

*DISTRICT QUALITY REVIEW
SIGNATURE FORM*

DATE: June 7, 1999

SITE NAME: Linden Road Landfill Frontage Parcels 2 & 3

SITE ADDRESS: Linden Road Flint Township

COUNTY: Genesee County

IS THE SITE ON THE 307 LIST? YES X NO IF YES, SITE SCORE: 29

PURPOSE OF PRESENTATION

Approval for generic residential closure

BRIEF SUMMARY OF SITE INFORMATION

The Linden Road Landfill site began as a 40-acre site on the West side of Linden Road located between Court and Calkin. GM incorporated five areas of industrial waste located along a 300' frontage (figure 1-3 attached) into the remaining 30 acres before installing a soil cover as part of a RAP. A total of 38,600 cubic yards of soil was relocated. Following the relocation of the waste soil samples were taken to verify remediation following VSR guidance. The results of these samples (tables 3-1 through 3-5 attached) showed benzo (a) pyrene in sample LR-A2-A5S (table 3-2) exceeded the direct contact value. Sample LR-A2-A5Sa taken at the same location after further excavation verified remediation. There were a total of 149 verification soil samples taken for arsenic in areas 1,3,4 and 5. These values were used to calculate an average arsenic level of 6.2 mg/kg, which was below the Generic Residential Direct Contact value of 6.6 mg/kg (tables B-1 through B-3 attached).

CONCLUSION OF THE REVIEW PANEL

Grant GM a generic residential closure for Parcels No. 2 and No. 3 of the Linden Road Landfill, as defined in the attached legal descriptions.

DATE, SOURCE AND IDENTIFICATION OF DOCUMENT/INFORMATION PROVIDING Residential, Industrial, or Commercial cleanups:

Soil Remediation and Verification Sampling Results Linden Road Landfill Parcels No. 2 and No. 3 (Frontage Property) Flint Township, Michigan; Roy F. Weston; dated May 1999

Certificate of Survey and Legal Description; Hubbell, Roth & Clark, Inc.; 10-20-1997

APPROVAL SIGNATURES

PROJECT MANAGER:

James Innes

James Innes 6/11/99

DISTRICT GEOLOGIST:

Cheryl Stanfield

Cheryl Stanfield 6/11/99

DISTRICT EQM:

Kathy Shirey

Kathy Shirey 6/11/99

DISTRICT SUPERVISOR:

