McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

McMAHON ASSOCIATES, INC.
1515 Market Street, Suite 1360
Philadelphia, PA 19102
p 215-433-1660 | f 215-433-1661

PRINCIPALS
Joseph J DeSantis, P E , PTOE
John S DePalma
Casey A Moore, P.E.
Gary R McNaughton, P E , PTOE
Christopher J Williams, P E

ASSOCIATES
John J Mitchell, P E
R Trent Ebersole, P E
Matthew M Kozsuch, P.E.
Maureen Chlebek, P E , PTOE
Dean A Carr, P E
Jason T Adams, P.E , PTOE
Christopher K Bauer, P E , PTOE

FOUNDER
Joseph W McMahon, P E

March 11, 2020

Mr. Scott Drumbore, P.E.
Division Manager – Engineering & Environmental Services Division
H&K Group, Inc.
2052 Lucon Road
P.O. Box 196
Skippack, PA 19474

RE: **Trip Generation Letter**
Center Valley Materials
Springfield Township, Bucks County, PA
McMahon Project No. 820220.11

Dear Scott:

Per your request, McMahon Associates, Inc. (McMahon) has completed a Trip Generation evaluation and letter report for submission to assess the existing operations, and proposed development, located along Springfield Street, east of N. West End Boulevard (S.R. 0309) in Springfield Township, Bucks County, PA.

The existing materials and trucking operations, known as Coopersburg Materials, consists of an occupied asphalt mixing plant on the north side of Springfield Street. The proposed development and operations, being referred to as Center Valley Materials, will consist of a G-7 Quarry use with access proposed via a single driveway on the south side of Springfield Street, directly opposite the existing Coopersburg Materials asphalt plant. The proposed quarry will provide stone to the existing asphalt plant, as well as other locations within the area. The stone and aggregate currently being processed at the asphalt plant is delivered from an existing quarry, Naceville Materials to the south in West Rockhill Township. Trucks currently traveling to and from the asphalt plant transporting stone travel along S.R. 0309 and Springfield Street to deliver the stone and then return to the quarry. The proposed Center Valley Materials quarry will become the new source for the stone and aggregate. Therefore, these existing truck trips will no longer utilize the existing roadway network to access Coopersburg Materials.

Trip Generation for Coopersburg Materials and Center Valley Materials

Peak hour and daily trip generation of the existing site, as well as the proposed modification of the site, was based on information provided by H&K Group Inc., herein H&K. Estimates of traffic volumes generated by any development and land use are typically prepared based on trip generation data compiled from numerous studies contained in the Institute of Transportation Engineers (ITE) publication, *Trip Generation, 10th Edition* (2017). However, due to the land use of the asphalt batch plant and quarry, McMahon was able to utilize information based on actual trip data and activity provided in H&K's log data and correspondence for the existing asphalt batch plant and future proposed G-7 Quarry use. H&K's peak season log data is attached.

Based on email correspondence, H&K provided McMahon with the following information:

- Log data of all loads from the Naceville quarry to Coopersburg Materials from January 2019 - December 2019.
- Log data of all loads from the H&K Materials quarry, in Hilltown Township from January 2019 - December 2019.
- Each load represents 1 enter trip and 1 exit trip.
- The proposed site is expected to produce a similar number of trips as the existing H&K Materials quarry based upon an annual production of 500,000 tons per year.
- Once the proposed Center Valley Materials site is complete, trips from the Naceville quarry to Coopersburg Materials will cease.
- Existing site traffic is primarily truck traffic.
- Approximately 10 people will be employed at the proposed site.
- Employees at the proposed site will typically arrive at 6:00 AM.
- Approximately 15 miscellaneous trips will occur daily at the proposed site.
- Busy season for the existing site occurs between the months of April and November with typical peaks between August and September.
- The existing weekday morning peak hour occurs from 7:00-9:00 AM.
- The existing weekday afternoon peak hour occurs from 4:00-6:00 PM.

Based on the data provided, and phone calls between our office and H&K, McMahon developed the following assumptions to calculate Center Valley Materials site trips:

- Assumed the months of August - September as the typical busiest season for this site and industry- wide. Used log information from August 2019 – September 2019 to calculate Center Valley Materials site trips.
- Used 7:00-9:00 AM and 4:00-6:00 PM as the peak hours. (matches commuter peak periods)

- Calculated the average amount of trips for the weekday morning, weekday afternoon, and daily from Monday-Friday in August 2019 – September 2019.
- Existing trip generation for the H&K Materials quarry is expected to be similar due to anticipated production rates for the Center Valley Materials quarry.
- Existing trip generation from the Naceville quarry to Coopersburg Materials will be eliminated in proposed conditions.

The trip generation characteristics for the existing site and the future proposed modification of the site were calculated based on information provided by H&K. Calculations for the trip generation are attached.

Table 1 provides a summary of the anticipated trips for the existing site utilizing information from H&K.

Table 1 - Vehicular Trip Generation Characteristics

Land Use	Daily	Weekday Morning			Weekday Afternoon		
		In	Out	Total	In	Out	Total
Proposed Quarry	319(1)	37	37	74	0	10	10
Existing Asphalt Plant	116	7	7	14	3	3	6
Total "New" Trips	203(1)	30	30	60	-3	7	4

(1) Daily trips include truck trips from the log data plus trips for the 10 employees and 15 miscellaneous trips.

As shown in Table 1, based on log sheet data from the existing Naceville quarry, Center Valley Materials is anticipated to generate approximately 319 daily trips, with approximately 74 total trips during the weekday morning peak hour, and approximately 10 total trips during the weekday afternoon peak hour. Based on the log data, vehicles providing quarry supplied material to/from the existing asphalt plant is calculated to be approximately 116 total daily trips, approximately 14 total trips during the weekday morning peak hour, and approximately 6 total trips during the weekday afternoon peak hour.

Since the existing trips from the Naceville quarry to Coopersburg Materials will be replaced by trips immediately crossing Springfield Street between the Center Valley Materials and Coopersburg Materials sites in the future, the net impact on the roadway network will be approximately 203 total daily trips, approximately 60 total trips during the weekday morning peak hour, and approximately 4 total trips during the weekday afternoon peak hour.

Based on our evaluation of trips associated with the proposed quarry use, it is our professional opinion that the traffic generated by the G-7 Quarry use will not have a significant impact on the operations of Springfield Street and its intersection with Route 309. Our opinion will be further confirmed with the completion of the Traffic Study.

We trust that this Trip Generation evaluation and letter responds to your requests and satisfactorily addresses the traffic-related questions at this time that are related to the proposed G-7 Quarry use and related operations in the future. If you have any questions, or require further clarification, please feel free to contact me.

Sincerely,

Mark A. Roth, P.E.
General Manager – Philadelphia Office

MAR/das

Attachments

cc: Derek A. Shew, McMahon Associates, Inc.

I:\eng\H&KGR1\820220.11 Center Valley Materials\Traffic\2020-03-10 Trip Generation Letter

Outgoing (Naceville Materials to Coopersburg Materials)

August	Daily	7-9 AM	4-6 PM
7th	31	3	5
14th	71	8	0
21st	62	8	4
28th	56	5	2

September	Daily	7-9 AM	4-6 PM
4th	58	5	2
11th	48	5	6
18th	56	8	2
25th	85	13	2
Average (Exiting Trips)	58	7	3
Assumed (Entering Trips)	58	7	3
Assumed Total Passenger Vehicle Trips (Exiting + Entering)	0	0	0
Assumed Existing Total Trips (Exiting + Entering)	**116**	**14**	**6**

Outgoing (Center Valley Materials)

August	Daily	7-9 AM	4-6 PM
7th	141	39	0
14th	126	35	0
21st	102	22	0
28th	96	21	0

September	Daily	7-9 AM	4-6 PM
4th	178	49	0
11th	188	51	0
18th	178	40	0
25th	166	38	0
Average (Exiting Trips)	147	37	0
Assumed (Entering Trips)	147	37	0
Assumed Total Passenger Vehicle Trips (Exiting + Entering)	25	0	10
Assumed Existing Total Trips (Exiting + Entering)	**319**	**74**	**10**

Proposed Net Trips

August	Daily	7-9 AM	4-6 PM
7th	110	36	-5
14th	55	27	0
21st	40	14	-4
28th	40	16	-2

September	Daily	7-9 AM	4-6 PM
4th	120	44	-2
11th	140	46	-6
18th	122	32	-2
25th	81	25	-2
Average (Exiting Trips)	89	30	-3
Assumed (Entering Trips)	89	30	-3
Assumed Total Passenger Vehicle Trips (Exiting + Entering)	25	0	10
Assumed Existing Total Trips (Exiting + Entering)	**203**	**60**	**4**

TICKET #	DATE	TIME	JOB NAME	TONS
328898	4/3/2019	7:02:00 AM	COOPERSBURG MATERIALS	24.72
328899	4/3/2019	7:06:00 AM	COOPERSBURG MATERIALS	21.75
328915	4/3/2019	7:49:00 AM	COOPERSBURG MATERIALS	23.81
328919	4/3/2019	7:59:00 AM	COOPERSBURG MATERIALS	21.92
328921	4/3/2019	8:03:00 AM	COOPERSBURG MATERIALS	24.26
328924	4/3/2019	8:11:00 AM	COOPERSBURG MATERIALS	21.42
328934	4/3/2019	8:44:00 AM	COOPERSBURG MATERIALS	24.13
328942	4/3/2019	8:59:00 AM	COOPERSBURG MATERIALS	22.41
8				
329105	4/3/2019	4:19:00 PM	COOPERSBURG MATERIALS	23.94
329107	4/3/2019	4:23:00 PM	COOPERSBURG MATERIALS	23.25
329109	4/3/2019	4:37:00 PM	COOPERSBURG MATERIALS	22.58
3				
330349	4/10/2019	7:14:00 AM	COOPERSBURG MATERIALS	22.24
330353	4/10/2019	7:28:00 AM	COOPERSBURG MATERIALS	23.89
330354	4/10/2019	7:33:00 AM	COOPERSBURG MATERIALS	21.77
330356	4/10/2019	7:35:00 AM	COOPERSBURG MATERIALS	24.63
330358	4/10/2019	7:39:00 AM	COOPERSBURG MATERIALS	20.82
330371	4/10/2019	8:14:00 AM	COOPERSBURG MATERIALS	22.33
330375	4/10/2019	8:25:00 AM	COOPERSBURG MATERIALS	24.13
330377	4/10/2019	8:35:00 AM	COOPERSBURG MATERIALS	21.89
330379	4/10/2019	8:43:00 AM	COOPERSBURG MATERIALS	23.99
330380	4/10/2019	8:46:00 AM	COOPERSBURG MATERIALS	21.08
10				
331603	4/17/2019	7:08:00 AM	COOPERSBURG MATERIALS	23.9
331605	4/17/2019	7:16:00 AM	COOPERSBURG MATERIALS	24.78
331611	4/17/2019	7:43:00 AM	COOPERSBURG MATERIALS	22.42
331630	4/17/2019	8:51:00 AM	COOPERSBURG MATERIALS	22.17
4				
332763	4/24/2019	7:13:00 AM	COOPERSBURG MATERIALS	22.42
332770	4/24/2019	7:46:00 AM	COOPERSBURG MATERIALS	24.13
332773	4/24/2019	7:57:00 AM	COOPERSBURG MATERIALS	24.09
332776	4/24/2019	8:16:00 AM	COOPERSBURG MATERIALS	22.25
332787	4/24/2019	8:53:00 AM	COOPERSBURG MATERIALS	24.12
332788	4/24/2019	8:57:00 AM	COOPERSBURG MATERIALS	24.19
6				
333908	5/1/2019	7:06:00 AM	COOPERSBURG MATERIALS	23.54

333917	5/1/2019	7:27:00 AM	COOPERSBURG MATERIALS	22.19
333928	5/1/2019	7:54:00 AM	COOPERSBURG MATERIALS	23.62
333940	5/1/2019	8:33:00 AM	COOPERSBURG MATERIALS	21.94
333942	5/1/2019	8:36:00 AM	COOPERSBURG MATERIALS	23.73

5

335081	5/8/2019	7:20:00 AM	COOPERSBURG MATERIALS	23.84
335083	5/8/2019	7:24:00 AM	COOPERSBURG MATERIALS	22.39
335086	5/8/2019	7:30:00 AM	COOPERSBURG MATERIALS	23.4
335097	5/8/2019	8:20:00 AM	COOPERSBURG MATERIALS	23.75
335100	5/8/2019	8:26:00 AM	COOPERSBURG MATERIALS	22.14

5

336274	5/15/2019	7:05:00 AM	COOPERSBURG MATERIALS	22.57
336283	5/15/2019	7:24:00 AM	COOPERSBURG MATERIALS	22.99
336289	5/15/2019	7:51:00 AM	COOPERSBURG MATERIALS	21.76
336294	5/15/2019	8:12:00 AM	COOPERSBURG MATERIALS	23.1
336299	5/15/2019	8:28:00 AM	COOPERSBURG MATERIALS	23.28

5

337445	5/22/2019	7:22:00 AM	COOPERSBURG MATERIALS	21.91
337450	5/22/2019	7:31:00 AM	COOPERSBURG MATERIALS	23.88
337455	5/22/2019	7:44:00 AM	COOPERSBURG MATERIALS	24.09
337472	5/22/2019	8:33:00 AM	COOPERSBURG MATERIALS	23.94
337476	5/22/2019	8:39:00 AM	COOPERSBURG MATERIALS	22.28
337482	5/22/2019	8:50:00 AM	COOPERSBURG MATERIALS	24.11

6

338364	5/29/2019	7:44:00 AM	COOPERSBURG MATERIALS	22.38
338367	5/29/2019	7:57:00 AM	COOPERSBURG MATERIALS	23.56
338368	5/29/2019	7:58:00 AM	COOPERSBURG MATERIALS	23.62
338385	5/29/2019	8:51:00 AM	COOPERSBURG MATERIALS	21.55

4

352568	8/7/2019	7:17:00 AM	COOPERSBURG MATERIALS	22.42
352589	8/7/2019	8:15:00 AM	COOPERSBURG MATERIALS	23.74
352590	8/7/2019	8:20:00 AM	COOPERSBURG MATERIALS	22.41

3

352784	8/7/2019	4:05:00 PM	COOPERSBURG MATERIALS	22.02
352789	8/7/2019	4:16:00 PM	COOPERSBURG MATERIALS	20.77
352793	8/7/2019	4:35:00 PM	COOPERSBURG MATERIALS	23.57
352794	8/7/2019	4:38:00 PM	COOPERSBURG MATERIALS	21.44

352795	8/7/2019	4:41:00 PM COOPERSBURG MATERIALS	23.47
5			
354444	8/14/2019	7:07:00 AM COOPERSBURG MATERIALS	22.22
354454	8/14/2019	7:25:00 AM COOPERSBURG MATERIALS	21.99
354462	8/14/2019	7:37:00 AM COOPERSBURG MATERIALS	23.08
354466	8/14/2019	7:42:00 AM COOPERSBURG MATERIALS	21.77
354497	8/14/2019	8:33:00 AM COOPERSBURG MATERIALS	21.8
354500	8/14/2019	8:37:00 AM COOPERSBURG MATERIALS	22.2
354508	8/14/2019	8:47:00 AM COOPERSBURG MATERIALS	22.91
354510	8/14/2019	8:49:00 AM COOPERSBURG MATERIALS	21.52
8			
356284	8/21/2019	7:07:00 AM COOPERSBURG MATERIALS	21.97
356288	8/21/2019	7:17:00 AM COOPERSBURG MATERIALS	23.89
356291	8/21/2019	7:25:00 AM COOPERSBURG MATERIALS	23.32
356309	8/21/2019	7:56:00 AM COOPERSBURG MATERIALS	24.11
356316	8/21/2019	8:13:00 AM COOPERSBURG MATERIALS	21.79
356318	8/21/2019	8:14:00 AM COOPERSBURG MATERIALS	21.93
356321	8/21/2019	8:20:00 AM COOPERSBURG MATERIALS	23.7
356328	8/21/2019	8:31:00 AM COOPERSBURG MATERIALS	23.33
8			
356522	8/21/2019	4:00:00 PM COOPERSBURG MATERIALS	20.68
356523	8/21/2019	4:04:00 PM COOPERSBURG MATERIALS	23.2
356529	8/21/2019	4:20:00 PM COOPERSBURG MATERIALS	22.73
356532	8/21/2019	4:32:00 PM COOPERSBURG MATERIALS	23.31
4			
357831	8/28/2019	7:01:00 AM COOPERSBURG MATERIALS	24.1
357840	8/28/2019	7:24:00 AM COOPERSBURG MATERIALS	23.45
357854	8/28/2019	8:01:00 AM COOPERSBURG MATERIALS	22.09
357856	8/28/2019	8:06:00 AM COOPERSBURG MATERIALS	24.33
357869	8/28/2019	8:31:00 AM COOPERSBURG MATERIALS	23.66
5			
358052	8/28/2019	4:03:00 PM COOPERSBURG MATERIALS	23.37
358056	8/28/2019	4:18:00 PM COOPERSBURG MATERIALS	22.32
2			
358954	9/4/2019	7:29:00 AM COOPERSBURG MATERIALS	24.03
358955	9/4/2019	7:31:00 AM COOPERSBURG MATERIALS	22.71
358959	9/4/2019	8:01:00 AM COOPERSBURG MATERIALS	21.79

358971	9/4/2019	8:29:00 AM	COOPERSBURG MATERIALS	24.2
358974	9/4/2019	8:40:00 AM	COOPERSBURG MATERIALS	22.83
5				
359184	9/4/2019	4:04:00 PM	COOPERSBURG MATERIALS	22.21
359189	9/4/2019	4:23:00 PM	COOPERSBURG MATERIALS	23.75
2				
360798	9/11/2019	7:18:00 AM	COOPERSBURG MATERIALS	23.09
360811	9/11/2019	7:51:00 AM	COOPERSBURG MATERIALS	22.25
360814	9/11/2019	7:59:00 AM	COOPERSBURG MATERIALS	24.33
360824	9/11/2019	8:16:00 AM	COOPERSBURG MATERIALS	23.42
360847	9/11/2019	8:59:00 AM	COOPERSBURG MATERIALS	21.75
5				
361074	9/11/2019	4:14:00 PM	COOPERSBURG MATERIALS	20.19
361081	9/11/2019	4:29:00 PM	COOPERSBURG MATERIALS	23.42
361082	9/11/2019	4:31:00 PM	COOPERSBURG MATERIALS	21.83
361083	9/11/2019	4:32:00 PM	COOPERSBURG MATERIALS	20.7
361084	9/11/2019	4:33:00 PM	COOPERSBURG MATERIALS	23.45
361085	9/11/2019	4:34:00 PM	COOPERSBURG MATERIALS	22.59
6				
362731	9/18/2019	7:01:00 AM	COOPERSBURG MATERIALS	23.2
362748	9/18/2019	7:23:00 AM	COOPERSBURG MATERIALS	21.95
362753	9/18/2019	7:31:00 AM	COOPERSBURG MATERIALS	21.9
362757	9/18/2019	7:37:00 AM	COOPERSBURG MATERIALS	23.18
362771	9/18/2019	8:11:00 AM	COOPERSBURG MATERIALS	23.65
362777	9/18/2019	8:23:00 AM	COOPERSBURG MATERIALS	24.06
362781	9/18/2019	8:28:00 AM	COOPERSBURG MATERIALS	21.93
362782	9/18/2019	8:29:00 AM	COOPERSBURG MATERIALS	21.94
8				
363040	9/18/2019	4:05:00 PM	COOPERSBURG MATERIALS	21.01
363047	9/18/2019	4:18:00 PM	COOPERSBURG MATERIALS	23.62
2				
364933	9/25/2019	7:12:00 AM	COOPERSBURG MATERIALS	24.36
364940	9/25/2019	7:23:00 AM	COOPERSBURG MATERIALS	22.05
364944	9/25/2019	7:31:00 AM	COOPERSBURG MATERIALS	23.19
364946	9/25/2019	7:36:00 AM	COOPERSBURG MATERIALS	23.69
364949	9/25/2019	7:39:00 AM	COOPERSBURG MATERIALS	22.4
364956	9/25/2019	7:47:00 AM	COOPERSBURG MATERIALS	22.18

364957	9/25/2019	7:48:00 AM COOPERSBURG MATERIALS	22.71
364979	9/25/2019	8:31:00 AM COOPERSBURG MATERIALS	24.04
364981	9/25/2019	8:37:00 AM COOPERSBURG MATERIALS	21.91
364985	9/25/2019	8:43:00 AM COOPERSBURG MATERIALS	23.48
364989	9/25/2019	8:50:00 AM COOPERSBURG MATERIALS	23.73
364997	9/25/2019	8:56:00 AM COOPERSBURG MATERIALS	22.38
364998	9/25/2019	8:57:00 AM COOPERSBURG MATERIALS	22.13
13			

365217	9/25/2019	4:00:00 PM COOPERSBURG MATERIALS	23.69
365228	9/25/2019	4:30:00 PM COOPERSBURG MATERIALS	24.16
2			

TICKET #	DATE	TIME	JOB NAME	TONS
327263	4/3/2019	7:36:00 AM	HWSA PFC Treatment Group 2	21.97
327264	4/3/2019	7:43:00 AM	HWSA PFC Treatment Group 2	22.2
443237	4/3/2019	7:47:00 AM	COSTARS 5610-15 PERKASIE BORO	3.11
327265	4/3/2019	7:52:00 AM	HWSA PFC Treatment Group 2	21
443238	4/3/2019	7:53:00 AM	B & L 2019 SEASONAL	15.78
443239	4/3/2019	8:02:00 AM	DOYLESTOWN HOSPITAL PAVILLION III	22.18
443240	4/3/2019	8:04:00 AM	H.D.PAVING	21.53
443241	4/3/2019	8:08:00 AM	PICKUP	20.09
443242	4/3/2019	8:15:00 AM	DOYLESTOWN HOSPITAL PAVILLION III	21.36
443243	4/3/2019	8:17:00 AM	DOYLESTOWN HOSPITAL PAVILLION III	21.23
443244	4/3/2019	8:26:00 AM	H.D.PAVING	4.45
443245	4/3/2019	8:35:00 AM	B & L 2019 SEASONAL	16.13
443246	4/3/2019	8:38:00 AM	J.D JOBS	11.1
327266	4/3/2019	8:41:00 AM	2019 Seasonal	19.89
327267	4/3/2019	8:59:00 AM	Various Jobs	18.86

15

443510	4/10/2019	7:05:00 AM	ROSE LANE	22.3
443511	4/10/2019	7:08:00 AM	ROSE LANE	21.9
443512	4/10/2019	7:11:00 AM	PENN BEER	22.25
327430	4/10/2019	7:21:00 AM	HWSA PFC TreatmentGroup1	22.31
443513	4/10/2019	7:23:00 AM	SEASONAL	22
327431	4/10/2019	7:38:00 AM	North Gate	12.07
327432	4/10/2019	7:47:00 AM	Various Jobs	18.61
443514	4/10/2019	7:48:00 AM	VARIOUS LEVEL 4	7.95
443515	4/10/2019	7:56:00 AM	NPWA E.BROAD ST.	23.19
443516	4/10/2019	7:58:00 AM	SEASONAL	21.96
443517	4/10/2019	8:05:00 AM	ROSE LANE	21.64
327434	4/10/2019	8:11:00 AM	HWSA PFC TreatmentGroup1	17.92
443518	4/10/2019	8:17:00 AM	VARIOUS JOBS	20.33
327435	4/10/2019	8:22:00 AM	Cash	22.38
443519	4/10/2019	8:26:00 AM	SEASONAL	21.93
327436	4/10/2019	8:29:00 AM	B & L Excavating - 2019 Seasonal	17.94
443521	4/10/2019	8:36:00 AM	SEASONAL PRICE 2019	22.6
327437	4/10/2019	8:38:00 AM	P & M Construction	13.95
327438	4/10/2019	8:40:00 AM	Cash	3.98
443522	4/10/2019	8:50:00 AM	DOYLESTOWN HOSPITAL PAVILLION III	21.67
443523	4/10/2019	8:54:00 AM	SEASONAL	23

