



Walker Engineering, Ltd.

31 Vale Court

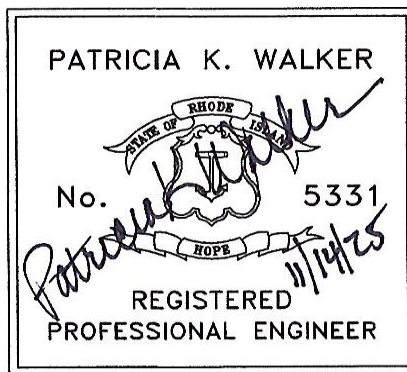
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DRAINAGE EVALUATION

Hoxie Court Place
AP 88, Lots 87 & 88.2
Hoxie Court & Notre Dame Street
Coventry, RI



Nov-25

**Hoxie Court Place
AP 88, Lots 87 & 88.2
Hoxie Court and Notre Dame Street
Coventry, RI**

INTRODUCTION

This drainage evaluation is prepared for the proposed Hoxie Court Place located on AP 88, Lots 87 and 88.2 in Coventry, RI.

Bruce B. and Victoria M. Gibb own the subject parcels, identified as Assessor's Plat 88, Lots 87 and 88.2 located on Hoxie Court in the Town of Coventry. The Gibbs reside at the existing home located on Lot 87 with associated amenities and also utilize Lot 88.2 for an existing garage and old tennis court. They presently have a paved drive access from Hoxie Court.

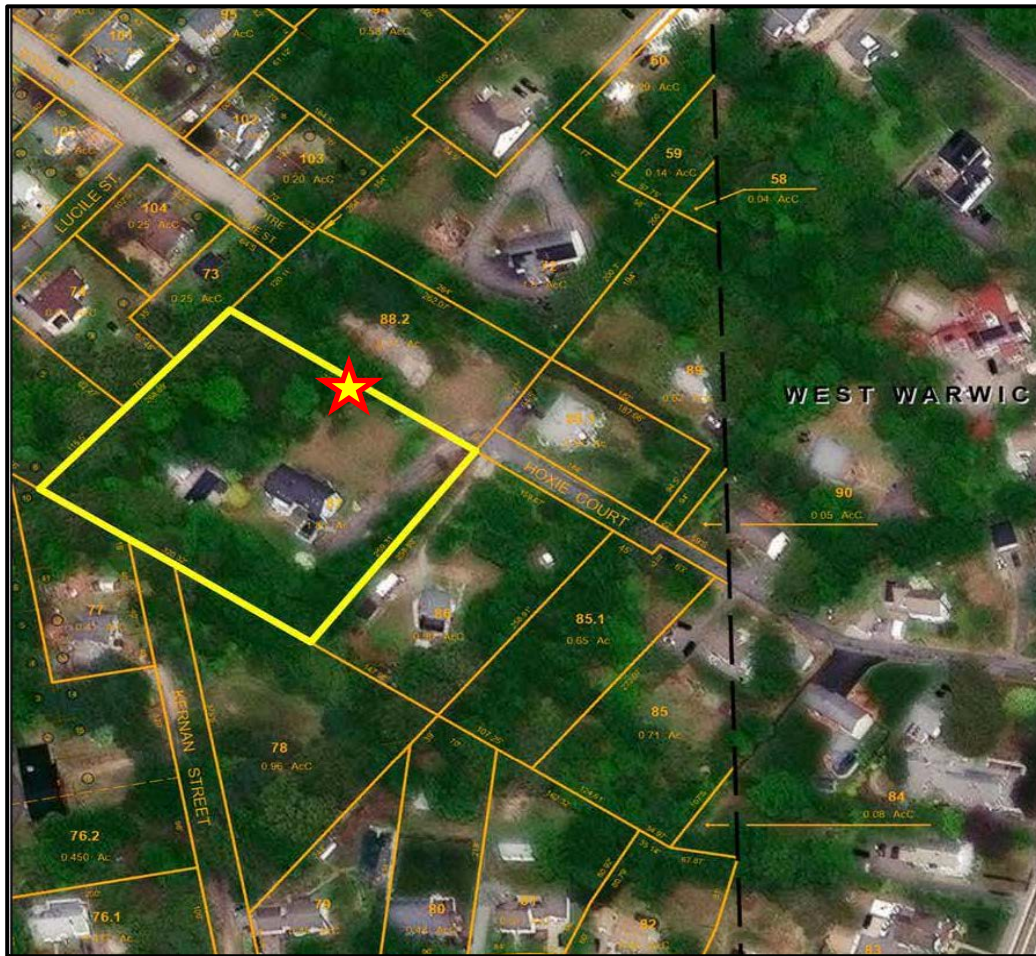
This project proposes to merge the existing 2 lots and provide a 3-lot residential subdivision meeting all applicable R-20 Zoning requirements. Each of the proposed lots will contain a single-family residence. for these items.

