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RESIDENTIAL NEW CONSTRUCTION PLAN REVIEW CHECKLIST

This list is provided as a guide to help you understand the information that must be contained on the construction drawings. This list is not all-inclusive of all building codes but is used as a general guide for plan review. Please address the following items marked with an "X" in the box and submit needed revisions. **Show all revisions with a cloud.**

General

☐ All construction documents shall be submitted in triplicate

☐ All drawings shall be completely dimensioned

☐ Drawn to scale not less than 1/8" = 1'0"

☐ Drawings must be clear and legible

☐ Drawing shall be prepared on sheet paper size no larger than 24" x 36".

☐ Complete scope of work must be clearly identified for all phases of construction, indicating compliance with 2015 Michigan Residential Code.

☐ Architect or Engineer Certification is required for buildings 3500 square feet or larger.

☐ Structural Certification may be required depending on the project's complexity.

☐ All construction sites are required to be maintained in a safe condition and to be protected from unauthorized entry. All excavations exceeding 24 inches in depth, such as for basements, crawl spaces, pools and spas must be secured through the use of a 4' high fence. Construction type fencing will be allowed for a period not to exceed 30 days. At such time, should the permitted work still physically be unable to be protected and secured, a chain link fence is required to be installed and must remain in place until its removal has been authorized by the Building Official. **2015 MRC-R104.1 & 2012 MBC-Chapter 33.**

☐ Soil Boring / Soil Capacity test is required **R401.4**

Grading Plans

Required for all new construction sites proposed for development and for any major grade change. See the Grading Plan Review Checklist for additional information. Note: Grading plan and architectural proposed elevation must match.

Building Height: The vertical distance from the **grade plane** (based upon existing grade) to the highest point of the flat roof or mansard roof and to have the average height between eaves and ridge for a gable, hip and gambrel roof; and 75 percent of the height of an "A" frame.

Grade: A reference plane representing the ground level adjoining a building or structure.

Grade, Existing: The elevation or surface of the ground or pavement as it exists prior to disturbance. This includes both the "natural" grade, where no man-made disturbances have impacted a building site, as well as the existing grade as established by existing buildings, structures and/or pavement.

Grade, Finished: The final elevation of the ground surface after development.

Grade Plane: A reference plane representing the average of the existing grades or ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than six (6) feet from the building, between the building a point six (6) feet from the building.

The ground areas outside walls of any building or structure hereafter erected, altered, or moved shall be so designed that the surface water shall flow away from the building walls in such a direction and with such a method of collection so as not to cause or create a nuisance to adjacent properties or public nuisance detrimental to the general health, safety or welfare of the community. Where property is developed adjacent to previously developed existing properties, existing grades of adjacent properties shall have priority over any proposed grade changes. Any property owner/developer who intends to add fill above the height of the existing contiguous grades shall demonstrate to the Building Official's satisfaction, that additional fill is not detrimental to surrounding properties in terms of compatibility and drainage issues. Grades around houses or structures shall meet existing grades in the shortest possible distance, as determined by the Building Official, but under no circumstances shall exceed 1:4 slopes or twenty-five percent (25%) grades.

Foundation Plan

- ☐ Foundation type showing width and depth, also indicating lead walls where needed, joining dowels and socked perimeter drain tile. **R401**
- ☐ Footing and column support pad with layout.
- ☐ Beam size and column spacing.
- ☐ Size of support for all bearing walls and point loads above.
- ☐ Framing at stair, fireplace, cantilevers, etc.
- ☐ Floor joist direction, size, spacing and span **R502**
- ☐ Basement floor thickness, vapor barrier and 4" stone base. **R506**
- ☐ Walkout and/or daylight wall areas with type and size of construction.
- ☐ Crawl space size and location.
- ☐ Show ground water control indicating gravity discharge or sump pump location. **R405**
- ☐ Mechanical equipment location indicating high efficiency or not and required floor drain. **M1411.3**
- ☐ Concrete-encased electrodes are to be identified on the plans. **E3607**
- ☐ Provide location of water and sewer service lines - they must have 10 feet of separation per City Engineering Design Standards.
- ☐ Water service lines should be installed no closer than 5 horizontal feet from driveways, structures, trees, related obstructions, or private parallel utility lines.

