

Data Validation Services

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January 22, 2019; Revised February 26, 2019

Jocelyn Martin
CDM Smith
4 Highland Rd Suite 1
Massena, NY 13662

RE: Validation of the West Plant Emerging Contaminant Analytical Laboratory Data
Alpha Analytical SDG Nos. L1843279, L1843740, and L1845940

Dear Ms. Martin:

Review has been completed for the data packages generated by Alpha Analytical that pertain to aqueous samples collected between 10/23/18 and 11/07/18 at the West Plant site. Twenty one aqueous samples, three field duplicates, and six field blanks were processed for per-and polyfluoroalkyl substances (PFAS) by a modified USEPA method 537, and 1,4-dioxane for USEPA method 8270D SIM.

The data packages submitted by the laboratory contain full deliverables for validation, and this usability report is generated from review of the QC summary form information, with full review of sample raw data and limited review of associated QC raw data. The reported QC summary forms and sample raw data have been reviewed for application of validation qualifiers, with guidance from the USEPA national and regional validation documents, and in consideration for the specific requirements of the analytical methodology.

The following items were reviewed:

- * Data Completeness
- * Case Narrative
- * Custody Documentation/Sample Receipt
- * Holding Times
- * Surrogate, Isotopic Dilution, and Internal Standard Recoveries
- * Preparation and Field Blanks
- * Matrix Spike Recoveries/Duplicate Correlations
- * Blind Field Duplicate Correlations
- * Laboratory Control Sample (LCS)
- * Instrumental Tunes
- * Initial and Continuing Calibration Standards
- * Method Compliance
- * Sample Result Verification

Those items listed above which show deficiencies are discussed within the text of this narrative. All of the other items were determined to be acceptable for the DUSR level review, as discussed in NYS

DER-10 Appendix B section 2.0 (c). Documentation of the outlying parameters cited in this report can be found in the laboratory data package.

In summary, results for target analytes are usable either as reported or with minor qualification or edit. Accuracy, precision, data completeness, sensitivity, comparability, and representativeness are acceptable.

Client sample identifications are attached to this text, and should be reviewed in conjunction with this report. Also included in this report are the laboratory EQUIS EDDs with recommended qualifiers/edits applied in red.

MW-06-1018FB was reported by the laboratory as MW-06-101FB.

Blind Field Duplicate Correlations

The blind field duplicate evaluations were performed on MW-01-1018 FD, MW-362-1018 FD, and MW-031-1118 FD, and show correlations that fall within validation guidelines.

1,4-Dioxane by EPA 8270D SIM

Surrogate and internal standard recoveries are within laboratory and protocol acceptance ranges. Holding times were met.

Matrix spikes of MW-335-1018P, MW-015-1018P, and MW-303-1018P show recoveries and correlations within laboratory acceptance ranges.

One of the matrix spikes of MW-031-1118P shows no recovery, while the other recovered at 119%. The parent sample and matrix spikes were reextracted, but well beyond a holding time for usable data. The reextracted spikes show acceptable recovery. It is suspected that the matrix spike was not actually spiked during the initial extraction. No qualification to the parent result is indicated.

Calibration standards show acceptable responses that are within validation guidelines.

PFAS by Modified EPA Method 537

PFAS compounds are identified by their common acronyms in this report. The report forms reference both the technical names and the acronyms.

The result for PFPeA in MW-257-1018P has been rejected due to the failure of its associated isotopic dilution standard to recover. A matrix effect is suspected.

Due to presence in the associated blanks, the following detections are considered external contamination and edited to reflect non-detection:

- PFOA in MW-292-1018P and MW-262-1018P
- NMeFOSAA in MW-127-1018P
- 6:2FTS in MW-127-1018P, MW-335-1018P, and MW-262-1018P, and in all samples reported in SDG L1843740

Matrix spikes of MW-015-1018P, MW-202-1018P, MW-031-1118BP, and MW-335-1018P show recoveries and correlations within validation action guidelines.

Holding times were met, and LCS recoveries are compliant.

Some of the samples were processed at dilution due to the sample matrix. This resulted in elevated reporting limits. These should have been noted in the laboratory case narrative.

The NYSDEC Category B data package for L1845940 does not include the QC summary forms for either the isotopic/surrogate standards or the internal standards. The recoveries and their relativity to the acceptance ranges were evaluated during validation by review of the raw data.

Please do not hesitate to contact me if questions or comments arise during your review of this report.

Very truly yours,


Judy Harry

Att: Validation Qualifier Definitions
Client and Laboratory Sample Identifications
Qualified Laboratory EQUIS EDDs

VALIDATION DATA QUALIFIER DEFINITIONS

- U** The analyte was analyzed for, but was not detected above the level of the associated reported quantitation limit.
- J** The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
- J-** The analyte was positively identified; the associated numerical value is an estimated quantity that may be biased low.
- J+** The analyte was positively identified; the associated numerical value is an estimated quantity that may be biased high.
- UJ** The analyte was analyzed for, but was not detected. The associated reported quantitation limit is approximate and may be inaccurate or imprecise.
- NJ** The detection is tentative in identification and estimated in value. Although there is presumptive evidence of the analyte, the result should be used with caution as a potential false positive and/or elevated quantitative value.
- R** The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control limits. The analyte may or may not be present.
- EMPC** The results do not meet all criteria for a confirmed identification. The quantitative value represents the Estimated Maximum Possible Concentration of the analyte in the sample.

Client and Laboratory Sample IDs

Project Name: W PLANT EMERGING CONTAMINANTS
Project Number: 232785

Lab Number: L1843279
Report Date: 11/13/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1843279-01	MW-228-1018P	WATER	NY	10/23/18 10:00	10/23/18
L1843279-02	MW-292-1018P	WATER	NY	10/23/18 09:15	10/23/18
L1843279-03	MW-293-1018P	WATER	NY	10/23/18 09:35	10/23/18
L1843279-04	MW-333-1018P	WATER	NY	10/23/18 11:00	10/23/18
L1843279-05	MW-262-1018P	WATER	NY	10/23/18 08:30	10/23/18
L1843279-06	MW-335-1018P	WATER	NY	10/23/18 08:00	10/23/18
L1843279-07	MW-343-1018P	WATER	NY	10/23/18 11:10	10/23/18
L1843279-08	MW-127-1018P	WATER	NY	10/23/18 10:30	10/23/18
L1843279-09	MW-04-1018FB	WATER	NY	10/23/18 10:45	10/23/18
L1843279-10	MW-05-1018FB	WATER	NY	10/23/18 08:15	10/23/18

Project Name: W PLANT EMERGING CONTAMINANTS
Project Number: 85906

Lab Number: L1843740
Report Date: 11/15/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1843740-01	MW-331-1018P	WATER	NY	10/24/18 08:40	10/25/18
L1843740-02	MW-038-1018P	WATER	NY	10/24/18 09:30	10/25/18
L1843740-03	MW-362-1018P	WATER	NY	10/24/18 11:30	10/25/18
L1843740-04	MW-257-1018P	WATER	NY	10/24/18 09:10	10/25/18
L1843740-05	MW-288-1018P	WATER	NY	10/25/18 08:15	10/25/18
L1843740-06	MW-298-1018P	WATER	NY	10/25/18 10:45	10/25/18
L1843740-07	MW-022-1018P	WATER	NY	10/25/18 08:30	10/25/18
L1843740-08	MW-306-1018P	WATER	NY	10/25/18 07:45	10/25/18
L1843740-09	MW-01-1018FD	WATER	NY	10/25/18 09:10	10/25/18
L1843740-10	MW-02-1018FD	WATER	NY	10/24/18 11:45	10/25/18
L1843740-11	MW-03-1018FB	WATER	NY	10/24/18 09:00	10/25/18
L1843740-12	MW-06-101FB	WATER	NY	10/24/18 09:45	10/25/18
L1843740-13	MW-07-1018FB	WATER	NY	10/25/18 09:15	10/25/18
L1843740-14	MW-303-1018P	WATER	NY	10/25/18 08:50	10/25/18
L1843740-15	MW-015-1018P	WATER	NY	10/24/18 08:20	10/25/18
L1843740-16	MW-060-1018P	WATER	NY	10/25/18 09:15	10/25/18

Project Name: WEST PLANT EMERGING CONTAMINAN
Project Number: 85904

Lab Number: L1845940
Report Date: 11/29/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1845940-01	MW-280-1118P	WATER	MASSENA, NY	11/07/18 15:20	11/08/18
L1845940-02	MW-031-1118P	WATER	MASSENA, NY	11/07/18 15:50	11/08/18
L1845940-03	MW-17-1118 FD	WATER	MASSENA, NY	11/07/18 16:10	11/08/18
L1845940-04	MW-18-1118 FB	WATER	MASSENA, NY	11/07/18 15:30	11/08/18



Memorandum

To: Todd Furnia

From: Ryan Kingsley

Date: January 31, 2019

*Subject: Arconic Inc.- Massena West Plant
Emerging Contaminants Sampling Summary Memorandum
Site# 645001 – Potliner Disposal Site “A”
Site# 645002 – General Refuse Landfill
Site# 645003 – Potliner Disposal Site “I”
Site# 645004 – Dennison Road
Site #645005-OU1 Former Soluble Oil Lagoon
Site #645005-OU2 Former Waste Lubricating Oil Lagoon
Site #645005-OU3 Primary Lagoon and Dredge Spoils Area (PLDSA)
Site #645005-OU4 Former 60 Acre Lagoon
Site #645005-OU5 Former Sanitary Lagoon
Site# 645016 – Oily Waste Landfill
Site# 645023 – Storage Tank 51
Site# 645024 – HPM Press Area
Site# 645025 – West Fill Area
Site# 645026 – Landfill Annex*

This memo provides a brief summary of the recent emerging contaminant groundwater sampling performed at the Arconic Massena West Plant.

Emerging Contaminants Sampling Plan

In letters dated April 27, 2018, the New York State Department of Environmental Conservation (NYSDEC) requested sampling for emerging contaminants (EC) in groundwater at the above-referenced sites. During a meeting on April 29, 2018 with representatives of NYSDEC, a targeted approach to identify representative locations for EC at the facility was discussed. NYSDEC indicated that such an approach would be acceptable assuming appropriate supporting rationale would be included in the plan.

On June 22, 2018, Arconic submitted an emerging contaminant sampling workplan to the NYSDEC. In a letter dated July 4, 2018, the NYSDEC provided comments on the workplan, and requested that Arconic revise and resubmit. An updated sampling plan, addressing all of the Department’s comments was submitted on August 27, 2018. In a letter dated August 31, 2018, the NYSDEC approved the updated workplan for the groundwater sampling for emerging contaminants.

On October 1, 2018, CDM Smith discovered that MW-208A at the Landfill Annex was damaged and not in sampleable condition. In an updated groundwater sampling plan dated October 3, 2018,

submitted via email, Arconic notified the Department of the damaged well, and requested to sample MW-113 as a replacement well. The same day, the department responded via email requesting that MW-022 at the Landfill Annex be sampled as the replacement for MW-208A. CDM Smith investigated MW-022 and found it in sampleable condition. Responding to the department's email on October 3, 2018, Arconic confirmed that MW-022 would be sampled as the replacement for MW-208A.

Emerging Contaminants Groundwater Sampling Event

From October 22, 2018 through October 25, 2018, CDM Smith performed the emerging contaminants groundwater sampling event, as committed in the workplan. All guidance, precautions and protocol provided via email by the NYSDEC on October 11, 2018 were followed. The NYSDEC observed the collection of samples at MW-362 on October 24, 2018.

During the four-day sampling event, MW-227 at Potlining Pile I (PPI) and MW-006A at the Former Waste Lubricating Oil Lagoon (WLOL) were dry, and samples were not able to be collected. On October 31, 2018, Arconic submitted a letter proposing MW-280 at PPI and MW-031 at the WLOL be sampled as replacement wells for MW-277 and MW-006A. In a letter dated November 1, 2018, the NYSDEC approved the proposed replacement wells. CDM Smith proceeded to sample these wells on November 7, 2018. A summary of the sampling dates for each well can be found on *Table 1* attached to this memorandum. Individual site maps, with each of the sampled wells highlighted, can be found in *Appendix A*.