EXISTING CONDITIONS

The proposed project is proposed on AP 88, Lot 87 and 88.2, totaling 2.54 +/- acres of land located between Hoxie Court to the southeast and Notre Dame Street to the northwest. Both of the 2 existing lots are Zoned R-20 and abut residentially zoned lots on adjacent properties.

The site's topography generally drains to the northwest and this existing overall drainage pattern will continue and remain unchanged. The subject parcel is not located in any Natural Heritage Areas, areas managed by a Special Area Management Plan, or OWTS Critical Resource Area. In addition, there are no historic cemeteries, homes, or areas otherwise listed on the National Register of Historic Places.

Location Plan (from Town GIS Information)

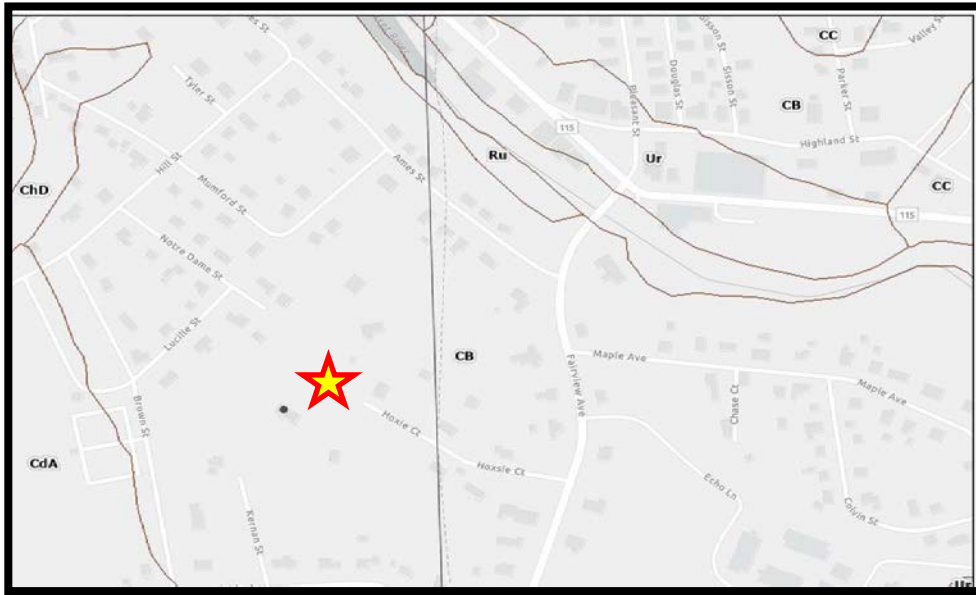


Wetlands & Floodplain

The site was examined by Avizinis Environmental Services, Inc. related to wetlands. As evidenced in their Wetland report (provided as a separate document), there are no wetland areas located within 200 feet of the project limits. In addition, the site contains no flood plains.

Soils & Soil Evaluations

As shown on the map below, the entire project area contains CB soils.