Floor Plans

- ☐ Basement, Attic Storage, Bonus Room, 1st and 2nd Floor
- ☐ Intended use of each room or space
- ☐ Floor joist direction, size, spacing and span. **R502**
- ☐ Roof framing direction, size, spacing and span. **R802**
- ☐ Size and location of all support for bearing walls and concentrated loads.
- ☐ Stairway locations with direction arrow and number of risers. **R311.7.4.1**
- ☐ Location of all required smoke detectors. **R314**
- ☐ Location of all required carbon monoxide alarms. **R315**
- ☐ Layout of kitchen, bath, laundry.
- ☐ Show all required access openings, calling out sizes. **R807/R408.4**
- ☐ Basements, habitable attics and every sleeping room shall have not less than one operable window or exterior door approved for emergency egress escape and rescue clearly shown on drawings. Basements with areas of habitable space and areas of sleeping rooms shall also meet emergency egress requirements. **R310**

Garage

- ☐ Floor thickness. **R506**
- ☐ 4 inch compacted sand base/vapor barrier.
- ☐ Over-dig slab support.
- ☐ Slab thickness and slope direction arrow. **R309.1**

Roof Framing

- ☐ Identify the location, direction, size, spacing and span of all roof and ceiling frame members. **R802**
- ☐ Identify all concentrated load points from ends of hip and valley rafters, ceiling joists, rafters, trusses, girder trusses, beams.
- ☐ Identify roof pitch for all portions of the roof and sloped ceilings.

Building/Wall Section Details

Depending on the complexity of your project, more sections or details may be required.

- ☐ Footing and basement wall size, type and heights. **R401**
- ☐ Foundation wall damp proofing**, R406.1** waterproofing, pea stone, 4 inch sock drain tile or fabric material over stone bed. **R405**
- ☐ Finish grade elevation. **R404.1.6**
- ☐ Sill seal and treated sill plate. **R317.1**
- ☐ Anchor bolt size and spacing. **R403.1.6**
- ☐ Floor joist and sub-floor framing size, type.
- ☐ Wall framing size, type, spacing and height including header sizes. **R602.7**
- ☐ Insulation R-Values for bond, wall, ceiling locations, floors over unconditioned spaces and under slab where required.
- ☐ Interior finish drywall size and type including garage walls and ceiling. **R302.6 / R702**
- ☐ Exterior sheathing size and type including house wrap. **R703.2**
- ☐ Indicate fire stopping and sealing per 2015 MRC. **R602.8**
- ☐ Roof construction details, size and type of sheathing, felt paper, ice and water shield, shingles, drip edge. **R905 / R802**
- ☐ Location, size, type, amount of attic ventilation, to shown and proven with calculation. Also crawl space ventilation. **R408 & R806**
- ☐ Brick veneer, size, type, weather-resistive barrier, brick wall ties, flashing, and weep holes 33 inches on center. **R703**

2015 Michigan Residential Code Chapter 11

☐ Provide documentation showing compliance 2015 MRC with Chapter 11.

☐ Energy star requires: Thermal Bypass Checklist and energy seal 1 at rough frame inspection; certification required with insulation certification. All homes require an approved air infiltration certification prior to the rough frame inspection and a second certification after the drywall installation to be submitted prior to scheduling the final building inspection. Blower door and duct blaster listing completed and approved prior to final building inspection.

☐ Upon final inspection, certification to be provided as outlined. Chapter 11

☐ Fireplace doors to comply with Chapter 11

Stair Details

☐ Stinger size and quantity. **R311.5**

☐ Tread width **R311.7.5**

☐ Riser material and height. **R311.7.5**

☐ Handrail detail. **R311.7.8**

☐ Baluster and guardrail detail for all stairways, calling out material and spacing. **R312**

☐ Under stair protection **R302.7**

Window/Door Schedule

☐ Sizes **R308**

☐ Locations

☐ Type and fire rating of door separating garage and house. **R302.5.1**

☐ Egress windows labeled, also call out size of window well if needed. **R310**

☐ Safety or tempered glazing in required areas must be labeled. **R308**

☐ Window sill height **R312**

Masonry Fireplace Detail

☐ Footing

☐ Flue size and material

☐ Hearth depth, width and means of support **R1001.9**

☐ Hearth extension, size **R1001.10**

☐ Call out type of fireplace to be installed, masonry/insert/prefab gas log unit.

☐ Material used for chimney chase. **R1003**

☐ Height of chimney above roofline. **R1003.9**

☐ Fireplace doors to comply with **MUEC 402.4.3**

Building Elevations

- ☐ Front, sides and rear elevation showing all retaining walls
- ☐ Façade material, window and door locations.
- ☐ Existing and proposed grade elevations that matches proposed elevations on site plan, also include building height calculations, **as shown on sample A**.
- ☐ Floor elevations.

