



Board of Trustees

William J. Fountain, Supervisor	Matthew J. Germane, Trustee
Larry N. Ciofu, Clerk	Summer L. McMullen, Trustee
Kathleen A. Horning, Treasurer	Denise M. O'Connell, Trustee
	Joseph M. Petrucci, Trustee

Board of Trustees Regular Meeting Agenda Hartland Township Hall Tuesday, October 17, 2023 7:00 PM

1. Call to Order
 2. Pledge of Allegiance
 3. Roll Call
 4. Approval of the Agenda
 5. Call to the Public
 6. Approval of the Consent Agenda
 - [a.](#) Approve Payment of Bills
 - [b.](#) Approve Post Audit of Disbursements Between Board Meetings
 - [c.](#) 10-03-23 Hartland Township Board Regular Meeting Minutes
 - [d.](#) Oakland County Online Payment Agreement
 7. Pending & New Business
 - [a.](#) Site Plan/PD Application #23-008, Highland Reserve Planned Development (PD) - Preliminary Site Plan
 - [b.](#) 2023 Early Voting Location
 - [c.](#) Township Hall Roof Replacement
 - [d.](#) Appointment of Michael Luce as Township Manager
 8. Board Reports
- [BRIEF RECESS]
9. Information / Discussion
 - a. Manager's Report
 - [b.](#) HDFA Fire Station Location Study
 10. Adjournment

Hartland Township Board of Trustees Meeting Agenda Memorandum

Submitted By: Susan Case, Finance Clerk

Subject: Approve Payment of Bills

Date: October 10, 2023

Recommended Action

Move to approve the bills as presented for payment.

Discussion

Bills presented total \$158,560.08. The bills are available in the Finance office for review.

Notable invoices include:

\$116,925.00 – The Huntington National Bank – (Special Assessment Refunding Bonds, Series 2019 & Sewer Refunding Bonds, Series 2021)

Financial Impact

Is a Budget Amendment Required? ☐ Yes ☒ No

All expenses are covered under the amended FY24 budget.

Attachments

Bills for 10.17.2023

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INVOICE APPROVAL BY INVOICE REPORT FOR HARTLAND TOWNSHIP
EXP CHECK RUN DATES 10/17/2023 - 10/17/2023
BOTH JOURNALIZED AND UNJOURNALIZED
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Vendor Code	Vendor name	Post Date	Invoice	Bank	Invoice Description	Gross Amount
Ref #	Address	CK Run Date	PO	Hold		Discount
Invoice Date	City/State/Zip	Disc. Date	Disc. %	Sep CK		Net Amount
		Due Date		1099		

ADOBE	ADOBE INC	10/02/2023	090723	FOA	ANNUAL MEMBERSHIP FOR DEPUTY CLERK	
49814		10/17/2023		N		254.27
09/07/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		254.27

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-215-727.000	SUPPLIES & POSTAGE	254.27

ADOBE	ADOBE INC	10/02/2023	2545158299	FOA	SEPT 2023	
49813		10/17/2023		N		19.99
09/05/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		19.99

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-265-740.000	OPERATING SUPPLIES	19.99

VENDOR TOTAL: 274.26

ALLSTAR	ALLSTAR ALARM LLC	10/01/2023	377255	FOA	11/1/23 - 1/31/24 MONITORING FIRE ST	
49801	8345 MAIN STREET	10/17/2023		N		246.00
10/01/2023	WHITMORE LAKE MI, 48189	/ /	0.0000	N		0.00
		10/17/2023		Y		246.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
206-000-801.000	CONTRACTED SERVICES	246.00

ALLSTAR	ALLSTAR ALARM LLC	10/01/2023	377302	FOA	11/1/23 - 1/31/24 MONITORING TOWNSHI	
49800	8345 MAIN STREET	10/17/2023		N		823.65
10/01/2023	WHITMORE LAKE MI, 48189	/ /	0.0000	N		0.00
		10/17/2023		Y		823.65

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-265-801.000	CONTRACTED SERVICES	823.65

VENDOR TOTAL: 1,069.65

AMAZON.COM	AMAZON CAPITAL SERVICES	09/18/2023	091823	FOA	PHONE CASE, NOTEBOOK, FLASH DRIVES,	
49759	P.O. BOX 035184	10/17/2023		N		347.50
09/18/2023	SEATTLE WA, 98124-5184	/ /	0.0000	N		0.00
		10/17/2023		N		347.50

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-441-740.000	OPERATING SUPPLIES	14.40
101-209-727.000	SUPPLIES & POSTAGE	9.79
101-441-740.000	OPERATING SUPPLIES	24.88

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Ref #	Address	CK Run Date	PO	Hold		Discount
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		Due Date		1099		

101-253-727.000	SUPPLIES & POSTAGE				57.40	
536-000-740.000	OPERATING SUPPLIES				24.97	
536-000-719.100	UNIFORMS/CLOTHING ALLOWANCE				177.95	
101-215-727.000	SUPPLIES & POSTAGE				21.15	
101-209-727.000	SUPPLIES & POSTAGE				16.96	
					<u>347.50</u>	

VENDOR TOTAL: 347.50

AUTOZONE	AUTOZONE , INC	09/18/2023	091823	FOA	OIL, FILTER, VEHICLE RAMP	
49758	PO BOX 116067	10/17/2023		N		135.04
09/18/2023	ATLANTA GA, 30368-6067	/ /	0.0000	N		0.00
		10/17/2023		N		135.04

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-930.002	REPAIRS & MAINT VEHICLE/EQUIP	40.58
536-000-930.002	REPAIRS & MAINT VEHICLE/EQUIP	34.47
536-000-740.000	OPERATING SUPPLIES	59.99
		<u>135.04</u>

VENDOR TOTAL: 135.04

BESTBUY	BEST BUY	08/28/2023	082823	FOA	WATER PLANT SYSTEM REPAIR	
49664	8487 W GRAND RIVER AVE	10/17/2023		N		119.98
08/28/2023	BRIGHTON MI, 48116	/ /	0.0000	N		0.00
		10/17/2023		N		119.98

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-930.001	REPAIRS & MAINTENANCE SYSTEM	119.98

VENDOR TOTAL: 119.98

BOYNE MTN	BOYNE MOUNTAIN RESORT	10/02/2023	092523	FOA	TOWNSHIP CLERKS RETREAT	
49815		10/17/2023		N		333.50
09/25/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		333.50

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-215-957.000	EDUCATION/TRAINING/CONVENTION	333.50

VENDOR TOTAL: 333.50

CINTAS	CINTAS CORPORATION	10/02/2023	4169513617	FOA	MATS	
49802	P.O. BOX 630910	10/17/2023		N		61.88
10/02/2023	CINCINNATI OH, 45263	/ /	0.0000	N		0.00
		10/17/2023		N		61.88

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Invoice Date	City/State/Zip	Disc. Date	Disc. %	Sep CK		Net Amount
		Due Date		1099		

Open

GL NUMBER	DESCRIPTION	AMOUNT				
101-265-801.000	CONTRACTED SERVICES	61.88				
CINTAS	CINTAS CORPORATION	10/01/2023	9241676600	FOA	EYEWASH SERVICE AGREEMENT	
49818	P.O. BOX 630910	10/17/2023		N		100.00
10/01/2023	CINCINNATI OH, 45263	/ /	0.0000	N		0.00
		10/17/2023		N		100.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-740.000	OPERATING SUPPLIES	100.00
VENDOR TOTAL:		161.88

COMCAST	COMCAST	09/18/2023	SEPT 2023	FOA	SEPT 2023 - CABLE/INTERNET/PHONE AT	
49756	P.O. BOX 70219	10/17/2023		N		1,445.57
09/18/2023	PHILADELPHIA PA, 19176-0219	/ /	0.0000	N		0.00
		10/17/2023		N		1,445.57

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-851.000	TELEPHONE	81.67
536-000-805.000	INTERNET	136.35
577-000-806.000	CABLE TV FEES	140.46
577-000-805.000	INTERNET	224.90
536-000-805.000	INTERNET	188.45
577-000-805.000	INTERNET	673.74
		1,445.57
VENDOR TOTAL:		1,445.57

CONSUMER	CONSUMERS ENERGY	10/05/2023	201542080632	FOA	SEPT 2023 - LED LIGHT	
49826	PO BOX 740309	10/17/2023		N		11.08
09/30/2023	CINCINNATI OH, 45274-0309	/ /	0.0000	N		0.00
		10/17/2023		N		11.08

Open

GL NUMBER	DESCRIPTION	AMOUNT				
101-448-921.000	STREET LIGHTS	11.08				
CONSUMER	CONSUMERS ENERGY	10/01/2023	209277003348	FOA	OCT 2023 - PARSHALLVILLE SIREN	
49827	PO BOX 740309	10/17/2023		N		44.34
10/01/2023	CINCINNATI OH, 45274-0309	/ /	0.0000	N		0.00
		10/17/2023		N		44.34

Open

GL NUMBER	DESCRIPTION	AMOUNT
206-000-920.002	UTILITIES - ELECTRIC	44.34

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		Due Date		1099		

VENDOR TOTAL: 55.42

DOUGIES	DOUGIE'S DISPOSAL & RECYCLING	09/26/2023	144650	FOA	DELIVERY FEE FOR 8 YD DUMP	
49789	PO BOX 241	10/17/2023		N		50.00
09/26/2023	HARTLAND MI, 48353	/ /	0.0000	N		0.00
		10/17/2023		Y		50.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-751-955.000	PARKS - SPECIAL EVENTS	50.00

DOUGIES	DOUGIE'S DISPOSAL & RECYCLING	10/01/2023	145093	FOA	OCT 2023 PARKS TRASH PICKUP	
49798	PO BOX 241	10/17/2023		N		300.00
10/01/2023	HARTLAND MI, 48353	/ /	0.0000	N		0.00
		10/17/2023		Y		300.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-751-801.000	CONTRACTED SERVICES	300.00

DOUGIES	DOUGIE'S DISPOSAL & RECYCLING	10/05/2023	145539	FOA	WEEKLY GARBAGE REMOVAL AT TWP	
49825	PO BOX 241	10/17/2023		N		188.00
10/05/2023	HARTLAND MI, 48353	/ /	0.0000	N		0.00
		10/17/2023		Y		188.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-265-801.000	CONTRACTED SERVICES	188.00

VENDOR TOTAL: 538.00

DROPBOX	DROPBOX	10/03/2023	092123	FOA	ANNUAL SUBSCRIPTION	
49819		10/17/2023		N		119.88
09/21/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		119.88

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-577-801.000	CONTRACTED SERVICES	119.88

VENDOR TOTAL: 119.88

0070	DTE ENERGY	10/09/2023	1018187601-09/20	FOA	SEPT 2023 - SETTLERS PARK PAVILION	
49833	P.O BOX 740786	10/17/2023		N		54.79
	CINCINNATI					
09/01/2023	OH, 45274-0786	/ /	0.0000	N		0.00
		10/17/2023		N		54.79

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GL NUMBER	DESCRIPTION	AMOUNT
101-751-920.002	UTILITIES - ELECTRIC	54.79
0070	DTE ENERGY	10/09/2023 200174588839 FOA SEPT 2023 - MILLPOINTE, FIDDLERS GRO
49834	P.O BOX 740786	10/17/2023 N 1,599.53
	CINCINNATI	
09/30/2023	OH, 45274-0786	/ / 0.0000 N 0.00
		10/17/2023 N 1,599.53

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-000-282.001	MILLPOINTE STREETLIGHTS DEPOSIT	294.44
101-000-282.002	FIDDLAR GROVE STREETLIGHT DEPOSIT	22.98
101-000-282.003	WALNUT RIDGE STREETLIGHTS DEPOSIT	25.16
101-448-921.000	STREET LIGHTS	1,256.95
		1,599.53

VENDOR TOTAL: 1,654.32

ECOSHIELD	ECOSHIELD PEST SOLUTIONS DET WEST	09/18/2023 083123 FOA AUG 2023 PEST CONTROL AT WTP, TWP HA
49757	P.O. BOX 92180	10/17/2023 N 297.00
08/31/2023	LAS VEGAS NV, 89193-2180	/ / 0.0000 N 0.00
		10/17/2023 Y 297.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-801.000	CONTRACTED SERVICES	99.00
101-265-801.000	CONTRACTED SERVICES	89.00
101-265-801.000	CONTRACTED SERVICES	109.00
		297.00

VENDOR TOTAL: 297.00

ELECTROCYC	ELECTROCYCLE, INC.	10/03/2023 44395 FOA SHREDDING
49823	23953 RESEARCH DR	10/17/2023 N 42.00
10/03/2023	FARMINGTON HILLS MI, 48335	/ / 0.0000 N 0.00
		10/17/2023 N 42.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-172-801.000	CONTRACTED SERVICES	42.00

VENDOR TOTAL: 42.00

FIVESTAR	FIVE STAR SIGNS, INC.	10/10/2023 18732 FOA SIGN FOR WATER PLANT
49838	10099 BERGIN RD, BLDG D	10/17/2023 N 725.00
09/28/2023	HOWELL MI, 48843	/ / 0.0000 N 0.00
		10/17/2023 N 725.00

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GL NUMBER	DESCRIPTION	AMOUNT
536-000-740.000	OPERATING SUPPLIES	725.00

FIVESTAR	FIVE STAR SIGNS, INC.	10/04/2023	18734	FOA	EMPLOYEE ONLY SIGNS	
49824	10099 BERGIN RD, BLDG D	10/17/2023		N		60.00
09/29/2023	HOWELL MI, 48843	/ /	0.0000	N		0.00
		10/17/2023		N		60.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-265-930.000	REPAIRS & MAINTENANCE	60.00

VENDOR TOTAL: 785.00

GODADDY	GO DADDY	10/03/2023	091123	FOA	SEPT 2023	
49820		10/17/2023		N		26.99
09/11/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		26.99

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-900.000	PRINTING & PUBLICATIONS	26.99

VENDOR TOTAL: 26.99

0150	HARTLAND CONSOLIDATED SCHOOLS	10/02/2023	174093	FOA	SEPTEMBER 2023 FUEL	
49803	9525 E HIGHLAND ROAD	10/17/2023		N		665.77
10/02/2023	HOWELL MI, 48843	/ /	0.0000	N		0.00
		10/17/2023		N		665.77

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-239-860.000	GASOLINE	151.26
536-000-860.000	GASOLINE	514.51
		665.77

VENDOR TOTAL: 665.77

HARTTREASU	HARTLAND TOWNSHIP TREASURER	10/03/2023	3RDQTR2023UB	FOA	3RD QTR 2023 UB	
49817	2655 CLARK RD	10/17/2023		N		3,580.55
10/03/2023	HARTLAND MI, 48353	/ /	0.0000	Y		0.00
		10/17/2023		N		3,580.55

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-265-920.005	UTILITIES - WATER	801.23
101-265-920.005	UTILITIES - WATER	569.97
101-265-920.004	UTILITIES - SEWER	166.51
101-265-920.005	UTILITIES - WATER	166.01

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101-751-920.004	UTILITIES - SEWER				145.36	
536-000-920.004	UTILITIES - SEWER				1,182.21	
101-463-920.005	UTILITIES - WATER				549.26	
					<u>3,580.55</u>	

VENDOR TOTAL: 3,580.55

WATERO&M	HARTLAND TOWNSHIP WATER O & M	10/05/2023	100523	FOA	SEPT 2023 WATER OUT OF DEPT COSTS	
49828	2655 CLARK RD	10/17/2023		N		6,357.14
10/05/2023	HARTLAND MI, 48353	/ /	0.0000	N		0.00
		10/17/2023		N		6,357.14

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-751-801.009	CONTRACT SERVICES - WATER SYSTEM	3,825.95
101-265-801.009	CONTRACT SERVICES - WATER SYSTEM	1,983.52
101-567-801.009	CONTRACT SERVICES - WATER SYSTEM	547.67
		<u>6,357.14</u>

VENDOR TOTAL: 6,357.14

1548	HORIZON LANDSCAPE INC.	10/10/2023	16776	FOA	LAWN MOWING MEDIANS	
49839	11765 HIBNER RD	10/17/2023		N		3,986.17
09/25/2023	HARTLAND MI, 48353	/ /	0.0000	N		0.00
		10/17/2023		N		3,986.17

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-463-802.000	LAWN/SNOW MAINTENANCE	3,986.17

1548	HORIZON LANDSCAPE INC.	10/05/2023	16777	FOA	LAWN MOWING STATION #61	
49840	11765 HIBNER RD	10/17/2023		N		1,396.83
10/05/2023	HARTLAND MI, 48353	/ /	0.0000	N		0.00
		10/17/2023		N		1,396.83

Open

GL NUMBER	DESCRIPTION	AMOUNT
206-000-802.000	LAWN/SNOW MAINTENANCE	1,396.83

VENDOR TOTAL: 5,383.00

4589	HORNING, KATHLEEN A	09/27/2023	092723	FOA	MILEAGE REIMBURSEMENT/MEAL PER DIEMS	
49794	1665 HARTLAND WOODS DR	10/17/2023		N		152.52
09/27/2023	HOWELL MI, 48843-9044	/ /	0.0000	N		0.00
		10/17/2023		N		152.52

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-253-957.000	EDUCATION/TRAINING/CONVENTION	152.52

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VENDOR TOTAL: 152.52

JOHNSSANIT	JOHN'S SANITATION	10/03/2023	197	FOA	CLEANING OF PORTAJOHNS	
49821	59075 OASIS CENTER DR	10/17/2023		N		185.00
09/06/2023	SOUTH LYON MI, 48178	/ /	0.0000	N		0.00
		10/17/2023		N		185.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-751-955.000	PARKS - SPECIAL EVENTS	185.00

VENDOR TOTAL: 185.00

LINDAHL	LINDAHL, CLIFFORD G	10/05/2023	100523	FOA	REIMBURSEMENT OF PERMIT APPLICATION	
49829	2832 CLARK RD	10/17/2023		N		175.00
10/05/2023	HARTLAND MI, 48353	/ /	0.0000	N		0.00
		10/17/2023		N		175.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-209-826.000	LEGAL FEES	175.00

VENDOR TOTAL: 175.00

LDPA	LIVINGSTON DAILY PRESS & ARGUS	10/02/2023	091123	FOA	SEPT 2023	
49811		10/17/2023		N		11.99
	3964 SOLUTIONS CENTER					
09/11/2023	CHICAGO IL, 60677-3009	/ /	0.0000	Y		0.00
		10/17/2023		N		11.99

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-577-801.000	CONTRACTED SERVICES	11.99

VENDOR TOTAL: 11.99

MTCOPELAND	M.T. COPELAND TECHNOLOGIES, INC	09/14/2023	48549	FOA		
49788		10/17/2023		N		67.50
09/14/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		67.50

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-209-957.000	EDUCATION/TRAINING/CONVENTION	67.50

VENDOR TOTAL: 67.50

MASTERS	MASTERS TELECOM LLC	08/28/2023	22853	FOA	AUGUST 2023	
49662		10/17/2023		N		19.43

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INVOICE APPROVAL BY INVOICE REPORT FOR HARTLAND TOWNSHIP
EXP CHECK RUN DATES 10/17/2023 - 10/17/2023
BOTH JOURNALIZED AND UNJOURNALIZED
OPEN - CHECK TYPE: PAPER CHECK

Page: 9/14

Vendor Code	Vendor name	Post Date	Invoice	Bank	Invoice Description	Gross Amount
Ref #	Address	CK Run Date	PO	Hold		Discount
Invoice Date	City/State/Zip	Disc. Date	Disc. %	Sep CK		Net Amount
		Due Date		1099		

08/28/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		19.43

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-265-851.000	TELEPHONE	19.43

MASTERS	MASTERS TELECOM LLC	10/02/2023	24169	FOA	SEPT 2023	
49810		10/17/2023		N		19.43
09/25/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		19.43

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-265-851.000	TELEPHONE	19.43

VENDOR TOTAL: 38.86

MTC	MATERIALS TESTING CONSULTANTS, INC.	10/02/2023	68723	FOA	DENSITY TESTING	
49807	693 PLYMOUTH NE	10/17/2023		N		4,049.50
07/14/2023	GRAND RAPIDS MI, 49505	/ /	0.0000	N		0.00
		10/17/2023		N		4,049.50

Open

GL NUMBER	DESCRIPTION	AMOUNT
206-000-930.003	REPAIRS & MAINTENANCE BLD&GRDS	4,049.50

VENDOR TOTAL: 4,049.50

MAMC	MICHIGAN ASS'N OF MUNICIPAL CLERKS	09/05/2023	090523	FOA	2023 MAMC MASTERS ACADEMY	
49783	ATTN: MEMBERSHIP	10/17/2023		N		525.00
	120 N WASHINGTON SQ, SUITE 110A					
09/05/2023	LANSING MI, 48933-1609	/ /	0.0000	N		0.00
		10/17/2023		N		525.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-215-957.000	EDUCATION/TRAINING/CONVENTION	525.00

VENDOR TOTAL: 525.00

MMTA	MICHIGAN MUNICIPAL TREASURERS ASSOC	10/10/2023	8715	FOA	2024 MEMBERSHIP RENEWAL	
49837		10/17/2023		N		198.00
	PO BOX 324					
10/01/2023	TAWAS CITY MI, 48764	/ /	0.0000	N		0.00
		10/17/2023		N		198.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-253-804.000	MEMBERSHIP & DUES	198.00

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INVOICE APPROVAL BY INVOICE REPORT FOR HARTLAND TOWNSHIP
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Vendor Code	Vendor name	Post Date	Invoice	Bank	Invoice Description	Gross Amount
Ref #	Address	CK Run Date	PO	Hold		Discount
Invoice Date	City/State/Zip	Disc. Date	Disc. %	Sep CK		Net Amount
		Due Date		1099		

VENDOR TOTAL: 198.00

MTA	MICHIGAN TOWNSHIPS ASSOCIATION	09/06/2023	090623	FOA	2023 CLERKS RETREAT & CLASS FOR M. G	
49784	P.O. BOX 80078	10/17/2023		N		590.00
09/06/2023	LANSING MI, 48908-0078	/ /	0.0000	N		0.00
		10/17/2023		N		590.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-215-957.000	EDUCATION/TRAINING/CONVENTION	415.00
101-101-957.000	EDUCATION/TRAINING/CONVENTION	175.00
		590.00

VENDOR TOTAL: 590.00

LCDPA	MICHIGAN.COM	10/09/2023	NOV 2023	FOA	NOVEMBER 2023	
49832	PO BOX 742520	10/17/2023		N		63.00
11/01/2023	CINCINNATI OH, 45274-2520	/ /	0.0000	N		0.00
		10/17/2023		N		63.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-101-804.000	MEMBERSHIP & DUES	63.00

VENDOR TOTAL: 63.00

NORTHWEST	NORTHWEST PIPE AND SUPPLY INC	10/02/2023	093023	FOA	HYDRANT METER PARTS	
49806	6430 GRAND RIVER	10/17/2023		N		144.77
09/06/2023	BRIGHTON MI, 48114	/ /	0.0000	N		0.00
		10/17/2023		N		144.77

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-740.000	OPERATING SUPPLIES	144.77

VENDOR TOTAL: 144.77

1180	PETER'S TRUE VALUE HARDWARE	09/28/2023	K69449	FOA	CUT WHEEL	
49796	3455 W. HIGHLAND ROAD	10/17/2023		N		15.16
09/28/2023	MILFORD MI, 48380	/ /	0.0000	N		0.00
		10/17/2023		N		15.16

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-740.000	OPERATING SUPPLIES	15.16

1180	PETER'S TRUE VALUE HARDWARE	09/28/2023	K69450	FOA	PAINT MARKERS	
49797	3455 W. HIGHLAND ROAD	10/17/2023		N		19.76

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User: SUSANC
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INVOICE APPROVAL BY INVOICE REPORT FOR HARTLAND TOWNSHIP
EXP CHECK RUN DATES 10/17/2023 - 10/17/2023
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Vendor Code	Vendor name	Post Date	Invoice	Bank	Invoice Description	Gross Amount
Ref #	Address	CK Run Date	PO	Hold		Discount
Invoice Date	City/State/Zip	Disc. Date	Disc. %	Sep CK		Net Amount
		Due Date		1099		

09/28/2023	MILFORD MI, 48380	/ /	0.0000	N		0.00
		10/17/2023		N		19.76

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-740.000	OPERATING SUPPLIES	19.76

1180	PETER'S TRUE VALUE HARDWARE	10/09/2023	K69579	FOA	LUMBER FOR WTP ROAD SIGN & COMMAND S	
49836	3455 W. HIGHLAND ROAD	10/17/2023		N		55.96
10/09/2023	MILFORD MI, 48380	/ /	0.0000	N		0.00
		10/17/2023		N		55.96

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-740.000	OPERATING SUPPLIES	29.98
101-265-740.000	OPERATING SUPPLIES	25.98
		<hr/> 55.96

VENDOR TOTAL: 90.88

RURALKING	RURAL KING	09/14/2023	091423	FOA	PAINT SUPPLIES, TRAIL CAM FOR PARKS	
49785	4216 DEWITT AVE	10/17/2023		N		225.94
09/14/2023	MATTOON IL, 61938	/ /	0.0000	N		0.00
		10/17/2023		N		225.94

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-265-930.000	REPAIRS & MAINTENANCE	11.98
101-751-740.000	OPERATING SUPPLIES	201.98
101-751-930.000	REPAIRS & MAINTENANCE	11.98
		<hr/> 225.94

VENDOR TOTAL: 225.94

SCHERER	SCHERER PERFORMANCE AUTO REPAIR	08/24/2023	28683	FOA	OIL CHANGE/BRAKES ON GMC SIERRA	
49667	7050 WEST GRAND RIVER	10/17/2023		N		2,790.00
08/24/2023	FOWLERVILLE MI, 48836	/ /	0.0000	N		0.00
		10/17/2023		N		2,790.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-930.002	REPAIRS & MAINT VEHICLE/EQUIP	2,790.00

VENDOR TOTAL: 2,790.00

SHUTTERSTO	SHUTTERSTOCK.COM	10/02/2023	091923	FOA	SEPT 2023	
49812		10/17/2023		N		29.00
09/19/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		29.00

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Vendor Code	Vendor name	Post Date	Invoice	Bank	Invoice Description	Gross Amount
Ref #	Address	CK Run Date	PO	Hold		Discount
Invoice Date	City/State/Zip	Disc. Date	Disc. %	Sep CK		Net Amount
		Due Date		1099		

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-577-801.000	CONTRACTED SERVICES	29.00

VENDOR TOTAL: 29.00

SPYPOINT	SPYPOINT	09/18/2023	1F4D2B78-0001	FOA	ANNUAL DATA PLAN FOR TRAIL CAM AT SE	
49786		10/17/2023		N		120.00
09/18/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		120.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-751-740.000	OPERATING SUPPLIES	120.00

VENDOR TOTAL: 120.00

STAPLES	STAPLES	09/30/2023	8071797298	FOA	MISC SUPPLIES	
49799	PO BOX 660409	10/17/2023		N		304.79
09/30/2023	DALLAS TX, 75266-0409	/ /	0.0000	N		0.00
		10/17/2023		N		304.79

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-751-740.000	OPERATING SUPPLIES	54.52
101-265-740.000	OPERATING SUPPLIES	67.21
101-172-727.000	SUPPLIES & POSTAGE	183.06
		304.79

STAPLES	STAPLES	10/07/2023	8071884831	FOA	MISC SUPPLIES	
49831	PO BOX 660409	10/17/2023		N		486.52
10/07/2023	DALLAS TX, 75266-0409	/ /	0.0000	N		0.00
		10/17/2023		N		486.52

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-172-727.000	SUPPLIES & POSTAGE	232.65
101-265-740.000	OPERATING SUPPLIES	41.66
101-253-727.000	SUPPLIES & POSTAGE	17.93
101-751-740.000	OPERATING SUPPLIES	194.28
		486.52

VENDOR TOTAL: 791.31

HUNTINGBAN	THE HUNTINGTON NATIONAL BANK	09/18/2023	3584226605	FOA	SPEC ASSMT REFUNDING BONDS SERIES 20	
49792	PO BOX 1558-GW4E64	10/17/2023		N		27,125.00
09/18/2023	COLUMBUS OH, 43216	/ /	0.0000	N		0.00
		10/17/2023		N		27,125.00

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Vendor Code	Vendor name	Post Date	Invoice	Bank	Invoice Description	Gross Amount
Ref #	Address	CK Run Date	PO	Hold		Discount
Invoice Date	City/State/Zip	Disc. Date	Disc. %	Sep CK		Net Amount

Open

GL NUMBER	DESCRIPTION	AMOUNT
354-000-997.010	2019 REFUNDING BOND INTEREST	27,125.00

HUNTINGBAN	THE HUNTINGTON NATIONAL BANK	09/18/2023	3584284702	FOA	SEWER REFUNDING BONDS SERIES 2021	
49791	PO BOX 1558-GW4E64	10/17/2023		N		89,800.00
09/18/2023	COLUMBUS OH, 43216	/ /	0.0000	N		0.00
		10/17/2023		N		89,800.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
595-000-997.011	2021 SEWER REFUNDING INTEREST	89,800.00

VENDOR TOTAL:					116,925.00
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TOSHIBA	TOSHIBA AMERICA BUSINESS SOLUTIONS	09/22/2023	6117775	FOA	8/25 - 9/24/23 - ESTUDIO2830C	
49795	PO BOX 927	10/17/2023		N		2.95
09/22/2023	BUFFALO NY, 14240-0927	/ /	0.0000	N		0.00
		10/17/2023		N		2.95

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-172-930.000	REPAIRS & MAINTENANCE	2.95

VENDOR TOTAL:					2.95
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TRAFFIC	TRAFFIC SAFETY STORE	09/11/2023	SO927054	FOA	REPLACEMENT PARKING BLOCKS IN VILLAG	
49787		10/17/2023		N		2,105.42
09/11/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		2,105.42

Open

GL NUMBER	DESCRIPTION	AMOUNT
204-000-969.300	OTHER ROAD IMPROVEMENTS	2,105.42

VENDOR TOTAL:					2,105.42
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UNIVAR	UNIVAR SOLUTIONS	10/09/2023	092023	FOA	CREDIT	
49835		10/17/2023		N		(1,354.01)
09/20/2023	,	/ /	0.0000	N		0.00
		10/17/2023		N		(1,354.01)

Open

GL NUMBER	DESCRIPTION	AMOUNT
536-000-740.001	WATER TREAT. CHEMICALS	(1,354.01)

VENDOR TOTAL:					(1,354.01)
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WSP	WSP USA ENVIRONMENT	10/02/2023	H19221363	FOA	WWTP REPORTING THRU 9/15/23	
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INVOICE APPROVAL BY INVOICE REPORT FOR HARTLAND TOWNSHIP
EXP CHECK RUN DATES 10/17/2023 - 10/17/2023
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Vendor Code	Vendor name	Post Date	Invoice	Bank	Invoice Description	Gross Amount
Ref #	Address	CK Run Date	PO	Hold		Discount
Invoice Date	City/State/Zip	Disc. Date	Disc. %	Sep CK		Net Amount
		Due Date		1099		
49822	P.O. BOX 74008618	10/17/2023		N		4,440.00
10/02/2023	CHICAGO IL, 60674-8618	/ /	0.0000	N		0.00
		10/17/2023		N		4,440.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-441-801.007	TREATMENT PLANT SAMPLING	4,440.00

VENDOR TOTAL: 4,440.00

ZIMMERMAN	ZIMMERMAN MASONRY, INC.	10/02/2023	092923	FOA	SETTLERS PARK SIGN REPAIR	
49809	5895 BRIGHTON PINES CT.	10/17/2023		N		2,800.00
10/02/2023	HOWELL MI, 48843	/ /	0.0000	N		0.00
		10/17/2023		N		2,800.00

Open

GL NUMBER	DESCRIPTION	AMOUNT
101-751-930.000	REPAIRS & MAINTENANCE	2,800.00

VENDOR TOTAL: 2,800.00

TOTAL - ALL VENDORS: 158,560.08

FUND TOTALS:

Fund 101 - GENERAL FUND	27,596.11
Fund 204 - MUNICIPAL STREET FUND	2,105.42
Fund 206 - FIRE OPERATING	5,736.67
Fund 354 - 2009 M-59 ROAD IMPROVEMENTS BOND	27,125.00
Fund 536 - WATER SYSTEM FUND	5,157.78
Fund 577 - CABLE TV FUND	1,039.10
Fund 595 - 2005 SEWER EXP BONDS	89,800.00

Hartland Township Board of Trustees Meeting Agenda Memorandum

Submitted By: Susan Case, Finance Clerk

Subject: Approve Post Audit of Disbursements Between Board Meetings

Date: October 10, 2023

Recommended Action

Move to approve the presented disbursements under the post-audit resolution.

Discussion

The following disbursements have been made since the last board meeting:

Accounts Payable - \$3,022.33

October 12, 2023 Payroll - \$65,454.44

Financial Impact

Is a Budget Amendment Required? ☐ Yes ☒ No

All expenses are covered under the amended FY24 budget.

Attachments

Post Audit Bills List 09.28.2023

Post Audit Bills List 10.05.2023

Payroll for 10.12.2023

09/27/2023 02:47 PM
User: SUSANC
DB: Hartland

CHECK DISBURSEMENT REPORT FOR HARTLAND TOWNSHIP
CHECK DATE FROM 09/28/2023 - 09/28/2023

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Check Date	Bank	Check #	Payee	Description	GL #	Amount
09/28/2023	FOA	44072	STATE OF MICHIGAN	LEGAL FEES	101-209-826.000	100.00
09/28/2023	FOA	44073	VERIZON WIRELESS	DUE TO EMPLOYEES	101-000-232.000	57.40
		44073		REPAIRS & MAINTENANCE	101-209-930.000	80.02
		44073		TELEPHONE	101-265-851.000	767.02
		44073		TELEPHONE	536-000-851.000	247.97
		44073		TELEPHONE	577-000-851.000	40.01
						<hr/> 1,192.42
			TOTAL - ALL FUNDS	TOTAL OF 2 CHECKS		1,292.42

--- GL TOTALS ---

101-000-232.000	DUE TO EMPLOYEES	57.40
101-209-826.000	LEGAL FEES	100.00
101-209-930.000	REPAIRS & MAINTENANCE	80.02
101-265-851.000	TELEPHONE	767.02
536-000-851.000	TELEPHONE	247.97
577-000-851.000	TELEPHONE	40.01
	TOTAL	1,292.42

Check Date	Bank	Check #	Payee	Description	GL #	Amount
10/05/2023	FOA	44101	HARTLAND TOWNSHIP GENERAL FUND	DOG LICENSES ESCROW	701-000-290.250	25.50
10/05/2023	FOA	44102	LIVINGSTON COUNTY TREASURER	DOG LICENSES ESCROW	701-000-290.250	359.50
10/05/2023	FOA	44103	PITNEY BOWES BANK INC RESERVE	SUPPLIES & POSTAGE	101-172-727.000	52.92
		44103		SUPPLIES & POSTAGE	101-191-727.000	127.71
		44103		SUPPLIES & POSTAGE	101-209-727.000	29.22
		44103		SUPPLIES & POSTAGE	101-215-727.000	58.53
		44103		TAX COLLECTION	101-253-811.100	60.21
		44103		SUPPLIES & POSTAGE	101-400-727.000	23.55
		44103		SUPPLIES & POSTAGE	101-441-727.000	110.89
		44103		SUPPLIES & POSTAGE	101-722-727.000	1.26
		44103		SUPPLIES/POSTAGE	536-000-727.000	0.95
		44103		SUPPLIES & POSTAGE	590-000-727.000	0.94
						<hr/> 466.18
10/05/2023	FOA	44104	POSTMASTER	SUPPLIES/POSTAGE	536-000-727.000	439.37
		44104		SUPPLIES & POSTAGE	590-000-727.000	439.36
						<hr/> 878.73
TOTAL - ALL FUNDS				TOTAL OF 4 CHECKS		1,729.91

--- GL TOTALS ---

101-172-727.000	SUPPLIES & POSTAGE	52.92
101-191-727.000	SUPPLIES & POSTAGE	127.71
101-209-727.000	SUPPLIES & POSTAGE	29.22
101-215-727.000	SUPPLIES & POSTAGE	58.53
101-253-811.100	TAX COLLECTION	60.21
101-400-727.000	SUPPLIES & POSTAGE	23.55
101-441-727.000	SUPPLIES & POSTAGE	110.89
101-722-727.000	SUPPLIES & POSTAGE	1.26
536-000-727.000	SUPPLIES/POSTAGE	440.32
590-000-727.000	SUPPLIES & POSTAGE	440.30
701-000-290.250	DOG LICENSES ESCROW	385.00
	TOTAL	1,729.91

Check Register Report For Hartland Township
For Check Dates 10/01/2023 to 10/12/2023

Check Date	Bank	Check Number	Name	Check Gross	Physical Check Amount	Direct Deposit	Status
10/12/2023	FOA	17453	MISSION SQUARE	1,077.01	1,077.01	0.00	Open
10/12/2023	FOA	17454	MISSION SQUARE	2,732.89	2,732.89	0.00	Open
10/12/2023	FOA	17455	MISSION SQUARE	2,582.43	2,582.43	0.00	Open
10/12/2023	FOA	DD8798	BEDUHN, TIMOTHY L.A.	2,070.50	0.00	1,588.40	Cleared
10/12/2023	FOA	DD8799	BERNARDI, MELYNDA A	1,856.62	0.00	1,448.43	Cleared
10/12/2023	FOA	DD8800	BROOKS, TYLER J	2,587.00	0.00	1,831.27	Cleared
10/12/2023	FOA	DD8801	CARRIGAN, AMANDA K	3,125.00	0.00	2,483.26	Cleared
10/12/2023	FOA	DD8802	CASE, SUSAN E	1,873.47	0.00	1,150.72	Cleared
10/12/2023	FOA	DD8803	CIOFU, LARRY N	2,856.09	0.00	2,060.43	Cleared
10/12/2023	FOA	DD8804	COSGROVE, HEATHER H	1,373.75	0.00	1,153.89	Cleared
10/12/2023	FOA	DD8805	DRYDEN-HOGAN, SUSAN A	3,777.57	0.00	2,684.54	Cleared
10/12/2023	FOA	DD8806	HAASETH, GWYN M	855.00	0.00	762.81	Cleared
10/12/2023	FOA	DD8807	HORNING, KATHLEEN A	2,856.09	0.00	1,993.76	Cleared
10/12/2023	FOA	DD8808	HUBBARD, TONYA S	1,605.92	0.00	1,020.77	Cleared
10/12/2023	FOA	DD8809	JOHNSON, LISA	2,136.80	0.00	1,344.88	Cleared
10/12/2023	FOA	DD8810	KENDALL, ANTHONY S	104.31	0.00	96.32	Cleared
10/12/2023	FOA	DD8811	LANGER, TROY D	3,767.92	0.00	2,649.34	Cleared
10/12/2023	FOA	DD8812	LOFTUS, DANIEL M	764.47	0.00	654.75	Cleared
10/12/2023	FOA	DD8813	LOUIS, CASEY	936.90	0.00	725.20	Cleared
10/12/2023	FOA	DD8814	LUCE, MICHAEL T	3,958.33	0.00	2,897.31	Cleared
10/12/2023	FOA	DD8815	MORGANROTH, CAROL L	1,859.72	0.00	1,446.30	Cleared
10/12/2023	FOA	DD8816	NIXON, MITCHELL A	1,913.50	0.00	1,483.67	Cleared
10/12/2023	FOA	DD8817	RADLEY, JAMES W	1,080.00	0.00	900.30	Cleared
10/12/2023	FOA	DD8818	SHOLLACK, DONNA M	1,963.86	0.00	1,490.67	Cleared
10/12/2023	FOA	DD8819	SOSNOWSKI, SHERI R	1,888.55	0.00	1,418.95	Cleared
10/12/2023	FOA	DD8820	WYATT, MARTHA K	2,908.29	0.00	1,877.48	Cleared
10/12/2023	FOA	EFT700	FEDERAL TAX DEPOSIT	10,910.15	10,910.15	0.00	Cleared
10/03/2023	FOA	17456	AMERICAN FAMILY LIFE ASSURANCE CO	32.30	32.30	0.00	Open

Totals:	Number of Checks: 028	65,454.44	17,334.78	35,163.45
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Total Physical Checks:	4
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Total Check Stubs:	24
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Hartland Township Board of Trustees Meeting Agenda Memorandum

Submitted By: Larry Ciofu, Clerk

Subject: 10-03-23 Hartland Township Board Special Meeting Minutes

Date: October 10, 2023

Recommended Action

Move to approve the Hartland Township Board Regular Meeting Minutes for October 3, 2023.

Discussion

Draft Minutes are attached for review.

Financial Impact

None

Attachments

10-3-23 HTB Special Minutes - DRAFT

HARTLAND TOWNSHIP BOARD OF TRUSTEES REGULAR MEETING MINUTES

October 03, 2023 – 7:00 PM

DRAFT

1. Call to Order

Supervisor Fountain called the meeting to order at 7:00 p.m.

2. Pledge of Allegiance

3. Roll Call

PRESENT: Supervisor Fountain, Clerk Ciofu, Trustee Germane, Trustee McMullen, Trustee O'Connell

ABSENT: Treasurer Horning, Trustee Petrucci

Also present was Interim Manager Mike Luce.

4. Approval of the Agenda

Move to approve the agenda for the October 3, 2023 Hartland Township Board meeting as presented.

Motion made by Trustee O'Connell, Seconded by Trustee McMullen.

Voting Yea: Supervisor Fountain, Clerk Ciofu, Trustee Germane, Trustee McMullen, Trustee O'Connell

Voting Nay: None

Absent: Treasurer Horning, Trustee Petrucci

5. Call to the Public

Larry Shaheen came forward and inquired as to whether there was any response from the Citizen's Survey company regarding his concerns with how the survey was distributed. Interim Manager Luce stated that the Citizen's Survey is sent out from the Township voter rolls, so surveys may be sent to individuals who are not taxpayers of the township, but if they are a registered voter and are of legal age they are able to participate in the survey as they are eligible to vote on everything that goes on a ballot at an election. He invited Mr. Shaheen to meet with him to further discuss these issues at a later time. Mr. Shaheen was still concerned that surveys were being sent to non-taxpayers and the Township is taking their opinions and running with them and they are being paid for by the taxpayers. Interim Manager Luce stated that the survey is not an end decision but it is to see what the residents of the Township would like to see. Supervisor Fountain stated that the goal of the survey is to be informative and to let the residents of the community have a say in what they want to see in the community. Clerk Ciofu stated that the survey is not just about taxes, but it is also about community events, how one perceives other issues in the community, and local government. He stated we are seeking a wide spectrum of people that would give us cross-section of opinions to provide us what we need for the overall community. Mr. Shaheen was also concerned with the discussion of the future needs of the fire department and the costs of a new fire station that were held at the last Board meeting. Supervisor Fountain stated that we are exploring options regarding future fire department needs and we had a fire study done and are currently investigating a lot more information on this matter, looking into the future five or ten years down the road. Interim Director Luce reiterated his invite to meet with Mr. Shaheen to further discuss his concerns.

HARTLAND TOWNSHIP BOARD OF TRUSTEES REGULAR MEETING MINUTES

October 03, 2023 – 7:00 PM

6. Approval of the Consent Agenda

Move to approve the consent agenda for the October 3, 2023 Hartland Township Board meeting as presented.

Motion made by Clerk Ciofu, Seconded by Trustee O'Connell.

Voting Yea: Supervisor Fountain, Clerk Ciofu, Trustee Germane, Trustee McMullen, Trustee O'Connell

Voting Nay: None

Absent: Treasurer Horning, Trustee Petrucci

- a. Approve Payment of Bills
- b. Approve Post Audit of Disbursement Between Board Meetings
- c. 09-19-23 Hartland Township Board Special Meeting Minutes
- d. 09-19-23 Hartland Township Board Regular Meeting Minutes
- e. General Fund to CIP Surplus Transfer

7. Pending & New Business

a. Water System PRV

Interim Manager Luce gave a brief overview of the water system and the need for a second pressure reducing valve (PRV). He stated that with the growth we are expecting from the developments that are in progress, there will need to be improvements to maintain our water system. He stated we have two twelve inch water mains that run on the north side on M-59 and the south side of M-59. The current water system is fed through the north side main where we installed a PRV a few years ago to be able to regulate the water pressure in the system. He stated that the common misconception people have is that water pressure is the same as water volume which is not the case as you could have high pressure through a small line that would not produce the water volume needed. He stated that we have to have the current twelve inch water main online to meet fireflows and that if you have a fire suppression system that kicks in you may not have sufficient volume for the rest of the township. He stated we are good right now, but looking into the future, with the additional developments that are coming in, we may run into volume issues which will affect water pressure. Interim Manager Luce stated the proposal before the Board tonight is to have our engineering firm, Spalding DeDecker engineer the project for the installation for a new PRV on the south side of M-59 across from the PRV on the north side. This item was in our Capital Improvement Fund projections for this year and would allow us to be prepared for the new developments as they occur. He did state that we have fluctuations in pressure due to the topography of the Township, so we do see spikes at certain peaks throughout the system. The PRV on the south side of M59 will help us regulate these peaks. He did say that with the full build out of the water system a third PRV may be warranted, but this second PRV would suffice for the next several years.

Move to approve the engineering of the M-59 PRV water valve from Spalding DeDecker in an amount not to exceed \$22,500.

Motion made by Trustee O'Connell, Seconded by Trustee Germane.

Voting Yea: Supervisor Fountain, Clerk Ciofu, Trustee Germane, Trustee McMullen, Trustee O'Connell

Voting Nay: None

Absent: Treasurer Horning, Trustee Petrucci

HARTLAND TOWNSHIP BOARD OF TRUSTEES REGULAR MEETING MINUTES

October 03, 2023 – 7:00 PM

8. Board Reports

Clerk Ciofu - No report.

Trustee Germane - No report. He did inquire as to the review of the newly hired Interim Manager and this will be discussed at the next Admin meeting.

Trustee O'Connell - No report.

Trustee McMullen - No report.

Supervisor Fountain - Informed the Board that we have been invited by Optimist Club to be acknowledged in their "Respect for the Law Breakfast" for our collaborative work on the police contract with the Hartland Consolidated Schools and Charyl Stockwell Academy on October 11, 2023 at 7:30 a.m at the Old High School. If any Board member plans to attend, please inform Interim Manager Luce of your intentions. He also stated the the Hartland Art Walk will conclude this Saturday, October 7th from noon until 2:00 p.m.

[BRIEF RECESS]

9. Information / Discussion

a. Manager's Report

Interim Manager Luce stated that the Township Hall landscaping has been completed and that it looks great. He thanked Planning Commissioner Sue Grissim for all of her persistence and efforts in getting this project designed and completed. He stated this landscape plan should be more sustainable over the long run and again commended Commissioner Grissim for all of her work. He stated the Hartland Art Walk will conclude this weekend on October 7th from noon to 2:00 p.m. and that this has been a very successful event. Interim Manager Luce also stated the San Marino connector sidewalk is now complete and he commended our engineering firm Spalding DeDecker and the construction firm, Priess Companies, for getting this done in a timely manner. The Board commented on how nice the project looked. He also brought up the issues we were having with the speed limit concerns on the Maxfield/Cundy road repairs. There have been concerns of residents that the road has been widened and that the speed limit will be increased to 35 mph. These are both inaccurate as the road is the same width but the shoulder has been revamped and anything that has grown over the shoulder was pushed backed to its original position. The traffic control order (TCO) that dictates the speed limit at that section of road has been in place since 1994 and is at 25 mph and will remain at 25 mph. Interim Manager Luce believes the issues here are residents concerns over monitoring of speed on the road and what we can do to help. He stated he will be reaching out to the Livingston County Sheriff's Department along with Hartland Township's contracted Deputies to help find a solution to this issue.

Interim Manager Luce stated that we did meet with MDOT and the Livingston County Road Commission (LCRC) regarding a potential development on the Waldenwoods property on M-59. They are looking for a grading permit for this location and in this meeting there was a very preliminary discussion on a potential additional traffic light at the entrance to Charyl Stockwell and the Target entrance. He stated he attended the Huron Valley Federal Aid Committee meeting and was informed that there are federal aid dollars allocated each year for certain stretches of road that qualify for the aid. He stated that he would start discussions with MDOT to see if we could utilize this program to provide upgrades to the M-59/Old US-23 intersection to help alleviate traffic congestion at this site. Supervisor Fountain stated another light would not seem effective but a possible boulevard at least down to the Old High School would be much more beneficial. Interim Director Luce stated we are just attempting to see if we can use federal dollars to improve traffic at

HARTLAND TOWNSHIP BOARD OF TRUSTEES REGULAR MEETING MINUTES

October 03, 2023 – 7:00 PM

this intersection. He stated that he would be reaching out to our recreation partners regarding the procedures for issuing keys for the park facilities as their Boards change over time and control over the keys has become an issue. He also stated that the parking blocks in the village are falling apart and will be replaced with a composite block. Work will be started early in the morning and the project should be complete sometime this month. He also gave a brief update on the Township Hall roof repairs informing the Board of the difficulty of getting quotes and he hopes to be able to bring at least two quotes to the Board in the very near future. He provided a brief update on the Fire Station Location Committee meeting last week stating a very good discussion was held and that we would be developing costs and timeframes for the three options discussed at the last Board meeting. The Committee requested that we have a work session at the October 17th Board meeting and bring in the Fire Location Study experts to answer any specific questions regarding the study and to have Fire Chief Adam Carroll brief the Board on the options, costs, and timelines. Interim Manager Luce stated that Hartland Township is participating in an Intern Program with the Assessors organization and we were selected for an Intern for two months and the intern will be starting on October 16th. He also stated the Septage Receiving Station Mediation is set for Monday, October 9, 2023 at 9:00 am at Foster Swift offices in Southfield. Trustee Germane stated that the outside lights at the Township Hall are not working and Interim Manager Luce stated he has tried to get them working on three occasions and that we do have an electrician coming in this week to get this fixed.

10. Adjournment

Move to adjourn the meeting at 7:50 p.m.

Motion made by Trustee Germane, Seconded by Clerk Ciofu.

Voting Yea: Supervisor Fountain, Clerk Ciofu, Trustee Germane, Trustee McMullen, Trustee O'Connell

Voting Nay: None

Absent: Treasurer Horning, Trustee Petrucci

Hartland Township Board of Trustees Meeting Agenda Memorandum

Submitted By: Kathie Horning, Treasurer

Subject: Oakland County Online Payment Agreement

Date: October 9, 2023

Recommended Action

Move to approve the new agreement with Oakland County to provide online payment services.

Discussion

This is a renewal of the original 5 year agreement. They have provided us with online credit payment options for residents and customers for the past five years.

Financial Impact

Is a Budget Amendment Required? ☐ Yes ☒ No

If there is a financial impact, include it here. If not, delete this section.

Attachments

Agreement

**AGREEMENT FOR I.T. SERVICES BETWEEN
OAKLAND COUNTY AND
HARTLAND TOWNSHIP**

This Agreement (the "Agreement") is made between Oakland County, a Municipal and Constitutional Corporation, 1200 North Telegraph Road, Pontiac, Michigan 48341 ("County"), and Hartland Township ("Public Body") 2655 Clark Road, Hartland, MI 48353. County and Public Body may also be referred to jointly as "Parties".

PURPOSE OF AGREEMENT. County and Public Body enter into this Agreement for the purpose of providing Information Technology Services ("I.T. Services") for Public Body pursuant to Michigan law.

In consideration of the mutual promises, obligations, representations, and assurances in this Agreement, the Parties agree to the following:

1. **DEFINITIONS.** The following words and expressions used throughout this Agreement, whether used in the singular or plural, shall be defined, read, and interpreted as follows.
 - 1.1. **Agreement** means the terms and conditions of this Agreement and any other mutually agreed to written and executed modification, amendment, Exhibit and attachment.
 - 1.2. **Claims** mean any alleged losses, claims, complaints, demands for relief or damages, lawsuits, causes of action, proceedings, judgments, deficiencies, liabilities, penalties, litigation, costs, and expenses, including, but not limited to, reimbursement for reasonable attorney fees, witness fees, court costs, investigation expenses, litigation expenses, amounts paid in settlement, and/or other amounts or liabilities of any kind which are incurred by or asserted against County or Public Body, or for which County or Public Body may become legally and/or contractually obligated to pay or defend against, whether direct, indirect or consequential, whether based upon any alleged violation of the federal or the state constitution, any federal or state statute, rule, regulation, or any alleged violation of federal or state common law, whether any such claims are brought in law or equity, tort, contract, or otherwise, and/or whether commenced or threatened.
 - 1.3. **"Confidential Information"** means all information and data that the County is required or permitted by law to keep confidential including records of County' security measures, including security plans, security codes and combinations, passwords, keys, and security procedures, to the extent that the records relate to ongoing security of the County as well as records or information to protect the security or safety of persons or property, whether public or private, including, but not limited to, building, public works, and public water supply designs relating to ongoing security measures, capabilities and plans for responding to a violation of the Michigan anti-terrorisms act, emergency response plans, risk planning documents, threat assessments and domestic preparedness strategies.
 - 1.4. **County** means Oakland County, a Municipal and Constitutional Corporation, including, but not limited to, all of its departments, divisions, the County Board of Commissioners, elected and appointed officials, directors, board members, council members, commissioners, authorities, committees, employees, agents, volunteers, and/or any such persons' successors.

- 1.5. **Day** means any calendar day beginning at 12:00 a.m. and ending at 11:59 p.m.
- 1.6. **Public Body** means the Hartland Township which is an entity created by state or local authority or which is primarily funded by or through state or local authority, including, but not limited to, its council, its Board, its departments, its divisions, elected and appointed officials, directors, board members, council members, commissioners, authorities, committees, employees, agents, subcontractors, attorneys, volunteers, and/or any such persons' successors. For purposes of this Agreement, Public Body includes any Michigan court, when acting in concert with its funding unit, to obtain I.T. Services.
- 1.7. **Public Body Employee** means any employees, officers, directors, members, managers, trustees, volunteers, attorneys, and representatives of Public Body, licensees, concessionaires, contractors, subcontractors, independent contractors, agents, and/or any such persons' successors or predecessors (whether such persons act or acted in their personal, representative or official capacities), and/or any persons acting by, through, under, or in concert with any of the above who have access to the I.T. Services provided under this Agreement. "Public Body Employee" shall also include any person who was a Public Body Employee at any time during the term of this Agreement but, for any reason, is no longer employed, appointed, or elected in that capacity.
- 1.8. **Points of Contact** mean the individuals designated by Public Body and identified to County to act as primary and secondary contacts for communication and other purposes as described herein.
- 1.9. **I.T. Services** means the following individual I.T. Services provided by County's Department of Information Technology, if applicable:
- 1.9.1. **Online Payments** mean the ability to accept payment of monies owed to Public Body initiated via a website maintained by County using a credit card, a debit card that functions as a credit card, or electronic debit of a checking account.
- 1.9.2. **Over The Counter Payments** means the ability to accept payment of monies owed to Public Body initiated via a credit card reader attached to an on-premise computer with access to a website maintained by County using a credit card or a debit card that functions as a credit card.
- 1.9.3. **Pay Local Taxes** means the ability to accept payment of local property taxes owed to Public Body initiated via a website maintained by County using a credit card, a debit card that functions as a credit card, or an electronic debit of a checking account. (Does not apply to Public Bodies outside of Oakland County).
- 1.9.4. **Jury Management System** means a subscription based software that facilitates the selection and communication with potential and selected individuals who may serve as jurors.
- 1.9.5. **Collaborative Asset Management System ("CAMS")** means providing for the collaborative use of information related to public assets, such as water, sanitary sewer, and/or storm sewer infrastructure, that is managed by various governmental entities participating in the CAMS within the County of Oakland in order to promote the effective maintenance and care of these assets.
- 1.9.6. **Remedial Support Services** means providing Public Body assistance with diagnosis and configuration of Public Body owned system components.

- 1.9.7. **Data Center Use & Services** means providing space for Public Body's equipment in County's Data Center and access to electrical power and backup power.
- 1.9.8. **Oaknet Connectivity** means use of communication lines and network equipment maintained by County for the transmission of digital information whether leased or owned by County.
- 1.9.9. **Internet Service** means access to the Internet from Public Body's work stations. Access from the Internet to Public Body's applications, whether at County or at Public Body (hosting), is not included.
- 1.9.10. **CLEMIS** means the Court and Law Enforcement Management Information System, an information management system comprised of specific software applications (CLEMIS Applications) operated and maintained by the CLEMIS Division of County.
- 1.9.11. **ArcGIS Online** means the ability to access a web based, collaborative Geographic Information System (GIS) that allows users having an ArcGIS Online (AGO) Named User account to create and share maps, applications (apps), layers, analytics, and data in Environmental Systems Research Institute, Inc.'s ("ESRI") secure cloud.
- 1.9.12. **Data Sharing** means the ability for the Public Body to utilize Access Oakland Products and data owned and maintained by the County on or in relation to its Geographic Information System (GIS).
- 1.9.13. **Pictometry Licensed Products** means the ability to use a Geographic Information System (GIS) solution that allows authorized users to access Pictometry-hosted high-resolution, orthogonal and oblique imagery.
- 1.9.14. **Security Best Practices Advice** means providing information on tools that may be used to enhance network security posture.
- 1.10. **Service Center** means the location of technical support and information provided by County's Department of Information Technology.
- 1.11. **Exhibits** mean the following descriptions of I.T. Services which are governed by this Agreement only if they are attached to this Agreement and selected below or added at a later date by a formal amendment to this Agreement:
- ☒ Exhibit I: Online Payments
 - ☒ Exhibit II: Over The Counter Payments
 - Exhibit III: Pay Local Taxes
 - Exhibit IV: Jury Management System
 - Exhibit V: Collaborative Asset Management System (CAMS)
 - Exhibit VI: Remedial Support Services
 - Exhibit VII: Data Center Use and Services
 - Exhibit VIII: Oaknet Connectivity
 - Exhibit IX: Internet Service
 - Exhibit X: CLEMIS

Exhibit XI: ArcGIS Online

Exhibit XII: Data Sharing

Exhibit XIII: Pictometry Licensed Products

Exhibit XIV: Security Best Practice Advice

2. **COUNTY RESPONSIBILITIES.**

- 2.1. County, through its Department of Information Technology, shall provide the I.T. Services selected above which are attached and incorporated into this Agreement.
- 2.2. County shall support the I.T. Services as follows:
 - 2.2.1. **Access.** County will provide secure access to I.T. Services for use on hardware provided by Public Body as part of its own computer system or as otherwise provided in an Exhibit to this Agreement.
 - 2.2.2. **Maintenance and Availability.** County will provide maintenance to its computer system to ensure that the I.T. Services are functional, operational, and work for intended purposes. Such maintenance to County's system will include "bug" fixes, patches, and upgrades, such as software, hardware, database and network upgrades. The impact of patches and/or upgrades to the applications will be thoroughly evaluated by County and communicated to Public Body through their Points of Contact prior to implementation in Public Body's production environment. County will reserve scheduled maintenance windows to perform these work activities. These maintenance windows will be outlined specifically for each application in the attached Exhibits.
 - 2.2.2.1. If changes to scheduled maintenance windows or if additional maintenance times are required, County will give as much lead time as possible.
 - 2.2.2.2. During maintenance windows, access to the application may be restricted by County without specific prior notification.
- 2.3. County may deny access to I.T. Services so that critical unscheduled maintenance (i.e. break-fixes) may be performed. County will make prompt and reasonable efforts to minimize unscheduled application downtime. County will notify the Points of Contact about such interruptions with as much lead time as possible.
- 2.4. **Backup and Disaster Recovery.**
 - 2.4.1. County will perform periodic backups of I.T. Services hosted on County's computer system. Copies of scheduled backups will be placed offsite for disaster recovery purposes.
 - 2.4.2. County will maintain a disaster recovery process that will be used to recover applications during a disaster or failure of County's computer system.
- 2.5. **Auditing.** County may conduct scheduled and unscheduled audits or scans to ensure the integrity of County's data and County's compliance with Federal, State and local laws and industry standards, including, but not limited to, the Health Insurance Portability and Accountability Act (HIPAA) and Payment Card Industry Data Security Standard (PCI DSS.)

2.5.1. In order to limit possibility of data theft and scope of audit requirements, County will not store credit card account numbers. County is only responsible for credit card data only during the time of transmission to payment processor.

2.6. **Training and Information Resources.** County may provide training on use of the I.T. Services on an as-needed basis or as set forth in an Exhibit to this Agreement.

2.7. **Service Center.** I.T. Service incidents requiring assistance must be reported to the Service Center, by the Points of Contact, to the phone number, e-mail or website provided below. The Service Center is staffed to provide support during County's normal business hours of 8:30 a.m. to 5:00 p.m., EST, Monday through Friday, excluding holidays. The Service Center can receive calls to report I.T. Service outages 24 hours a day, 7 days a week. Outages are defined as unexpected service downtime or error messages. Depending on severity, outage reports received outside of County's normal business hours may not be responded to until the resumption of County's normal business hours.

Service Center Phone Number	248-858-8812
Service Center Email Address	servicecenter@oakgov.com
Service Center Website	https://sc.oakgov.com

2.8. County may access, use and disclose transaction information and any content to comply with the law such as a subpoena, Court Order or Freedom of Information Act request. County shall first refer all such requests for information to Public Body's Points of Contact for their response within the required time frame. County shall provide assistance for the response if requested by the Public Body's Points of Contact, and if able to access the requested information. County shall not distribute Public Body's data to other entities for reasons other than in response to legal process.

2.9. I.T. service providers require County to pass through to Public Body certain terms and conditions contained in license agreements, service agreements, acceptable use policies and similar terms of service, in order to provide I. T. Services to Public Body. The County will provide Public Body with access to these terms and conditions. County will provide notice when it becomes aware of changes to the terms and conditions of these agreements that are applicable to Public Body.

3. **PUBLIC BODY RESPONSIBILITIES.**

3.1. Public Body shall immediately notify County of any unauthorized use of the I.T. Services and any breach of security of the I.T. Services. Public Body shall cooperate with County in all investigations involving the potential misuse of County's computer system or data.

3.2. Public Body is the owner of all data provided by Public Body and is responsible to provide all initial data identified in the attached Exhibits, in a format acceptable to County, and, for the CLEMIS Exhibit, as required by applicable statute, regulation, or administrative rule. Public Body is responsible for ensuring the accuracy and currency of data contained within its applications.

3.3. Public Body shall follow County's I.T. Services requirements as described on County's website. Public Body shall comply with County's minimum standards for each Internet browser used by Public Body to access I.T. Services as set forth in an Exhibit(s) to this Agreement. Public Body shall meet any changes to these minimum standards that County may reasonably update from time to time.

- 3.4. Public Body shall not interfere with or disrupt the I.T. Services provided herein or networks connected with the I.T. Services.
- 3.5. Public Body requires that each Public Body Employee with access to I.T. Services shall:
 - 3.5.1. Utilize an antivirus software package/system on their equipment and keep same updated in a reasonable manner.
 - 3.5.2. Have a unique User ID and password that will be removed upon termination of Public Body Employee's employment or association with Public Body.
 - 3.5.3. Maintain the most reasonably current operating system patches on all equipment accessing the I.T. Services.
- 3.6. If authorized by County, Public Body may extend I.T. Services to other entities which are created by or primarily funded by state or local authority. If County authorizes Public Body to provide access to any I.T. Services to other entities, Public Body shall require those entities to agree to utilize an antivirus software package/system on computers accessing the I.T. Services and to assign users of the I.T. Services a unique User ID and password that will be terminated when a user is no longer associated with the entity. Public Body must require an entity receiving I.T. Services under this Section, to agree in writing to comply with the terms and conditions of this Agreement and to provide County with a copy of this writing.
- 3.7. For each I.T. Service covered by an Exhibit to this Agreement, Public Body shall designate two representatives to act as a primary and secondary Points of Contact with County. The Points of Contact responsibilities shall include:
 - 3.7.1. Direct coordination and interaction with County staff.
 - 3.7.2. Communication with general public supported by Public Body.
 - 3.7.3. Following County's procedures to report an application incident.
 - 3.7.4. If required by County, attend training classes provided by County either online or at County's Information Technology Building in Waterford, Michigan or other suitable location determined by County.
 - 3.7.5. Providing initial support services to Public Body users prior to logging a Service Center incident with County.
 - 3.7.6. Requesting security changes and technical support from the Service Center.
 - 3.7.7. Testing Applications in conjunction with County, at the times and locations mutually agreed upon by County and Public Body.
 - 3.7.8. To report a service incident to the Service Center, one of Public Body's Points of Contact shall provide the following information:
 - 3.7.8.1. Contact Name
 - 3.7.8.2. Telephone Number
 - 3.7.8.3. Email Address
 - 3.7.8.4. Public Body Name
 - 3.7.8.5. Application and, if possible, the specific module with which the incident is associated.

- 3.7.8.6. Exact nature of the problem or function including any error message that appeared on the computer screen.
- 3.7.8.7. Any action the Points of Contact or user has taken to resolve the matter.
- 3.8. Public Body may track the status of the incident by calling the Service Center and providing the Incident Number.
- 3.9. Public Body shall respond to Freedom of Information Act Requests relating to Public Body's data.
- 3.10. I.T. service providers require County to pass through to Public Body certain terms and conditions contained in license agreements, service agreements, acceptable use policies and similar terms of service, in order to provide I. T. Services to Public Body. Public Body agrees to comply with these terms and conditions. Public Body may follow the termination provisions of this Agreement if it determines that it cannot comply with any of the terms and conditions.

4. **DURATION OF INTERLOCAL AGREEMENT.**

- 4.1. This Agreement and any amendments shall be effective when executed by both Parties with resolutions passed by the governing bodies of each Party except as otherwise specified below. The approval and terms of this Agreement and any amendments, except as specified below, shall be entered in the official minutes of the governing bodies of each Party. An executed copy of this Agreement and any amendments shall be filed by the County Clerk with the Secretary of State. If Public Body is a Court, a signature from the Chief Judge of the Court shall evidence approval by the Public Body, providing a resolution and minutes does not apply. If the Public Body is the State of Michigan, approval and signature shall be as provided by law.
- 4.2. Notwithstanding Section 4.1, the Chairperson of the Oakland County Board of Commissioners is authorized to sign amendments to the Agreements to add Exhibits that were previously approved by the Board of Commissioners but are requested by Public Body after the execution of the Agreement. An amendment signed by the Board Chairperson under this Section must be sent to the Election Division in the County Clerk's Office to be filed with the Agreement once it is signed by both Parties.
- 4.3. Unless extended by an Amendment, this Agreement shall remain in effect for five (5) years from the date the Agreement is completely executed by all Parties or until cancelled or terminated by any of the Parties pursuant to the terms of the Agreement.

5. **PAYMENTS.**

- 5.1. I.T. Services shall be provided to Public Body at the rates specified in the Exhibits, if applicable.
- 5.2. **Possible Additional Services and Costs.** If County is legally obligated for any reason, e.g. subpoena, Court Order, or Freedom of Information Request, to search for, identify, produce or testify regarding Public Body's data or information that is electronically stored by County relating to I.T. Services the Public Body receives under this Agreement, then Public Body shall reimburse County for all reasonable costs the County incurs in searching for, identifying, producing or testifying regarding such data or information. County may waive this requirement in its sole discretion.
- 5.3. County shall provide Public Body with a detailed invoice/explanation of County's costs for I.T. Services provided herein and/or a statement describing any amounts owed to County.

Public Body shall pay the full amount shown on any such invoice within sixty (60) calendar days after the date shown on any such invoice. Payment shall be sent along with a copy of the invoice to: Oakland County Treasurer – Cash Acctg, Bldg 12 E, 1200 N. Telegraph Road, Pontiac, MI 48341.

- 5.4. If Public Body, for any reason, fails to pay County any monies when and as due under this Agreement, Public Body agrees that unless expressly prohibited by law, County or the Oakland County Treasurer, at their sole option, shall be entitled to set off from any other Public Body funds that are in County's possession for any reason, including but not limited to, the Oakland County Delinquent Tax Revolving Fund ("DTRF"), if applicable. Any setoff or retention of funds by County shall be deemed a voluntary assignment of the amount by Public Body to County. Public Body waives any Claims against County or its Officials for any acts related specifically to County's offsetting or retaining of such amounts. This paragraph shall not limit Public Body's legal right to dispute whether the underlying amount retained by County was actually due and owing under this Agreement.
- 5.5. If County chooses not to exercise its right to setoff or if any setoff is insufficient to fully pay County any amounts due and owing County under this Agreement, County shall have the right to charge up to the then-maximum legal interest on any unpaid amount. Interest charges shall be in addition to any other amounts due to County under this Agreement. Interest charges shall be calculated using the daily unpaid balance method and accumulate until all outstanding amounts and accumulated interest are fully paid.
- 5.6. Nothing in this Section shall operate to limit County's right to pursue or exercise any other legal rights or remedies under this Agreement or at law against Public Body to secure payment of amounts due County under this Agreement. The remedies in this Section shall be available to County on an ongoing and successive basis if Public Body at any time becomes delinquent in its payment. Notwithstanding any other term and condition in this Agreement, if County pursues any legal action in any court to secure its payment under this Agreement, Public Body agrees to pay all costs and expenses, including attorney fees and court costs, incurred by County in the collection of any amount owed by Public Body.

6. ASSURANCES.

- 6.1. Each Party shall be responsible for any Claims made against that Party by a third party, and for the acts of its employees arising under or related to this Agreement.
- 6.2. Except as provided for in Section 5.6, in any Claim that may arise from the performance of this Agreement, each Party shall seek its own legal representation and bear the costs associated with such representation, including judgments and attorney fees.
- 6.3. Except as otherwise provided for in this Agreement, neither Party shall have any right under this Agreement or under any other legal principle to be indemnified or reimbursed by the other Party or any of its agents in connection with any Claim.
- 6.4. Public Body shall be solely responsible for all costs, fines and fees associated with any misuse by its Public Body Employees of the I.T. Services provided herein.
- 6.5. This Agreement does not, and is not intended to, impair, divest, delegate or contravene any constitutional, statutory, and/or other legal right, privilege, power, obligation, duty, or immunity of the Parties. Nothing in this Agreement shall be construed as a waiver of governmental immunity for either Party.
- 6.6. The Parties have taken all actions and secured all approvals necessary to authorize and complete this Agreement. The persons signing this Agreement on behalf of each Party

have legal authority to sign this Agreement and bind the Parties to the terms and conditions contained herein.

- 6.7. Each Party shall comply with all federal, state, and local ordinances, regulations, administrative rules, and requirements applicable to its activities performed under this Agreement.

7. USE OF CONFIDENTIAL INFORMATION

- 7.1. The Parties shall not reproduce, provide, disclose, or give access to Confidential Information to the County or to a Public Body Employee not having a legitimate need to know the Confidential Information, or to any third-party. County and Public Body Employees shall only use the Confidential Information for performance of this Agreement. Notwithstanding the foregoing, the Parties may disclose the Confidential Information if required by law, statute, or other legal process provided that the Party required to disclose the information: (i) provides prompt written notice of the impending disclosure to the other Party, (ii) provides reasonable assistance in opposing or limiting the disclosure, and (iii) makes only such disclosure as is compelled or required. This Agreement imposes no obligation upon the Parties with respect to any Confidential Information which can establish by legally sufficient evidence: (i) was in possession of or was known by prior to its receipt from the other Party, without any obligation to maintain its confidentiality; or (ii) was obtained from a third party having the right to disclose it, without an obligation to keep such information confidential.
- 7.2. Within five (5) business days' receipt of a written request from the other Party, or upon termination of this Agreement, the receiving Party shall return or destroy all of the disclosing Party's Confidential Information.

8. DISCLAIMER OR WARRANTIES.

- 8.1. The I.T. Services are provided on an "as is" and "as available" basis. County expressly disclaims all warranties of any kind, whether express or implied, including, but not limited to, the implied warranties of merchantability, fitness for a particular purpose and non-infringement.
- 8.2. County makes no warranty that (i) the I.T. Services will meet Public Body's requirements; (ii) the I.T. Services will be uninterrupted, timely, secure or error-free; nor (iii) the results that may be obtained by the I.T. Services will be accurate or reliable.
- 8.3. Any material or data downloaded or otherwise obtained through the use of the I.T. Services is accessed at Public Body's discretion and risk. Public Body will be solely responsible for any damage to its computer system or loss of data that results from downloading of any material.

9. **LIMITATION OF LIABILITY.** In no event shall either Party be liable to the other Party or any other person, for any consequential, incidental, direct, indirect, special, and punitive or other damages arising out of this Agreement.

10. **DISPUTE RESOLUTION.** All disputes relating to the execution, interpretation, performance, or nonperformance of this Agreement involving or affecting the Parties may first be submitted to County's Director of Information Technology and Public Body's Agreement Administrator for possible resolution. County's Director of Information Technology and Public Body's Agreement Administrator may promptly meet and confer in an effort to resolve such dispute. If they cannot resolve the dispute in five (5) business days, the dispute may be submitted to the signatories of this

Agreement or their successors in office. The signatories of this Agreement may meet promptly and confer in an effort to resolve such dispute.

11. TERMINATION OR CANCELLATION OF AGREEMENT.

- 11.1. Either Party may terminate or cancel this entire Agreement or any one of the I.T. Services described in the attached Exhibits, upon one hundred twenty (120) days written notice, if either Party decided, in its sole discretion, to terminate this Agreement or one of the Exhibits, for any reason including convenience.
- 11.2. Early termination fees may apply to Public Body if provided for in the Exhibits.
- 11.3. The effective date of termination and/or cancellation shall be clearly stated in the written notice. Either the County Executive or the Board of Commissioners is authorized to terminate this Agreement for County under this provision. A termination of one or more of the Exhibits which does not constitute a termination of the entire Agreement may be accepted on behalf of County by its Director of Information Technology.

12. SUSPENSION OF SERVICES. County, through its Director of Information Technology, may immediately suspend I.T. Services for any of the following reasons: (i) requests by law enforcement or other governmental agencies; (ii) engagement by Public Body in fraudulent or illegal activities relating to the I.T. Services provided herein; (iii) breach of the terms and conditions of this Agreement; or (iv) unexpected technical or security issues. The right to suspend I.T. Services is in addition to the right to terminate or cancel this Agreement according to the provisions in Section 11. County shall not incur any penalty, expense or liability if I.T. Services are suspended under this Section.

13. DELEGATION OR ASSIGNMENT. Neither Party shall delegate or assign any obligations or rights under this Agreement without the prior written consent of the other Party.

14. NO EMPLOYEE-EMPLOYER RELATIONSHIP. Nothing in this Agreement shall be construed as creating an employee-employer relationship between County and Public Body.

15. NO THIRD-PARTY BENEFICIARIES. Except as provided for the benefit of the Parties, this Agreement does not and is not intended to create any obligation, duty, promise, contractual right or benefit, right to indemnification, right to subrogation, and/or any other right in favor of any other person or entity.

16. NO IMPLIED WAIVER. Absent a written waiver, no act, failure, or delay by a Party to pursue or enforce any rights or remedies under this Agreement shall constitute a waiver of those rights with regard to any existing or subsequent breach of this Agreement. No waiver of any term, condition, or provision of this Agreement, whether by conduct or otherwise, in one or more instances shall be deemed or construed as a continuing waiver of any term, condition, or provision of this Agreement. No waiver by either Party shall subsequently affect its right to require strict performance of this Agreement.

17. SEVERABILITY. If a court of competent jurisdiction finds a term or condition of this Agreement to be illegal or invalid, then the term or condition shall be deemed severed from this Agreement. All other terms, conditions, and provisions of this Agreement shall remain in full force.

18. PRECEDENCE OF DOCUMENTS. In the event of a conflict between the terms of and conditions of any of the documents that comprise this Agreement, the terms in the Agreement shall prevail and take precedence over any allegedly conflicting terms in the Exhibits or other documents that comprise this Agreement.

19. **CAPTIONS.** The section and subsection numbers, captions, and any index to such sections and subsections contained in this Agreement are intended for the convenience of the reader and are not intended to have any substantive meaning. The numbers, captions, and indexes shall not be interpreted or be considered as part of this Agreement. Any use of the singular or plural, any reference to gender, and any use of the nominative, objective or possessive case in this Agreement shall be deemed the appropriate plurality, gender or possession as the context requires.
20. **FORCE MAJEURE.** Notwithstanding any other term or provision of this Agreement, neither Party shall be liable to the other for any failure of performance hereunder if such failure is due to any cause beyond the reasonable control of that Party and that Party cannot reasonably accommodate or mitigate the effects of any such cause. Such cause shall include, without limitation, acts of God, fire, explosion, vandalism, national emergencies, insurrections, riots, wars, strikes, lockouts, work stoppages, other labor difficulties, or any law, order, regulation, direction, action, or request of the United States government or of any other government. Reasonable notice shall be given to the affected Party of any such event.
21. **NOTICES.** Notices given under this Agreement shall be in writing and shall be personally delivered, sent by express delivery service, certified mail, or first class U.S. mail postage prepaid, and addressed to the person listed below. Notice will be deemed given on the date when one of the following first occur: (i) the date of actual receipt; (ii) the next business day when notice is sent express delivery service or personal delivery; or (iii) three days after mailing first class or certified U.S. mail.
- 21.1. If Notice is sent to County, it shall be addressed and sent to: Chief Information Officer, Oakland County Department of Information Technology, 1200 North Telegraph Road, Pontiac, Michigan, 48341, and the Chairperson of the Oakland County Board of Commissioners, 1200 North Telegraph Road, Pontiac, Michigan 48341.
- 21.2. If Notice is sent to Public Body, it shall be addressed to: Kathleen Horning, treasurer@hartlandtwp.com, 2655 Clark Road, Hartland, MI 48353.
- 21.3. Either Party may change the individual to whom Notice is sent and/or the mailing address by notifying the other Party in writing of the change.
22. **GOVERNING LAW/CONSENT TO JURISDICTION AND VENUE.** This Agreement shall be governed, interpreted, and enforced by the laws of the State of Michigan. Except as otherwise required by law or court rule, any action brought to enforce, interpret, or decide any Claim arising under or related to this Agreement shall be brought in the 6th Judicial Circuit Court of the State of Michigan, the 50th District Court of the State of Michigan, or the United States District Court for the Eastern District of Michigan, Southern Division, as dictated by the applicable jurisdiction of the court. Except as otherwise required by law or court rule, venue is proper in the courts set forth above.
23. **ENTIRE AGREEMENT.**
- 23.1. This Agreement represents the entire agreement and understanding between the Parties regarding the specific Services described in the attached Exhibits. With regard to those Services, this Agreement supersedes all other oral or written agreements between the Parties.
- 23.2. The language of this Agreement shall be construed as a whole according to its fair meaning, and not construed strictly for or against any Party.

IN WITNESS WHEREOF, Kathleen Horning hereby acknowledges that he/she has been authorized by a resolution of the Hartland Township, a certified copy of which is attached, or by approval of the Chief Judge if the Public Body is a Court, to execute this Agreement on behalf of Public Body and hereby accepts and binds Public Body to the terms and conditions of this Agreement.

EXECUTED: _____

Kathleen Horning
Treasurer

DATE: _____

WITNESSED: _____

DATE: _____

AGREEMENT

ADMINISTRATOR: _____

(IF APPLICABLE) WILLIAM FOUNTAIN
Supervisor

DATE: _____

IN WITNESS WHEREOF, David T. Woodward, Chairperson, Oakland County Board of Commissioners, hereby acknowledges that he has been authorized by a resolution of the Oakland County Board of Commissioners to execute this Agreement on behalf of Oakland County, and hereby accepts and binds Oakland County to the terms and conditions of this Agreement.

EXECUTED: _____

David T. Woodward, Chairperson
Oakland County Board of Commissioners

DATE: _____

WITNESSED: _____

Oakland County Board of Commissioners
County of Oakland

DATE: _____

EXHIBIT I
I.T. SERVICES AGREEMENT
ONLINE PAYMENTS

INTRODUCTION

The I.T. Service described in this Exhibit (Online Payments) will provide government agencies with the ability to accept credit card and/or electronic check payments online.

1.0 COUNTY RESPONSIBILITIES

- 1.1 County will provide an I.T. Service where the general public can make payments for any type of fees or costs, i.e. pay property taxes, licenses, permits or traffic tickets by means of a credit card or electronic check, utilizing the Internet.
- 1.2 If requested by Public Body, County will provide a single public web page that will reside on County server(s) and include basic information with links to the I.T. Service for Online Payments. County will not provide content management. County will provide basic design template customization (header and colors) and minimal content (basic contact information). URLs will have a G2Gcloud.com domain name. County has sole discretion as to what may be placed on this one-page website.
- 1.3 County will provide Public Body with access to a password protected web site where Public Body can issue credits and view daily, weekly, and monthly transaction activity of payments processed through this I.T. Service.
- 1.4 The Enhanced Access Fee charged to the general public shall be an amount established by County Board of Commissioners (MISCELLANEOUS RESOLUTION #07121, County Board of Commissioner Minutes, May 24, 2007, p. 246) or as revised by County Board of Commissioners.

2.0 PUBLIC BODY RESPONSIBILITIES

- 2.1 Public Body will be responsible for placing the URL provided by County onto their website for this service.
- 2.2 Public Body will include the URL in printed or electronic communications to the general public regarding this service.
- 2.3 Public Body shall respond to all questions from the general public regarding payments. County shall refer questions regarding the amount of payment due or owing to Public Body.

3.0 SUPPORT

The I.T. Service will be supported by County's Information Technology (I.T.) Department as described in the Agreement.

4.0 SERVICE ACCESS AND REQUIREMENTS

- 4.1 Service Access
 - 4.1.1 Access to the I.T. Service is via an internet browser. The URL for the general public to initiate the Online Payments service will be provided by County.

EXHIBIT I
I.T. SERVICES AGREEMENT
ONLINE PAYMENTS

- 4.1.2 Public Body will provide access to this I.T. Service for the general public via the URL provided by County on the web site owned by Public Body.
- 4.1.3 The URL for Public Body to view activity reports and to perform all administrative functions and for the general public to maintain recurring payments will be provided by County.
- 4.2 Service Requirements
 - 4.2.1 The general public shall be required to pay County an Enhanced Access Fee to use this I.T. Service. County will use Enhanced Access Fees to recover costs associated with this I.T. Service.
 - 4.2.2 The person making the payment will authorize two transactions: (1) one transaction for payment of monies owed to Public Body and (2) one transaction for payment of the Enhanced Access Fee. The payment to Public Body will be deposited in Public Body's designated account. The funds for the Enhanced Access Fee will be deposited into an account owned by County.

5.0 SERVICE COSTS

There is no cost to Public Body for this I.T. Service.

6.0 SHARING OF NET ENHANCED ACCESS FEES

- 6.1 Public Body will receive 50% of Net Enhanced Access Fees collected from Online Payments. For purposes of Sharing Net Enhanced Access Fees, if the Public Body that entered into this Agreement is a Court, any Net Enhanced Access Fees that can be shared will be directed to and deposited with the Court's Funding Unit or Units. Payments will be made quarterly based on the County's fiscal year of October 1 through September 30. Net Enhanced Access Fees is defined as follows:
- 6.2 County will deduct a percentage from Public Body's gross Enhanced Access Fees to cover transactional fees. The percentage will be recalculated every fiscal year due to changes in County's costs incurred. County shall list the percentage of Enhanced Access Fee used to calculate transactional fees on the www.G2Gcloud.com website.
- 6.3 Definitions.
 - 6.3.1 Gross Enhanced Access Fees Collected – All fees added to transactions processed for your agency paid by end-user
 - 6.3.2 County's Cost for Transactional Fees –Average costs incurred by County to process transactions for all agencies as a percentage of Gross Enhanced Access Fees Collected
 - 6.3.3 Transactional Fees Deducted from Gross Enhanced Access Fees – Result of applying percentage to Gross Enhanced Access Fees Collected

EXHIBIT I
I.T. SERVICES AGREEMENT
ONLINE PAYMENTS

- 6.3.4 Net Enhanced Access Fees Remaining – Result of subtracting costs of transactional fees from Gross Enhanced Access Fees Collected
- 6.3.5 50% Shared Back with Public Body- Percentage of Total Net Enhanced Access Fees to be shared with your agency.
- 6.3.6 Fees Shared Back with Public Body – Funds your agency will receive.
- 6.4 Illustration. Below is an example of how the Net Enhanced Access Fees will be shared:
- | | |
|--------------|---|
| \$5,000 | Gross Enhanced Access Fees Collected |
| <u>x 39%</u> | County's Cost for Transactional Fees |
| - \$1950 | Transactional Fees Deducted from Gross Enhanced Access Fees |
| \$3050 | Net Enhanced Access Fees Remaining |
| <u>x50%</u> | 50% Shared Back with Public Body |
| \$1525 | Fees Shared Back with Public Body |

7.0 PROVISION AND MAINTENANCE OF DATA

- 7.1 Public Body must use the same credit card and check processing entities used by County. The names and contact information for these entities shall be provided by County. County shall notify Public Body in advance of any changes to the third-party entities.
- 7.2 Public Body shall provide County with all necessary bank account and routing numbers to give effect to this Agreement.

8.0 LICENSE USE AND ACCESS

County grants to Public Body a nonexclusive license to use County developed applications needed to receive this I.T. Service. This license cannot be provided to any other party without County's consent in writing.

EXHIBIT II
I.T. SERVICES AGREEMENT
OVER THE COUNTER PAYMENTS

INTRODUCTION

The I.T. Service described in this Exhibit (Over the Counter Payments) will provide government agencies with the ability to take credit card payments at the counter and over the phone.

1.0 COUNTY RESPONSIBILITIES

- 1.1 County will provide an I.T. Service where the general public can make Over the Counter Payments for any type of fees or costs; i.e. pay property taxes, licenses, permits or traffic tickets by means of a credit card.
- 1.2 County will provide Public Body with access to a password protected web site where Public Body can issue credits and view daily, weekly, and monthly transaction activity of payments processed through this I.T. Service.
- 1.3 The Enhanced Access Fee charged to the general public shall be an amount established by County Board of Commissioners (MISCELLANEOUS RESOLUTION #07121, County Board of Commissioner Minutes, May 24, 2007, p. 246) or as revised by County Board of Commissioners.

2.0 PUBLIC BODY RESPONSIBILITIES

- 2.1 Public Body shall respond to all questions from the general public regarding payments.

3.0 SUPPORT

The I.T. Service will be supported by County's Information Technology (I.T.) Department as described in the Agreement.

4.0 SERVICE ACCESS AND REQUIREMENTS

- 4.1 Service Access
 - 4.1.1 Access to the I.T. Service is via a credit card reader provided by County attached to a computer with a connection to an Internet website run by County.
 - 4.1.2 The URL for Public Body to view activity reports and to perform all administrative functions will be provided by County.
 - 4.1.3 Public Body will provide access to this I.T. Service for the general public via computer owned by Public Body and on the premise of the Public Body. This computer may be operated by Public Body staff or made available directly to the general public.
- 4.2 Service Requirements
 - 4.2.1 The general public shall be required to pay County a fee to use this I.T. Service. County will use fees to recover costs associated with this I.T. Service.

EXHIBIT II
I.T. SERVICES AGREEMENT
OVER THE COUNTER PAYMENTS

- 4.2.2 The person making the payment will authorize two transactions: (1) one transaction for payment of monies owed to Public Body and (2) one transaction for payment of the fee. The payment to Public Body will be deposited in Public Body's designated account. The fee will be deposited into an account owned by County.

5.0 SERVICE COSTS

There is no cost to Public Body for this I.T. Service.

6.0 SHARING OF NET ENHANCED ACCESS FEES

- 6.1 Public Body will receive 50% of Net Enhanced Access Fees collected from Over the County Online Payments. For purposes of Sharing Net Enhanced Access Fees, if the Public Body that entered into this Agreement is a Court, any Net Enhanced Access Fees that can be shared will be directed to and deposited with the Court's Funding Unit or Units. Payments will be made quarterly based on the County's fiscal year of October 1 through September 30. Net Enhanced Access Fees is defined as follows:
- 6.2 County will deduct a percentage from Public Body's gross Enhanced Access Fees to cover transactional fees. The percentage will be recalculated every fiscal year due to changes in County's costs incurred. County shall list the percentage of Enhanced Access Fee used to calculate transactional fees on the www.G2Gcloud.com website.
- 6.3 Definitions.
- 6.3.1 Gross Enhanced Access Fees Collected – All fees added to transactions processed for your agency paid by end-user
- 6.3.2 County's Cost for Transactional Fees –Average costs incurred by County to process transactions for all agencies as a percentage of Gross Enhanced Access Fees Collected
- 6.3.3 Transactional Fees Deducted from Gross Enhanced Access Fees – Result of applying percentage to Gross Enhanced Access Fees Collected
- 6.3.4 Net Enhanced Access Fees Remaining – Result of subtracting costs of transactional fees from Gross Enhanced Access Fees Collected
- 6.3.5 50% Shared Back with Public Body- Percentage of Total Net Enhanced Access Fees to be shared with your agency.
- 6.3.6 Fees Shared Back with Public Body – Funds your agency will receive.

EXHIBIT II
I.T. SERVICES AGREEMENT
OVER THE COUNTER PAYMENTS

- 6.4 Illustration. Below is an example of how the Net Enhanced Access Fees will be shared:

\$5,000	Gross Enhanced Access Fees Collected
<u>x 39%</u>	County's Cost for Transactional Fees
- \$1950	Transactional Fees Deducted from Gross Enhanced Access Fees
\$3050	Net Enhanced Access Fees Remaining
<u>x50%</u>	50% Shared Back with Public Body
\$1525	Fees Shared Back with Public Body

7.0 PROVISION AND MAINTENANCE OF DATA

- 7.1 Public Body must use the same credit card processing entities used by County. The names and contact information for these entities shall be provided by County. County shall notify Public Body in advance of any changes to the third-party entities.
- 7.2 Public Body shall provide County with all necessary bank account and routing numbers to give effect to this Agreement.

8.0 LICENSE USE AND ACCESS

County grants to Public Body a nonexclusive license to use County developed applications needed to receive this I.T. Service. This license cannot be provided to any other party without County's consent in writing.

Hartland Township Board of Trustees Meeting Agenda Memorandum

Submitted By: Troy Langer, Planning Director

Subject: Site Plan/PD Application #23-008, Highland Reserve Planned Development (PD) – Preliminary Site Plan

Date: October 10, 2023

Recommended Action

Move to approve Site Plan/PD #23-008, the Preliminary Planned Development Site Plan for Highland Reserve Planned Development as outlined in the staff memorandum dated October 10, 2023.

Approval is subject to the following conditions:

1. The Preliminary Planned Development Site Plan for Highland Reserve Planned Development, SP/PD #23-008, is subject to the approval of the Township Board.
2. Waiver request for the substitution of evergreen trees for 50% of the required canopy trees in the greenbelt area of the residential section of the planned development along Highland Road, is approved.
3. Waiver request to deviate from the Livingston County Road Commission design standards regarding the roadway surface width for a private road, is approved.
4. The applicant shall adequately address the outstanding items noted in the Planning Department's memorandum, dated September 21, 2023, on the Construction Plan set, subject to an administrative review by Planning staff prior to the issuance of a land use permit.
5. As part of the Final Plan Review, the applicant shall provide a Planned Development (PD) Agreement that includes any access and maintenance agreements. Access and maintenance agreements will be required for the use of the Hartland Glen Lane and future road connections to the east (via Melsetter Street) and south (via Ardmore Avenue). The documents shall be in a recordable format and shall comply with the requirements of the Township Attorney.
6. Applicant complies with any requirements of the Township Engineering Consultant, Department of Public Works Director, Fire Code Requirements, and all other government agencies, as applicable.
7. The applicant shall install additional trees, as outlines in the staff memorandum, dated October 10, 2023; and the applicant shall make the storm detention/retention basin more random and natural in its appearance.
8. Any of the permitted commercial uses that are proposed in this PD, which would require a Special Land Use Permit in the GC (General Commercial), shall only be permitted by Special Land Use Permit.
9. (Any other conditions the Township Board deems necessary).

Discussion

Applicant: Michael West

Site Description

The subject property is south of Highland Road and east of Hartland Glen Lane/Hartland Glen Golf Course, in Section 26 of the Township. Redwood Living Planned Development has frontage along the west side of Hartland Glen Lane and is currently under construction. The subject parcel (Parcel ID #4708-26-200-002) is approximately 39.05 acres in size and zoned CA (Conservation Agricultural). The subject property is designated as Special Planning Area (SPA) on the 2020-2021 Comprehensive Plan and Future Land Use Map (FLUM) Amendment. The property is part of the M-59/Cundy/Hartland Glen Golf Course Special Planning Area.

Currently the property primarily consists of open fields which have historically been used for agricultural activities. Per the Wetland Delineation report submitted by the applicant (compiled by Fishbeck, dated May 19, 2023), three (3) wetland areas have been identified on the subject site. One wetland area is in the southeast corner. The other wetland area is on the west side of the parcel, and the third wetland area is in the northwest corner of the site. The applicant has not provided documentation that the wetland areas have been reviewed by the State of Michigan Department of Environment, Great Lakes, and Energy (EGLE) regarding their regulatory status or permit requirements.

Wooded areas occur along the M-59 boundary (west and northeast), and along the east and west sides of the property. A stand of trees exists in the southwest corner of the site.

The property to the south is part of Hartland Glen Golf Course, addressed as 12400 Highland Road and is zoned CA (Conservation Agricultural).

To the east, is property that has been historically associated with the Newberry Place Planned Development project, which is zoned CA (Conservation Agricultural). The property is undeveloped currently.

Per the site plan, access to the site is via Highland Road, a public road, which is under the jurisdiction of the Michigan Department of Transportation (MDOT).

An additional road connection is shown from Hartland Glen Lane, west of the subject site. Hartland Glen Lane was never formally approved as a private roadway and would be considered a non-conforming roadway. Historically this roadway has been the only access route to the clubhouse, golf course, and parking associated with Hartland Glen Golf Course. The approved plans for Redwood Living PD (SP PD #21-005 and SP PD #22-003) shows Hartland Glen Lane as paved (asphalt surfacing), twenty (20) feet wide, and without curb and gutter. Redwood Living PD has two (2) access points from Hartland Glen Lane. An access easement for ingress and egress would be required as part of the Final PD documents, allowing Highland Reserve PD to take access from Hartland Glen Lane.

Municipal water and sanitary sewer will be required for this project.

Site History

Per Township records, the property was occupied by a residential home, and addressed as 12690 Highland Road. The records do not indicate when the house was constructed. The house and detached building were demolished in 2000, under Land Use Permit #5344. The Township Assessing records indicate the property has been leased for agricultural purposes since 2007.

Historically, plans for the Newberry Place Planned Development have included the subject property as part of that development, under several applications from 2007 to 2016 (Newberry West). Conversely, other development plans for Newberry Place PD did not include this property. The Preliminary PD for Newberry Place PD was approved by the Township Board on July 6, 2021, under SP/PD #20-012, and did not include the subject property.

The Planning Commission held a public hearing on the Preliminary Plan for PD #23-008 at the September 28, 2023, regular meeting. The Planning Commission recommended approval of the request at that meeting.

Site Plan/PD Application #23-003 Highland Reserve Planned Development – Concept Plan

The Concept PD Plan was discussed under SP/PD Application #23-003. The Planning Commission reviewed the project on March 23, 2023, which was followed up by the Township Board's review on April 4, 2023.

Planned Development Procedure

Section 3.1.18 of the Township's Zoning Ordinance provides standards and approval procedures for a PD (Planned Development). Approval of a Planned Development is a three-step process. A Concept Plan, Preliminary Plan, and Final Plan are all reviewed by the Planning Commission and the Township Board, with the Planning Commission making a recommendation and the Board having final approval at each step. The process usually requires a rezoning from the existing zoning district to the Planned Development (PD) zoning district. As part of the rezoning, a public hearing is held before the Planning Commission consistent with the Michigan Zoning Enabling Act; this public hearing is held at the same meeting during which the Planning Commission reviews and makes a recommendation on the Preliminary PD. Approval of the Final Plan by the Township Board usually constitutes a rezoning of the subject property to PD (Planned Development).

Given the requirements for publishing a notice for the planned development, the public hearing has been scheduled for the September 28, 2023 Planning Commission meeting. Approval of the Final Plan by the Township Board usually constitutes a rezoning of the subject property to PD (Planned Development).

For all intents and purposes, the Preliminary Plan step is essentially the same as a preliminary site plan review for a conventional project in the Township. All the information and details required for a preliminary site plan approval must be provided for the Preliminary PD review and approval. Final PD review will involve detailed plans for those phases for which construction is intended to begin immediately, review of the Planned Development Agreement, and other written documents as applicable.

Overview of the Preliminary Plan and Proposed Uses

Currently the subject site (39.05 acres) is zoned CA (Conservation Agricultural). The proposed planned development is comprised of two (2) proposed parcels of land with two (2) different uses. An approximate 2.1-acre parcel, in the northwest corner of the site, is designated as Future Commercial Development. To be noted, the Project Narrative and Pattern Book dated August 31, 2023 (revised), states the parcel area as 1.9 acres in size.

The remaining portion of the property, approximately 36.95 acres, is shown as a single-family residential development with a total of one hundred and one (101) detached single-family homes. Thirty-five (35) of the detached homes are homes for rent. Sixty-six (66) homes are detached, single-family condominium units, as part of a site condominium development. The Concept Plan had shown sixty-five (65) condominium units. The residential portion of the project area is slightly different than the Concept Plan, regarding the layout of the residential units (rental and condominium units). The street plan is generally the

same as the Concept Plan.

Following is a discussion of each component of the Planned Development.

Future Commercial Development Area

Per the applicant, the current landowner (Lexington Homes, LLC) intends to retain the northwest corner for a commercial project, essentially proposing to go through a land division process to create that parcel. The submitted plans do not show specific development plans for this parcel; essentially the proposed parcel is considered a place holder for commercial use(s) to be determined. The commercial development area is part of the proposed planned development.

Per the Project Narrative, the applicant specifically proposes the following uses for the commercial parcel, which are based on uses listed in Section 3.1.14 of the Zoning Ordinance (GC- General Commercial):

- Gasoline station/convenience store
- Fast-food restaurant with drive-through service
- Retail center
- Professional/medical offices
- Financial institution
- Personal service establishment
- Child care center
- Personal fitness center
- Restaurant

These will be considered permitted principal uses, specifically for this planned development, even though some are listed as special land uses in Section 3.1.14 (GC). Future development plans for commercial area will be reviewed by the Planning Commission as a Site Plan application, and the plans will be subject to the approval of the Planning Commission. None of the proposed uses are considered a Special Land Use.

The applicant states the commercial site is to be developed using the GC (General Commercial) zoning standards and all applicable design standards in the Zoning Ordinance such as landscaping, lighting, architecture, building materials, parking, and signage. Staff has concerns about setbacks and other required design guidelines if using the GC standards and/or standards for a specific use.

Single-Family Residential Development

The remaining portion of the site, approximately 36.95 acres, is shown as a single-family residential development with a total of one hundred and one (101) detached single-family homes. Thirty-five (35) of the detached homes are homes for rent. The rental homes are situated along the northern portion of the site, along Highland Road frontage, and in the central area, generally on the west side of the residential development.

The remainder of the property will be developed as a site condominium subdivision with sixty-six (66) detached owner-occupied, single-family residential condominium units. The Concept Plan had shown sixty-five (65) condominium units, for a total count of 100 residential units.

The plan shows three (3) development phases for the residential portion of the project, which are summarized below:

Phase #	#Rental units	#Site condo units
Phase 1	25	6
Phase 2	10	34
Phase 3	0	26
TOTAL UNITS	35	66

Several housing options are available for both the rental and condominium units, and include a single-story ranch, two-story and/or bi-level homes. Individual floor plans range between 1,250 to 2,800 square feet in size. Options include homes with 3-4 bedrooms, 2-3 bathrooms, and an attached two-car or three-car garage. Product information on the building materials is found in the Sample Portfolio of Houses and in Exhibit G.

For the rental homes, the plan states the typical unit envelope as fifty (50) feet wide and sixty-five (65) feet long, however there are some dimensional variations in unit sizes. Sheet 5 in the plan set has a chart listing the size of each rental unit envelope. The rental unit envelopes are all on the same parcel thus there are no true setbacks from a property line. The applicant has stated the rental units will not be permitted to have detached accessory structures, play structures, or boats according to the rental agreement. The assumption is that the residential structure, deck, and patios will be contained within the rental unit envelope.

Exhibit A of the Project Narrative (Sample Sketches) shows sample sketches of rental unit envelopes with varying sizes of houses, garages (2-stall or 3-stall), and features such as decks or patios. The distance between two (2) adjacent structures is stated. All elements are placed within the unit envelope. The driveway and front sidewalk extend beyond the unit envelope.

The minimum lot size within the condominium subdivision is shown as 60 feet wide by 120 feet long, and approximately 7,200 square feet in area. The largest lot size is approximately 12,978 square feet.

Exhibit A of the Project Narrative (Sample Sketches) also has sample sketches of condominium units, with varying sizes of the house, garage, deck, and patio. All site elements are shown within the building envelope. The building envelope is defined by the building setbacks. The distance between adjacent structures is stated on the sample sketches and varies from 10 feet to 22.7 feet depending on the size of the condominium unit (lot) and design details (house footprint size; 2 or 3-stall garage option). Exhibit B contains aerial and street photographs of similar residential developments in other cities. Distances between structures are stated. Exhibits A and B are intended to show possible site layout scenarios for the rental or condominium units.

Sheet 5 of the site plans shows a drawing of a typical condominium lot with setbacks that define the building envelope (Typical Site Condo Unit Detail). A drawing is also provided on Sheet 5 for a Typical Rental Unit, with separation requirements stated.

Rental Unit - Setbacks and Building Separation Requirements:

Interior Streets: 25 feet (measured from street ROW to leading edge of unit envelope)
 Highland Road: 80 feet (Unit #1-13; measured from ROW to edge of unit envelope)
 Side: 10 feet (minimum 10-foot separation between buildings, measured side-to-side)
 Rear: Not Applicable
 Separation: 40 feet (minimum 40-foot separation between buildings, measured back-to-back)
(All structures, patios, decks, and other site improvements are to be placed within the rental unit envelope, except driveways and sidewalks)

Condominium Unit – Building Setbacks/Building Envelope:

Front: 25 feet

Side: 5 feet

Rear: 20 feet

(All structures, patios, decks, in-ground pools, and other site elements are to be placed within the building envelope, except driveways and sidewalks)

Lot coverage. Lot coverage is not stated on the plans. All structures and site elements are to be built within the rental unit envelope or within the buildable area of a site condominium unit, with the exception of driveways and sidewalks (from house to street). Site elements include hard surfacing (concrete patios, paver patios, sidewalks, pool apron), deck, shed, pools, pavilion, gazebo, and other built structures.

Other Development Features

Internally, vehicular circulation is provided by a network of paved, private roads and includes two (2) cul-de-sacs. Two street stubs are shown, one on the east (Melsetter Street) and one on the south (Ardmore Avenue), which are intended to allow for future street extensions and connectivity to the adjacent properties. Ardmore Avenue extends to the south property line. Melsetter Street ends shy of the east property line. Per the applicant's explanation, off-site grading would be required to show Melsetter Street ending at the east property line. The applicant will need to work with the adjacent property owner to acquire permission to do off-site grading. Access easements for ingress and egress for the proposed road connections will be required as part of the Final PD documents.

The private roads in the proposed development will be required to meet the standards of Section 5.23 of the Zoning Ordinance. For a road serving twenty-five (25) or more units or parcels, private roads are to be constructed consistent with public road requirements of the Livingston County Road Commission (LCRC). The paved roadway portion is shown as thirty (30) feet wide with mountable concrete curb and gutter, and a 66-foot-wide right-of-way. Additional comments on the private roads are found in this memorandum under the section "Requirements for Preliminary Review".

Five (5) foot wide concrete sidewalks are shown on both sides of each private road. Natural, mowed paths are planned within the two larger open space areas of the site, with connections to the concrete sidewalks in several locations for walkability throughout the development. Benches are shown along the mowed paths. Details on the mowed path, split rail fencing, and benches are shown in Exhibit C.

Stormwater run-off from the residential portion of the project will be collected and conveyed to two (2) detention areas, in the west-central area of the site. Additionally, infiltration swales are shown in several areas, as required by the Livingston County Drain Commission. Stormwater run-off from the commercial portion of the project will be handled within the commercial site.

Approximately 15.72 acres of the site is designated as open space, equating to approximately 40.3% of the of the property, using the parcel size of 39.05 acres. Additional information is provided under the "Open Space" section of this memorandum.

Municipal water and sanitary sewer will be required for this project. The applicant will need to work with the Township and Livingston County regarding public water and sanitary sewer. They will also need to work with the Hartland Township Department of Public Works (DPW) to acquire the necessary Residential Equivalent Units (REU)'s for this development.

The parcel is approximately 39.05 acres, resulting in an estimated density of 2.59 dwelling units per acre (101 units ÷ 39.05 acres). More discussion on density is provided in the next section of this report.

Eligibility Criteria (Section 3.1.18.B.)

To be eligible for PD approval, the applicant must demonstrate that the criteria in Section 3.1.18.B. will be met.

- 1. Recognizable Benefits.** *The planned development shall result in a recognizable and substantial benefit to the ultimate uses of the project and to the community and shall result in a higher quality of development than could be achieved under conventional zoning.*

The applicant has provided an explanation of the recognizable benefits in the Project Narrative dated August 31, 2023 (revised). Per the applicant, the recognizable benefits include the following:

- Substantial open space preservation (15.72 acres or 40% of overall property), which would exceed what could be achieved under conventional zoning.
- A sustainable and healthy walkable neighborhood design with approximately 9,900 lineal feet of concrete sidewalks; 1,850 lineal feet of natural walking paths; and neighborhood park with a pavilion, playground, and picnic tables.
- Quality housing for residents in Hartland Township in a price range that is more attainable for middle income individuals and families.

- 2. Minimum Size.** *Planned Developments must be a minimum of 20 acres of contiguous land.*

The parcel is approximately 39.05 acres and complies with the minimum size for a planned development.

- 3. Use of Public Services.** *The proposed type and density of use shall not result in an unreasonable increase in the use of public services, facilities, and utilities, and shall not place an unreasonable burden upon the subject site, surrounding land, property owners and occupants, or the natural environment.*

The residential development is accessed from Highland Road, which is under the jurisdiction of the Michigan Department of Transportation MDOT). Approval and permits from MDOT will be required for the proposed access point. A second proposed access to the residential development is via Hartland Glen Lane, an existing private roadway along the western edge of this development. Access from Hartland Glen Lane requires authorization from Redwood Living and Hartland Glen Development LLC. An ingress-egress easement agreement and road maintenance agreement between all parties are required as part of the Final PD submittal. Internally, a looped system of private roadways is proposed. The intent is that the private roads will be maintained by the Homeowner's Association per the applicant.

Access to the commercial development area will be determined when development plans are submitted for that parcel.

Regarding density, the FLUM designation for this property is Special Planning Area (SPA) which allows for a density that is flexible, but with an overall base density of four (4) dwellings per acre. Using this density, a maximum 156 dwelling units could be permitted (39.05 acres x 4 dwelling units per acre). In comparison, the proposed residential single-family development has 101 dwelling units and density of 2.59 dwelling units per acre, which could generate less traffic and have less impact on Highland Road.

Public water and sanitary sewer services will be required for the project. The Township Director of Public Works has provided comments in the review letter dated July 11, 2023. Extension of the municipal water and sanitary sewer services could benefit the adjacent properties to the east and south when they develop.

The Hartland Deerfield Fire Authority will provide fire protection and will review the proposed plans for fire hydrant placement and other safety issues. A review letter from the Fire Authority, dated March 2, 2023, is provided.

- 4. Compatibility with Comprehensive Plan.** *The proposed development shall not have an adverse impact upon the Comprehensive Plan for the Township. Notwithstanding this requirement, the Township may approve a Planned Development proposal that includes uses which are not called for on the Future Land Use Map, provided that the Planning Commission and Township Board determine that such a deviation from the Future Land Use Map is justified in light of the current planning and development objectives of the Township.*

The subject property is designated as Special Planning Area (SPA) on the 2020-2021 Comprehensive Plan and Future Land Use Map (FLUM) Amendment. The property is part of the M-59/Cundy/Hartland Glen Golf Course Special Planning Area. This category designation envisions a density that is flexible. Overall, the SPA should have an overall density of four (4) dwelling units per acre, with a higher density being more desirable in the northern portion of the SPA and a lower density in the lower portion.

Using 39.05 acres for property size and allowing a density of four (4) units per acre, a maximum 156.2 (or 156) dwelling units could be permitted (39.05 acres x 4 dwelling units per acre). The Preliminary Plan proposes a density of 2.59 dwelling units per acre (101 dwellings ÷ 39.05 acres), which is consistent with the maximum allowed density for the Special Planning Area.

Specific principles were agreed upon for the Special Planning Area in the 2020-2021 Comprehensive Plan Amendment, as listed below.

1. Development within the Special Planning Area shall provide for a variety of housing forms (for example, single family, townhouses, condominium, apartments, and senior housing), along with retail, office, recreation, and entertainment space. *The applicant proposes a residential development comprised of a combination of detached single-family homes for lease/rent and single-family site condominium units. A variety of building styles are proposed. Per the applicant, the Hartland Reserve PD is intended to provide much needed and quality housing in a price range that is amenable for the middle-income individuals and families. A commercial component is proposed in the northwest corner of the site, with the specific use(s) to be determined at a future time.*
2. Development within the Special Planning Area shall provide for public facilities and other neighborhood amenities. *The proposed extension of the public watermain and sewer to serve this site could potentially serve adjacent sites in the future. This could be considered an asset to the Township. The design of the PD provides open space areas that can be enjoyed by the Hartland Reserve PD community, that include a covered pavilion, playground, and internal walking paths.*
3. Special Planning Area shall provide pedestrian and vehicular links between land uses and adjacent property (that may not be directly included within this Special Planning Area development). *The proposed plan shows 5-foot-wide concrete sidewalks on each side of each private road. The internal sidewalks connect to the proposed 5-foot-wided concrete sidewalk along the Highland*

Road frontage. Vehicular access points are provided from the PD site from Hartland Glen Lane, Highland Road, as well as future connections to the east and south.

4. Special Planning Area shall also coordinate with the Township's goal of creating walkable pathways to the Township settlements and other public and private facilities. *The PD provides an internal system of sidewalks and walking paths. Additionally, the proposed 5-foot-wide concrete sidewalk along the frontage of Highland Road has the potential to connect to future developments to the east.*
 5. Developments shall be developed in harmonious coexistence with pre-existing historical and natural features within the Township. *The intent of the PD is to retain portions of existing natural features such as the wetland areas and existing trees, as shown on the plans.*
 6. Special Planning Area shall include landscape, streetscape, traffic and architectural solutions that are superior in design and visually enhancing the local community with sensitivity to the existing historic features in the Township. *The residential buildings are a mix of single-story and two-story detached houses which are in keeping with the surrounding neighborhoods. The proposed landscape plan provides buffering of the buildings on the north with a berm and plantings along Highland Road. A majority of the existing trees on the east and west boundaries are shown to be preserved, which can provide buffering in those areas. Street trees are shown for each residential unit. The rental units will have planting beds on the front of each house. Standard planting plans for the rental units are found in Exhibit F.*
- 5. Unified Control.** *The proposed development shall be under single ownership or control such that there is a single person or entity having responsibility for completing the project, or assuring completion of the project, in conformity with the Ordinance.*

The commercial portion of the planned development, Commercial Split Area, will be developed by the current landowner (Lexington Homes, LLC). The individual homes and exterior grounds associated with the rental portion of the residential community will be professionally managed and maintained by the developer.

The site condominium subdivision portion of the PD will be governed by a Master Deed and Bylaws. A Homeowners Association (HOA) will be established which will oversee the maintenance of open space areas, private roads, and stormwater areas. Architectural review, enforcement of community restriction, and financial management will also be under the authority of the HOA. A thorough review of the condominium documents will occur with the Final Plan submittal.

Planned Development Design Standards (Section 3.1.18.C.)

This section outlines the design standards for a planned development. Additional site standards will be discussed from applicable sections of the Zoning Ordinance.

- 1. Permitted Uses.** *The predominant use on the site shall be consistent with the uses specified for the parcel on the Township's Comprehensive Plan for Future Land Uses.*

The subject area for the planned development project is designated as Special Planning Area (SPA) on the adopted 2020-2021 Comprehensive Plan and Future Land Use Map (FLUM) Amendment. This land use category envisions a variety of housing (for example, single-family, townhouses, condominiums, apartments and senior housing), as well as retail, office, recreation, and entertainment

space. The proposed planned development includes rental housing options, site condominium residential units, and the potential for commercial uses for the Commercial Development Area.

2. Residential Density. *Residential density in a planned development shall be consistent with the density designation within the Township's Comprehensive Plan.*

Section 3.1.18.C. of the Zoning Ordinance states the residential density in a planned development shall be consistent with the density designation within the Township's Comprehensive Plan. The subject property is designated as Special Planning Area (SPA) on the 2020-2021 Comprehensive Plan and Future Land Use Map (FLUM) Amendment. This category designation envisions a flexible density, with an overall density of four (4) dwelling units per acre.

Using the subject site acreage of 39.05 acres and allowing a density of four (4) units per acre, approximately 156.2 (or 156) dwelling units could be permitted (39.05 acres x 4 dwelling units per acre). The Preliminary Plan proposes a density of 2.59 dwelling units per acre (101 dwellings ÷ 39.05 acres), which is consistent with the allowed density of the SPA.

Per Section 3.1.18.C.iv., the Planning Commission may agree to recommend up to a forty (40%) percent increase in units on a site in recognition of outstanding attributes as listed in this section. The Township Board in its sole discretion shall have the ability to approve such density increase up to forty (40%) percent subsequent to an affirmative recommendation from the Planning Commission. In this case if the Planned Development land area could accommodate 156.2 units (39.05 acres x 4 units per acre), in accordance with the Comprehensive Plan, the Planned Development plan could include up to 218 dwelling units (156 + 62 additional units) if a maximum bonus of 40% were awarded by the Planning Commission and Township Board. A density bonus is not being considered for this PD project.

The chart below outlines residential density as discussed in this section.

Residential Density	Residential Units
Proposed	101
Permitted	156
Bonus – maximum	218

3. Design Details. *The applicant shall prepare a detailed description of design details to be implemented in the proposed planned development, to be presented in a Pattern Book.*

The design details are provided within the Project Narrative and Pattern Book and the Sample Portfolio of Houses as well as on the submitted site plans.

4. Minimum Yard Requirements. The minimum yard requirements are noted in the chart below per Section 3.1.18.C.vi.a. (Residential Use)

Yard Location	Minimum PD Standard	Proposed distance or setback*	Complies Yes/No
Along perimeter adjacent to public road (Highland Road)	50 ft.	84 ft. (closest point to a rental unit envelope on north)	Yes for both rental and condo units

		70 ft. (Condo Unit 1)	
Along perimeter, but not adjacent to a road (for rear yard, condo unit only)	40 ft.	20 ft.	No
Along an internal collector or local road – front yard	40 ft.	25 ft.	No

*As measured to closest point of a rental unit envelope or condo unit envelope

Section 3.1.18.C.vi.b.(2) states that minimum rear yard setback and minimum lot size for detached single-family structures in a planned development shall be based on good planning and design principles taking into account several variables as follows: degree of compatibility between adjoining uses; sensitivity to the characteristics of the site; the need for free access for emergency vehicles; the need for adequate amounts of light and air between buildings; and the need for proper amounts of open space for the exclusive use of residents on the site. The Planning Commission can evaluate the plans using those variables.

- 5. Distances Between Buildings.** Spacing requirements for buildings in a planned development for any detached single-family structure are outlined in Section 3.1.18.C.vi.b.(1). *Any detached single-family structure shall be located at least thirty (30) feet from any other detached single-family structure and shall provide a minimum side yard setback of fifteen (15) feet on both sides.*

The typical unit envelope for a rental home is fifty (50) feet by sixty-five (65) feet, with a minimum 10-foot separation between buildings. Potentially, if adjacent homes were built to meet the outer boundaries of each rental unit envelope, the separation between structures could be ten (10) feet. This would not meet the minimum required spacing standards of thirty (30) feet between any other detached single-family structure. Per Section 3.1.18.C.vi.a., modification to yard requirements may be approved by the Township Board upon recommendation from the Planning Commission, upon making the determination other setbacks would be more appropriate.

The typical lot detail drawing for the site condominium unit shows the building envelope as defined by the proposed setbacks. Based on the plans, the side yard setback is five (5) feet, which equates to ten (10) feet between two (2) structures. This would not meet the minimum required spacing standards of thirty (30) feet between any other detached single-family structure. Per Section 3.1.18.C.vi.a., modification to yard requirements may be approved by the Township Board upon recommendation from the Planning Commission, upon making the determination other setbacks would be more appropriate.

The Hartland Deerfield Fire Authority has concerns with the proposed plans as noted in the review letter dated March 2, 2023.

- 6. Building Height.** *No building in a planned development shall be greater than thirty-five (35) feet in height.*

The sample house portfolio shows one-story and two-story structures however the building height is not stated. Additional details will be required as part of the Construction Plan set.

- 7. Parking and Loading.** *Planned Developments shall comply with the parking and loading requirements specified in Section 5.8, Off-Street Parking requirements, and Section 5.9, Loading Space Requirements of the Zoning Ordinance.*

Parking requirements are listed in Section 5.8.4.H (Table of Minimum Parking Space Requirements). For the category, Residential, Family, two (2) parking spaces are required for each dwelling unit.

There are options for an attached 2-stall garage, or 3-stall garage per the sample house portfolio. This satisfies the parking requirement. Exhibit A (Sample Sketches of Rental Units and Condo Units) shows the residential driveway to be at least twenty-five (25) feet long, which could accommodate additional parking of vehicles.

- 8. Landscaping.** Landscaping requirements are found in Section 3.1.18.C.vi.e. These are considered minimum design standards, typically for a commercial or office development. A more detailed review of the landscaping is provided in this memorandum using applicable landscape standards as outlined in Section 5.11 (Landscaping and Screening).
- 9. Open Space.** *Open space shall be provided to complement and accentuate the high-quality design of the proposed planned development. At minimum the planned development shall provide open space consistent with the previous zoning designation for the site.*

Per this section of the Zoning ordinance (Section 3.1.18.C.vi.f.), the planned development shall provide open space consistent with the previous zoning designation for the site, at a minimum. Currently the site is zoned CA-Conservation Agricultural. In CA, the open space requirement is a minimum of 85%, for a single-family detached dwelling. The proposed plan states the overall open space is 40.3% of the site (using 39.05 acres) and thus would not comply. Historically, however, open space requirements outlined in Section 3.15 of the Zoning Ordinance have been applied for other single-family residential planned developments in the Township such as Walnut Ridge Estates and Fiddler Grove.

Section 3.15 of the Zoning Ordinance states residential condominium developments (in several zoning district classifications) should provide a minimum of 25% open space, with a minimum of 10% of the total open space to be usable open space (“usable open space” is defined as land area suitable for active recreation). For the proposed development consisting of 39.05 acres, this would equate to a minimum of 9.76 acres of open space, with a minimum of 0.976 acres of usable open space.

The Project Narrative provides a breakdown of the open space areas by category. Sheet 4 of the Site Plans shows the different categories of open space areas. All the open space areas are within the residential portion of the planned development, and none are shown in the Commercial Development Area. The open space areas include wetland and detention areas, upland areas, infiltration swales, and open areas adjacent to the rental homes on the north and center area of the site, as well as the open area in the southeast corner of the development. A series of mowed trails are proposed within the open space areas, adjacent to wetland areas, with benches along the trails. A playground and pavilion are shown in the southeast corner of the development.

Per the Project Narrative, the total open space is approximately 15.72 acres equating to 40.3% of the site (39.05 acres). The percentage of usable open space is stated as 4.69 acres or thirty (30) percent of the total open space. The useable open space includes active recreation areas such as mowed walking paths, the playground/park area, areas around the wetlands, and the Greenbelt along Highland Road.

- 10. Natural Features.** *Consistent with the stated intentions for the creation of these regulations, the preservation of the natural features of the Township is an important planning consideration. A PD proposal must consider the natural topography and geologic features, scenic vistas, trees and other vegetation and natural drainage patterns that exist on the site and propose a development pattern which preserves and avoids disruption of those natural features as much as possible.*

A Topographic Survey and Tree Inventory are provided, which show the existing features of the site. A Tree Survey lists the tree species and condition of each tree on the Tree Inventory. Currently the site consists of an open field which has been farmed in the past. Wooded areas occur on the east and west boundaries of the site, and in the southwest and northwest corners. The plans indicate that trees will be preserved that are located in the east, west, and southwest areas of the site.

Three (3) wetland areas have been identified per the applicant's Wetland Delineation report. A small portion of the wetland in the southeast area will be impacted (0.176 acres). Approvals and permits from the State Department of Environment, Great Lakes and Energy (EGLE) may be required. The remaining wetland areas will be preserved and are shown as Open Space.

- 11. Sidewalks and Pedestrian Access.** *The applicant must demonstrate the PD site, and all uses within the site, will be connected to any existing pedestrian and nonmotorized vehicle paths and trails within a public right-of-way or easement open to the public.*

A proposed 5-foot-wide concrete, sidewalk is shown along the frontage of the residential portion of the PD site on Highland Road, with connections to the 5-foot-wide sidewalks in the PD along Lockerbie Lane. The internal sidewalks along Abernathy Street extend to Hartland Glen Lane on the west; however, no sidewalks are in place along Hartland Glen Lane. Future street and sidewalk connections could occur to adjacent properties to the south and east, where street stubs are shown on the plans.

Requirements for Preliminary Review (Section 3.1.18.E.ii)

The following section is a summary of items that have not been addressed in the previous review as part of the Design Standards section.

1. Sewer and Water.

The Department of Public Works has provided a review letter dated July 11, 2023, which outlines the number of REU's required for the proposed development.

2. Stormwater and Drainage Systems.

Stormwater from the residential; portion of the project will be collected and conveyed to two (2) detention areas. Additional collection of stormwater is via infiltration bioswales which are shown in several areas. The commercial portion of the project will have its own on-site stormwater management system.

3. Traffic Impacts.

The applicant has provided a Traffic Impact Study, dated June 20, 2023, conducted by Fleis and Vandenbrink. Based on the email from the Michigan Department of Transportation (MDOT), dated August 16, 2023, MDOT has no concerns with the easterly M-59 access to the residential development (Lockerbie Lane). MDOT is working with the applicant regarding other access points from M-59 and/or Cundy Road.

4. Vehicular Circulation.

The residential portion of the project area development has one (1) entrance from Highland Road and one (1) entrance from Hartland Glen Lane. Internal circulation is via private roads that include two (2) cul-de-sacs. Section 5.23.5 of the Zoning Ordinance states when a potential number of units or parcels served is twenty-five (25) or greater, the proposed private roads must be constructed consistent with public road requirements of the Livingston County Road Commission (LCRC). The minimum required roadway surface width shall not be less than thirty (30) feet, with the dimension measured from face of curb to face of curb.

The plans show a typical cross section of the private road (half-section), and the roadway surface width is stated as thirty (30) feet, as measured from back of curb to back of curb. The curb is a mountable curb. A 66-foot wide private road right-of-way easement is shown. The roadway surface width in the cross section is not measured from face of curb to face of curb, and thus does not comply with the LCRC standards. Using the LCRC standards would add approximately four (4) feet of paved surface area and would reduce the width of the planting area for street trees, between the back of curb and sidewalk. The deviation from the LCRC design standards is considered a waiver. The proposed road design has been approved for private roads in similar residential PD developments such as the Villas of Hartland PD and the Courtyards of Hartland PD.

Section 5.23.5.E.vi. of the Zoning Ordinance (Minimum Private Road Standards) states that private roads serving more than twenty-four (24) parcels or dwelling units or combination thereof equaling twenty-four (24) shall have at least two (2) points of access to a public road. In this case there is access to Highland Road (public road) via Lockerbie Lane. A second access is shown from Abernathy Street to Hartland Glen Lane, which is a private roadway. Hartland Glen Lane merges with Cundy Road, a public road, which intersects with Highland Road.

5. Fiscal Impacts.

The applicant has provided a response to this topic in the Project Narrative and Pattern Book dated August 31, 2023.

Landscaping (Section 5.11)

Applicable sections of Section 5.11 (Landscaping and Screening) will be applied to the PD, as outlined below.