The site was examined and evaluated by Scituate Surveys, Inc. for soil conditions specifically related to seasonal high groundwater table (SHGWT). Soil evaluations were performed at four (4) locations, two test holes on each of the proposed lots as shown on the accompanying plans. As evidenced in their Soil Evaluations (provided as a separate document), the SHGWT varied in depth from 24" to 48" from existing grade and the onsite soils were found to be generally sandy loam.

DRAINAGE DESIGN

The drainage analysis that follows was prepared using the proposed improvements on the subject property as shown on the accompanying plan set. The drainage evaluation was performed in accordance with the RI Stormwater Management Rules & Guidance, 250-RICR-150-10-8 as required by RIDEM and the Town of Coventry.

General

The TR-55 methodology was used in the calculations. The analysis was performed for only the site improvements proposed for Hoxie Court Place within the Limits of Disturbance (LOD) as shown on the accompanying plan set. This provides for a conservative design and ensures that no detrimental impacts result from the proposed site improvements from the construction of Hoxie Court Place and its associated amenities.

Analysis

As noted, the existing conditions used in this evaluation are what existed on site at the time of existing conditions plan preparation by others and general field observations.

The area within the LOD as shown on the accompanying plans drains to the northwest and this existing drainage pattern will remain unchanged. The LOD area contains 0.97 +/- acres and therefore due to its size, does not require a RIPDES Permit for construction activities.

TR-55 Calculations

The TR-55 calculations are provided on the next pages. The analysis was performed for only the site improvements proposed on the project area. This provides for a conservative design and ensures that no detrimental impacts result from the proposed site improvements from the construction of the project.

Drainage Plans are found at the end of this analysis as required.

Proposed Drainage Measures

As part of the pre-application phase of the project, the Town required that the dead-end section of Notre Dame Street be extended with a cul-de-sac terminus. The cul-de-sac is required to have a 50-foot paved surface for emergency vehicles per the Fire Department. The soil evaluations performed by others revealed a 2' SHGWT from original ground, and generally 4 feet from the existing ground in the northern area of the project.

As noted above, the existing drainage pattern is the northwest corner of the project area and this pattern will continue following the project construction. Per coordination with Joseph Levesque, PE, Town Engineer, the existing impervious surfaces that will remain on proposed Lot 2 are considered grandfathered and need not be included in the evaluation.

The increase in runoff will be addressed in two ways by measures described below for the increase in impervious runoff as required. An open drainage system is proposed consisting of surface runoff from the impervious surface overland through vegetated areas terminating into the proposed infiltration basin. This surface overland flow generally follows the existing drainage pattern to the northwest portion of the project area.

A time of concentration of 15 minutes was used in the analysis for both the existing and proposed conditions. This is based on sound engineering judgement and an understanding of "real world" conditions providing for a conservative Tc in design.

HOXIE COURT PLACE	Existing Conditions		% of LOD Area	Proposed Conditions		% of LOD Area
	Area			Area		
	sf	ac		sf	ac	
SUBJECT PARCELS	126002	2.89				
LOD						
ON-SITE	40803.00	0.937	96.76%	40803.00	0.937	96.76%
OFF-SITE	1367.27	0.031	3.24%	1367.27	0.031	3.24%
TOTAL LOD	42170.27	0.968		42170.27	0.968	
NOTE: All existing improvements on proposed Lot 2 are grandfathered and are excluded from these calculations						
IMPERVIOUS						
Buildings	408.01	0.009		2804.00	0.064	
Concrete pads/walks	168.46	0.004		269	0.006	
Tennis Court	5905.94	0.136				
Pavement						
Roadway	298.49	0.007		10517.62		
Drives				2011.41		
Total Pavement	298.49	0.007		12529.03		
Total Impervious	6780.9	0.156	16.08%	15602.03	0.358	37.00%
LOD area (remaining) vegetated	35389.37	0.812	83.92%	26568.24	0.610	63.00%