Story: The portion of the building included between the upper surface of any floor, and the upper surface of any floor above; or any portion of a building between the topmost floor and the roof having a usable floor area of at least 50 percent of the usable floor area of the floor immediately below it. A top floor area under a sloping roof with less than 50 percent of the usable floor area is a half story. The first story shall be considered the lowest story of a building as determined by the illustration. **Sample A.**

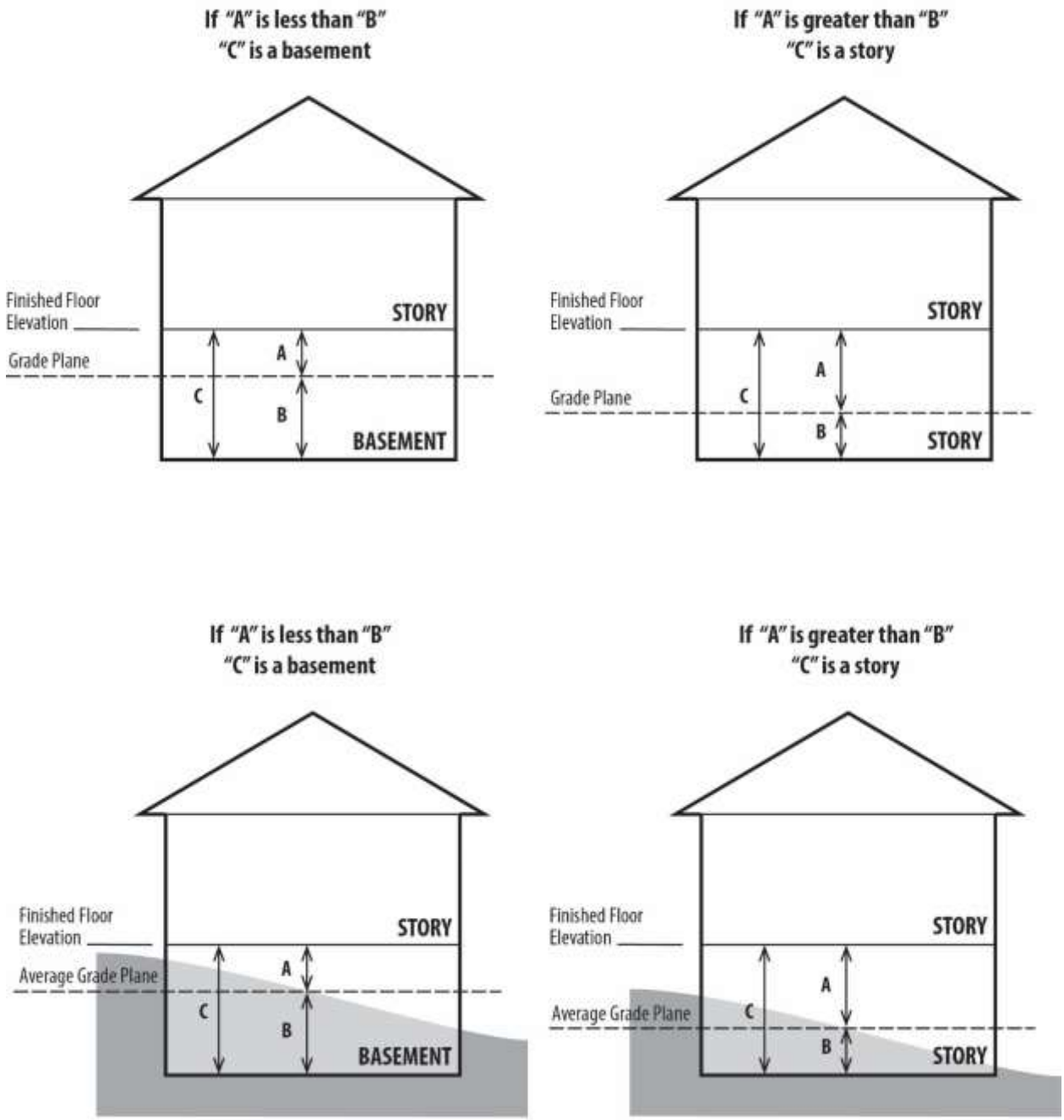
A separate permit is required for all ground-mounted mechanicals.