Emerging Contaminants Analytical Results

As requested by the NYSDEC, all samples were analyzed by Alpha Analytical Laboratory, which holds the required ELAP certification. Modified EPA Method 537 was used to analyze the groundwater samples for PFOA and PFOS to achieve the 2 ng/L (ppt) detection limit. EPA Method 8270 with selective ion monitoring (SIM) was used to analyze the groundwater samples for 1,4-Dioxane to achieve the 0.28 ug/L (ppb) detection limit. The lab prepared a full category B deliverable and a DUSR was prepared by a data validator.

On January 25, 2018, the qualified analytical results were submitted by electronic data submission, following the requirements provided at: <https://www.dec.ny.gov/chemical/62440.html>. In addition, Arconic provided a letter of competition and the DUSR to the Department via email. A summary of the qualified analytical results are provided in *Table 2*.

RK:jhm

Attachments

cc: Ernest Ashley, CDM Smith
Paul Rodrigue, CDM Smith

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Site	Site Number	Well	Date Sampled	Comments
General Refuse Landfill	645002	MW-303	10/25/2018	MS/MSD and MW-01-1018FD
Potliner Disposal Site "A"	645001	MW-015	10/24/2018	MS/MSD
Potliner Disposal Site "I"	645003	MW-280	11/7/2018	
		MW-228	10/23/2018	
		MW-292	10/23/2018	
Dennison Road	645004	MW-293	10/23/2018	
Former Soluble Oil Lagoon	645005-OU1	MW-060	10/25/2018	
Former Waste Lubricating Oil Lagoon	645005-OU2	MW-031	11/7/2018	MW-17-1118FD and MS/MSD
Primary Lagoon & Dredge Spoils Area	645005-OU3	MW-331	10/24/2018	
		MW-038	10/24/2018	
Former 60 Acre Lagoon	645005-OU4	MW-362	10/24/2018	NYSDEC Observation and MW-02-1018FD
Former Sanitary Lagoon	645005-OU5	MW-257	10/24/2018	
Oily Waste Lagoon	645016	MW-288	10/25/2018	
Storage Tank 51	645023	MW-333	10/23/2018	
Hydraulic Press Manufacturing Area	645024	MW-298	10/25/2018	
West Fill Area	645025	MW-262	10/23/2018	
		MW-335	10/23/2018	MS/MSD
		MW-343	10/23/2018	
Landfill Annex	645026	MW-022	10/25/2018	
		MW-306	10/25/2018	
West Plant Background Well (East of Secure Landfill)	N/A	MW-127	10/23/2018	

Well		MW-127	MW-303	MW-015	MW-228	MW-280 ¹	MW-292
Location		Background	GRL	PPA	PPI	PPI	Dennison
Sample ID		MW-127-1018P	MW-303-1018P	MW-015-1018P	MW-228-1018P	MW-280-1118P	MW-292-1018P
Sample date	Units	10/23/2018	10/25/2018	10/24/2018	10/23/2018	11/7/2018	10/23/2018
Analyte							
1,4-Dioxane	ng/l	144U	144U	4650	150U	160U	388
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ng/l	1.47U	1.8U	2.02U	101	25U	1.83U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ng/l	0.366J	1.8U	2.02U	1.82U	8.1J	1.83U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluorobutanesulfonic Acid (PFBS)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluorobutanoic Acid (PFBA)	ng/l	1.79U	1.8U	28.4	4.32	25U	0.949J
Perfluorodecanesulfonic Acid (PFDS)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluorodecanoic Acid (PFDA)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluorododecanoic Acid (PFDoA)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluoroheptanoic Acid (PFHpA)	ng/l	1.79U	1.8U	0.899J	0.64J	25U	1.83U
Perfluorohexanesulfonic Acid (PFHxS)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluorohexanoic Acid (PFHxA)	ng/l	1.79U	1.8U	10.6	2.74	7.25J	1.83U
Perfluorononanoic Acid (PFNA)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluorooctanesulfonamide (FOSA)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluorooctanesulfonic Acid (PFOS)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluorooctanoic Acid (PFOA)	ng/l	1.79U	1.8U	2.02U	1.82U	7J	1.83U
Perfluoropentanoic Acid (PFPeA)	ng/l	1.79U	1.8U	78.6	1.82U	25U	1.83U
Perfluorotetradecanoic Acid (PFTA)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluorotridecanoic Acid (PFTrDA)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U
Perfluoroundecanoic Acid (PFUnA)	ng/l	1.79U	1.8U	2.02U	1.82U	25U	1.83U

Notes:

- ¹The sample has elevated detection limits due to the dilution required by the sample matrix
B- The analyte was detected above the reporting limit in the associated method blank.
J- The associated numerical value is an approximate concentration of the analyte in the sample
U- Analyte was not detected above the level of the associated reported quantitation limit.
R- Sample results are Rejected due to deficiencies in meeting quality control limits.

Well		MW-293	MW-060	MW-031	MW-331	MW-038 ¹	MW-362
Location		Dennison	SOL	WLOL	PLDSA	60 Acre	60 Acre
Sample ID		MW-293-1018P	MW-060-1018P	MW-031-1118P	MW-331-1018P	MW-038-1018P	MW-362-1018P
Sample date	Units	10/23/2018	10/25/2018	11/7/2018	10/24/2018	10/24/2018	10/24/2018
Analyte							
1,4-Dioxane	ng/l	3390	144U	144U	144U	2490	147U
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ng/l	1.82U	1.75U	1.95U	2.08U	50U	1.77U
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ng/l	1.82U	1.75U	1.95U	2.08U	50U	1.77U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ng/l	0.414J	1.75U	1.95U	2.08U	50U	1.77U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ng/l	1.82U	1.75U	1.95U	2.08U	50U	1.77U
Perfluorobutanesulfonic Acid (PFBS)	ng/l	0.785J	1.75U	1.95U	0.488J	50U	0.752J
Perfluorobutanoic Acid (PFBA)	ng/l	26.1	1.16J	1.22J	1.84J	50U	2.69
Perfluorodecanesulfonic Acid (PFDS)	ng/l	1.82U	1.75U	1.95U	2.08U	50U	1.77U
Perfluorodecanoic Acid (PFDA)	ng/l	1.82U	0.615J	1.95U	2.08U	50U	1.77U
Perfluorododecanoic Acid (PFDoA)	ng/l	1.82U	1.75U	1.95U	2.08U	50U	1.77U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/l	1.82U	1.75U	1.95U	2.08U	50U	1.77U
Perfluoroheptanoic Acid (PFHpA)	ng/l	3.19	0.49J	1.95U	2.08U	50U	0.947J
Perfluorohexanesulfonic Acid (PFHxS)	ng/l	1.82U	1.75U	1.95U	2.08U	50U	0.855J
Perfluorohexanoic Acid (PFHxA)	ng/l	6.56	1.49J	1.95U	2.08U	50U	1.2J
Perfluorononanoic Acid (PFNA)	ng/l	0.4J	0.423J	1.95U	2.08U	50U	1.77U
Perfluorooctanesulfonamide (FOSA)	ng/l	1.82U	1.75U	1.95U	2.08U	50U	1.77U
Perfluorooctanesulfonic Acid (PFOS)	ng/l	1.2J	0.78J	1.18J	2.08U	50U	1.19J
Perfluorooctanoic Acid (PFOA)	ng/l	5.99	1.62J	1.95U	0.479J	50U	1.8
Perfluoropentanoic Acid (PFPeA)	ng/l	8.77	0.867J	1.95U	2.08U	50U	1.77U
Perfluorotetradecanoic Acid (PFTA)	ng/l	1.82U	1.75U	1.95U	2.08U	50U	1.77U
Perfluorotridecanoic Acid (PFTrDA)	ng/l	1.82U	1.75U	1.95U	2.08U	50U	1.77U
Perfluoroundecanoic Acid (PFUnA)	ng/l	1.82U	1.75U	1.95U	2.08U	50U	1.77U

Notes:

- ¹The sample has elevated detection limits due to the dilution required by the sample matrix
B- The analyte was detected above the reporting limit in the associated method blank.
J- The associated numerical value is an approximate concentration of the analyte in the sample
U-Analyte was not detected above the level of the associated reported quantitation limit.
R- Sample results are Rejected due to deficiencies in meeting quality control limits.

Well		MW-257	MW-288	MW-333	MW-298	MW-262	MW-335
Location		Sanitary Lagoon	OWL	ST-51	HPM	WFA	WFA
Sample ID		MW-257-1018P	MW-288-1018P	MW-333-1018P	MW-298-1018P	MW-262-1018P	MW-335-1018P
Sample date	Units	10/24/2018	10/25/2018	10/23/2018	10/25/2018	10/23/2018	10/23/2018
Analyte							
1,4-Dioxane	ng/l	144U	147U	23100	422	144U	147U
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ng/l	1.82U	2.16U	1.79U	1.8U	1.82U	1.78U
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ng/l	1.82U	5.67U	8.91	1.8U	1.82U	2.64U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ng/l	1.82U	2.16U	1.79U	1.8U	1.82U	1.78U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ng/l	1.82U	2.16U	1.79U	1.8U	1.82U	1.78U
Perfluorobutanesulfonic Acid (PFBS)	ng/l	1.82U	2.16U	1.79U	1.3J	1.82U	1.78U
Perfluorobutanoic Acid (PFBA)	ng/l	3.55	2.16U	13.2	18.3	3.8	0.498J
Perfluorodecanesulfonic Acid (PFDS)	ng/l	1.82U	2.16U	1.79U	1.8U	1.82U	1.78U
Perfluorodecanoic Acid (PFDA)	ng/l	1.82U	2.16U	3.56	1.8U	1.82U	1.78U
Perfluorododecanoic Acid (PFDoA)	ng/l	1.82U	2.16U	0.588J	1.8U	1.82U	1.78U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/l	1.82U	2.16U	1.79U	1.8U	1.82U	1.78U
Perfluoroheptanoic Acid (PFHpA)	ng/l	1.69J	2.16U	11.4	5.06	0.358J	1.78U
Perfluorohexanesulfonic Acid (PFHxS)	ng/l	1.82U	2.16U	1.79U	1.8U	1.82U	1.78U
Perfluorohexanoic Acid (PFHxA)	ng/l	1.34J	2.16U	44.7	16	0.456J	1.78U
Perfluorononanoic Acid (PFNA)	ng/l	0.487J	2.78	2.88	1.32J	1.82U	1.78U
Perfluorooctanesulfonamide (FOSA)	ng/l	1.82U	2.16U	1.79U	1.8U	1.82U	1.78U
Perfluorooctanesulfonic Acid (PFOS)	ng/l	1.82U	2.16U	1.79U	1.8U	1.82U	1.78U
Perfluorooctanoic Acid (PFOA)	ng/l	1.45J	0.793J	45	6.51	1.82U	1.78U
Perfluoropentanoic Acid (PFPeA)	ng/l	R	2.16U	40.5	37.4	1.82U	1.78U
Perfluorotetradecanoic Acid (PFTA)	ng/l	1.82U	2.16U	1.79U	1.8U	1.82U	1.78U
Perfluorotridecanoic Acid (PFTrDA)	ng/l	1.82U	2.16U	1.79U	1.8U	1.82U	1.78U
Perfluoroundecanoic Acid (PFUnA)	ng/l	1.82U	2.16U	1.79U	1.8U	1.82U	1.78U

Notes:

- ¹The sample has elevated detection limits due to the dilution required by the sample matrix
B- The analyte was detected above the reporting limit in the associated method blank.
J- The associated numerical value is an approximate concentration of the analyte in the sample
U- Analyte was not detected above the level of the associated reported quantitation limit.
R- Sample results are Rejected due to deficiencies in meeting quality control limits.

