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Schematic Design Documents

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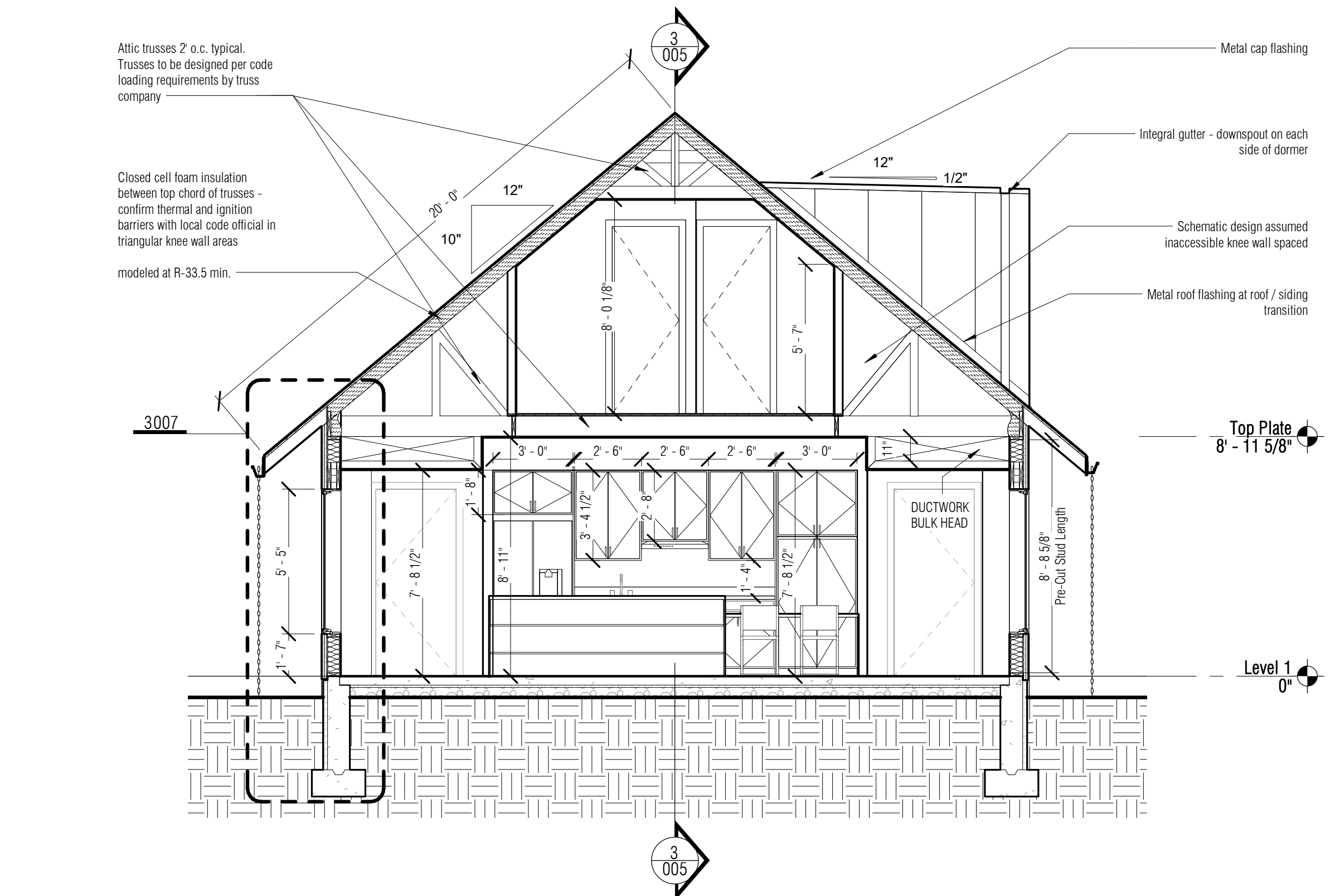
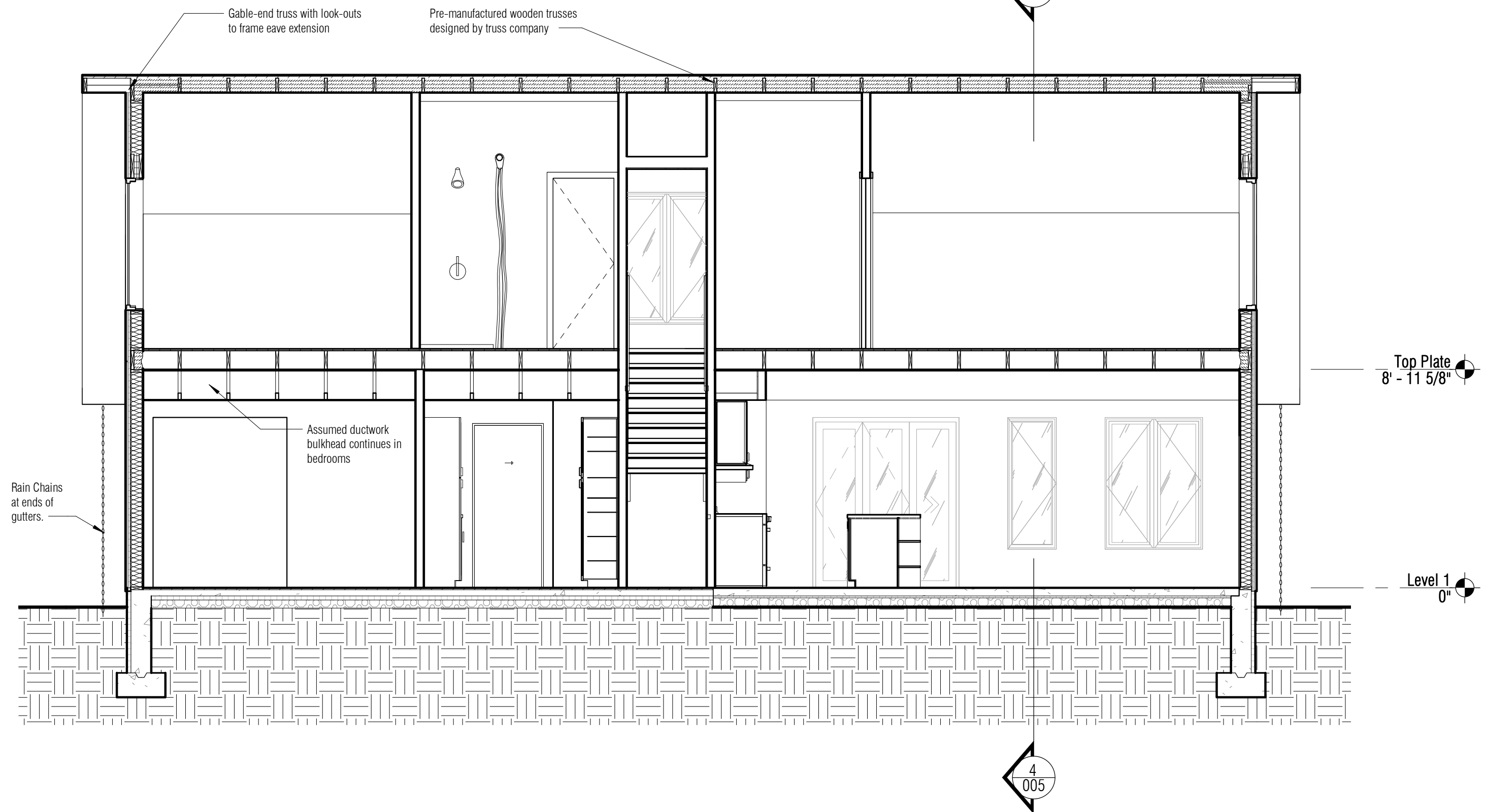
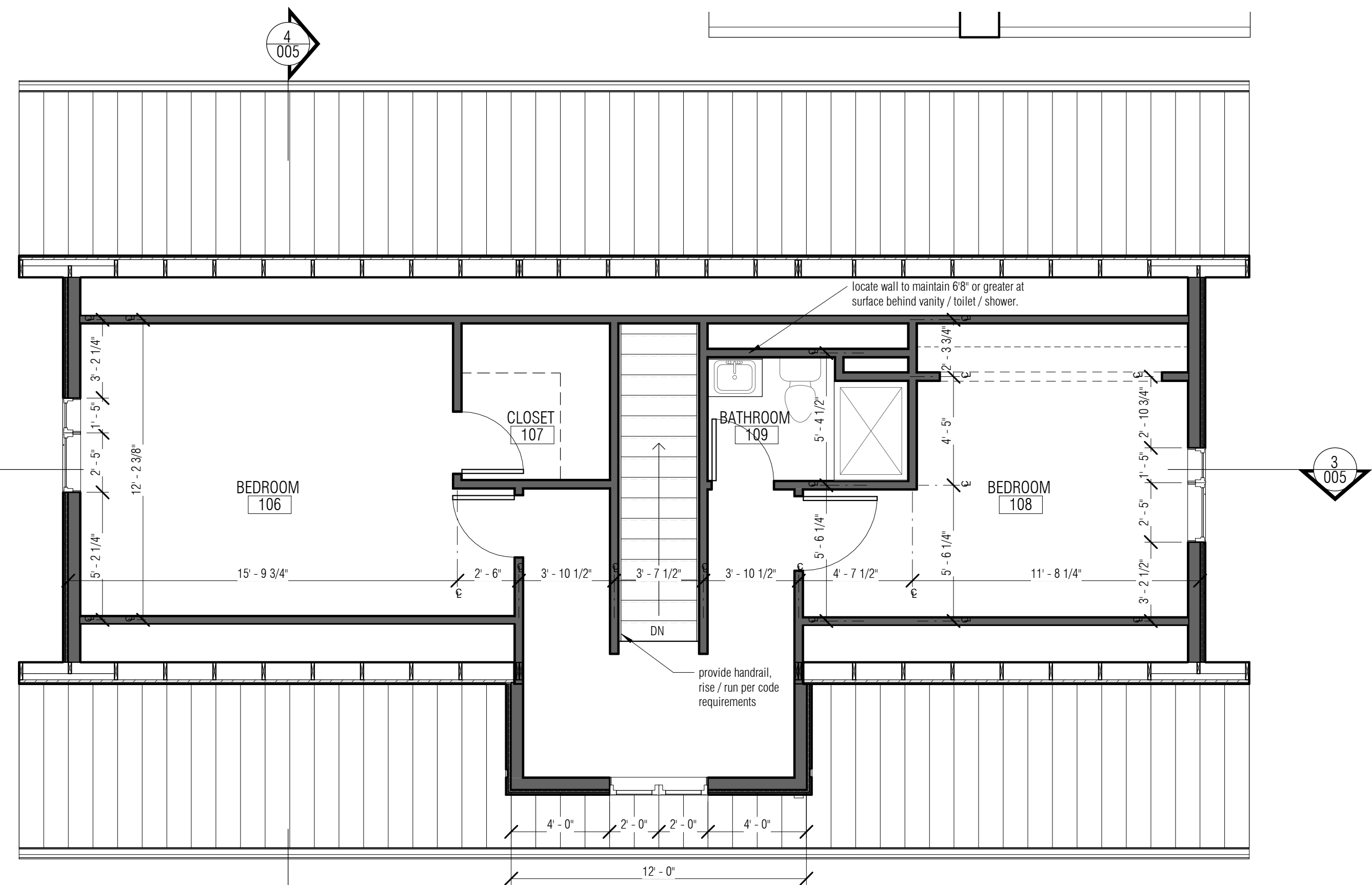
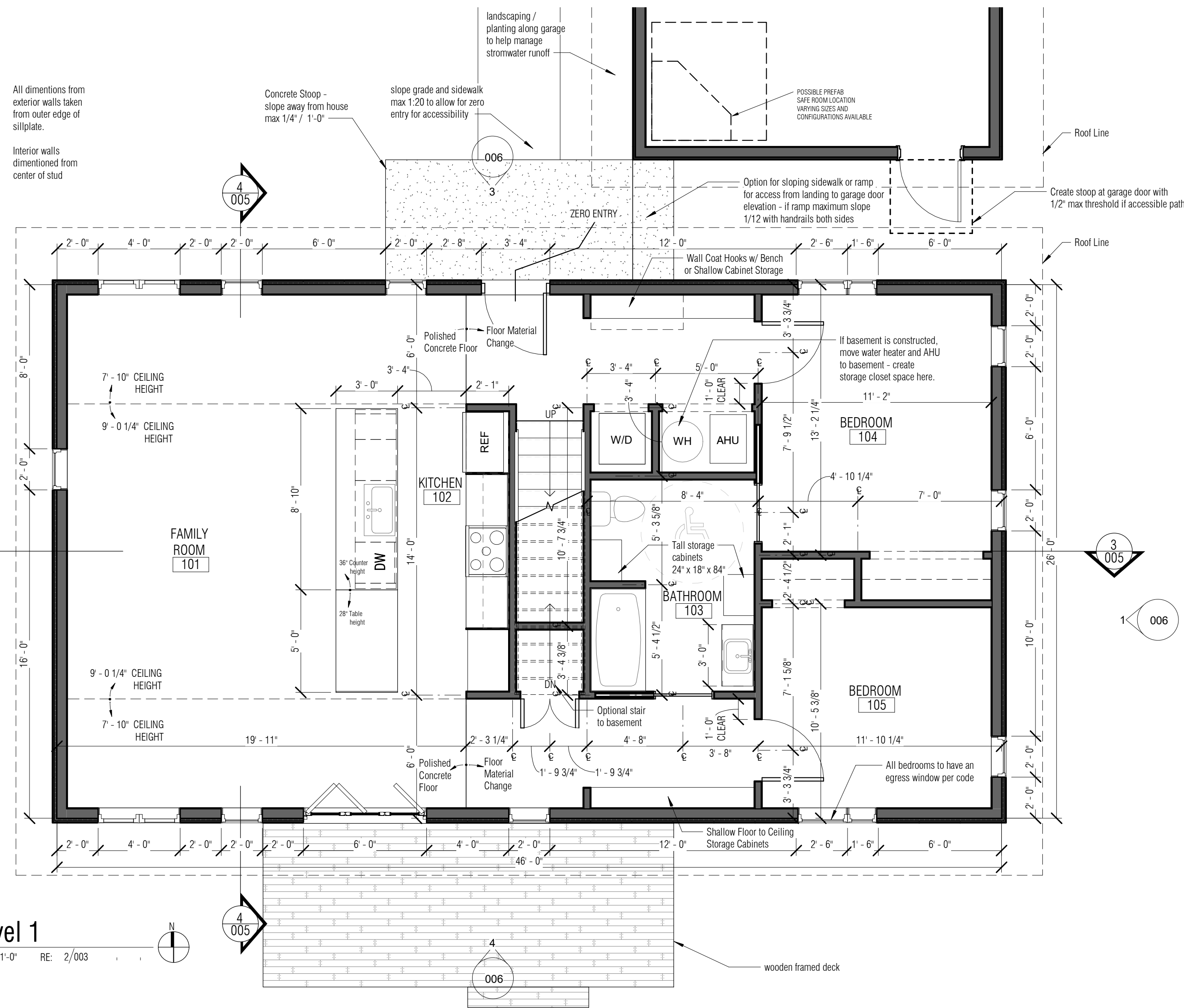
Iowa Energy Office
Iowa Economic Development Authority