A. Greenbelt Landscaping (Sec. 5.11.C.)

- Required – Within the first 30 feet of the property, 1 canopy tree for every 30 ft of lineal of frontage; Planning Commission may approve up to 50% substitution of canopy trees with evergreen trees; PLUS 3 small deciduous ornamental trees or large deciduous or evergreen shrubs for the initial 40 ft., and 1 per 20 ft. thereafter. Length of ROW frontage of Highland Road for residential portion of PD (1,081 lineal ft)
EQUATES TO: 36 canopy trees and 55 additional ornamental trees, or large deciduous or evergreen shrubs or combination thereof **REQUIRED**
- Proposed – 18 canopy trees; 18 evergreen trees; 3 ornamental trees; and 54 large shrubs, generally within first 30 feet of the property; on a berm that runs parallel to frontage along Highland Road
- Meets Requirement? – 50% of the trees in the greenbelt are evergreen trees. Concerns with placement of trees under the overhead wires and future conflicts with tree height. The applicant has requested a waiver for 50% of the Greenbelt trees to be conifer trees.
- Comment – **Planning Commission may approve a substitution of evergreen trees for up to 50% of the canopy trees. Existing overhead power lines are in place within the Greenbelt. A**

utility easement is not shown. The applicant notes that the trees are placed outside a 30-foot-wide zone associated with the overhead power lines.

B. Canopy trees along Internal Roadways (Sec. 5.11.2.C.ii.) –

- Required – 15-foot-wide landscaped area along the length of internal roadways, planted with a minimum of 1 canopy tree or evergreen tree for every 30 feet or portion thereof. Required canopy tree size is a minimum 3-inch caliper tree at the time of planting.
- Proposed – 10-foot-wide landscaped area between sidewalk and street (curb); generally, 1 canopy tree is shown per unit and to be spaced thirty-five (35) feet on center. Proposed canopy tree size is 3-inch caliper tree, with the exception of White Oak which is stated to be a two (2) inch caliper tree.
- Meets Requirement? – Yes, except for caliper size of White Oak
- Comment – **Plan to be revised to state White Oak tree is a three (3) inch caliper tree, on the Construction Plan set.**

Buffering or Screening (Sec. 5.11.2.G.i.) – Screening between Land Uses (east and south property lines where abutting single-family CA zoned properties)

- Required – landscape buffer shall be provided to create a year-round visual screen at least eight (8) feet in height along all adjoining boundaries of a non-residential use or a residential use of higher density and abutting a single-family residential zoned property. Evergreen trees to be planted in a staggered or clustered pattern with varying tree heights.
- Proposed – EAST: random groupings of existing deciduous trees to be preserved.
Proposed – SOUTH: SW corner has wetland area and some existing deciduous trees to be preserved. Along the rear of Units 32-40, no landscaping is shown. SE area has wetland area, open space, and a few existing trees to be preserved.
- Meets Requirement? – **TBD**
- Comment – **Planning Commission to determine if the proposed plan meets the intent of the screening requirement.**

C. Detention/Retention Area Landscaping (Sec. 5.11.2.H.)

- Required – Landscape materials shall be used to integrate the area with the overall landscape design; 1 canopy or evergreen tree must be planted for every 50 lineal ft. of basin perimeter as measured at the top of the bank elevation. The required trees shall be planted in a random pattern or in groupings.
Northwest Basin Perimeter - approx. 650 lineal ft. EQUATES TO: 13 canopy or evergreen trees/combination of REQUIRED
South/central Basin Perimeter – Approx. 866 lineal ft. EQUATES TO: 18 canopy or evergreen trees /combination of REQUIRED
- Proposed –
Northwest Basin: 12 canopy trees
South/central Basin: 16 trees
- Meets Requirement? – **TBD**
- Comment – **Planning Commission to determine if the proposed planting plan meets the intent of the detention landscaping requirements. Trees should be planted in a random pattern or groupings.**

D. Requirements for Single Family Residential Districts (Sec. 5.11.6.B.)

Single Family Residential properties are encouraged to plant and maintain landscaping which provides a good street side appearance. All unpaved portions of the front yard are to be planted with suitable live plan material (grass, groundcover, and shrubs) and extending to any abutting street pavement edge. Lawn is proposed around each unit as well as landscape beds in the front of the rental unit houses. A typical landscape plan is provided for these areas. Maintenance of the exterior grounds of the rental portion of the community will be professionally managed by the developer.

Landscaping around each condominium unit is up to the discretion of the individual homeowner.

Other site details

Irrigation

Irrigation is provided on the landscape berm along Highland Road (Greenbelt area).

Lighting

Street lighting is proposed and detailed information is found in the Project Narrative and Patten Book. The total height of the pole and fixture is approximately 14'-8".

Architecture/Building Materials (Sec. 5.24)

Architectural standards for façade materials are not provided in Section 5.24 for single-family buildings. The applicant provided a Sample Portfolio of Houses. The façade materials include vinyl siding and trim, dimensional shingles (roof), brick, and stone veneer. The color palette and material options are presented in Exhibit G. The vinyl products come in several colors including taupe, grey, blue, green, and red. Brick and stone veneer products are offered in earthtone colors. Additional information should be provided on the brick and stone products, such as manufacturers' name and product specifications. Façade material percentages are not required to be submitted. The applicant has been asked to bring a sample board of the façade materials to the public hearing.

Other Requirements-Zoning Ordinance Standards

Nothing additional at this time.

Hartland Township DPW Review

The DPW Director has provided a review letter dated July 11, 2023.

Hartland Township Engineer's Review (Spaulding DeDecker)

The Township Engineer (SDA) has provided a review letter dated July 24, 2023.

Hartland Deerfield Fire Authority Review

The Hartland Deerfield Fire Authority has provided comments in the review letter dated March 2, 2023.

Attachments:

1. DPW review letter 07.11.2023 – PDF version
2. Township Engineer (SDA) review letter 07.24.2023 – PDF version
3. Hartland Deerfield Fire Authority review letter 03.02.2023 – PDF version
4. Project Narrative and Pattern Book 08.31.2023 revised – PDF version
5. Traffic Impact Study 06.20.2023 – PDF version
6. Wetland Delineation 05.19.2023 – PDF version
7. Sample Portfolio of Houses 08.10.2023 – PDF version
8. Highland Reserve Greenbelt Plan 08.31.2023– PDF version
9. MDOT email 08.16.2023 – PDF version
10. Site Plans 08.29.2023 – PDF version



DEPARTMENT OF PUBLIC WORKS

Michael Luce, Public Works Director
2655 Clark Road
Hartland MI 48353
Phone: (810) 632-7498

TO: Planning Department
DATE: 7/11/2023
DEVELOPMENT NAME: Highland Reserve
PIN#:
APPLICATION #: SUP#
REVIEW TYPE: Site Plan

Site Plans for the proposed Highland Reserve Development Site Plan proposes 101 single family homes in with 1 REU is required in Water and Sewer for each lot. Thus totaling 101 REU's for the proposed project. Currently the parcel has 67 Sewer REU's and 0 Water REU's, sufficient REU's will need to be purchased prior to development. The proposed plan also depicts a commercial use property on the corner of Hartland Glenn Dr and M59, once it is determined what may occupy that space the correct REU determination can be provided.

	Sewer REUs	Water REUs
Owned	67	0
Required	101	101
REU Difference	34	101
Cost Each	\$9,439.20	\$5,816.10
Total Due Each	\$320,932.80	\$587,426.10
TOTAL REU COST	\$908,358.90	

Hartland Township Public Works approves the Highland Reserve Development site plan subject to inclusion of the following details on the construction plans:

1. Sanitary sewer material and sizes and connection detail sheet
2. Monitoring manhole for sewer connection and location if required
3. Utility easements noted as public or private.
4. All watermain and leads installed to meet Township specifications
5. Approval of the Livingston County Drain Commission.

Please feel free to contact me with any further questions or comments regarding this matter.

Michael Luce
Public Works Director

Preliminary Site Plan Review

July 24, 2023

Troy Langer
Planning Director
Hartland Township, MI

Re: Highland Reserve – Preliminary Site Plan Review
SDA Review No. HL22-127

Dear Troy:

We have received the preliminary site plan submittal for the above referenced project prepared by Diffin Engineering & Surveying dated June 22, 2023 and received by our office on July 12, 2023. A concept review letter was provided on March 8, 2023. The plans were reviewed in accordance with Hartland Township Engineering Standards and the following comments are our observations.

Recommendation

Approval of the Preliminary Site Plan is recommended, with items to be addressed before Final Site Plan approval.

Comments:

The preliminary Site Plan meets the general requirements of the Hartland Township Code of Ordinances and the Engineering Design Manual.

Project Summary

- Construction of a Planned Development (PD) clustered residential site with 35 rental units and 66 condo units at 12685 Highland Road (M-59) east of US-23 on the south side of Highland Road. Site access would be provided via private streets with access drives from Highland Road (M-59) and Hartland Glen Lane. It is noted that the site is 39.05 acres.
- Water service would be provided by an 8-inch extension from the currently under construction 12-inch water main on the west side of Hartland Glen Lane. The proposed water main connects near the proposed entrance of Abernethy Street at GV-5, loops around the proposed units and connects near the southwest corner of the parcel at GV-20. It is assumed that a domestic lead and fire lead would be provided to serve the proposed units along with additional hydrants on-site.
- Sanitary sewer service would be provided by two connection points. A proposed 8-inch extension from the existing manhole (EX-40202) located on the south side of Highland Road to serve the northerly portion of the site. And an 8-inch extension from the currently under construction 8-inch sanitary sewer on the west side of Hartland Glen Lane, near the southwest corner of the parcel to serve the southerly portion of the site. It is assumed that a lead would be provided to serve the proposed units.
- Storm water would be collected by a single storm sewer collection system and discharged to two on-site detention basins and existing wetlands.

General

1. 2.1 acres of the original 39.05-acre parcel is shown as a proposed commercial split by others northwest of the proposed planned development. A parcel divided or split shall be required consistent with the provisions of the Michigan Land Division Act, the Hartland Township Land Division Ordinance and the Hartland Township Zoning Ordinance, shall have proper frontage on a public road or on an approved and legally recorded private road or shared driveway that is designed consistent with the requirements of the Ordinance and shall be in compliance with all minimum parcel requirements for the zoning district in which the property is located.

These comments are to assist in plan preparation in anticipation of your final site plan review submittal and are not required at this time for preliminary site plan approval:

1. The Redwood Living residential development is currently undergoing construction on the west side of Hartland Glen Lane. Future phases are expected for this project. Coordination with Township and the Redwood Living development will be required.
2. On site pavement, water main, sanitary sewer and storm sewer and quantities must be shown on the plans.
3. Drainage and SESC sheets shall be submitted for site plan review.
4. Hartland Township Standard Detail Sheets are to be attached to the proposed plans when applicable.
5. The existing site is located within wetlands areas. The current plans indicate that these areas will be impacted and disturbed. Plans do not indicate the regulatory status of the wetlands. EGLE Permits will be required for any proposed work within these areas. Plans revisions and layout changes may be required to address EGLE comments.

Water Main

1. Water mains in new developments shall be installed from boundary to boundary in abutting road rights-of-way, on roads the project fronts, on interior streets and at other locations as may be deemed necessary by the Township for future extensions. A proposed (12" or 16") watermain extension will be required along the south side of M-59.

These comments are to assist in plan preparation in anticipation of your final site plan review submittal and are not required at this time for preliminary site plan approval:

1. Water mains shall be located to provide a minimum of ten (10) feet horizontal clearance between the nearest edge of the water main and the nearest edge of any sanitary or storm sewer.
2. The proposed 8" water main shall be enclosed in a 20-foot easement if not located within the existing easement.
3. An EGLE Construction permit will be required for the proposed water main.
4. Gate valves shall be spaced at a maximum of 800 feet intervals on distribution lines.
5. Provide proposed water services and fire line location for the proposed units.
6. The Hartland Fire Marshall shall review and approve the hydrant coverage for the site.

Storm Drainage & Site Grading

1. No stormwater management calculations were provided. At this time, we are unable to determine if the stormwater management system is sized properly for the proposed development.

These comments are to assist in plan preparation in anticipation of your final site plan review submittal and are not required at this time for preliminary site plan approval:

1. Offsite surface runoff shall not be trapped along the development perimeter. If the existing runoff from adjacent properties pass onto the proposed site, the proposed storm sewer system must be sized to accommodate.
2. On-site drainage must be captured within the proposed development via the storm sewer network and will not be allowed to drain to adjacent properties.
3. Confirm that Livingston County Drain Commission will not require any additional water quality requirements before connection to the existing system.
4. All storm water design calculations are to follow Hartland Township and Livingston County Drain Commissioner standards and details.
5. Coordination with Livingston County and EGLE will be needed to confirm the outlet into the wetlands as acceptable.

Paving

1. Private roads and driveways shall meet the requirement of Hartland Township's Zoning Ordinance Article 30.00, unless amended herein. A note on the plan states that all public road requirements will be met which is consistent with the private road ordinance which states that LCRC requirements must be met when serving greater than 25 units.
2. Private roads longer than six-hundred (600) feet shall provide one or more additional easements which shall extend from the primary private road easement to the adjoining parcels, unless the Township determines that it would be impractical or not beneficial to connect to existing or future public or private roads on adjoining parcels. The purpose of this requirement is to facilitate the development of a continuous road network.
3. Provide a circulation plan demonstrating turning movement around the proposed unit. It shall be reviewed and approved by the Hartland Fire Marshall.

Sanitary Sewer

1. All sanitary sewer design requirements are to follow current Livingston County Drain Commissioner's (LCDC) standards and details. LCDC sanitary sewer detail sheets shall be attached to the proposed plans when applicable.

Permits and Agreements Required

Based on those improvements depicted on the plans, the following permits and agreements will need to be provided for review and approval:

Hartland Township:

Note - A current title policy for ownership verification shall be provided with all executed easement submittals. Easements must be on the Hartland Township Standard Easement document and include an exhibit.

- A draft copy of the Lot split must be submitted to our office.

- A draft copy of the Storm Drain Agreement. Agreement can be found in the LCDC book appendix K.
- A draft copy of the 20-foot wide easement for water main construction.
- A draft copy of the 20-foot wide easement for sanitary sewer construction.
- A Land Use Permit will be granted after the pre-construction meeting.

Livingston County:

- Livingston County Drain Commissioner approval and permit.
- Soil Erosion and Sedimentation permit from Livingston County Drain Commissioner.
- Livingston County Roads permit for any work within the County ROW.
- Genesee County Drain Commissioner's Office IPP Discharge Permit approval.

Michigan Department of Environment, Great Lakes, and Energy (EGLE) & Michigan Department of Transportation (MDOT):

- NPDES Notice of Coverage Documentation
- EGLE Permit for all public sanitary sewer installation.
- EGLE Permit for all public water main installation.
 - Basis of Design Check
 - Township DPW Check
 - Portal Submission Check
- MDOT Permit for any work within the Highland Road (M-59) ROW.

The following must be submitted with the Revised Site Plan:

A letter from either the applicant or the applicant's engineer must be submitted with the Site Plan highlighting the changes made to the plans addressing each of the comments listed above and indicating the revised sheets involved.

Please be aware that additional comments may arise with the submittal of the requested revisions and/or additional information.

The comments are not to be construed as approvals and are not necessarily conclusive. The final engineering plans for this development are to be prepared in accordance with the Hartland Township Engineering Design Standards and 2021 Hartland Township Standard Details. Sanitary sewer and water benefit fees may be applicable for this project.

If you have any questions regarding this letter, please contact Luisa Amici at (248) 844-5400 with any questions.

Sincerely,

SPALDING DEDECKER ASSOCIATES, INC.



Luisa Amici
Engineer



Mark Collins, PE
Municipal Project Manager

cc: Jeremy Schrot, Hartland Township Engineer (via email)
 Troy Langer, Hartland Township Planning Director (via email)
 Martha Wyatt, Hartland Township Planner – Landscape Architect (via email)



HARTLAND DEERFIELD FIRE AUTHORITY
HARTLAND AREA FIRE DEPT.

3205 Hartland Road
Hartland, MI. 48353-1825

Voice: (810) 632-7676
E-Mail: firemarshal@hartlandareafire.com

March 2, 2023

To: Hartland Township Planning Commission
c/o: Planning Department

Re: 12685 Highland Road

This review and the following comments are for the residential development in the area of Hartland Glen Lane and Highland Road, dated 2-24-2023. The development consists of roughly one hundred residential homes of various sizes and a two-acre parcel on the northwest portion of the complex for a future commercial development.

The residential portion of the development is proposed to include five-foot side setbacks (ten feet between homes), however, Hartland Township Ordinance 76 states minimum side setback requirements for High Density Residential is ten feet. One of the critical reasons for ten-foot setbacks is to aid in preventing the spread of fire from one structure to an adjacent structure, especially with radiant heat compromising the adjacent structure with potential flame spread to the combustible materials on the walls, eaves, and fascia. This is a problem the fire service routinely encounters in the manufactured home environment with twice the distance (twenty feet) between homes with the same exterior finishes as proposed.

Most importantly, limiting fire spread reduces the potential for loss of life in adjacent homes. It is our position that if this precedent-setting request to remove a life safety and property conservation ordinance requirement that creates a non-compliant development is considered, it would necessitate reinstating a life safety protective measure that provides an equal or better level of protection, such as: residential sprinklers in accordance with NFPA 13R; 2-hour rated non-combustible exterior walls, eaves, and fascia; or 2-hour rated non-combustible fence extending to the top of the fascia. Should the better level of protection with residential sprinklers be selected, we would support longer hydrant spacing and reduced road widths within the development.

Jon Dehanke
Captain

Highland Reserve Planned Development

Preliminary PD Plan Review

Project Narrative & Pattern Book

August 31, 2023 (revised)

Project Objective/Overview

The subject property at 12685 Highland Road (Parcel #08-26-200-002) is approximately 39 acres and currently zoned CA, Conservation Agriculture. Under the PD, Planned Development zoning option (Section 3.1.18 of the Hartland Township Zoning Ordinance), a detached single family residential community, to be called "Highland Reserve", is proposed on 37.1 acres of the property. The intent of the Highland Reserve portion of the PD is to create a unique residential neighborhood that provides detached single family residential homes for both sale and lease. A 1.9 acre parcel located in the northwest corner of the overall property will be retained by the current land owner and developed separately for a future commercial project. This commercial parcel will provide compatible and supportive retail services to the proposed Highland Reserve neighborhood, along with the Redwood Apartments project which is currently under construction to the west.

The PD project also proposes preservation of natural features and valuable open space areas, while incorporating a sustainable and healthy walkable neighborhood design that includes concrete sidewalks along both sides of the private streets, natural walking paths and benches through the open space areas, and a neighborhood park/playground in the southeast corner of the site. The overall objective of the Highland Reserve project is to provide much needed and quality housing for residents in Hartland Township through a unique development concept. A further description is provided below.

Previous Conceptual Plan Review

The Hartland Township Planning Commission conducted a Conceptual Review of the proposed Highland Reserve PD on March 23, 2023. The Hartland Township Board of Trustees subsequently conducted a Conceptual Review of the proposed Highland Reserve PD on April 4, 2023. Comments and direction received during these conceptual reviews have been incorporated into the Preliminary Review application submittal.

Residential & Commercial Development Components (Minimum Design Details)

Commercial Project (1.9 Acres)

As stated above, the 1.9 acre commercial parcel located in the northwest corner of the property will be retained by the current owner (Lexington Homes, LLC) for future commercial development. While plans are conceptual at this point, the commercial portion of the PD envisions a gasoline station/convenience store and a fast food restaurant with drive-thru service. Alternatively, this parcel may be developed as a retail center, professional/medical offices, financial institution, personal service establishment, child care center, personal fitness center, and/or a restaurant. Minimum design details for this commercial parcel including

setbacks, building height, lot coverage, access/driveways, parking/loading, storm water management, signage, outdoor lighting, landscaping/screening/buffering and architectural features and materials will follow requirements for the GC, General Commercial zoning district. It is understood that future development of this commercial parcel, including access determination, will be subject to Site Plan review by the Township.

Detached Single Family Residential Project “Highland Reserve” (37.1 Acres)

The Highland Reserve single family residential community is proposed on 37.1 acres of the overall 39 acre property. The northern portion approximate 10.4 acres of the Highland Reserve project, adjacent Highland Road/M-59, is proposed to be developed as an exclusive rental community containing 35 detached single family homes. Individual homes and exterior grounds will be professionally managed and maintained by the developer’s property management team. The remaining approximate 26.5 acres of the Highland Reserve residential community will be developed as a site condominium subdivision with a total of 66 detached single family residential units. The overall Highland Reserve neighborhood will consist of 101 detached single family homes on 37.1 acres with an overall development density of 2.7 units/per acre. The residential community is anticipated to be constructed in three development phases: Phase 1 (2024); Phase 2 (2025/26); and Phase 3 (2026/27).

Minimum lots sizes, setbacks, separations and homes sizes for the Highland Reserve detached single family residential community are summarized in the table below.

Highland Reserve – Rental Portion (35 homes)				
Lot Size	Front Setback	Rear Setback	Separation	Home Types & Sizes
NA	80’ (Highland Road)	NA	10’	1,250 – 2,080 square feet
	25’ (Interior Streets)		*(see comment below)	Mix of ranch, two-story, bi-level
- All structures within rental portion of project will be provided within the rental unit “envelope” area as depicted on Preliminary Plan.				
Highland Reserve – Site Condominium Portion (66 homes)				
Lot Size	Front Setback	Rear Setback	Side Setback	Home Types & Sizes
7,200 sf/60’ wide	80’ (Highland Road)	20’	5’	1,250 – 3,000 square feet
	25’ (Interior Streets)		*(see comment below)	Mix of ranch, two-story, bi-level

* While minimum 10’ home separations are proposed within the rental portion of the community and minimum 5’ side yard setbacks are proposed within the site condominium portion of the community, it is envisioned that the majority of the homes in the residential community will greater than 10’ apart. As shown on the Preliminary PD Plan, a 50’ wide building “envelope” or “box” have been assumed for homes within both the rental and site condominium portions of the project. However, most of the home product offerings will range between 35’-45’ wide. Having the extra building envelope width afforded by the 10’ separations and 5’ side setbacks will allow for greater variety in home product offerings and allow for the flexibility of adding a 3rd car garage on some homes, where desired. Sample sketches showing how homes will likely be oriented and separated throughout the neighborhood, along with aerial photos of similar neighborhoods constructed by the developer with minimum 10’ separations are provided in Exhibits A and B. Homes constructed with a 10’ separation, will include 1-hour fire rated exterior side walls. This additional construction requirement is being self-imposed beyond what is required by building codes for additional fire safety assurances.

Detached single family homes throughout the Highland Reserve community will consist of a mixture of ranch, two-story and/or bi-level homes with individual floor plans ranging between 1,250-3,000 square feet in size with 3-4 bedrooms, 2-3 bathrooms and an attached 2-3 car garage. Homes for retail sale are anticipated to range in value from the mid \$300s and up, while homes for rent are anticipated to range between \$2,200-\$2,500/month with a minimum 12-month lease. A sample portfolio of homes with color elevations and floor plans depicting homes planned within the Highland Reserve neighborhood is included with the application package. A color palette of exterior siding and material options is also provided in Exhibit G.

Natural Feature & Open Space Preservation

A professional wetland delineation of the overall property was completed by Fishbeck in May 2023 and a copy of this report is attached with the application package. Two areas of regulated wetland were identified along the southeast and west-central portions of the property, and one small area (0.17 acre) of potentially regulated wetland was identified along the northwest corner of the property. These wetland areas are identified on the Preliminary PD Plan and serious consideration was taken to avoid these important natural features during the overall project design. While over 95% of the regulated wetlands present on the property will be preserved with the proposed project, a small area of wetland disturbance/fill (0.176 acre) will be necessary along the southeast portion of the site to accommodate Melsetter Street and related utilities, and a small area of temporary wetland disturbance (0.034 acre) will be necessary along the southwest portion of the site. Additionally, and if determined to be regulated a wetland, a small area of wetland fill (0.17 acre) will also be necessary along the northwest portion of the site to accommodate the proposed commercial project. All required approvals and permits will be secured from the Michigan Department of Energy, Great Lakes and Environment (EGLE) before any construction activities commence.

While the PD ordinance requires a minimum 25% open space, a total of 15.72 acres (40%) of the overall property is proposed to be preserved in perpetual open space consisting of wetlands, storm water basins, wooded areas, mature tree lines and open fields. Primary locations of open space preservation are concentrated in the southeast and west-central portions of the property, with additional perimeter areas provided along the northern and western portions of the site. The “useable” portion of the overall open space that is available for active recreation (walking/park) is 4.69 acres or 30% of the total open space area. A more specific breakdown of open space areas is provided on Sheet 4 of the Preliminary Site Plan set and summarized below:

<u>Total Open Space Preservation:</u>	15.72 acres (40% of overall 39 acre property)
Useable Open Space	4.69 acres (30% of total open space)
Other Upland Open Space:	5.48 acres (35% of total open space)
Wetlands:	4.51 acres (29% of total open space)
Storm Water Basins:	1.04 acres (6% of total open space)

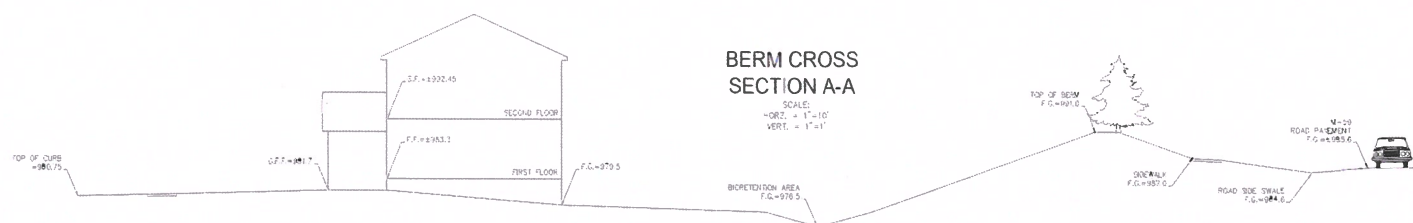
Open Space Amenities/Walkability

Five (5) foot wide concrete sidewalks will be installed along both sides of the interior private streets and along the Highland Road frontage. Additionally, a series of natural walking paths will be installed within the two large open space areas located in the southeast and west-central portions of the property. Benches will be strategically located along these walking paths to provide views of the preserved wetlands, woods and meadows. The natural walking paths will connect to the interior private street network at the west end of Abernethy Street (west side of House 14), west end of Carradale Court (between Units 27-28) and east end of Melsetter Street (east side of Unit 50). A detail of this natural walking path and split rail fencing which will define their entrances, along with a photograph of a path constructed in a similar neighborhood and benches proposed along the paths, is provided in Exhibit C. In total, the project will include approximately 9,900 lineal feet of concrete sidewalk and 1,850 lineal feet of natural walking paths.

Within the southeastern open space area (along the south side of Units 48-50), a neighborhood park is also proposed. This community amenity will consist of a covered pavilion (approximately 16' by 16') with picnic tables and an approximate 32' by 80' playground area consisting of swings, playset and associated children play equipment. Pedestrian access to the pavilion/playground area will be provided from the sidewalk located at the east end of Melsetter Street, along the east side of Unit 50. Examples of the pavilion and playground equipment proposed for this neighborhood park are provided in Exhibit D.

Landscaping, Buffering and Screening

A detailed inventory of existing trees present across the subject property, along with indications of which trees will be preserved with the project, is included on Sheets 2-3 of the Preliminary Site Plan set. Additionally, a Landscape Plan identifying required street trees and detention basin landscaping is provided on Sheet 8 of the Preliminary Site Plan set, while a separate Landscape Plan identifying required greenbelt landscaping along Highland Road/M-59 is provided in Exhibit E. Street trees and detention pond trees will be deciduous, a minimum 3" caliper at planting and include a mixture of Linden Greenspire, Autumn Blaze Maple, Red Maple, Princeton Elm, Tulip, White Oak, or other trees approved by the Township. Greenbelt landscaping along the Highland Road/M-59 frontage will include a combination of berming and canopy/evergreen/ornamental trees and large shrubs to screen the rear portions of Homes 1-13. Greenbelt trees/shrubs will be of appropriate size at planting and include a mixture of Norway Spruce, Giant Arborvitae, Redpointe Maple, Crimson Maple, Columnar Hornbeam, Red Oak, Serviceberry, Burning Bush, Viburnum, Forsythia, Summersweet or other trees/shrubs approved by the Township. A cross section of this landscaped berm and the typical elevation relationship between Highland Road and the back of the homes is provided below.



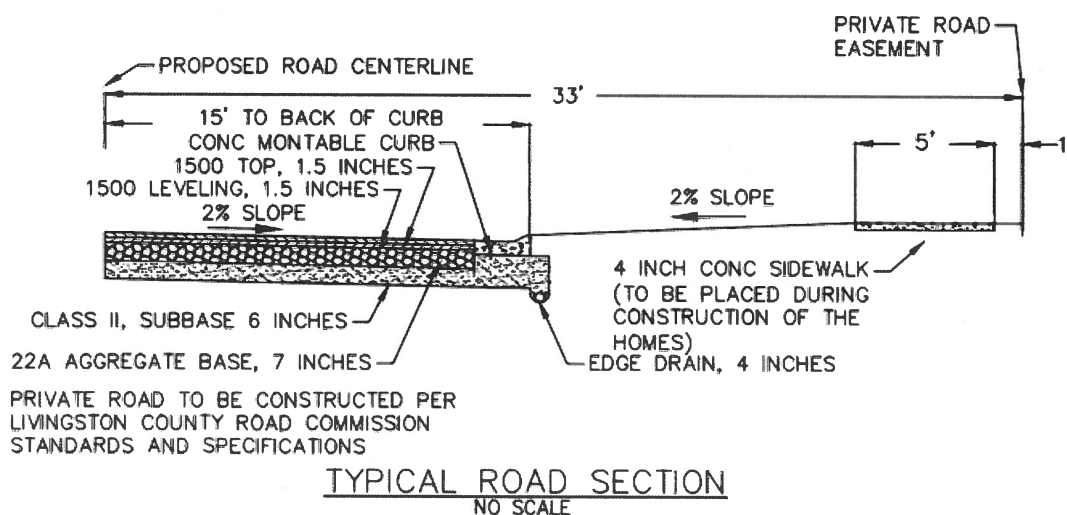
As shown on the Landscape Plan provided in Exhibit E, greenbelt landscaping along Highland Road/M-59 is proposed to consist of a 50% deciduous trees and 50% evergreen trees/shrubs. Pursuant to Section 5.1.1.2.C.i.b of the Hartland Township Zoning Ordinance, a modification from the 100% deciduous tree planting requirement within the Highland Reserve greenbelt is requested.

In addition to street trees along the private street frontage, individual homes within the rental portion of the residential community will be provided a standard landscape package around the front of the homes (refer to Exhibit F). Specific landscaping for homes/units within the site condominium portion of the project will be determined by the individual home owners.

Access/Private Streets


A professional Traffic Impact Study (TIS) of the overall PD project was completed by Fleis & Vanderbrink in June 2023 and a copy of this report is attached with the application package. Access to the Highland Reserve detached single family residential portion of the project is proposed through a private street connection (Lockerbee Lane) to Highland Road, along the eastern portion of the site, and a private street connection (Abernathy Street) to Hartland Glen Lane. Rights to connect to Hartland Glen Lane were included with the 2021 Redwood Living PD approval and details associated with this connection will be finalized with Redwood Living prior to Final PD approval. The location and spacing of the private driveway and private street connection to Highland Road have been confirmed by the traffic consultant to be acceptable using Michigan Department of Transportation (MDOT) Geometric Design Guidance. Formal review/approval along with any roadway related improvement requirement will not be determined by MDOT until detailed construction drawings and a formal application is submitted for review/approval.

All internal streets serving the residential community (Lockerbee Lane, Abernethy Street, Ardmore Avenue, Kirkwall Court, Melsetttter Street and Carradale Court) will be private, however, will be constructed in accordance with Livingston County Road Commission standards and specifications including mountable concrete curb & gutter and a 30' wide roadway (back-of-curb, back-of-curb). A typical road cross section detail is provided below.






Since the project is bordered by large vacant parcels to the east and south, Melsetter Street will be extended to the eastern property line and Ardmore Avenue will be extended to southern property lines to allow for future street extensions and neighborhood connectivity. Legal right for these adjacent properties to connect to these private streets will be included in the PD Development Agreement and Community Master Deed and Bylaws.

Street lights will be installed along these private streets as depicted on the Sheet 10 of the Preliminary Site Plan set. LED fixtures will be installed on 12' tall poles as generally shown on the following details.



MRP LED
LED Area Luminaire

Specifications

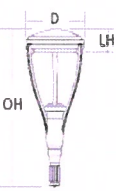
EPA: 1.125 ft²
6,630 lumens

Luminaire Height: 3'-3 3/8"
90.5 cm

Overall Height: 3'-2"
91.4 cm

Diameter: 18"
45.7 cm

Weight (max): 27.5 lbs
12.5 kg



Category: _____
Notes: _____
Type: _____

Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and system level interoperability.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency.
- This luminaire is A+ Certified when ordered with DTL controls marked by a shaded background DTL DLL equipped luminaires meet the A+ specification for luminaire to photocontrol interoperability.
- This luminaire is part of an A+ Certified solution for ROAM® or XPoint™ Wireless control networks, providing out-of-the-box control compatibility with ample commissioning, when ordered with drivers and control optics marked by a shaded background.

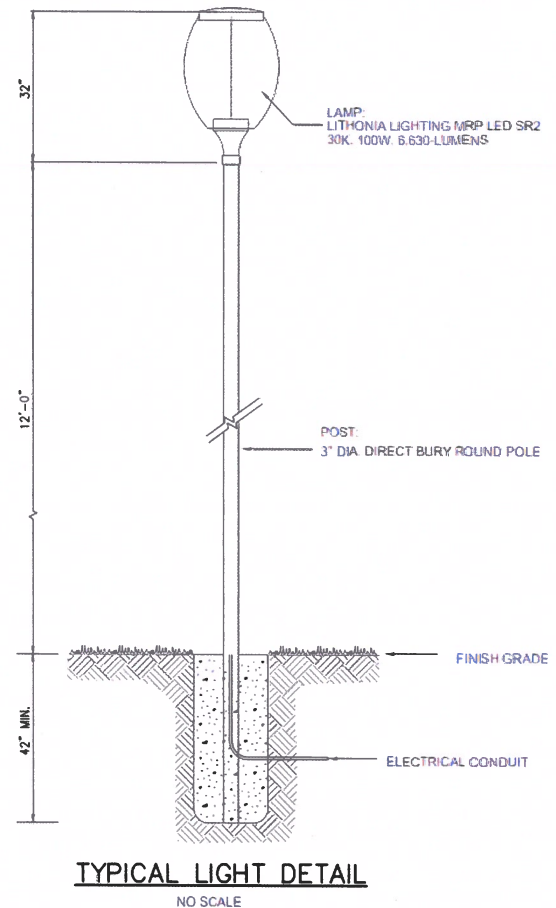
To learn more about A+ visit www.acuitybrands.com/aplus

1. See ordering tree for details

2. A+ Certified Solutions for ROAM require the order of one ROAM node per luminaire. Sold Separately: [Link to Roam](#) [Link to DTL DLL](#)

Ordering Information EXAMPLE: MRP LED 42C 700 40K SRS MVOLT DDBXD

Series	LEDs	Drive current	Color temperature	Distribution	Package	Mounting
MRP LED	4X 4110B package	150 70mA	30K 300K	SR2 Spot	MRP011 277V	Shipped Included
		500 220mA	40K 400K	SR3 Spot	120V 347V	Shipped separately ¹
		700 220mA	50K 500K	SR4 Spot	200V 400V	Shipped separately ¹
		1000 220mA 70V	50K 500K	SR5 Spot	240V	Shipped separately ¹
						Shipped separately ²
						MRP030 120V 347V
						MRP015 200V 400V
						MRP010 240V 400V
						MRP015 200V 400V
						MRP015 200V 400V



Public Utilities/Storm Water Management

The commercial project in the northwest corner of the property, along with all homes within the Highland Reserve neighborhood, will be served by municipal water and sanitary sewer. Storm water runoff from the residential portion of the project will be collected and conveyed to two detention basins located in the west-central portion of the site with additional infiltration swales constructed within the rear yards of homes as required by the Livingston County Drain Commission. Storm water runoff from the commercial portion of the project will be provided on-site and designed consistent with township and county requirements for the GC, General Commercial zoning district.

Residential Community Organization and Maintenance

As stated above, the individual homes and exterior grounds associated with the rental portion of the community will be professionally managed and maintained by the developer, similar to an apartment or townhome project. The site condominium subdivision portion of the project will be governed by a Master Deed and Bylaws. A Homeowner's Association (HOA) will be established with the scope of authority that includes maintenance of the private roads, open space areas-natural paths-playground, storm water areas, architectural review, enforcement of community restrictions, and financial management. Each homeowner will pay a modest annual fee for the operation of the HOA.

Fiscal and Community Impact Analysis

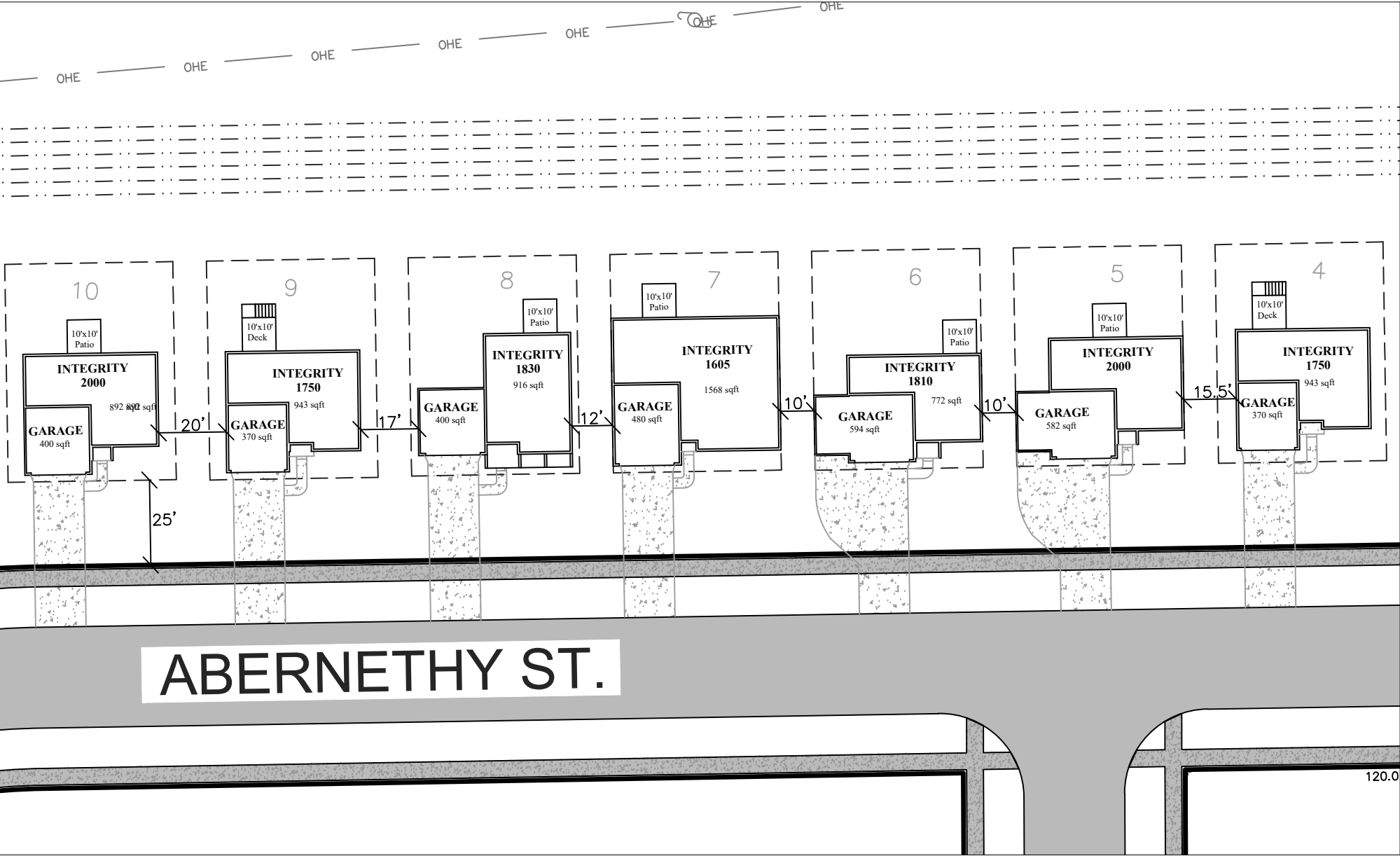
Upon full build-out, the 101 unit Highland Reserve residential neighborhood will add an estimated \$35-40 million dollars in assessed value to Hartland Township. Property tax generation from each single family home is estimated at approximately \$4,500/year per unit, which would translate into approximately \$450,000/year in total tax generation upon full development. With each Highland Reserve home having a minimum of 3 bedrooms and 2 bathrooms, it is estimated the average household size will be 3.0-3.5 individuals/home, or 300-350 total residents at full build-out. While the exact number of children that will comprise these households is unknown, an assumption that 50% of the households will have between 1.0-2.0 children/home would equate to approximately 50-100 children upon full development. These additional children integrated into the public school system over several years is not anticipated to adversely impact the capacity of the Hartland Public School system which has lost enrollment over the past several years. Finally, the addition of 300-350 residents with this new neighborhood will help support the local economy and workforce, while adding to the vibrancy and growth of Hartland Township.

Summary/Conclusions

The Highland Reserve PD project proposes a unique development concept with a mix of single family detached homes both for retail sale and lease. The project is consistent and compatible with the Hartland Township Comprehensive Plan and surrounding land use pattern, and will not result in an unreasonable increase in the use of public services, facilities and utilities, and will not place an unreasonable burden upon the subject site, surrounding land, property owners and occupants, or the natural environment. The overall project design also incorporates recognizable and substantial benefits to the owners/occupants of the project and overall community beyond what would be achieved under conventional zoning including substantial open space preservation (15.72 acres or 40% of overall property), a sustainable and healthy walkable neighborhood design that includes approximately 9,900 lineal feet of concrete sidewalks and 1,850 lineal feet of natural walking paths, and a neighborhood park with a pavilion, picnic tables and playground. Finally, the Highland Reserve PD project will provide much needed and quality housing for residents in Hartland Township in a price band that is more attainable for middle income individuals and families.

EXHIBIT A

**SAMPLE SKETCHES SHOWING HOW HOMES WILL LIKELY BE
CONSTRUCTED WITH MINIMUM 10' SEPARATIONS**



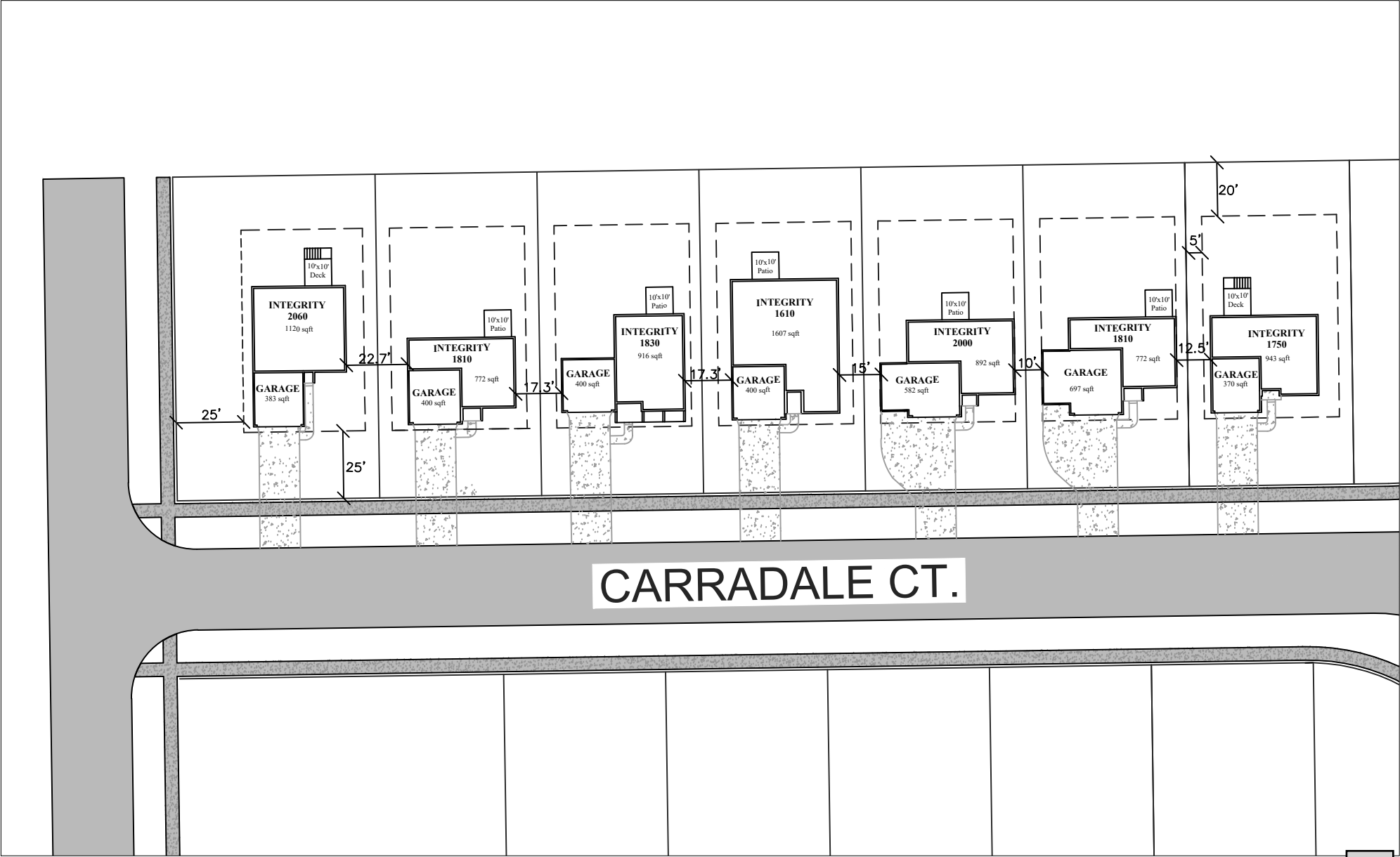
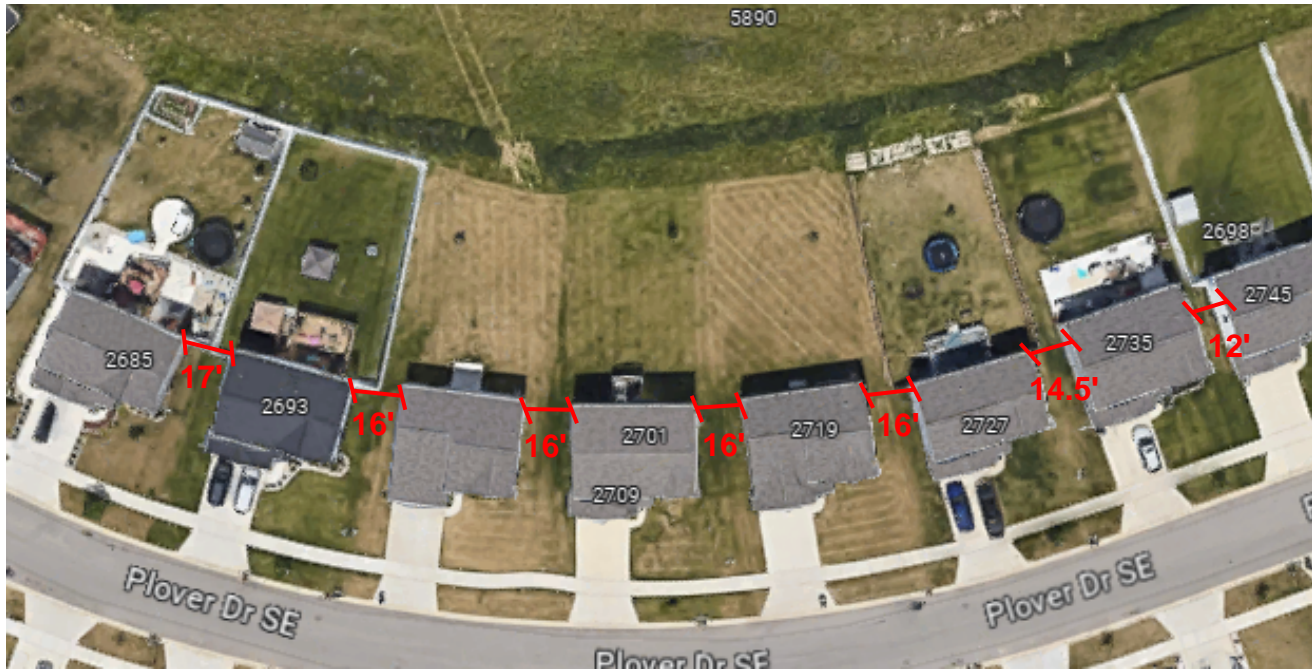


EXHIBIT B
AERIAL PHOTOS AND STREET VIEW PHOTOS OF SIMILAR
NEIGHBORHOODS WITH MINIMUM 10' SEPARATIONS

Bretonfield Preserve
City of Kentwood, Kent County, MI
2685 - 2745 Sage Wing Dr



Aerial View



2685 & 2693 Sage Wing Dr



2693 & 2701 Sage Wing Dr



2701 & 2709 Sage Wing Dr



2709 & 2719 Sage Wing Dr



2719 & 2727 Sage Wing Dr



2727 & 2735 Sage Wing Dr

Centennial North
Village of Vicksburg, Kalamazoo County, MI
1529 - 1513 Notley Field Lane



Aerial View



1529 -1525 Notley Field Lane



1525 - 1521 Notley Field Lane

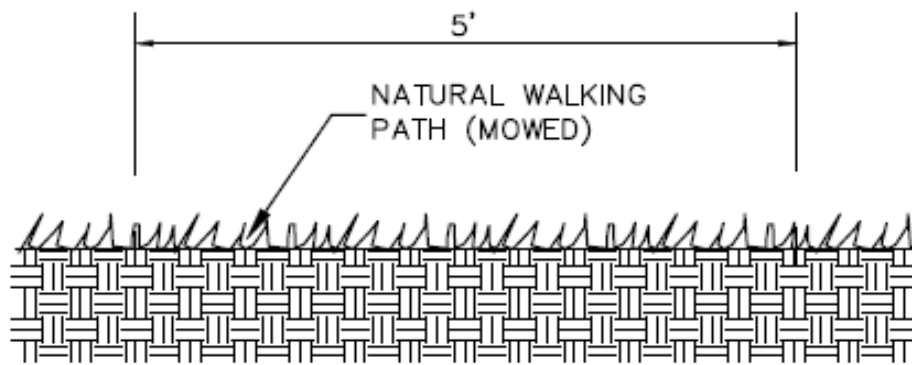


1521 - 1517 Notley Field Lane



1517 - 1513 Notley Field Lane

EXHIBIT C
NATURAL WALKING PATH DETAILS/EXAMPLE



NATURAL WALKING PATH

NOT TO SCALE



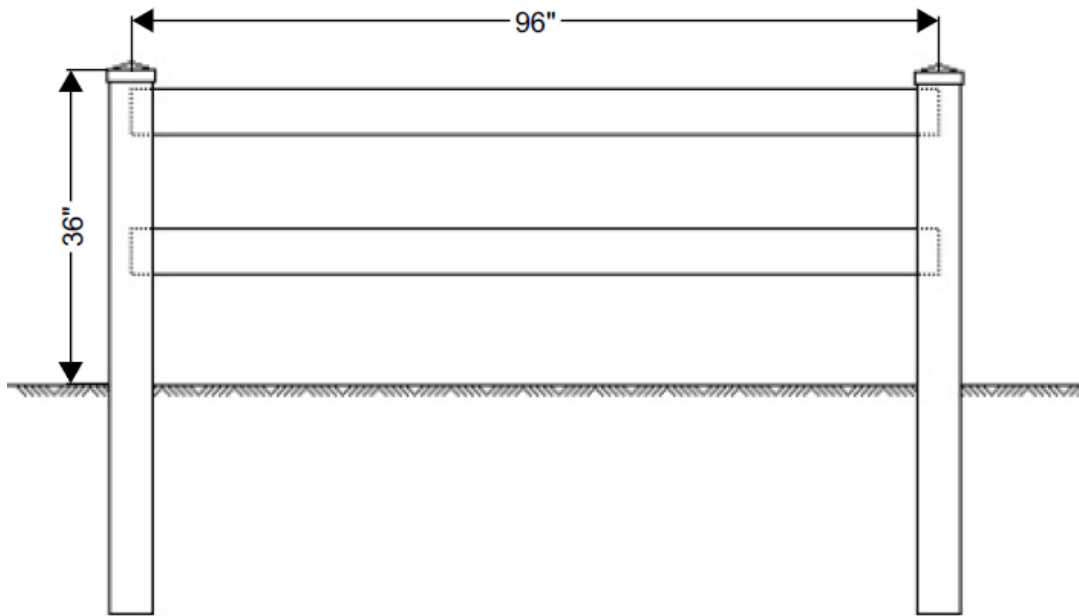
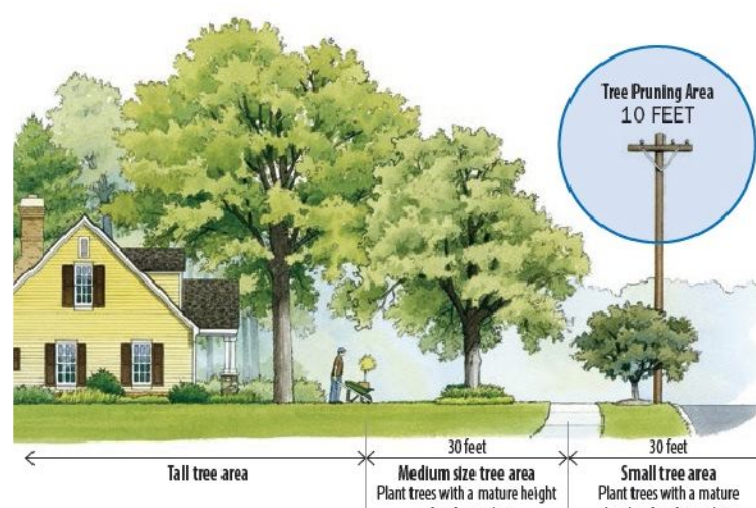


EXHIBIT D
PAVILION AND PLAYGROUND DETAILS/EXAMPLE





EXHIBIT E
LANDSCAPE PLAN – GREENBELT (HIGHLAND ROAD/M-59)

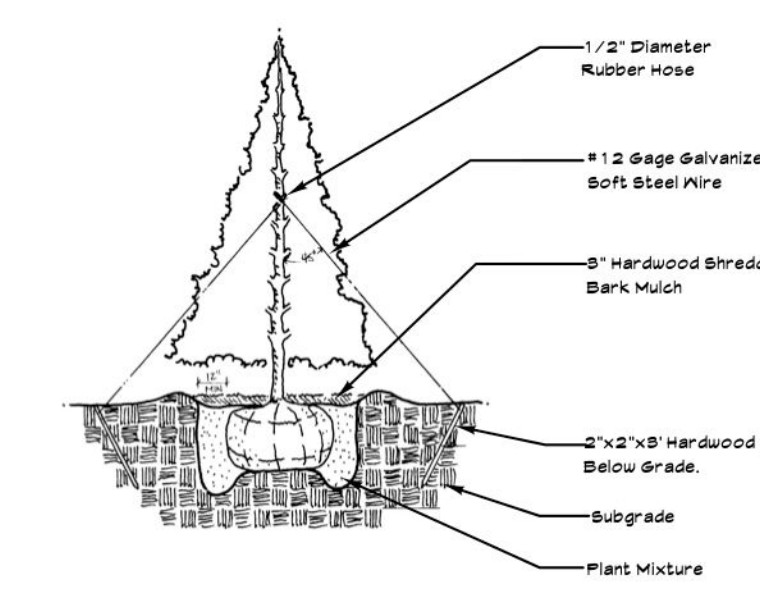


Smart planting

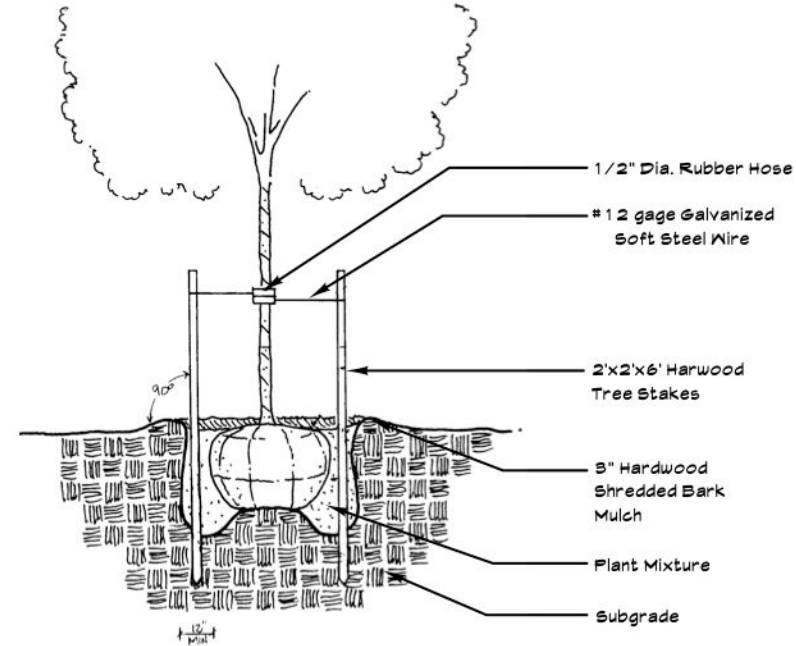
No trees should be planted near power lines. However, many trees are attractive additions to your yard and, under normal conditions, will not grow tall enough to interfere with our distribution lines.

Avoid planting tall-growing trees such as the following near or under power lines:

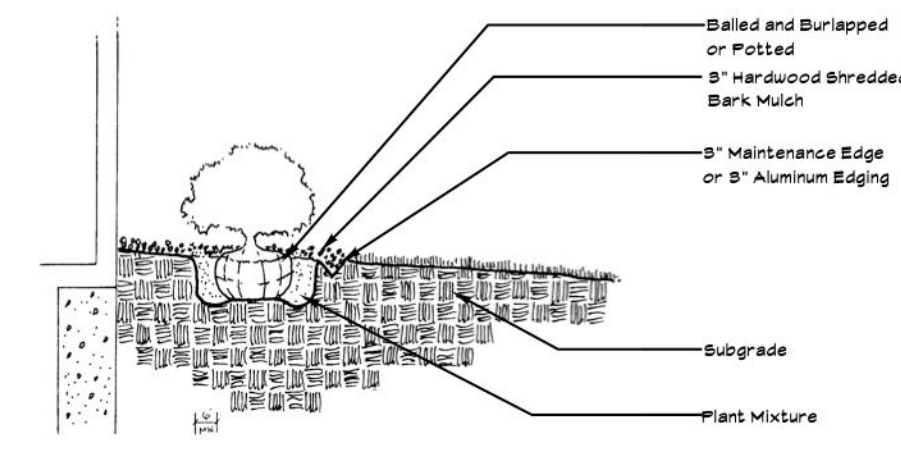
- Silver Maple
- White Spruce
- Norway Maple
- Colorado Blue Spruce
- Oak
- Most pines
- Willows



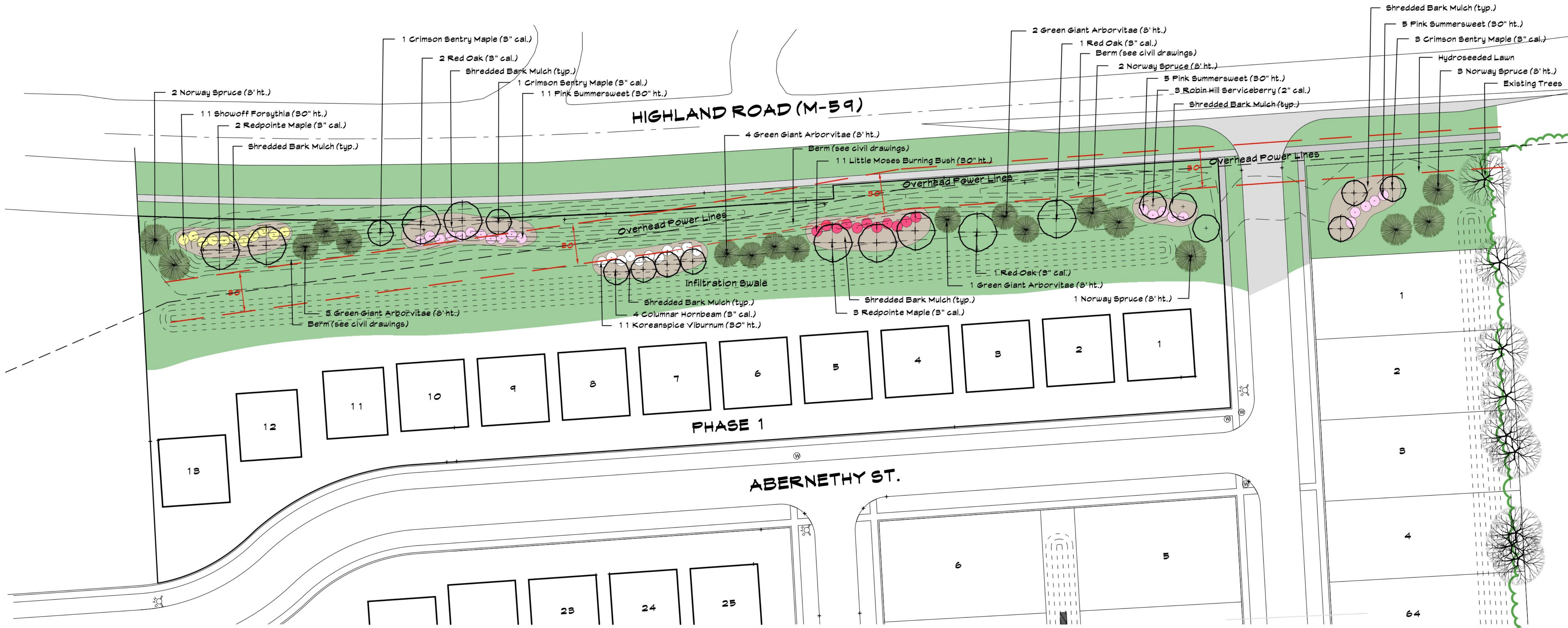
Evergreen Planting Detail-5' and Taller (as needed)



Deciduous Trees 5" Caliper and Smaller (as needed or required)



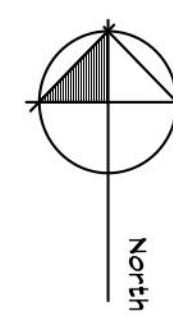
Shrub Planting Detail



Plant List

Quantity	Common Name	Latin Name	Planted Size
5	Redpointe Maple	Acer rubrum 'Frank Jr.'	3" cal.
5	Crimson Sentry Maple	Acer platanoides 'Crimson Sentry'	3" cal.
4	Red Oak	Quercus rubra	3" cal.
4	Columnar Hornbeam	Carpinus betulus 'Frans Fontaine'	3" cal.
5	Norway Spruce	Picea abies	8' ht.
10	Green Giant Arborvitae	Thuja standishii x plicata 'Green Giant'	8' ht.
3	Robin Hill Serviceberry	Amelanchier x grandiflora 'Robin Hill'	2" cal./TFF
11	Little Moses Burning Bush	Euonymus alatus compactum 'Little Moses'	30" ht.
11	Korean Spice Viburnum	Viburnum carlesii	30" ht.
11	Show Off Forsythia	Forsythia x intermedia 'Show Off'	30" ht.
21	Pink Summersweet	Clethra alnifolia 'Ruby Spice'	30" ht.

(note: Plant list for ordinance purposes only, the landscape contractor is responsible for plant quantities shown on the landscape plan)



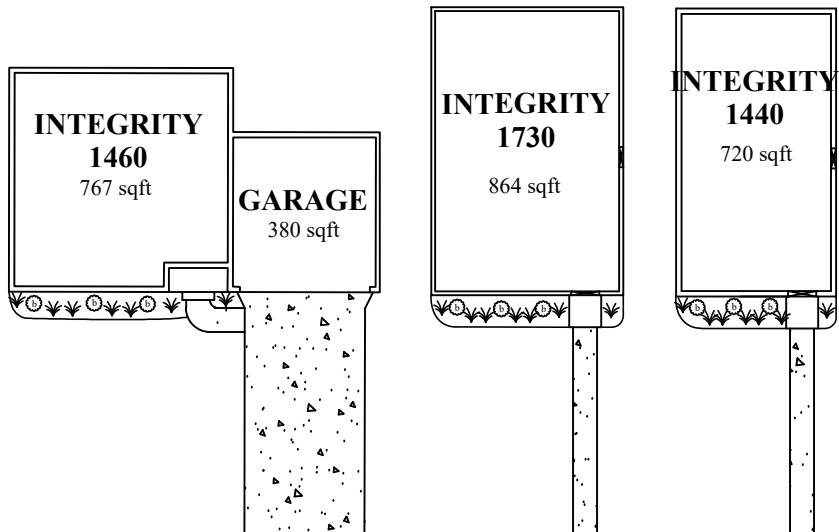
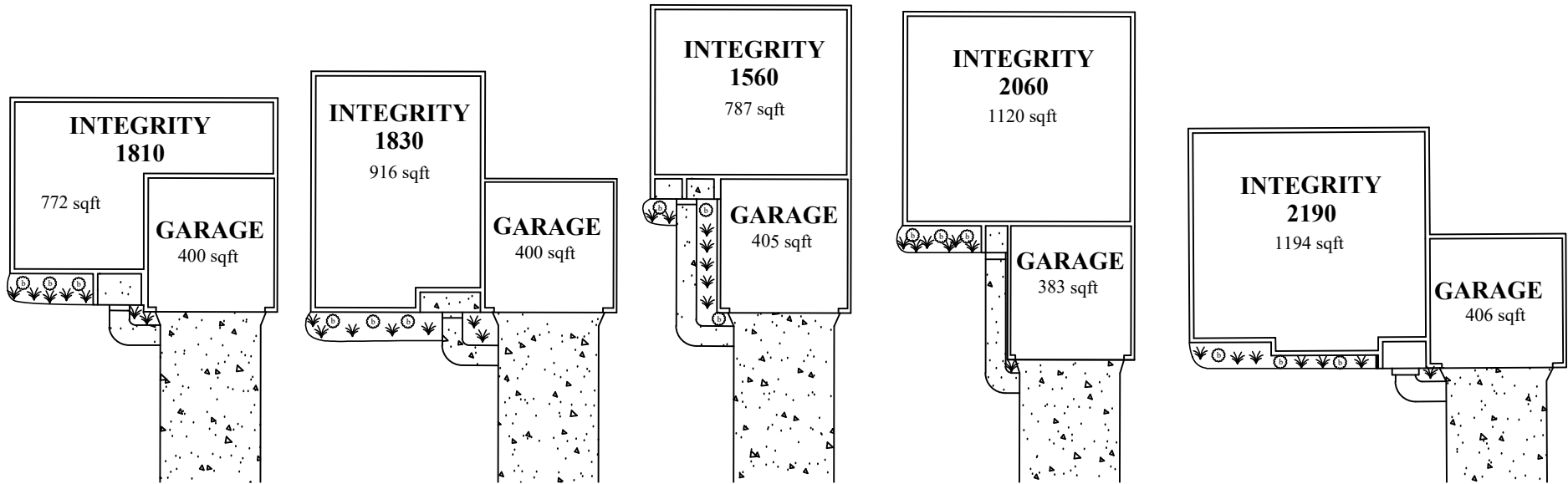
Notes:

- All landscaping shall be installed by a qualified Landscape Contractor. Plant sizes specified on the landscape plan shall be the size planted. Plants smaller than specified will be rejected. Substitutions of any kind must be approved by the Landscape Architect.
- All plantings shall be mulched with 3" shredded premium hardwood bark mulch. Trees in lawn areas shall receive a 6" diameter bark ring 3" deep.
- The landscape contractor shall remove any twine that is wrapped around the trunk of a tree or shrub as well as the top third of any burlap. Remove excess soil on the top of the root ball to expose the root flare or first layer of roots prior to planting. Use a wire cutter to make 3-5 cuts in the wire basket to allow roots to grow through. When planting trees in the lawn area or on the berm the existing soil within a 10 foot diameter shall be loosened by tilling or similar and amended with composted manure or peat at a depth of 6-12".
- Planting areas shall be edged with a mechanical bed edger to define a border for the shredded bark mulch.
- Lawn areas shall receive at least 4" of topsoil and hydroseeded. Check with specifications for topsoil availability or contact project manager. Topsoil for lawns shall be appropriate for growing and sustaining a healthy lawn. All lawns shall be hydroseeded with a seed blend consisting of 30% Kentucky Bluegrass, 20% Perennial Ryegrass, 10% Hard Fescue, 20% Creeping Red Fescue and 20% Chewings Fescue.
- Maintenance of the landscape shall be provided for by the owner and include fertilizing of lawn and plant material, yearly pruning, top dressing of mulch areas every other year and provide 1" of water per week during the growing season.
- Plant materials shall be chosen and installed in accordance with standards recommended by the County Cooperative Extension Service or American Nursery Association.

EXHIBIT F
STANDARD LANDSCAPE PACKAGE FOR RENTAL HOMES

COPPER BAY LANDSCAPE STANDARDS

12/19/2022



Floorplan	Day Lily	Boxwood	1" River Rock & Fabric	Metal Edging
Integrity 1440	7	3	60 sqft	22 lf
Integrity 1460	7	3	80 sqft	24 lf
Integrity 1560	7	3	80 sqft	8 lf
Integrity 1730	7	3	77 sqft	26 lf
Integrity 1810	7	3	65 sqft	16 lf
Integrity 1830	7	3	110 sqft	24 lf
Integrity 2060	7	3	55 sqft	16 lf
Integrity 2190	7	3	82 sqft	30 lf

* Quantity of materials subject to change

PLAN ATTRIBUTES



7 - Yellow Day Lily

3 - Boxwood

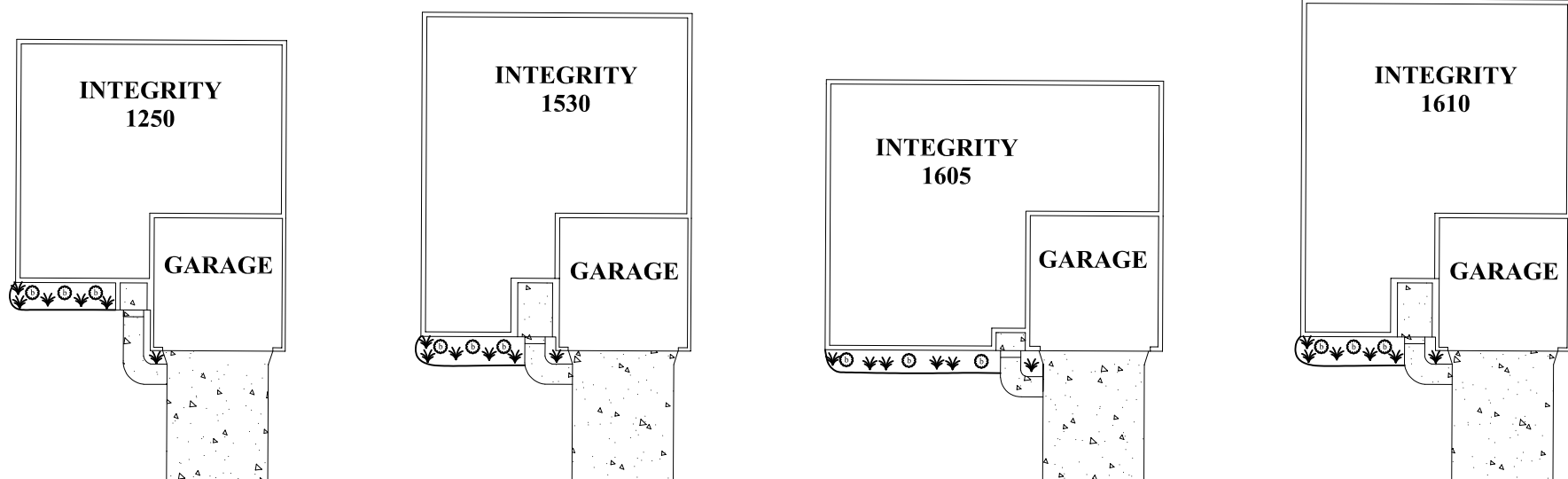
1" River Rock (3"-4" Depth)

Landscape Fabric

Metal Edging

COPPER BAY LANDSCAPE STANDARDS

2/17/2023



Floorplan	Day Lily	Boxwood	1" River Rock & Fabric	Metal Edging
Integrity 1250	7	3	75 sqft	20 lf
Integrity 1530	7	3	80 sqft	20 lf
Integrity 1605	7	3	100 sqft	28 lf
Integrity 1610	7	3	75 sqft	20 lf

* Quantity of materials subject to change

PLAN ATTRIBUTES



7 - Yellow Day Lily



3 - Boxwood

1" River Rock (3"-4" Depth)

Landscape Fabric

Metal Edging

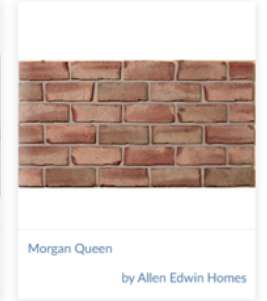
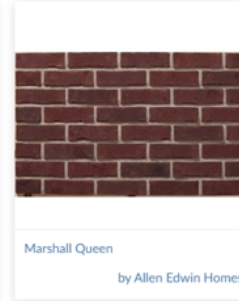
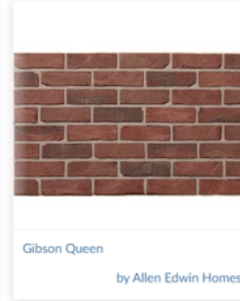
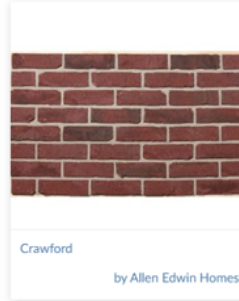
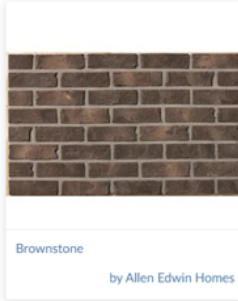
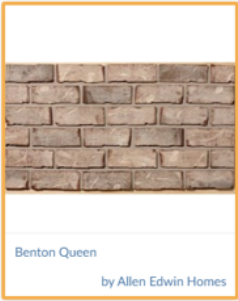
Hydroseeded Yard

ALLEN EDWIN HOMES

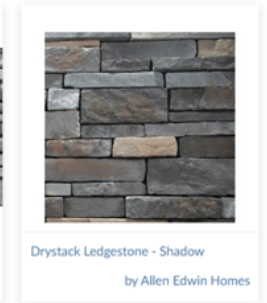
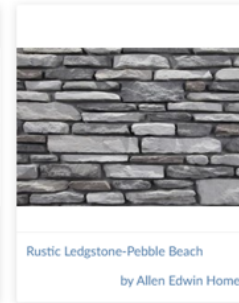
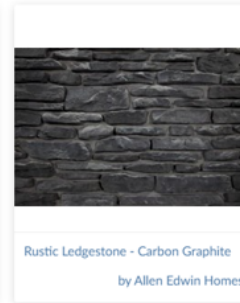
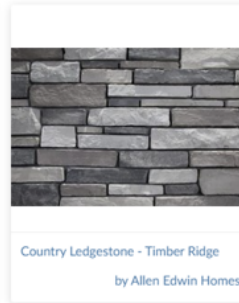
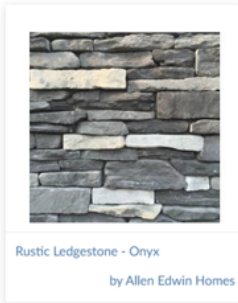
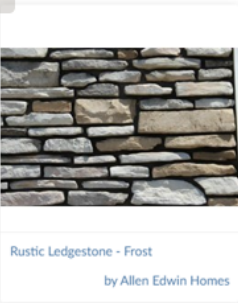
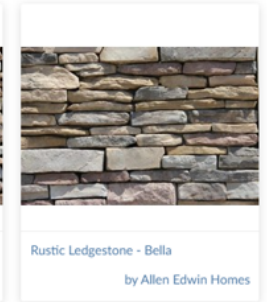
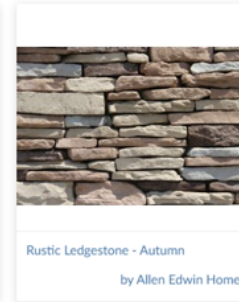
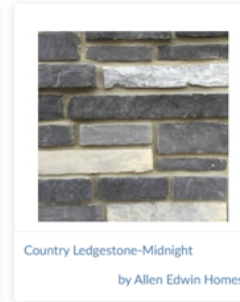
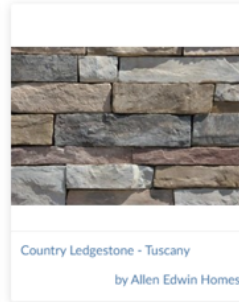
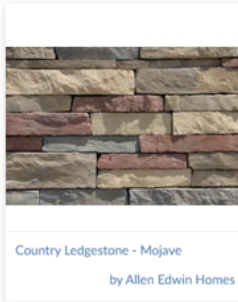
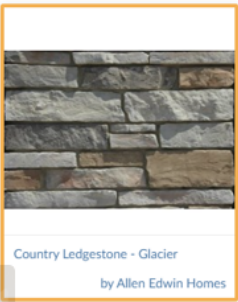
EXHIBIT G
EXTERIOR HOME COLOR PALETTE AND MATERIAL OPTIONS

Allen Edwin Homes Exterior Color Palette Options

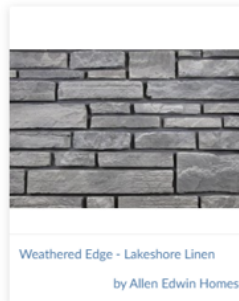
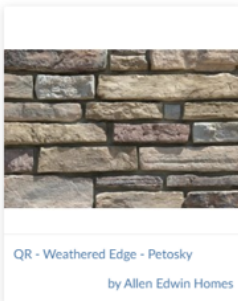
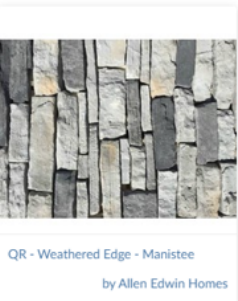
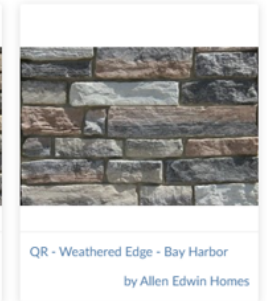
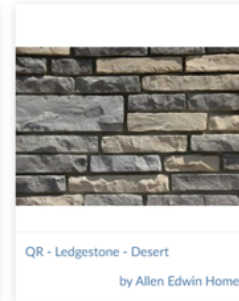
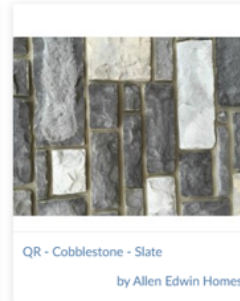
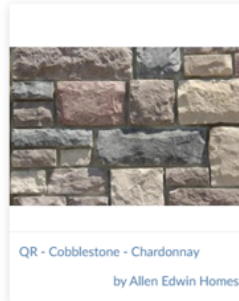
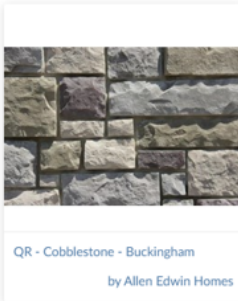
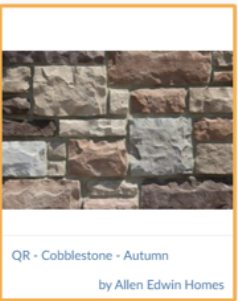
Available Choices in Brick Color




Available Choices in Stone Level 1 - Drystack - Color




Available Choices in Stone with Mortar - Color




Available Choices in Level 1 Exterior Siding - Horizontal




Vytec - Smokestone
by Allen Edwin Homes



CT - Espresso
by Allen Edwin Homes




CT - Midnight Blue
by Allen Edwin Homes



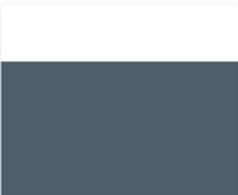
CT - Slate
by Allen Edwin Homes




Vytec - Canyon Ridge
by Allen Edwin Homes




Vytec - Forest
by Allen Edwin Homes



Vytec - Harbour
by Allen Edwin Homes



Vytec - Lakeshore Blue
by Allen Edwin Homes



Vytec - Redwood
by Allen Edwin Homes



Vytec - Rustic Oak
by Allen Edwin Homes



Vytec - Shoreline
by Allen Edwin Homes




Vytec - Smoky Steel
by Allen Edwin Homes




Vytec - Spring Meadow
by Allen Edwin Homes


Available Choices in Standard Siding Color




Vytec - Castle Stone
by Allen Edwin Homes




Vytec - Classic Gray
by Allen Edwin Homes




Vytec - Grasslands
by Allen Edwin Homes




Vytec - Maplewood
by Allen Edwin Homes




Vytec - Natural Sand
by Allen Edwin Homes




Vytec - Rustic Clay
by Allen Edwin Homes




Vytec - Sand Drift
by Allen Edwin Homes



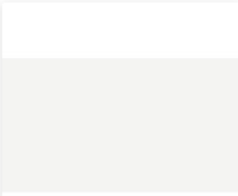
Vytec - Sierra Brown
by Allen Edwin Homes



Vytec - Tundra Moss
by Allen Edwin Homes



Vytec - Twilight Gray
by Allen Edwin Homes



Vytec - White
by Allen Edwin Homes

Available Trim Options



Vytec - White
by Allen Edwin Homes

MEMO

VIA EMAIL ckohane@allenedwin.com

To: Chris Kohane
Allen Edwin Homes

From: Jacob Swanson, PE
Salman Ahmad
Fleis & VandenBrink Engineering

Date: June 20, 2023

Re: Proposed Highland Reserve PUD
Hartland Township, Michigan
Traffic Impact Study

1 INTRODUCTION

This memorandum presents the results of the Traffic Impact Study (TIS) for the proposed Highland Reserve Planned Unit Development (PUD) in Hartland Township, Michigan. The project site is located on vacant property, generally located in the southeast quadrant of the Highland Road (M-59) & Hartland Glen Lane / Cundy Road intersection, as shown in the attached **Figure 1**. The proposed PUD includes a mixed-used development consisting of two (2) phases; Phase 1 includes residential units and Phase 2 includes a gas station with convenience store and a fast-food restaurant with drive-through. Site access is proposed via two (2) right-in/right-out (RIRO) driveways on Highland Road (M-59) and two (2) full-access driveways on Hartland Glen Lane. Highland Road (M-59) is under the jurisdiction of the Michigan Department of Transportation (MDOT); Hartland Glen Lane and Cundy Road are both under the jurisdiction of the Livingston County Road Commission (LCRC). Hartland Township has required the completion of a TIS as part of the site plan approval process and MDOT and LCRC have required the completion of a TIS for the permitting of site access.

F&V has performed this TIS to evaluate the impact of the proposed development on the adjacent roadway network. The scope of the study was developed based on Fleis & VandenBrink's (F&V) understanding of the development program, accepted traffic engineering practice, requirements of Hartland Township, MDOT, and LCRC, and professional experience. The TIS was completed using Synchro/SimTraffic (Version 11) traffic analysis software. Sources of data for this study include F&V subconsultant Quality Counts, LLC (QC), the Southeast Michigan Council of Governments (SEMCOG), the Institute of Transportation Engineers (ITE), MDOT, and LCRC.

2 BACKGROUND DATA

2.1 EXISTING ROAD NETWORK

The lane use and traffic control at the study intersections are shown on the attached **Figure 2** and the study roadways are further described below. For the purposes of this study, minor streets, crossovers, and site driveways were assumed to have an operating speed of 25 miles per hour (mph), unless otherwise noted.

Highland Road (M-59) generally runs in the east and west directions, adjacent to the north side of the project site. The study section of Highland Road (M-59) is classified as an *Other Principal Arterial*, is under the jurisdiction of MDOT, has a posted speed limit of 55 mph, and has an Annual Average Daily Traffic (AADT) volume of approximately of 23,975 (MDOT 2022) vehicles per day. Highland Road (M-59), adjacent to the project site, provides a median-divided four-lane cross-section, with two (2) lanes of travel in each direction; left turn movements are accommodated via the median U-turns (crossovers).

27725 Stansbury Boulevard, Suite 195
Farmington Hills, MI 48334

P: 248.53

F: 248.53

www.fver.com

Hartland Glen Lane runs in north and south directions, adjacent to the west side of project site. The study section of Hartland Glen Lane is a *Private Roadway*. The study section of roadway provides a typical two-lane cross-section, with one (1) lane of travel in each direction.

Cundy Road generally runs in east and west directions, adjacent to the west side of the project site. The study section of Cundy Road is classified as a *Local Road*, is under the jurisdiction of LCRC, and has a posted speed limit of 40 mph. The study section of roadway provides a typical two-lane cross-section, with one (1) lane of travel in each direction.

2.2 EXISTING TRAFFIC VOLUMES

F&V subconsultant QC collected existing Turning Movement Count (TMC) data on Wednesday May 17, 2023, during the AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) peak periods at the study intersections:

- EB Highland Road (M-59) & WB-to-EB X/O, West of Hartland Glen Lane / Cundy Road
- EB Highland Road (M-59) & Hartland Glen Lane / Cundy Road
- WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen Lane / Cundy Road
- EB Highland Road (M-59) & WB-to-EB X/O, East of Hartland Glen Lane / Cundy Road
- WB Highland Road (M-59) & EB-to-WB X/O, West of Pleasant Valley / Fenton Road

During collection of the turning movement counts, Peak Hour Factors (PHFs), pedestrian and bike volumes, and commercial truck percentages were recorded and used in the traffic analysis. The peak hours of the study intersections were utilized and the through volumes were carried through the roadway network and balanced upwards at the proposed site driveway. Therefore, the traffic volumes used in the analysis and shown on the attached traffic volume figures may not match the raw traffic volumes shown in the data collection.

The peak periods for the adjacent streets were observed to generally occur during the AM and PM peak hours, from 7:45 AM to 8:45 AM and from 5:00 PM to 6:00 PM, respectively. F&V collected an inventory of the existing lane use and traffic controls, as shown on the attached **Figure 2**. The existing 2023 peak hour traffic volumes utilized in this TIS analysis are shown on the attached **Figure 3**. All applicable background data referenced in this memorandum is attached.

3 EXISTING CONDITIONS (2023)

The existing peak hour vehicle delays and Levels of Service (LOS) were calculated at the study intersections using Synchro (Version 11) traffic analysis software. This analysis was based on the existing lane use and traffic control shown on the attached **Figure 2**, the existing peak hour traffic volumes shown on the attached **Figure 3**, and the methodologies presented in the *Highway Capacity Manual, 6th Edition* (HCM6).

Descriptions of LOS "A" through "F", as defined in the HCM6, are attached. Typically, LOS D is considered acceptable, with LOS A representing minimal delay, and LOS F indicating failing conditions. Additionally, SimTraffic network simulations were reviewed to evaluate network operations and vehicle queues. The results for the existing conditions analysis are attached and summarized in **Table 1**.

The results of the existing conditions analysis indicates that all approaches and movements at the study intersections are currently operating acceptably, at LOS D or better during both the AM and PM peak periods, with the exception of the following.

WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen Lane

- During the PM peak hour: The eastbound to westbound U-turn (NBL) approach is currently operating at LOS E.

Although the Synchro intersection LOS analysis indicates poor operations, review of SimTraffic network simulation indicates generally acceptable operation. Occasional periods of vehicle queues were observed; however, the vehicle queues were observed to dissipate and were not present throughout the PM peak hour. Crossover traffic was observed to find sufficient gaps within the through traffic, without experiencing significant delays or excessive vehicle queuing.

Review of the SimTraffic network simulations at the remaining study intersections indicates acceptable traffic operations throughout the study roadway network during both the AM and PM peak hours.

Table 1: Existing Intersection Operations

Intersection	Control	Approach	Existing Conditions			
			AM Peak		PM Peak	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS
10	Stop (Minor)	EB	Free			
		SBL	15.4	C	19.9	C
20	Stop (Minor)	EB	Free			
		NBR	19.9	C	21.1	C
30	Stop (Minor)	WB	Free			
		NBL	15.2	C	35.1	E
40	Stop (Minor)	EB	Free			
		SBL	14.9	B	16.5	C
50	Stop (Minor)	WB	Free			
		NBL	14.6	B	16.6	C

4 BACKGROUND CONDITIONS (2028 NO BUILD)

Historical population and employment community profile data was obtained for Hartland Township from the Southeast Michigan Council of Government (SEMCOG), in order to calculate a background growth rate to project the existing 2023 traffic volumes to the site buildout year of 2028. Population and employment projections from 2020 to 2050 were reviewed and indicated an average annual growth of 0.94% and 1.08%, respectively. Therefore, a conservative annual background growth rate of **1.08%** per year was applied to the existing peak hour traffic volumes to forecast the background 2028 traffic volumes.

In addition to the background traffic growth, it is important to account for traffic that will be generated by developments within the vicinity of the study area that are currently under construction or will be within the buildout year. At the time of this study, no planned background developments were identified by Hartland Township or LCRC, within the vicinity of the project site.

Background peak hour vehicle delays and LOS *without the proposed development* were calculated at the study intersections based on the existing lane use and traffic control shown on the attached **Figure 2**, the background peak hour traffic volumes shown on the attached **Figure 4**, and the methodologies presented in the HCM6. The results of the background conditions analysis are attached and summarized in **Tables 2**.

Table 2: Background Intersection Operations

Intersection	Control	Approach	Existing Conditions				Background Conditions				Difference			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
10	Stop (Minor)	EB	Free				Free				Free			
		SBL	15.4	C	19.9	C	16.0	C	21.5	C	0.6	-	1.6	-
20	Stop (Minor)	EB	Free				Free				Free			
		NBR	19.9	C	21.1	C	21.0	C	22.8	C	1.1	-	1.7	-
30	Stop (Minor)	WB	Free				Free				Free			
		NBL	15.2	C	35.1	E	15.8	C	44.4	E	0.6	-	9.3	-
40	Stop (Minor)	EB	Free				Free				Free			
		SBL	14.9	B	16.5	C	15.5	C	17.2	C	0.6	B→C	0.7	-
50	Stop (Minor)	WB	Free				Free				Free			
		NBL	14.6	B	16.6	C	15.1	C	17.5	C	0.5	B→C	0.9	-

The results of the background conditions analysis indicates that all approaches and movements at the study intersections are expected to continue operating in a manner similar to the existing conditions analysis, with minor increases in delays.

Review of SimTraffic network simulations throughout the study roadway network indicates generally acceptable operations during both peak periods, with the exception of the EB-to-WB crossover, East of Hartland Glen Lane. These queues were observed to occasionally spill back onto EB Highland Road (M-59) and block the through traffic during the PM peak hour. However, these queues were not present throughout the peak period.

5 SITE TRIP GENERATION

The number of weekday peak hour (AM and PM) and daily vehicle trips that would be generated by the proposed development were calculated using the rates and equations published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual, 11th Edition*. The proposed PUD includes a mixed-used development consisting of two (2) phases:

- **Phase 1:** 100 single family residential units
- **Phase 2:** A gas station / convenience store with 12 vehicle fueling positions (VFP) and a fast-food restaurant with a drive-through.

However, for the purpose of this TIS analysis, the full site buildout of the proposed development was evaluated. The trip generation forecast utilized for the proposed development is summarized in **Table 3**.

Table 3: Site Trip Generation Summary

Scenario	Land Use	ITE Code	Amount	Units	Average Daily Traffic (vpd)	AM Peak Hour (vph)			PM Peak Hour (vph)		
						In	Out	Total	In	Out	Total
Phase 1	Single-Family Detached	210	100	DU	1,009	19	55	74	62	37	99
Phase 2	Fast Food Restaurant w/Drive Through	934	2,400	SF	1,122	55	52	107	41	38	79
	<i>Pass-By (50% AM, 55% PM)</i>				398	27	27	54	21	21	42
	<i>New Trips</i>				724	28	25	53	20	17	37
	Gas Station with Convenience Market	945	12	VFP	3,086	162	162	324	137	136	273
	<i>Pass-By (76% AM, 75% PM)</i>				2,330	123	123	246	102	102	204
	<i>New Trips</i>				756	39	39	78	35	34	69
Buildout	<i>Total Trips</i>				5,217	236	269	505	240	211	451
	<i>Total Pass-By</i>				2,728	150	150	300	123	123	246
	Total New Trips				2,489	86	119	205	117	88	205

6 SITE TRIP DISTRIBUTION

The vehicular trips that would be generated by the proposed development were assigned to the study roadway network based on the proposed site access plan and driveway configurations, the existing peak hour traffic patterns in the adjacent roadway network, and the methodologies published by ITE. The ITE trip distribution methodology assumes that new trips are home-to-work based, and will enter the network and access the development, then leave the development and return to their direction of origin, whereas pass-by trips will enter and exit the development and continue on their original direction of travel. The site trip distributions utilized in this analysis are summarized in **Table 4**.

Table 4: Site Trip Distribution

To/From	Via	Commercial		Commercial Pass-By		Residential	
		AM	PM	AM	PM	AM	PM
East	Highland Road (M-59)	49%	48%	51% (EB)	53% (EB)	51%	48%
West	Highland Road (M-59)	51%	52%	49% (WB)	47% (WB)	49%	52%
Total		100%	100%	100%	100%	100%	100%

The vehicular traffic volumes shown in **Table 3** were distributed to the study roadway network according to the distribution shown in **Table 4**. The site-generated trips shown on the attached **Figure 5** were added to the background peak hour traffic volumes shown on the attached **Figure 4**, in order to calculate the future peak hour traffic volumes, with the addition of the proposed development. Future peak hour traffic volumes are shown on the attached **Figure 6**.

7 FUTURE CONDITIONS (2028)

Future peak hour vehicle delays and LOS **with the proposed development** were calculated based on the future lane use and traffic control shown on the attached **Figure 2**, the proposed site access plan, the future peak hour traffic volumes shown on the attached **Figure 6**, and the methodologies presented in the HCM6. The results of the future conditions analysis are attached and summarized in **Table 6**.

Table 5: Future Intersection Operations

Intersection	Control	Approach	Background Conditions				Future Conditions				Difference			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
10	EB M-59 & WB-to-EB X/O, W. of Hartland Glen	Stop (Minor)	Free				Free				Free			
		SBL	16.0	C	21.5	C	22.6	C	33.1	D	6.6	-	11.6	C→D
20	EB M-59 & Hartland Glen Lane	Stop (Minor)	Free				Free				Free			
		NBR	21.0	C	22.8	C	22.2	C	29.3	D	1.2	-	6.5	C→D
30	WB M-59 & EB-to-WB X/O, E. of Hartland Glen	Stop (Minor)	Free				Free				Free			
		NBL	15.8	C	44.4	E	23.4	C	58.6	F	7.6	-	14.2	E→F
40	EB M-59 & WB-to-EB X/O, E. of Hartland Glen	Stop (Minor)	Free				Free				Free			
		SBL	15.5	C	17.2	C	16.2	C	19.1	C	0.7	-	1.9	-
50	WB M-59 & EB-to-WB X/O, W. of Fenton	Stop (Minor)	Free				Free				Free			
		NBL	15.1	C	17.5	C	15.8	C	18.3	C	0.7	-	0.8	-
60	EB M-59 & Site Drive #1	Stop (Minor)	N/A				Free				N/A			
		NBR					35.9	E	49.0	E				
70	EB M-59 & Site Drive #2	Stop (Minor)	N/A				Free				N/A			
		NBR					17.8	C	19.4	C				
80	Hartland Glen / Cundy Road & Site Drive #4	Stop (Minor)	N/A				0.0*	A	0.0*	A	N/A			
		WB					8.5	A	8.5	A				
		NBL					0.0*	A	0.0*	A				
		SBL					7.4	A	7.4	A				
90	Hartland Glen / Cundy Road & Site Drive #3	Stop (Minor)	N/A				8.4	A	8.6	A	N/A			
		NB					Free							
		SBL					7.2	A	7.3	A				

* Indicates no vehicle volume present

The result of the future conditions analysis indicates that all study intersection approaches and movements are expected to continue operating in a manner similar to the background conditions analysis, with the exception of the following:

WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen Lane

- During the PM peak hour: The eastbound to westbound U-turn (NBL) approach is expected to operate at LOS F.

Review of SimTraffic microsimulations indicates periods of long vehicle queues which were observed to exceed the available crossover storage area, spilling back onto EB Highland Road (M-59) and block the through traffic during the PM peak hour.

EB Highland Road (M-59) & Site Drive #1

- During the AM and PM peak hour: The Site Drive approach is expected to operate at LOS E.

Review of SimTraffic microsimulations indicates acceptable operation during the AM peak hour, with a 95th percentile queue length of approximately 124-ft (4-5 vehicles), which is not significant. However, review of SimTraffic network simulations indicates that the overflow queues generated at the adjacent EB-to-WB crossover, east of Hartland Glen Lane were observed to occasionally block the operations at the proposed site driveway.

8 ACCESS MANAGEMENT

8.1 AUXILIARY TURN LANE EVALUATION

MDOT auxiliary turn lane warranting criteria charts were utilized to determine the need for auxiliary turn lanes at the proposed site driveways on Highland Road (M-59); the analysis was based on the future peak hour traffic volumes, shown on the attached **Figure 6**. The study section of Highland Road (M-59) is median-divided and left-turns are accommodated via median U-turns (crossovers); therefore, the warranting criteria for auxiliary left-turn lanes was not evaluated. The results of the analysis are shown on the attached MDOT warranting charts and are summarized in **Table 6**.

Table 6: Auxiliary Turn Lane Warrant Analysis Summary

Site Driveway Intersection	Right-Turn Treatment
Highland Road (M-59) & Site Drive #1	Right-Turn Lane
Highland Road (M-59) & Site Drive #2	Right-Turn Lane

The results of the auxiliary turn lane evaluation indicates that right-turn deceleration lanes are recommended on Highland Road (M-59) at both the proposed site driveways.

8.2 DRIVEWAY SPACING EVALUATION

The MDOT Geometric Design Guidance (Section 1.2.2) was utilized to evaluate the location of the proposed site driveways, in relation to nearby intersections and driveways within close proximity to the project site. The MDOT driveway spacing and intersection corner clearance criteria were evaluated for the 55-mph section of Highland Road (M-59). The proposed development plans include two (2) right-in/right-out (RIRO) driveways on Highland Road (M-59). The distance of the proposed site driveways from nearby access points and the warranting criteria are displayed in **Exhibit 1** and summarized in **Table 7**.

Exhibit 1: Site Driveway Spacing



Table 7: Desirable Driveway Spacing Summary

Adjacent Driveways & Intersections			Distance	Criteria	Meets
Site Drive #1	to	Hartland Glen Lane / Cundy Road	320 feet	230 feet	YES
Site Drive #1	to	EB-to-WB X/O, East of Hartland Glen Lane	260 feet	150 feet	YES
Site Drive #2	to	WB-to-EB X/O, East of Hartland Glen Lane	430 feet	150 feet	YES
Site Drive #2	to	EB-to-WB X/O, West of Fenton Road	600 feet	150 feet	YES

The results of the analysis indicates that both of the proposed site driveways are expected to meet the MDOT desirable spacing criteria in relation to the nearby roadways and access points.

9 FUTURE (2028) CONDITIONS WITH IMPROVEMENTS

9.1 SIGNAL WARRANT EVALUATION

In order to mitigate the future intersection delays at the study intersection of WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen Lane, intersection signalization is recommended. Therefore, a signal warrant analysis was performed in accordance with the *Michigan Manual on Uniform Traffic Control Devices (MMUTCD)* which documents eight warrants by which traffic signal control are considered. Warrant 1 (8-Hour Vehicular Volume), Warrant 2 (4-Hour Vehicular Volume), and Warrant 3 (Peak-Hour) were evaluated at the study intersection based on the projected future traffic volumes.

F&V only collected 4-hours (7-9AM and 4-6PM) of turning movement counts (TMCs); therefore, available historical traffic volume data along Highland Road (M-59) was utilized to evaluate all 24 hours of the signal warrant analysis spreadsheet. The results of the signal warrant analysis are summarized in **Table 8** and discussed below; the signal warrant charts are attached for reference.

Table 8: Signal Warrant Analysis Summary

WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen Lane		
Warrant 1: Eight Hour		Future
		YES
Condition A	Hours Met	1
	Warrant Met	NO
Condition B	Hours Met	12
	Warrant Met	YES
Warrant 2: Four-Hour	Hours Met	7
	Warrant Met	YES
Warrant 3: Peak-Hour	Hours Met	3
	Warrant Met	YES

The results of the signal warrant analysis indicates that the study intersection of WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen is expected to meet Warrant 1B (Eight-Hour), Warrant 2 (Four-Hour), and Warrant 3 (Peak-Hour) based on future traffic volumes. Therefore, a fully actuated traffic signal is recommended. However, it is recommended to continue monitoring this intersection as the proposed development progresses, to determine if/when a traffic signal would be recommended.

9.2 INTERSECTION OPERATIONS

In order to improve traffic operations under future conditions and mitigate the impact of the proposed development, mitigation measures were investigated. These mitigation measures included geometric improvements and traffic control modifications. The proposed improvements and their impact to intersection operations are summarized below.

WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen Lane

Review of the intersection operations during the PM peak hour indicates long vehicle queues for the northbound (U-turn) approach; these vehicle queues were the result of limited gaps within the through traffic along WB Highland Road (M-59), due to the high volume of through traffic. Therefore, mitigation measures were investigated, including geometric improvements and signalization. The results of the signal warrant analysis indicates a traffic signal is warranted at this location, based on the future traffic volumes. Therefore, the following mitigation measures are recommended at this intersection:

- Install a fully actuated traffic signal

EB Highland Road (M-59) & Site Drive #1 & #2

Review of SimTraffic microsimulations, with the implementation of the recommended traffic signal, indicates that the proposed site driveways will operate acceptably during both peak periods. The 95th percentile queue length for the northbound (egress) approach is projected to be approximately 140-ft (5-6 vehicles) or less during both peak periods, which is not significant based on the volume of egress traffic. Therefore, the following mitigation measures are recommended at these site driveway intersections:

- Provide a right-turn deceleration lane along EB Highland Road at Site Drive #1 and Site Drive #2.

The results of the future improvements conditions analysis, with the implementation of the recommended mitigation measures, are attached and summarized in **Table 7**.

Table 9: Future Intersection Operations with Improvements

Intersection	Control	Approach	Future Conditions				Future w/ IMP				Difference			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
30	WB M-59 & EB-to-WB X/O, E. of Hartland Glen	Stop (Minor)	Free				14.0	B	19.7	B	N/A			
		NBL	23.4	C	58.6	F	20.7	C	24.6	C	-2.7	-	-34.0	F→C
		Overall	N/A				14.5	B	20.3	C	N/A			
60	EB M-59 & Site Drive # 1	Stop (Minor)	Free				Free				Free			
		NBR	35.9	E	49.0	E	29.8	D	41.3	E	-6.1	E→D	-7.7	-
70	EB M-59 & Site Drive # 2	Stop (Minor)	Free				Free				Free			
		NBR	17.8	C	19.4	C	17.6	C	18.8	C	-0.2	-	-0.6	-

With the implementation of the recommended intersection improvements, all study intersection approaches and movements are expected to operate acceptably, at LOS D or better during both peak periods, with the exception of Site Drive #1; however, review of microsimulations indicates acceptable operations. Occasional periods of vehicles queues were observed at the southbound (U-turn) approach at the intersection of WB Highland Road (M-59) & WB-to-EB X/O, West of Hartland Glen Lane during the PM peak hour; however, the queues were observed to dissipate and were not present throughout the peak hour. Review of SimTraffic network simulations indicates acceptable operations throughout the remaining study roadway network.

10 CONCLUSIONS

The conclusions of this TIS are as follows:

1. Existing (2023) Conditions

The results of the existing conditions analysis indicates that all approaches and movements at the study intersections are currently operating acceptably, at LOS D or better during the AM and PM peak hours, with the exception of following:

- WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen Lane: The northbound (U-turn) approach is currently operating at LOS E during the PM peak hour.

Occasional periods of vehicle queues were observed; however, the vehicle queues were observed to dissipate and were not present throughout the PM peak hour.

2. Background (2028) Conditions

- Historical population and employment data in the area were reviewed to determine a conservative annual growth rate of **1.08%** per year, to apply to the existing 2023 peak hour traffic volumes, in order to forecast the 2028 background peak hour traffic volumes, without the proposed development.
- The results of the background conditions analysis indicates that all approaches and movements at the study intersections are expected to continue operating in a manner similar to the existing conditions analysis, with minor increases in delays.
- Review of SimTraffic network simulations throughout the study roadway network indicates generally acceptable operations during both peak periods, with the exception of the EB-to-WB crossover, East of Hartland Glen Lane. These queues were observed to occasionally spill back onto EB Highland Road (M-59) and block the through traffic during the PM peak hour. The queues were not present throughout the peak period.

3. Future (2028) Conditions

The result of the future conditions analysis indicates that all study intersection approaches and movements are expected to continue operating in a manner similar to the background conditions analysis, with the following exceptions:

- WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen Lane: The northbound (U-turn) approach is expected to operate at LOS F during the PM peak hour.

Review of SimTraffic microsimulations indicates periods of long vehicle queues which were observed to exceed the available crossover storage area, spilling back onto EB Highland Road (M-59) and block the through traffic during the PM peak hour.
- EB Highland Road (M-59) & Site Drive #1: The northbound approach is expected to operate at LOS E during both the AM and PM peak hours.

Review of SimTraffic network simulations indicates acceptable operation during the AM peak hour, with a 95th percentile queue length of approximately 124-ft (4-5 vehicles), which is not significant. However, review of SimTraffic microsimulations indicates that the adjacent EB-to-WB crossover intersection is expected to impact the operations of the site driveway intersection.

4. Access Management

- MDOT auxiliary turn lane warranting criteria charts were evaluated to determine the need for right-turn treatments at the proposed site driveways on Highland Road (M-59). The results indicates that full width right-turn deceleration lanes are warranted along eastbound Highland Road (M-59) at the proposed Site Drive #1 and Site Drive #2.
- The results of the driveway spacing evaluation indicates that the proposed site driveways on Highland Road (M-59) are expected to meet the MDOT desirable spacing criteria, in relation to the nearby roadways, crossovers, and access points.

5. Future (2028) Conditions with Improvements

WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen Lane

- In order to mitigate intersection projected future delays at the study intersection of WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen Lane, a signal warrant evaluation was performed. The results of the signal warrant analysis indicates that the study intersection is expected to meet Warrant 1B (Eight-Hour), Warrant 2 (Four-Hour), and Warrant 3 (Peak-Hour), based on future traffic volumes.

EB Highland Road (M-59) & Site Drive #1

- The results of the future improvements analysis, with the implementation of the recommended mitigation measures indicates that proposed Site Drive #1 is expected to operate at LOS D during the AM peak hour; however, the PM peak hour is expected to continue operating at LOS E. The 95th percentile queue length for the northbound (egress) approach is approximately 140-ft (5-6 vehicles) or less during both peak periods.

11 RECOMMENDATIONS

The recommendations of this TIS are as follows:

Intersections and Recommended Mitigation Measures	Phase 1	Buildout
30. WB Highland Road (M-59) & EB-to-WB X/O, East of Hartland Glen Lane		
Install a fully actuated traffic signal. <i>(It is recommended to continue monitoring this intersection as the proposed development progresses, to determine if/when a traffic signal is warranted).</i>		✓
60. EB Highland Road (M-59) & Site Drive #1		
Provide an eastbound right-turn deceleration lane along EB Highland Road (M-59) at the proposed Site Drive #1.		✓
70. EB Highland Road (M-59) & Site Drive #2		
Provide an eastbound right-turn deceleration lane along EB Highland Road (M-59) at the proposed Site Drive #2.	✓	

Any questions related to this memorandum, study, analysis, and results should be addressed to Fleis & VandenBrink.



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Michigan.