Well		MW-343	MW-022	MW-306	Field Dup 01	Field Dup 02	Field Dup 17
Location		WFA	LA	LA	MW-303	MW-362	MW-031
Sample ID		MW-343-1018P	MW-022-1018P	MW-306-1018P	MW-01-1018FD	MW-02-1018FD	MW-17-1118 FD
Sample date	Units	10/23/2018	10/25/2018	10/25/2018	10/25/2018	10/24/2018	11/7/2018
Analyte							
1,4-Dioxane	ng/l	743	10800	147U	144U	144U	147U
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ng/l	6.25	1.78U	1.82U	1.82U	1.81U	1.91U
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ng/l	155	1.78U	1.82U	1.82U	1.81U	1.91U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ng/l	1.83U	1.78U	1.82U	1.82U	1.81U	1.91U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ng/l	1.83U	1.78U	1.82U	1.82U	1.81U	1.91U
Perfluorobutanesulfonic Acid (PFBS)	ng/l	0.905J	1.78U	1.82U	1.82U	0.746J	1.91U
Perfluorobutanoic Acid (PFBA)	ng/l	48.4	0.722J	7.9	1.82U	2.68	1J
Perfluorodecanesulfonic Acid (PFDS)	ng/l	1.83U	1.78U	1.82U	1.82U	1.81U	1.91U
Perfluorodecanoic Acid (PFDA)	ng/l	0.571J	1.78U	1.7J	1.82U	1.81U	1.91U
Perfluorododecanoic Acid (PFDoA)	ng/l	1.83U	1.78U	1.82U	1.82U	1.81U	1.91U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/l	1.83U	1.78U	1.82U	1.82U	1.81U	1.91U
Perfluoroheptanoic Acid (PFHpA)	ng/l	161	1.78U	6.55	1.82U	1.02J	1.91U
Perfluorohexanesulfonic Acid (PFHxS)	ng/l	1.83U	1.78U	1.82U	1.82U	0.768J	1.91U
Perfluorohexanoic Acid (PFHxA)	ng/l	103	1.78U	20.5	1.82U	1.32J	1.91U
Perfluorononanoic Acid (PFNA)	ng/l	31.6	1.78U	1.44J	1.82U	1.81U	1.91U
Perfluorooctanesulfonamide (FOSA)	ng/l	1.83U	1.78U	1.82U	1.82U	1.81U	1.91U
Perfluorooctanesulfonic Acid (PFOS)	ng/l	1.84	1.78U	1.82U	1.82U	1.28J	1.2J
Perfluorooctanoic Acid (PFOA)	ng/l	193	1.78U	12.3	1.82U	1.73J	1.91U
Perfluoropentanoic Acid (PFPeA)	ng/l	151	1.78U	29.4	1.82U	1.35J	1.91U
Perfluorotetradecanoic Acid (PFTA)	ng/l	1.83U	1.78U	1.82U	1.82U	1.81U	1.91U
Perfluorotridecanoic Acid (PFTrDA)	ng/l	1.83U	1.78U	1.82U	1.82U	1.81U	1.91U
Perfluoroundecanoic Acid (PFUnA)	ng/l	1.83U	1.78U	1.82U	1.82U	1.81U	1.91U

Notes:

- ¹The sample has elevated detection limits due to the dilution required by the sample matrix
B- The analyte was detected above the reporting limit in the associated method blank.
J- The associated numerical value is an approximate concentration of the analyte in the sample
U-Analyte was not detected above the level of the associated reported quantitation limit.
R- Sample results are Rejected due to deficiencies in meeting quality control limits.

Well		Field Blank 04	Field Blank 05	Field Blank 06	Field Blank 07	Field Blank 18	Field Blank 03
Location							
Sample ID		MW-04-1018FB	MW-05-1018FB	MW-06-101FB	MW-07-1018FB	MW-18-1118FB	MW-03-1018FB
Sample date	Units	10/23/2018	10/23/2018	10/24/2018	10/25/2018	11/7/2018	10/24/2018
Analyte							
1,4-Dioxane	ng/l	142U	153U	153U	153U	144U	147U
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ng/l	0.993J	0.586J	3.28B	3.48B	1.89U	3.78B
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ng/l	0.376J	1.75U	1.78U	1.82U	0.402J	1.79U
Perfluorobutanesulfonic Acid (PFBS)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorobutanoic Acid (PFBA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorodecanesulfonic Acid (PFDS)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorodecanoic Acid (PFDA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorododecanoic Acid (PFDoA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluoroheptanoic Acid (PFHpA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorohexanesulfonic Acid (PFHxS)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorohexanoic Acid (PFHxA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorononanoic Acid (PFNA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorooctanesulfonamide (FOSA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorooctanesulfonic Acid (PFOS)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorooctanoic Acid (PFOA)	ng/l	0.431J	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluoropentanoic Acid (PFPeA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorotetradecanoic Acid (PFTA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluorotridecanoic Acid (PFTrDA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U
Perfluoroundecanoic Acid (PFUnA)	ng/l	1.82U	1.75U	1.78U	1.82U	1.89U	1.79U

Notes:

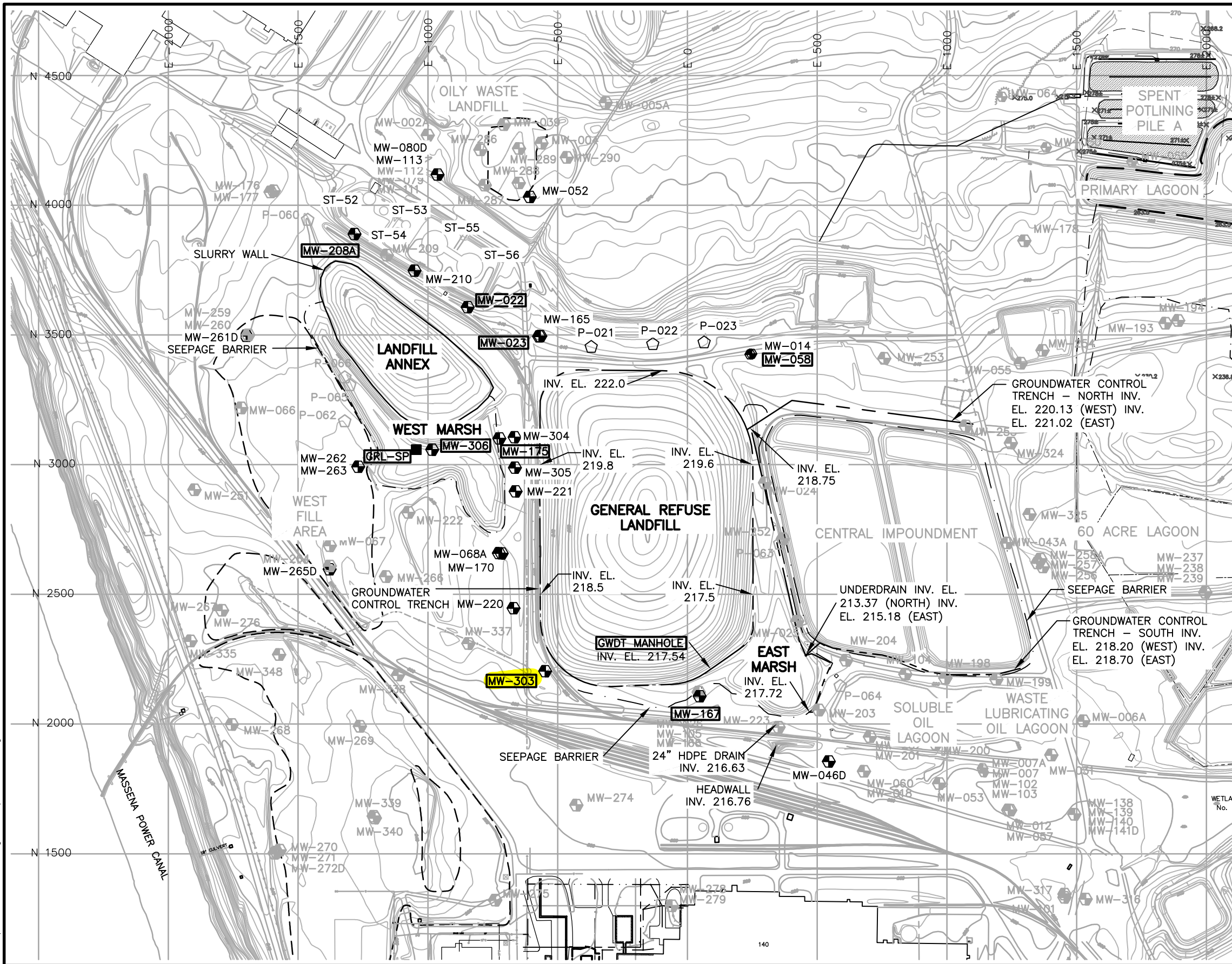
- ¹The sample has elevated detection limits due to the dilution required by the sample matrix
 B- The analyte was detected above the reporting limit in the associated method blank.
 J- The associated numerical value is an approximate concentration of the analyte in the sample
 U- Analyte was not detected above the level of the associated reported quantitation limit.
 R- Sample results are Rejected due to deficiencies in meeting quality control limits.

Appendix A

Site Maps






General Refuse Landfill

Site# 645002



- NOTES**
1. BASE MAP PREPARED FROM ALCOA MASSENA OPERATIONS 1987 AERIAL SURVEY (4/20/87), SHEETS NO. 3,4,8 AND 9, AND UPDATED WITH TOPOGRAPHIC FIELD SURVEYS AT THE GENERAL REFUSE LANDFILL, WEST MARSH, AND EAST MARSH. TOPOGRAPHY AT THE LANDFILL ANNEX AND WEST MARSH WAS VERIFIED AND MODIFIED WHERE APPROPRIATE BASED ON A TOPOGRAPHY SURVEY PERFORMED IN DECEMBER 1992.
 2. NORTH ARROW AS SHOWN INDICATES PLANT NORTH.
 3. ELEVATIONS ARE BASED ON USLS DATUM.

LEGEND

	MW-023	MONITORING WELL LOCATION
	P-064	PIEZOMETER LOCATION
	GRL-SP	SEEPAGE MONITORING PORT
	MW-316	POST-CLOSURE SAMPLING LOCATION
	MW-316	5-YEAR COMPLIANCE SAMPLING LOCATION

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 pw:\adapwapp\p\w_XM11902060003 Reports and Studies\09_CADD Figures and Graphics\GRL\FIG 3-1.dwg