Rod Mosier

Rod Mosier 6/11/99

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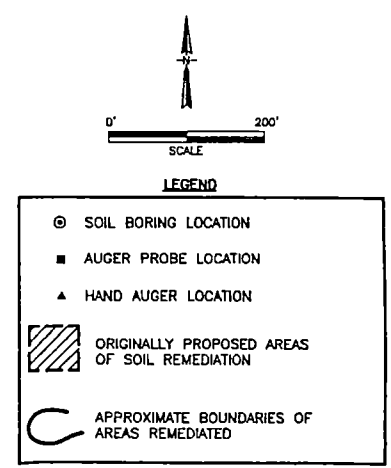
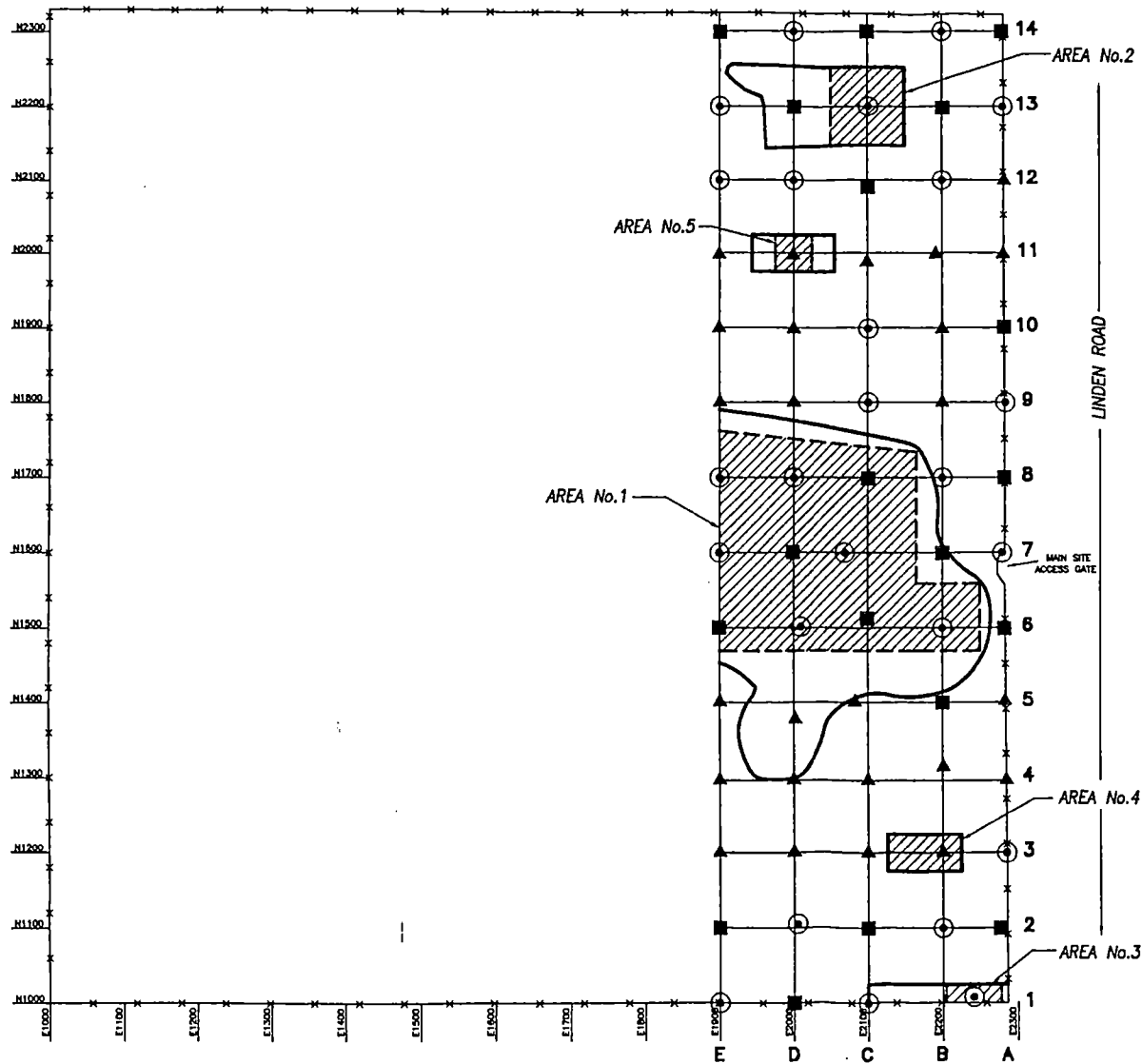


FIGURE 1-3

WESTON Three Hawthorn Parkway
Vernon Hills, Illinois 60061
MANAGERS DESIGNERS/CONSULTANTS

SOIL REMEDIATION AREAS
LINDEN ROAD LANDFILL SITE
Flint Michigan

Table 3-1

**Area 1 - Analytical Results of Verification Sampling
Linden Road Site Parcels No. 2 and No. 3 Soil Remediation
July/August 1998
(mg/kg)**

