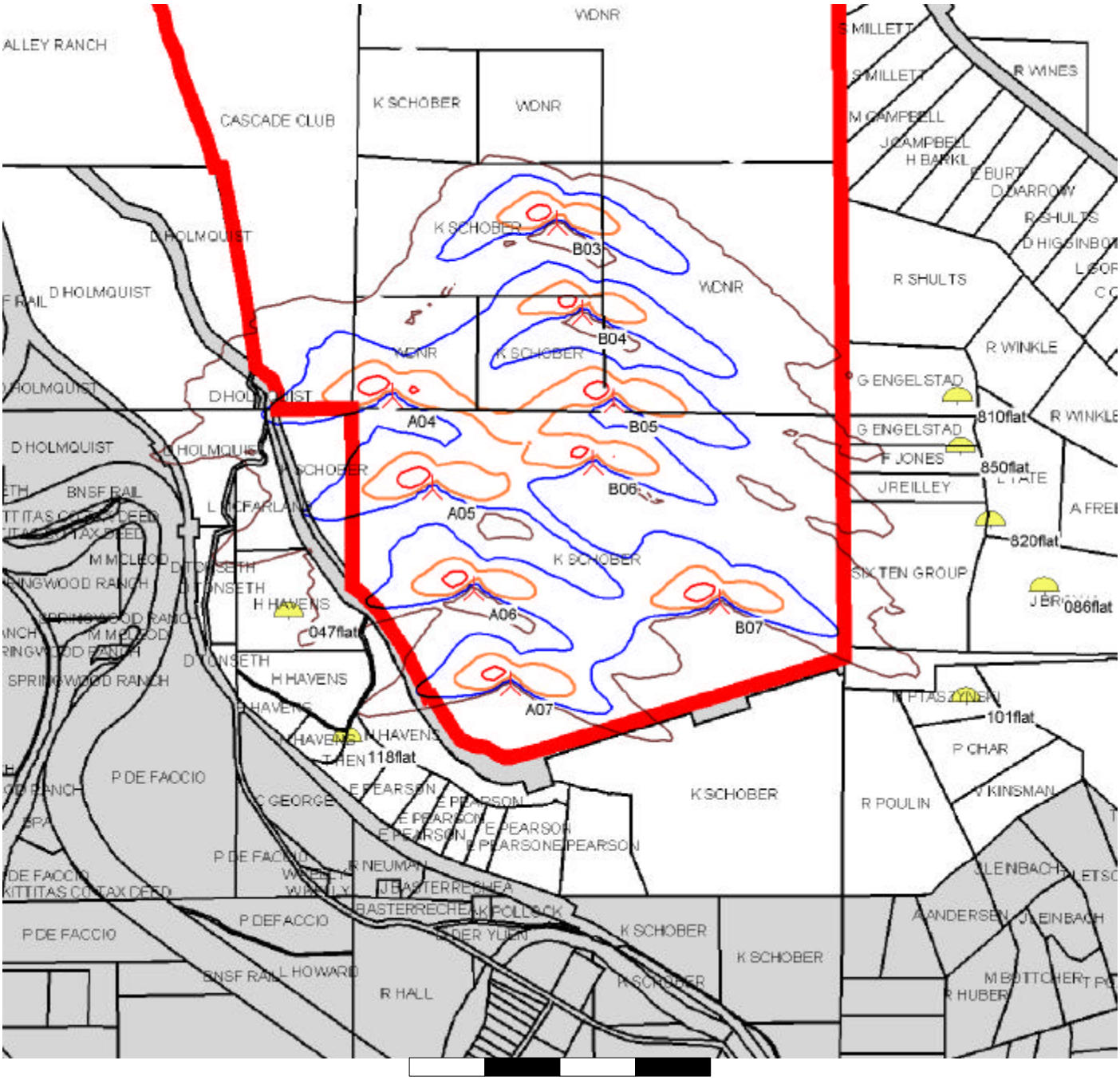
SHADOW - kv simply parcels 110405, wt_2

Calculation: 051111 SF, A, B and G, on 047, 086, 118, 810, 820, 850, 900 **File:** kv simply parcels 110405, wt_2.bmi



Map: kv simply parcels 110405, wt_2 , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 674,523 North: 5,220,112

New WTG Shadow receptor

Isolines showing shadow in Shadow hours|per year. Real value calculation.