Arconic Inc. - Massena, New York

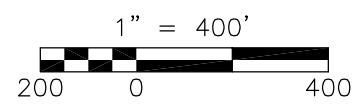
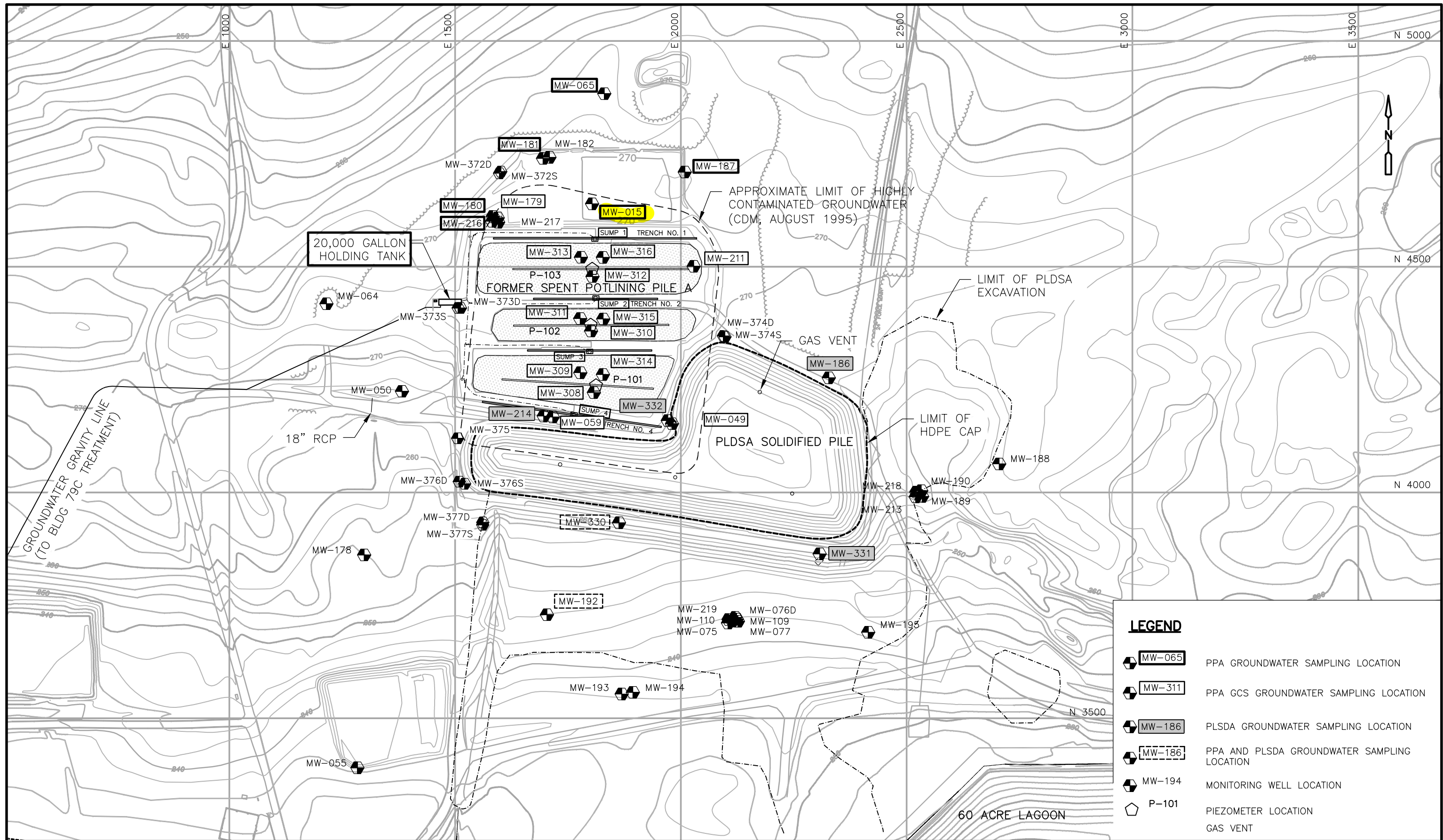


FIGURE 3-1
GENERAL REFUSE LANDFILL AND LANDFILL ANNEX
MONITORING LOCATION PLAN

Potliner Disposal Site "A"

Site# 645001

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 p:\www.cdmsmith.com\p\p\1190221982\103 Reports and Graphics\Fig 2 DATA SUMMARY.dwg

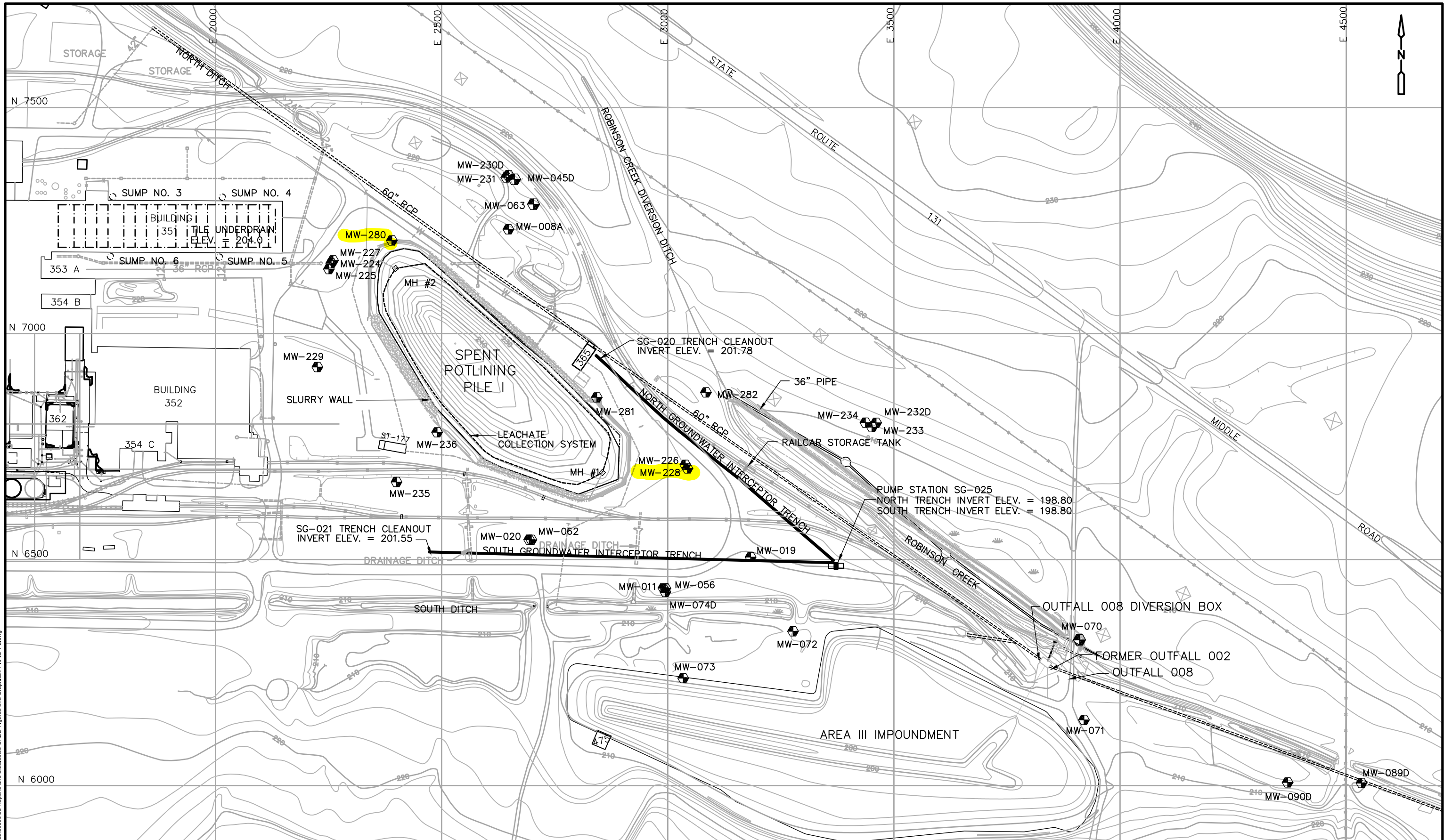


Arconic Inc. - Massena, New York

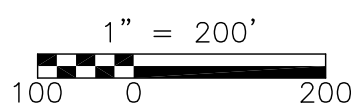
Figure 1
PPA
Monitoring Well Location to be Decommissioned

Potliner Disposal Site "I"

Site# 645003



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 pw:\vw\cdmsmith.com\PM_X1119020060003 Reports and Studies\09 CADD Figures and Graphics\PP1FIG 1-2.dwg



Arconic Inc. - Massena, New York
FIGURE 1-2
SPENT POTLINING PILE I
EXISTING CONDITIONS PLAN

Dennison Road

Site# 645004

E 6280

E 6000

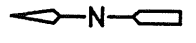
E 5650

N 2000

N 1500

N 1000

N 500



EXCAVATION LIMITS AND
LIMIT OF GCL CAP AS
DEFINED BY THE LOCATION
OF THE ANCHOR TRENCH.

AREA II

AREA I

SOUTHERN SWALE

EXISTING SUBSTATION

MW-051

MW-001

MW-295

MW-069

MW-291

MW-292

MW-293

MW-030

MW-029

MW-028

MW-114

MW-048D

MW-115

MW-296

MW-294

MW-027

LEGEND:

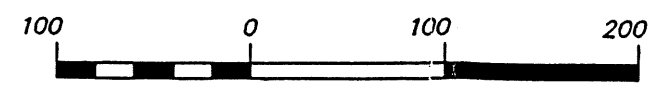
 MW-027 MONITORING WELL LOCATION

 MW-294 POST-CLOSURE SAMPLING LOCATION

NOTES:

1. TOPOGRAPHY IS BASED ON THE SURVEY PREPARED BY EASTERN MAPPING COMPANY 1987 AND MK FINAL CAPPING GRADES (1996).
2. HORIZONTAL COORDINATES ARE BASED ON "ALCOA PLANT REFERENCE DATUM", VERTICAL DATUM IS BASED ON USLS.

SCALE IN FEET



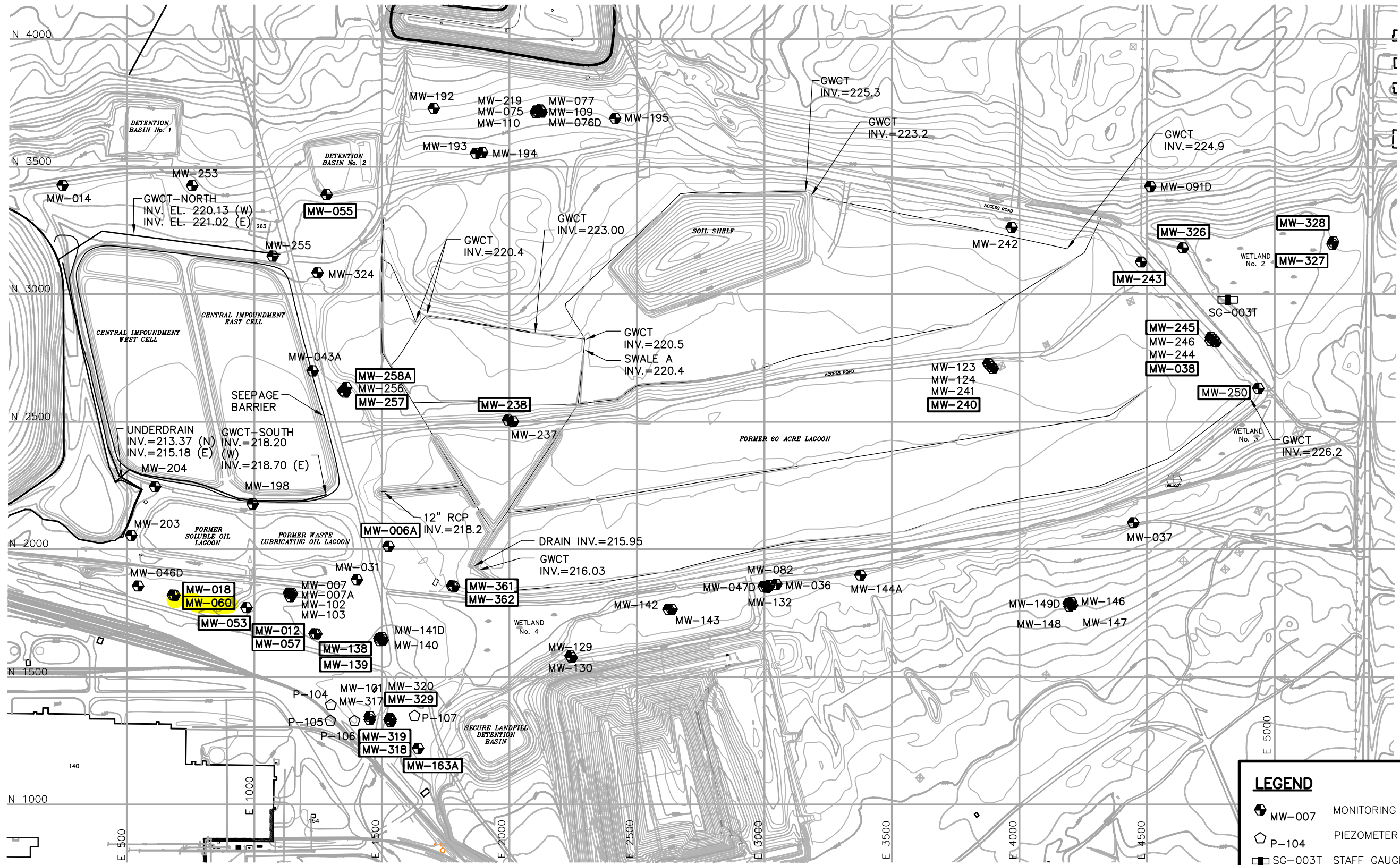
ALCOA - MASSENA, NEW YORK

**DENNISON CROSS ROAD SITE
MONITORING LOCATION PLAN**

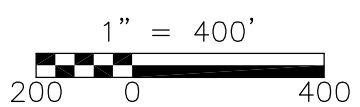


Former Soluble Oil Lagoon

Site# 645005-OU1



LEGEND	
	MW-007 MONITORING WELL LOCATION
	P-104 PIEZOMETER LOCATION
	SG-003T STAFF GAUGE LOCATION
	MW-240 SAMPLING LOCATION