Project No: 20023.00

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2 Story Option Plans

005



2 Level 2
1/4" = 1'-0" RE: /

4 Section A2
1/4" = 1'-0" RE: 1/005

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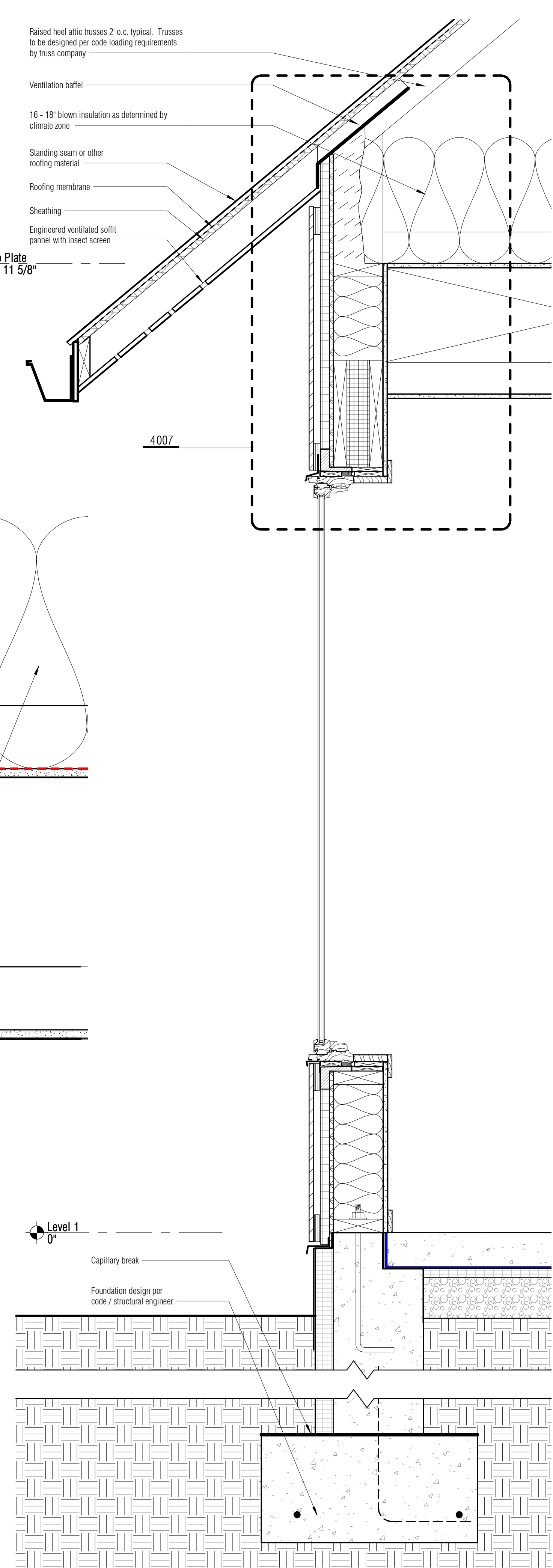
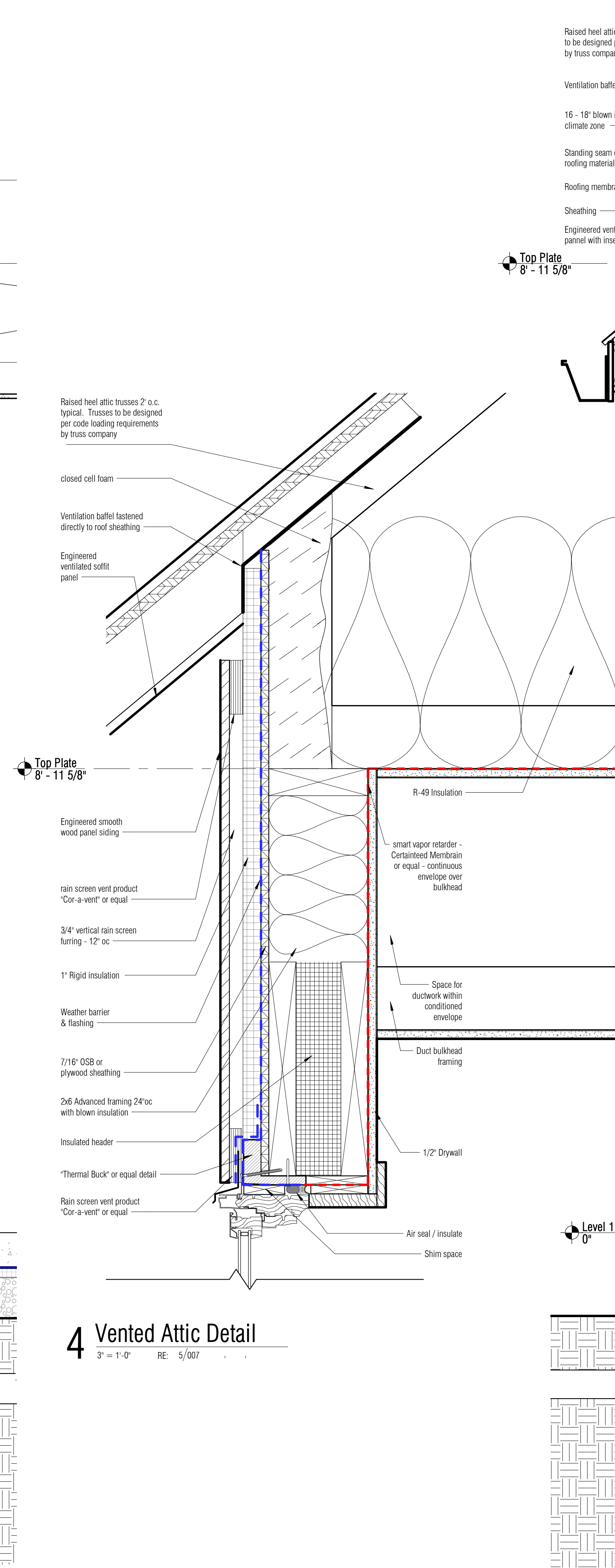
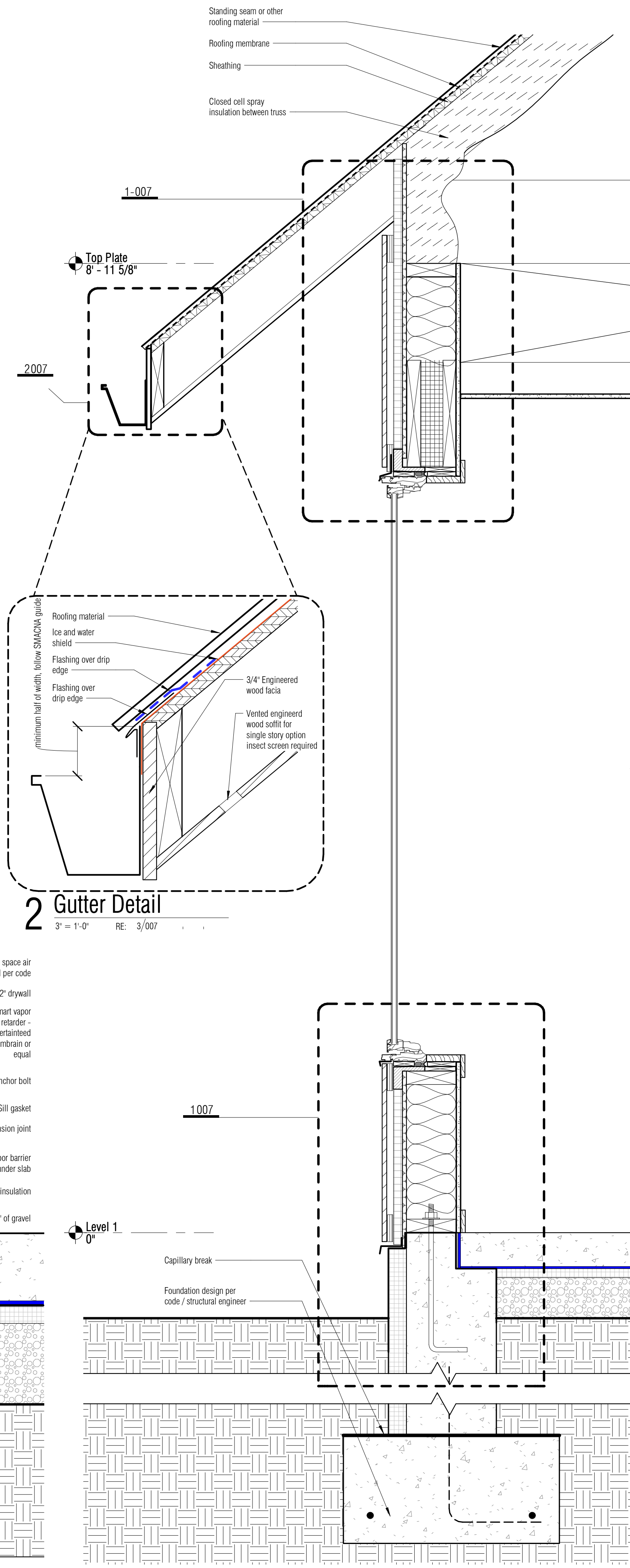
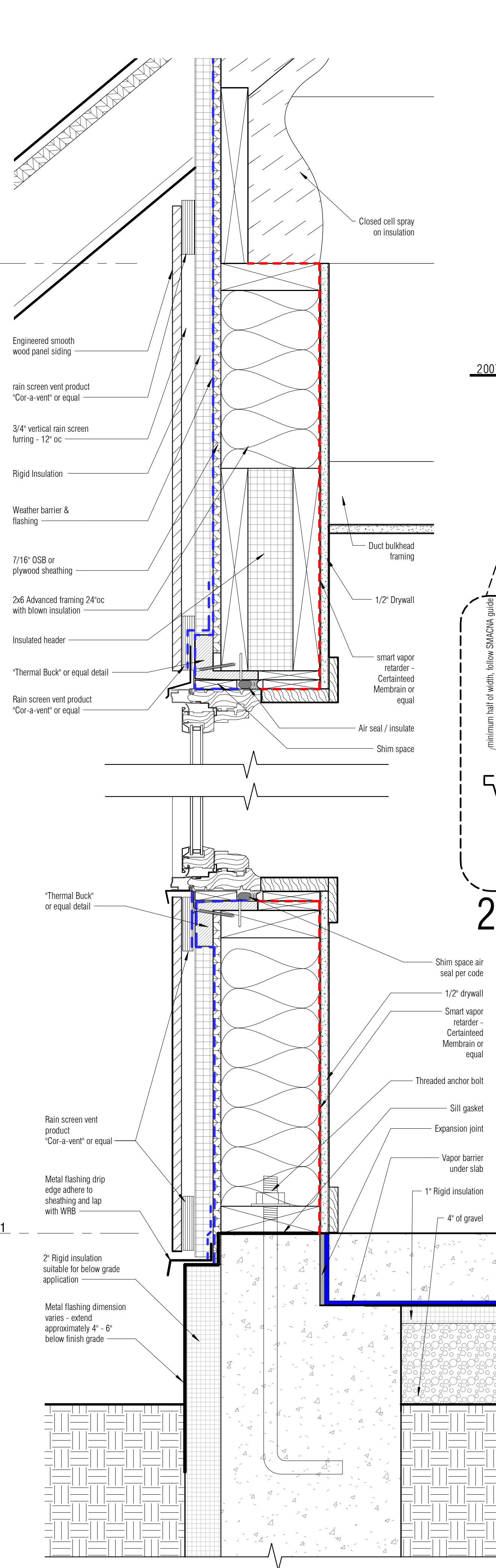
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Details

