The Pointe at Hills Farm

Shrewsbury, Massachusetts

Presentation Agenda

Pursuant to M.G.L. Chapter 40B Comprehensive Permit Process
March 28, 2016

Project Presentation

I Smart Growth Design, LLC

II Sewer Hydraulic Capacity Analysis Follow up Presentation
AECOM
Jami B. Walsh, P.E.

III Architecture Presentation
Cube 3 Studio, LLC
Talia Cannistra, Project Coordinator

IV Completion of Presentation – Public Hearing #6
Smart Growth Design, LLC

V Questions and Answers

Westborough / Shrewsbury Wastewater Treatment Plant Capacity Overview

Smart Growth Design, LLC
Francis P. Zarette, P.E.

Westborough / Shrewsbury Wastewater Treatment Plant has **design** capacity, **and permitted capacity, of 7.68 million gallons per day (mgd)**.

The allocation of flows is as follows:

- By Westborough and Shrewsbury Inter-Municipal Agreement Amendment as well as other legal documents:
- Westborough = **2.89 mgd**
- Shrewsbury = **4.39 mgd**

- By WTPB / Hopkinton Agreement: Hopkinton = **0.4 mgd** (disregarding conditions relative to septage, but **use 0.4 mgd** for simplicity sake).

The current (December 31 2015) 12 month rolling average flows are:
Westborough = **1.952 mgd**
Shrewsbury = **2.965 mgd**
Hopkinton = **0.249 mgd**
Total = **5.166 mgd**

- The proposed flow for " The Pointe at Hills Farm" = **0.035 mgd**
- Conclusion: Wastewater Treatment Plant **Capacity is not an issue**

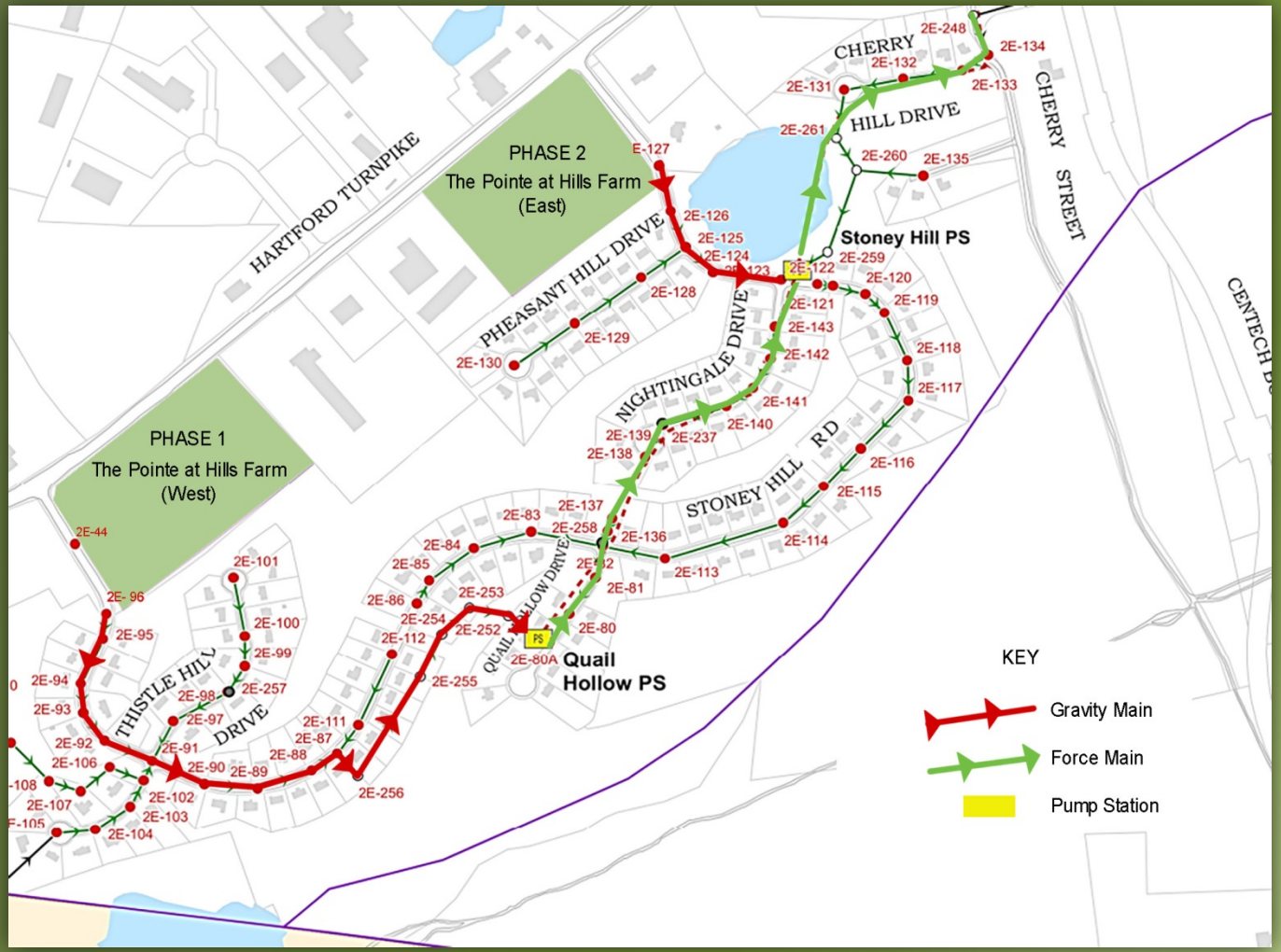
Sewer Hydraulic Capacity Analysis

AECOM
Jami B. Walsh, P.E.

- Capacity Analysis Approach
- Flow Estimate for the Pointe at Hills Farm
- Field Verification
- Document Review
- Capacity Analysis
- Areas of Concern Identified by the Town
- Results of the Hydraulic Capacity Analysis

- Recommendations/Conclusions

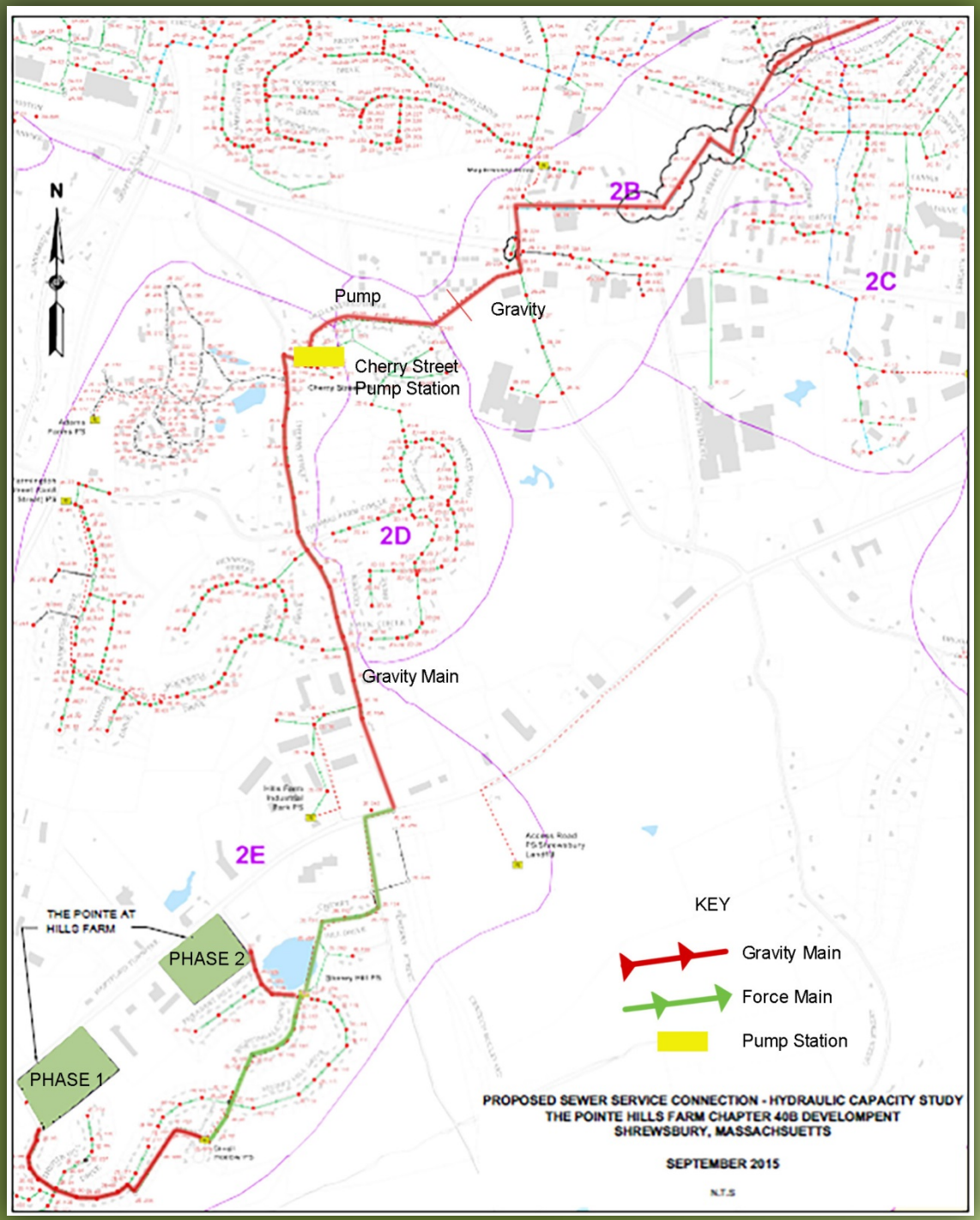
WASTEWATER SYSTEM CAPACITY ANALYSIS



Jami Walsh, P.E., AECOM Technical Services, Inc., Chelmsford, MA

CAPACITY ANALYSIS APPROACH

- ESTIMATED FLOWS FOR DEVELOPMENT BASED ON TR-16 PER THE TOWN'S SEWER CONNECTION RULES AND REGULATIONS
- CONDUCTED FIELD VERIFICATION
  - FIELD SURVEY
  - DRAWDOWN TESTS
- CONDUCTED DOCUMENT REVIEWS
  - REVIEWED DOCUMENTS FROM TOWN
  - OBTAINED AND REVIEWED DOCUMENTS FROM OTHER ENGINEERING FIRMS
- CALCULATED CAPACITY FROM THE POINTE AT HILLS FARM DEVELOPMENT TO INTERCEPTOR