Arconic Inc. - Massena, New York

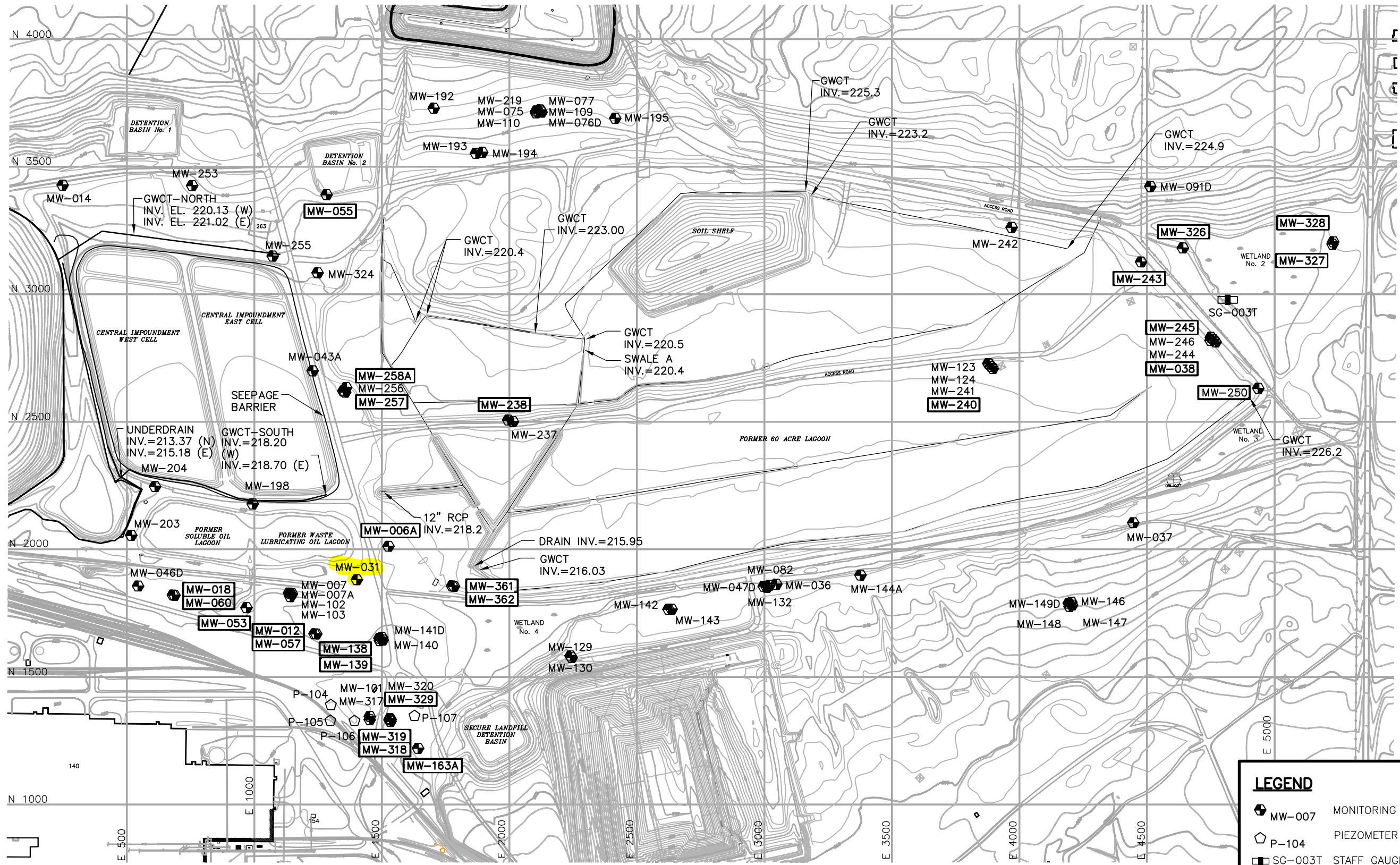
FIGURE 3-1
EASTERN CENTRAL VALLEY
SITE FEATURES CONTROLLING SHALLOW GROUNDWATER

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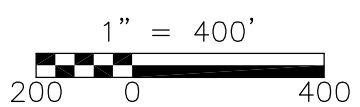


Former Waste Lubricating Oil Lagoon

Site# 645005-OU2



LEGEND	
	MW-007 MONITORING WELL LOCATION
	P-104 PIEZOMETER LOCATION
	SG-003T STAFF GAUGE LOCATION
	MW-240 SAMPLING LOCATION



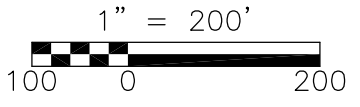
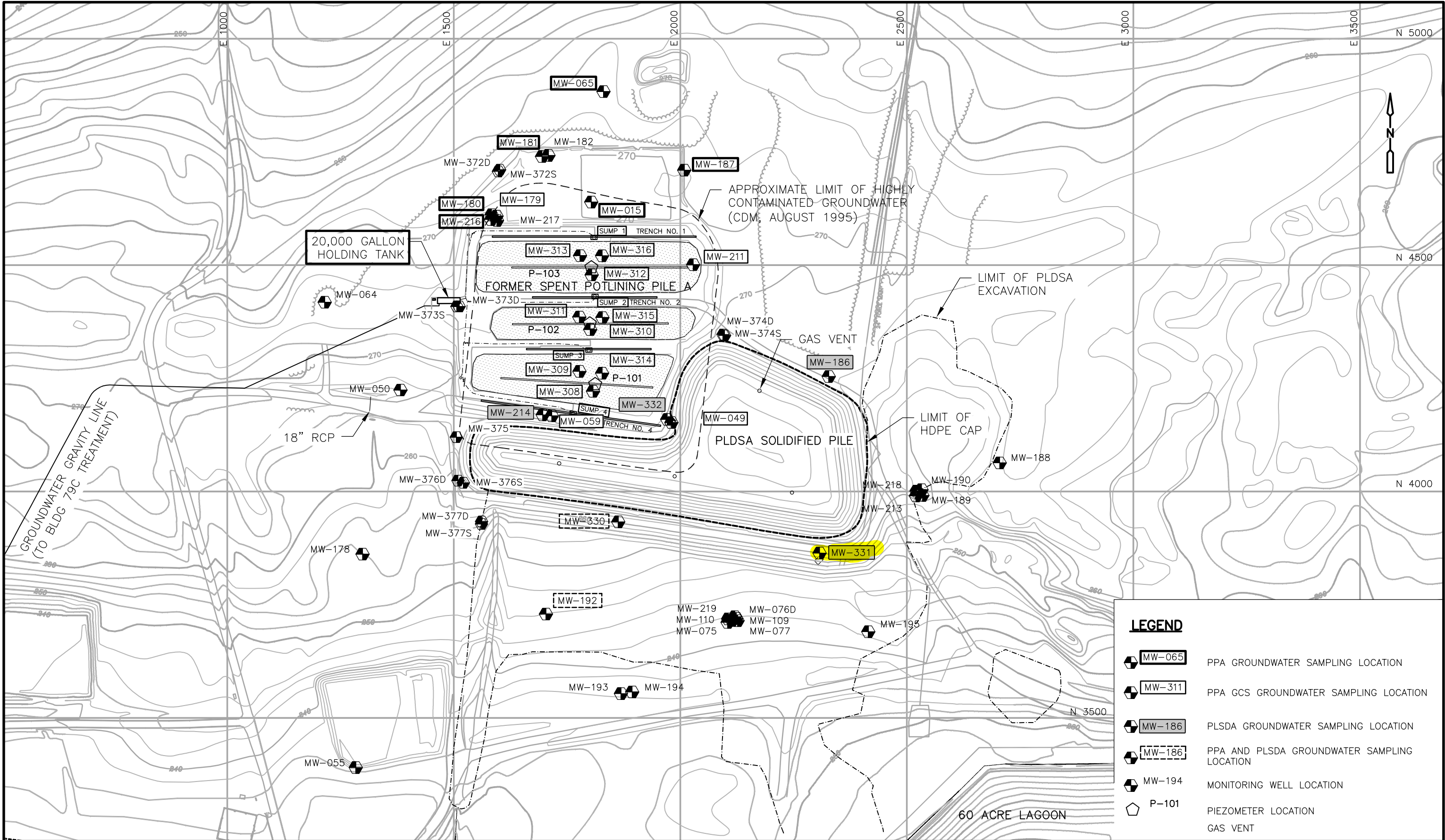
Arconic Inc. - Massena, New York

FIGURE 3-1
EASTERN CENTRAL VALLEY
SITE FEATURES CONTROLLING SHALLOW GROUNDWATER

Primary Lagoon and Dredge Spoils Area

Site# 645005-OU3

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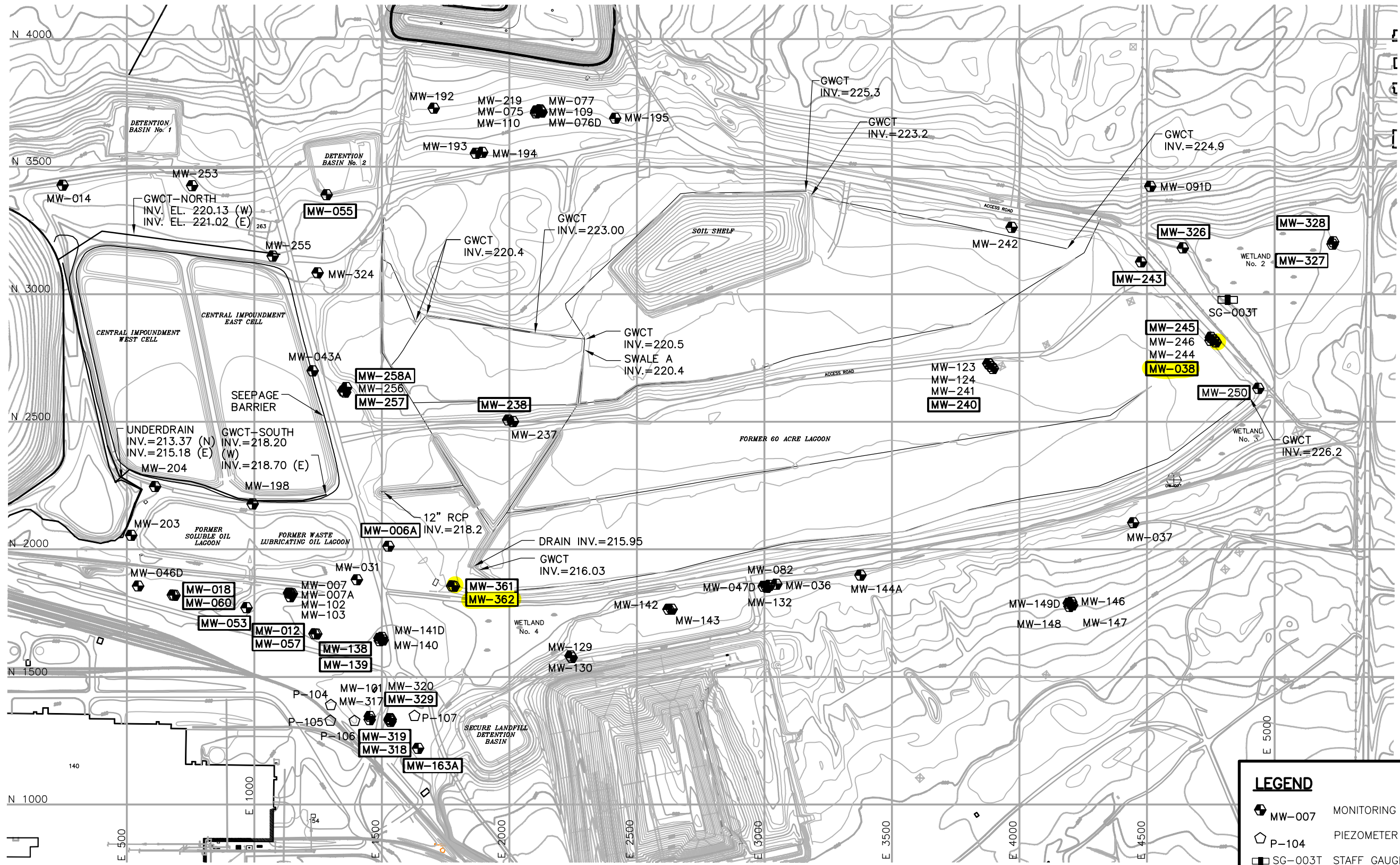
LEGEND	
	MW-065 PPA GROUNDWATER SAMPLING LOCATION
	MW-311 PPA GCS GROUNDWATER SAMPLING LOCATION
	MW-186 PLSDA GROUNDWATER SAMPLING LOCATION
	MW-187 PPA AND PLSDA GROUNDWATER SAMPLING LOCATION
	MW-194 MONITORING WELL LOCATION
	P-101 PIEZOMETER LOCATION
	GAS VENT