21

443744	4/17/2019	7:05:00 AM	J.D JOBS	21.79
443745	4/17/2019	7:27:00 AM	SR4013-BMP-ECMS#92741	19.22
443746	4/17/2019	7:29:00 AM	SR4013-BMP-ECMS#92741	20.95
443747	4/17/2019	7:37:00 AM	J.D JOBS	22.47

443748	4/17/2019	7:40:00 AM	PICK UP	14.66
443749	4/17/2019	7:46:00 AM	SEASONAL PRICING 2019	20.58
443750	4/17/2019	8:01:00 AM	SEASONAL PRICE 2019	18.3
327645	4/17/2019	8:10:00 AM	Schmidt Paving - 2019	23.52
443751	4/17/2019	8:11:00 AM	J.D JOBS	20.69
443752	4/17/2019	8:13:00 AM	OLD FORTY FT. RD. BRIDGE	19.77
327646	4/17/2019	8:15:00 AM	Schmidt Paving - 2019	24.11
443753	4/17/2019	8:15:00 AM	SR4013-BMP-ECMS#92741	19.81
443754	4/17/2019	8:18:00 AM	SR4013-BMP-ECMS#92741	21.29
327647	4/17/2019	8:19:00 AM	A & T Subaru	22.73
327648	4/17/2019	8:24:00 AM	A & T Subaru	22.76
327649	4/17/2019	8:28:00 AM	Various Jobs	13.69
327650	4/17/2019	8:32:00 AM	A & T Subaru	22.68
443755	4/17/2019	8:33:00 AM	NPWA E.BROAD ST.	21.67
327651	4/17/2019	8:34:00 AM	A & T Subaru	2.12
443756	4/17/2019	8:39:00 AM	J.D JOBS	21.43
327652	4/17/2019	8:42:00 AM	2019 Seasonal	24.04
327653	4/17/2019	8:49:00 AM	2019 Seasonal	22.99
327654	4/17/2019	8:51:00 AM	Costars 5610-36 E Rockhill	3.03
327655	4/17/2019	8:56:00 AM	HD Paving	14.06

24

327766	4/24/2019	7:03:00 AM	Doylestown Hospital	22.41
327767	4/24/2019	7:08:00 AM	Doylestown Hospital	21.55
443931	4/24/2019	7:11:00 AM	QUANTUM	9.3
443932	4/24/2019	7:15:00 AM	VARIOUS JOBS	22.58
443933	4/24/2019	7:21:00 AM	VARIOUS JOBS	22.45
327768	4/24/2019	7:24:00 AM	Doylestown Hospital	21.77
327769	4/24/2019	7:29:00 AM	Doylestown Hospital	23.08
327770	4/24/2019	7:33:00 AM	Doylestown Hospital	21.14
443934	4/24/2019	7:38:00 AM	VARIOUS JOBS	21.58
443935	4/24/2019	7:40:00 AM	SR4013-BMP-ECMS#92741	21.84
443936	4/24/2019	7:41:00 AM	JASON BRICKAJLIK	22.63
327771	4/24/2019	7:45:00 AM	A.S. Paving	16.01
443937	4/24/2019	7:46:00 AM	SEASONAL PRICING 2019	22.22
443938	4/24/2019	7:52:00 AM	MASON LANDSCAPE & CONST.	3.66
327772	4/24/2019	7:54:00 AM	2019 Seasonal	20.97
443939	4/24/2019	7:56:00 AM	JNS- SEASONAL PRICE 2019	22.5
327773	4/24/2019	7:59:00 AM	A.S. Paving	20.95
443940	4/24/2019	8:01:00 AM	OLD FORTY FT. RD. BRIDGE	20.28
327774	4/24/2019	8:03:00 AM	PennDOT Lot	21.87
327775	4/24/2019	8:08:00 AM	PennDOT Lot	21.94
443941	4/24/2019	8:11:00 AM	VARIOUS JOBS	8.77
327776	4/24/2019	8:13:00 AM	PennDOT Lot	21.95
327777	4/24/2019	8:17:00 AM	PennDOT Lot	22.03
443942	4/24/2019	8:21:00 AM	LIFE STORAGE	21.95

327778	4/24/2019	8:22:00 AM	Doylestown Hospital	22.06
443943	4/24/2019	8:23:00 AM	JNS- SEASONAL PRICE 2019	21.76
443944	4/24/2019	8:26:00 AM	LIFE STORAGE	20.21
327779	4/24/2019	8:27:00 AM	Timber Creek	22.94
443945	4/24/2019	8:29:00 AM	VARIOUS JOBS	21.99
443946	4/24/2019	8:31:00 AM	20 NOBLE ST.SELLERSVILLE	21.61
327780	4/24/2019	8:32:00 AM	Timber Creek	22.47
327781	4/24/2019	8:37:00 AM	Timber Creek	22.97
327782	4/24/2019	8:42:00 AM	Doylestown Hospital	21.6
443947	4/24/2019	8:43:00 AM	JNS- SEASONAL PRICE 2019	20.87
327783	4/24/2019	8:47:00 AM	Cov-Wilson	22.02
327784	4/24/2019	8:52:00 AM	Doylestown Hospital	21.54
327785	4/24/2019	8:56:00 AM	Doylestown Hospital	22.93
327786	4/24/2019	8:59:00 AM	P & M Construction	8

38

444170	5/1/2019	7:06:00 AM	OLD FORTY FT. RD. BRIDGE	21.84
444171	5/1/2019	7:07:00 AM	261 TOWNSHIP LINE ROAD	15.7
444172	5/1/2019	7:15:00 AM	VARIOUS LOADS PICKED UP	19.71
444173	5/1/2019	7:53:00 AM	VARIOUS LEVEL 4	22.5
444174	5/1/2019	7:56:00 AM	A.S PAVING	3.95
444175	5/1/2019	8:02:00 AM	KRAGER TRUCKING	20.36
327996	5/1/2019	8:25:00 AM	Various Jobs	22.72
444176	5/1/2019	8:31:00 AM	VARIOUS LOADS PICKED UP	19.9
327997	5/1/2019	8:31:00 AM	Various Jobs	23.79
444177	5/1/2019	8:32:00 AM	VARIOUS JOBS	9.97
327998	5/1/2019	8:36:00 AM	Various Jobs	22.98
327999	5/1/2019	8:42:00 AM	A.S. Paving	9.98

12

328112	5/8/2019	7:03:00 AM	2019 Seasonal	20.25
444454	5/8/2019	7:06:00 AM	LIFE STORAGE OTTSVILLE	22.48
328113	5/8/2019	7:09:00 AM	Hidden Meadows	22.68
444455	5/8/2019	7:09:00 AM	SEASONAL PRICE 2019	21.79
328114	5/8/2019	7:13:00 AM	Hidden Meadows	22.15
328115	5/8/2019	7:18:00 AM	Hidden Meadows	23.19
444456	5/8/2019	7:18:00 AM	VARIOUS LEVEL 4	21.44
444457	5/8/2019	7:23:00 AM	SEASONAL 2018 PRICING	20.55
328116	5/8/2019	7:26:00 AM	Hidden Meadows	22.11
444458	5/8/2019	7:27:00 AM	NEW BRITIAN WAREHOUSE	20.03
328117	5/8/2019	7:35:00 AM	Rodon	23.08
328118	5/8/2019	7:41:00 AM	Hidden Meadows	22.43
328119	5/8/2019	7:46:00 AM	Hidden Meadows	21.97
328120	5/8/2019	7:51:00 AM	Rodon	22
444459	5/8/2019	7:52:00 AM	HORGAN JOBS LEVEL 4	21.67

328121	5/8/2019	7:53:00 AM	Schmidt Paving - 2019	4.03
328122	5/8/2019	8:11:00 AM	Various Jobs	1
328123	5/8/2019	8:19:00 AM	SR4013 Bridge	22.65
444460	5/8/2019	8:23:00 AM	SEASONAL 2018 PRICING	20.81
328124	5/8/2019	8:23:00 AM	Hidden Meadows	22.55
444461	5/8/2019	8:25:00 AM	NEW BRITIAN WAREHOUSE	21.68
328125	5/8/2019	8:28:00 AM	Hidden Meadows	23.11
444462	5/8/2019	8:29:00 AM	VARIOUS JOBS	2.88
444463	5/8/2019	8:30:00 AM	SEASONAL PRICE 2019	22.76
328126	5/8/2019	8:32:00 AM	SR4013 Bridge	21.55
328127	5/8/2019	8:43:00 AM	Hidden Meadows	22.04
328128	5/8/2019	8:46:00 AM	Solebury Seal	1.52
328129	5/8/2019	8:52:00 AM	Hidden Meadows	22.49
444464	5/8/2019	8:53:00 AM	SEASONAL PRICE 2019	21.03
444465	5/8/2019	8:55:00 AM	NPWA E.BROAD ST.	9.98

30

444676	5/15/2019	7:02:00 AM	2018 SEASONAL	23.01
444677	5/15/2019	7:09:00 AM	SR4013-BMP-ECMS#92741	13.83
444678	5/15/2019	7:18:00 AM	NPWA E.BROAD ST.	22.79
444679	5/15/2019	7:21:00 AM	SEASONAL 2018 PRICING	20.97
444680	5/15/2019	7:23:00 AM	SEASONAL 2018 PRICING	20.96
444681	5/15/2019	7:26:00 AM	SEASONAL	22.33
444682	5/15/2019	7:29:00 AM	PICKED UP	0.87
444683	5/15/2019	7:48:00 AM	E. SCHMIDT PAVING-COD SEASONAL PRICE 2019	21.12
328392	5/15/2019	7:51:00 AM	Various Jobs	1.54
328393	5/15/2019	7:57:00 AM	Various Jobs	22.72
444684	5/15/2019	7:59:00 AM	VARIOUS JOBS	22.67
328394	5/15/2019	8:03:00 AM	Various Jobs	22.98
444685	5/15/2019	8:04:00 AM	VARIOUS JOBS	11.42
444686	5/15/2019	8:05:00 AM	SEASONAL	22.97
444687	5/15/2019	8:09:00 AM	1144 SQUIRES WAY LANSDALE	22.94
328395	5/15/2019	8:11:00 AM	Various Jobs	22.46
328396	5/15/2019	8:16:00 AM	Various Jobs	21.97
328397	5/15/2019	8:23:00 AM	Various Jobs	22.98
444688	5/15/2019	8:24:00 AM	2018 SEASONAL	22.76
444689	5/15/2019	8:27:00 AM	E. SCHMIDT PAVING-COD SEASONAL PRICE 2019	20.82
328398	5/15/2019	8:30:00 AM	Various Jobs	23.99
328399	5/15/2019	8:34:00 AM	Lawrence Site Contractors	21.94
444690	5/15/2019	8:36:00 AM	KOPLIN MASONRY	0.94
444691	5/15/2019	8:39:00 AM	SEASONAL	22.63
328400	5/15/2019	8:41:00 AM	Lawrence Site Contractors	22.01
444692	5/15/2019	8:44:00 AM	VARIOUS JOBS	23.21
328401	5/15/2019	8:46:00 AM	Lawrence Site Contractors	21.98
444693	5/15/2019	8:57:00 AM	E. SCHMIDT PAVING-COD SEASONAL PRICE 2019	21.25

28

328437	5/15/2019	4:03:00 PM	Various Jobs	14.21

1

444882	5/22/2019	7:11:00 AM	LEVEL 4	17.13
444883	5/22/2019	7:14:00 AM	MASON LANDSCAPE & CONST.	4.37
444884	5/22/2019	7:25:00 AM	DUKE TRANSPORT-SEASONAL 2019	15.68
328615	5/22/2019	7:29:00 AM	Various Jobs	8.11
328616	5/22/2019	7:35:00 AM	Rodon	23.12
444885	5/22/2019	7:37:00 AM	WEISS MKTS.	22.59
444886	5/22/2019	7:40:00 AM	LEVEL 3 PICKUP	21.65
328617	5/22/2019	7:42:00 AM	Various Jobs	20.12
328618	5/22/2019	7:43:00 AM	2019 Seasonal	3.06
328619	5/22/2019	7:52:00 AM	Rodon	22.02
444887	5/22/2019	8:02:00 AM	VARIOUS LEVEL 3	14.96
328620	5/22/2019	8:06:00 AM	Rt 113	22.54
444888	5/22/2019	8:21:00 AM	CARVERSVILLE FARM FOUNDATION	23.32
444889	5/22/2019	8:37:00 AM	VARIOUS LEVEL 4	22.44
444890	5/22/2019	8:38:00 AM	ANDREW ROTMAN	3.9
328621	5/22/2019	8:41:00 AM	Rodon	21.98
328622	5/22/2019	8:42:00 AM	New Britain Warehouse	3.04
444891	5/22/2019	8:48:00 AM	SEASONAL PRICE 2019	23.02
328623	5/22/2019	8:57:00 AM	Various Jobs	10.42

19

328711	5/29/2019	7:07:00 AM	McDonald's Quakertown	22.18
328712	5/29/2019	7:12:00 AM	McDonald's Quakertown	22.12
445026	5/29/2019	7:12:00 AM	DUKE TRANSPORT-SEASONAL 2019	23.43
445027	5/29/2019	7:15:00 AM	PICKED UP	1.28
328713	5/29/2019	7:16:00 AM	McDonald's Quakertown	22.01
328714	5/29/2019	7:33:00 AM	McDonald's Quakertown	23.04
328715	5/29/2019	7:38:00 AM	McDonald's Quakertown	21.99
328716	5/29/2019	8:12:00 AM	Schmidt Paving - 2019	9.03
328717	5/29/2019	8:14:00 AM	Various Jobs	9
328718	5/29/2019	8:18:00 AM	2019 Seasonal	20.91
445028	5/29/2019	8:22:00 AM	LEVEL 3 PICKUP	22.4
328719	5/29/2019	8:22:00 AM	2019 Seasonal	12.95
328720	5/29/2019	8:25:00 AM	2019 Seasonal	13.02
328721	5/29/2019	8:34:00 AM	D. Mallozzi	7.01
328722	5/29/2019	8:47:00 AM	RFQ561036ITQ 19-01 FOB Bucks 9.5mm	8.02
445029	5/29/2019	8:47:00 AM	KOPLIN MASONRY	1.03

16

331951	8/7/2019	7:00:00 AM	Weis Markets	22.64
331952	8/7/2019	7:04:00 AM	Hillstone	19.55
447631	8/7/2019	7:07:00 AM	2018 SEASONAL	21.14
331953	8/7/2019	7:09:00 AM	Weis Markets	22.35
447632	8/7/2019	7:12:00 AM	CHAPMAN RD.	21.46
331954	8/7/2019	7:14:00 AM	Weis Markets	22.8
447633	8/7/2019	7:24:00 AM	CHAPMAN RD.	21.9
331955	8/7/2019	7:32:00 AM	Weis Markets	21.94
447634	8/7/2019	7:40:00 AM	VARIOUS LEVEL 1	21.63
331956	8/7/2019	7:44:00 AM	Weis Markets	21.97
331957	8/7/2019	7:46:00 AM	Various Jobs	2.97
447635	8/7/2019	7:46:00 AM	JNS- SEASONAL PRICE 2019	22.41
331958	8/7/2019	7:48:00 AM	Schmidt Paving - 2019	11.99
331959	8/7/2019	7:55:00 AM	2019 Seasonal	22.5
447636	8/7/2019	7:57:00 AM	VARIOUS JOBS	1.83
331960	8/7/2019	8:00:00 AM	2019 Seasonal	22.93
331961	8/7/2019	8:05:00 AM	Weis Markets	22.55
447637	8/7/2019	8:06:00 AM	VARIOUS	20.38
447638	8/7/2019	8:07:00 AM	CHAPMAN RD.	21.78
447639	8/7/2019	8:07:00 AM	DOYLESTOWN HOSPITAL PAVILLION III	22.14
447640	8/7/2019	8:08:00 AM	VARIOUS LEVEL 4	21.84
447641	8/7/2019	8:09:00 AM	VARIOUS	20.04
447642	8/7/2019	8:11:00 AM	JNS- SEASONAL PRICE 2019	22.66
447643	8/7/2019	8:13:00 AM	PINNACLE PAVEMENT LLC	1.51
331962	8/7/2019	8:14:00 AM	Weis Markets	22.24
447644	8/7/2019	8:22:00 AM	VARIOUS	18.21
331963	8/7/2019	8:23:00 AM	Weis Markets	22.74
447645	8/7/2019	8:25:00 AM	VARIOUS LEVEL 1	21.7
331964	8/7/2019	8:29:00 AM	Weis Markets	21.99
447646	8/7/2019	8:31:00 AM	JNS- SEASONAL PRICE 2019	22.56
447647	8/7/2019	8:32:00 AM	VARIOUS	17.68
331965	8/7/2019	8:32:00 AM	DiPalantino Contractors, Inc.	13.99
447648	8/7/2019	8:40:00 AM	VARIOUS LEVEL 4	19.25
447649	8/7/2019	8:43:00 AM	VARIOUS	20.22
331966	8/7/2019	8:48:00 AM	Weis Markets	22
331967	8/7/2019	8:51:00 AM	Various Jobs	9
447650	8/7/2019	8:57:00 AM	CHAPMAN RD.	22.02
447651	8/7/2019	8:58:00 AM	VARIOUS LEVEL 4	21.1
331968	8/7/2019	8:58:00 AM	Weis Markets	22.48

39

447938	8/14/2019	7:06:00 AM	VARIOUS JOBS	9.98
332352	8/14/2019	7:07:00 AM	Pennridge Business Park	22.61
332353	8/14/2019	7:12:00 AM	Various Jobs	22.1
447939	8/14/2019	7:12:00 AM	VARIOUS JOBS	21.27
332354	8/14/2019	7:16:00 AM	Various Jobs	22.53

332355	8/14/2019	7:21:00 AM	Pennridge Business Park	22.2
447940	8/14/2019	7:22:00 AM	CHAPMAN RD.	21.63
332356	8/14/2019	7:26:00 AM	Various Jobs	22.96
447941	8/14/2019	7:29:00 AM	PICKED UP	0.92
332357	8/14/2019	7:30:00 AM	Various Jobs	21.46
447942	8/14/2019	7:35:00 AM	VARIOUS JOBS	21.57
332358	8/14/2019	7:36:00 AM	Pennridge Business Park	22.75
447943	8/14/2019	7:38:00 AM	ALBRECHT EXCAVATING	21.06
447944	8/14/2019	7:41:00 AM	VARIOUS JOBS	21.4
332359	8/14/2019	7:41:00 AM	Various Jobs	21.04
447945	8/14/2019	7:45:00 AM	2018 SEASONAL	21.88
447946	8/14/2019	7:50:00 AM	NEW BRITAIN TWP. CULVERTS	21.77
447947	8/14/2019	7:51:00 AM	K SQUARED LANDSCAPE LLC	4.43
332360	8/14/2019	7:51:00 AM	New Britain	23.98
447948	8/14/2019	7:53:00 AM	ECMS102837 RAILROAD AVE.	20.58
447949	8/14/2019	7:56:00 AM	A.S PAVING	4.98
447950	8/14/2019	8:00:00 AM	VARIOUS JOBS	21.26
447951	8/14/2019	8:02:00 AM	PICKED UP	20.87
447952	8/14/2019	8:07:00 AM	ECMS102837 RAILROAD AVE.	20.21
447953	8/14/2019	8:09:00 AM	MIDDLE RD-DUBLIN VLG.	20.8
332361	8/14/2019	8:15:00 AM	RFQ561036ITQ 19-01 FOB Bucks 9.5mm	6
447954	8/14/2019	8:22:00 AM	NEW BRITAIN TWP. CULVERTS	22.38
447955	8/14/2019	8:23:00 AM	SEASONAL PRICE 2019	23.08
447956	8/14/2019	8:28:00 AM	SEASONAL 2018 PRICING	20.78
447957	8/14/2019	8:30:00 AM	VARIOUS	20.06
447958	8/14/2019	8:32:00 AM	VARIOUS JOBS	20.95
447959	8/14/2019	8:46:00 AM	847 BETHLEHEM PIKE	22.96
447960	8/14/2019	8:52:00 AM	ECMS102837 RAILROAD AVE.	20.05
447961	8/14/2019	8:55:00 AM	NEW BRITAIN TWP. CULVERTS	21.64
447962	8/14/2019	8:58:00 AM	VARIOUS - LEVEL 4	21.77

35

332777	8/21/2019	7:02:00 AM	St. Johns Church	23.06
332778	8/21/2019	7:08:00 AM	Towamencin	22.06
332779	8/21/2019	7:12:00 AM	2019 Seasonal	23.03
448155	8/21/2019	7:15:00 AM	CHAPMAN RD.	22.06
332780	8/21/2019	7:19:00 AM	Various Jobs	21.95
448156	8/21/2019	7:23:00 AM	VARIOUS LEVEL 4	21.99
332781	8/21/2019	7:24:00 AM	Towamencin	22.92
448157	8/21/2019	7:24:00 AM	BUX MONT JOBS	8.79
332782	8/21/2019	7:27:00 AM	Towamencin	22.86
448158	8/21/2019	7:49:00 AM	SEASONAL 2018 PRICING	21.31
448159	8/21/2019	8:00:00 AM	COSTARS 5610-15 HILLTOWN TWSP.	9.5
332783	8/21/2019	8:08:00 AM	Various Jobs	21.49
448160	8/21/2019	8:10:00 AM	VARIOUS LEVEL 3	20.99
332784	8/21/2019	8:13:00 AM	Costars 5610-36 Salford S Dietz Mill	23.01

332786	8/21/2019	8:18:00 AM	Costars 5610-36 Salford S Dietz Mill	24.02
332785	8/21/2019	8:18:00 AM	Towamencin	3.59
332787	8/21/2019	8:24:00 AM	Towamencin	18.93
332788	8/21/2019	8:25:00 AM	RFQ561036ITQ 19-01 FOB Bucks 9.5mm	6.01
332789	8/21/2019	8:36:00 AM	Towamencin	23.3
448161	8/21/2019	8:38:00 AM	KRAGER TRUCKING	3.29
332790	8/21/2019	8:41:00 AM	St. Johns Church	22.97
332791	8/21/2019	8:47:00 AM	Towamencin	22.75

22

333137	8/28/2019	7:07:00 AM	Pine Run Rd	22.35
448300	8/28/2019	7:12:00 AM	CHAPMAN RD.	22.13
333138	8/28/2019	7:14:00 AM	Doylestown Hospital	20.9
333139	8/28/2019	7:42:00 AM	Pine Run Rd	22.73
333140	8/28/2019	7:55:00 AM	Doylestown Hospital	22.49
333141	8/28/2019	8:00:00 AM	E Saw Mill Rd	21.73
333142	8/28/2019	8:04:00 AM	E Saw Mill Rd	22.97
448301	8/28/2019	8:07:00 AM	GENERAL SERVICES-PARKS	4.36
333143	8/28/2019	8:09:00 AM	E Saw Mill Rd	22.97
333144	8/28/2019	8:15:00 AM	Pine Run Rd	22.54
333145	8/28/2019	8:17:00 AM	CoStars 5610-36 Hilltown	9.49
333146	8/28/2019	8:21:00 AM	CoStars 5610-36 Hilltown	15.98
333147	8/28/2019	8:23:00 AM	CoStars 5610-36 Hilltown	9.52
448302	8/28/2019	8:24:00 AM	SEASONAL PRICE 2019	23.35
333148	8/28/2019	8:26:00 AM	CoStars 5610-36 Hilltown	9.01
333149	8/28/2019	8:29:00 AM	2019 Seasonal	15
333150	8/28/2019	8:33:00 AM	Various Jobs	18.03
448303	8/28/2019	8:37:00 AM	JOHN MADGIC	1.05
333151	8/28/2019	8:39:00 AM	Pine Run Rd	22.46
333152	8/28/2019	8:50:00 AM	Pine Run Rd	22.74
448304	8/28/2019	8:57:00 AM	DOYLESTOWN HOSPITAL	19.01