TR 55 Worksheet

Project	Hoxie Court Place
Location	Notre Dame Avenue
	Coventry, RI
	Kent

Hydrologic Soil Group B
Rainfall Distribution III

WATERSHED Hoxie Court Place

Runoff Curve Number

Watershed ID	Condition	Surface Coverage	CN	Area (ac)	CN X A
Project	Existing	Impervious	98	0.16	15.26
		Vegetated	61	0.81	49.56
	Total			0.97	64.81
	Weighted CN		66.9		
within LOD	Proposed	Impervious	98	0.358	35.101
		Vegetated / Wooded	61	0.610	37.205
	Total			0.968	72.306
	Weighted CN		74.7		

Time of Concentration

Watershed ID	Condition	Tc (min)	Tc (hr)
Subject Parcel	Existing	15.0	0.3
	Proposed	15.0	0.3

Peak Discharge & Volume of Runoff

Watershed - Existing		Year Storm							
Frequency		1	2	5	10	25	50	100	
Rainfall (24 hour), P		2.7	3.3	4.1	4.8	6.2	7.3	8.7	
Initial Abstraction Ia		0.990	0.990	0.990	0.990	0.990	0.990	0.990	
Ia/P		0.366	0.300	0.241	0.206	0.160	0.136	0.114	
Unit Peak Discharge, Qu (csm/in)		600	610	625	630	635	650	655	
Drainage Area	acres	0.968	0.968	0.968	0.968	0.968	0.968	0.968	
	Am (sq mi)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	
Runoff Q (in)		0.291	0.528	0.918	1.315	2.225	3.016	4.098	
Peak Discharge, Qp (cfs)		0.264	0.487	0.868	1.253	2.137	2.965	4.060	
Volume of Runoff	ac ft	0.023	0.043	0.074	0.106	0.179	0.243	0.331	
	cf	1022.57	1853.69	3224.56	4620.59	7817.60	10597.57	14399.40	
Watershed - Proposed		Year Storm							
Frequency		1	2	5	10	25	50	100	
Rainfall (24 hour), P		2.7	3.3	4.1	4.8	6.2	7.3	8.7	
Initial Abstraction Ia		0.678	0.678	0.678	0.678	0.678	0.678	0.678	
Ia/P		0.251	0.205	0.165	0.141	0.109	0.093	0.078	
Unit Peak Discharge, Qu (csm/in)		630	635	650	655	660	665	670	
Drainage Area	acres	0.968	0.968	0.968	0.968	0.968	0.968	0.968	
	Am (sq mi)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	
Runoff Q (in)		0.761	1.148	1.725	2.266	3.425	4.384	5.641	
Peak Discharge, Qp (cfs)		0.725	1.102	1.696	2.245	3.419	4.410	5.717	
Volume of Runoff	ac ft	0.061	0.093	0.139	0.183	0.276	0.354	0.455	
	cf	2674.69	4032.49	6062.02	7963.08	12035.63	15406.30	19820.62	

Watershed Summary		Year Storm							
Existing Runoff, cf		1022.57	1853.69	3224.56	4620.59	7817.60	10597.57	14399.40	
Proposed Runoff, cf		2674.69	4032.49	6062.02	7963.08	12035.63	15406.30	19820.62	
Increase in Runoff, cf		1652.13	2178.80	2837.46	3342.49	4218.03	4808.73	5421.21	

The increase in runoff is utilized for the sizing of the infiltration basin

Infiltration Basin

From the Soil Evaluations performed, a SHGWT of 2 feet and sandy loam was found.
This soil type has an infiltration rate of 0.0014 ft/min or 2.016 ft/day

Increase in runoff 5421.21 cf for the 100-year, 24 hour storm event

Infiltration Basin Storage Capacity

(Bottom Size = 38' +/- x 56' +/- x 12" deep)

Depth	Area	Storage Provided			
		w/o infiltration		w/ infiltration	
ft	sf	cf	ac ft	cf	ac ft
0	2194	0.00	0	0.00	0.000
1	2880.00	2537.00	0.058	6960.10	0.160

Note: Infiltration credit only for bottom area

In addition, there is 2 feet of freeboard provided above the top of the basin providing additional safety measures. Given this, if the basin ever overflows for a storm event greater than the 100-year, 24 hour design event, the basin would flow overland through the vegetation and follow the same drainage pattern that exists today and no concentrated point discharge is proposed.