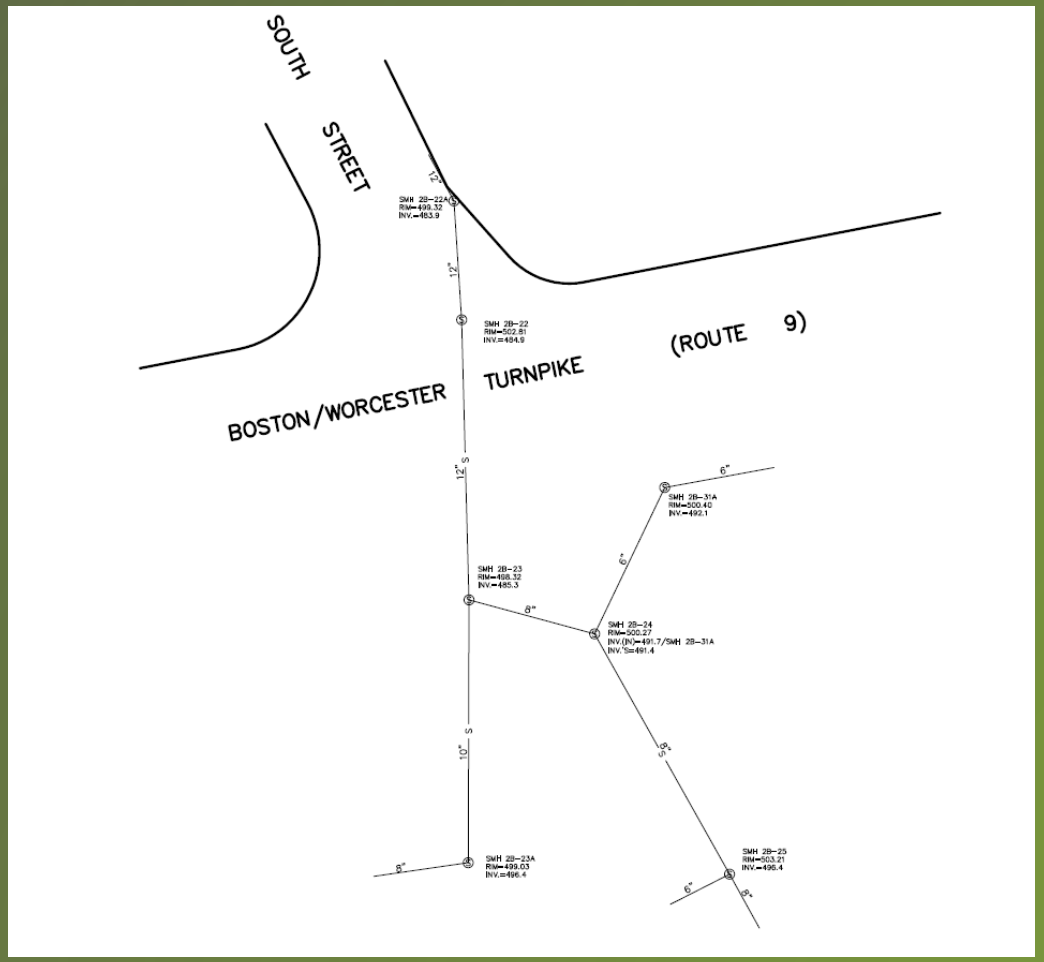

N
2B
2C
Pump
Gravity
Cherry Street
Pump Station
2D
Gravity Main
2E
THE POINTE AT
HILLO FARM
PHASE 2
PHASE 1
KEY
Gravity Main
Force Main
Pump Station
PROPOSED SEWER SERVICE CONNECTION - HYDRAULIC CAPACITY STUDY
THE POINTE HILLS FARM CHAPTER 40B DEVELOMPENT
SHREWSBURY, MASSACHSUETTS
SEPTEMBER 2015
N.T.S

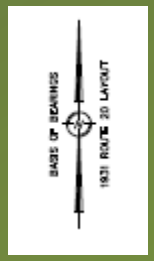
FLOW ESTIMATE FOR THE POINTE AT HILLS FARM

- PER TR-16 REVIEWED COMPARABLE DEVELOPMENTS (ARBOR AND AVALON) TO OBTAIN ESTIMATE OF FLOW PER UNIT.
- UTILIZED HIGHER FLOW RATE (141 GALLONS PER DAY PER UNIT) IN FLOW CALCULATIONS.
- DID NOT REDUCE FLOW FROM WATER RECORDS ASSUMED 100% OF WATER USED WENT TO WASTEWATER SYSTEM.
- 300 UNITS = 42,300 GALLONS PER DAY (GPD)

FIELD VERIFICATION

- CONDUCTED SURVEY OF ACCESSIBLE MANHOLES AND PIPES WHERE RECORD PLANS WERE NOT AVAILABLE AND THE TOWN HAD EXPRESSED CAPACITY CONCERNS.
- SURVEY USED TO VERIFY PIPE SLOPE AND PIPE DIAMETER.
- VERIFIED PUMPING RATES AT THE THREE (3) PUMP STATIONS EFFECTED BY THE ADDITION OF THE POINTE DEVELOPMENT.





PREPARED BY:

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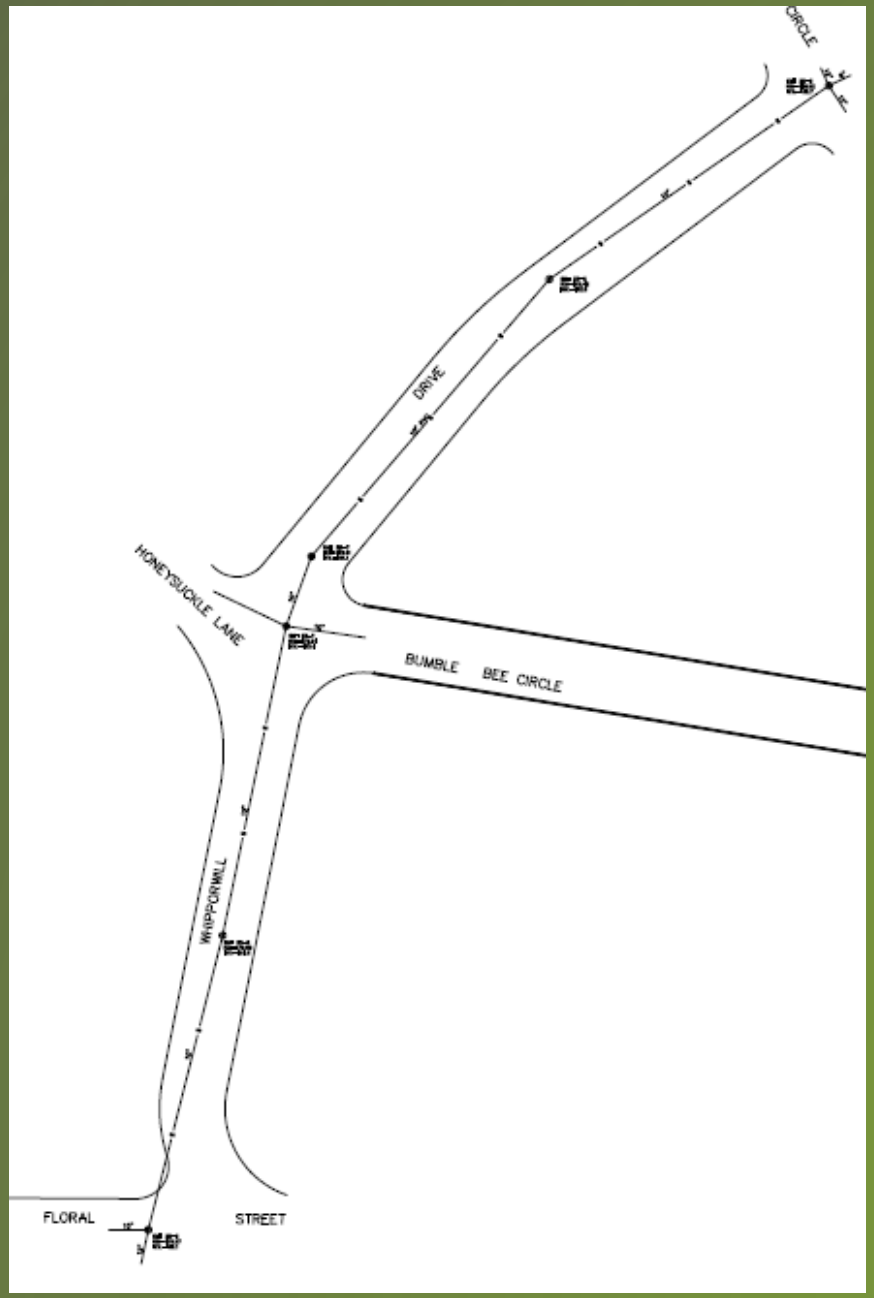
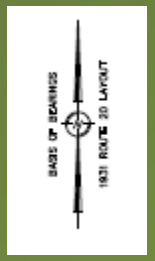
TITLE:

SEWER INFRASTRUCTURE SKETCH

Shrewsbury, MA
(Worcester County)





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SEWER INFRASTRUCTURE SKETCH

Shrewsbury, MA
(Worcester County)

DOCUMENT REVIEW

- CONDUCTED DOCUMENT REVIEWS
  - REVIEWED DOCUMENTS FROM TOWN
    - FLOW RECORDS FOR PUMP STATIONS
    - RECORD DRAWINGS FOR PUMP STATIONS
    - RECORD DRAWINGS FOR MISCELLANEOUS SEWER SEGMENTS
    - TV INSPECTION REPORTS
  - OBTAINED DOCUMENTS FROM OTHER ENGINEERING FIRMS
    - RECORD INFORMATION FOR CHERRY STREET PUMP STATION

CAPACITY ANALYSIS

- CONDUCTED FROM POINTE AT HILLS FARM TO INTERCEPTOR.
- UTILIZED 95% FOR PIPE CAPACITY CALCULATIONS FOR PIPES 10-INCH AND LARGER.
- UTILIZED 90% FOR 6 AND 8-INCH PIPES.
- UTILIZED FLOWS PROVIDED BY W&S FOR ALL SEGMENTS.
- ADJUSTED FLOWS PROVIDED BY W&S UP BASED ON PUMP DRAW DOWN TESTS.
- ADJUSTED FLOWS PROVIDED BY W&S TO INCLUDE PROJECTED FLOW FROM THE POINTE DEVELOPMENT.
- UTILIZED PIPE DIAMETERS AND SLOPES OBTAINED THROUGH FIELD SURVEY.