21

448478	9/4/2019	7:03:00 AM	2018 SEASONAL	22.61
333435	9/4/2019	7:06:00 AM	Court St. Doylestown	23.98
448479	9/4/2019	7:08:00 AM	VARIOUS - LEVEL 4	23.02
448480	9/4/2019	7:24:00 AM	DOYLESTOWN HOSPITAL PAVILLION III	18.67
333436	9/4/2019	7:27:00 AM	Various Jobs	22.98
448481	9/4/2019	7:28:00 AM	HORSHAM WASTEWATER	21
333437	9/4/2019	7:29:00 AM	2019 Seasonal	10.02
333438	9/4/2019	7:31:00 AM	Court St. Doylestown	22.41
333439	9/4/2019	7:35:00 AM	Various Jobs	19.98
448482	9/4/2019	7:36:00 AM	DOYLESTOWN HOSPITAL	21.16
333440	9/4/2019	7:39:00 AM	2019 Seasonal	22.99
448483	9/4/2019	7:39:00 AM	SEASONAL PRICE 2019	23.01

333441	9/4/2019	7:42:00 AM	Perkasie	10.01
333442	9/4/2019	7:43:00 AM	Court St. Doylestown	22.61
333443	9/4/2019	7:47:00 AM	Court St. Doylestown	21.82
448484	9/4/2019	7:49:00 AM	VARIOUS	20.22
448485	9/4/2019	7:50:00 AM	SEASONAL PRICE 2019	22.13
448486	9/4/2019	7:52:00 AM	VARIOUS	18.85
333444	9/4/2019	7:56:00 AM	Various Jobs	2.5
333445	9/4/2019	7:58:00 AM	Snyder Square	22.82
333446	9/4/2019	8:00:00 AM	Snyder Square	22.16
448487	9/4/2019	8:03:00 AM	VARIOUS	18.24
333447	9/4/2019	8:03:00 AM	Snyder Square	22.72
448488	9/4/2019	8:04:00 AM	VARIOUS	17.91
333448	9/4/2019	8:04:00 AM	Court St. Doylestown	22.89
333449	9/4/2019	8:06:00 AM	Snyder Square	22.35
333450	9/4/2019	8:07:00 AM	Court St. Doylestown	21.68
448489	9/4/2019	8:08:00 AM	COSTARS 5610-15 HILLTOWN TWSP.	13.72
333451	9/4/2019	8:09:00 AM	Court St. Doylestown	24.14
448490	9/4/2019	8:12:00 AM	COSTARS 5610-15 HILLTOWN TWSP.	8.07
333452	9/4/2019	8:13:00 AM	Snyder Square	22.81
448491	9/4/2019	8:13:00 AM	HORGAN JOBS LEVEL 4	0.21
448492	9/4/2019	8:15:00 AM	VARIOUS	14.92
448493	9/4/2019	8:17:00 AM	VARIOUS	17.29
448494	9/4/2019	8:18:00 AM	VARIOUS	17.28
333453	9/4/2019	8:20:00 AM	Various Jobs	9.01
448495	9/4/2019	8:22:00 AM	BROAD ST.PERKASIE	22.96
333454	9/4/2019	8:23:00 AM	CoStars 5610-36 Telford	7.01
333455	9/4/2019	8:24:00 AM	Various Jobs	1.51
333456	9/4/2019	8:27:00 AM	Snyder Square	22.26
333457	9/4/2019	8:33:00 AM	P & M Construction	21.94
448496	9/4/2019	8:37:00 AM	SEASONAL PRICE 2019	22.26
333459	9/4/2019	8:38:00 AM	Court St. Doylestown	22.4
448497	9/4/2019	8:49:00 AM	847 BETHLEHEM PIKE	22.92
448498	9/4/2019	8:51:00 AM	COSTARS 5610-15 HILLTOWN TWSP.	13.18
333460	9/4/2019	8:52:00 AM	Court St. Doylestown	22.61
333461	9/4/2019	8:56:00 AM	Court St. Doylestown	21.78
333462	9/4/2019	8:57:00 AM	CoStars 5610-36 W Rockhill	2.99
448499	9/4/2019	8:57:00 AM	COSTARS 5610-15 HILLTOWN TWSP.	6.51

49

333794	9/11/2019	7:03:00 AM	East Rockhill Township	22.56
333795	9/11/2019	7:04:00 AM	Various Jobs	22.54
448873	9/11/2019	7:04:00 AM	MASON LANDSCAPE & CONST.	3.12
448874	9/11/2019	7:07:00 AM	VARIOUS JOBS	24.34
333796	9/11/2019	7:09:00 AM	Various Jobs	22
333797	9/11/2019	7:12:00 AM	East Rockhill Township	21.89
333798	9/11/2019	7:14:00 AM	Various Jobs	22.99

448875	9/11/2019	7:15:00 AM	2018 SEASONAL	21.59
448876	9/11/2019	7:17:00 AM	REGENCY @ HILLTOWN	22.56
333799	9/11/2019	7:20:00 AM	Various Jobs	23
448877	9/11/2019	7:23:00 AM	VARIOUS LEVEL 4	22
333800	9/11/2019	7:24:00 AM	East Rockhill Township	22.68
333801	9/11/2019	7:25:00 AM	New Britain	21.94
448878	9/11/2019	7:25:00 AM	CHAPMAN RD.	22.21
448879	9/11/2019	7:26:00 AM	PECO WHITEMARSH JOB	22.34
333802	9/11/2019	7:30:00 AM	Various Jobs	22.02
448880	9/11/2019	7:30:00 AM	MASON LANDSCAPE & CONST.	3.65
333803	9/11/2019	7:35:00 AM	Various Jobs	22.74
448881	9/11/2019	7:35:00 AM	PECO WHITEMARSH JOB	22.29
448882	9/11/2019	7:38:00 AM	SEASONAL PRICE 2019	22.65
333804	9/11/2019	7:38:00 AM	Pennridge Business Park	10.01
448883	9/11/2019	7:40:00 AM	VARIOUS LEVEL 4	22.69
333805	9/11/2019	7:41:00 AM	CoStars 5610-36 Hilltown	15.97
333806	9/11/2019	7:42:00 AM	East Rockhill Township	24.17
333807	9/11/2019	7:44:00 AM	CoStars 5610-36 Hilltown	9.95
333808	9/11/2019	7:46:00 AM	CoStars 5610-36 Hilltown	9.45
333809	9/11/2019	7:48:00 AM	Ridgeline Church	23.99
333810	9/11/2019	7:49:00 AM	CoStars 5610-36 Hilltown	10
333811	9/11/2019	7:51:00 AM	CoStars 5610-36 Hilltown	9.51
333812	9/11/2019	7:54:00 AM	CoStars 5610-36 Hilltown	7.01
333813	9/11/2019	7:56:00 AM	CoStars 5610-36 Hilltown	9.52
333814	9/11/2019	8:01:00 AM	Various Jobs	21.99
333815	9/11/2019	8:06:00 AM	New Britain	24.01
333816	9/11/2019	8:11:00 AM	2019 Seasonal	22.25
448884	9/11/2019	8:14:00 AM	REGENCY @ HILLTOWN	21.29
333817	9/11/2019	8:15:00 AM	CoStars 5610-36 Telford	16.03
333818	9/11/2019	8:17:00 AM	Various Jobs	9.01
333819	9/11/2019	8:18:00 AM	East Rockhill Township	22.55
333820	9/11/2019	8:22:00 AM	CoStars 5610-36 Telford	16.04
448885	9/11/2019	8:23:00 AM	SEASONAL PRICING 2019	0.8
448886	9/11/2019	8:28:00 AM	SEASONAL PRICE 2019	22.5
333821	9/11/2019	8:29:00 AM	Ridgeline Church	22.96
333822	9/11/2019	8:33:00 AM	East Rockhill Township	21.93
333823	9/11/2019	8:39:00 AM	CoStars 5610-36 Hilltown	9.44
448887	9/11/2019	8:40:00 AM	SEASONAL PRICE 2019	22.34
333824	9/11/2019	8:48:00 AM	Ridgeline Church	23.81
448888	9/11/2019	8:50:00 AM	COSTARS 5610-15 LANSDALE BORO	8.97
333825	9/11/2019	8:51:00 AM	Various Jobs	14.48
333826	9/11/2019	8:54:00 AM	CoStars 5610-36 Hilltown	15.96
448889	9/11/2019	8:55:00 AM	REGENCY @ HILLTOWN	21.42
333827	9/11/2019	8:58:00 AM	East Rockhill Township	22.69

334359	9/18/2019	7:07:00 AM	Various Jobs	22.11
334360	9/18/2019	7:09:00 AM	Pennridge Business Park	22.4
449200	9/18/2019	7:10:00 AM	HORGAN JOBS LEVEL 4	22.53
334361	9/18/2019	7:11:00 AM	Various Jobs	22.68
334362	9/18/2019	7:12:00 AM	Various Jobs	23.43
449201	9/18/2019	7:12:00 AM	MASON LANDSCAPE & CONST.	4.21
334363	9/18/2019	7:17:00 AM	Pennridge Business Park	24.28
334365	9/18/2019	7:19:00 AM	Various Jobs	23.02
334366	9/18/2019	7:21:00 AM	Various Jobs	23.23
334367	9/18/2019	7:35:00 AM	Various Jobs	22.12
334368	9/18/2019	7:48:00 AM	Pennridge Business Park	23.7
449202	9/18/2019	7:48:00 AM	VARIOUS LEVEL 4	0.25
334369	9/18/2019	7:50:00 AM	2019 Seasonal	22.08
334370	9/18/2019	7:51:00 AM	Pennridge Business Park	23.1
334371	9/18/2019	7:53:00 AM	Pennridge Business Park	21.82
449203	9/18/2019	7:56:00 AM	VARIOUS - LEVEL 4	20.88
334372	9/18/2019	7:57:00 AM	2019 Seasonal	21.24
449204	9/18/2019	7:58:00 AM	PICKED UP	20.69
334373	9/18/2019	7:59:00 AM	2019 Seasonal	22.47
449205	9/18/2019	8:00:00 AM	COSTARS 5610-15 LANSDALE BORO	9.54
449206	9/18/2019	8:02:00 AM	MOORE'S EXCAVATING	21.44
334374	9/18/2019	8:11:00 AM	CoStars 5610-36 Hilltown	10
334375	9/18/2019	8:17:00 AM	Pennridge Business Park	22.98
334376	9/18/2019	8:21:00 AM	Various Jobs	22.54
334377	9/18/2019	8:23:00 AM	Pennridge Business Park	22.4
334378	9/18/2019	8:25:00 AM	Pennridge Business Park	24.01
449207	9/18/2019	8:29:00 AM	MOORE'S EXCAVATING	21.57
334379	9/18/2019	8:34:00 AM	Various Jobs	22.94
334380	9/18/2019	8:36:00 AM	Various Jobs	23.25
449208	9/18/2019	8:37:00 AM	VARIOUS	22.02
449209	9/18/2019	8:39:00 AM	PICKED UP	20.41
334381	9/18/2019	8:42:00 AM	D. Mallozzi	23.23
449210	9/18/2019	8:42:00 AM	VARIOUS - LEVEL 4	22.22
449211	9/18/2019	8:44:00 AM	COSTARS 5610-15 LANSDALE BORO	8.96
334382	9/18/2019	8:45:00 AM	D. Mallozzi	22.1
334383	9/18/2019	8:47:00 AM	Various Jobs	22.43
334384	9/18/2019	8:49:00 AM	Various Jobs	24
334385	9/18/2019	8:55:00 AM	Various Jobs	11.23
449212	9/18/2019	8:56:00 AM	MOORE'S EXCAVATING	21.54
334386	9/18/2019	8:57:00 AM	Various Jobs	21.96

40

449485	9/25/2019	7:03:00 AM	VARIOUS JOBS	21.21
334929	9/25/2019	7:04:00 AM	Various Jobs	22.74
449486	9/25/2019	7:05:00 AM	WEISS	10.64
449487	9/25/2019	7:07:00 AM	MILK HOUSE MARKET	22.18

334930	9/25/2019	7:13:00 AM	Various Jobs	22.39
449488	9/25/2019	7:18:00 AM	CHAPMAN RD.	22.29
449489	9/25/2019	7:19:00 AM	MASON LANDSCAPE & CONST.	2.71
334931	9/25/2019	7:20:00 AM	Spring House	22.05
449490	9/25/2019	7:22:00 AM	WAWA HILLTOWN	23.03
334932	9/25/2019	7:25:00 AM	Spring House	22.5
334933	9/25/2019	7:33:00 AM	Spring House	22.56
334934	9/25/2019	7:38:00 AM	Spring House	21.96
449491	9/25/2019	7:43:00 AM	PENNLAND FARM BASIN CONVERSION	22.38
449492	9/25/2019	7:46:00 AM	HORGAN JOBS LEVEL 4	21.64
334935	9/25/2019	7:46:00 AM	Various Jobs	23.99
334936	9/25/2019	7:50:00 AM	Various Jobs	23.04
449493	9/25/2019	7:52:00 AM	VARIOUS JOBS	21.16
334937	9/25/2019	7:55:00 AM	Spring House	22.01
449494	9/25/2019	8:02:00 AM	WAWA HILLTOWN	22.91
334938	9/25/2019	8:02:00 AM	Various Jobs	14.99
334939	9/25/2019	8:06:00 AM	Various Jobs	22.49
334940	9/25/2019	8:11:00 AM	Various Jobs	21.98
334941	9/25/2019	8:16:00 AM	Various Jobs	22.48
334942	9/25/2019	8:18:00 AM	CoStars 5610-36 Tinicum	4.01
449495	9/25/2019	8:33:00 AM	COOPERSBURG BLACKTOP PLANT	22.26
449496	9/25/2019	8:34:00 AM	COOPERSBURG BLACKTOP PLANT	21.44
449497	9/25/2019	8:35:00 AM	COSTARS 5610-15 HILLTOWN TWSP.	15.28
334943	9/25/2019	8:37:00 AM	Various Jobs	22.45
334944	9/25/2019	8:40:00 AM	Weis Markets	22.54
449498	9/25/2019	8:40:00 AM	COOPERSBURG BLACKTOP PLANT	21.99
449499	9/25/2019	8:44:00 AM	WAWA HILLTOWN	23.04
449500	9/25/2019	8:48:00 AM	PENNLAND FARM BASIN CONVERSION	21.51
449501	9/25/2019	8:50:00 AM	VARIOUS JOBS	21.46
449502	9/25/2019	8:54:00 AM	SEASONAL PRICE 2019	22.19
334945	9/25/2019	8:56:00 AM	Various Jobs	22.73
334946	9/25/2019	8:56:00 AM	Weis Markets	21.32
449503	9/25/2019	8:57:00 AM	SEASONAL PRICE 2019	22.72
334947	9/25/2019	8:59:00 AM	Weis Markets	23.02

Attachment E

Wetland and Waters Delineation Map/Verification Letter

VALLEY
ENVIRONMENTAL SERVICES, INC.

610.762.0990
484.661.6209

3282 Hope Drive
Emmaus, PA 18049

www.valenv.com

Via Email (sdrumbore@hkgroup.com)

February 13, 2020

The H&K Group
Engineering & Environmental Services Division
2052 Lucon Road
P.O. Box 196
Skippack, PA 19474

Attn: Scott Drumbore, P.E., Division Manager

Re: Wetland/Watercourse Boundary Verification
Center Valley Materials
Springfield Twp., Bucks Co., PA
Valley Environmental Services, Inc. Job No. 18-227

Dear Mr. Drumbore:

Valley Environmental Services, Inc. has reviewed the wetland and watercourse boundaries illustrated on the plans entitled "Wetlands & Waters Delineation Map", sheet numbers 1-3 of 3, dated February 12, 2020, prepared by the H&K Group's Engineering & Environmental Services Division. This letter verifies the above referenced plans accurately represent those portions of the property field delineated on June 10 -13, 2019.

Please be aware that any encroachment or impacts to the delineated portion(s) of the property may require permitting from the Pennsylvania Department of Environmental Protection and/or the United State Army Corps of Engineers.

Should you have any questions, or require additional information, please do not hesitate to contact me.

Sincerely,
Valley Environmental Services, Inc.

Jason J. Mease, PWS
Professional Wetland Scientist/Principal

VALLEY
ENVIRONMENTAL SERVICES, INC.

610.762.0990
484.661.6209

3282 Hope Drive
Emmaus, PA 18049

www.valenv.com

Via Email (sdrumbore@hkgroup.com)

February 13, 2020

The H&K Group
Engineering & Environmental Services Division
2052 Lucon Road
P.O. Box 196
Skippack, PA 19474

Attn: Scott Drumbore, P.E., Division Manager

Re: Observed Wetland Hydrology
Center Valley Materials
Springfield Twp., Bucks Co., PA
Valley Environmental Services, Inc. Job No. 18-227

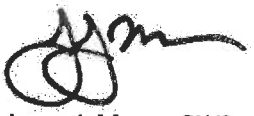
Dear Mr. Drumbore:

As requested, Valley Environmental Services, Inc. (VES) has completed numerous thorough evaluations of the above referenced property. The purpose of these evaluations was to identify and delineate (flag) all encountered regulated aquatic resources (e.g. wetlands and watercourses). Site evaluations were conducted on May 29th and 30th of 2018 and June 10th, 11th, 12th, and 13th of 2019. Utilizing the guidelines set forth in the *Corps of Engineers Wetland Delineation Manual* Y-87-01 (Environmental Laboratory, January 1987-Final Report) and their applicable *Eastern Mountains and Piedmont Regional Supplement* Version 2.0 (U.S. Army Corps of Engineers, April 2012) the vegetation, soils, and hydrology throughout the property were examined to determine the presence/absence of regulated features.

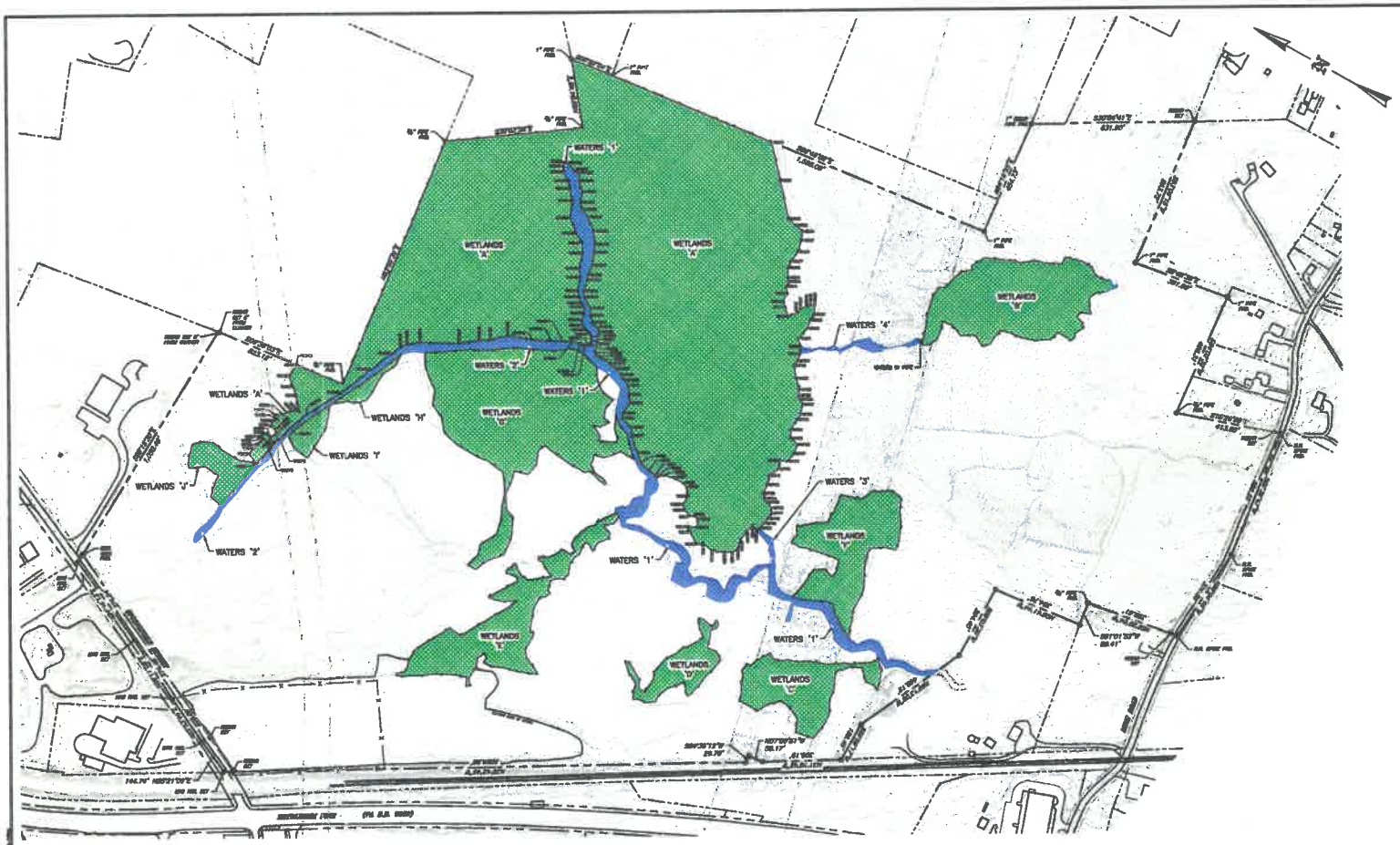
While completing the above referenced sitework numerous habitat specific characteristics were encountered. Based upon a combination of biologic, geomorphologic, and hydrologic traits observed it is VES's professional opinion that Wetlands A, B, F, G, J, I, and H, as identified on the plan entitled "Wetlands & Waters Delineation Map" (sheet number 1 of 3, dated February 12, 2020, prepared by the H&K Group's Engineering & Environmental Services Division) are primarily fed via perennial sources of hydrology like groundwater (springs) and baseflow. Alternately, Wetlands C, D, and E appear to be sustained primarily through ephemeral sources, like overland flow, in response to seasonal and annual fluctuations in precipitation.

Should you have any questions, or require additional information, please do not hesitate to contact me.

Sincerely,
Valley Environmental Services, Inc.



Jason J. Mease, PWS
Professional Wetland Scientist/Principal



WETLANDS AREA PLAN

SCALE: 1"=200'

SITE LOCATION MAP

Scale: 1" = 2000'

LEGEND

- Existing Major Contour Line (Survey)
- Existing Minor Contour Line (Survey)
- Existing Major Contour Line (LIDAR)
- Existing Minor Contour Line (LIDAR)
- Existing Mapped Wetlands Area
- Existing Mapped Waters Area
- Existing Wetlands/Waters Flag

APPLICANT/DEVELOPER:

H&K Group, Inc.

2052 Lucon Road
P.O. Box 198
Skippack, PA 19474-0198

Ph: 215-584-2500

www.hkgroup.com

LANDOWNER:

Liberty Home Development Corp, Ltd.