Please note revisions to construction documents shall be clouded, data and resubmitted in full sets

RW = Retaining Wall **NS = Not shown** **ZBA = Zoning Board of Appeals** **NI = Not Indicated**

* **Sample A -** Finished First Floor Elevation

BASEMENT AND STORY



Ordinance

- ☐ Provide subdivision association comments on site plan and elevation of plans presented to City of Walled Lake for plan review, with all dates corresponding to current set.
- ☐ Dimensions of property lines are inaccurate provide revisions.
- ☐ Provide a full dimensioned engineered site plan
- ☐ Construction/foundation plan must agree.
- ☐ Proposed floor plan has not met the intent of the ordinance.
- ☐ Provide existing elevations for proposed addition.
- ☐ Proposed does not meet minimum floor area per unit required by ordinance.
- ☐ Provide dimension from lot to proposed building.
- ☐ Provide average lake front setbacks.
- ☐ Provide average front yard setbacks for the proposed block along proposed street side only.
- ☐ Architectural projections(s) exceed maximum projection into required yard.
- ☐ A common roofline is required.

The following requires possible approval from the Zoning Board of Appeals:

- ☐ Encroachment(s): Required yard, lakefront, natural feature.
- ☐ Insufficient lot square footage
- ☐ Retaining walls
- ☐ Insufficient lot frontage
- ☐ Proposed exceeds the maximum 30 percent lot coverage
- ☐ Height of proposed exceeds the 30-foot allowed
- ☐ Provide top and bottom wall elevations with cross section detail of the proposed wall construction identifying material type and dimensions to scale.
- ☐ Accessory Use.
- ☐ Accessory structure: Ground mounted mechanical or electrical equipment (AC and Generators)
- ☐ Second Dwelling
- ☐ Open, unenclosed paved terrace may project into a front yard for a distance not exceeding 10 feet.
- ☐ Natural feature issues.
- ☐ Future compliance issues.

BUILDING INSPECTION LIST

Notice – Inspections are permit specific and are dependent on the scope of the work. This is a partial list of possible required inspections. It is the responsibility of the permit holder to ensure that all work is inspected prior to covering. This list is to be used as a guide.

1 Site inspection
2 Sanitary sewer tap*
3 Storm sewer*
4 Water service*
5 Open trench (basement)
6 Open Rail
7 Foundation/basement walls & drains – before backfill & requires Foundation Certificate
8 Open trench (i.e. garage, porch, post holes for decks)
9 Underground & rough plumbing & shower pan*
10 Underground heating (before sand inspection)
11 In-floor radiant heat (after sand inspection & before concrete pour)
12 Rough HVAC
13 Rough pre-fab fireplace
14 Underground electric
15 Rough electric
16 Rough fire alarm
17 Rough fire suppression (Any associated required tests and inspections)
18 Gas pressure test
19 Brick flashing inspection (can be at time of rough frame)
20 Sheathing (can be at time of rough frame)
21 Rough Frame (includes deck frame as required)
22 Compaction inspection (basement, garage, porch. Not exterior slabs on grade)
23 Deck ledger flashing (called at various times)
24 Insulation (Certification Required)
25 Damper
26 Final plumbing
27 Final HVAC
28 Final pre-fab fireplace
29 Final gas line
30 Final electrical
31 Final Grade (requires final grade certificate)
32 Final fire alarm
33 Final fire suppression (any associated required test and inspections)
34 Final building
35 Change of Occupancy:
A. Plumbing B. HVAC C. Electric D. Building
36 Backflow preventor (irrigation systems)
37. Steel (pools)
38. Light niche (pools)
39. Sidewalk (signs)

BUILDING INSPECTION LIST

*Separate permits are required for Electrical, Plumbing, Irrigation, Heat & A/C, Water/Sewer installation and Generators.

24 HOUR NOTICE REQUIRED FOR INSPECTION

All inspections must be scheduled by 3:00 PM at least one working day prior to the requested inspection date. Any inspections performed outside the normal office time may be charged special inspection fees at one and one-half times the standard inspection rate.

Do not ask for an inspection request unless the job is ready, otherwise a re-inspection fee may be required. Partial inspection will be an additional fee also. Re-inspection fee(s) must be paid before a re-inspection can be scheduled. Contractor MUST have the permit number and a job address to schedule an inspection. Inspection times may not be requested due to time constraints.

All disciplines (Electrical, Plumbing and Mechanical) permits must be inspected and approved PRIOR to scheduling the rough frame and final building inspections.