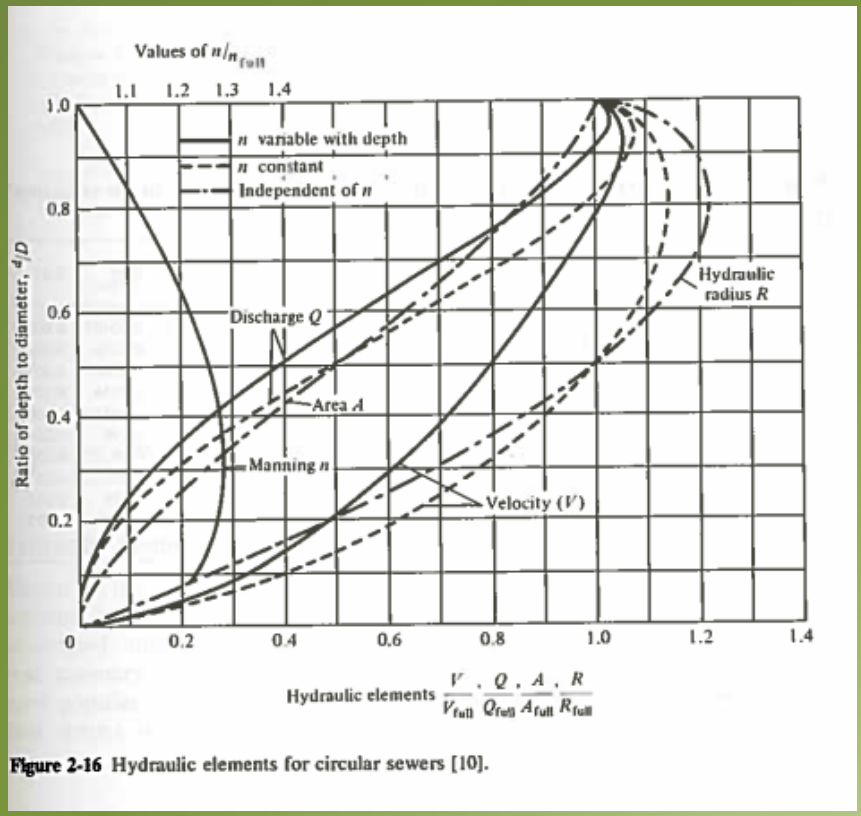
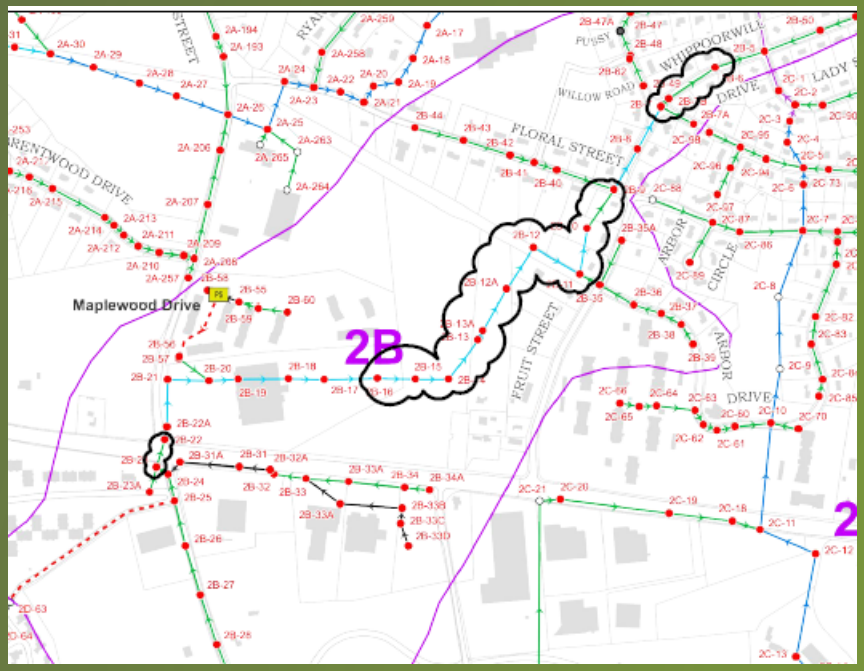


Figure 2-16 Hydraulic elements for circular sewers [10].

Graphic Taken From Metcalf & Eddy Collection and Pumping of Wastewater

AREAS OF CONCERN IDENTIFIED BY TOWN



- IDENTIFIED 3 AREAS WITH INSUFFICIENT CAPACITY
  - CROSSING UNDER ROUTE 9
  - CROSS COUNTRY SEWER BEHIND PRICE CHOPPER TO FRUIT AND FLORAL STREET
  - WHIPPORWILL DRIVE NORTHEAST OF BUMBLEBEE CIRCLE

CAPACITY COMPARISON FOR SEGMENTS OF CONCERN

AECOM Capacity Analysis For Segments of Concern								
Segments IDed By Town To Have Capacity Problems		Pipe Dia.	Pipe Slope	Exist. Peak Flow Plus Proposed Flow	Pipe Capacity as Calc'd by Town	Pipe Capacity As Calc'd by AECOM	% Pipe Capacity	Remaining Pipe Capacity
Start MH	End MH	(Inches)	(ft/ft)	(GPD)	GPD	(GPD)	Remaining	(GPD)
2B-23	2B-22	12*	0.0072*	788,100	523,083	**2,414,027**	67%	1,625,927
2B-16	2B-15	10**	0.028**	788,100	706,649	**841,222**	6%	53,122
2B15	2B-14	10**	0.028**	788,100	706,649	**841,222**	6%	53,122
2B-14	2B-13	10**	0.028**	788,100	706,649	**841,222**	6%	53,122
2B-13	2B-12	10**	0.028**	788,100	706,649	**841,222**	6%	53,122
2B-12	2B-11	10**	0.028**	788,100	706,649	**841,222**	6%	53,122
2B-11	2B-10	10**	0.028**	788,100	706,649	**841,222**	6%	53,122
2B-10	2B-9	10**	0.028**	788,100	465,484	**841,222**	6%	53,122
2B-7	2B-6	10*	0.0297*	825,000	568,925	**3,013,718**	73%	2,188,718
2B-6	2B-5	10*	0.0546*	825,000	568,925	**4,086,777**	80%	3,261,777

*From Survey

**Assumed (Minimum slope per TR-16; Pipe diameter from Record Drawings)

BOLD= Sufficient Capacity

NOTE:

1. Where Pipe Diameter and Slope are assumed, manholes were inaccessible
2. Where Pipe Diameters and Slopes are assumed, pipe capacity and remaining capacity (GPD and %) are our best approximation

WHY THE DIFFERENCE IN CAPACITY?

- CAPACITY FOR A PIPE IS DETERMINED BASED PRIMARILY ON ITS SLOPE AND DIAMETER.
  - TOWN ASSUMED MINIMUM PIPE SLOPES WHEN SLOPES WERE UNKNOWN. AECOM FIELD VERIFIED PIPE SLOPES WHERE POSSIBLE.
  - TOWN UTILIZED PIPE DIAMETERS PROVIDED IN GIS SYSTEM. AECOM FIELD VERIFIED PIPE DIAMETERS WHERE POSSIBLE AND USED RECORD DRAWINGS WHERE NOT POSSIBLE.
- TOWN CALCULATED CAPACITY USING 80% OF FLOW DEPTH. AECOM USED A CAPACITY OF 95% (IN ACCORDANCE WITH PUBLISHED DATA) FOR PIPES 10-INCH AND LARGER AND 90% FOR SMALLER PIPES TO ACCOUNT FOR POTENTIAL REDUCTION IN DIAMETER DUE TO BUILD UP THROUGHOUT THE YEARS.

RESULTS OF HYDRAULIC CAPACITY ANALYSIS

- AECOM DID NOT IDENTIFY ANY SEWER SEGMENTS WITH INSUFFICIENT HYDRAULIC CAPACITY.
- THE QUAIL HOLLOW PUMP STATION APPEARS TO HAVE SUFFICIENT CAPACITY TO ACCOMMODATE THE POINTE AT HILLS FARM.
- STONEY HILL PUMP STATION APPEARS TO HAVE SUFFICIENT CAPACITY TO ACCOMMODATE THE POINTE AT HILLS FARM.
- WITH THE USE OF THE EXISTING STORAGE TANK AND PROPER MAINTENANCE THE CHERRY STREET PUMP STATION APPEARS TO HAVE SUFFICIENT CAPACITY TO ACCOMMODATE THE POINTE AT HILLS FARM.

CAPACITY ANALYSIS UPDATE

- THE POINTE AT HILLS FARM REDUCED THE NUMBER OF UNITS FROM 300 TO 248.
- THIS RESULTED IN A ESTIMATED WASTEWATER FLOW REDUCTION OF 7,300 GPD WHICH IS A 17.3% REDUCTION IN FLOW FOR THE DEVELOPMENT.

CAPACITY COMPARISON FOR SEGMENTS OF CONCERN WITH REDUCED FLOW

AECOM Capacity Analysis For Segments of Concern								
Segments IDed By Town To Have Capacity Problems		Pipe Dia.	Pipe Slope	Estimated Peak Flow	Pipe Capacity as Calc'd by Town	Pipe Capacity As Calc'd by AECOM	% Pipe Capacity	Remaining Pipe Capacity
Start MH	End MH	(Inches)	(ft/ft)	(GPD)	GPD	(GPD)	Remaining	(GPD)
2B-23	2B-22	12*	0.0072*	771,778	523,083	**2,414,027**	68%	1,642,249
2B-16	2B-15	10**	0.028**	771,778	706,649	**841,222**	8%	69,444
2B15	2B-14	10**	0.028**	771,778	706,649	**841,222**	8%	69,444
2B-14	2B-13	10**	0.028**	771,778	706,649	**841,222**	8%	69,444
2B-13	2B-12	10**	0.028**	771,778	706,649	**841,222**	8%	69,444
2B-12	2B-11	10**	0.028**	771,778	706,649	**841,222**	8%	69,444
2B-11	2B-10	10**	0.028**	771,778	706,649	**841,222**	8%	69,444
2B-10	2B-9	10**	0.028**	771,778	465,484	**841,222**	8%	69,444
2B-7	2B-6	10*	0.0297*	782,606	568,925	**3,013,718**	74%	2,231,112
2B-6	2B-5	10*	0.0546*	782,605	568,925	**4,086,777**	81%	3,304,172