As shown the drainage measures proposed will handle the 100-year, 24-hour storm event with credit for infiltration

Required storage = 5421.21 cf => provided 6960 cf

The vegetated infiltration basin is 12 inches deep with an additional storage provided. If it overflows the freeboard, it would overflow to the ground surface and the excess runoff will flow overland through the vegetation and follow the same drainage pattern that exists today.

Infiltration Basin Storage Depth

Storm Event	Total Increase in Runoff	Estimated Depth of Basin	
(24 hour)		w/ Infil	
	cf	ft	in
1	1652.13	0.24	2.85
2	2178.80	0.31	3.76
5	2837.46	0.41	4.89
10	3342.49	0.48	5.76
25	4218.03	0.61	7.27
50	4808.73	0.69	8.29
100	5421.21	0.78	9.35

It should be noted that the vegetated infiltration basin has the ability to provide additional storage.

As shown above, the drainage measures proposed will handle up to the 100-year. 24-hour storm event with infiltration credit.

Water Quality Volume

$$WQ_v = \text{Water Quality Volume} \\ \text{Net increase in impervious coverage} \quad 0.203 \text{ acres}$$

$$WQ_v = (1")(I)/12$$

$$I = \text{impervious area, acres} \\ = 0.203 \text{ acres}$$

$$WQ_v = (1")(0.203)/12 \\ = 0.0169 \text{ ac ft} = 735.09 \text{ cf}$$

$$\text{Minimum } WQ_v \quad \text{value of 0.2 watershed inches} \\ \text{is required of the total site disturbance} \\ = (0.2"/12)(0.97 \text{ ac}) \\ = 0.0162 \text{ ac ft} = 704.22 \text{ cf}$$

The seeded infiltration basin and overland vegetated surface flow proposed will address the required Water Quality Volume. The vegetated buffers that are proposed along the perimeter of the roadway extension and proposed residences will provide additional measures to improve the water quality.

Recharge Volume

$$Re_v = (1")(F)(I)/12 \\ Re_v \quad \text{groundwater recharge volume (ac ft)} \\ F \quad \text{Recharge factor} \\ I \quad \text{Impervious area (acres)}$$

Recharge Factors (F)

HSG	F
B	0.35

$$Re_v = (1)(0.35)(0.358)/12 = 0.010 \text{ ac ft} \\ = 454.84 \text{ cf}$$

The vegetated areas and the seeded infiltration basin proposed will address the required Recharge Volume.

Conveyance and Natural Channel Protection

The seeded infiltration basin is designed such that if it overflows, no concentrated point discharge is proposed. In addition, runoff flows across the site in a generally northwest direction. Based on these items, no additional conveyance and natural channel protection is required.

Overbank Flood Protection

Due to the subject parcel location and size of project, no overbank flood protection measures are required as a result of the proposed site improvements for the lot.

The total storage provided exceeds that required. As shown, the sedimentation and water quality volumes are provided as part of the design.

Emptying of Infiltration Basins

Per requirements, the basin must drain within 48 hours max.

For conservative design measures, a 60 min / in rate was examined

This would provide the maximum 12" depth Infiltration Basin to drain in
(12 inches)(60 min/inch)(1 hr / 60 min)
= 720 min = 12 hours

The Calculations show that the Infiltration Basin will drain in < 48 hours

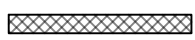
CONCLUSION

As shown, the site improvements proposed for the Hoxie Court Place subdivision have considered the existing development in and the aesthetics of the area. With the provision of the vegetated areas and the Infiltration Basin system to handle the runoff from the proposed improvements; no detrimental impacts should result to the surrounding areas. In addition, recharge and water quality requirements have been addressed for the proposed site improvements. In addition, the overall drainage pattern of the area has remained unchanged.