Sample ID	Arsenic	Lead	Benzo(a)pyrene
LR-A1-B3	7.14	8.5	ND
LR-A1-B4	9.96	10.3	ND
LR-A1-C3	9.86	11.4	ND
LR-A1-C4	2.24	3.3	ND
LR-A1-C5	10.6	8.5	ND
LR-A1-D2	11.3	9.6	ND
LR-A1-D3	9.69	9.8	ND
LR-A1-D4	18.0	8.5	ND
LR-A1-D5	11.7	7.5	ND
LR-A1-D6	6.4	6.9	ND
LR-A1-D7	6.17	7.0	ND
LR-A1-E2	8.83	6.4	ND
LR-A1-E3	6.29	7.7	ND
LR-A1-E4	4.87	6.0	ND
LR-A1-E5	6.8	8.0	ND
LR-A1-E6	6.9	14.8	ND
LR-A1-E7	16.6	8.8	ND
LR-A1-E8	6.35	15.1	ND
LR-A1-E9	8.67	10.4	ND
LR-A1-F2	8.09	9.8	ND
LR-A1-F3	4.64	6.2	ND
LR-A1-F4	3.55	7.3	ND
LR-A1-F5	3.51	6.2	ND
LR-A1-F6	5.84	7.1	ND
LR-A1-F7	4.03	19.3	ND
LR-A1-F8	2.74	7.3	ND
LR-A1-F9	1.86	4.5	ND
LR-A1-G2	4.74	5.3	ND
LR-A1-G3	6.96	7.2	ND
LR-A1-G4	5.11	5.7	ND
LR-A1-G5	4.57	6.1	ND
LR-A1-G6	6.2	6.2	ND
LR-A1-G7	5.29	5.5	ND
LR-A1-G8	3.87	9.4	ND
LR-A1-G9	4.64	16.0	ND
LR-A1-H2	4.93	27.1	ND
LR-A1-H3	5.55	5.8	ND
LR-A1-H4	5.53	5.5	ND
LR-A1-H5	4.12	5.7	ND
LR-A1-H6	4.23	11.2	ND

MDEQ Commercial Sub-Category I Direct Contact Criteria : As = 6.6 mg/kg, Pb = 400 mg/kg, benzo(a)pyrene = 1.4 mg/kg

Table 3-1

**Area 1 - Analytical Results of Verification Sampling
Linden Road Site Parcels No. 2 and No. 3 Soil Remediation
July/August 1998
(mg/kg)
(Continued)**

Sample ID	Arsenic	Lead	Benzo(a)pyrene
LR-A1-H7	3.94	8.8	ND
LR-A1-H8	1.59	9.5	ND
LR-A1-H9	3.92	5.4	ND
LR-A1-I2	8.87	6.3	ND
LR-A1-I3	5.87	13.4	ND
LR-A1-I4	7.77	7.0	ND
LR-A1-I5	6.09	6.5	ND
LR-A1-I6	5.89	5.8	ND
LR-A1-I7	5.0	5.7	ND
LR-A1-J2	6.09	24.1	ND
LR-A1-J3	8.17	7.2	ND
LR-A1-J4	5.78	8.6	ND
LR-A1-J5	4.05	5.7	ND
LR-A1-J6	3.37	6.4	ND
LR-A1-J7	3.76	7.0	ND
LR-A1-K2	3.54	7.3	ND
LR-A1-K3	3.62	6.3	ND
LR-A1-K4	4.15	6.0	ND
LR-A1-K5	4.55	19.8	ND
LR-A1-K6	3.67	8.5	ND
LR-A1-K7	3.78	6.1	ND
LR-A1-L2	3.3	6.0	ND
LR-A1-L3	5.25	12.4	ND
LR-A1-L4	1.06	7.9	ND
LR-A1-SW1	7.83	8.7	ND
LR-A1-SW2	3.64	6.8	ND
LR-A1-SW3	6.16	6.3	ND
LR-A1-SW4	10.8	35.7	ND
LR-A1-SW5	8.45	6.5	ND
LR-A1-SW6	0.87	9.9	ND
LR-A1-SW7	3.31	139	ND
LR-A1-SW8	1.59	18.3	ND
LR-A1-SW9	1.83	10.71	ND
LR-A1-SW10	1.7	40.2	ND
LR-A1-SW11	1.52	6.3	ND
LR-A1-SW12	3.57	58.5	ND
LR-A1-SW13	1.62	7.2	ND