25 50 100 200

Project:
030326 Kittitas

Description:
SIEMENS 90m 2.3 MW MkII at 80m hub height
Shadow receptor Rainbow Valley Ranch (041flat), Archambeau (042flat), Ahles (370flat), Henley (380flat), Yeager (420flat), Hink (440flat), Thayer (470flat and 480flat)
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
Turbines F-01, F-02, G-01 through G-04
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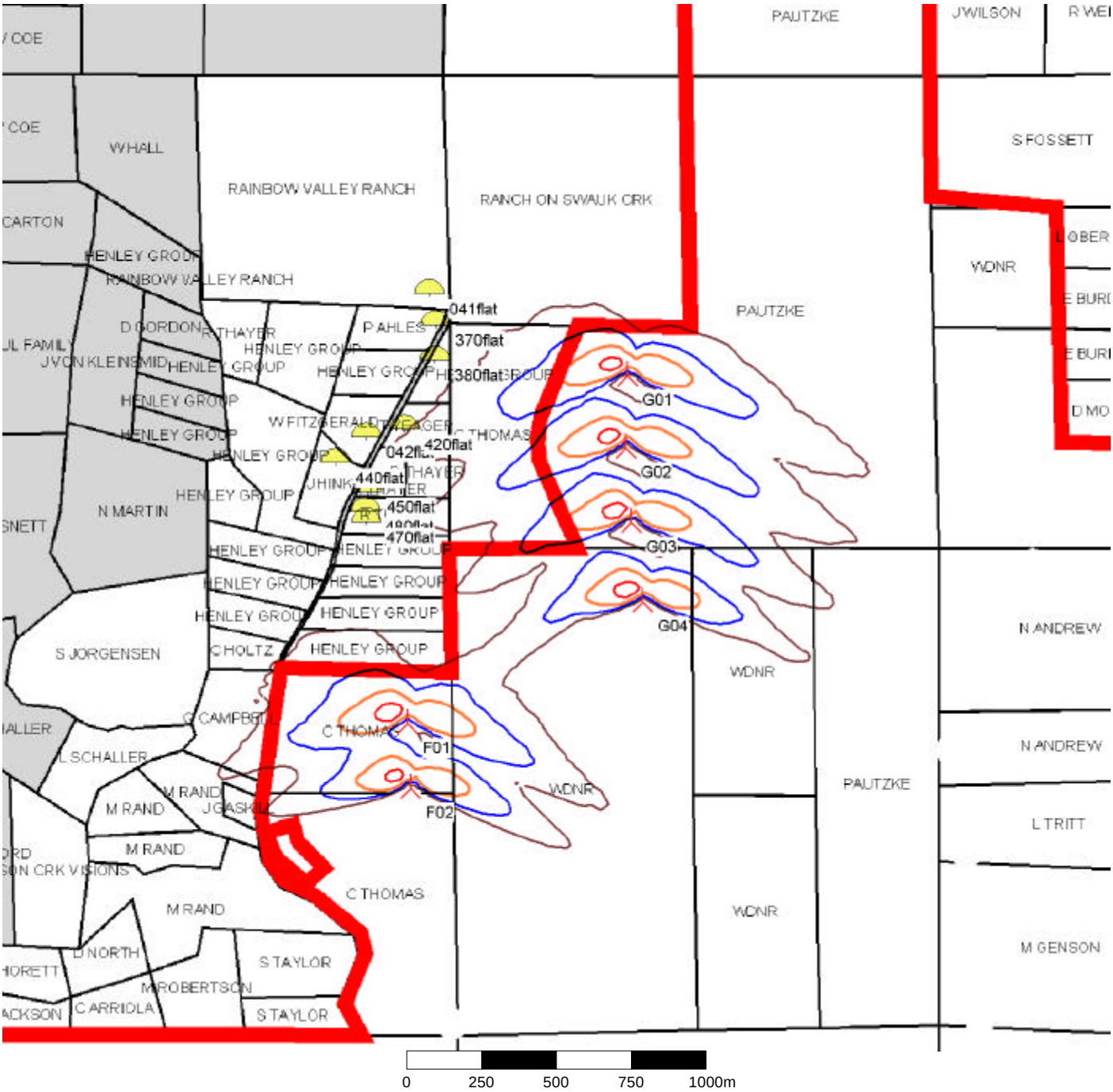
SHADOW - kv simply parcels 110405, wt_2

Calculation: 051108 SF, F-G, on 041, 042, 370-380, 420, 440, 450, 470, 480 **File:** kv simply parcels 110405, wt_2.bmi



Map: kv simply parcels 110405, wt_2 , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 674,023 North: 5,225,412

New WTG Shadow receptor

Isolines showing shadow in Shadow hours|per year. Real value calculation.

25 50 100 200

Project:
030326 Kittitas

Description:
SIEMENS 90m 2.3 MW MkII at 80m hub height
Shadow receptor Anthony (043flat), Gaskill (044flat), Taylor (045flat),
Jackson (149flat), North (150flat), Robertson (555flat)
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
Turbines E-02-05, F-01-06, G-01-04 (no E-01)
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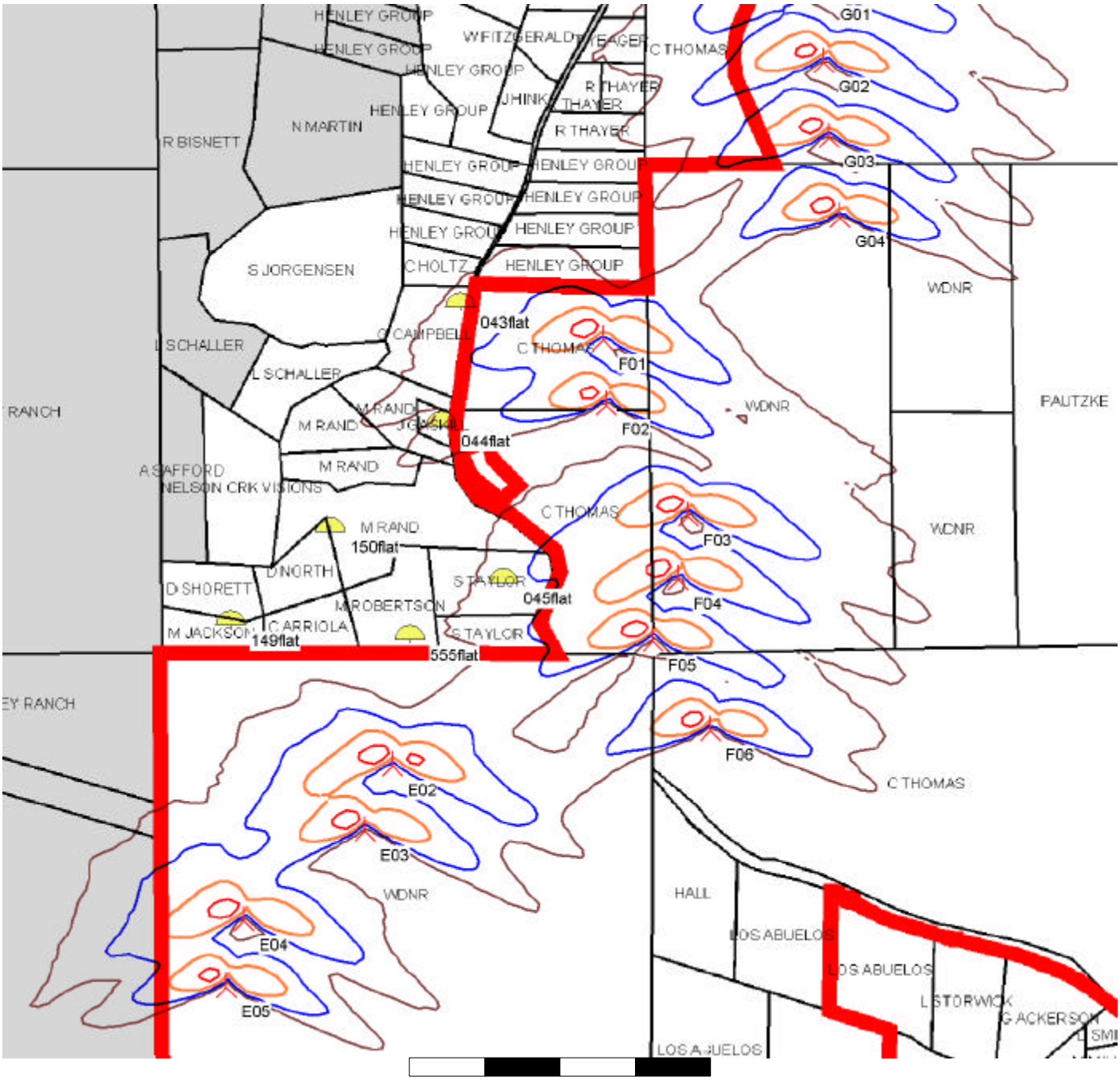
SHADOW - kv simply parcels 110405, wt_2