One set of approved plans must be at the job site at all times. The inspector may not inspect work if the plans are not available.

Final Building inspection approval DOES NOT grant permission to occupy space. All building permits require a Certificate of Occupancy to be issued PRIOR to moving in.

GRADING PLAN REVIEW CHECKLIST

This list is provided as a guide to help you understand the information that must be contained in the grading plan. This list is not all inclusive of all building codes but is used as a general guide for plan review. Please address the following items marked with an "X". These comments should be given to the State Licensed Civil Engineer or Surveyor to make correct revisions to your plans.

GENERAL

☐ Grading plans shall be submitted in triplicate to the Building Division for review.

☐ Plans shall be prepared neatly and accurately on a minimum 24"x36" or 18"x24" sheet paper.

☐ Plans shall be prepared, signed and sealed by a Civil Engineer or Surveyor registered in the State of Michigan. They shall also be dated current to the year prepared for building permit submittal, not to exceed one (1) year.

☐ A tree preservation survey is required to be included on the site plan as required by City Zoning Ordinance.

☐ Legal description of the property and a statement affirming that the property has been surveyed and boundary corners of the property have been marked by placing permanent points at each corner of the property.

☐ North point compass.

☐ Drawn to scale of not less than 1" = 30'.

☐ Exact dimensions of the property including bearings and distances as described in the legal description.

☐ Proper relation of the subject property with all abutting property lines.

☐ Street names and property addresses. **(Lot number is insufficient)**

☐ Location of the proposed building shall be clearly shown and shall include tie dimensions to the front, side and rear property lines.

☐ Outline footprint of all existing on-site features (i.e. accessory structures, buildings, driveways, fences, retaining walls, etc.). Existing developed sites proposed for demolition may be required to be cleared of all existing features. Intent of each feature shall be identified and clearly noted, "To be demolished and removed from the site" or "To remain on site without change". Each feature will be reviewed for ordinance conformity. Zoning Board of Appeals approval may be required to retain existing on-site features.

☐ Setback dimensions for building envelope as per City Ordinance.

GRADING PLAN REVIEW CHECKLIST

ELEVATIONS

- ☐ Proposed finished first floor elevations shall not exceed the average finished first floor elevations taken from the immediate adjacent homes to the proposed site for development. Both sides if available.
- ☐ Proposed brick ledge (PBL) elevations shall not exceed the average existing brick ledge (EBL) elevations taken from the immediate adjacent homes to the proposed site for development.
- ☐ Grading plan shall clearly identify extent of all proposed grade changes in relation to the existing established grade elevations and adjacent properties.
- ☐ Proposed grade cut to allow for a “forced” walk-out basement, shall be properly designed and detailed to control its surface runoff by means of an independent drainage system separate from the building foundation drainage system. Independent mechanical sump pump or gravity system shall discharge into an approved location.
- ☐ Forced walkouts and/or daylight basements proposed for development will be reviewed individually to determine feasibility. Total cubic yards of soil proposed for cut and/or fill shall be shown on the proposed grading plan with section detail identifying top and bottom elevations and slope.
- ☐ Location of retaining walls with top and bottom elevations. Provide section detail of the proposed wall construction identifying material type and dimensions drawn to scale.
- ☐ Elevations shall be based on U.S.G.S. datum. Benchmark locations for the work shall be indicated on the plan with its proper elevation.
- ☐ Existing grade elevations shall be shown as 50 foot on center pegged elevations across the entire property and not less than 50 feet outside the perimeter of the property lines.
- ☐ Proposed grade elevations shall be shown as 2 foot on center contour lines across the entire property. The proposed shall overlay the existing elevations.
- ☐ Proposed brick ledge elevations (PBL) shall be shown around the entire foundation perimeter footprint and at points of building corners.
- ☐ Existing brick ledge elevations (EBL) shall be shown at corners of each existing principle building on adjacent properties to the site of proposed development.
- ☐ Proposed finished floor elevations shall be identified (Finished first floor, finished basement floor and finished garage floor).
- ☐ Existing finish floor elevations of the existing principal building on site proposed to be demolished shall be shown.
- ☐ Existing finish floor elevations of each principle building on adjacent properties to the site proposed for development.
- ☐ Proposed foundation perimeter footprint dimensions properly corresponding with the proposed building foundation plan.