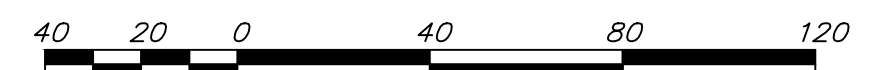
DRAIN PLANS

A.P.	ASSESSOR'S PLAT
N/F	NOW OR FORMERLY
SQ.FT.	SQUARE FEET
■ GB	GRANITE BOUND FOUND
● IR	IRON ROD FOUND
● IP	IRON PIN FOUND
○ IR	IRON ROD WITH CAP SET
⊗	UTILITY POLE
✱	LIGHT POLE
⊙	WATER GATE
Ⓢ	SEWER MANHOLE
HH	UTILITY HAND HOLE
OHW	OVERHEAD WIRES
EOP	EDGE OF PAVEMENT
SH	OUTDOOR SHOWER
●	TEST HOLE LOCATION
△ — △	RETAINING WALL
— — — —	CHAIN LINK FENCE
x ——— x	WIRE FENCE
—— W ——	APPROXIMATE EXISTING WATER MAIN



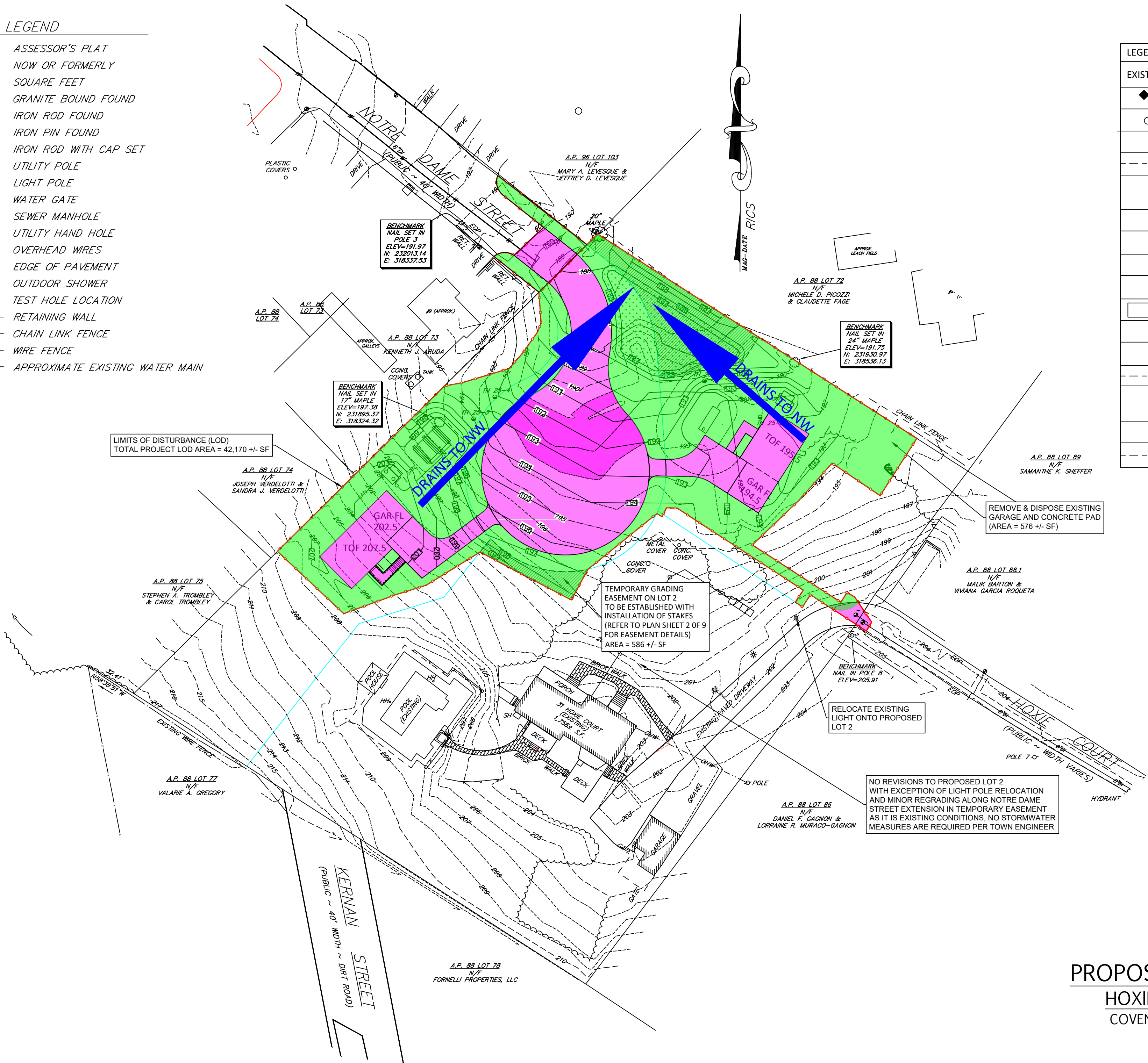
LEGEND		
EXISTING	DESCRIPTION	PROPOSED
	GRANITE BOUND	 GB
	IRON ROD	 IR
	PUBLIC HYDRANT	
--- W ---	WATER LINE	--- W ---
	CURB STOP WITH GATE VALVE	 CV
	CORPORATION STOP	 CS
	THRUST BLOCK	
	LOT NO.	(3)
	PAVEMENT	
	BUILDING	
	CONCRETE WALK	
	3'H MAX RETAINING WALL	
--- 00 ---	CONTOUR LINE	--- 00 ---
	LIMIT OF DISTURBANCE WITH E&S MEASURES	
	STAKE	 STK
--- S ---	SANITARY LINE	--- SAN ---