Calculation: 051110 SF, E (-1), F and G, on 043-045, 149-150, 555 **File:** kv simply parcels 110405, wt_2.bmi



0 250 500 750 1000m

Map: kv simply parcels 110405, wt_2 , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 673,423 North: 5,224,112

New WTG Shadow receptor

Isolines showing shadow in Shadow hours|per year. Real value calculation.

25 50 100 200

Project:
030326 Kittitas

Description:
SIEMENS 90m 2.3 MW MkII at 80m hub height
Shadow receptor Andrew N (510flat)
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Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
Turbines H-01-07, I-03-10
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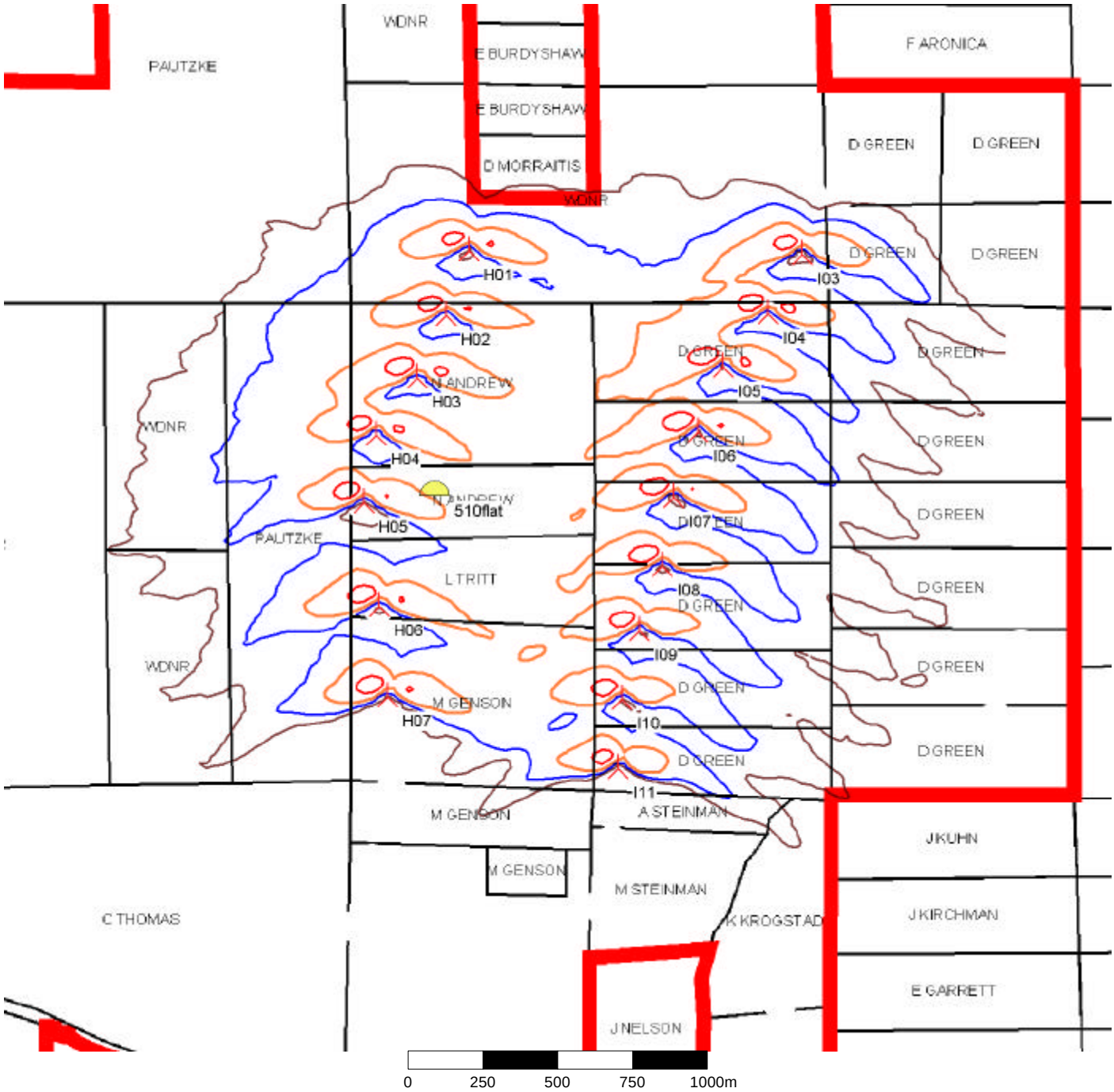
SHADOW - kv simply parcels 110405, wt_2

Calculation: 051108 SF, H and I, on 510 **File:** kv simply parcels 110405, wt_2.bmi



0 250 500 750 1000m

Map: kv simply parcels 110405, wt_2 , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 676,023 North: 5,224,662

New WTG Shadow receptor

Isolines showing shadow in Shadow hours|per year. Real value calculation.