Arconic Inc. - Massena, New York

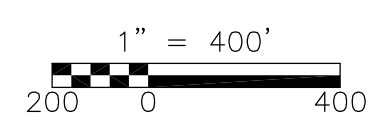
Figure 1
PPA
Monitoring Well Location to be Decommissioned

Former 60 Acre Lagoon

Site# 645005-OU4



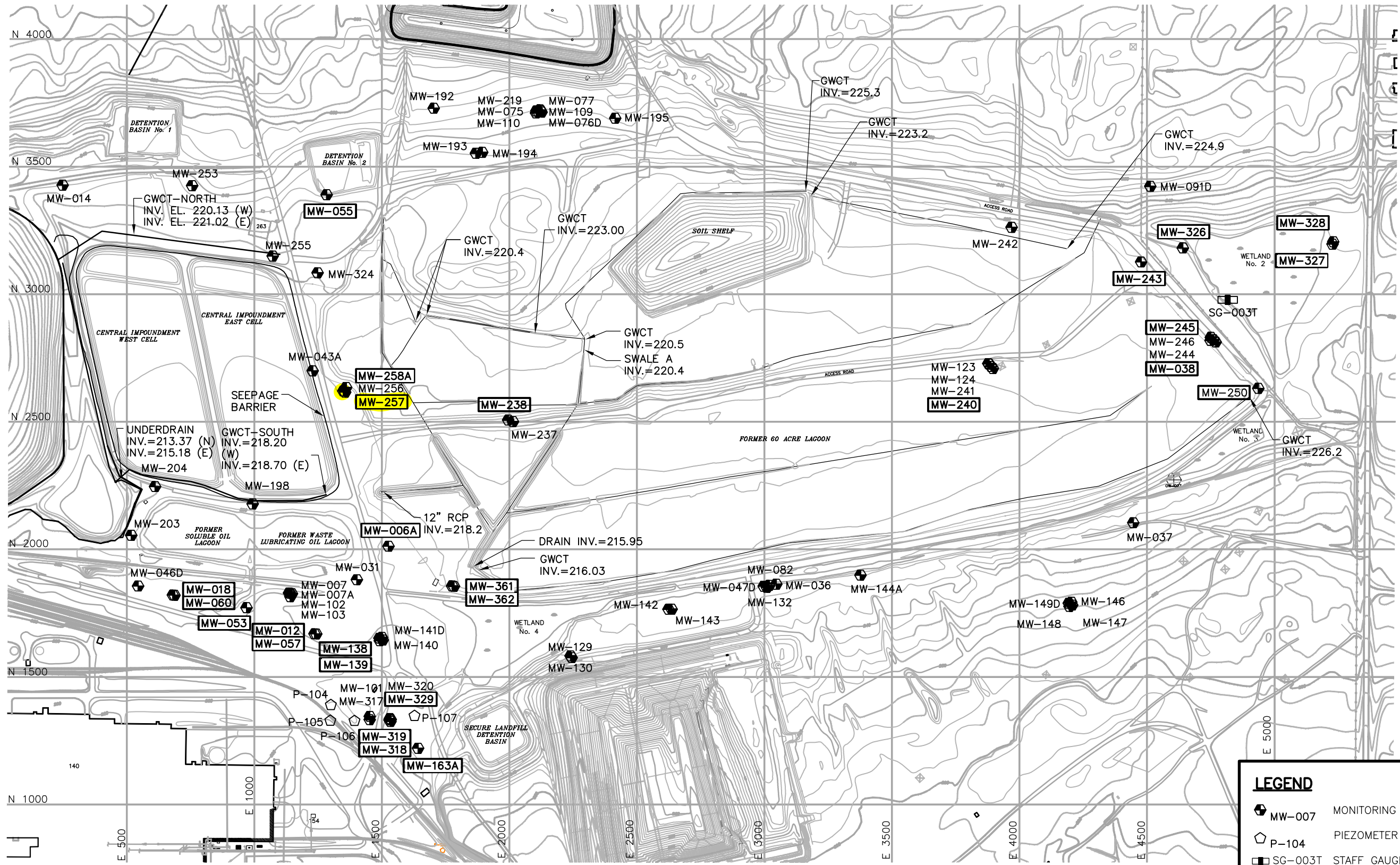
LEGEND	
	MW-007 MONITORING WELL LOCATION
	P-104 PIEZOMETER LOCATION
	SG-003T STAFF GAUGE LOCATION
	MW-240 SAMPLING LOCATION



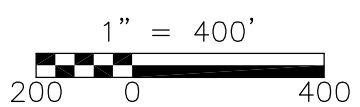
Arconic Inc. - Massena, New York
FIGURE 3-1
EASTERN CENTRAL VALLEY
SITE FEATURES CONTROLLING SHALLOW GROUNDWATER

Former Sanitary Lagoon

Site# 645005-OU5



LEGEND	
	MW-007 MONITORING WELL LOCATION
	P-104 PIEZOMETER LOCATION
	SG-003T STAFF GAUGE LOCATION
	MW-240 SAMPLING LOCATION



Arconic Inc. - Massena, New York

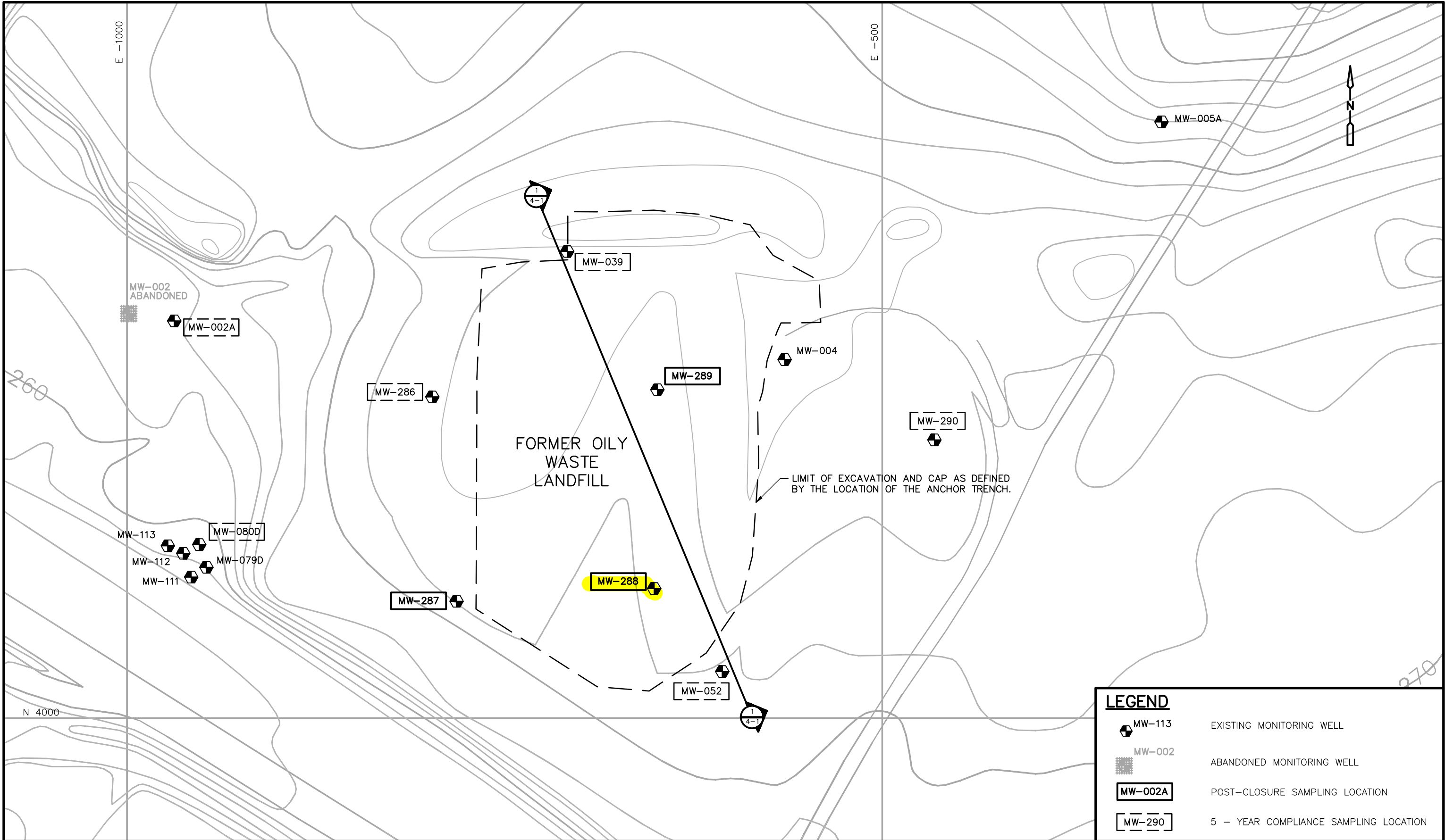
FIGURE 3-1
EASTERN CENTRAL VALLEY
SITE FEATURES CONTROLLING SHALLOW GROUNDWATER



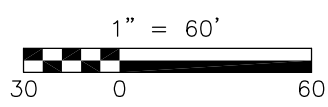
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Oily Waste Lagoon

Site# 645016



LEGEND	
	MW-113 EXISTING MONITORING WELL
	MW-002 ABANDONED MONITORING WELL
	MW-002A POST-CLOSURE SAMPLING LOCATION
	MW-290 5 - YEAR COMPLIANCE SAMPLING LOCATION



Arconic Inc. - Massena, New York
FIGURE 1-2
OILY WASTE LANDFILL
MONITORING WELL LOCATION PLAN