Jacob Swanson

Digitally signed
by Jacob Swanson
Date: 2023.06.20
16:51:25 -04'00'

Attached: Figure 1-6
Proposed Site/Concept Plan
Traffic Volume Data
SEMCOG Information
Synchro / SimTraffic Results
Auxiliary Turn Lane Criteria
Signal Warrants

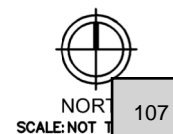


FIGURE 1
SITE LOCATION

Highland Reserve PUD TIS - Hartland Township, MI

LEGEND

 SITE LOCATION



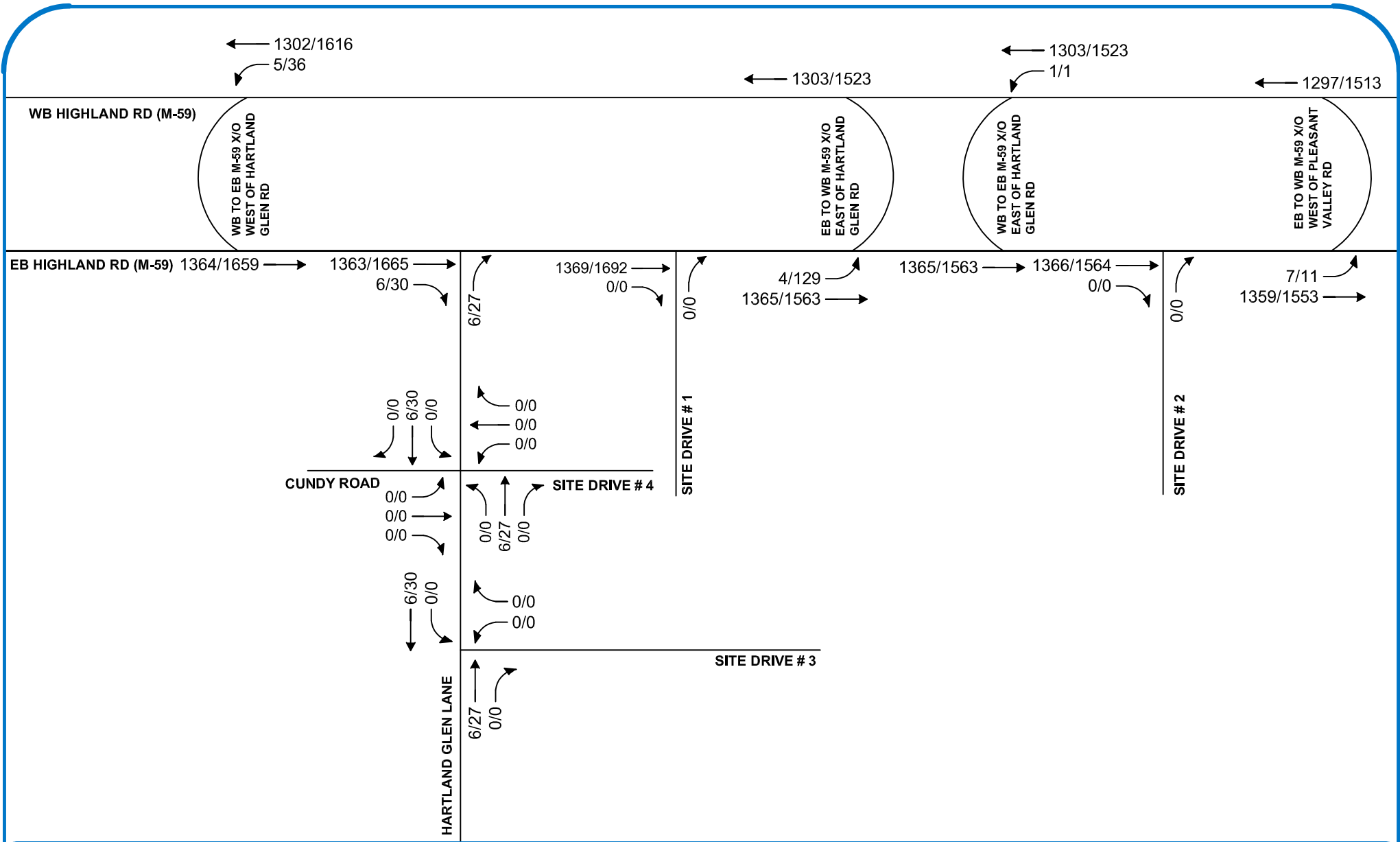
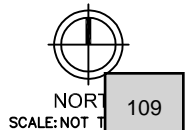


FIGURE 3
EXISTING TRAFFIC VOLUMES

Highland Reserve PUD TIS - Hartland Township, MI

LEGEND

- ROADS
- - - PROPOSED ROADS
- TRAFFIC VOLUMES (AM/PM)



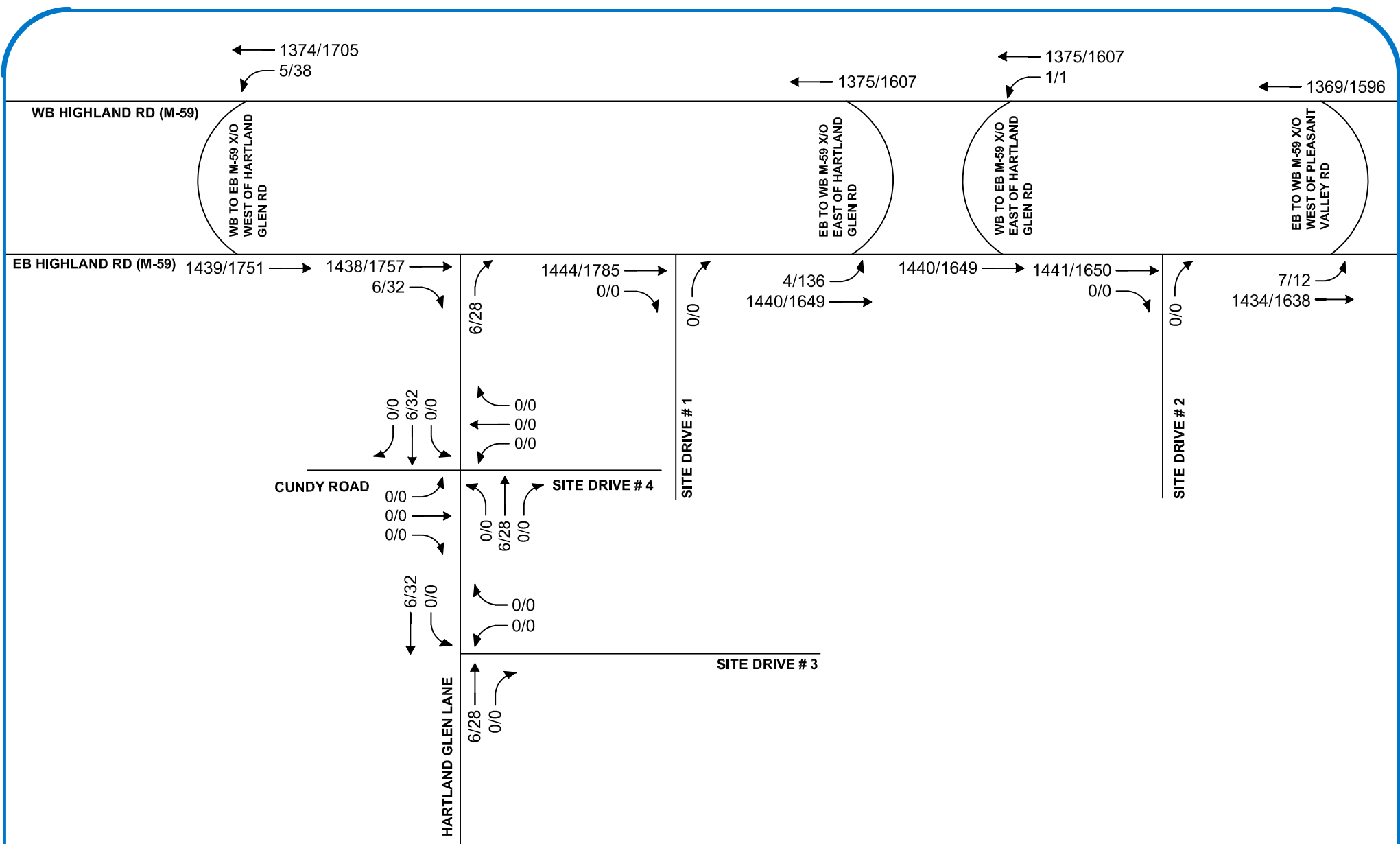
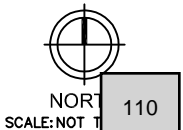


FIGURE 4
BACKGROUND TRAFFIC VOLUMES

Highland Reserve PUD TIS - Hartland Township, MI

LEGEND

- ROADS
- PROPOSED ROADS
- TRAFFIC VOLUMES (AM/PM)



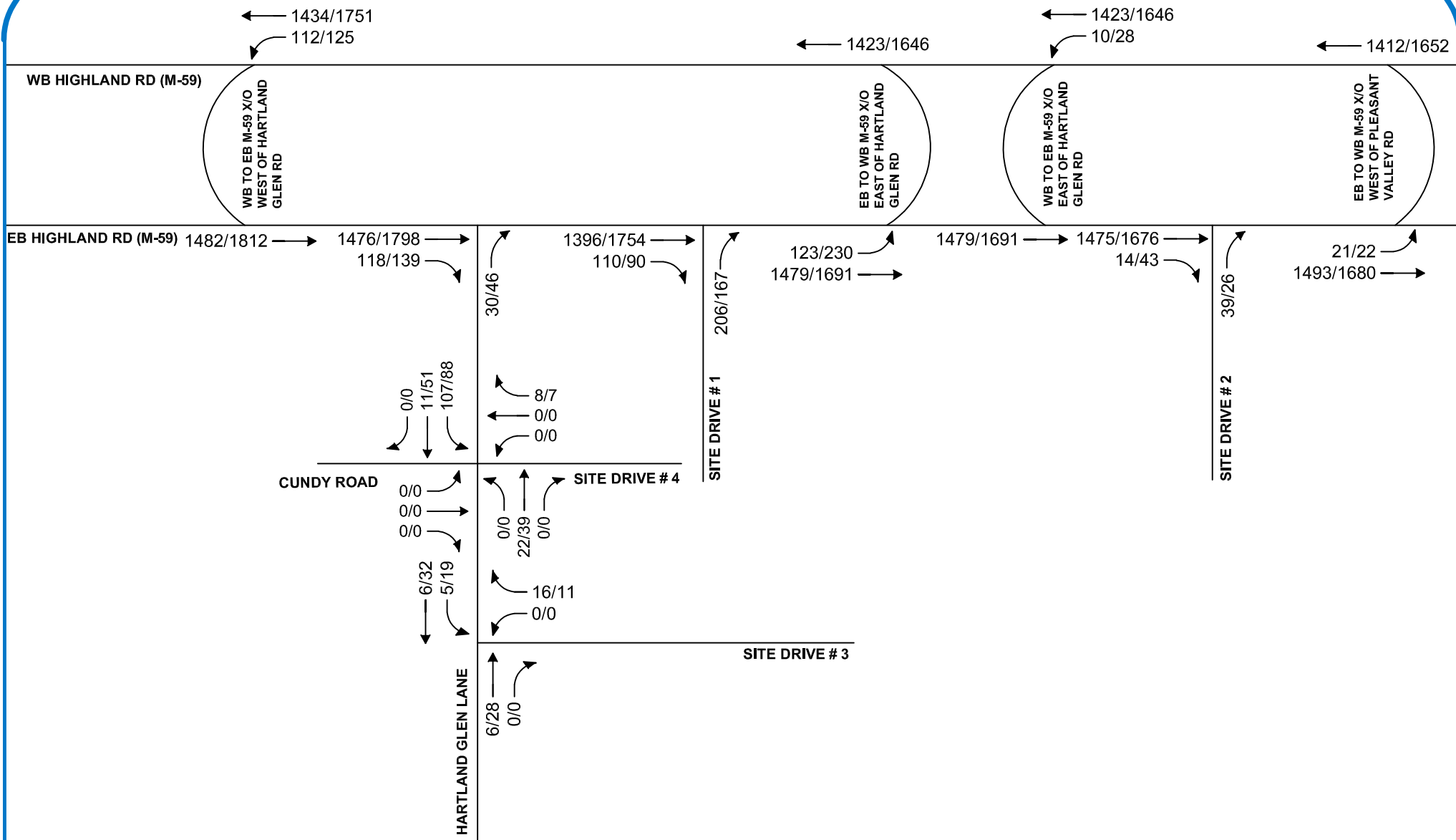
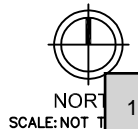


FIGURE 6 FUTURE TRAFFIC VOLUMES

Highland Reserve PUD TIS - Hartland Township, MI

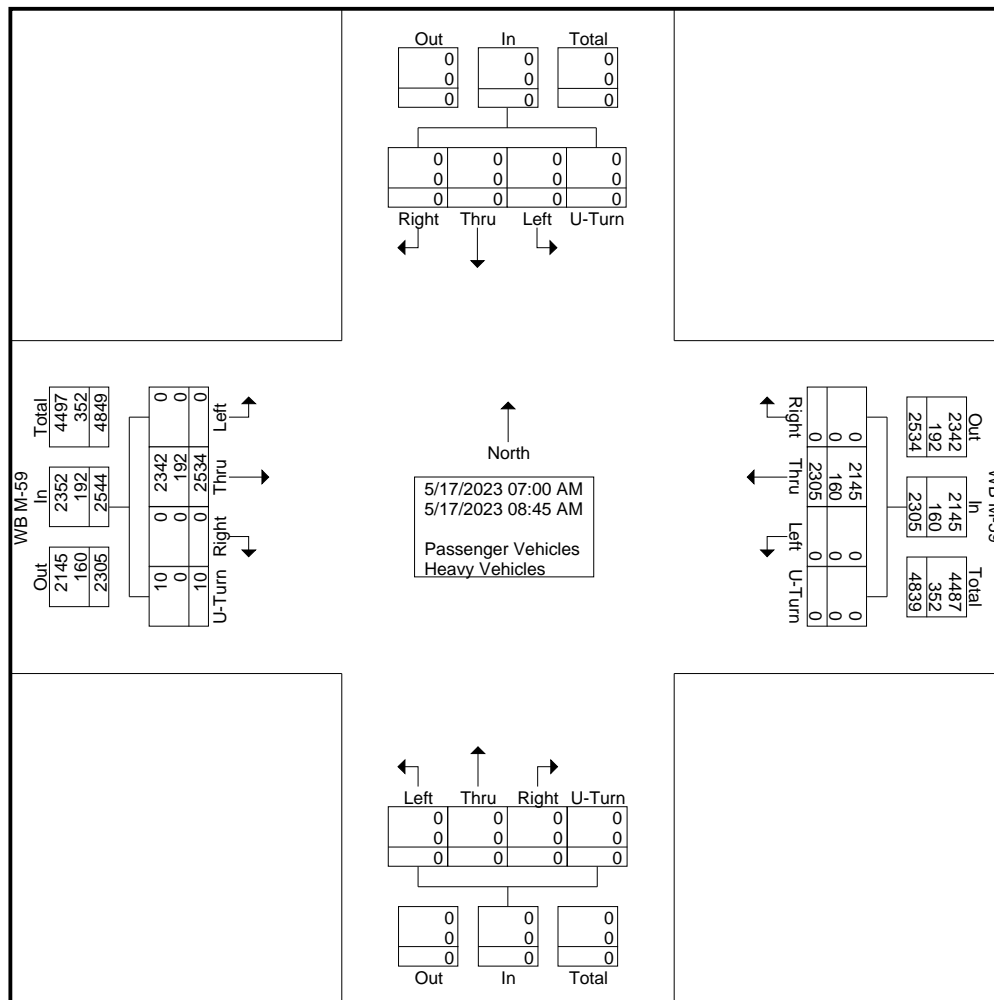
LEGEND

- ROADS
- - - PROPOSED ROADS
- TRAFFIC VOLUMES (AM/PM)

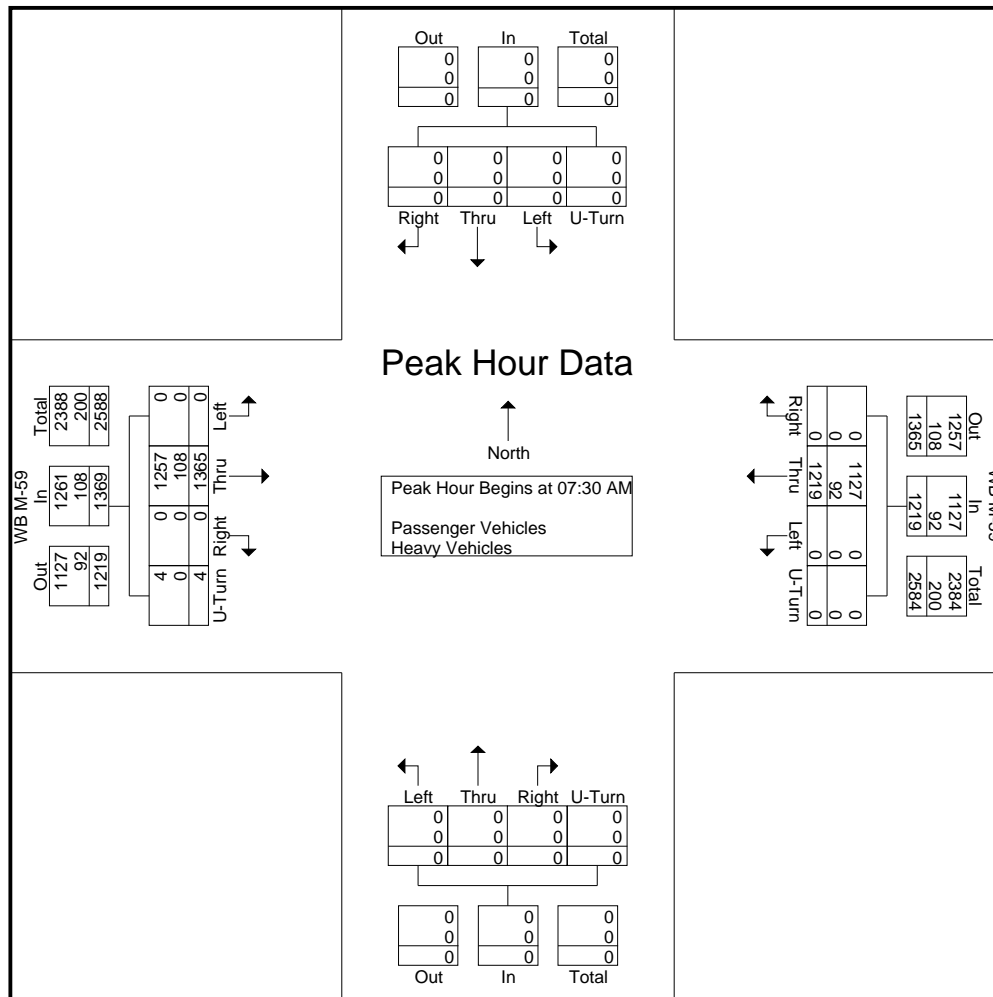


Groups Printed- Passenger Vehicles - Heavy Vehicles

	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
07:00 AM	0	250	0	1	251	0	228	0	0	228	0	0	0	0	0	0	0	0	0	0	479
07:15 AM	0	314	0	4	318	0	253	0	0	253	0	0	0	0	0	0	0	0	0	0	571
07:30 AM	0	365	0	0	365	0	269	0	0	269	0	0	0	0	0	0	0	0	0	0	634
07:45 AM	0	357	0	1	358	0	342	0	0	342	0	0	0	0	0	0	0	0	0	0	700
Total	0	1286	0	6	1292	0	1092	0	0	1092	0	0	0	0	0	0	0	0	0	0	2384
08:00 AM	0	313	0	3	316	0	269	0	0	269	0	0	0	0	0	0	0	0	0	0	585
08:15 AM	0	330	0	0	330	0	339	0	0	339	0	0	0	0	0	0	0	0	0	0	669
08:30 AM	0	296	0	0	296	0	337	0	0	337	0	0	0	0	0	0	0	0	0	0	633
08:45 AM	0	309	0	1	310	0	268	0	0	268	0	0	0	0	0	0	0	0	0	0	578
Total	0	1248	0	4	1252	0	1213	0	0	1213	0	0	0	0	0	0	0	0	0	0	2465
Grand Total	0	2534	0	10	2544	0	2305	0	0	2305	0	0	0	0	0	0	0	0	0	0	4849
Apprch %	0	99.6	0	0.4		0	100	0	0		0	0	0	0		0	0	0	0		
Total %	0	52.3	0	0.2	52.5	0	47.5	0	0	47.5	0	0	0	0	0	0	0	0	0	0	
Passenger Vehicles	0	2342	0	10	2352	0	2145	0	0	2145	0	0	0	0	0	0	0	0	0	0	4497
% Passenger Vehicles	0	92.4	0	100	92.5	0	93.1	0	0	93.1	0	0	0	0	0	0	0	0	0	0	92.7
Heavy Vehicles	0	192	0	0	192	0	160	0	0	160	0	0	0	0	0	0	0	0	0	0	352
% Heavy Vehicles	0	7.6	0	0	7.5	0	6.9	0	0	6.9	0	0	0	0	0	0	0	0	0	0	7.3

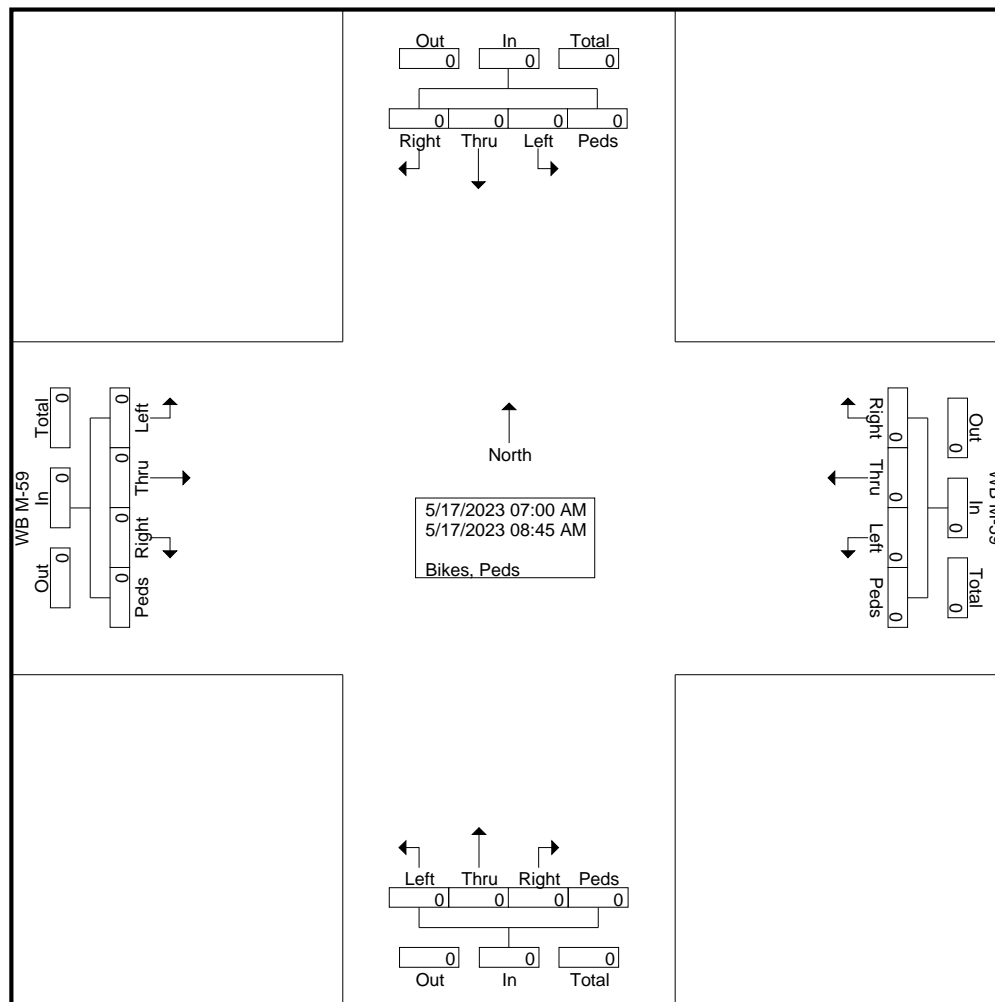


	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	365	0	0	365	0	269	0	0	269	0	0	0	0	0	0	0	0	0	0	634
07:45 AM	0	357	0	1	358	0	342	0	0	342	0	0	0	0	0	0	0	0	0	0	700
08:00 AM	0	313	0	3	316	0	269	0	0	269	0	0	0	0	0	0	0	0	0	0	585
08:15 AM	0	330	0	0	330	0	339	0	0	339	0	0	0	0	0	0	0	0	0	0	669
Total Volume	0	1365	0	4	1369	0	1219	0	0	1219	0	0	0	0	0	0	0	0	0	0	2588
% App. Total	0	99.7	0	0.3		0	100	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.935	.000	.333	.938	.000	.891	.000	.000	.891	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.924
Passenger Vehicles	0	1257	0	4	1261	0	1127	0	0	1127	0	0	0	0	0	0	0	0	0	0	2388
% Passenger Vehicles	0	92.1	0	100	92.1	0	92.5	0	0	92.5	0	0	0	0	0	0	0	0	0	0	92.3
Heavy Vehicles	0	108	0	0	108	0	92	0	0	92	0	0	0	0	0	0	0	0	0	0	200
% Heavy Vehicles	0	7.9	0	0	7.9	0	7.5	0	0	7.5	0	0	0	0	0	0	0	0	0	0	7.7

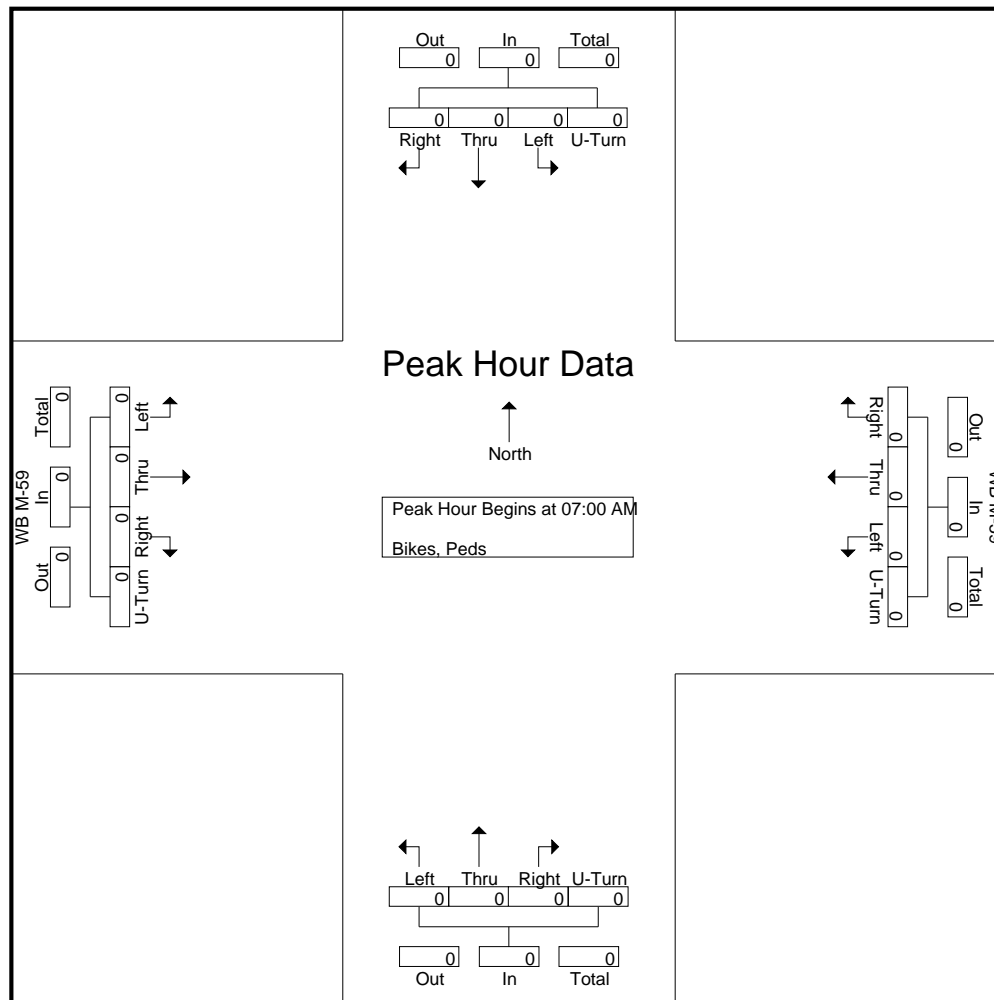


Groups Printed- Bikes, Peds

	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

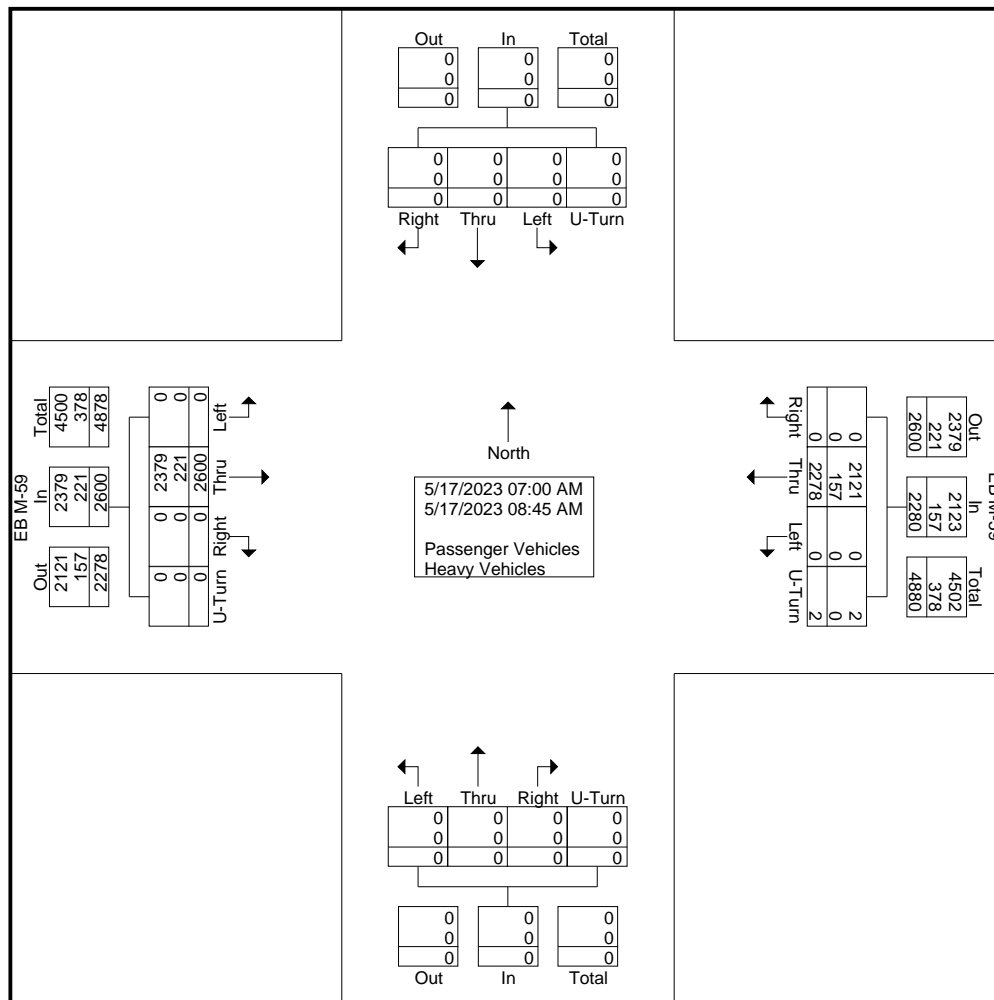


	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

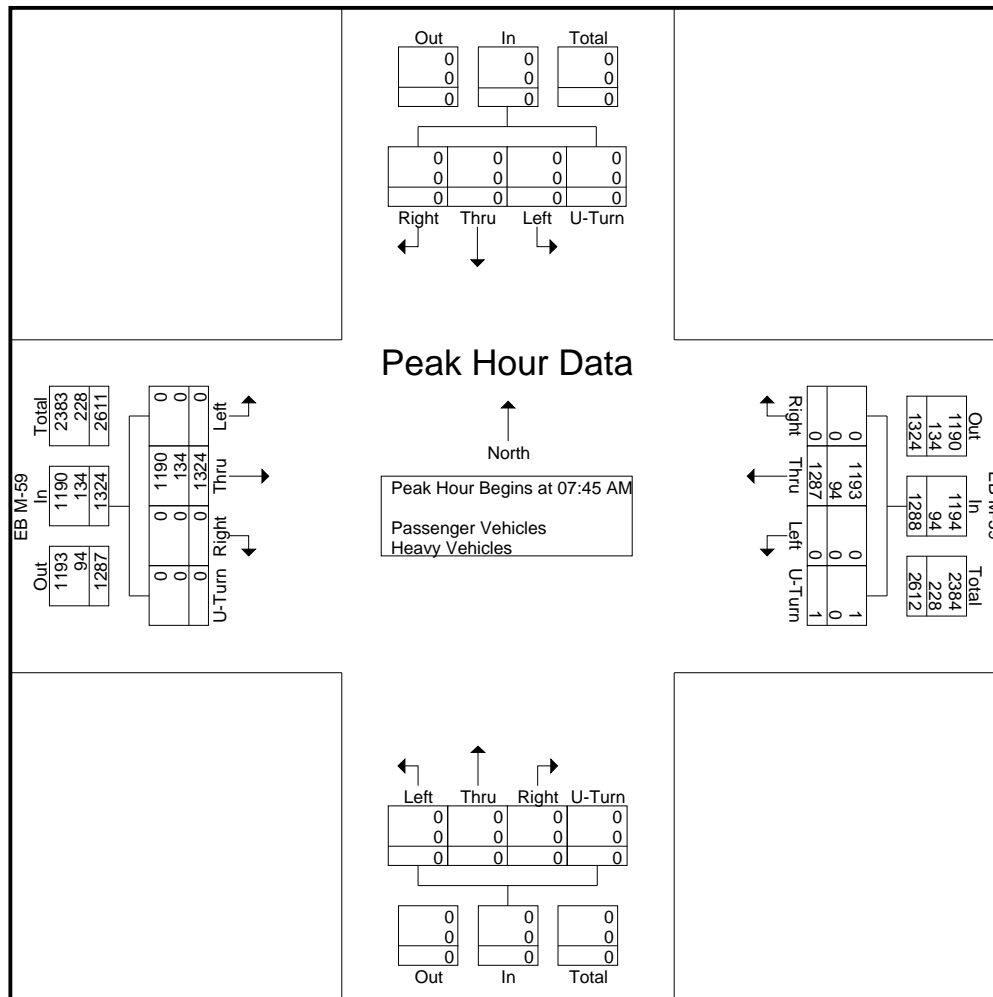


Groups Printed- Passenger Vehicles - Heavy Vehicles

	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
07:00 AM	0	270	0	0	270	0	232	0	0	232	0	0	0	0	0	0	0	0	0	0	502
07:15 AM	0	326	0	0	326	0	241	0	0	241	0	0	0	0	0	0	0	0	0	0	567
07:30 AM	0	378	0	0	378	0	259	0	0	259	0	0	0	0	0	0	0	0	0	0	637
07:45 AM	0	354	0	0	354	0	337	0	0	337	0	0	0	0	0	0	0	0	0	0	691
Total	0	1328	0	0	1328	0	1069	0	0	1069	0	0	0	0	0	0	0	0	0	0	2397
08:00 AM	0	321	0	0	321	0	263	0	1	264	0	0	0	0	0	0	0	0	0	0	585
08:15 AM	0	340	0	0	340	0	342	0	0	342	0	0	0	0	0	0	0	0	0	0	682
08:30 AM	0	309	0	0	309	0	345	0	0	345	0	0	0	0	0	0	0	0	0	0	654
08:45 AM	0	302	0	0	302	0	259	0	1	260	0	0	0	0	0	0	0	0	0	0	562
Total	0	1272	0	0	1272	0	1209	0	2	1211	0	0	0	0	0	0	0	0	0	0	2483
Grand Total	0	2600	0	0	2600	0	2278	0	2	2280	0	0	0	0	0	0	0	0	0	0	4880
Apprch %	0	100	0	0		0	99.9	0	0.1		0	0	0	0		0	0	0	0		
Total %	0	53.3	0	0	53.3	0	46.7	0	0	46.7	0	0	0	0	0	0	0	0	0	0	
Passenger Vehicles	0	2379	0	0	2379	0	2121	0	2	2123	0	0	0	0	0	0	0	0	0	0	4502
% Passenger Vehicles	0	91.5	0	0	91.5	0	93.1	0	100	93.1	0	0	0	0	0	0	0	0	0	0	92.3
Heavy Vehicles	0	221	0	0	221	0	157	0	0	157	0	0	0	0	0	0	0	0	0	0	378
% Heavy Vehicles	0	8.5	0	0	8.5	0	6.9	0	0	6.9	0	0	0	0	0	0	0	0	0	0	7.7

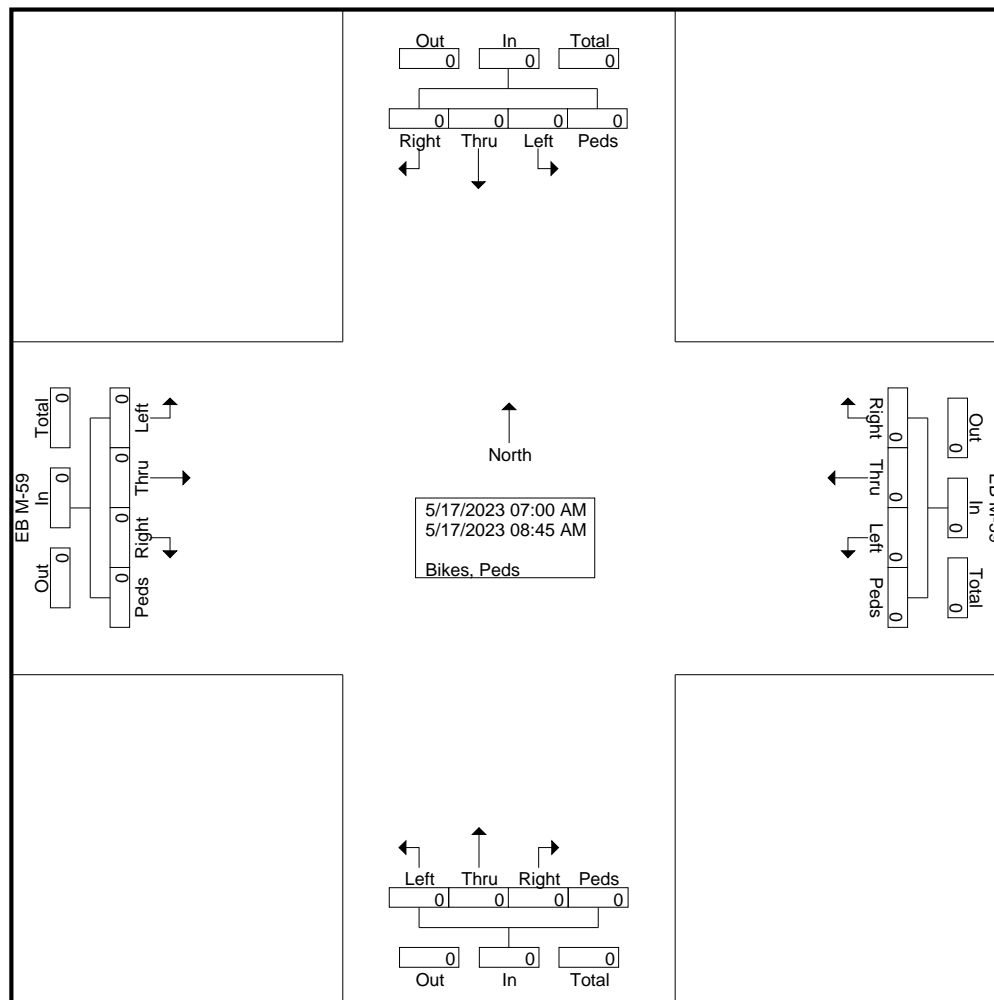


	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	354	0	0	354	0	337	0	0	337	0	0	0	0	0	0	0	0	0	0	691
08:00 AM	0	321	0	0	321	0	263	0	1	264	0	0	0	0	0	0	0	0	0	0	585
08:15 AM	0	340	0	0	340	0	342	0	0	342	0	0	0	0	0	0	0	0	0	0	682
08:30 AM	0	309	0	0	309	0	345	0	0	345	0	0	0	0	0	0	0	0	0	0	654
Total Volume	0	1324	0	0	1324	0	1287	0	1	1288	0	0	0	0	0	0	0	0	0	0	2612
% App. Total	0	100	0	0		0	99.9	0	0.1		0	0	0	0		0	0	0	0		
PHF	.000	.935	.000	.000	.935	.000	.933	.000	.250	.933	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.945
Passenger Vehicles	0	1190	0	0	1190	0	1193	0	1	1194	0	0	0	0	0	0	0	0	0	0	2384
% Passenger Vehicles	0	89.9	0	0	89.9	0	92.7	0	100	92.7	0	0	0	0	0	0	0	0	0	0	91.3
Heavy Vehicles	0	134	0	0	134	0	94	0	0	94	0	0	0	0	0	0	0	0	0	0	228
% Heavy Vehicles	0	10.1	0	0	10.1	0	7.3	0	0	7.3	0	0	0	0	0	0	0	0	0	0	8.7

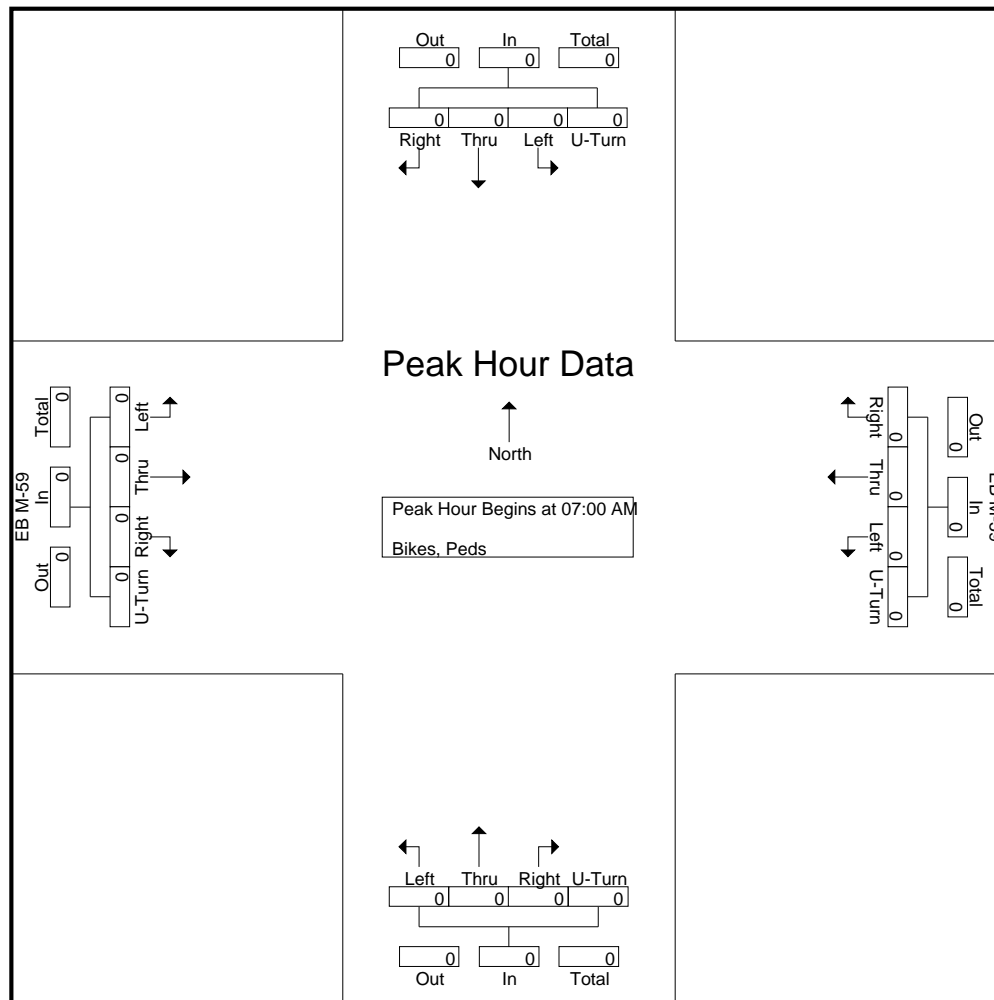


Groups Printed- Bikes, Peds

Start Time	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

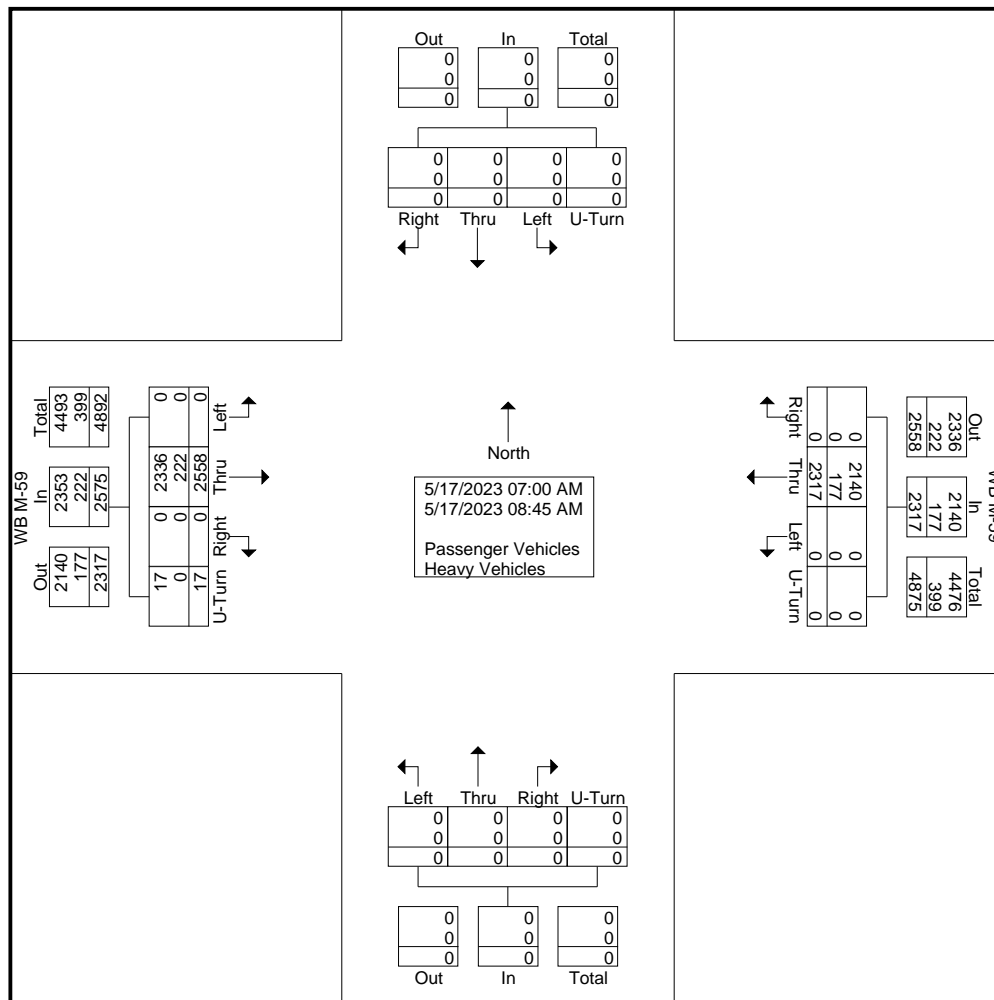


	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

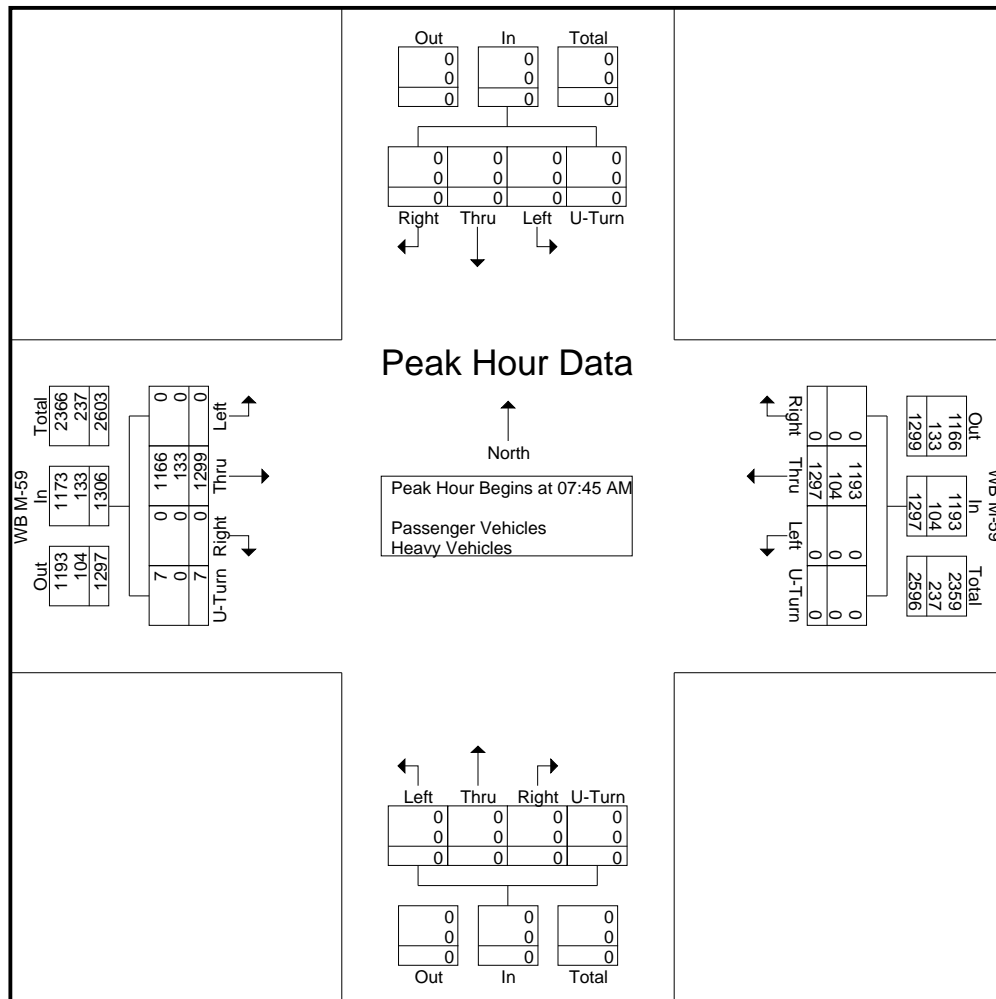


Groups Printed- Passenger Vehicles - Heavy Vehicles

	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
07:00 AM	0	270	0	1	271	0	239	0	0	239	0	0	0	0	0	0	0	0	0	0	510
07:15 AM	0	320	0	0	320	0	255	0	0	255	0	0	0	0	0	0	0	0	0	0	575
07:30 AM	0	364	0	0	364	0	262	0	0	262	0	0	0	0	0	0	0	0	0	0	626
07:45 AM	0	350	0	1	351	0	341	0	0	341	0	0	0	0	0	0	0	0	0	0	692
Total	0	1304	0	2	1306	0	1097	0	0	1097	0	0	0	0	0	0	0	0	0	0	2403
08:00 AM	0	321	0	0	321	0	273	0	0	273	0	0	0	0	0	0	0	0	0	0	594
08:15 AM	0	329	0	0	329	0	340	0	0	340	0	0	0	0	0	0	0	0	0	0	669
08:30 AM	0	299	0	6	305	0	343	0	0	343	0	0	0	0	0	0	0	0	0	0	648
08:45 AM	0	305	0	9	314	0	264	0	0	264	0	0	0	0	0	0	0	0	0	0	578
Total	0	1254	0	15	1269	0	1220	0	0	1220	0	0	0	0	0	0	0	0	0	0	2489
Grand Total	0	2558	0	17	2575	0	2317	0	0	2317	0	0	0	0	0	0	0	0	0	0	4892
Apprch %	0	99.3	0	0.7		0	100	0	0		0	0	0	0		0	0	0	0		
Total %	0	52.3	0	0.3	52.6	0	47.4	0	0	47.4	0	0	0	0	0	0	0	0	0	0	
Passenger Vehicles	0	2336	0	17	2353	0	2140	0	0	2140	0	0	0	0	0	0	0	0	0	0	4493
% Passenger Vehicles	0	91.3	0	100	91.4	0	92.4	0	0	92.4	0	0	0	0	0	0	0	0	0	0	91.8
Heavy Vehicles	0	222	0	0	222	0	177	0	0	177	0	0	0	0	0	0	0	0	0	0	399
% Heavy Vehicles	0	8.7	0	0	8.6	0	7.6	0	0	7.6	0	0	0	0	0	0	0	0	0	0	8.2

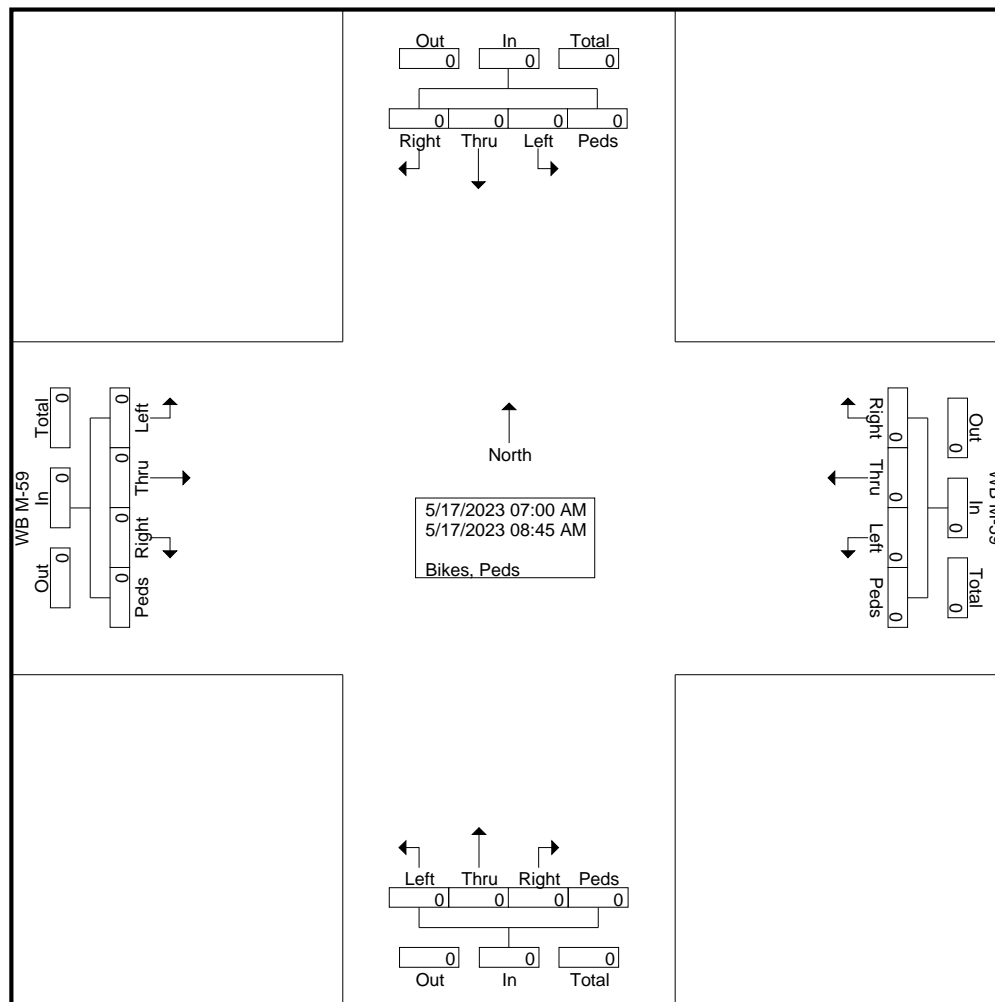


	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	350	0	1	351	0	341	0	0	341	0	0	0	0	0	0	0	0	0	0	692
08:00 AM	0	321	0	0	321	0	273	0	0	273	0	0	0	0	0	0	0	0	0	0	594
08:15 AM	0	329	0	0	329	0	340	0	0	340	0	0	0	0	0	0	0	0	0	0	669
08:30 AM	0	299	0	6	305	0	343	0	0	343	0	0	0	0	0	0	0	0	0	0	648
Total Volume	0	1299	0	7	1306	0	1297	0	0	1297	0	0	0	0	0	0	0	0	0	0	2603
% App. Total	0	99.5	0	0.5		0	100	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.928	.000	.292	.930	.000	.945	.000	.000	.945	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.940
Passenger Vehicles	0	1166	0	7	1173	0	1193	0	0	1193	0	0	0	0	0	0	0	0	0	0	2366
% Passenger Vehicles	0	89.8	0	100	89.8	0	92.0	0	0	92.0	0	0	0	0	0	0	0	0	0	0	90.9
Heavy Vehicles	0	133	0	0	133	0	104	0	0	104	0	0	0	0	0	0	0	0	0	0	237
% Heavy Vehicles	0	10.2	0	0	10.2	0	8.0	0	0	8.0	0	0	0	0	0	0	0	0	0	0	9.1

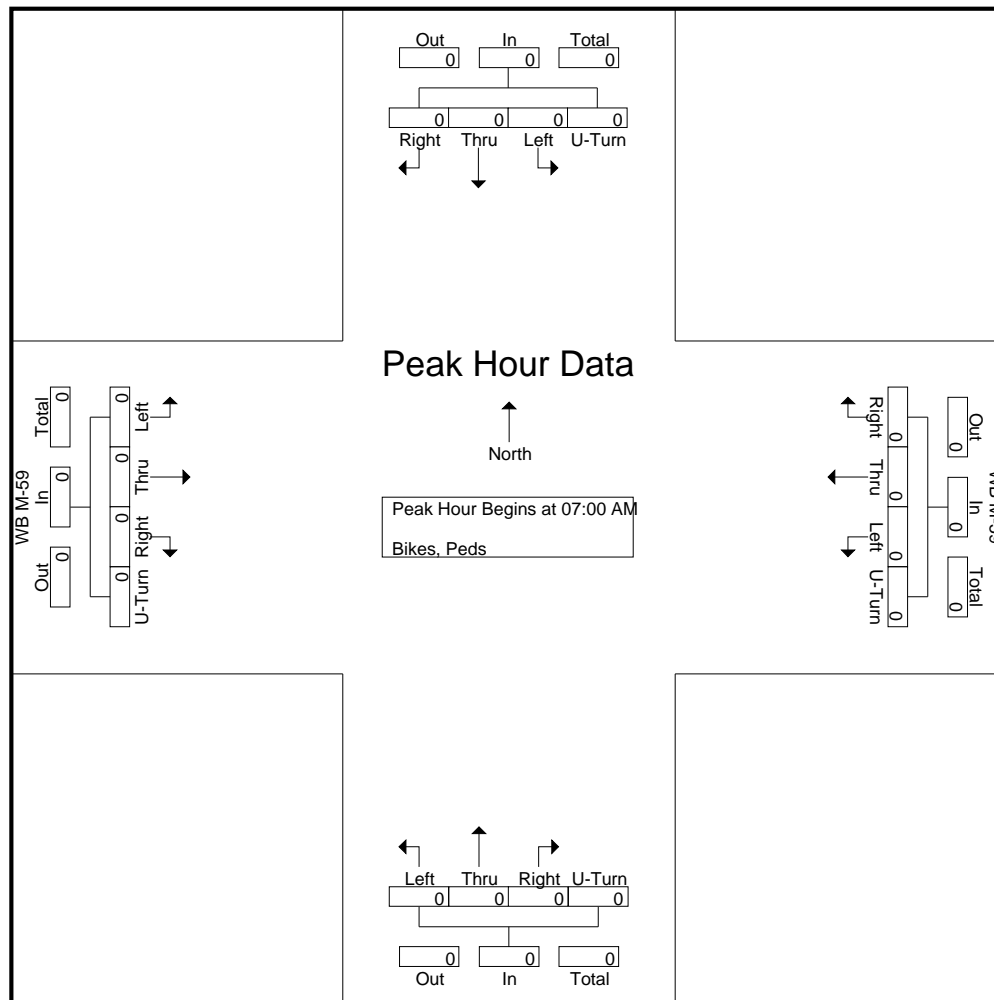


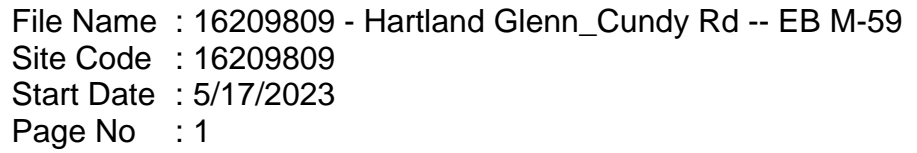
Groups Printed- Bikes, Peds

Start Time	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					



	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

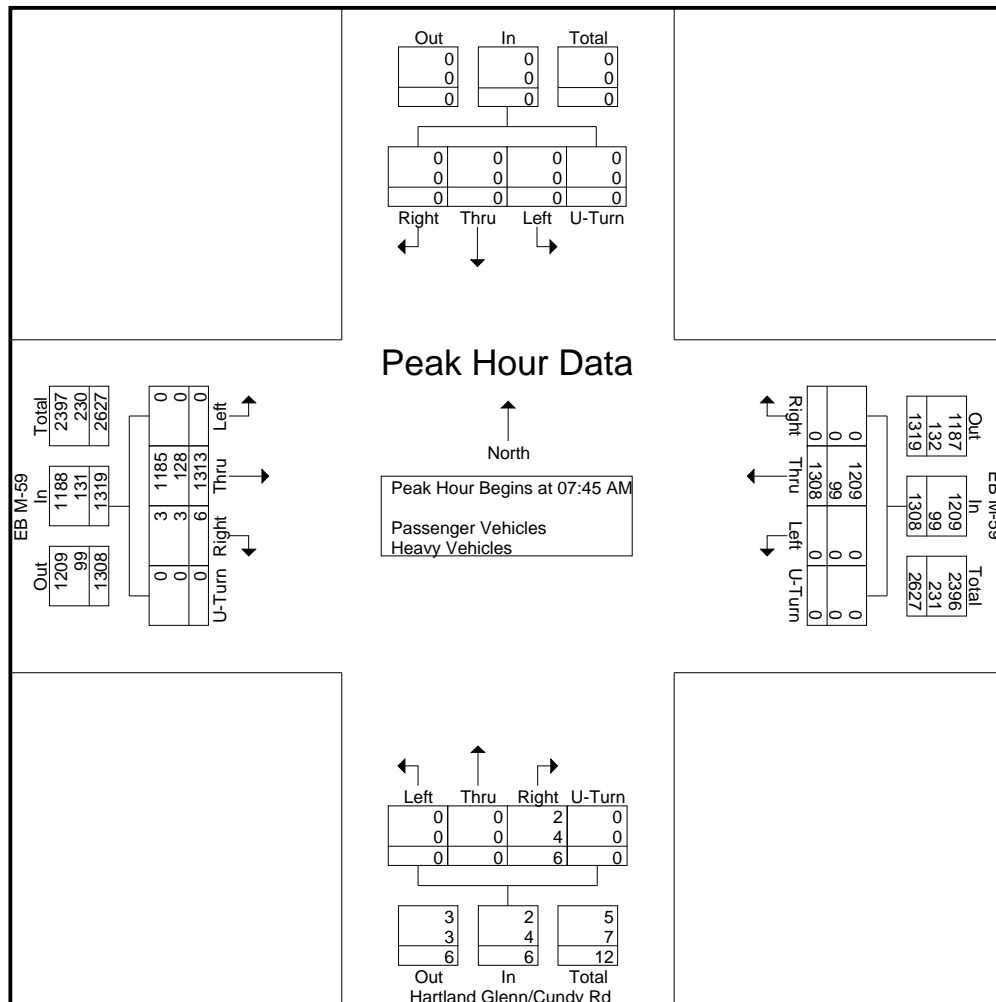




	EB M-59 Eastbound					EB M-59 Westbound					Hartland Glenn/Cundy Rd Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
07:00 AM	0	276	2	0	278	0	240	0	0	240	0	0	1	0	1	0	0	0	0	0	519
07:15 AM	0	337	1	0	338	0	258	0	0	258	0	0	1	0	1	0	0	0	0	0	597
07:30 AM	0	370	2	0	372	0	260	0	0	260	0	0	3	0	3	0	0	0	0	0	635
07:45 AM	0	347	1	0	348	0	341	0	0	341	0	0	1	0	1	0	0	0	0	0	690
Total	0	1330	6	0	1336	0	1099	0	0	1099	0	0	6	0	6	0	0	0	0	0	2441
08:00 AM	0	321	3	0	324	0	277	0	0	277	0	0	3	0	3	0	0	0	0	0	604
08:15 AM	0	338	1	0	339	0	345	0	0	345	0	0	1	0	1	0	0	0	0	0	685
08:30 AM	0	307	1	0	308	0	345	0	0	345	0	0	1	0	1	0	0	0	0	0	654
08:45 AM	0	318	4	0	322	0	263	0	0	263	0	0	2	0	2	0	0	0	0	0	587
Total	0	1284	9	0	1293	0	1230	0	0	1230	0	0	7	0	7	0	0	0	0	0	2530
Grand Total	0	2614	15	0	2629	0	2329	0	0	2329	0	0	13	0	13	0	0	0	0	0	4971
Apprch %	0	99.4	0.6	0		0	100	0	0		0	0	100	0		0	0	0	0		
Total %	0	52.6	0.3	0	52.9	0	46.9	0	0	46.9	0	0	0.3	0	0.3	0	0	0	0	0	
Passenger Vehicles	0	2393	8	0	2401	0	2161	0	0	2161	0	0	8	0	8	0	0	0	0	0	4570
% Passenger Vehicles	0	91.5	53.3	0	91.3	0	92.8	0	0	92.8	0	0	61.5	0	61.5	0	0	0	0	0	91.9
Heavy Vehicles	0	221	7	0	228	0	168	0	0	168	0	0	5	0	5	0	0	0	0	0	401
% Heavy Vehicles	0	8.5	46.7	0	8.7	0	7.2	0	0	7.2	0	0	38.5	0	38.5	0	0	0	0	0	8.1

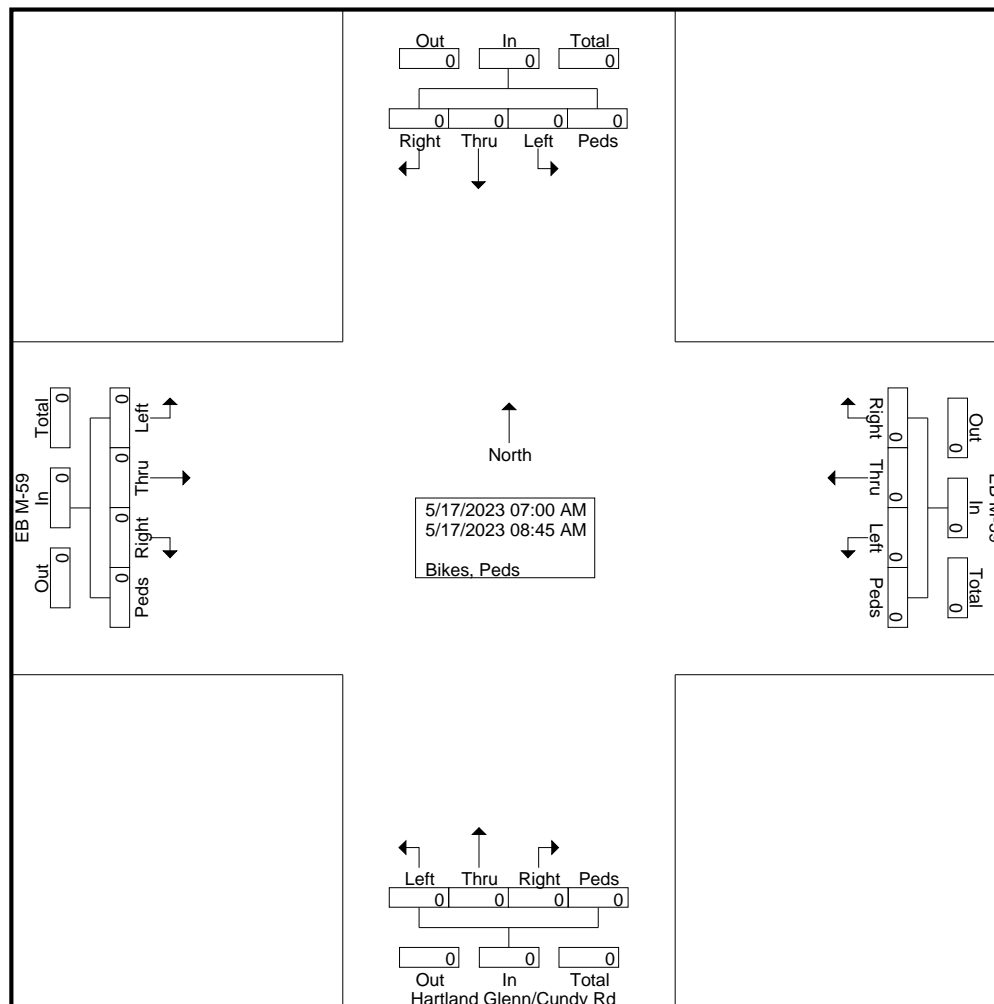


	EB M-59 Eastbound					EB M-59 Westbound					Hartland Glenn/Cundy Rd Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	347	1	0	348	0	341	0	0	341	0	0	1	0	1	0	0	0	0	0	690
08:00 AM	0	321	3	0	324	0	277	0	0	277	0	0	3	0	3	0	0	0	0	0	604
08:15 AM	0	338	1	0	339	0	345	0	0	345	0	0	1	0	1	0	0	0	0	0	685
08:30 AM	0	307	1	0	308	0	345	0	0	345	0	0	1	0	1	0	0	0	0	0	654
Total Volume	0	1313	6	0	1319	0	1308	0	0	1308	0	0	6	0	6	0	0	0	0	0	2633
% App. Total	0	99.5	0.5	0		0	100	0	0		0	0	100	0		0	0	0	0		
PHF	.000	.946	.500	.000	.948	.000	.948	.000	.000	.948	.000	.000	.500	.000	.500	.000	.000	.000	.000	.000	.954
Passenger Vehicles	0	1185	3	0	1188	0	1209	0	0	1209	0	0	2	0	2	0	0	0	0	0	2399
% Passenger Vehicles	0	90.3	50.0	0	90.1	0	92.4	0	0	92.4	0	0	33.3	0	33.3	0	0	0	0	0	91.1
Heavy Vehicles	0	128	3	0	131	0	99	0	0	99	0	0	4	0	4	0	0	0	0	0	234
% Heavy Vehicles	0	9.7	50.0	0	9.9	0	7.6	0	0	7.6	0	0	66.7	0	66.7	0	0	0	0	0	8.9

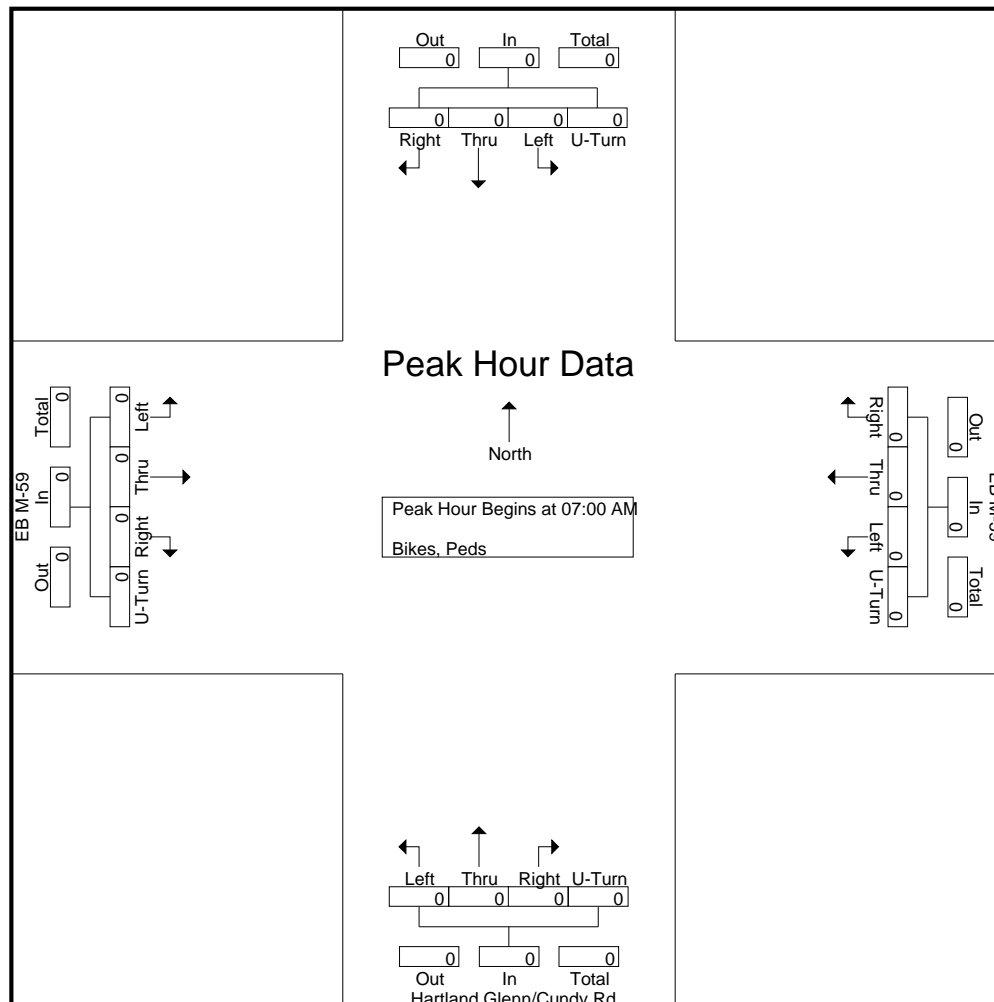


Groups Printed- Bikes, Peds

	EB M-59 Eastbound					EB M-59 Westbound					Hartland Glenn/Cundy Rd Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

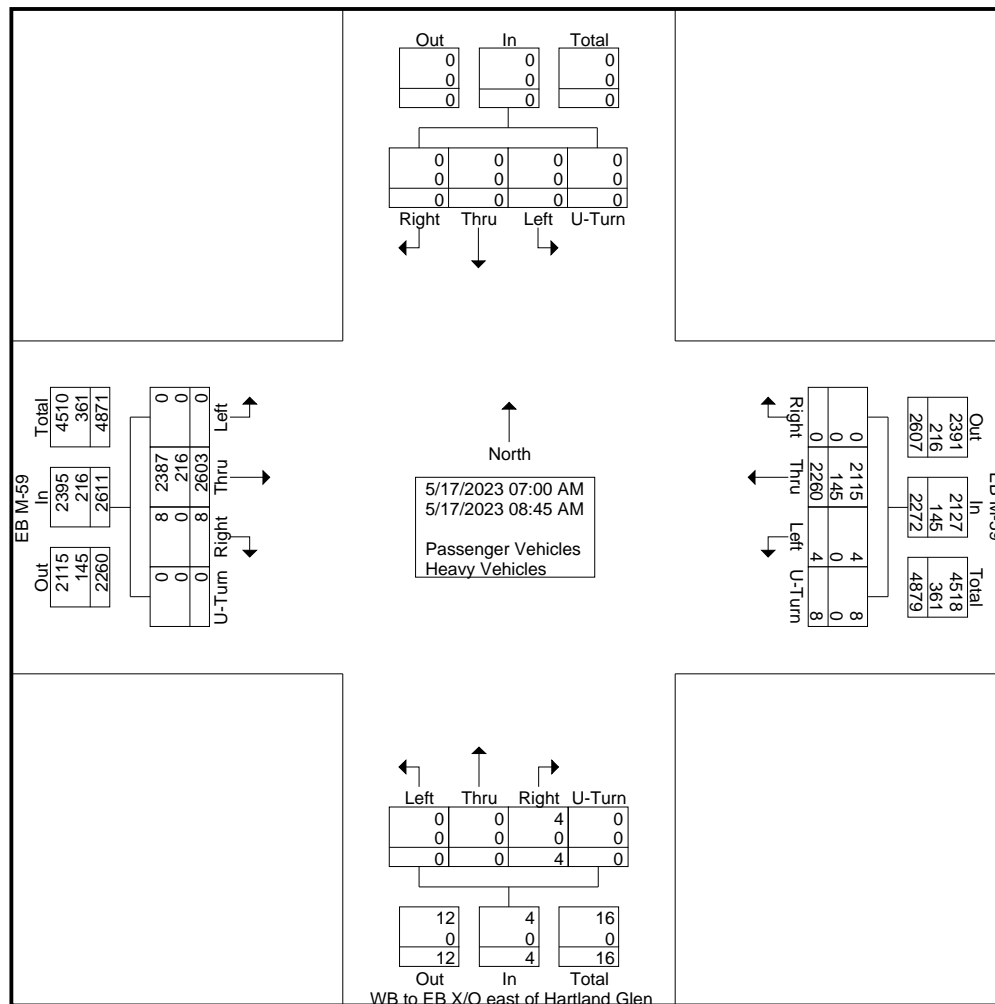


	EB M-59 Eastbound					EB M-59 Westbound					Hartland Glenn/Cundy Rd Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

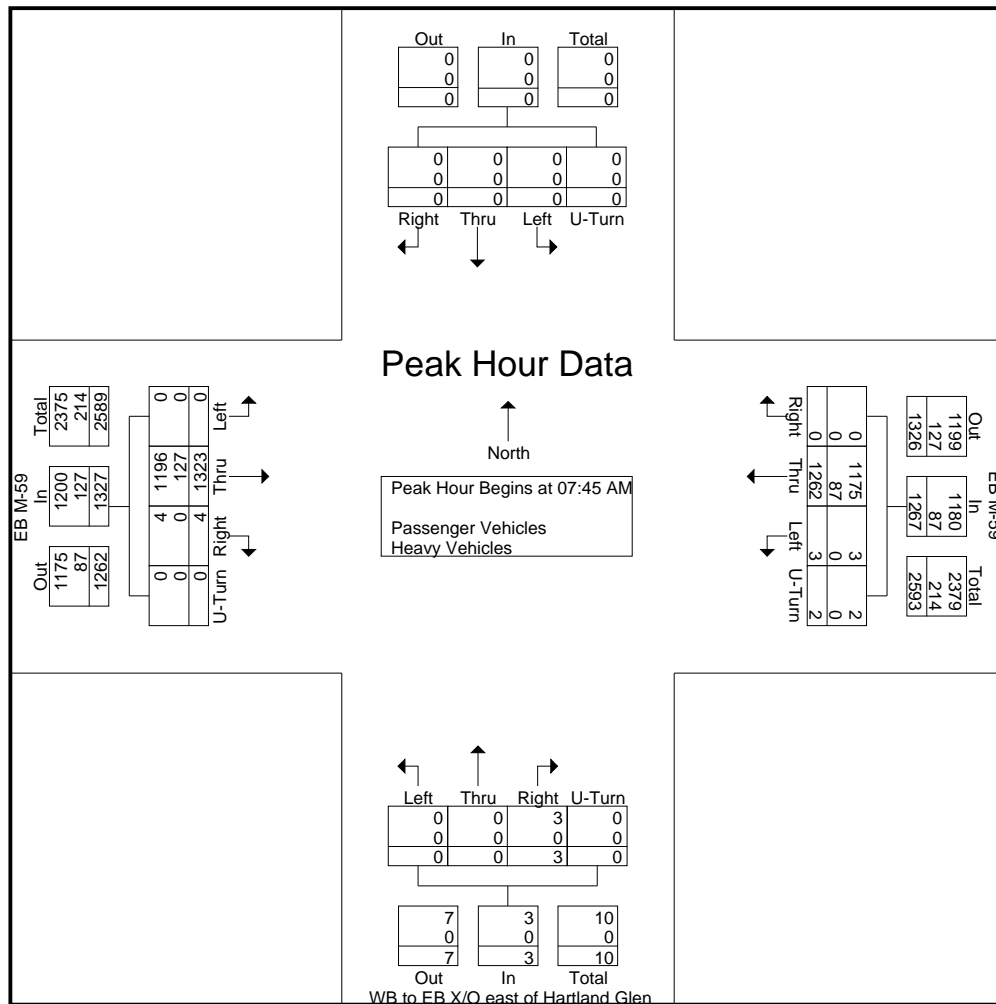


Groups Printed- Passenger Vehicles - Heavy Vehicles

	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
07:00 AM	0	268	0	0	268	0	232	0	1	233	0	0	0	0	0	0	0	0	0	0	501
07:15 AM	0	328	0	0	328	1	241	0	0	242	0	0	0	0	0	0	0	0	0	0	570
07:30 AM	0	368	0	0	368	0	256	0	2	258	0	0	0	0	0	0	0	0	0	0	626
07:45 AM	0	358	1	0	359	1	327	0	1	329	0	0	0	0	0	0	0	0	0	0	688
Total	0	1322	1	0	1323	2	1056	0	4	1062	0	0	0	0	0	0	0	0	0	0	2385
08:00 AM	0	326	2	0	328	1	269	0	0	270	0	0	0	0	0	0	0	0	0	0	598
08:15 AM	0	336	0	0	336	0	340	0	0	340	0	0	0	0	0	0	0	0	0	0	676
08:30 AM	0	303	1	0	304	1	326	0	1	328	0	0	3	0	3	0	0	0	0	0	635
08:45 AM	0	316	4	0	320	0	269	0	3	272	0	0	1	0	1	0	0	0	0	0	593
Total	0	1281	7	0	1288	2	1204	0	4	1210	0	0	4	0	4	0	0	0	0	0	2502
Grand Total	0	2603	8	0	2611	4	2260	0	8	2272	0	0	4	0	4	0	0	0	0	0	4887
Apprch %	0	99.7	0.3	0		0.2	99.5	0	0.4		0	0	100	0		0	0	0	0		
Total %	0	53.3	0.2	0	53.4	0.1	46.2	0	0.2	46.5	0	0	0.1	0	0.1	0	0	0	0	0	
Passenger Vehicles	0	2387	8	0	2395	4	2115	0	8	2127	0	0	4	0	4	0	0	0	0	0	4526
% Passenger Vehicles	0	91.7	100	0	91.7	100	93.6	0	100	93.6	0	0	100	0	100	0	0	0	0	0	92.6
Heavy Vehicles	0	216	0	0	216	0	145	0	0	145	0	0	0	0	0	0	0	0	0	0	361
% Heavy Vehicles	0	8.3	0	0	8.3	0	6.4	0	0	6.4	0	0	0	0	0	0	0	0	0	0	7.4

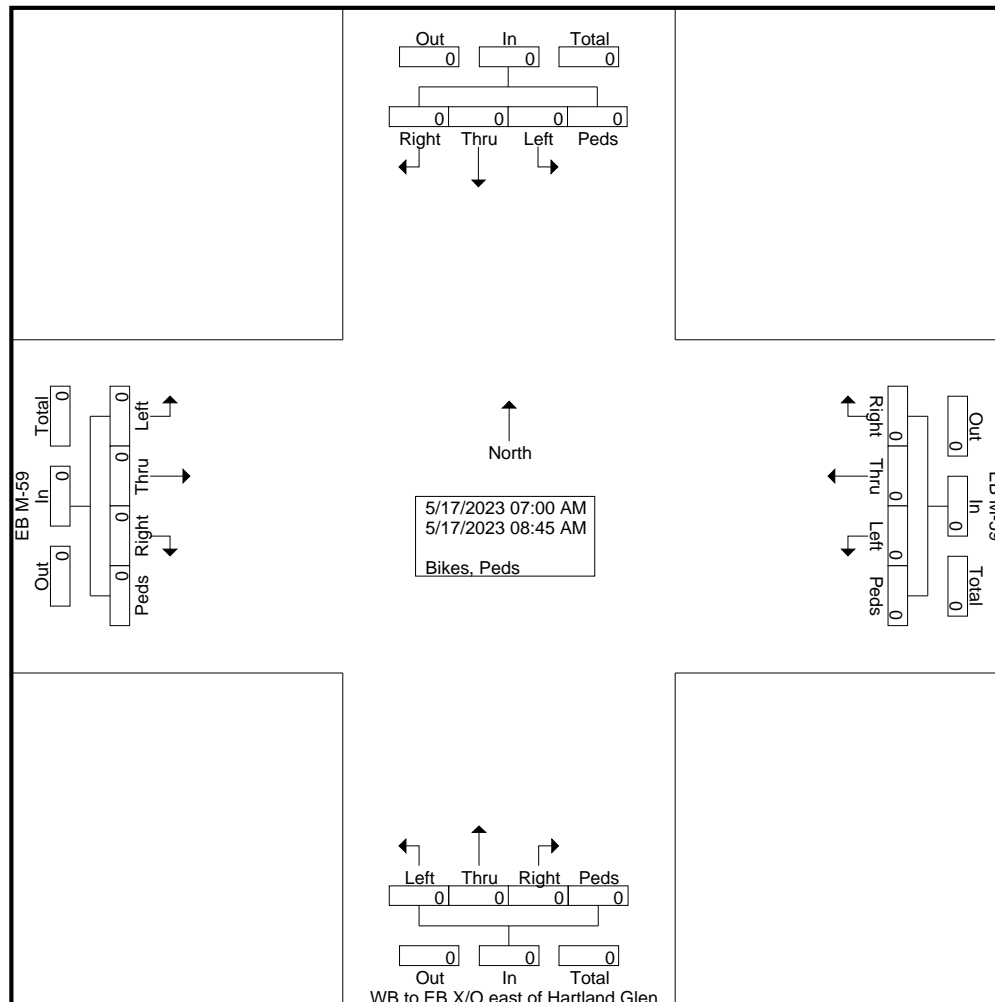


	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	358	1	0	359	1	327	0	1	329	0	0	0	0	0	0	0	0	0	0	688
08:00 AM	0	326	2	0	328	1	269	0	0	270	0	0	0	0	0	0	0	0	0	0	598
08:15 AM	0	336	0	0	336	0	340	0	0	340	0	0	0	0	0	0	0	0	0	0	676
08:30 AM	0	303	1	0	304	1	326	0	1	328	0	0	3	0	3	0	0	0	0	0	635
Total Volume	0	1323	4	0	1327	3	1262	0	2	1267	0	0	3	0	3	0	0	0	0	0	2597
% App. Total	0	99.7	0.3	0		0.2	99.6	0	0.2		0	0	100	0		0	0	0	0		
PHF	.000	.924	.500	.000	.924	.750	.928	.000	.500	.932	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.944
Passenger Vehicles	0	1196	4	0	1200	3	1175	0	2	1180	0	0	3	0	3	0	0	0	0	0	2383
% Passenger Vehicles	0	90.4	100	0	90.4	100	93.1	0	100	93.1	0	0	100	0	100	0	0	0	0	0	91.8
Heavy Vehicles	0	127	0	0	127	0	87	0	0	87	0	0	0	0	0	0	0	0	0	0	214
% Heavy Vehicles	0	9.6	0	0	9.6	0	6.9	0	0	6.9	0	0	0	0	0	0	0	0	0	0	8.2

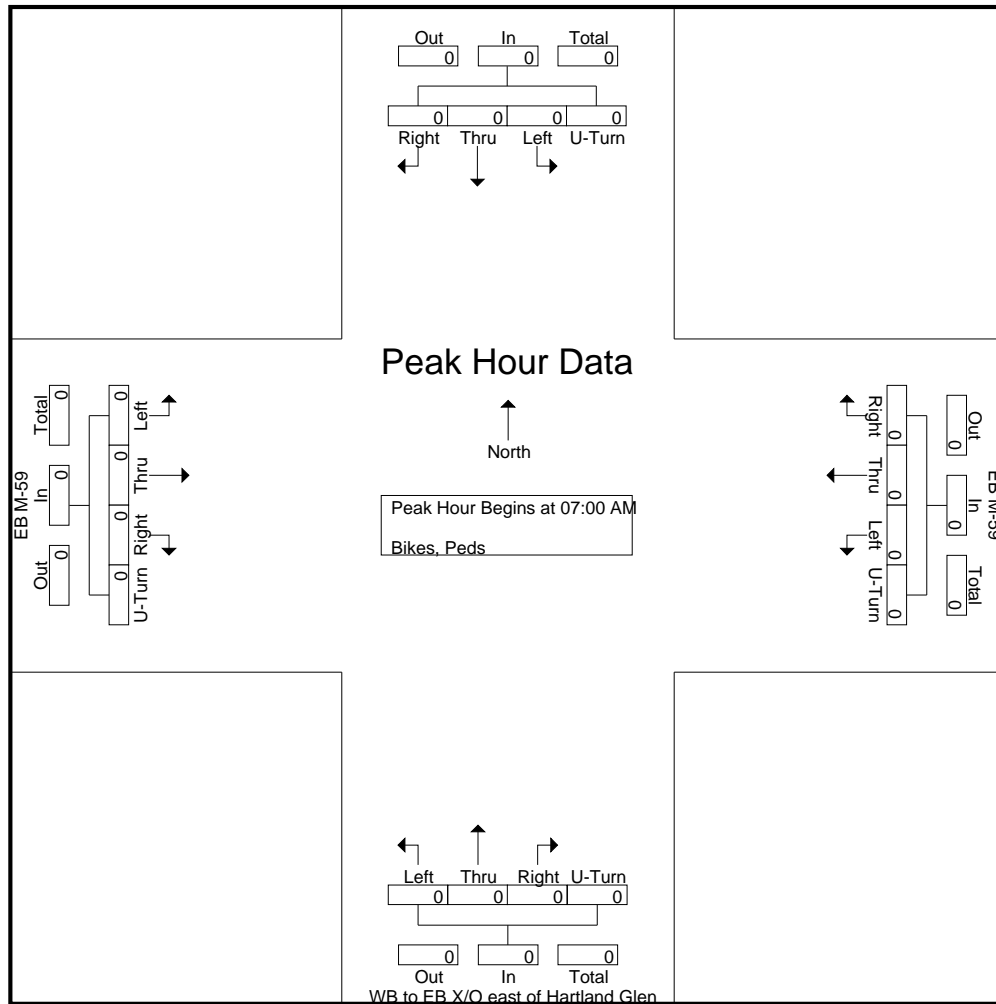


Groups Printed- Bikes, Peds

	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

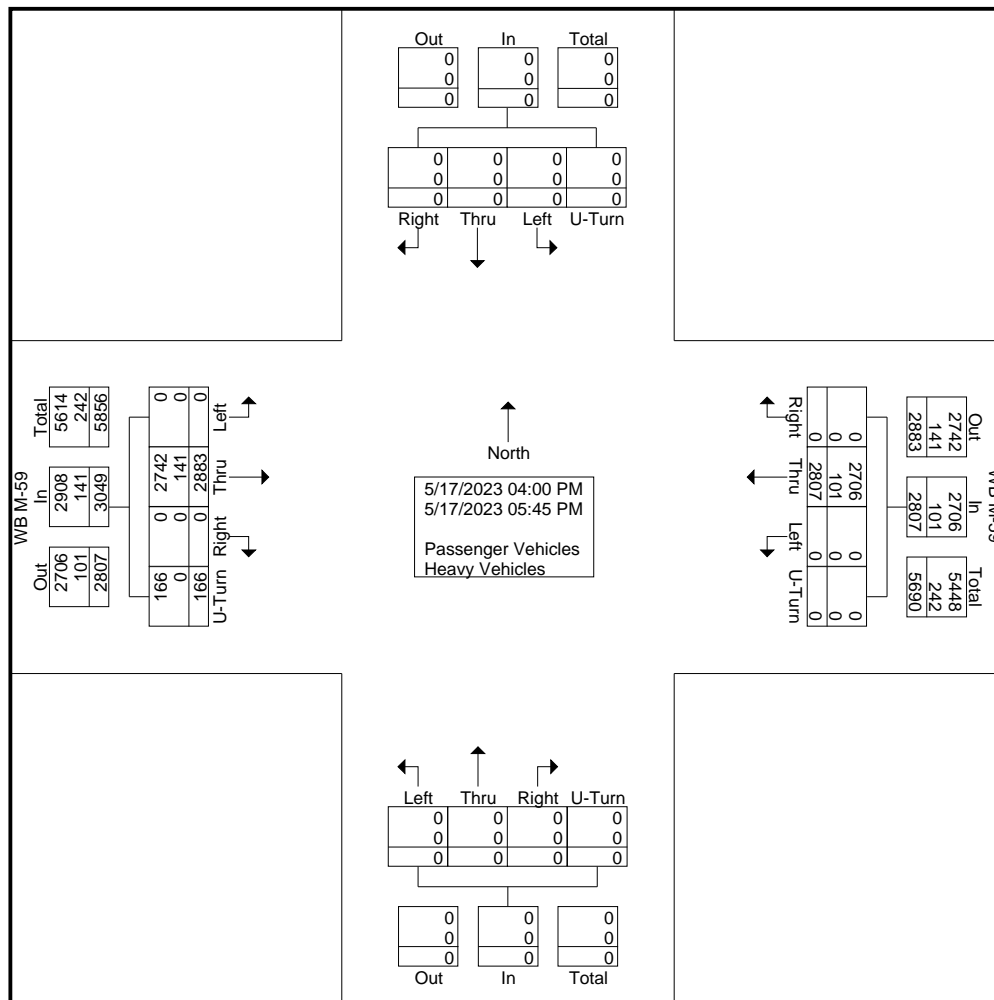


	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

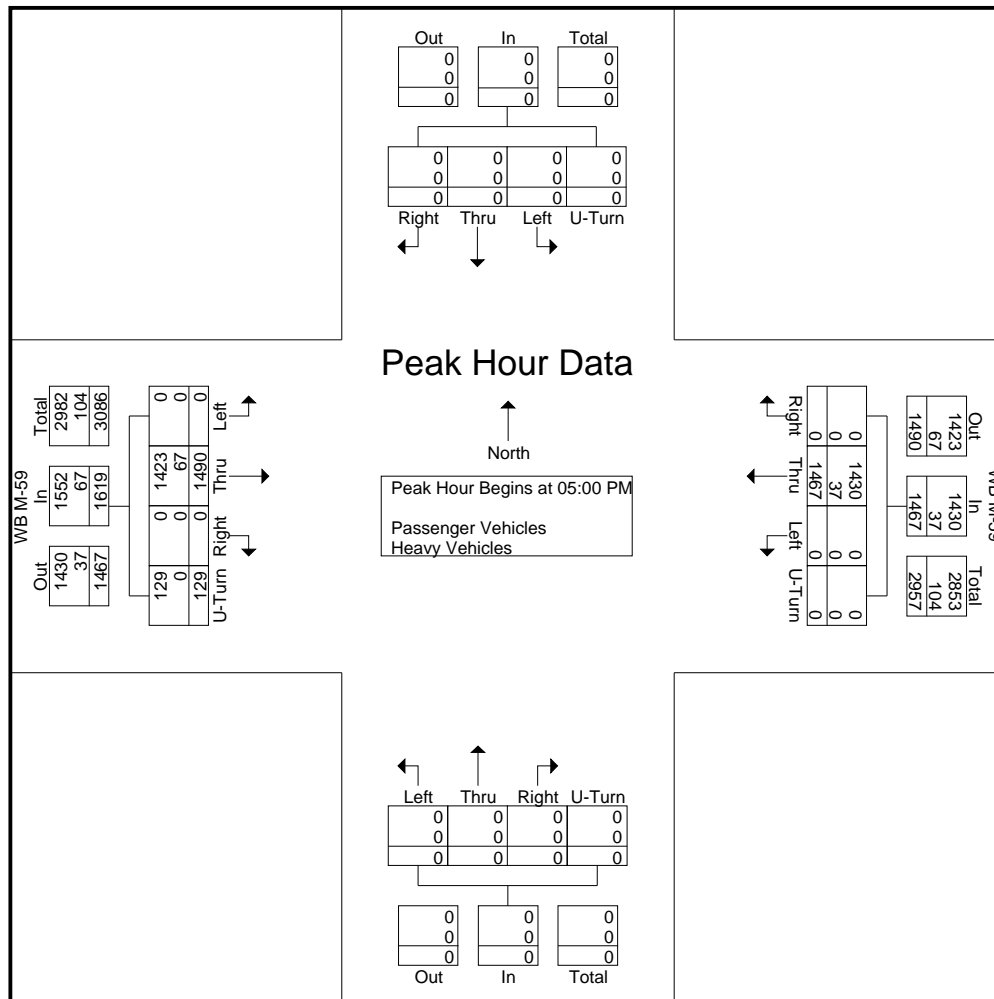


Groups Printed- Passenger Vehicles - Heavy Vehicles

	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
04:00 PM	0	370	0	9	379	0	333	0	0	333	0	0	0	0	0	0	0	0	0	0	712
04:15 PM	0	347	0	3	350	0	328	0	0	328	0	0	0	0	0	0	0	0	0	0	678
04:30 PM	0	338	0	8	346	0	362	0	0	362	0	0	0	0	0	0	0	0	0	0	708
04:45 PM	0	338	0	17	355	0	317	0	0	317	0	0	0	0	0	0	0	0	0	0	672
Total	0	1393	0	37	1430	0	1340	0	0	1340	0	0	0	0	0	0	0	0	0	0	2770
05:00 PM	0	378	0	15	393	0	360	0	0	360	0	0	0	0	0	0	0	0	0	0	753
05:15 PM	0	401	0	12	413	0	375	0	0	375	0	0	0	0	0	0	0	0	0	0	788
05:30 PM	0	374	0	26	400	0	349	0	0	349	0	0	0	0	0	0	0	0	0	0	749
05:45 PM	0	337	0	76	413	0	383	0	0	383	0	0	0	0	0	0	0	0	0	0	796
Total	0	1490	0	129	1619	0	1467	0	0	1467	0	0	0	0	0	0	0	0	0	0	3086
Grand Total	0	2883	0	166	3049	0	2807	0	0	2807	0	0	0	0	0	0	0	0	0	0	5856
Apprch %	0	94.6	0	5.4		0	100	0	0		0	0	0	0		0	0	0	0		
Total %	0	49.2	0	2.8	52.1	0	47.9	0	0	47.9	0	0	0	0	0	0	0	0	0	0	
Passenger Vehicles	0	2742	0	166	2908	0	2706	0	0	2706	0	0	0	0	0	0	0	0	0	0	5614
% Passenger Vehicles	0	95.1	0	100	95.4	0	96.4	0	0	96.4	0	0	0	0	0	0	0	0	0	0	95.9
Heavy Vehicles	0	141	0	0	141	0	101	0	0	101	0	0	0	0	0	0	0	0	0	0	242
% Heavy Vehicles	0	4.9	0	0	4.6	0	3.6	0	0	3.6	0	0	0	0	0	0	0	0	0	0	4.1

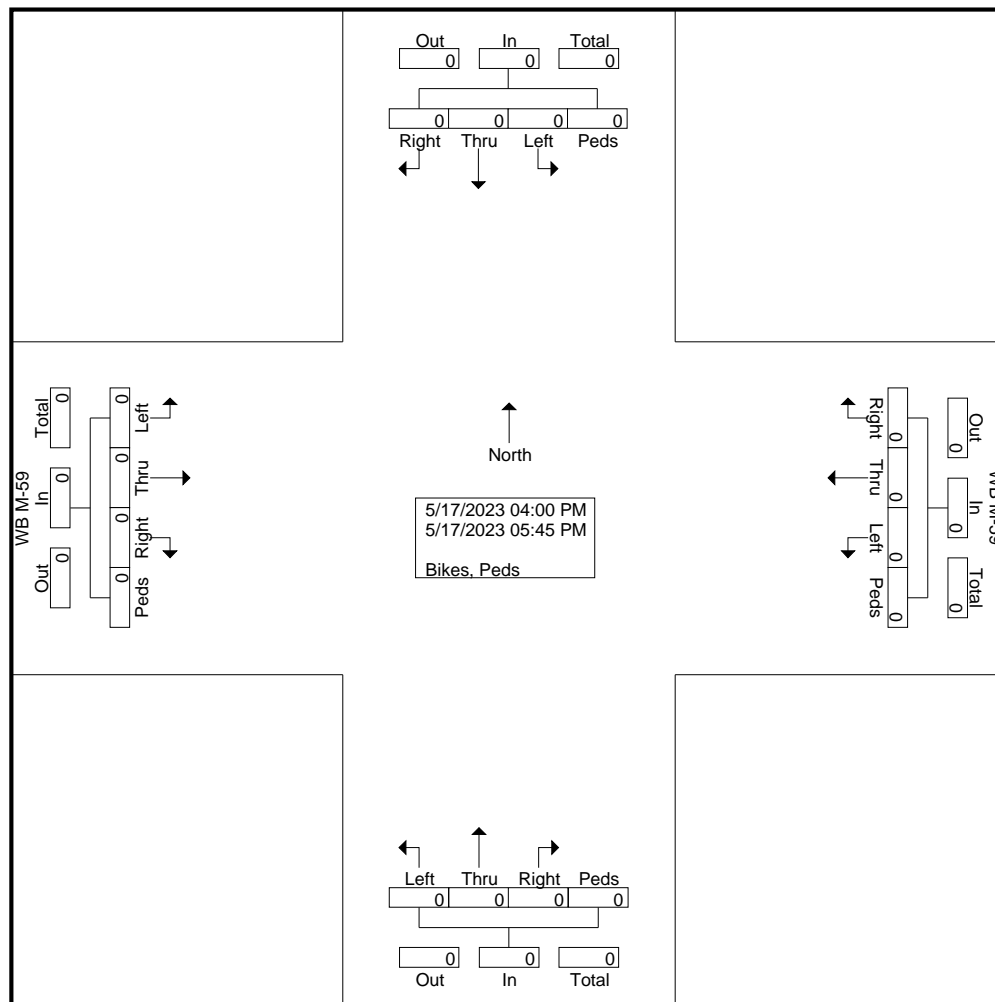


	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	378	0	15	393	0	360	0	0	360	0	0	0	0	0	0	0	0	0	0	753
05:15 PM	0	401	0	12	413	0	375	0	0	375	0	0	0	0	0	0	0	0	0	0	788
05:30 PM	0	374	0	26	400	0	349	0	0	349	0	0	0	0	0	0	0	0	0	0	749
05:45 PM	0	337	0	76	413	0	383	0	0	383	0	0	0	0	0	0	0	0	0	0	796
Total Volume	0	1490	0	129	1619	0	1467	0	0	1467	0	0	0	0	0	0	0	0	0	0	3086
% App. Total	0	92	0	8		0	100	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.929	.000	.424	.980	.000	.958	.000	.000	.958	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.969
Passenger Vehicles	0	1423	0	129	1552	0	1430	0	0	1430	0	0	0	0	0	0	0	0	0	0	2982
% Passenger Vehicles	0	95.5	0	100	95.9	0	97.5	0	0	97.5	0	0	0	0	0	0	0	0	0	0	96.6
Heavy Vehicles	0	67	0	0	67	0	37	0	0	37	0	0	0	0	0	0	0	0	0	0	104
% Heavy Vehicles	0	4.5	0	0	4.1	0	2.5	0	0	2.5	0	0	0	0	0	0	0	0	0	0	3.4

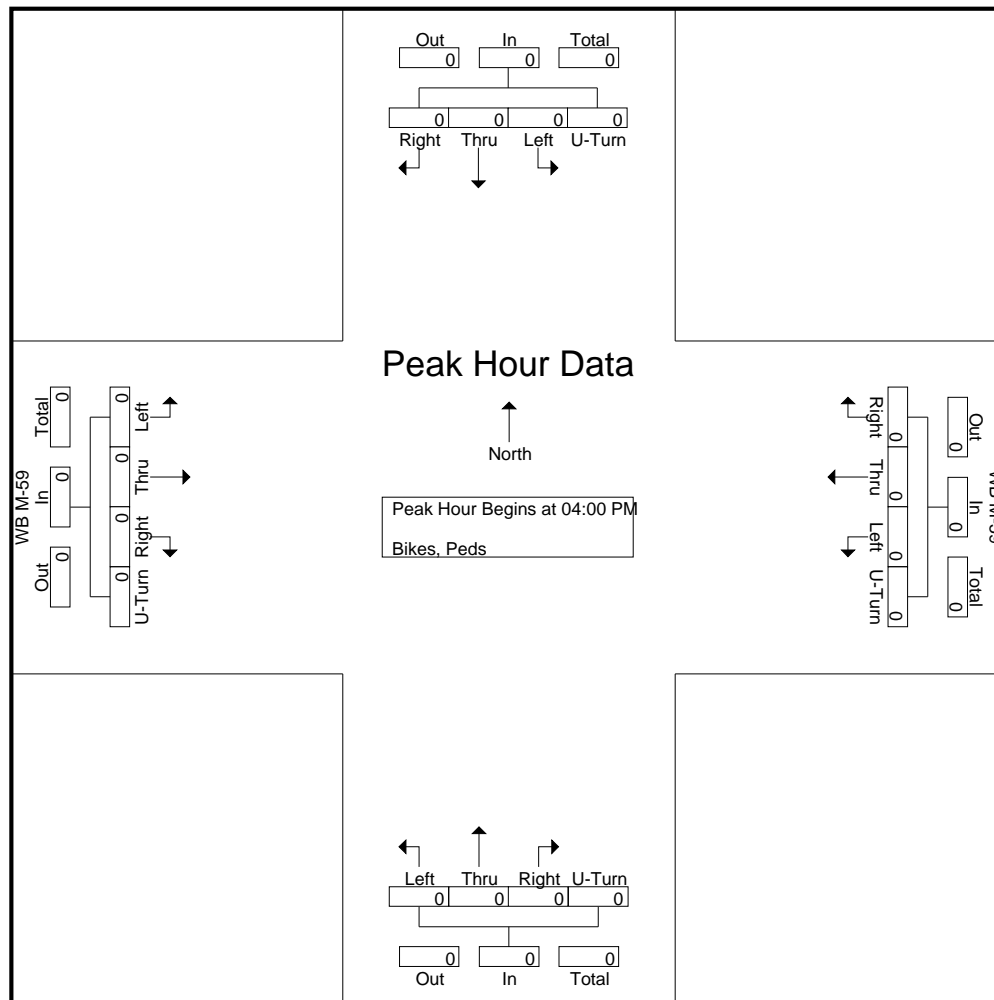


Groups Printed- Bikes, Peds

	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

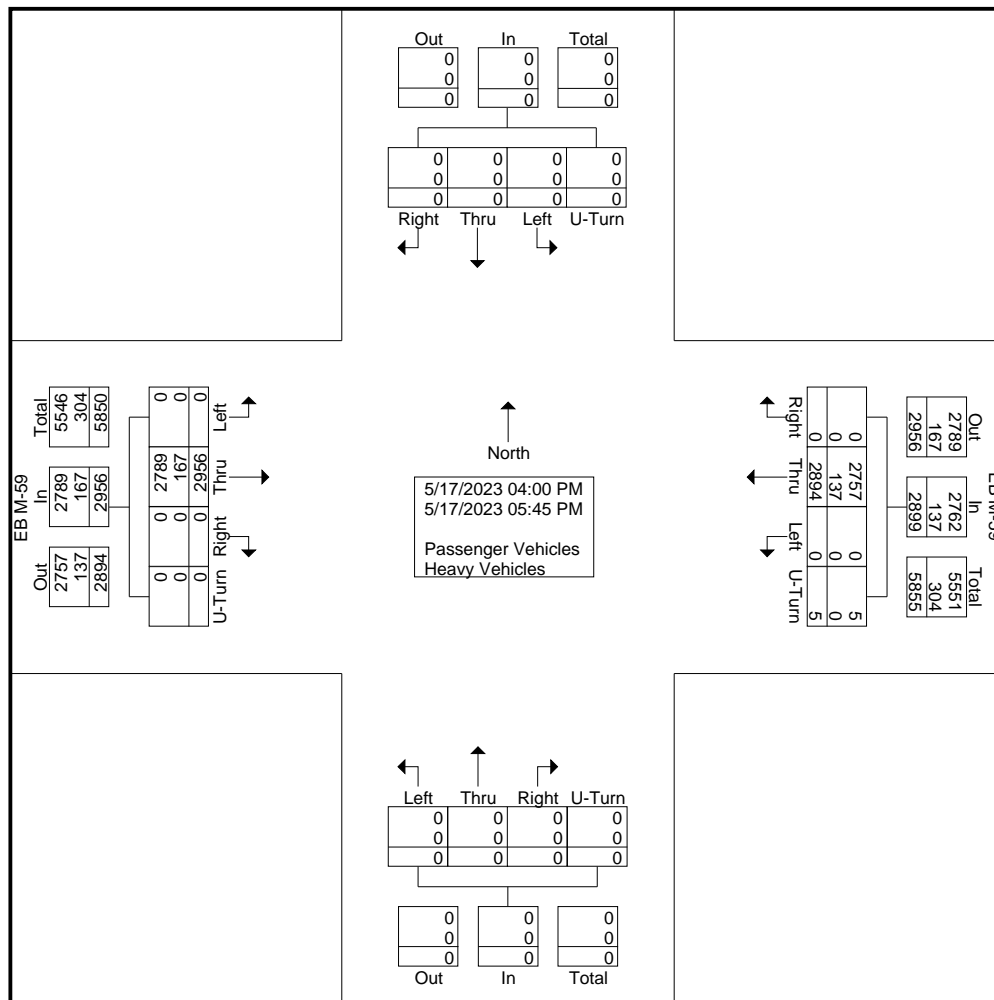


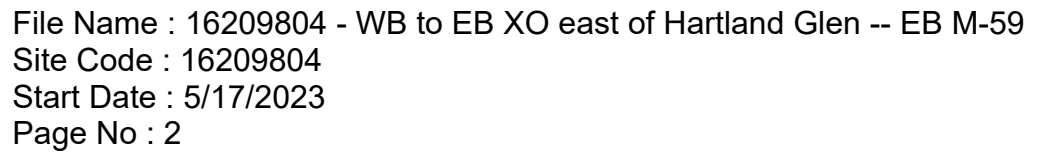
	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



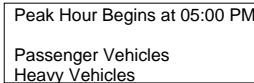
Groups Printed- Passenger Vehicles - Heavy Vehicles

	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
04:00 PM	0	389	0	0	389	0	341	0	0	341	0	0	0	0	0	0	0	0	0	0	730
04:15 PM	0	342	0	0	342	0	336	0	3	339	0	0	0	0	0	0	0	0	0	0	681
04:30 PM	0	350	0	0	350	0	362	0	0	362	0	0	0	0	0	0	0	0	0	0	712
04:45 PM	0	343	0	0	343	0	332	0	1	333	0	0	0	0	0	0	0	0	0	0	676
Total	0	1424	0	0	1424	0	1371	0	4	1375	0	0	0	0	0	0	0	0	0	0	2799
05:00 PM	0	401	0	0	401	0	363	0	1	364	0	0	0	0	0	0	0	0	0	0	765
05:15 PM	0	396	0	0	396	0	390	0	0	390	0	0	0	0	0	0	0	0	0	0	786
05:30 PM	0	389	0	0	389	0	371	0	0	371	0	0	0	0	0	0	0	0	0	0	760
05:45 PM	0	346	0	0	346	0	399	0	0	399	0	0	0	0	0	0	0	0	0	0	745
Total	0	1532	0	0	1532	0	1523	0	1	1524	0	0	0	0	0	0	0	0	0	0	3056
Grand Total	0	2956	0	0	2956	0	2894	0	5	2899	0	0	0	0	0	0	0	0	0	0	5855
Apprch %	0	100	0	0		0	99.8	0	0.2		0	0	0	0		0	0	0	0		
Total %	0	50.5	0	0	50.5	0	49.4	0	0.1	49.5	0	0	0	0	0	0	0	0	0	0	
Passenger Vehicles	0	2789	0	0	2789	0	2757	0	5	2762	0	0	0	0	0	0	0	0	0	0	5551
% Passenger Vehicles	0	94.4	0	0	94.4	0	95.3	0	100	95.3	0	0	0	0	0	0	0	0	0	0	94.8
Heavy Vehicles	0	167	0	0	167	0	137	0	0	137	0	0	0	0	0	0	0	0	0	0	304
% Heavy Vehicles	0	5.6	0	0	5.6	0	4.7	0	0	4.7	0	0	0	0	0	0	0	0	0	0	5.2



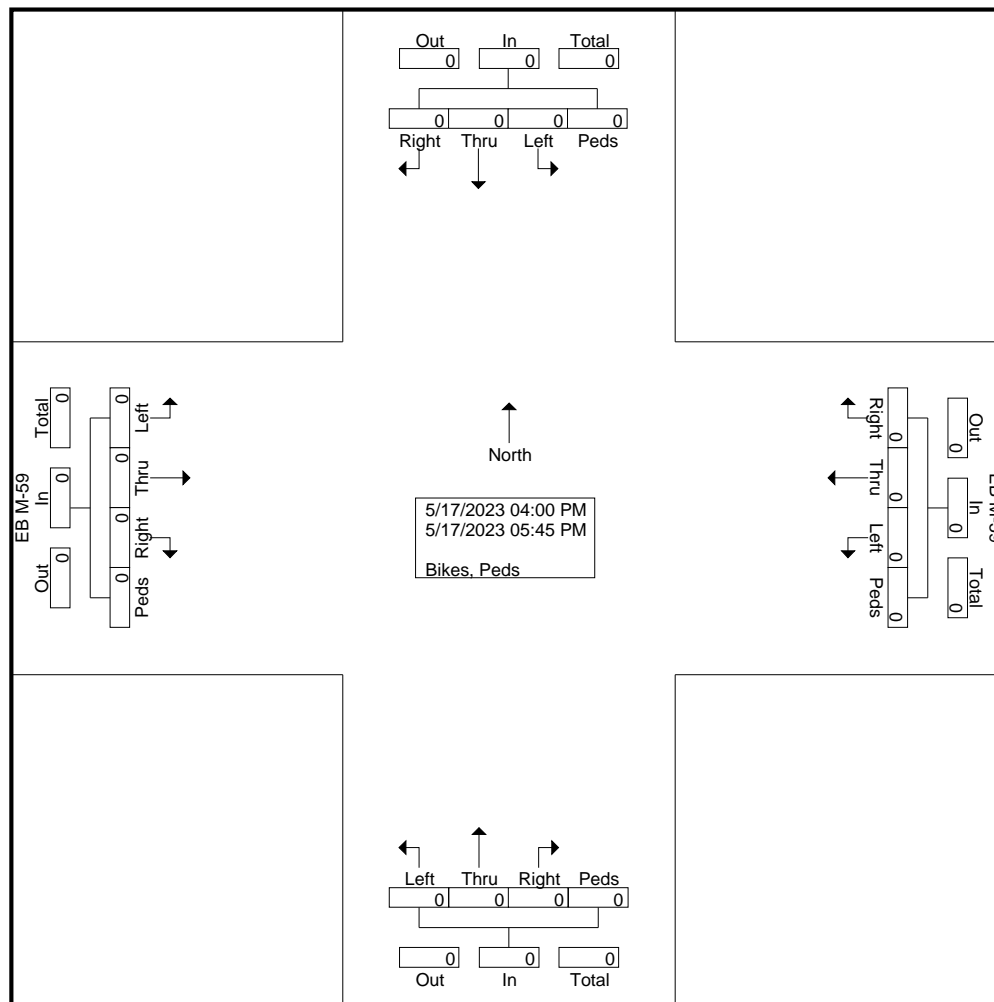


Peak Hour for Entire Intersection Begins at 05:00 PM

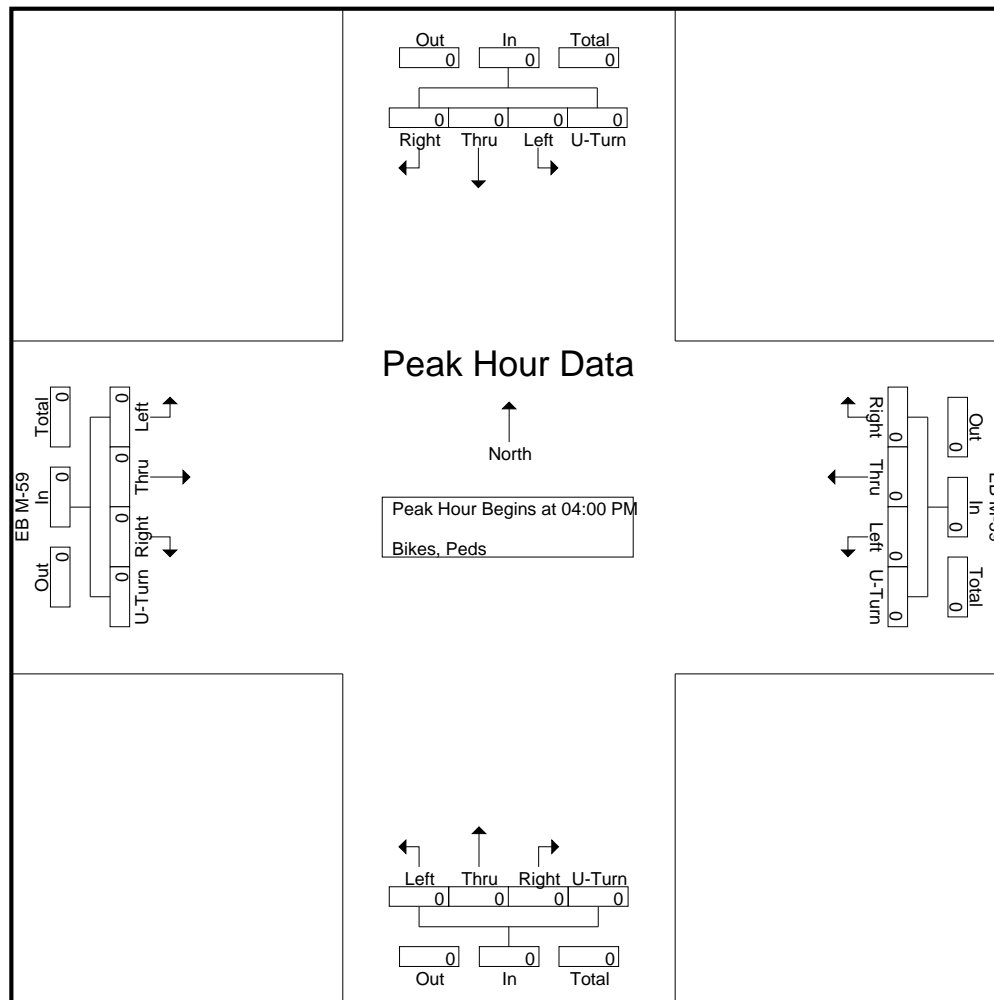


Groups Printed- Bikes, Peds

Start Time	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

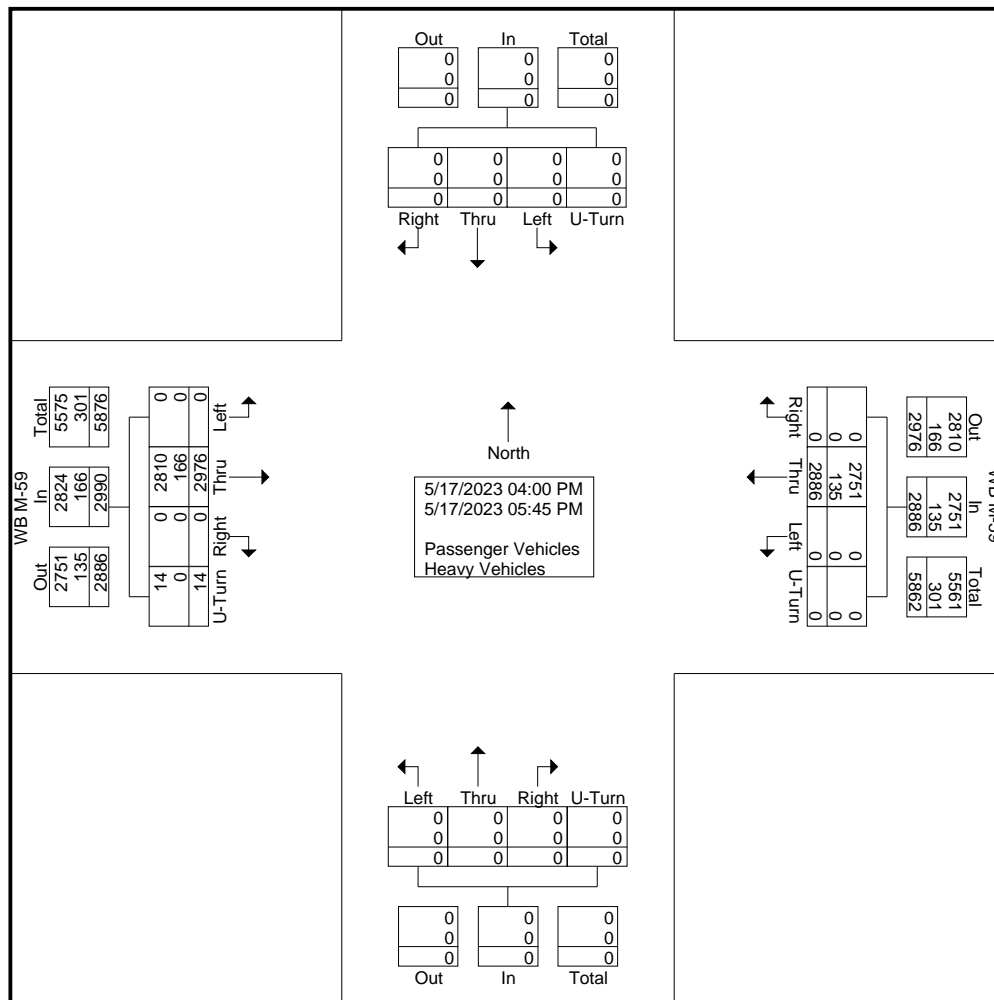


	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

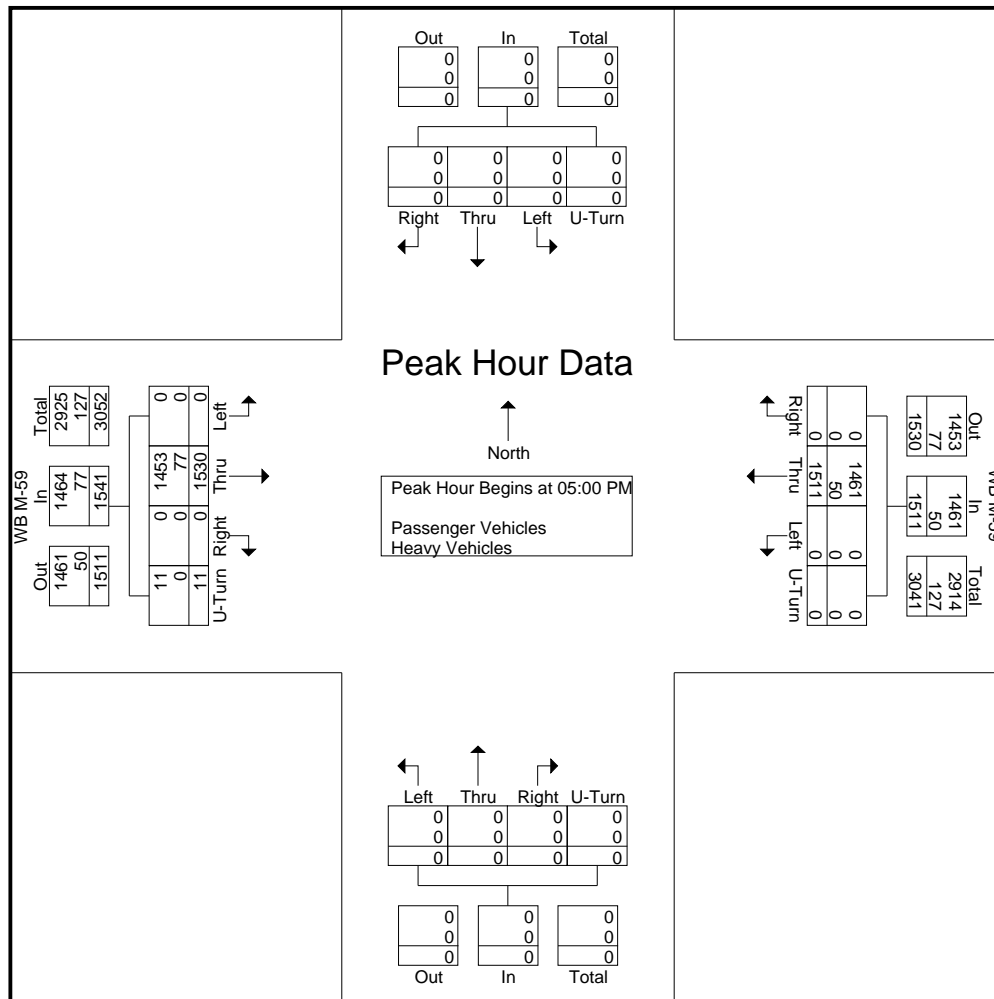


Groups Printed- Passenger Vehicles - Heavy Vehicles

	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
04:00 PM	0	387	0	1	388	0	342	0	0	342	0	0	0	0	0	0	0	0	0	0	730
04:15 PM	0	363	0	1	364	0	337	0	0	337	0	0	0	0	0	0	0	0	0	0	701
04:30 PM	0	354	0	1	355	0	365	0	0	365	0	0	0	0	0	0	0	0	0	0	720
04:45 PM	0	342	0	0	342	0	331	0	0	331	0	0	0	0	0	0	0	0	0	0	673
Total	0	1446	0	3	1449	0	1375	0	0	1375	0	0	0	0	0	0	0	0	0	0	2824
05:00 PM	0	397	0	1	398	0	360	0	0	360	0	0	0	0	0	0	0	0	0	0	758
05:15 PM	0	402	0	1	403	0	386	0	0	386	0	0	0	0	0	0	0	0	0	0	789
05:30 PM	0	389	0	2	391	0	375	0	0	375	0	0	0	0	0	0	0	0	0	0	766
05:45 PM	0	342	0	7	349	0	390	0	0	390	0	0	0	0	0	0	0	0	0	0	739
Total	0	1530	0	11	1541	0	1511	0	0	1511	0	0	0	0	0	0	0	0	0	0	3052
Grand Total	0	2976	0	14	2990	0	2886	0	0	2886	0	0	0	0	0	0	0	0	0	0	5876
Apprch %	0	99.5	0	0.5		0	100	0	0		0	0	0	0	0	0	0	0	0	0	
Total %	0	50.6	0	0.2	50.9	0	49.1	0	0	49.1	0	0	0	0	0	0	0	0	0	0	
Passenger Vehicles	0	2810	0	14	2824	0	2751	0	0	2751	0	0	0	0	0	0	0	0	0	0	5575
% Passenger Vehicles	0	94.4	0	100	94.4	0	95.3	0	0	95.3	0	0	0	0	0	0	0	0	0	0	94.9
Heavy Vehicles	0	166	0	0	166	0	135	0	0	135	0	0	0	0	0	0	0	0	0	0	301
% Heavy Vehicles	0	5.6	0	0	5.6	0	4.7	0	0	4.7	0	0	0	0	0	0	0	0	0	0	5.1

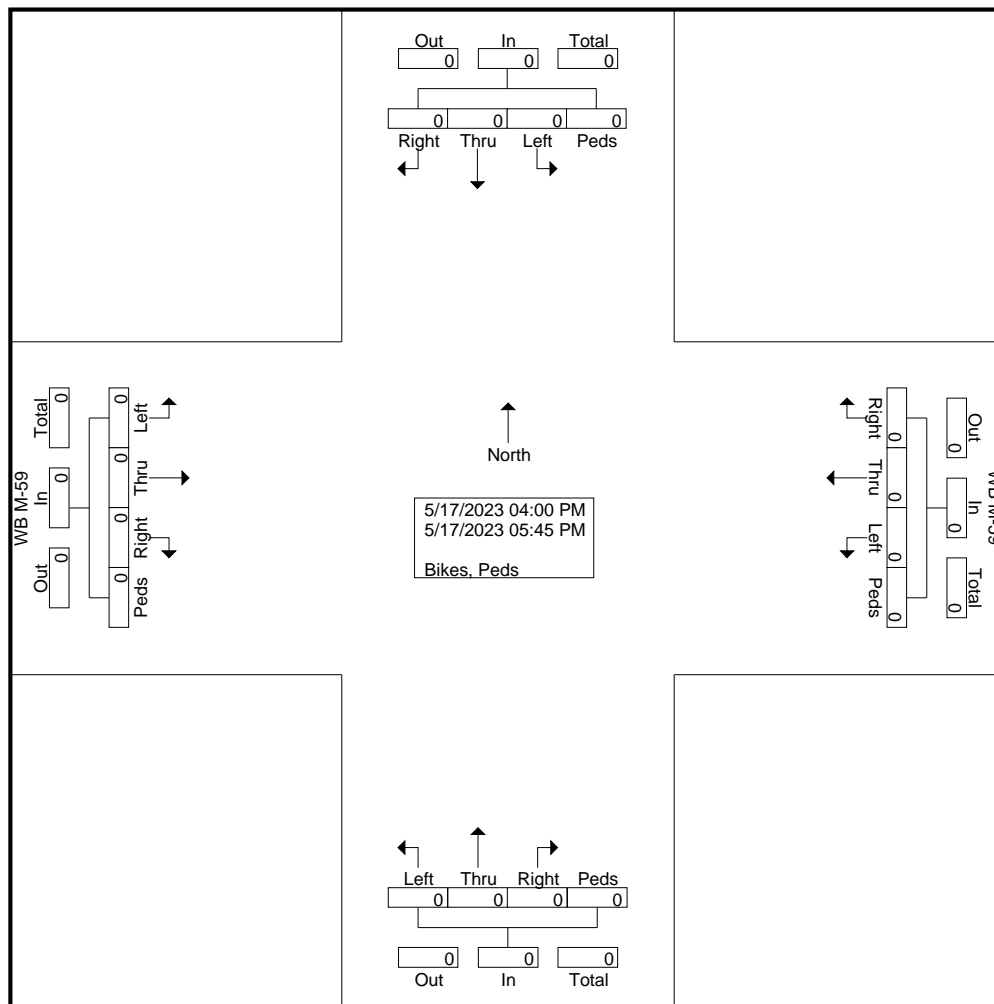


	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	397	0	1	398	0	360	0	0	360	0	0	0	0	0	0	0	0	0	0	758
05:15 PM	0	402	0	1	403	0	386	0	0	386	0	0	0	0	0	0	0	0	0	0	789
05:30 PM	0	389	0	2	391	0	375	0	0	375	0	0	0	0	0	0	0	0	0	0	766
05:45 PM	0	342	0	7	349	0	390	0	0	390	0	0	0	0	0	0	0	0	0	0	739
Total Volume	0	1530	0	11	1541	0	1511	0	0	1511	0	0	0	0	0	0	0	0	0	0	3052
% App. Total	0	99.3	0	0.7		0	100	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.951	.000	.393	.956	.000	.969	.000	.000	.969	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.967
Passenger Vehicles	0	1453	0	11	1464	0	1461	0	0	1461	0	0	0	0	0	0	0	0	0	0	2925
% Passenger Vehicles	0	95.0	0	100	95.0	0	96.7	0	0	96.7	0	0	0	0	0	0	0	0	0	0	95.8
Heavy Vehicles	0	77	0	0	77	0	50	0	0	50	0	0	0	0	0	0	0	0	0	0	127
% Heavy Vehicles	0	5.0	0	0	5.0	0	3.3	0	0	3.3	0	0	0	0	0	0	0	0	0	0	4.2

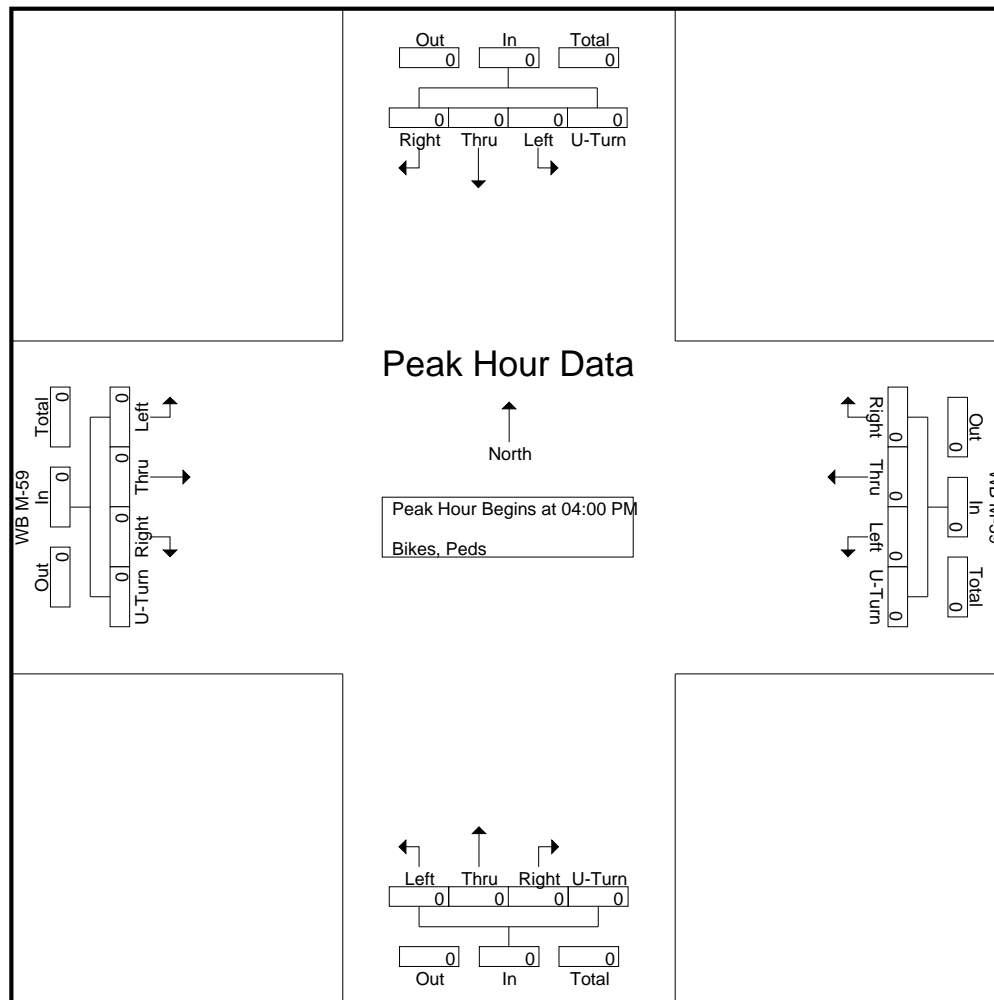


Groups Printed- Bikes, Peds

	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

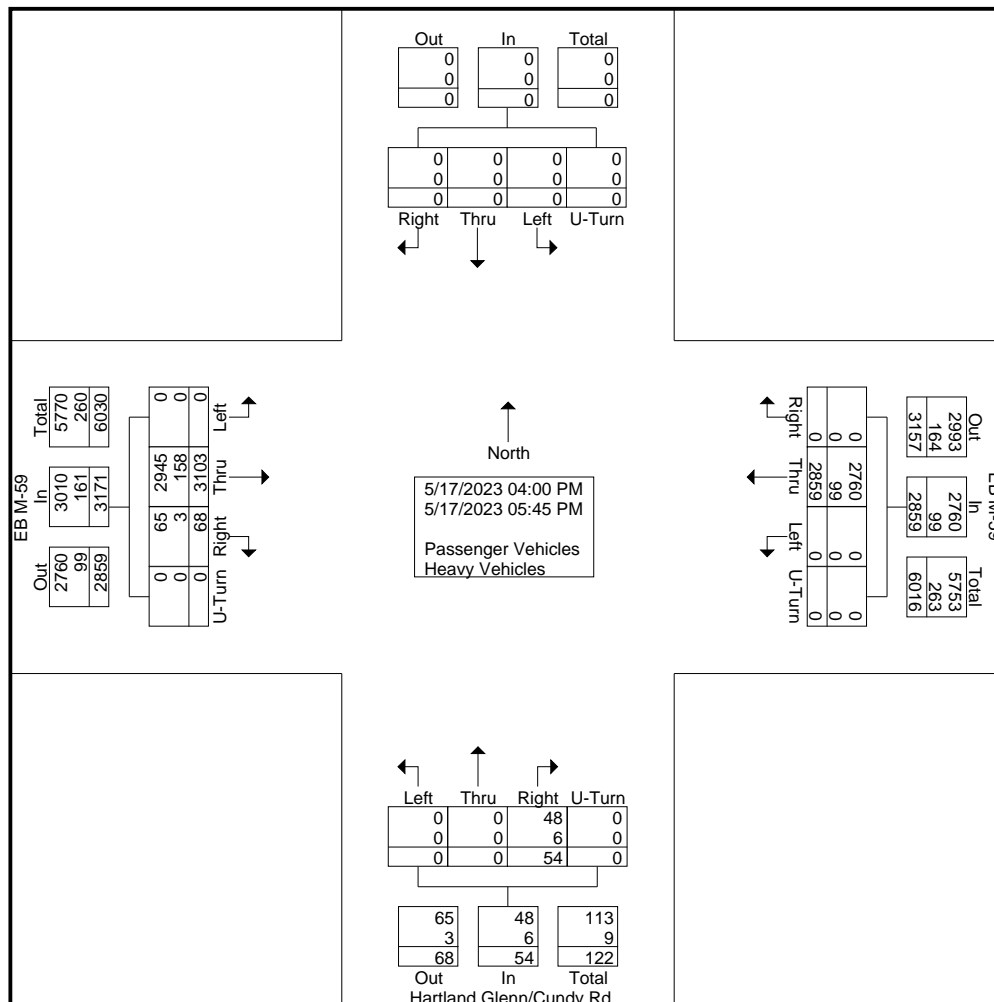


	WB M-59 Eastbound					WB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

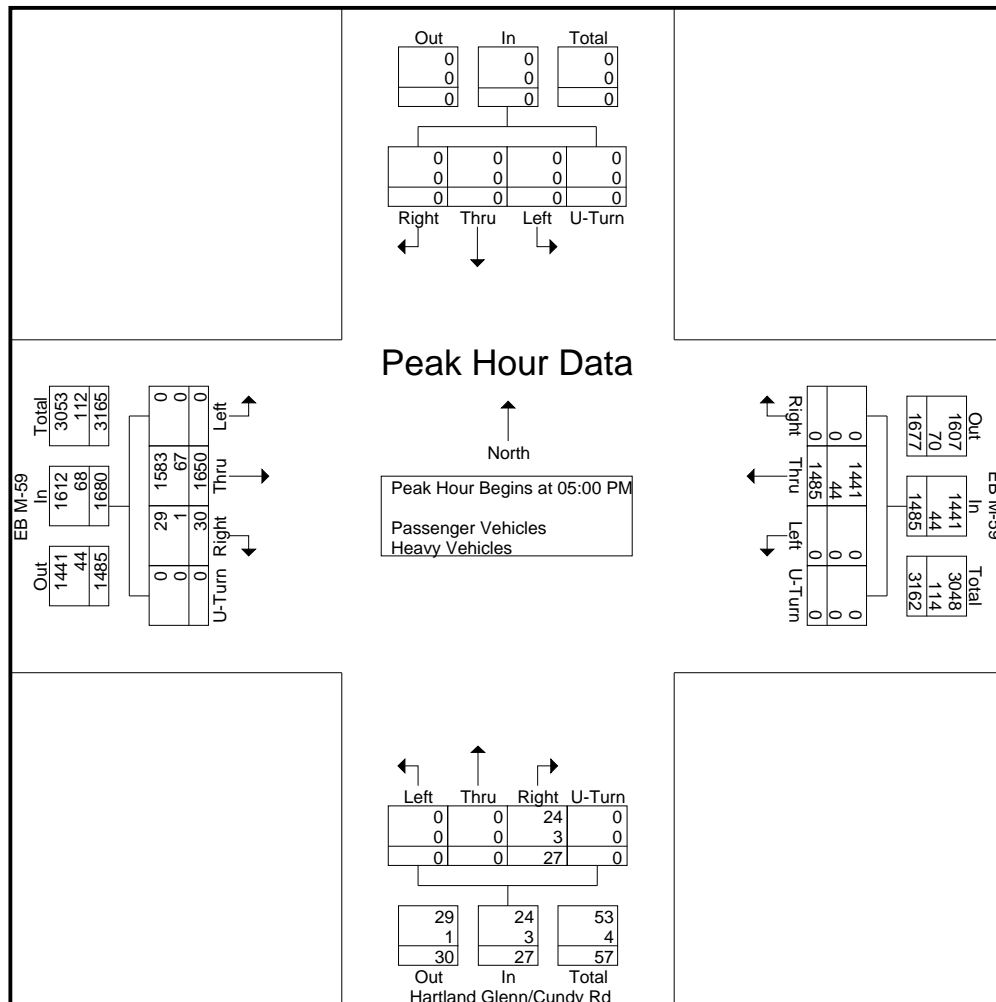


Groups Printed- Passenger Vehicles - Heavy Vehicles

	EB M-59 Eastbound					EB M-59 Westbound					Hartland Glenn/Cundy Rd Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
04:00 PM	0	388	11	0	399	0	336	0	0	336	0	0	10	0	10	0	0	0	0	0	745
04:15 PM	0	342	7	0	349	0	342	0	0	342	0	0	11	0	11	0	0	0	0	0	702
04:30 PM	0	358	10	0	368	0	361	0	0	361	0	0	4	0	4	0	0	0	0	0	733
04:45 PM	0	365	10	0	375	0	335	0	0	335	0	0	2	0	2	0	0	0	0	0	712
Total	0	1453	38	0	1491	0	1374	0	0	1374	0	0	27	0	27	0	0	0	0	0	2892
05:00 PM	0	406	6	0	412	0	362	0	0	362	0	0	5	0	5	0	0	0	0	0	779
05:15 PM	0	410	8	0	418	0	391	0	0	391	0	0	3	0	3	0	0	0	0	0	812
05:30 PM	0	418	6	0	424	0	367	0	0	367	0	0	11	0	11	0	0	0	0	0	802
05:45 PM	0	416	10	0	426	0	365	0	0	365	0	0	8	0	8	0	0	0	0	0	799
Total	0	1650	30	0	1680	0	1485	0	0	1485	0	0	27	0	27	0	0	0	0	0	3192
Grand Total	0	3103	68	0	3171	0	2859	0	0	2859	0	0	54	0	54	0	0	0	0	0	6084
Apprch %	0	97.9	2.1	0		0	100	0	0		0	0	100	0		0	0	0	0		
Total %	0	51	1.1	0	52.1	0	47	0	0	47	0	0	0.9	0	0.9	0	0	0	0	0	
Passenger Vehicles	0	2945	65	0	3010	0	2760	0	0	2760	0	0	48	0	48	0	0	0	0	0	5818
% Passenger Vehicles	0	94.9	95.6	0	94.9	0	96.5	0	0	96.5	0	0	88.9	0	88.9	0	0	0	0	0	95.6
Heavy Vehicles	0	158	3	0	161	0	99	0	0	99	0	0	6	0	6	0	0	0	0	0	266
% Heavy Vehicles	0	5.1	4.4	0	5.1	0	3.5	0	0	3.5	0	0	11.1	0	11.1	0	0	0	0	0	4.4