C/O Burke MR at the Perkiomen Creek
1 South Main Street
The Woodmere, Suite #5
Collegeville, PA 19426

T.M.P. 542-004-078 (DB: 6573/2382)
T.M.P. 542-004-075
T.M.P. 542-004-108
T.M.P. 542-004-107

SITE ADDRESS:

Springfield Street
Quakertown, PA 18951

ENGINEERING CONSULTANT:

H&K Group, Inc.
Engineering & Environmental Services Division
2052 Lucon Road
P.O. Box 198
Skippack, PA 19474

Ph: 610-222-3502
Ph: 610-584-4743

www.hkgroup.com

WETLAND MAPPING CONSULTANT:

Jason J. Moore, P.W.S.
Professional Wetland Scientist/Principal

Valley Environmental Services, Inc.
2262 Hope Drive
Emmaus, PA 18049

Ph: 610-762-0880

www.valleyes.com

SOURCE NOTES:

1. Property boundary derived from plan entitled "Plan of Survey" for Liberty Home Development Corporation, Ltd., dated 11/19/2019 by Urwiler & Walter, Inc., P.O. Box 339, 3128 Main Street, Emmaus, PA 18049, Ph: 610-965-6202 Fx: 610-965-8992 www.urwilerwalter.com. Field survey data gathered July 2019. Survey data is on PA State Plane Coordinates (NAD 1983-97).
2. Mapping within the subject properties derived from photogrammetric digital mapping compiled by NorStar Mapping, Inc. P.O. Box 2170, 76 Lincoln Road, Kingston, PA 18657-0970. Ph: 570-346-1157 Fx: 570-346-1178. www.norstarmapping.com. Aerial photography obtained 4/24/2019. Vertical control is based on NAVD 88 datum provided by H&K Group, Inc.
3. Topography beyond the limits of the subject properties derived from LIDAR Arc/Info coverage files published 2008 through 2009, downloaded from *Pennsylvania Spatial Data Access (PASDA), (http://www.pasda.psu.edu).*
4. Adjacent property lines derived from Bucks County Tax Map images obtained online at Bucks County GIS (https://bucksgis.maps.arcgis.com/).
5. Property ownership information obtained online from the Bucks County Board of Assessment Appeals (http://www.bucksassessment.com).
6. Wetlands & Waters were flagged in the field by the listed Wetland Mapping Consultant and then surveyed by H&K Group, Inc.

WETLAND TABULATION

WETLAND	AREA (SQ.FT.)	AREA (AC.)	LATITUDE	LONGITUDE
A	1,765,539	40.531	40.350971°	-75.312559°
B	113,004	2.593	40.354153°	-75.312559°
C	65,181	1.503	40.354389°	-75.312559°
D	43,564	0.977	40.354389°	-75.312559°
E	102,000	2.343	40.355376°	-75.312559°
F	113,264	2.600	40.355376°	-75.312559°
G	39,281	0.902	40.354389°	-75.311764°
H	49,881	1.331	40.353402°	-75.312559°
I	16,241	0.373	40.353402°	-75.312559°
J	35,232	0.809	40.353402°	-75.313355°
TOTAL	2,344,787	53.847		

WATERS TABULATION

WATER	AREA (SQ.FT.)	AREA (AC.)	LENGTH (L.F.)	LATITUDE	LONGITUDE
1	164,867	3.785	2,713	40.357104°	-75.311355°
2	45,259	1.197	1,000	40.350971°	-75.313355°
3	5,631	0.129	100	40.354389°	-75.311764°
4	7,310	0.179	275	40.355376°	-75.310168°
TOTAL	183,271	3.291	3,763		

Scale: 1" = 200'

200 0 200 400

DATE	REVISIONS	BY	CHK.	REV.

CENTER VALLEY MATERIALS
A Division of H&K Group, Inc.

WETLAND & WATERS DELINEATION MAP

SPRINGFIELD TOWNSHIP — BUCKS COUNTY

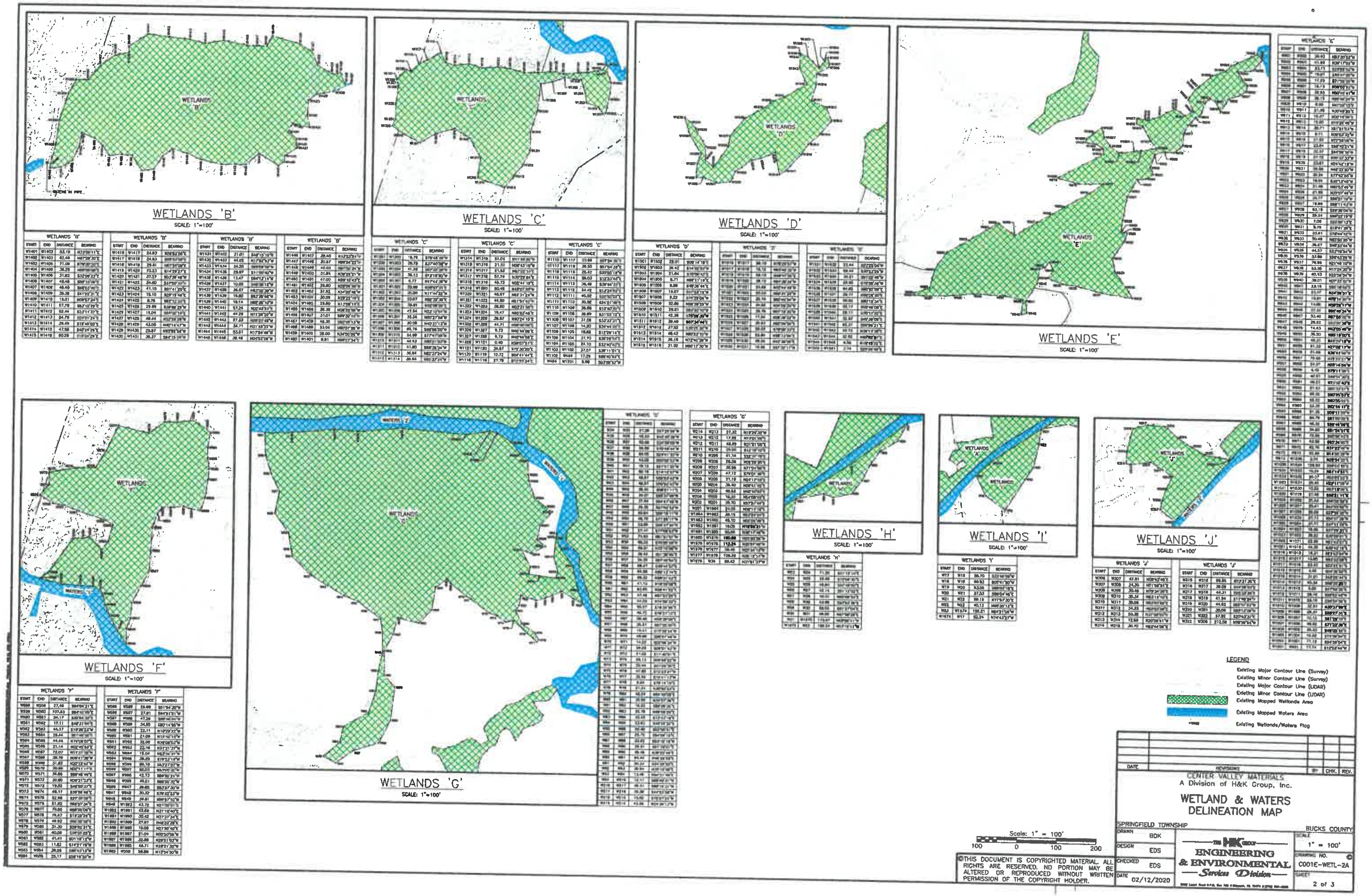
DRAWN:	BDK
REVIEW:	EDS
CHECKED:	EDS
DATE:	02/12/2020

H&K GROUP — ENGINEERING & ENVIRONMENTAL Services Division

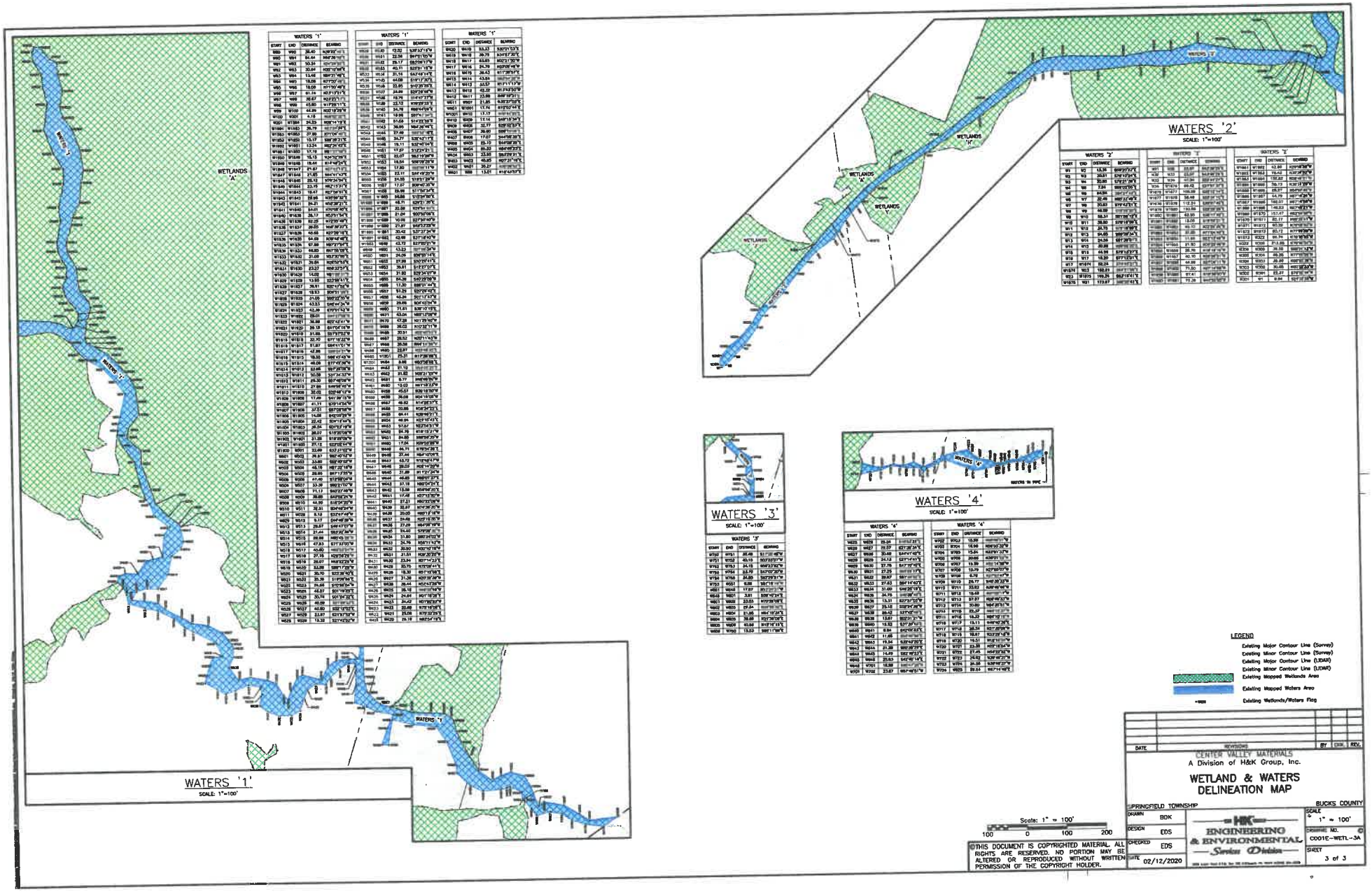
SCALE: 1" = 200'

DRAWING NO.: C001E-WETL-1A

SHEET: 1 of 3



WETLANDS 'B'
SCALE: 1"=100'
WETLANDS 'C'
SCALE: 1"=100'
WETLANDS 'D'
SCALE: 1"=100'
WETLANDS 'E'
SCALE: 1"=100'
WETLANDS 'F'
SCALE: 1"=100'
WETLANDS 'G'
SCALE: 1"=100'
WETLANDS 'H'
SCALE: 1"=100'
WETLANDS 'I'
SCALE: 1"=100'
WETLANDS 'J'
SCALE: 1"=100'
LEGEND
Existing Major Contour Line (Survey)
Existing Minor Contour Line (Survey)
Existing Major Contour Line (LIDAR)
Existing Minor Contour Line (LIDAR)
Existing Mapped Wetlands Area
Existing Mapped Waters Area
Existing Wetlands/Waters Flag
DATE
REVISIONS
BY
CHK.
REV.
CENTER VALLEY MATERIALS
A Division of H&K Group, Inc.
WETLAND & WATERS
DELINEATION MAP
SPRINGFIELD TOWNSHIP
BUCKS COUNTY
DRAWN BDK
DESIGN EDS
CHECKED EDS
DATE 02/12/2020
ENGINEERING
& ENVIRONMENTAL
Services Division
SCALE 1" = 100'
DRAWING NO. C001E-WETL-2A
SHEET 2 of 3
Scale: 1" = 100'
100 0 100 200
©THIS DOCUMENT IS COPYRIGHTED MATERIAL. ALL RIGHTS ARE RESERVED. NO PORTION MAY BE ALTERED OR REPRODUCED WITHOUT WRITTEN PERMISSION OF THE COPYRIGHT HOLDER.


WETLANDS 'A'
WATERS '1'
WETLANDS 'B'
WETLANDS 'C'
WETLANDS 'D'
WETLANDS 'E'
WATERS '2'
WATERS '3'
WATERS '4'
WATERS TO PIPE
WATERS '1'
SCALE: 1"=100'
WATERS '2'
SCALE: 1"=100'
WATERS '3'
SCALE: 1"=100'
WATERS '4'
SCALE: 1"=100'
LEGEND
Existing Major Contour Line (Survey)
Existing Minor Contour Line (Survey)
Existing Major Contour Line (LIDAR)
Existing Minor Contour Line (LIDAR)
Existing Mapped Wetlands Area
Existing Mapped Waters Area
Existing Wetlands/Waters Flag
Scale: 1" = 100'
100 0 100 200
THIS DOCUMENT IS COPYRIGHTED MATERIAL. ALL RIGHTS ARE RESERVED. NO PORTION MAY BE ALTERED OR REPRODUCED WITHOUT WRITTEN PERMISSION OF THE COPYRIGHT HOLDER.
DATE
REVISIONS
BY
DSK.
REV.
CENTER VALLEY MATERIALS
A Division of H&K Group, Inc.
WETLAND & WATERS DELINEATION MAP
SPRINGFIELD TOWNSHIP
BUCKS COUNTY
DRAWN BDK
DESIGN EDS
CHECKED EDS
DATE 02/12/2020
H&K ENGINEERING & ENVIRONMENTAL Service Division
SCALE 1" = 100'
DRAWING NO. C001E-WETL-3A
SHEET 3 of 3

Attachment F

Groundwater Model Report

V.F. Britton Group, LLC
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING

PRELIMINARY GROUNDWATER MODEL REPORT CENTER VALLEY MATERIALS SPRINGFIELD TOWNSHIP BUCKS COUNTY, PENNSYLVANIA

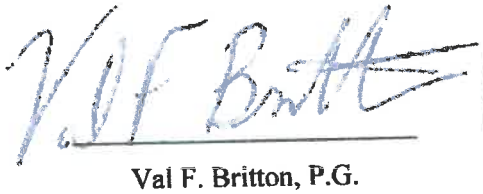
Prepared For:

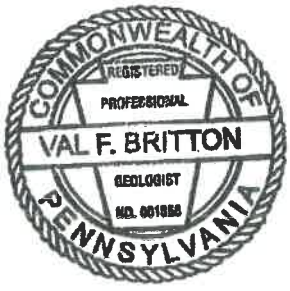
The H&K Group, Engineering & Environmental Services Division
2052 Lucon Road
P.O. Box 196
Skippack, PA 19474

Prepared By:

V.F. Britton Group, LLC
326 Conestoga Road
Wayne, PA 19087
(610) 964-1462

March 12, 2020





Val F. Britton, P.G.
Technical Consultant

Table of Contents

Tables

Figures

1.0 General

1.1 Background

The proposed Center Valley Materials surface mining operation is located south of Springfield Street and east of Route 309 (Bethlehem Pike) just south of Coopersburg, in Springfield Township, Bucks County, Pennsylvania (site). The proposed surface mining operation will consist of two quarry pit areas one located in the northern portion of the site (Northern Pit) and one located in the southern portion of the site (Southern Pit). Figure 1 presents the locations of the site and the two pit areas.

It is anticipated that one pit will be mined to completion prior to moving to the second pit location. The current ground elevation at the mining locations is approximately 600 feet mean sea level (ft-msl) and it is proposed that both pits will be mined to a bench elevation of 400 ft-msl. Both pit locations exist in a relatively flat area underlain by poorly drained diabase bedrock material and as a result, wetland areas exist proximate to the pit locations. A general site layout is provided on Figure 2.

Although no groundwater elevation monitoring wells have been installed on the site area, it is anticipated that a shallow water table exists, likely perched on the underlying poorly drained diabase geology.

The purpose of the preliminary groundwater model discussed in this report is to provide a preliminary numeric representation of the hydro-geologic conditions existing at the site and the surrounding area based on the existing site conceptual model. The model will allow the evaluation of groundwater flow at the site and in the surrounding areas under existing site conditions through numeric simulations based on available hydrogeological published data. The preliminary model will then be used for initial predictive evaluation of the groundwater elevation and zone of influence of the proposed active mining operations at the maximum mining limits (400-foot bench elevation). This preliminary model provides an initial evaluation of the hydrogeological conditions and is based on available published hydrogeological material that characterizes the site conditions. Once site-specific data is collected (i.e. monitoring well water level data, stream flow data, etc.), the model and results will be refined based on the site-specific data.

Limited hydro-geologic data has been collected by others related to site characteristic data; however, the data that has been collected has been relied upon for the construction of the groundwater model. It is not the intent of this groundwater model document to describe the methods used to collect this data, however, in some cases a brief explanation of the quality of the data is discussed where interpretation is warranted.

Groundwater Modeling Systems (GMS) software, Version 10.1, developed by the United States Department of Defense and distributed by Aqueveo, Inc. was utilized in the development of the groundwater model for the site. This modeling software consists of numerous modules that are interfaced to allow more accurate representation of hydro-

geologic conditions and greater flexibility in simulating and evaluating flow conditions on the site and surrounding area.

As discussed above, the majority of the preliminary groundwater model provided in this document is based on available hydrogeological published information with very little site-specific data. Once site-specific data is collected, this preliminary groundwater model and results will be refined with the data.

The "site" generally encompasses the entire region of the groundwater model that incorporates numerous properties within the general drainage basin of the site.

It is not the intent of the groundwater model to solely define the hydrogeologic characteristics that exist at the site, but rather this preliminary groundwater model is intended to be used as a preliminary screening tool to evaluate anticipated drawdown conditions associated with the proposed quarry operations.

Figures that have been included as part of this report are provided in an 11 x 17-inch paper size format and are in color allowing the data to be graphically presented. Black and white copies and/or smaller paper size copies of the figures may not present the data in the clarity originally intended.

2.0 Model Construction

2.1 General

The collection and or evaluation of all data desired for a particular investigative purpose may not be possible due to economics and/or logistic limitations. For this reason, some assumptions relative to the site's geologic or hydro-geologic characteristics have been made during the development of this preliminary groundwater model. However, all of the assumptions have been based on sound and accepted geologic and hydro-geologic theory and are identified when utilized.

The model was constructed in three stages. The first stage consisted of developing a three-dimensional conceptual model representing the physical characteristics of the site. The second stage consisted of converting the three-dimensional conceptual model into a numeric model for calibration. MODFLOW 20050, a finite difference model, was utilized for the numeric model. The model was constructed as a steady-state model, which allows the input data to be interpolated through numerous iterations to solve the finite difference equation. The third step consisted of running a predictive flow simulation to represent maximum pumping conditions at the site under average recharge conditions. The modeled simulations presented in this report were run under steady state conditions.

2.2 Numeric Flow Model Construction

Boundary Conditions

The boundary conditions of the model are provided on Figure 3. The selection of the model boundary was based on isolating the groundwater drainage basin that the site is within: groundwater that flows into the basin interacts with the model domain and becomes incorporated into the water budget and water that flows outside of the basin does not interact with the model domain and is not part of the water budget and; therefore, not part of the model. However, it should be noted that the Northern Pit area is located very close to the northern boundary of the regional groundwater divide (watershed boundary) and; therefore, the model domain was expanded in a northern direction into the neighboring watershed to prevent the potential for the Northern Pit dewatering simulation from interacting with the model boundary.

The general model area (model domain), with the exception to the north as noted above, is bordered by MODFLOW "no flow" boundaries that represent watershed divides. MODFLOW drain boundaries represent locations where surface water drainage would simulate the removal of water from the model as base flow. Drain boundaries were used to simulate the tributaries that likely only receive base flow drainage and surface water would not likely enter the underlying porous media.

The elevations of the surface waterways (drain nodes) were based on the United States Geologic Survey (USGS) topographic quadrangle map of the area. The elevations were

estimated from the USGS maps and then 2.0 feet were subtracted from the estimated surface water elevation at each node location to estimate the bottom of the creek bed elevation. The bottom of the creek bed elevation was used in the model as the node elevation. The node locations are presented on Figure 3.

Surface Water

As discussed above, tributaries were mapped as MODFLOW drain arcs. The elevations of the drain nodes were based on the United States Geologic Survey (USGS) topographic quadrangle map of the area as discussed above. The node locations are presented on Figure 3.

The conductance values assigned to the surface water bodies were determined from the estimated creek dimensions and the estimated hydraulic conductivity of the creek bed material. Conductance is the leakage of water through the stream bed material that can discharge as base flow to the stream or leak back into the aquifer as recharge. Conductance is calculated by the product of the creek width and the hydraulic conductivity divided by the creek bed thickness. This provides a conductance value per unit distance (per foot) for the stream bed material. When this value is assigned to MODFLOW, the unit distance is multiplied by the length of the stream bed material in each cell of the model and the conductance of each cell is assigned to the MODFLOW model. A conductance value of 5.0 $feet^2$/day/foot was used for the tributaries within the model domain.

Model Grid

Based on site specific geologic information collected from available publication data (Sloto and Schreffler, 1994, Plate 1), it is apparent that the site exists within a diabase intrusion with no specific preferential groundwater flow direction. For this reason, no specific grid orientation was assigned and the model grid was oriented north to south.

A general grid spacing of approximately 100 by 100 feet was assigned to the entire domain of the model. The model boundary conditions (drains package) were assigned to the grid. The general model grid is presented on Figure 4.

Model Layers and Geologic Characteristics

Two major geologic units exist within the model domain and consist of a diabase intrusion (diabase) and the Triassic age Brunswick Formation. The distribution of these formations within the model domain is presented on Figure 5. The distribution of these geologic units is based on site specific data obtained from publication data (Sloto and Schreffler, 1994, Plate 1). The current site topography has been superimposed on Figure 5 presenting the current site conditions used in the model.

Based on publication data (Sloto and Schreffler, 1994, pp. 17-20), the upper 100 feet of consolidated rock have the highest permeability when compared to the underlying rocks.

Generally, as stated in the published data, based on water-bearing fractures encountered during well installations, there are 4 hydrogeological zones underlying the site area (Sloto and Schreffler, 1994, p. 36). With depth (deeper than 400 feet), these water-bearing fractures eventually disappear reducing the permeability of the deeper aquifer. The diabase has very limited water-bearing capacity below 50 to 100 feet (Sloto and Schreffler, 1994, p.17-20).

For the purpose of the model construction, the model was assigned five MODFLOW layers to reflect the four upper hydrogeologic zones; 0 to 100 feet (layer 1), 100 to 200 feet (layer 2), 200 to 300 feet (layer 3), 300 to 400 feet (layer 4), and the base of the model with no permeability (layer 5). Figure 6 presents the general layer configuration of the model along with hydraulic parameters used in the model and discussed below.

Hydraulic Conductivity Assignment

Hydraulic conductivities were obtained from publication data (Sloto and Schreffler, 1994, pp. 36-41, and Reese and Risser, 2010, Plate 3); however, adjustments were made during the calibration process to the initial values to obtain an appropriate calibration of the model. Table 1 provides a summary of the key hydrogeological publication data and the actual values used in the model for calibration purposes. In addition, the hydrogeological assignments for each layer are provided on Figure 6.

Vertical anisotropy ratios were assigned to the model layers. The vertical hydraulic conductivity ratios assigned to all of the deeper diabase layers was 0.5 based on publication data (Senior 1999). It should be noted that this was not a sensitive parameter in the model.