*From Survey

**Assumed (Minimum slope per TR-16; Pipe diameter from Record Drawings)

BOLD= Sufficient Capacity

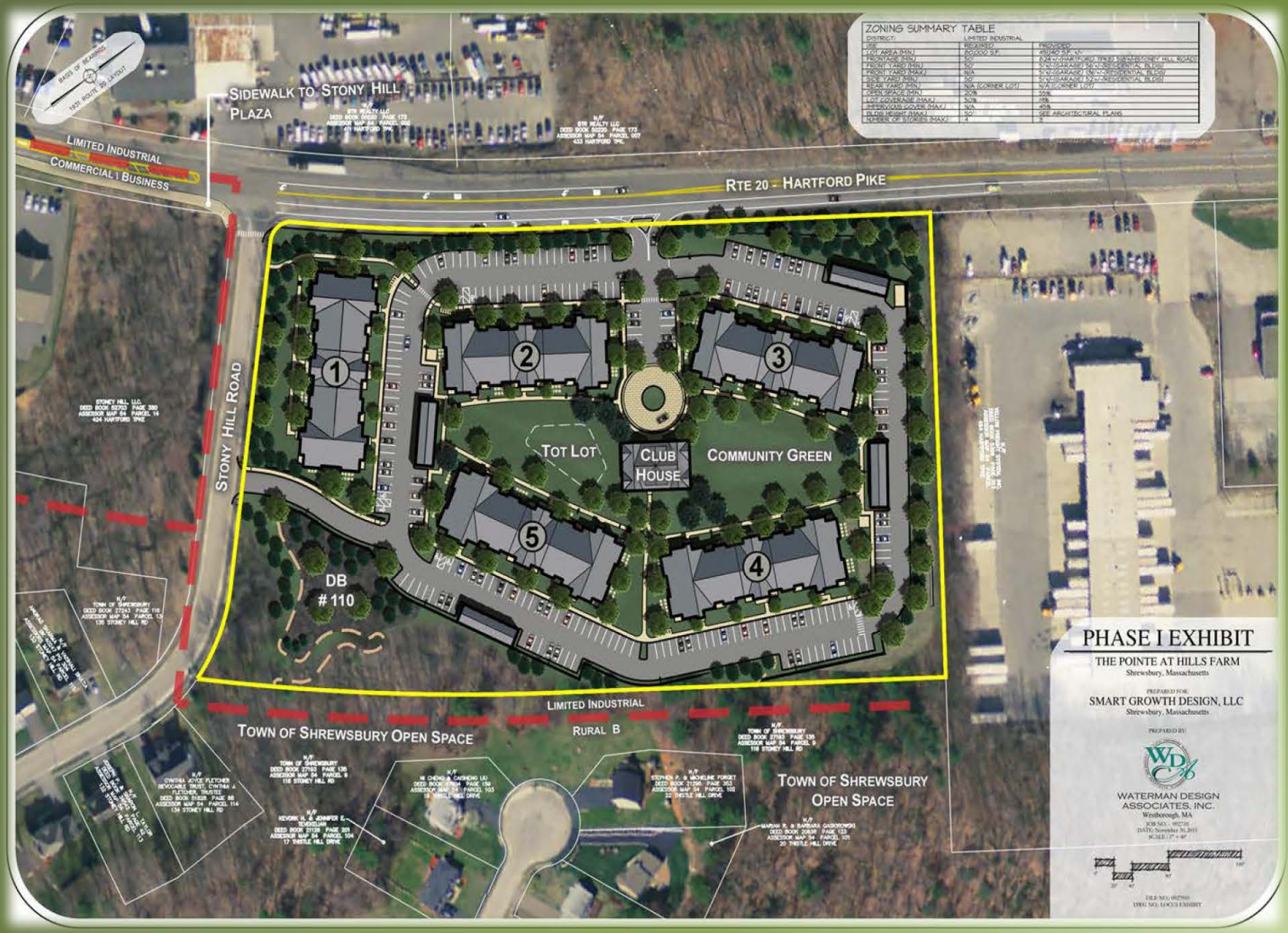
NOTE:

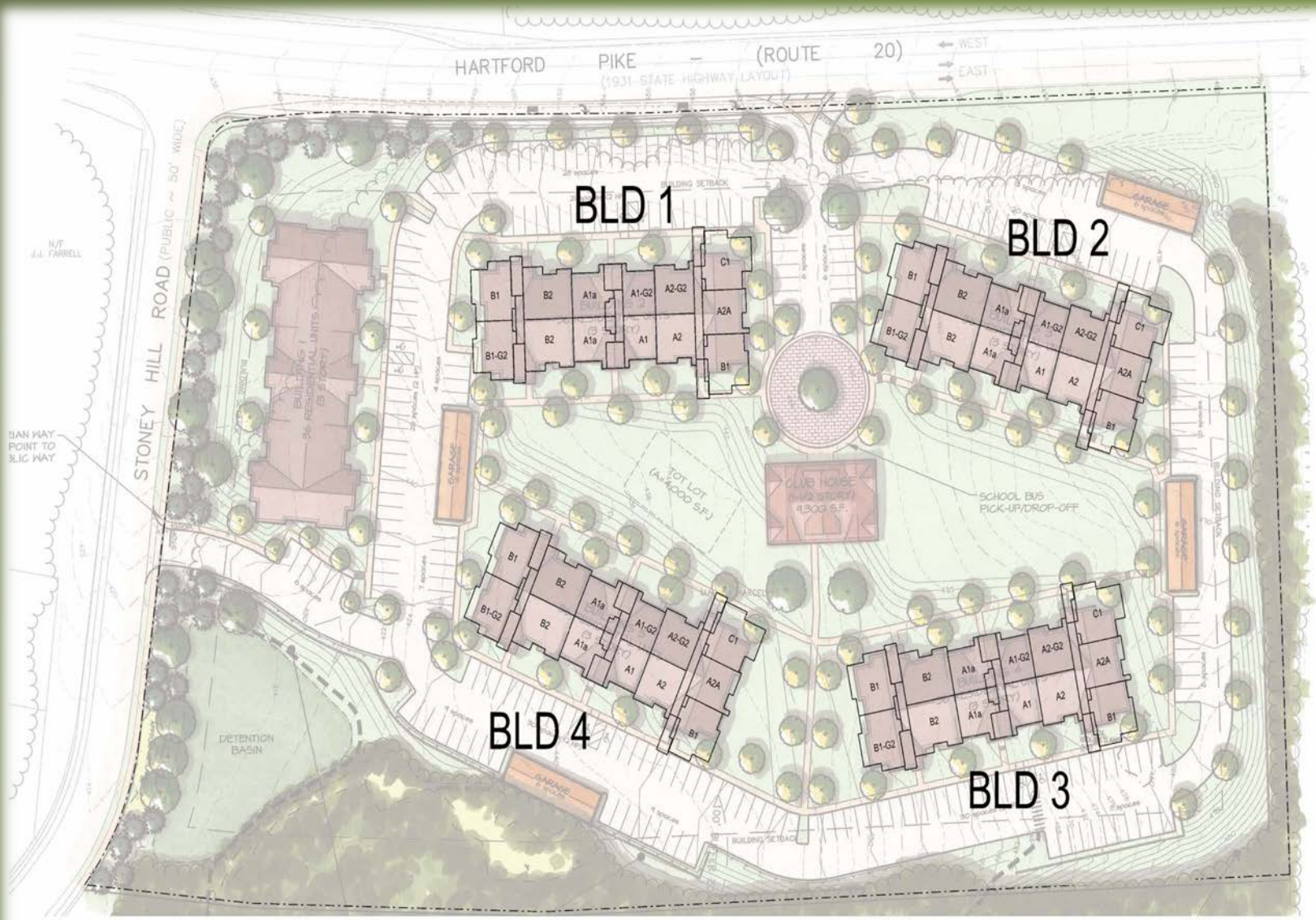
1. Where Pipe Diameter and Slope are assumed, manholes were inaccessible
2. Where Pipe Diameters and Slopes are assumed, pipe capacity and remaining capacity (GPD and %) are our best approximation

Architecture

Talia Cannistra, Project Coordinator
Cube 3 Studio, LLC

- Phase I
  - Conceptual Site Plan (2015 & 2016) Comparative Presentation
    - Reduce density and scale
    - Reduce density to minimize direct line of site impacts
    - Provide relief at public street edges
    - Create meaningful relationship to pedestrian environment through building fenestration, color, and texture
  - Architectural Elevations (2015 & 2016) Comparative Presentation
    - Reduce scale
    - Reduce height to minimize direct line of site impacts
    - Provide relief at public street edges
    - Provide consistent, contextually-driven architectural language and material palette
- Phase II
  - Conceptual Site Plan (2015 & 2016) Comparative Presentation
    - Reduce density and scale
    - Reduce density to minimize direct line of site impacts
    - Provide relief at public street edges
    - Create meaningful relationship to pedestrian environment through building fenestration, color, and texture
  - Architectural Elevations (2015 & 2016) Comparative Presentation
    - Reduce scale
    - Reduce height to minimize direct line of site impacts
    - Provide relief at public street edges
    - Provide consistent, contextually-driven architectural language and material palette
    - Capitalize on pitched roof architecture as a method for concealing mechanical equipment


ZONING SUMMARY TABLE
DISTRICT: LIMITED INDUSTRIAL
SIDEWALK TO STONY HILL PLAZA
LIMITED INDUSTRIAL
COMMERCIAL I BUSINESS
RTE 20 - HARTFORD PIKE
STONY HILL ROAD
TOT LOT
CLUB HOUSE
COMMUNITY GREEN
1
2
3
4
5
DB # 110
LIMITED INDUSTRIAL
RURAL B
TOWN OF SHREWSBURY OPEN SPACE
TOWN OF SHREWSBURY OPEN SPACE
PHASE I EXHIBIT
THE POINTE AT HILLS FARM
Shrewsbury, Massachusetts
PREPARED FOR:
SMART GROWTH DESIGN, LLC
Shrewsbury, Massachusetts
PREPARED BY:
WATERMAN DESIGN ASSOCIATES, INC.
Westborough, MA



Smart Growth Design, LLC. - The Pointe at Hills Farm - Shrewsbury, MA | Phase I - Conceptual Site Plan | 21 March 2016

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Phase I - Front Elevation

07 October 2015

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Phase I - Side Elevations

07 October 2015

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Phase I - Conceptual Site Plan

21 March 2016

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Phase I - Side Elevation

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Conceptual Site Plan

10 September 2015

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Phase II - Conceptual Site Plan

21 March 2016

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Conceptual Elevation - 1A (Building 1 & 3)

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Smart Growth Design, LLC. - 526 Hartford Turnpike - Shrewsbury, MA

Conceptual Elevation - 1B (Building 1 & 3)