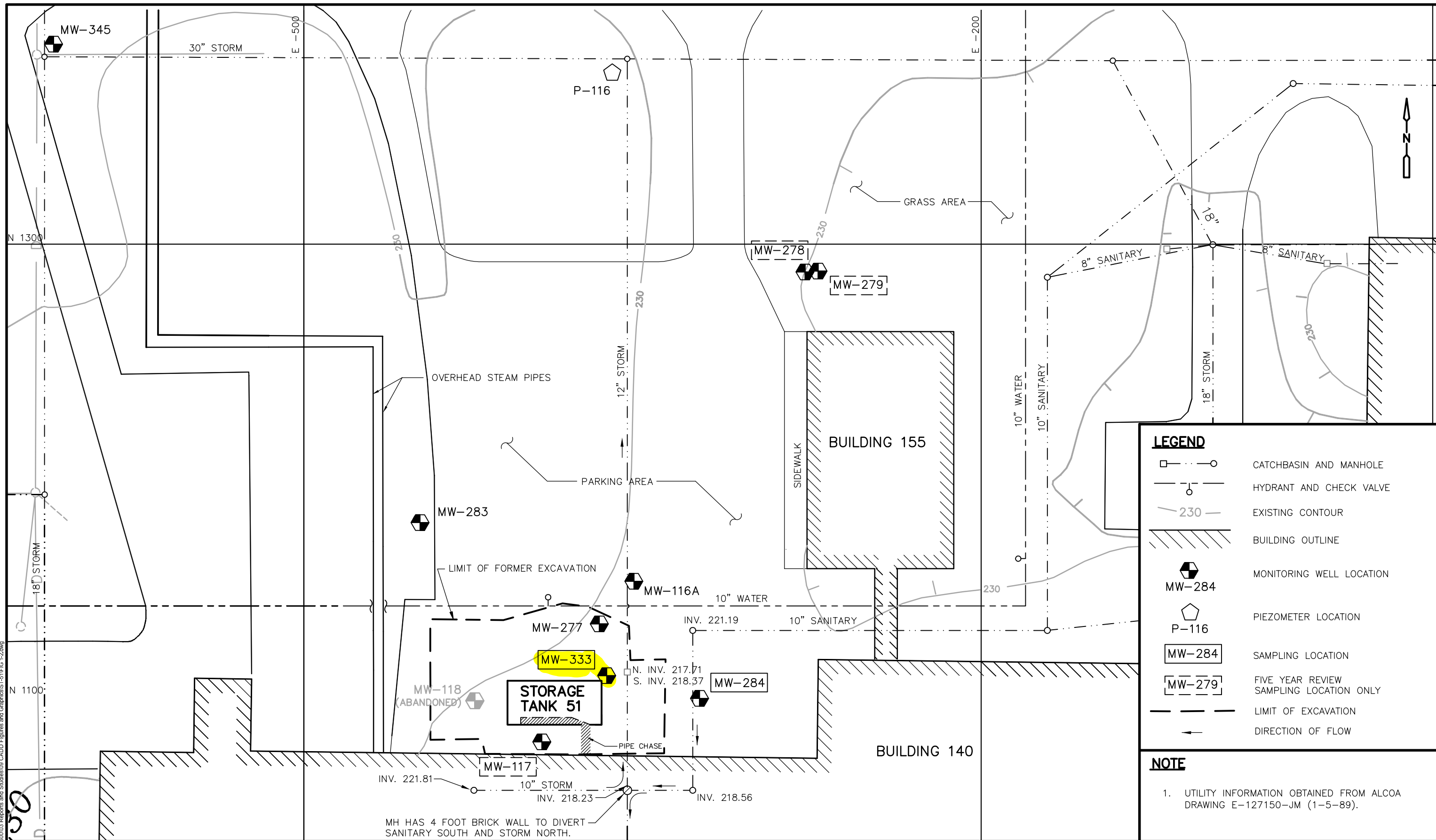


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Storage Tank 51

Site# 645023

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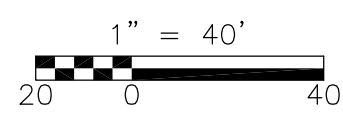


LEGEND

- CATCHBASIN AND MANHOLE
- HYDRANT AND CHECK VALVE
- 230 EXISTING CONTOUR
- BUILDING OUTLINE
- MW-284 MONITORING WELL LOCATION
- P-116 PIEZOMETER LOCATION
- MW-284 SAMPLING LOCATION
- MW-279 FIVE YEAR REVIEW SAMPLING LOCATION ONLY
- LIMIT OF EXCAVATION
- ← DIRECTION OF FLOW

NOTE

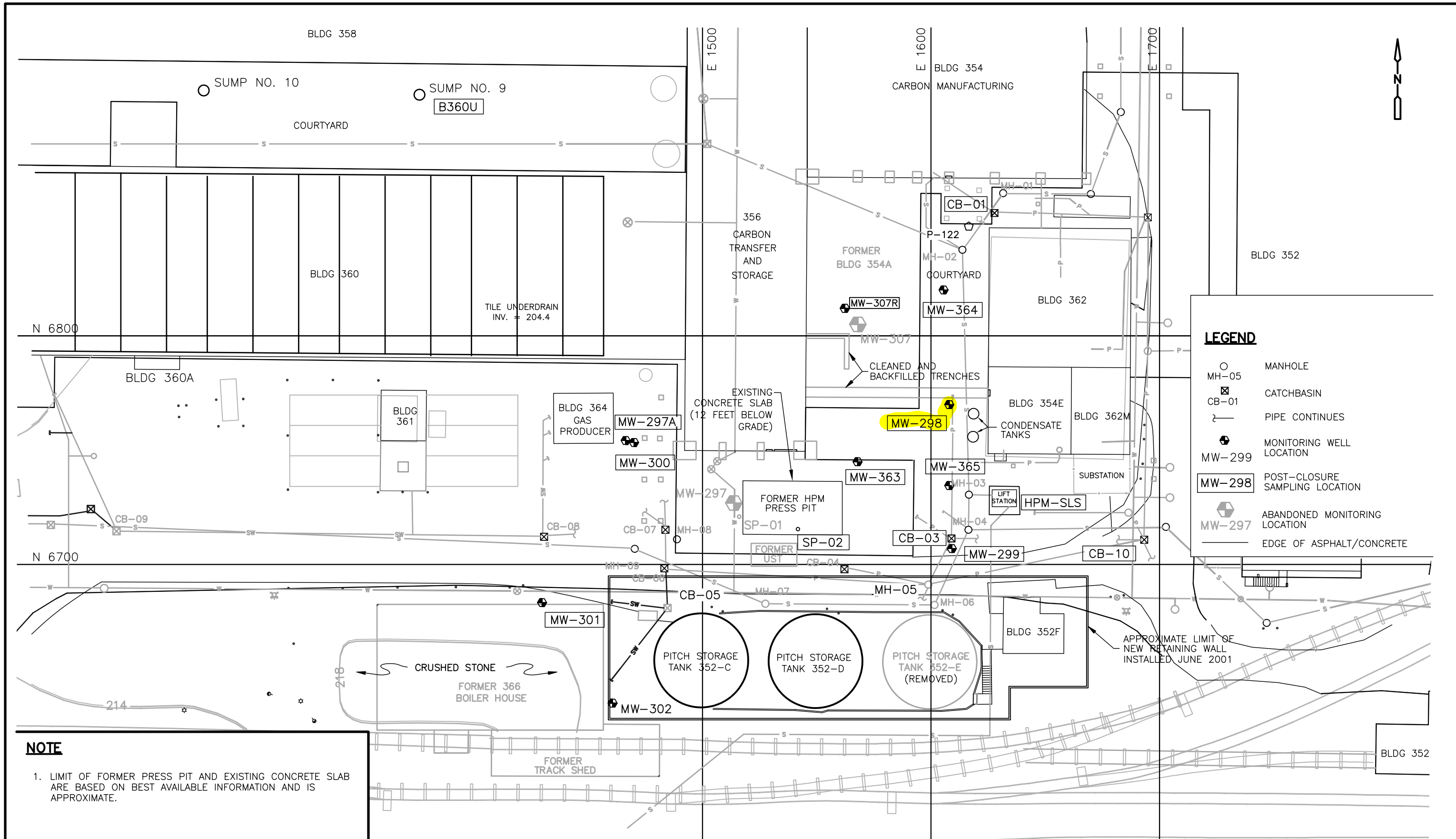
1. UTILITY INFORMATION OBTAINED FROM ALCOA DRAWING E-127150-JM (1-5-89).



Arconic Inc. - Massena, New York
FIGURE 1-2
STORAGE TANK 51
MONITORING WELL LOCATION PLAN

Hydraulic Press Manufacturing Area

Site# 645024

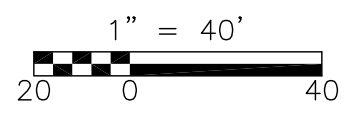


LEGEND

○	MANHOLE
⊠	CATCHBASIN
—	PIPE CONTINUES
●	MONITORING WELL LOCATION
⊙	POST-CLOSURE SAMPLING LOCATION
⊗	ABANDONED MONITORING LOCATION
—	EDGE OF ASPHALT/CONCRETE

NOTE

1. LIMIT OF FORMER PRESS PIT AND EXISTING CONCRETE SLAB ARE BASED ON BEST AVAILABLE INFORMATION AND IS APPROXIMATE.



Arconic Inc. - Massena, New York

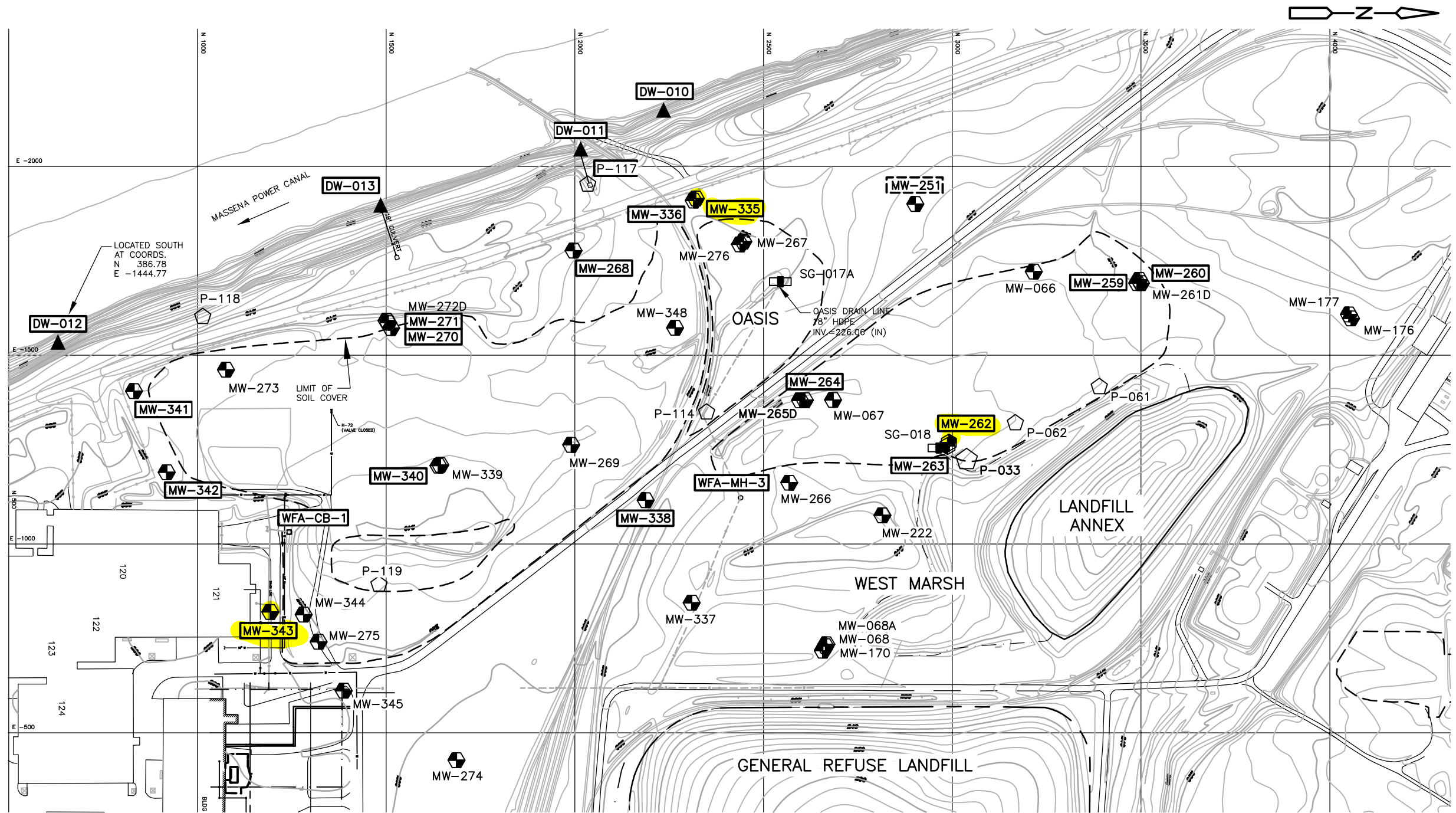
FIGURE 1-2
HPM PRESS AREA
SITE LAYOUT

XREFs: [CSTPL, F11X17] Images: []
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 p:\v\cdmsmith.com\FW_XM11902060003 Reports and Studies\09 CADD Figures and Graphics\HPM\FIG 1-2.dwg



West Fill Area

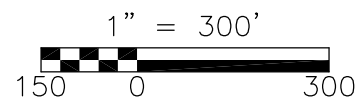
Site# 645025



LEGEND

	MW-344	MONITORING WELL LOCATION
	P-119	PIEZOMETER LOCATION
	SG-021	STAFF GAUGE LOCATION
	MW-251	FIVE YEAR REVIEW SAMPLING LOCATION
	MW-260	SAMPLING LOCATION
	DW-012	SEEP LOCATION
	WFA-CB-1	CATCH BASIN

- NOTES**
1. WEST FILL AREA TOPOGRAPHY BASED ON 1987 AERIAL SURVEY.
 2. GENERAL REFUSE LANDFILL TOPOGRAPHY BASED ON MORRISON KNUDSEN SURVEY, FEBRUARY 1995.
 3. LANDFILL ANNEX/WEST MARSH TOPOGRAPHY BASED ON MORRISON KNUDSEN SURVEY, APRIL 1994.