007



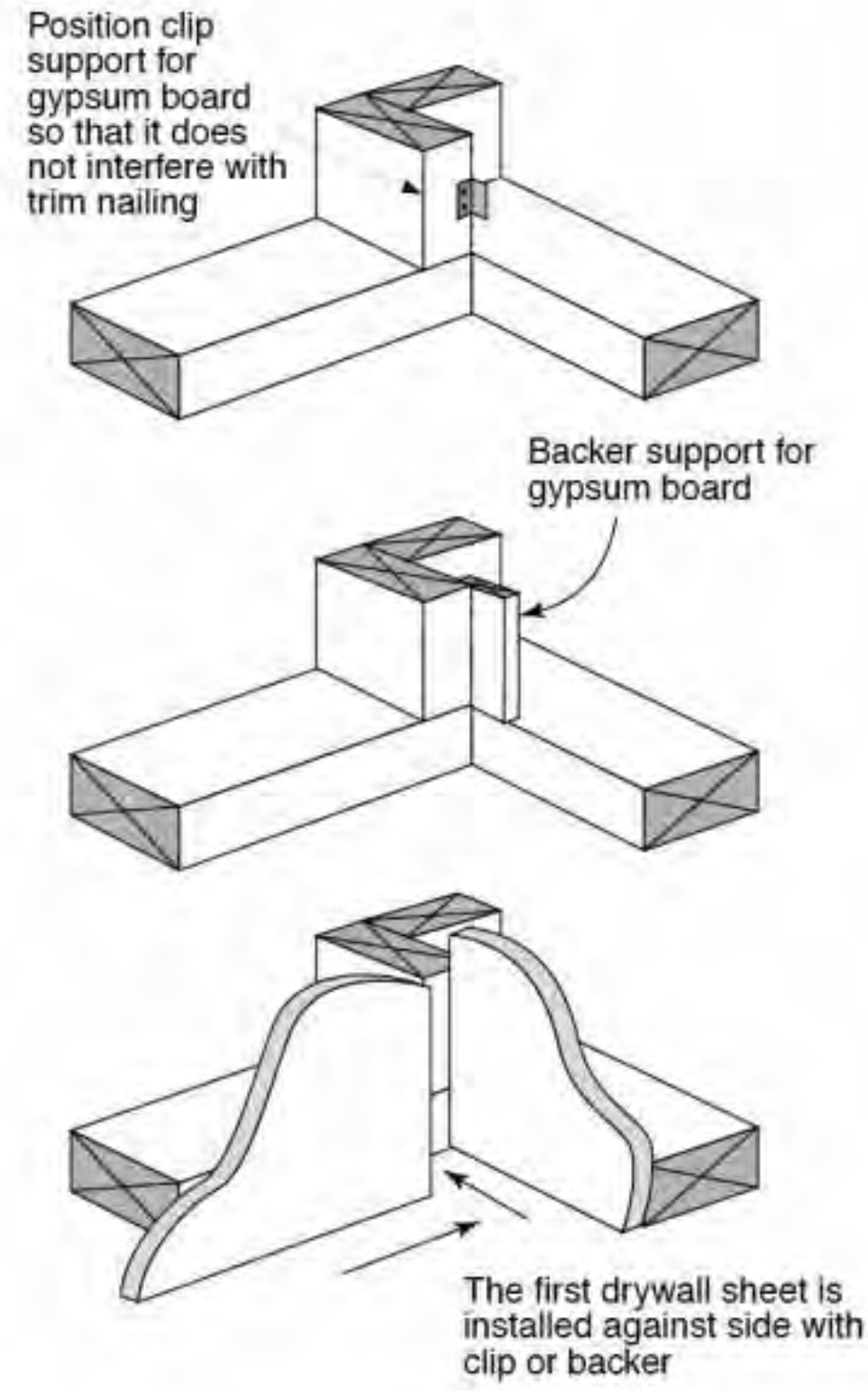
1 Detail Section - Foundation and Sill
3" = 1'-0" RE: 3/007

3 Exterior Wall - 2 Story Option
1 1/2" = 1'-0" RE: 4/005

4 Vented Attic Detail
3" = 1'-0" RE: 5/007

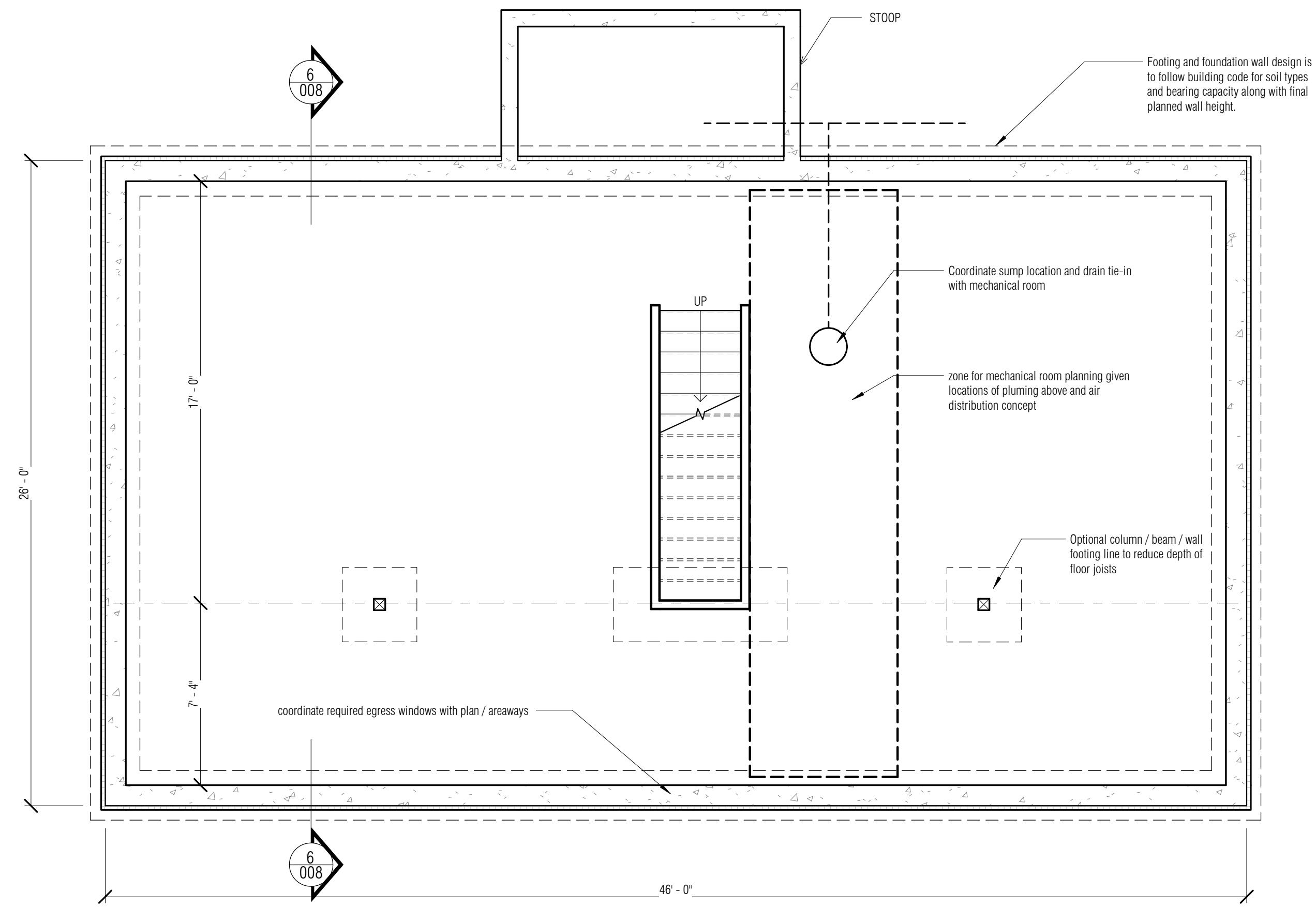
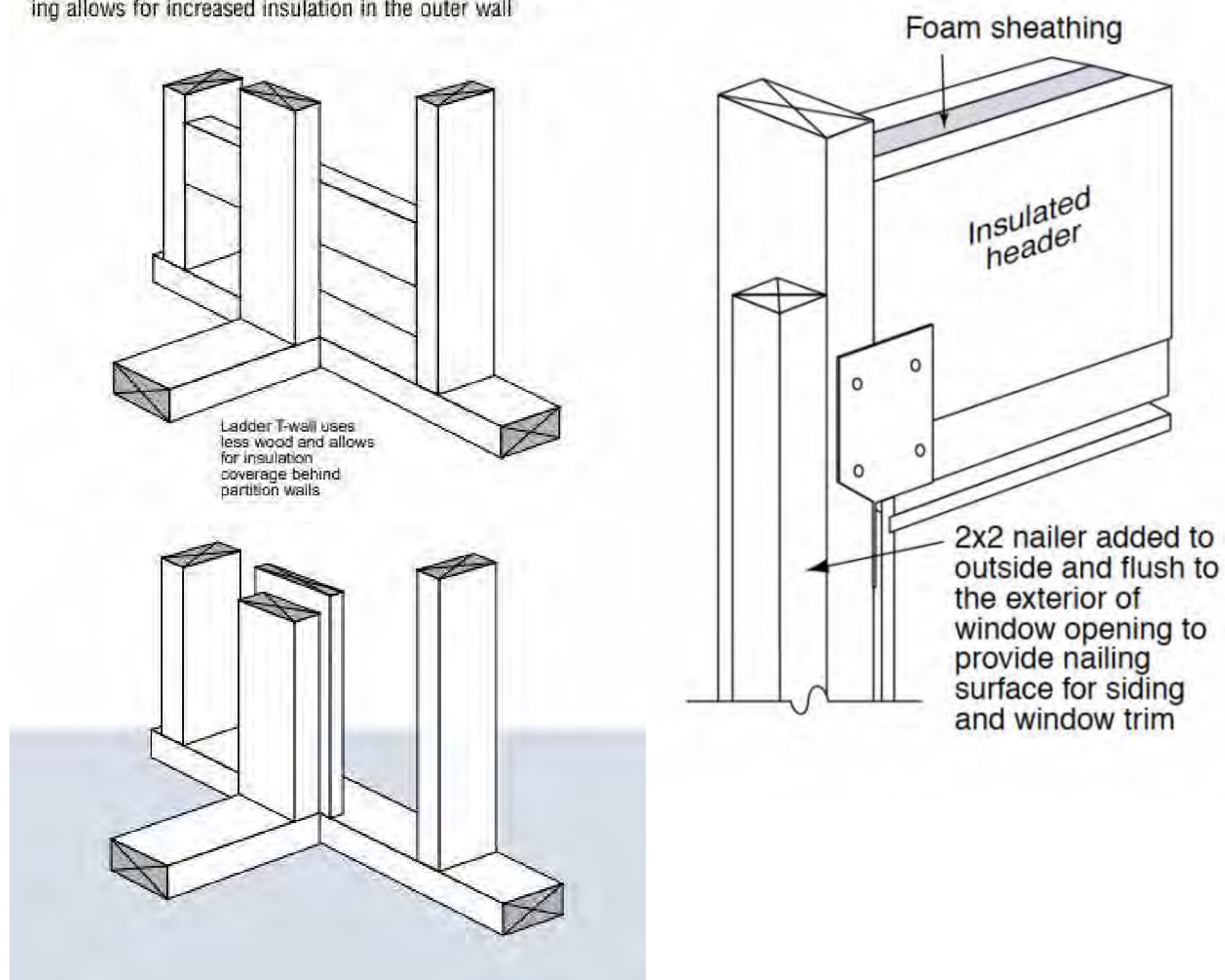
5 Exterior Wall - 1 Story Option
1 1/2" = 1'-0" RE: 1/003

INSIDE "TWO-STUD" CORNERS



T-WALL ALTERNATIVES

The use of ladder blocking or a full-length 1x6 or 2x6 blocking allows for increased insulation in the outer wall