10 September 2015

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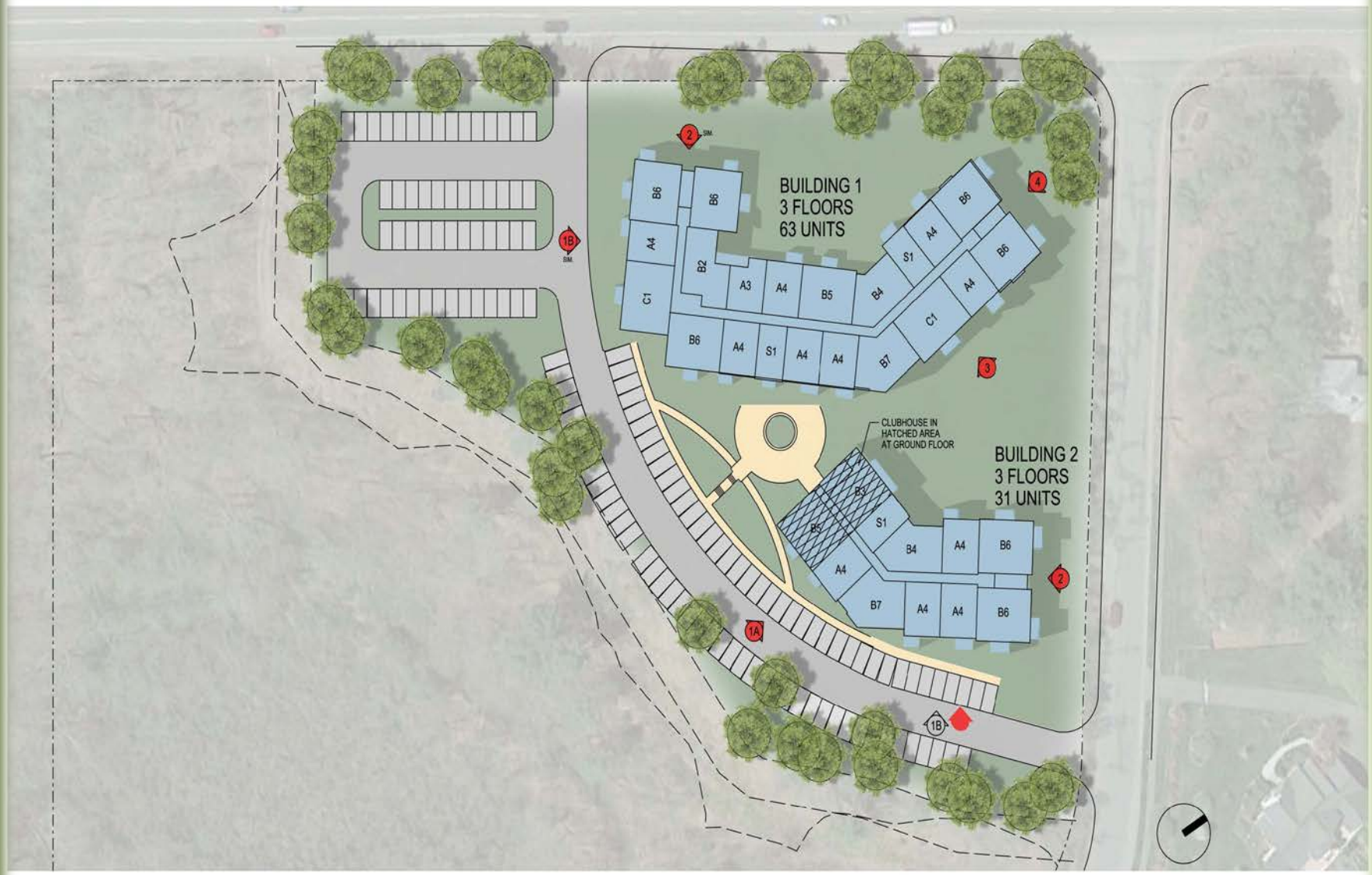

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Phase II - Conceptual Site Plan

21 March 2016

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Conceptual Elevation - 3 (Building 2)

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Phase II - Elevation - 3 (Building 2)

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Conceptual Elevation - 4 (Building 2)

10 September 2015

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Smart Growth Design, LLC. - 526 Hartford Turnpike - Shrewsbury, MA

Conceptual Elevation - 2 (Building 1 & 3)

10 September 2015

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Smart Growth Design, LLC. - The Pointe at Hills Farm - Shrewsbury, MA

Phase II - Conceptual Site Plan

21 March 2016

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Phase I - 440 HARTFORD TURNPIKE - SHREWSBURY, MA
BUILDING SUMMARY & UNIT MIX

9-Feb-2016

UNIT TYPE	DESCRIPTION	BEDS / UNIT	UNIT NRSF	BUILDING 1 P1	P2	P3	TOTAL UNITS	TOTAL NRSF	BUILDING 2 P1	P2	P3	TOTAL UNITS	TOTAL NRSF	BUILDING 3 P1	P2	P3	TOTAL UNITS	TOTAL NRSF	BUILDING 4 P1	P2	P3	TOTAL UNITS	TOTAL NRSF	PROJECT TOTALS TOTAL UNITS	TOTAL BEDS	TOTAL NRSF	UNIT MIX
S1	Studio	1	592	0	0	0	0	0	0	0	0	0	0	1	2	2	5	2,960	2	2	2	6	3,552	11	11	6,512	7.1%
S1	Group 2 - Studio	1	592	0	0	0	0	0	0	0	0	0	0	1	0	0	1	592	0	0	0	0	0	1	1	592	0.6%
		Average SF	**592**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**2**	**6**	**3,552**	**2**	**2**	**2**	**6**	**3,552**	**12**	**12**	**7,104**	**7.69%**
A1	One Bed/One Bath	1	772	1	2	2	5	3,860	1	2	2	5	3,860	0	0	0	0	0	0	0	0	0	0	10	10	7,720	6.4%
A1-G2	Group 2 - One Bed/One Bath	1	772	1	0	0	1	772	1	0	0	1	772	0	0	0	0	0	0	0	0	0	0	2	2	1,544	1.3%
A1A	One Bed/One Bath	1	824	2	2	2	6	4,944	2	2	2	6	4,944	2	2	2	6	4,944	2	2	2	6	4,944	24	24	19,776	15.4%
A1B	One Bed/One Bath		776	0	0	0	0	0	1	1	1	3	2,328	1	1	1	3	2,328	1	1	1	3	2,328	9	0	6,984	5.8%
A1A-G2	Group 2 - One Bed/One Bath	1	824	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
A2	One Bed/One Bath	1	988	1	2	2	5	4,940	1	2	2	5	4,940	0	0	0	0	0	0	0	0	0	0	10	10	9,880	6.4%
A2-G2	Group 2 - One Bed/One Bath	1	988	1	0	0	1	988	1	0	0	1	988	0	0	0	0	0	0	0	0	0	0	2	2	1,976	1.3%
A2A	One Bed/One Bath	1	989	1	1	1	3	2,967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2,967	1.9%
		Average SF	**847**	**7**	**7**	**7**	**21**	**18,471**	**7**	**7**	**7**	**21**	**17,832**	**3**	**3**	**3**	**9**	**7,272**	**3**	**3**	**3**	**9**	**7,272**	**60**	**51**	**50,847**	**38.46%**
B1	Two Bed/Two Bath	2	1,182	2	3	3	8	9,456	0	2	2	4	4,728	1	3	3	7	8,274	1	4	4	9	10,638	28	56	33,096	17.9%
B1-G2	Group 2 - Two Bed/Two Bath	2	1,182	1	0	0	1	1,182	1	0	0	1	1,182	1	0	0	1	1,182	1	0	0	1	1,182	4	8	4,728	2.6%
B2	Two Bed/Two Bath	2	1,265	2	2	2	6	7,590	2	2	2	6	7,590	4	4	4	12	15,180	4	4	4	12	15,180	36	72	45,540	23.1%
		Average SF	**1,226**	**5**	**5**	**5**	**15**	**18,228**	**3**	**4**	**4**	**11**	**13,500**	**6**	**7**	**7**	**20**	**24,636**	**6**	**8**	**8**	**22**	**27,000**	**68**	**136**	**83,364**	**43.59%**
C1	Three Bed/Two Bath	3	1,341	1	1	1	3	4,023	2	2	2	6	8,046	2	1	1	4	5,364	2	0	0	2	2,682	15	45	20,115	9.6%
C1-G2	Group 2 - Three Bed/Two Bath	3	1,341	0	0	0	0	0	1	0	0	1	1,341	0	0	0	0	0	0	0	0	0	0	1	3	1,341	0.64%
		Average SF	**1,257**	**1**	**1**	**1**	**3**	**4,023**	**2**	**2**	**2**	**7**	**8,046**	**2**	**1**	**1**	**4**	**5,364**	**2**	**0**	**0**	**2**	**2,682**	**16**	**45**	**20,115**	**10.26%**
Totals				**13**	**13**	**13**	**39**	**40,722**	**12**	**13**	**13**	**39**	**39,378**	**13**	**13**	**13**	**39**	**40,824**	**13**	**13**	**13**	**39**	**40,506**	**156**	**244**	**161,430**	**100%**

PARKING	
TOTAL PARKING SPACES	315
PARKING RATIO (SPACES / UNIT)	**2.02**

BUILDING 1 SUMMARY	CALCS
GROUND FLOOR	16,067
FLOOR 2	16,067
FLOOR 3	16,067
TOTAL RESIDENTIAL NRSF	40,722
TOTAL RESIDENTIAL GSF	48,201
BUILDING EFFICIENCY	**84%**

BUILDING 2 SUMMARY	CALCS
GROUND FLOOR	15,950
FLOOR 2	15,720
FLOOR 3	15,720
TOTAL RESIDENTIAL NRSF	39,378
TOTAL RESIDENTIAL GSF	47,390
BUILDING EFFICIENCY	**83%**

BUILDING 3 SUMMARY	CALCS
GROUND FLOOR	16,145
FLOOR 2	16,145
FLOOR 3	16,145
TOTAL RESIDENTIAL NRSF	40,824
TOTAL RESIDENTIAL GSF	48,435
BUILDING EFFICIENCY	**84%**

BUILDING 4 SUMMARY	CALCS
GROUND FLOOR	15,940
FLOOR 2	15,915
FLOOR 3	15,915
TOTAL RESIDENTIAL NRSF	40,506
TOTAL RESIDENTIAL GSF	47,770
BUILDING EFFICIENCY	**85%**

PROJECT SUMMARY	CALCS
TOTAL GROUP 2 UNITS	8
TOTAL UNITS	156
MIX	**5%**
TOTAL RESIDENTIAL NRSF	161,430
TOTAL RESIDENTIAL GSF	191,796
PROJECT EFFICIENCY	**84%**