GRADING PLAN REVIEW CHECKLIST

DRAINAGE

- ☐ In no way shall surface runoff be directed so as to adversely impact adjacent properties with a flooding condition. The grading plan should continue as far as a storm sewer outlet or other natural outlet point of discharge to assure proper control of surface runoff. Surface runoff shall be diverted to a storm sewer or other approved point of collection so as not to create a flooding condition.
- ☐ Swales, ditches, drainage easements, catch basins, pipes and/or other points to which surface runoff is to be directed and controlled. Centerline elevations, drainage direction arrows, pipe sizes with invert elevations shall be clearly identified.
- ☐ Lots shall be graded so as to direct surface runoff away from foundation walls. The grade away from foundation walls shall fall a minimum of 6 inches within the first 10 feet. Where lot lines, walls, slopes or other physical barriers prohibit 6 inches of fall within 10 feet, drains or swales shall be provided to ensure drainage away from the structure.
- ☐ Driveway perimeter edge elevations shall show proper control of surface runoff protecting the building foundation and the adjacent properties from flooding. Driveways that are proposed to extend to a property line edge shall be designed so as to control runoff by means of a minimum 6 inch high curb with gutter, a driveway centerline swale or catch basin structured designed with a minimum 2 foot sump and pipe to direct runoff into an approved discharge location.
- ☐ Sump pump and roof gutter downspout discharge locations. Maintain a minimum distance of 3 feet away from the building foundation and 20 feet away from a property line. Discharge shall be directed into an approved location (i.e. swale, pipe ditch line and/or storm sewer if available).

UTILITIES

- ☐ Location and sizes of all existing and/or proposed utilities underground and overhead including manholes, hydrants, water, sewer, storm, electric, gas, etc.
- ☐ Location and sizes of water and sewer connections into building foundation.
- ☐ Location and sizes of existing and/or proposed septic system and/or well.
- ☐ Location and widths of all existing and/or proposed rights-of-way and/or easements and all abutting streets and alleys
- ☐ For single-family residential districts, ground mounted mechanical or electrical equipment shall be permitted in any rear yard when placed immediately adjacent to the residential building. The equipment shall not be located in the required side yard setback. Screen walls, other than vegetative screen walls, shall not be located in the required side yard setback as measured from the side lot line. It is understood that separate permits are required and to be obtained by others.

GRADING PLAN REVIEW CHECKLIST

NATURAL FEATURES

- ☐ Existing natural features such as, watercourses, river, lake or stream, high waters edge elevation, wetland edge and flood plain base elevation shall be identified on the site plan. All natural features shall be protected, identify on the site plan and denoting in the field the "Area of No Disturbance" including installation of a silt fence and establishment of a minimum 25-foot buffer zone. Flood plain base elevation, Natural Features and wetland edges shall be flagged on site for site inspection.

- ☐ Water front properties proposed for development shall be prepared by and bear the signature and seal of the registered professional. Dimensions shall be taken from the closest point between the water's edge and the furthest projection of the principle building. All dimensions and calculations shall be shown.

SOIL EROSION

- ☐ Silt fence location, installation details and timing sequence of re-establishment of permanent vegetation.

- ☐ Temporary gravel driveways shall be a minimum 16' X 40' area of crushed concrete; location must be indicated on site plan. Access to the building site shall be large enough to accommodate for all construction traffic. Site access shall be maintained throughout all construction phases, also a copy of Oakland County Road Commission driveway permit.

- ☐ You must obtain and supply a City of Walled Lake Soil Erosion Permit and show silt fence location around the entire perimeter of proposed areas of soil disturbance.

Note: A pre-site inspection is required before your permit can be issued.

PLEASE BE ADVISED

The following sealed and signed documents will be required as noted:

- Prior to Backfill Inspection (or Sand Inspection for slab-on-grade) – *Foundation Certification* identifying the location of the building on the property, as well as elevations for brick ledges, top of footing, and if applicable, top of foundation wall.

- Prior to Final Grade Inspection – *Grade Certification* identifying as-built grade elevations at all locations cited on the approved site plan.

- Prior to Final Building Inspection – *Landscape Certification* stating that all required landscaping has been installed in accordance with the approved landscape plan and/or Zoning Board of Appeals resolution.

RESIDENTIAL
Building Permit Application Guide

2015 Michigan Residential Code

This Guide is for design professionals, builders, plan reviewers and building inspectors. Its intent is to promote consistency in the preparation and review of construction documents, streamline the approval process, and foster code-compliant construction.

The Guide itemizes the most typical building code requirements necessary for the issuance of a building permit, cross-referenced to the 2015 Michigan Residential Code. Not every item in the Guide applies to all projects, the Building Official may request additional information.