MDEQ Commercial Sub-Category I Direct Contact Criteria : As = 6.6 mg/kg, Pb = 400 mg/kg, benzo(a)pyrene = 1.4 mg/kg

Table 3-2

Area 2 Analytical results of Verification Sampling
 Linden Road Site Parcels No. 2 and No. 3 Soil Remediation
 July/August 1998
 (mg/kg)

Sample ID	Benzo (a) pyrene
LR-A2-A2S	ND
LR-A2-A3S	ND
LR-A2-A4S	ND
LR-A2-A5S	3.5
LR-A2-A5Sa	ND
LR-A2-A6S	ND
LR-A2-A7S	ND
LR-A2-A8S	ND
LR-A2-A9S	ND
LR-A2-A10S	ND
LR-A2-B1S	ND
LR-A2-B2F	ND
LR-A2-B3F	ND
LR-A2-B4F	ND
LR-A2-B5F	ND
LR-A2-B6F	ND
LR-A2-B7F	ND
LR-A2-B8F	ND
LR-A2-B9F	ND
LR-A2-B10F	ND
LR-A2-B11S	ND
LR-A2-C1S	ND
LR-A2-C2F	ND
LR-A2-C3F	ND
LR-A2-C4F	ND
LR-A2-C5F	ND
LR-A2-C6F	ND
LR-A2-C7F	ND
LR-A2-C8F	ND
LR-A2-C9F	ND
LR-A2-C10F	ND
LR-A2-C11S	ND
LR-A2-D1S	ND
LR-A2-D2F	ND
LR-A2-D3F	ND
LR-A2-D4F	ND
LR-A2-D5F	ND
LR-A2-D6F	ND
LR-A2-D7F	ND
LR-A2-D8F	ND

MDEQ Commercial Sub-Category I Direct Contact Criteria for benzo(a)pyrene = 1.4 mg/kg).

Table 3-2

Area 2 Analytical results of Verification Sampling
Linden Road Site Parcels No. 2 and No. 3 Soil Remediation
July/August 1998
(mg/kg)
(Continued)

Sample ID	Benzo (a) pyrene
LR-A2-D9F	ND
LR-A2-D10F	ND
LR-A2-D11S	ND
LR-A2-E1S	ND
LR-A2-E2F	ND
LR-A2-E3F	ND
LR-A2-E4F	ND
LR-A2-E5F	ND
LR-A2-E6F	ND
LR-A2-E7F	ND
LR-A2-E8F	ND
LR-A2-E9F	ND
LR-A2-E10F	ND
LR-A2-E11S	ND
LR-A2-F2S	ND
LR-A2-F3S	ND
LR-A2-F4S	ND
LR-A2-F5S	ND
LR-A2-F6S	ND
LR-A2-F7S	ND
LR-A2-F8S	ND
LR-A2-F9S	ND
LR-A2-F10S	ND

MDEQ Commercial Sub-Category I Direct Contact Criteria for benzo(a)pyrene = 1.4 mg/kg).

Table 3-3

Area 3 - Analytical Results of Verification Sampling
Linden Road Site Parcels No. 2 and No. 3 Soil Remediation
July/August 1998
(mg/kg)

Sample ID	Arsenic
LR-A3-01	5.45
LR-A3-02	0.63
LR-A3-03	0.65
LR-A3-04	1.47
LR-A3-05	2.13
LR-A3-06	7.19
LR-A3-06a	12.6
LR-A3-07	4.10
LR-A3-08	9.73
LR-A3-08a	26.8
LR-A3-09	4.22
LR-A3-10	12.3
LR-A3-10a	17.4
LR-A3-11	0.79
LR-A3-12	4.68
LR-A3-13	9.82
LR-A3-13a	9.01
LR-A3-14	21.6
LR-A3-14a	7.09
LR-A3-10-3	4.07
LR-A3-08-3	2.82
LR-A3-14-2	1.93

MDEQ Commerical Sub-Category I Direct Contact Criteria for Arsenic = 6.6 mg/kg.