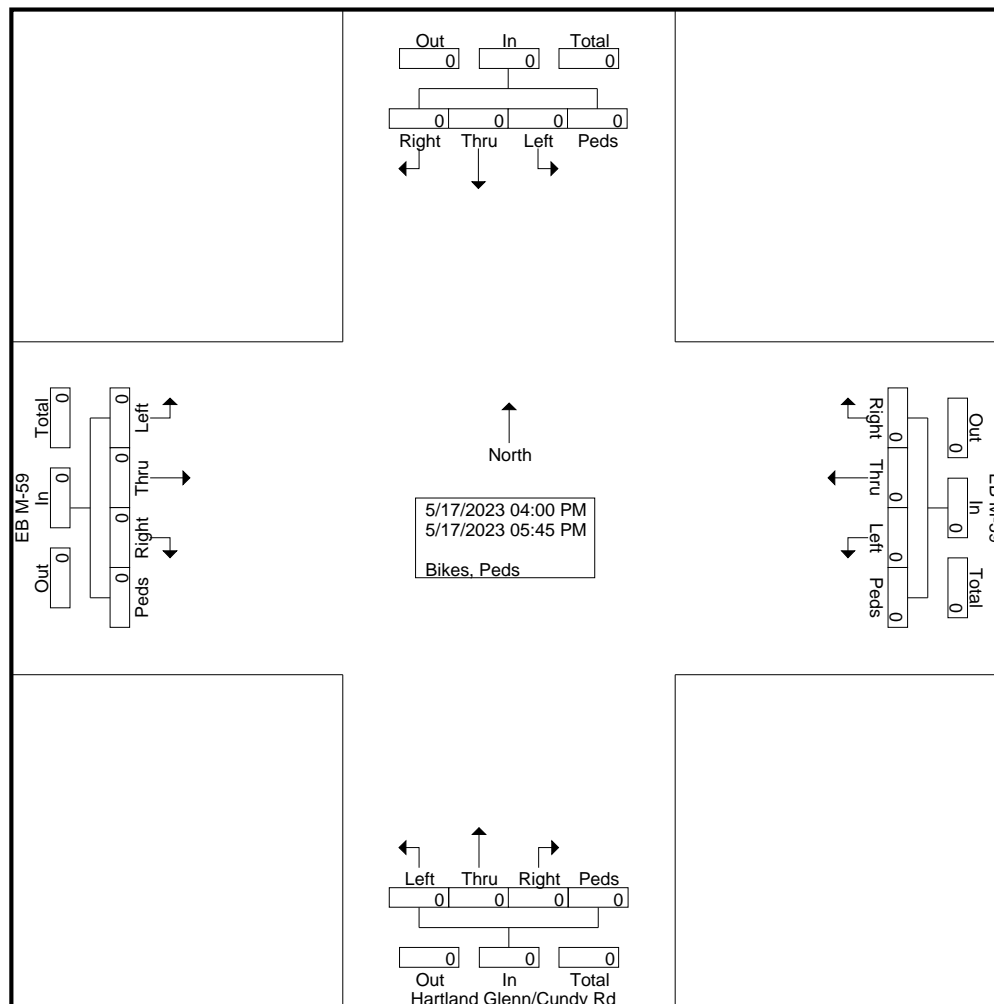


	EB M-59 Eastbound					EB M-59 Westbound					Hartland Glenn/Cundy Rd Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	406	6	0	412	0	362	0	0	362	0	0	5	0	5	0	0	0	0	0	779
05:15 PM	0	410	8	0	418	0	391	0	0	391	0	0	3	0	3	0	0	0	0	0	812
05:30 PM	0	418	6	0	424	0	367	0	0	367	0	0	11	0	11	0	0	0	0	0	802
05:45 PM	0	416	10	0	426	0	365	0	0	365	0	0	8	0	8	0	0	0	0	0	799
Total Volume	0	1650	30	0	1680	0	1485	0	0	1485	0	0	27	0	27	0	0	0	0	0	3192
% App. Total	0	98.2	1.8	0		0	100	0	0		0	0	100	0		0	0	0	0		
PHF	.000	.987	.750	.000	.986	.000	.949	.000	.000	.949	.000	.000	.614	.000	.614	.000	.000	.000	.000	.000	.983
Passenger Vehicles	0	1583	29	0	1612	0	1441	0	0	1441	0	0	24	0	24	0	0	0	0	0	3077
% Passenger Vehicles	0	95.9	96.7	0	96.0	0	97.0	0	0	97.0	0	0	88.9	0	88.9	0	0	0	0	0	96.4
Heavy Vehicles	0	67	1	0	68	0	44	0	0	44	0	0	3	0	3	0	0	0	0	0	115
% Heavy Vehicles	0	4.1	3.3	0	4.0	0	3.0	0	0	3.0	0	0	11.1	0	11.1	0	0	0	0	0	3.6

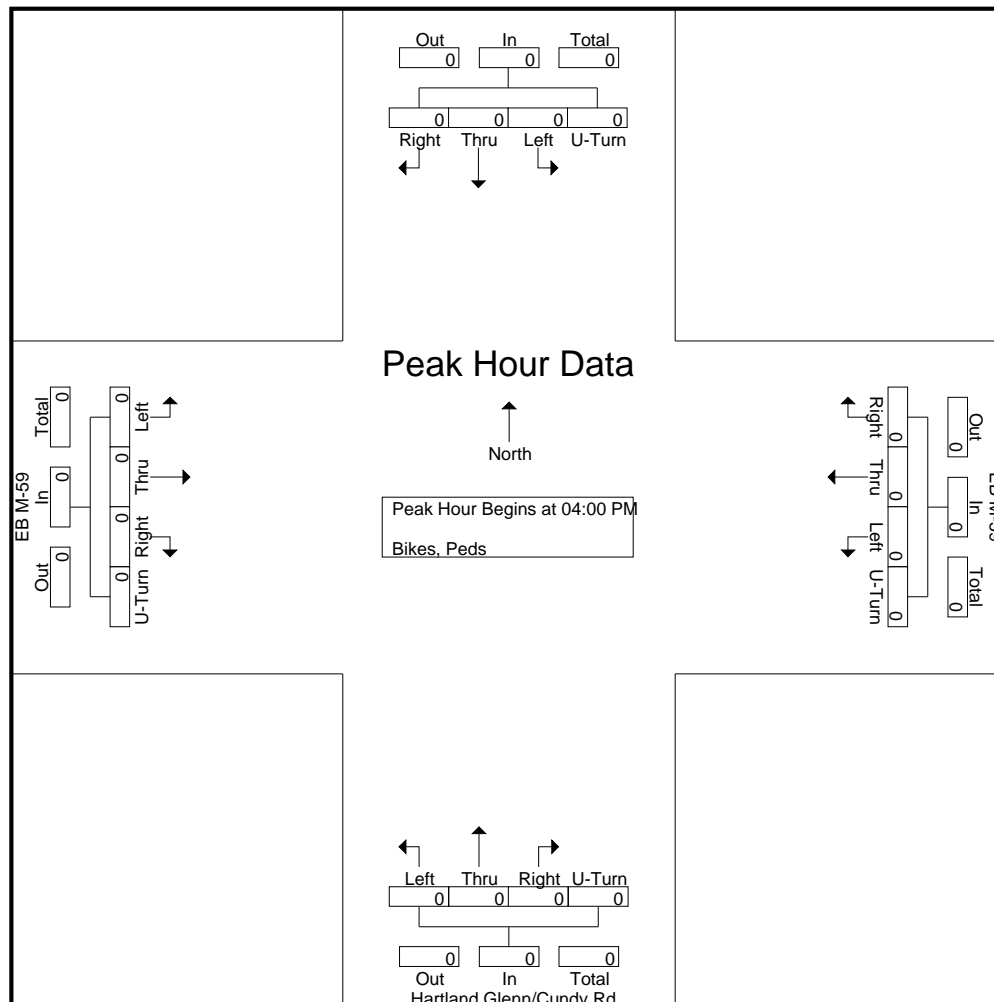


Groups Printed- Bikes, Peds

	EB M-59 Eastbound					EB M-59 Westbound					Hartland Glenn/Cundy Rd Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

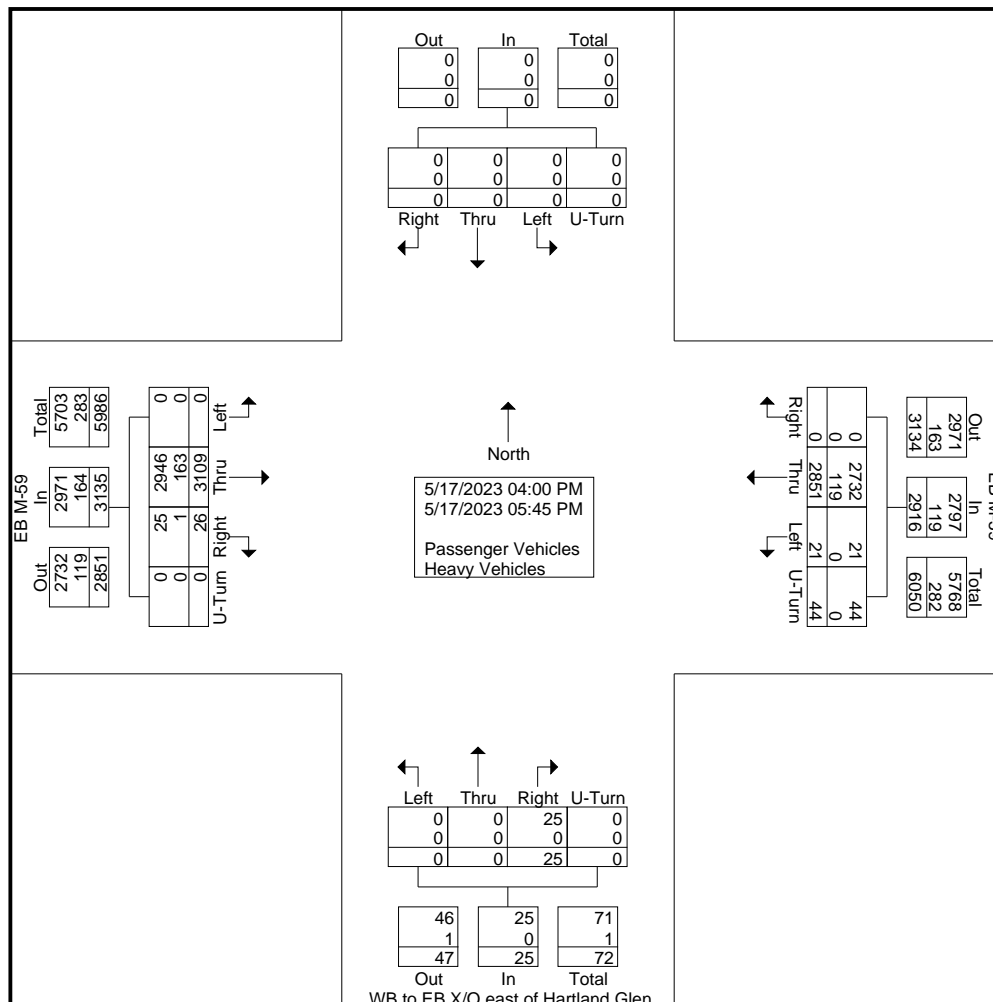


	EB M-59 Eastbound					EB M-59 Westbound					Hartland Glenn/Cundy Rd Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

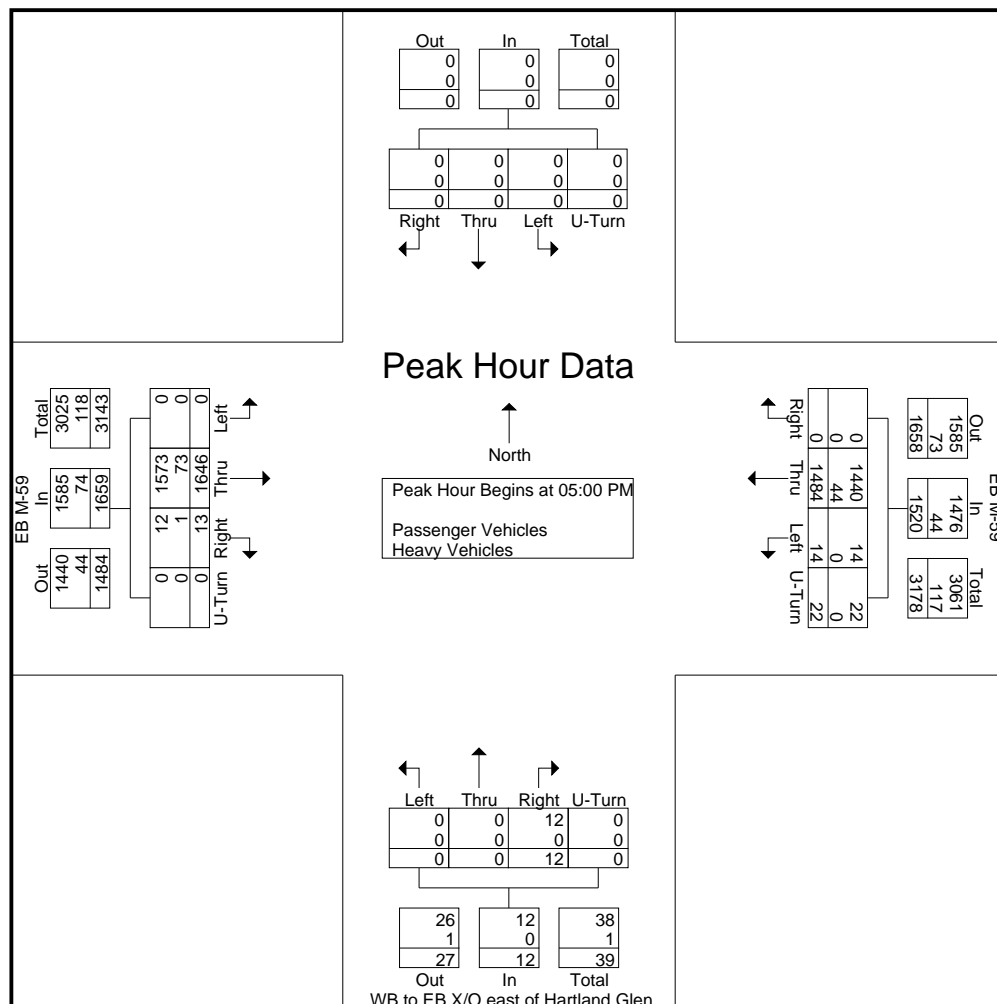


Groups Printed- Passenger Vehicles - Heavy Vehicles

	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
04:00 PM	0	391	0	0	391	4	346	0	3	353	0	0	4	0	4	0	0	0	0	0	748
04:15 PM	0	354	8	0	362	1	335	0	5	341	0	0	2	0	2	0	0	0	0	0	705
04:30 PM	0	355	4	0	359	0	354	0	6	360	0	0	4	0	4	0	0	0	0	0	723
04:45 PM	0	363	1	0	364	2	332	0	8	342	0	0	3	0	3	0	0	0	0	0	709
Total	0	1463	13	0	1476	7	1367	0	22	1396	0	0	13	0	13	0	0	0	0	0	2885
05:00 PM	0	403	4	0	407	1	366	0	4	371	0	0	2	0	2	0	0	0	0	0	780
05:15 PM	0	409	1	0	410	6	385	0	6	397	0	0	4	0	4	0	0	0	0	0	811
05:30 PM	0	410	4	0	414	5	359	0	4	368	0	0	2	0	2	0	0	0	0	0	784
05:45 PM	0	424	4	0	428	2	374	0	8	384	0	0	4	0	4	0	0	0	0	0	816
Total	0	1646	13	0	1659	14	1484	0	22	1520	0	0	12	0	12	0	0	0	0	0	3191
Grand Total	0	3109	26	0	3135	21	2851	0	44	2916	0	0	25	0	25	0	0	0	0	0	6076
Apprch %	0	99.2	0.8	0		0.7	97.8	0	1.5		0	0	100	0		0	0	0	0		
Total %	0	51.2	0.4	0	51.6	0.3	46.9	0	0.7	48	0	0	0.4	0	0.4	0	0	0	0	0	
Passenger Vehicles	0	2946	25	0	2971	21	2732	0	44	2797	0	0	25	0	25	0	0	0	0	0	5793
% Passenger Vehicles	0	94.8	96.2	0	94.8	100	95.8	0	100	95.9	0	0	100	0	100	0	0	0	0	0	95.3
Heavy Vehicles	0	163	1	0	164	0	119	0	0	119	0	0	0	0	0	0	0	0	0	0	283
% Heavy Vehicles	0	5.2	3.8	0	5.2	0	4.2	0	0	4.1	0	0	0	0	0	0	0	0	0	0	4.7

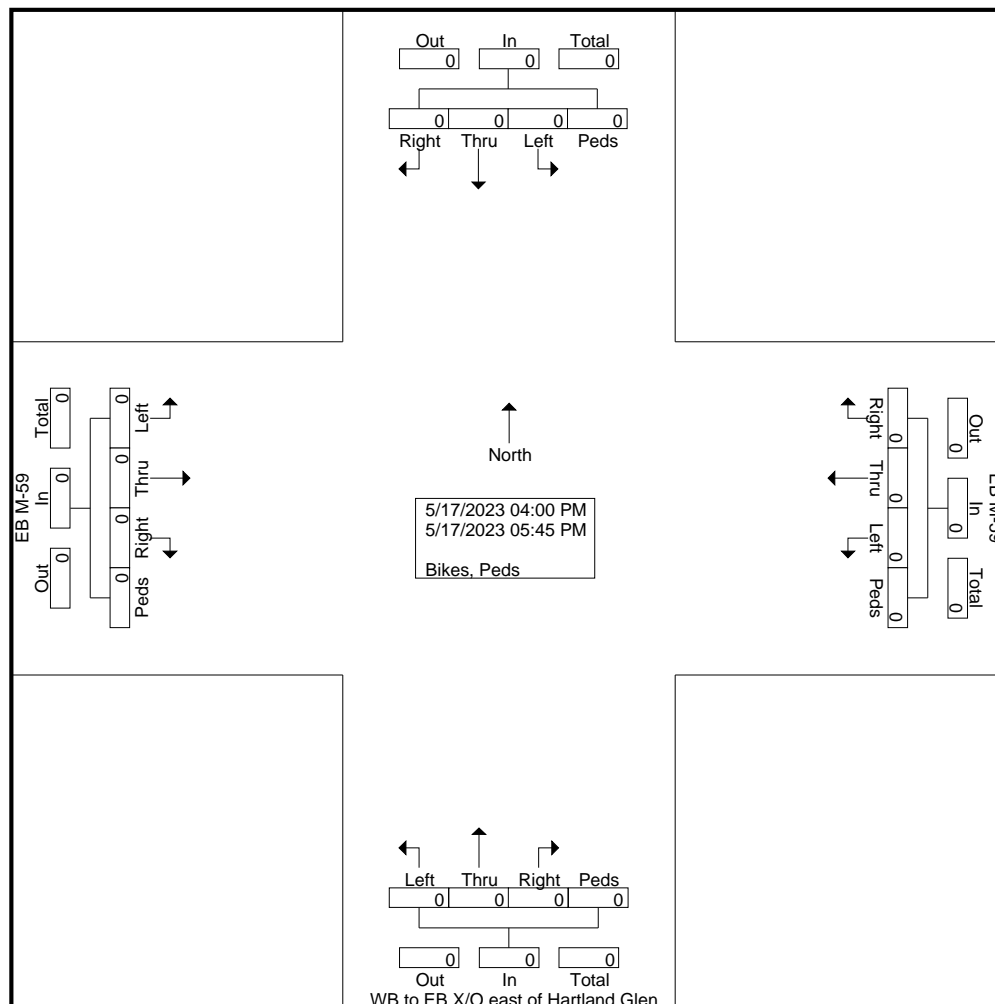


	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	403	4	0	407	1	366	0	4	371	0	0	2	0	2	0	0	0	0	0	780
05:15 PM	0	409	1	0	410	6	385	0	6	397	0	0	4	0	4	0	0	0	0	0	811
05:30 PM	0	410	4	0	414	5	359	0	4	368	0	0	2	0	2	0	0	0	0	0	784
05:45 PM	0	424	4	0	428	2	374	0	8	384	0	0	4	0	4	0	0	0	0	0	816
Total Volume	0	1646	13	0	1659	14	1484	0	22	1520	0	0	12	0	12	0	0	0	0	0	3191
% App. Total	0	99.2	0.8	0		0.9	97.6	0	1.4		0	0	100	0		0	0	0	0		
PHF	.000	.971	.813	.000	.969	.583	.964	.000	.688	.957	.000	.000	.750	.000	.750	.000	.000	.000	.000	.000	.978
Passenger Vehicles	0	1573	12	0	1585	14	1440	0	22	1476	0	0	12	0	12	0	0	0	0	0	3073
% Passenger Vehicles	0	95.6	92.3	0	95.5	100	97.0	0	100	97.1	0	0	100	0	100	0	0	0	0	0	96.3
Heavy Vehicles	0	73	1	0	74	0	44	0	0	44	0	0	0	0	0	0	0	0	0	0	118
% Heavy Vehicles	0	4.4	7.7	0	4.5	0	3.0	0	0	2.9	0	0	0	0	0	0	0	0	0	0	3.7

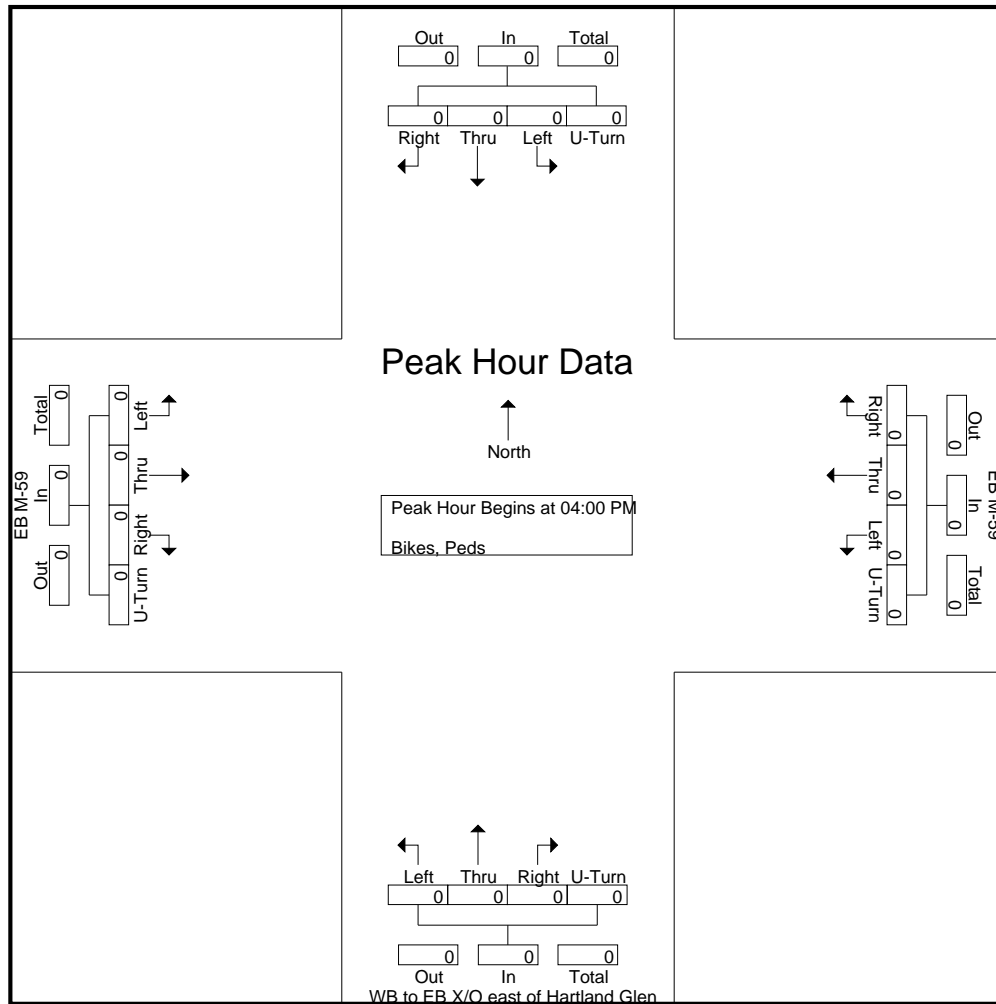


Groups Printed- Bikes, Peds

	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					









	EB M-59 Eastbound					EB M-59 Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000





Disclaimer: The Michigan Department of Transportation (MDOT) works with individual agencies (cities/villages, counties, metropolitan planning organizations (MPOs), regional planning organizations (RPOs), and other areas of MDOT) to identify existing traffic count programs and/or traffic data. [... more](#)


[List View](#)
[All DIRs](#)
[Report Center](#)

	Record			1			of 2	Goto Record	<input type="text"/>	<input type="button" value="go"/>	
Location ID	47-0550				MPO ID	3011					
Type	SPOT				HPMS ID						
On NHS	No				On HPMS	No					
LRS ID	0934502				LRS Loc Pt.	0.7052841					
SF Group	Local Road				Route Type						
AF Group	NoFactor				Route						
GF Group	Local Road				Active	Yes					
Class Dist Grp	NTL_7				Category						
Seas Clss Grp											
WIM Group											
QC Group	Default										
Funct'l Class	(7) Local Road or Street				Milepost						
Located On	Cundy Rd										
Loc On Alias											
BETWEEN	Bullard Rd AND Hartland Glen Ln										
More Detail											
STATION DATA											

Directions: [2-WAY](#) [EB](#) [WB](#) 
AADT 

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2022	304 ³		9		289 (95%)	15 (5%)	Grown from 2021
2021	307 ³		9		260 (85%)	47 (15%)	Grown from 2020
2020	274	26	9		247 (90%)	27 (10%)	

VOLUME COUNT			
	Date	Int	Total
	Mon 6/8/2020	60	274
			

VOLUME TREND 	
Year	Annual Growth
2022	-1%
2021	12%

CLASSIFICATION

	Date	Int	Total
No Data			

NOTES/FILES

	Note	Date	

Search...



Crash and Road Data

Road Segment Report

Highland Rd, (PR Number 933209)

From:	Hartland Rd 12.996 BMP
To:	Fenton Rd 15.296 EMP
Jurisdiction:	State
FALINK ID:	5285
Community:	Hartland Township
County:	Livingston
Functional Class:	3 - Other Principal Arterial
Direction:	1 Way
Length:	2.300 miles
Number of Lanes:	2
Posted Speed:	55 (source: TCO)
Route Classification:	M-36
Annual Crash Average 2017-2021:	15
Traffic Volume (2020)*:	15,100 (Observed AADT)
Pavement Type (2021):	Asphalt
Pavement Rating (2021):	Poor
Short Range (TIP) Projects:	No TIP projects for this segment.
Long Range (RTP) Projects:	No long-range projects for this segment.

* AADT values are derived from Traffic Counts

Street View



Community Profiles

YOU ARE VIEWING DATA FOR:

Hartland Township

2655 Clark Rd
Hartland, MI 48353-2614
<http://www.hartlandtwp.com/>



Census 2020 Population: 15,256
Area: 37.3 square miles

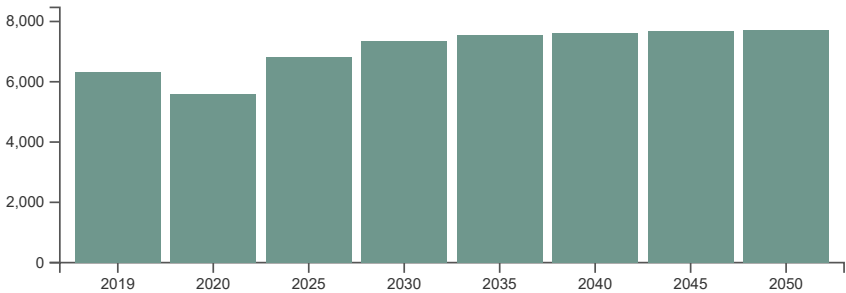
VIEW COMMUNITY EXPLORER MAP

VIEW 2020 CENSUS MAP

Economy & Jobs

Link to American Community Survey (ACS) Profiles: **Select a Year** **Economic**

Forecasted Jobs



Note: The base year for the employment forecast is 2019, as 2020 employment was artificially low due to the COVID recession.

Source: SEMCOG 2050 Regional Development Forecast

Forecasted Jobs by Industry Sector

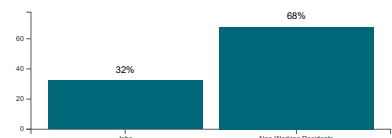
Forecasted Jobs By Industry Sector	2019	2020	2025	2030	2035	2040	2045	2050	Change 2019-2050	Pct Change 2019-2050
Natural Resources, Mining, & Construction	590	565	776	804	816	822	836	834	244	41.4%
Manufacturing	467	437	494	483	465	444	413	403	-64	-13.7%
Wholesale Trade	106	102	119	137	138	134	137	132	26	24.5%
Retail Trade	900	838	943	1,006	976	951	934	920	20	2.2%
Transportation, Warehousing, & Utilities	103	95	124	134	135	135	138	144	41	39.8%
Information & Financial Activities	832	724	828	885	918	932	949	959	127	15.3%
Professional and Technical Services & Corporate HQ	498	413	516	541	566	588	593	606	108	21.7%
Administrative, Support, & Waste Services	252	200	233	255	274	286	305	321	69	27.4%
Education Services	509	485	538	568	587	598	601	602	93	18.3%
Healthcare Services	389	339	369	445	495	508	547	557	168	43.2%
Leisure & Hospitality	1,166	937	1,363	1,566	1,638	1,658	1,677	1,692	526	45.1%
Other Services	383	331	384	402	400	403	402	390	7	1.8%
Public Administration	112	108	121	130	133	138	138	137	25	22.3%
Total Employment Numbers	6,307	5,574	6,808	7,356	7,541	7,597	7,670	7,697	1,390	22%

Note: The base year for the employment forecast is 2019, as 2020 employment was artificially low due to the COVID recession.

Source: **SEMCOG 2050 Regional Development Forecast**

Daytime Population

Daytime Population	ACS 2016
Jobs	3,663
Non-Working Residents	7,661
Age 15 and under	3,505
Not in labor force	3,626
Unemployed	530
Daytime Population	11,324



Source: **2012-2016 American Community Survey 5-Year Estimates** and **2012-2016 Census Transportation Planning Products Program (CTPP)**. For additional information, visit SEMCOG's **Interactive Commuting Patterns Map**

Note: The number of residents attending school outside Southeast Michigan is not available. Likewise, the number of students commuting into Southeast Michigan to attend school is also not known.

Community Profiles

YOU ARE VIEWING DATA FOR:

Hartland Township

2655 Clark Rd
Hartland, MI 48353-
2614
<http://www.hartlandtwp.com/>



Census 2020 Population:
15,256
Area: 37.3 square miles

VIEW COMMUNITY EXPLORER MAP

VIEW 2020 CENSUS MAP

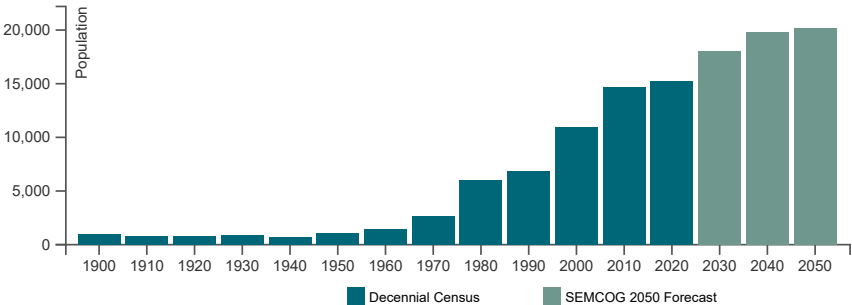
Population and Households

Link to American Community Survey (ACS) Profiles:

Select a Year2017-2021

[Social | Demographic](#)
[Population and Household Estimates for Southeast Michigan, 2022](#)

Population Forecast



Population and Households

Population and Households	Census 2020	Census 2010	Change 2010-2020	Pct Change 2010-2020	SEMCOG Jul 2022	SEMCOG 2050
Total Population	15,256	14,663	593	4.0%	15,234	20,180
Group Quarters Population	13	5	8	160.0%	82	93
Household Population	15,243	14,658	585	4.0%	15,152	20,087
Housing Units	5,813	5,442	371	6.8%	5,952	-
Households (Occupied Units)	5,496	5,154	342	6.6%	5,494	7,848
Residential Vacancy Rate	5.5%	5.3%	0.2%	-	7.7%	-
Average Household Size	2.77	2.84	-0.07	-	2.76	2.56

Source: **U.S. Census Bureau** and **SEMCOG 2050 Regional Development Forecast**

Components of Population Change

Components of Population Change	2000-2005 Avg.	2006-2010 Avg.	2011-2018 Avg.
Natural Increase (Births - Deaths)	103	49	15
Births	174	111	118
Deaths	71	62	103
Net Migration (Movement In - Movement Out)	498	83	180
Population Change (Natural Increase + Net Migration)	601	132	195

Source: **Michigan Department of Community Health Vital Statistics**, **U.S. Census Bureau**, and **SEMCOG**

Household Types

Household Types	Census 2010	ACS 2021	Change 2010-2021	Pct Change 2010-2021	SEMCOG 2050
With Seniors 65+	1,082	1,737	655	60.5%	-
Without Seniors	4,072	4,005	-67	-1.6%	-
Live Alone, 65+	309	700	391	126.5%	-
Live Alone, <65	565	766	201	35.6%	-
2+ Persons, With children	2,142	1,793	-349	-16.3%	-
2+ Persons, Without children	2,138	2,483	345	16.1%	-
Total Households	5,154	5,742	588	11.4%	-

Source: **U.S. Census Bureau**, **Decennial Census**, **2017-2021 American Community Survey 5-Year Estimates**, and **SEMCOG 2050 Regional Development Forecast**

The level of service criteria are given in Exhibit 20-2. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in queue.

Upstream signals are present on the major street, upstream of the subject intersection, flows may not be random but will likely have some platoon structure. Although the procedures in this chapter provide a method for approximating the operations of a TWSC intersection with an upstream signal, the operations of such an intersection is arguably best handled by including it in a complete simulation

LEVEL OF SERVICE	AVERAGE CONTROL DELAY (sec/veh)
A	≤ 10
B	$> 10 \text{ and } \leq 15$
C	$> 15 \text{ and } \leq 25$
D	$> 25 \text{ and } \leq 35$
E	$> 35 \text{ and } \leq 50$
F	> 50

Additionally, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, where drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized than signalized intersections. For these reasons, it is considered that the total delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection.

Source: Highway Capacity Manual, 6th Edition. Transportation Research Board, National Research Council

Level of Service for Signalized Intersections

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS can be characterized for the entire intersection, each intersection approach, and each lane group. Specifically, level-of-service (LOS) criteria are stated in terms of the average stopped delay per vehicle. The criteria are given in Exhibit 19-8. Delay may be measured in the field or estimated using procedures presented later in this chapter. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group in question.

LOS A describes operations with a control delay of 10 s/veh or less. This level is typically assigned when the volume-to-capacity ratio is low and either progression is extremely favorable or the cycle length is very short. If LOS A is the result of favorable progression, most vehicles arrive during a green indication and travel through the intersection without stopping.

LOS B describes operations with control delay between 10 and 20 s/veh. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

Exhibit 19.8. Level-of-Service Criteria for Signalized Intersections (Motorized Vehicles)

LEVEL OF SERVICE	STOPPED DELAY PER VEHICLE (SEC)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	> 80.0

1. If the v/c ratio for a lane group exceeds 1.0, a LOS F is assigned to the individual lane group. LOS for approach-based and intersection-wide assessments are determined solely by the control delay.

LOS C describes operations with control delay between 20 and 35 s/veh. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e. one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicle stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D describes operations with control delay between 35 and 55 s/veh. This level is typically assigned when when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E describes operations with control delay between 55 and 80 s/veh. This level is typically assigned when when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level, considered to be unacceptable to most drivers, often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of the intersection. This level is typically assigned when the volume-to-capacity ratio is high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Source: Highway Capacity Manual, 6th Edition. Transportation Research Board, National Research Council

HCM 6th TWSC
10: EB M-59 & WB to EB XO W. of Hartland Glen

Existing Conditions
AM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↓	
Traffic Vol, veh/h	0	1364	0	0	5	0
Future Vol, veh/h	0	1364	0	0	5	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	63	63
Heavy Vehicles, %	10	10	2	2	0	0
Mvmt Flow	0	1483	0	0	8	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			742	-
Stage 1	-	-			0	-
Stage 2	-	-			742	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			355	0
Stage 1	0	-			-	0
Stage 2	0	-			437	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			355	-
Mov Cap-2 Maneuver	-	-			355	-
Stage 1	-	-			-	-
Stage 2	-	-			437	-
Approach	EB		SB			
HCM Control Delay, s	0		15.4			
HCM LOS			C			
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	- 355					
HCM Lane V/C Ratio	- 0.022					
HCM Control Delay (s)	- 15.4					
HCM Lane LOS	- C					
HCM 95th %tile Q(veh)	- 0.1					

HCM 6th TWSC
20: Hartland Glen Lane/ Cundy Road & EB M-59

Existing Conditions
AM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑					↑
Traffic Vol, veh/h	1363	6	0	0	0	6
Future Vol, veh/h	1363	6	0	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	60	60
Heavy Vehicles, %	10	10	2	2	67	67
Mvmt Flow	1435	6	0	0	0	10
Major/Minor	Major1		Minor1			
Conflicting Flow All	0	0	-	-	-	721
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	8.24
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.97
Pot Cap-1 Maneuver	-	-	-	-	0	252
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	252
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB			NB		
HCM Control Delay, s	0			19.9		
HCM LOS				C		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR			
Capacity (veh/h)	252	-	-			
HCM Lane V/C Ratio	0.04	-	-			
HCM Control Delay (s)	19.9	-	-			
HCM Lane LOS	C	-	-			
HCM 95th %tile Q(veh)	0.1	-	-			

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↑	
Traffic Vol, veh/h	0	0	0	1303	4	0
Future Vol, veh/h	0	0	0	1303	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	89	89	60	60
Heavy Vehicles, %	2	2	8	8	0	0
Mvmt Flow	0	0	0	1464	7	0
Major/Minor	Major2		Minor1			
Conflicting Flow All			-	-	732	-
Stage 1			-	-	0	-
Stage 2			-	-	732	-
Critical Hdwy			-	-	6.8	-
Critical Hdwy Stg 1			-	-	-	-
Critical Hdwy Stg 2			-	-	5.8	-
Follow-up Hdwy			-	-	3.5	-
Pot Cap-1 Maneuver			0	-	361	0
Stage 1			0	-	-	0
Stage 2			0	-	442	0
Platoon blocked, %			-			
Mov Cap-1 Maneuver			-	-	361	-
Mov Cap-2 Maneuver			-	-	361	-
Stage 1			-	-	-	-
Stage 2			-	-	442	-
Approach	WB		NB			
HCM Control Delay, s			0	15.2		
HCM LOS			C			
Minor Lane/Major Mvmt	NBLn1	WBT				
Capacity (veh/h)	361	-				
HCM Lane V/C Ratio	0.018	-				
HCM Control Delay (s)	15.2	-				
HCM Lane LOS	C	-				
HCM 95th %tile Q(veh)	0.1	-				

HCM 6th TWSC
40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Existing Conditions
AM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↑	
Traffic Vol, veh/h	0	1365	0	0	1	0
Future Vol, veh/h	0	1365	0	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	92	92	60	60
Heavy Vehicles, %	10	10	2	2	0	0
Mvmt Flow	0	1452	0	0	2	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			726	-
Stage 1	-	-			0	-
Stage 2	-	-			726	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			364	0
Stage 1	0	-			-	0
Stage 2	0	-			445	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			364	-
Mov Cap-2 Maneuver	-	-			364	-
Stage 1	-	-			-	-
Stage 2	-	-			445	-
Approach	EB		SB			
HCM Control Delay, s	0				14.9	
HCM LOS					B	
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	-		364			
HCM Lane V/C Ratio	-		0.005			
HCM Control Delay (s)	-		14.9			
HCM Lane LOS	-		B			
HCM 95th %tile Q(veh)	-		0			

HCM 6th TWSC
50: EB to WB XO W. of Fenton Road & WB M-59

Existing Conditions
AM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↑	
Traffic Vol, veh/h	0	0	0	1297	7	0
Future Vol, veh/h	0	0	0	1297	7	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	60	60
Heavy Vehicles, %	2	2	8	8	0	0
Mvmt Flow	0	0	0	1365	12	0
Major/Minor		Major2		Minor1		
Conflicting Flow All		-	-	683	-	-
Stage 1		-	-	0	-	-
Stage 2		-	-	683	-	-
Critical Hdwy		-	-	6.8	-	-
Critical Hdwy Stg 1		-	-	-	-	-
Critical Hdwy Stg 2		-	-	5.8	-	-
Follow-up Hdwy		-	-	3.5	-	-
Pot Cap-1 Maneuver		0	-	387	0	-
Stage 1		0	-	-	0	-
Stage 2		0	-	468	0	-
Platoon blocked, %		-	-	-	-	-
Mov Cap-1 Maneuver		-	-	387	-	-
Mov Cap-2 Maneuver		-	-	387	-	-
Stage 1		-	-	-	-	-
Stage 2		-	-	468	-	-
Approach		WB		NB		
HCM Control Delay, s		0		14.6		
HCM LOS				B		
Minor Lane/Major Mvmt		NBLn1		WBT		
Capacity (veh/h)		387		-		
HCM Lane V/C Ratio		0.03		-		
HCM Control Delay (s)		14.6		-		
HCM Lane LOS		B		-		
HCM 95th %tile Q(veh)		0.1		-		

HCM 6th TWSC
10: EB M-59 & WB to EB XO W. of Hartland Glen

Existing Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↓	
Traffic Vol, veh/h	0	1659	0	0	36	0
Future Vol, veh/h	0	1659	0	0	36	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	92	92	69	69
Heavy Vehicles, %	5	5	2	2	0	0
Mvmt Flow	0	1746	0	0	52	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			873	-
Stage 1	-	-			0	-
Stage 2	-	-			873	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			293	0
Stage 1	0	-			-	0
Stage 2	0	-			374	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			293	-
Mov Cap-2 Maneuver	-	-			293	-
Stage 1	-	-			-	-
Stage 2	-	-			374	-
Approach	EB		SB			
HCM Control Delay, s	0		19.9			
HCM LOS			C			
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	-		293			
HCM Lane V/C Ratio	-		0.178			
HCM Control Delay (s)	-		19.9			
HCM Lane LOS	-		C			
HCM 95th %tile Q(veh)	-		0.6			

HCM 6th TWSC
20: Hartland Glen Lane/ Cundy Road & EB M-59

Existing Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑					↑
Traffic Vol, veh/h	1665	30	0	0	0	27
Future Vol, veh/h	1665	30	0	0	0	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	61	61
Heavy Vehicles, %	4	4	2	2	11	11
Mvmt Flow	1753	32	0	0	0	44

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	-	893
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.12
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.41
Pot Cap-1 Maneuver	-	-	0	267
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	267
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	21.1
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	267	-	-
HCM Lane V/C Ratio	0.166	-	-
HCM Control Delay (s)	21.1	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.6	-	-

Intersection						
Int Delay, s/veh	4.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↑	
Traffic Vol, veh/h	0	0	0	1523	129	0
Future Vol, veh/h	0	0	0	1523	129	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	60	60
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	0	0	0	1603	215	0
Major/Minor		Major2		Minor1		
Conflicting Flow All			-	-	802	-
Stage 1			-	-	0	-
Stage 2			-	-	802	-
Critical Hdwy			-	-	6.8	-
Critical Hdwy Stg 1			-	-	-	-
Critical Hdwy Stg 2			-	-	5.8	-
Follow-up Hdwy			-	-	3.5	-
Pot Cap-1 Maneuver			0	-	326	0
Stage 1			0	-	-	0
Stage 2			0	-	407	0
Platoon blocked, %				-		
Mov Cap-1 Maneuver			-	-	326	-
Mov Cap-2 Maneuver			-	-	326	-
Stage 1			-	-	-	-
Stage 2			-	-	407	-
Approach			WB		NB	
HCM Control Delay, s			0		35.1	
HCM LOS					E	
Minor Lane/Major Mvmt	NBLn1	WBT				
Capacity (veh/h)	326	-				
HCM Lane V/C Ratio	0.66	-				
HCM Control Delay (s)	35.1	-				
HCM Lane LOS	E	-				
HCM 95th %tile Q(veh)	4.4	-				

HCM 6th TWSC
40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Existing Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↑	
Traffic Vol, veh/h	0	1563	0	0	1	0
Future Vol, veh/h	0	1563	0	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	92	92	60	60
Heavy Vehicles, %	5	5	2	2	0	0
Mvmt Flow	0	1645	0	0	2	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			823	-
Stage 1	-	-			0	-
Stage 2	-	-			823	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			316	0
Stage 1	0	-			-	0
Stage 2	0	-			397	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			316	-
Mov Cap-2 Maneuver	-	-			316	-
Stage 1	-	-			-	-
Stage 2	-	-			397	-
Approach	EB		SB			
HCM Control Delay, s	0				16.5	
HCM LOS					C	
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	-		316			
HCM Lane V/C Ratio	-		0.005			
HCM Control Delay (s)	-		16.5			
HCM Lane LOS	-		C			
HCM 95th %tile Q(veh)	-		0			

HCM 6th TWSC
50: EB to WB XO W. of Fenton Road & WB M-59

Existing Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↑	
Traffic Vol, veh/h	0	0	0	1513	11	0
Future Vol, veh/h	0	0	0	1513	11	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	60	60
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	0	0	0	1593	18	0
Major/Minor			Major2		Minor1	
Conflicting Flow All			-	-	797	-
Stage 1			-	-	0	-
Stage 2			-	-	797	-
Critical Hdwy			-	-	6.8	-
Critical Hdwy Stg 1			-	-	-	-
Critical Hdwy Stg 2			-	-	5.8	-
Follow-up Hdwy			-	-	3.5	-
Pot Cap-1 Maneuver			0	-	328	0
Stage 1			0	-	-	0
Stage 2			0	-	409	0
Platoon blocked, %				-		
Mov Cap-1 Maneuver			-	-	328	-
Mov Cap-2 Maneuver			-	-	328	-
Stage 1			-	-	-	-
Stage 2			-	-	409	-
Approach			WB		NB	
HCM Control Delay, s			0		16.6	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	WBT				
Capacity (veh/h)	328	-				
HCM Lane V/C Ratio	0.056	-				
HCM Control Delay (s)	16.6	-				
HCM Lane LOS	C	-				
HCM 95th %tile Q(veh)	0.2	-				

Intersection: 10: EB M-59 & WB to EB XO W. of Hartland Glen

Movement	SB
Directions Served	L
Maximum Queue (ft)	42
Average Queue (ft)	6
95th Queue (ft)	27
Link Distance (ft)	27
Upstream Blk Time (%)	2
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: WB to EB XO W. of Hartland Glen & WB M-59

Movement	
Directions Served	
Maximum Queue (ft)	
Average Queue (ft)	
95th Queue (ft)	
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 20: Hartland Glen Lane/ Cundy Road & EB M-59

Movement	NB
Directions Served	R
Maximum Queue (ft)	69
Average Queue (ft)	10
95th Queue (ft)	42
Link Distance (ft)	58
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 30: EB to WB XO E. of Hartland Glen & WB M-59

Movement	NB
Directions Served	L
Maximum Queue (ft)	25
Average Queue (ft)	3
95th Queue (ft)	16
Link Distance (ft)	50
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: EB M-59 & EB to WB XO E. of Hartland Glen

Movement	
Directions Served	
Maximum Queue (ft)	
Average Queue (ft)	
95th Queue (ft)	
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Movement	SB
Directions Served	L
Maximum Queue (ft)	27
Average Queue (ft)	2
95th Queue (ft)	12
Link Distance (ft)	52
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41: WB to EB XO E. of Hartland Glen Lane & WB M-59

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 50: EB to WB XO W. of Fenton Road & WB M-59

Movement

NB

Directions Served

L

Maximum Queue (ft)

28

Average Queue (ft)

7

95th Queue (ft)

27

Link Distance (ft)

40

Upstream Blk Time (%)

0

Queuing Penalty (veh)

0

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 51: EB M-59 & EB to WB XO W. of Fenton Road

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 10: EB M-59 & WB to EB XO W. of Hartland Glen

Movement	SB
Directions Served	L
Maximum Queue (ft)	67
Average Queue (ft)	24
95th Queue (ft)	53
Link Distance (ft)	27
Upstream Blk Time (%)	14
Queuing Penalty (veh)	5
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: WB to EB XO W. of Hartland Glen & WB M-59

Movement	WB
Directions Served	L
Maximum Queue (ft)	6
Average Queue (ft)	0
95th Queue (ft)	3
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	250
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 20: Hartland Glen Lane/ Cundy Road & EB M-59

Movement	NB
Directions Served	R
Maximum Queue (ft)	59
Average Queue (ft)	21
95th Queue (ft)	52
Link Distance (ft)	58
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 30: EB to WB XO E. of Hartland Glen & WB M-59

Movement	NB
Directions Served	L
Maximum Queue (ft)	95
Average Queue (ft)	58
95th Queue (ft)	98
Link Distance (ft)	50
Upstream Blk Time (%)	26
Queuing Penalty (veh)	40
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: EB M-59 & EB to WB XO E. of Hartland Glen

Movement	EB	EB
Directions Served	L	T
Maximum Queue (ft)	76	31
Average Queue (ft)	7	0
95th Queue (ft)	41	7
Link Distance (ft)		299
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	250	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Movement	SB
Directions Served	L
Maximum Queue (ft)	17
Average Queue (ft)	1
95th Queue (ft)	10
Link Distance (ft)	52
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41: WB to EB XO E. of Hartland Glen Lane & WB M-59

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 50: EB to WB XO W. of Fenton Road & WB M-59

Movement

NB

Directions Served

L

Maximum Queue (ft)

37

Average Queue (ft)

9

95th Queue (ft)

30

Link Distance (ft)

40

Upstream Blk Time (%)

0

Queuing Penalty (veh)

0

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 51: EB M-59 & EB to WB XO W. of Fenton Road

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

HCM 6th TWSC
10: EB M-59 & WB to EB XO W. of Hartland Glen

Background Conditions
AM Peak hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↑	
Traffic Vol, veh/h	0	1439	0	0	5	0
Future Vol, veh/h	0	1439	0	0	5	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	60	60
Heavy Vehicles, %	10	10	2	2	0	0
Mvmt Flow	0	1564	0	0	8	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			782	-
Stage 1	-	-			0	-
Stage 2	-	-			782	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			335	0
Stage 1	0	-			-	0
Stage 2	0	-			417	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			335	-
Mov Cap-2 Maneuver	-	-			335	-
Stage 1	-	-			-	-
Stage 2	-	-			417	-
Approach	EB			SB		
HCM Control Delay, s	0			16		
HCM LOS				C		
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	- 335					
HCM Lane V/C Ratio	- 0.025					
HCM Control Delay (s)	- 16					
HCM Lane LOS	- C					
HCM 95th %tile Q(veh)	- 0.1					

HCM 6th TWSC
20: Hartland Glen Lane/ Cundy Road & EB M-59

Background Conditions
AM Peak hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑					↑
Traffic Vol, veh/h	1438	6	0	0	0	6
Future Vol, veh/h	1438	6	0	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	60	60
Heavy Vehicles, %	10	10	2	2	67	67
Mvmt Flow	1514	6	0	0	0	10

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	-	760
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	8.24
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.97
Pot Cap-1 Maneuver	-	-	0	235
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	235
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	21
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	235	-	-
HCM Lane V/C Ratio	0.043	-	-
HCM Control Delay (s)	21	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↑	
Traffic Vol, veh/h	0	0	0	1375	4	0
Future Vol, veh/h	0	0	0	1375	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	89	89	60	60
Heavy Vehicles, %	2	2	8	8	0	0
Mvmt Flow	0	0	0	1545	7	0
Major/Minor			Major2		Minor1	
Conflicting Flow All			-	-	773	-
Stage 1			-	-	0	-
Stage 2			-	-	773	-
Critical Hdwy			-	-	6.8	-
Critical Hdwy Stg 1			-	-	-	-
Critical Hdwy Stg 2			-	-	5.8	-
Follow-up Hdwy			-	-	3.5	-
Pot Cap-1 Maneuver			0	-	340	0
Stage 1			0	-	-	0
Stage 2			0	-	421	0
Platoon blocked, %				-		
Mov Cap-1 Maneuver			-	-	340	-
Mov Cap-2 Maneuver			-	-	340	-
Stage 1			-	-	-	-
Stage 2			-	-	421	-
Approach			WB		NB	
HCM Control Delay, s			0		15.8	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	WBT				
Capacity (veh/h)	340	-				
HCM Lane V/C Ratio	0.02	-				
HCM Control Delay (s)	15.8	-				
HCM Lane LOS	C	-				
HCM 95th %tile Q(veh)	0.1	-				

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↑	
Traffic Vol, veh/h	0	1440	0	0	1	0
Future Vol, veh/h	0	1440	0	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	92	92	60	60
Heavy Vehicles, %	10	10	2	2	0	0
Mvmt Flow	0	1532	0	0	2	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			766	-
Stage 1	-	-			0	-
Stage 2	-	-			766	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			343	0
Stage 1	0	-			-	0
Stage 2	0	-			425	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			343	-
Mov Cap-2 Maneuver	-	-			343	-
Stage 1	-	-			-	-
Stage 2	-	-			425	-
Approach	EB		SB			
HCM Control Delay, s	0		15.5			
HCM LOS			C			
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	-		343			
HCM Lane V/C Ratio	-		0.005			
HCM Control Delay (s)	-		15.5			
HCM Lane LOS	-		C			
HCM 95th %tile Q(veh)	-		0			

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↑	
Traffic Vol, veh/h	0	0	0	1369	7	0
Future Vol, veh/h	0	0	0	1369	7	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	60	60
Heavy Vehicles, %	2	2	8	8	0	0
Mvmt Flow	0	0	0	1441	12	0
Major/Minor	Major2		Minor1			
Conflicting Flow All			-	-	721	-
Stage 1			-	-	0	-
Stage 2			-	-	721	-
Critical Hdwy			-	-	6.8	-
Critical Hdwy Stg 1			-	-	-	-
Critical Hdwy Stg 2			-	-	5.8	-
Follow-up Hdwy			-	-	3.5	-
Pot Cap-1 Maneuver			0	-	367	0
Stage 1			0	-	-	0
Stage 2			0	-	448	0
Platoon blocked, %			-			
Mov Cap-1 Maneuver			-	-	367	-
Mov Cap-2 Maneuver			-	-	367	-
Stage 1			-	-	-	-
Stage 2			-	-	448	-
Approach	WB		NB			
HCM Control Delay, s			0	15.1		
HCM LOS			C			
Minor Lane/Major Mvmt	NBLn1	WBT				
Capacity (veh/h)	367	-				
HCM Lane V/C Ratio	0.032	-				
HCM Control Delay (s)	15.1	-				
HCM Lane LOS	C	-				
HCM 95th %tile Q(veh)	0.1	-				

HCM 6th TWSC
10: EB M-59 & WB to EB XO W. of Hartland Glen

Background Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↑	
Traffic Vol, veh/h	0	1751	0	0	38	0
Future Vol, veh/h	0	1751	0	0	38	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	92	92	69	69
Heavy Vehicles, %	5	5	2	2	0	0
Mvmt Flow	0	1843	0	0	55	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			922	-
Stage 1	-	-			0	-
Stage 2	-	-			922	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			273	0
Stage 1	0	-			-	0
Stage 2	0	-			353	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			273	-
Mov Cap-2 Maneuver	-	-			273	-
Stage 1	-	-			-	-
Stage 2	-	-			353	-
Approach	EB		SB			
HCM Control Delay, s	0				21.5	
HCM LOS					C	
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	-		273			
HCM Lane V/C Ratio	-		0.202			
HCM Control Delay (s)	-		21.5			
HCM Lane LOS	-		C			
HCM 95th %tile Q(veh)	-		0.7			

HCM 6th TWSC
20: Hartland Glen Lane/ Cundy Road & EB M-59

Background Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑					↑
Traffic Vol, veh/h	1757	32	0	0	0	28
Future Vol, veh/h	1757	32	0	0	0	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	61	61
Heavy Vehicles, %	4	4	2	2	11	11
Mvmt Flow	1849	34	0	0	0	46

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	-	942
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.12
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.41
Pot Cap-1 Maneuver	-	-	0	248
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	248
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	22.8
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	248	-	-
HCM Lane V/C Ratio	0.185	-	-
HCM Control Delay (s)	22.8	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.7	-	-

Intersection						
Int Delay, s/veh	5.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↑	
Traffic Vol, veh/h	0	0	0	1607	136	0
Future Vol, veh/h	0	0	0	1607	136	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	60	60
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	0	0	0	1692	227	0
Major/Minor		Major2		Minor1		
Conflicting Flow All			-	-	846	-
Stage 1			-	-	0	-
Stage 2			-	-	846	-
Critical Hdwy			-	-	6.8	-
Critical Hdwy Stg 1			-	-	-	-
Critical Hdwy Stg 2			-	-	5.8	-
Follow-up Hdwy			-	-	3.5	-
Pot Cap-1 Maneuver			0	-	305	0
Stage 1			0	-	-	0
Stage 2			0	-	386	0
Platoon blocked, %				-		
Mov Cap-1 Maneuver			-	-	305	-
Mov Cap-2 Maneuver			-	-	305	-
Stage 1			-	-	-	-
Stage 2			-	-	386	-
Approach			WB		NB	
HCM Control Delay, s			0		44.4	
HCM LOS					E	
Minor Lane/Major Mvmt	NBLn1	WBT				
Capacity (veh/h)	305	-				
HCM Lane V/C Ratio	0.743	-				
HCM Control Delay (s)	44.4	-				
HCM Lane LOS	E	-				
HCM 95th %tile Q(veh)	5.5	-				

HCM 6th TWSC
40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Background Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↑	
Traffic Vol, veh/h	0	1649	0	0	1	0
Future Vol, veh/h	0	1649	0	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	92	92	60	60
Heavy Vehicles, %	5	5	2	2	0	0
Mvmt Flow	0	1736	0	0	2	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			868	-
Stage 1	-	-			0	-
Stage 2	-	-			868	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			296	0
Stage 1	0	-			-	0
Stage 2	0	-			376	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			296	-
Mov Cap-2 Maneuver	-	-			296	-
Stage 1	-	-			-	-
Stage 2	-	-			376	-
Approach	EB		SB			
HCM Control Delay, s	0		17.2			
HCM LOS			C			
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	-		296			
HCM Lane V/C Ratio	-		0.006			
HCM Control Delay (s)	-		17.2			
HCM Lane LOS	-		C			
HCM 95th %tile Q(veh)	-		0			

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↑	
Traffic Vol, veh/h	0	0	0	1596	12	0
Future Vol, veh/h	0	0	0	1596	12	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	60	60
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	0	0	0	1680	20	0
Major/Minor	Major2		Minor1			
Conflicting Flow All			-	-	840	-
Stage 1			-	-	0	-
Stage 2			-	-	840	-
Critical Hdwy			-	-	6.8	-
Critical Hdwy Stg 1			-	-	-	-
Critical Hdwy Stg 2			-	-	5.8	-
Follow-up Hdwy			-	-	3.5	-
Pot Cap-1 Maneuver			0	-	308	0
Stage 1			0	-	-	0
Stage 2			0	-	389	0
Platoon blocked, %			-			
Mov Cap-1 Maneuver			-	-	308	-
Mov Cap-2 Maneuver			-	-	308	-
Stage 1			-	-	-	-
Stage 2			-	-	389	-
Approach	WB		NB			
HCM Control Delay, s			0	17.5		
HCM LOS			C			
Minor Lane/Major Mvmt	NBLn1	WBT				
Capacity (veh/h)	308	-				
HCM Lane V/C Ratio	0.065	-				
HCM Control Delay (s)	17.5	-				
HCM Lane LOS	C	-				
HCM 95th %tile Q(veh)	0.2	-				

Intersection: 10: EB M-59 & WB to EB XO W. of Hartland Glen

Movement	SB
Directions Served	L
Maximum Queue (ft)	30
Average Queue (ft)	3
95th Queue (ft)	17
Link Distance (ft)	27
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: WB to EB XO W. of Hartland Glen & WB M-59

Movement	
Directions Served	
Maximum Queue (ft)	
Average Queue (ft)	
95th Queue (ft)	
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 20: Hartland Glen Lane/ Cundy Road & EB M-59

Movement	NB
Directions Served	R
Maximum Queue (ft)	64
Average Queue (ft)	8
95th Queue (ft)	38
Link Distance (ft)	58
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 30: EB to WB XO E. of Hartland Glen & WB M-59

Movement	NB
Directions Served	L
Maximum Queue (ft)	40
Average Queue (ft)	3
95th Queue (ft)	19
Link Distance (ft)	50
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: EB M-59 & EB to WB XO E. of Hartland Glen

Movement	
Directions Served	
Maximum Queue (ft)	
Average Queue (ft)	
95th Queue (ft)	
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Movement	SB
Directions Served	L
Maximum Queue (ft)	6
Average Queue (ft)	0
95th Queue (ft)	4
Link Distance (ft)	52
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41: WB to EB XO E. of Hartland Glen Lane & WB M-59

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 50: EB to WB XO W. of Fenton Road & WB M-59

Movement

NB

Directions Served

L

Maximum Queue (ft)

29

Average Queue (ft)

5

95th Queue (ft)

21

Link Distance (ft)

40

Upstream Blk Time (%)

0

Queuing Penalty (veh)

0

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 51: EB M-59 & EB to WB XO W. of Fenton Road

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 10: EB M-59 & WB to EB XO W. of Hartland Glen

Movement	SB
Directions Served	L
Maximum Queue (ft)	68
Average Queue (ft)	30
95th Queue (ft)	63
Link Distance (ft)	27
Upstream Blk Time (%)	24
Queuing Penalty (veh)	10
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: WB to EB XO W. of Hartland Glen & WB M-59

Movement	WB
Directions Served	L
Maximum Queue (ft)	21
Average Queue (ft)	1
95th Queue (ft)	10
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	250
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 20: Hartland Glen Lane/ Cundy Road & EB M-59

Movement	NB
Directions Served	R
Maximum Queue (ft)	65
Average Queue (ft)	19
95th Queue (ft)	50
Link Distance (ft)	58
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 30: EB to WB XO E. of Hartland Glen & WB M-59

Movement	NB
Directions Served	L
Maximum Queue (ft)	95
Average Queue (ft)	62
95th Queue (ft)	108
Link Distance (ft)	50
Upstream Blk Time (%)	38
Queuing Penalty (veh)	63
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: EB M-59 & EB to WB XO E. of Hartland Glen

Movement	EB	EB	EB
Directions Served	L	T	T
Maximum Queue (ft)	190	156	122
Average Queue (ft)	37	21	17
95th Queue (ft)	157	135	119
Link Distance (ft)		299	299
Upstream Blk Time (%)	1	1	0
Queuing Penalty (veh)	0	7	1
Storage Bay Dist (ft)	250		
Storage Blk Time (%)	2	0	
Queuing Penalty (veh)	18	0	

Intersection: 40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Movement	SB
Directions Served	L
Maximum Queue (ft)	22
Average Queue (ft)	1
95th Queue (ft)	9
Link Distance (ft)	52
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41: WB to EB XO E. of Hartland Glen Lane & WB M-59

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 50: EB to WB XO W. of Fenton Road & WB M-59

Movement

NB

Directions Served

L

Maximum Queue (ft)

46

Average Queue (ft)

10

95th Queue (ft)

33

Link Distance (ft)

40

Upstream Blk Time (%)

1

Queuing Penalty (veh)

0

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 51: EB M-59 & EB to WB XO W. of Fenton Road

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

HCM 6th TWSC
10: EB M-59 & WB to EB XO W. of Hartland Glen

Future Conditions
AM Peak Hour

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↓	
Traffic Vol, veh/h	0	1482	0	0	112	0
Future Vol, veh/h	0	1482	0	0	112	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	2	2	0	0
Mvmt Flow	0	1611	0	0	122	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			806	-
Stage 1	-	-			0	-
Stage 2	-	-			806	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			324	0
Stage 1	0	-			-	0
Stage 2	0	-			405	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			324	-
Mov Cap-2 Maneuver	-	-			324	-
Stage 1	-	-			-	-
Stage 2	-	-			405	-
Approach	EB		SB			
HCM Control Delay, s	0				22.6	
HCM LOS					C	
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	-		324			
HCM Lane V/C Ratio	-		0.376			
HCM Control Delay (s)	-		22.6			
HCM Lane LOS	-		C			
HCM 95th %tile Q(veh)	-		1.7			

HCM 6th TWSC
20: Hartland Glen Lane/ Cundy Road & EB M-59

Future Conditions
AM Peak Hour

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑					↑
Traffic Vol, veh/h	1476	118	0	0	0	30
Future Vol, veh/h	1476	118	0	0	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	60	60
Heavy Vehicles, %	10	10	2	2	29	29
Mvmt Flow	1554	124	0	0	0	50

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	-	839
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	7.48
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.59
Pot Cap-1 Maneuver	-	-	0	259
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	259
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	22.2
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	259	-	-
HCM Lane V/C Ratio	0.193	-	-
HCM Control Delay (s)	22.2	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.7	-	-

Intersection							
Int Delay, s/veh	1.8						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations				↑↑	↑		
Traffic Vol, veh/h	0	0	0	1423	123	0	
Future Vol, veh/h	0	0	0	1423	123	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	-	
Veh in Median Storage, #	2	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	89	89	92	92	
Heavy Vehicles, %	2	2	8	8	0	0	
Mvmt Flow	0	0	0	1599	134	0	
Major/Minor		Major2		Minor1			
Conflicting Flow All				-	-	800	-
Stage 1				-	-	0	-
Stage 2				-	-	800	-
Critical Hdwy				-	-	6.8	-
Critical Hdwy Stg 1				-	-	-	-
Critical Hdwy Stg 2				-	-	5.8	-
Follow-up Hdwy				-	-	3.5	-
Pot Cap-1 Maneuver				0	-	327	0
Stage 1				0	-	-	0
Stage 2				0	-	408	0
Platoon blocked, %				-			
Mov Cap-1 Maneuver				-	-	327	-
Mov Cap-2 Maneuver				-	-	327	-
Stage 1				-	-	-	-
Stage 2				-	-	408	-
Approach		WB		NB			
HCM Control Delay, s		0		23.4			
HCM LOS				C			
Minor Lane/Major Mvmt	NBLn1	WBT					
Capacity (veh/h)	327	-					
HCM Lane V/C Ratio	0.409	-					
HCM Control Delay (s)	23.4	-					
HCM Lane LOS	C	-					
HCM 95th %tile Q(veh)	1.9	-					

HCM 6th TWSC
40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Future Conditions
AM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↑	
Traffic Vol, veh/h	0	1479	0	0	10	0
Future Vol, veh/h	0	1479	0	0	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	92	92	92	92
Heavy Vehicles, %	10	10	2	2	0	0
Mvmt Flow	0	1573	0	0	11	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			787	-
Stage 1	-	-			0	-
Stage 2	-	-			787	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			333	0
Stage 1	0	-			-	0
Stage 2	0	-			414	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			333	-
Mov Cap-2 Maneuver	-	-			333	-
Stage 1	-	-			-	-
Stage 2	-	-			414	-
Approach	EB		SB			
HCM Control Delay, s	0		16.2			
HCM LOS			C			
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	-		333			
HCM Lane V/C Ratio	-		0.033			
HCM Control Delay (s)	-		16.2			
HCM Lane LOS	-		C			
HCM 95th %tile Q(veh)	-		0.1			

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↑	
Traffic Vol, veh/h	0	0	0	1412	21	0
Future Vol, veh/h	0	0	0	1412	21	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	92	92
Heavy Vehicles, %	2	2	8	8	0	0
Mvmt Flow	0	0	0	1486	23	0

Major/Minor	Major2	Minor1
Conflicting Flow All	-	743
Stage 1	-	0
Stage 2	-	743
Critical Hdwy	-	6.8
Critical Hdwy Stg 1	-	-
Critical Hdwy Stg 2	-	5.8
Follow-up Hdwy	-	3.5
Pot Cap-1 Maneuver	0	355
Stage 1	0	-
Stage 2	0	436
Platoon blocked, %	-	-
Mov Cap-1 Maneuver	-	355
Mov Cap-2 Maneuver	-	355
Stage 1	-	-
Stage 2	-	436

Approach	WB	NB
HCM Control Delay, s	0	15.8
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	WBT
Capacity (veh/h)	355	-
HCM Lane V/C Ratio	0.064	-
HCM Control Delay (s)	15.8	-
HCM Lane LOS	C	-
HCM 95th %tile Q(veh)	0.2	-

Intersection						
Int Delay, s/veh	4.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑					↑
Traffic Vol, veh/h	1396	110	0	0	0	206
Future Vol, veh/h	1396	110	0	0	0	206
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	92	92
Heavy Vehicles, %	10	10	2	2	2	2
Mvmt Flow	1469	116	0	0	0	224

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	-	793
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	331
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	331
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	35.9
HCM LOS		E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	331	-	-
HCM Lane V/C Ratio	0.676	-	-
HCM Control Delay (s)	35.9	-	-
HCM Lane LOS	E	-	-
HCM 95th %tile Q(veh)	4.7	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑					↑
Traffic Vol, veh/h	1475	14	0	0	0	39
Future Vol, veh/h	1475	14	0	0	0	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1603	15	0	0	0	42

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	-	809
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	323
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	323
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	17.8
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	323	-	-
HCM Lane V/C Ratio	0.131	-	-
HCM Control Delay (s)	17.8	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.4	-	-

Intersection												
Int Delay, s/veh	5.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	0	0	8	0	22	0	107	11	0
Future Vol, veh/h	0	0	0	0	0	8	0	22	0	107	11	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	9	0	24	0	116	12	0




Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	273	268	12	268	268	24	12	0	0	24	0	0
Stage 1	244	244	-	24	24	-	-	-	-	-	-	-
Stage 2	29	24	-	244	244	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	679	638	1069	685	638	1052	1607	-	-	1591	-	-
Stage 1	760	704	-	994	875	-	-	-	-	-	-	-
Stage 2	988	875	-	760	704	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	636	591	1069	647	591	1052	1607	-	-	1591	-	-
Mov Cap-2 Maneuver	636	591	-	647	591	-	-	-	-	-	-	-
Stage 1	760	653	-	994	875	-	-	-	-	-	-	-
Stage 2	980	875	-	705	653	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.5	0	6.7
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1607	-	-	-	1052	1591	-
HCM Lane V/C Ratio	-	-	-	-	0.008	0.073	-
HCM Control Delay (s)	0	-	-	0	8.5	7.4	0
HCM Lane LOS	A	-	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0.2	-

HCM 6th TWSC
90: Hartland Glen Lane/ Cundy Road & Site Drive # 3

Future Conditions
AM Peak Hour

Intersection						
Int Delay, s/veh	5.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	16	6	0	5	6
Future Vol, veh/h	0	16	6	0	5	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	67	67	2	2
Mvmt Flow	0	17	7	0	5	7
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	24	7	0	0	7	0
Stage 1	7	-	-	-	-	-
Stage 2	17	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	992	1075	-	-	1614	-
Stage 1	1016	-	-	-	-	-
Stage 2	1006	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	989	1075	-	-	1614	-
Mov Cap-2 Maneuver	989	-	-	-	-	-
Stage 1	1016	-	-	-	-	-
Stage 2	1003	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	8.4	0	3.3			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 1075	1614	-		
HCM Lane V/C Ratio	-	- 0.016	0.003	-		
HCM Control Delay (s)	-	- 8.4	7.2	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0	0	-		

HCM 6th TWSC
10: EB M-59 & WB to EB XO W. of Hartland Glen

Future Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↱	
Traffic Vol, veh/h	0	1812	0	0	125	0
Future Vol, veh/h	0	1812	0	0	125	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	92	92	92	92
Heavy Vehicles, %	5	5	2	2	0	0
Mvmt Flow	0	1907	0	0	136	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			954	-
Stage 1	-	-			0	-
Stage 2	-	-			954	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			260	0
Stage 1	0	-			-	0
Stage 2	0	-			339	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			260	-
Mov Cap-2 Maneuver	-	-			260	-
Stage 1	-	-			-	-
Stage 2	-	-			339	-
Approach	EB		SB			
HCM Control Delay, s	0				33.1	
HCM LOS					D	
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	-		260			
HCM Lane V/C Ratio	-		0.523			
HCM Control Delay (s)	-		33.1			
HCM Lane LOS	-		D			
HCM 95th %tile Q(veh)	-		2.8			

HCM 6th TWSC
20: Hartland Glen Lane/ Cundy Road & EB M-59

Future Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑					↑
Traffic Vol, veh/h	1798	139	0	0	0	46
Future Vol, veh/h	1798	139	0	0	0	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	61	61
Heavy Vehicles, %	4	4	2	2	9	9
Mvmt Flow	1893	146	0	0	0	75
Major/Minor	Major1		Minor1			
Conflicting Flow All	0	0	-	-	1020	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	7.08	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	3.39	-
Pot Cap-1 Maneuver	-	-	-	-	0	222
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	222	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		NB			
HCM Control Delay, s	0				29.3	
HCM LOS					D	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR			
Capacity (veh/h)	222	-	-			
HCM Lane V/C Ratio	0.34	-	-			
HCM Control Delay (s)	29.3	-	-			
HCM Lane LOS	D	-	-			
HCM 95th %tile Q(veh)	1.4	-	-			

Intersection							
Int Delay, s/veh	7.4						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations				↑↑	↑		
Traffic Vol, veh/h	0	0	0	1646	230	0	
Future Vol, veh/h	0	0	0	1646	230	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	0	-	
Veh in Median Storage, #	2	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	95	95	92	92	
Heavy Vehicles, %	2	2	3	3	0	0	
Mvmt Flow	0	0	0	1733	250	0	
Major/Minor		Major2		Minor1			
Conflicting Flow All				-	-	867	-
Stage 1				-	-	0	-
Stage 2				-	-	867	-
Critical Hdwy				-	-	6.8	-
Critical Hdwy Stg 1				-	-	-	-
Critical Hdwy Stg 2				-	-	5.8	-
Follow-up Hdwy				-	-	3.5	-
Pot Cap-1 Maneuver				0	-	296	0
Stage 1				0	-	-	0
Stage 2				0	-	377	0
Platoon blocked, %				-			
Mov Cap-1 Maneuver				-	-	296	-
Mov Cap-2 Maneuver				-	-	296	-
Stage 1				-	-	-	-
Stage 2				-	-	377	-
Approach		WB		NB			
HCM Control Delay, s				0	58.6		
HCM LOS				F			
Minor Lane/Major Mvmt	NBLn1	WBT					
Capacity (veh/h)	296	-					
HCM Lane V/C Ratio	0.845	-					
HCM Control Delay (s)	58.6	-					
HCM Lane LOS	F	-					
HCM 95th %tile Q(veh)	7.2	-					

HCM 6th TWSC
40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Future Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↑	
Traffic Vol, veh/h	0	1691	0	0	28	0
Future Vol, veh/h	0	1691	0	0	28	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	92	92	92	92
Heavy Vehicles, %	5	5	2	2	0	0
Mvmt Flow	0	1780	0	0	30	0
Major/Minor	Major1		Minor2			
Conflicting Flow All	-	0			890	-
Stage 1	-	-			0	-
Stage 2	-	-			890	-
Critical Hdwy	-	-			6.8	-
Critical Hdwy Stg 1	-	-			-	-
Critical Hdwy Stg 2	-	-			5.8	-
Follow-up Hdwy	-	-			3.5	-
Pot Cap-1 Maneuver	0	-			286	0
Stage 1	0	-			-	0
Stage 2	0	-			366	0
Platoon blocked, %		-				
Mov Cap-1 Maneuver	-	-			286	-
Mov Cap-2 Maneuver	-	-			286	-
Stage 1	-	-			-	-
Stage 2	-	-			366	-
Approach	EB			SB		
HCM Control Delay, s	0			19.1		
HCM LOS				C		
Minor Lane/Major Mvmt	EBT SBLn1					
Capacity (veh/h)	-		286			
HCM Lane V/C Ratio	-		0.106			
HCM Control Delay (s)	-		19.1			
HCM Lane LOS	-		C			
HCM 95th %tile Q(veh)	-		0.4			

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↑	
Traffic Vol, veh/h	0	0	0	1652	22	0
Future Vol, veh/h	0	0	0	1652	22	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	95	95	92	92
Heavy Vehicles, %	2	2	3	3	0	0
Mvmt Flow	0	0	0	1739	24	0
Major/Minor		Major2		Minor1		
Conflicting Flow All			-	-	870	-
Stage 1			-	-	0	-
Stage 2			-	-	870	-
Critical Hdwy			-	-	6.8	-
Critical Hdwy Stg 1			-	-	-	-
Critical Hdwy Stg 2			-	-	5.8	-
Follow-up Hdwy			-	-	3.5	-
Pot Cap-1 Maneuver			0	-	295	0
Stage 1			0	-	-	0
Stage 2			0	-	375	0
Platoon blocked, %				-		
Mov Cap-1 Maneuver			-	-	295	-
Mov Cap-2 Maneuver			-	-	295	-
Stage 1			-	-	-	-
Stage 2			-	-	375	-
Approach			WB		NB	
HCM Control Delay, s			0		18.3	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	WBT				
Capacity (veh/h)	295	-				
HCM Lane V/C Ratio	0.081	-				
HCM Control Delay (s)	18.3	-				
HCM Lane LOS	C	-				
HCM 95th %tile Q(veh)	0.3	-				

Intersection						
Int Delay, s/veh	4.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑					↑
Traffic Vol, veh/h	1754	90	0	0	0	167
Future Vol, veh/h	1754	90	0	0	0	167
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	92	92
Heavy Vehicles, %	4	4	2	2	2	2
Mvmt Flow	1846	95	0	0	0	182

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	-	971
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	252
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	252
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	49
HCM LOS		E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	252	-	-
HCM Lane V/C Ratio	0.72	-	-
HCM Control Delay (s)	49	-	-
HCM Lane LOS	E	-	-
HCM 95th %tile Q(veh)	4.9	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑					↑
Traffic Vol, veh/h	1676	43	0	0	0	26
Future Vol, veh/h	1676	43	0	0	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	92	92
Heavy Vehicles, %	5	5	2	2	2	2
Mvmt Flow	1764	45	0	0	0	28

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	-	905
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	279
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	279
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	19.4
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	279	-	-
HCM Lane V/C Ratio	0.101	-	-
HCM Control Delay (s)	19.4	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.3	-	-

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	0	0	7	0	39	0	88	51	0
Future Vol, veh/h	0	0	0	0	0	7	0	39	0	88	51	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	8	0	42	0	96	55	0




Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	293	289	55	289	289	42	55	0	0	42	0	0
Stage 1	247	247	-	42	42	-	-	-	-	-	-	-
Stage 2	46	42	-	247	247	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	659	621	1012	663	621	1029	1550	-	-	1567	-	-
Stage 1	757	702	-	972	860	-	-	-	-	-	-	-
Stage 2	968	860	-	757	702	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	623	582	1012	631	582	1029	1550	-	-	1567	-	-
Mov Cap-2 Maneuver	623	582	-	631	582	-	-	-	-	-	-	-
Stage 1	757	658	-	972	860	-	-	-	-	-	-	-
Stage 2	961	860	-	709	658	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.5	0	4.7
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1550	-	-	-	1029	1567	-
HCM Lane V/C Ratio	-	-	-	-	0.007	0.061	-
HCM Control Delay (s)	0	-	-	0	8.5	7.4	0
HCM Lane LOS	A	-	-	A	A	A	A
HCM 95th %tile Q(veh)	0	-	-	-	0	0.2	-

HCM 6th TWSC
90: Hartland Glen Lane/ Cundy Road & Site Drive # 3

Future Conditions
PM Peak Hour

Intersection						
Int Delay, s/veh	2.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	11	28	0	19	32
Future Vol, veh/h	0	11	28	0	19	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	61	61	92	92
Heavy Vehicles, %	2	2	11	11	2	2
Mvmt Flow	0	12	46	0	21	35

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	123	46	0
Stage 1	46	-	-
Stage 2	77	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	872	1023	-
Stage 1	976	-	-
Stage 2	946	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	860	1023	-
Mov Cap-2 Maneuver	860	-	-
Stage 1	976	-	-
Stage 2	933	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	2.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1023	1562
HCM Lane V/C Ratio	-	-	0.012	0.013
HCM Control Delay (s)	-	-	8.6	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection: 10: EB M-59 & WB to EB XO W. of Hartland Glen

Movement	SB
Directions Served	L
Maximum Queue (ft)	73
Average Queue (ft)	49
95th Queue (ft)	79
Link Distance (ft)	27
Upstream Blk Time (%)	45
Queuing Penalty (veh)	51
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: WB to EB XO W. of Hartland Glen & WB M-59

Movement	WB
Directions Served	L
Maximum Queue (ft)	107
Average Queue (ft)	14
95th Queue (ft)	61
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	250
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 20: Hartland Glen Lane/ Cundy Road & EB M-59

Movement	EB	NB
Directions Served	TR	R
Maximum Queue (ft)	5	68
Average Queue (ft)	0	24
95th Queue (ft)	4	62
Link Distance (ft)	501	58
Upstream Blk Time (%)		1
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: EB to WB XO E. of Hartland Glen & WB M-59

Movement	NB
Directions Served	L
Maximum Queue (ft)	95
Average Queue (ft)	56
95th Queue (ft)	97
Link Distance (ft)	50
Upstream Blk Time (%)	24
Queuing Penalty (veh)	30
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 31: EB M-59 & EB to WB XO E. of Hartland Glen

Movement	EB	EB
Directions Served	L	T
Maximum Queue (ft)	84	7
Average Queue (ft)	8	0
95th Queue (ft)	48	5
Link Distance (ft)		299
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	250	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Movement	SB
Directions Served	L
Maximum Queue (ft)	38
Average Queue (ft)	10
95th Queue (ft)	34
Link Distance (ft)	52
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41: WB to EB XO E. of Hartland Glen Lane & WB M-59

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 50: EB to WB XO W. of Fenton Road & WB M-59

Movement

NB

Directions Served

L

Maximum Queue (ft)

52

Average Queue (ft)

15

95th Queue (ft)

40

Link Distance (ft)

40

Upstream Blk Time (%)

1

Queuing Penalty (veh)

0

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 51: EB M-59 & EB to WB XO W. of Fenton Road

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 60: Site Drive # 1 & EB M-59

Movement	EB	NB
Directions Served	TR	R
Maximum Queue (ft)	14	159
Average Queue (ft)	0	68
95th Queue (ft)	7	124
Link Distance (ft)	286	240
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 70: Site Drive # 2 & EB M-59

Movement	EB	NB
Directions Served	TR	R
Maximum Queue (ft)	11	61
Average Queue (ft)	0	27
95th Queue (ft)	8	56
Link Distance (ft)	393	575
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 80: Hartland Glen Lane/ Cundy Road & Cundy Road/Site Drive # 4

Movement	WB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	29	22
Average Queue (ft)	7	1
95th Queue (ft)	27	13
Link Distance (ft)	209	58
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 90: Hartland Glen Lane/ Cundy Road & Site Drive # 3

Movement	WB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	11
95th Queue (ft)	34
Link Distance (ft)	259
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 82

Intersection: 10: EB M-59 & WB to EB XO W. of Hartland Glen

Movement	EB	EB	SB
Directions Served	T	T	L
Maximum Queue (ft)	1564	1562	73
Average Queue (ft)	766	766	65
95th Queue (ft)	1934	1939	77
Link Distance (ft)	1517	1517	27
Upstream Blk Time (%)	37	36	100
Queuing Penalty (veh)	0	0	124
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: WB to EB XO W. of Hartland Glen & WB M-59

Movement	WB	WB	WB
Directions Served	L	T	T
Maximum Queue (ft)	300	1178	1189
Average Queue (ft)	267	789	564
95th Queue (ft)	370	1550	1436
Link Distance (ft)		1147	1147
Upstream Blk Time (%)		31	10
Queuing Penalty (veh)		283	96
Storage Bay Dist (ft)	250		
Storage Blk Time (%)	81	0	
Queuing Penalty (veh)	714	0	

Intersection: 20: Hartland Glen Lane/ Cundy Road & EB M-59

Movement	EB	EB	NB
Directions Served	T	TR	R
Maximum Queue (ft)	519	562	87
Average Queue (ft)	349	213	52
95th Queue (ft)	714	617	85
Link Distance (ft)	501	501	58
Upstream Blk Time (%)	47	14	62
Queuing Penalty (veh)	455	139	29
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 30: EB to WB XO E. of Hartland Glen & WB M-59

Movement	WB	WB	NB
Directions Served	T	T	L
Maximum Queue (ft)	142	165	95
Average Queue (ft)	58	42	90
95th Queue (ft)	160	150	101
Link Distance (ft)	120	120	50
Upstream Blk Time (%)	28	8	100
Queuing Penalty (veh)	228	67	230
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 31: EB M-59 & EB to WB XO E. of Hartland Glen

Movement	EB	EB	EB
Directions Served	L	T	T
Maximum Queue (ft)	299	349	264
Average Queue (ft)	280	305	58
95th Queue (ft)	339	396	248
Link Distance (ft)		299	299
Upstream Blk Time (%)	69	80	1
Queuing Penalty (veh)	0	768	7
Storage Bay Dist (ft)	250		
Storage Blk Time (%)	90	3	
Queuing Penalty (veh)	759	6	

Intersection: 40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Movement	SB
Directions Served	L
Maximum Queue (ft)	35
Average Queue (ft)	17
95th Queue (ft)	41
Link Distance (ft)	52
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41: WB to EB XO E. of Hartland Glen Lane & WB M-59

Movement	WB	WB	WB
Directions Served	L	T	T
Maximum Queue (ft)	210	760	767
Average Queue (ft)	29	224	228
95th Queue (ft)	188	754	762
Link Distance (ft)		1035	1035
Upstream Blk Time (%)		5	5
Queuing Penalty (veh)		38	38
Storage Bay Dist (ft)	300		
Storage Blk Time (%)		24	
Queuing Penalty (veh)		7	

Intersection: 50: EB to WB XO W. of Fenton Road & WB M-59

Movement	WB	WB	NB
Directions Served	T	T	L
Maximum Queue (ft)	392	382	48
Average Queue (ft)	59	58	9
95th Queue (ft)	511	505	33
Link Distance (ft)	1459	1459	40
Upstream Blk Time (%)	3	3	1
Queuing Penalty (veh)	0	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 51: EB M-59 & EB to WB XO W. of Fenton Road

Movement	EB
Directions Served	L
Maximum Queue (ft)	5
Average Queue (ft)	0
95th Queue (ft)	4
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	300
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 60: Site Drive # 1 & EB M-59

Movement	EB	EB	NB
Directions Served	T	TR	R
Maximum Queue (ft)	302	352	253
Average Queue (ft)	244	101	213
95th Queue (ft)	399	328	305
Link Distance (ft)	286	286	240
Upstream Blk Time (%)	63	7	82
Queuing Penalty (veh)	574	63	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 70: Site Drive # 2 & EB M-59

Movement	NB
Directions Served	R
Maximum Queue (ft)	56
Average Queue (ft)	22
95th Queue (ft)	50
Link Distance (ft)	575
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 80: Hartland Glen Lane/ Cundy Road & Cundy Road/Site Drive # 4

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	79	233	43
Average Queue (ft)	16	95	4
95th Queue (ft)	58	255	23
Link Distance (ft)	209	231	58
Upstream Blk Time (%)		21	0
Queuing Penalty (veh)		7	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 90: Hartland Glen Lane/ Cundy Road & Site Drive # 3

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	52	129	6
Average Queue (ft)	12	19	0
95th Queue (ft)	42	105	4
Link Distance (ft)	259	930	231
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 4630

HCM Signalized Intersection Capacity Analysis
30: EB to WB XO E. of Hartland Glen & WB M-59

Future Conditions w/ IMP
AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↖	
Traffic Volume (vph)	0	0	0	1423	123	0
Future Volume (vph)	0	0	0	1423	123	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.5	8.1	
Lane Util. Factor				0.95	1.00	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3343	1805	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3343	1805	
Peak-hour factor, PHF	0.92	0.92	0.89	0.89	0.92	0.92
Adj. Flow (vph)	0	0	0	1599	134	0
RTOR Reduction (vph)	0	0	0	0	13	0
Lane Group Flow (vph)	0	0	0	1599	121	0
Heavy Vehicles (%)	2%	2%	8%	8%	0%	0%
Turn Type				NA	Prot	
Protected Phases				8	2	
Permitted Phases						
Actuated Green, G (s)				29.6	8.8	
Effective Green, g (s)				29.6	8.8	
Actuated g/C Ratio				0.56	0.17	
Clearance Time (s)				6.5	8.1	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				1867	299	
v/s Ratio Prot				c0.48	c0.07	
v/s Ratio Perm						
v/c Ratio				0.86	0.41	
Uniform Delay, d1				9.9	19.8	
Progression Factor				1.00	1.00	
Incremental Delay, d2				4.1	0.9	
Delay (s)				14.0	20.7	
Level of Service				B	C	
Approach Delay (s)	0.0			14.0	20.7	
Approach LOS	A			B	C	
Intersection Summary						
HCM 2000 Control Delay			14.5	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.75			
Actuated Cycle Length (s)			53.0	Sum of lost time (s)		14.6
Intersection Capacity Utilization			58.3%	ICU Level of Service		B
Analysis Period (min)			15			
c Critical Lane Group						

Intersection						
Int Delay, s/veh	3.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑				↑
Traffic Vol, veh/h	1396	110	0	0	0	206
Future Vol, veh/h	1396	110	0	0	0	206
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	92	92
Heavy Vehicles, %	10	10	2	2	2	2
Mvmt Flow	1469	116	0	0	0	224
Major/Minor	Major1		Minor1			
Conflicting Flow All	0	0	-	-	-	735
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	-	-	0	362
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	362
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		NB			
HCM Control Delay, s	0		29.8			
HCM LOS			D			
Minor Lane/Major Mvmt	NBLn1	EBT	EBR			
Capacity (veh/h)	362	-	-			
HCM Lane V/C Ratio	0.619	-	-			
HCM Control Delay (s)	29.8	-	-			
HCM Lane LOS	D	-	-			
HCM 95th %tile Q(veh)	4	-	-			

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑				↑
Traffic Vol, veh/h	1475	14	0	0	0	39
Future Vol, veh/h	1475	14	0	0	0	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1603	15	0	0	0	42

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	-	802
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	327
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	327
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	17.6
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	327	-	-
HCM Lane V/C Ratio	0.13	-	-
HCM Control Delay (s)	17.6	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.4	-	-

HCM Signalized Intersection Capacity Analysis
30: EB to WB XO E. of Hartland Glen & WB M-59

Future Conditions w/ IMP
PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↖	
Traffic Volume (vph)	0	0	0	1646	230	0
Future Volume (vph)	0	0	0	1646	230	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.5	8.1	
Lane Util. Factor				0.95	1.00	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3505	1805	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3505	1805	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.92	0.92
Adj. Flow (vph)	0	0	0	1733	250	0
RTOR Reduction (vph)	0	0	0	0	6	0
Lane Group Flow (vph)	0	0	0	1733	244	0
Heavy Vehicles (%)	2%	2%	3%	3%	0%	0%
Turn Type				NA	Prot	
Protected Phases				6	8	
Permitted Phases						
Actuated Green, G (s)				32.8	13.1	
Effective Green, g (s)				32.8	13.1	
Actuated g/C Ratio				0.54	0.22	
Clearance Time (s)				6.5	8.1	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				1900	390	
v/s Ratio Prot				c0.49	c0.14	
v/s Ratio Perm						
v/c Ratio				0.91	0.62	
Uniform Delay, d1				12.5	21.5	
Progression Factor				1.00	1.00	
Incremental Delay, d2				7.1	3.1	
Delay (s)				19.7	24.6	
Level of Service				B	C	
Approach Delay (s)	0.0			19.7	24.6	
Approach LOS	A			B	C	
Intersection Summary						
HCM 2000 Control Delay			20.3	HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			60.5	Sum of lost time (s)		14.6
Intersection Capacity Utilization			70.4%	ICU Level of Service		C
Analysis Period (min)			15			
c Critical Lane Group						

Intersection						
Int Delay, s/veh	3.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑				↑
Traffic Vol, veh/h	1754	90	0	0	0	167
Future Vol, veh/h	1754	90	0	0	0	167
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	92	92
Heavy Vehicles, %	4	4	2	2	2	2
Mvmt Flow	1846	95	0	0	0	182

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	-	923
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	272
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	272
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	41.3
HCM LOS		E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	272	-	-
HCM Lane V/C Ratio	0.667	-	-
HCM Control Delay (s)	41.3	-	-
HCM Lane LOS	E	-	-
HCM 95th %tile Q(veh)	4.3	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑				↑
Traffic Vol, veh/h	1676	43	0	0	0	26
Future Vol, veh/h	1676	43	0	0	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	92	92	92	92
Heavy Vehicles, %	5	5	2	2	2	2
Mvmt Flow	1764	45	0	0	0	28

Major/Minor	Major1		Minor1	
Conflicting Flow All	0	0	-	882
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	289
Stage 1	-	-	0	-
Stage 2	-	-	0	-
Platoon blocked, %	-	-		
Mov Cap-1 Maneuver	-	-	-	289
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	NB
HCM Control Delay, s	0	18.8
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	289	-	-
HCM Lane V/C Ratio	0.098	-	-
HCM Control Delay (s)	18.8	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.3	-	-

Intersection: 10: EB M-59 & WB to EB XO W. of Hartland Glen

Movement	SB
Directions Served	L
Maximum Queue (ft)	73
Average Queue (ft)	51
95th Queue (ft)	78
Link Distance (ft)	27
Upstream Blk Time (%)	44
Queuing Penalty (veh)	50
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: WB to EB XO W. of Hartland Glen & WB M-59

Movement	WB
Directions Served	L
Maximum Queue (ft)	85
Average Queue (ft)	11
95th Queue (ft)	49
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	250
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 20: Hartland Glen Lane/ Cundy Road & EB M-59

Movement	EB	NB
Directions Served	TR	R
Maximum Queue (ft)	31	68
Average Queue (ft)	1	25
95th Queue (ft)	13	62
Link Distance (ft)	501	45
Upstream Blk Time (%)		2
Queuing Penalty (veh)		1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: EB to WB XO E. of Hartland Glen & WB M-59

Movement	WB	WB	NB
Directions Served	T	T	L
Maximum Queue (ft)	157	162	95
Average Queue (ft)	103	103	59
95th Queue (ft)	155	160	95
Link Distance (ft)	120	120	50
Upstream Blk Time (%)	3	4	17
Queuing Penalty (veh)	24	28	21
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 31: EB M-59 & EB to WB XO E. of Hartland Glen

Movement	EB
Directions Served	L
Maximum Queue (ft)	46
Average Queue (ft)	4
95th Queue (ft)	23
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	250
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Movement	SB
Directions Served	L
Maximum Queue (ft)	48
Average Queue (ft)	12
95th Queue (ft)	39
Link Distance (ft)	52
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 41: WB to EB XO E. of Hartland Glen Lane & WB M-59

Movement	WB	WB
Directions Served	T	T
Maximum Queue (ft)	100	109
Average Queue (ft)	18	17
95th Queue (ft)	67	67
Link Distance (ft)	1035	1035
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 50: EB to WB XO W. of Fenton Road & WB M-59

Movement	NB
Directions Served	L
Maximum Queue (ft)	47
Average Queue (ft)	15
95th Queue (ft)	40
Link Distance (ft)	40
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 51: EB M-59 & EB to WB XO W. of Fenton Road

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 60: Site Drive # 1 & EB M-59

Movement	EB	NB
Directions Served	T	R
Maximum Queue (ft)	9	132
Average Queue (ft)	0	60
95th Queue (ft)	6	107
Link Distance (ft)	286	232
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 70: Site Drive # 2 & EB M-59

Movement	NB
Directions Served	R
Maximum Queue (ft)	55
Average Queue (ft)	20
95th Queue (ft)	44
Link Distance (ft)	562
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 80: Hartland Glen Lane/ Cundy Road & Cundy Road/Site Drive # 4

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	29	10	35
Average Queue (ft)	7	0	3
95th Queue (ft)	27	5	18
Link Distance (ft)	209	231	45
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 90: Hartland Glen Lane/ Cundy Road & Site Drive # 3

Movement	WB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	12
95th Queue (ft)	36
Link Distance (ft)	259
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 124

Intersection: 10: EB M-59 & WB to EB XO W. of Hartland Glen

Movement	SB
Directions Served	L
Maximum Queue (ft)	73
Average Queue (ft)	66
95th Queue (ft)	87
Link Distance (ft)	27
Upstream Blk Time (%)	83
Queuing Penalty (veh)	104
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 11: WB to EB XO W. of Hartland Glen & WB M-59

Movement	WB	WB	WB
Directions Served	L	T	T
Maximum Queue (ft)	253	283	301
Average Queue (ft)	103	57	45
95th Queue (ft)	272	308	279
Link Distance (ft)		1147	1147
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	250		
Storage Blk Time (%)	13	0	
Queuing Penalty (veh)	110	0	

Intersection: 20: Hartland Glen Lane/ Cundy Road & EB M-59

Movement	EB	NB
Directions Served	TR	R
Maximum Queue (ft)	4	56
Average Queue (ft)	0	27
95th Queue (ft)	3	55
Link Distance (ft)	501	45
Upstream Blk Time (%)		4
Queuing Penalty (veh)		2
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: EB to WB XO E. of Hartland Glen & WB M-59

Movement	WB	WB	NB
Directions Served	T	T	L
Maximum Queue (ft)	156	157	95
Average Queue (ft)	125	131	81
95th Queue (ft)	154	162	112
Link Distance (ft)	120	120	50
Upstream Blk Time (%)	13	15	34
Queuing Penalty (veh)	109	122	79
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 31: EB M-59 & EB to WB XO E. of Hartland Glen

Movement	EB
Directions Served	L
Maximum Queue (ft)	85
Average Queue (ft)	23
95th Queue (ft)	67
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	250
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 40: EB M-59 & WB to EB XO E. of Hartland Glen Lane

Movement	EB	SB
Directions Served	T	L
Maximum Queue (ft)	5	52
Average Queue (ft)	0	18
95th Queue (ft)	3	45
Link Distance (ft)	124	52
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 41: WB to EB XO E. of Hartland Glen Lane & WB M-59

Movement	WB	WB
Directions Served	T	T
Maximum Queue (ft)	240	259
Average Queue (ft)	80	82
95th Queue (ft)	195	202
Link Distance (ft)	1035	1035
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 50: EB to WB XO W. of Fenton Road & WB M-59

Movement	NB
Directions Served	L
Maximum Queue (ft)	59
Average Queue (ft)	19
95th Queue (ft)	46
Link Distance (ft)	40
Upstream Blk Time (%)	3
Queuing Penalty (veh)	1
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 51: EB M-59 & EB to WB XO W. of Fenton Road

Movement	EB
Directions Served	L
Maximum Queue (ft)	5
Average Queue (ft)	0
95th Queue (ft)	3
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	300
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 60: Site Drive # 1 & EB M-59

Movement	EB	NB
Directions Served	T	R
Maximum Queue (ft)	9	170
Average Queue (ft)	0	73
95th Queue (ft)	6	137
Link Distance (ft)	286	232
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 70: Site Drive # 2 & EB M-59

Movement	NB
Directions Served	R
Maximum Queue (ft)	47
Average Queue (ft)	14
95th Queue (ft)	37
Link Distance (ft)	562
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 80: Hartland Glen Lane/ Cundy Road & Cundy Road/Site Drive # 4

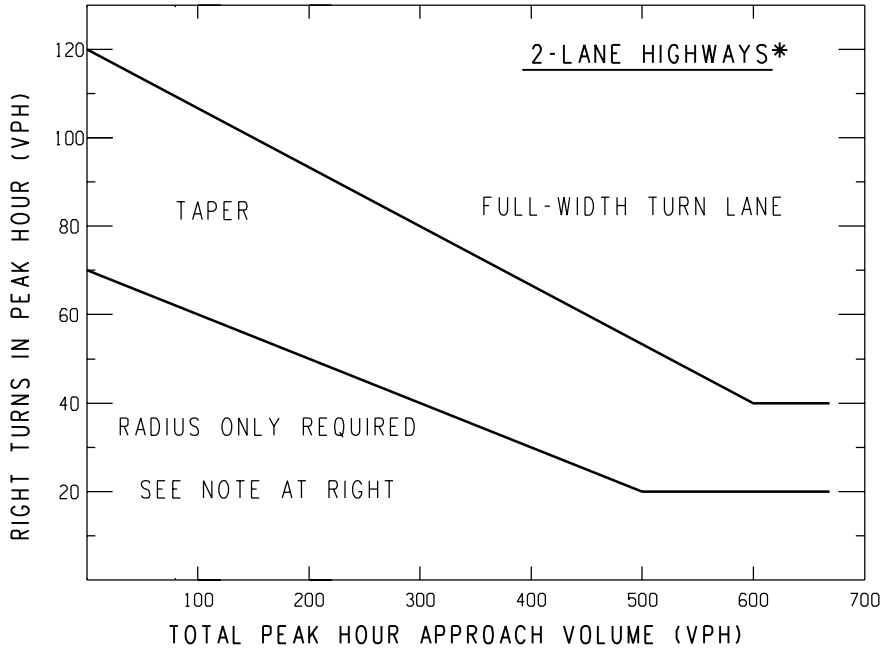
Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	29	42	30
Average Queue (ft)	5	2	3
95th Queue (ft)	23	20	18
Link Distance (ft)	209	231	45
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 90: Hartland Glen Lane/ Cundy Road & Site Drive # 3

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	31	23
Average Queue (ft)	10	1
95th Queue (ft)	33	9
Link Distance (ft)	259	231
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

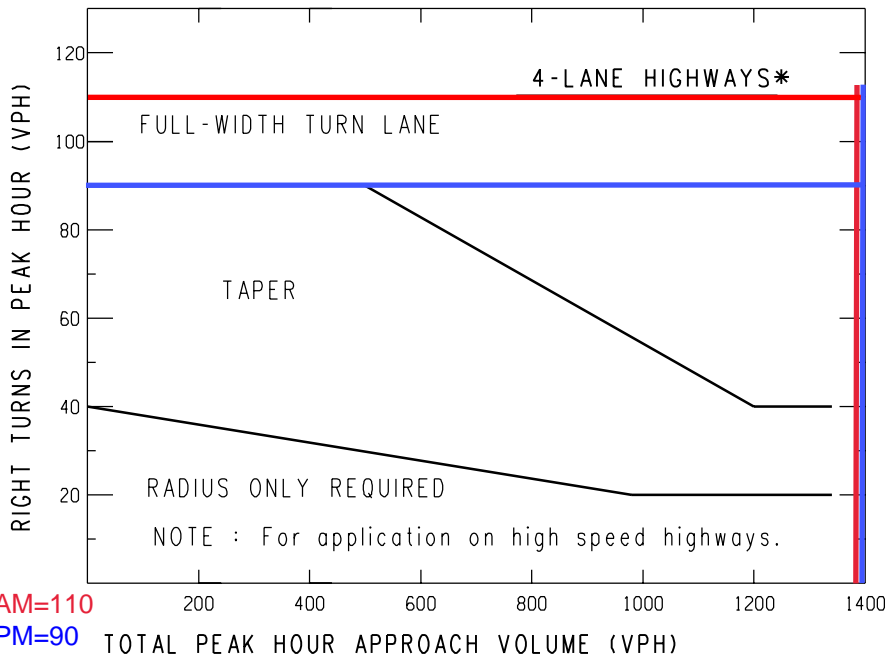
Zone wide Queuing Penalty: 525



NOTE:

For posted speeds at or under 45 mph, peak hour right turns greater than 40 vph, and total peak hour approach less than 300 vph, adjust right turn volumes.

Adjust peak hour right turns = Peak hour right turns - 20



*If a center left-turn lane exists (i.e. 3 or 5 lane highway), subtract the number of left turns in approach volume from the total approach volume to get an adjusted total approach volume.

AM=1506

PM=1844

Full-Width RT Lane Recommended

Sample Problem:

The Design Speed is 55 mph. The Peak Hour Approach Volume is 300 vph. The Number of Right Turns in the Peak Hour is 100 vph. Determine if a right turn lane is recommended.

Solution:

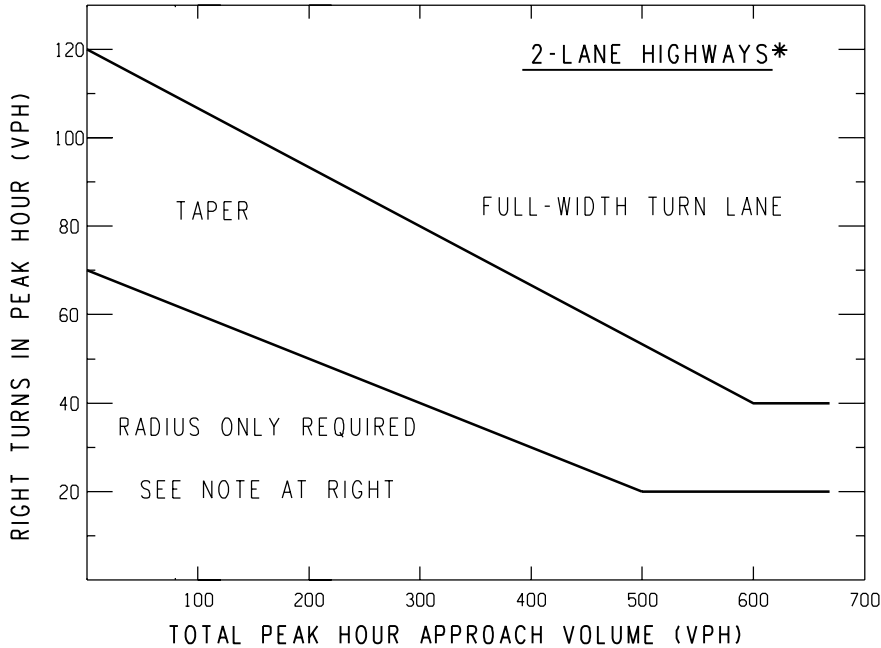
Figure indicates that the intersection of 300 vph and 100 vph is located above the upper trend line; thus, a right-turn lane may be recommended.

TRAFFIC AND SAFETY NOTE	
DRAWN BY: MTS	08/05/2004
CHECKED BY: JAT	PLAN DATE:
FILE: K:\DGN\ts notes\Note604A tsn.dgn	

TRAFFIC VOLUME GUIDELINES FOR RIGHT-TURN LANES AND TAPERS

604A

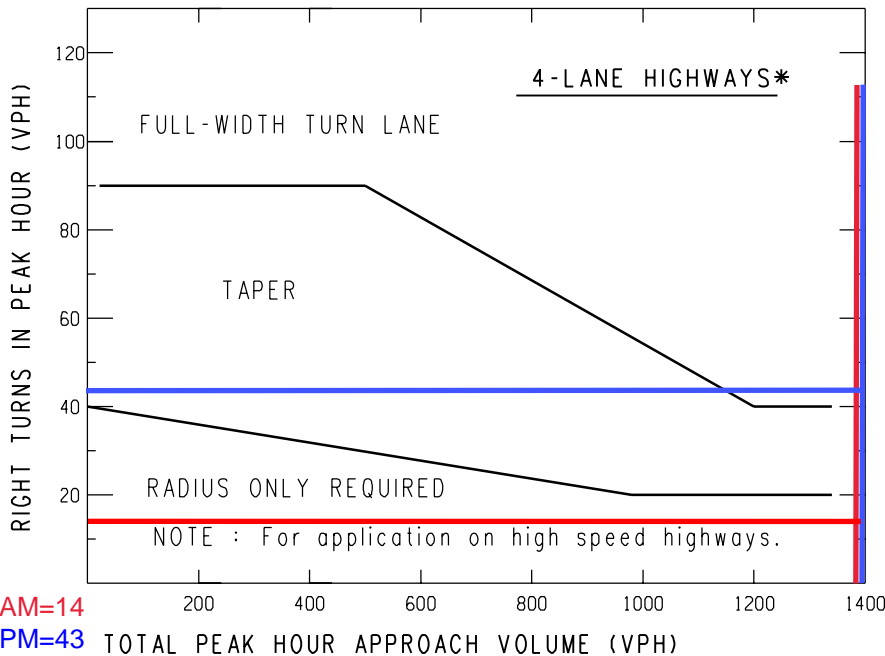
REV. 08/05/2004



NOTE:

For posted speeds at or under 45 mph, peak hour right turns greater than 40 vph, and total peak hour approach less than 300 vph, adjust right turn volumes.

Adjust peak hour right turns = Peak hour right turns - 20



*If a center left-turn lane exists (i.e. 3 or 5 lane highway), subtract the number of left turns in approach volume from the total approach volume to get an adjusted total approach volume.

AM=1489

PM=1719

Full-width RT Lane Recommended

Sample Problem:

The Design Speed is 55 mph. The Peak Hour Approach Volume is 300 vph. The Number of Right Turns in the Peak Hour is 100 vph. Determine if a right turn lane is recommended.

Solution:

Figure indicates that the intersection of 300 vph and 100 vph is located above the upper trend line; thus, a right-turn lane may be recommended.

TRAFFIC AND SAFETY NOTE	
DRAWN BY: MTS	08/05/2004
CHECKED BY: JAT	PLAN DATE:
FILE: K:\DGN\ts notes\Note604A tsn.dgn	

TRAFFIC VOLUME GUIDELINES FOR RIGHT-TURN LANES AND TAPERS

604A

REV. 08/05/2004

Summary of Warrants			
Spot Number:	Future Conditions		
Major Street:	WB (M-59)	Minor Street:	EB-to-WB X/O, E. of Hartland Glen Ln
Intersection:	WB (M-59) at EB-to-WB X/O, E. of Hartland Glen Ln		
City/Twp:	Hartland Township		
Date Performed:	6/19/2023	Performed By:	F&V
Date Volumes Collected:	5/17/2023		
Warrant	Condition	Is Warrant Met	
Data Validation Error		NO	
WARRANT 1: Eight-Hour Vehicular Volume		YES	
	Condition A	NO	
	Condition B	YES	
	Condition A&B	N/A	
WARRANT 2: Four-Hour Vehicular Volume	(70%)	YES	
WARRANT 3: Peak-Hour Vehicular Volume	(70%)	YES	
	Condition A	N/A	
	Condition B	YES	
WARRANT 4: Pedestrian Volume	(70%)	NO	
	Four Hour	N/A	
	Peak Hour	N/A	
	(Threshold)	HAWK	
	(Threshold)	RRFB	
WARRANT 5: School Crossing		NO	
WARRANT 6: Coordinated Signal System		NO	
WARRANT 7: Crash Experience		NO	
	Condition A	NO	
	Condition B	NO	
WARRANT 8: Roadway Network		NO	
WARRANT 9: Intersection Near a Grade Crossing		#N/A	
Issue to Be Addressed by Signalization:			
0			

Michigan Manual of Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 1: Eight-Hour Vehicular Volume

Intersection:	WB (M-59) @ EB-to-WB X/O, E. of Hartland Glen Lt
Date	6/19/2023 by F&V

2	: No. of Lanes on Major St?
1	: No. of Lanes on Minor St?
55	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
0	: if answer 4 is Yes, then what is the of the population isolated community?
NO	: Have other remedial measures been tried?

USE 70% WARRANTS 1A AND 1B. DO NOT USE COMBINATION OF A & B

Time	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	Combination Major A	Combination Minor A	Combination Major B	Combination Minor B	Warrant Condition A&B met?
00:01 - 01:00	70	14	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
01:00 - 02:00	42	8	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
02:00 - 03:00	39	7	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
03:00 - 04:00	56	7	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
04:00 - 05:00	112	14	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
05:00 - 06:00	397	30	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
06:00 - 07:00	834	53	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
07:00 - 08:00	1117	76	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
08:00 - 09:00	1043	80	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
09:00 - 10:00	934	68	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
10:00 - 11:00	941	68	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
11:00 - 12:00	1001	55	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
12:00 - 13:00	1002	68	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
13:00 - 14:00	938	57	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
14:00 - 15:00	1086	54	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
15:00 - 16:00	1055	59	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
16:00 - 17:00	969	82	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
17:00 - 18:00	1041	151	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
18:00 - 19:00	830	52	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
19:00 - 20:00	631	40	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
20:00 - 21:00	516	35	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
21:00 - 22:00	315	27	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
22:00 - 23:00	183	20	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
23:00 - 00:00	104	16	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A

Number of Hours that met the warrant 1A =	1
Number of Hours that met the warrant 1B =	12
Number of Hours that met the warrant 1 A & B =	0

A. Is the Minimum Vehicular Volume Warrant Met? (Condition A)

NO

B. Is the Interruption of Continuous Traffic Met? (Condition B)

YES

C. Combination of Warrants A and B Criteria Met?

N/A

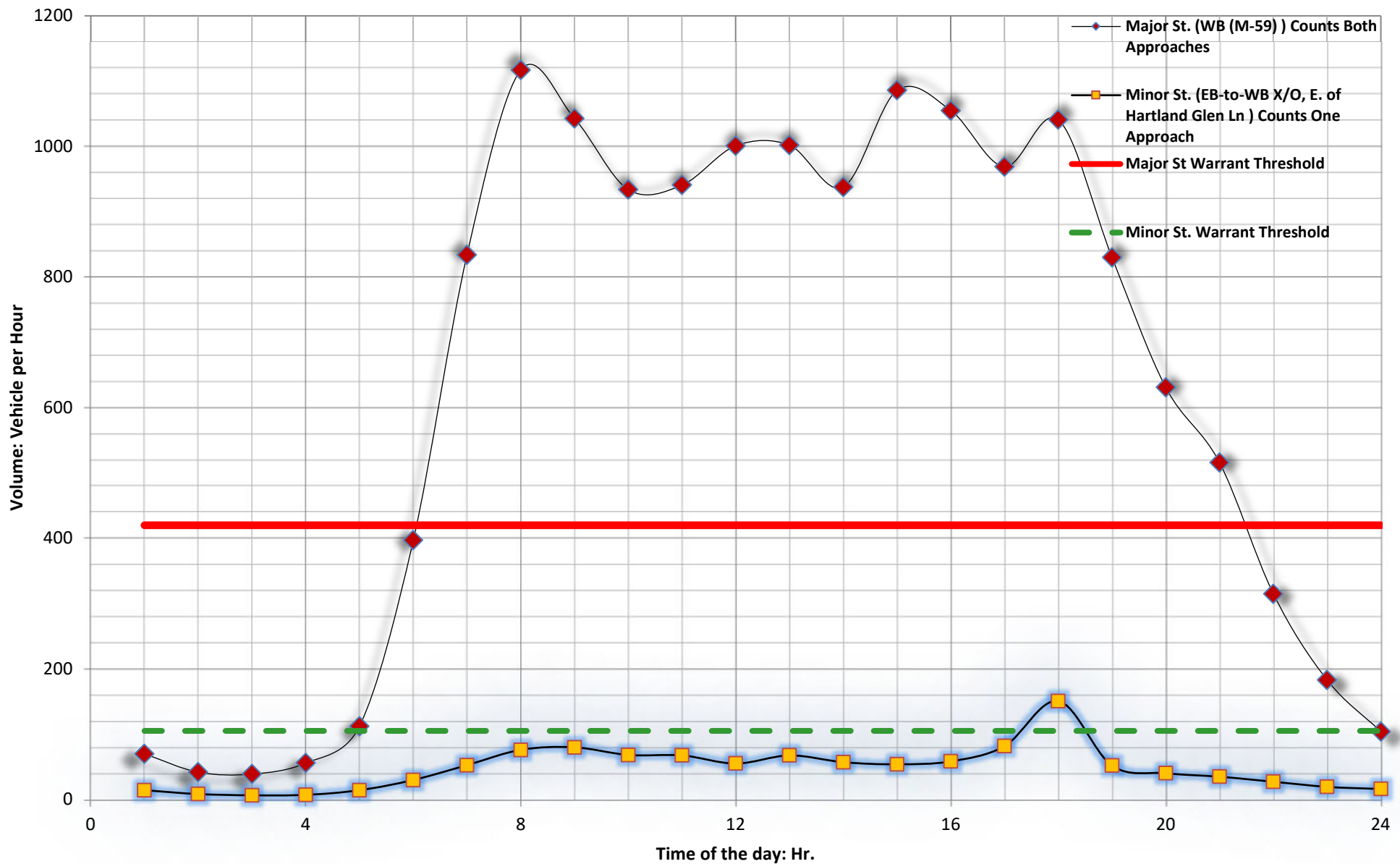


FIGURE 1: WARRANT 1A

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number: Future Conditions
WB (M-59) @ EB-to-WB X/O, E. of Hartland Glen Ln

NO. OF LANES ON MAJOR ST.? 2

NO. OF LANES ON MINOR ST.? 1

Number of Hours that met the Warrant: 1

Does this intersection meet Warrant 1A for signal installation? NO

Data Collection Date: 5/17/20 243

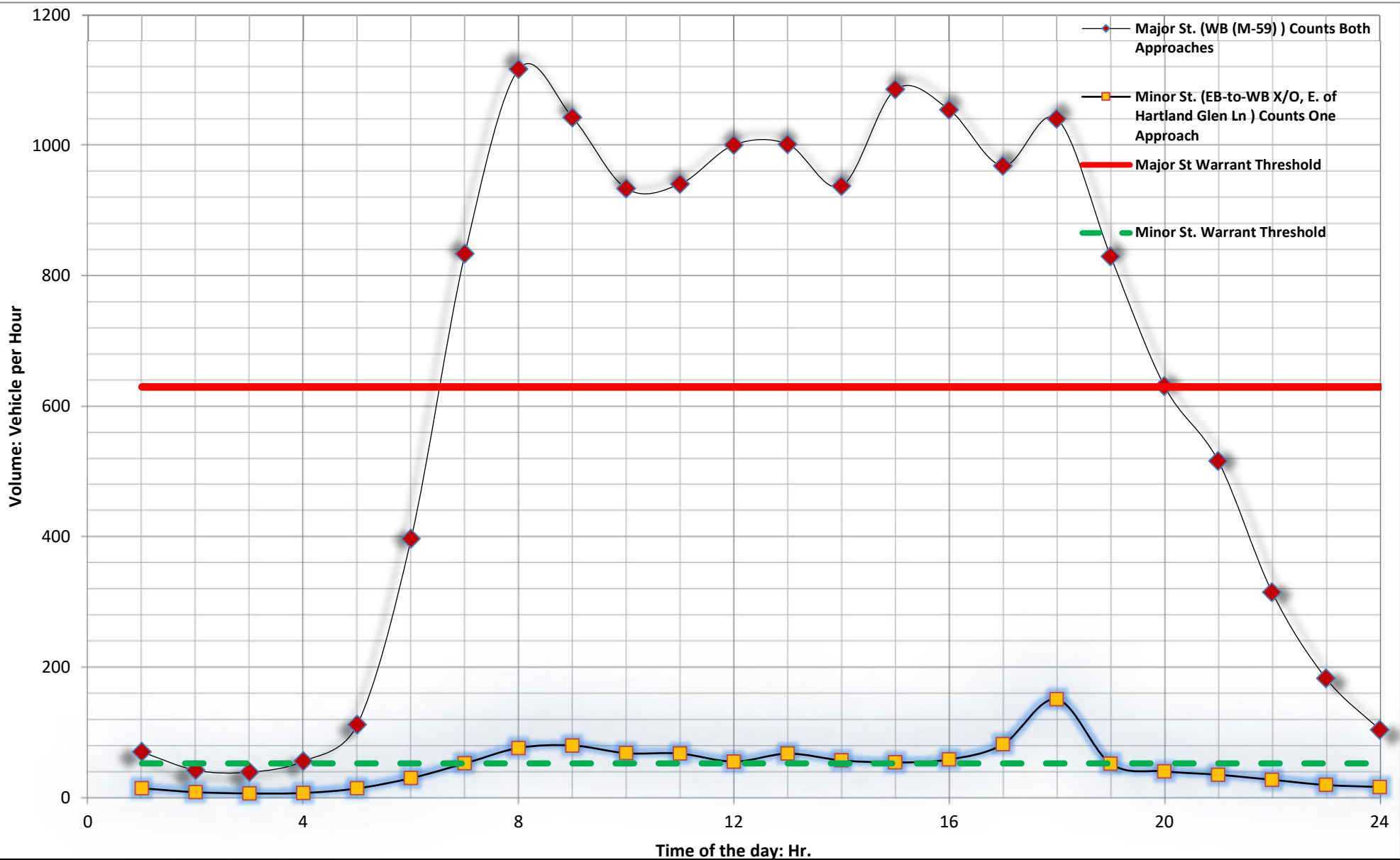


FIGURE 1: WARRANT 1B

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number: Future Conditions
WB (M-59) @ EB-to-WB X/O, E. of
Hartland Glen Ln

NO. OF LANES ON MAJOR ST.? 2

NO. OF LANES ON MINOR ST.? 1

Number of Hours that met the Warrant: 12

Does this intersection meet Warrant 1B for signal installation? YES

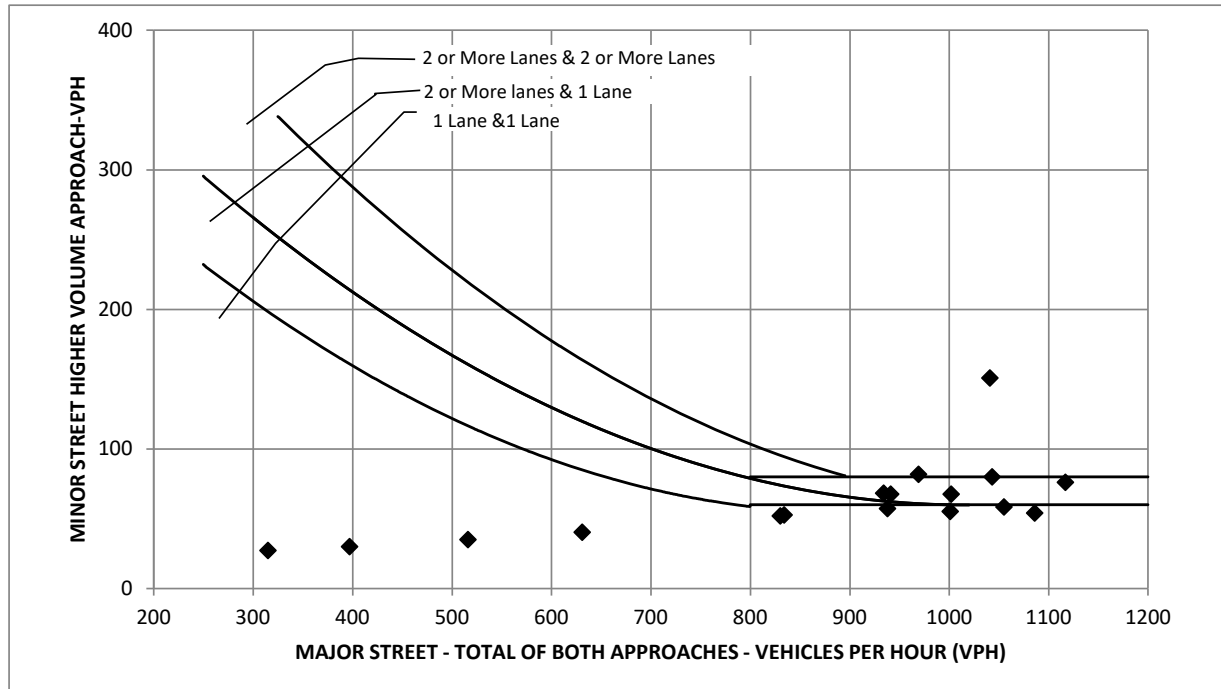
Data Collection Date: 5/17/20

244

Michigan Manual of Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 2: Four-Hour Vehicular Volume

Spot Number:	Future Conditions	
Intersection:	WB (M-59) @ EB-to-WB X/O, E. of Hartland Glen Ln	
Date	6/19/2023	by F&V

2	: No. of Lanes on Major St.
1	: No. of Lanes on Minor St.
55	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
0	: What is the of the population isolated community?