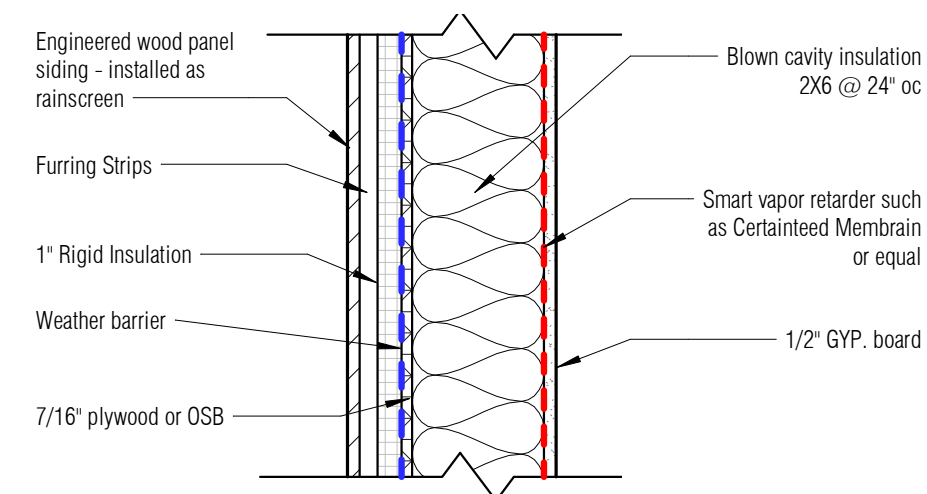


5 Optional Basement

1/4" = 1'-0" RE: 4/008

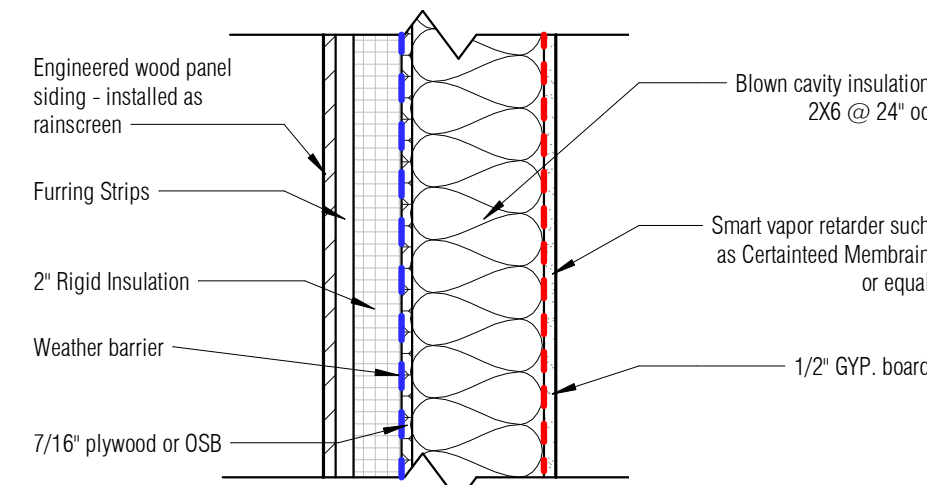
Advanced Framing Details - Example

Details can be found on www.buildingscience.com and DOE Building America Website



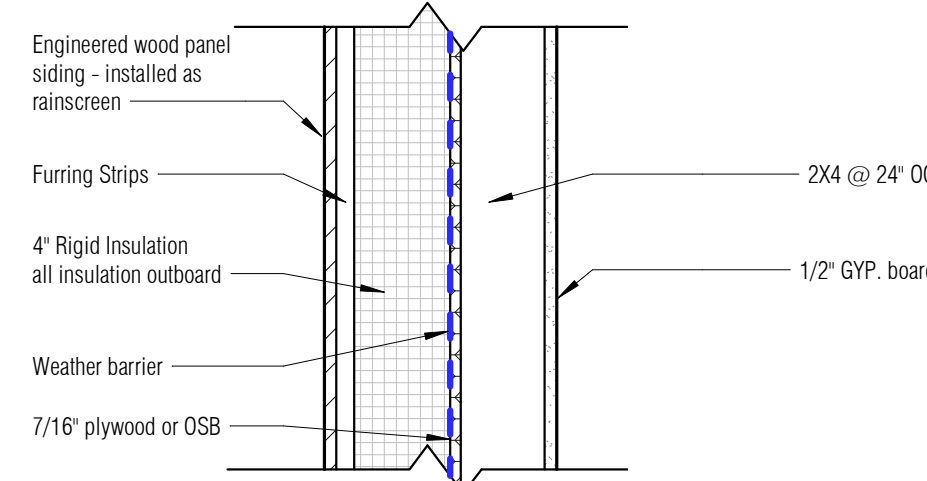
1 Wall Type A - Home Plans as drawn

1 1/2" = 1'-0" RE: /



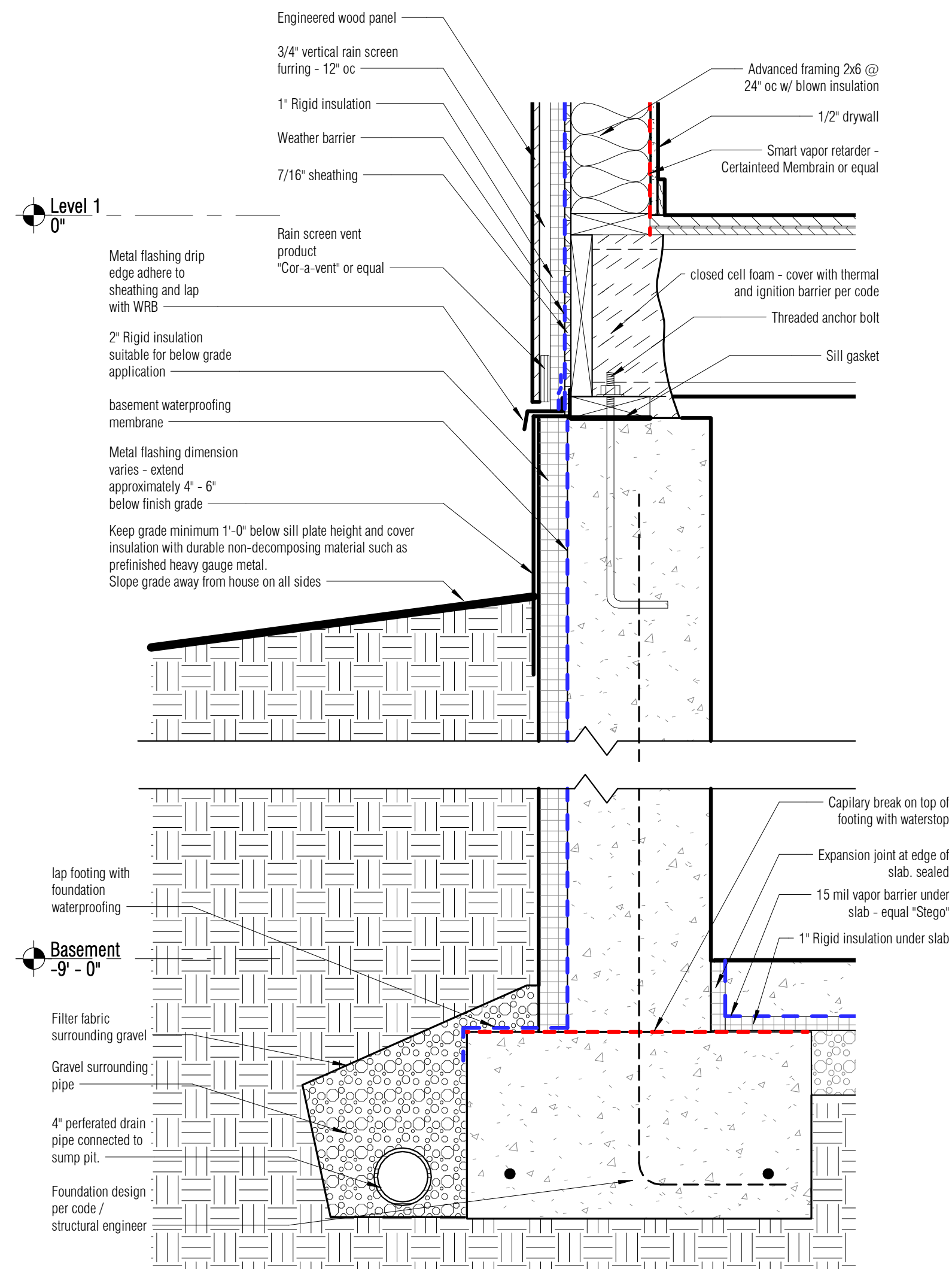
2 Wall Type B - High Performance Option

1 1/2" = 1'-0" RE: /



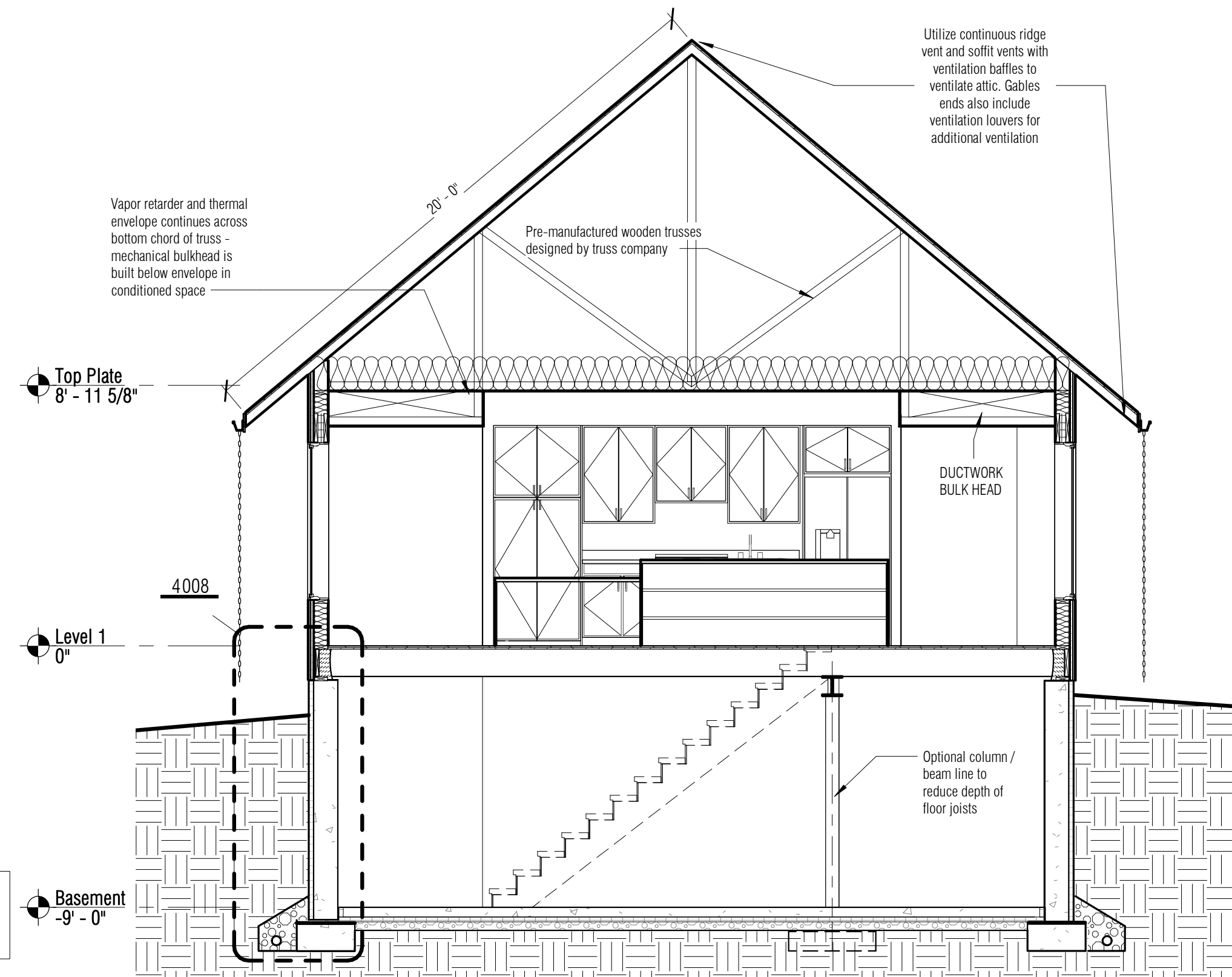
3 Wall Type C - High Performance Option

1 1/2" = 1'-0" RE: /



4 Basement Wall Detail

1 1/2" = 1'-0" RE: 6/008



6 Section Basement

1/4" = 1'-0" RE: 5/008

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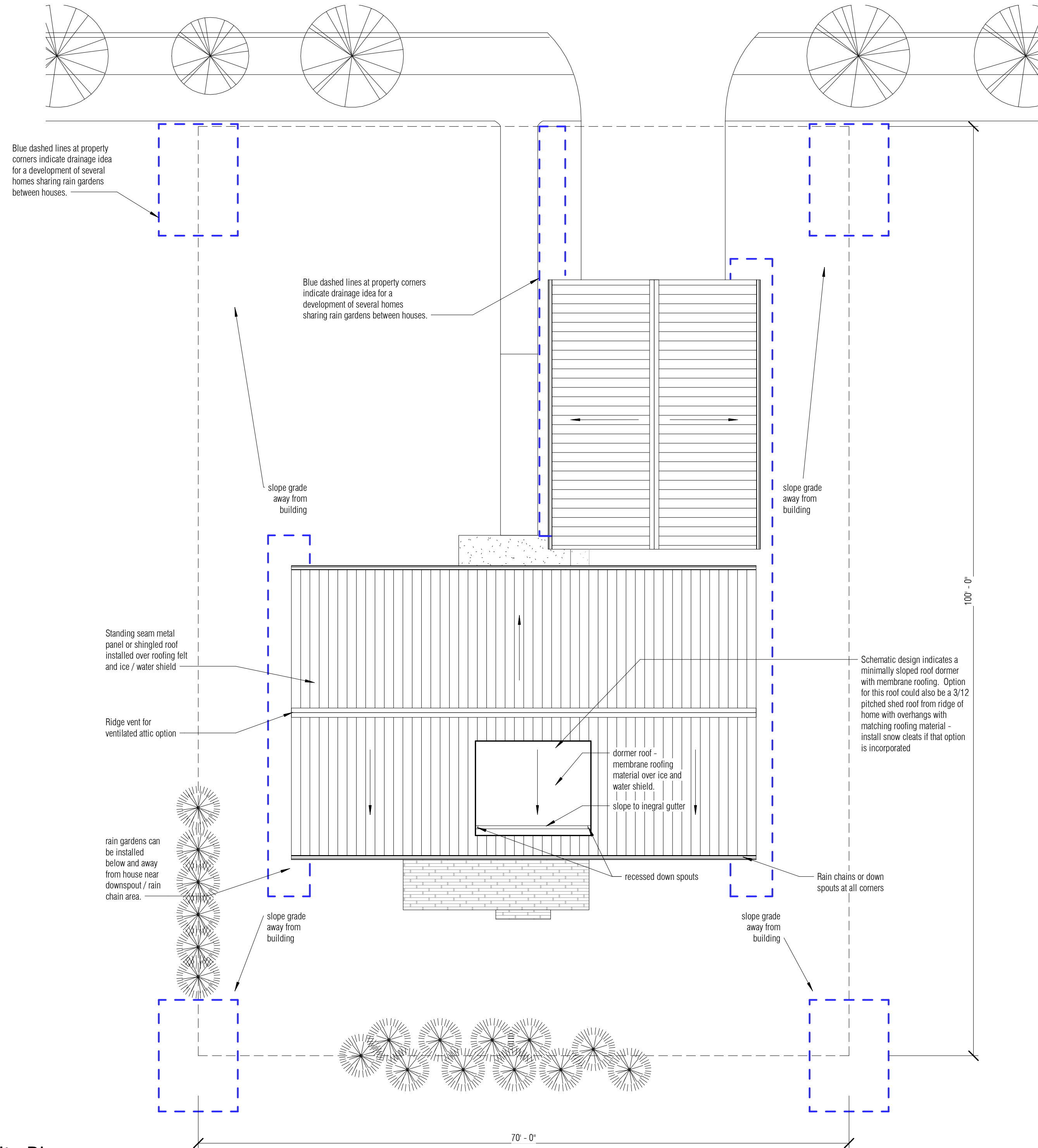
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Basement and Wall Options

008

Stormwater management notes:

- A. Follow the best management practices and universal sizing criteria for rain gardens found in the Iowa Rain Garden Design and Installation Manual and the Iowa Stormwater Management Manual at website links below:
 - a. [Iowa Stormwater Management Manual](#)
 - b. [Iowa Rain Garden Design & Installation Manual](#)
- B. Main strategy shown on this typical site configuration is to slope site away from house foundation and if a new development rain gardens could be location to share at the property lines / corners and drain all lot stormwater to those locations.
- C. The rain gardens could also be sized and located to intercept roof water closer to the home from rain chains or downspouts – (away from the foundation).
- D. The configuration shown also assumes a landscaped rain garden to intercept garage roof water and to avoid icing on the entry sidewalk.