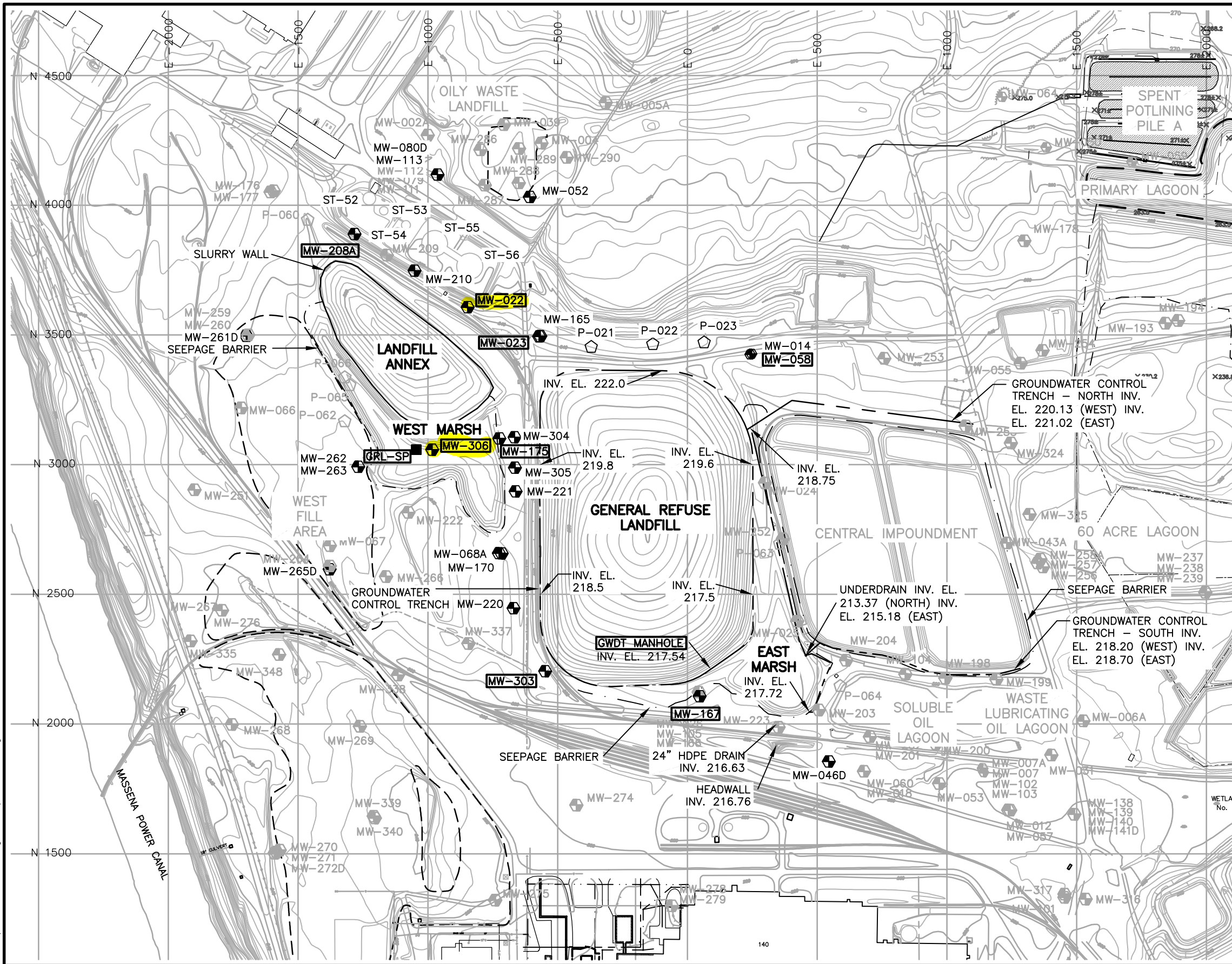


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FIGURE 3-1
WEST FILL AREA
MONITORING LOCATION PLAN

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Landfill Annex

Site# 645026



NOTES

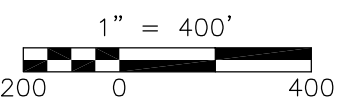
1. BASE MAP PREPARED FROM ALCOA MASSENA OPERATIONS 1987 AERIAL SURVEY (4/20/87), SHEETS NO. 3,4,8 AND 9, AND UPDATED WITH TOPOGRAPHIC FIELD SURVEYS AT THE GENERAL REFUSE LANDFILL, WEST MARSH, AND EAST MARSH. TOPOGRAPHY AT THE LANDFILL ANNEX AND WEST MARSH WAS VERIFIED AND MODIFIED WHERE APPROPRIATE BASED ON A TOPOGRAPHY SURVEY PERFORMED IN DECEMBER 1992.
2. NORTH ARROW AS SHOWN INDICATES PLANT NORTH.
3. ELEVATIONS ARE BASED ON USLS DATUM.

LEGEND

- MW-023 MONITORING WELL LOCATION
- P-064 PIEZOMETER LOCATION
- GRL-SP SEEPAGE MONITORING PORT
- MW-316 POST-CLOSURE SAMPLING LOCATION
- MW-316 5-YEAR COMPLIANCE SAMPLING LOCATION

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**FIGURE 3-1
GENERAL REFUSE LANDFILL AND LANDFILL ANNEX
MONITORING LOCATION PLAN**

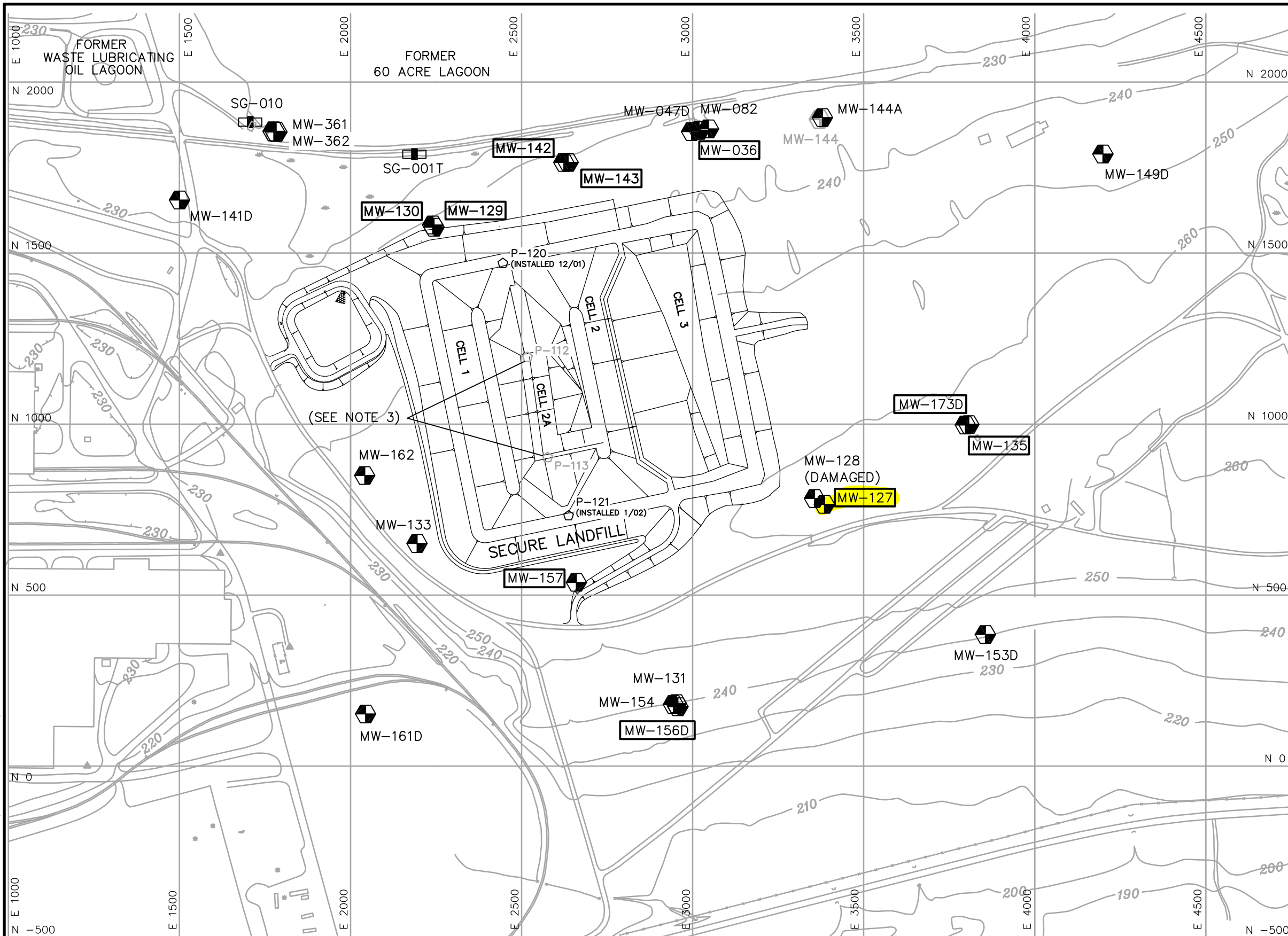


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Background Monitoring Well

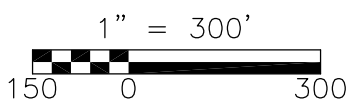
East of the Secure Landfill



- NOTES**
- CONSTRUCTION OF CELLS 1 AND 2 COMPLETED. CELL 2A CONSTRUCTED IN THE FALL OF 1999. CELL 3 CONSTRUCTED IN THE SPRING OF 2005.
 - TOPOGRAPHY BASED ON BASE MAP PREPARED FROM ALCOA MASSENA OPERATIONS 1987 AERIAL SURVEY. POST CONSTRUCTION TOPOGRAPHY HAS NOT BEEN RESURVEYED OUTSIDE THE LIMITS OF THE LANDFILL AND VARY FROM THAT SHOWN.
 - PIEZOMETERS P-112 AND P-113 WERE ABANDONED IN SEPTEMBER 1999 DUE TO CONSTRUCTION OF CELL 2A.
 - PIEZOMETERS P-120 AND P-121 WERE INSTALLED IN DECEMBER 2001 AND JANUARY 2002 UPON COMPLETION OF FINAL CAPPING OF CELL 2.

LEGEND

	STAFF GAUGE
	MONITORING WELL
	PIEZOMETER LOCATION
	ABANDONED STAFF GAUGE
	ABANDONED PIEZOMETER LOCATION
	SAMPLING LOCATION
	MONITORING WELL DAMAGED



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FIGURE 3-1
SECURE LANDFILL
MONITORING LOCATIONS

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