Used during the design and documentation process, the Guide can identify which code stipulations must show on the construction documents, as well as those outside the scope of the work. Attendant code-section numbers provide quick access to the applicable MRC paragraph or table.

The Guide may be submitted as part of the building permit application by filling out the top portion. Submitting a project-specific list will allow the plan reviewer a fast understanding of the proposed work, speed up the review process and result in fewer questions and permit denials

DATE SUBMITTED
PROJECT NAME
PROJECT ADDRESS
JOB NUMBER/TRACKING NUMBER
CHECKLIST COMPLETED BY
REPRESENTING

BUILDING PERMIT APPLICATION DATA

Contact the local building department for the required number of sets and/or additional information.

Applicable/ Provided	Not Applicable		
		Contact Information: Name, address, business phone, cell phone, Email - R105.3	
		Michigan license number of builder - PA230 125.1510(2)	
		Use and occupancy of proposed work - R105.3; 3	
		Legal description of property - R105.3; 2	
		Subdivision and lot number - R105.3; 2	
		Certified topographical survey - R105.3; 7	
		Soils report from an approved agency - R401.4	
		Zoning approval - R106.1.1	
		Flood elevation and lowest floor elevation if work is in a flood area - R106.1.3	
		Gross square footage/net square footage of project - R109.16.1	
		Project calculated area is in excess of 3,500 sq. ft. - R106.1	
			Name and license number of registered design professional
			Address and phone number of registered design professional
			Original signature of registered design professional, seal and date
		Identify work using engineered solutions in lieu of prescriptive standards - R301.1.3	
			Name and license number of registered design professional
			Original signature of registered design professional, seal and date
			Submit engineering calculations
		Identify special inspections - R106.1	
		Construction documents - Drawings and Specifications	
Applicable/ Provided	Not Applicable		
		Site plan with north arrow - R106.1; 106.2; 401.3; 403.3.3	
			Structures and existing site improvements to be demolished
			Proposed new structures and existing structures and improvements to remain
			Front, rear and side dimensions from all structures to property lines
			Proposed new site grades; existing site grades
			Finished grade planes at exterior walls
			Location of sewers, septic, water supply, wells, gas lines and electrical service
			Location of decks
			Easements, wet lands
			Natural features of site
			Retaining walls, embankments
		Floor and basement plans	
			Mininum footing sizes - R403.1
			Walls, partitions, size and type of columns, beams, all dimensioned - R106.1.1
			Materials, thicknesses, R-values for roof and wall insulation - R408.31063
			Materials, R-values for crawl space, under-slab insulation - N1102.2.7
			Foundation drainage system and connection to sewer - R405.1
			Crawl space ventilated - R408.1
			Combustion air for furnace room, boiler room - M1701.1
			Finish grade at exterior walls - R403.3.3
			Exterior platform(s) at egress door(s) - R311.3
			Fire separation(s) - R302.1
			Decks - R507.1
		Stairs	
			Rise, run, floor opening(s) head clearance clearly dimensioned - R311.7
			Treads, risers and winders dimensioned - R311.7.5
			Landings dimensioned - R311.7.6
			Ramps dimensioned - R311.8
			Handrails - R311.7.8
			Guardrails - R312.1
			Illumination - R303.7; 303.8
		Roof plan	