1 Site Plan

1/8" = 1'-0" RE: 2/003

IMPACTS OF STORMWATER

During storms, impervious surfaces such as roadways, parking lots and compacted soils cause accumulated pollutants to flow into storm drains without treatment. The contaminated water then makes its way into streams and rivers.

Rainwater should naturally soak into the soil to be filtered, but impervious areas prevent that from happening. This causes an increase in the volume and rate of polluted stormwater runoff into local waterbodies. As communities grow, they often experience even more stormwater runoff problems.



RESULT
Without proper stormwater management, developed areas negatively impact their surroundings. There is increased water runoff which damages stream channels, pollutes water resources, and causes flooding.
Stormwater from roads and buildings can impact private property. Unlike common public infrastructure such as roads, sewers, or electricity, stormwater is often left for citizens to repair when damage occurs on private property.



UPDATED DESIGN STRATEGIES

Better site design is the first step to improved communities. Urban areas should be designed to:

- preserve natural drainage in open spaces
- reduce flow of additional stormwater
- reduce pollutants
- reduce flooding
- reduce impervious surfaces

This approach is used with management of both small and large storm events to:

- improve water quality
- reduce water quantity

WATER QUALITY PROTECTION

Small Storms

These are methods that target the small rainfall events. They provide treatment for the dirtiest portion of the runoff. The methods will help water soak into the ground, limit runoff in small rains, and reduce runoff that is causing erosion and damage in streams.

FLOOD PROTECTION

Large Storms

These are methods that manage the large and infrequent storms that cause infrastructure damage and the catastrophic floods that threaten public safety.

UNIFIED SIZING CRITERIA

Unified Sizing Criteria is a comprehensive approach to design stormwater management systems.

It uses measurement standards to meet flooding, health, safety, and water quality goals. These criteria are used to design best management practices that meet desired treatment objectives.

OBJECTIVES OF UNIFIED SIZING CRITERIA

The Unified Sizing Criteria is used to manage stormwater with engineering techniques that protect our streams, rivers, and lakes. This approach mimics how Iowa's original native prairie landscape and soils were able to soak in rainfall.



This pond is part of a series of natural treatment areas for stormwater. It was designed using the unified sizing criteria and it creates an open, park-like setting for residents to enjoy.
Permeable pavers (top) and bioretention cells (bottom) also soak in rainfall and manage stormwater where it falls instead of shedding polluted water.

SMALL STORM Criteria for Water Quality:

RECHARGE VOLUME (Rev)

- Absorbs rainfall and replenishes groundwater
- Reduces surface runoff and improves stream low-flow
- Infiltrates or reuses up to 1.0" of rainfall

WATER QUALITY VOLUME (WQv)

- Captures runoff from the most common storm events
- Provides water quality treatment and reduced pollutant loads
- This amount of runoff results from a 1.25" rainfall (includes 90% of all storms in Iowa)

CHANNEL PROTECTION VOLUME (CPv)

- Stabilizes streams by reducing flow rates and stream erosion
- Slowly releases the amount of rainwater from a 1-year storm over 24 hours (approximately 2.7" rain)

LARGE STORM Criteria for Water Quality:

OVERBANK FLOOD PROTECTION (Op)

- Reduces local flash flooding from overloaded storm drains
- Reduces streams from overflowing their banks within communities
- Manages approximately 3.0" to 4.5" rainfall from a 2-year to 10-year storm

EXTREME FLOOD PROTECTION (O1)

- Prevents flood damage to downstream properties and infrastructure
- Prevents increases in high water elevation during a flood
- Manages up to and beyond a 100-year storm (approximately 8.0" rain)

For more information, refer to:

Iowa Stormwater Management Manual (ISWMM) - a statewide stormwater resource that provides design information on the Unified Sizing Criteria as well as stormwater best management practices.

Visit this site to view the ISWMM: www.iowadnr.gov/Environmental-Protection/Water-Quality/APDES-Storm-Water/Storm-Water-Manual

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317 Sixth Avenue, Suite 100, Des Moines IA 50309
www.bnim.com

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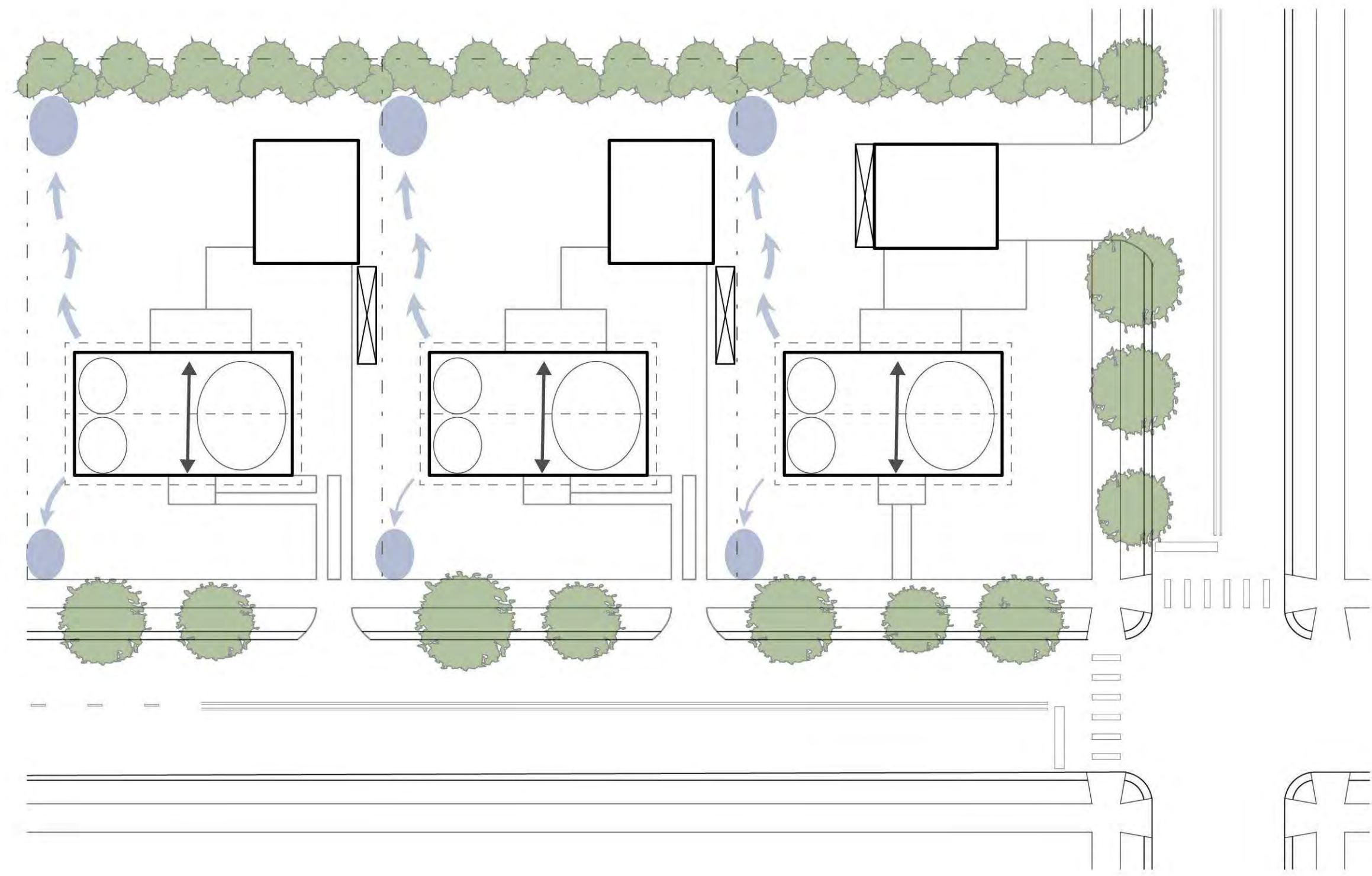
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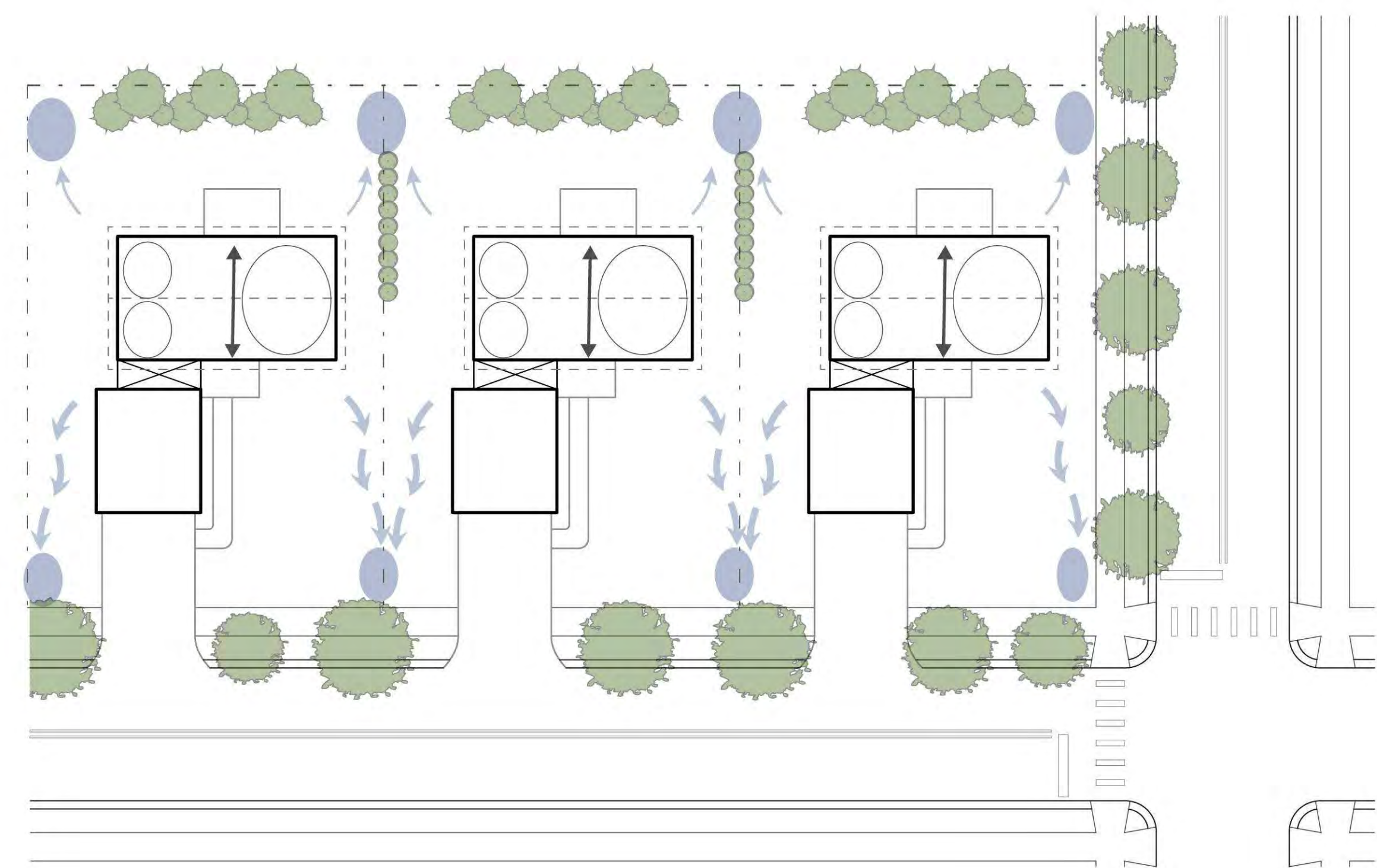
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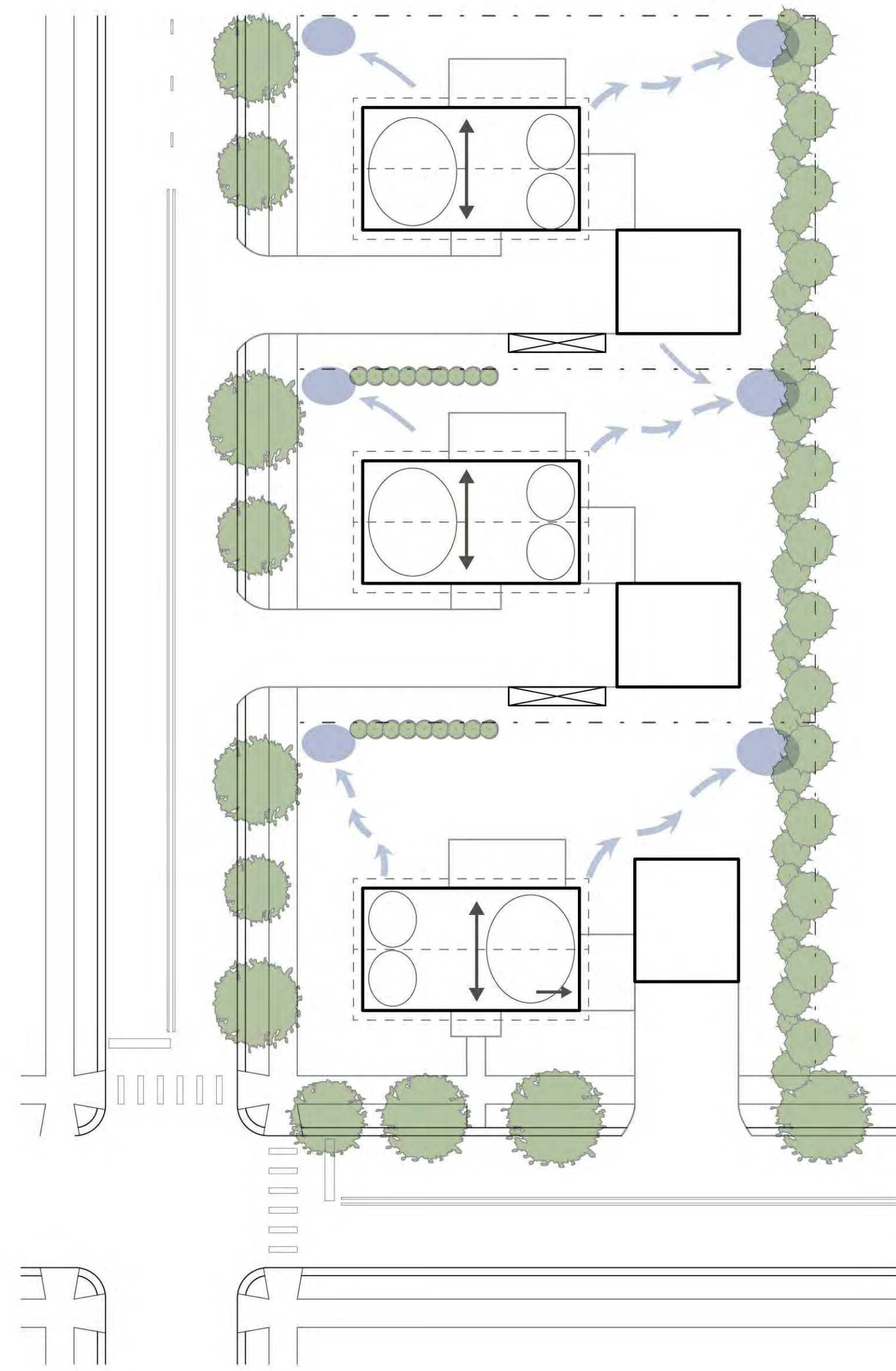
Site Plan Options