Recharge

Groundwater recharge is based on annual precipitation, infiltration rates, stream base flow rates, and evapotranspiration rates. As a general "rule of thumb", recharge is approximately 1/3 of the actual precipitation that occurs in relatively flat and porous terrain. Initial recharge values were obtained from publication data (Sloto and Schreffler, 1994, pp. 52-54, and Reese and Riser, 2010, Plate 3) and were refined during the calibration process. Based on the publication data, recharge in the area of the site ranges from 10.0 to 12.0 inches per year. Specifically, in the area of the diabase, recharge was reported to be approximately 2.0 inches per year and the Brunswick Formation area was reported to be approximately 8 to 12 inches per year. The final mean recharge values used over the entire domain of the model based on the model calibration was 2.0 inches per year for the diabase and 8.5 inches per year for the Brunswick Formation.

A sensitivity analysis of average recharge was conducted to better understand the impact that this parameter has on the groundwater movement on the site. Average recharge and hydraulic conductivity were used for the sensitivity analyses. Higher and lower values of recharge were evaluated. It was determined that the model was very sensitive to recharge: the higher values caused flooding in the model in areas that none was observed, and the

lower recharge values resulted in "dry cells" in the model where groundwater was known to exist. Additionally, the sensitivity analysis was compared to the residual error between the observed groundwater elevations and the simulated groundwater elevations.

2.3 Numeric Flow Model Calibration

General

Calibration refers to the demonstration that the model is capable of producing field measured heads and flows. Calibration can be evaluated both qualitatively and quantitatively; however, even in a quantitative evaluation, the judgment of when the fit between model and reality is satisfactory is a subjective one (Anderson, 1992, pp. 223-246).

The groundwater model was calibrated to estimated groundwater elevation (head) data collected from two site boreholes, two residential wells, six well location data points provided by the Pennsylvania Groundwater Information System (PAGWIS), and three control points (CP) based on stream elevations on USGS topographical quadrangle maps. At this time (preliminary groundwater model development), no site-specific groundwater elevation monitoring wells have been installed on the site for characterization purposes. Once site monitoring wells are installed and data are collected, the model will be recalibrated with the site-specific data.

Model Calibration (Head Elevation)

Groundwater elevation data obtained from the sources discussed above was used to calibrate the preliminary groundwater model. Table 2 provides a tabulation of the groundwater elevation data used for each of the calibration locations. It should be noted that the data obtained provides a general groundwater elevation; however, does not provide the same quality of data that long-term site-specific monitoring well data would provide. Once site-specific data is collected, the groundwater model will be re-calibrated.

During the calibration process, a sensitivity analyses of the recharge values and the hydraulic conductivity values were conducted to identify the most unique parameter values to best match the calibration targets (head elevations at the calibration points). The sensitivity analysis is provided on Table 3. The final hydrogeological values used in the model are discussed above and provided on Figure 6 and Table 1.

The result of the calibration (residual error) is presented in tabular format on Table 2 and is graphically presented on Figure 7. Based on a reasonable distribution of calibration points (groundwater head values) on both sides of the perfect fit line (see Figure 7), a reasonable calibration was achieved using the available data. Based on this calibration, a mean error over the domain of the model of 5.02 feet was achieved which equates to an approximate normalized error of 12.2 % (mean error divided by the range of water elevation within the domain of the model). Additional calibration statistics are provided on Figure 7 and Table 2.

Sensitivity Analyses

Several sensitivity evaluations were conducted on the hydraulic parameters input into the model. The sensitivity analyses allow key parameters of the model to be adjusted independently of the other parameters to evaluate the sensitivity of each of the parameters within the model. Generally, the purpose of the sensitivity analyses confirms the uniqueness of the set of hydrogeologic parameters used in the model. This prevents the use of model boundary conditions that allow broad ranges of parameter values that are non-unique to a specific site.

During the calibration, the recharge values were changed while the average hydraulic conductivity values for each of the four geologic zones were held constant. These values were derived through a trial and error process. Once the best quantitative calibration was obtained, a sensitivity analysis of the parameters was conducted.

Flow Budget

The flow budget of the MODFLOW model was evaluated to determine if reasonable inflows and outflows of the model had been achieved. Based on a conceptual understanding of the site's hydrologic cycle, it was apparent that the aquifer on the site was recharged from precipitation. Groundwater was lost from the aquifer through drainage into surface water creeks (drains). Results of the flow budget are presented on Table 4.

Based on the results of the flow budget, it is evident that the inflow of water into the model domain closely matches the outflow of water from the model domain suggesting a reasonable water budget balance.

3.0 Simulated Groundwater Flow

3.1 Existing Site Groundwater Elevation Conditions

Based on the calibrated groundwater model, Figure 8 presents the existing groundwater flow elevation contours for the existing site static non-pumping conditions on a regional level. A mean recharge value of 8.5 inches per year was used for the Brunswick Formation and mean recharge value of 2.0 inches per year was used for the diabase in this simulation.

3.2 Simulation of Maximum Pit Dewatering Conditions (Bench – 400 ft-msl)

It is anticipated that one pit location will be mined to its entirety prior to mining the second pit. For this reason, the dewatering simulations for each pit (Northern and Southern Pit) were simulated separately and not at the same time. The dewatering simulations represented the maximum drawdown for each pit which correlates to a final bench elevation of 400 ft-msl. For the dewatering simulations each of the pits were dewatered to the maximum depth of 400 ft-msl. The bench configurations for each pit were based on the mining bench plan (50-foot depth expansions down to 400 ft-msl). The pit dewatering was simulated with MODFLOW drains over the area of the benches at the appropriate bench elevation (600 ft-msl down to 400 ft-msl). This configuration allowed the model to simulate the proposed pit configurations under the maximum dewatering scenario.

Figures 9 and 10 provide the groundwater elevations for the dewatering of the Northern Pit and the Southern Pit respectively. Figures 11 and 12 provide the associated simulated drawdown for the Northern Pit and the Southern Pit respectively. The drawdown was obtained from subtracting the maximum pumping groundwater elevation contours (Figures 9 and 10) from the static groundwater elevation contours (Figure 8) within the model software.

A is evident on drawdown Figures 11 and 12, very little dewatering impact is occurring due to the low permeability of the diabase material. Both the Northern Pit and Southern Pit have less than 1000 feet of radial expansion to the 10-foot drawdown mark. Additionally, the deeper the pits are expanded into the diabase material, tighter and less fractured diabase is encountered with very little water-bearing capacity. It is anticipated that the majority of the groundwater impact will occur in the first 50-foot bench expansion since this is the most weathered and water-bearing zone in the diabase. Based on the model simulations, the Northern Pit is estimated to yield an average 21 gallons per minute (gpm) during the maximum dewatering process. The Southern Pit is estimated to yield an average of 17 gpm during the dewatering process.

It should be noted that the model simulations tend to over-predict the drawdown impact from the dewatering operations due to the steady-state nature of the model simulations. The model simulations are 100% efficient in calculating the water budgets when in

reality, dewatering occurs over time and is not instantaneous. This would result in a smaller zone of influence than is presented in this report.

4.0 Summary and Conclusions

Based on the results of the groundwater model simulation discussed in this document, the following conclusions have been reached:

- The proposed Northern and Southern Pit locations are situated on diabase geologic material that has very limited water-bearing capacity. Furthermore, this capacity decreases with depth.

- A very limited horizontal zone of influence is expected to occur from the proposed pit locations under the maximum dewatering scenario (Bench elevations at 400 ft-msl). Less than a 1000-foot radius was calculated for both pit locations and is likely to be much less since model simulations tend to over predict drawdown.

- Vertical expansion of the pits is not likely to increase the zone of influence since the water-bearing capacity of the diabase material decrease with depth. Only the upper 50 to 100 feet are reported to have very limited water-bearing capacity with almost no capacity below 100 feet.

- Dewatering rates are expected to range from 17 to 21 gallons per minute at the deepest pit depth (400 ft-msl) with the majority of the dewatering yield coming from the upper 50 feet.

5.0 Limitations

The modeling in this report was performed using a commercially available software package (Groundwater Modeling System-GMS, Version 10.1 developed by the United States Department of Defense) designed to simulate groundwater flow. Where available, actual data from the site was utilized to calibrate the models and develop the graphical representations presented in this document. In other instances, assumptions were necessary to complete the model and limitations associated with the site data result in a level of uncertainty in the model predictions. Therefore, the results of the model predictions should be independently evaluated using actual site monitoring data.

The results of the model may differ from actual site conditions because of unknown subsurface conditions. The results of the models presented in this document shall not be construed to create any warranty or representation with regard to the site. The conclusions presented in this report were based on the services described, and not on scientific tasks or procedures beyond the described scope of services.

6.0 References

Anderson, M.P., Woessner, W. W., 1992, Applied Groundwater Modeling – Simulation of Flow and Advective Transport, Academic Press, Inc., pp. 223-246.

Reese, S.O., and Risser, D.W., Summary of Groundwater-Recharge Estimates for Pennsylvania Water Resource Report 70, Pennsylvania Geologic Survey, 2010.

Senior, L.A., and Goode, D.J., Ground-Water System, Estimation of Aquifer Hydraulic Properties, and Effects of Pumping on Ground-Water Flow in Triassic Sedimentary Rocks in and near Lansdale, Pennsylvania, U.S. Geologic Survey, Water-Resources Investigations Report 99-4228, 1999.

Sloto, R.A., and Schreffler, C.L., Hydrogeology and Ground-Water Quality of Northern Bucks County, Pennsylvania, U.S. Geological Survey, Water-Resources Investigations Report 94-4109, 1994.

TABLES

TABLE 1

Key Hydraulic Parameters
Preliminary Groundwater Model
Center Valley Materials
Springfield Township
Bucks County, Pennsylvania

Source	Published Value(s)	Model Value	Comments
Hydraulic Conductivity			
USGS - Water-Resources Investigations Report 94-4109 (Sloto, 1994, pp.19, 35-41)	0.475 ft/day Brunswick	0.328 ft/day Brunswick	Assumes aquifer is approximately 400 feet thick as discussed in publication relative to available fracture zones.
USGS - Water-Resources Investigations Report 94-4109 (Sloto, 1994, pp.17, 35-41)	0.1 ft/day Diabase	0.1 ft/day Diabase	Assumes aquifer is approximately 400 feet thick as discussed in publication relative to available fracture zones.
Anisotropy Ratios (Preferential Flow)			
USGS - Water-Resources Investigations Report 99-4228 (Senior, 1999)	20 to 1	1.0	Based on diabase characteristics and site location within diabase area.
Recharge			
USGS - Water-Resources Investigations Report 94-4109 (Sloto, 1994, pp.52-53)	2.0 in/year Diabase 8.5 in/year Brunswick	2.0 in/year Diabase 8.5 in/year Brunswick	Based on statics and model calibration.
Summary of Groundwater-Recharge Estimates for Pennsylvania PAGS- Water Resource Report 70 (Reese and Risser, 2010, Plate 3)	10 to 12 inches per year	2.0 in/year Diabase 8.5 in/year Brunswick	Publication is regional and does not evaluate individual sub-watersheds.

TABLE 2

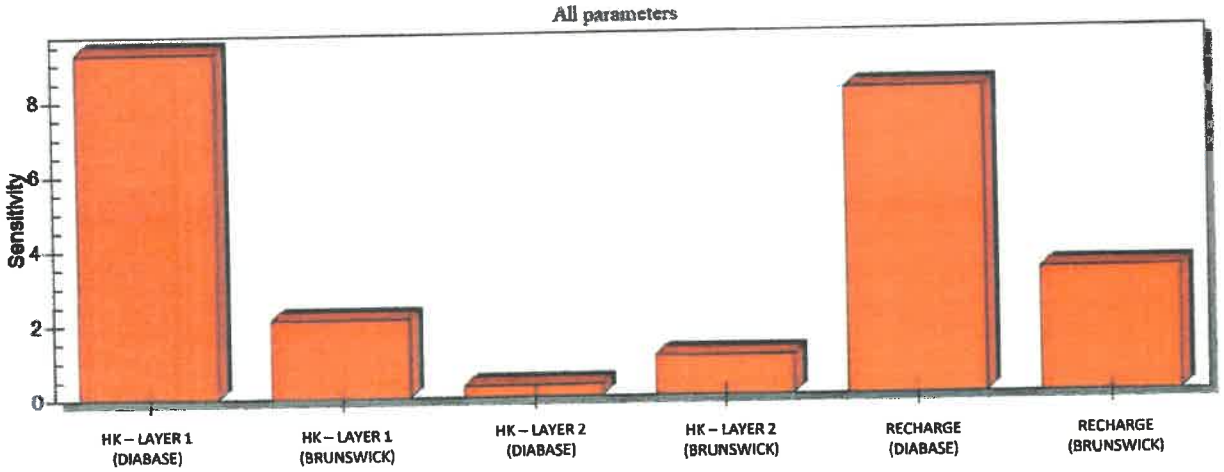
Calibration
Residual Error of Calibration Points
Center Valley Materials
Springfield Township
Bucks County, Pennsylvania

Well ID	Description	Computed (Simulated) Groundwater Elevation (feet/msl)	Observed Groundwater Elevation (feet-msl)	Residual Error (feet)
CP-A	Surface Water Point	589	590	1.0
CP-B	Surface Water Point	571	600	29.0
CP-3	Surface Water Point	596	598	2.5
CM	Measured Residential Well	530	557	27.2
HK-2	Measured Borehole	594	606	12.7
TATOO	Measured Residential Well	594	605	11.0
HK-3	Measured Borehole	593	593	-0.8
5862	PAGWIS Well	601	586	-14.7
73443	PAGWIS Well	571	556	-15.0
474788	PAGWIS Well	603	586	-16.6
73397	PAGWIS Well	621	628	7.1
73460	PAGWIS Well	617	630	12.9
72840	PAGWIS Well	637	646	9.1

Mean Error:	5.02
Absolute Mean Error:	8.07
Root Mean Square Error:	11.07
Normalized RMS:	12.20%

TABLE 3

Parameter Sensitivity
Center Valley Materials
Springfield Township
Bucks County, Pennsylvania



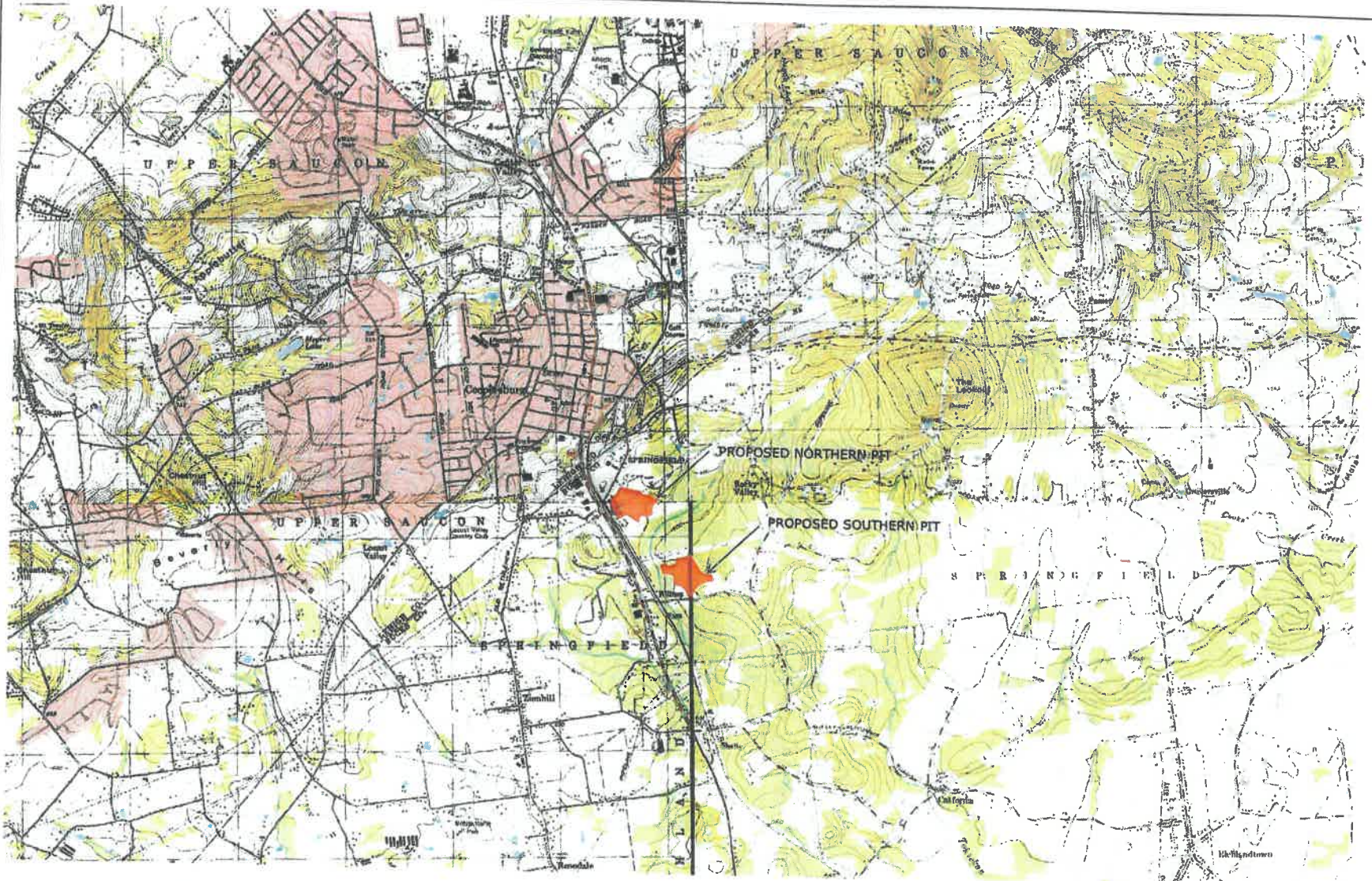
HK – HORIZONTAL HYDRAULIC CONDUCTIVITY

TABLE 4

Flow Budget
Preliminary Groundwater Model
Center Valley Materials
Springfield Township
Bucks County, Pennsylvania

	Flow In (ft^3/day)	Flow Out (ft^3/day)
Source/Sinks		
Drains (Creeks)	0.00	292624.00
Recharge	292626.00	0.00
Total	292626.00	292624.00
% Difference		0.0010

FIGURES



NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE MAP.

Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610-964-1462
val@vbritton.com www.vbritton.com

SITE LOCATION MAP

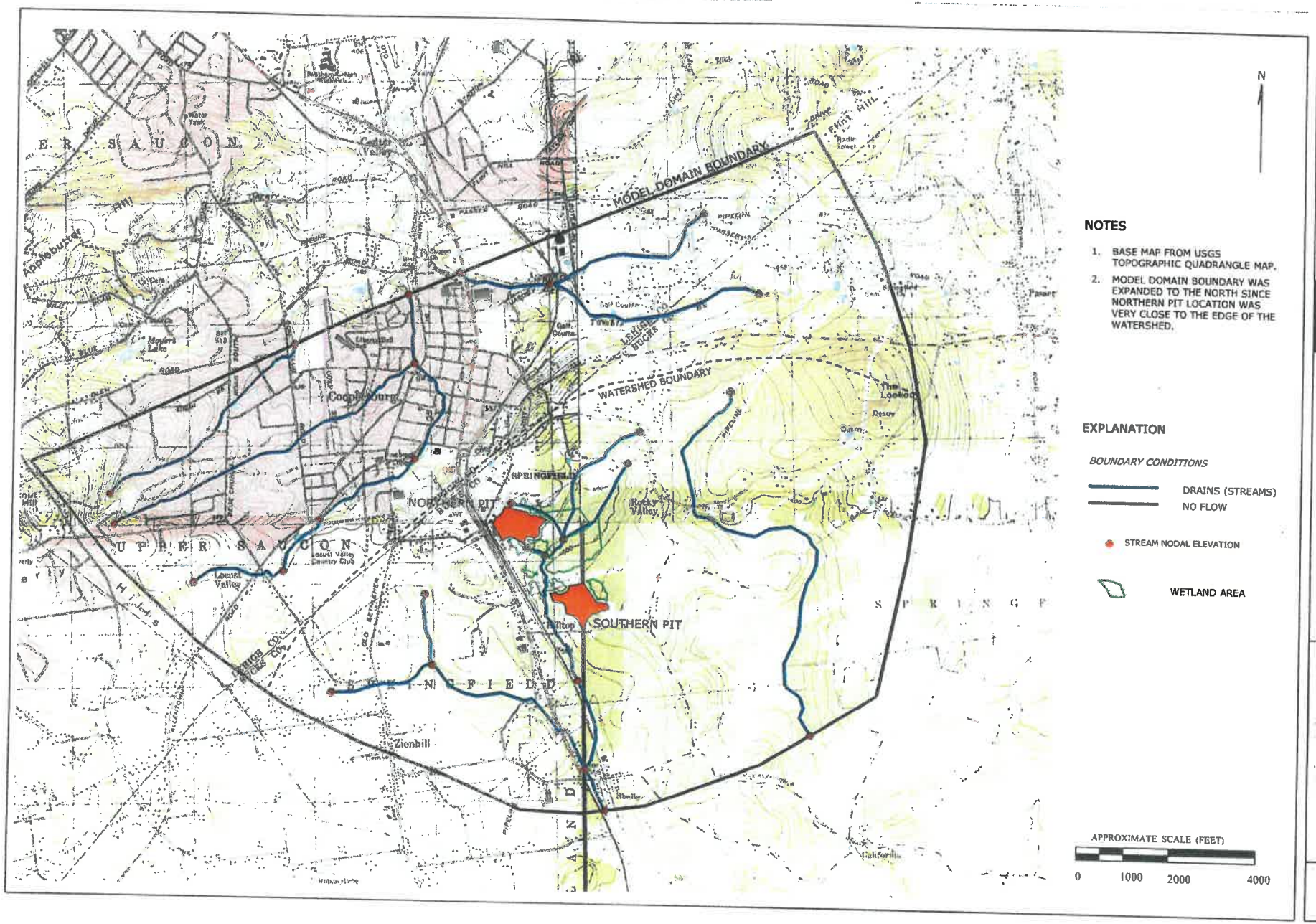
CENTER VALLEY MATERIALS
SPRINGFIELD TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

DRAWN BY VFB DATE 3/12/20

1

2.	CENTER VALLEY MATERIALS SPRINGFIELD TOWNSHIP BUCKS COUNTY, PENNSYLVANIA	VFB Date: 3/12/20
	SITE LAYOUT PLAN	

Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610 964 1462
val@vbritton.com www.vbritton.com



Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087

GENERAL MODEL CONSTRUCTION
BOUNDARY CONDITIONS

CENTER VALLEY MATERIALS
SPRINGFIELD TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

VFB 3/12/20

3

4	CENTER VALLEY MATERIALS SPRINGFIELD TOWNSHIP BUCKS COUNTY, PENNSYLVANIA	VFB	3/12/20
	GENERAL MODEL CONSTRUCTION MODEL GRID		

Vali F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610 964-1462
vali@vbritton.com www.vbritton.com

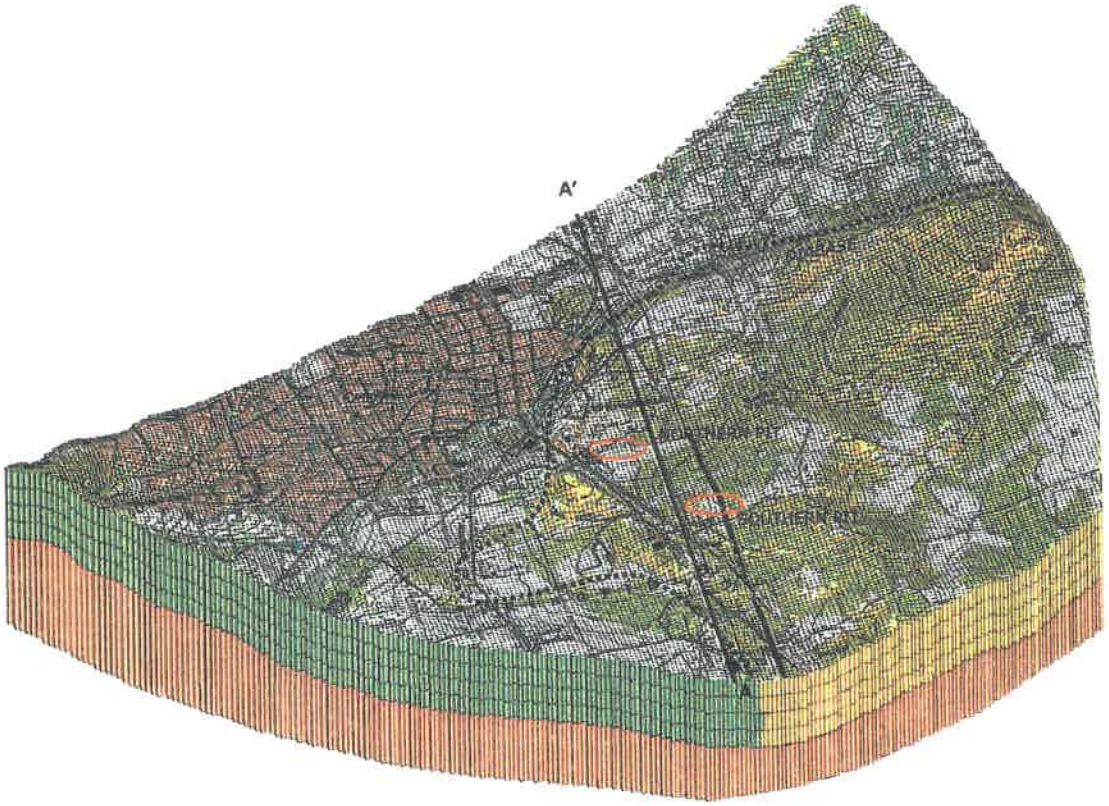
GENERAL MODEL CONSTRUCTION
GEOLOGIC MATERIAL
DISTRIBUTION

CENTER VALLEY MATERIALS
SPRINGFIELD TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

VFB | 3/12/20

5

Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610-964-1467
valfbritton.com www.vbritton.com



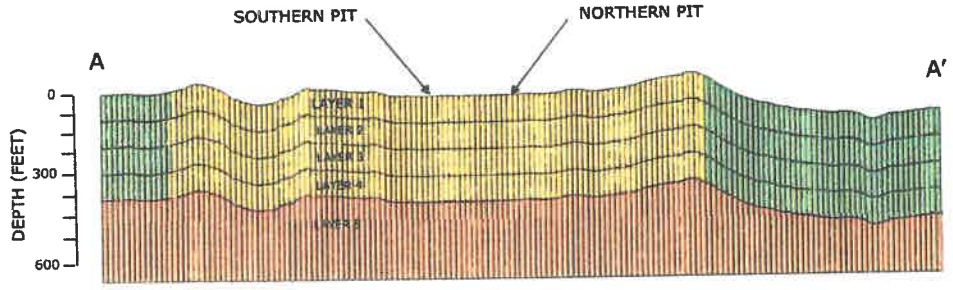
EXPLANATION

HYDROGEOLOGIC ZONES

- DIABASE
- BRUNSWICK FORMATION
- BOTTOM OF MODEL

NOTES

1. VERTICAL EXAGGERATION IS 5X.
2. THE RECHARGE VALUE USED IN THE MODEL WAS 8.5 INCHES PER YEAR FOR THE BRUNSWICK FORMATION AREA AND 2.0 INCHES PER YEAR FOR THE DIABASE.