25 50 100 200

Project:
030326 Kittitas

Description:
SIEMENS 90m 2.3 MW MkII at 80m hub height
Shadow receptor (216flat), STATR OF WASH DNR (270flat), STATR OF WASH DNR (930flat), GEREAN (340flat)
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
Turbines H-01-03, I-01-05
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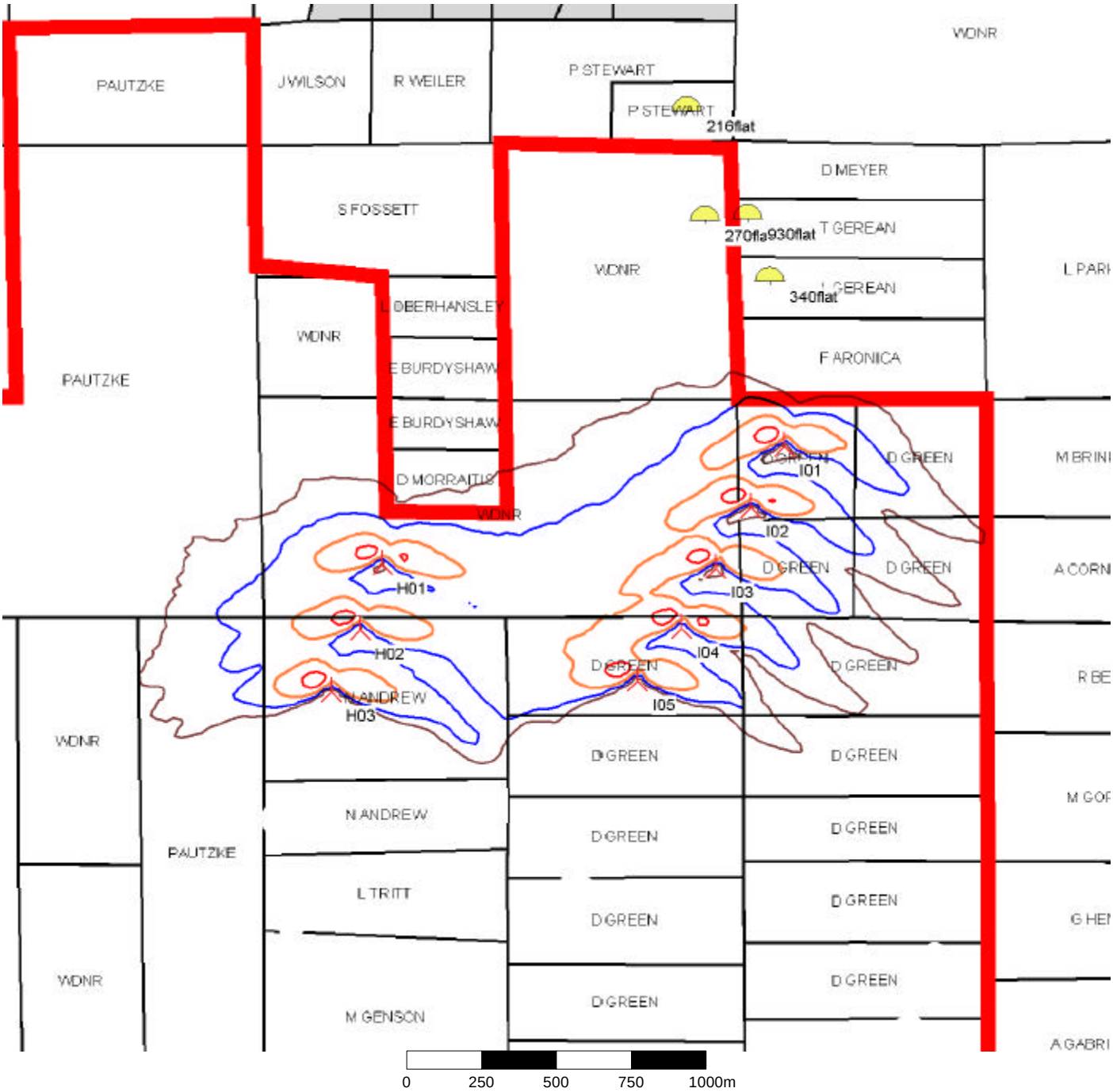
SHADOW - kv simply parcels 110405, wt_2

Calculation: 051109 SF, H and I, on 216, 270, 930, 340 **File:** kv simply parcels 110405, wt_2.bmi



Map: kv simply parcels 110405, wt_2 , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 676,273 North: 5,225,712

New WTG Shadow receptor

Isolines showing shadow in Shadow hours|per year. Real value calculation.