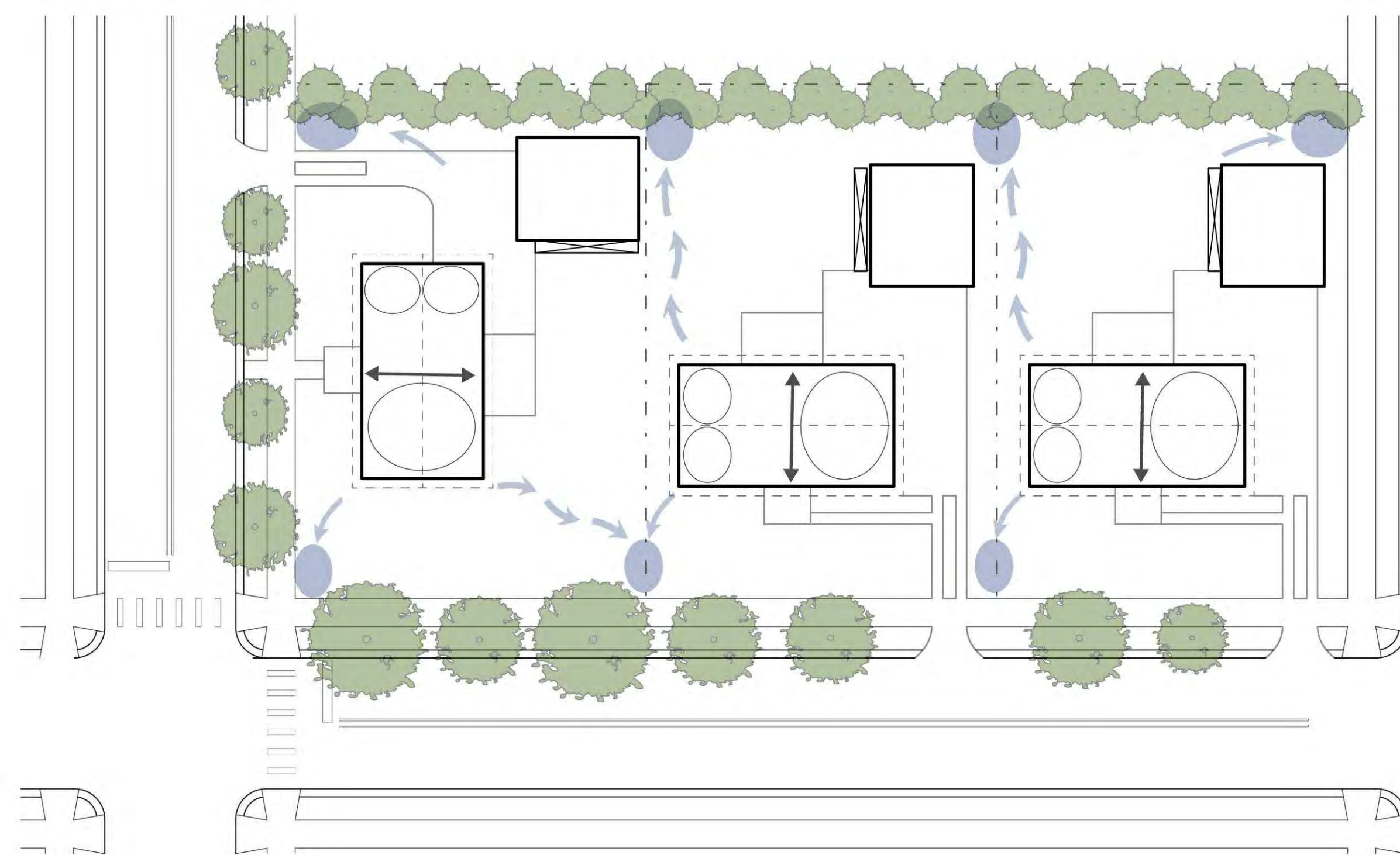
Option 1
1" = 24' - 0"



Option 3
1" = 24' - 0"



Option 2
1" = 24' - 0"



Option 4
1" = 24' - 0"

1. This sheet indicates diagrammatic options for how the home could be arranged in various configurations in a development for different street configurations.

2. The home plans could be slipped or mirrored to orient the front door to the street and windows can be moved within the prototype module.

3. In all cases the window fenestration should stay at or below 15% window to floor area with exceptions noted in the DOE ZERH Program. And, windows should be minimized on the east / west / north elevations and maximized on the southern exposure.

4. When siting the building or buildings, a storm water strategy should be to minimize impervious area on the property. Pervious paver sidewalks, driveways, and patios should be considered to manage a minimum of 1.25" rain event on the property.

5. Considerations should be given for PV roof mounted installation with considering tree placement and future growth / shade of the property and home. Trees should be located to minimize future shading of installed PV panels, but species could be investigated to maximize their growth to shade walls in the summer, but allow solar access to the roof PV panels year round

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Site Options

2020 Iowa Green Streets Criteria Summary Items:

Please note – the following is a brief summary of highlights of items to consider for each category of the Iowa Green Streets Criteria along with a summary checklist of each point in the system. This is not a comprehensive list. Please refer to the full Green Streets Document for descriptions, requirements, and related resources for each point. <https://www.iowaeda.com/green-streets/after-2020/>

1. INTEGRATIVE DESIGN:

- a. To maximize high-performance design, it is important to have all designers, engineers, contractors, subcontractors, and community members / homeowners involved in the design refinement and construction processes making decisions together.
- b. Integrated design considers effective and frequent communication during all phases of the project design and construction.
- c. Consider resilient design strategies to minimize climate related risks.

2. LOCATION + NEIGHBORHOOD FABRIC

- a. Locate site for construction that does not negatively impact sensitive sites such as:
 - i. Agricultural farmland
 - ii. Wildlife habitats
 - iii. Wetlands and other ecosystems
 - iv. Floodplains
- b. Foster development in existing neighborhoods within a community.
 - i. Build utilizing existing infrastructure
 - ii. Foster density / infill in communities in lieu of expanding development in surrounding farmland
 - iii. Locate properties that encourage accessible pedestrian connections to community services / amenities
- c. Foster connectivity / community
 - i. Connect to recreation / trail systems
 - ii. Foster local food access
 - iii. Provide broadband connectivity
 - iv. Utilize local / regional contractors / material suppliers
 - v. Consider development that has solar access for PV installations and if developing more than one home, consider district (shared) geothermal systems for a larger multi-home development

3. SITE IMPROVEMENTS

- a. Construction:
 - i. Minimize site development to only what is needed for construction and storm water management.
 - ii. Secure NPDES permits as required by IDNR
 - iii. Develop and implement a Storm Water Pollution Prevention plan as required
 - iv. Protect trees and vegetation to remain
- b. Landscape:
 - i. Implement native / climate appropriate landscaping

- c. Storm Water Management
 - i. Utilize rain gardens, rain barrels, and pervious paving driveway / patios to manage a 1.25" rain event at minimum on site
 - ii. Consider what is required to manage a 2.5" rain event on site.
- d. Irrigation
 - i. Static service pressure must not exceed 60psi
 - ii. Consider no potable water irrigation system for the entire property as a first step
 - iii. If irrigation is provided utilize a smart / efficient irrigation system for a maximum 50% of the site (assumed native landscaping utilized with rain barrels for additional irrigation)

4. WATER CONSERVATION

- a. Fixtures:
 - i. Utilize water conserving fixtures as outlined in the Criteria.
 - ii. Consider Water Sense Certified Fixtures

5. OPERATING EFFICIENCY

- a. Green Streets 5.1a – New Single-Family Construction
 - i. Utilize at minimum the Energy Performance Criteria and Air Barrier Insulation Checklist included in this section.
 - ii. Secure the services of a HERS Rater
 - 1. Collaborate regarding plan review, energy modeling, and inspection / testing to be completed prior to occupancy
 - iii. Size all HVAC – Heating and Cooling Systems utilizing ACCA Manuals J, S, and D.
 - iv. Utilize advanced framing techniques as allowed by local building codes.
- b. Moving to Zero Energy – Design and planning strategies
 - i. Design home with HERS Rater modeling to achieve 5 points lower than HERS Goal of 56. Achieve HERS 51 or less.
 - ii. Consider Certification of the design and construction with DOE ZERH Program
 - iii. Consider orientation of plan and organize pathways for Photovoltaic / Solar Hot Water Ready systems
 - iv. Consider install of PV and / or Solar Hot Water Systems
 - v. The design is predicated on all-electric systems. If the home is built with gas heat and appliances, allow for electrical capacity and space for future switch from natural gas to all electric systems and appliances.
- c. Appliances
 - i. Install all Energy Star appliances – kitchen, laundry, etc.
- d. Lighting
 - i. Install latest LED permanent fixtures – indoor and outdoor fixtures
- e. Provide for electrical vehicle charging in garage.

6. MATERIALS

- a. Utilize materials that include post-consumer recycled content
- b. Utilize materials that do not off-gas and have low VOC content.
- c. Utilize materials that do not provide chemical hazards
- d. Utilize materials that are durable, low-maintenance, and cleanable

- e. Utilize FSC certified wood products
- f. Utilize materials that foster local and regional economies
- g. Develop a construction waste management plan and recycle construction waste
- h. Provide for the material longevity by managing moisture / water so it drains and does not saturate materials
 - i. Manage roof water and slope grades away from foundations

7. HEALTHY LIVING ENVIRONMENT

- a. Implement a passive radon mitigation system.
- b. Utilize all electric systems and avoid combustion equipment and appliances
- c. Isolate the garage
- d. Seal all wall / floor joints and penetrations to prevent pest entry.
- e. No smoking on site during construction
- f. Install bathroom and kitchen exhausts and consider whole-house ventilation per ASHRAE 62.2
- g. Install supplemental dehumidification equipment to maintain less than 60% humidity
- h. Implement a construction indoor air quality management plan to prevent ductwork and systems / equipment from getting dirty during construction. OR earn the EPA Indoor Air Plus label
 - i. Provide for universal design
 - ii. Incorporate sloped sidewalks and zero entries from sidewalk and garage for accessibility
 - iii. Create appropriate clearance space
 - 1. At minimum follow requirements of Chapter 11 – IBC for Type A units as a general guide for doors clearances, etc.