How Many Hours Are Met

7

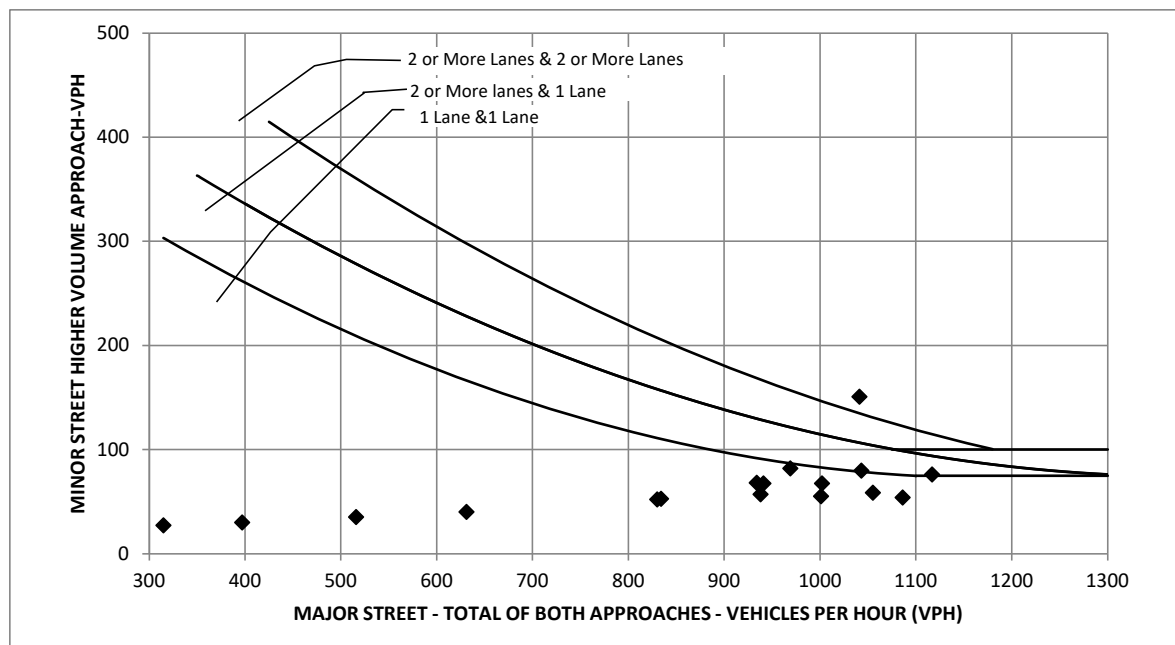
Is Warrant (70%) Met?

YES

Michigan Manual of Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 3 B(70%): Peak-Hour Vehicular Volume

Spot Number:	Future Conditions		
Intersection:	WB (M-59) @ EB-to-WB X/O, E. of Hartland Glen Ln		
Date	6/19/2023	by	F&V

2	: No. of Lanes on Major St.
1	: No. of Lanes on Minor St.
55	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an isolated community?
0	: What is the of the population isolated community?



How Many Hours Are Met	3
Is Warrant (70%) Met?	YES

May 19, 2023
Project No. 230838

Mike West
Allen Edwin Homes
2186 East Centre Avenue
Portage, MI 49002

Wetland Delineation – 40-acre Parcel, 12685 Highland Road Hartland Township, Livingston County, Michigan

On May 3, 2023, Fishbeck staff conducted a field investigation and delineated wetlands on an approximately 40-acre property (Parcel No. 4708-26-200-002) located at 12685 Highland Road in Section 26 of Hartland Township (Town 03 North, Range 06 East), Livingston County, Michigan (the Site). The Site is situated in a relatively rural residential and commercial area of Hartland Township, scattered with undeveloped land, including forested habitat. Hartland Glen Golf Course is directly south and west of the Site (see Figure 1).

This letter summarizes the results of the wetlands investigation. The wetlands investigation was conducted consistent with the 1987 *US Army Corps of Engineers (USACE) Wetlands Delineation Manual* and the 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual- Northcentral Northeast* (Version 2.0). The wetlands identification and delineation procedures outlined in these manuals require evaluating site vegetation, soils, and hydrologic characteristics. Hydrophytic vegetation decisions are based on the wetland indicator status of dominant species in the plant community. Species with indicator statuses of obligate wetland (OBL), facultative wetland (FACW), and facultative (FAC) are considered wetland species, while species with indicator statuses of facultative upland (FACU) and upland (UPL) are considered upland species. FAC species are also commonly present in upland plant communities. An area must contain dominant wetland vegetation, hydric (wetland) soil, and wetland hydrology to be classified as a wetland.

Literature Review

According to the U.S. Department of Agriculture Natural Resources Conservation Service *Web Soil Survey*, most of the Site contains soil series with low hydric ratings ($\leq 6\%$ hydric). However, Carlisle muck, 0 to 2 percent slopes (CarabA, 100% hydric rating) is mapped at the southeast end of the Site and Gilford sandy loam, 0 to 2 percent slopes, gravelly subsoil (Gd, 95% hydric rating), is mapped at the northwest end of the Site (Attachment 1).

The National Wetlands Inventory map indicates no wetlands on the Site, but several wetlands are mapped in the surrounding area, primarily south of the Site (Attachment 2).

Site Investigation

Fishbeck staff traversed the area of investigation on May 3, 2023. Most of the Site contained agricultural (harvested corn) fields, which were generally flat, with elevations roughly 960 to 990 feet above mean sea level (AMSL). A roadside ditch originates from a concrete culvert in the Site's northwest corner and runs south along the east side of Highland Glen Lane. The Site also contained wetland, upland forest, and tree lines.

Fishbeck staff identified three wetlands (Wetlands A, B, and C) within the area of investigation, as described below. Fishbeck flagged the wetland boundaries with pink ribbons labeled A.1 through A.8, B.1 to B.75, and C.1

through C.32 open, CC.1 open through CC.6 connect to C.1. Wetland B continued south along a stream between wetland flags B.62 and B.63. Wetland boundary flags were surveyed with a handheld Trimble R1 GNSS receiver with submeter accuracy. Wetland boundaries are noted on Figure 2.

Soil, vegetation, and hydrology data were collected at wetland sampling points WSPA, WSP.B, and WSP.C, and adjacent upland sampling points (USP.A, USP.B, and USP.C). These data are summarized on USACE Wetland Determination Data Forms (Attachment 3). Site photographs are included as Attachment 4.

Wetland A (Emergent Wetland)

Wetland A is a 0.17-acre, emergent wetland in a small depression within the Site's northwest quadrant near the overhead electric utility. An overland flow (surface water connection) may exist to the roadside ditch.

Wetland hydrology, dominant hydrophytic vegetation, and hydric soils were confirmed at Sampling Point WSP.A. Several hydrology indicators were identified, including surface water (A1), high water table (A2), saturation (A3), water-stained leaves (B9), saturation visible on aerial imagery (C9), stunted or stressed plants (D1), geomorphic position (D2), and FAC-Neutral Test (D5). Dominant species observed included *Typha angustifolia* (narrow-leaf cattail, OBL), *Typha latifolia* (broadleaf cattail, OBL), and *Phalaris arundinacea* (reed canary grass, FACW). Other less commonly observed species included *Lamium purpureum* (purple dead nettle, UPL), *Solidago gigantea* (late goldenrod, FACW), *Rumex crispus* (curly dock, FAC), and *Symphytotrichum lateriflorum* (calico aster, FAC). A soil pit dug within Wetland A revealed a very dark gray (10YR 3/1) silty clay loam with prominent iron concentrations (10YR 4/6, dark yellowish brown) to a depth of 8 inches, confirming hydric soil indicator F6 (redox dark surface). A hard clay pan restrictive layer was identified at 8 inches below the ground surface.

Upland conditions were verified adjacent to Wetland A at Sampling Point USP.A. A soil pit dug to a depth of 6 inches contained dark brown (10YR 3/3) fine sandy loam, which does not indicate hydric soil. A roots-restrictive layer was identified at 6 inches below the ground surface. The dominant species observed at USP.A included *Carya ovata* (shagbark hickory, FACU), *Prunus serotina* (black cherry, FACU), *Rhus typhina* (staghorn sumac, UPL), *Lonicera tatarica* (Tartarian honeysuckle, FACU), *Elaeagnus umbellata* (autumn-olive, UPL), *Bromus inermis* (smooth brome, UPL), *Poa compressa*, and *P. pratensis* (bluegrasses, FACU). Other less commonly observed species included *Taraxacum officinale* (dandelion, FACU), *Barbarea vulgaris* (yellow rocket, FAC), *Daucus carota* (wild carrot, UPL), *Verbascum thapsus* (mullein, UPL). Fishbeck did not observe wetland hydrology, hydric soils, or dominant wetland vegetation at this location.

Wetland B (Emergent/Scrub-shrub)

Wetland B includes the roadside ditch along the east side of Highland Glen Lane and extends east into the agricultural field. Portions of the wetland were historically dredged, and spoils were piled just outside the wetland near the farm field. The ditch continues south within the east roadside and into the Site's forested southwest corner. The ditch becomes more stream-like south of the Site's southwest corner. Some tree clearing was observed in the surrounding upland.

Wetland hydrology, dominant hydrophytic vegetation, and hydric soils were confirmed at sampling point WSP.B. Several hydrology indicators were identified, including surface water (A1), high water table (A2), saturation (A3), water marks (B1), saturation visible on aerial imagery (C9), geomorphic position (D2), microtopographic relief (D4), and FAC-Neutral Test (D5). Dominant species observed at WSP.B included *Salix nigra* (black willow, OBL), *Populus deltoides* (cottonwood, FAC), *Salix interior/exigua* (sandbar willow, FACW), *Cornus racemosa* (gray dogwood, FAC), *Cornus amomum* (silky dogwood, FACW), *Salix eriocephala* (Missouri willow, FACW), reed canary grass (FACW), *Toxicodendron radicans* (poison-ivy, FAC), and *Vitis riparia* (riverbank grape, FAC). Other less commonly observed species included *Rubus strigosus* (red raspberry, FAC), calico aster (FACW), and late goldenrod (FACW). A soil pit dug revealed a black (10YR 2/1) silty clay loam with prominent iron concentrations (10YR 3/3, dark brown) to a depth of 12 inches, confirming hydric soil indicator F8 (redox depressions).

Upland conditions adjacent to Wetland B were confirmed at sampling point USP.B. A soil pit dug to a depth of 12 inches contained brown (10YR 4/3) fine sandy loam, which did not indicate hydric soil. The dominant species observed at USP.B was *Tilia americana* (basswood, FACU), *Quercus rubra* (red oak, FACU), *Prunus virginiana* (chokecherry, FACU), *Ostrya virginiana* (hop-hornbeam, FACU), *Carex pensylvanica* (penn sedge, UPL), *Erythronium rostratum* (yellow trout-lily, UPL), and *Podophyllum peltatum* (may-apple, FACU). Fishbeck did not observe wetland hydrology, hydric soils, or dominant wetland vegetation at this location.

Wetland C (Emergent/Forested Wetland)

Wetland C is in the Site's southeast quadrant, extends into the agricultural field, and continues off-site to the south and east. A ditch containing wetland vegetation connected two broader wetland areas along the Site's southern boundary. Wetland hydrology, dominant hydrophytic vegetation, and hydric soils were confirmed at sampling point WSP.C. Several hydrology indicators were identified and included surface water (A1), high water table (A2), saturation (A3), water-stained leaves (B9), crayfish burrows (C8), saturation visible on aerial imagery (C9), stunted or stressed plants (D1), geomorphic position (D2), microtopographic relief (D4), and FAC-Neutral Test (D5). Dominant species observed at WSP.C included *Salix amygdaloides* (peachleaf willow, FACW), *Salix discolor* (pussy willow, FACW), reed canary grass (FACW), *Carex lacustris* (lake sedge, OBL), and riverbank grape (FAC). Other less commonly observed species included cattails (OBL), *Doellingeria umbellata* (white-top, FACW), calico aster (FACW), late goldenrod (FACW), and *Phragmites australis ssp. australis* (common reed, FACW). A soil pit dug to a depth of 16 inches revealed a black (10YR 2/1) mucky loamy clay, verifying hydric indicator F1 (loamy mucky mineral).

Upland conditions adjacent to Wetland C were confirmed at Sampling Point USP.C. A soil pit dug to a depth of 12 inches contained dark brown (10YR 3/3) fine sandy loam, which lacked a hydric soil indicator. The dominant vegetation consisted of basswood (FACU), black cherry (FACU), prickly-ash, FACU), Pennsylvania sedge (UPL), may-apple (FACU), dandelion (FACU), and *Parthenocissus quinquefolia* (Virginia creeper, FACU). Therefore, Fishbeck did not observe wetland hydrology, hydric soils, or dominant wetland vegetation.

Upland Sampling Point (USP.1)

Upland conditions were confirmed at Sampling Point USP.1 in a forested area near the Site's northern boundary. A soil pit dug to a depth of 12 inches contained brown (10YR 4/3) sandy clay loam, which lacked a hydric soil indicator. The dominant species observed at USP.1 include *Quercus macrocarpa* (bur oak, FACU), *Ulmus pumila* (Siberian elm, FACU), Tartarian honeysuckle (FACU), *Rosa multiflora* (multiflora rose, FACU), *Rubus occidentalis* (black raspberry, UPL), *Acer negundo* (box-elder, FAC), smooth brome (UPL), *Parthenocissus quinquefolia* (Virginia creeper, FACU). Therefore, Fishbeck did not observe wetland hydrology, hydric soils, or dominant wetland vegetation.

Regulatory Review and Conclusions

Part 303, Wetlands Protection

According to Section 30301(d) of Michigan's Natural Resources and Environmental Protection Act (NREPA), Act 451, wetlands "contiguous to the Great Lakes or Lake St. Clair, an inland lake or pond, or a river or stream" or "more than 5 acres in size" are regulated by the State of Michigan. "Contiguous" is defined as being within 500 feet of an inland lake, pond, river, or stream. A stream is defined as having a defined bed, banks, and evidence of flow. A pond is defined as an area of "natural or permanent artificial" open water with "more than one acre, but less than five acres" in size.

Wetlands B and C are contiguous to regulating features (e.g., streams) and, therefore, are regulated under Part 303 of the NREPA. Wetlands B and C also continue off-site and may be more than 5 acres in size.

Upland is present between Wetland A and the roadside ditch to its west. The ditch appeared to consist of linear wetland in the vicinity of Wetland A because its bed was well vegetated. Fishbeck staff did not identify stream morphology in the ditch until the Site's southern boundary. The roadside ditch conveys water from a storm pipe (from under Hartland Road) in the Site's northwest corner and water flows slowly south through the linear emergent wetland (Wetland B). However, if EGLE decides the ditch has a defined enough bed/bank and evidence of flow, the ditch may be considered an EGLE-regulated stream under Part 301 of the NREPA. In that case, Wetland A would be a regulated wetland due to its proximity to the ditch.

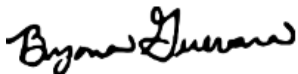
A permit would be required from EGLE for any of the following activities within the Site's regulated wetland:

- Placing fill or permitting the placement of fill.
- Dredging, removing, or permitting the removal of soil or minerals.
- Constructing, operating, or maintaining any use or development.
- Draining surface water.

According to the EGLE's MiWaters website (EGLE 2023), Hartland Township does not appear to have a wetland protection ordinance. Contact Hartland Township's Zoning and Planning Commission for more information on any building setbacks or authorizations on the local level.

If you have any questions or require additional information, please contact Elise at 616-464-3738 or ehtripp@fishbeck.com.

Sincerely,



Bryana J. Guevara

Wetland Scientist/Arborist



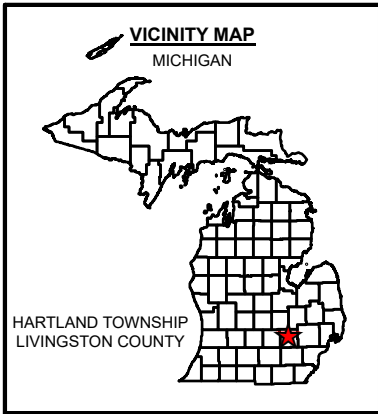
Elise Hansen Tripp, PWS

Senior Wetland Scientist and Ecologist

Attachments

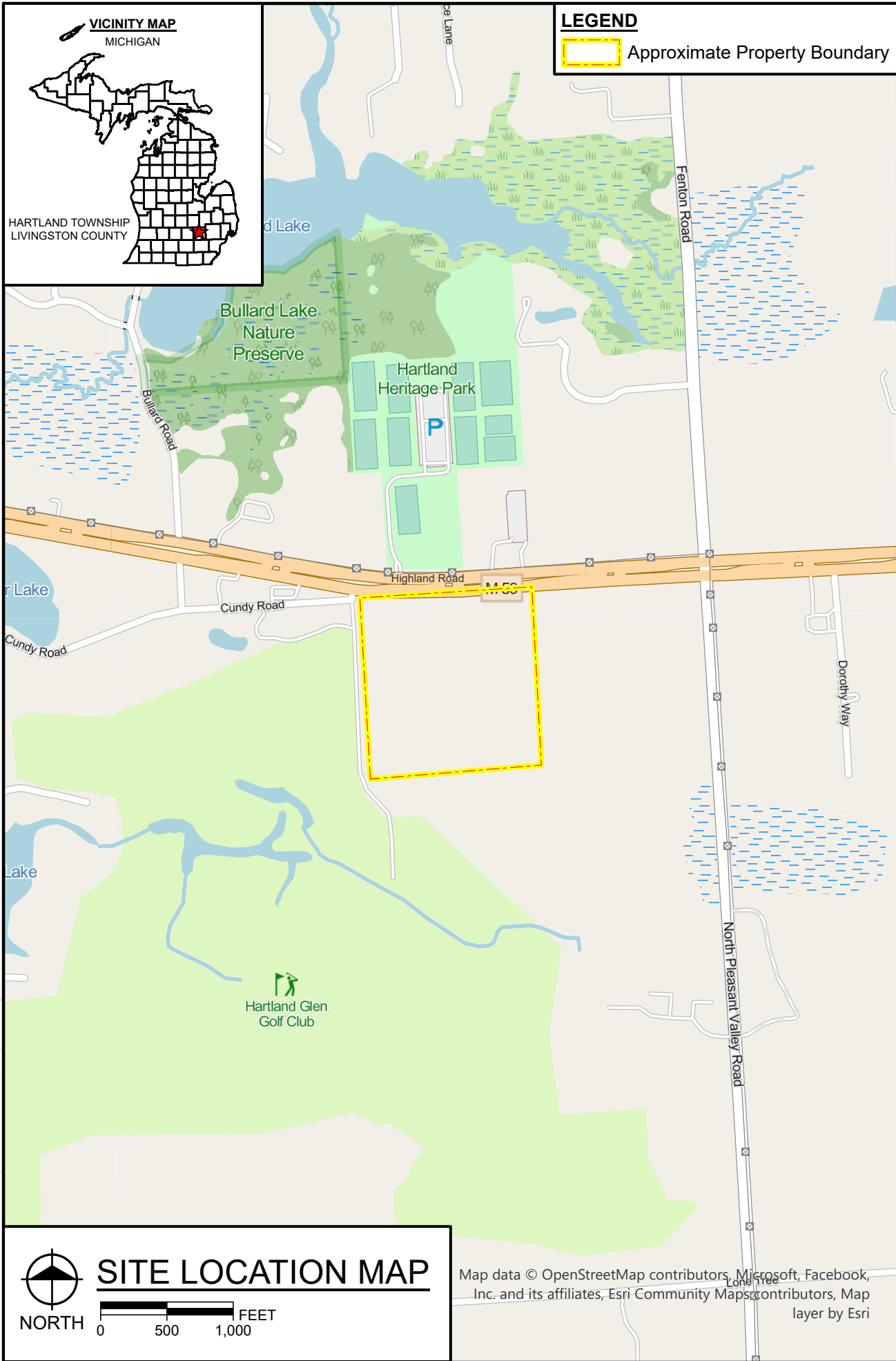
By email

Figures



LEGEND

Approximate Property Boundary



Hard copy is intended to be 8.5"x11" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

Allen Edwin Homes
Hartland Township, Livingston County, Michigan
Wetland Delineation

PROJECT NO.
230838

FIGURE NO.

1
252



NORTH

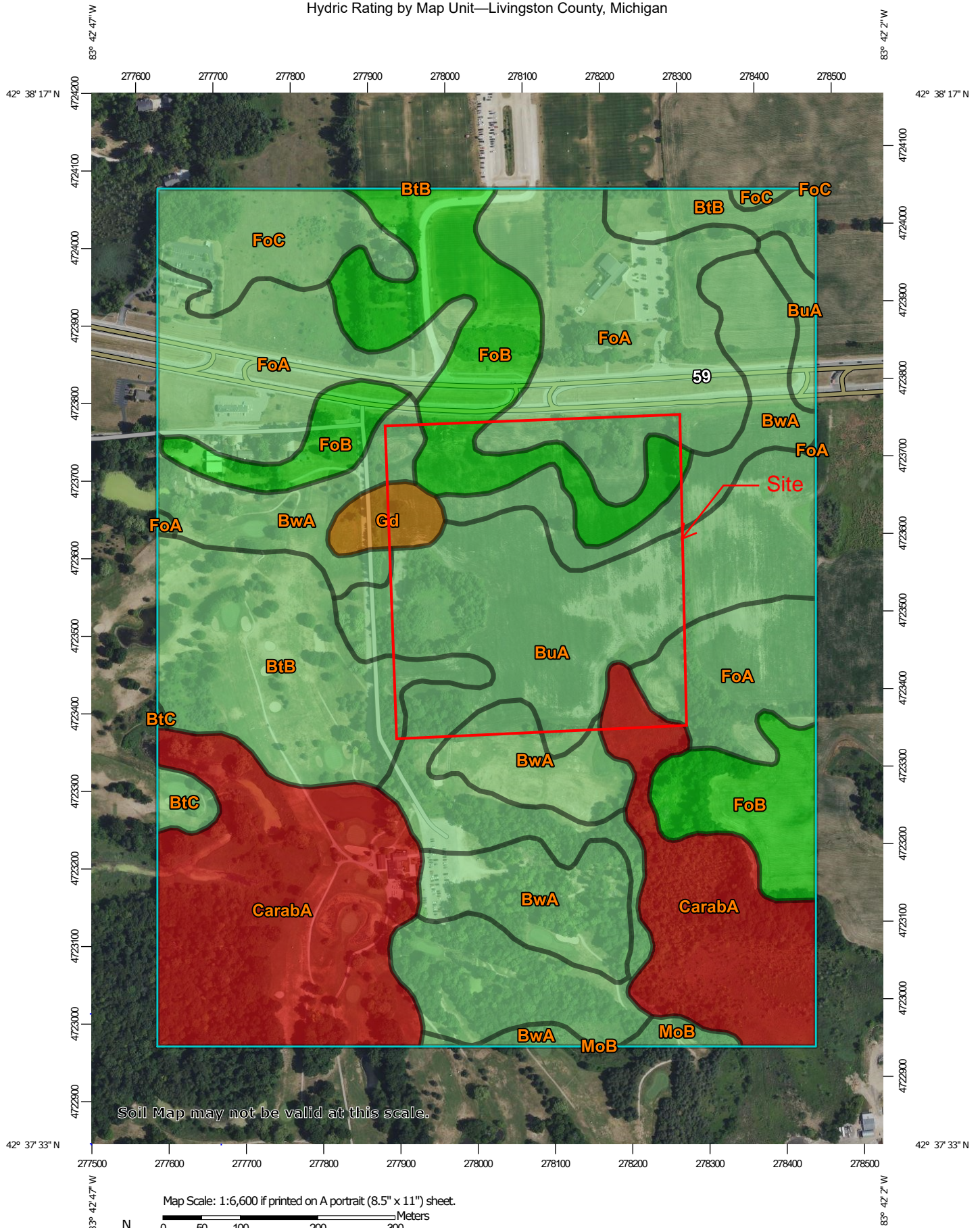
SITE LOCATION MAP

0 500 1,000 FEET

Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Attachment 1

Hydric Rating by Map Unit—Livingston County, Michigan




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

12/14/2022
Page 1 of 5







MAP LEGEND

Area of Interest (AOI)







 Area of Interest (AOI)

Soils







Soil Rating Polygons

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available


Soil Rating Lines

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available






Soil Rating Points

-  Hydric (100%)
-  Hydric (66 to 99%)
-  Hydric (33 to 65%)
-  Hydric (1 to 32%)
-  Not Hydric (0%)
-  Not rated or not available


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Livingston County, Michigan
Survey Area Data: Version 20, Aug 26, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 29, 2020—Jul 28, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BtB	Boyer-Oshtemo loamy sands, 2 to 6 percent slopes	4	23.4	10.0%
BtC	Boyer-Oshtemo loamy sands, 6 to 12 percent slopes	5	1.4	0.6%
BuA	Brady loamy sand, 0 to 2 percent slopes	6	44.9	19.2%
BwA	Bronson loamy sand, 0 to 2 percent slopes	4	32.9	14.1%
CarabA	Carlisle muck, 0 to 2 percent slopes	100	43.7	18.7%
FoA	Fox sandy loam, 0 to 2 percent slopes	2	45.2	19.3%
FoB	Fox sandy loam, 2 to 6 percent slopes	0	29.4	12.6%
FoC	Fox sandy loam, 6 to 12 percent slopes	5	9.3	4.0%
Gd	Gilford sandy loam, 0 to 2 percent slopes, gravelly subsoil	95	2.6	1.1%
MoB	Wawasee loam, 2 to 6 percent slopes	5	1.0	0.4%
Totals for Area of Interest			233.9	100.0%

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Attachment 2



U.S. Fish and Wildlife Service

National Wetlands Inventory

Wetlands



December 14, 2022

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Attachment 3

Project/Site:	1268 Highland Road		City/County:	Hartland/Livingston County		Sampling Date:	05/03/2023	
Applicant/Owner:	Allen Edwin Homes			State:	Michigan	Sampling Point:	USP.1	
Investigator(s):	B.Guevara; Fishbeck		Section, Township, Range:	S26, Hartland Twp (T3N, R6E)				
Landform (hillslope, terrace, etc):	Roadside	Local relief (concave, convex, none):	convex			Slope (%):	5-8	
Subregion (LRR or MLRA):	LRR L	Lat:	42.63451554	Long:	-83.70493651	Datum:	WGS 1984	
Soil Map Unit Name:	Fox sandy loam, 0 to 2 percent slopes (FoA)			NWI classification:	None			
Are climatic / hydrologic conditions on the site typical for this time of year?				Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/> (If no, explain in Remarks.)	
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed?				Are "Normal Circumstances" present?		Yes	<input checked="" type="checkbox"/>	No
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic?				(If needed, explain any answers in Remarks.)				

Hydrophytic Vegetation Present?	Yes _____	No <u> X </u>	Is the Sampled Area within a Wetland? Yes _____ No <u> X </u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u> X </u>	
Wetland Hydrology Present?	Yes _____	No <u> X </u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Moss Trim Lines (B16)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		<input type="checkbox"/> Microtopographic Relief (D4)	
		<input type="checkbox"/> FAC-Neutral Test (D5)	

Field Observations:			
Surface Water Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <input type="text"/>
Water Table Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <input type="text"/>
Saturation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <input type="text"/>
(includes capillary fringe)			

Wetland Hydrology Present?	
Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

Remarks:

VEGETATION - Use scientific names of plants.

 Sampling Point: USP.1

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Quercus macrocarpa</u> / Bur oak	10	Yes	FACU	
2. <u>Ulmus pumila</u> / Siberian elm	10	Yes	FACU	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
	20	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15'</u> radius)				
1. <u>Lonicera tatarica</u> / Tatarian honeysuckle	20	Yes	FACU	
2. <u>Rubus occidentalis</u> / Black raspberry	10	Yes	UPL	
3. <u>Rosa multiflora</u> / Multiflora rose, Multiflora rosa	10	Yes	FACU	
4. <u>Acer negundo</u> / Boxelder, Box elder	10	Yes	FAC	
5. <u>Rhus typhina</u> / Staghorn sumac	5	No	NI	
6. _____				
7. _____				
	55	= Total Cover		
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Bromus inermis</u> / Smooth brome, Smooth brome, Hungarian	70	Yes	UPL	
2. <u>Cirsium arvense</u> / Canada thistle	10	No	FACU	
3. <u>Daucus carota</u> / Carrot, Carrot, Queen anne's lace	10	No	UPL	
4. <u>Cichorium intybus</u> / Chicory	10	No	FACU	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
	100	= Total Cover		
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. <u>Parthenocissus quinquefolia</u> / Virginia creeper	10	Yes	FACU	
2. <u>Vitis riparia</u> / River-bank grape	10	Yes	FAC	
3. _____				
4. _____				
	20	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 22.2 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>20</u>	x 3 = <u>60</u>
FACU species <u>80</u>	x 4 = <u>320</u>
UPL species <u>95</u>	x 5 = <u>475</u>
Column Totals: <u>195</u> (A)	<u>855</u> (B)

Prevalence Index = B/A = 4.38

Hydrophytic Vegetation Indicators:

 1 - Rapid Test for Hydrophytic Vegetation

 2 - Dominance Test is >50%

 3 - Prevalence Index ≤3.0¹

 4 - Morphological Adaptations¹ (Provide supporting Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No X

Remarks: (Explain alternative procedures here or in a separate report.)

SOIL

Sampling Point: USP.1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (F21)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes No X

Remarks:

Project/Site:	1268 Highland Road		City/County:	Hartland/Livingston County		Sampling Date:	05/03/2023	
Applicant/Owner:	Allen Edwin Homes			State:	Michigan	Sampling Point:	USPA	
Investigator(s):	B.Guevara; Fishbeck		Section, Township, Range:	S26, Hartland Twp (T3N, R6E)				
Landform (hillslope, terrace, etc):	Hillside	Local relief (concave, convex, none):	convex			Slope (%):	5-8	
Subregion (LRR or MLRA):	LRR L	Lat:	42.63388783	Long:	-83.708609	Datum:	WGS 1984	
Soil Map Unit Name:	Bronson loamy sand, 0 to 2 percent slopes (BwA)			NWI classification:	None			
Are climatic / hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain in Remarks.)								
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed?				Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic?				(If needed, explain any answers in Remarks.)				

Hydrophytic Vegetation Present?	Yes _____	No <u> X </u>	Is the Sampled Area within a Wetland? Yes _____ No <u> X </u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u> X </u>	
Wetland Hydrology Present?	Yes _____	No <u> X </u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Moss Trim Lines (B16)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		<input type="checkbox"/> Microtopographic Relief (D4)	
		<input type="checkbox"/> FAC-Neutral Test (D5)	

Field Observations:			
Surface Water Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <input type="text"/>
Water Table Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <input type="text"/>
Saturation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <input type="text"/>
(includes capillary fringe)			

Wetland Hydrology Present?	
Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

Remarks:

VEGETATION - Use scientific names of plants.

 Sampling Point: USP.A

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <i>Carya ovata</i> / Shag-bark hickory	10	Yes	FACU	
2. <i>Prunus serotina</i> / Black cherry	10	Yes	FACU	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
	20	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15'</u> radius)				
1. <i>Rhus typhina</i> / Staghorn sumac	40	Yes	UPL	
2. <i>Elaeagnus umbellata</i> / Autumn olive	20	Yes	UPL	
3. <i>Lonicera tatarica</i> / Tatarian honeysuckle	15	Yes	FACU	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
	75	= Total Cover		
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <i>Bromus inermis</i> / Smooth brome, Smooth brome, Hungarian	30	Yes	UPL	
2. <i>Poa compressa</i> / Canada blue grass, Canadian blue grass	25	Yes	FACU	
3. <i>Poa pratensis</i> / Kentucky blue grass	25	Yes	FACU	
4. <i>Verbascum thapsus</i> / Woolly mullein	15	No	UPL	
5. <i>Taraxacum officinale</i> / Red seeded dandelion, Common dan	10	No	FACU	
6. <i>Barbarea vulgaris</i> / Yellow rocket	10	No	FAC	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
	115	= Total Cover		
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>95</u>	x 4 = <u>380</u>
UPL species <u>105</u>	x 5 = <u>525</u>
Column Totals: <u>210</u> (A)	<u>935</u> (B)

Prevalence Index = B/A = 4.45

Hydrophytic Vegetation Indicators:

 1 - Rapid Test for Hydrophytic Vegetation

 2 - Dominance Test is >50%

 3 - Prevalence Index ≤3.0¹

 4 - Morphological Adaptations¹ (Provide supporting Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No X

Remarks: (Explain alternative procedures here or in a separate report.)

SOIL

Sampling Point: USP.A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**

- ☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (F21)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Roots

Depth (inches): 6

Hydric Soil Present? Yes No X

Remarks:

Project/Site:	1268 Highland Road		City/County:	Hartland/Livingston County		Sampling Date:	05/03/2023	
Applicant/Owner:	Allen Edwin Homes			State:	Michigan	Sampling Point:	USP.B	
Investigator(s):	B.Guevara; Fishbeck		Section, Township, Range:	S26, Hartland Twp (T3N, R6E)				
Landform (hillslope, terrace, etc):	Hillside	Local relief (concave, convex, none):	convex			Slope (%):	5-6	
Subregion (LRR or MLRA):	LRR L	Lat:	42.63097783	Long:	-83.70842433	Datum:	WGS 1984	
Soil Map Unit Name:	Boyer-Oshtemo loamy sands, 2 to 6 percent slopes (BtB)				NWI classification:	None		
Are climatic / hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain in Remarks.)								
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed?				Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic?				(If needed, explain any answers in Remarks.)				

Hydrophytic Vegetation Present?	Yes _____	No <u> X </u>	Is the Sampled Area within a Wetland? Yes _____ No <u> X </u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u> X </u>	
Wetland Hydrology Present?	Yes _____	No <u> X </u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Moss Trim Lines (B16)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		<input type="checkbox"/> Microtopographic Relief (D4)	
		<input type="checkbox"/> FAC-Neutral Test (D5)	

Field Observations:			
Surface Water Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <input type="text"/>
Water Table Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <input type="text"/>
Saturation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Depth (inches): <input type="text"/>
(includes capillary fringe)			

Wetland Hydrology Present?	
Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

Remarks:

VEGETATION - Use scientific names of plants.

 Sampling Point: USP.B

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30'</u> radius)			
1. <i>Tilia americana</i> / American basswood	30	Yes	FACU
2. <i>Quercus rubra</i> / Northern red oak	20	Yes	FACU
3. <i>Quercus velutina</i> / Black oak	10	No	NI
4. <i>Carya ovata</i> / Shag-bark hickory	5	No	FACU
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	65	= Total Cover	
Sapling/Shrub Stratum (Plot size: <u>15'</u> radius)			
1. <i>Prunus virginiana</i> / Chokecherry	20	Yes	FACU
2. <i>Ostrya virginiana</i> / Eastern hop-hornbeam	15	Yes	FACU
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	35	= Total Cover	
Herb Stratum (Plot size: <u>5'</u> radius)			
1. <i>Erythronium rostratum</i> / Yellow trout-lily	35	Yes	NI
2. <i>Carex pensylvanica</i> / Pennsylvania sedge	20	Yes	UPL
3. <i>Podophyllum peltatum</i> / May-apple	20	Yes	FACU
4. <i>Cardamine concatenata</i> / Cut-leaf toothwort	10	No	FACU
5. <i>Carya cordiformis</i> / Bitter-nut hickory	5	No	FAC
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
	90	= Total Cover	
Woody Vine Stratum (Plot size: <u>30'</u> radius)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	0	= Total Cover	

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

 Total Number of Dominant Species Across All Strata: 7 (B)

 Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	<u>0</u>	x 1 =	<u>0</u>
FACW species	<u>0</u>	x 2 =	<u>0</u>
FAC species	<u>5</u>	x 3 =	<u>15</u>
FACU species	<u>120</u>	x 4 =	<u>480</u>
UPL species	<u>65</u>	x 5 =	<u>325</u>
Column Totals:	<u>190</u>	(A)	<u>820</u> (B)

Prevalence Index = B/A = 4.32

Hydrophytic Vegetation Indicators:
 ___ 1 - Rapid Test for Hydrophytic Vegetation
 ___ 2 - Dominance Test is >50%
 ___ 3 - Prevalence Index ≤3.0¹
 ___ 4 - Morphological Adaptations¹ (Provide supporting Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Explain alternative procedures here or in a separate report.)

SOIL

Sampling Point: USP.B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**

Indicators for Problematic Hydric Soils³:

- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (F21)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes No X

Remarks:

Project/Site:	1268 Highland Road	City/County:	Hartland/Livingston County	Sampling Date:	05/03/2023
Applicant/Owner:	Allen Edwin Homes	State:	Michigan	Sampling Point:	USP.C
Investigator(s):	B.Guevara; Fishbeck	Section, Township, Range:	S26, Hartland Twp (T3N, R6E)		
Landform (hillslope, terrace, etc):	Hillside	Local relief (concave, convex, none):	convex	Slope (%):	4-6
Subregion (LRR or MLRA):	LRR L	Lat:	42.630889	Long:	-83.70393283
		Datum:	WGS 1984		
Soil Map Unit Name:	Fox sandy loam, 0 to 2 percent slopes (FoA)	NWI classification:	None		
Are climatic / hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain in Remarks.)					
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> significantly disturbed?			Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic?			(If needed, explain any answers in Remarks.)		

Hydrophytic Vegetation Present?	Yes _____	No <u> X </u>	Is the Sampled Area within a Wetland? Yes _____ No <u> X </u> If yes, optional Wetland Site ID: _____
Hydric Soil Present?	Yes _____	No <u> X </u>	
Wetland Hydrology Present?	Yes _____	No <u> X </u>	
Remarks: (Explain alternative procedures here or in a separate report.)			

Wetland Hydrology Indicators:		
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Surface Water Present?	Yes	<u> </u>	No	<u> X </u>	Depth (inches):	<u> </u>
Water Table Present?	Yes	<u> </u>	No	<u> X </u>	Depth (inches):	<u> </u>
Saturation Present?	Yes	<u> </u>	No	<u> X </u>	Depth (inches):	<u> </u>
(includes capillary fringe)						

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

VEGETATION - Use scientific names of plants.

Sampling Point: USP.C

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <i>Tilia americana</i> / American basswood	30	Yes	FACU	
2. <i>Prunus serotina</i> / Black cherry	15	Yes	FACU	
3. <i>Quercus rubra</i> / Northern red oak	10	No	FACU	
4. <i>Acer rubrum</i> / Red maple	10	No	FAC	
5. <i>Acer negundo</i> / Boxelder, Box elder	5	No	FAC	
6. _____				
7. _____				
	70	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15'</u> radius)				
1. <i>Zanthoxylum americanum</i> / Toothachetree	20	Yes	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
	20	= Total Cover		
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <i>Podophyllum peltatum</i> / May-apple	20	Yes	FACU	
2. <i>Carex pensylvanica</i> / Pennsylvania sedge	20	Yes	NI	
3. <i>Taraxacum officinale</i> / Red seeded dandelion, Common dan	15	Yes	FACU	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
	55	= Total Cover		
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. <i>Parthenocissus quinquefolia</i> / Virginia creeper	15	Yes	FACU	
2. _____				
3. _____				
4. _____				
	15	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>125</u>	x 4 = <u>500</u>
UPL species <u>20</u>	x 5 = <u>100</u>
Column Totals: <u>160</u>	(A) <u>645</u> (B)

Prevalence Index = B/A = 4.03

Hydrophytic Vegetation Indicators:

 1 - Rapid Test for Hydrophytic Vegetation

 2 - Dominance Test is >50%

 3 - Prevalence Index ≤3.0¹

 4 - Morphological Adaptations¹ (Provide supporting Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No X

Remarks: (Explain alternative procedures here or in a separate report.)

SOIL

Sampling Point: USP.C

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**

- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (F21)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes No X

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: 1268 Highland Road City/County: Hartland/Livingston County Sampling Date: 05/03/2023
 Applicant/Owner: Allen Edwin Homes State: Michigan Sampling Point: WSP.A
 Investigator(s): B.Guevara; Fishbeck Section, Township, Range: S26, Hartland Twp (T3N, R6E)
 Landform (hillslope, terrace, etc): Depression Local relief (concave, convex, none): concave Slope (%): 0-1
 Subregion (LRR or MLRA): LRR L Lat: 42.633886 Long: -83.70861067 Datum: WGS 1984
 Soil Map Unit Name: Bronson loamy sand, 0 to 2 percent slopes (BwA) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u> Hydric Soil Present? Yes <u>X</u> No <u> </u> Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u> If yes, optional Wetland Site ID: <u>Wetland A</u>
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>1</u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>5</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION - Use scientific names of plants.

 Sampling Point: WSP.A

Tree Stratum (Plot size: <u>30' radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15' radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
	0	= Total Cover		
Herb Stratum (Plot size: <u>5' radius</u>)				
1. <i>Typha angustifolia</i> / Narrow leaf cattail, Narrow-leaved cattail	30	Yes	OBL	
2. <i>Typha latifolia</i> / Broadleaf cattail, Broad-leaved cattail	30	Yes	OBL	
3. <i>Phalaris arundinacea</i> / Reed canary grass	20	No	FACW	
4. <i>Rumex crispus</i> / Curly dock	15	No	FAC	
5. <i>Lamium purpureum</i> / Purple dead nettle	10	No	UPL	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
	105	= Total Cover		
Woody Vine Stratum (Plot size: <u>30' radius</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
	0	= Total Cover		

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

 Total Number of Dominant Species Across All Strata: 2 (B)

 Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	20	x 2 =	40
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	10	x 5 =	50
Column Totals:	105	(A)	195 (B)

Prevalence Index = B/A = 1.86

Hydrophytic Vegetation Indicators:
☒ 1 - Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☒ 3 - Prevalence Index ≤3.0¹
☐ 4 - Morphological Adaptations¹ (Provide supporting Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: (Explain alternative procedures here or in a separate report.)

SOIL

Sampling Point: WSP.A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**

☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☒ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (F21)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: hard clay pan

Depth (inches): 8

Hydric Soil Present? Yes X No

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: 1268 Highland Road City/County: Hartland/Livingston County Sampling Date: 05/03/2023
 Applicant/Owner: Allen Edwin Homes State: Michigan Sampling Point: WSP.B
 Investigator(s): B.Guevara; Fishbeck Section, Township, Range: S26, Hartland Twp (T3N, R6E)
 Landform (hillslope, terrace, etc): Depression Local relief (concave, convex, none): concave Slope (%): 0-1
 Subregion (LRR or MLRA): LRR L Lat: 42.63222533 Long: -83.70804533 Datum: WGS 1984
 Soil Map Unit Name: Brady loamy sand, 0 to 2 percent slopes (BuA) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u> Hydric Soil Present? Yes <u>X</u> No <u> </u> Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u> If yes, optional Wetland Site ID: <u>Wetland B</u>
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0.5</u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>6</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>6</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION - Use scientific names of plants.

 Sampling Point: WSP.B

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30'</u> radius)			
1. <i>Populus deltoides</i> / Eastern cottonwood	20	Yes	FAC
2. <i>Salix nigra</i> / Black willow	10	Yes	OBL
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: <u>15'</u> radius)			
1. <i>Salix eriocephala</i> / Missouri willow	30	Yes	FACW
2. <i>Cornus racemosa</i> / Gray dogwood	15	Yes	FAC
3. <i>Cornus amomum</i> / Silky dogwood	15	Yes	FACW
4. <i>Salix interior</i> / Sandbar willow	15	Yes	FACW
5. <i>Rubus idaeus ssp. strigosus</i> / Grayleaf red raspberry	10	No	FAC
6. _____	_____	_____	_____
7. _____	_____	_____	_____
	85	= Total Cover	
Herb Stratum (Plot size: <u>5'</u> radius)			
1. <i>Phalaris arundinacea</i> / Reed canary grass	80	Yes	FACW
2. <i>Solidago gigantea</i> / Smooth goldenrod	15	No	FACW
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
	95	= Total Cover	
Woody Vine Stratum (Plot size: <u>30'</u> radius)			
1. <i>Toxicodendron radicans</i> / Eastern poison ivy	30	Yes	FAC
2. <i>Vitis riparia</i> / River-bank grape	30	Yes	FAC
3. _____	_____	_____	_____
4. _____	_____	_____	_____
	60	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 9 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>10</u>	x 1 = <u>10</u>
FACW species <u>155</u>	x 2 = <u>310</u>
FAC species <u>105</u>	x 3 = <u>315</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>270</u> (A)	<u>635</u> (B)

Prevalence Index = B/A = 2.35

Hydrophytic Vegetation Indicators:

 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index ≤3.0¹

 4 - Morphological Adaptations¹ (Provide supporting Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Explain alternative procedures here or in a separate report.)

SOIL

Sampling Point: WSP.B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**

☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
☐ Loamy Mucky Mineral (F1) **(LRR K, L)**
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☒ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (F21)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: 1268 Highland Road City/County: Hartland/Livingston County Sampling Date: 05/03/2023
 Applicant/Owner: Allen Edwin Homes State: Michigan Sampling Point: WSP.C
 Investigator(s): B.Guevara; Fishbeck Section, Township, Range: S26, Hartland Twp (T3N, R6E)
 Landform (hillslope, terrace, etc): Depression Local relief (concave, convex, none): concave Slope (%): 0-1
 Subregion (LRR or MLRA): LRR L Lat: 42.632167 Long: -83.70503717 Datum: WGS 1984
 Soil Map Unit Name: Carlisle muck, 0 to 2 percent slopes (CarabA) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u> Hydric Soil Present? Yes <u>X</u> No <u> </u> Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u> If yes, optional Wetland Site ID: <u>Wetland C</u>
Remarks: (Explain alternative procedures here or in a separate report.)	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>1</u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION - Use scientific names of plants.

 Sampling Point: WSP.C

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u> radius)				
1. <u>Salix amygdaloides / Peachleaf willow</u>	10	Yes	FACW	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
	10	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15'</u> radius)				
1. <u>Salix discolor / Pussy willow</u>	15	Yes	FACW	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
	15	= Total Cover		
Herb Stratum (Plot size: <u>5'</u> radius)				
1. <u>Carex lacustris / Lakebank sedge</u>	40	Yes	OBL	
2. <u>Phalaris arundinacea / Reed canary grass</u>	25	Yes	FACW	
3. <u>Typha angustifolia / Narrow leaf cattail, Narrow-leaved cattail</u>	20	No	OBL	
4. <u>Typha latifolia / Broadleaf cattail, Broad-leaved cattail</u>	20	No	OBL	
5. <u>Solidago gigantea / Smooth goldenrod</u>	10	No	FACW	
6. <u>Doellingeria umbellata / Parasol white-top</u>	5	No	FACW	
7. <u>Phragmites australis ssp. australis / European common reed</u>	5	No	FACW	
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
	125	= Total Cover		
Woody Vine Stratum (Plot size: <u>30'</u> radius)				
1. <u>Vitis riparia / River-bank grape</u>	10	Yes	FAC	
2. _____				
3. _____				
4. _____				
	10	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>80</u>	x 1 = <u>80</u>
FACW species <u>70</u>	x 2 = <u>140</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>160</u>	(A) <u>250</u> (B)

Prevalence Index = B/A = 1.56

Hydrophytic Vegetation Indicators:

 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index ≤3.0¹

 4 - Morphological Adaptations¹ (Provide supporting Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Explain alternative procedures here or in a separate report.)

SOIL

Sampling Point: WSP.C

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**

☐ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
☐ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
☒ Loamy Mucky Mineral (F1) **(LRR K, L)**
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (F21)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes X No

Remarks:

Attachment 4

Upland Habitats

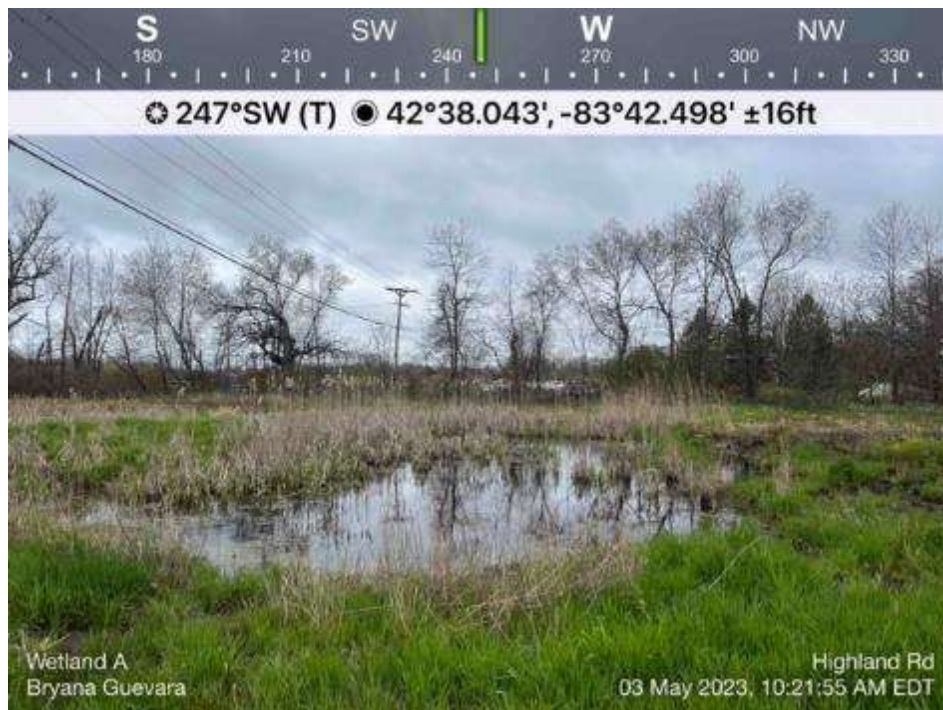


Typical Harvested Corn Field



Upland Forest

Wetland A: Emergent Wetland



Wetland A/Intermittent Streams



Wetland B: Farmed Portion



Wetland B: Roadside Ditch



Wetland B/Roadside ditch



Concrete pipe at Site's northwest corner.

Wetland C: Emergent/Forested Wetland



East-facing view of ditch within Wetland C

Typical Upland Soils



USP.A: Upland Sampling Point adjacent to Wetland A



USP.C: Upland Sampling Point adjacent to Wetland C

Wetland (Hydric) Soils



WSP.B: Wetland Sampling Point in Wetland B



WSP.C: Wetland Sampling Point in Wetland C

HIGHLAND RESERVE
SINGLE FAMILY RESIDENTIAL NEIGHBORHOOD
SAMPLE PORTFOLIO OF HOMES
8/10/23

The following plans represent a sample set of homes that may be constructed in the Highland Reserve Single Family Residential Neighborhood:

INTEGRITY 1250 - 1252 Square Foot Ranch
INTEGRITY 1530 - 1,526 Square Foot Ranch
INTEGRITY 1610 - 1,607 Square Foot Ranch
INTEGRITY 1810 - 1,822 Square Foot Two-Story
INTEGRITY 2000 - 2,022 Square Foot Two-Story
INTEGRITY 2060 - 2,060 Square Foot Bi-Level
INTEGRITY 2080 - 2,062 Square Foot Two-Story

integrity 1250

1,252 SF

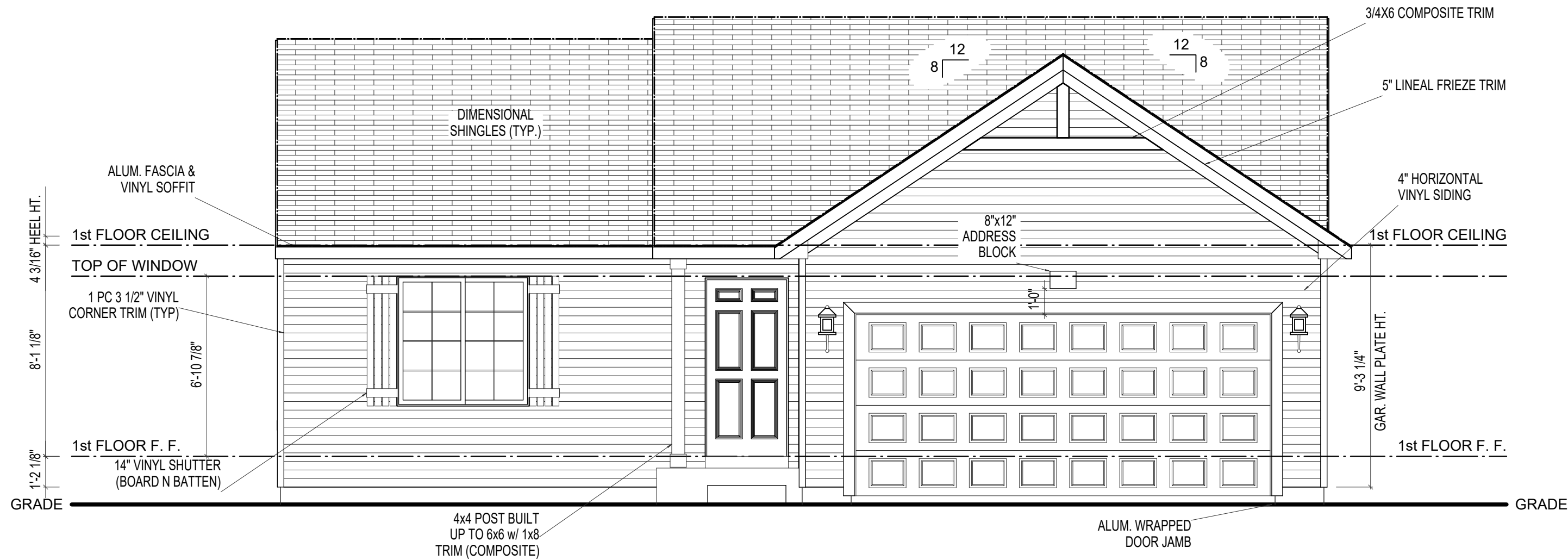
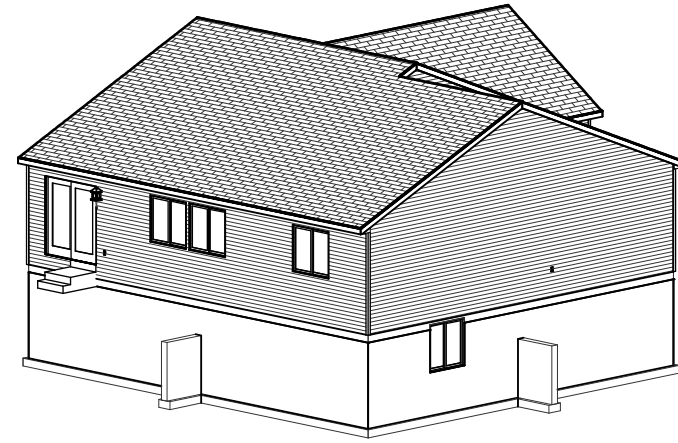
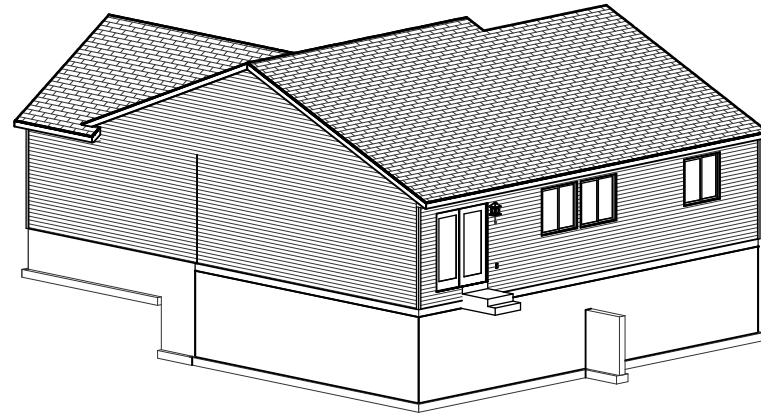
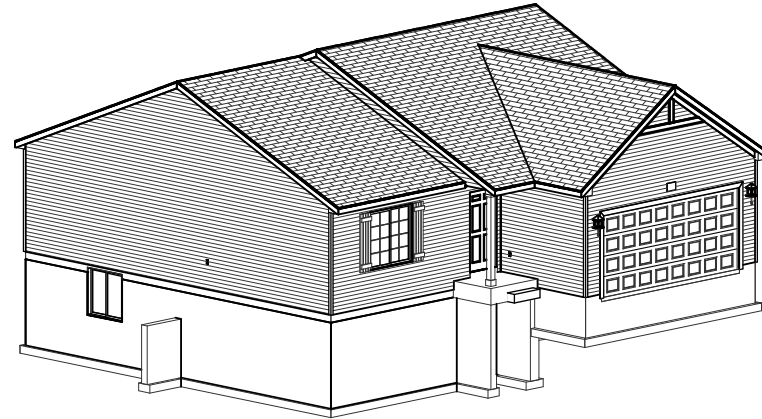
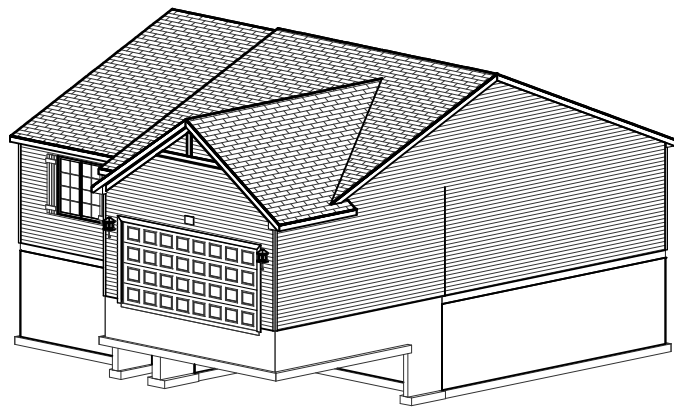
2-4 bedrooms

1-2 bathrooms

2-3 car attached garage



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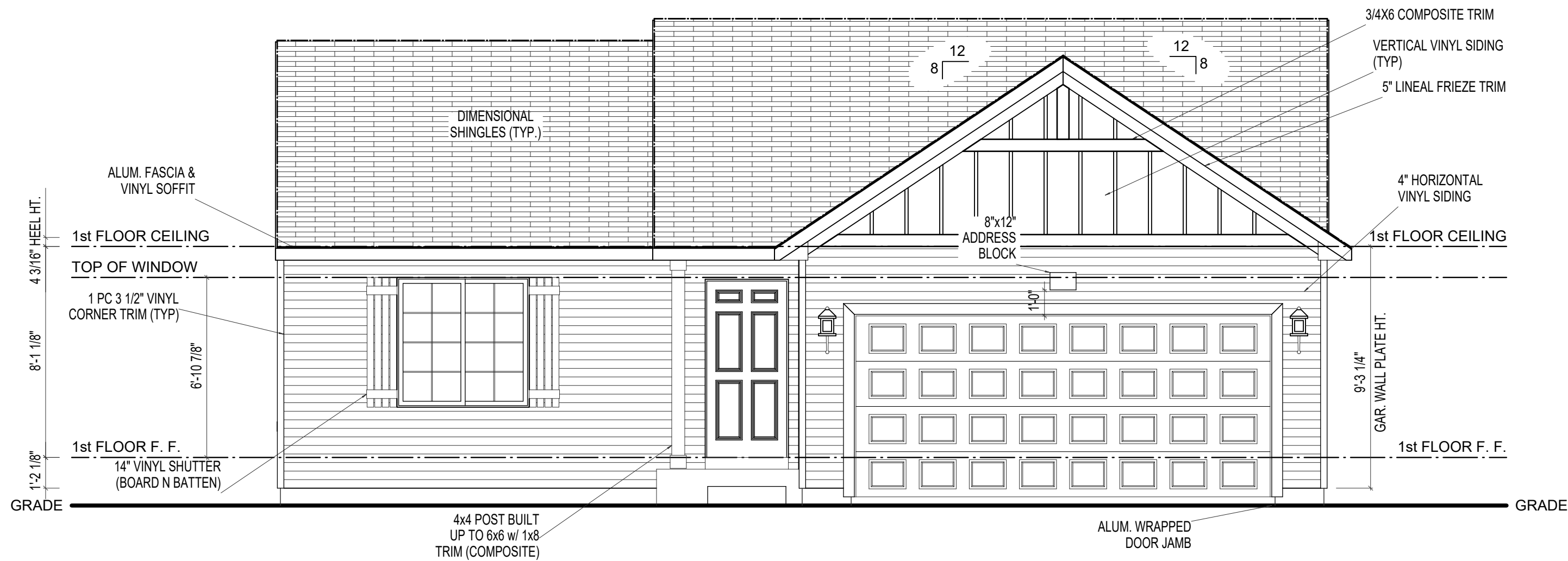
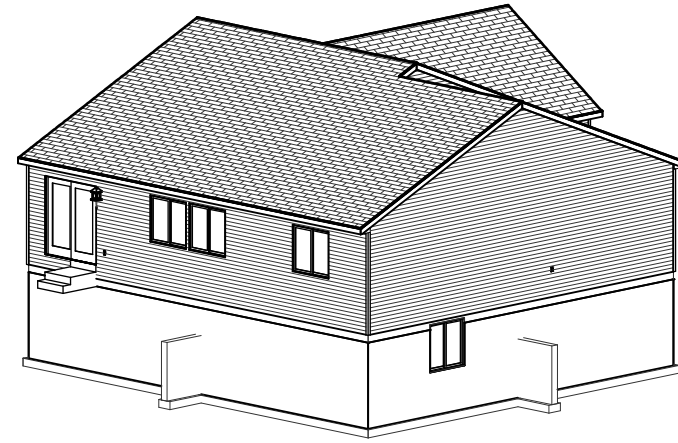
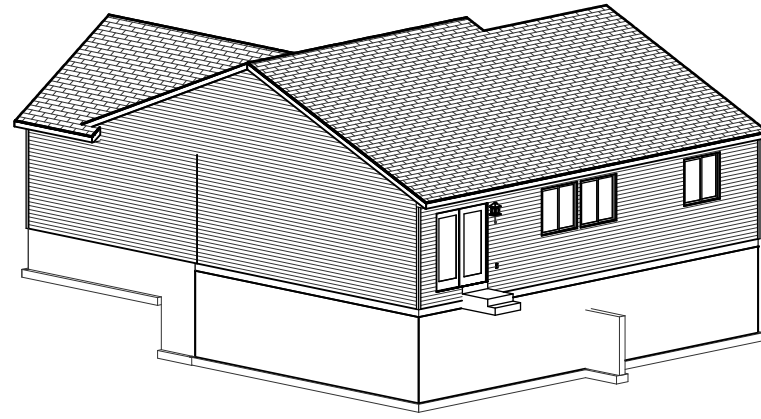
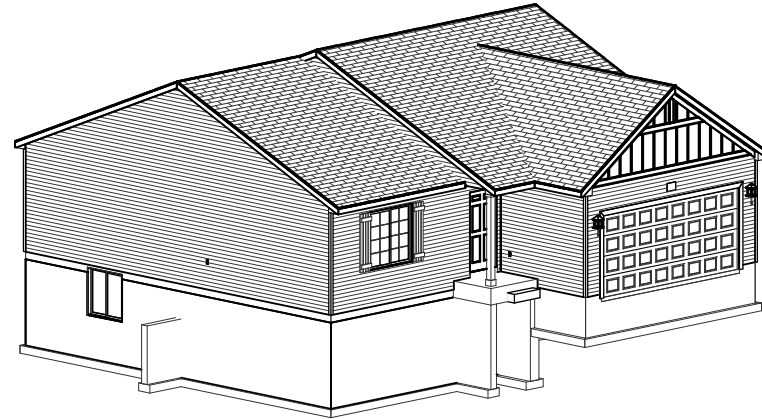
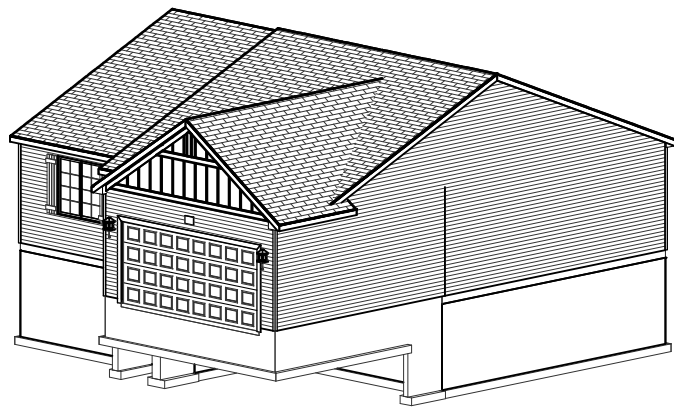
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FRONT ELEVATION A2

SCALE: 1/4"=1'-0"

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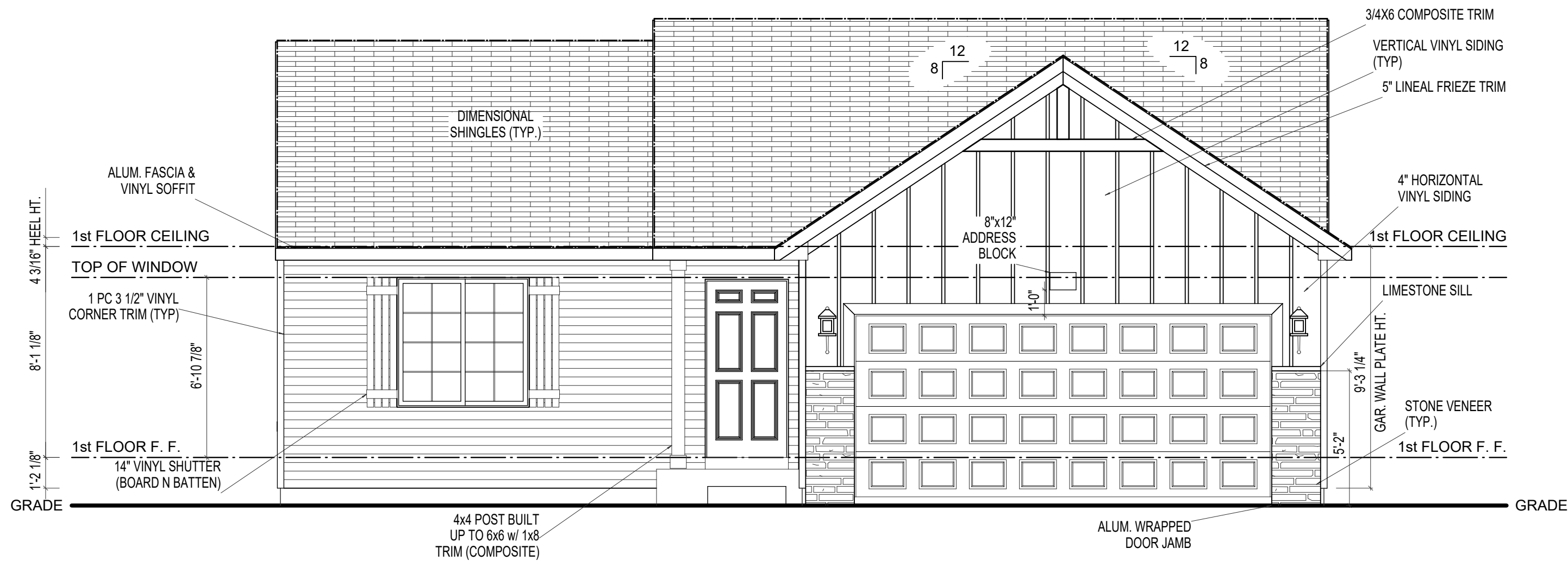
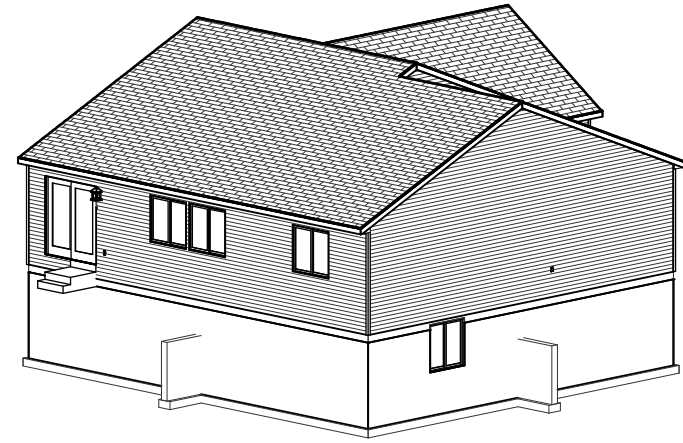
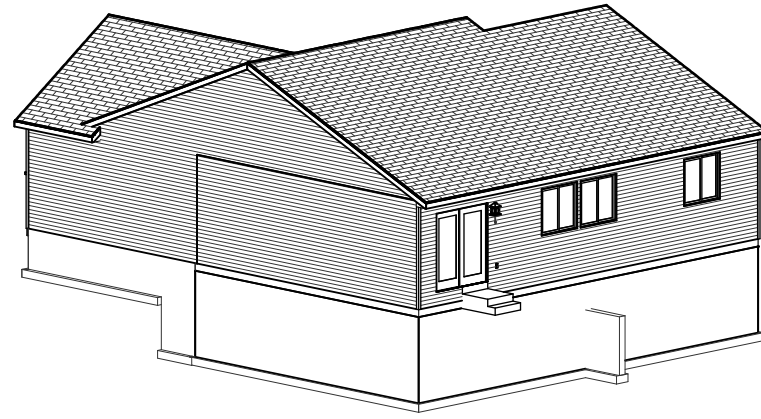
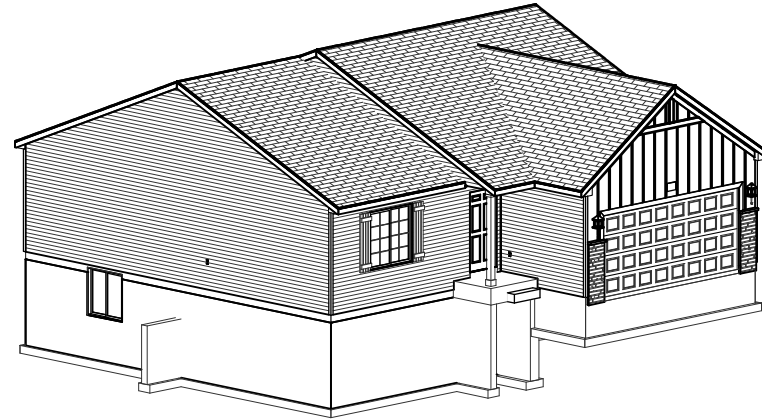
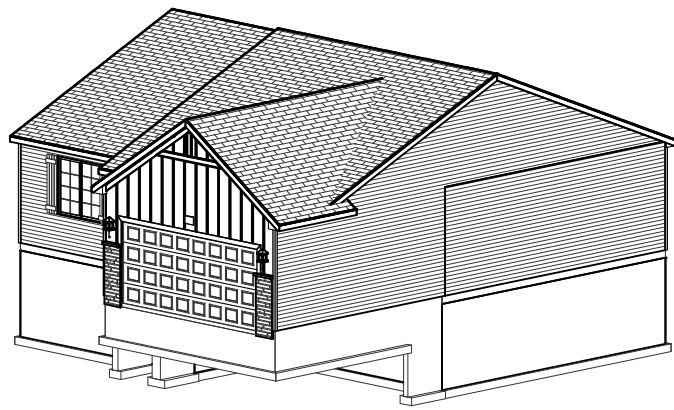
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FRONT ELEVATION A3

SCALE: 1/4"=1'-0"

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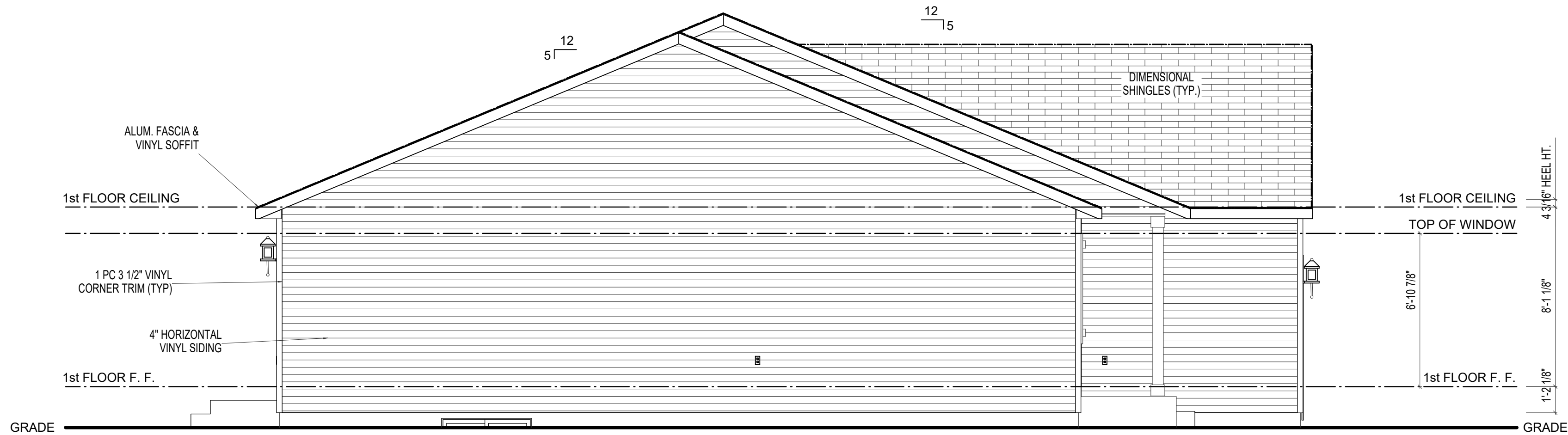
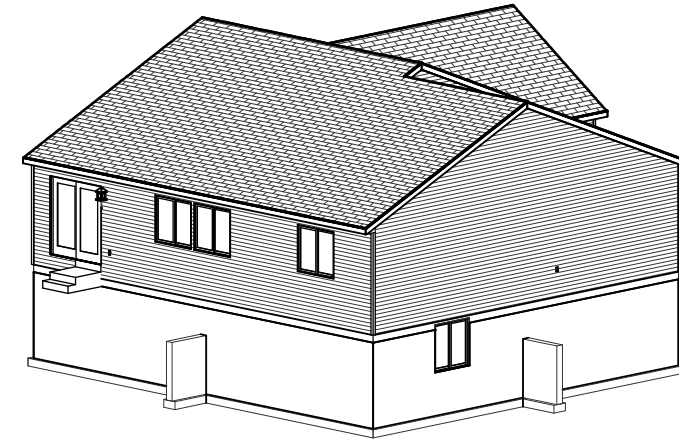
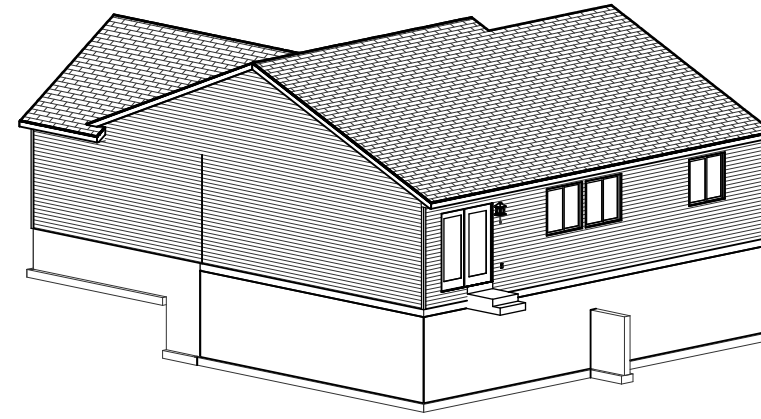
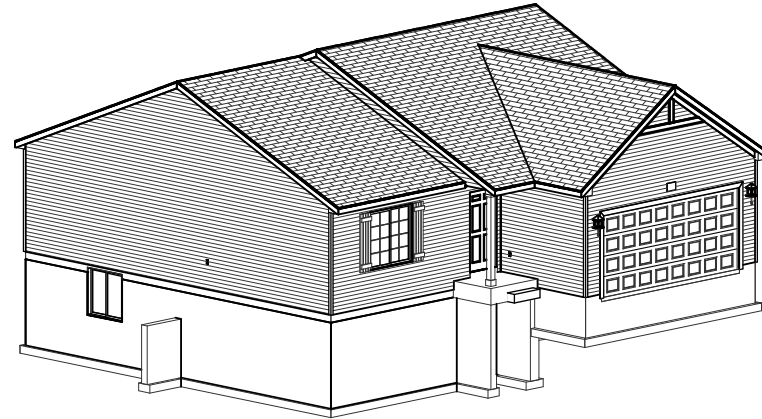
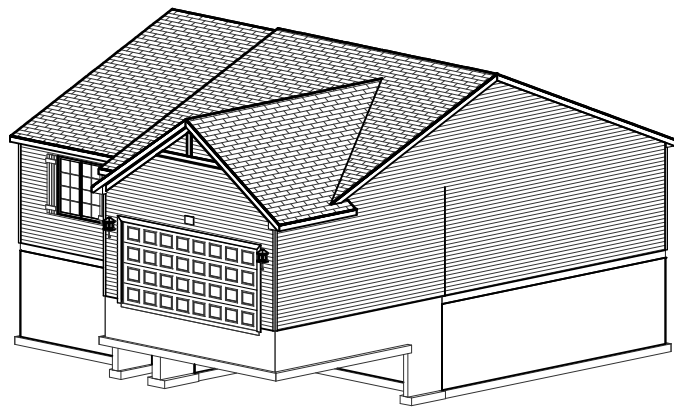
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LEFT ELEVATION A1

SCALE: 1/4"=1'-0"

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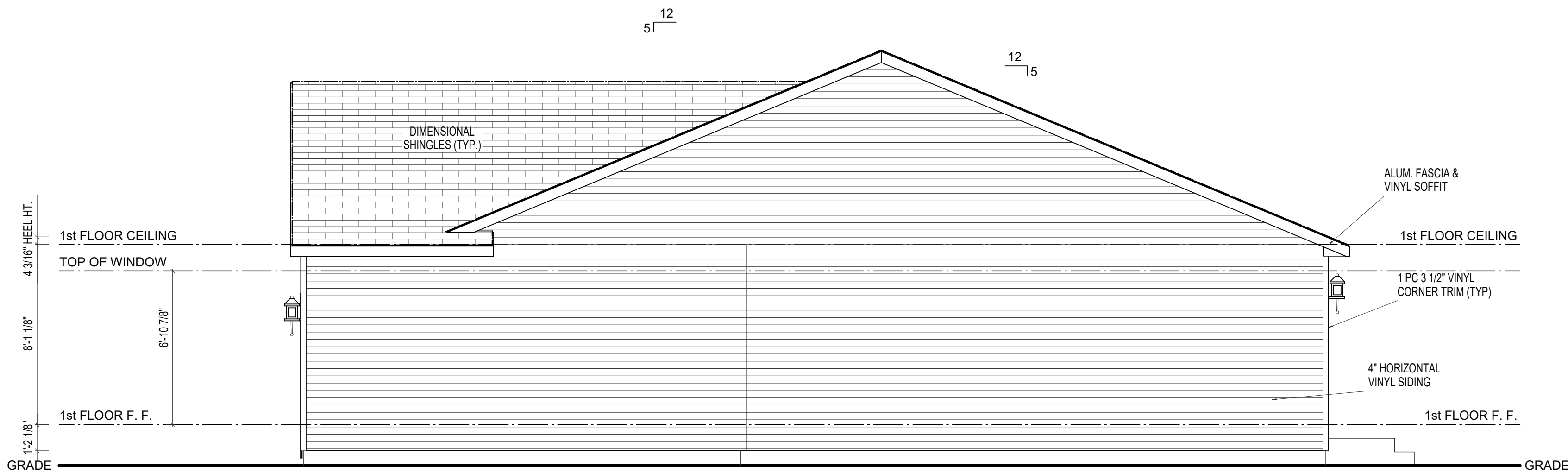
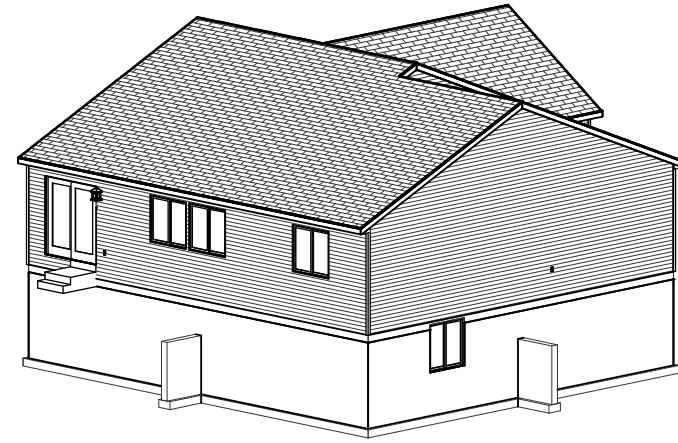
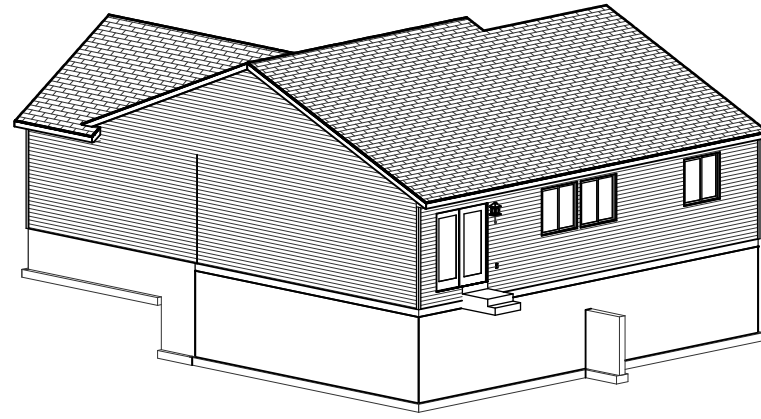
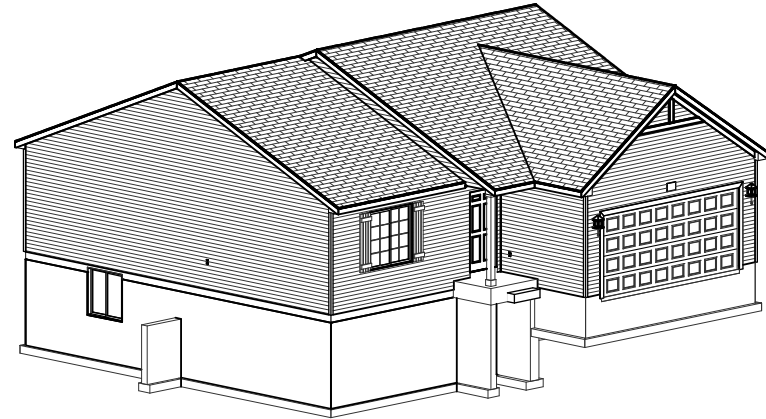
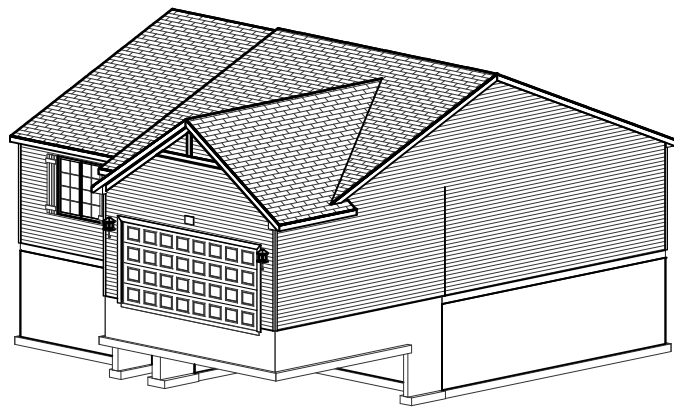
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LOCATION:

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A-02.00

297



RIGHT ELEVATION A1

SCALE: 1/4"=1'-0"

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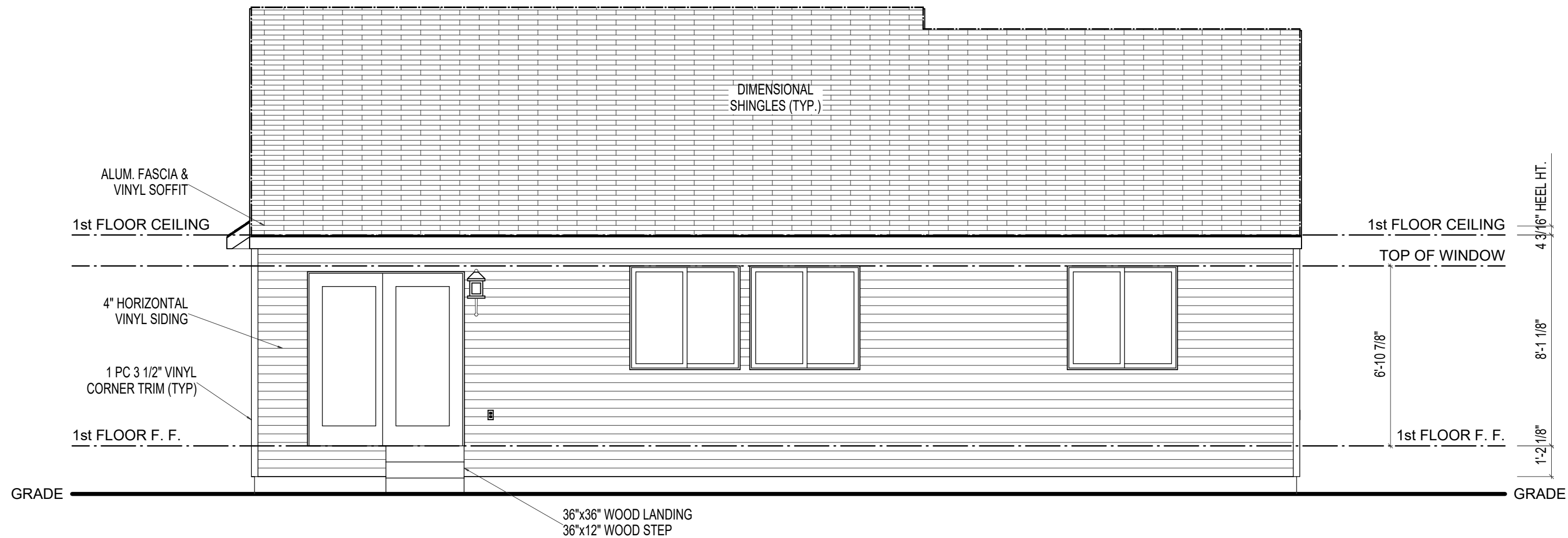
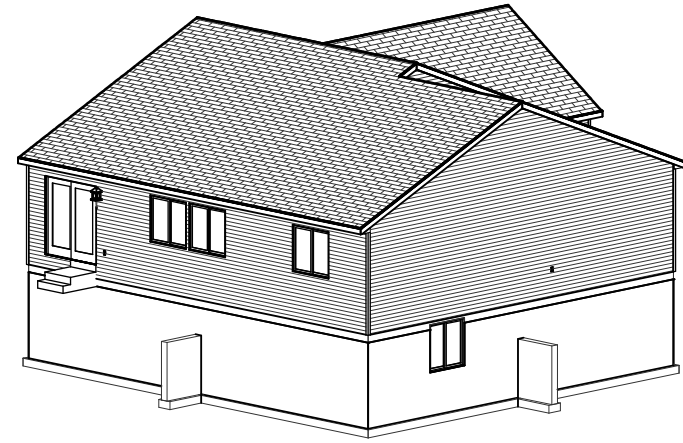
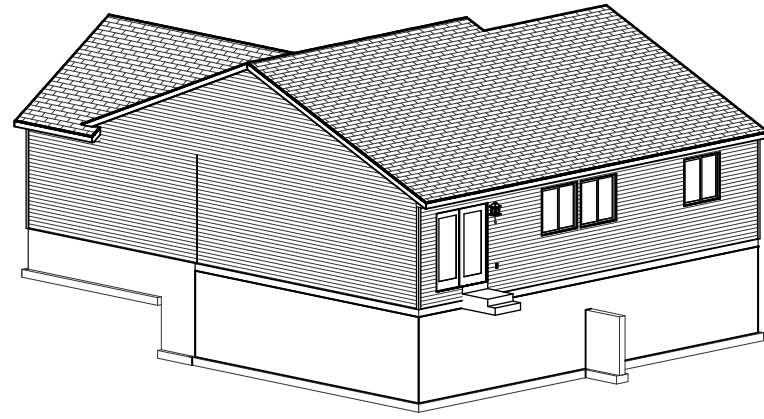
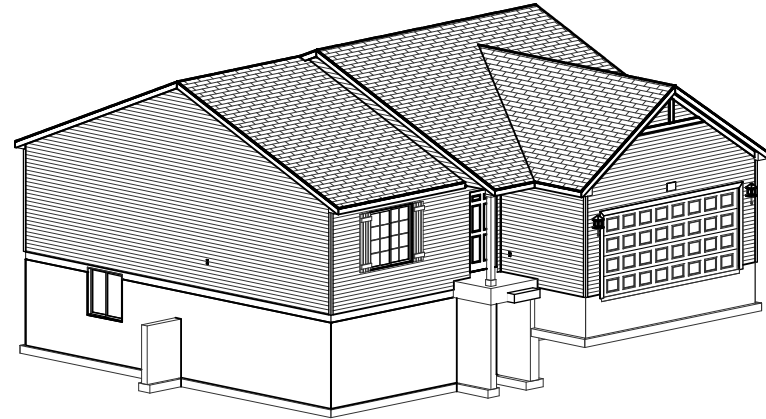
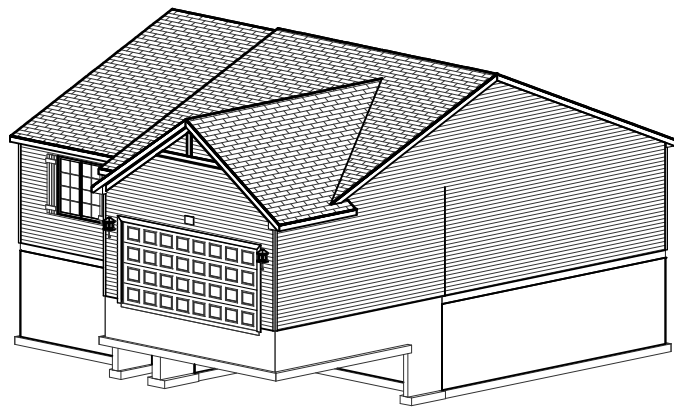
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REAR ELEVATION A1

SCALE: 1/4"=1'-0"

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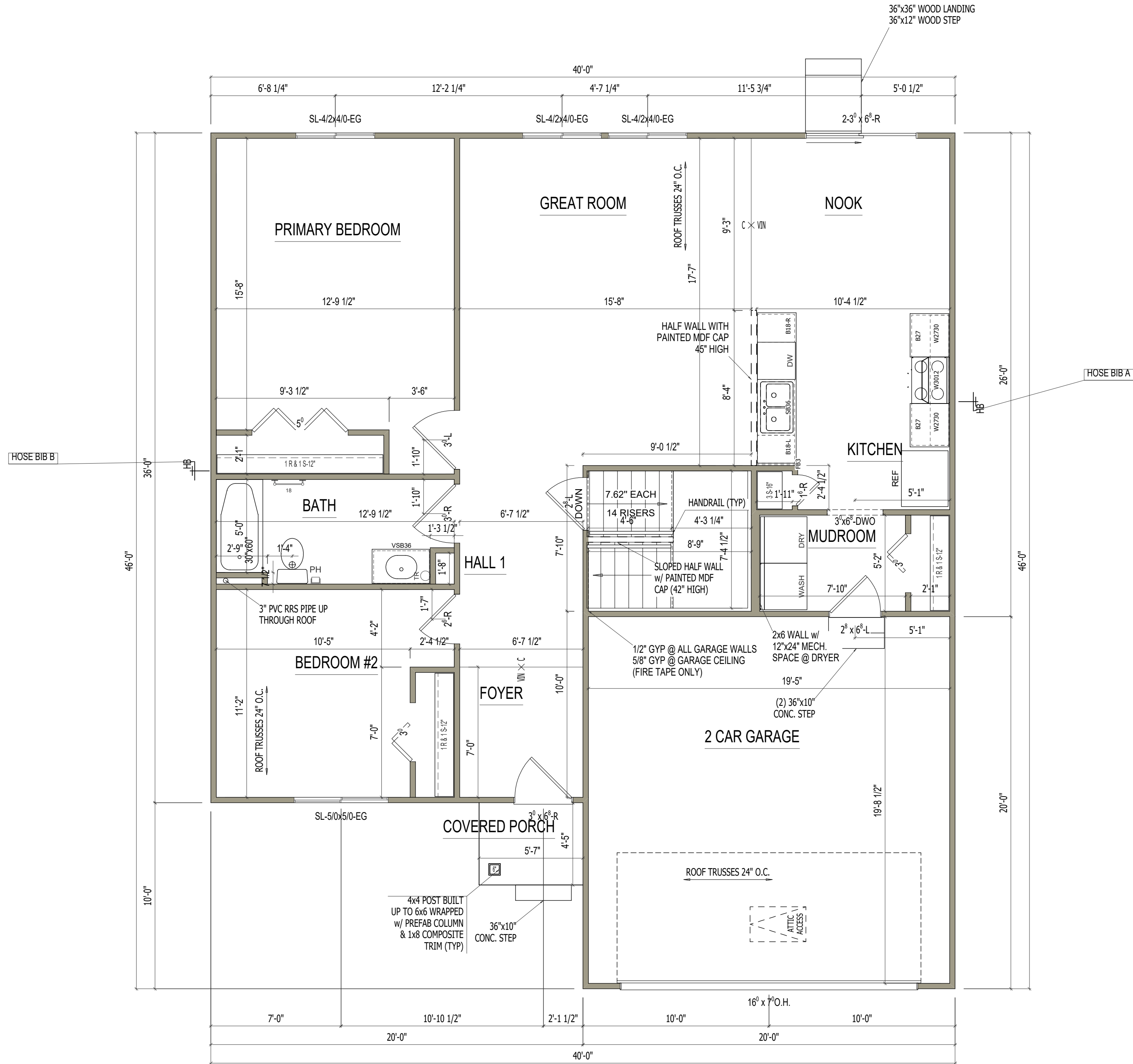
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FIRST FLOOR i1250

SCALE: 1/4"=1'-0"

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integrity 1530

1,526 SF

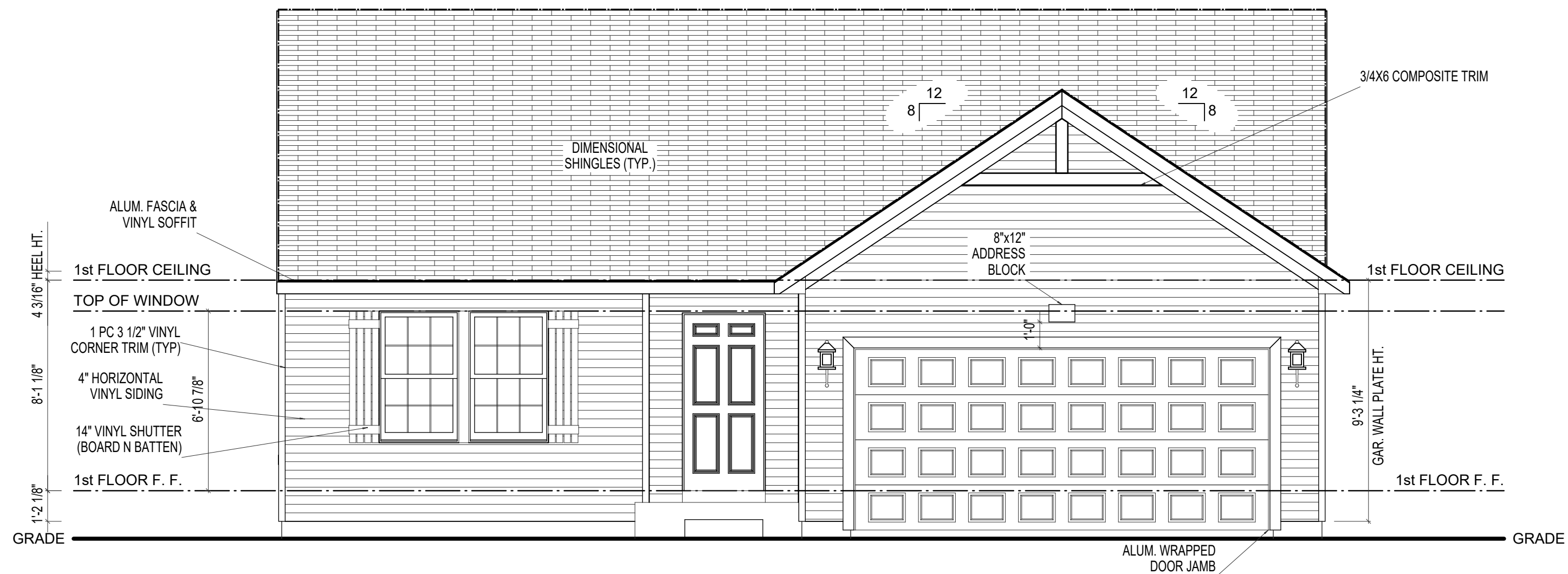
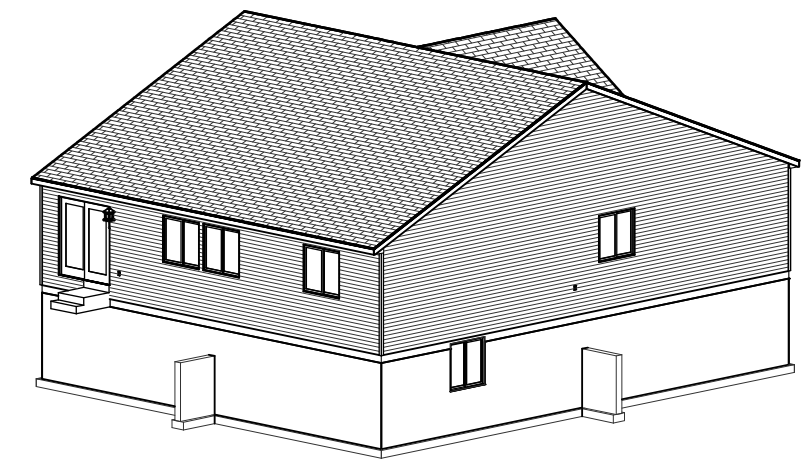
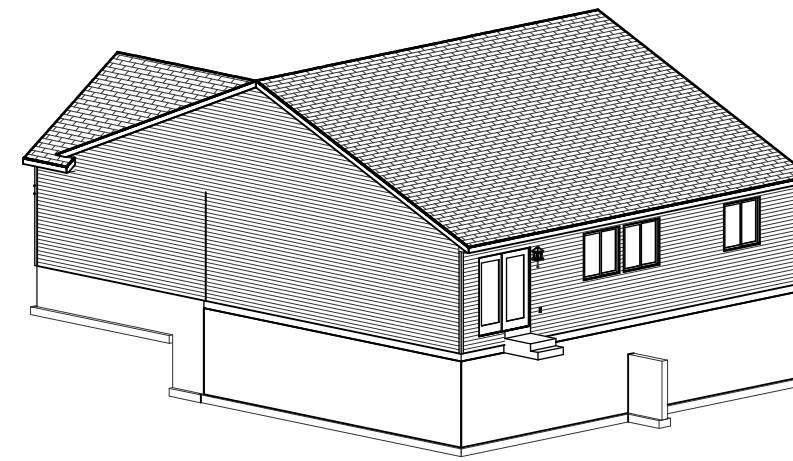
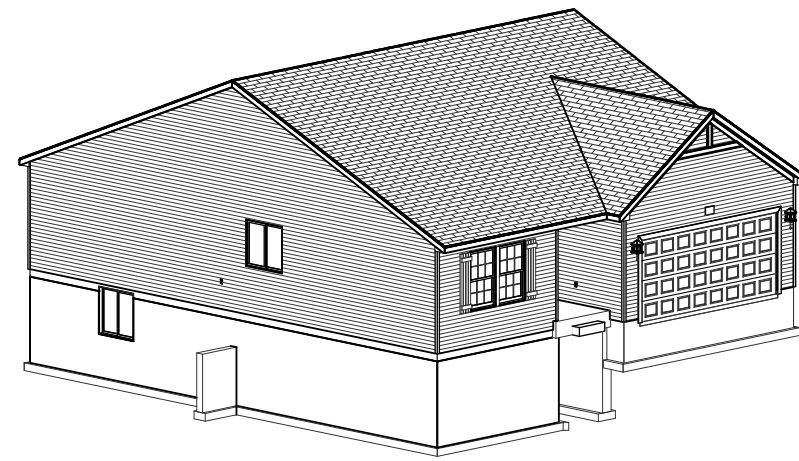
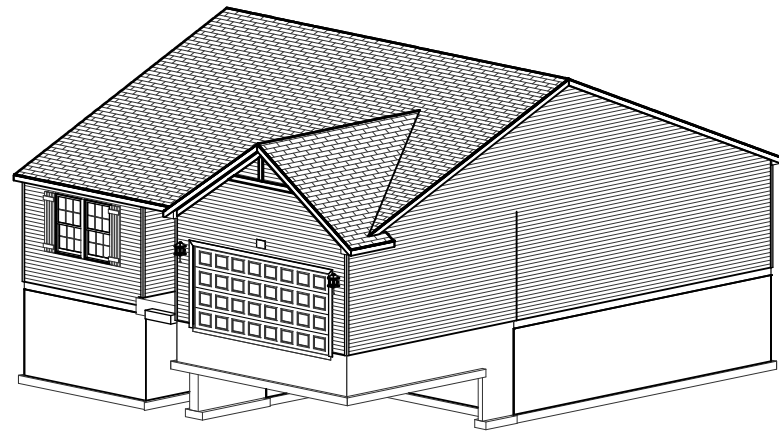
3-5 bedrooms

1-3 bathrooms

2-3 car attached garage



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FRONT ELEVATION A1

SCALE: 1/4"=1'-0"

1503

ELEVATION A1GARAGE RIGHT

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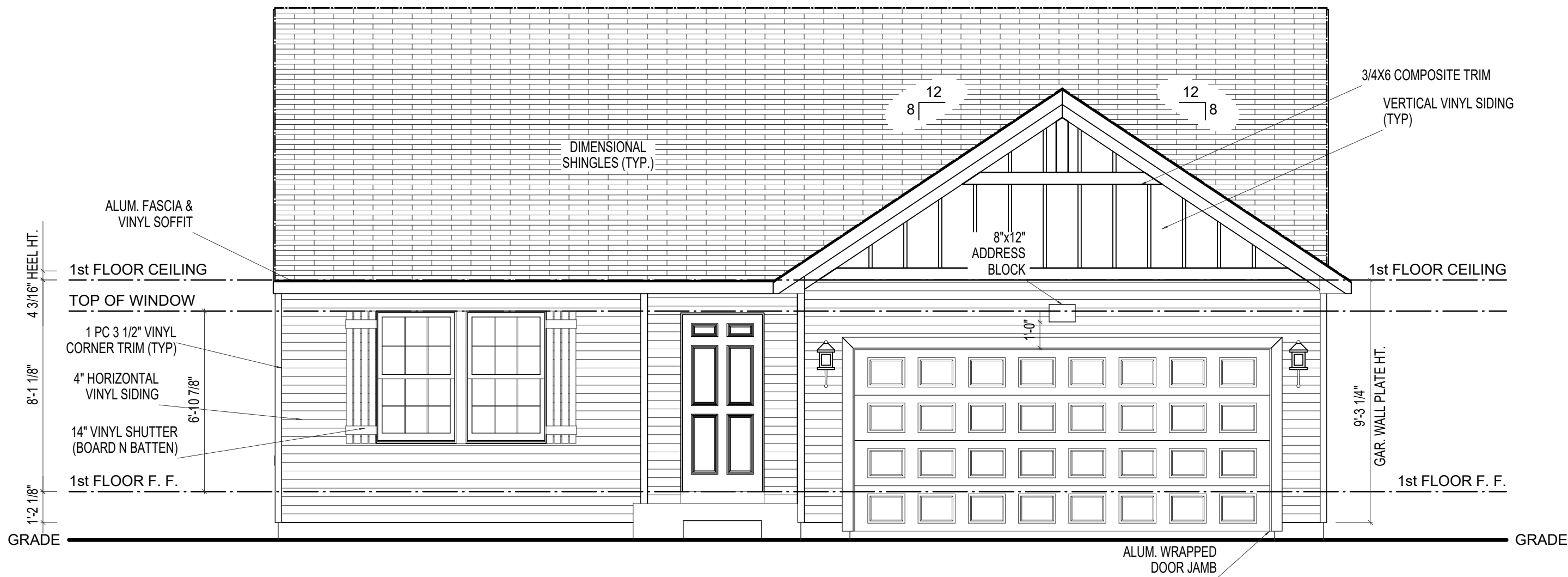
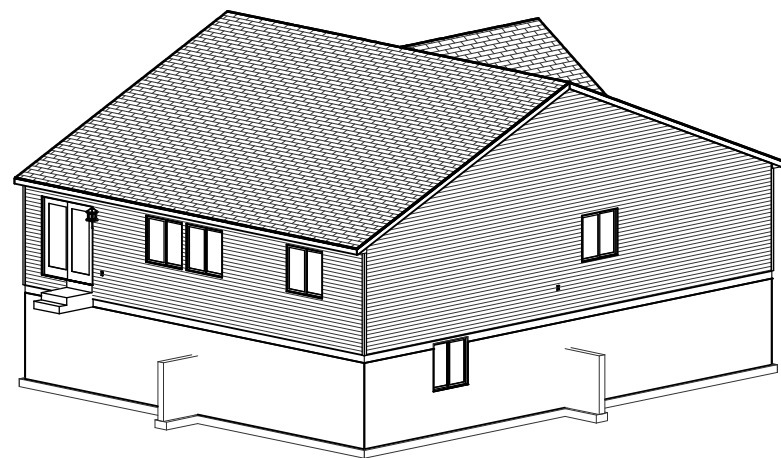
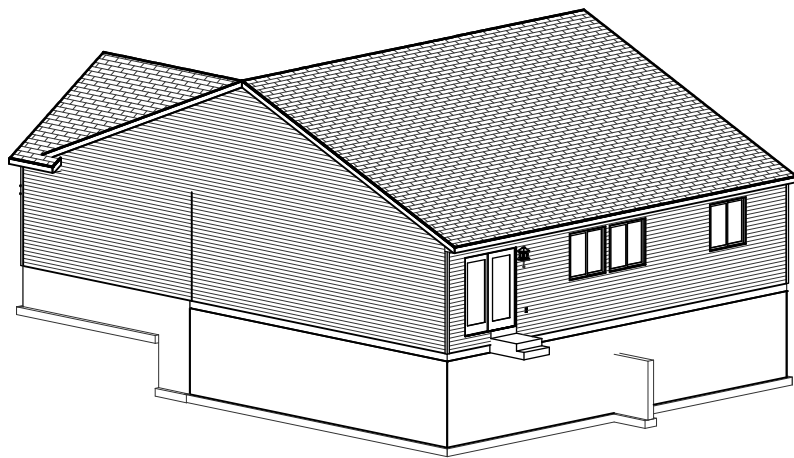
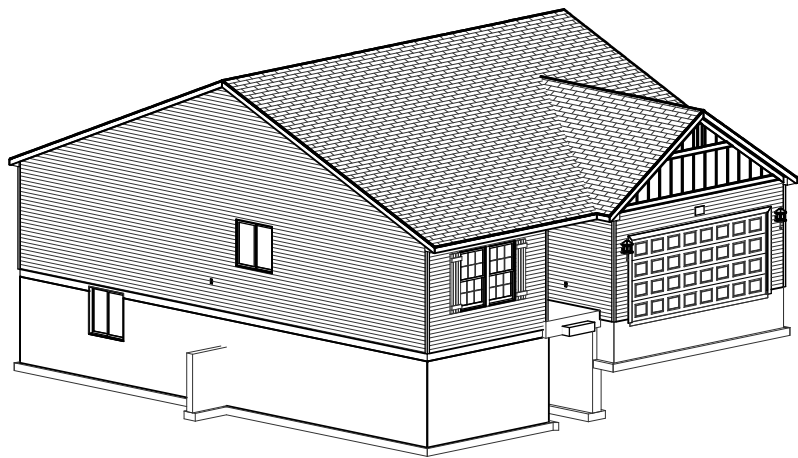
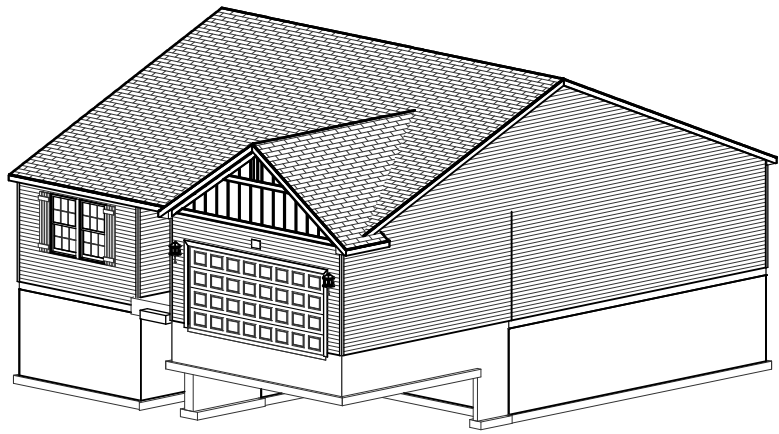
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FRONT ELEVATION A2

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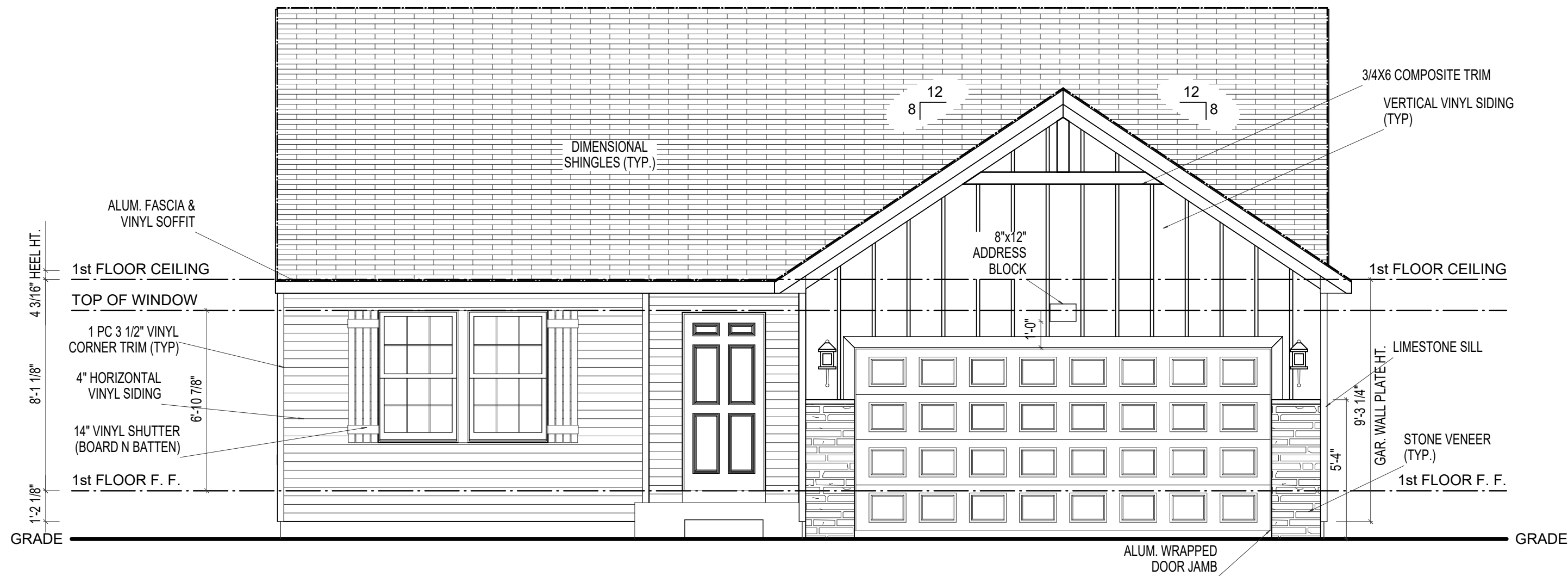
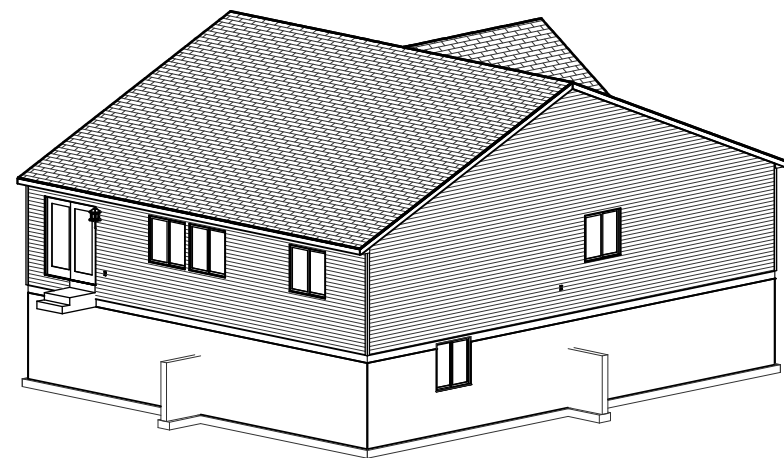
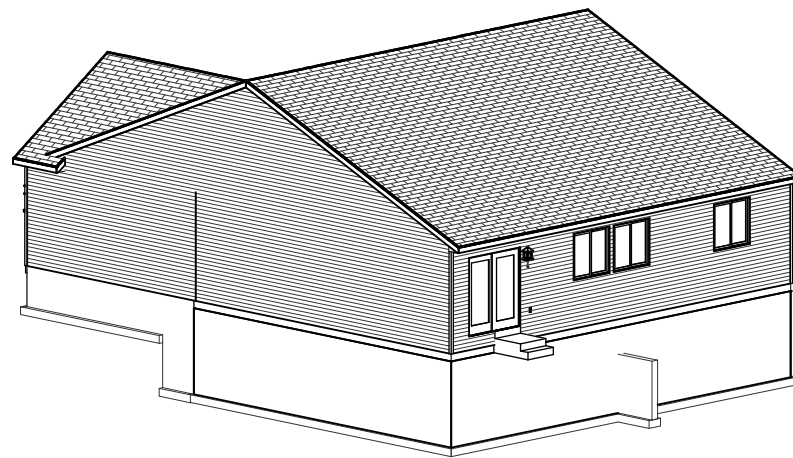
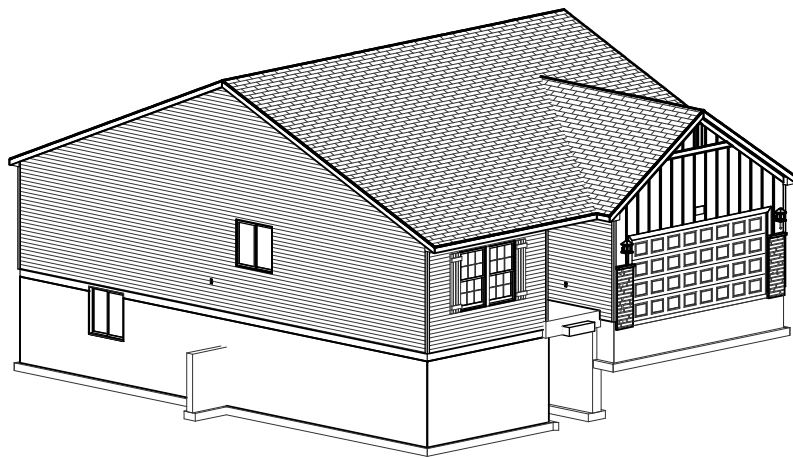
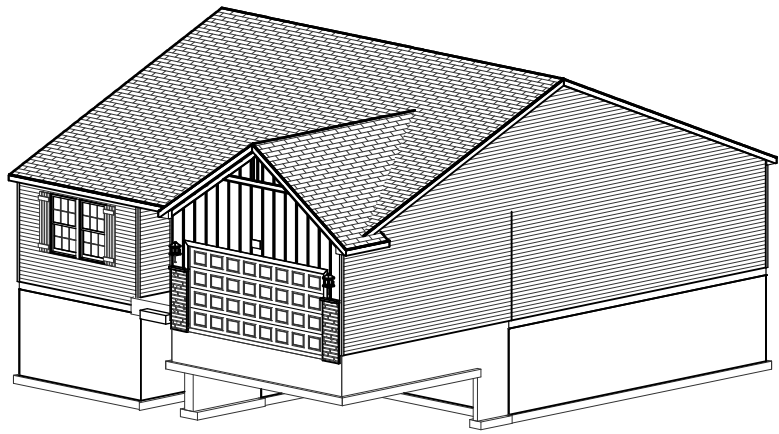
FOR:
Allen Edwin Homes

LOT #:

LOCATION:

SHEET NUMBER

A-01.04



FRONT ELEVATION A3

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

ELEVATION A1

GARAGE RIGHT

REVISION V8.0a

ALLEN EDWIN HOMES

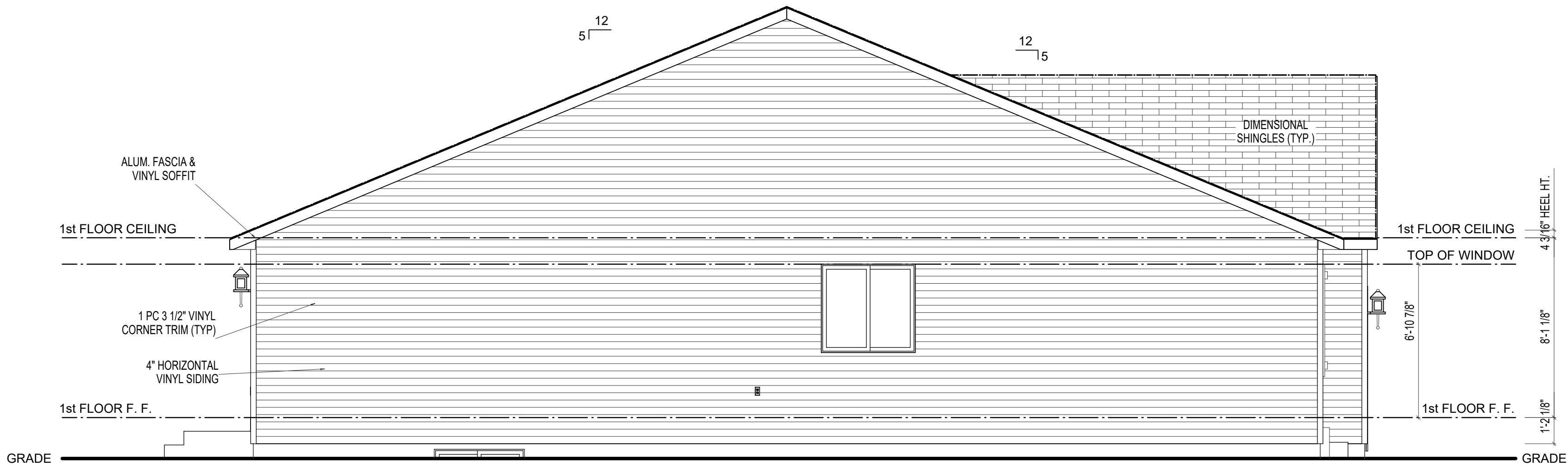
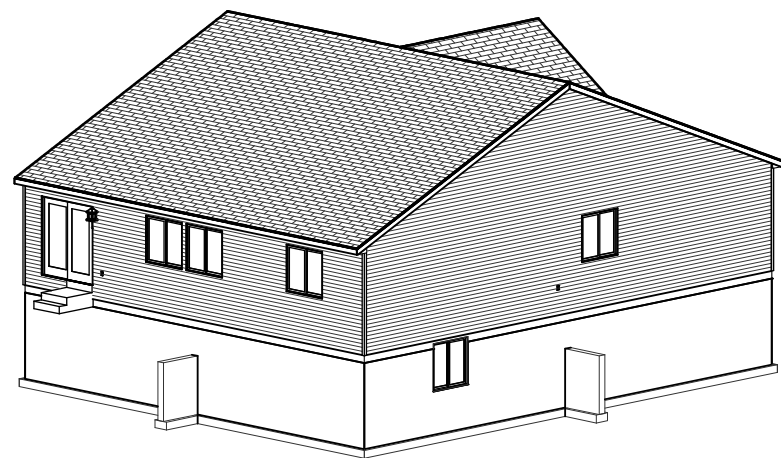
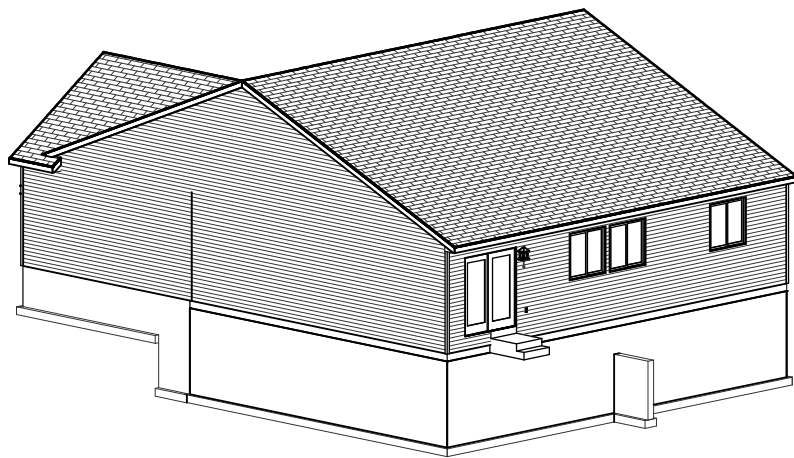
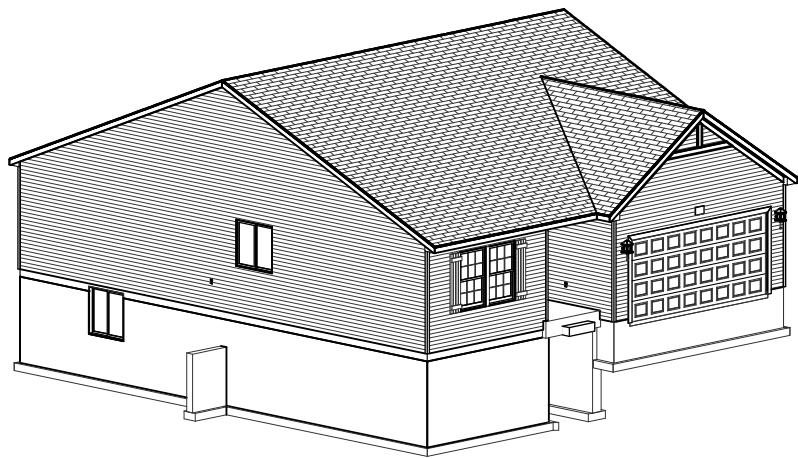
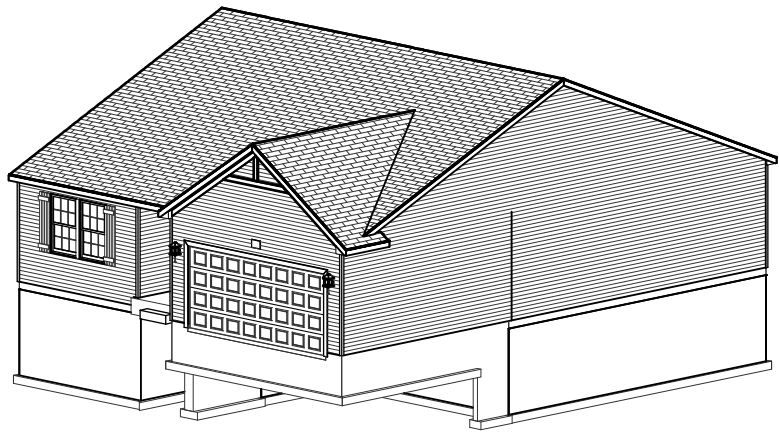
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05/25/2023

i1530
FOR: Allen Edwin Homes
LOT #:
LOCATION:

SHEET NUMBER

A-01.00



LEFT ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

ELEVATION A1

GARAGE RIGHT

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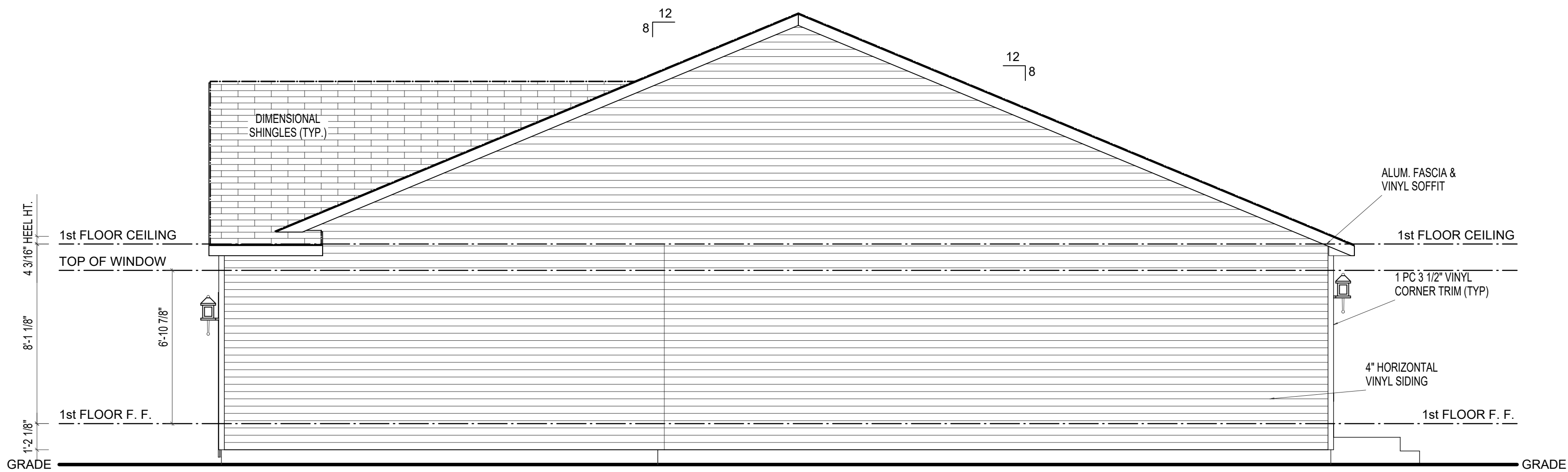
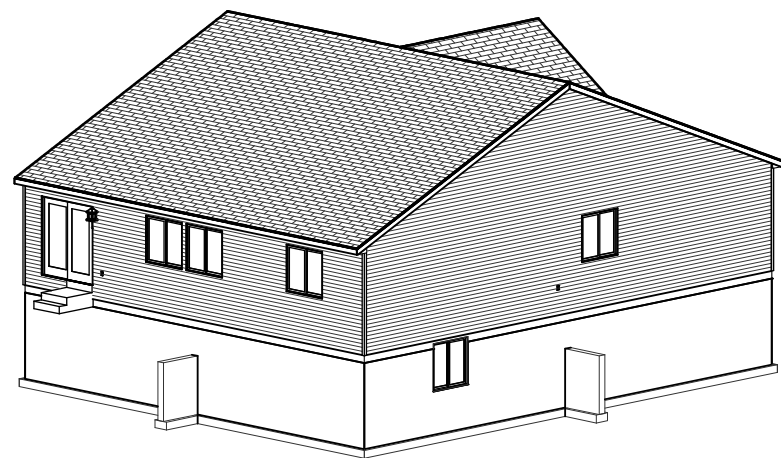
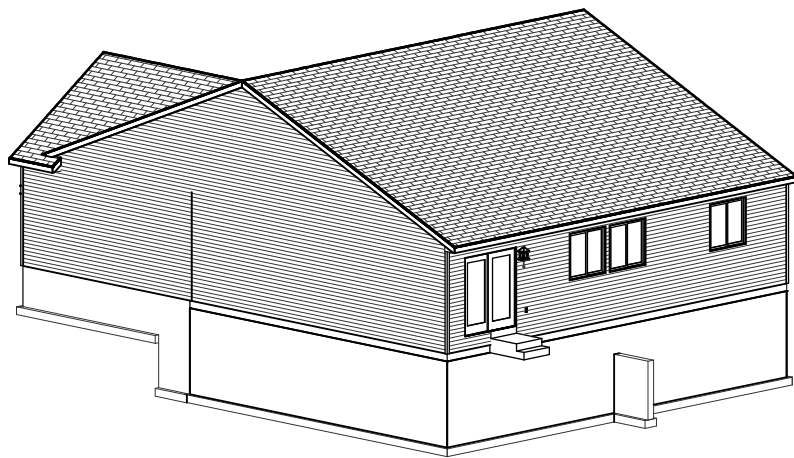
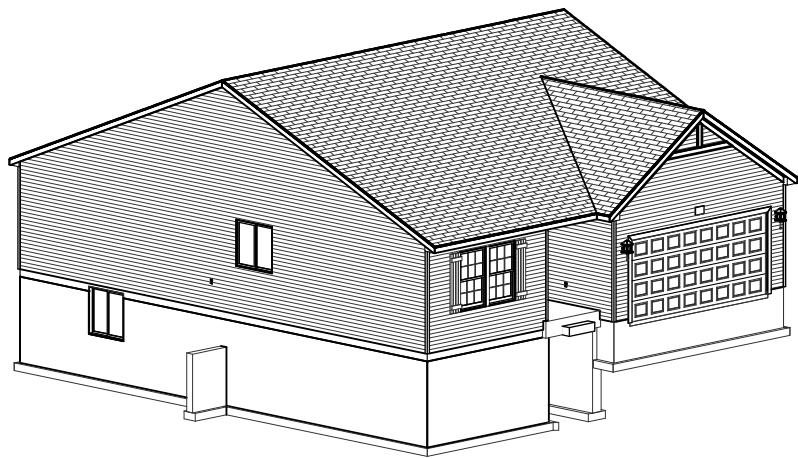
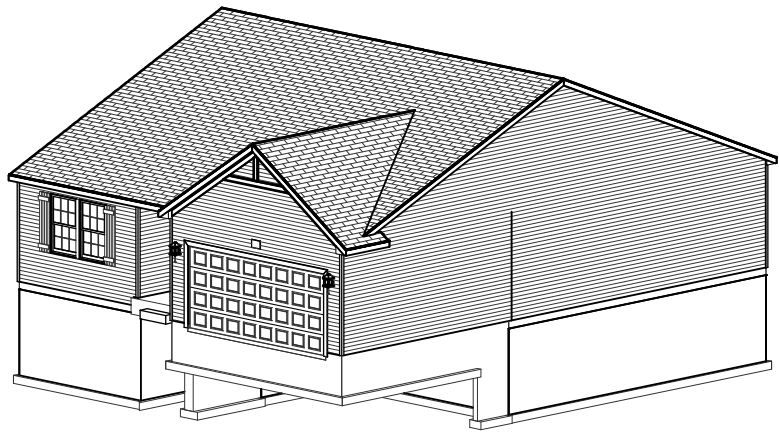
LOT #:

LOCATION:

SHEET NUMBER

A-02.00

306



RIGHT ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

ELEVATION A1

GARAGE RIGHT

REVISION V8.0a

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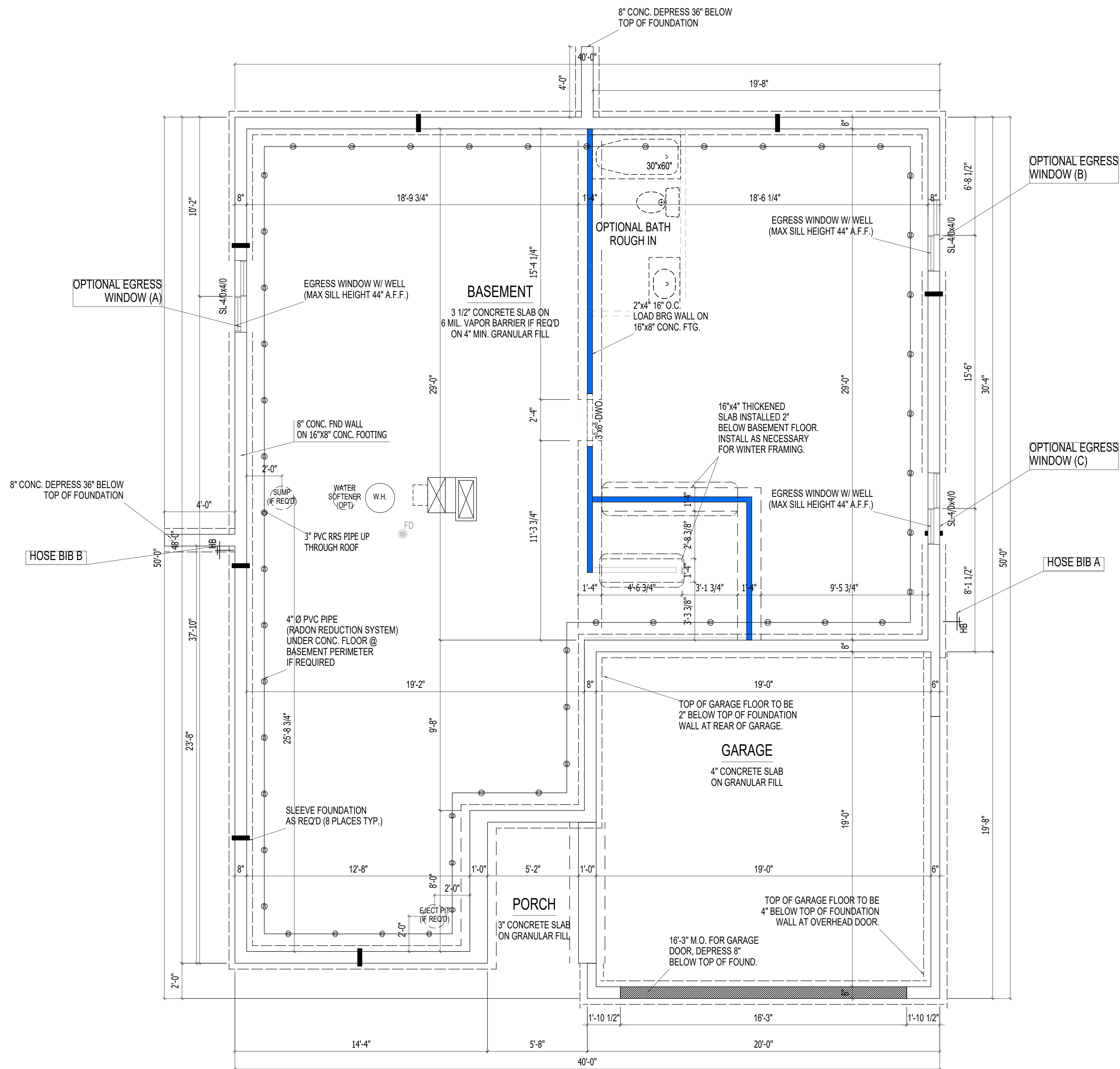
PRINT DATE:
05/25/2023

i1530
FOR: Allen Edwin Homes
LOT #:
LOCATION:

SHEET NUMBER

A-03.00

ms/A-06.00.vxp



BASEMENT FOUNDATION: STANDARD A ELEVATION

SCALE: 1/4"=1'-0"

REMARKS		DATE	REV. NO.
ELEVATION A1			
GARAGE RIGHT			
REVISION	V8.0a		

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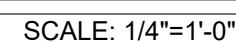
FOR: Allen Edwin Homes

LOT #:

LOCATION:

SHEET NUMBER

A-06.00



integrity 1610

1,607 SF

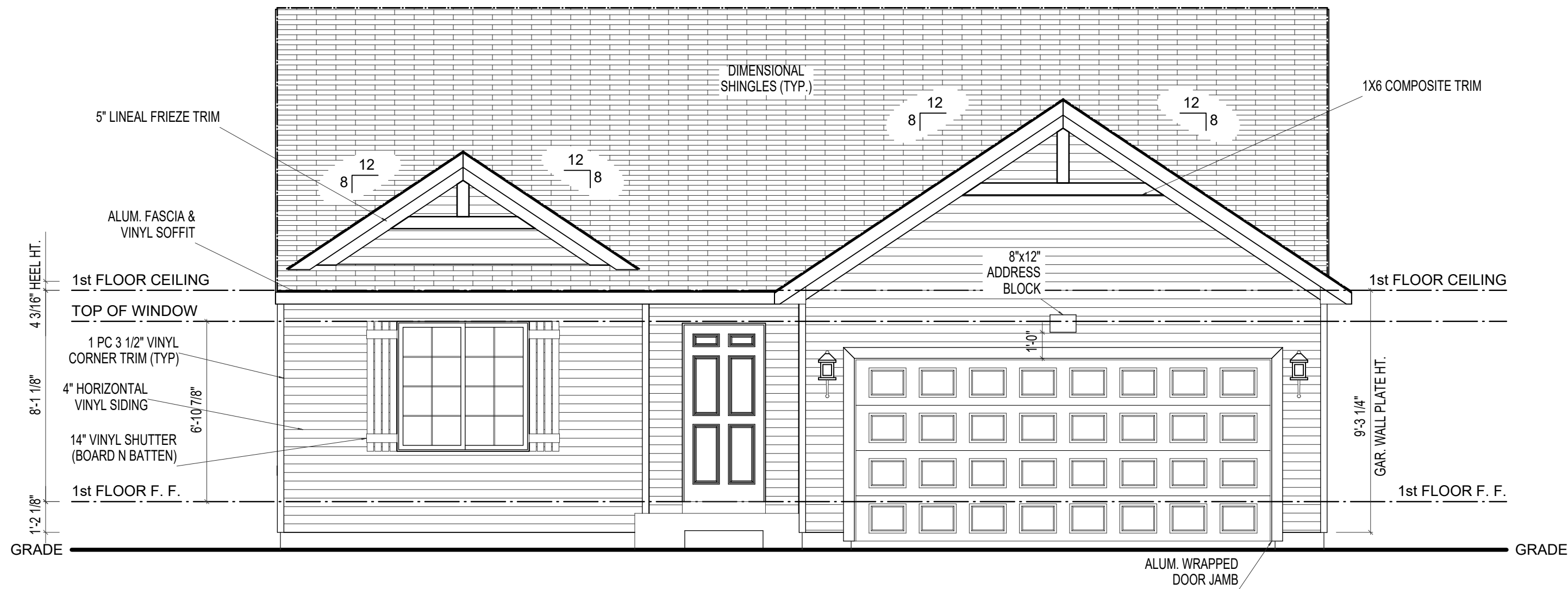
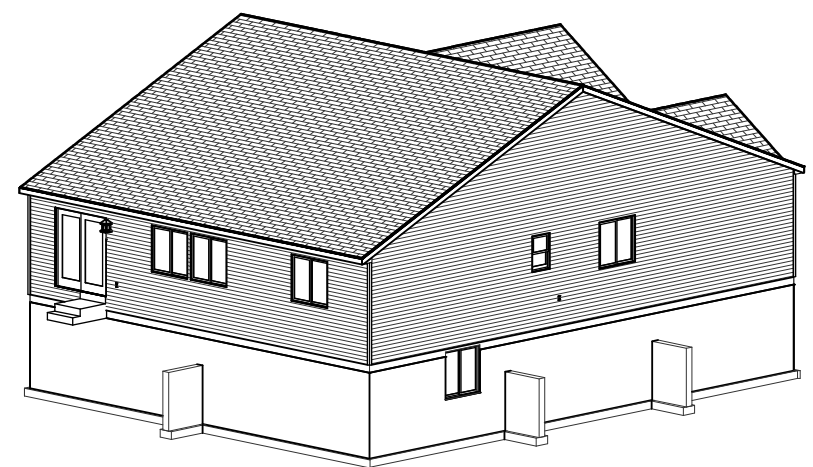
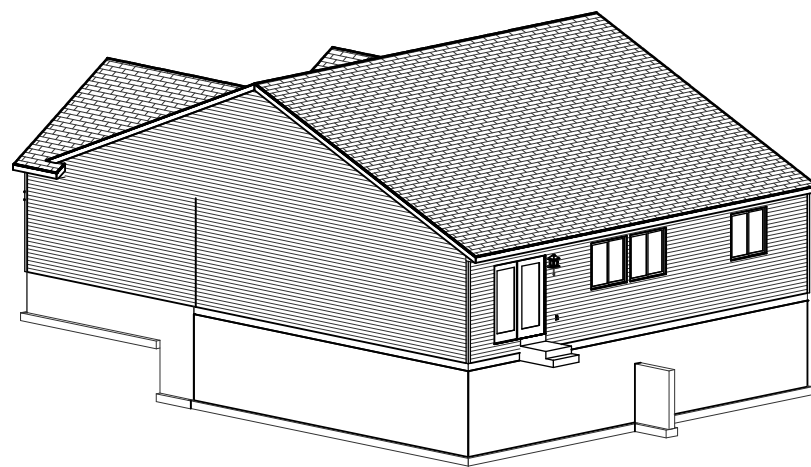
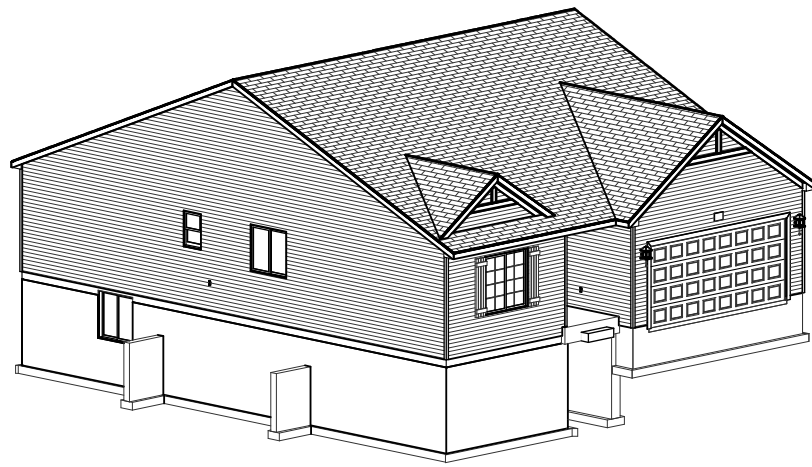
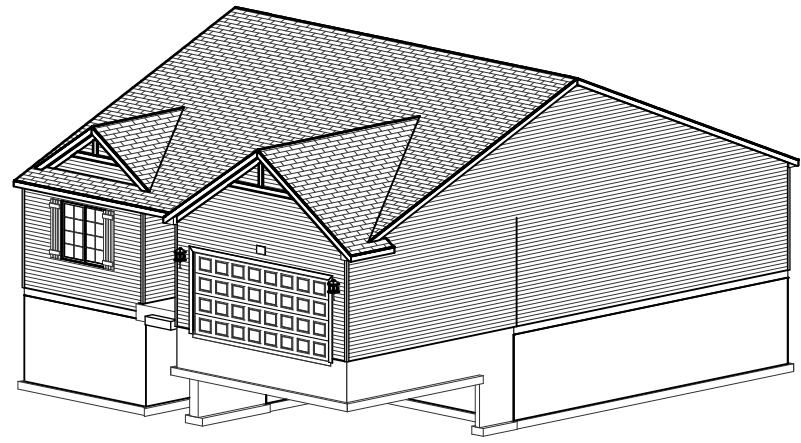
3-5 bedrooms

2-3 bathrooms

2-3 car attached garage



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FRONT ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

ELEVATION A1

GARAGE RIGHT

REVISION

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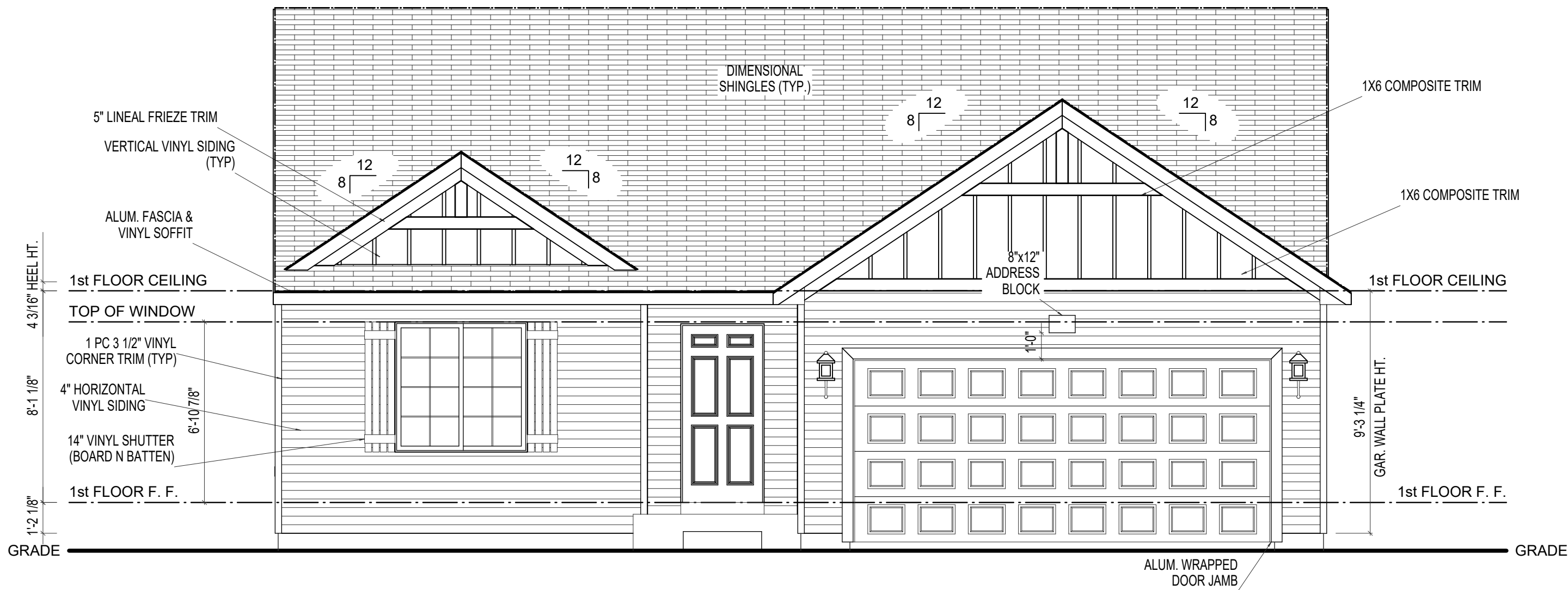
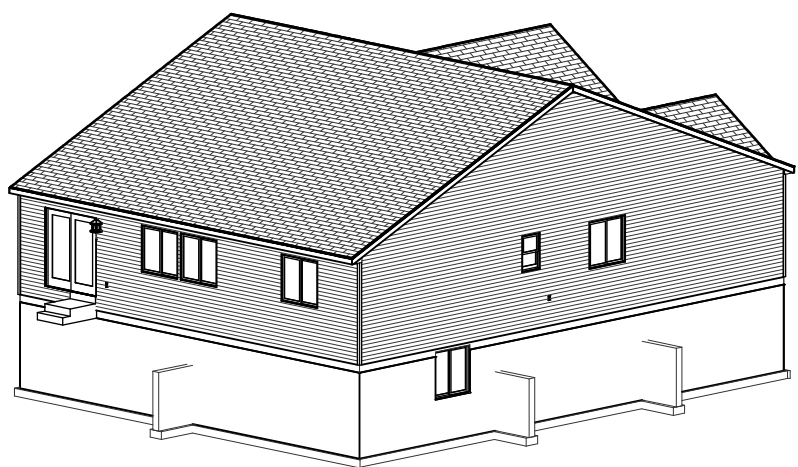
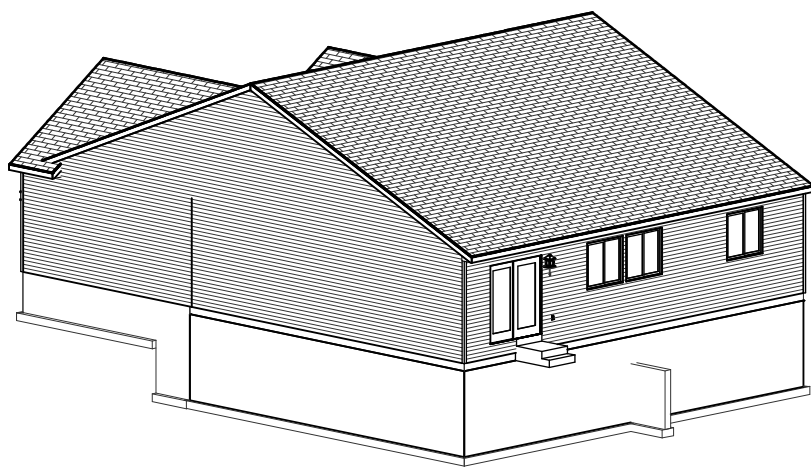
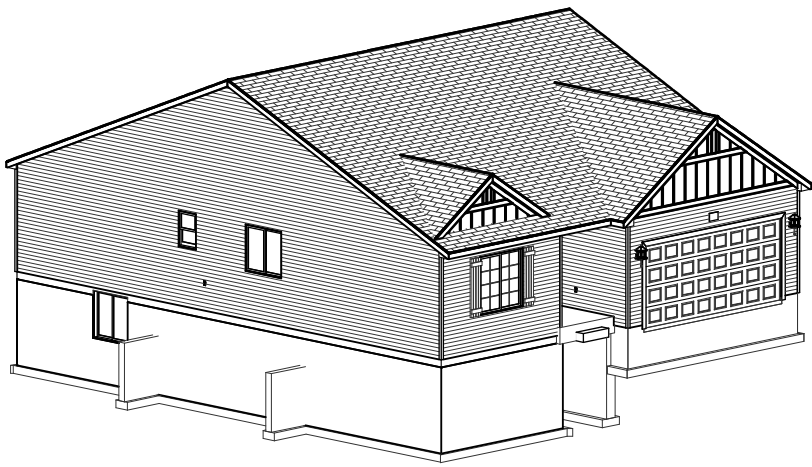
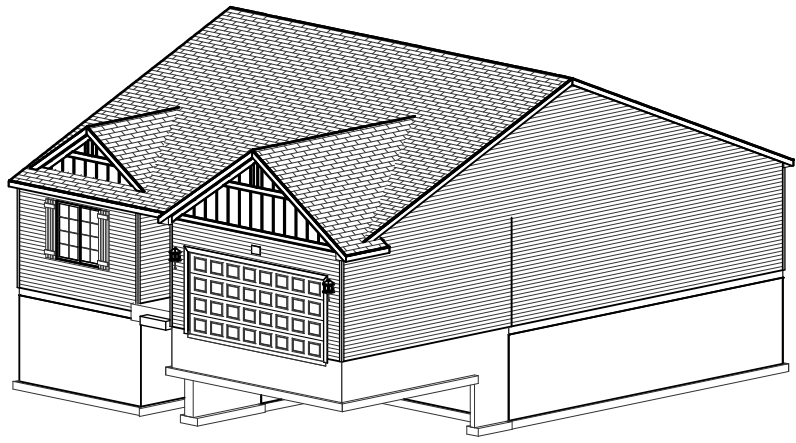
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FOR: Allen Edwin Homes
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FRONT ELEVATION A2

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

ELEVATION A1

GARAGE RIGHT

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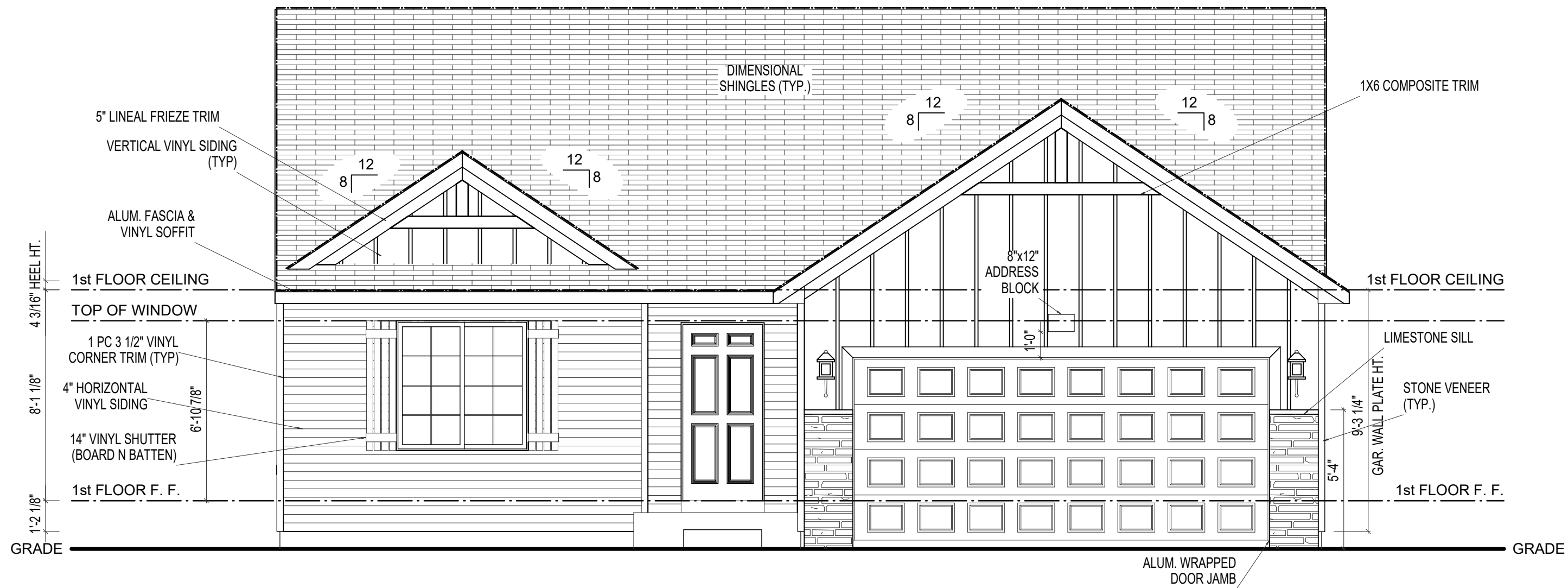
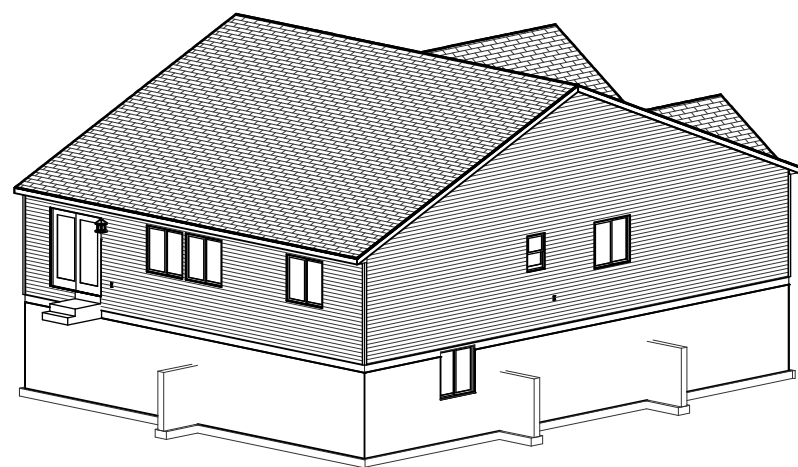
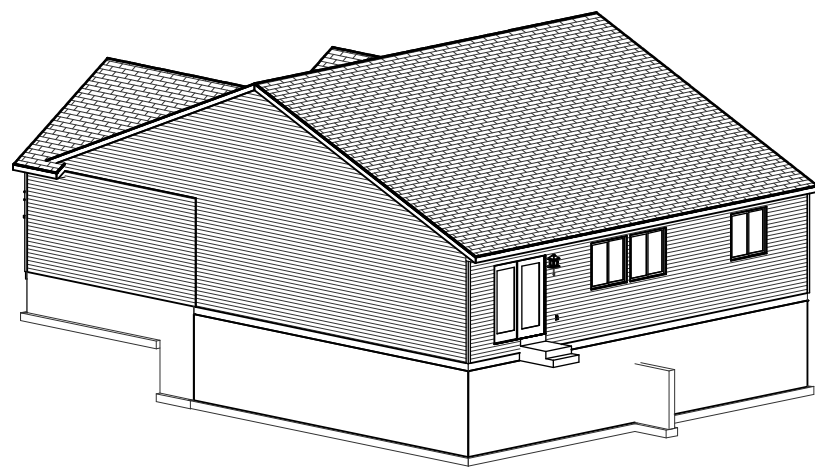
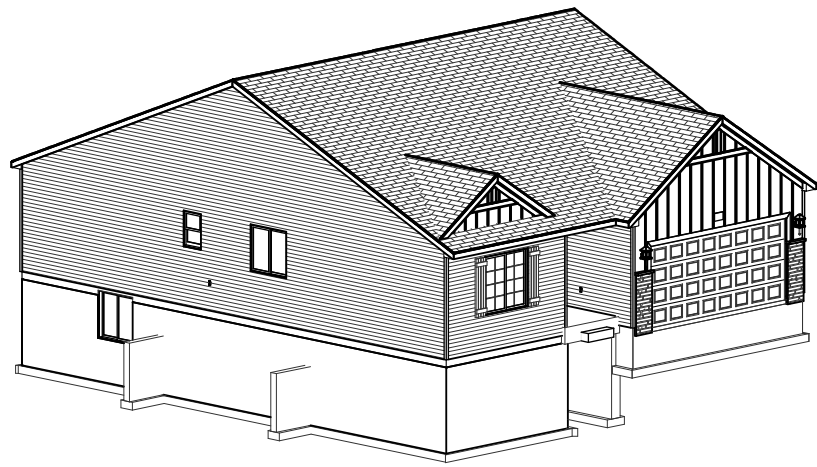
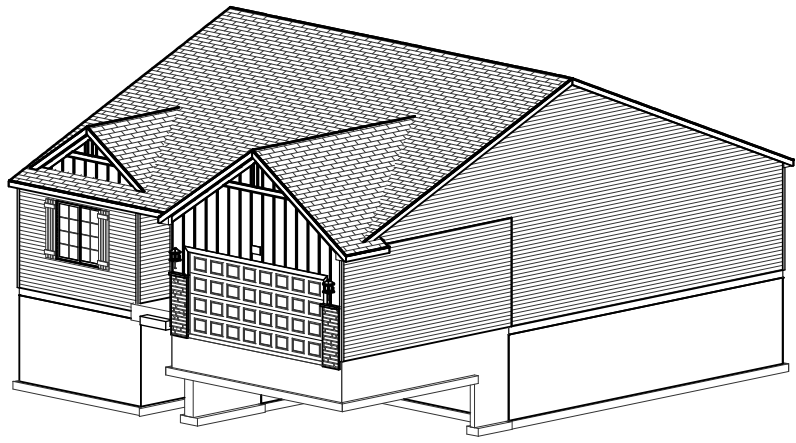
FOR:
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LOT #:

LOCATION:

SHEET NUMBER

A-01.01



FRONT ELEVATION A3

SCALE: 1/4"=1'-0"

REMARKS

DATE

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ELEVATION A1

GARAGE RIGHT

REVISION

V8.0a

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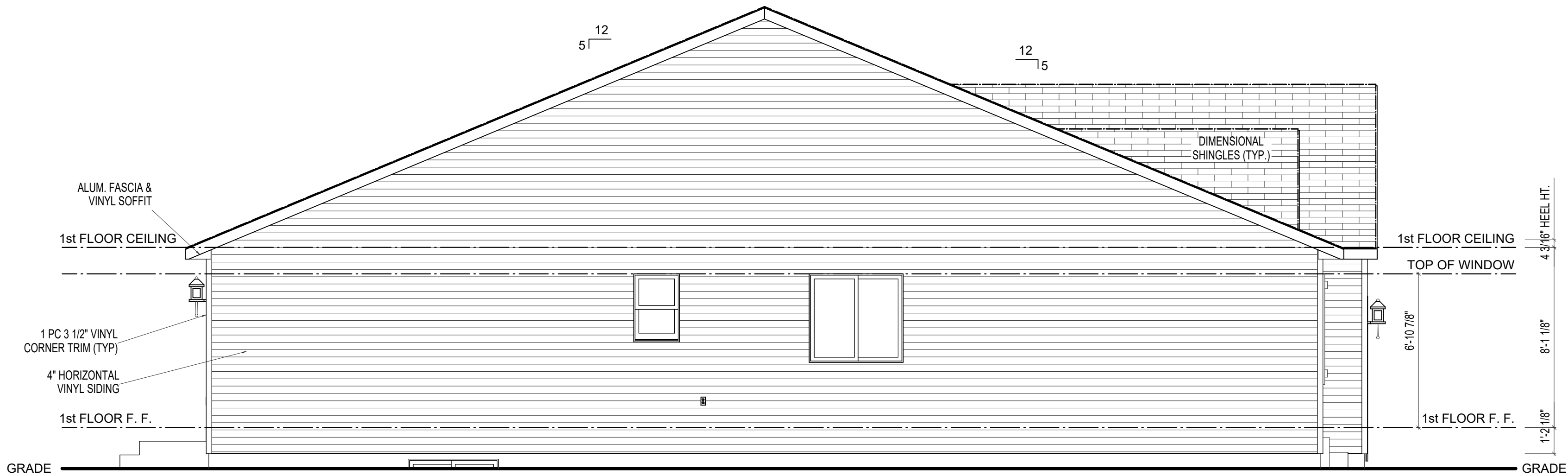
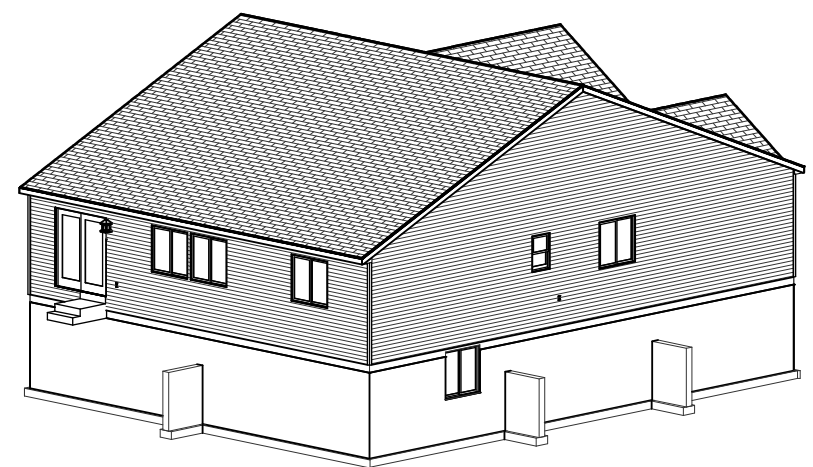
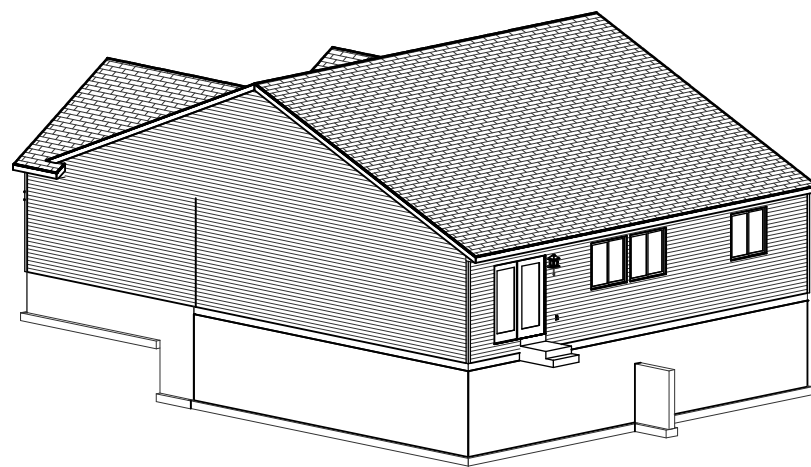
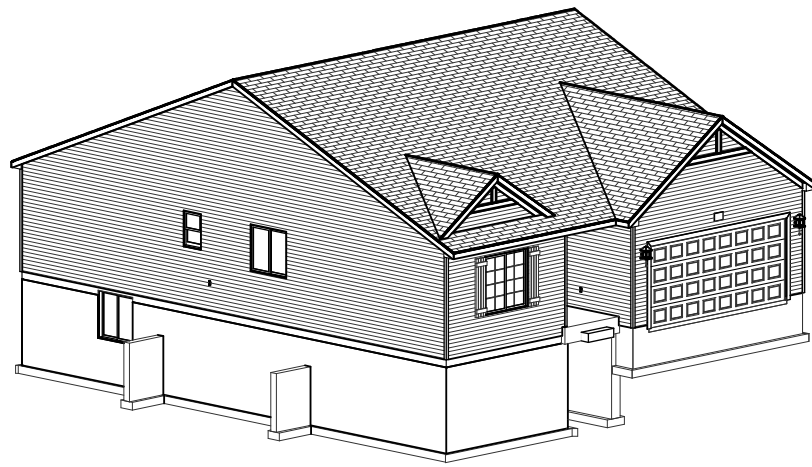
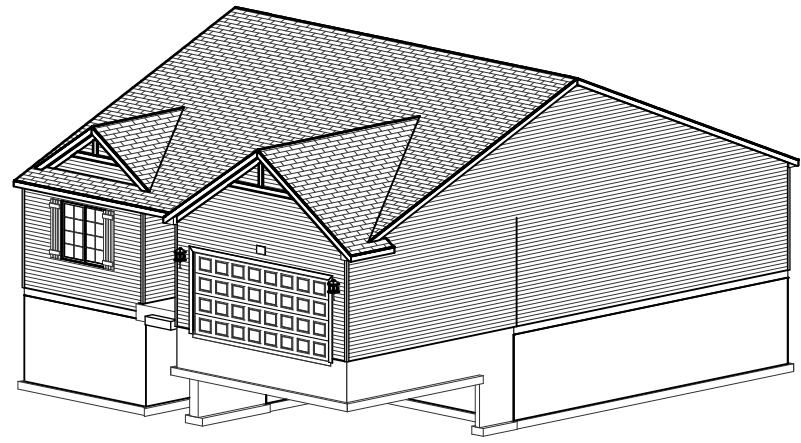
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LEFT ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

ELEVATION A1

GARAGE RIGHT

REVISION

V8.0a

ALLEN EDWIN HOMES

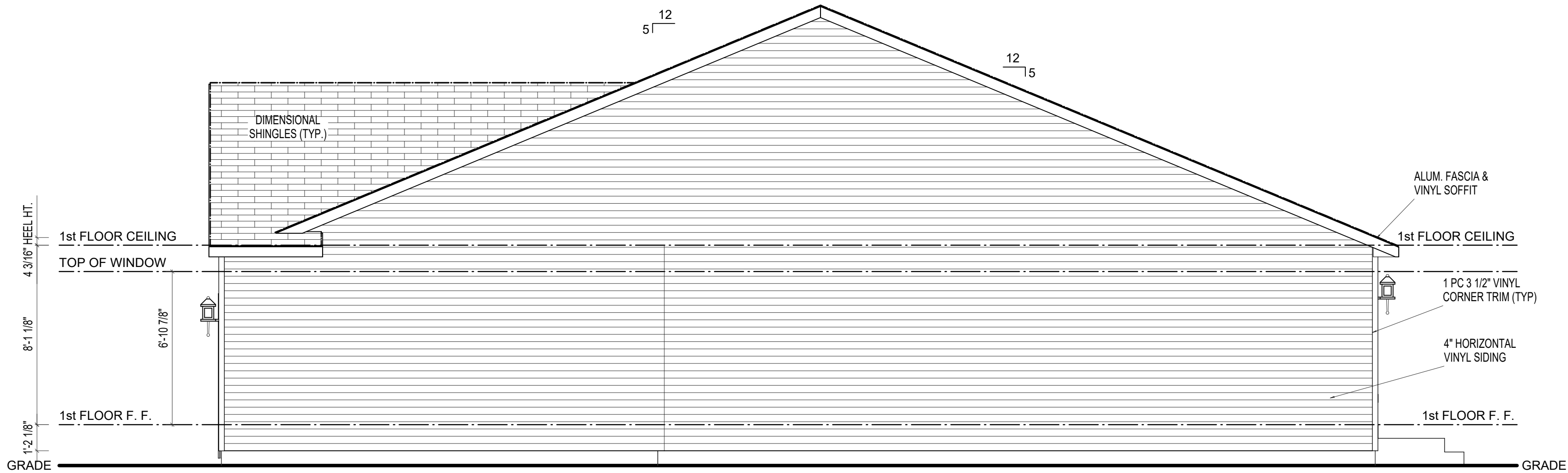
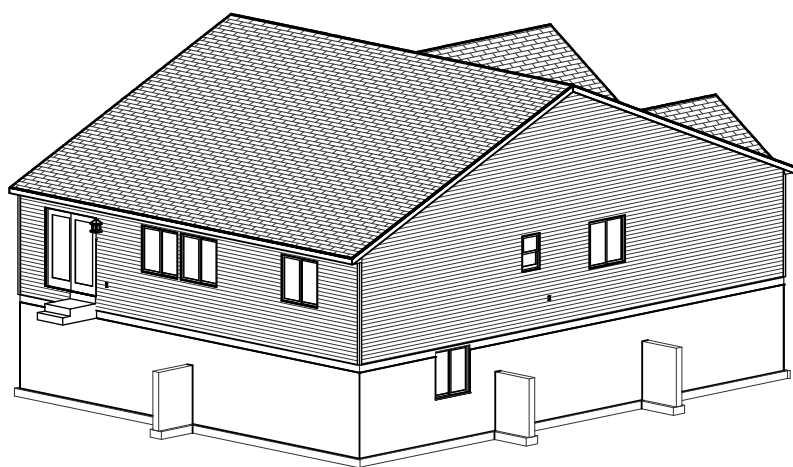
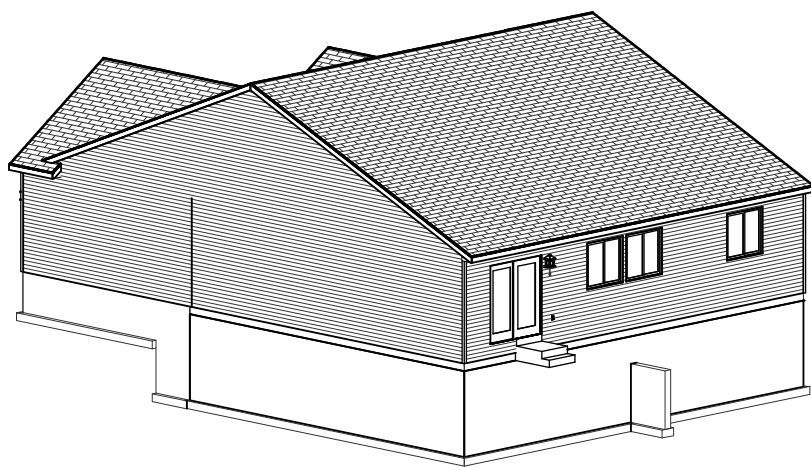
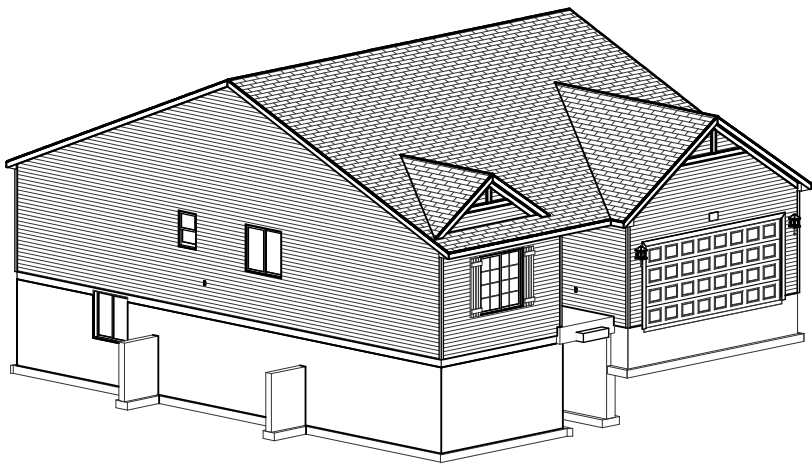
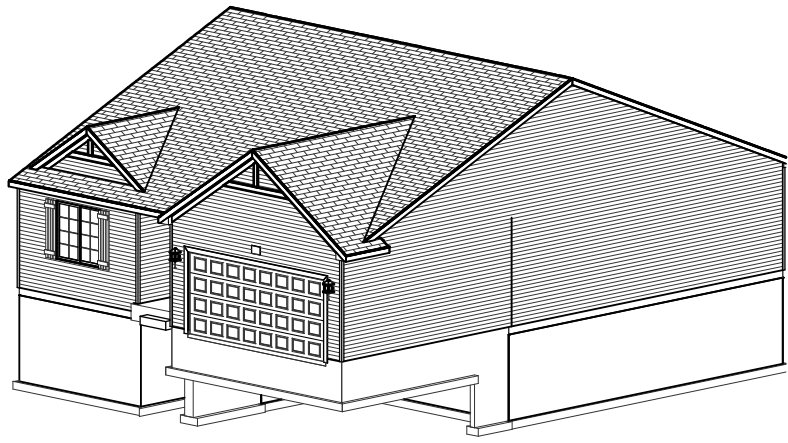
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FOR: Allen Edwin Homes
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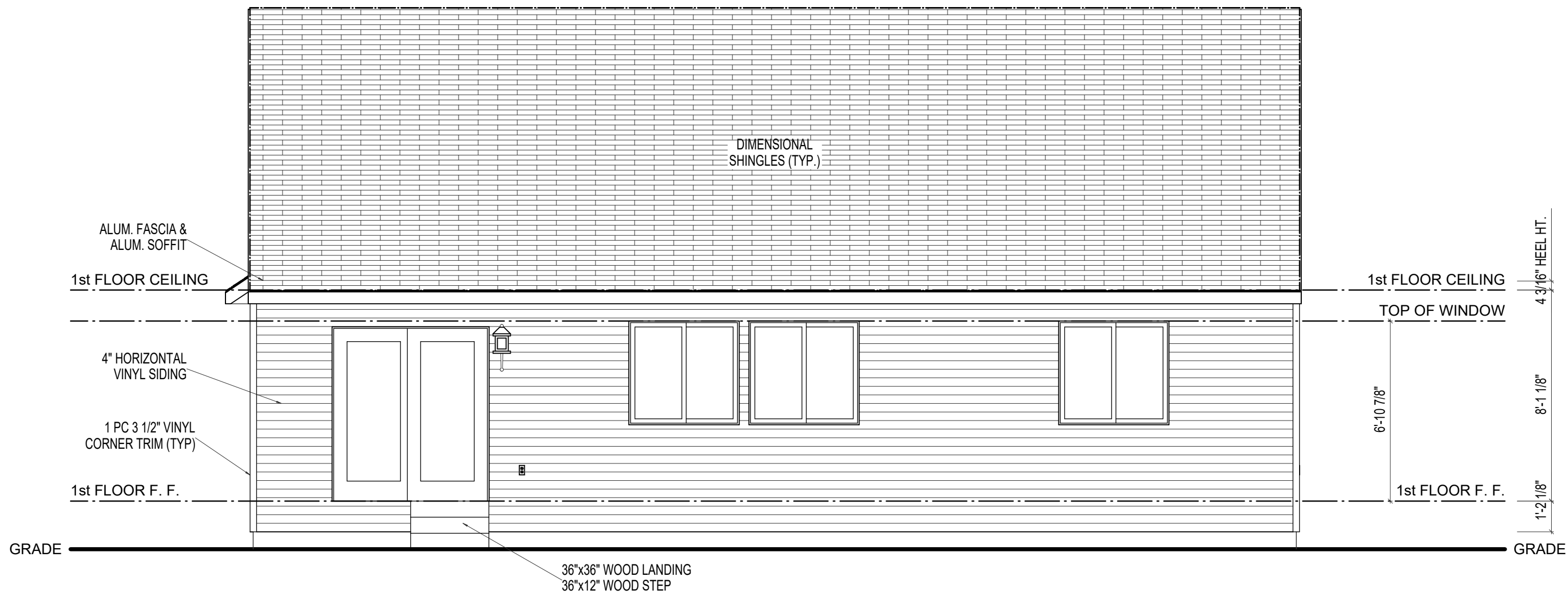
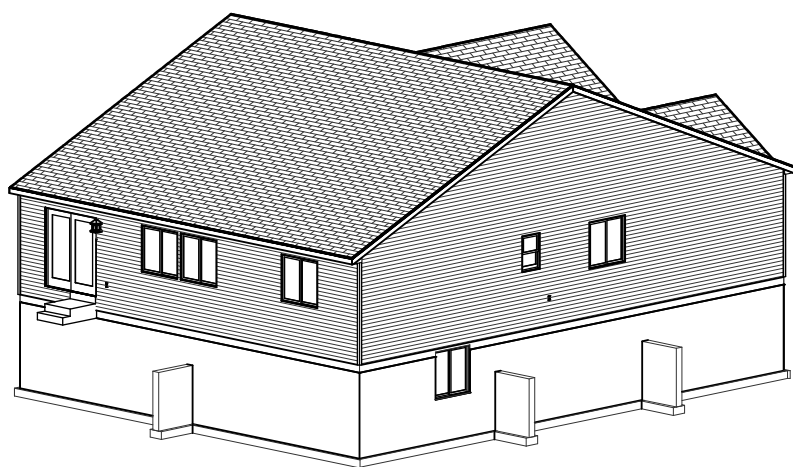
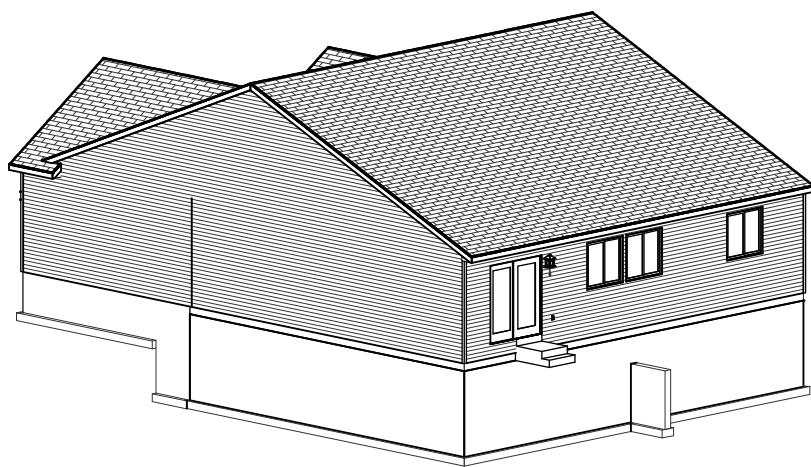
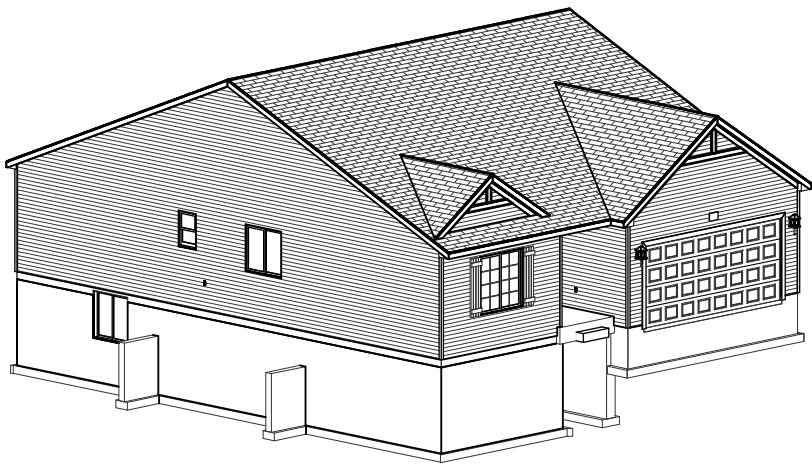
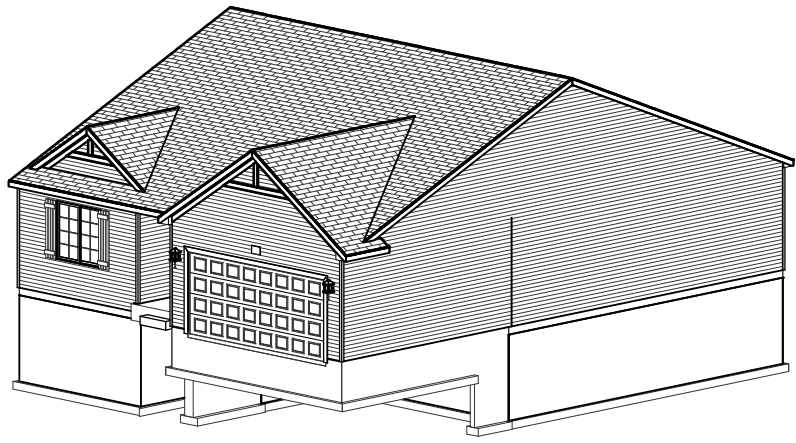
LOT #:

LOCATION:

SHEET NUMBER

A-03.00

316



REAR ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

REV. NO.

ELEVATION A1

GARAGE RIGHT

REVISION

DATE

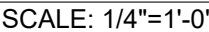
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LOCATION:

PRINT DATE: 05/25/2023

317



PRINT DATE:
05/25/2023

i1610

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Allen Edwin Homes

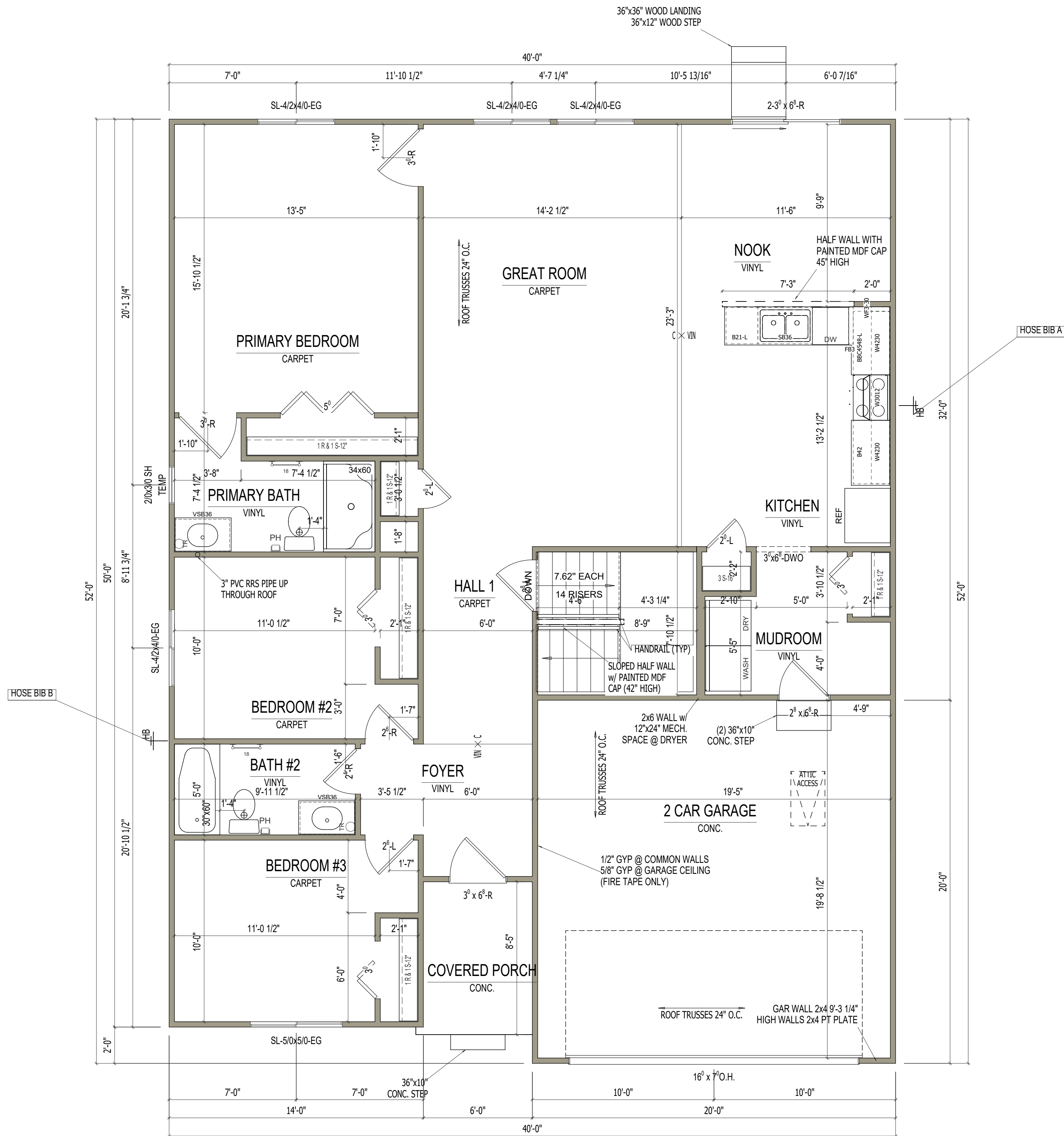
LOT #:

LOCATION:

SHEET NUMBER

A-06.00

318



FIRST FLOOR i1610

SCALE: 1/4"=1'-0"

ELEVATION A1		REV. NO.	DATE	REMARKS
GARAGE RIGHT				
REVISION		V8.0a		

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LOCATION:

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SHEET NUMBER

A-07.00

integrity 1810

1,822 SF

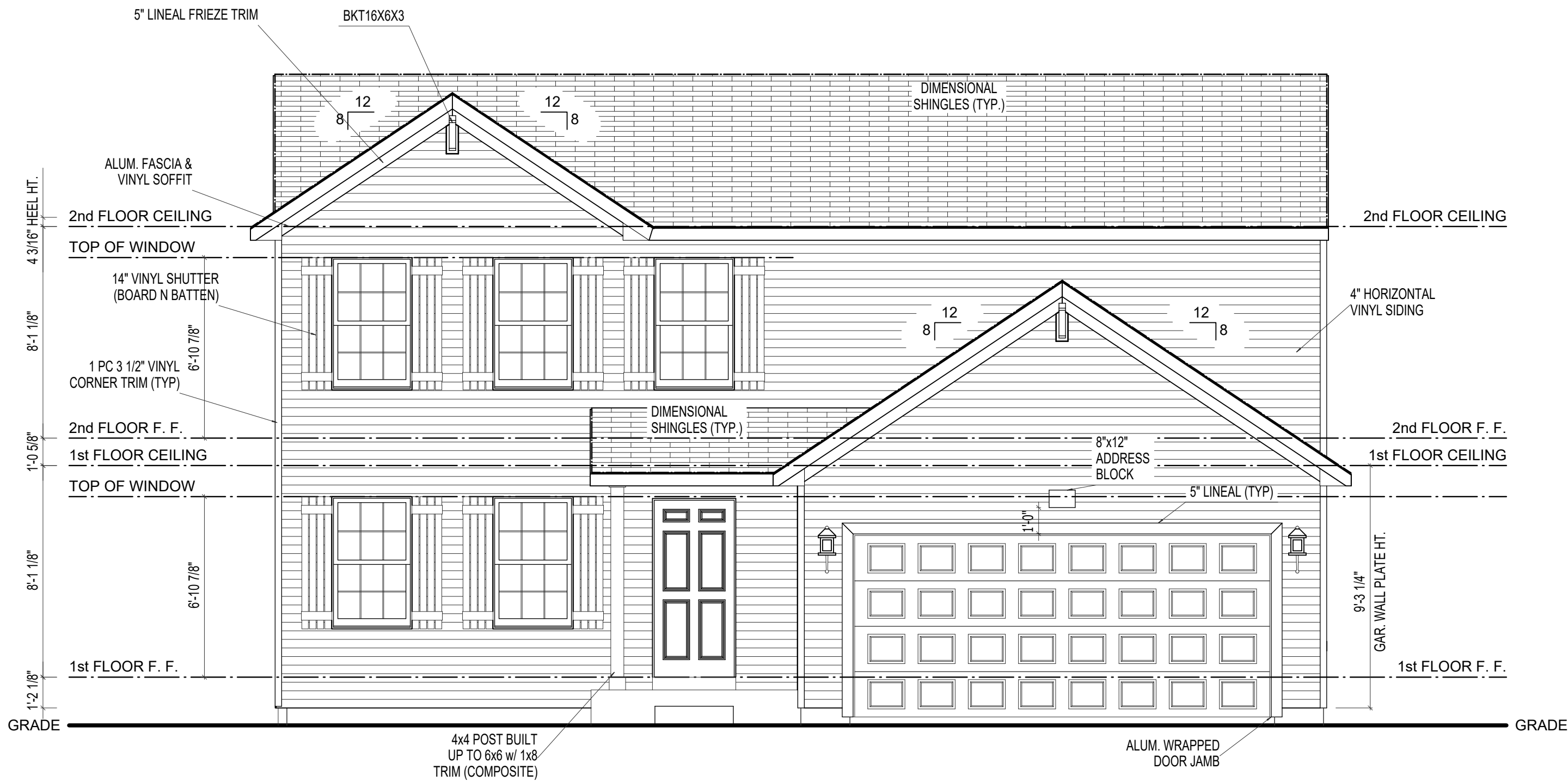
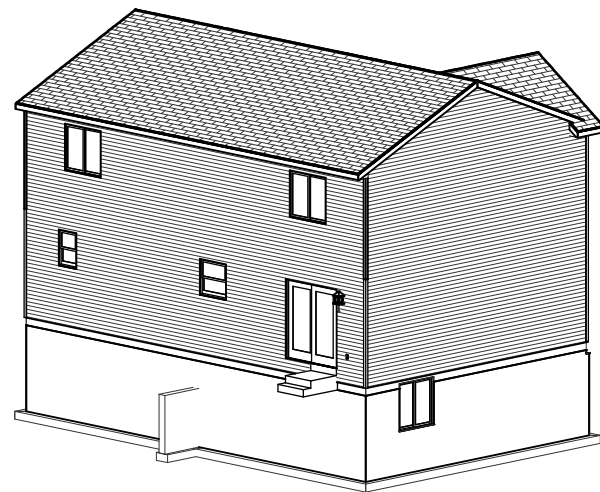
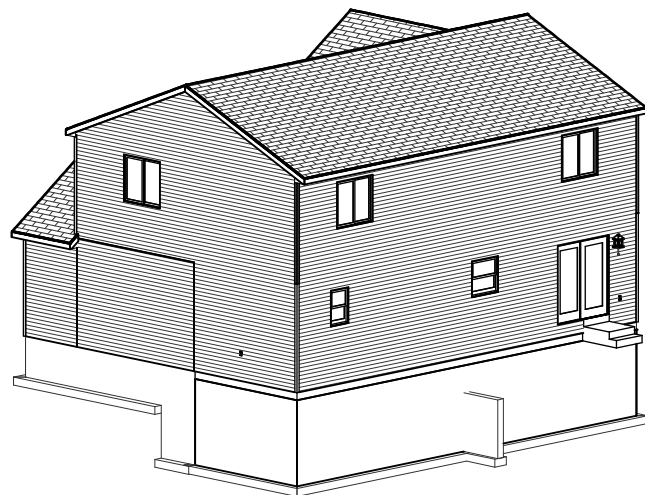
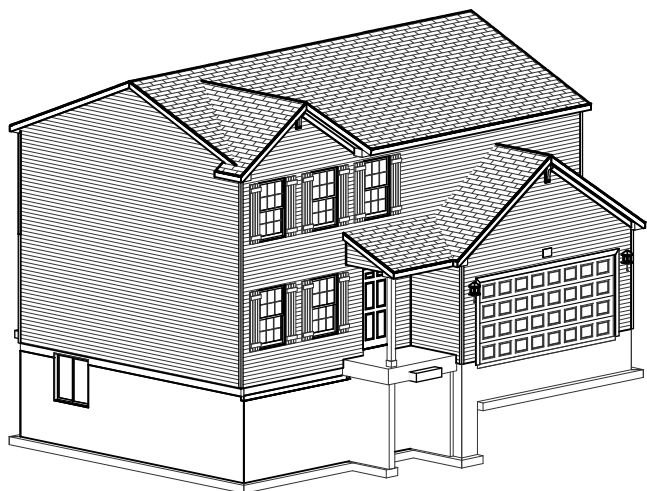
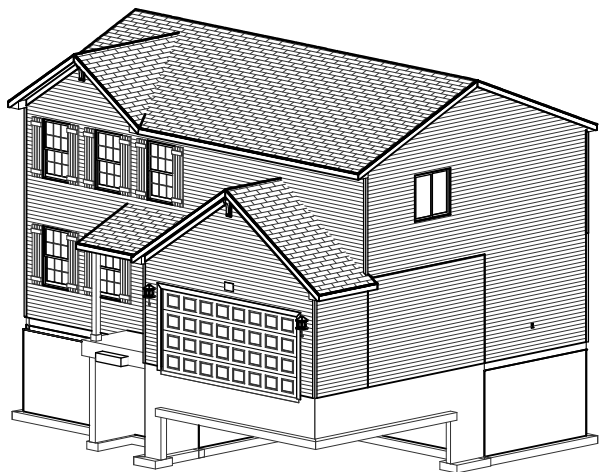
4 bedrooms

2.5-3.5 bathrooms

2-3 car attached garage



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FRONT ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

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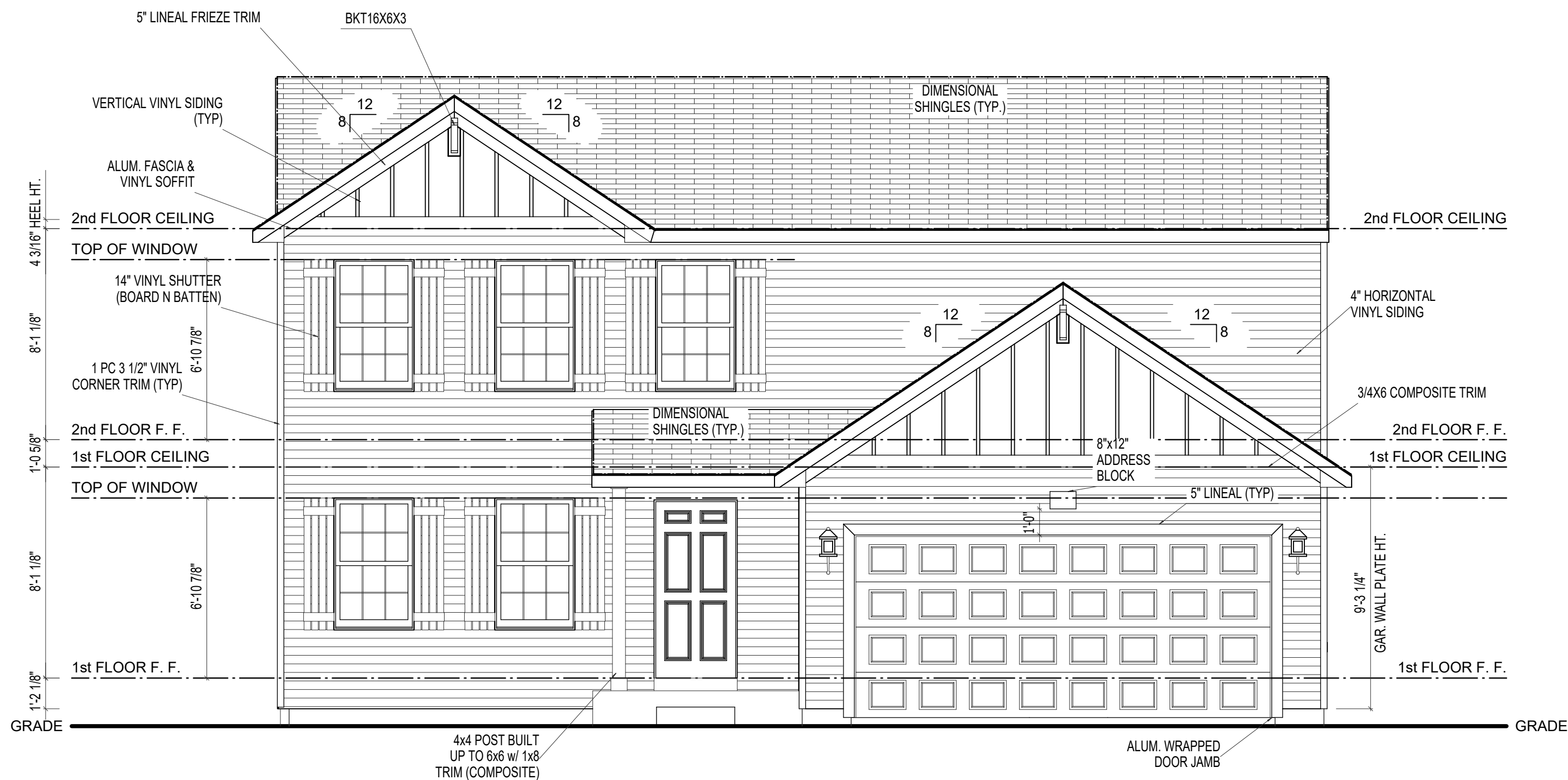
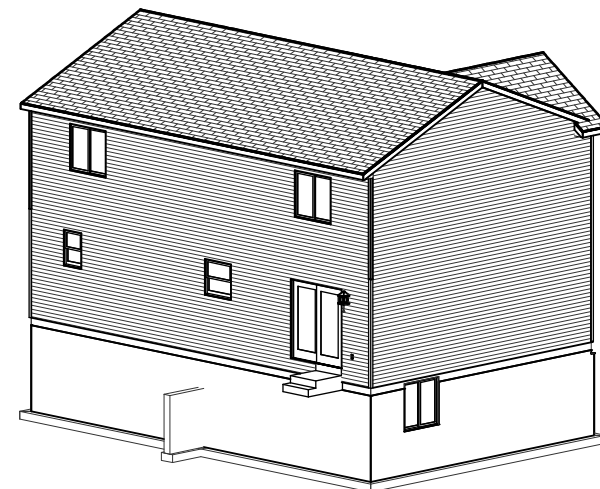
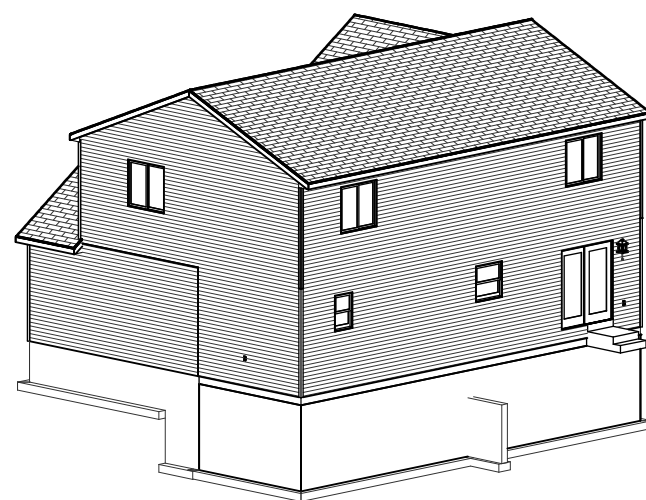
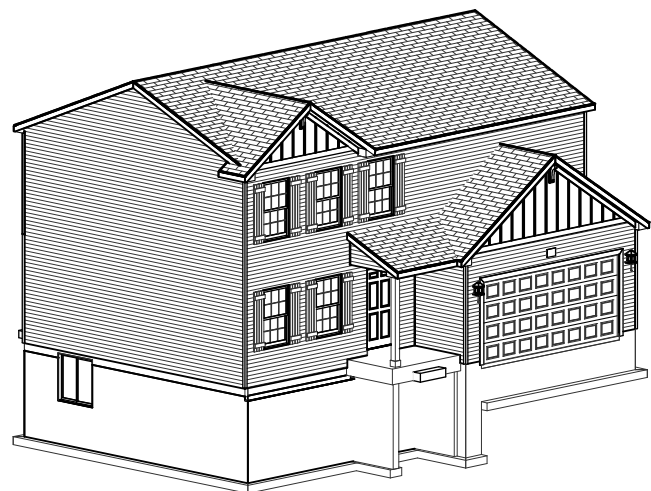
LOT #:

LOCATION:

SHEET NUMBER

A-01.00

321



FRONT ELEVATION A2

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

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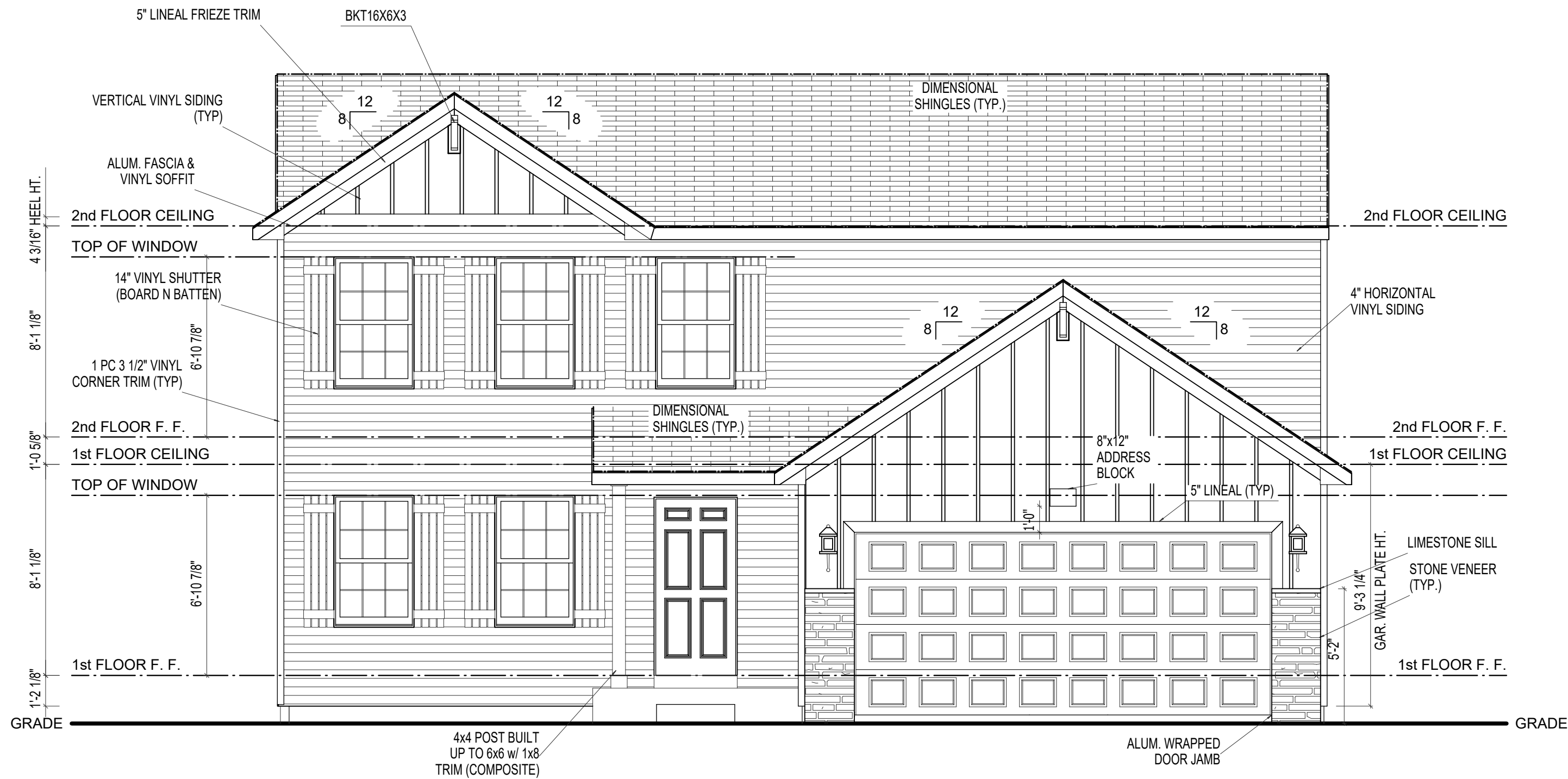
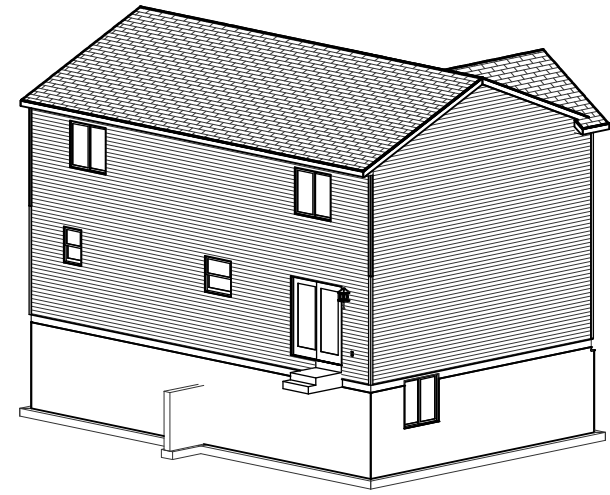
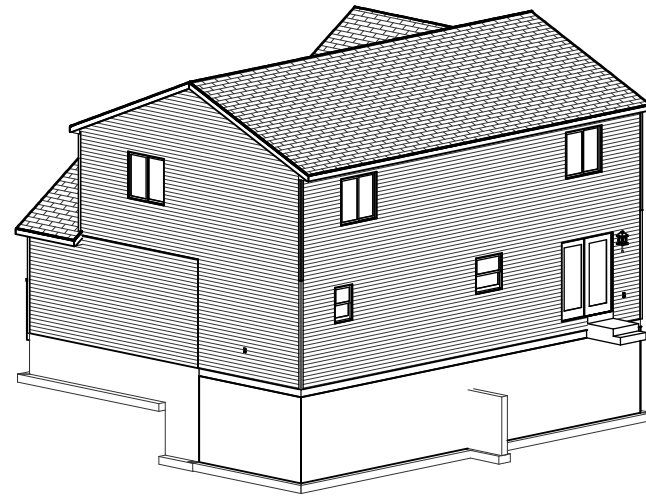
LOT #:

LOCATION:

SHEET NUMBER

A-01.04

322



FRONT ELEVATION A3

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

i1810

REVISION

V8.1a

ALLEN EDWIN HOMES

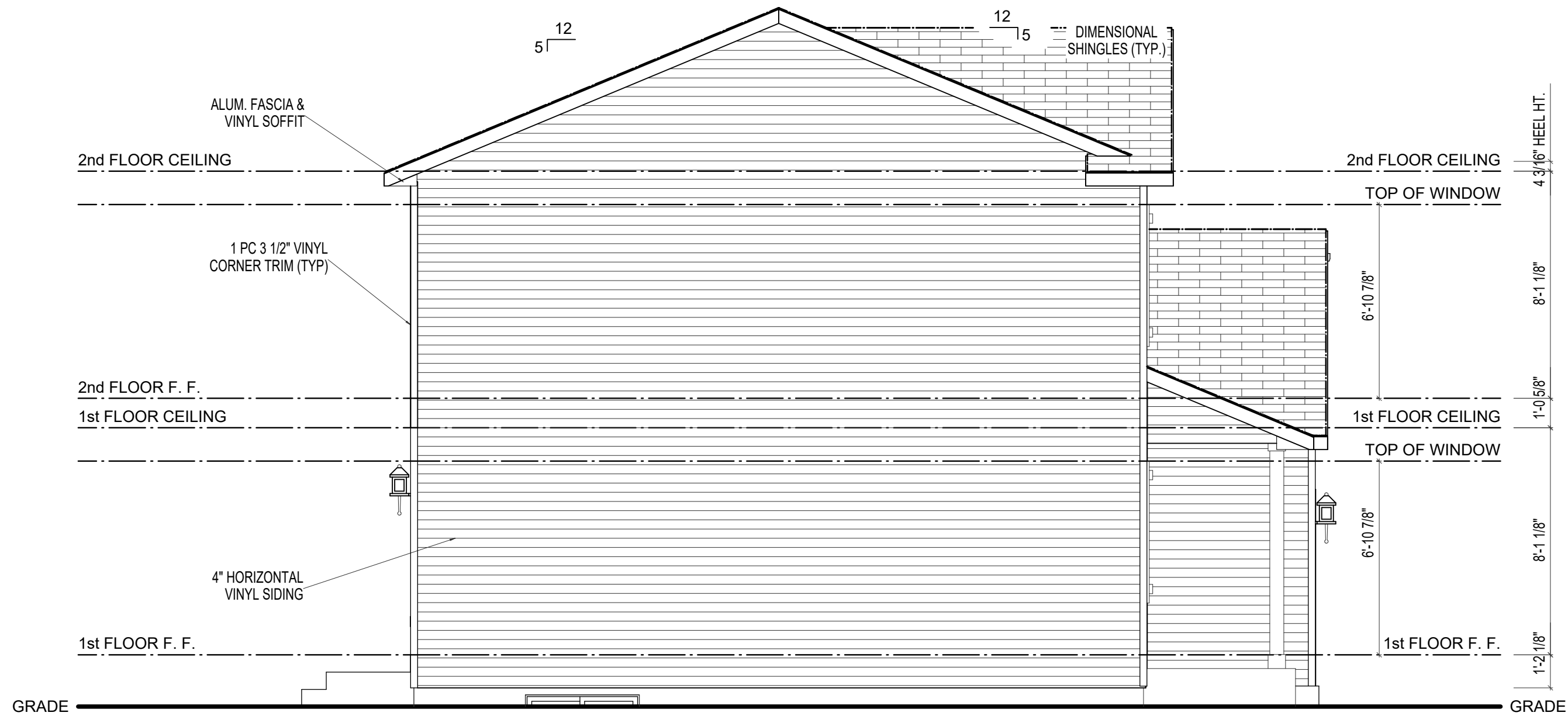
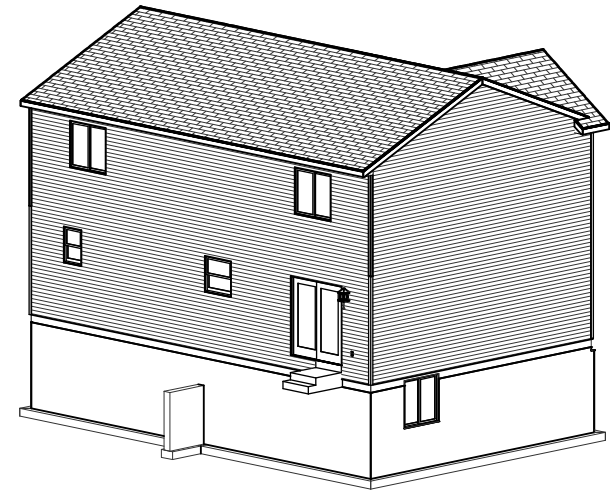
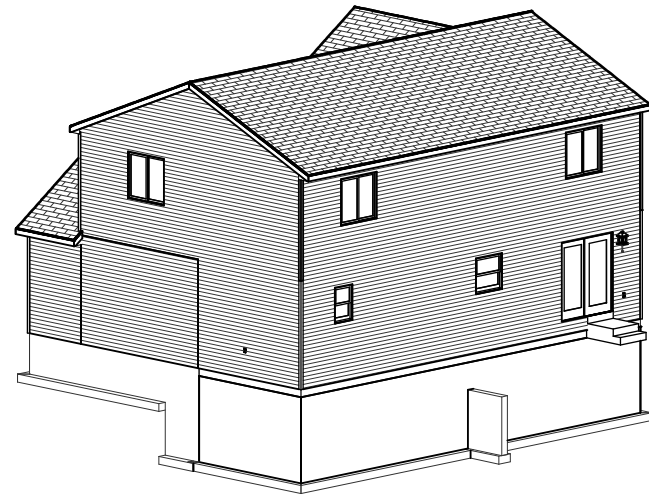
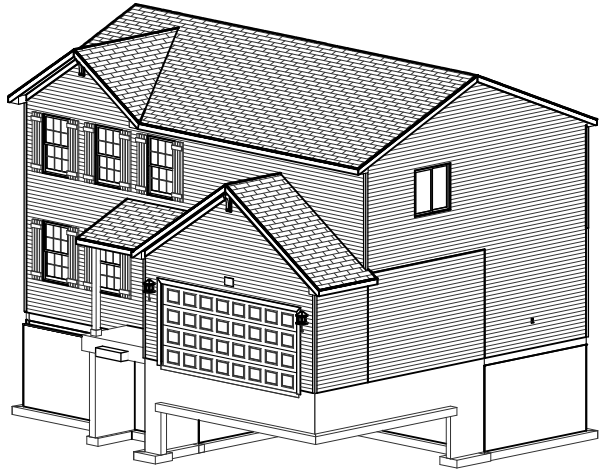
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LEFT ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

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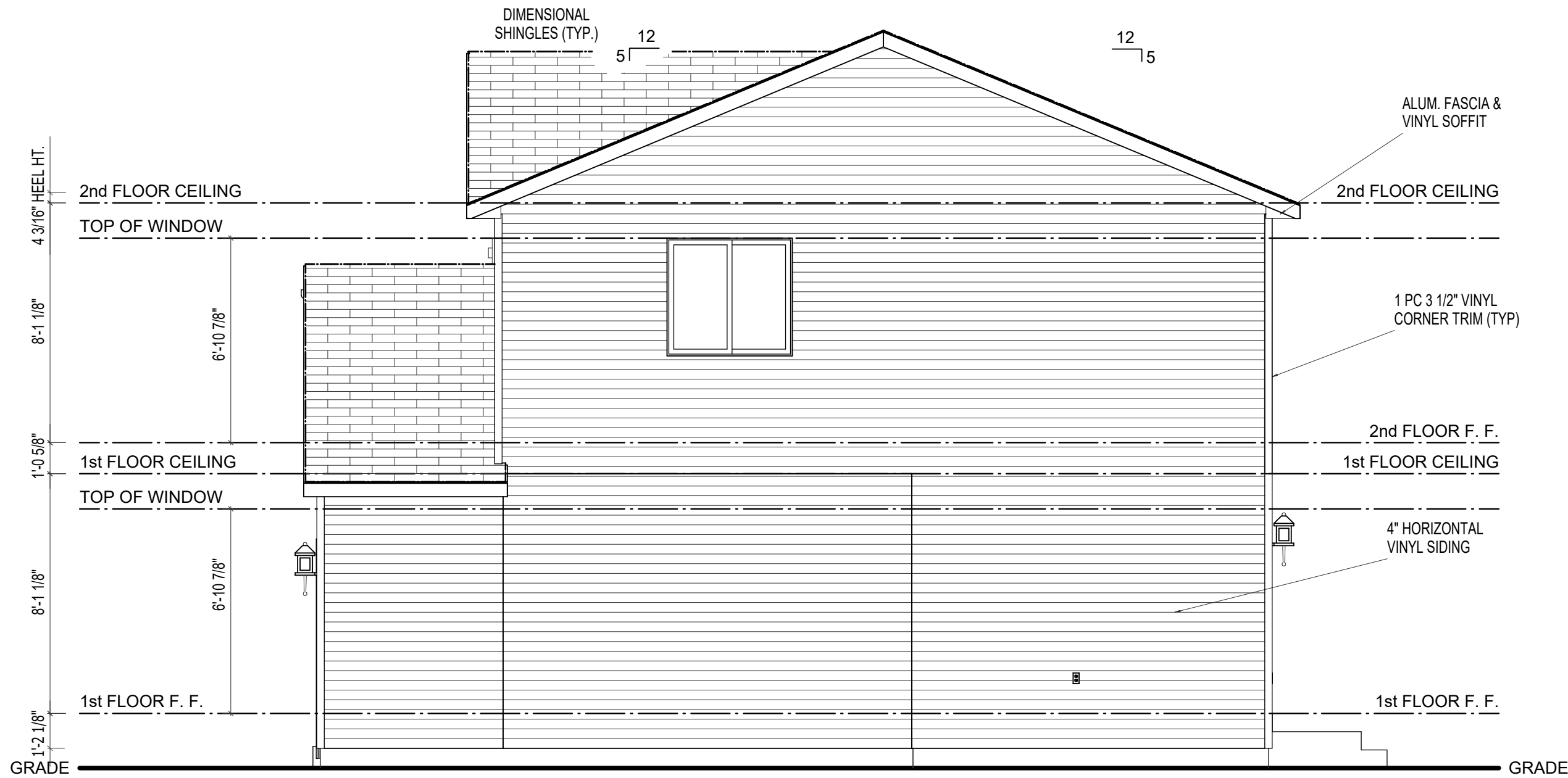
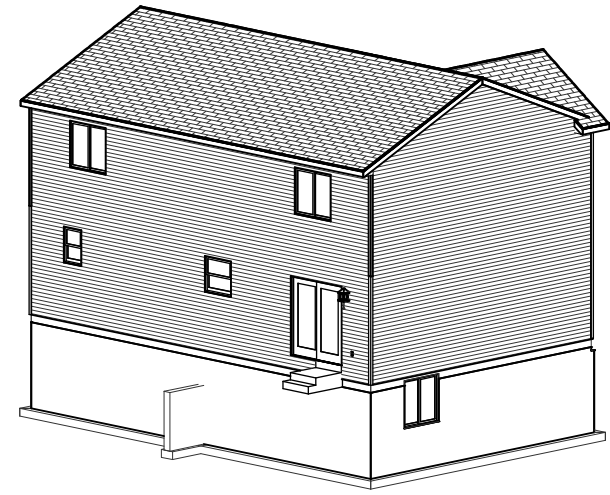
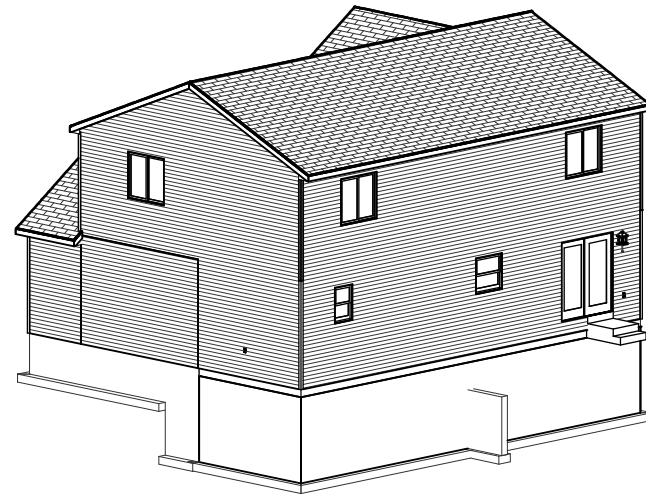
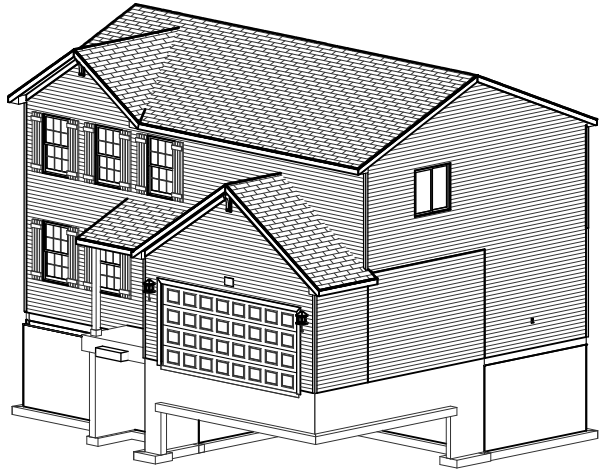
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RIGHT ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

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i1810

REVISION

V8.1a

ALLEN EDWIN HOMES

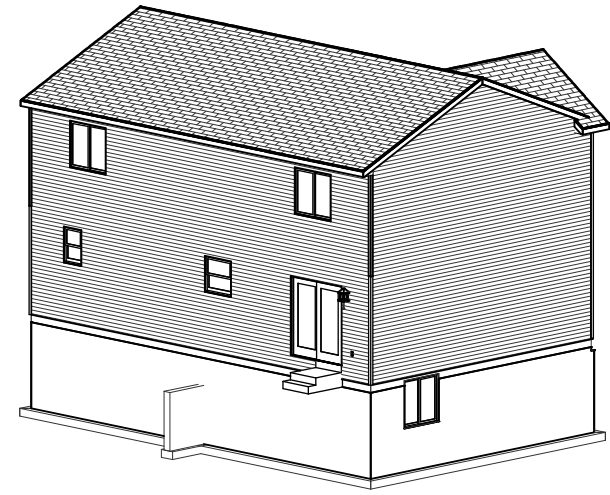
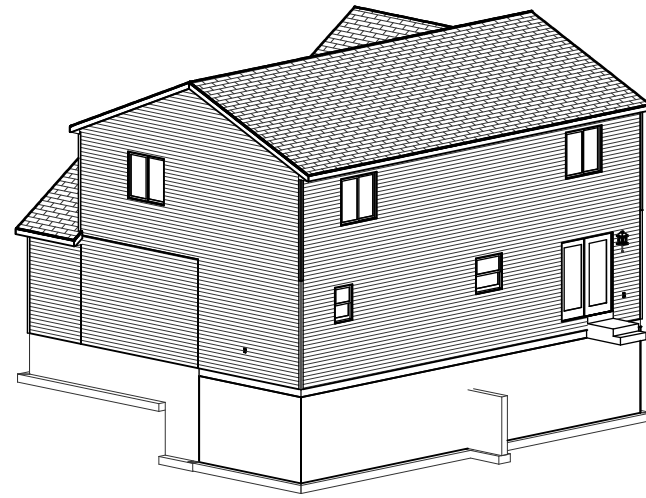
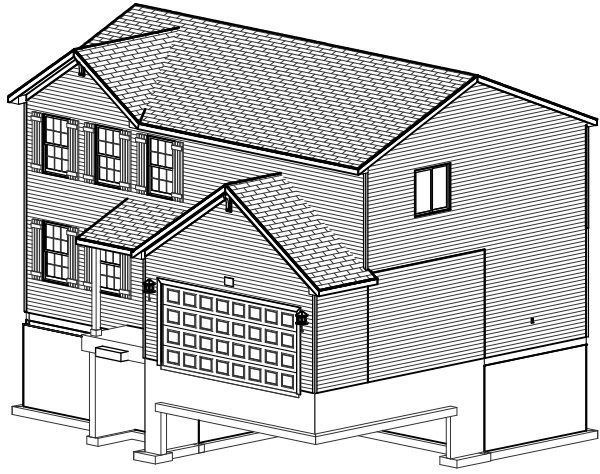
2186 E. Centre Street
Portage, MI 49002
(269) 321-2600
www.allenedwin.com

PRINT DATE:
03/29/2023

FOR: Allen Edwin Homes
LOT #:
LOCATION:

SHEET NUMBER

A-03.00



REAR ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

i1810

REVISION

V8.1a

ALLEN EDWIN HOMES

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LOT #:
LOCATION:

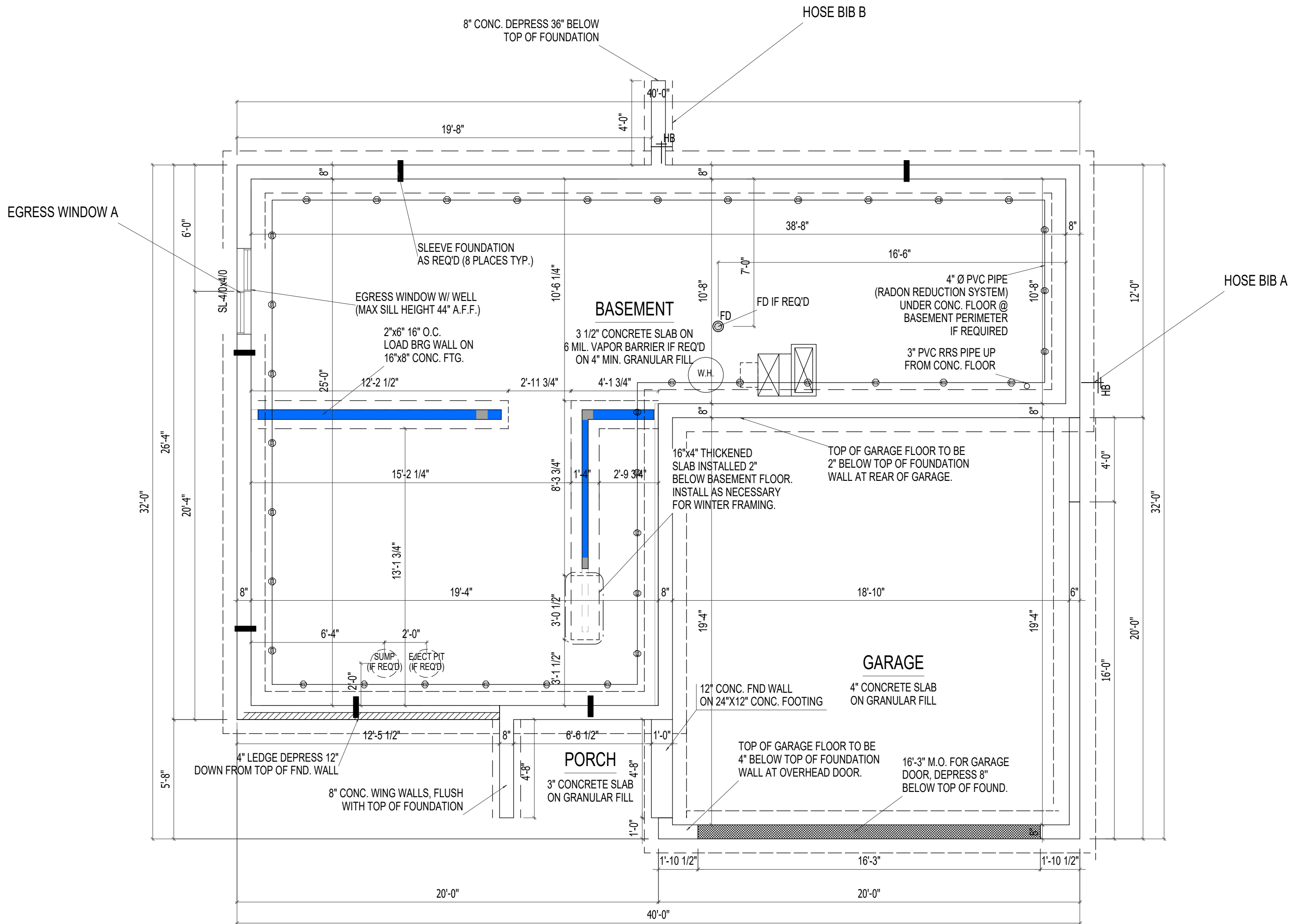
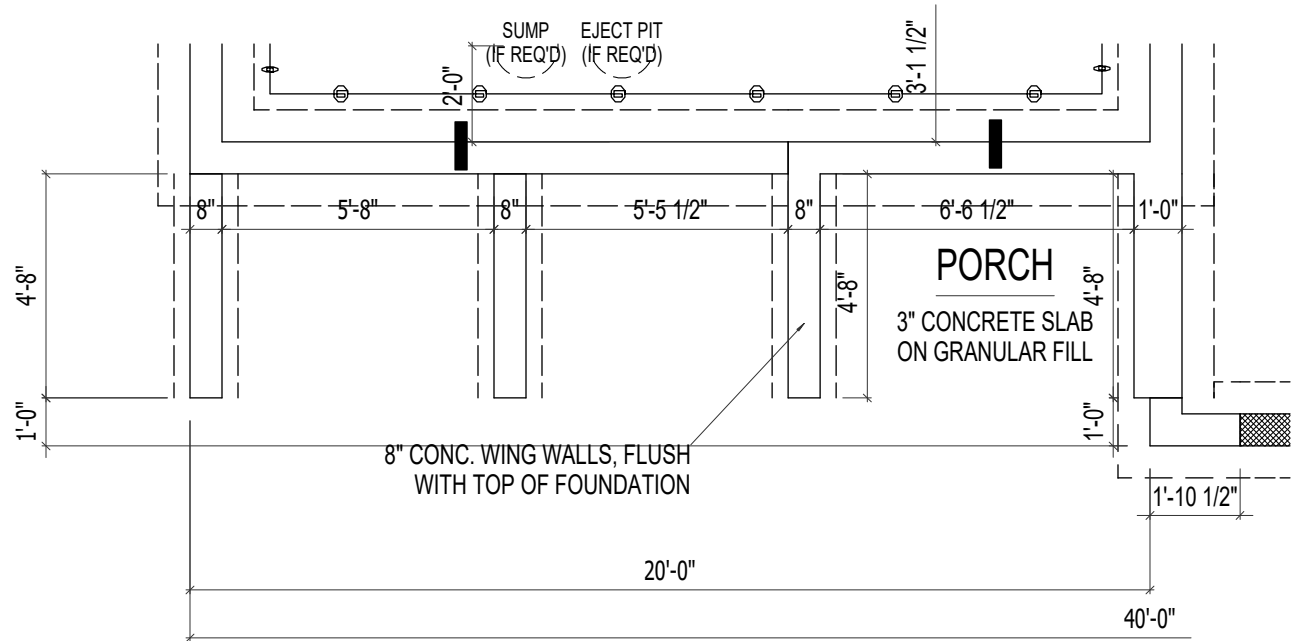
SHEET NUMBER

A-04.00

ms/A-06.00.vxp

C/D ELEVATION OPTIONS

SCALE: 1/4"=1'-0"



BASEMENT FOUNDATION

SCALE: 1/4"=1'-0"

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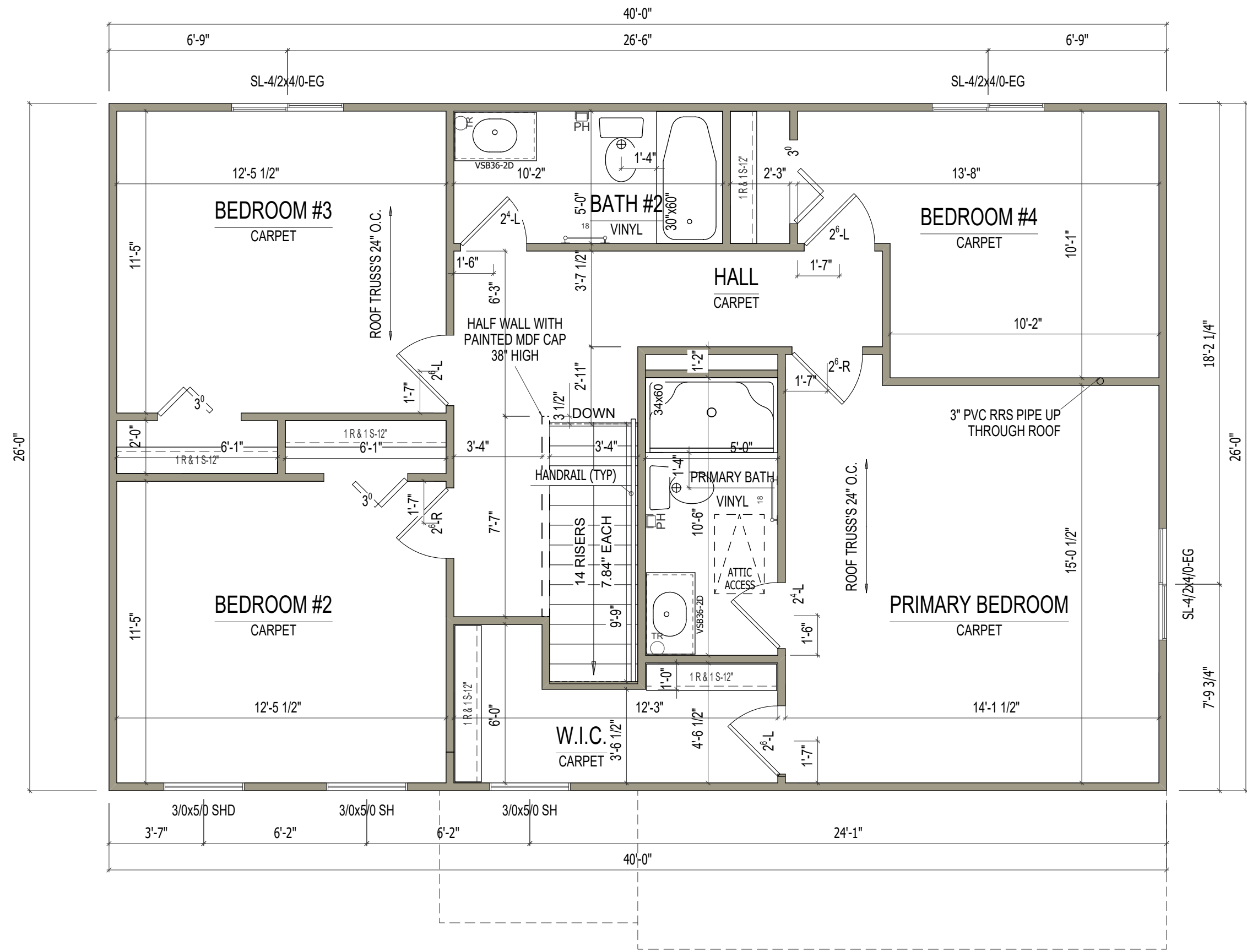
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REVISIONS



SECOND FLOOR i1810

SCALE: 1/4"=1'-0"

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329

CG Visions 2006 PLAN CREATION DATE 06/13/2013

integrity 2000

2,022 SF

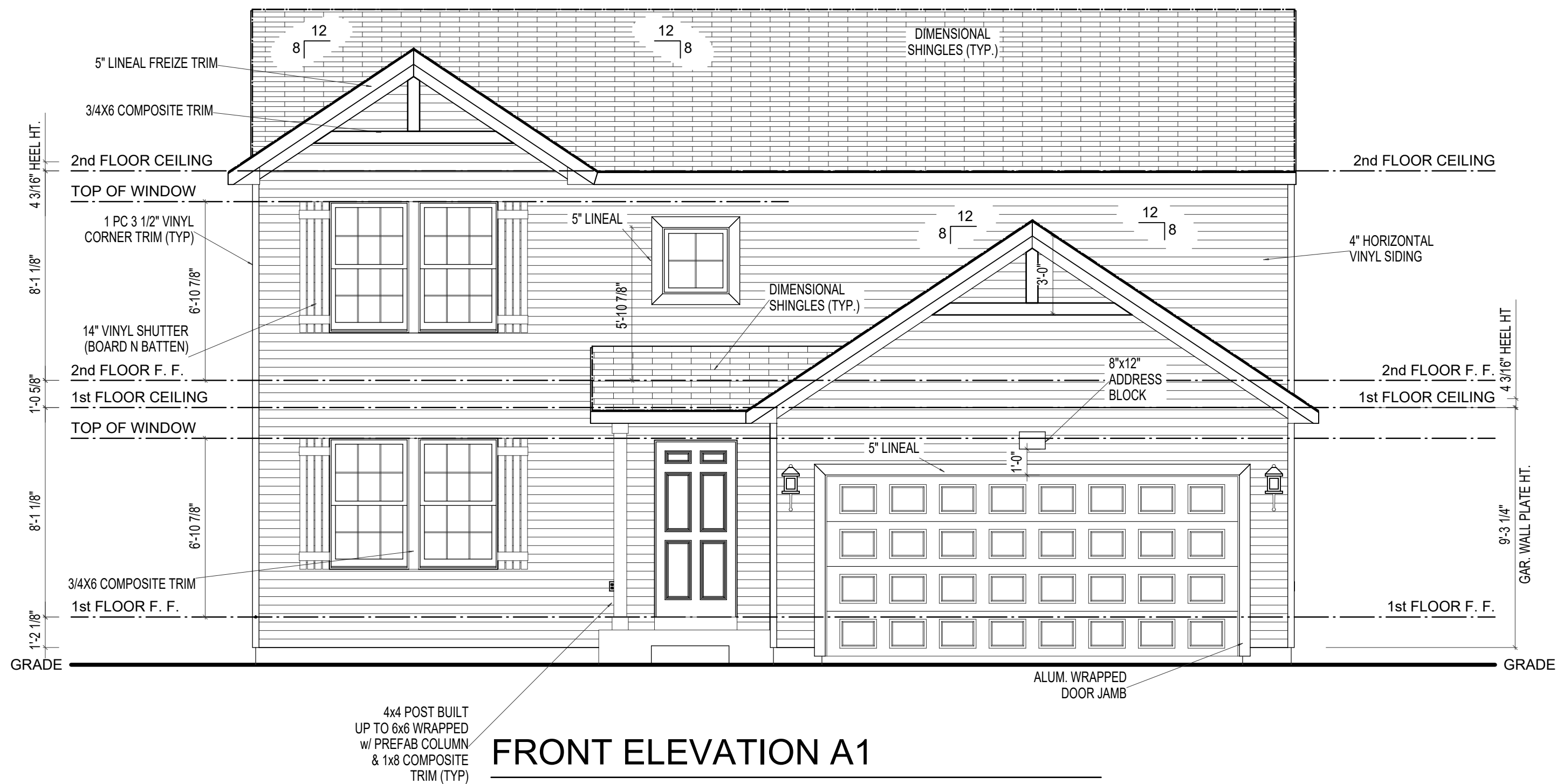
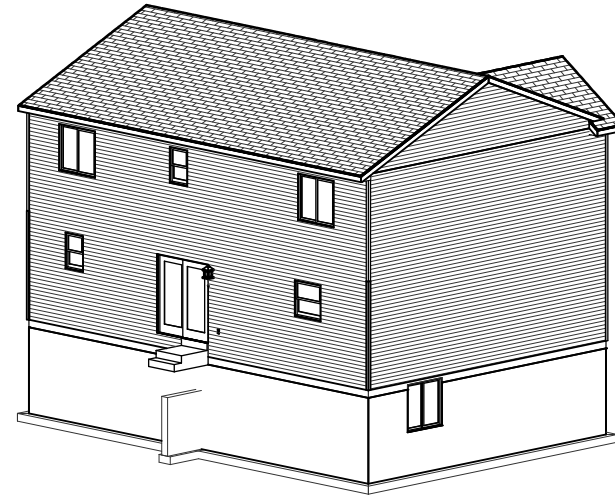
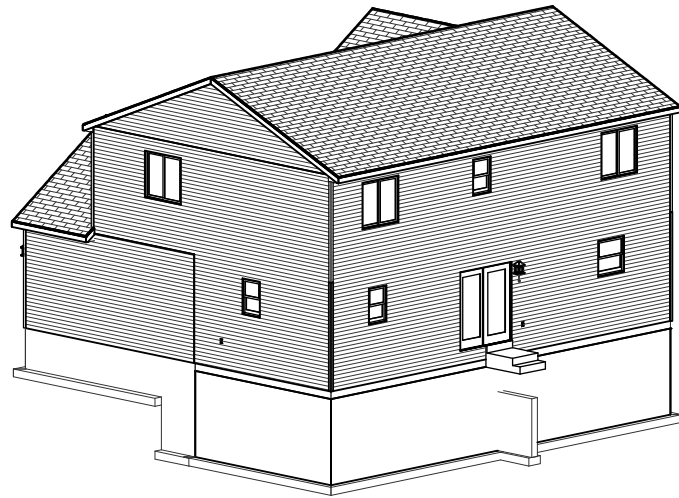
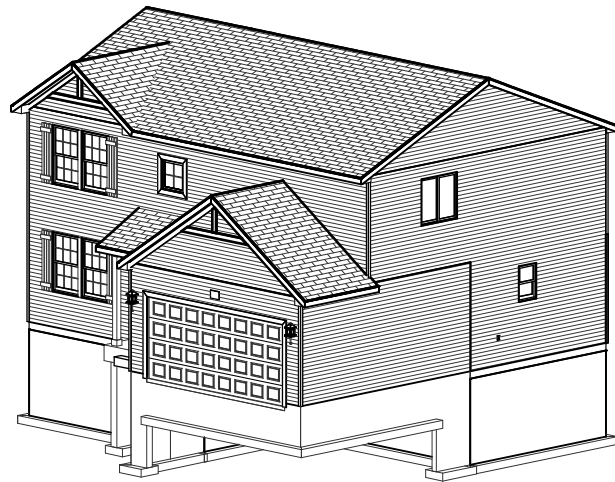
4-5 bedrooms

2.5-3.5 bathrooms

2-3 car attached garage



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FRONT ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

i2000

GARAGE RIGHT

REVISION V8.0c

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i2000

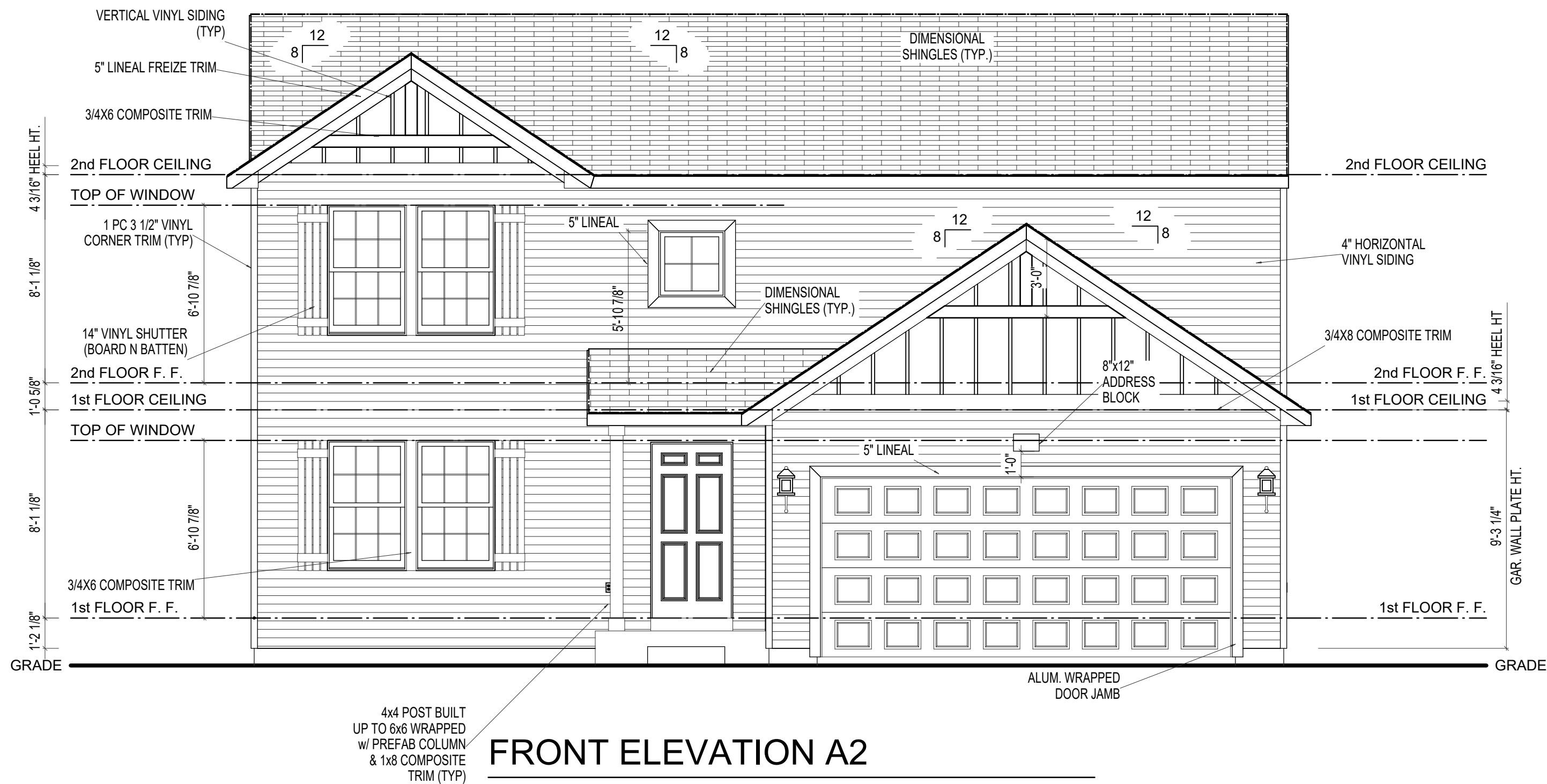
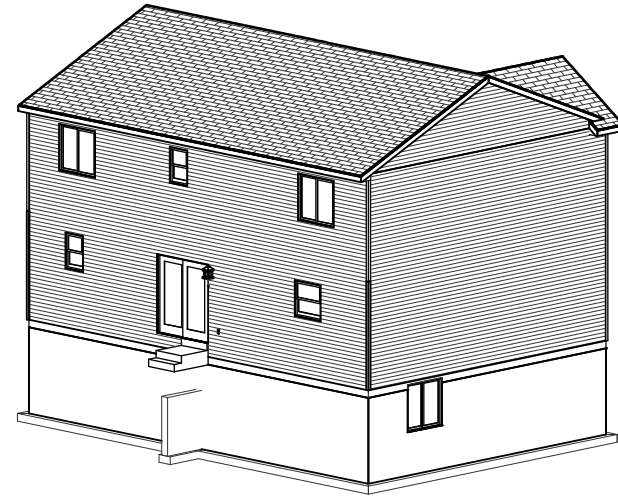
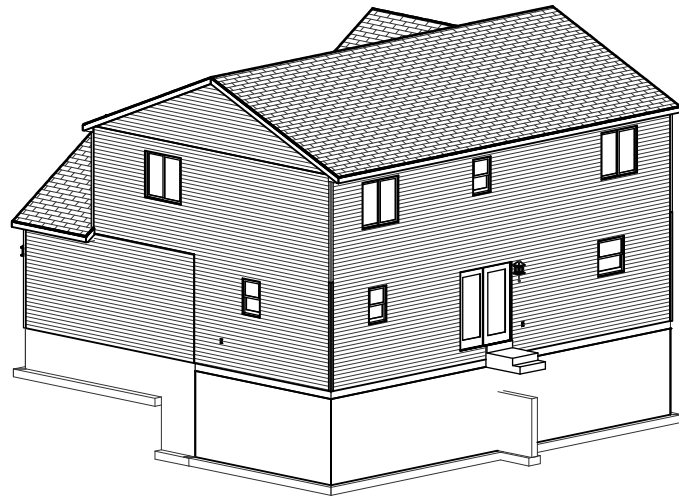
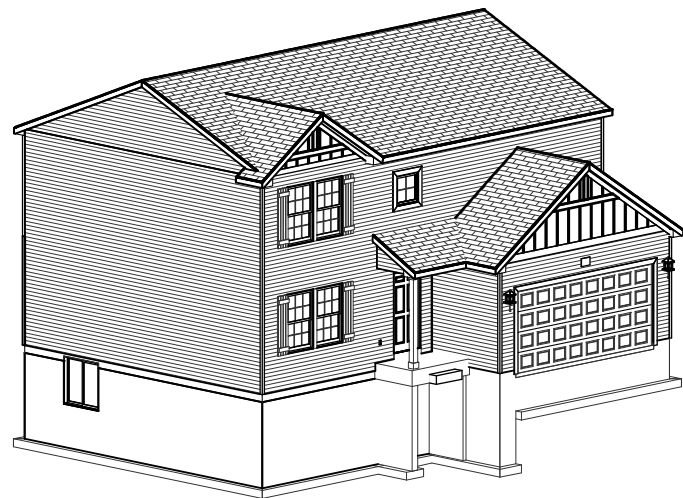
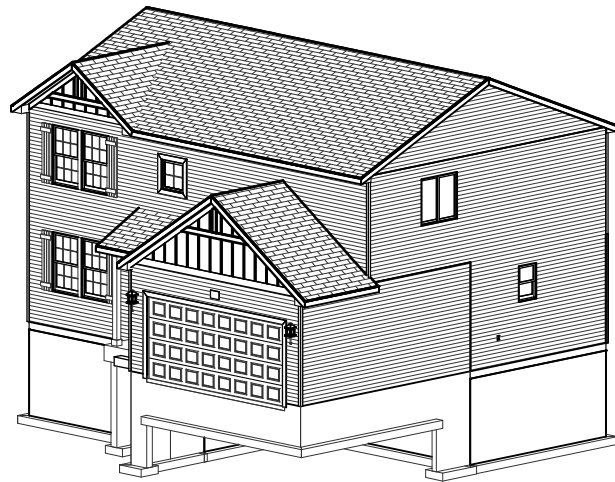
FOR: Allen Edwin Homes