Table 3-4

Area 4 - Analytical Results of Verification Sampling
Linden Road Site Parcels No. 2 and No. 3 Soil Remediation
July/August 1998
(mg/kg)

Sample ID	Arsenic
LR-A4-01	0.84
LR-A4-02	4.17
LR-A4-03	0.99
LR-A4-04	2.7
LR-A4-05	2.8
LR-A4-06	1.08
LR-A4-07	2.03
LR-A4-08	13.4
LR-A4-08a	3.00
LR-A4-09	1.94
LR-A4-10	1.81
LR-A4-11	7.98
LR-A4-11a	7.75
LR-A4-12	1.33

MDEQ Commercial Sub-Category I Direct Contact Criteria for Arsenic = 6.6 mg/kg

Table 3-5

**Area 5 - Analytical Results of Verification Sampling
Linden Road Site Parcels No. 2 and No. 3 Soil Remediation
July/August 1998
(mg/kg)**

Sample ID	Arsenic
LR-A5-01F	10.5
LR-A5-02F	4.26
LR-A5-03F	5.72
LR-A5-04F	7.74
LR-A5-05F	12.4
LR-A5-06F	9.29

MDEQ Commerical Sub-Category I Direct Contact Criteria for Arsenic = 6.6 mg/kg.

TABLE B-1

CALCULATION OF 95 PERCENT UCL CONCENTRATION OF ARSENIC
LINDEN ROAD SITE
PARCELS NO. 2 AND NO. 3

Statistical Parameters	Arsenic (mg/kg)
Mean (lognormal)	1.32116
Standard deviation(s)	0.848283
s ²	0.72
n	149
sqrt (n-1)	12.17
H (0.95)	2.074592
UCL (95%)	6.2
Maximum detected concentration	26.8
Exposure point concentration	6.2

s = standard deviation

n = number of samples

H = H-statistic, value of H (0.95) for computing one-sided Upper 95% Confidence Limit on a Lognormal Mean (see Table B-2)

95% UCL = 95 % Upper Confidence Limit on the arithmetic mean.

Source/Reference:

1. EPA, 1992. Supplemental Guidance of RAGS: Calculating the Concentration Term. OSWER Publication 9285.7-081. May 1992.
2. EPA, 1994. Soil Screening Guidance: Technical Background Document. Draft, December 1994.

TABLE B-2

DERIVATION OF H-STATISTIC FOR
CALCULATION OF 95 PERCENT UCL CONCENTRATION OF ARSENIC
LINDEN ROAD SITE
PARCELS NO. 2 AND NO. 3

$$H_{0.95} = (1-p)(1-q)h(1,1) + p(1-q)h(2,1) + (1-p)qh(1,2) + pqh(2,2)$$

Parameters	Values
n	149
s	0.8483
n1	101
n2	101
s1	0.8
s2	0.9
h(s1,n1)	2.035
h(s1,n2)	2.035
h(s2,n1)	2.117
h(s2,n2)	2.117
p	0.48283
q	0
H _{0.95}	2.07459206

s = standard deviation

n = number of samples

n1 = closest number less than n in Table 4-3*.

n2 = closest number greater than n in Table 4-3.

s1 = closest number less than s in Table 4-3.

s2 = closest number greater than s in Table 4-3.

h(s1,n1) = corresponds to value in Table 4-3 for s1, n1

h(s1,n2) = corresponds to value in Table 4-3 for s1, n2

h(s2,n1) = corresponds to value in Table 4-3 for s2, n1

h(s2,n2) = corresponds to value in Table 4-3 for s2, n2

$$p = \frac{s-s_1}{s_2-s_1} \quad \text{and} \quad q = \frac{n-n_1}{n_2-n_1}$$

$$H_{0.95} = (1-p)(1-q)h(s_1,n_1) + p(1-q)h(s_2,n_1) + (1-p)qh(s_1,n_2) + pqh(s_2,n_2)$$

*Table 4-3 of EPA, 1994, Soil Screening Guidance: Technical Background Document, (draft) December 1994.