25 50 100 200

Project:
030326 Kittitas

Description:
SIEMENS 90m 2.3 MW MkII at 80m hub height
Shadow receptor HENRY, GREG (530flat)
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Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
Turbines K-01-02
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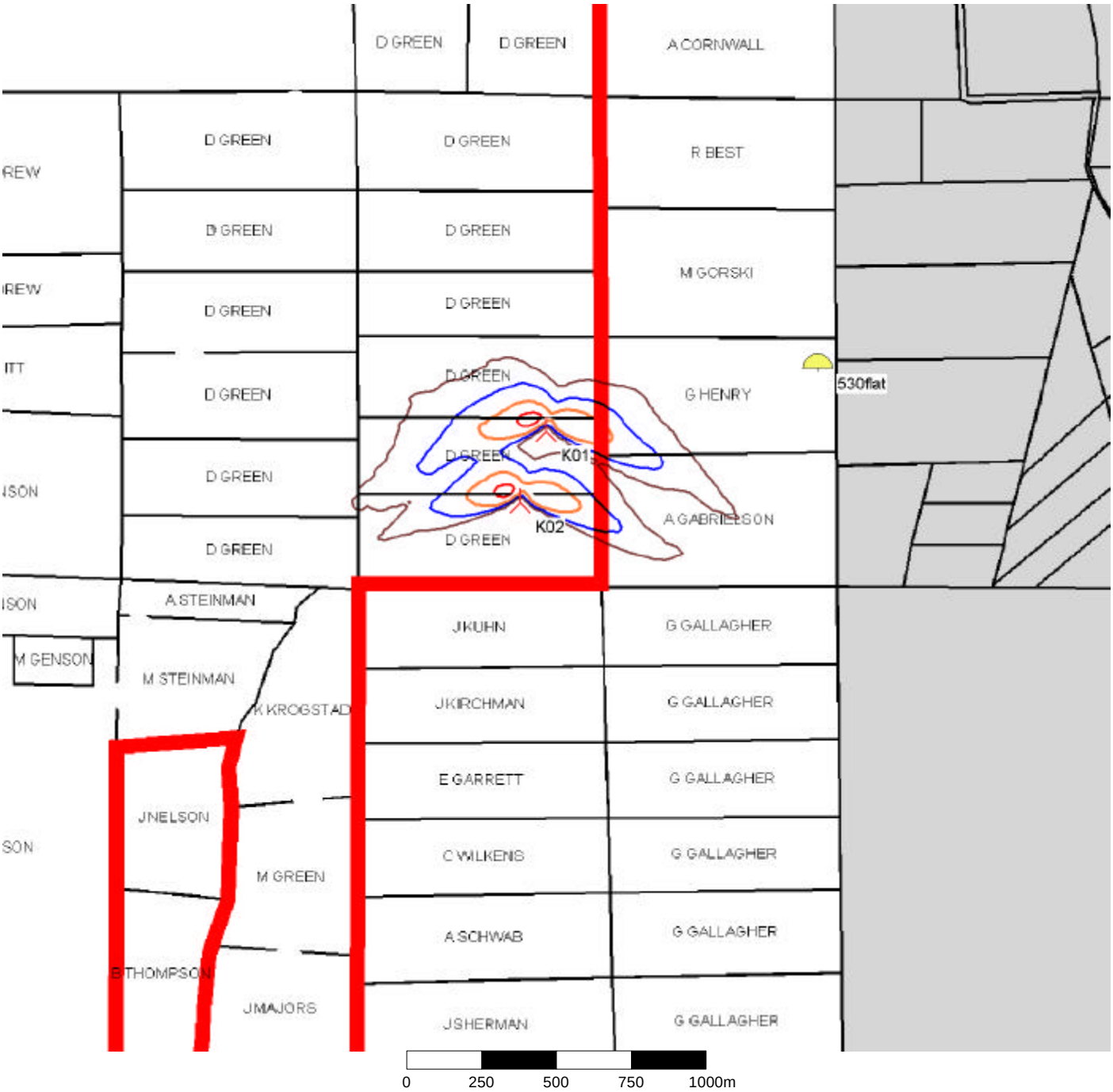
SHADOW - kv simply parcels 110405, wt_2

Calculation: 051109 SF, K, on 530 **File:** kv simply parcels 110405, wt_2.bmi



Map: kv simply parcels 110405, wt_2 , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 677,623 North: 5,224,012

New WTG Shadow receptor

Isolines showing shadow in Shadow hours|per year. Real value calculation.

25 50 100 200

Project:
030326 Kittitas

Description:
SIEMENS 90m 2.3 MW MkII at 80m hub height
Shadow receptor GENSON (570), NELSON (580), ACKERSON (590), THOMPSON (600)
SCHWAB (610) all flat
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
Turbines B-01-02, C, D, F-03-06, H-06-10, I-10-16, J, K
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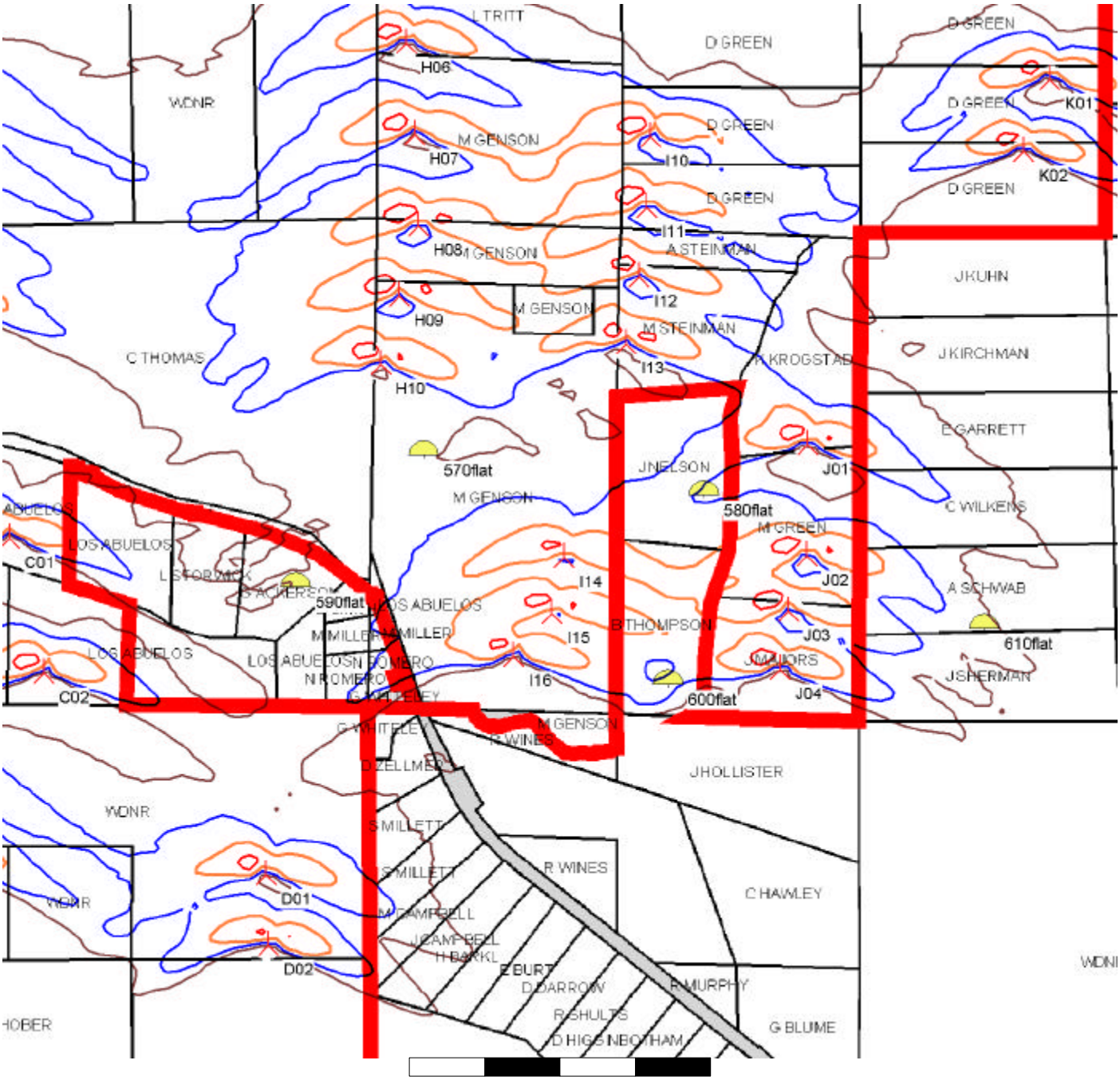
SHADOW - kv simply parcels 110405, wt_2