CUBE3 STUDIO
architecture interiors planning

Phase II - 526 HARTFORD TURNPIKE - SHREWSBURY, MA
BUILDING SUMMARY & UNIT MIX

18-Mar-2016

CUBE3 STUDIO
architecture interiors planning

				BUILDING 1					BUILDING 2					PROJECT TOTALS			
UNIT TYPE	DESCRIPTION	BEDS / UNIT	UNIT NRSF	P1	P2	P3	TOTAL UNITS	TOTAL NRSF	P1	P2	P3	TOTAL UNITS	TOTAL NRSF	TOTAL UNITS	TOTAL BEDS	TOTAL NRSF	UNIT MIX
S1	Studio	1	649	1	2	2	5	3,245	0	1	1	2	1,298	7	7	4,543	7%
S1	Group 2 - Studio	1	649	1	0	0	1	649	1	0	0	1	649	2	2	1,298	2%
		Average SF	**649**	**2**	**2**	**2**	**6**	**3,894**	**1**	**1**	**1**	**3**	**1,947**	**9**	**9**	**5,841**	**10%**
A3	One Bed/One Bath	1	762	1	1	1	3	2,286	0	0	0	0	0	3	3	2,286	3%
A4	One Bed/One Bath	1	838	6	7	7	20	16,760	3	4	4	11	9,218	31	31	25,978	33%
A4-G2	Group 2 - One Bed/One Bath	1	838	1	0	0	1	838	1	0	0	1	838	2	2	1,676	2%
		Average SF	**832**	**8**	**8**	**8**	**24**	**19,884**	**4**	**4**	**4**	**12**	**10,056**	**36**	**36**	**29,940**	**38%**
B2	Two Bed/Two Bath	2	1,219	1	1	1	3	3,657	0	0	0	0	0	3	6	3,657	3%
B3	Two Bed/Two Bath	2	1,277	0	0	0	0	0	0	1	1	2	2,554	2	4	2,554	2%
B4	Two Bed/Two Bath	2	1,158	1	1	1	3	3,474	1	1	1	3	3,474	6	12	6,948	6%
B5	Two Bed/Two Bath	2	1,257	1	1	1	3	3,771	0	1	1	2	2,514	5	10	6,285	5%
B6	Two Bed/Two Bath	2	1,238	4	5	5	14	17,332	1	2	2	5	6,190	19	38	23,522	20%
B6A-G2	Group 2 - Two Bed/Two Bath	2	1,238	1	0	0	1	1,238	1	0	0	1	1,238	2	4	2,476	2%
B7	Two Bed/Two Bath	2	1,235	1	1	1	3	3,705	1	1	1	3	3,705	6	12	7,410	6%
		Average SF	**1,229**	**9**	**9**	**9**	**27**	**33,177**	**4**	**6**	**6**	**16**	**19,675**	**43**	**86**	**52,852**	**46%**
C1	Three Bed/Two Bath	3	1,442	1	2	2	5	7,210	0	0	0	0	0	5	15	7,210	5%
C1-G2	Group 2 - Three Bed/Two Bath	3	1,442	1	0	0	1	1,442	0	0	0	0	0	1	3	1,442	1%
		Average SF	**1,442**	**2**	**2**	**2**	**6**	**8,652**	**0**	**0**	**0**	**0**	**0**	**6**	**18**	**8,652**	**6%**
Totals				21	21	21	63	65,607	9	11	11	31	31,678	94	149	97,285	100%

PARKING	
TOTAL SURFACE PARKING SPACES	132
PARKING RATIO (SPACES / UNIT)	**1.40**

BUILDING 1 SUMMARY	CALCS
GROUND FLOOR	24,174
TYPICAL FLOOR (2-3)	48,348
TOTAL RESIDENTIAL NRSF	65,607
TOTAL RESIDENTIAL GSF	72,522
BUILDING EFFICIENCY	**90%**

BUILDING 2 SUMMARY	CALCS
GROUND FLOOR	12,507
TYPICAL FLOOR (2-3)	25,014
CLUBHOUSE (INLCUDED IN GROUND FL)	2,700
TOTAL RESIDENTIAL NRSF	31,678
TOTAL RESIDENTIAL GSF	37,521
BUILDING EFFICIENCY	**84%**

PROJECT SUMMARY	CALCS
TOTAL GROUP 2 UNITS	7
TOTAL UNITS	94
MIX	**7%**
TOTAL RESIDENTIAL NRSF	97,285
TOTAL RESIDENTIAL GSF	110,043
PROJECT EFFICIENCY	**88%**

QUESTIONS?

FLOW FROM 2B-16 to 2B-9

- LENGTH OF PIPE ~2,000 LF
- DIAMETER OF PIPE 10” AT 2B-16 AND 12” AT 2B-9.
- AECOM ASSUMED 10”, PER GIS INFO AND SIZE AT 2B-16.
- DROP FROM 2B-16 TO 2B-9 IS ~9.5 FEET.
- HYDRAULIC GRADE LINE THEREFORE HAS A SLOPE OF ~ 0.00475 FT/FT
- IF HGL ASSUMED THROUGH SECTION, NO CAPACITY ISSUES USING 95%. NO CAPACITY ISSUES USING 80%.

CAPACITY ANALYSIS USING HYDRAULIC GRADE LINE 2B-16 to 2B-9

AECOM Capacity Analysis For Segments of Concern						
Segments IDed By Town To Have Capacity Problems		Pipe Dia.	Pipe Slope	Estimated Peak Flow	Pipe Capacity Using 80%	Pipe Capacity Using 95%
Start MH	End MH	(Inches)	(ft/ft)	(GPD)	GPD	(GPD)
2B-23	2B-22	12*	0.0072*	774,778	**2,032,865**	**2,414,027**
2B-16	2B-15	10**	0.048**	771,778	**927,510**	**1,101,418**
2B15	2B-14	10**	0.048**	771,778	**927,510**	**1,101,418**
2B-14	2B-13	10**	0.048**	771,778	**927,510**	**1,101,418**
2B-13	2B-12	10**	0.048**	771,778	**927,510**	**1,101,418**
2B-12	2B-11	10**	0.048**	771,778	**927,510**	**1,101,418**
2B-11	2B-10	10**	0.048**	771,778	**927,510**	**1,101,418**
2B-10	2B-9	10**	0.048**	771,778	**927,510**	**1,101,418**
2B-7	2B-6	10*	0.0297*	782,605	**2,537,867**	**3,013,718**
2B-6	2B-5	10*	0.0546*	782,605	**3,441,497**	**4,086,777**

*From Survey

**Using Hydraulic Grade Line as Slope

BOLD= Sufficient Capacity

Site Designer

Wayne M. Belec, Senior Project Manager
Waterman Design Associates, Inc.

- Response to Peer Review Comments
- Use Waiver Acknowledgement
- ZBA Comments follow-up
- Phase I
  - Horizontal & Vertical Dimensional Waivers Follow-up Presentation
- Phase II
  - Horizontal & Vertical Dimensional Waivers Follow-up Presentation

Requested Dimensional Waivers

Phase I

Number of Dimensional Waivers: 2

Waiver #1

Waiver #2

Waiver #1

Waiver to Zoning Bylaw-
Minimum Landscape Buffer From Road Layout to Parking Area:
Allowed/ Required: 15'
Proposed: 9'
Justification for Waiver:

- Avoids shifting project farther east toward the residents at Hills Farm
- Maintaining the proposed spacing between Buildings 2 and 3 & 3 and 4 will provide for a higher quality Common Green for the residents

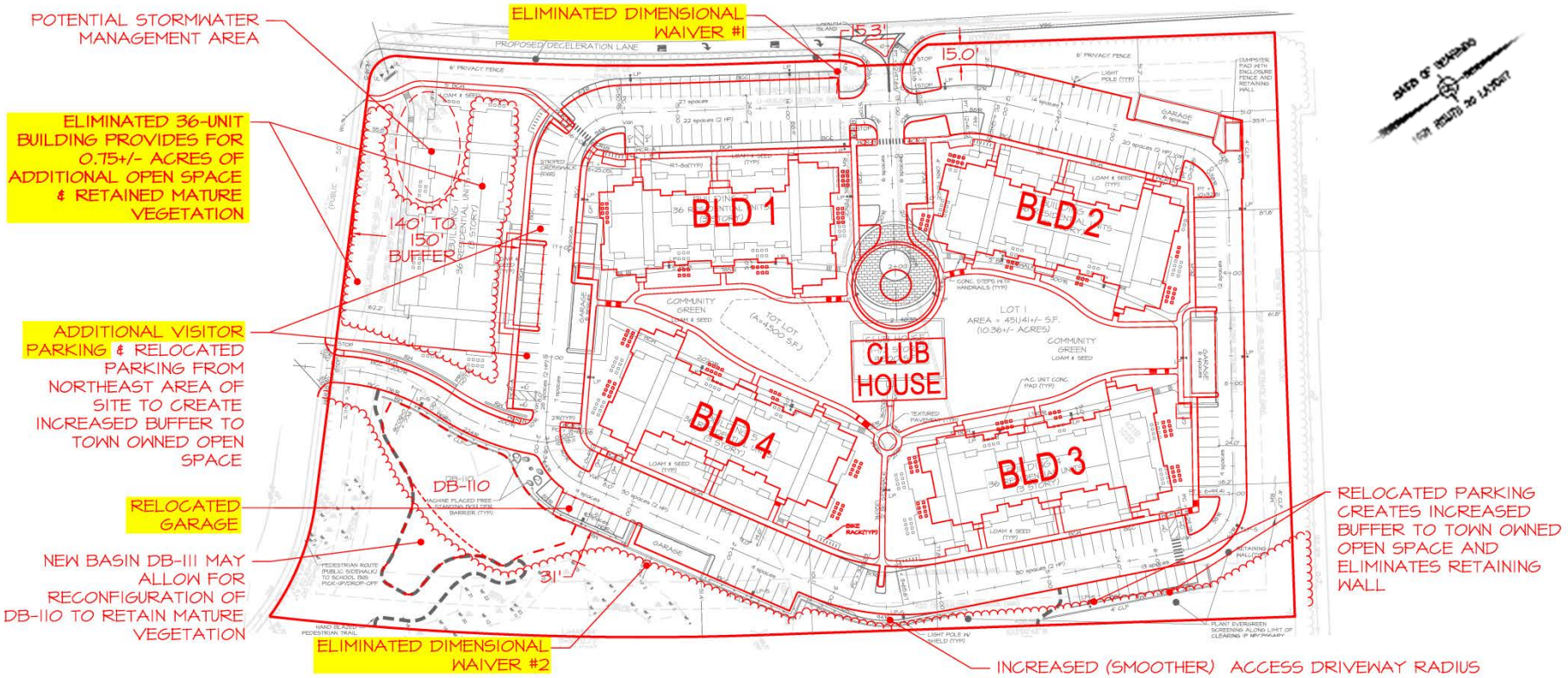
Waiver #2

Waiver to Conservation Commission Policy Requirements-
Minimum Building Setback to a Resource Area (Wetland):
Allowed/ Required: 30'
Proposed: 21'
Justification for Waiver:

- Garage serves as a Physical Barrier between the development and the closest point of the Resource Area.
- Preserves a permanently protected undisturbed natural buffer adjacent to the Wetland.
- Existing, mature trees are preserved allowing instant screening along the rear of the garage.