8. OPERATIONS, MAINTENANCE + OCCUPANT ENGAGEMENT

- a. Create a building operations and maintenance manual for the homeowner
- b. Provide a walk-through of systems and maintenance schedules with the homeowner.

ENERGY MODELING ANALYSIS:

Using the RESNET approved REMRate energy simulation software the variations of design were evaluated individually per their configuration. This process began with modeling the geometry of the dwelling and assigning thermal properties to each individual envelope component. From there the mechanical systems, lighting and appliances were assigned to further evaluate the energy consumption of the home. Final energy consumption and the home’s corresponding HERS index reflect a year-round hourly simulation based on location. Using this simulation approach, the annual energy usage of the home is projected as designed. But as noted earlier, many variables can affect the final performance of the home once occupied; therefore, the final built home may achieve different results that what are projected below.

In the spreadsheet that follows tabulates various energy strategies organized by the following logic:

- A. **Option 1: Base Home:** 1196 sf – 2 Bedroom, 1 Bathroom, Slab-on-Grade (003-004)
- B. **Option 2: 1 ½ Story Home:** 1841 sf – 4 Bedroom, 2 Bathroom, Slab-on Grade (005-006)
- C. **Option 3: 1 ½ Story Home:** 2943 sf – 5 Bedroom, 3 Bathroom, Slab-on Grade - With Basement

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- 1. **Baseline Energy Model:** Each Option / concept has a Baseline Energy Model created for a current code-compliant home in Iowa. As of May 1, 2021 the adopted code in Iowa is the 2012 IECC with amendments.
 - a. 4 ACH 50, Windows U-0.32, 2x6 wall, 16" oc, fiberglass batt, R-49 ventilated attic, slab on grade R-10 perimeter (2' deep), 80 AFUE Gas Furnace (60 kbtu/h capacity), 13 Seer A/C - 2 ton, 0.56 EF gas water heater, RESNET default appliance – gas where applicable, 75% LED's.
- 2. **Option 1, 2, 3 Models:** Conceptually these models modify key components and performance for the 2018 IECC. All other items are unchanged. The items that change from the baseline are:
 - a. 3 ACH 50, Window U-0.3, 2x6 Advanced Framing, Blown Fiberglass cavity-R-22.5 + R-5 CI, slab-on-grade also includes R-5 below slab, Energy Star Appliances – gas included, 100% LED's, ductwork in conditioned space.
- 3. **Option 1.1 Model:** This modeled the Option 1 Scenario with the variation of 2" of insulating sheathing in lieu of 1".
- 4. **Option 1A, 2A, 3A Models:** These models only modify the exterior insulating sheathing thickness and cavity insulation. Cavity insulation is eliminated, 2x4 advanced framing is used, and 4" of rigid insulation is installed outboard of the sheathing.
- 5. **Option 1B, 2B, 3B Models:** These models utilize DOE ZERH Program Criteria. The following items are modified from the "A" options above:
 - a. 2 ACH 50, All-electric home, Air Source Heat Pump (9 HSPF, 16 Seer), balanced ventilation w/recovery, 2.0 EF Heat pump water heater, Energy Star Appliances - all electric.
- 6. **Results:** The results indicate that the "B" scenarios meet the Green Streets and ZERH Program goals and given the modest improvements with 4" of insulating sheathing vs the 1" it appears the 1" or 2" insulating sheathing could be substituted in Options "B".

Energy Performance Criteria			
<i>as of April 2021</i>			
	Iowa Green Streets Criteria Post 11/2020	DOE ZERH	Energy Star 3.1
HERS Index	Less than or equal 56	by calculation	by calculation
Cooling			
Electric Forced-air, central air conditioners	16 SEER	13 SEER	13 SEER
Electric Forced-air, air-source heat pump	16 SEER	13 SEER	15 SEER
Electric Ground-source heat pump	18 EER		
Mini-Split Heat Pump	15 SEER / HSPF 8.5		
Heating			
Natural Gas Forced Air Furn	96 AFUE	94 AFUE	95 AFUE - Energy Star
Electric Forced-air, air-source heat pump	9 HSPF	10 HSPF	9.25 HSPF
Electric Ground-source heat pump	4 COP		
Whole House Ventilation ASHRAE 62.2	Balanced System	1.2 cfm/W heat exchange with 60% SRE	
Water Heating			
Electric	.95EF and Energy Star Qualified	2.0 EF	0.59 EF
Electric Heat Pump	2.0 EF or greater and Energy Star qualified	2.0 EF	
Insulation Values			
Climate Zone 5			
Penetration U-Factor / SHGC	0.30 / Any	0.27 / Any	
Doors	R-5 opaque	R-49	R 3.33 greater than 1/2 glass
Ceiling R-Value	R-49	R-49	R-49
Wood Framed Wall R-Value	R-13 Cavity + R-5 Cont.	R-13 Cavity + R-5 Cont. or R-20	R-15 Cavity + R-5 Cont. or R-20
Basement Wall R-Value	R-15 / R-19 per code	R-15 / R-19 per code	R-15 / R-19 per code
Slab R-Value	R-10 @ 2' depth	R-10 @ 2' depth	R-10 @ 2' depth
Crawl Space	R-15 / R-19 per code	R-15 / R-19 per code	R-15 / R-19 per code
Climate Zone 6			
Penetration U-Factor / SHGC	0.30 / Any	0.27 / Any	
Doors	R-5 opaque		R 3.33 greater than 1/2 glass
Ceiling R-Value	R-49	R-49	R-49
Wood Framed Wall R-Value	R-13 Cavity + R-5 Cont.	R-13 Cavity + R-5 Cont. or R-20 +5 or R-13 +10	R-13 Cavity + R-5 Cont. or R-20 +5 or R-13 +10
Basement Wall R-Value	R-15 / R-19 per code	R-15 / R-19 per code	R-15 / R-19 per code
Slab R-Value	R-10 @ 2' depth	R-10 @ 2' depth	R-10 @ 2' depth
Crawl Space	R-15 / R-19 per code	R-15 / R-19 per code	R-15 / R-19 per code
Infiltration Rates	3.0 ACH50	2.0 ACH50	3.0 ACH50

AIR BARRIER AND INSULATION INSPECTION COMPONENT GUIDE

COMPONENT	CRITERIA
Air barrier and thermal barrier	Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Breaks or joints in the air barrier are filled or repaired. Air-permeable insulation is not used as a sealing material.
Ceiling	Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed.
Walls	Corners and headers are insulated; junction of foundation and sill plate is sealed.
Windows and doors	Space between window/door jambs and framing is sealed. No stuffing of fiberglass insulation is allowed.
Rim joists	Rim joists are insulated and include an air barrier following included reference to best practice example.
Floors (including above-garage cantilevered floors)	Insulation is installed to maintain permanent contact with the area it is insulating. Air barrier is installed at any exposed edge of insulation.
Crawl space walls	Insulation is permanently attached to walls. No poly or vinyl faced insulation. Follow included reference to best practice example. Exposed earth in unvented crawl spaces is covered with Class I vapor barrier with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations, knee walls, and flue shafts opening to exterior or unconditioned spaces are sealed.
Narrow cavities	Batts in narrow cavities are cut to fit, or narrow cavities are filled with sprayed/blown insulation. Narrow cavities are defined as 4 inches wide or less.
Garage separation	Air sealing is provided between the garage and conditioned spaces and door assembly meets fire code.
Recessed lighting	Recessed light fixtures are airtight, ICAT rated, & sealed to drywall. Exception – fixtures in conditioned space. Use LED flush mount lighting instead of recessed fixtures.

COMPONENT	CRITERIA
Plumbing and wiring	Insulation is placed between the exterior wall and the pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring
Shower/tub exterior wall	Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall
Electrical/phone box	Air barrier extends behind boxes or air-sealed-type boxes are installed on exterior walls
Common wall	Air barrier is installed in common wall between dwelling units and air infiltration is treated like an exterior wall. Common walls need to be considered as an exterior wall for air sealing.
HVAC register boots	HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.
Attic Doors & Hatches (from conditioned to unconditioned spaces)	Attic access (except unvented attic), knee-wall door, or drop-down stair is insulated and sealed or in conditioned space. Gasketed/barrier of a minimum of 18" tall/minimum of R-40 rigid foam on scuttle top. Must include fire rated assembly.
Fireplace	Fireplace walls include an air barrier. Wood-burning fireplaces shall have gasketed doors & outdoor combustion air/insulated/blocked & sealed.

Des Moines, Iowa											
Energy Modeling Information Climate Zone 5											
Model	HERS	Heating (kwh/yr)	Cooling (kwh/yr)	Water Heating (kwh/yr)	Lights and Appliances Total (kwh/yr)	Monthly Average (kwh/yr)	% Energy Savings Over Baseline	7kw	8kw	9kw	10kw
Baseline 1	96	3525	1260	4150	6787	21704	1809				
Option 1	80	6360	1026	3810	5627	18928	1400	22.5%			
Option 1.1	79	5920	1026	3810	5627	18388	1365	24.5%			
Option 1A	49	6277	1026	3810	5627	16735	1295	22.9%			
Option 1B	49	3839	615	879	3731	9066	756	58.2%			
Baseline 2	83	14888	1485	5568	7993	29914	2493				
Option 2	70	10652	1377	5099	6862	23390	1949	21.8%			
Option 2A	71	10697	1377	5099	6862	24035	2003	19.7%			
Option 2B	55	6858	879	1390	4857	13884	1157	53.6%			
Option 3	76	19962	1465	5566	8336	34334	2861				
Option 3A	67	14654	1407	5187	8199	29447	2454	14.2%			
Option 3B	67	14566	1407	5187	8199	29359	2447	14.5%			
Option 3C	49	7005	879	1330	6077	15776	1319	54.0%			

Waterloo, Iowa											
Energy Modeling Information Climate Zone 6											
Model	HERS	Heating (kwh/yr)	Cooling (kwh/yr)	Water Heating (kwh/yr)	Lights and Appliances Total (kwh/yr)	Monthly Average (kwh/yr)	% Energy Savings Over Baseline	7kw	8kw	9kw	10kw
Baseline 1	83	12485	967	4396	6759	24607	2051				
Option 1	77	8440	762	4015	5663	18800	1573	23.3%			
Option 1.1	75	7854	762	4015	5663	18294	1525	25.7%			
Option 1A	76	8499	733	4015	5663	18910	1576	23.2%			
Option 1B	50	3303	381	398	4079	10755	896	56.8%			
Baseline 2	83	17086	1485	5801	7975	32329	2694				
Option 2	67	13393	1026	5480	6927	26826	2236	17.0%			
Option 2A	69	14214	1053	5480	6927	27676	2306	14.6%			
Option 2B	55	9671	557	1436	5057	16721	1393	48.3%			
Baseline 3	76	22344	1343	5891	9320	38598	3217				
Option 3	64	19182	1026	5568	8078	34544	2871	10.7%			
Option 3A	64	19636	1026	5568	8078	34308	2859	11.1%			
Option 3B	49	10785	557	1436	6077	18855	1573	51.2%			

Schematic Design Documents

Iowa - High Performance Prototype Home

Iowa Energy Office

Iowa Economic Development Authority

Project No: 20023.00

May 1, 2021

Green Streets

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- 007 Wall sections
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2020 IOWA GREEN STREETS CRITERIA QUICK REFERENCE

This checklist provides an overview of the technical requirements within the Iowa Green Street Criteria.

To achieve Iowa Green Streets Criteria Certification, all projects must achieve compliance with the Criteria mandatory measures applicable to that project type. Additionally, New Construction projects must achieve 40 optional points, Substantial Rehab projects must achieve 35 optional points, and Moderate Rehab projects must also achieve 35 optional points.

Projects proposing to achieve a higher quantity of optional points may be scored more favorably during the application review process. To assist you in evaluating your project, a fillable form is available here: iowaeda.com/userdocs/programs/2020iowagreenstreetscriteriachecklistform.pdf

M = MANDATORY # = OPTIONAL POINTS		
1. INTEGRATIVE DESIGN		
OYES	ON/O	1.1 Integrative Design: Project Priorities Survey Complete the Project Priorities Survey in Appendix K.
OYES	ON/O	1.2 Integrative Design: Charettes and Coordination Meetings Develop an integrative design process that moves the outputs of the Project Priorities Survey into action through a series of collaborative meetings. Prioritize multi-benefit strategies. Assign responsibility within your design and development teams for accountability.
OYES	ON/O	1.3 Integrative Design: Documentation Include Iowa Green Streets Criteria information in your contract documents and construction specifications (Division 1 Section 01 81 13 Sustainable Design Requirements) as necessary for the construction team to understand the requirements and how they will be verified. Ensure, and indicate that the drawings and specifications have been generated to be compliant and meet the certification goals.
OYES	ON/O	1.4 Integrative Design: Construction Management Create, implement, and document your contractor/subcontractor education plan to ensure that all persons working on-site fully understand their role in achieving the project objectives. Include a summary of the Project Priorities Survey (Criterion 1.1), the sustainability goals, and anticipated roles of each party regarding performance expected of the project. Attach and reference this training plan to Division 1 Section 01 81 13 Sustainable Design Requirements. Include timeline estimates for performance testing and verification schedules in the overall construction schedule. As relevant, review requirements for Criteria 8.1, 8.2, and 8.3, and begin populating these documents with relevant information from design and construction.
OYES	ON/O	1.5 Design for Health and Well-Being: Health Action Plan Follow Steps 1-6 of the Health Action Plan framework per the full criterion. (12 points with extra 3 points for Step 7) This includes: 1) Commit to embedding health into the project lifecycle; 2) Partner with a project health professional; 3) Collect and analyze community health data; 4) Engage with community stakeholders to prioritize health data and strategies; 5) Identify strategies to address those health issues; 6) Create an implementation plan; and 7) Create a monitoring plan.