SCALE IN FEET:



SURVEY LEGEND

- A.P. ASSESSOR'S PLAT
N/F NOW OR FORMERLY
SQ.FT. SQUARE FEET
■ GB GRANITE BOUND FOUND
● IR IRON ROD FOUND
● IP IRON PIN FOUND
○ IR IRON ROD WITH CAP SET
○ UTILITY POLE
* LIGHT POLE
● WATER GATE
⊙ SEWER MANHOLE
HH UTILITY HAND HOLE
OHW OVERHEAD WIRES
EOP EDGE OF PAVEMENT
SH OUTDOOR SHOWER
● TEST HOLE LOCATION
— — — — — RETAINING WALL
— — — — — CHAIN LINK FENCE
— x — x — WIRE FENCE
— W — W — APPROXIMATE EXISTING WATER MAIN



LEGEND		
EXISTING	DESCRIPTION	PROPOSED
◆ GB	GRANITE BOUND	■ GB
○ IR	IRON ROD	○ IR
○	PUBLIC HYDRANT	●
— W —	WATER LINE	— W —
	CURB STOP WITH GATE VALVE	● CV
	CORPORATION STOP	● CS
	THRUST BLOCK	▲
	LOT NO.	③
	PAVEMENT	▨
▭	BUILDING	▨
	CONCRETE WALK	▨
	3'H MAX RETAINING WALL	▨
— 00 —	CONTOUR LINE	— 00 —
	LIMIT OF DISTURBANCE WITH E&S MEASURES	— — — — —
	STAKE	▲ STK
— S —	SANITARY LINE	— SAN —

PROPOSED DRAIN PLAN
HOXIE COURT PLACE
COVENTRY, RHODE ISLAND

SCALE IN FEET: 40 20 0 40 80 120