HYDRO-GEOLOGICAL PARAMETERS

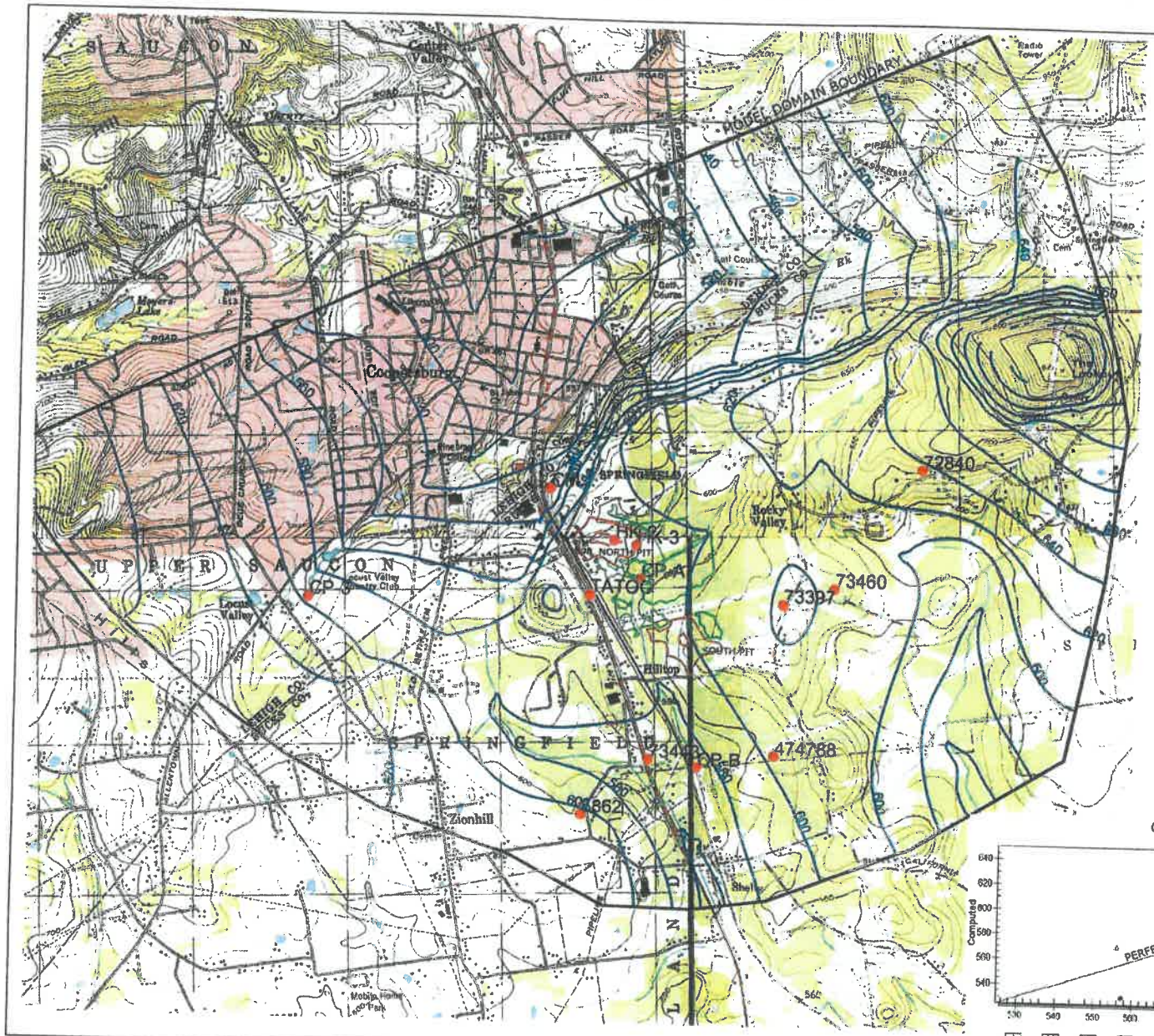
	k (ft/d)	kxy (ratio)	kz(ratio)
Diabase (Layer 1)	0.1	1	1
Diabase (Layer 2)	0.01	1	0.5
Diabase (Layer 3)	0.001	1	0.5
Diabase (Layer 4)	0.0001	1	0.5
Brunswick (Layer 1)	0.328	1	1
Brunswick (Layer 2)	0.148	1	1
Brunswick (Layer 3)	0.148	1	1
Brunswick (Layer 4)	0.148	1	1
Layer 5	0.001	1	1

Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610-964-1462
val@vbritton.com www.vbritton.com

GENERAL MODEL CONSTRUCTION
LAYER CONFIGURATION AND
HYDROGEOLOGICAL PARAMETERS

CENTER VALLEY MATERIALS
SPRINGFIELD TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

VFB | DATE: 3/12/20



NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC CONTOUR MAP
2. GROUNDWATER ELEVATION CONTOURS REPRESENT THE SIMULATION OF EXISTING SITE CONDITIONS.
3. CALIBRATION RESIDUAL ERROR TABULATION IS PROVIDED ON TABLE 2.
4. AVERAGE RECHARGE VALUE OF 8.5 INCHES PER YEAR FOR BRUNSWICK FORMATION AND 2.0 INCHES PER YEAR FOR THE DIABASE WAS USED IN MODEL SIMULATION.

EXPLANATION

- CALIBRATION LOCATION
- 620 — SIMULATED GROUNDWATER ELEVATION CONTOUR (FT/MSL)
- PROPOSED QUARRY AREA
- WETLAND AREA

N

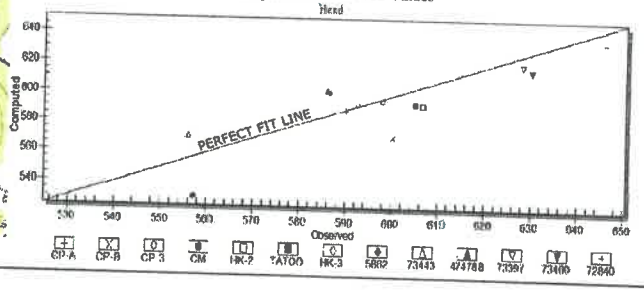
APPROXIMATE SCALE (FEET)

0 1000 2000 4000

CALIBRATION

MEAN ERROR:	5.02 FEET
ABSOLUTE MEAN ERROR:	8.07 FEET
ROOT MEAN SQUARE ERROR (RMS):	11.07 FEET
NORMALIZED RMS:	12.2%

Computed vs. Observed Values



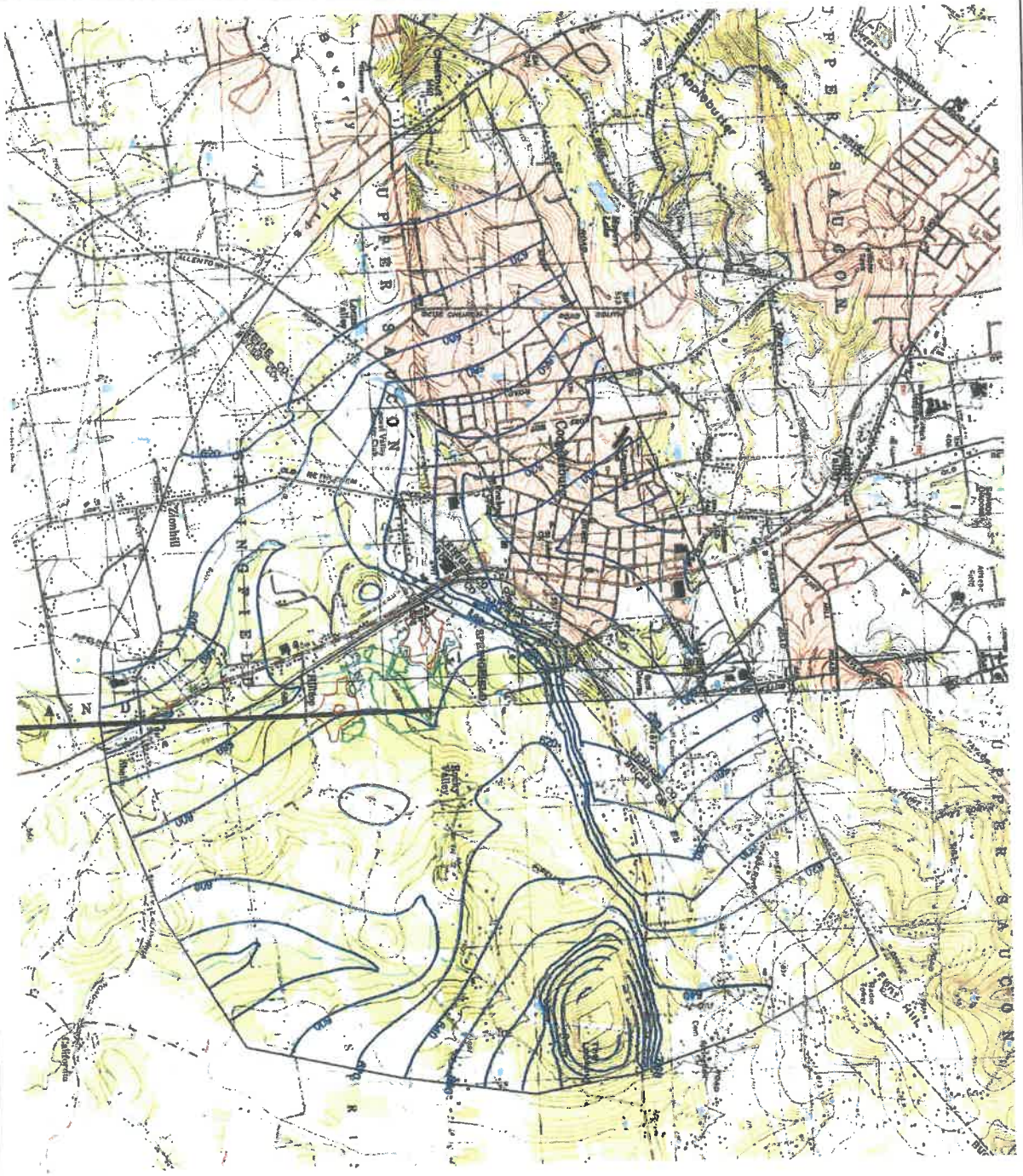
Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610 964-1462
val@vbritton.com www.vbritton.com

MODEL CALIBRATION

CENTER VALLEY MATERIALS
SPRINGFIELD TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

VFB | 3/12/20

7



NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC CONTOUR MAP
2. GROUNDWATER ELEVATION CONTOURS REPRESENT THE SIMULATION OF EXISTING SITE CONDITIONS.
3. AVERAGE RECHARGE VALUE OF 8.5 INCHES PER YEAR FOR BRUNSWICK FORMATION AND 2.0 INCHES PER YEAR FOR THE DIABASE WAS USED IN MODEL SIMULATION.

N

EXPLANATION

620 — SIMULATED GROUNDWATER ELEVATION CONTOUR (FT/MSL)

PROPOSED QUARRY AREA

WETLAND AREA

0 2000 4000 8000

APPROXIMATE SCALE (FEET)

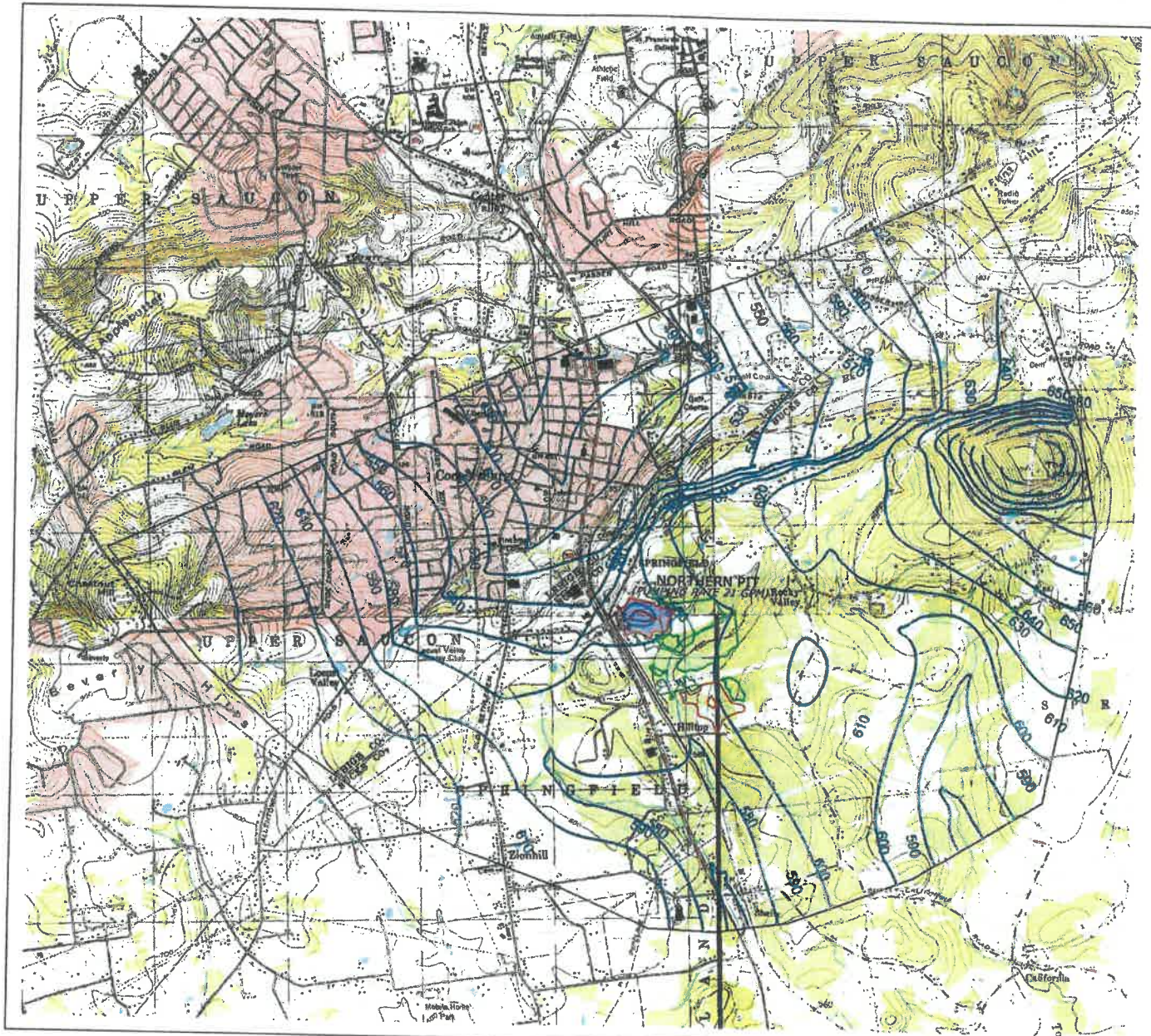
8

CENTER VALLEY MATERIALS
SPRINGFIELD TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

VFB | 3/12/20

SIMULATION OF EXISTING STATIC GROUNDWATER ELEVATION CONDITIONS

Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087



N

NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC CONTOUR MAP
2. GROUNDWATER ELEVATION CONTOURS REPRESENT THE SIMULATION OF DEWATERING CONDITIONS OF THE NORTHERN PIT TO BENCH ELEVATION OF 400 FEET.
3. AVERAGE RECHARGE VALUE OF 8.5 INCHES PER YEAR FOR BRUNSWICK FORMATION AND 2.0 INCHES PER YEAR FOR THE DIABASE WAS USED IN MODEL SIMULATION.
4. QUARRY (NORTHERN PIT) DEWATERING RATE BASED ON MODEL SIMULATION IS APPROXIMATELY 21 GPM.
5. PURPLE SHADE INDICATES PIT DEWATERING AREA.

EXPLANATION

620 SIMULATED GROUNDWATER ELEVATION CONTOUR (FT/MSL)

PROPOSED QUARRY AREA

WETLAND AREA

APPROXIMATE SCALE (FEET)

0 2000 4000 8000

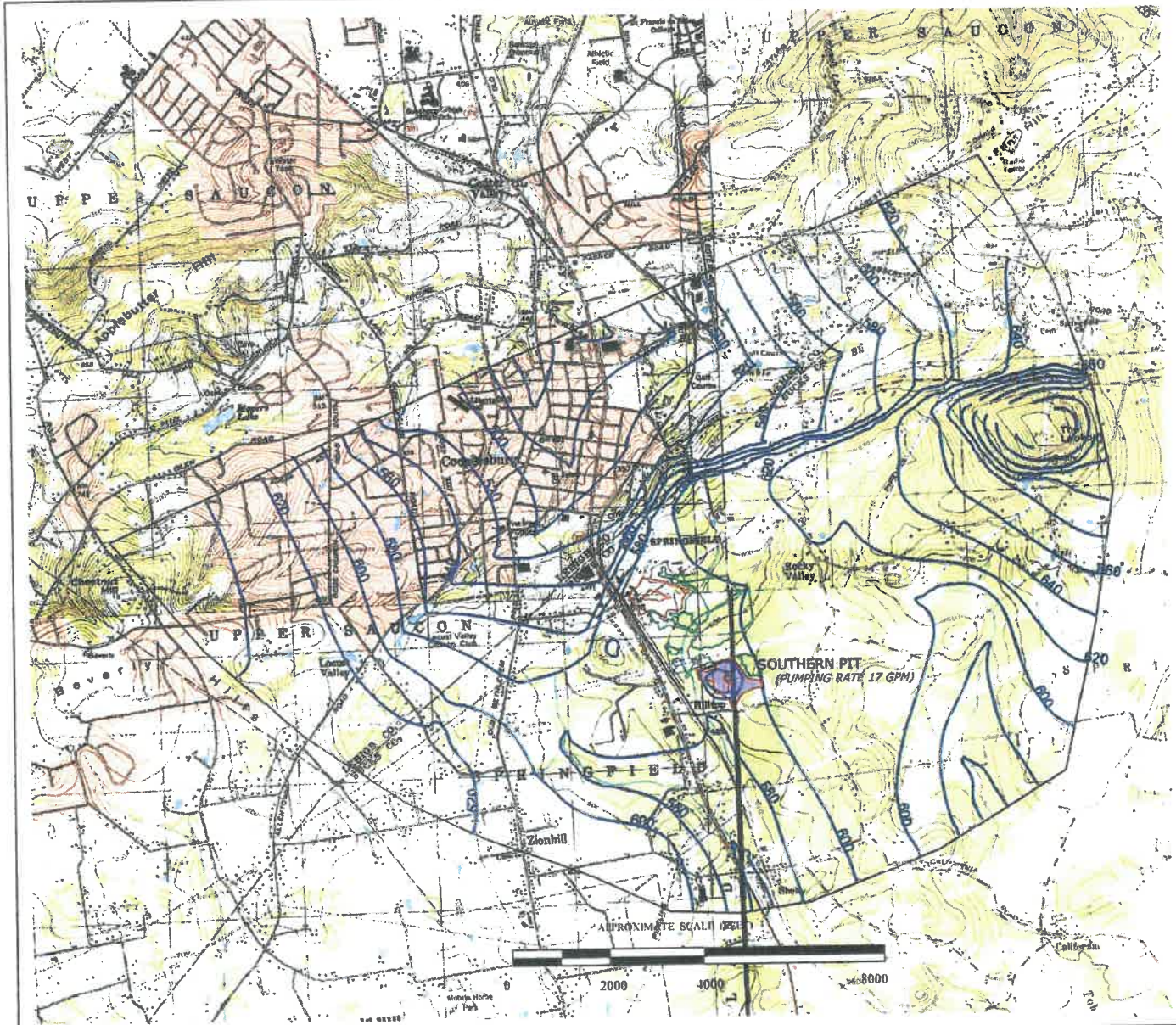
Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610-964-1462
val@vbritton.com www.vbritton.com

SIMULATION DEWATERING OF NORTHERN PIT GROUNDWATER ELEVATION CONTOUR (400 FOOT BENCH ELEVATION)

CENTER VALLEY MATERIALS
SPRINGFIELD TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

VFB | 3/12/20

9



N

NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC CONTOUR MAP
2. GROUNDWATER ELEVATION CONTOURS REPRESENT THE SIMULATION OF DEWATERING CONDITIONS OF THE SOUTHERN PIT TO BENCH ELEVATION OF 400 FEET.
3. AVERAGE RECHARGE VALUE OF 8.5 INCHES PER YEAR FOR BRUNSWICK FORMATION AND 2.0 INCHES PER YEAR FOR THE DIABASE WAS USED IN MODEL SIMULATION.
4. QUARRY (SOUTHERN PIT) DEWATERING RATE BASED ON MODEL SIMULATION IS APPROXIMATELY 17 GPM.
5. PURPLE SHADE INDICATES PIT DEWATERING AREA.