LOT #:

LOCATION:

SHEET NUMBER

A-01.00



FRONT ELEVATION A2

SCALE: 1/4"=1'-0"

REMARKS		REV. NO.	DATE
i2000			
GARAGE RIGHT			
REVISION	V8.0c		

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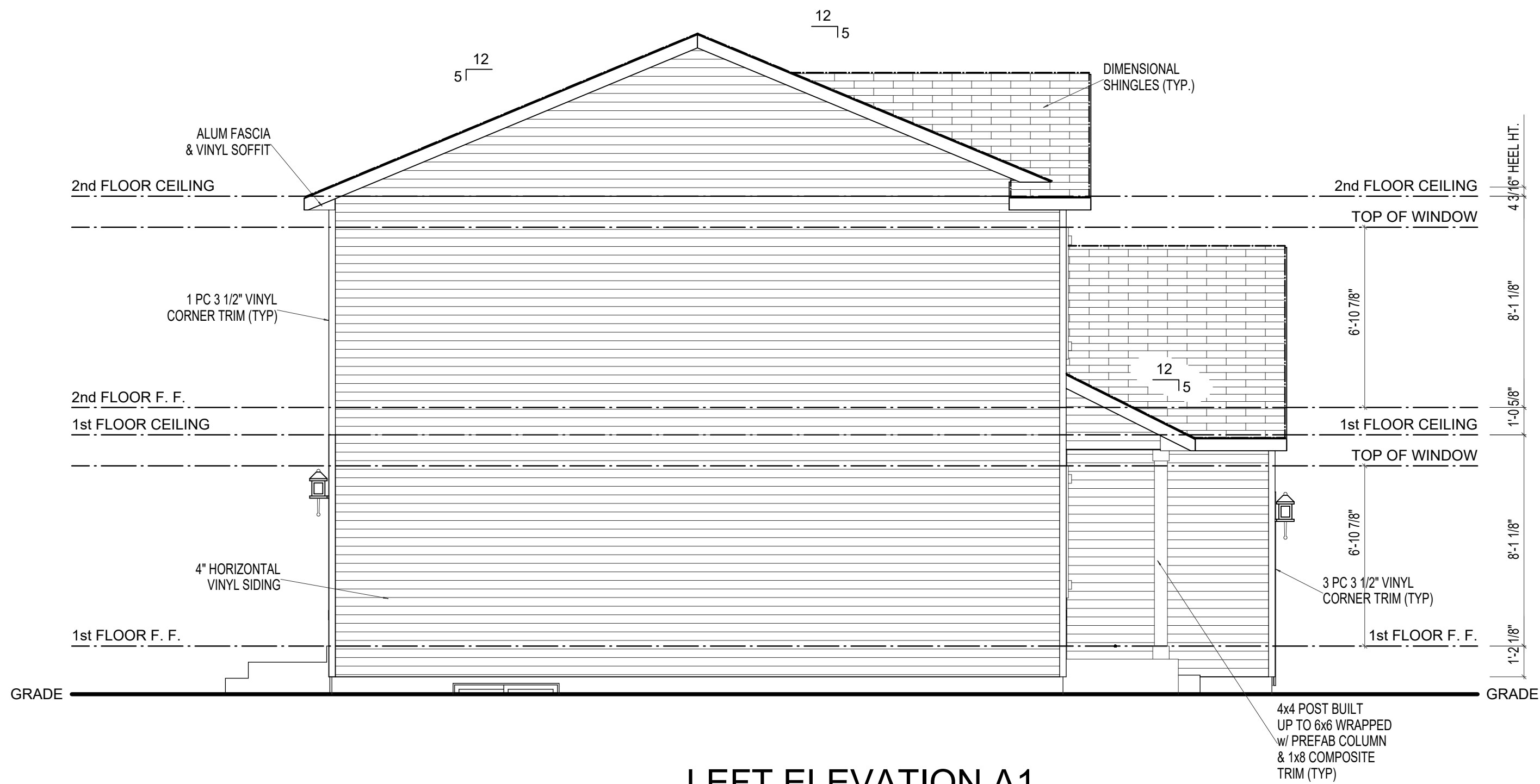
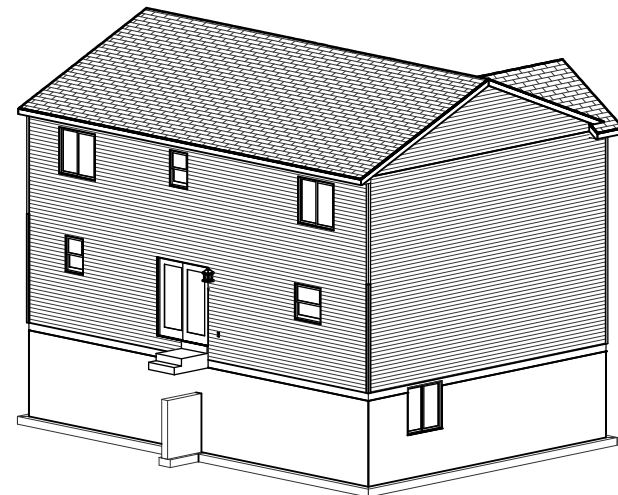
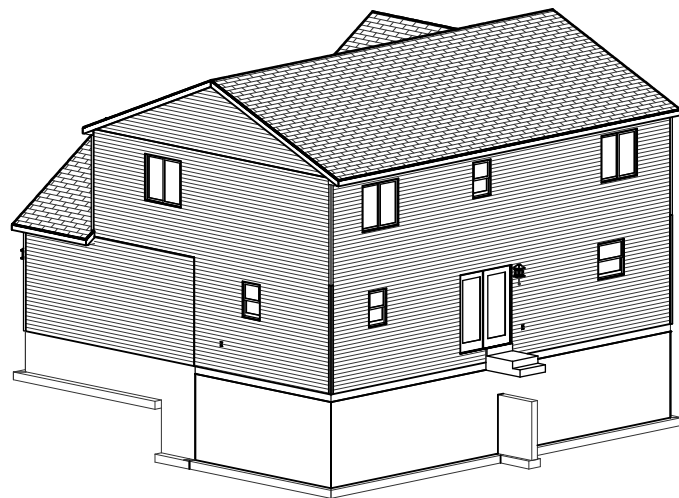
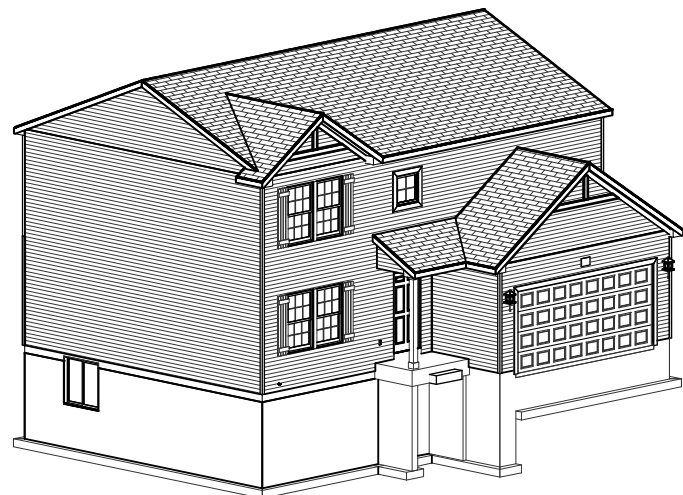
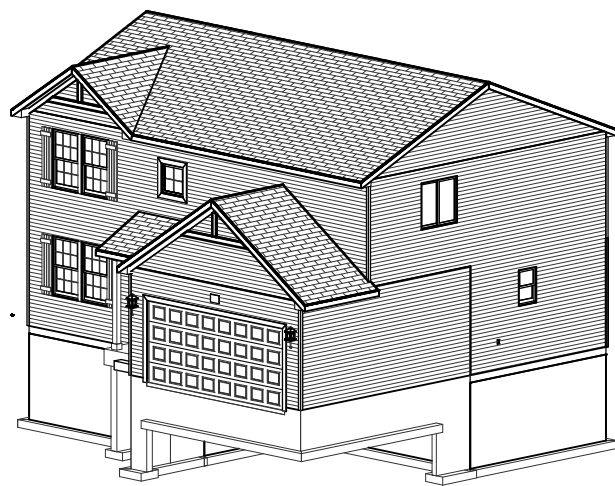
LOT #:

LOCATION:

i2000

SHEET NUMBER

A-01.04



LEFT ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

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03/29/2023

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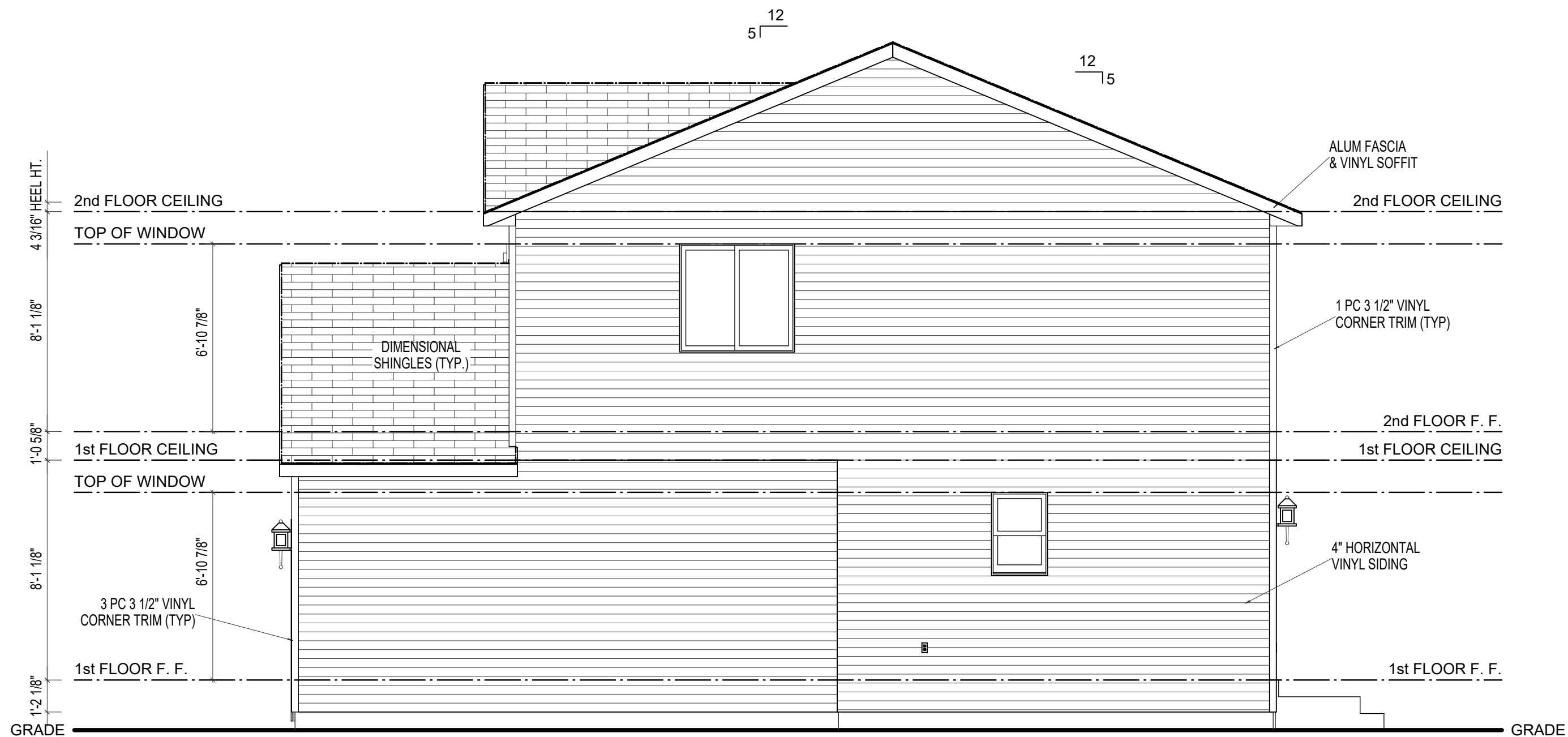
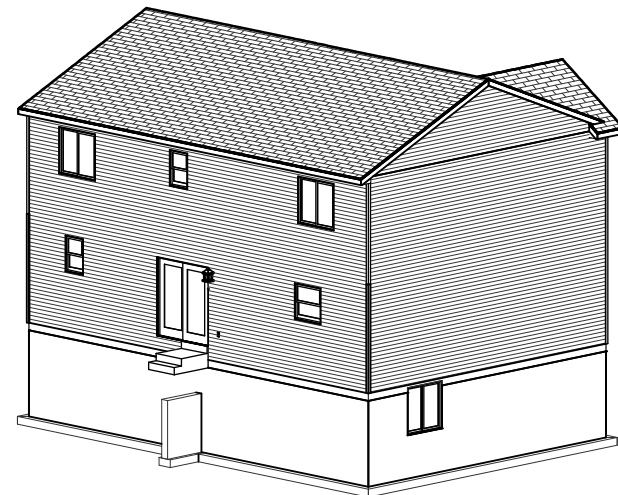
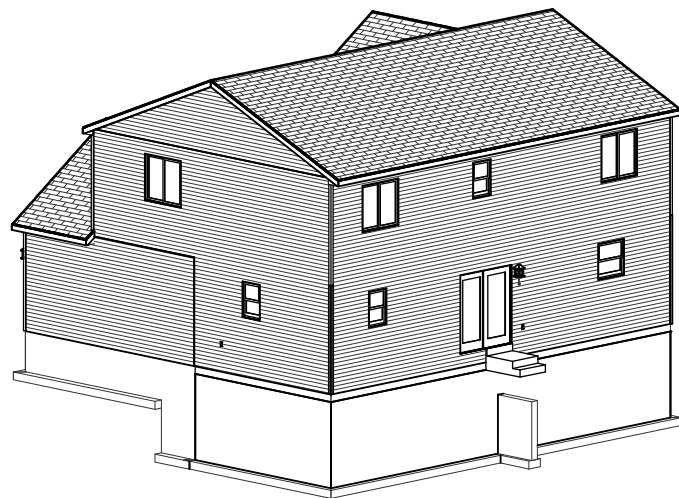
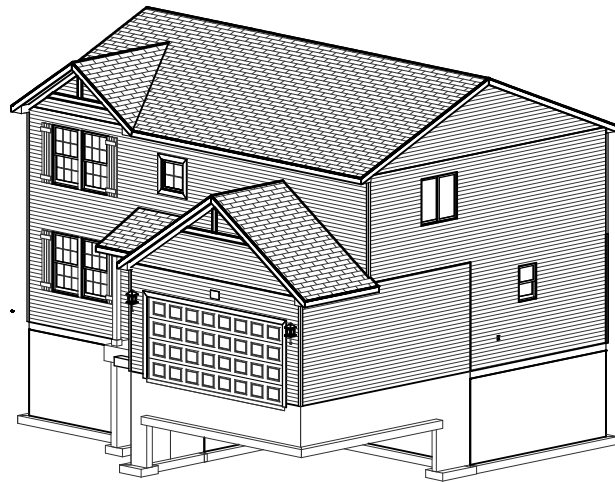
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LOT #:

LOCATION:

SHEET NUMBER

A-02.00



RIGHT ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

DATE

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03/29/2023

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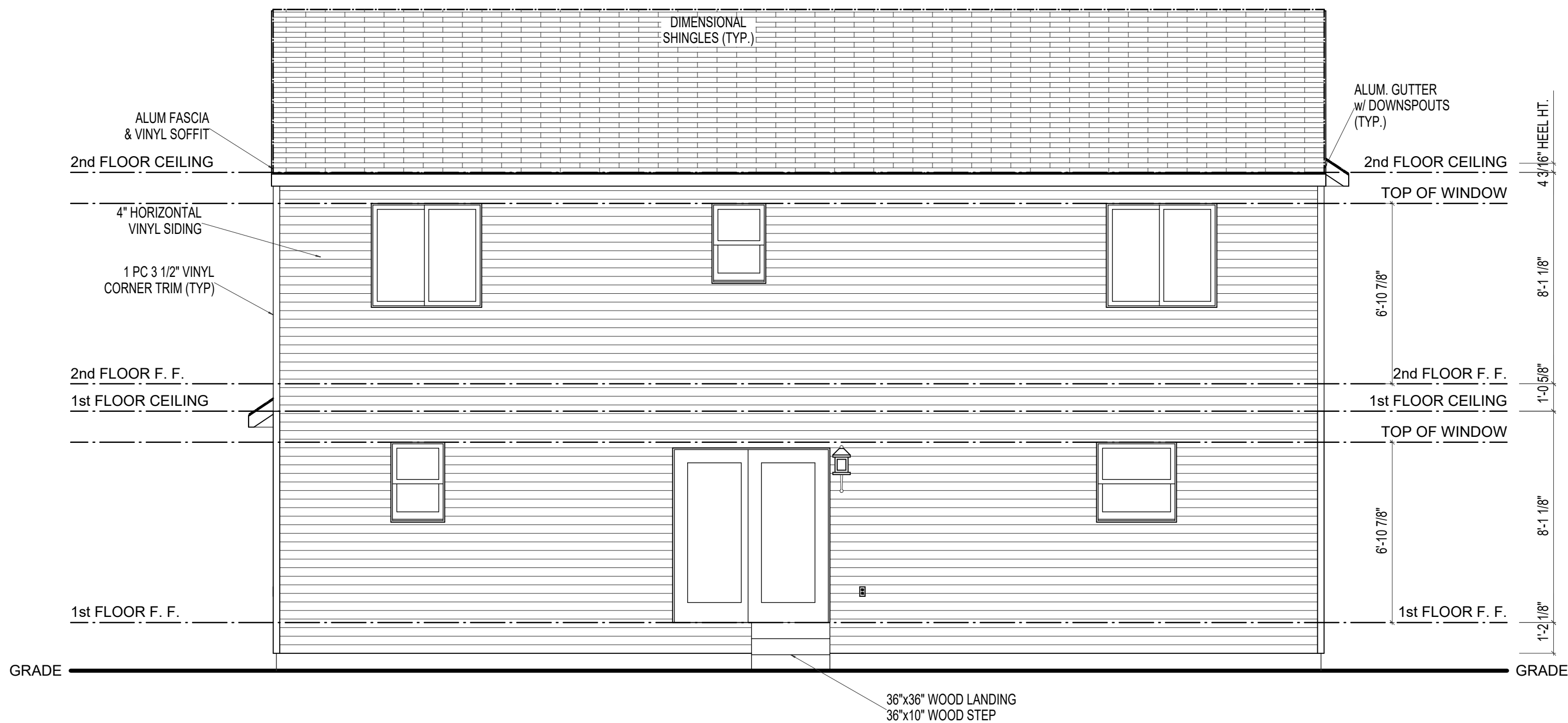
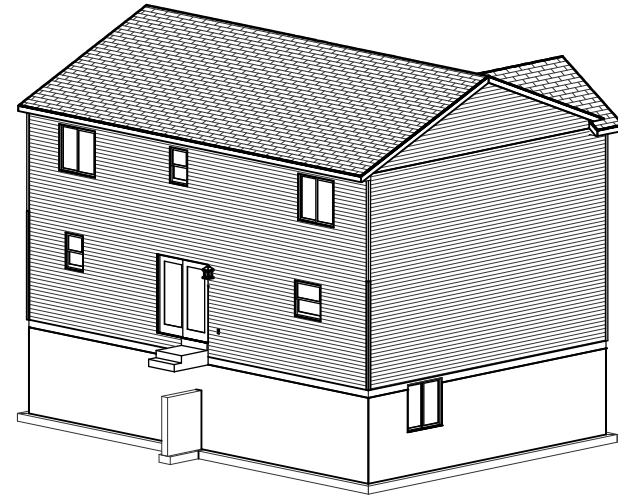
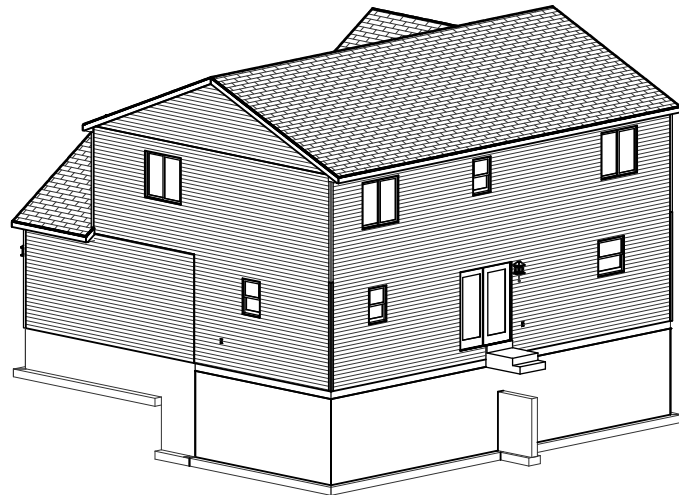
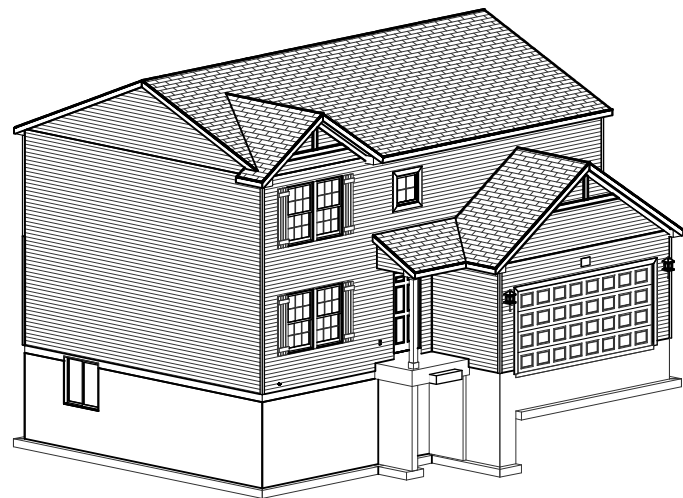
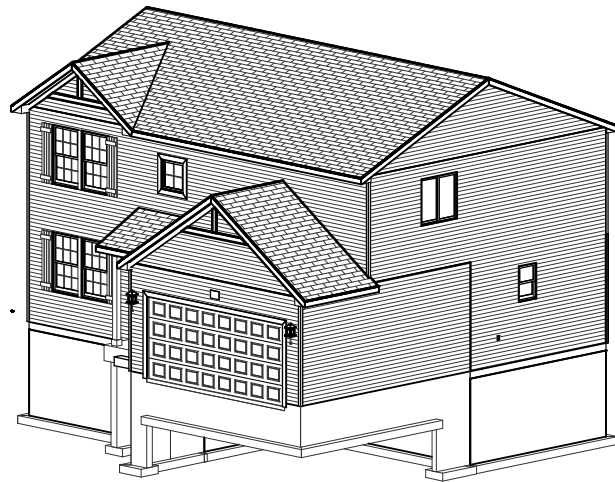
LOT #:

LOCATION:

SHEET NUMBER

A-03.00

335



REAR ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

REV. NO.

DATE

i2000

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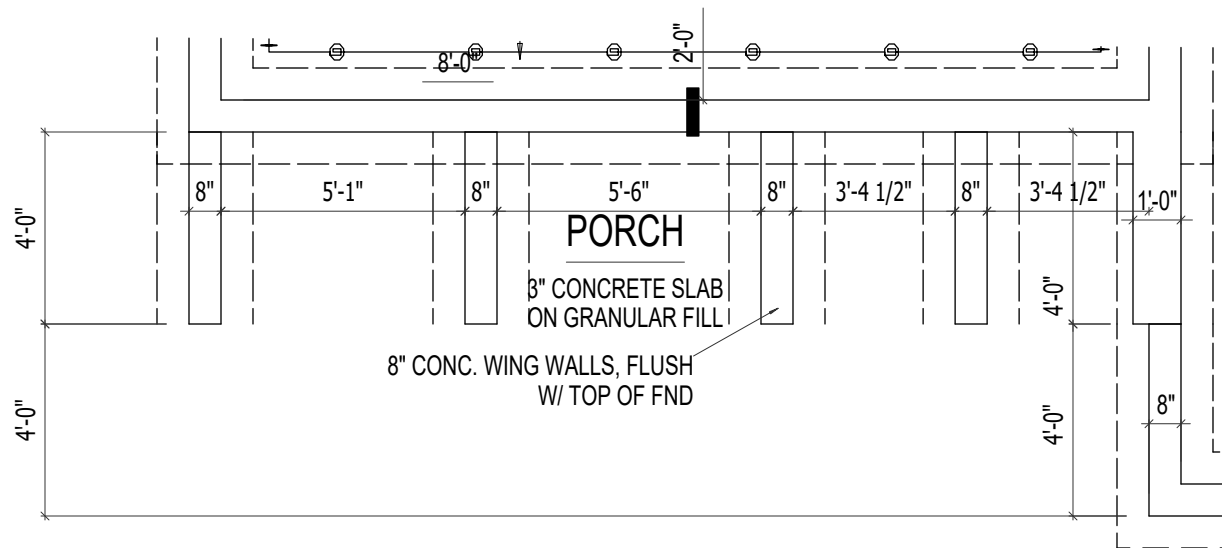
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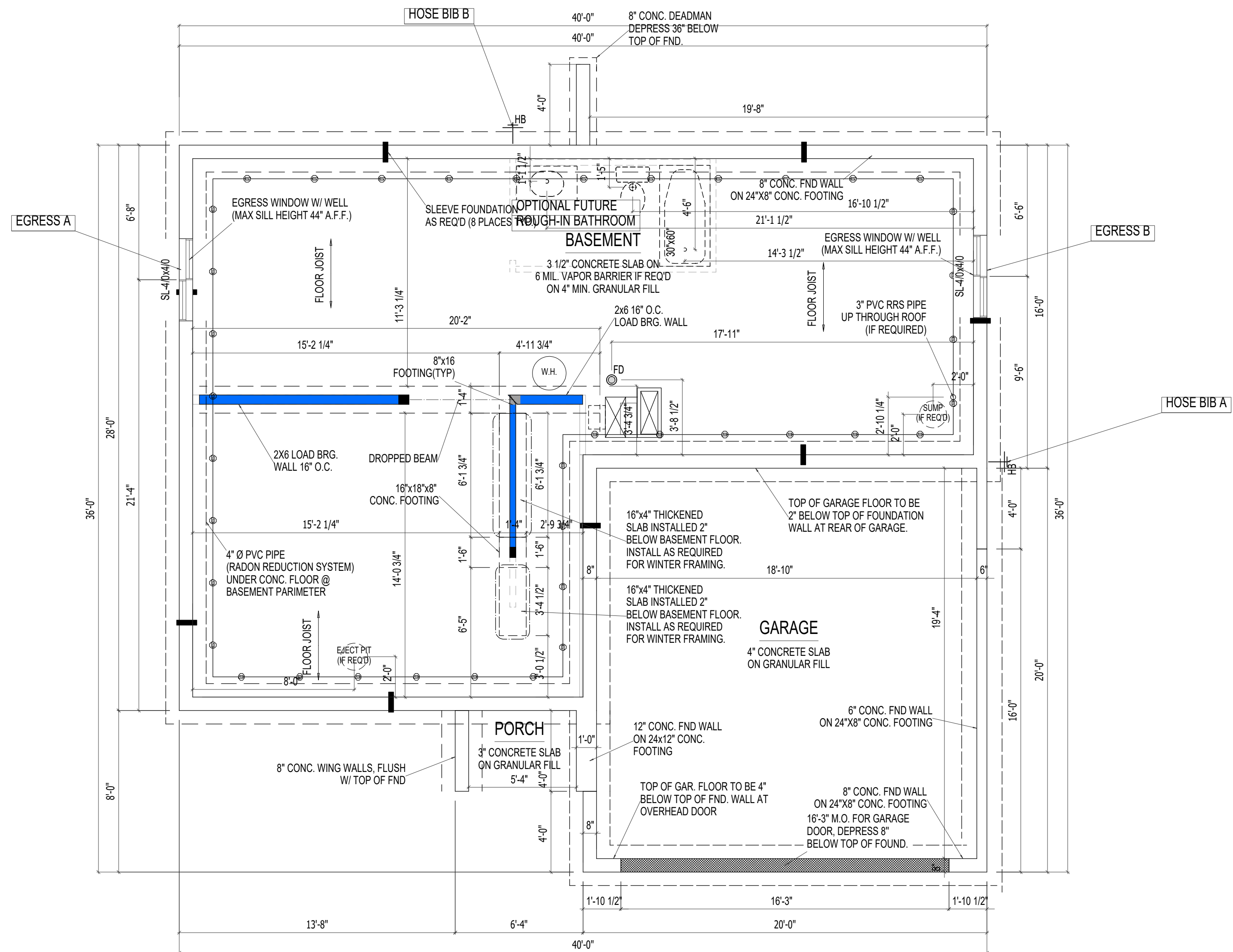
A-04.00

336



C/D ELEVATION OPTIONS

SCALE: 1/4"=1'-0"



BASEMENT FOUNDATION: STANDARD A ELEVATION

SCALE: 1/4"=1'-0"

REMARKS

DATE

REV. NO.

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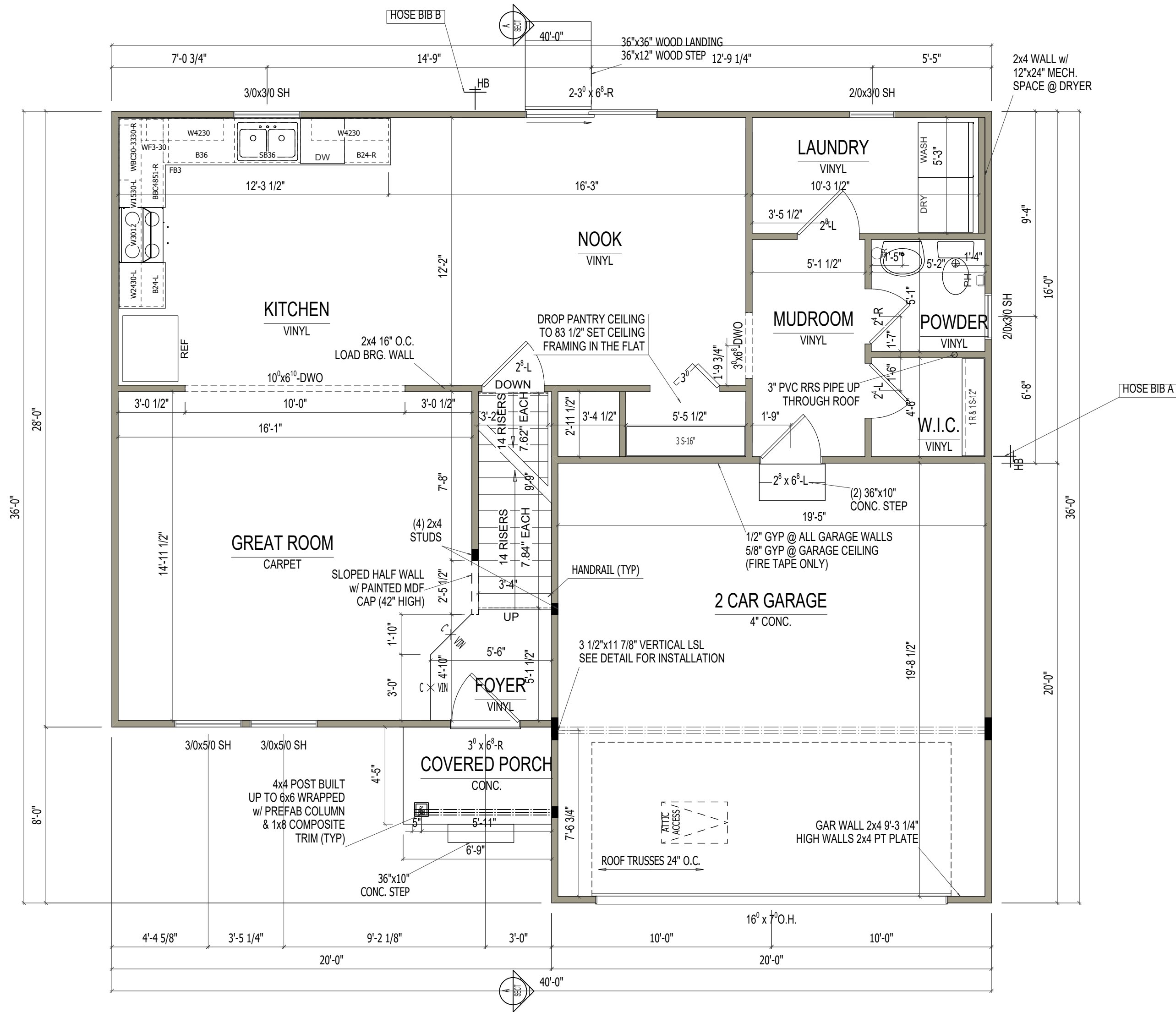
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A-06.00

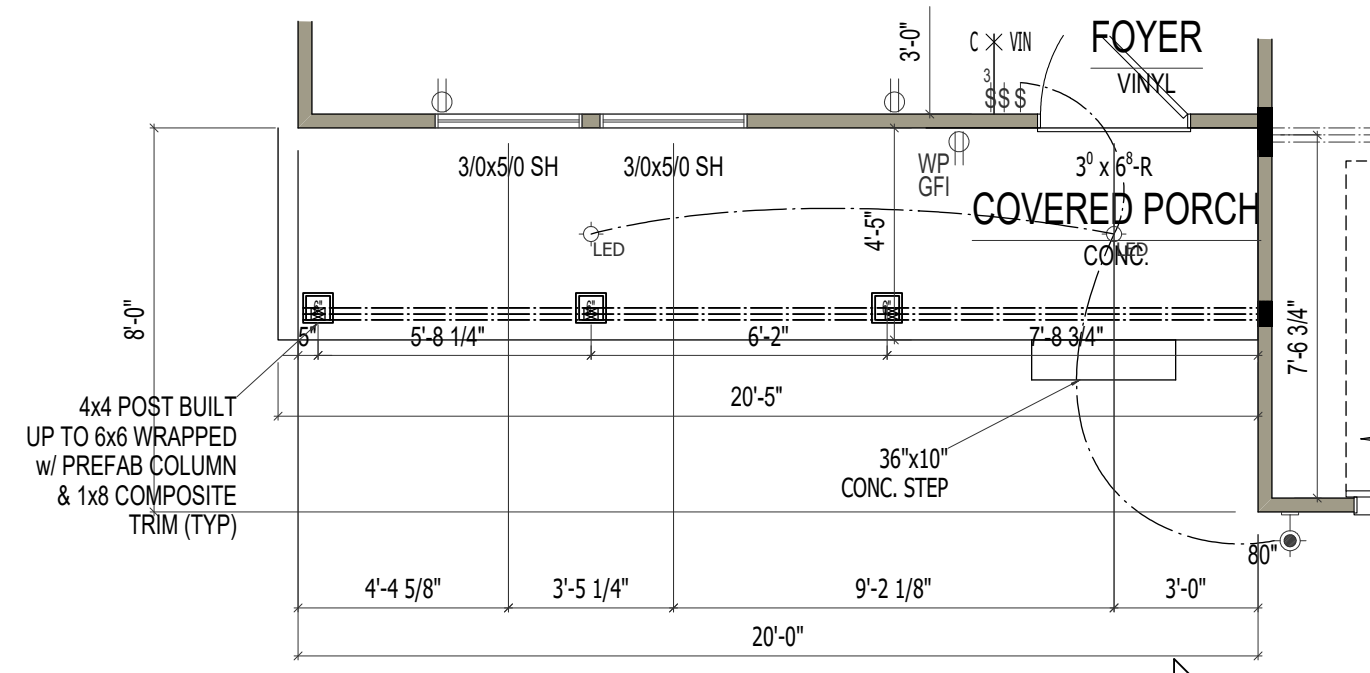
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CG Visions 2006 PLAN CREATION DATE 06/30/2016



FIRST FLOOR i2000

SCALE: 1/4"=1'-0"



C/D ELEVATION OPTIONS

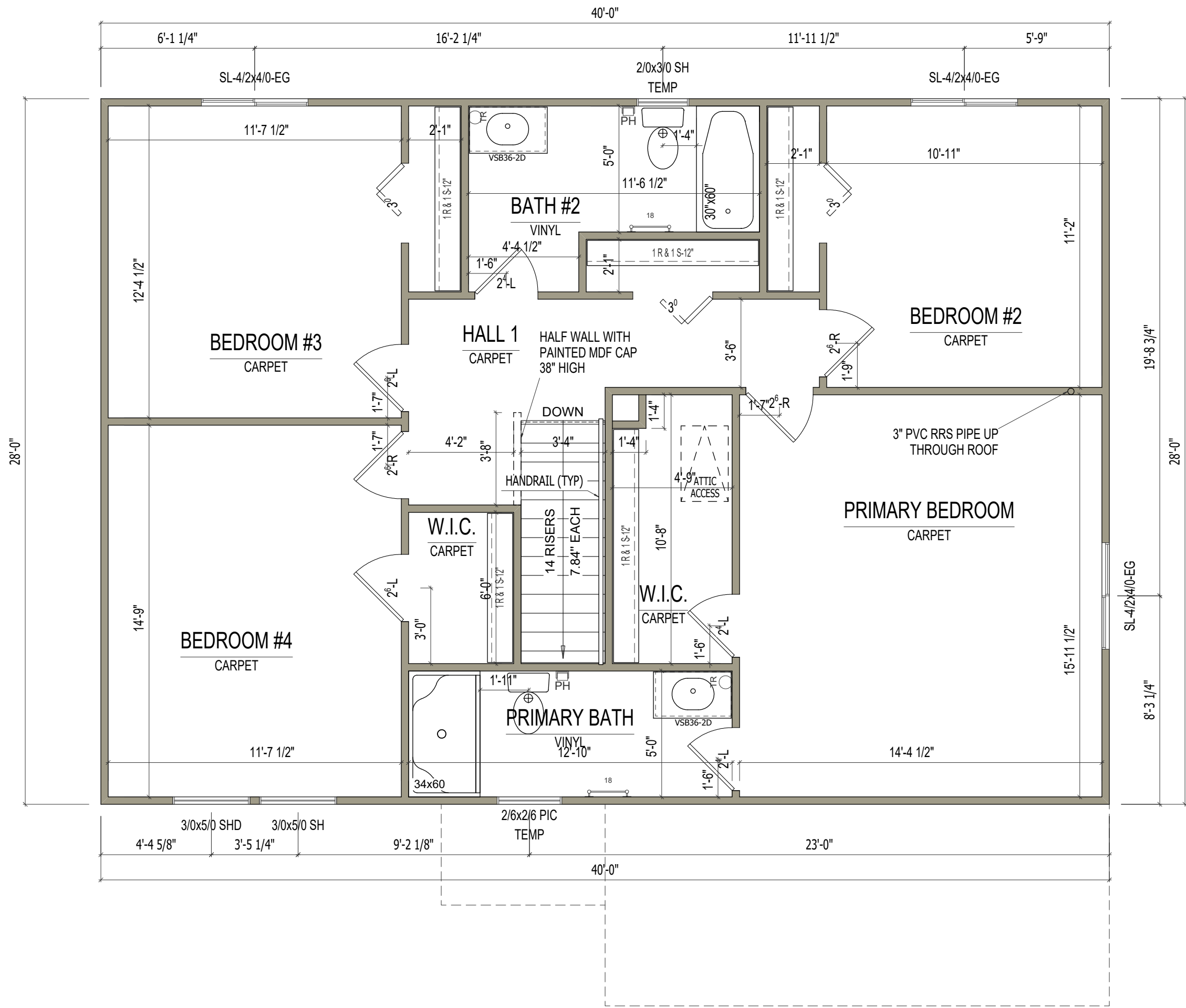
SCALE: 1/4"=1'-0"

REMARKS		DATE	REV. NO.	i2000
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REVISION	V8.0c			

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	LOCATION:

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SECOND FLOOR i2000

SCALE: 1/4"=1'-0"

i2000		REV. NO.	DATE	REMARKS
GARAGE RIGHT				
REVISION	V8.0c			

integrity 2060

2,060 SF

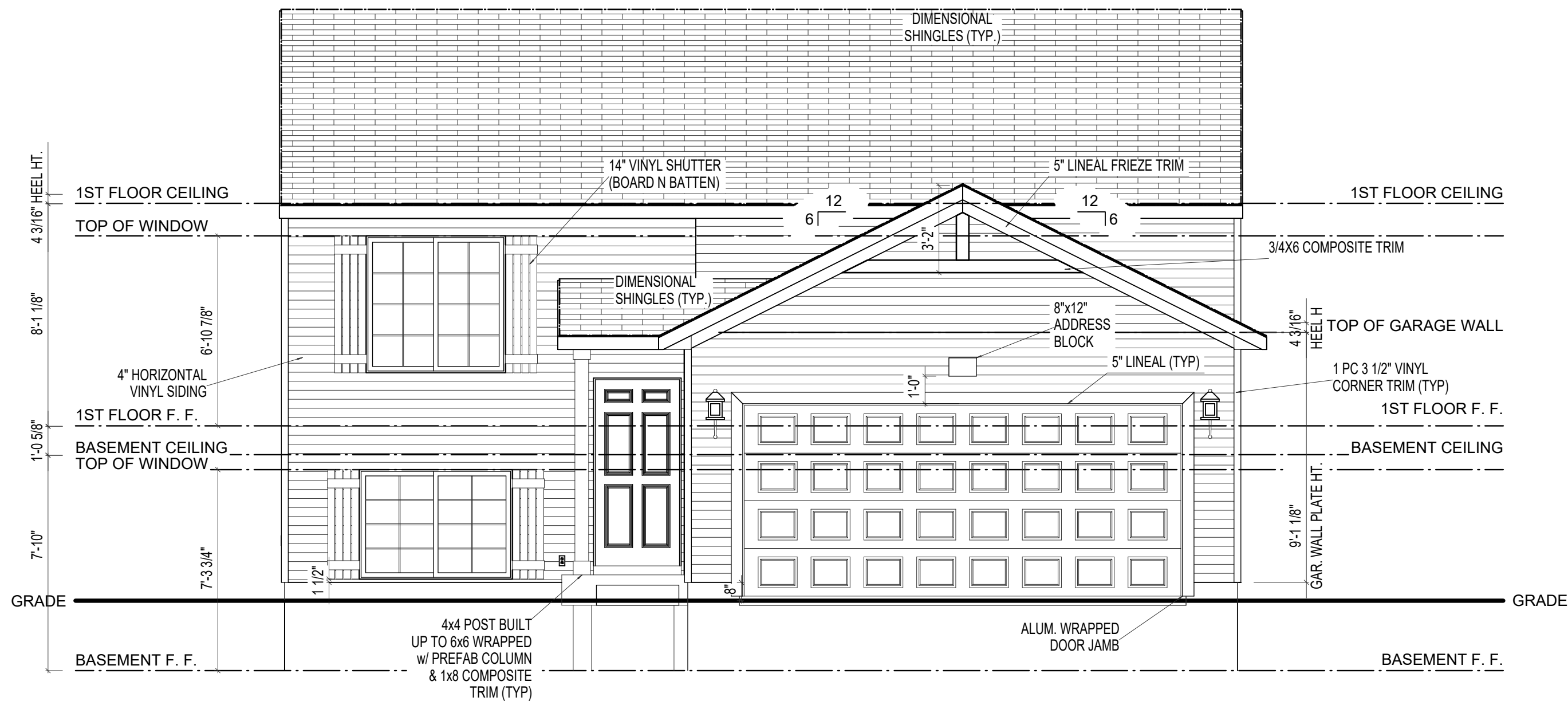
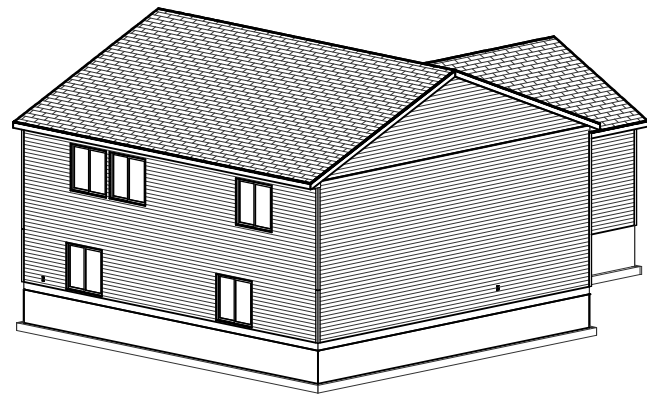
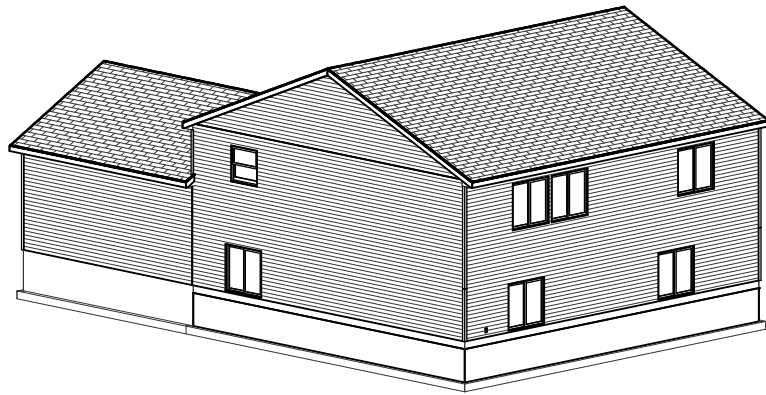
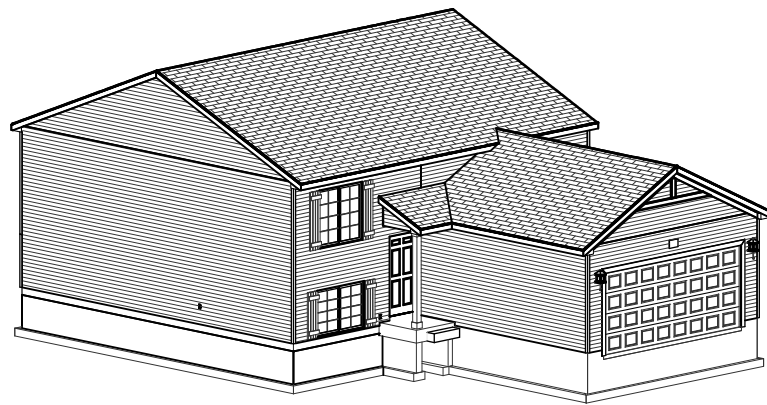
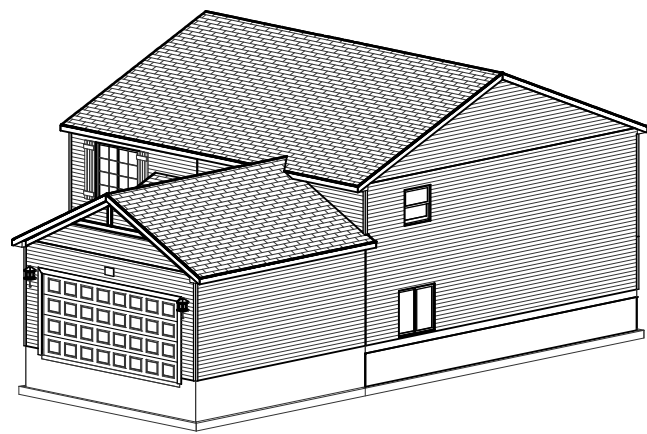
3-4 bedrooms

2-2.5 bathrooms

2 car attached garage



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FRONT ELEVATION A1

SCALE: 1/4"=1'-0"

REMARKS

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08/04/2023

i2060

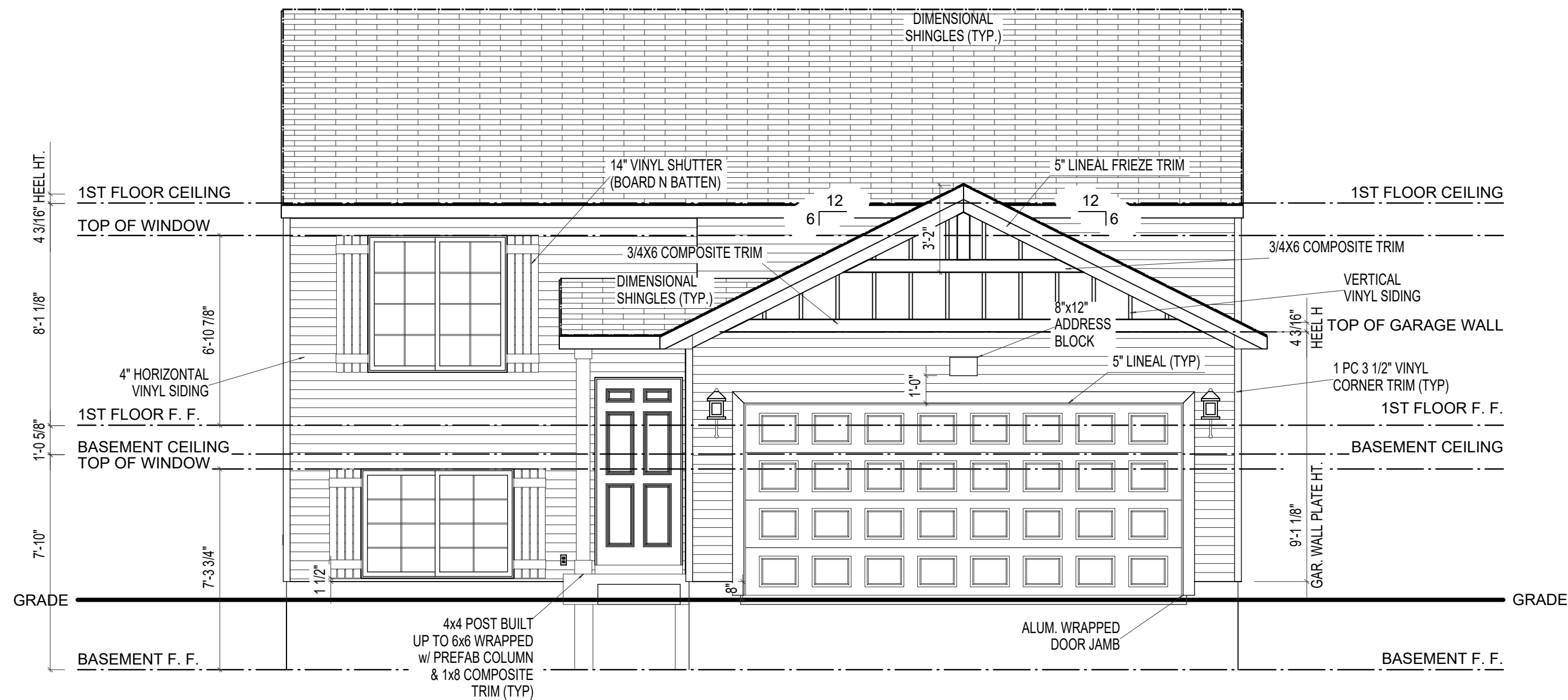
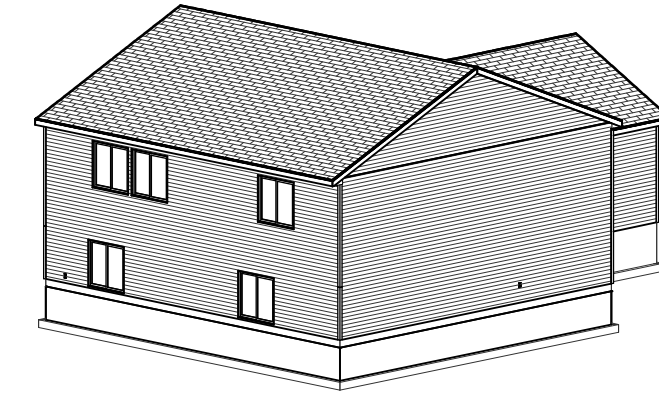
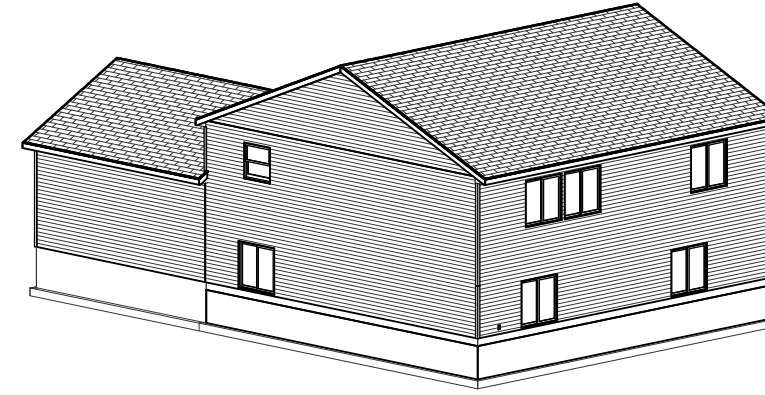
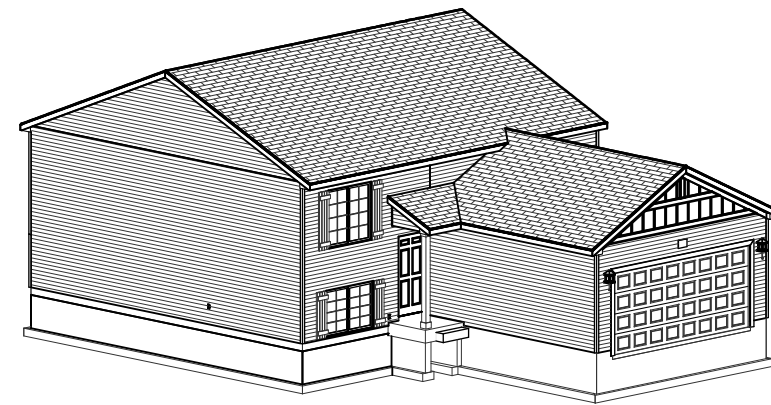
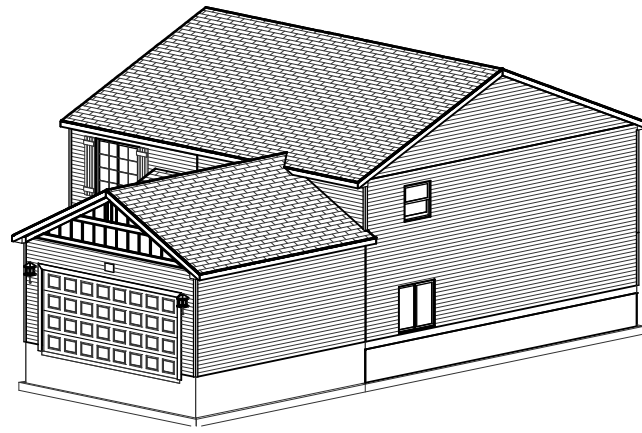
FOR:
Allen Edwin Homes

LOT #:

LOCATION:

SHEET NUMBER

A-01.00



FRONT ELEVATION A2

SCALE: 1/4"=1'-0"

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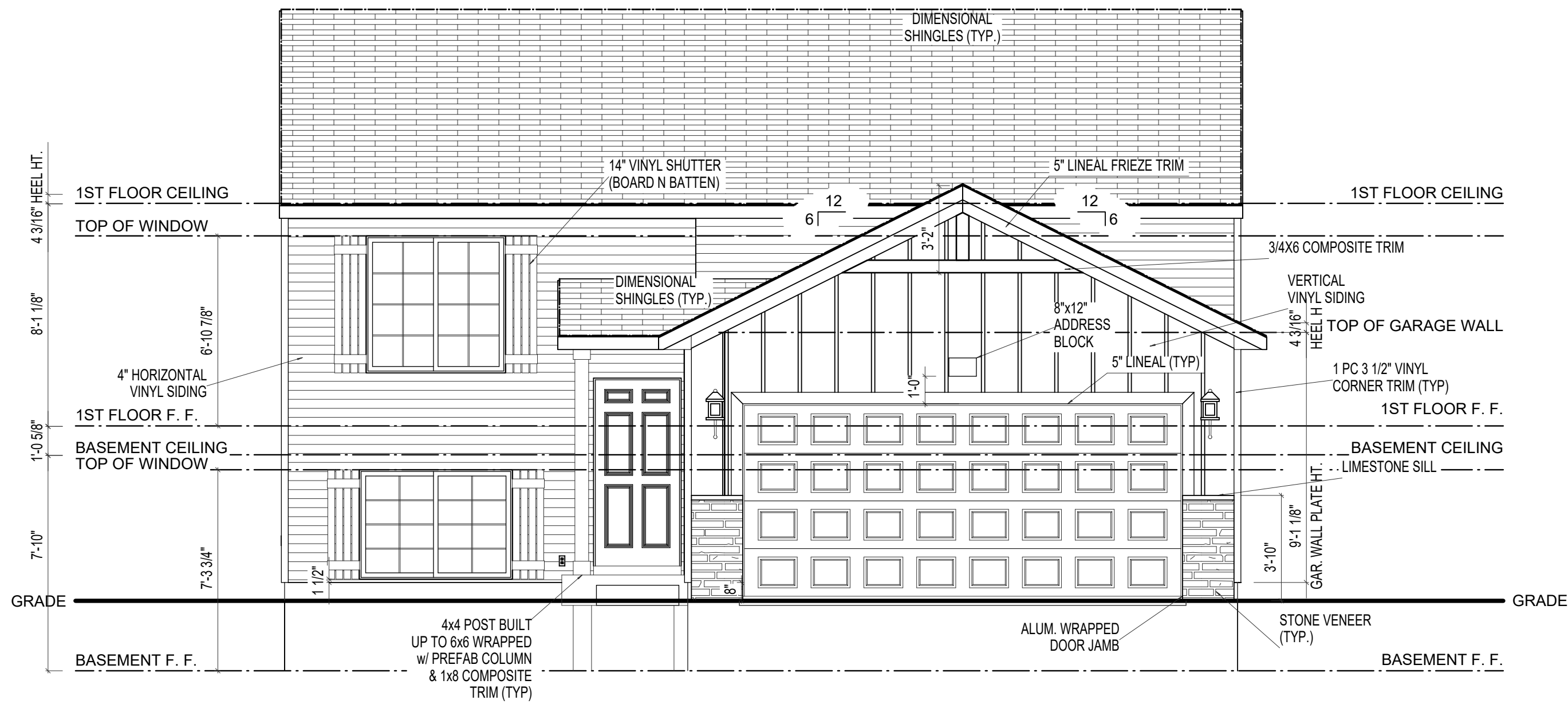
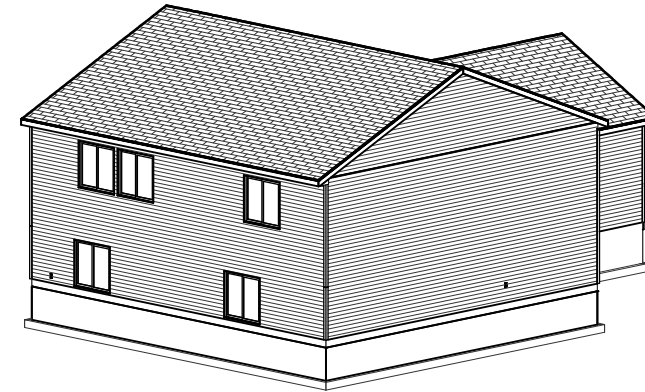
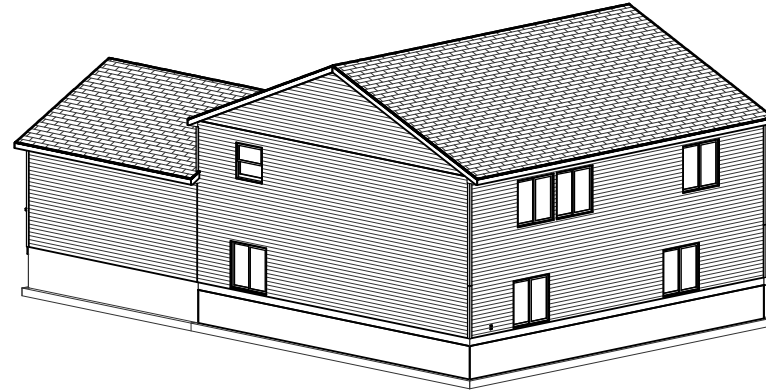
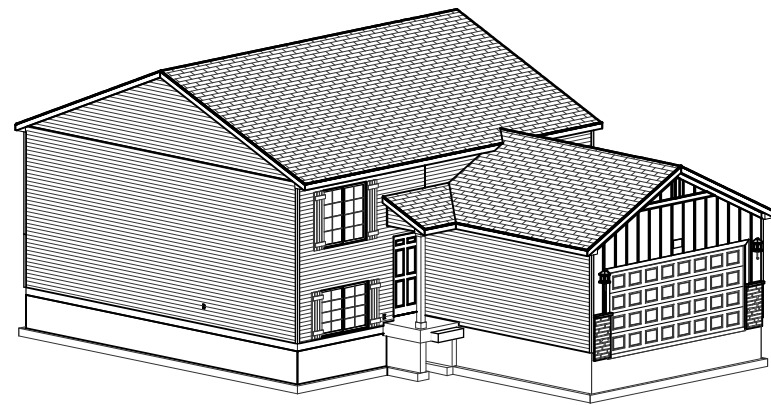
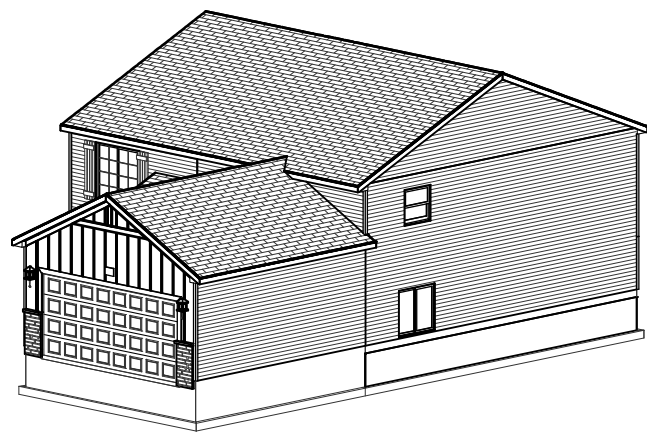
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107

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SHEET NUMBER

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FRONT ELEVATION A3

SCALE: 1/4"=1'-0"

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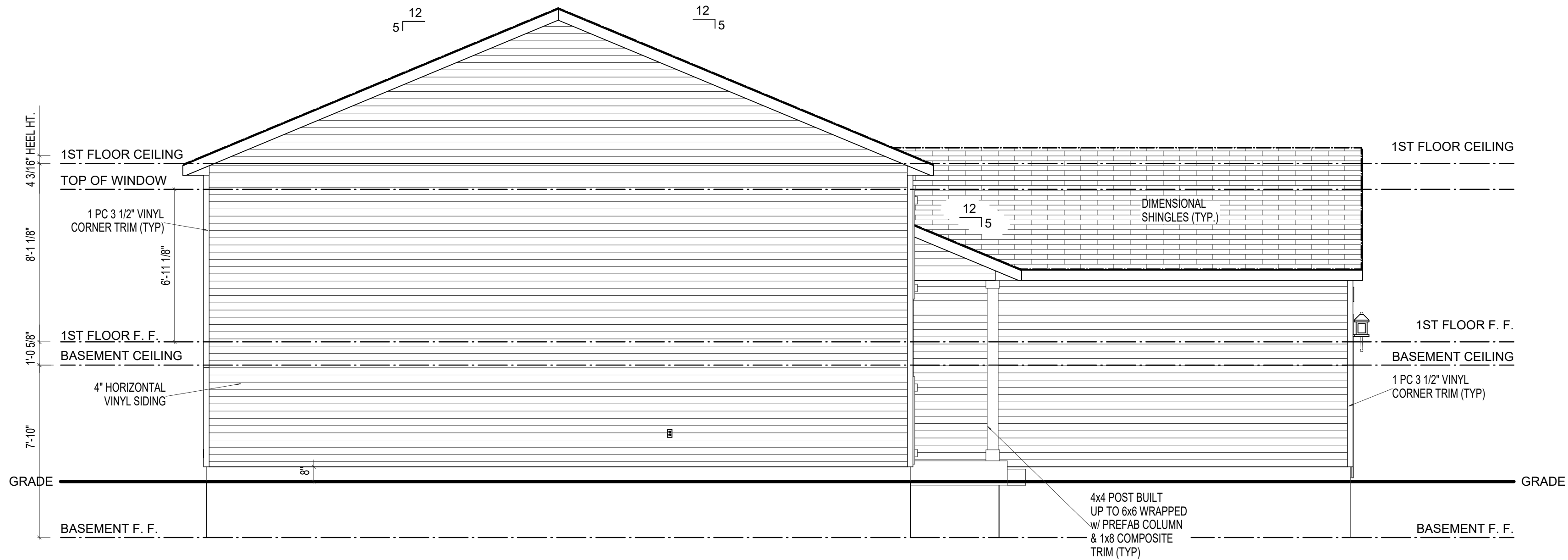
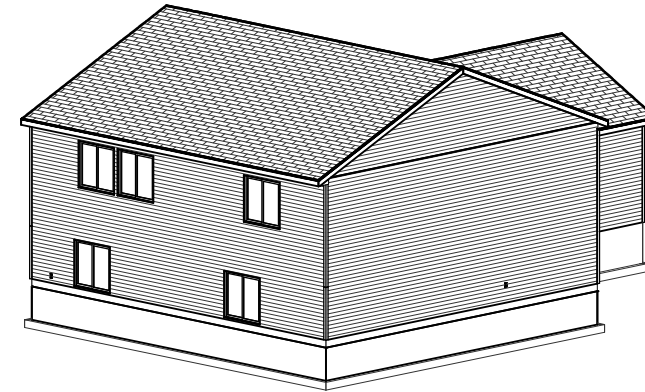
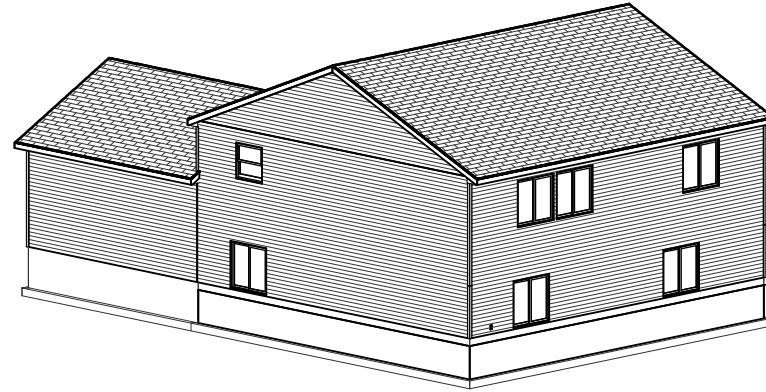
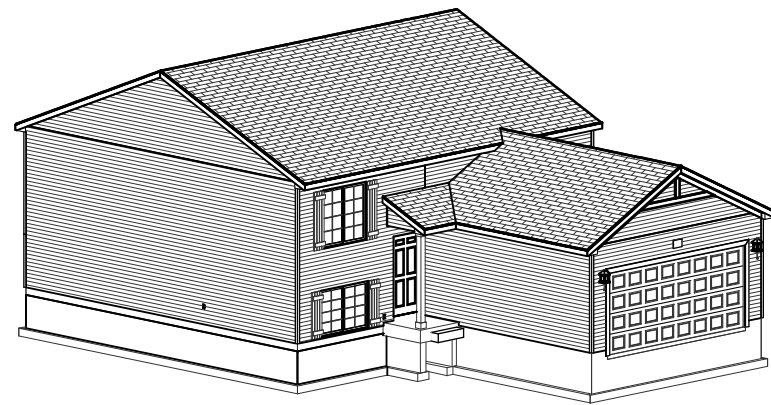
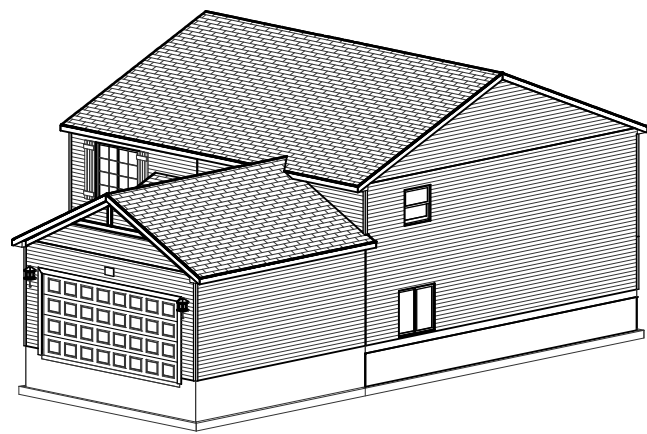
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LEFT ELEVATION A1

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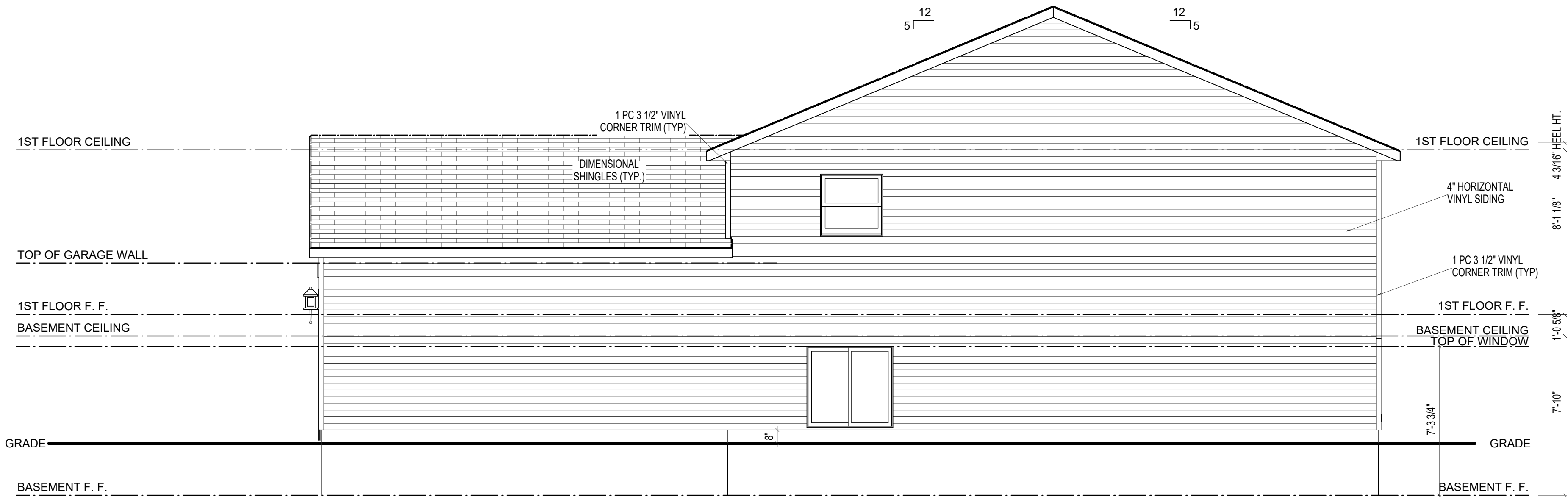
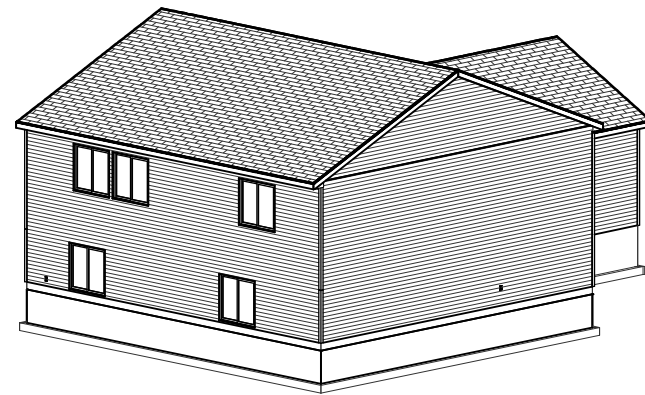
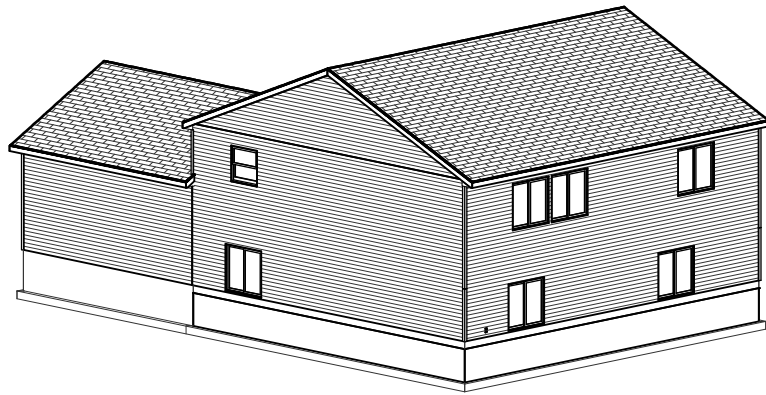
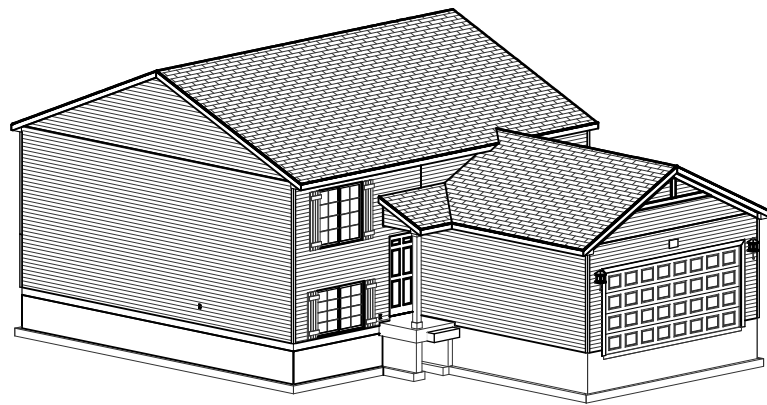
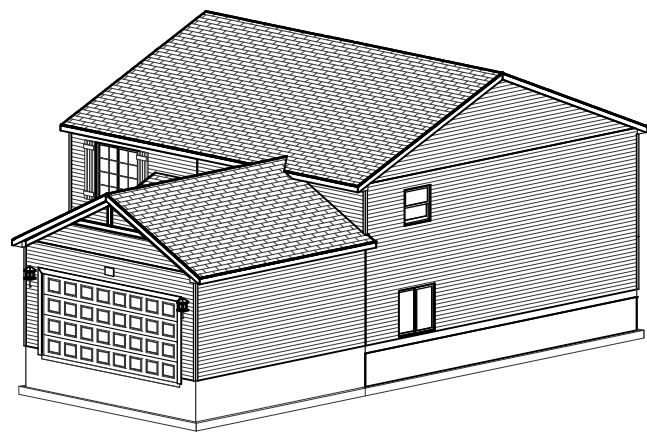
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RIGHT ELEVATION A1

SCALE: 1/4"=1'-0"

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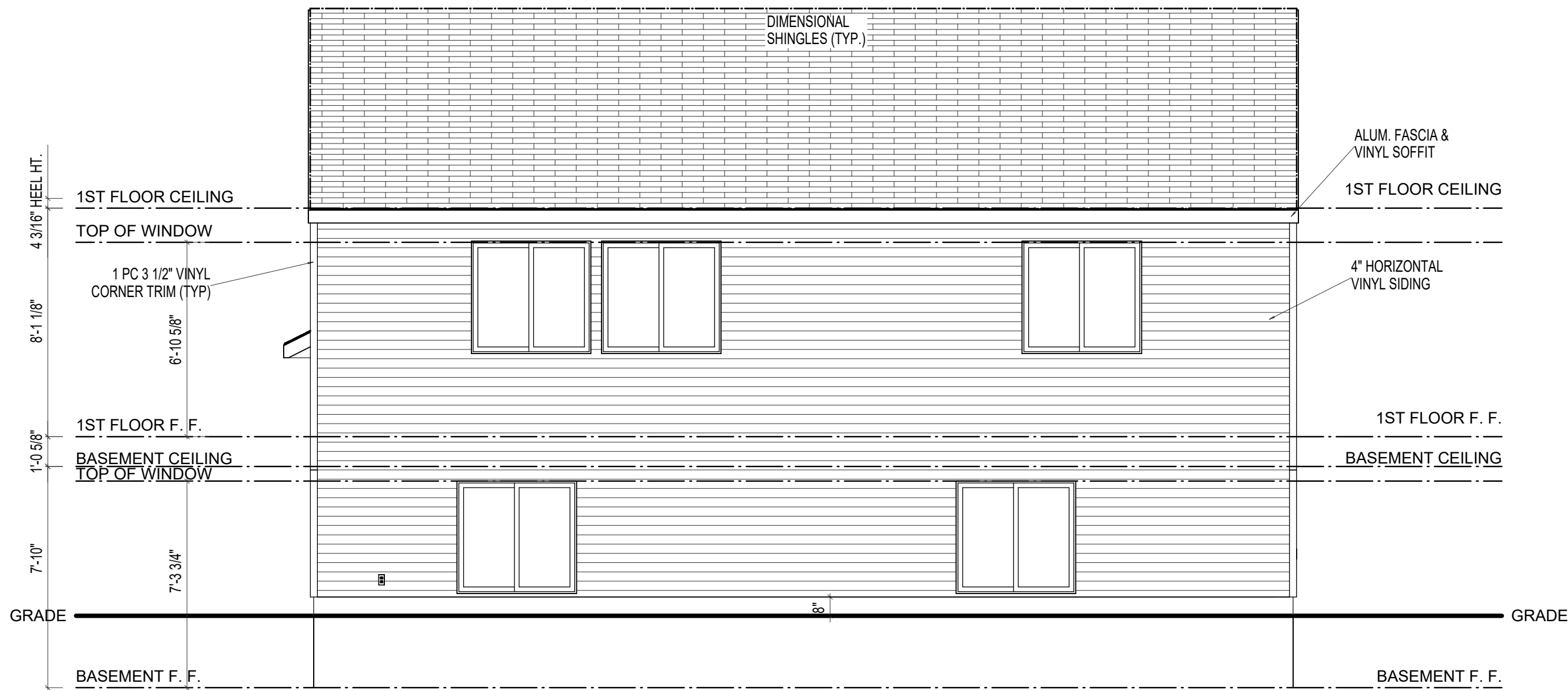
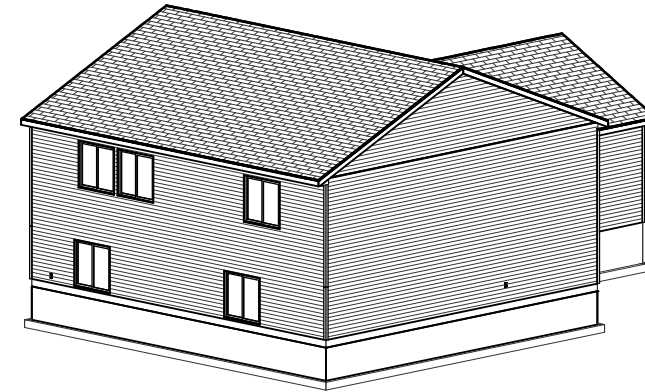
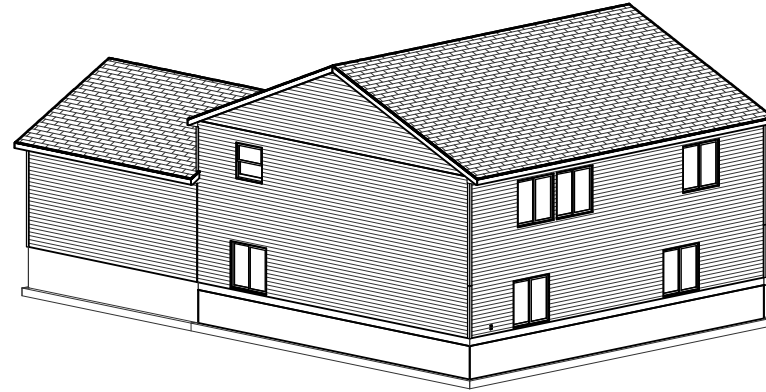
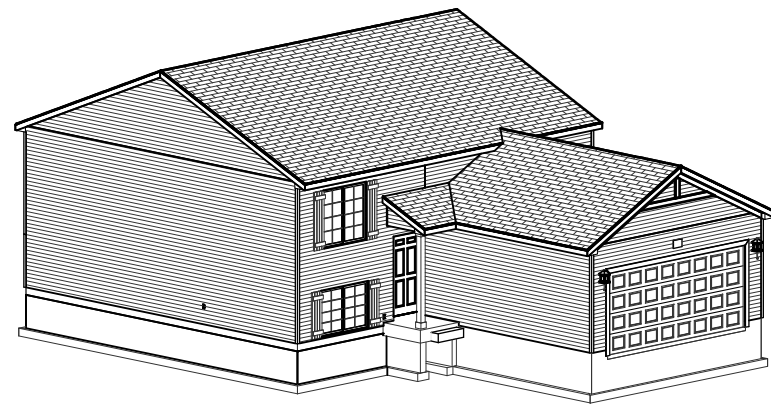
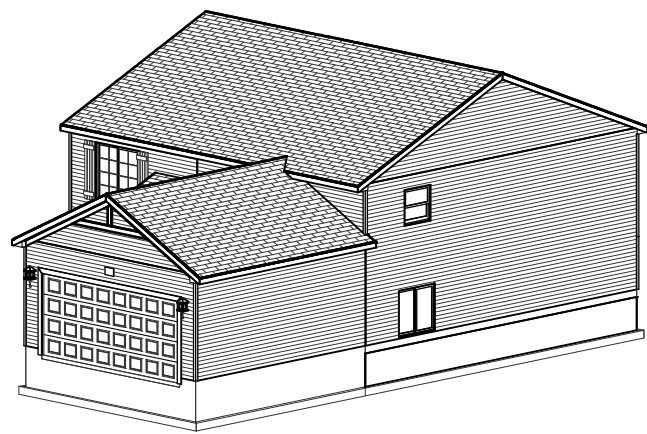
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REAR ELEVATION A1

SCALE: 1/4"=1'-0"

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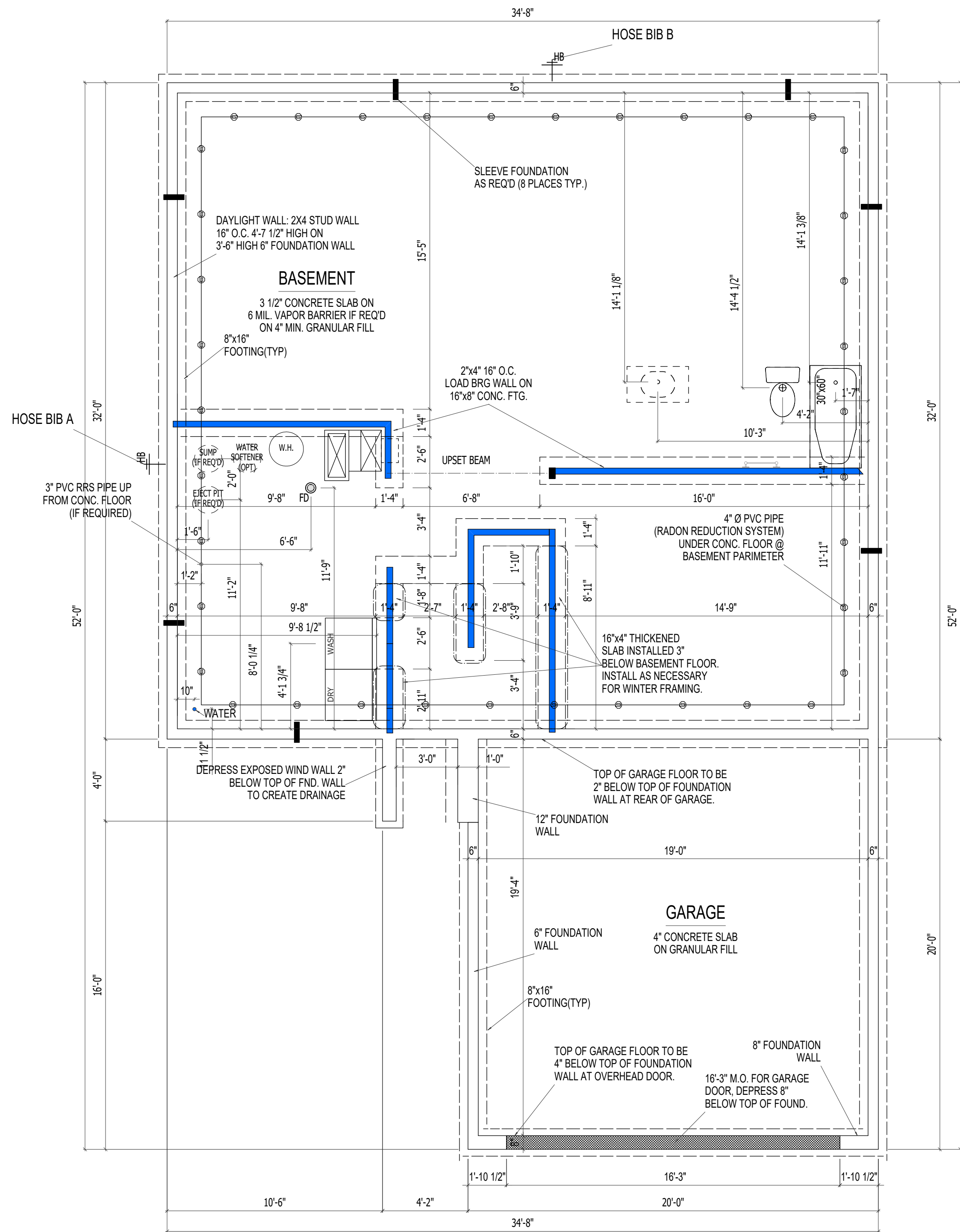
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BASEMENT FOUNDATION: STANDARD A ELEVATION

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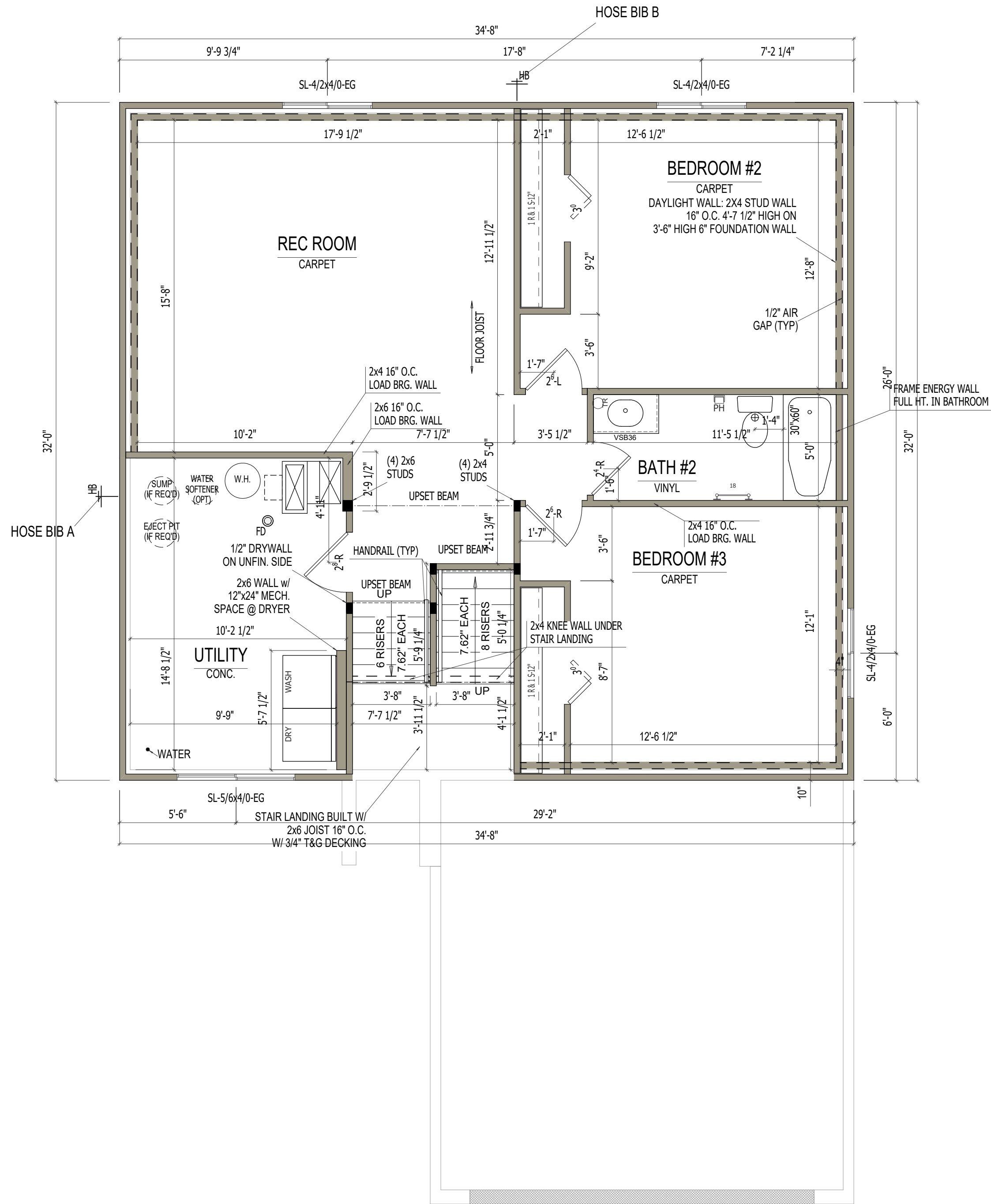
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BASEMENT FLOOR PLAN

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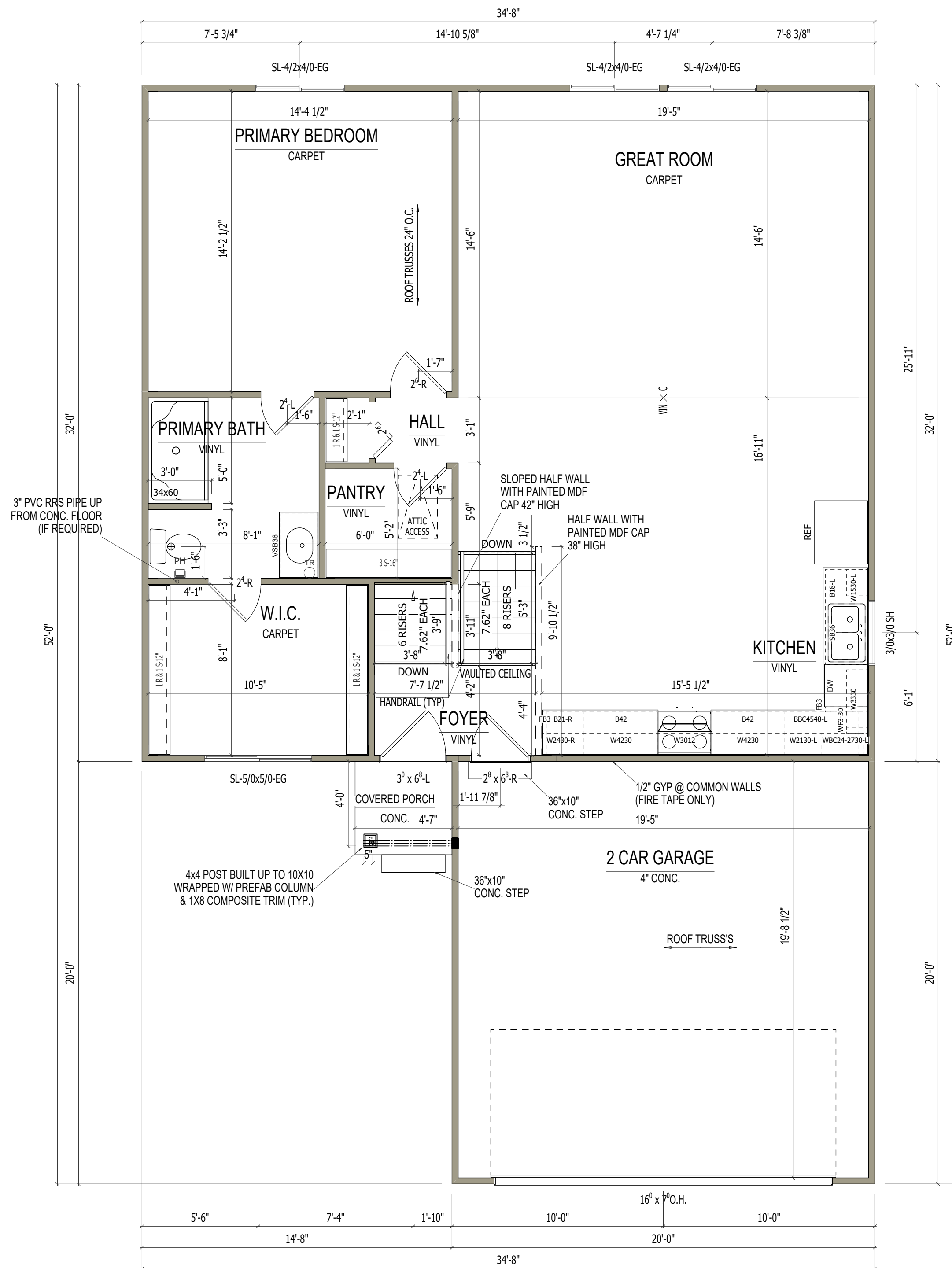
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2,062 SF

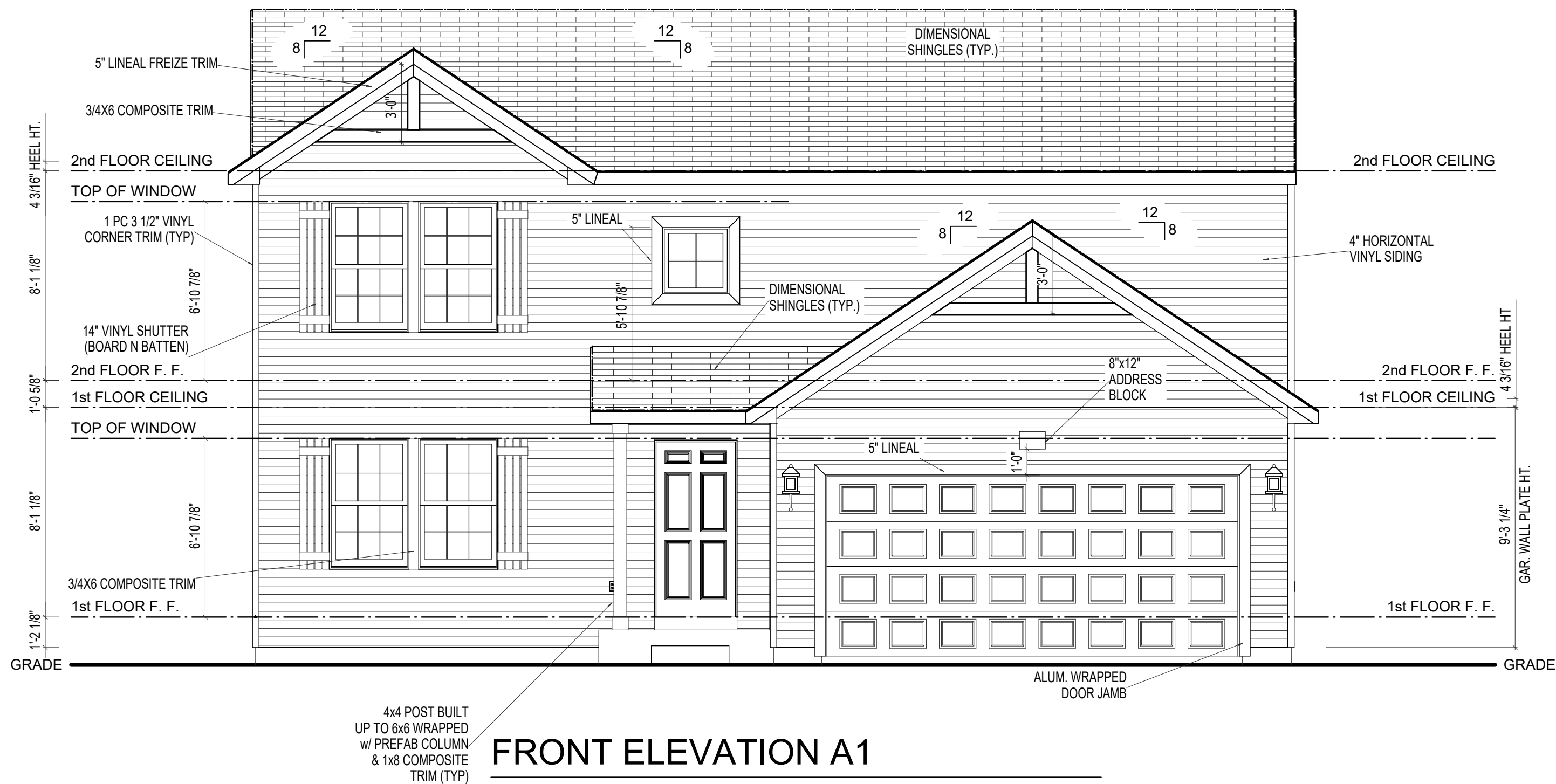
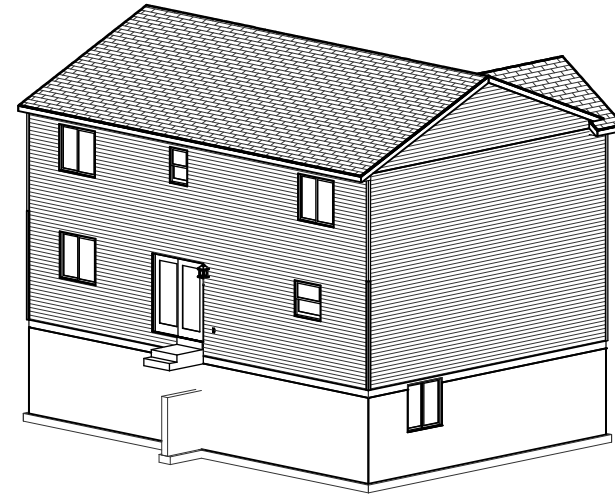
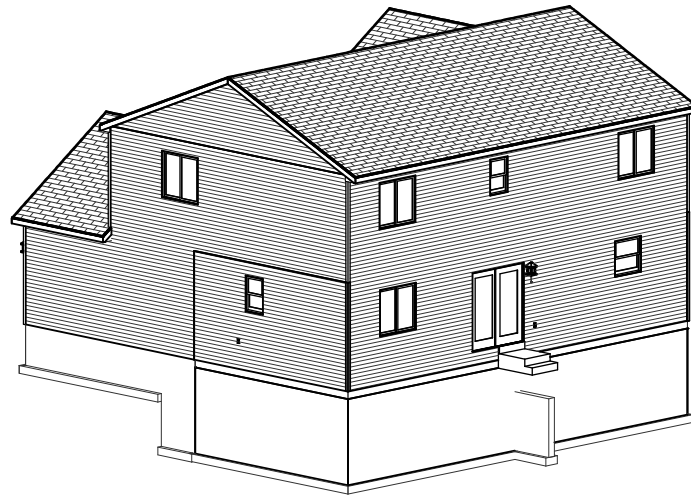
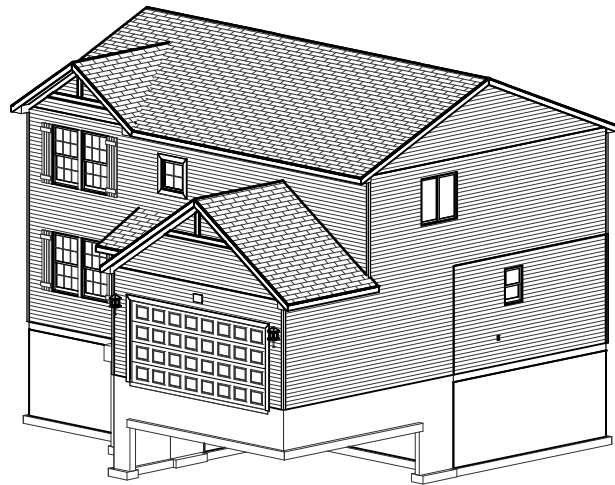
4-5 bedrooms

2.5 - 3.5 baths

2 - 3 car attached garage



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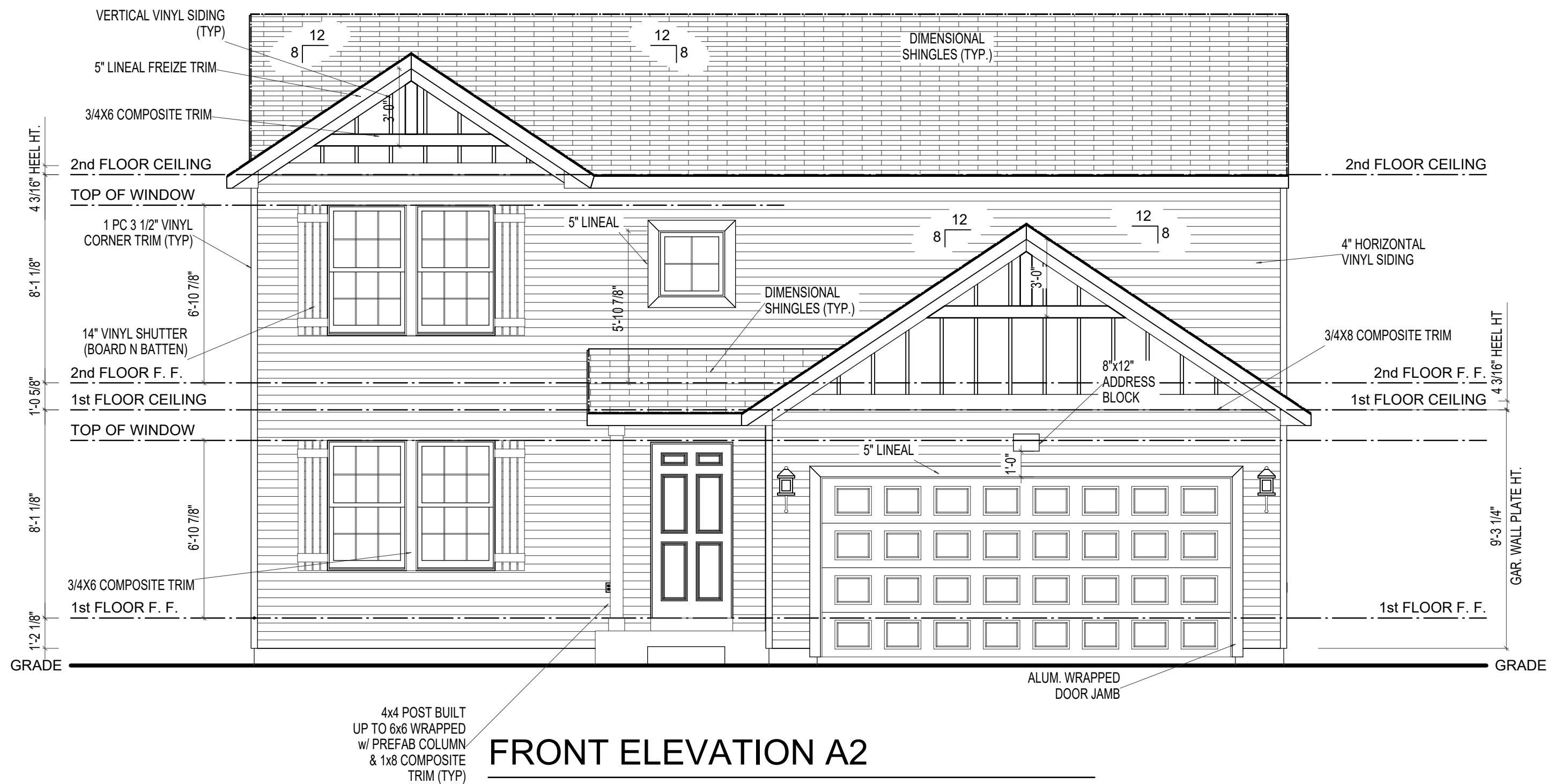
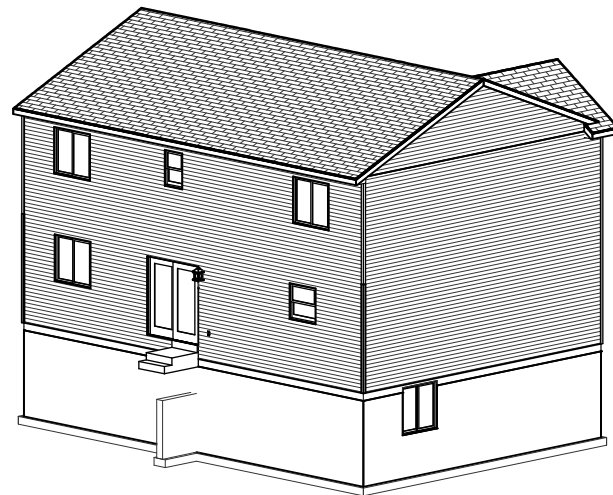
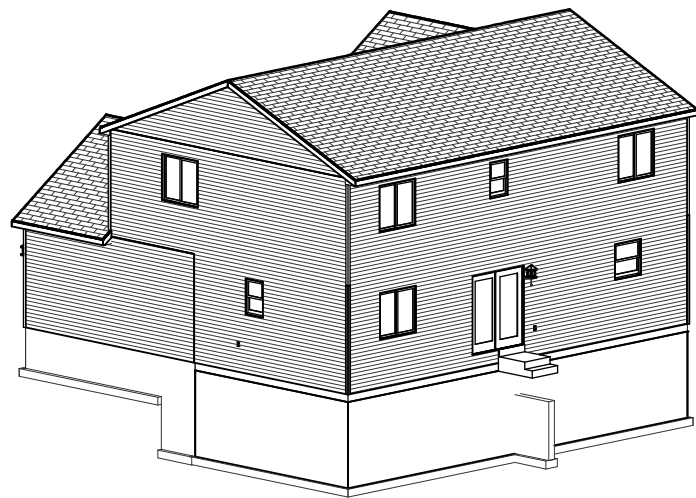
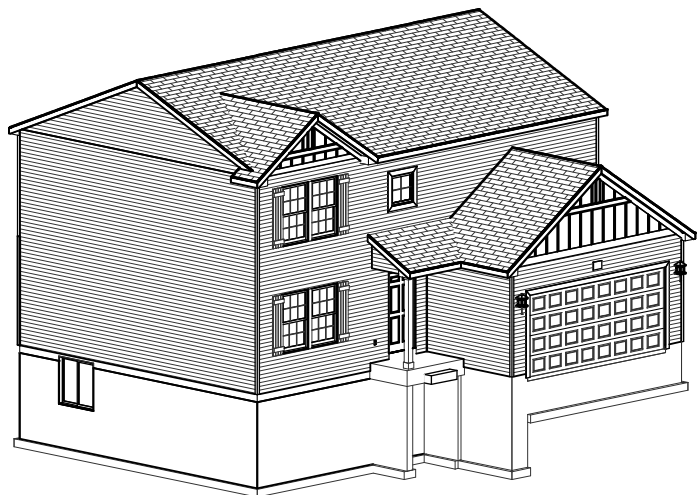
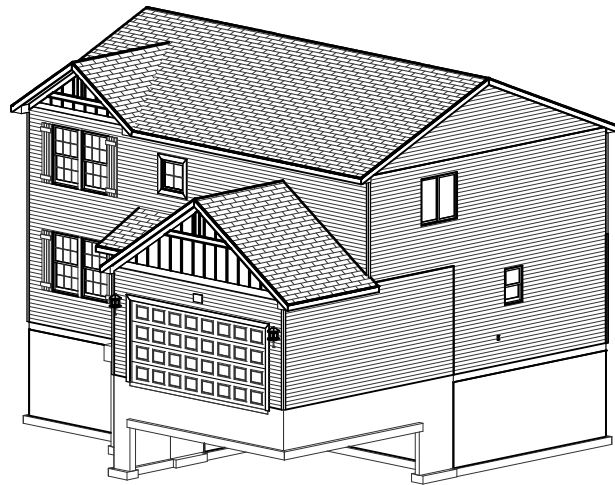
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FRONT ELEVATION A2

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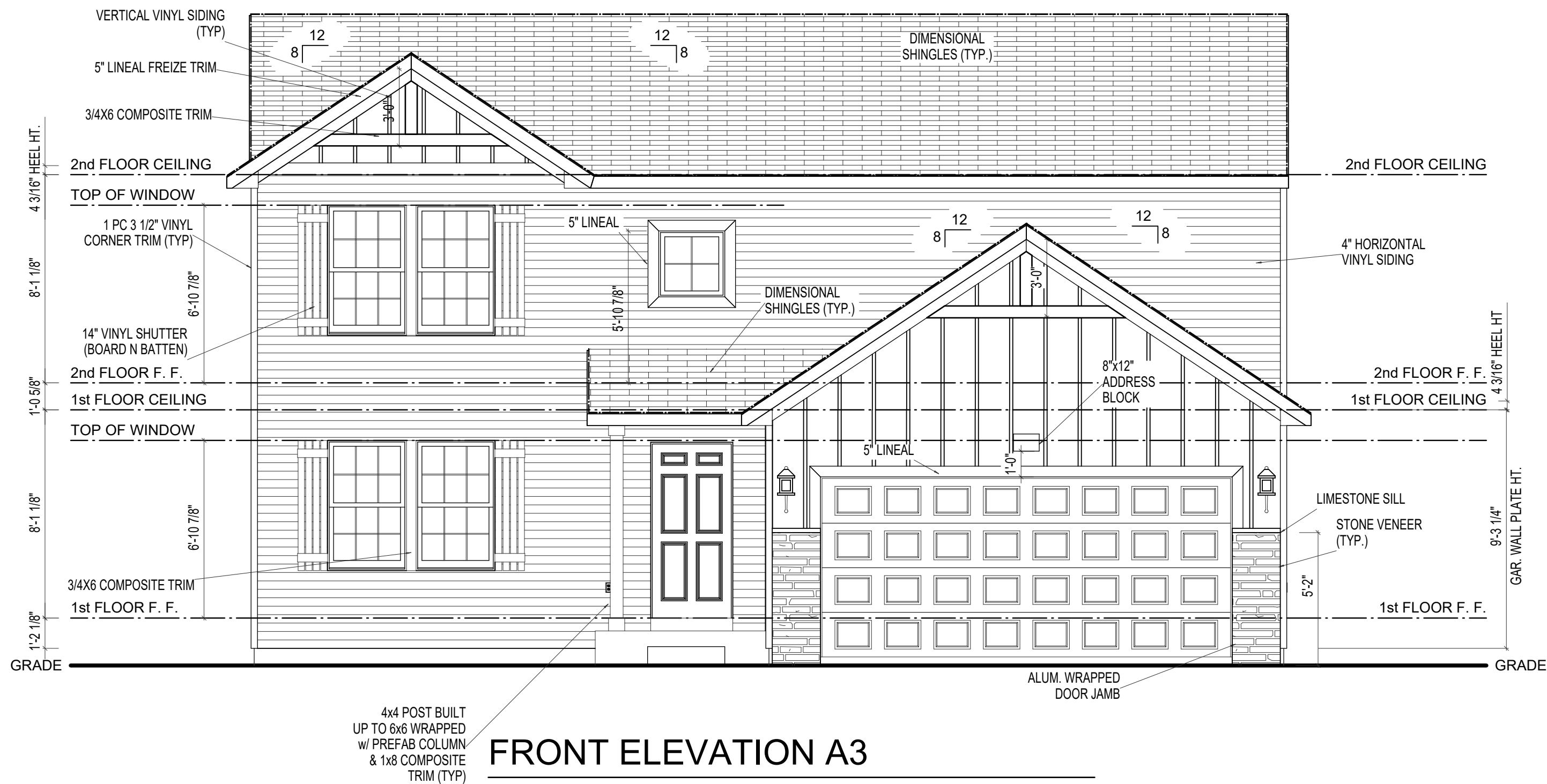
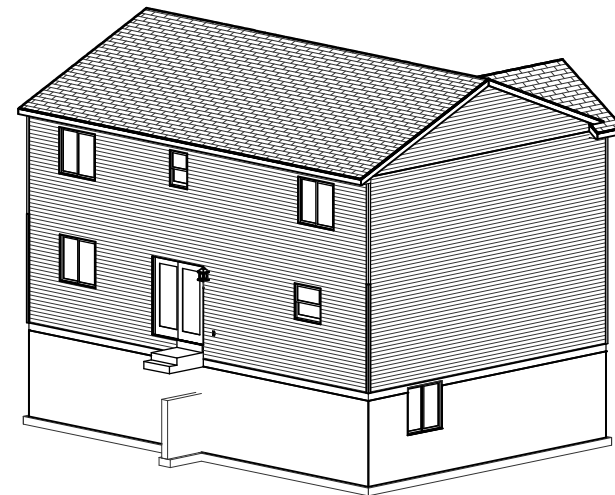
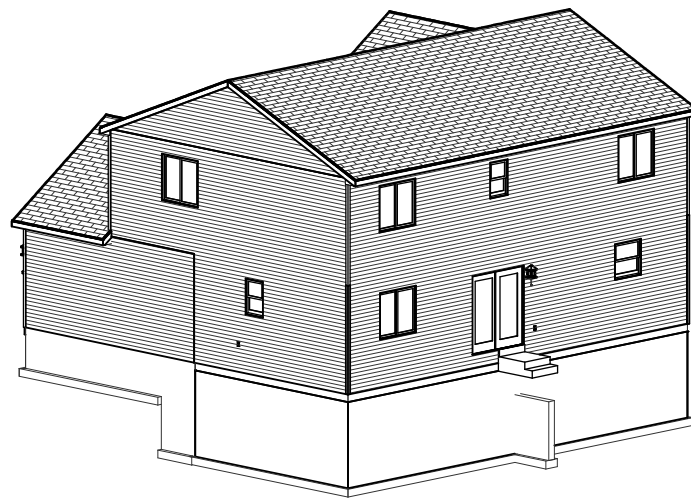
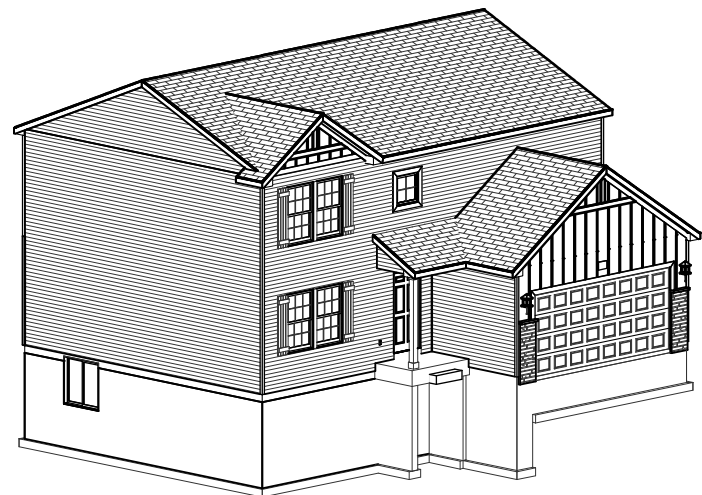
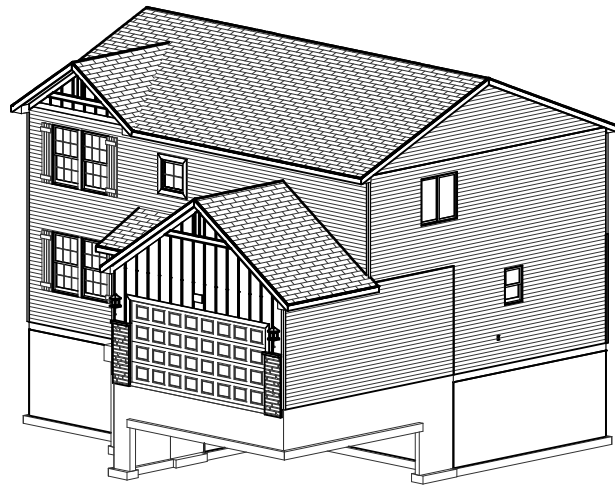
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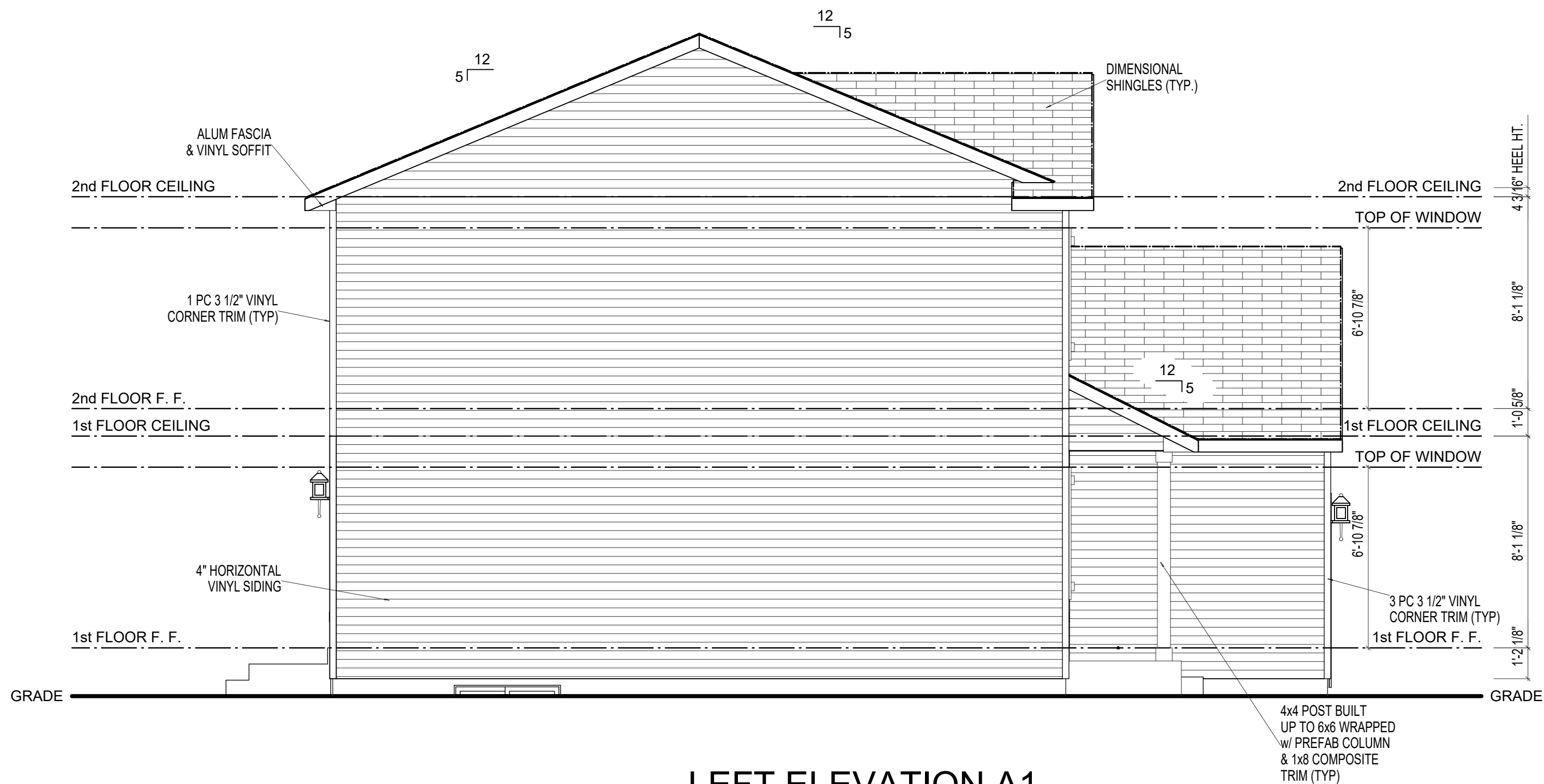
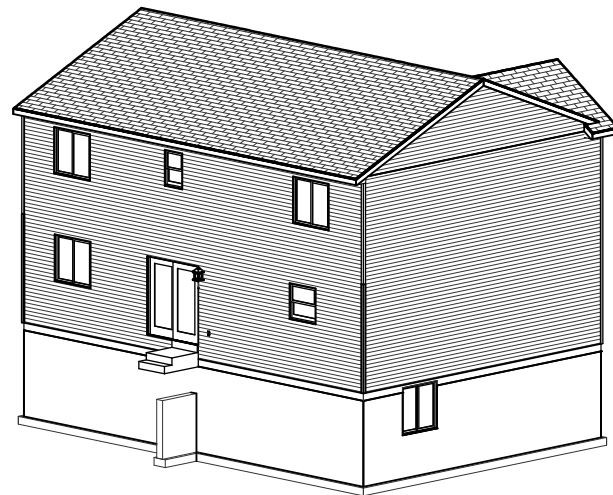
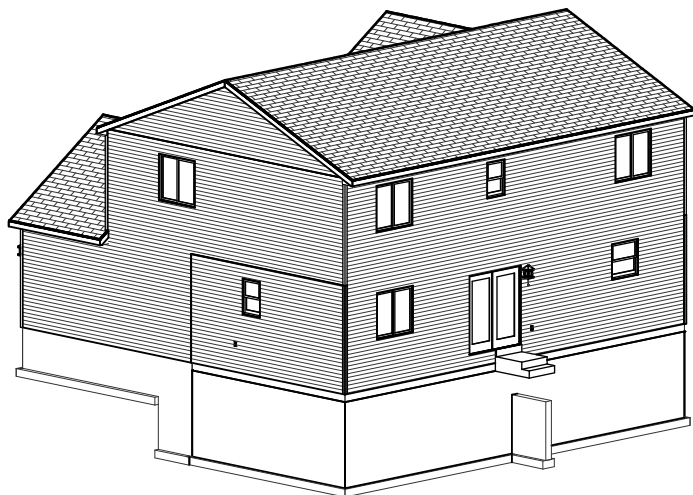
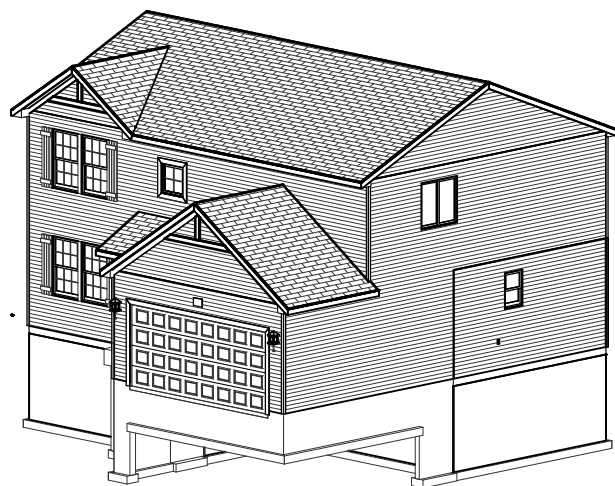
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LEFT ELEVATION A1

SCALE: 1/4"=1'-0"

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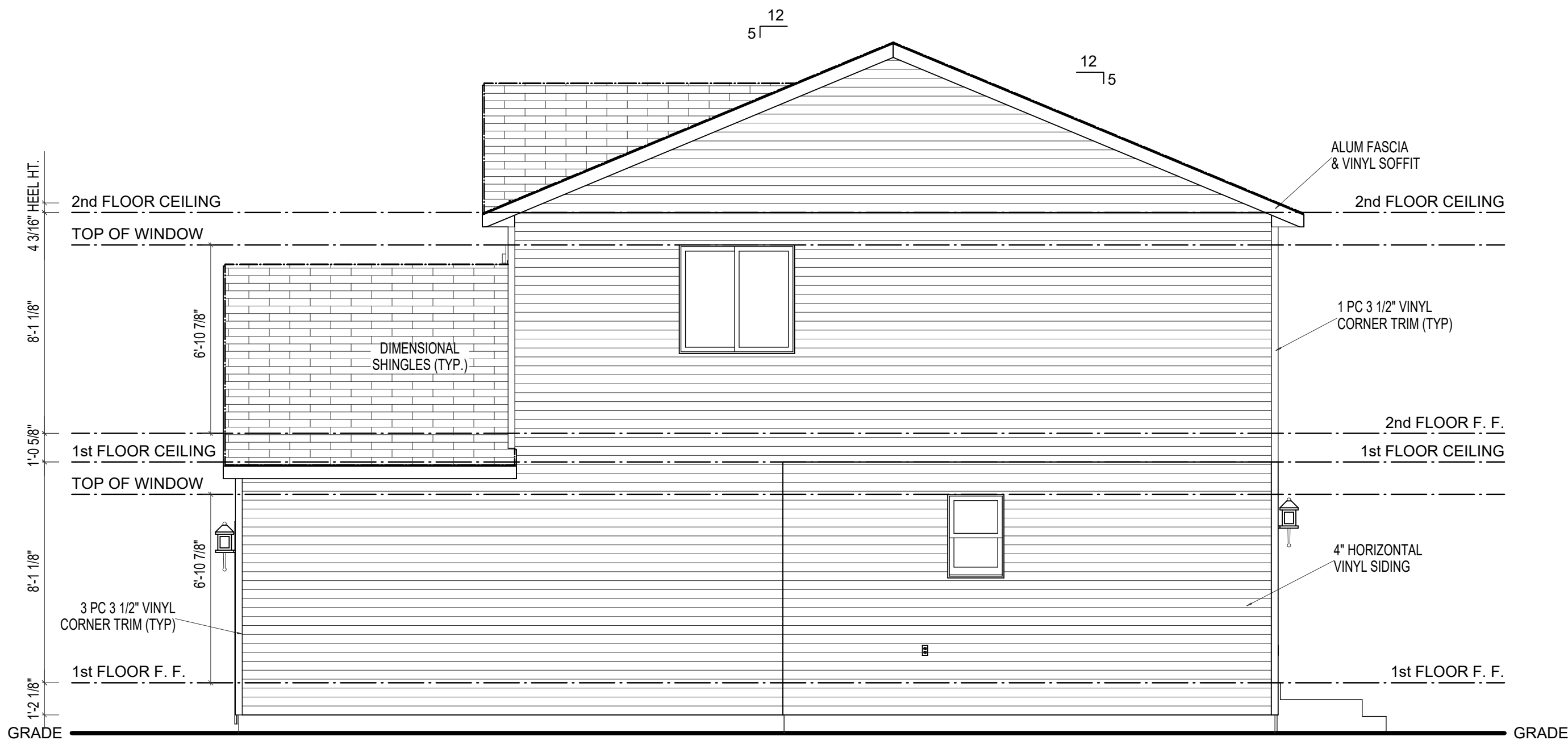
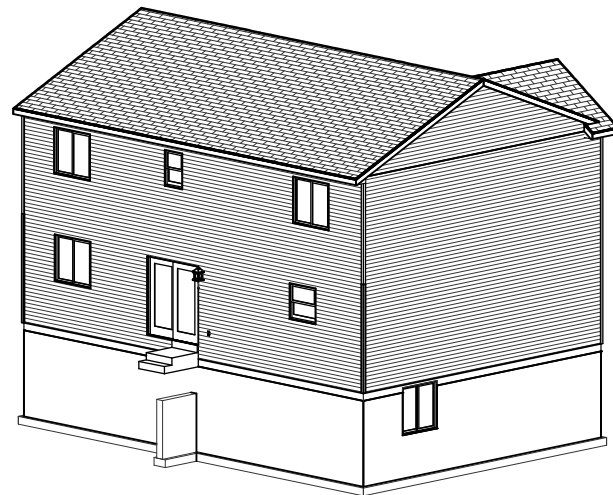
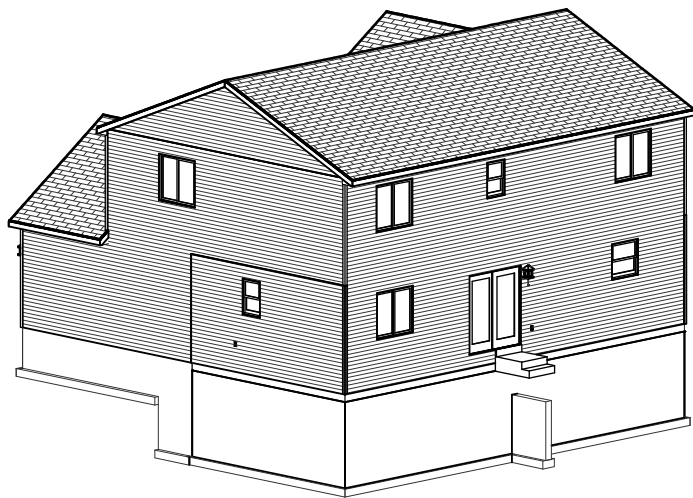
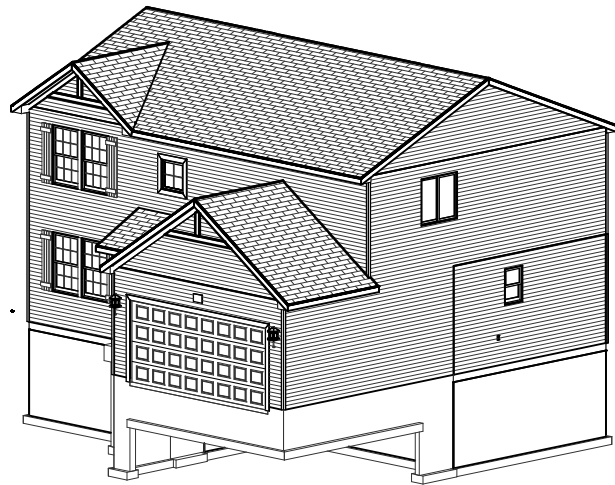
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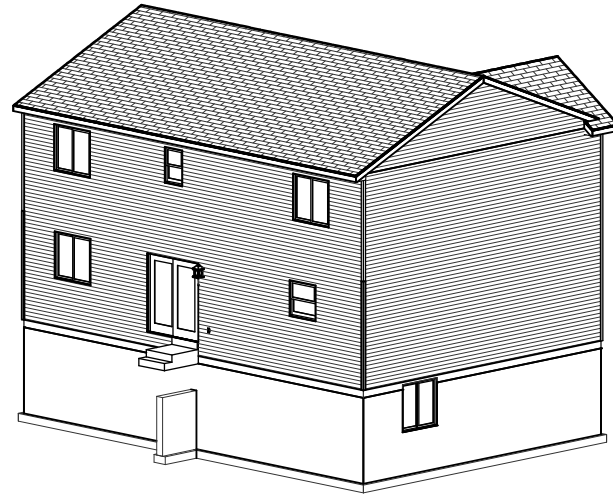
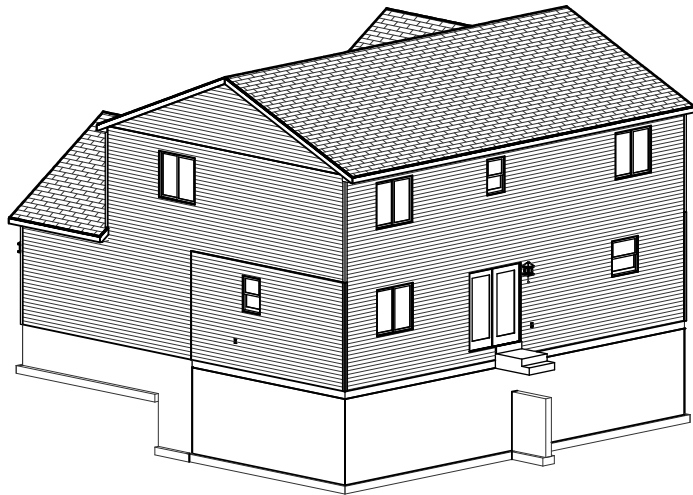
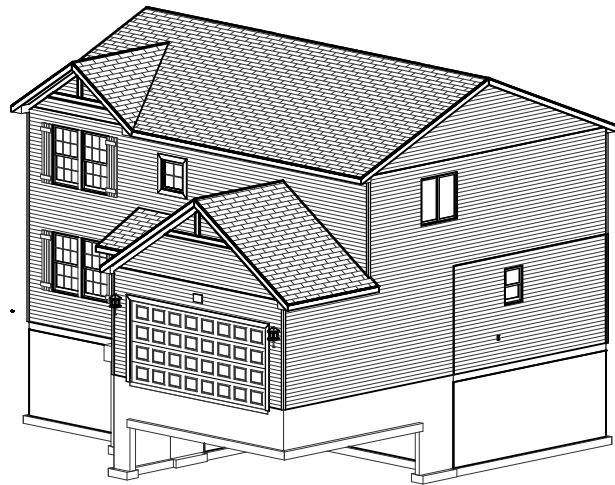
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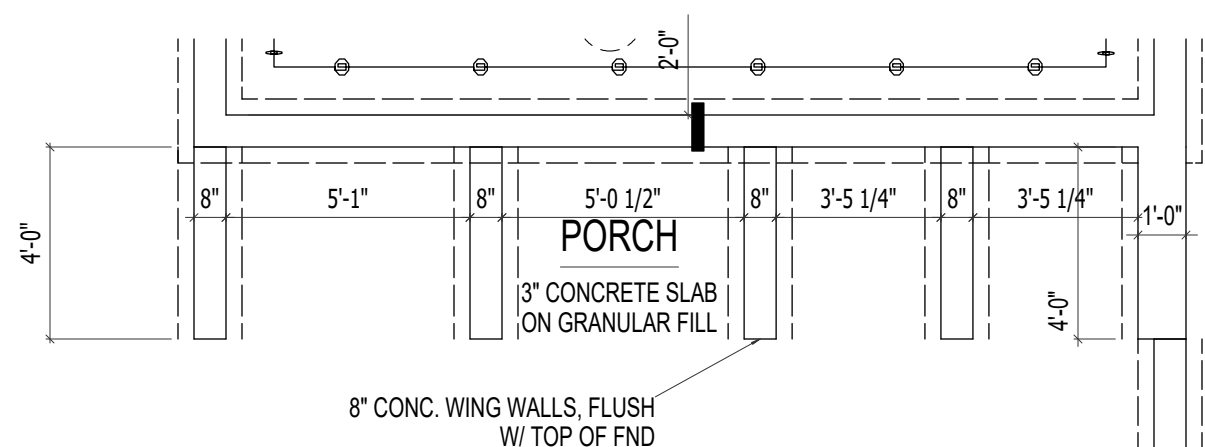
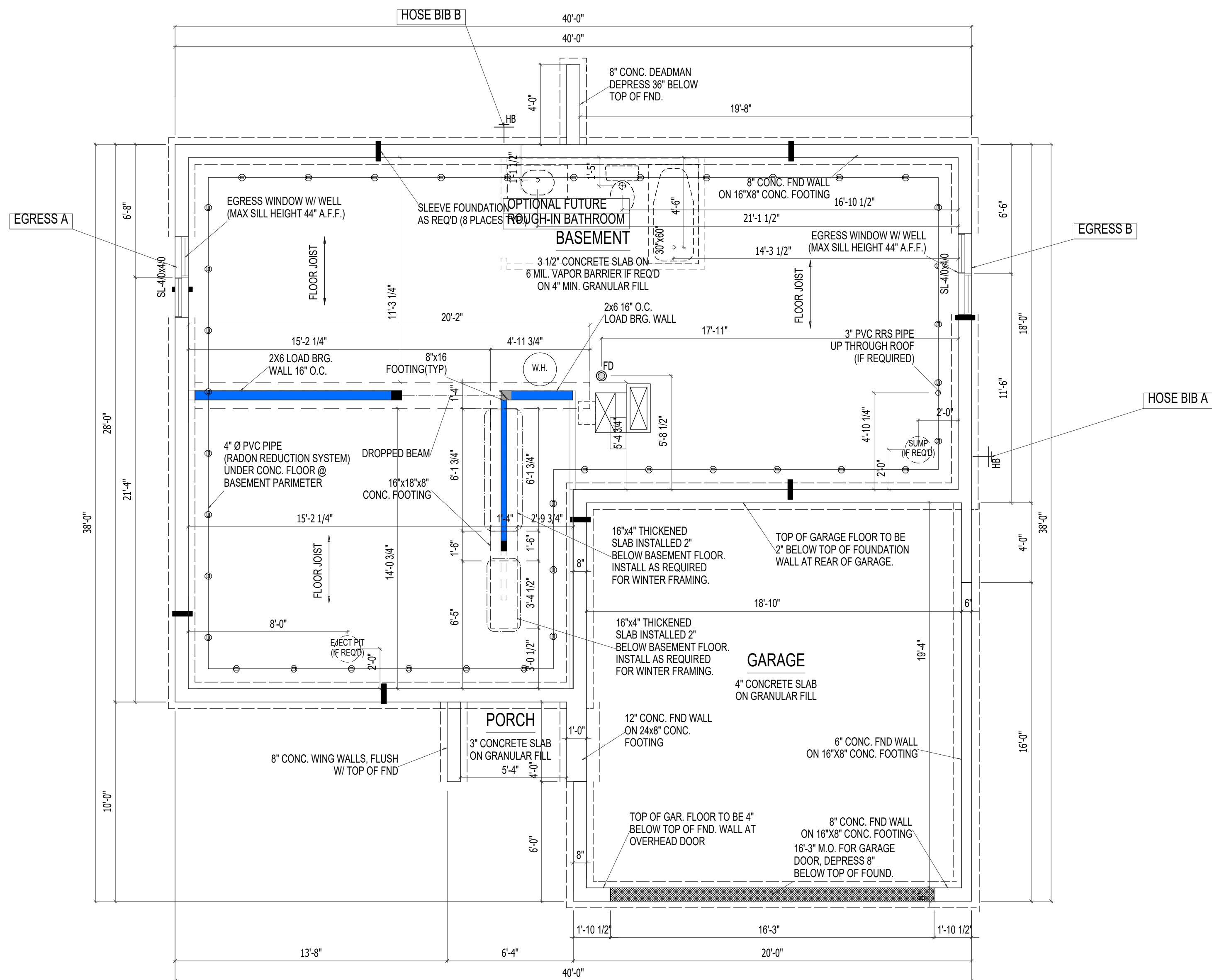
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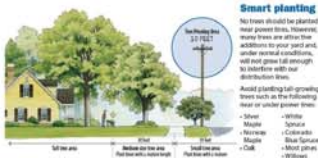
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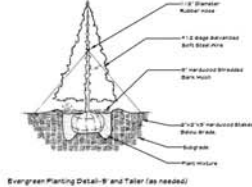


Smart planting

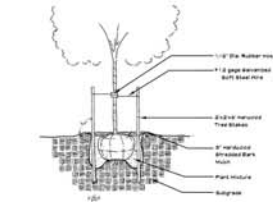
No trees should be planted near power lines. However, trees are often planted near power lines. If you are planting a tree near a power line, you must follow the following guidelines to ensure the tree's safety and the safety of the power lines.