M = MANDATORY # = OPTIONAL POINTS		
OYES	ON/O	10
		1.6 Resilient Communities: Multi-Hazard/Vulnerability Assessment Conduct a four-part assessment (social, physical, functional, strategy) to identify critical risk factors of your property and implement at least two sets of strategies to enable the project to adapt to, and mitigate, climate related or seismic risks. See full criterion for more guidance.
OYES	ON/O	8
		1.7 Resilient Communities: Strengthening Cultural Resilience Integrate community and resident participation in the development processes so that the built environment honors cultural identities, resident voices, and community histories. Option 1: Complete a Cultural Resilience Assessment OR Option 2: Convene a Cultural Advisory Group
OYES	ON/O	M
		1.8 Resilient Structures Mandatory: New residential construction projects without a basement construct a safe room to protect against wind forces and wind debris from events such as a tornado. Optional: New construction projects with a basement and rehab projects construct a safe room to protect against wind forces and wind debris from events such as a tornado.
SUBTOTAL OPTIONAL POINTS		
M = MANDATORY # = OPTIONAL POINTS		
2. LOCATION + NEIGHBORHOOD FABRIC		
OYES	ON/O	M
		2.1 Sensitive Site Protection All projects must: 1. Protect floodplain functions (e.g., storage, habitat, water quality) by limiting new development within the 100-year floodplain of all types of watercourses. 2. Conserve and protect aquatic ecosystems, including wetlands and deepwater habitats, that provide critical ecosystem functions for fish, other wildlife, and people. 3. Protect ecosystem function by avoiding the development of areas that contain habitat for plant and animal species identified as threatened or endangered. 4. Conserve the most productive agricultural soils by protecting prime farmland, unique farmland, and farmland of statewide or local importance. If your site contains any of these ecologically sensitive features, follow the specific Requirements under that subheading.

M = MANDATORY # = OPTIONAL POINTS		
OYES	ON/O	M
		2.2 Connections to Existing Development and Infrastructure Locate the project on a site with access to existing roads, water, sewers, and other infrastructure and within or contiguous to (having at least 25% of the perimeter bordering) existing development. Connect the project to the existing pedestrian network. For sites over 5 acres, provide connections to the adjacent street network at least every 800 feet. Tie all planned bike paths to existing bike paths.
OYES	ON/O	M
		2.3 Compact Development (Mandatory for New Construction) At a minimum, build to the residential density (dwelling units/acre) of the census block group where the project is located. In Rural/Tribal/Small Town locations that do not have zoning requirements: Build to a minimum net density of 5 units per acre for single-family houses; 10 units per acre for multifamily buildings, single and two-story; and 15 units per acre for multifamily buildings greater than two-stories.
OYES	ON/O	5 or 7
		2.4 Compact Development Exceed the residential density (dwelling units/acre) of the census block group in which your project is located. Exceed by 2x for [5 points]; exceed by 3x for [7 points]. In Rural/Tribal/Small Towns that do not have zoning requirements, build to a minimum net density of 7.5 units per acre for single-family houses; 12 units per acre for multifamily buildings, single and two-story; and 20 units per acre for multifamily buildings greater than two stories. [5 points]
OYES	ON/O	M
		2.5 Proximity to Services and Community Resources (Mandatory for New Construction) Locate the project within a 0.5-mile walk distance of at least four, or a 1-mile walk distance of at least seven, of the listed services.
OYES	ON/O	M
		2.6 Preservation of and Access to Open Space for Rural/Tribal/Small Town (Mandatory for New Construction Rural/Tribal/Small Town) Option 1: Locate the project within a 0.25-mile walk distance of dedicated public open space that is a minimum of 0.75 acres; at least 80% of which unpaved. OR Option 2: Set aside a minimum of 10% (minimum of 0.25 acres) of the total project acreage as open and accessible to all residents; at least 80% of which unpaved. 2.7 Preservation of and Access to Open Space Option 1: Locate the project within a 0.25-mile walk distance of dedicated open space that is a minimum of 0.75 acres; at least 80% of which unpaved. OR Option 2: Set aside a percentage of permanent open space for use by all residents; at least 80% of which unpaved. 20% [2 points]; 35% [4 points]; 45% + written statement of preservation/conservation policy [6 points].
OYES	ON/O	6 max

M = MANDATORY # = OPTIONAL POINTS		
OYES	ON/O	M
		2.8 Access to Transit (Mandatory for New Construction projects that do not qualify as Rural/Tribal/Small Town; Optional for all other project types) Mandatory: New Construction, not Rural/Tribal/Small Town Locate projects within a 0.5-mile walk distance of transit services (bus, rail and/or ferry), constituting at least 45 or more transit rides per weekday, with some type of weekend service. Optional: New Construction, not Rural/Tribal/Small Town Locate the project along dedicated bike trails or lanes (Class I, II, or IV) that lead to high-quality transit services (100 trips per day) within 3 miles. [2 points]
		2, 6, 8
		Optional: Rehabilitation, not Rural/Tribal/Small Town Locate projects within a 0.5-mile walk distance of public transit services (bus, rail and/or ferry), constituting at least 45 or more transit rides per weekday, with some type of weekend service. [6 points] Locate the project along dedicated bike trails or lanes (Class I, II, or IV) that lead to high-quality transit services (100 trips per day) within 3 miles. [2 points]
		6
		Optional: New Construction and Rehabilitation, Rural/Tribal/Small Town Locate the project within 0.5 mile walk distance of public transit services with at least 45 rides per weekday and some weekend service. OR, install at least two charging stations for electric vehicles. OR, locate the project with 5 miles of one of the following transit options: 1) vehicle share program; 2) dial-a-ride program; 3) employer vanpool; 4) park-and-ride; 5) public/private regional transportation.
OYES	ON/O	2-8
		2.9 Improving Connectivity to the Community Improve access to community amenities through at least one of the options incentivizing biking mobility or improving access to transit.
OYES	ON/O	5 max
		2.10 Passive Solar Heating/Cooling Design and build with passive solar design, orientation, and shading that meet the guidelines specified.
OYES	ON/O	10
		2.11 Adaptive Reuse of Buildings Rehabilitate and adapt an existing structure. Design the project to adapt, renovate, or reuse at least 50% of the existing structure and envelope.
OYES	ON/O	6
		2.12 Access to Fresh, Local Foods Provide residents and staff with access to fresh, local foods through one of the following options: Option 1: Neighborhood Farms and Gardens Option 2: Community-Supported Agriculture Option 3: Proximity to Farmers Market
OYES	ON/O	8
		2.13 Advanced Certification: Site Planning, Design, and Management Locate building(s) within a community that is certified in LEED for Neighborhood Development, LEED for Cities and Communities, Living Community Challenge, or SITES.

M = MANDATORY # = OPTIONAL POINTS		
OYES	ON/O	2
		2.14 Local Economic Development and Community Wealth Creation Demonstrate that local preference for construction employment and subcontractor hiring was part of your bidding process, and how it functioned during construction. OR Demonstrate that you achieved at least 20% local employment. OR Provide physical space for small business, nonprofits, and/or skills and workforce education.
OYES	ON/O	M
		2.15a Access to Broadband: Broadband Ready (Mandatory for New Construction and Substantial Rehab Projects in Rural/Tribal/Small Town Locations) Incorporate broadband infrastructure so that when broadband service comes to a community, the property can be easily connected. Include a network of mini-ducts or conduit throughout the building, extending from the expected communications access point to each network termination point in the building.
OYES	ON/O	6
		2.15b Access to Broadband: Connectivity (Optional for Rural/Tribal/Small Town) Ensure all units and common spaces in the property have broadband internet access with at least a speed of 25/3 mbs.
SUBTOTAL OPTIONAL POINTS		
M = MANDATORY # = OPTIONAL POINTS		
3. SITE IMPROVEMENTS		
OYES	ON/O	M
		3.1 Environmental Remediation Determine whether there are any hazardous materials present on the site through one of the four methods listed. Mitigate any contaminants found.
OYES	ON/O	M
		3.2 Minimization of Disturbance During Staging and Construction For sites >1 acre, implement EPA's National Pollutant Discharge Elimination System Stormwater Discharges from Construction Activities guidance, or local requirements, whichever is more stringent. For sites with an area ≤1, follow guidance in full criterion.
OYES	ON/O	M
		3.3 Ecosystem Services/Landscape (Mandatory, if providing landscaping) If providing plantings, all must be native or climate-appropriate (adapted) to the region and appropriate to the site's soil and microclimate. Do not introduce any invasive plant species. Plant, seed, or xeriscape all disturbed areas.
OYES	ON/O	M
		3.4 Surface Stormwater Management (Mandatory for New Construction; Mandatory for all Rehab projects if land disturbed is ≥1,000 sq.ft.) Through on-site infiltration, evapotranspiration, and rainwater harvesting, retain the 1.25" rain event on site.

M = MANDATORY # = OPTIONAL POINTS		
OYES	ON/O	10
		3.5 Surface Stormwater Management: Channel Protection Volume (Mandatory to manage 2.5" rain event for Iowa Green Streets Certification Plus) Through on-site infiltration, evapotranspiration, and rainwater harvesting, retain the 1.25" rain event on site (rehab projects) or 2.5" rain event on site (new construction or projects disturbing ≥ 1,000 square feet).
OYES	ON/O	M
		3.6 Efficient Irrigation and Water Reuse (Mandatory, if permanent irrigation is utilized) At least 50% of the site's irrigation satisfied by water use from the sources listed. If irrigation is utilized, install an efficient irrigation system per the requirements listed.
OYES	ON/O	6
		3.7 Efficient Irrigation and Water Reuse (for systems grandfathered-in in 3.6) At least 50% of the site's irrigation satisfied by water use from the sources listed.
SUBTOTAL OPTIONAL POINTS		
M = MANDATORY # = OPTIONAL POINTS		
4. WATER CONSERVATION		
OYES	ON/O	M
		4.1 Water-Conserving Fixtures Install water-conserving fixtures meeting the specifications in the criterion. For all single-family homes and all dwelling units in buildings three stories or fewer, the static service pressure must not exceed 60 psi.
OYES	ON/O	6 max
		4.2 Advanced Water Conservation (Mandatory for Iowa Green Streets Certification Plus) Reduce total indoor water consumption by at least 30% compared to baseline indoor water consumption chart. Any new toilet, showerhead, and/or lavatory faucet must be WaterSense certified.
OYES	ON/O	M / 3
		4.3 Water Quality Mandatory/Optional: Mandatory for Substantial Rehabs of buildings built before 1986; Optional for all other building types: Replace lead service lines. [3 points]
		M
		Mandatory: For multifamily buildings with either a cooling tower, a centralized hot water system, or 10+ stories: Develop a Legionella water management program.
		8
		Optional: Test and remediate as indicated for lead, nitrates, arsenic, and coliform bacteria.

Schematic Design Documents

Iowa - High Performance Prototype Home

Iowa Energy Office
Iowa Economic Development Authority

Project No: 20223.00

May 1, 2021

Green Streets Checklist

012



Table with 4 columns: YES, ONQ, O/MAYBE, #. Rows include 4.4 Monitoring Water Consumption and Leaks, 4.5 Efficient Plumbing Layout and Design, 4.6 Non-Potable Water Reuse, 4.7 Access to Potable Water During Emergencies, and 5. OPERATING EFFICIENCY with sub-rows 5.1, 5.1a, and 5.1b.



Table with 4 columns: YES, ONQ, O/MAYBE, #. Rows include 5.1c Building Performance Standard, 5.1d Building Performance Standard, 5.2a Moving to Zero Energy: Additional Reductions in Energy Use, 5.2b Moving to Zero Energy: Near Zero Certification, 5.3a Moving to Zero Energy: Photovoltaic/Solar Hot Water Ready, and 5.3b Moving to Zero Energy: Renewable Energy.



Table with 4 columns: YES, ONQ, O/MAYBE, #. Rows include 5.4 Achieving Zero Energy, 5.5a Moving to Zero Carbon: All-Electric Ready, 5.5b Moving to Zero Carbon: All Electric, 5.6 Sizing of Heating and Cooling Equipment, 5.7 ENERGY STAR Appliances, 5.8 Lighting, and 5.9 Resilient Energy Systems: Floodproofing.



Table with 4 columns: YES, ONQ, O/MAYBE, #. Rows include 5.10 Resilient Energy Systems: Critical Loads, 5.11 Electric Vehicle Charging, 5.12 Advanced Framing and Resilient Design, 6. MATERIALS with sub-rows 6.1, 6.2, and 6.3, and 6.4 Healthier Material Selection.



Table with 4 columns: YES, ONQ, O/MAYBE, #. Rows include 6.4 Healthier Material Selection, 6.5 Environmentally Responsible Material Selection, 6.6 Bath, Kitchen, Laundry Surfaces, 6.7 Regional Materials, 6.8 Managing Moisture: Foundations, 6.9 Managing Moisture: Roofing and Wall Systems, 6.10 Construction Waste Management, and 6.11 Recycling Storage.



Table with 4 columns: YES, ONQ, O/MAYBE, #. Rows include 7. HEALTHY LIVING ENVIRONMENT with sub-rows 7.1 Radon Mitigation, 7.2 Reduce Lead Hazards, 7.3 Combustion Equipment, 7.4 Garage Isolation, 7.5 Integrated Pest Management, 7.6 Smoke-Free Policy, and 7.7 Green Streets / energy.

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Table with 2 columns: Date, Description. Multiple empty rows for notes or schedule.

Green Streets Checklist