TABLE B-3

RESIDUAL ARSENIC CONCENTRATIONS
LINDEN ROAD SITE
PARCELS NO. 2 AND NO. 3
(All concentrations in mg/kg)

1.32	4.87	1.06
18	6.8	7.83
3.15	6.9	3.64
0.25	16.6	6.16
3.55	6.35	10.8
1.94	8.67	8.45
1.24	8.07	0.87
0.86	4.64	3.31
0.99	3.55	1.59
17.5	3.51	1.83
2.46	5.84	1.7
0.8	4.03	1.52
3.03	2.74	3.57
3.45	1.86	1.62
1.18	4.74	5.45
3.35	6.96	0.63
3.36	5.11	0.65
1.34	4.57	1.47
1.07	6.2	2.13
0.25	5.29	12.6
3.34	3.87	4.1
3.38	4.64	26.8
0.65	4.93	4.22
7.37	5.55	17.4
10.8	5.53	0.79
2.84	4.12	4.68
2.86	4.23	9.01
3.26	3.94	7.09
9.25	1.59	0.84
1.52	3.92	4.17
1.89	8.87	0.99
10.5	5.87	2.7
6.48	7.77	2.8
2.65	6.09	1.08
3.37	5.89	2.03
1.72	5	3
1.53	6.09	1.94
7.14	8.17	1.81
9.96	5.78	7.75
9.86	4.05	1.33
2.24	3.37	10.5
10.6	3.76	4.26
11.3	3.54	5.72
9.69	3.62	7.74
18	4.15	12.4
11.7	4.55	9.29
6.4	3.67	4.07
6.17	3.78	2.82
8.83	3.3	1.93
6.29	5.25	----

Date Source: data from the April/May 1997 (WESTON, July 1997) Characterization Study and July/August 1998 Verification of Soil Remediation conducted by WESTON.

12-10-97
95479 RLH
Linden Landfill Split - REVISED 2

DESCRIPTION OF PROPERTY- (FROM RECORD)

The SE 1/4 of the NE 1/4 of Section 17, T7N, R6E, Flint Township, Genesee County, Michigan, described as: BEGINNING at the E 1/4 corner of Section 17; thence N89°48'15"W 1336.34 feet along the E-W 1/4 line to the 1/8 line; thence N00°17'45"E 1329.80 feet along the 1/8 line; thence S89°27'45"E 1329.52 feet along the 1/8 line to the east line of Section 17 and Linden Road; thence South 1321.88 feet along the east line of Section 17 and to the POINT OF BEGINNING. Containing 1,767,223 square feet or 40.5699 acres, more or less.

Subject to restrictions, reservations, and easements, if any.

DESCRIPTION OF PROPERTY- PARCEL NO. 1

A part of the SE 1/4 of the NE 1/4 of Section 17, T7N, R6E, Flint Township, Genesee County, Michigan, described as: Commencing at the E 1/4 corner of Section 17; thence N89°48'15"W 400.00 feet along the E-W 1/4 line for a POINT OF BEGINNING; thence continuing N89°48'15"W 936.34 feet along the E-W 1/4 line to the 1/8 line; thence N00°17'45"E 1329.80 feet along the 1/8 line; thence S89°27'45"E 929.50 feet; thence South 1324.26 feet to the E-W 1/4 line and to the POINT OF BEGINNING. Containing 1,237,998 square feet or 28.4205 acres, more or less.

Subject to and together with, the following 108.00 foot wide easement for ingress-egress described as: Commencing at the E 1/4 corner of Section 17; thence North 676.83 feet along the east line of Section 17 and centerline of Linden Road; thence West 50.00 feet to the west right-of-way of Linden Road and for a POINT OF BEGINNING; thence North 54.00 feet along the west right-of-way of Linden Road; thence West 350.00 feet; thence North 108.00 feet; thence East 350.00 feet to the west right-of-way of Linden Road; thence South 54.00 feet along the west right-of-way of Linden Road and to the POINT OF BEGINNING. Containing a total of 37,799 square feet or 0.8678 acres, more or less.