EXPLANATION

620 — SIMULATED GROUNDWATER ELEVATION CONTOUR (FT/MSL)

PROPOSED QUARRY AREA

WETLAND AREA

APPROXIMATE SCALE (FEET)

0 2000 4000 8000

Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610 964-1462
val@vbritton.com www.vbritton.com

SIMULATION DEWATERING OF SOUTHERN PIT GROUNDWATER ELEVATION CONTOUR (400 FOOT BENCH ELEVATION)

CENTER VALLEY MATERIALS
SPRINGFIELD TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

VFB | 3/12/20

10

NOTES

1. BASE MAP FROM PEMA 2018 AERIAL PHOTOGRAPH.
2. INTERIOR DRAWDOWN LINES REMOVED FOR CLARITY.
3. SIMULATION IS OF BENCH AT 400 FEET MEAN SEA LEVEL.
4. DRAWDOWN CONTOURS REPRESENT THE SIMULATION OF DEWATERING CONDITIONS OF THE NORTHERN PIT TO BENCH ELEVATION OF 400 FEET.
5. AVERAGE RECHARGE VALUE OF 8.5 INCHES PER YEAR FOR BRUNSWICK FORMATION AND 2.0 INCHES PER YEAR FOR THE DIABASE WAS USED IN MODEL SIMULATION.
6. QUARRY DEWATERING RATE BASED ON MODEL SIMULATION IS APPROXIMATELY 21 GALLONS PER MINUTE.

EXPLANATION

10 — DRAWDOWN CONTOUR (FEET) WHITE LINE

PROPOSED QUARRY AREA

WETLAND AREA

N

APPROXIMATE SCALE (FEET)

0 500 1000 2000

Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610 964-1462
val@vbritton.com www.vbritton.com

SIMULATION
NORTHERN PIT DRAWDOWN
(400 FOOT BENCH ELEVATION)

CENTER VALLEY MATERIALS
SPRINGFIELD TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

DRAWN BY: VFB DATE: 3/12/20

11

Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610-964-1462
val@vbritton.com www.vbritton.com

SIMULATION
SOUTHERN PIT DRAWDOWN
(400 FOOT BENCH ELEVATION)

CENTER VALLEY MATERIALS
SPRINGFIELD TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

DRAWN BY VFB | DATE 3/12/20

12

Attachment G

Plans

CONDITIONAL USE APPLICATION (G-7 QUARRY USE)

PREPARED FOR

H&K GROUP, INC. – CENTER VALLEY MATERIALS

SPRINGFIELD TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA

MARCH 13, 2020

A Portion of the 7.5 Minute Quadrangle Quad, Hellertown, Milford Square, and Quakertown, Pennsylvania Quadrangles dated 2016.

U.S.G.S. SITE LOCATION MAP
Scale: 1" = 2,000'

A Portion of the Springfield Township, Bucks County, Pennsylvania Zoning Map, Last Revised January 08, 2019

ZONING SITE LOCATION MAP
Scale: 1" = 2,000'

Portions of FIRM Panel 42017C0201G, 42017C0202G, 42017C0214G, and 42017C0215G, Last Revised March 16, 2015.

FEMA SITE LOCATION MAP
Scale: 1" = 2,000'

AERIAL SITE LOCATION MAP
Scale: 1" = 1,000'

PROJECT ENGINEER:
Scott S. Brandeis, P.E.
PA License #PE-047262
H&K Group, Inc.
Engineering & Environmental Services Division
3535 Leora Road
P.O. Box 189
Skippack, PA 19474
P: 610-222-3615
F: 610-584-1743
sbrandeis@hkgroup.com
www.hkgroup.com

PROJECT SURVEYOR:
Paul Vetterstedt, P.L.S.
PA License #SU-0000000
Urwiler & Walter, Inc.
3120 16th Street
P.O. Box 339
Bannsylvania, PA 18034
P: 610-865-6656
F: 610-865-0915
pvetterstedt@urwiler.com
www.urwiler.com

APPLICANT/OWNER'S REPRESENTATIVE:
H&K Group, Inc.
(David R. Holmes, President)
3535 Leora Road
Skippack, PA 19474
P: 610-584-5000
F: 610-584-5435
dholmes@hkgroup.com
www.hkgroup.com

DRAWING INDEX

SHEET	TITLE
1 of 8	Cover Sheet
2 of 8	Plan of General Area
3 of 8	Overall Site Plan
4 of 8	South Extraction Area – Operations Plan
5 of 8	South Extraction Area – Reclamation Plan
6 of 8	North Extraction Area – Operations Plan
7 of 8	North Extraction Area – Reclamation Plan
8 of 8	Detail Sheet

GENERAL NOTES:

1. This Conditional Use Plan Set includes sheets 1 through 8 has been prepared in accordance with the Springfield Township Zoning Ordinance of 2007, with amendments.
2. Use of the project site for G-7 Quarry Use is subject to Conditional Use Approval.
3. Use of the project site for surface mineral extraction is also subject to obtaining a Large Non-Coal (Industrial Minerals) Surface Mining Permit as well as a General NPDES Permit Associated with Mining Activities from the Pennsylvania Department of Environmental Protection (PADEP).
4. This plan is subject to any and all rights-of-way, easements, and covenants of record.
5. There are no proposed streets associated with this Conditional Use Application.
6. There are no parcels to be dedicated to the public, reserved for their use, or to be reserved by covenant.
7. There are no drainage easements associated with this Conditional Use Application.
8. There are no proposed utilities, with the exception of new electric service, associated with this project. Existing utility services, including the new electric service, will remain in use as is.
9. The Bucks County Conservation District and the Pennsylvania Department of Environmental Protection (PADEP) have jurisdiction over minor sites.
10. The plan for storm water management during mineral extraction activities will be reviewed and approved by the PADEP District Mining Office as part of the Large Non-Coal (Industrial Minerals) Surface Mining Permit application process. Following mineral extraction activities, storm water management will be in accordance with the approved Land Use & Reclamation Map to be reviewed and approved by PADEP.
11. The project site is to be served by existing on-lot water and on-lot septic systems or existing tank.
12. A PennDOT Highway Occupancy Permit will not be required for this project.
13. The Mine Operator will be responsible for insuring that all work done onsite is in accordance with all applicable MSHA and PADEP regulations.
14. Property plan and/or measurements cited as depicted on Plan of Survey, dated November 19, 2018, prepared by Urwiler & Walter, Inc.

WIND DATA – Allentown Beaver, PA (Average Annual)

- Direction
  August & September: From South
  September – August: From West
- Speed
  November 16 – May 1: 8.0 mph Average
  May 1 – November 16: 8.7 mph Average

PLANNED INDUSTRIAL AREA & DIMENSIONAL REGULATIONS
SPRINGFIELD TOWNSHIP ZONING ORDINANCE (2007)

USE TYPE	MINIMUM LOT SIZE AT MINIMUM BUILDING SETBACK (FT)	MAXIMUM BUILDING HEIGHT (FT)	MINIMUM YARDS (FT) FRONT/EACH SIDE/REAR
ALLOWED USE IN ONE CATEGORY "G-"	200	50*	50 / 70** / 70**
OTHER ALLOWED USE	200	50*	50 / 35 / 40**

* Except for minimum non-combustible towers, which shall meet the conditions of section 402.F.2.b
** Except a side yard and rear yard of 20 feet shall apply where the abutting lot line is part of a lot which is R.C. or P.I. zoning district.

G-7 QUARRY USE AREA & DIMENSIONAL REQUIREMENTS
SPRINGFIELD TOWNSHIP ZONING ORDINANCE (402.G.7.G)

DIMENSION	REQUIRED
MINIMUM LOT AREA	50 ACRES
MAXIMUM BUILDING COVERAGE	0.20
MAXIMUM IMPERVIOUS SURFACE RATIO	0.80
MINIMUM LOT WIDTH AT BUILDING SETBACK LINE	200 FEET
FRONT YARD	125 FEET *
SIDE YARD (EACH/TOTAL)	125 FEET **
REAR YARD	125 FEET **
MAXIMUM BUILDING HEIGHT	40 FEET ***

* The front yard shall be measured from the ultimate right-of-way line. No part of the front yard may be stayed or set in any fashion except as necessary for access roads.
** The side and rear yard setbacks may be stayed inclusive at a point no closer than 50 feet from any boundary line to a point 100 feet from said boundary line. The slope shall not exceed a 3:1 slope and shall be maintained by seeding and planting in accordance with a plan and standards approved by the board of supervisors.
*** Building height shall be applicable only to those buildings or structures having a permanent fixed foundation or location on the ground and shall not include penthouses or other temporary structures necessary to the operation or extraction operations, asphalt plant, or ready mix concrete plants.

1. Base Site Data: Certain portions of tracts may not be usable for the activities proposed for the site. Those areas shall therefore be subtracted from the site area to determine base site area.
   (a) Site areas as determined by actual on-site survey ..... 188.554 Ac.
   (b) Subtract – land which is not contiguous to:
   (1) A separate parcel which does not abut or adjoin, nor shares common boundaries with the rest of the development, and/or
   (2) Land which is cut off from the main parcel by an arterial or collector roadway, railroad, existing land use, or major stream so as to serve as a major barrier to common use, or so that it is isolated and unavailable for building purposes. (Each parcel shall be treated separately for the purpose of base site area determination.)
   ..... Ac.
   (c) Subtract – land that was previously preserved by a conservation easement or a condition of an approved plan.
   ..... Ac.
   (d) Subtract – land used or zoned for another use, i.e., land used or to be used for commercial or industrial uses in a residential development, or land in a different zoning district rather than primary use.
   ..... Ac.
   (e) Subtract – land within ultimate right-of-way of existing roads or utility rights-of-way or easements.
   10.021 Ac.
   = 10.021 Ac.
   178.533 Ac.
2. Impervious Surface Ratio shall be calculated for each lot based upon the lot area of each lot.
   0.000

SITE DATA:

Total Area (Gross):	188.554 Ac.
Right-of-Way:	10.021 Ac. (Roads & Overhead Power)
Base Site Area (Net):	178.533 Ac.
Proposed Impervious:	2.500 ± of Base Site Area
Existing No. of Lots:	4
Proposed No. of Lots:	4
Proposed Structures:	2 (Single Scale House and Storage Building)
Water Service:	Existing On-site Well
Sewer Service:	Existing On-site Septic / Holding Tank

ZONING DATA:

District:	PI – Planned Industrial
Existing Use:	Undeveloped, Predominantly Wooded Land
Proposed Use:	G-7 Quarry
Required Parking:	10 Spaces (1 Space/Employee ± 10 Employees)
Provided Parking:	10 Spaces (1 Space/Employee ± 10 Employees, ± 0 Visitors)

LANDOWNER:

Liberty Home Development Corporation, Ltd.
1235 Route 309
Coopersburg, PA 18036

TAX:

Springfield Township
- Parcel No. 42-002-070, Dt. 6/27, Pg. 2386, 39.439 Acres
- Parcel No. 42-002-070, Dt. 6/27, Pg. 2386, 89.000 Acres
- Parcel No. 42-002-106, Dt. 6/27, Pg. 2317, 43.533 Acres
- Parcel No. 42-002-107, Dt. 6/27, Pg. 2317, 16.582 Acres

Total: 188.554 Acres

SURVEY NOTES:

1. Property boundary survey performed by Urwiler and Walter, Inc. July 2018. Property boundary is based on a survey made by Urwiler & Walter, Inc. This survey is based on the NAD83 PA State Plane – South Datum.
2. Adjacent/Contiguous property lines derived from Anyfinity coverage data obtained from Bucks County Geographic Information Services (GIS) Department.
3. Base map data, within 50 feet of project area boundary, derived from photogrammetric digital mapping compiled by Key Aerial Surveys, Inc., Allentown, PA, using aerial photography obtained April 24, 2018. Vertical datum is based on NAVD 88 datum established by USGS Quad Sheets, Inc. Base map data, outside of 50 feet of project area boundary, derived from LIDAR Anyfinity coverage data published June 2014, downloaded from Pennsylvania Spatial Data Access (PASDA) Anyfinity (http://www.pasda.psu.edu).
4. Property ownership information current as of February 2020.
5. Soil boundaries derived from Soil Survey of Bucks County, Pennsylvania published by USDA Soil Conservation Service in cooperation with the Pennsylvania State University College of Agriculture and PASDA, September 1966.
6. Soil data obtained from Soil Survey of Bucks County Pennsylvania published by USDA Soil Conservation Service in cooperation with the Pennsylvania State University College of Agriculture and PASDA, September 1966.
7. Wetlands delineation by Valley Environmental Services, Inc., 2000 Hope Drive, Emmaus, PA 18049. Wetlands flagged in the field June 10-13, 2018.

SCOTT S. BRANDEIS
COMMONWEALTH OF PENNSYLVANIA

DATE	REVISIONS	BY	CHK'D	REV.

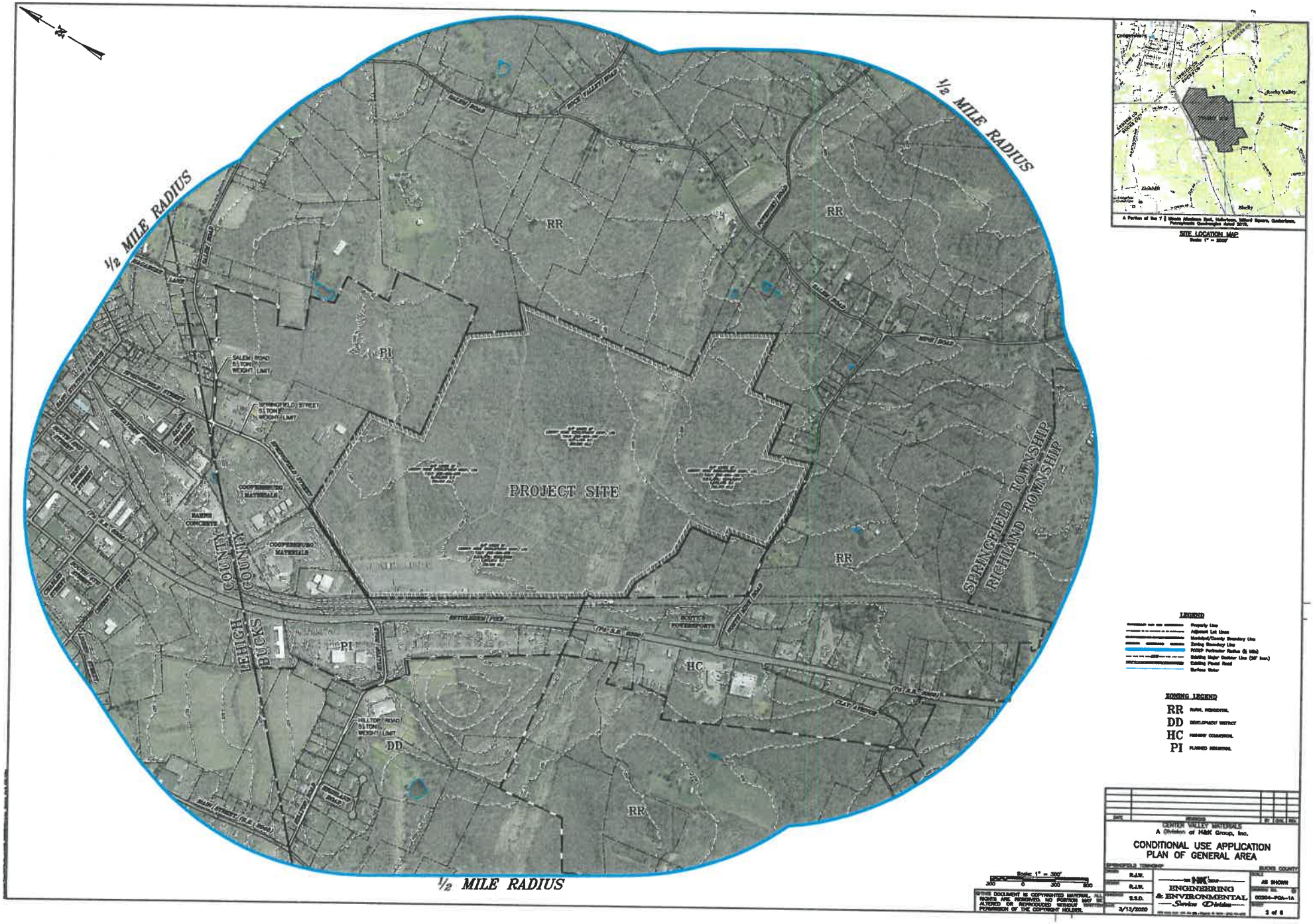
CENTER VALLEY MATERIALS
A Division of H&K Group, Inc.

CONDITIONAL USE APPLICATION
COVER SHEET

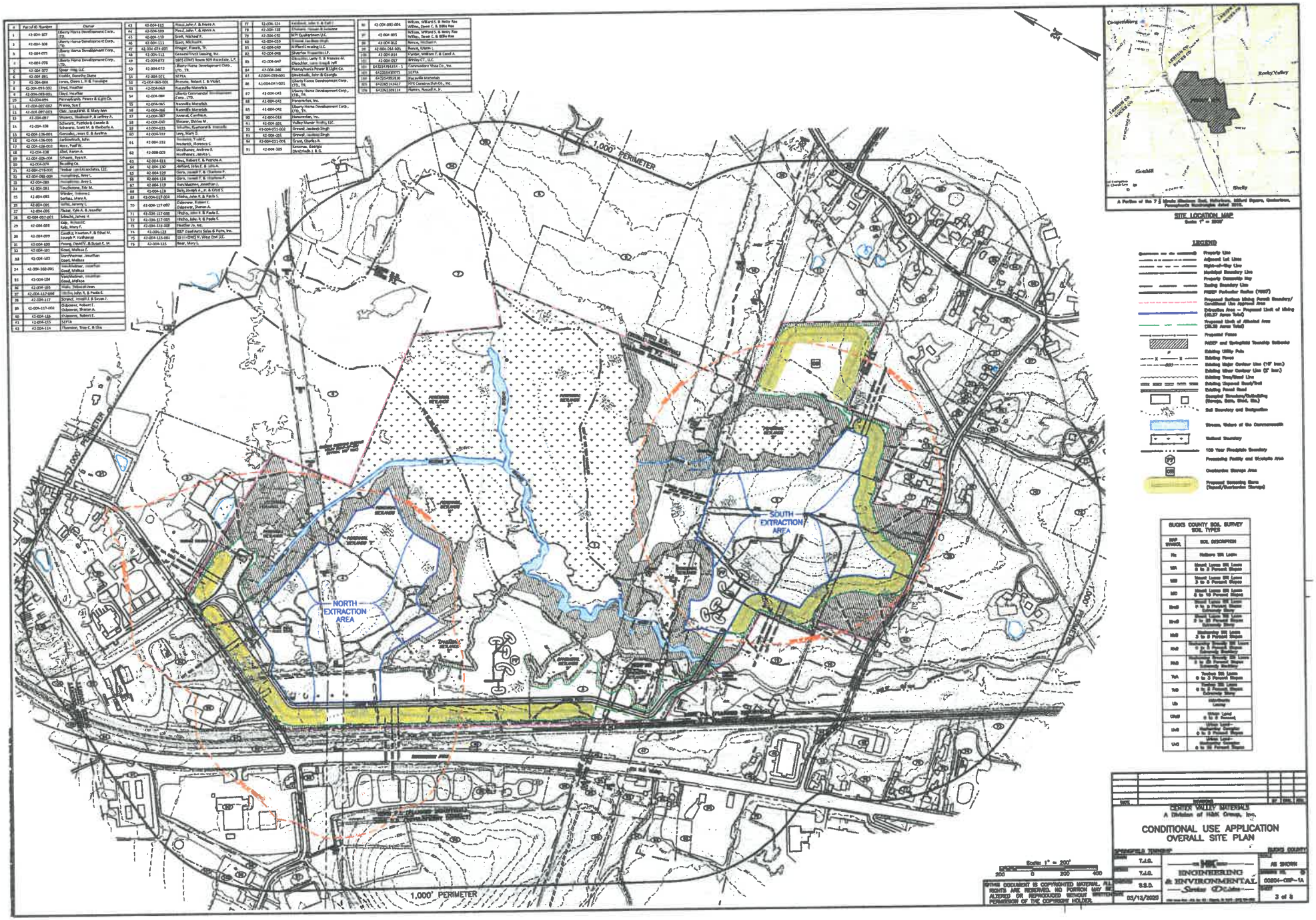
SPRINGFIELD TOWNSHIP — BUCKS COUNTY

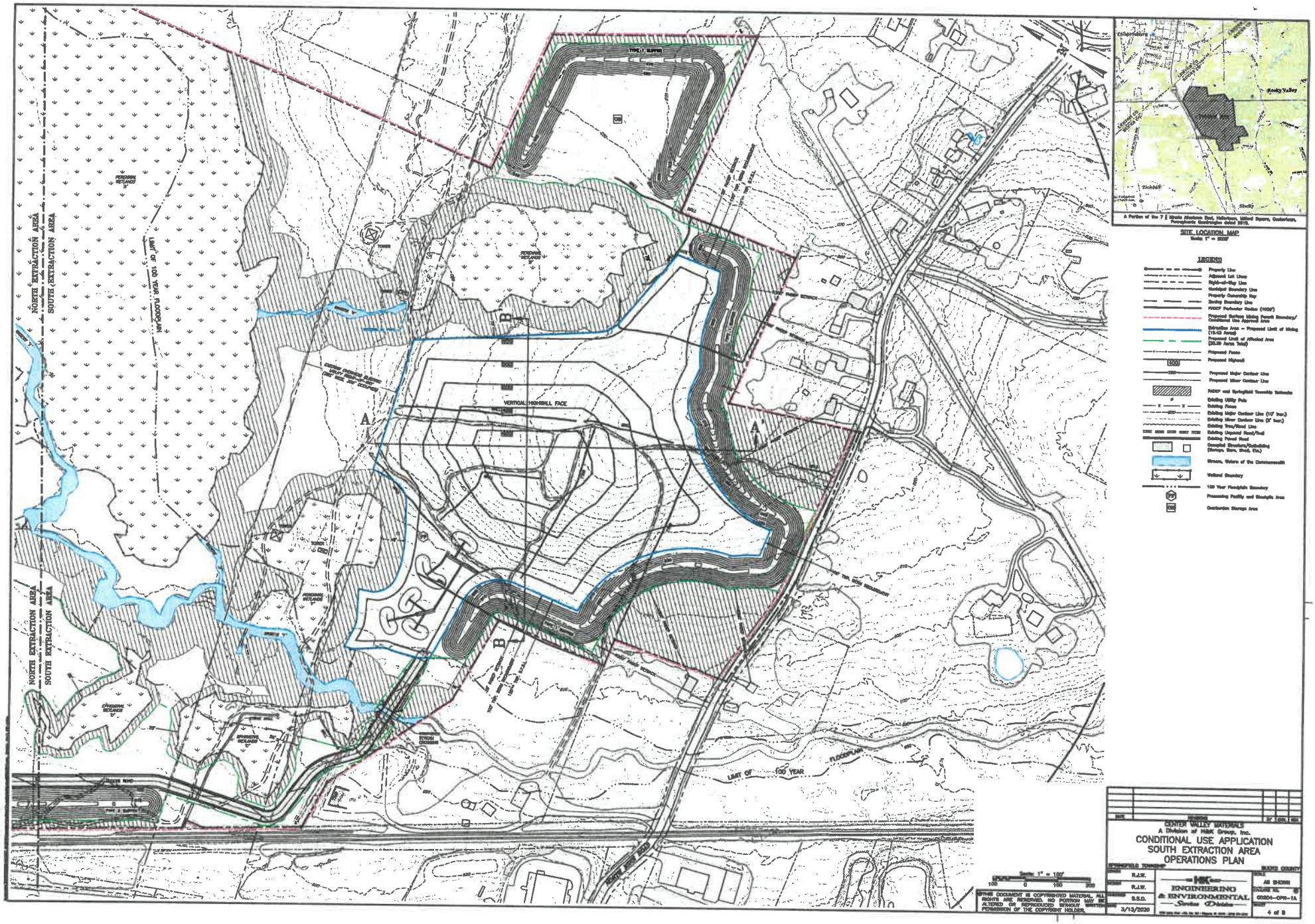
DESIGNED	T.J.G.	SCALE	AS SHOWN
DRAWN	T.J.G.	PROJECT NO.	00204-CVR-1A
CHECKED	S.S.B.	DATE	03/13/2020
		SHEET	1 of 8