Planting a tree near a power line is a safety hazard. The tree's roots can grow into the power lines, causing a fire or a power outage. To prevent this, you should follow the following guidelines:

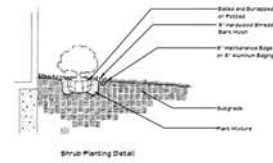
- Plant the tree at least 10 feet away from the power line.
- Plant the tree at an angle away from the power line.
- Plant the tree in a hole that is at least 10 feet deep.
- Plant the tree in a hole that is at least 10 feet wide.
- Plant the tree in a hole that is at least 10 feet high.



Evergreen Planting Detail-9' and Taller (as needed)



Deciduous Tree 5' Caliber and Smaller (as needed or required)



Shrub Planting Detail



Plant List

Quantity	Common Name	Latin Name	Planted Size
8	Redpointe Maple	Acer rubrum 'Franklin'	8' cal.
8	Crimson Sentry Maple	Acer glaberrimus 'Crimson Sentry'	8' cal.
4	Red Oak	Quercus rubra	8' cal.
4	Columnar Hornbeam	Cornus latifolia 'Frans Fontaine'	8' cal.
8	Norway Spruce	Picea abies	8' Ht.
10	Green Giant Arborvitae	Thuja standishii x plicata 'Green Giant'	8' Ht.
8	Robin Hill Serviceberry	Amelanchier x grandiflora 'Robin Hill'	2' cal./TP
11	Little Moses Burning Bush	Burnynia alternifolia 'Compactum'	8' Ht.
11	Korean Spice Viburnum	Viburnum carlesii	8' Ht.
11	Show Off Forsythia	Forsythia x intermedia 'Show Off'	8' Ht.
21	Pink Summersweet	Calycanthus floricolor	8' Ht.

(Note: Plant list for ordinance purposes only; the landscape contractor is responsible for plant quantities shown on the landscape plan.)

Notes:

- All landscaping shall be installed by a qualified Landscape Contractor. Plant species specified on the landscape plan shall be the only species planted. Planting shall be completed within 90 days of the date of the landscape plan. Any delay shall be approved by the Landscape Architect.
- All plantings shall be installed within 3' of the finished ground level. Any delay shall be approved by the Landscape Architect.
- Trees in lawn areas shall be planted with a 6" diameter trunk ring 3' deep.
- The Landscape Contractor shall remove any debris that is scattered around the trunk of a tree or shrub as well as the top third of any trunk. Remove excess soil on the top of the root ball to expose the root flare or first layer of roots prior to planting. Use a wire cutter to make 3-5 cuts in the wire basket to allow roots to grow through.
- When planting trees in the lawn area or on the lawn the existing soil within a 15 foot diameter shall be loosened by tilling or similar and amended with composted manure or peat at a depth of 6-12".
- Planting areas shall be edged with a mechanical bed edge to define a border for the finished lawn.
- Lawn areas shall receive at least 1" of topsoil and hydroseeded. Check with specifications for topsoil availability or contact project manager. Topsoil for lawn shall be appropriate for growing and sustaining a healthy lawn. All lawn shall be hydroseeded with a seed blend consisting of 50% Kentucky Bluegrass, 20% Perennial Ryegrass, 10% Hard Fescue, 20% Creeping Red Fescue and 20% Chewings Fescue.
- Maintenance of the landscape shall be provided for by the owner and include fertilizing of lawn and plant material, yearly pruning, tree staking of newly planted trees, and provide 1" of water per week during the growing season.
- Plant materials shall be chosen and installed in accordance with standards recommended by the County Cooperative Extension Service or American Nursery Association.



811 Know what's below. Call before you dig.

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Troy Langer

From: Heidelberg, Craig (MDOT) <HeidelbergC@michigan.gov>
Sent: Wednesday, August 16, 2023 10:53 AM
To: Troy Langer
Cc: Martha Wyatt; Fournier, Laurent (MDOT); Seif, George (MDOT)
Subject: RE: Traffic Study - Highland Reserve - Hartland Township

Troy,

At this point in our review, we don't have a concern with the easterly M-59 access (Lockerie Lane). Th residential access has much lower traffic volumes than the gas station, and is better located across from the cross over. So I think we are safe in saying that access is acceptable.

FYI, besides the gas station driveway location, the other thing we are looking at is whether the cross over needs to be signalized. That is still being discussed.

Thank you
Craig

From: Troy Langer <TLanger@hartlandtwp.com>
Sent: Wednesday, August 16, 2023 10:31 AM
To: Heidelberg, Craig (MDOT) <HeidelbergC@michigan.gov>
Cc: Martha Wyatt <MWyatt@hartlandtwp.com>; Fournier, Laurent (MDOT) <FournierL@michigan.gov>; Seif, George (MDOT) <SeifG@michigan.gov>
Subject: RE: Traffic Study - Highland Reserve - Hartland Township

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Thanks Craig.

I think we could move forward with this project and not worry about the access points of the gas station. The proposed Lockerbie Lane, as it connects to M-59 (Highland Road) is more important. If we have to move this road, it impacts the development.

Unofficially, do you feel this location is pretty close?



Troy Langer
Planning Director
810.632.7498
2655 Clark Road
Hartland, MI 48353
www.hartlandtwp.com

From: Heidelberg, Craig (MDOT) <HeidelbergC@michigan.gov>
Sent: Wednesday, August 16, 2023 10:29 AM

To: Troy Langer <TLanger@hartlandtwp.com>

Cc: Martha Wyatt <MWyatt@hartlandtwp.com>; Fournier, Laurent (MDOT) <FournierL@michigan.gov>; Seif, George (MDOT) <SeifG@michigan.gov>

Subject: RE: Traffic Study - Highland Reserve - Hartland Township

Hello Troy,

We have been reviewing the traffic models and access locations. We haven't completed our review, but hope to have something soon.

To let you know unofficially, as far as access, we possibly may request that the gas station driveway on M-59 to be moved a little further west, due to the backups projected in the models in the cross over. But like I mentioned, it is still under review.

Sorry for the delay. Let you know

Thank you

Craig

From: Troy Langer <TLanger@hartlandtwp.com>

Sent: Thursday, August 10, 2023 4:03 PM

To: Heidelberg, Craig (MDOT) <HeidelbergC@michigan.gov>

Cc: Martha Wyatt <MWyatt@hartlandtwp.com>; Fournier, Laurent (MDOT) <FournierL@michigan.gov>; Seif, George (MDOT) <SeifG@michigan.gov>

Subject: RE: Traffic Study - Highland Reserve - Hartland Township

CAUTION: This is an External email. Please send suspicious emails to abuse@michigan.gov

Craig,

Just checking on the status of this.

In reality, the Township is focused on the location of the access points (if they are even permitted). The Township is less concerned about any improvements, such as de-acceleration lanes, turn lanes, signalized intersections. The Township figures those items can be part of the project, but once we know the location of the access lanes to M-59 (Highland Road), we can move forward with the rest of the project. Otherwise, the entire project is on hold waiting.

Let me know your thoughts.

Thanks.



Troy Langer
Planning Director
810.632.7498
2655 Clark Road
Hartland, MI 48353
www.hartlandtwp.com

From: Heidelberg, Craig (MDOT) <HeidelbergC@michigan.gov>
Sent: Monday, July 10, 2023 4:17 PM
To: Troy Langer <TLanger@hartlandtwp.com>
Cc: Martha Wyatt <MWyatt@hartlandtwp.com>; Fournier, Laurent (MDOT) <FournierL@michigan.gov>; Seif, George (MDOT) <SeifG@michigan.gov>
Subject: RE: Traffic Study - Highland Reserve - Hartland Township

Hello Troy,

I sent the below email but never received notification that it didn't go through. Then I responded to your last two emails, once on 7/6 and once today. Then today I received notification my email didn't go through because I induced both attachments. My guess is your email can not receive both attachments at once but mine can send them.

So to answer your question again, but you should receive this time since I didn't include the pdf attachments, yes MDOT received both of your emails. And see below for that first original response.

Sorry it took so long to figure out the issue.
Thank you

Craig Heidelberg, P.E.
MDOT Brighton TSC
Operations Engineer
810-623-8341 C

From: Heidelberg, Craig (MDOT)
Sent: Tuesday, June 27, 2023 2:22 PM
To: Troy Langer <TLanger@hartlandtwp.com>
Cc: Martha Wyatt <MWyatt@hartlandtwp.com>; Fournier, Laurent (MDOT) <FournierL@michigan.gov>; Seif, George (MDOT) <SeifG@michigan.gov>
Subject: RE: Traffic Study - Highland Reserve - Hartland Township

Hello Troy,

MDOT has received both emails (plans and TIS). Thank you for sharing with us.

Traffic Studies can be time consuming to review. It roughly takes 3-4 weeks to complete a TIS review with all of my Traffic Engineer's other duties. We will get back to you with any comments once the review is complete.

MDOT will need a permit submitted at some point by the developer for any of the work in MDOT Right of Way.

Thank you

Craig Heidelberg, P.E.
MDOT Brighton TSC
Operations Engineer
810-623-8341 C

From: Troy Langer <TLanger@hartlandtwp.com>
Sent: Tuesday, June 27, 2023 11:33 AM
To: Heidelberg, Craig (MDOT) <HeidelbergC@michigan.gov>
Cc: Martha Wyatt <MWyatt@hartlandtwp.com>
Subject: Traffic Study - Highland Reserve - Hartland Township

CAUTION: This is an External email. Please send suspicious emails to abuse@michigan.gov

Craig,

Please find attached the traffic report for the development.

Let me know your thoughts.

Thank you.



Troy Langer
Planning Director
810.632.7498
2655 Clark Road
Hartland, MI 48353
www.hartlandtwp.com

Tag No.	Scientific Name	Common Name	DBH(s)	Condition	TREES REMOVED
4001	Quercus rubra	Red Oak	24"	Good	X
4002	Quercus rubra	Red Oak	48"	Good	X
4003	Quercus rubra	Red Oak	36"	Good	X
4004	Quercus rubra	Red Oak	30"	Good	X
4005	Quercus rubra	Red Oak	52"	Good	X
4006	Quercus rubra	Red Oak	24"	Good	X
4007	Ulmus	Elm	24"	Good	X
4008	Prunus pensylvanica	Pin Cherry	2"	Good	X
4009	Prunus pensylvanica	Pin Cherry	10", 8"	Good	X
4010	Prunus pensylvanica	Pin Cherry	10"	Good	X
4011	Prunus pensylvanica	Pin Cherry	10", 10"	Good	X
4012	Prunus pensylvanica	Pin Cherry	10", 8"	Good	X
4013	Prunus pensylvanica	Pin Cherry	9", 8", 5", 4"	Good	X
4014	Prunus pensylvanica	Pin Cherry	15"	Good	X
4015	Prunus pensylvanica	Pin Cherry	10"	Good	X
4016	Prunus pensylvanica	Pin Cherry	8"	Good	X
4017	Quercus rubra	Red Oak	10"	Good	X
4018	Ulmus	Elm	48"	Good	X
4019	Tilia	Basswood	10"	Good	X
4020	Carya glabra	Pignut Hickory	20", 9", 6", 4"	Good	X
4021	Salix alba	Willow	18"	Good	
4022	Salix alba	Willow	17"	Good	
4023	Acer rubrum	Red Maple	15"	Good	
4024	Acer saccharinum	Silver Maple	20", 20"	Good	
4025	Acer rubrum	Red Maple	12"	Good	
4026	Prunus pensylvanica	Pin Cherry	17", 18"	Good	
4027	Ulmus	Elm	8", 4"	Good	
4028	Prunus pensylvanica	Pin Cherry	10"	Good	
4029	Prunus pensylvanica	Pin Cherry	10"	Good	
4030	Prunus pensylvanica	Pin Cherry	8"	Good	
4031	Prunus pensylvanica	Pin Cherry	12"	Good	
4032	Salix alba	Willow	10", 10", 8"	Good	
4033	Salix alba	Willow	12"	Good	
4034	Prunus pensylvanica	Pin Cherry	12"	Good	
4035	Prunus pensylvanica	Pin Cherry	8"	Good	
4036	Prunus pensylvanica	Pin Cherry	8"	Good	
4037	Prunus pensylvanica	Pin Cherry	8"	Good	
4038	Prunus pensylvanica	Pin Cherry	15"	Good	
4039	Salix alba	Willow	14"	Good	
4040	Salix alba	Willow	13"	Good	
4041	Populus	Poplar	14"	Good	
4042	Populus	Poplar	11"	Good	
4043	Populus	Poplar	8"	Good	
4044	Populus	Poplar	8"	Good	
4045	Populus	Poplar	8"	Good	
4046	Populus	Poplar	10"	Good	
4047	Populus	Poplar	9"	Good	
4048	Populus	Poplar	9"	Good	
4049	Salix alba	Willow	8"	Good	
4050	Ulmus	Elm	9"	Good	
4051	Prunus pensylvanica	Pin Cherry	16", 12"	Good	
4052	Ulmus	Elm	10", 9"	Good	

Tag No.	Scientific Name	Common Name	DBH(s)	Condition	TREES REMOVED
4053	Prunus pensylvanica	Pin Cherry	32", 30"	Good	
4054	Ulmus	Elm	8"	Good	
4055	Ulmus	Elm	8", 7"	Good	
4056	Ulmus	Elm	8"	Good	
4057	Ulmus	Elm	8"	Good	
4058	Ulmus	Elm	11"	Good	
4059	Carya glabra	Pignut Hickory	24"	Good	
4060	Prunus pensylvanica	Pin Cherry	12"	Good	
4061	Prunus pensylvanica	Pin Cherry	10"	Good	
4062	Carya glabra	Pignut Hickory	10"	Good	
4063	Prunus pensylvanica	Pin Cherry	10"	Good	
4064	Carya glabra	Pignut Hickory	8"	Good	
4065	Carya glabra	Pignut Hickory	36"	Good	
4066	Carya glabra	Pignut Hickory	11"	Good	
4067	Carya glabra	Pignut Hickory	26"	Good	
4068	Ulmus	Elm	18"	Good	
4069	Carya glabra	Pignut Hickory	10"	Good	
4070	Ulmus	Elm	12"	Good	
4071	Ulmus	Elm	18"	Good	
4072	Ulmus	Elm	30"	Good	X
4073	Prunus pensylvanica	Pin Cherry	9"	Good	
4074	Malus	Apple	8", 7"	Good	
4075	Prunus pensylvanica	Pin Cherry	12"	Good	
4076	Prunus pensylvanica	Pin Cherry	12"	Good	
4077	Prunus pensylvanica	Pin Cherry	12"	Good	
4078	Prunus pensylvanica	Pin Cherry	18", 18", 16"	Good	
4079	Salix alba	Willow	10"	Good	
4081	Ulmus	Elm	11"	Good	
4082	Prunus pensylvanica	Pin Cherry	16"	Good	
4083	Ulmus	Elm	12"	Good	
4084	Ulmus	Elm	8"	Good	
4085	Acer rubrum	Red Maple	32"	Good	
4086	Tilia	Basswood	12"	Good	
4087	Prunus pensylvanica	Pin Cherry	14"	Good	
4088	Acer Negundo	Box Elder	12", 12", 12"	Good	
4089	Acer Negundo	Box Elder	12", 5"	Good	
4091	Ulmus	Elm	24", 24", 18", 12"	Good	X
4092	Ulmus	Elm	12"	Good	X
4093	Ulmus	Elm	28", 24"	Good	X
4094	Ulmus	Elm	8"	Good	X
4095	Ulmus	Elm	8"	Good	X
4096	Ulmus	Elm	26"	Good	X
4097	Ulmus	Elm	36"	Good	X
4098	Ulmus	Elm	52"	Good	X
4099	Ulmus	Elm	48"	Good	X
4100	Acer rubrum	Red Maple	18"	Good	X
4101	Malus	Apple	36"	Poor	X
4102	Malus	Apple	16", 14"	Poor	X
4103	Morus rubus	Mulberry	12", 9", 9"	Good	X
4104	Malus	Apple	17"	Poor	X
4105	Malus	Apple	19"	Poor	X

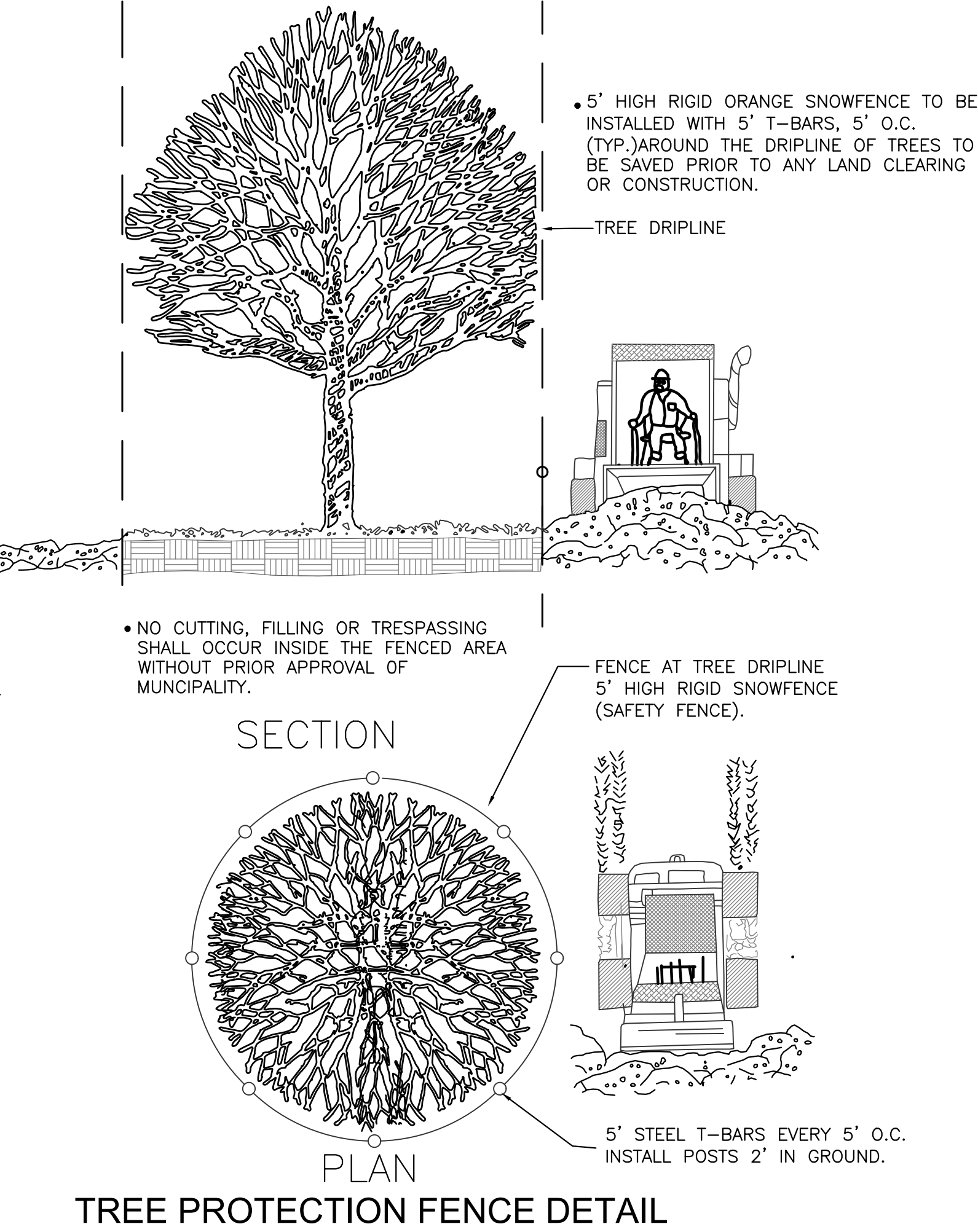
Tag No.	Scientific Name	Common Name	DBH(s)	Condition	TREES REMOVED
4106	Ulmus	Elm	18"	Good	X
4107	Ulmus	Elm	7"	Good	X
4108	Ulmus	Elm	11"	Good	X
4109	Ulmus	Elm	9"	Good	X
4110	Ulmus	Elm	10"	Good	X
4111	Ulmus	Elm	9"	Good	X
4112	Ulmus	Elm	12"	Good	X
4113	Ulmus	Elm	28"	Good	X
4114	Ulmus	Elm	16", 12"	Good	X
4115	Ulmus	Elm	15"	Good	X
4116	Acer rubrum	Red Maple	12", 10", 10"	Good	X
4117	Acer rubrum	Red Maple	10"	Good	X
4118	Acer rubrum	Red Maple	16"	Good	X
4119	Malus	Apple	20"	Poor	X
4120	Malus	Apple	17"	Poor	X
4121	Acer rubrum	Red Maple	16"	Good	X
4122	Populus deltoids	Cottonwood	15"	Good	
4123	Populus deltoids	Cottonwood	10"	Good	
4124	Populus deltoids	Cottonwood	15"	Good	
4125	Populus deltoids	Cottonwood	12"	Good	
4126	Populus deltoids	Cottonwood	11"	Good	
4127	Populus deltoids	Cottonwood	12"	Good	
4128	Populus deltoids	Cottonwood	12"	Good	
4129	Populus deltoids	Cottonwood	16"	Good	
4130	Ulmus	Elm	8"	Good	
4131	Ulmus	Elm	12", 10"	Good	
4132	Ulmus	Elm	12"	Good	
4133	Malus	Apple	9"	Good	
4134	Prunus pensylvanica	Pin Cherry	10", 10"	Good	
4135	Ulmus	Elm	14", 6"	Good	
4136	Ulmus	Elm	16"	Good	
4137	Ulmus	Elm	9"	Good	
4138	Prunus pensylvanica	Pin Cherry	10"	Good	
4139	Tilia	Basswood	8"	Good	
4140	Tilia	Basswood	16"	Good	
4141	Quercus rubra	Red Oak	16"	Good	
4142	Tilia	Basswood	8"	Good	X
4143	Prunus pensylvanica	Pin Cherry	18"	Good	X
4144	Populus	Poplar	9"	Good	
4145	Populus	Poplar	16", 8"	Good	
4146	Salix alba	Willow	24", 16", 12"	Good	
4147	Salix alba	Willow	12"	Good	X
4148	Salix alba	Willow	12"	Good	X
4149	Salix alba	Willow	12"	Good	X
4150	Acer rubrum	Red Maple	16"	Good	X
4151	Acer rubrum	Red Maple	20"	Good	X
4152	Acer rubrum	Red Maple	30"	Good	X
4153	Acer rubrum	Red Maple	10"	Good	X
4154	Acer rubrum	Red Maple	10", 8", 8"	Good	X
4155	Acer rubrum	Red Maple	14", 14", 14"	Good	X
4156	Tilia	Basswood	8", 8", 6"	Good	X
4157	Tilia	Basswood	8"	Good	X
4158	Tilia	Basswood	10"	Good	X

Tag No.	Scientific Name	Common Name	DBH(s)	Condition	TREES REMOVED
4106	Ulmus	Elm	18"	Good	X
4107	Ulmus	Elm	7"	Good	X
4108	Ulmus	Elm	11"	Good	X
4109	Ulmus	Elm	9"	Good	X
4110	Ulmus	Elm	10"	Good	X
4111	Ulmus	Elm	9"	Good	X
4112	Ulmus	Elm	12"	Good	X
4113	Ulmus	Elm	28"	Good	X
4114	Ulmus	Elm	16", 12"	Good	X
4115	Ulmus	Elm	15"	Good	X
4116	Acer rubrum	Red Maple	12", 10", 10"	Good	X
4117	Acer rubrum	Red Maple	10"	Good	X
4118	Acer rubrum	Red Maple	18"	Good	X
4119	Malus	Apple	20"	Poor	X
4120	Malus	Apple	17"	Poor	X
4121	Acer rubrum	Red Maple	16"	Good	X
4122	Populus deltoids	Cottonwood	15"	Good	
4123	Populus deltoids	Cottonwood	10"	Good	
4124	Populus deltoids	Cottonwood	15"	Good	
4125	Populus deltoids	Cottonwood	12"	Good	
4126	Populus deltoids	Cottonwood	11"	Good	
4127	Populus deltoids	Cottonwood	12"	Good	
4128	Populus deltoids	Cottonwood	12"	Good	
4129	Populus deltoids	Cottonwood	16"	Good	
4130	Ulmus	Elm	8"	Good	
4131	Ulmus	Elm	12", 10"	Good	
4132	Ulmus	Elm	12"	Good	
4133	Malus	Apple	9"	Good	
4134	Prunus pensylvanica	Pin Cherry	10", 10"	Good	
4135	Ulmus	Elm	14", 6"	Good	
4136	Ulmus	Elm	16"	Good	
4137	Ulmus	Elm	9"	Good	
4138	Prunus pensylvanica	Pin Cherry	10"	Good	
4139	Tilia	Basswood	8"	Good	
4140	Tilia	Basswood	16"	Good	
4141	Quercus rubra	Red Oak	16"	Good	
4142	Tilia	Basswood	8"	Good	X
4143	Prunus pensylvanica	Pin Cherry	18"	Good	X
4144	Populus	Poplar	9"	Good	
4145	Populus	Poplar	16", 8"	Good	
4146	Salix alba	Willow	24", 16", 12"	Good	
4147	Salix alba	Willow	12"	Good	X
4150	Acer rubrum	Red Maple	16"	Good	X
4151	Acer rubrum	Red Maple	20"	Good	X
4152	Acer rubrum	Red Maple	30"	Good	X
4153	Acer rubrum	Red Maple	10"	Good	X
4154	Acer rubrum	Red Maple	10", 8", 8"	Good	X
4155	Acer rubrum	Red Maple	14", 14", 14"	Good	X
4156	Tilia	Basswood	8", 8", 6"	Good	X
4157	Tilia	Basswood	8"	Good	X
4158	Tilia	Basswood	10"	Good	X

Tag No.	Scientific Name	Common Name	DBH(s)	Condition	TREES REMOVED
4210	Tilia	Basswood	15"	Good	X
4211	Carya glabra	Pignut Hickory	16"	Good	X
4212	Acer rubrum	Red Maple	9"	Good	X
4213	Tilia	Basswood	16"	Good	X
4214	Acer rubrum	Red Maple	15"	Good	X
4215	Acer rubrum	Red Maple	20"	Good	X
4216	Acer rubrum	Red Maple	14"	Good	X
4217	Tilia	Basswood	18"	Good	X
4218	Tilia	Basswood	20"	Good	X
4219	Acer rubrum	Red Maple	10"	Good	X
4220	Acer rubrum	Red Maple	10"	Good	X
4221	Carya glabra	Pignut Hickory	19"	Good	X
4222	Acer glabra	Pignut Hickory	13"	Good	X
4223	Tilia	Basswood	8"	Good	X
4224	Tilia	Basswood	10", 5"	Good	X
4225	Acer rubrum	Red Maple	46"	Good	X
4226	Acer rubrum	Red Maple	16"	Good	X
4227	Tilia	Basswood	42"	Good	X
4228	Acer rubrum	Red Maple	22"	Good	X
4229	Acer rubrum	Red Maple	22"	Good	X
4230	Acer rubrum	Red Maple	15"	Good	X
4231	Quercus rubra	Red Oak	26"	Good	X
4232	Acer rubrum	Red Maple	17"	Good	X
4233	Fagus	Beech	26"	Good	
4234	Acer rubrum	Red Maple	18"	Good	
4235	Acer rubrum	Red Maple	12"	Good	
4236	Acer rubrum	Red Maple	16"	Good	
4237	Acer rubrum	Red Maple	15"	Good	X
4238	Acer rubrum	Red Maple	17"	Good	
4239	Acer rubrum	Red Maple	11"	Good	
4240	Acer rubrum	Red Maple	15"	Good	
4241	Acer rubrum	Red Maple	15"	Good	
4242	Tilia	Basswood	18"	Good	
4243	Ulmus	Elm	15", 12", 12"	Good	

TREE FENCE NOTE:

1. EITHER PLASTIC OR WOOD ORANGE SNOW FENCING SHALL BE INSTALLED AT OR BEYOND THE DRIPLINE, UNLESS MORE SUBSTANTIAL FENCING IS REQUIRED.
2. STAKES SHALL BE METAL "T" POLES SPACED NO FURTHER APART THAN 5' ON CENTER.
3. FENCING SHALL NOT BE INSTALLED CLOSER TO THE TREE THAN THE DRIPLINE OF THOSE TREES TO BE SAVED. SPECIAL CIRCUMSTANCES SHALL BE REVIEWED BY THE CITY.
4. ALL FENCING SHALL BE ERECTED PRIOR TO CONSTRUCTION. THE CITY SHALL BE NOTIFIED ONCE THE FENCING IS INSTALLED FOR INSPECTION.
5. UNDER NO CIRCUMSTANCES SHALL THE PROTECTIVE FENCING BE REMOVED WITHOUT PROPER APPROVAL FROM THE CITY.
6. NO PERSON SHALL CONDUIT ANY ACTIVITY WITHIN THE AREAS PROPOSED TO REMAIN. THIS SHALL INCLUDE, BUT NOT LIMITED TO: a) NOSOLVENTS OR CHEMICALS WITHIN PROTECTIVE AREA. b) NO BUILDING MATERIALS OR CONSTRUCTION EQUIPMENT WITHIN THE PROTECTED AREA. c) NO GRADE CHANGES, INCLUDING FILL, WITHIN PROTECTIVE AREA. d) NO REMOVAL OF VEGETATION FROM THE GROUND UP WITHOUT PERMISSION FROM THE PROPER REVIEWING AUTHORITY, INCLUDING THE WOOLANDS REVIEW BOARD. e) ANY REQUIRED SWALE ARE APPROVED THROUGH A PROTECTED AREAS. IN INSTANCES WHERE SWALES ARE APPROVED THROUGH THE PROTECTED AREA, THE SWALES NEED TO BE HAND DUG. MACHENERY OF ANY KIND IS PROHIBITED.
7. REGULATED WOOLANDS OR REGULATED TREES ADJACENT TO THE PROPERTY ARE ALSO REQUIRED TO BE PROTECTED WHETHER OR NOT THEY ARE SHOWN ON THE PLAN.





Civil Engineering
Landscape Architecture
Land Surveying
Construction Services

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REVISIONS
Added final wetland delineation 6-1-23

CLIENT: ALLEN EDWIN HOMES
2186 E. CENTRE STREET
PORTAGE, MICHIGAN 49002

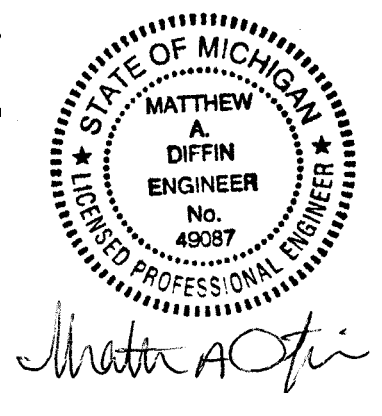
SITE PLAN
HARTLAND RESERVE

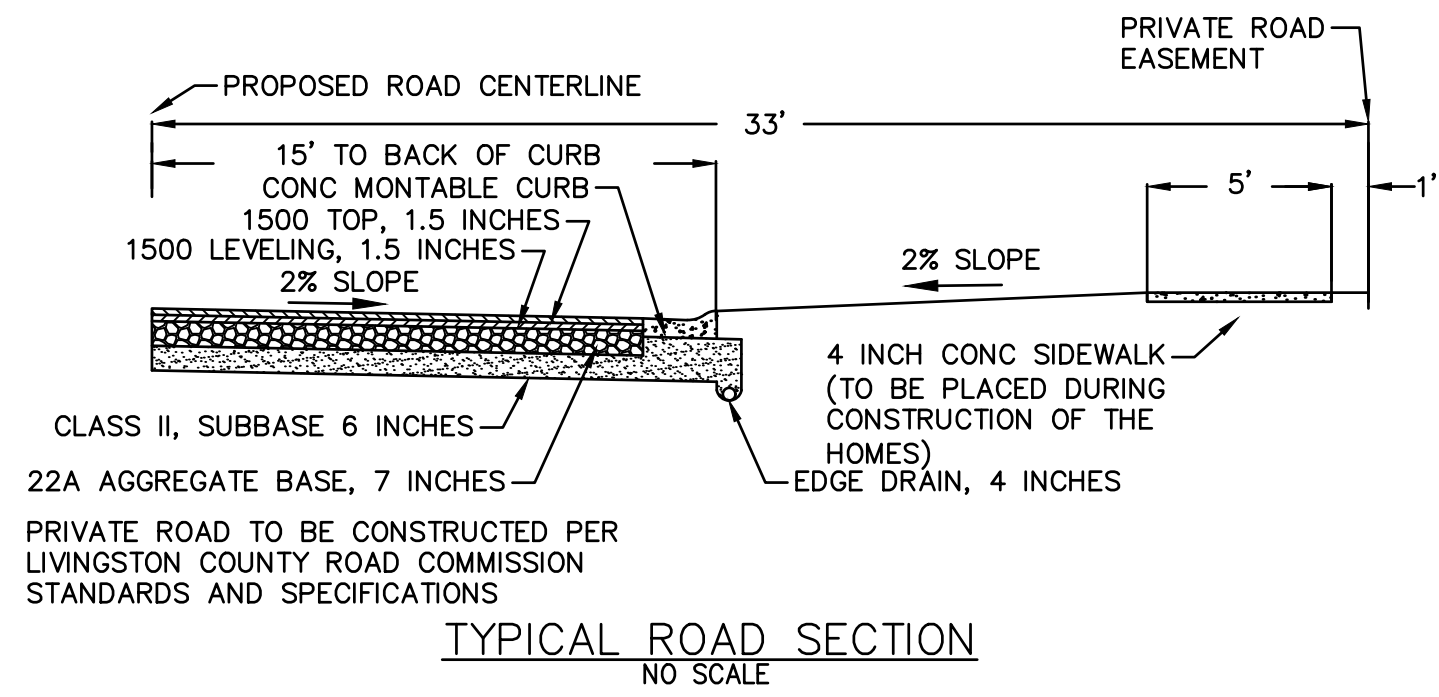
SECTION 26
TOWN 3 NORTH, RANGE 6 EAST

HARTLAND TOWNSHIP
LIVINGSTON COUNTY, MICHIGAN

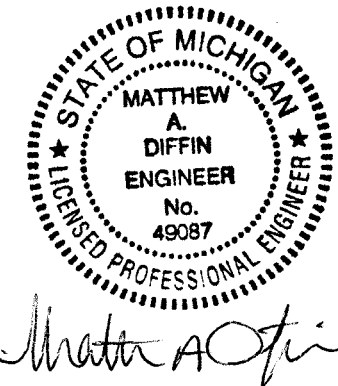
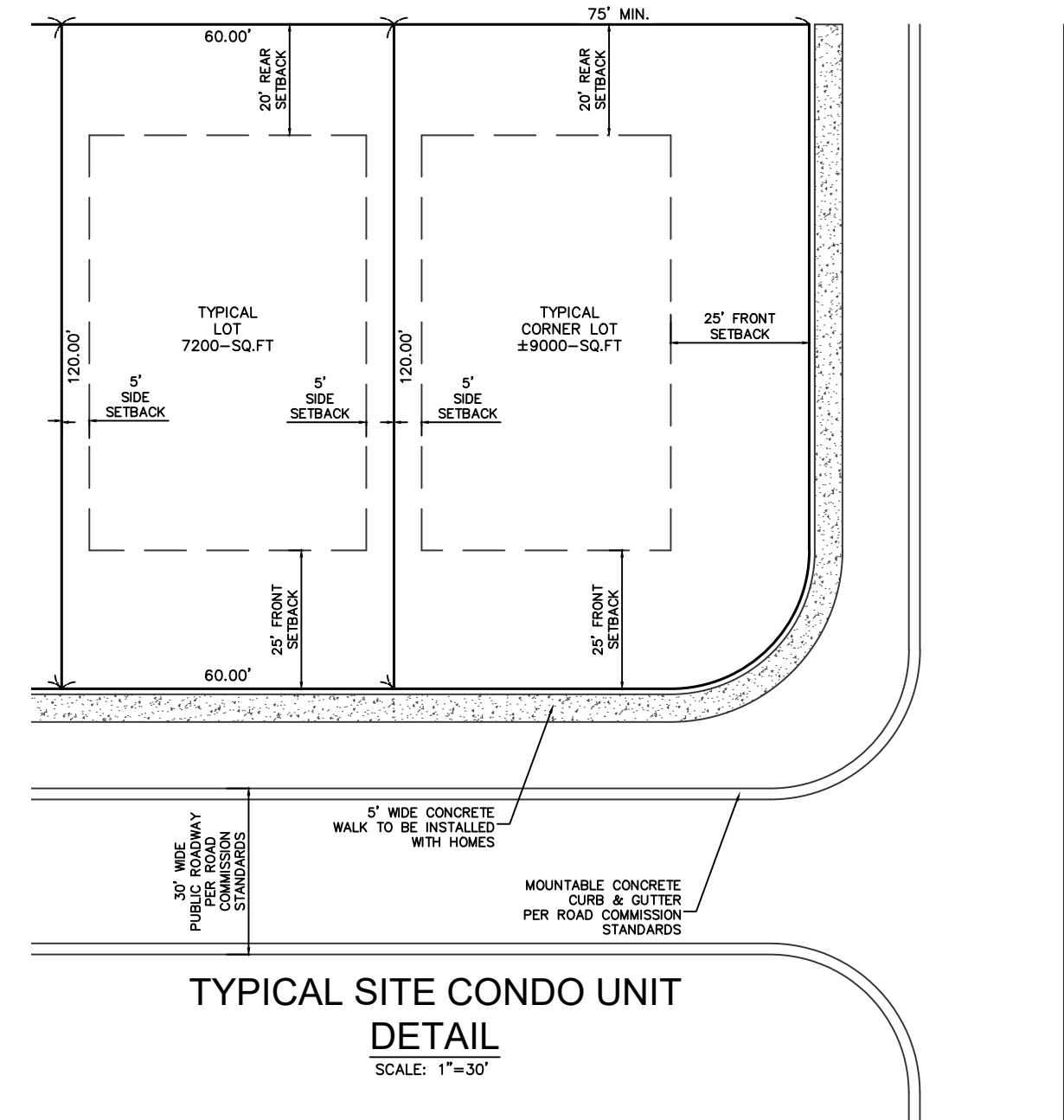
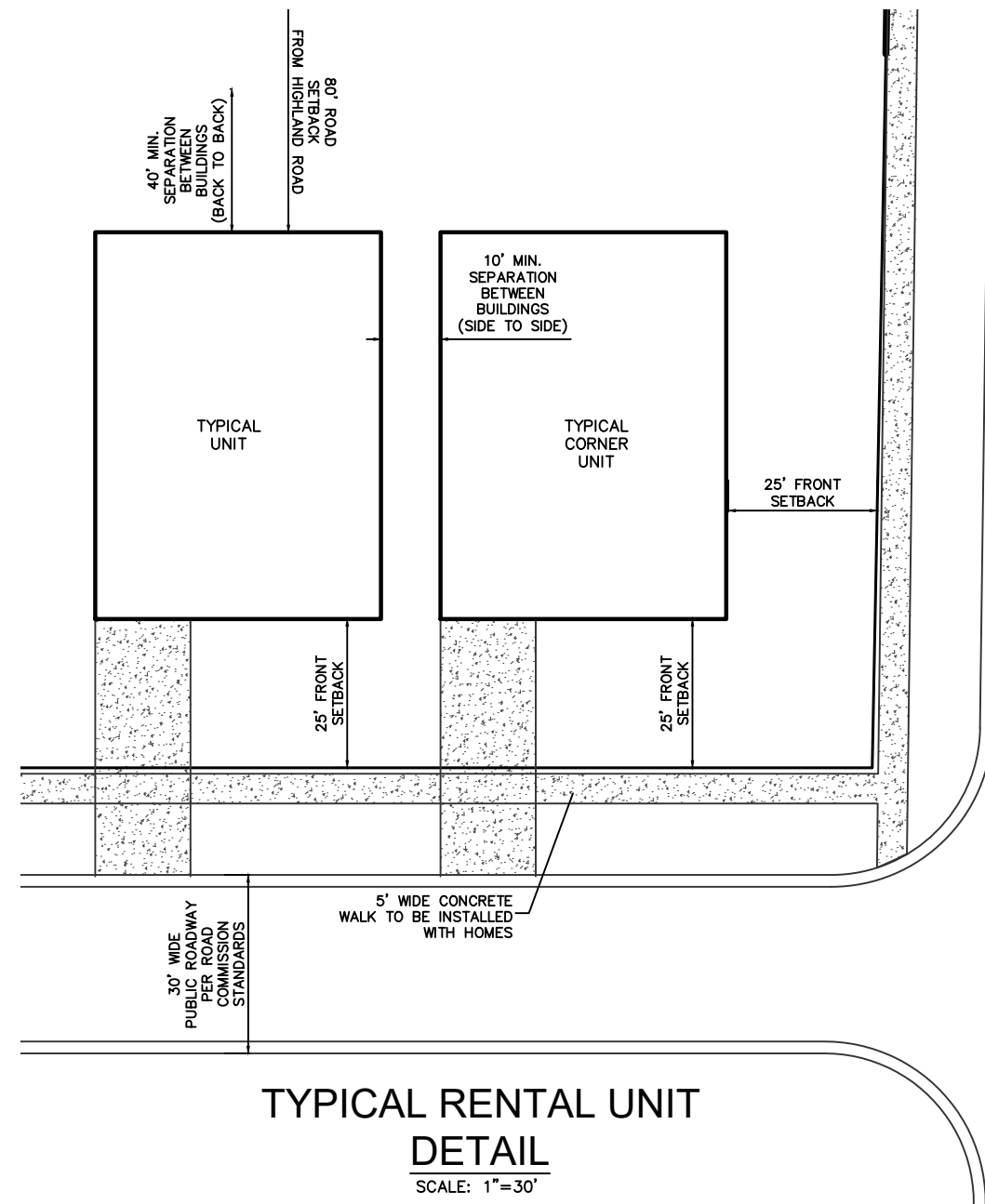
DATE: 8-29-23
Drawn By: XX
P.E.: MD
Job No.: 221215
Sheet No.: 4

These documents are instruments of service in respect of the project and are prepared without regard to the specific purposes intended. The user will be at their sole risk and without liability or legal recourse for any damages, losses and expenses including attorney's fees arising out of or resulting therefrom. Any such verification or ratification shall be agreed upon by user and DEE.



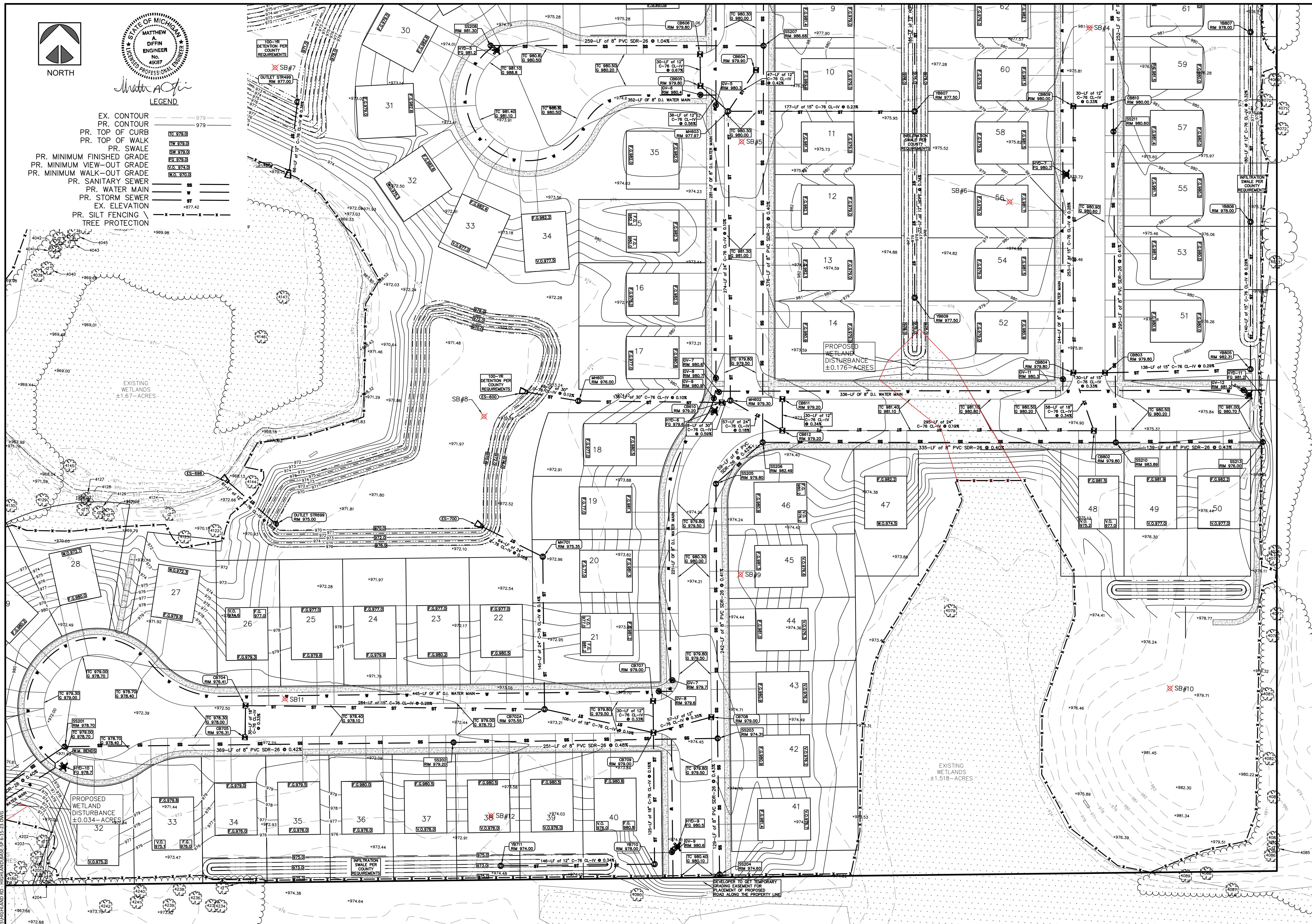


Rental Portion Building Envelope Dimensions		
Unit Number	Width (Ft)	Depth (Ft)
1	48	65
2	48	65
3	48	65
4	48	65
5	48	65
6	48	65
7	48	65
8	45	65
9	48	65
10	45	65
11	45	65
12	45	65
13	45	65
14	45	65
15	45	65
16	50	65
17	50	65
18	50	65
19	50	65
20	50	65
21	50	55
22	50	55
23	50	55
24	50	55
25	50	55
26	50	55
27	50	55
28	50	55
29	50	55
30	50	55
31	50	55
32	50	55
33	50	55
34	42	55
35	50	55





EX. CONTOUR _____ 979 _____
PR. CONTOUR _____ 979 _____
PR. TOP OF CURB 116.979.0
PR. TOP OF WALK 117.979.0
PR. SWALE 118.979.0
PR. MINIMUM FINISHED GRADE 119.979.0
PR. MINIMUM VIEW-OUT GRADE 120.979.0
PR. MINIMUM WALK-OUT GRADE 121.979.0
PR. SANITARY SEWER _____ SS _____
PR. WATER MAIN _____ W _____
PR. STORM SEWER _____ ST _____
EX. ELEVATION _____ 877.42 _____
PR. SILT FENCING \ _____ X _____ X _____ X _____
TREE PROTECTION _____



CONSTRUCTION SITE SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR. NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.



DIFFIN
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South Lyon, MI 48178
P: 248.943.8244
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www.Diffin-Eng.com

REVISIONS

ALLEN EDWIN HOMES
2186 E. CENTRE STREET
PORTAGE, MICHIGAN 49002

Surveying (DES) for the specific purposes intended will be at Users' sole risk and without liability or legal exposure to DES and User shall indemnify and hold harmless DES from all claims, damages, losses and expenses including attorneys' fees arising out of or resulting therefrom. Any such verification or adaptation will entitle DES to further compensation at rates to be agreed upon by User and DES.

SECTION 26

1/4 N 3 NORTH, RANGE 6 EAST

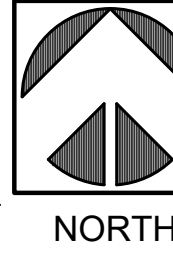
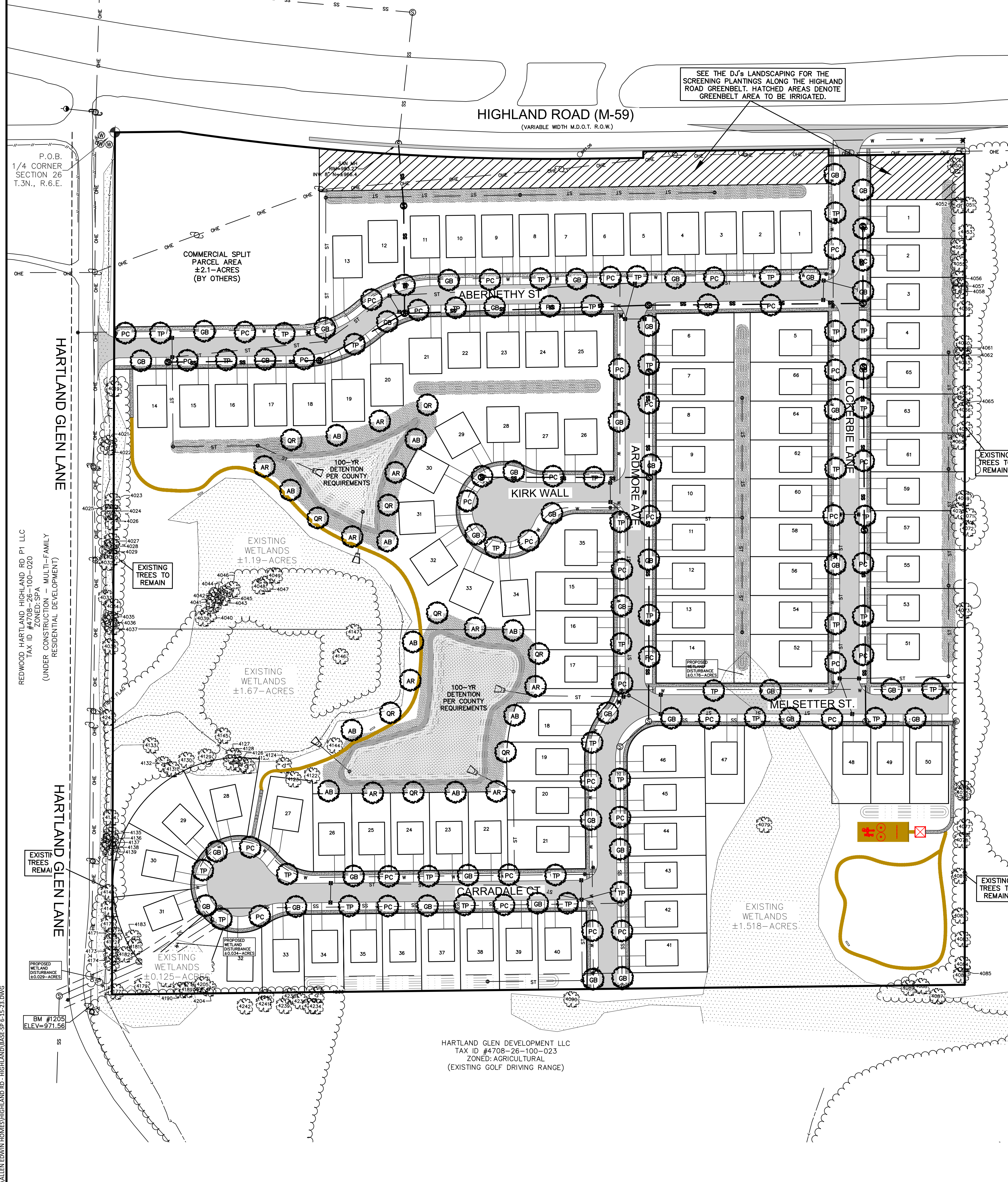
ATE: 8-29-23

Drawn By: XX

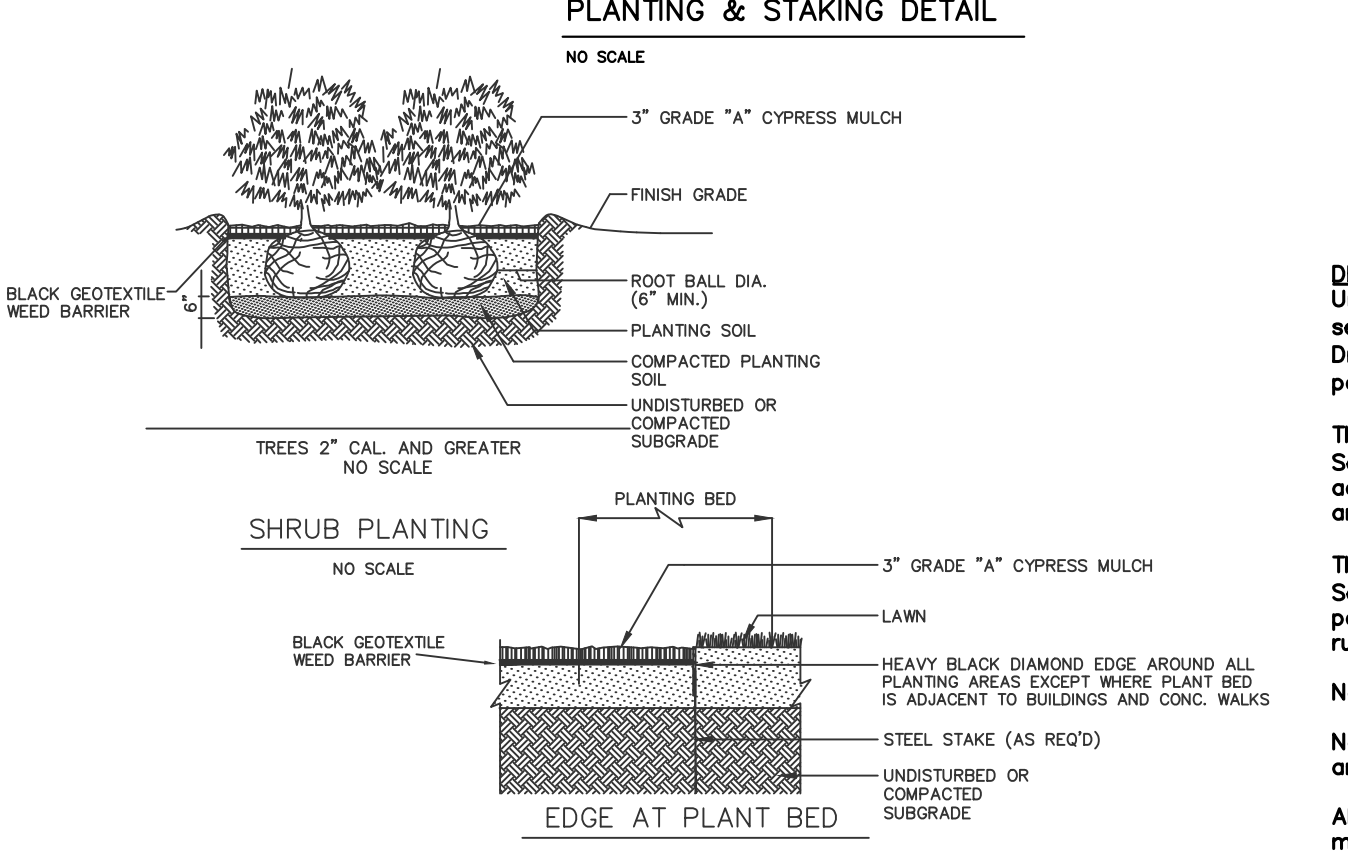
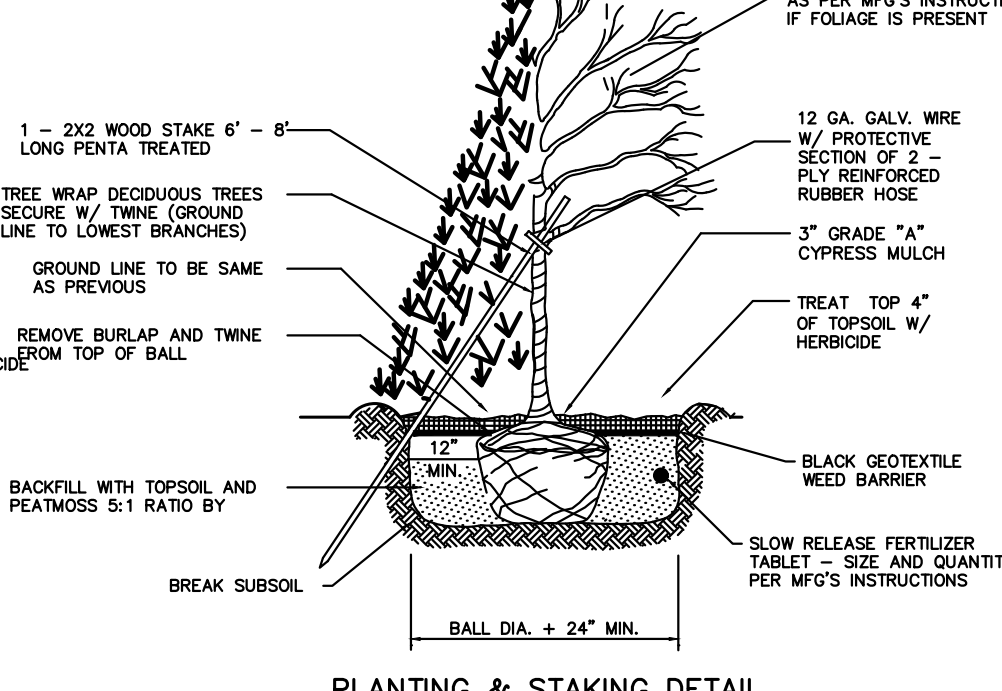
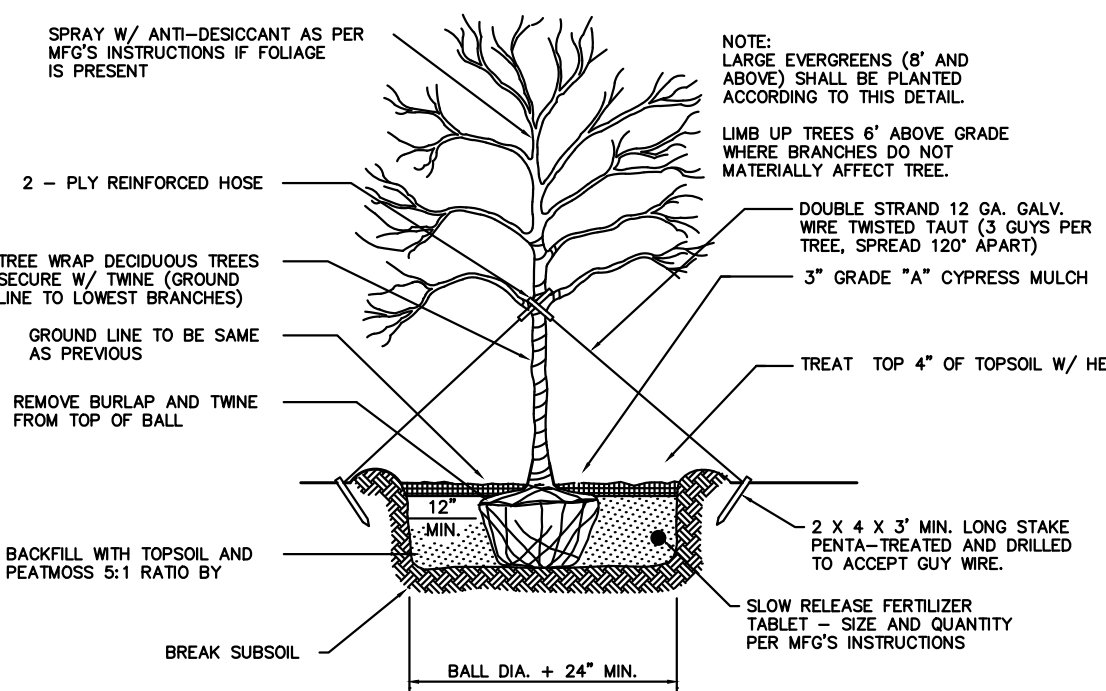
E.: MD

Job No.: 22121

Sheet No.



PLANTING SCHEDULE FOR SITE LANDSCAPING				
KEY	QUAN.	SIZE	BOTANICAL NAME	COMMON NAME
PP	12	8'	Picea Strobus	Eastern White Pine
PN	12	8'	Thuja standishii ? plicata	Giant Green Arborvitae
PS	18	8'	Picea abies	Norway Spruce
TP	40	3.0' Cal.	Tilia cordata "greenspire"	Linden Greenspire
AB	10	3.0' Cal.	Acer x freemanii 'jeffsred'	Autum Blaze Maple
AR	10	3.0' Cal.	Acer rubrum	Red Maple
PC	41	3.0' Cal.	Ulmaceae 'Princeton'	Pinceton Elm
GB	41	3.0' Cal.	Magnoliaceae	Tulip
QR	10	2.0' Cal.	Quercus alba	White Oak



DETENTION BASIN & FORE BAYS SEEDING NOTES:
Undeveloped portion of the site surrounding the detention basins and fore bays, shall be seeded with a "Meadow-To-Dry Prairie Seed Mix" by Cardno Native Plant Nursery, (128 Sunset Dr., Walkerton, IN 46574, 574-586-2412, nurseriesales@cardno.com) at 38.84 PLS pounds/acre.

The upland zone of the fore bays and detention basins shall be seeded with "Sedge Meadow Seed Mix" by Cardno Native Plant Nursery (see info in note #12) at approximately 35 PLS pounds per acre. This seed mix consists of 13 of 17 native permanent grass, sedge and rush species and 27 of 30 native forb and shrub species.

The edge zone of the fore bays and detention basins shall be seeded with "Wetland Edge Seed Mix" by Cardno Native Plant Nursery (see info in note #12) at approximately 35 PLS pounds per acre. This seed mix consists of 10 of 12 native permanent grass, sedge and rush species and 7 of 20 native forb species.

Native seed shall be planted above the permanent water elevation.

Native seed mixes shall contain a cover crop consisting of 10 pounds per acre of annual ryegrass and 30 pounds per acre of seed oats.

All sloped native seed areas adjacent to wetlands and drains shall be stabilized with a mulch blanket pegged-in-place.

GENERAL NOTES

1. ALL PLANTS MUST BE HEALTHY, VIGOROUS MATERIAL, FREE OF PESTS AND DISEASE.
2. ALL PLANTS MUST BE CONTAINER GROWN OR BALLED AND BUR LAPPED AS INDICATED IN THE PLANT LIST.
3. ALL TREES MUST BE STRAIGHT TRUNKED AND FULL HEADED AND MEET ALL REQUIREMENTS SPECIFIED.
4. ALL PLANTS ARE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT BEFORE, DURING, AND AFTER INSTALLATION.
5. ALL TREES MUST BE GUIED OR STAKED AS SHOWN IN THE DETAILS.
6. ALL PLANTING AREAS MUST BE COMPLETELY MULCHED AS SPECIFIED.
7. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL AVOID DAMAGE TO ALL UTILITIES AND SHALL AVOID DAMAGE TO ALL UTILITIES DURING THE COURSE OF THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY AND ALL DAMAGE TO UTILITIES, STRUCTURES, SITE APPURTENANCES, ETC. WHICH OCCURS AS A RESULT OF THE LANDSCAPE CONSTRUCTION.
8. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL QUANTITIES SHOWN ON THESE PLANS BEFORE PRICING THE WORK.
9. THE CONTRACTOR IS RESPONSIBLE FOR FULLY MAINTAINING ALL PLANTING (INCLUDING BUT NOT LIMITED TO: WATERING, SPRAYING, MULCHING, FERTILIZING, ETC.) OF THE PLANTING AREAS AND LAWN UNTIL THE WORK IS ACCEPTED IN TOTAL BY THE OWNER.
10. THE CONTRACTOR SHALL COMPLETELY GUARANTEE ALL PLANT MATERIAL FOR A PERIOD OF ONE (1) YEAR BEGINNING ON THE DATE OF TOTAL ACCEPTANCE. THE CONTRACTOR SHALL PROMPTLY MAKE ALL REPLACEMENTS BEFORE OR AT THE END OF THE GUARANTEE PERIOD.
11. THE DEVELOPER SHALL APPROVE THE STAKING LOCATION OF ALL PLANT MATERIAL PRIOR TO INSTALLATION.
12. AFTER BEING DUG AT THE NURSERY SOURCE, ALL TREES IN LEAF SHALL BE ACCLIMATED FOR TWO (2) WEEKS UNDER A MIST SYSTEM PRIOR TO INSTALLATION.
13. ANY PLANT MATERIAL WHICH DIES, TURNS BROWN, OR DEFLATES (PRIOR TO TOTAL ACCEPTANCE OF THE WORK) SHALL BE PROMPTLY REMOVED FROM THE SITE AND REPLACED WITH MATERIAL OF THE SAME SPECIES, QUANTITY, AND SIZE AND MEETING ALL PLANT LIST SPECIFICATIONS.
14. STANDARDS SET FORTH IN "AMERICAN STANDARD FOR NURSERY STOCK" REPRESENT GUIDELINE SPECIFICATIONS ONLY AND SHALL CONSTITUTE MINIMUM QUALITY REQUIREMENTS FOR PLANT MATERIAL FOR PLANTING.
15. ALL SHRUB, GROUND COVER AND SEASONAL COLOR ANNUAL PLANTING BEDS ARE TO BE COMPLETELY COVERED WITH PINE BARK MULCH TO A MINIMUM DEPTH OF FOUR INCHES.
16. LOCATIONS OF EXISTING BURIED UTILITY LINES SHOWN ON THE PLANS ARE BASED UPON BEST AVAILABLE INFORMATION AND ARE TO BE CONSIDERED APPROXIMATE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATIONS OF UTILITY LINES AND ADJACENT TO THE WORK AREA. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL UTILITY LINES DURING THE CONSTRUCTION PERIOD.
17. SAFE, CLEARLY MARKED PEDESTRIAN AND VEHICULAR ACCESS TO ALL ADJACENT PROPERTIES MUST BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROCESS.
18. DURING THE GROWING SEASON ALL ANNUALS SHALL REMAIN IN A HEALTHY, VITAL CONDITION THROUGHOUT THE CONSTRUCTION PERIOD.
19. ALL PLANT MATERIALS QUANTITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETE COVERAGE OF ALL PLANTING BEDS AT SPACING SHOWN.
20. ALL DISTURBED AREAS ARE TO RECEIVE 4" OF TOP SOIL, MULCH, AND WATER UNTIL A HEALTHY STAND OF GRASS IS OBTAINED. THIS IS EXCLUDING ALL LANDSCAPED ISLANDS AND ENTRANCE AREAS.

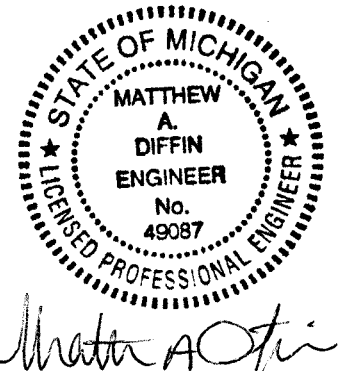
PLANTING NOTES

1. LOAM USED IN PLANTING BEDS SHALL BE UNIFORM IN COMPOSITION, FREE OF STONES LARGER THAN 1" AND SHALL NOT CONTAIN TOXIC SUBSTANCES HARMFUL TO PLANT GROWTH.
2. CREATE A PLANTING MIX COMPRISED OF 2/3 SCREENED LOAM AND 1/3 PEAT MOSS OR LEAF COMPOST. AMEND WITH "PLANTONE" ORGANIC FERTILIZER, OR EQUAL, AT THE RATE RECOMMENDED BY MANUFACTURER.
3. THE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTING SHOWN ON THIS DRAWING.
4. ALL PLANT MATERIALS SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC.
5. PLANT PITS SHALL BE DUG TWICE THE WIDTH OF THE ROOTBALL. PLANT PITS AND PLANTING BEDS SHALL BE BACKFILLED WITH THE AMENDED PLANTING MIX IN LIFTS TO AVOID AIR POCKETS IN BACKFILL.
6. ALL PLANT MATERIAL TO BE SET PLUMB, AND TO BEAR NATURAL RELATIONSHIP WITH FINISHED GRADE.
7. ALL BIODEGRADABLE BURLAP SHALL BE UNTIED AND PULLED DOWN ON THE BALL. WIRE BASKETS AND OTHER NON-BIODEGRADABLE MATERIALS ATTACHED TO PLANTS SHALL BE REMOVED PRIOR TO PLANTING. CARE SHALL BE TAKEN NOT TO BREAK OR DISTURB ROOTBALL OF PLANTS.
8. ALL PLANTS SHALL BE WATERED IMMEDIATELY AFTER PLANTING.
9. 3" OF COMPOSTED PINE BARK MULCH SHALL BE SPREAD OVER ALL PLANT BEDS.
10. THE CONTRACTOR SHALL MAINTAIN ALL PLANTS FOR 90 DAYS AFTER THE COMPLETION OF PLANT INSTALLATION. MAINTENANCE SHALL CONSIST OF KEEPING ALL PLANTS IN A HEALTHY GROWING CONDITION.
11. PLANTS SHALL BE GUARANTEED FOR A PERIOD OF 1 YEAR AFTER ACCEPTANCE OF THE PROJECT AND SHALL BE ALIVE AND IN SATISFACTORY GROWTH AT THE END OF THE GUARANTEE PERIOD. THE CONTRACTOR SHALL BE RESPONSIBLE TO REMOVE ALL FAILING PLANT MATERIALS, AND REPLACE THEM WITH THE SAME KIND AND SIZE OF MATERIAL AS SPECIFIED IN THE PLANT LIST, WITH THE SAME GUARANTEE AS INITIAL PLANTING.
12. ANY PROPOSED SUBSTITUTIONS OF PLANT SPECIES SHALL BE MADE WITH PLANTS OF EQUIVALENT OVERALL FORM, HERITAGE, BRANCHING HABIT, FLOWER, LEAF, COLOR, FRUIT AND CULTURE, AND ONLY AFTER WRITTEN APPROVAL OF THE OWNER, AND THE CITY OF ROMULUS PLANNING DEPARTMENT.
13. CONTRACTOR SHALL LOCATE AND VERIFY ALL EXISTING UTILITY LINES PRIOR TO PLANTING AND SHALL REPORT ANY CONFLICTS TO THE OWNER.
14. ALL PLANTING BEDS AND GREENBELT AREAS SHALL RECEIVE SIX INCHES (6") OF SCREENED TOPSOIL, MEASURED AFTER COMPACTION, PRIOR TO INSTALLATION OF PLANTS, SEEDING, OR SOODING.
15. ALL LANDSCAPE ISLANDS SHALL BE FILLED SUCH THAT THEY ARE CROWNED IN THE MIDDLE TO PROVIDE POSITIVE DRAINAGE AND TO PREVENT POOLING WITHIN THE LANDSCAPED AREA (TYP.)
16. STREET TREES TO BE INSTALLED WITH A MINIMUM 35' OF SEPARATION ON CENTER.

DETENTION BASINS & FORE BAYS

- PRairie SEED
- POND ZONE PLANTINGS
- EDGE ZONE SEED
- UPLAND ZONE SEED

NOTE:
STREET TREES SHALL BE PLANTED 35--FT ON CENTER



Civil Engineering
Landscape Architecture
Land Surveying
Construction Services

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Engineering & Surveying
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REVISIONS

CLIENT:
ALLEN EDWIN HOMES
2186 E. CENTRE STREET
PORTAGE, MICHIGAN 49002

LANDSCAPE PLAN
HARTLAND RESERVE

These documents are instruments of service in respect of the project and are to be used without alteration or modification for the specific purposes intended. Surveying (DLS) for the specific purposes intended will be at Users sole risk and without liability or legal responsibility. The user acknowledges that the user has received and understands the scope, limitations, and exclusions of the services provided. The user agrees to hold the engineer harmless from all claims, damages, losses and expenses including attorneys' fees arising out of or resulting therefrom. Any such verification or certification shall be subject to the user's written consent. The user agrees to pay the user's portion of the rates to be agreed upon by user and DCS.

SECTION 26
TOWN 3 NORTH, RANGE 6 EAST
HARTLAND TOWNSHIP
LIVINGSTON COUNTY, MICHIGAN

DATE: 8-29-23
Drawn By: XX
P.E.: MD
1" = 80'
Job No.: 221215
Sheet No.

9

REDWOOD, HARTLAND AND HIGHLAND RD. P1, LLC
TAX ID #4708-26-100-020
ZONED: SPA
(UNDER CONSTRUCTION - MULTI-FAMILY RESIDENTIAL DEVELOPMENT)

BM #1203
ELEV=971.56

PROPOSED WETLAND DISTURBANCE (±0.04-ACRES)

EXISTING WETLANDS ±1.19-ACRES

EXISTING WETLANDS ±1.67-ACRES

EXISTING WETLANDS ±0.125-ACRES

EXISTING WETLANDS ±1.518-ACRES

HARTLAND GLEN DEVELOPMENT LLC
TAX ID #4708-26-100-023
ZONED: AGRICULTURAL
(EXISTING GOLF DRIVING RANGE)

2: ALLEN EDWIN HOMES/HIGHLAND RD. - HIGHLAND BASE: SP 4-15-23.DWG



MRP LED LED Area Luminaire

Buy American

Specifications

EPA: 1,125 ft² (0.105 ac)
Luminaire Height: 6'-0" (182.9 cm)
Overall Height: 32" (81.3 cm)
Diameter: 18" (45.7 cm)
Weight (max): 37.5 lbs (17 kg)

Ordering Information

MRP LED	LEDs	Size (sq ft)	Color Temperature	Beam Angle	Mounting	Notes
MRP LED	4K 42 LEDs (integrated)	7200	3000K	50°	120"	Shipped separately
		7200	4000K	50°	120"	Shipped separately
		7200	5000K	50°	120"	Shipped separately
		7200	5000K	50°	120"	Shipped separately

EXAMPLE: MRP LED 42C 7200 40K SRS MVOLT DBXBD

MRP LED	LEDs	Size (sq ft)	Color Temperature	Beam Angle	Mounting	Notes
MRP LED	4K 42 LEDs (integrated)	7200	3000K	50°	120"	Shipped separately
		7200	4000K	50°	120"	Shipped separately
		7200	5000K	50°	120"	Shipped separately
		7200	5000K	50°	120"	Shipped separately

TYPICAL LIGHT DETAIL

NO SCALE

LAMP: LITHONIA LIGHTING MRP LED SR2 30K, 100W, 6,630-LUMENS

POST: 3" DIA. DIRECT BURY ROUND POLE

FINISH GRADE

ELECTRICAL CONDUIT

REVISIONS

NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMIT	8-29-23

CLIENT: ALLEN EDWIN HOMES
2186 E. CENTRE STREET
PORTAGE, MICHIGAN 49002

SECTION 26
TOWN 3 NORTH, RANGE 6 EAST
HARTLAND TOWNSHIP
LIVINGSTON COUNTY, MICHIGAN

DATE: 8-29-23
Drawn By: XX
P.E.: MD

Job No.: 221215
Sheet No.: 10

Hartland Township Board of Trustees Meeting Agenda Memorandum

Submitted By: Larry Ciofu, Clerk

Subject: Early Voting Location

Date: October 10, 2023

Recommended Action

Move to designate Hartland Township Hall at 2655 Clark Rd., Hartland, MI 48353 as the polling location for precincts to conduct Early Voting.

Discussion

Michigan electors adopted Proposal 2022-2 to amend the Michigan constitution on November 8, 2022 which in part requires each municipality to have at least one Early Voting site for statewide and federal elections to accommodate Early Voting. Early Voting consists of nine consecutive days of in-person voting starting on the second Saturday before the election through the Sunday prior to the election, with eight hours of in-person voting required each day.

The constitution offers three options to municipalities to accommodate voters for the nine days of Early Voting.

1. Enter into a County agreement and authorize the County to conduct early voting at a central or regional site(s);
2. Enter into a municipal agreement and jointly conduct early voting with one or more other municipalities in the same county at an agreed upon location;
3. Offer early voting as a single municipality.

There was not enough interest from the townships in Livingston County to enter into a County Agreement to have the County conduct Early Voting (see attached) and the neighboring townships to Hartland Township opted to provide Early Voting as a single municipality, so there was not a feasible option for a Municipal Agreement. Therefore, Hartland Township will provide eight days of Early Voting (hours to be determined) within our township.

Michigan Law requires that the legislative body in each municipality provide a suitable Early Voting site for each precinct in the municipality for state and federal elections. It is the recommendation of the Clerk's Office that the Hartland Township Hall Board Room is the most suitable location for Early Voting for all five precincts in Hartland Township. The Township Hall is a convenient location for the residents, requires no additional location expenses, and provides the required security features for securely storing ballots and equipment at the end of each night's Early Voting. The hours for Early Voting will be set so as to not conflict with any of the scheduled Board, Planning Commission, or Zoning Board of Appeals meetings.

The attached Early Voting Plan was submitted to the County per the Law and is subject to change depending on the Boards action tonight. The Early Voting location will be staffed with four Election Inspectors each day and will be assisted by the Clerk and/or the Deputy Clerk during voting hours. Due to the special nature of the Early Voting process an additional tabulator (\$5735) and electronic poll book (\$380) will be needed for Early Voting and both have already been included in the 2023-2024 budget.

We have also submitted the attached Early Voting Grant Application to the County in the amount of \$43,503. The State of Michigan Fiscal Year 2024 budget included a grant to provide funding for the implementation and execution of early voting as required. The funding will be divided between counties largely based on population and expected early voting turnout. The number of early voting sites may be capped at one site per two jurisdictions. For Livingston County this would mean that grant funding would be capped at 9

early voting sites (16 townships and 2 cities divided by 2). The funds received for these these nine early voting sites would then be distributed to the 18 local jurisdictions. The County has no idea what each jurisdiction would end up receiving, but they indicated it would not be near the amount each that each township may have requested on their grant application.

Financial Impact

None

Attachments

2023 County EV Notification to Local Clerks

Early Voting Plan – FINAL – 8-30-23

Early Voting Grant Application – FINAL – 8-31-23



ELIZABETH HUNDLEY LIVINGSTON COUNTY CLERK

County Clerk
200 E. Grand River Ave.
Howell, MI 48843
Phone: (517) 546-0500
countyclerk@livgov.com

Circuit Court Clerk
204 S. Highlander Way, Suite 4
Howell, MI 48843
Phone: (517) 546-9816
circuitcourtclerk@livgov.com

To: Livingston County City & Township Clerks

From: Elizabeth Hundley, Livingston County Clerk

Re: MCL 168.720d Early Voting Notification

Date: September 18, 2023

MCL 168.720d requires the County Clerk to notify municipal clerks whether or not the County will conduct early voting through a county agreement.

I hereby notify city and township clerks within Livingston County that the County will not offer early voting through a county agreement.

Local clerks must offer early voting to voters. Local clerks within Livingston County will be required to conduct early voting as a single municipality as described in MCL 168.720e or enter into a municipal agreement and jointly conduct early voting with one or more municipalities in Livingston County as described in MCL 168.720f.

Early Voting Plan

No later than 120 days before the first statewide or federal election in each even numbered year, the clerk of the municipality is responsible for ensuring an Early Voting Plan is filed with the county clerk of the county in which the municipality is located.

Not less than 45 days before the first early voting day allowed by statute, the clerk will be responsible for providing the Secretary of State any changes made to a previously submitted Early Voting Plan that affect the locations, dates, and hours of operation for each early voting site operated by the municipality. This ensures that the correct information is posted on the Michigan Voter Information Center (MVIC) portion of the Department of State's website.

Plan Coverage: Single Municipal

Municipality Information:

Name of municipality	Clerk of municipality	Number of precincts in municipality	Number of registered electors in municipality
Hartland Township	Larry N. Ciofu	Five	12,789

Early Voting Information:

	Early voting site #1	Early voting site #2	Early voting site #3
Location of site			
Number of Election Workers at site	8		
Is this an EV site for all 9 days of Constitutionally-required early voting? (Y/N)	Yes		
Hours for 9 days of Constitutionally-required early voting	8:00 a.m. – 4:00 p.m. Or 12:00 p.m. – 8:00 p.m.		
How many (if any) additional days of early voting will be provided at this site?	None		
Hours for any additional days of early voting	None		
Is this site ADA compliant?	Yes		
In selecting this site, did you take into account expected turnout, population density, public transportation, accessibility, travel time, travel patterns, and any other relevant considerations?	Yes		

Early Voting Equipment Information:

Early Voting Site #	Number of Tabulators	Number of Early Voting Poll Book Laptops
1	Two	Two
2		
3		

Early Voting Site Supervisors:

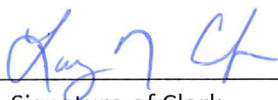
	Supervisor at Early Voting site #1	Supervisor at Early Voting site #2	Supervisor at Early Voting site #3
Early Voting Day 1	Larry N. Ciofu		
Early Voting Day 2	Larry N. Ciofu		
Early Voting Day 3	Larry N. Ciofu		
Early Voting Day 4	Larry N. Ciofu		
Early Voting Day 5	Larry N. Ciofu		
Early Voting Day 6	Larry N. Ciofu		
Early Voting Day 7	Larry N. Ciofu		
Early Voting Day 8	Larry N. Ciofu		
Early Voting Day 9	Larry N. Ciofu		

Describe the communication strategy for informing electors of their opportunity for early voting:

Provide required election law notifications to voters in a timely manner as required by law. Develop training and informational exhibits to aid in Early Voting education regarding processes and procedures and disseminate this information through Township website and social media and local community events. Provide access to the Clerk's department through social media contact, in person visits, and potential Town Hall meeting events to educate the public on the various voting methods, including Early Voting. Post notification of Early Voting dates and hours on website and provide updates through the website and social media as deadlines approach for in-person, absentee and early voting methods.

LARRY N. CIOFU

Printed name of Clerk



Signature of Clerk

8-31-23

Date



Early Voting Grant Application

The Fiscal Year 2024 budget includes a grant to provide funding for the implementation and execution of early voting as required under Section 4(1)(m) of Article II of the Constitution of Michigan of 1963 and in accordance with Public Acts 81-88 of 2023. The funding will be divided between counties largely based on population and expected early voting turnout. The number of early voting sites may be capped at one site per two jurisdictions, absent good reason to deviate from that number (indicate reason on pg. 5 of this application). For example, a county with 51 jurisdictions may be capped for funding purposes at 26 early voting sites. Based on the materials requested in this application, the Michigan Department of State (MDOS) and Bureau of Elections (BOE) will determine the payment method, which will happen in one of four ways:

- The approved materials will be ordered by the county clerk or local clerk and billed to BOE (will likely be used for tabulators and VATs).
- A grant amount will be approved for the county, specifying the approved materials; the county clerk or local clerk will purchase the approved materials; the county clerk will submit the reimbursement request to BOE and BOE will transmit the grant amount to the county clerk (will likely be used for staffing support reimbursement).
- The approved materials will be ordered through BOE (similarly to drop box procurement; will likely be used for early voting poll book laptops).
- A grant amount will be approved and transmitted to the county, specifying the approved materials, and the county will either pay for the approved materials using that grant amount or transmit it to the requesting municipality within the county to pay for the approved materials.

The county clerk will be responsible for coordinating the implementation of early voting by municipalities within their jurisdiction in the most efficient manner possible. In order to be eligible for funding, submit this application and your early voting plan by **September 1, 2023**.

NOTE: This grant is a one-time appropriation for the implementation of early voting, and it is unknown what amount, if any, may be available in future years.

The county clerk must complete this worksheet on behalf of all jurisdictions in the county, filling out the tables below to indicate which materials are available and the materials for which the clerk is requesting funding. Note that an early voting site is a polling place and shall be subject to the same requirements as an Election Day polling place under the Michigan Election Law. Likewise, an early voting site is subject to the same statutory requirements as an Election Day precinct.

Name of City/Township: Hartland Township
Name of Clerk: Larry N. Ciofu
Total funding requested to purchase materials needed for early voting: \$ 43,503
Total number of early voting sites anticipated: One
Number of early voting sites to be funded through this grant: One
Number of registered voters who will be served by the early voting site(s): 12,789

The following materials will be prioritized for the grant:

Electronic poll book laptops (EPBs): These will be ordered by and billed to BOE.

Number of Dell Latitude 5540 laptops (or equivalent model) requested: Two
--

Staffing support for August 2024 and November 2024: BOE anticipates that staffing support individuals will be reimbursed at \$15 per hour. To calculate the total cost, multiply the number of requested staffing support individuals by the number of hours, by \$15. Reimbursement for 2024 presidential primary early voting staffing will be rolled into the reimbursement for the presidential primary.

Number of staffing support individuals requested: 8 per day
Total cost: \$11,550

Tabulators: These will be ordered by the local or county clerk and billed to BOE. Note that the same tabulator may **not** be used at both an early voting site and an Election Day site.

Number owned and expected to be used for early voting: None
Number requested: Two
Voting system vendor: Hart InterCivic
Cost per item requested: \$5,500
Total cost: \$11,000

Voter assist terminals (VATs): These will be ordered by the local or county clerk and billed to BOE. Note that the same VAT **may** be used at an early voting site and an Election Day site.

Number owned and expected to be used for early voting: One
Number requested: None
Voting system vendor: n/a
Cost per item requested: n/a
Total cost: \$ 0

**The following materials may be funded under the grant
if additional funding remains after the initial allocation.**

Ballot containers and approved transport cases: Bureau-approved and used for secure storage of ballots during early voting and until the release of security:

Number owned and expected to be used for early voting: None
Number requested: Two
Requested manufacturer or vendor: Election Source
Requested model or style: EZ Pull Rolling Supply Bag - BA-EZPULL
Cost per item requested: \$180
Total cost: \$360

Ballot on-demand (BOD) systems:

Number requested: None
Voting system vendor: n/a
Requested model or style: n/a
Cost per item requested: n/a
Total cost: \$ 0

Bar code scanners:

Number owned and expected to be used for early voting: None
Number requested: Two
Requested manufacturer or vendor: Staples
Requested model or style: HP Engage Imaging II - 5YQ08AT
Cost per item requested: \$170
Total cost: \$340

Internet connectivity support:

Item requested to aid in internet connectivity: Cellular Booster System
Number requested: One
Requested manufacturer or vendor: IT Right
Requested model or style: To be determined by IT Right
Cost per item requested: \$ 600
Total cost: \$ 600

Printers:

Number owned and expected to be used for early voting: None
Number requested: Two
Requested manufacturer or vendor: Staples
Requested model or style: HP Laser Jet Pro M404dn
Cost per item requested: \$370
Total cost: \$740

Secrecy sleeves:

Number owned and expected to be used for early voting: None
Number requested: 20
Requested manufacturer or vendor: PSI
Requested model or style: 654 Secrecy Folder with Clear Instruction Pouches
Cost per item requested: \$3.75
Total cost: \$75

Vendor support: Note: Counties are encouraged to work together to secure vendor support so that two counties using the same vendor can be supported by a single representative.

Portion/cost of vendor support paid for by requesting county: None
Requested manufacturer or vendor: Hart InterCivic
Description of support: On site support as needed
Cost per day: \$2000
Total cost: \$18,000

Voting booths:

Number owned and expected to be used for early voting: None
Number requested: 20
Requested manufacturer or vendor: PSI
Requested model or style: 981 Corrugated Plastic Table Top Poll Booth
Cost per item requested: \$17.50
Total cost: \$350

Other (item not described in this document)

Description of item: V-Drives
Number requested: Two
Requested manufacturer or vendor: Hart InterCivic
Requested model or style: unknown
Cost per item requested: \$66
Total cost: \$132

Anything else, indicate the below:

4 - 8' Long Tables for Voting Area at Early Voting Site - WalMart @ \$89.00 per table = \$356

Hartland Township Board of Trustees Meeting Agenda Memorandum

Submitted By: Michael Luce, Director of Public Works

Subject: Township Hall Roof Replacement

Date: October 11, 2023

Recommended Action

Move to approve the replacement of the Township Hall roof and contingency funding in an amount not to exceed \$109,337 and allow the Township Manager to act on behalf of the Township for decisions relating to the project.

Discussion

As has been discussed, the Township Hall building is nearly 16 years old and our roof has reached its life expectancy. A few leaks were identified over the years and repairs were made, however currently we have multiple leaks, and the roof can no longer be patched. All of this leads to the necessity for replacement before we move into the Michigan winter.

Staff has solicited 6 quotes from various contractors and only 2 contractors have provided quotes, an additional quote from a third is forth coming. With variations in roofing material the pricing has come in at a few extremes, depicting the difference in an asphalt shingle, composite asphalt shingle, full composite to metal. At this time because of the variation in cost staff is recommending the composite asphalt shingle option. Subsequently, when the old roof is torn off, we anticipate plywood or OSB needing to be replaced due to the ongoing leaks we currently have. The total cost of this project includes a 20% contingency.

The replacement of the Township Hall roof is not currently in this fiscal year's budget however, it has become a necessity to replace it at this time.

Financial Impact

Is a Budget Amendment Required? ☒ Yes ☐ No

This project will be funded from the 401 Capital Projects Fund, the finance director will determine the necessary budget amendment.

Attachments

2023 Township Hall Roof Quotes



Lifetime Roof System (734) 627-ROOF

6250 Jackson Road, Ann Arbor, MI 48103

Name Hartland Township City Hall, Michael Luce Date 10/05/2023 Est. Install Date _____

Address 2655 Clark Road, Hartland, Michigan, 48353

☎ (810) 632-7498

☐ Text OK

☎ _____

☐ Text OK

Inspector Jeff Foster

☎ (248) 308-8006

Email Jfoster@gotoroofing.com

- 1) Prepare property for construction project. Tarp/protect outside of building and landscaping to ensure debris does not damage property. Please be sure to remove yard decorations and fragile landscaping items prior to installation date.
- 2) Remove all previous roofing materials down to original wood decking. Remove and replace any rotten/damaged wood decking.
- 3) The first 25 ft. of linear board decking OR (2) 4'X8' sheets of OSB are included in this agreement (15 sq. minimum). Thereafter, a charge of \$3 per foot of linear board and \$65 per sheet of OSB will be added.
- 4) Install premium 1.5" "T-Style" aluminum drip edge along all eaves and rakes.
- 5) Install premium ice shield at all eaves (min 6 ft.), flashings, valleys, and/or skylights and where needed to exceed building code requirements to prevent possible damage that ice dams cause to roof system. (Ice shield does not stop the formation of ice on roofs).
- 6) Install **PREMIUM SYNTHETIC** roofing underlayment on remainder of the roof.
- 7) Install Lifetime Architectural Shingle: Manufacturer _____ Brand _____
- 8) Use premium, galvanized, high-wind nails (not staples) to secure shingles.
- 9) Install heavy-duty neoprene vent stack collars to all stack pipes. **(NOT PLASTIC!)**.
- 10) Install multi-layer, high-wind perimeter system on all outside edges of roof.
- 11) Install ☒ **Premium Metal Vents** (NOT PLASTIC!) OR ☒ **Low-Profile Ridge** exhaust ventilation system.
- 12) Inspect intake ventilation. Add additional intake vents (soffit, rooftop, or fascia style available) at a cost of (SEE NOTES BELOW).
- 13) Flash and counter-flash all chimneys, walls, and roof penetrations, as needed. **(FLASHING IS SAW-CUT INTO ALL MASONRY)**
- 14) Job includes thorough clean-up with **MAGNETIC SWEEP** and proper disposal of all debris that day. All permits, fees, and taxes are included in this agreement. **Permits are pulled by GoTo Roofing, NOT a subcontractor.**
- 15) A quality control inspection will be performed within one year of installation, after the roof has had time to settle.
- 16) Limited lifetime warranty from manufacturer included, **PLUS 10** years **NO-LEAK GUARANTEE** from GoTo Roofing on material and labor. Length of "No-Leak Guarantee" is based on quality of materials chosen by homeowner. GoTo Roofing holds funds specifically for repairs, which means we back our guarantee with CASH, not empty promises.
- 17) Homeowner understands that due to the nature of construction, the extent of damage may not be fully known until after the installation has been initiated and the greater scope of the problem(s) becomes evident, which may impact pricing.

Existing Flat roof and metal roof will not be replaced

Install Limited Lifetime Economy Dimensional Shingle \$59,665 Install Class 4 Hail Impact Polymer Modified

Shingle \$79,864. Install Composite Lifetime Shingle \$171,545 Install Standing Seam Metal Roof \$254,793

This proposal includes roof replacement on the following structure(s): ☐ House ☐ Garage ☒ Outbuilding

PRICING	CUSTOMIZE	PAYMENT INFORMATION
ROOF PRICE	SHINGLE COLOR:	CHOOSE PAYMENT METHOD
OTHER	CHOOSE DRIP EDGE COLOR	DEPOSIT CHECK # CREDIT CARD CVC:
OTHER	GUTTER OPTIONS	***CASH/CHECK DISC. CANNOT BE COMBINED WITH OTHER OFFERS***
OTHER	GUTTER COLOR:	ALL DISCOUNTS INCLUDED IN AGREEMENT
\$0.00		

BALANCE IS DUE AT TIME OF COMPLETION. ANY REMAINING BALANCE UNPAID AFTER 14 DAYS FROM COMPLETION WILL INCUR A 10% LATE FEE. MANUFACTURER WARRANTY WILL NOT BE REGISTERED, NOR WILL GOTO ROOFING'S NO-LEAK GUARANTEE TAKE EFFECT UNTIL BALANCE IS PAID IN FULL. A \$40 SERVICE FEE WILL BE ADDED TO THE FINAL BALANCE FOR ANY PAYMENT RETURNED OR CANCELED.

Jeff Foster

Signature Date

10/05/2023

CUSTOMER SIGNATURE

INSPECTOR SIGNATURE

NOTICE OF RIGHT TO CANCEL: YOU, THE BUYER, MAY CANCEL THIS TRANSACTION ANY TIME PRIOR TO 5 PM ON THE THIRD DAY OF BUSINESS FROM THE DATE OF THIS TRANSACTION. SEE TERM & CONDITIONS FOR DETAILS. MANAGEMENT RESERVES THE RIGHT TO TERMINATE THIS CONTRACT AT ANY TIME, FOR ANY REASON WHATSOEVER, WITH ZERO PENALTY.

TERMS & CONDITIONS

1. **ENTIRE AGREEMENT** – This document states the entire agreement between the owner and contractor. NO REPRESENTATIONS, PROMISES OR WARRANTIES, EXPRESSED OR IMPLIED, HAVE BEEN MADE BY THE OWNER(S) EXCEPT THOSE OF WHICH ARE STATED IN THIS CONTRACT. This agreement cannot be changed through any conversations between the owner, estimator or contractor. Any changes must be in writing, signed and paid for by the owner. GoTo Roofing Inc. or its manufacturer's may, at its sole discretion, upgrade a product to similar or higher quality without notice.
2. **CANCELLATION** - Unless this contract was solicited in your home, in which case you should see the cancellation form on this side. The buyer may rescind or cancel this contract, no later than 5pm on the third business day from the date of this transaction, by giving written notice of rescission to the contractor (or his agent at his place of business) or by sending a certified letter via United States Post Service, but if owner rescinds after 5pm of the third business day following this transaction, the owner is still entitled to offer defenses in mitigation of damages and to pursue any rights of action or defenses that arise out of the transaction.
3. **RESULTANT DAMAGES** – The contractor, GoTo Roofing Inc., assumes no liability for any resulting damages to premises or materials located on the premises. Nor shall the contractor be liable for any damage to trees, shrubs, flowers, grass, concrete, or driveways. The replacement of joists or decking is based on the wood's integrity, not appearance or mold growth. There will be a charge for this labor and material. We will attach satellite dishes to the best of our ability, but customer is responsible for all costs to restore service. In the unlikely event of ceiling damage on the interior due to contractor's negligence, GoTo Roofing Inc. will patch that area of the home and paint that area only. GoTo Roofing Inc. assumes no liability for nail pops, cracks, or objects falling from the drywall, unless this was caused by our negligence. GoTo Roofing Inc. assumes no liability for gaps created from going from multiple layers down to one. GoTo Roofing Inc. assumes no liability for removing previously used tar, cement, or other material in order to properly flash any wall, chimney, or like. GoTo Roofing Inc. assumes no liability for heating/cooling or electrical pipes or collars. GoTo Roofing Inc. will do its best to seal these, but always recommends having these replaced by a licensed electrician and/or heating and cooling contractor. GoTo Roofing Inc. assumes no liability for any existing skylights and always recommends replacement during roof replacement.
4. **TIME FOR PERFORMANCE** – It is understood by all parties that time is of the essence for this project, and all work contracted for shall be performed as soon as scheduling, materials, and weather conditions permit. Contractor shall not be liable for delays caused by weather conditions, in obtaining materials, permits, or other causes beyond its control. Owner agrees to make available to GoTo Roofing Inc. electrical service and running water.
5. **STIPULATED DAMAGES** – If the owner cancels, rescinds, or otherwise terminates this contract after the expiration of the applicable cancellation period provided in this contract, the contractor will incur costs in preparation, damages and lost profits. The parties agree that if the following formula is a reasonable estimate of the actual damages that the contractor will incur if the owner does not allow the contractor to perform this contract. If the owner breaches this contract, the owner agrees to pay liquidated damages, which include 1/3 of the contract price and contractor's actual cost for any custom ordered materials.
6. **DISPUTE RESOLUTION**
- A. Notice – Except as to actions for the payment of the contract sum, it is an express condition precedent to resorting to any outside dispute resolution process, for the owner to notify the contractor, in writing, of any areas of concern that have not been satisfactorily resolved. After giving such written notice, owner and contractor shall attempt to resolve the issue in good faith.
- B. Mediation – Prior to filing an arbitration demand, the owner and contractor shall first attempt to resolve the dispute using a mediation service.
- C. Arbitration – Any disagreement arising out of this agreement or any other agreement document or from the breach thereof, shall be submitted to binding arbitration and judgement upon the award rendered, may be entered in the court of the forum, state or federal, having jurisdiction. The venue of the arbitration shall be in the Ann Arbor, Michigan area. The arbitration shall be conducted pursuant to the construction industry rules of the American Arbitration Associations prevailing at the time proceedings are initiated. The arbitrators shall be a panel of three – one selected by contractor, one selected by owner and a third selected by the first two arbitrators.
7. **BEYOND OUR CONTROL** – contractor shall not be responsible for any code violations existing at the time of this contract. Many homes are not square and also have rafters that are not equal. The appearance of dips and bows have nothing to do with the roof installation. It is not GoTo Roofing Inc.'s responsibility to remove anything that may dam up or stop the downward flow of water. Gutters are designed to divert water. During heavy downpours, a percentage of rainwater will not be caught by the gutter system. This overflow is expected and standard.
8. **MOLD** – GoTo Roofing Inc. accepts no liability whatsoever (past, present, or future) involving any type of mold in your structure, regardless of structure having been previously treated by GoTo Roofing Inc. or any other company. Furthermore, GoTo Roofing Inc. does not replace wood due to surface mold unless requested prior to installation.
9. **COMPLETION** – Job is complete and all terms of this contract are complete when the last shingle is installed.
10. **ASSIGNMENT** – Homeowner and all signers of this contract shall assume all costs incurred in the collection of this debt, including but not limited to attorney fees, 12% interest on total contract price, and court costs.
11. **APPROVAL** – All contracts must be approved by management before any work is performed. Management reserves the right to terminate this contract for any reason whatsoever with zero penalty. If terminated by management, any deposits made by the home owner would be returned within 10 business days.
12. **GUARANTEE** – GoTo Roofing Inc. guarantees that its work will be free from defects in workmanship for the time period specified on the front of this contract from the date that the contractor's work is substantially complete. Contractor shall repair or replace any defective work at the contractor's option. Repair or replacement shall be owner's exclusive remedy and in no event shall contractor be liable for any consequential or incidental damages. Contractor shall pass on to owner whatever warranties are made by the manufacturers of such products that were used on the owner's home. Contractor makes no guarantee of any kind, expressed or implied, other than as expressly set forth in this paragraph and all guarantees of any kind, whether of merchantability, fitness for particular purpose, habitation or otherwise, are expressly disclaimed by the contractor and excluded from this contract. Furthermore, contractor makes no representations, guarantees, covenants, or agreements of any kind, expressed or implied, for any trees, bushes, vegetation, or other natural growth that may be present on the property, whether before or after the signing of this contract. Owner understands and agrees that trees, bushes, vegetation, or other natural growth may be destroyed, removed, or altered in the course of construction, and that those remaining after construction is complete may have been damaged during construction. Third party warranties are in no way affiliated with GoTo Roofing Inc.

NOTICE OF RIGHT TO CANCEL

I (WE) _____ PHONE _____ STATE of MICHIGAN

ADDRESS _____ CITY _____ ZIP _____ DATE _____

You may cancel this transaction, without penalty or obligation, prior to 5PM on the THIRD BUSINESS DAY from the above date. If you cancel, any property traded, any payments made by you under this contract of sale, or any negotiable instrument executed by you will be returned within TEN BUSINESS DAYS following receipt by the seller of your cancellation notice, any and all security interest arising out of this transaction will be cancelled.

If you cancel, you must make available to the seller at your residence, in substantially as good condition as when received, any goods delivered to you under this contract of sale, or you may, if you wish, comply with the instructions of the seller regarding the return shipment of the goods at the homeowner's expense and risk.

If you do make the goods available to the seller and the seller does not pick them up within 20 calendar days of the date of your notice of cancellation, you may retain or dispose of the goods without any further obligation. If you fail to make available to the seller, or if you agree to return the goods to the seller and fail to do so, you remain liable for the performance of all obligations under the contract.

To cancel this transaction, a certified letter may be mailed to the business address or owner may deliver a signed and dated copy of this cancellation notice, or any other written notice, to GoTo Roofing Inc., 6250 Jackson Road, Ann Arbor, MI 48103.

BUYERS SIGNATURES _____ DATE _____



Iron Horse Building, LLC
PO BOX 51
Hartland, MI 48353 United States
248-702-1499
info@ironhorsebuilding.com

Estimate

Date	Estimate #
9/8/2023	11663

Bill To:

Hartland Township
2655 Clark Road
Hartland, Michigan 48353



**PREFERRED
CONTRACTOR**

Terms

Net 30

Scope of Work**Amount**

This proposal includes removing and replacing all slopes, with a separate option of replacing the standing-seam metal portion of the roof on east side of building.

Job Site: 2655 Clark Road Hartland, Michigan 48353 (Township Hall)

52,887.00

- Remove up to one layer of existing roofing materials from building to expose complete roof deck, clean-up and haul away.

- Inspection of the entire roof deck to insure all is structurally sound. (2) replacement sheets of OSB are included. Each additional required sheet is \$75.00 and will be added to the final invoice.

- Install GAF WeatherWatch Mineral-Surfaced Ice and Water Shield will be applied 3-feet in all valleys and 6-feet from all eaves, per code.

- Install GAF Tiger Paw Premium Roof Deck Protection Underlayment will be applied to the remainder of the exposed roof deck.

- Install TRI-BUILT 1 5/8" T-Style Heavy-Duty Drip Edge will be installed to cover the perimeter of all eaves and rakes.
*Color to match existing aluminum fascia as close as possible.

- Install step-flashing, masonry saw cut counter-flashing and pipe-flashing will be install as required.

- Install GAF Pro-Start Starter Strip – a starter course of shingles will be installed at all eaves, and at all outside edges, per code.

- Install GAF Timberline HDZ Shingles w/ StainGuard Protection (13 1/4" x 39 3/8") will be installed using 1 1/4" fasteners (4 fasteners per shingle, per manufacturer guidelines).
Color: TBD

- Install GAF Cobra Ridge Vent 3 will be install at each ridge to allow for proper ventilation, per code.

- Install GAF Seal-A-Ridge Hip and Ridge Shingles will be installed to properly seal and finish off the roof.
Color: To match shingle selection.

- R&R (5) Exhaust Vents

Signature: _____ Date: _____

THIS CONTRACT CANNOT BE CANCELLED ONCE THE INSURANCE COMPANY HAS APPROVED THE CLAIM(S) FROM THE SCOPE OF LOSS EXCEPT BY MUTUAL WRITTEN AGREEMENT OF THE PARTIES.

Please make all checks payable to: IRON HORSE BUILDING, LLC and REFERENCE INVOICE NUMBER ON CHECK.

THANK YOU FOR YOUR BUSINESS!



Iron Horse Building, LLC
PO BOX 51
Hartland, MI 48353 United States
248-702-1499
info@ironhorsebuilding.com

Estimate

Date	Estimate #
9/8/2023	11663

Bill To:

Hartland Township
2655 Clark Road
Hartland, Michigan 48353



**PREFERRED
CONTRACTOR**

Terms

Net 30

Scope of Work**Amount**

- Quality Control Inspection upon completion.
- Annual Roof Inspection and Tune-Up included (10-years).
- All required permits and inspections are included.
- Completion time will be approximately 2 – 3 days, weather permitting.
- The site will be thoroughly cleaned and swept for nails and (2) 20-yard dumpsters will be on-site to haul away all debris.

Michigan Builders License Number: 262100508 Expires: 05/31/2024

Payment Schedule: Balance on Completion

Metal Roof Replacement: Remove and Replace existing standing-seam metal roof and replace with new. *Color to match existing as close as possible. +\$28480.00

Signature: _____ Date: _____

THIS CONTRACT CANNOT BE CANCELLED ONCE THE INSURANCE COMPANY HAS APPROVED THE CLAIM(S) FROM THE SCOPE OF LOSS EXCEPT BY MUTUAL WRITTEN AGREEMENT OF THE PARTIES.

Please make all checks payable to: IRON HORSE BUILDING, LLC and REFERENCE INVOICE NUMBER ON CHECK.

THANK YOU FOR YOUR BUSINESS!

Hartland Township Board of Trustees Meeting Agenda Memorandum

Submitted By: Larry Ciofu, Clerk

Subject: Appointment of Michael Luce as Township Manager

Date: October 12, 2023

Recommended Action

Move to approve the appointment of Michael Luce as Hartland Twosnhip Manager effective October 11, 2023.

Discussion

On August 1, 2023 the Hartland Township Board of Directors appointed Michael Luce as Interim Manager upon the resignation of Manager Bob West. At a Special Meeting of the Hartland Township Board on October 10, 2023 the Board reveiwed several options for replacing Manager West and after evaluating theses options and Interim Manager Luce's perfomance as Interim Manager for the past 60 plus days, it was the opinion of the Board to appoint Michael Luce as the permanent Manager.

Financial Impact

None

Attachments

None

Hartland Township Board of Trustees Meeting Agenda Memorandum

Submitted By: Larry Ciofu, Clerk

Subject: HDFA Fire Station Location Study

Date: October 12, 2023

Recommended Action

No formal action is required by the Township Board. This will be a follow up discussion regarding the Fire Station Location Committee meeting on September 28th regarding the Hartland Deerfield Fire Authority Station Location Study.