Also, Subject to the 50.00 foot wide right-of-way for Linden Road as recorded in Liber 1751, Pages 67-70, Genesee County Records.

Subject to restrictions, reservations, and easements, if any.

DESCRIPTION OF PROPERTY- PARCEL NO. 2

A part of the SE 1/4 of the NE 1/4 of Section 17, T7N, R6E, Flint Township, Genesee County, Michigan, described as: Commencing at the E 1/4 corner of Section 17; thence North 676.83 feet along the east line of Section 17 and centerline of Linden Road for a POINT OF BEGINNING; thence continuing North 645.05 feet along the east line of Section 17 and centerline of Linden Road to the 1/8 line; thence N89°27'45"W 400.02 feet along the 1/8 line; thence South 648.80 feet; thence East 400.00 feet to the east line of Section 17 and centerline of Linden Road and to the POINT OF BEGINNING. Containing 258,768 square feet or 5.9405 acres, more or less.

Subject to and together with, the following 108.00 foot wide easement for ingress-egress described as: Commencing at the E 1/4 corner of Section 17; thence North 676.83 feet along the east line of Section 17 and centerline of Linden Road; thence West 50.00 feet to the west right-of-way of Linden Road and for a POINT OF BEGINNING; thence South 54.00 feet along the west right-of-way of Linden Road; thence West 350.00 feet; thence North 108.00 feet; thence East 350.00 feet to the west right-of-way of Linden Road; thence South 54.00 feet along the west right-of-way of Linden Road and to the POINT OF BEGINNING. Containing a total of 37,799 square feet or 0.8678 acres, more or less.

Also, Subject to the 50.00 foot wide right-of-way for Linden Road as recorded in Liber 1751, Pages 67-70, Genesee County Records.

DESCRIPTION OF PROPERTY- PARCEL NO. 3

A part of the SE 1/4 of the NE 1/4 of Section 17, T7N, R6E, Flint Township, Genesee County, Michigan, described as: BEGINNING at the E 1/4 corner of Section 17; thence N89°48'15"W 400.00 feet along the E-W, 1/4 line; thence North 675.46 feet; thence East 400.00 feet to the east line of Section 17 and centerline of Linden Road; thence South 676.83 feet along the east line of Section 17 and centerline of Linden Road and to the POINT OF BEGINNING. Containing 270,456 square feet or 6.2088 acres, more or less.

Subject to and together with, the following 108.00 foot wide easement for ingress-egress described as: Commencing at the E 1/4 corner of Section 17; thence North 676.83 feet along the east line of Section 17 and centerline of Linden Road; thence West 50.00 feet to the west right-of-way of Linden Road and for a POINT OF BEGINNING; thence South 54.00 feet along the west right-of-way of Linden Road; thence West 350.00 feet; thence North 108.00 feet; thence East 350.00 feet to the west right-of-way of Linden Road; thence South 54.00 feet along the west right-of-way of Linden Road and to the POINT OF BEGINNING. Containing a total of 37,799 square feet or 0.8678 acres, more or less.

Also, Subject to the 50.00 foot wide right-of-way for Linden Road as recorded in Liber 1751, Pages 67-70, Genesee County Records.

Subject to restrictions, reservations, and easements, if any.

I HEREBY CERTIFY that this is a true and accurate survey; that this drawing is a correct representation of all the exterior boundaries of the land surveyed; that said survey was performed with an error of closure of 1 in 14500; and that this survey complies with the requirements of Section 3, Act No. 132, P.A. of 1970.

Date: _____

Robert L. Higgins, P.S. 21570
Hubbell, Roth & Clark, Inc.
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Bloomfield Hills, Michigan 48303-0824