Phase I

Reduced Density/ No Dimensional Waivers/ Visitor Parking



BUILDOUT SUMMARY:
4 BLDGS @ 39 UNITS EA. = 156 UNITS
(REDUCTION OF 24 UNITS)

PARKING GENERATION, ITE 2010 (4TH EDITION)

PARKING RATIOS FOR LAND USE APARTMENT BUILDINGS: 1.23 VEHICLES PER UNIT*
PARKING RATIOS FOR THE POINTE AT HILLS FARM: 1.50 VEHICLES PER UNIT

*THESE RATIOS ARE BASED ON PARKING SURVEYS CONDUCTED AT NUMEROUS LOCATIONS THROUGHOUT THE UNITED STATES. FOR LAND USE CODE 221 - LOW/MID-RISE APARTMENTS, PARKING DEMAND RATIOS ARE REPORTED FOR BOTH URBAN AND SUBURBAN SETTINGS. THE AVERAGE PARKING RATIO FOR 21 SUBURBAN APARTMENT COMPLEXES (WITH AN AVERAGE OF 311 UNITS) WAS MEASURED AT 1.23 VEHICLES PER UNIT

PARKING SUMMARY TABLE

USE	REQUIRED	PROVIDED
RESIDENTIAL*		
RESIDENTS:	1.5 SPACES / UNIT x 156 = 234 SPACES	234
VISITORS:	234 SPACES + 10% = 24 SPACES	24
TOTAL:		258 (234 SURFACE) (24 GARAGE)

ACCESSIBLE PARKING (HP) SPACES

TOTAL PARKING SPACES	REQUIRED	PROVIDED
201 TO 300	7	10
VAN ACCESSIBLE	1 VAN	5 VAN
1 PER 8 ACCESSIBLE SPACES	6 ACCESSIBLE	

Phase II

Number of Dimensional Waivers: 2

Waiver #1

Waiver to Zoning Bylaw-
Minimum Front Setback From Road Layout to Building:
Allowed/ Required: 50'
Proposed: 41'

Justification for Waiver:

- Avoids impacts to Resource Area (wetlands).
- Allows for reduced footprint of 4-Story portion of Building 2 and concentrates it farther away and less in view of Stoney Hill Road.
- Creates space between the buildings allowing sunlight to be cast upon the Common Greens.
- Provides for a more welcoming Plaza on approach to the buildings.
- Responds to the request of Town Officials to 'break up" a single building into multiple buildings.
- The buildings are located away from the existing residential homes as much as possible within the limits of the site

Waiver #2

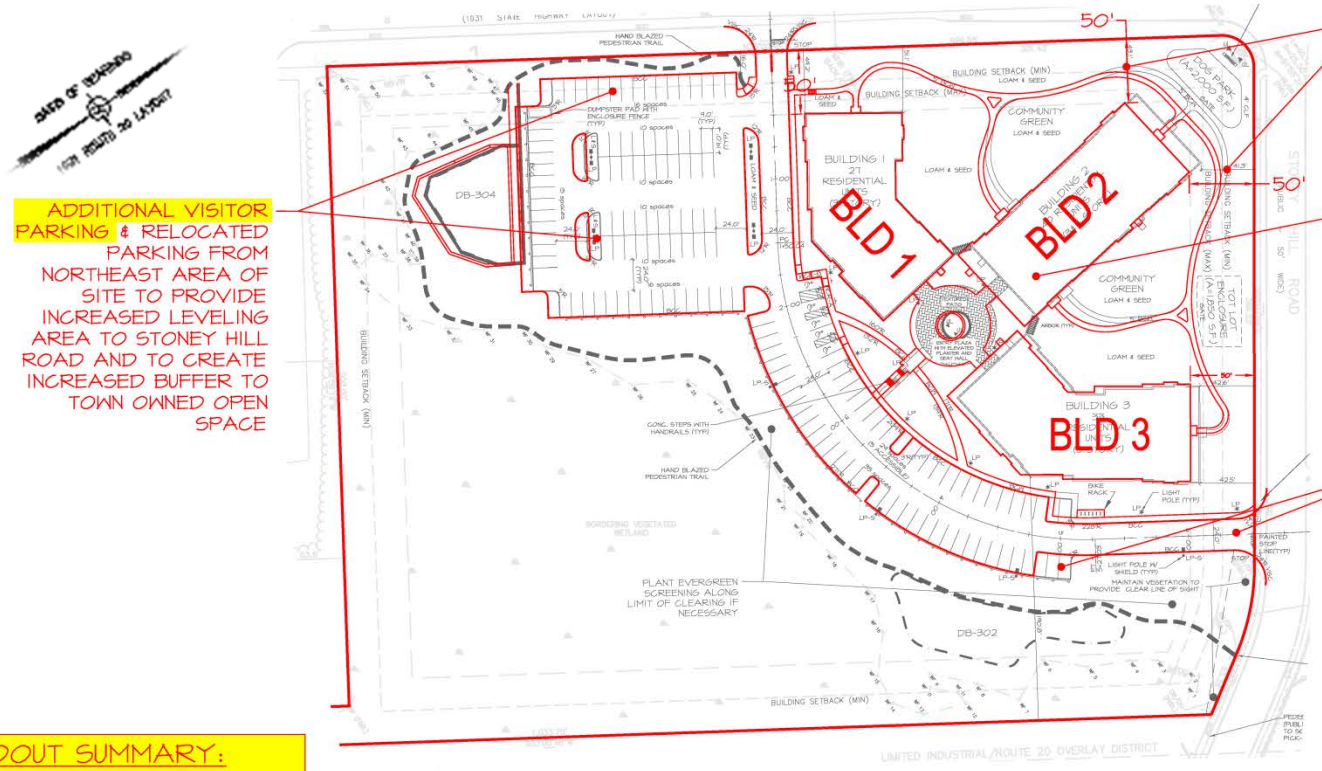
Waiver to Zoning Bylaw-
Maximum Building Height:
Allowed/ Required: 50'
Proposed: 54'

Justification for Waiver:

- Waiver is specific to the south end (4 Story portion) of Building 2 covering only 22% of the building which is located farther away and less in view of Stoney Hill Road.
- The tallest portion of the project is located to be internal to the site as a strategy for lessening impacts along Route 20, Stoney Hiil Rd, and from the abutting properties to the South.
- The roof style and building fenestration are designed to lower the perceived building height. Scale is further reduced through the use of color, texture, and articulation of the building footprint. Only the roof exists above the 50' limit, and this is for the purposes of screening rooftop mechanical equipment

Phase II

Reduced Density/ No Dimensional Waivers/ Visitor Parking



BUILDOUT SUMMARY:

BLDG #1: 27 UNITS
BLDG #2: 32 UNITS
BLDG #3: 33 UNITS

TOTAL: 92 UNITS
(REDUCTION OF 8 UNITS)

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PARKING SUMMARY TABLE

USE	REQUIRED	PROVIDED
RESIDENTIAL*		
RESIDENTS:	1.5 SPACES / UNIT x 92 = 138 SPACES	138
VISITORS:	138 SPACES + 10% = 14 SPACES	14
TOTAL:		152

ACCESSIBLE PARKING (HP) SPACES

TOTAL PARKING SPACES	REQUIRED	PROVIDED
201 TO 300	5	5
VAN ACCESSIBLE		
1 PER 8 ACCESSIBLE SPACES	1	2

Phase II- Alternative

Reduced Density/ No Dimensional Waivers/ Visitor Parking

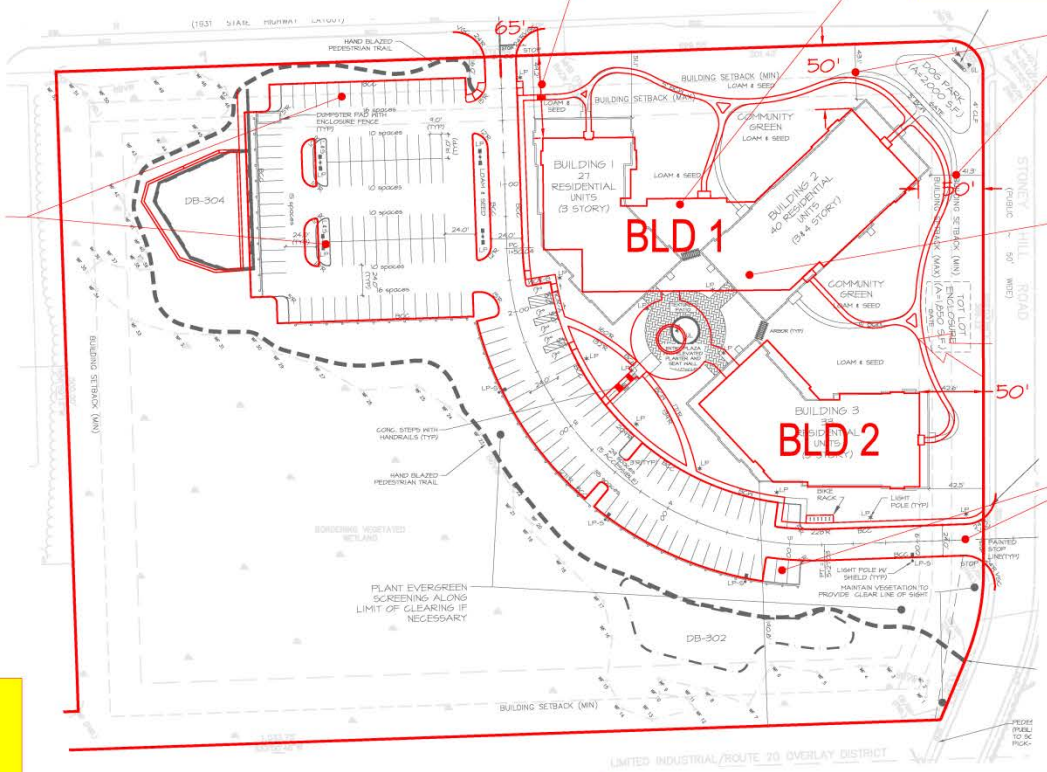
ALTERNATIVE RESULTS IN INCREASED SETBACK TO ROUTE 20

COMBINED BUILDING FOOTPRINTS TO CREATE BUILDING 1 ALTERNATIVE PROPOSED AWAY FROM STONEY HILL ROAD TO LIMIT BUILDING FACADE EXPOSURE TO THE STONEY HILL COMMUNITY

ELIMINATED DIMENSIONAL WAIVER #1

ELIMINATED DIMENSIONAL WAIVER #2

ADDITIONAL VISITOR PARKING & RELOCATED PARKING FROM NORTHEAST AREA OF SITE TO PROVIDE INCREASED LEVELING AREA TO STONEY HILL ROAD AND TO CREATE INCREASED BUFFER TO TOWN OWNED OPEN SPACE



RELOCATED PARKING CREATES INCREASED BUFFER TO TOWN OWNED OPEN SPACE AND PROVIDES INCREASED LEVELING AREA AT STONEY HILL ROAD

BUILDOUT SUMMARY:

BLDG #1: 59 UNITS
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(REDUCTION OF 8 UNITS)