Calculation: 051112 SF, B, C, D, F, H I, J, K on 570, 580, 590, 600, 610 **File:** kv simply parcels 110405, wt_2.bmi



Map: kv simply parcels 110405, wt_2 , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 676,000 North: 5,222,790

New WTG Shadow receptor

Isolines showing shadow in Shadow hours|per year. Real value calculation.

25 50 100 200

Project:
030326 Kittitas

Description:
SIEMENS 90m 2.3 MW MkII at 80m hub height
Shadow receptor Pearson North (047flat), Brown (086flat), PTASZYNSKI (900flat), Pearson South (118flat), ENGELSTAD (810flat), JONES (850flat), TATE (820flat)
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
Turbines A-04-07, B-03-07
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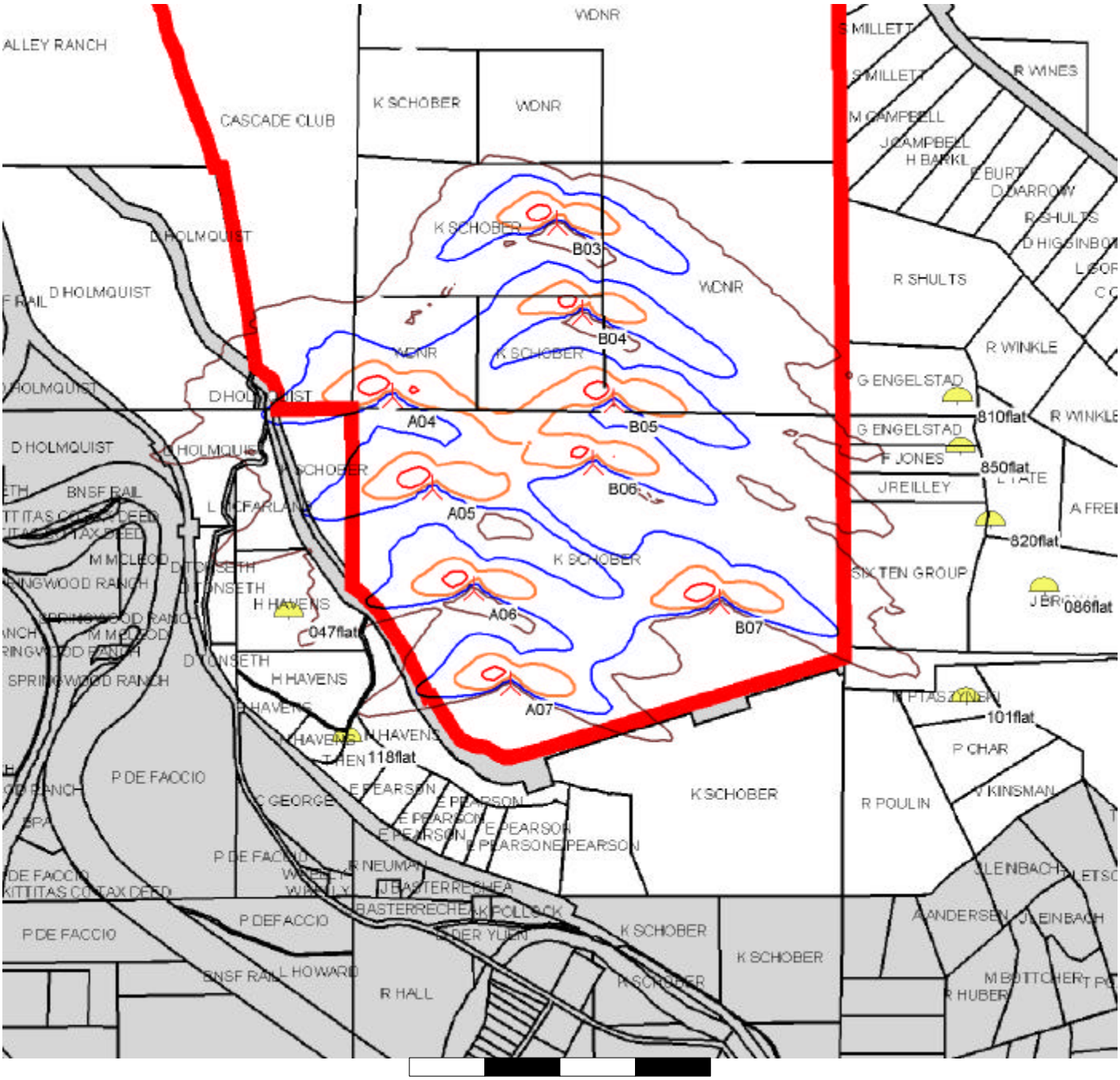
SHADOW - kv simply parcels 110405, wt_2

Calculation: 051111 SF, A, B and G, on 047, 086, 118, 810, 820, 850, 900 **File:** kv simply parcels 110405, wt_2.bmi



Map: kv simply parcels 110405, wt_2 , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 674,523 North: 5,220,112

New WTG Shadow receptor

Isolines showing shadow in Shadow hours|per year. Real value calculation.