H&K GROUP, INC. ENGINEERING & ENVIRONMENTAL Services Division

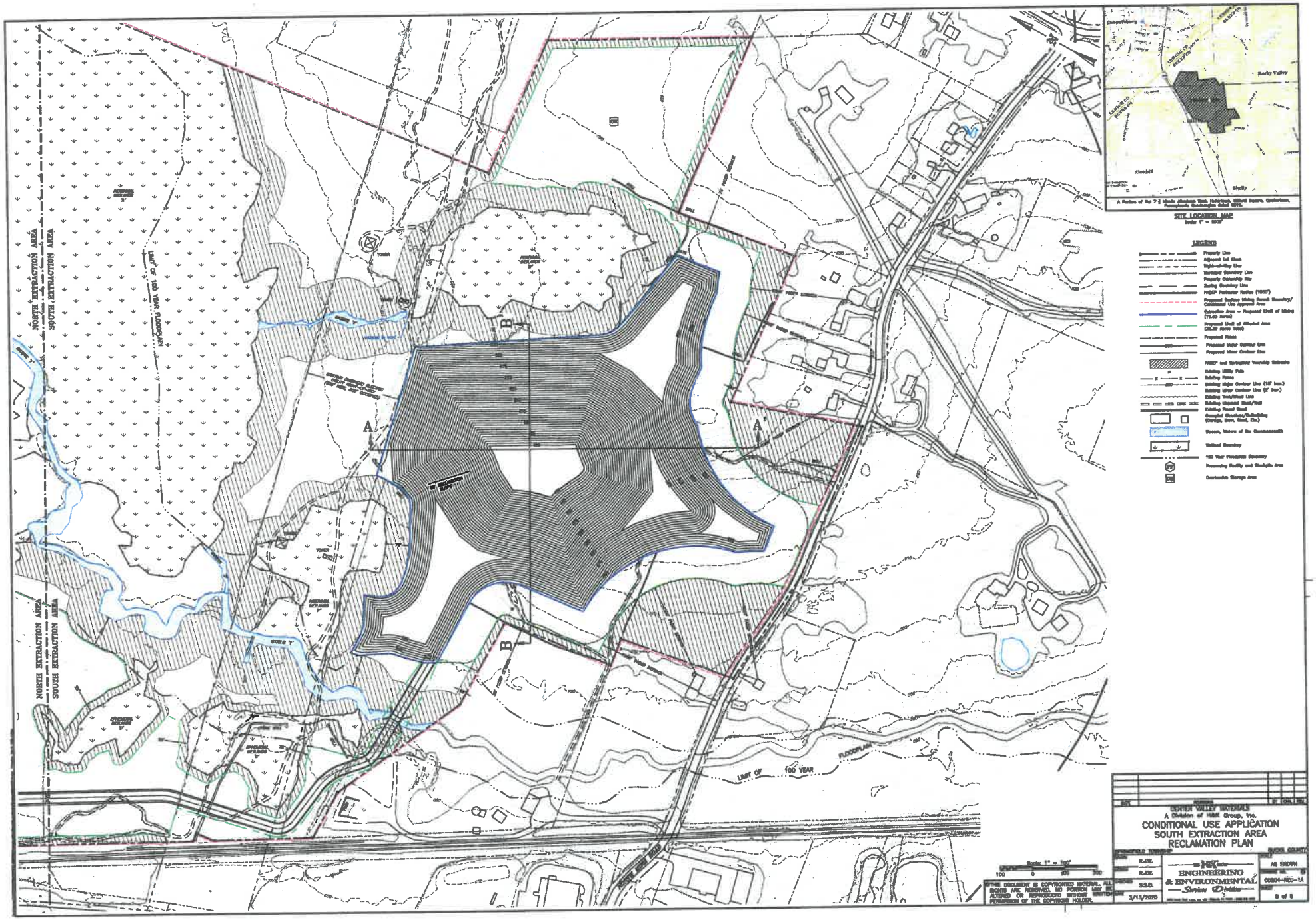


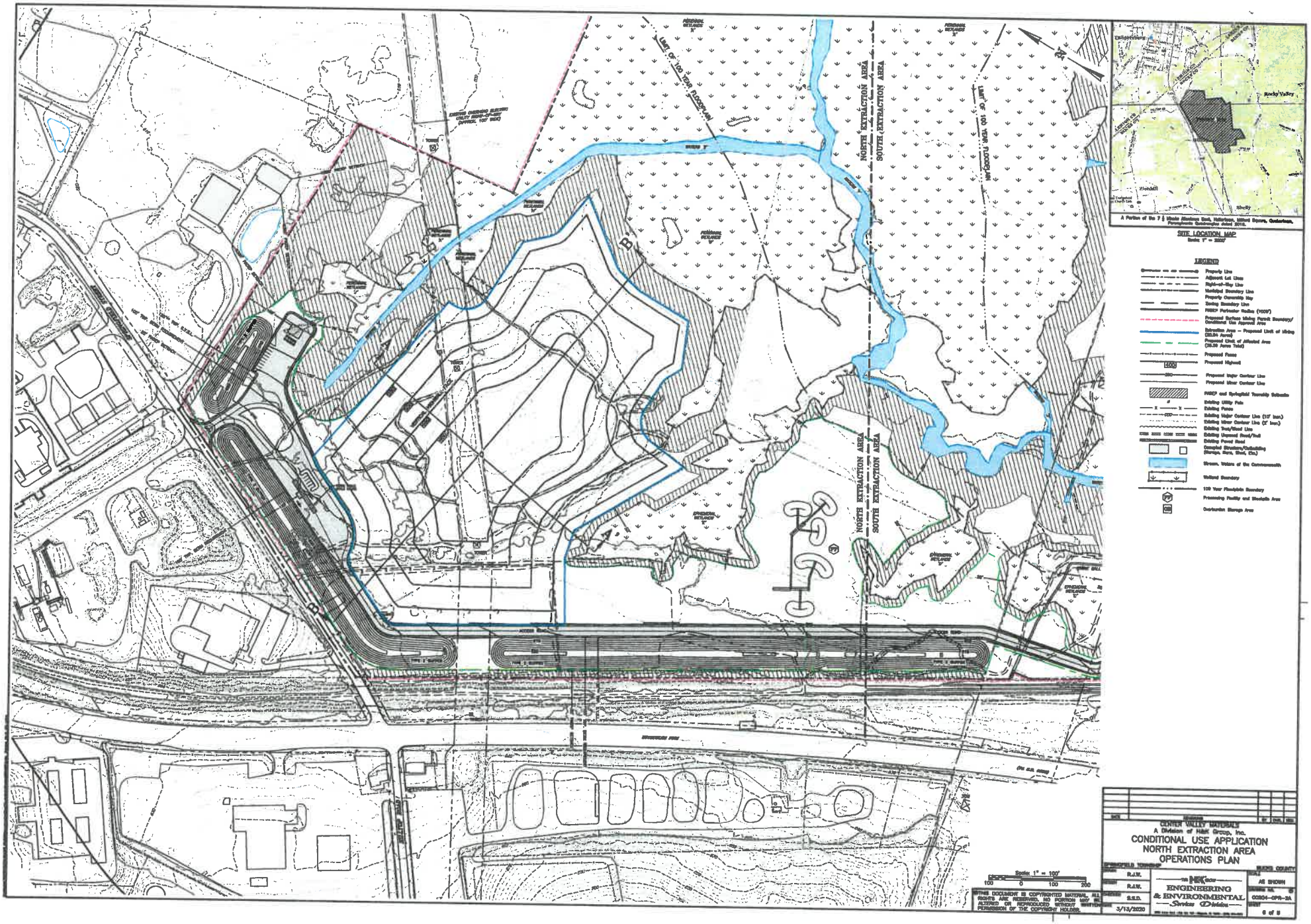
A-7

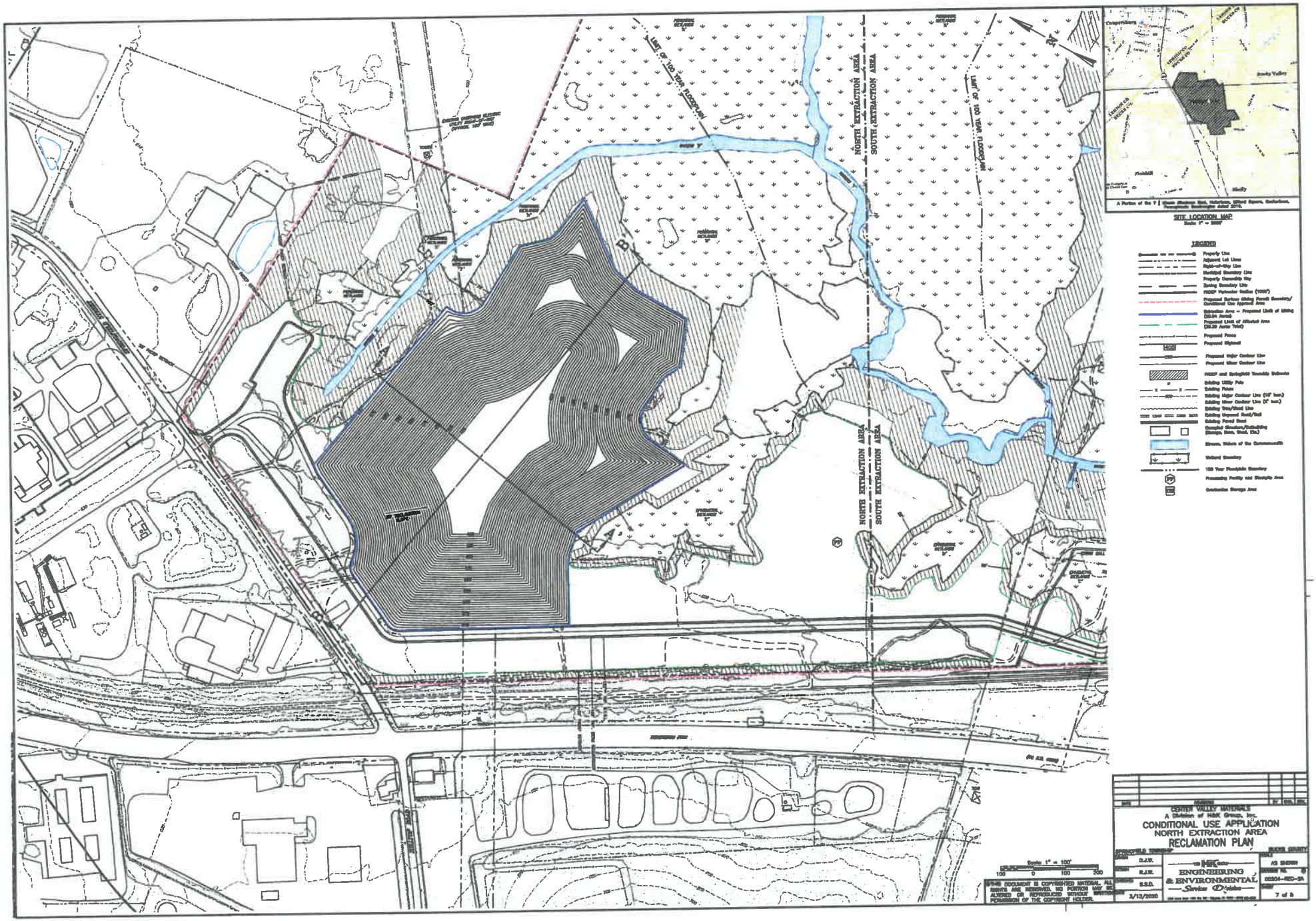

1,000' PERIMETER
NORTH EXTRACTION AREA
SOUTH EXTRACTION AREA
SITE LOCATION MAP
LEGEND
SUCKS COUNTY SOIL SURVEY SOIL TYPES
CENTER VALLEY MATERIALS
A Division of H&K Group, Inc.
CONDITIONAL USE APPLICATION
OVERALL SITE PLAN
HILLTOWN TOWNSHIP
BUCKS COUNTY
ENGINEERING & ENVIRONMENTAL
Scale: 1" = 200'
03/13/2020
3 of 8


NORTH EXTRACTION AREA
SOUTH EXTRACTION AREA
LIMIT OF 100 YEAR FLOODPLAIN
VERTICAL HIGHWALL FACE
A
A'
B
B'
LIMIT OF 100 YEAR FLOODPLAIN
SITE LOCATION MAP
LEGEND
Property Line
Adjacent Lot Lines
Right-of-Way Line
Municipal Boundary Line
Property Ownership Map
Zoning Boundary Line
PADEP Perimeter Buffer (100')
Extraction Area = Proposed Limit of Mining (18.43 Acres)
Proposed Limit of Affected Area (26.39 Acres Total)
Proposed Fence
Proposed Highwall
Proposed Major Contour Line
Proposed Minor Contour Line
Existing Utility Pole
Existing Fence
Existing Major Contour Line (10' Int.)
Existing Minor Contour Line (2' Int.)
Existing Tree/Wood Line
Existing Unpaved Road/Trail
Existing Paved Road
Occupied Structure/Outbuilding (Garage, Barn, Shed, Etc.)
Stream, Waters of the Commonwealth
Wetland Boundary
100 Year Floodplain Boundary
Processing Facility and Stockpile Area
Contractor Storage Area
CENTER VALLEY MATERIALS
A Division of H&K Group, Inc.
CONDITIONAL USE APPLICATION
SOUTH EXTRACTION AREA
OPERATIONS PLAN
SPRINGFIELD TOWNSHIP
BUCKS COUNTY
R.J.W.
R.J.W.
S.S.O.
3/13/2020
AS SHOWN
00804-OPR-1A
4 of 8
ENGINEERING & ENVIRONMENTAL Services
Scale: 1" = 100'
THIS DOCUMENT IS COPYRIGHTED MATERIAL. ALL RIGHTS ARE RESERVED. NO PORTION MAY BE ALTERED OR REPRODUCED WITHOUT WRITTEN PERMISSION OF THE COPYRIGHT HOLDER.

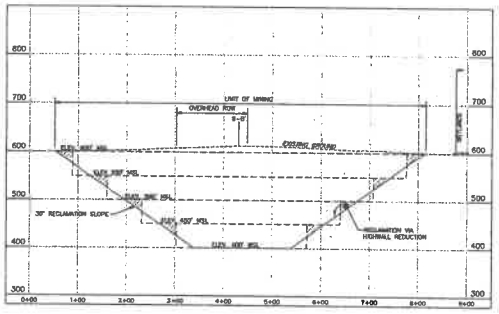
A-9


NORTH EXTRACTION AREA
SOUTH EXTRACTION AREA
LIMIT OF 100 YEAR FLOODPLAIN
A
A'
B
B'
LIMIT OF 100 YEAR FLOODPLAIN
SITE LOCATION MAP
LEGEND
CENTER VALLEY MATERIALS
A Division of Hilltop Group, Inc.
CONDITIONAL USE APPLICATION
SOUTH EXTRACTION AREA
RECLAMATION PLAN
HANOVER ENGINEERING & ENVIRONMENTAL Service Division
3/13/2020
5 of 8

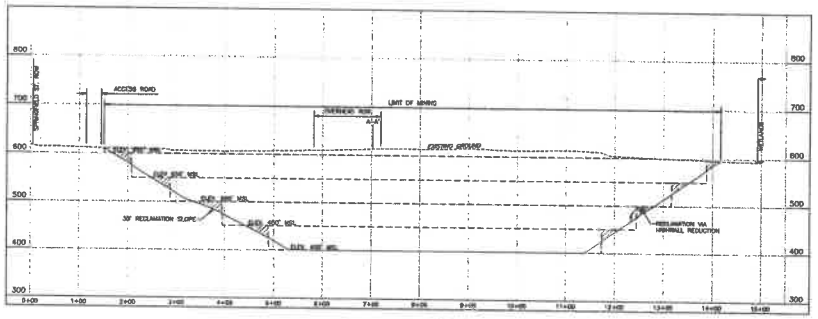




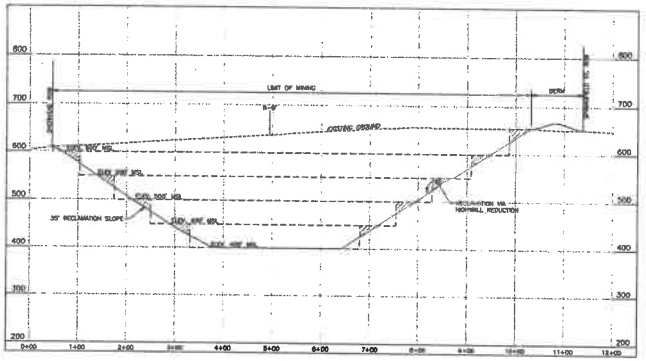
A-12



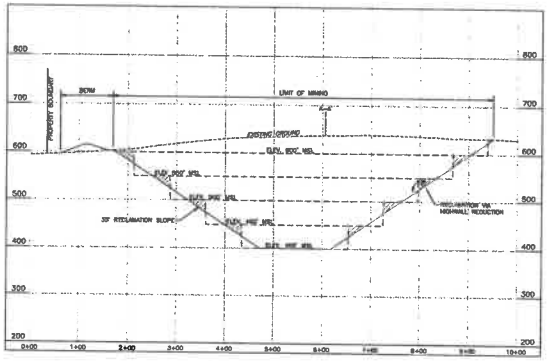
NORTH EXTRACTION AREA
CROSS SECTION: A-A'
Horizontal Scale: 1" = 100'
Vertical Scale: 1" = 100'



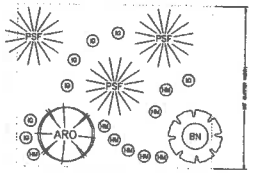
NORTH EXTRACTION AREA
CROSS SECTION: B-B'
Horizontal Scale: 1" = 100'
Vertical Scale: 1" = 100'



SOUTH EXTRACTION AREA
CROSS SECTION: A-A'
Horizontal Scale: 1" = 100'
Vertical Scale: 1" = 100'



SOUTH EXTRACTION AREA
CROSS SECTION: B-B'
Horizontal Scale: 1" = 100'
Vertical Scale: 1" = 100'



TYPE 1 BUFFER
TYPICAL PLANTING PATTERN (100' SEGMENT)
SCALE: 1" = 10'

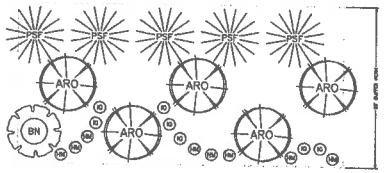
TYPE 1 BUFFER PLANTING REQUIREMENTS
SPRINGFIELD TOWNSHIP ZONING ORDINANCE (§402.6.1.A)

PLANT TYPE	HEIGHT	CALIPER	REQUIRED QUANTITY
EVERGREEN	6' - 7'	N/A	(1) PER 20 FEET OF BUFFER LENGTH
SHADE TREE	N/A	2" - 2.5"	(1) PER EVERY (2) EVERGREENS
FLOWERING TREE	8' - 10'	2 IN"	(1) PER EVERY (2) EVERGREENS
SHRUB	4' MIN	N/A	SEE PLAN SHEET (1) EVERGREEN PER DECIDUOUS SHRUB TRIAD AND FLOWERING SHRUB (ONE)

* GROUND COVER TO BE HYDROSEED APPLICATION PROVIDING COVER HEIGHT OF 12"-15".

PLANTING SCHEDULE

SYMBOL	PLANT TYPE	BOTANICAL NAME	COMMON NAME	PROVIDED QUANTITY (BUFFER LENGTH: 3,850 FT)
	EVERGREEN	PICEA ABIES "NIDIFORMIS"	NIDIFORM NORWAY SPRUCE	193
ARO	SHADE TREE	ACER RUBRUM "OCTOBER GLORY"	RED MAPLE	91
DB	FLOWERING TREE	BETULA NIGRA "HERITAGE" SERIES	RIVER BIRCH	51
	FLOWERING EVERGREEN SHRUB	HYDRANGEA MACROPHYLLA "ALL SUMMER BEAUTY"	HYDRANGEA	455
	EVERGREEN SHRUB	ILEX CRENATA "SKY PENCIL"	SKY PENCIL JAPANESE HOLLY	457



TYPE 2 BUFFER
TYPICAL PLANTING PATTERN (100' SEGMENT)
SCALE: 1" = 10'

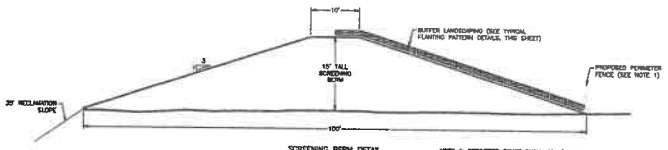
TYPE 2 BUFFER PLANTING REQUIREMENTS
SPRINGFIELD TOWNSHIP ZONING ORDINANCE (§402.6.1.B)

PLANT TYPE	HEIGHT	CALIPER	REQUIRED QUANTITY
EVERGREEN	6' - 7'	N/A	(10) PER 100 LINEAR FEET OF BUFFER LENGTH
SHADE TREE	N/A	2 IN"	(10) PER 100 LINEAR FEET OF BUFFER LENGTH
FLOWERING TREE	8' - 10'	N/A	(10) PER 100 LINEAR FEET OF BUFFER LENGTH
SHRUB	4' MIN	N/A	(100) PER 100 LINEAR FEET OF BUFFER LENGTH

* GROUND COVER TO BE HYDROSEED APPLICATION PROVIDING COVER HEIGHT OF 12"-15".

PLANTING SCHEDULE

SYMBOL	PLANT TYPE	BOTANICAL NAME	COMMON NAME	PROVIDED QUANTITY (BUFFER LENGTH: 2,550 FT)
	EVERGREEN	PICEA ABIES "NIDIFORMIS"	NIDIFORM NORWAY SPRUCE	159
ARO	SHADE TREE	ACER RUBRUM "OCTOBER GLORY"	RED MAPLE	100
DB	FLOWERING TREE	BETULA NIGRA "HERITAGE" SERIES	RIVER BIRCH	50
	FLOWERING EVERGREEN SHRUB	HYDRANGEA MACROPHYLLA "ALL SUMMER BEAUTY"	HYDRANGEA	300
	EVERGREEN SHRUB	ILEX CRENATA "SKY PENCIL"	SKY PENCIL JAPANESE HOLLY	270



SCREENING BERM DETAIL
N.T.S.

NOTE 1: PERIMETER FENCE SHALL BE 6' CHAIN LINK WITH THREE (3) STRANDS BARB WIRE. WARNING SIGNS "DANGER QUARRY KEEP OUT" POST AT 100' INTERVALS.

CENTER VALLEY MATERIALS
A Division of H&K Group, Inc.

CONDITIONAL USE APPLICATION
DETAIL SHEET

SPRINGFIELD TOWNSHIP — BUCKS COUNTY

DRAWN:	B.D.K.	SCALE: AS SHOWN
DESIGN:	B.D.K.	DRAWING NO. 8
CHECKED:	S.S.D.	JOB NO. 00204-DTL-1A
DATE:	03/13/2020	SHEET 8 of 8

H&K ENGINEERING & ENVIRONMENTAL Service Driven