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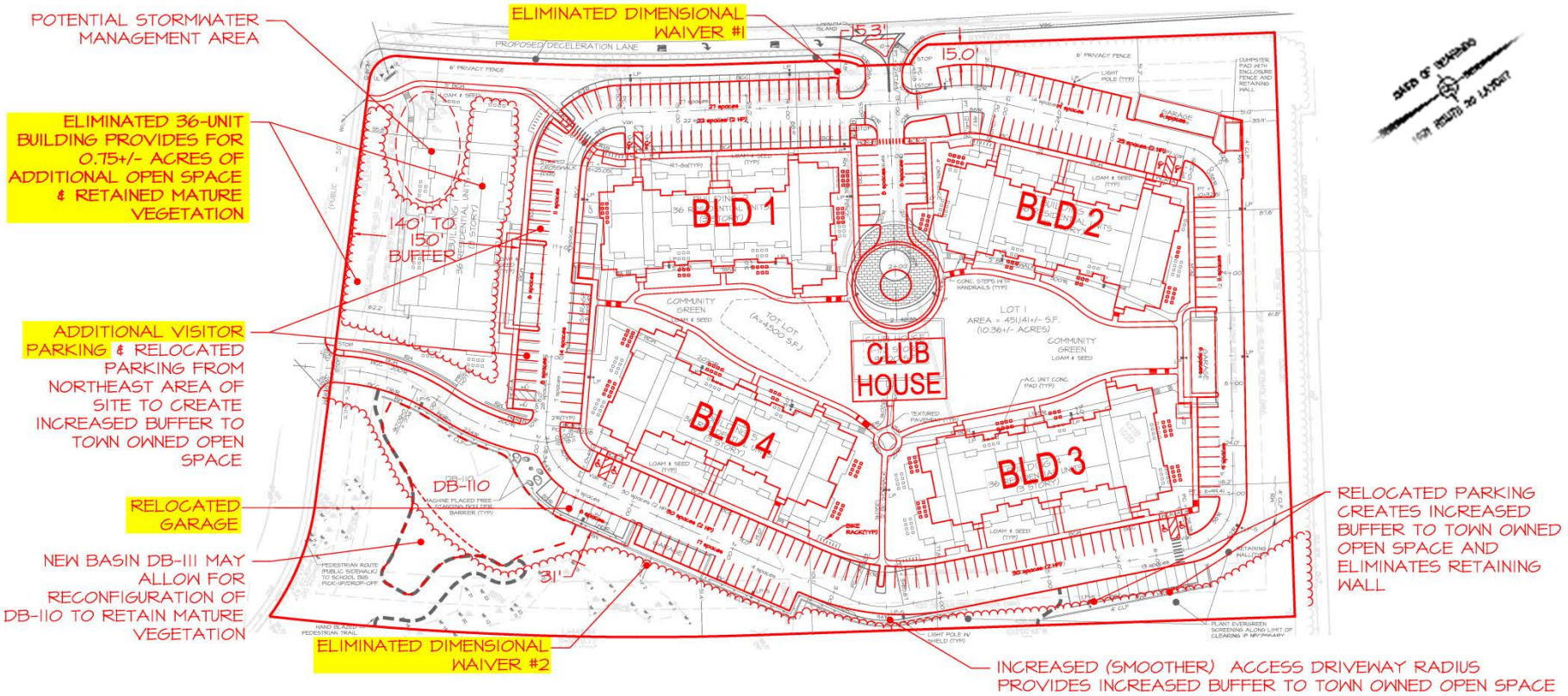
Phase I

Reduced Density/ No Dimensional Waivers/ Visitor Parking



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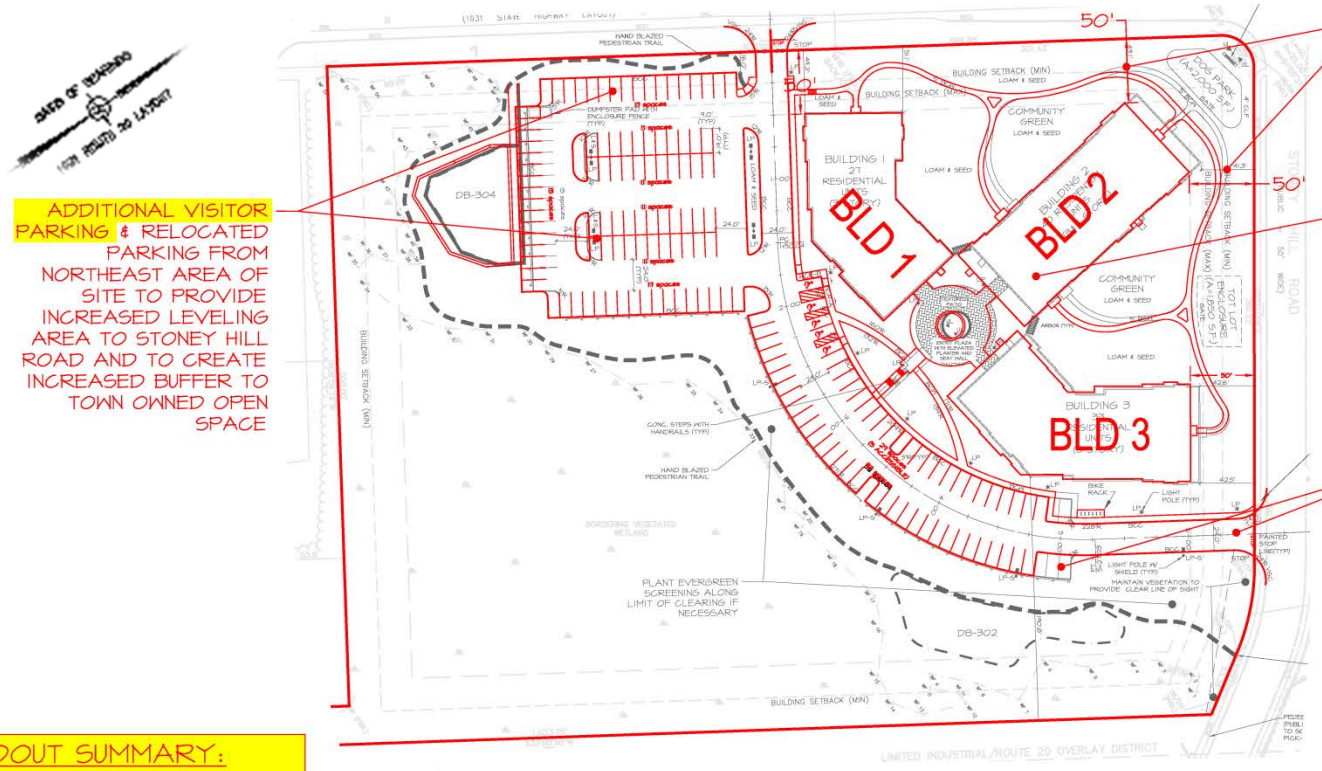
ACCESSIBLE PARKING (HP) SPACES

TOTAL PARKING SPACES	REQUIRED	PROVIDED
201 TO 300	7	10
VAN ACCESSIBLE	1 VAN	5 VAN
1 PER 8 ACCESSIBLE SPACES	6 ACCESSIBLE	

Phase II

Reduced Density/ No Dimensional Waivers/ Visitor Parking



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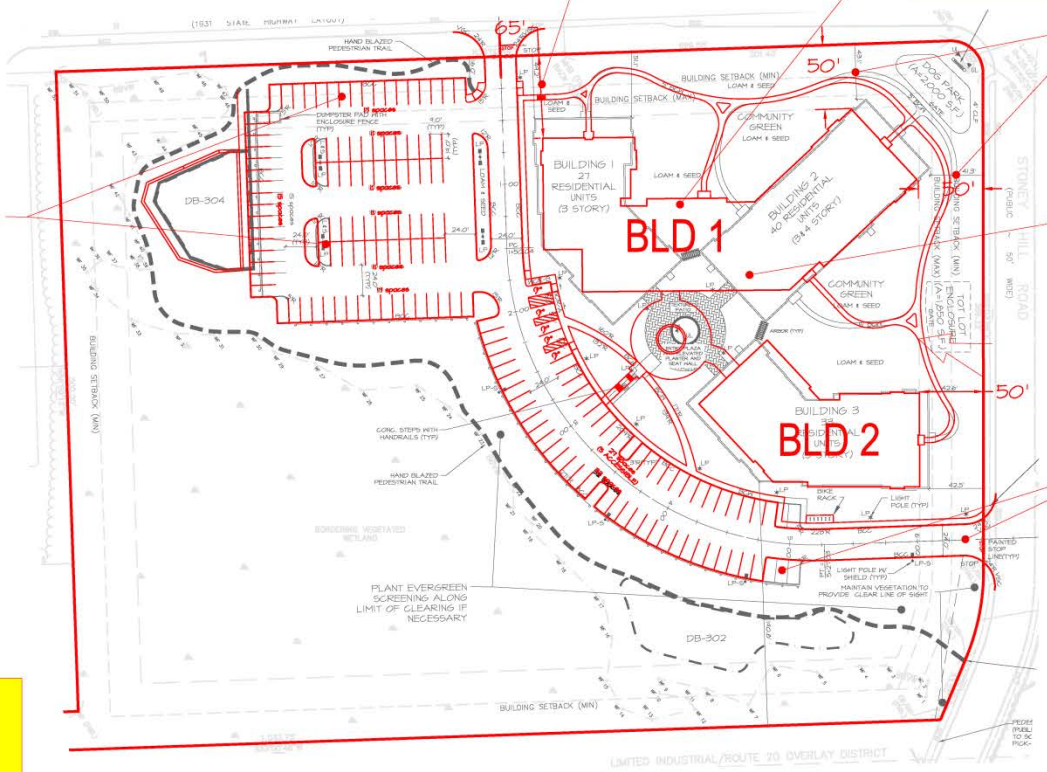

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Site Density Study

TOWN MULTI-FAMILY DENSITY STUDY – ALL SITES

Apt complex	Yorkshire Terrace	20-100 Commons	25-55 Commons	10 Arbor Shrewsbury	15 Sheridan Sheridan	177 Crescent Crescent Hollow	465-479 Boston TP Imperial	30 Julio Southgate	1 Avalon Way Avalon	35 Julio Southgate	552 Main (not included)	Madison Madison
# of units	180	160	144	302	216	27	187	146	251	87	9	96
Acreage	9.7	21.03	10.34	28.09	10	1.55	10	10.04	23.64	5.3	0.2	12.96
Units Per acre	18.56	7.61	13.93	10.75	21.60	17.42	18.70	14.54	10.62	16.42	45.00	7.41

DENSITY
UNITS/ACRE

21.60
18.70
18.56
17.42
16.42
14.54 – Arithmetic median
13.93
10.75
10.62
7.61
7.41

157.56 ÷ 11 = 14.32 - Arithmetic mean (avg.)

DENSITY: PROJECTS (Proposed)
Avg.

A. **Pointe at Hills Farm Project:**

280 units ⇒ 248 = 12.85
19.3 acres = 14.50 19.3

B. **Lakeway Commons Project**

250 units
8 acres = 31.25

C. **Former Capital Group Walnut Street**
40B Proposal

150 units
8.5 acres = 17.60+

TOWN MULTI-FAMILY DENSITY STUDY – 10+/- ACRE SITES ONLY

Yorkshire Terrace	25-55 Commons	15 Sheridan Sheridan	177 Crescent Crescent Hollow	465-479 Boston TP Imperial	30 Julio Southgate
180	144	216	27	187	146
9.7	10.34	10	1.55	10	10.04
18.56	13.93	21.60	17.42	18.70	14.54

DENSITY
UNITS/ACRE

21.60
18.70
18.56 - Median
14.54
13.93

87.33 ÷ 5 = 17.6 Mean

DENSITY / PHASE

Pointe at Hills Farm Project:

Phase 1 180 units ⇒ 156 = 15.00
10.4 acres = 17.30 10.4

Phase 2 100 units ⇒ 92 = 10.33
8.9 acres = 11.24 8.9