25 50 100 200

Project:
030326 Kittitas

Description:
SIEMENS 90m 2.3 MW MkII at 80m hub height
Shadow receptor Zellmar (048), MILLETT (650), Campbell (082), BURT (670, 084, 690), Darrow (086)
SHULTS (710, 720), HIGGINSBOTHAM (740, 750), FRANKLIN (780), HAWLEY (640)
WINES/SNOVER (630) all flat
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
Turbines A01-07, B01-07, C-01-02, D-01-02, I-14-16, J-01-04 on 048
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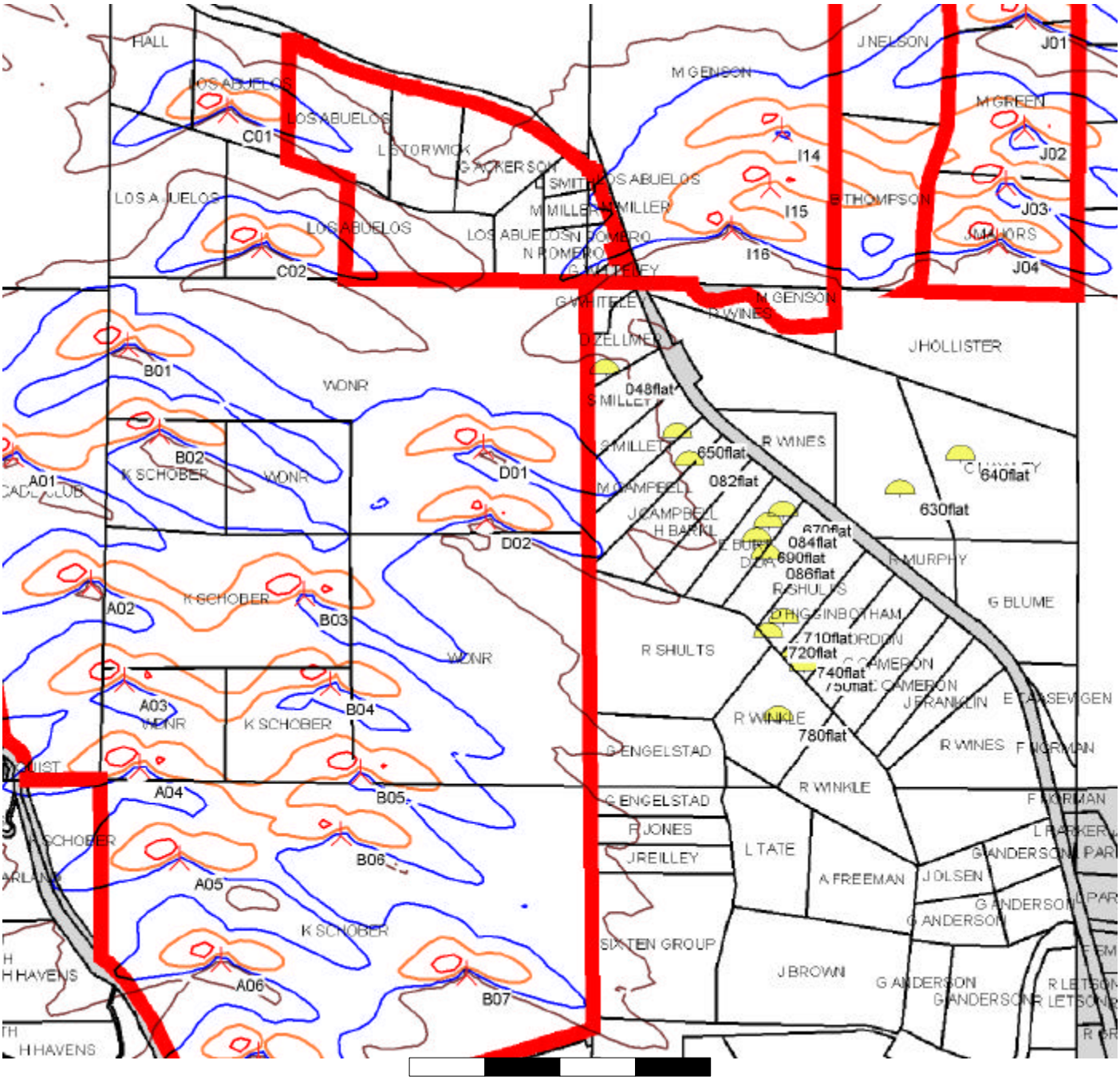
SHADOW - kv simply parcels 110405, wt_2

Calculation: 051110 SF, A, B, C, D, I, J on 048, 650, 082, 670, 084, 690, 086, 710, 720, 740, 750, 780, 630, 640 **File:** kv simply parcels 110405, wt_2.bmi



0 250 500 750 1000m

Map: kv simply parcels 110405, wt_2 , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 675,322 North: 5,221,362

New WTG Shadow receptor

Isolines showing shadow in Shadow hours|per year. Real value calculation.

25 50 100 200

Project:
030326 Kittitas

Description:
SIEMENS 90m 2.3 MW MkII at 80m hub height
Shadow receptor Morriatis (flat)
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Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
Turbines G-01-04, H-01-06, I-01-07
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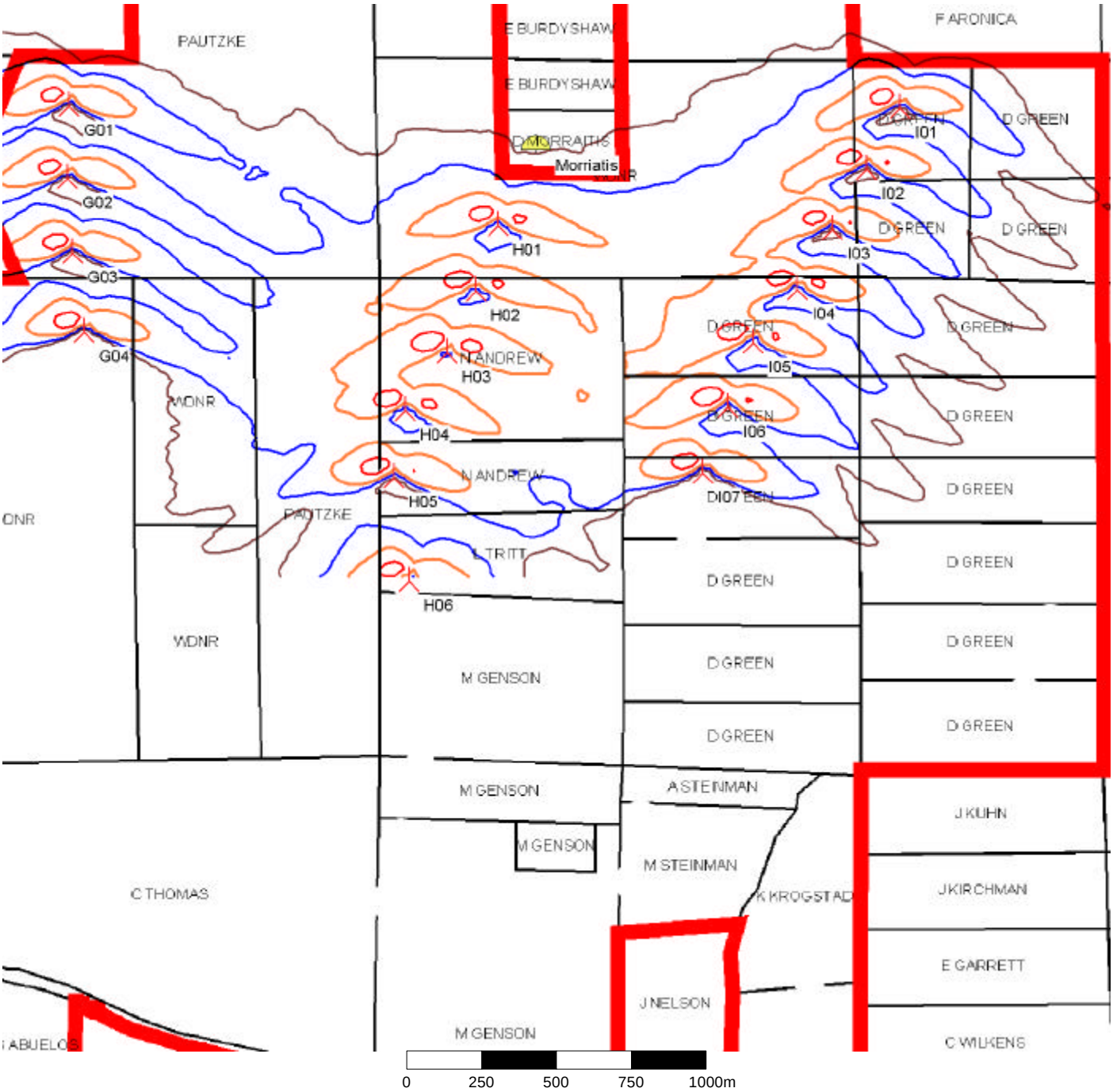
SHADOW - kv simply parcels 110405, wt_2

Calculation: 051122 SF, G, H and I, on Morriatis **File:** kv simply parcels 110405, wt_2.bmi



Map: kv simply parcels 110405, wt_2 , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 675,923 North: 5,224,577

New WTG Shadow receptor

Isolines showing shadow in Shadow hours|per year. Real value calculation.

25 50 100 200

Table 3.4-2: Kittitas Valley Wind Power Project Wind Turbine Shadow-Flicker Analysis

Residence	# Days/Year with Shadow Flicker	Max # Hours/Day with Shadow Flicker	Expected #Hour/Year with Shadow Flicker
Ackerson	186	0:52	26:28
Ahles	138	0:30	14:21
Andrew	297	1:44	84:07
Anthony	247	0:40	29:42
Archambeau	140	0:24	16:32
Brown	125	0:22	9:48
Burt (#084)	198	0:22	15:25
Burt (#670)	186	0:22	13:00
Burt (#690)	194	0:24	15:52
Campbell	233	0:42	22:29
Darrow	183	0:22	16:00
Engelstad	190	0:22	10:29
Franklin	113	0:14	4:10
Gaskill	247	0:38	28:55
Genson	257	1:06	30:54
Gerean, L	16	0:04	0:08
Hawley	34	0:14	2:22
Henley Group	173	0:30	19:13
Henry	50	0:22	3:14
Higginbotham (#740)	114	0:20	9:24
Higginbotham (#750)	141	0:20	9:52
Hink	138	0:22	15:08
Jackson	140	0:32	11:00
Jones	196	0:26	15:20
Millett	169	0:36	18:54
Nelson	220	1:30	41:10
North	120	0:20	10:48
Pearson (#047)	160	0:34	21:38
Pearson (#118)	75	0:28	8:46
Ptaszynski	108	0:26	10:50
Rainbow Valley Ranch	134	0:28	12:18
Robertson	149	0:26	17:06
Schwab	192	0:42	35:52
Shults (#710)	141	0:22	11:30
Shults (#720)	121	0:22	10:23
Tate	155	0:22	12:27
Taylor	240	0:40	39:44
Thayer (#450)	120	0:24	13:32
Thayer (#470)	119	0:24	14:35
Thayer (#480)	108	0:24	13:10
Thompson/Giesick	162	1:30	56:40
Wines/Snover	53	0:16	3:44
Yeager	191	0:28	24:28
Zellmer	273	0:50	25:24