			Roofing materials, roof slopes - Table R905.1.1(1)			73
			Insulation: material, thickness, R-value - R408.31063a			74
			Flashing - R903.2			75
			Cants, saddles, crickets - R903.2.2			76
			Ventilation - R806.1			77
			Drainage - R801.3			78
		Attic				79
			Attic Loads - Table R301.5			80
			Egress window, dimensions and height off floor - R310.1			81
			Limited storage in attic, not habitable - Table R310.5			82
			No storage in attic, not habitable - R301.5			83
			Access - R807.1			84
		Elevations, north, south, east and west - R106.1.1				85
			Windows, doors and exterior materials clearly noted			86
			Maximum building height			87
						88
Applicable/ Provided	Not Applicable					89
						90
			Interior finishes			91
			Ceiling heights			92
		Structural				93
			Braced wall lines shown on plans - R106.1.3			94
				Bracing method		95
				Location and length of panels		96
				Attachmet at sill		97
				Attachment at head		98
			Footing material, depth, width, reinforcement - R403.1			99
			Foundation wall material, thickness, reinforcement - R402			100
			Foundation pads, material, size, reinforcement - Table R403.1.1			101
			Basement floor, concrete thickness and reinforcing - R506			102
			Wall anchorage to foundation - R403.1.6			103
			Wall anchorage to roof - R602.10.6.2			104
			Tensile strength of lumber, lumber species, pressure treating - Table R502.3.1(1)			105
			Size and spacing of roof framing, bracing, roof/wall connectors - Table R802			106
			Material and thickness of wall and roof sheathing - R503.2.1(1)			107
			Columns: Dimensions, size, material, connections -R407			108
			Floor framing: Joist size, spacing, blocking, bridging, subfloor - R502			109
			Wall stud spacing, sizes, materials, bracing - R602			110
			Performance data for exterior doors, windows - R612.1			111
			Indicate fire blocking, stopping -R302.11			112
			Trusses: Layout and bracing; erection bracing - R502.11			113
				Truss design by Mich. Registered Design Professional - R106.1.4		114
			Precast concrete certified by Mich. registered design professional - R106.1			115
		Energy Efficiency				116
			Information on the construction documents - N1101.8			117
				Insulation materials and R-values		118
				Fenestration U-factors		119
				Area-weighted U-factor and SHGC calculations		120
				Mechanical system design criteris		121
				Mechanical, waterheating system, equipment types, sizes, efficiencies		122
				Economizer description		123
				Equipment and system controls		124
				Motor horsepowers and controls		125
				Duct sealing, duct and pipe insulation, locations		126
				Light fixture schedule and wattages		127
				Air sealing details		128
			Exposed foundation insulation protected - N1103.13.1			129
			Eave baffels provided - N1102.2.3			130
			Slab-on-grade insulation - N1102.2.9			131
			Duct, air handlers, filter boxes sealed - N1103.2.2			132
			Heating, cooling equipment sized per ACCA Manuals S and J - N1105.3			133
			Annual energy cost meets Standard Referenced Design - N1105.3			134
			Compliance report - N1106.6.2			135
		Building Details				136
			Typical wall section			137
			Roof to wall connection			138
			Gable end wall bracing			139
Applicable/ Provided	Not Applicable					140
						141
			Draftstopping, fire blocking			142
			Vapor barrier: Roof, walls, under slabs			143
			Flashing			144
				Window heads, sills		145
				Door heads		146
				Roof to walls		147
				Wall bases		148
				Under sill plate		149
				Thru-wall poenings		150
				Chimney		151
			Fireplaces: Cross section, materials, dimensions			152
				Factory-built fireplaces conform to UL 127		153
			Exterior deck anchorage to house, diagonal bracing			154
		Plumbing - R306.1; 307.1				155
			Show sinks, tubs lavs, water closets, hose bibs, floor drains			156
		Heating-Cooling				157

			System is less than 375,000BTU	158
			Show furnaces / boilers, thermostats	159
			System is less than 400 amps and 3,500 sf	160
			Ground fault interruptors	161
			Carbon monoxide detectors	162
			Smoke detectors	163
			Arc-fault circuit interuptors	164
		Products, equipment		165
			Site address - R319.1	166
			Emergency escape weindows - R310.1	167
			Windows fall prevention devices - R312.2	168
			Window product rating - N1101.12.3; Table N1102.1.1	169
		Signatures		170
		Original signature of the applicant or applicant's authorized agent - R105.3; 6		171
			Original signature(s) of registered design professional(s) including seal(s) and date(s)	172

Sec. 86-27. - Tree survey and superimposed tree survey guidelines.

(a) The purpose of the tree survey is to locate trees on site. The purpose of the superimposed tree survey is to evaluate the impact of development on the trees on site.

(b) The tree survey shall be in a form acceptable to the department and shall bear the following information and details:

(1) Minimum scale of one inch equals 50 feet. The scale shall be the same as the site plans.

(2) The shape and dimensions of the lot or parcel.

(3) The location of existing structures.

(4) The existing grade at the base of each tree shall be indicated on the tree survey using contour lines at two-foot intervals or spot grades.

(5) All trees shall be tagged in the field with identifying numbers, using non-corrosive metal tags and shown on the plan with the corresponding number, including trees within 25 feet of property lines and trees affected by road improvements and/or off-site utility work.

(6) The tree survey shall include a list of all trees on site with their corresponding tree inventory number and disposition. Indicate common name, botanical name, size, and condition. If this list is too extensive to fit on the plan and is in a separate book, a note indicating so shall be included on the plan.

(7) Tree surveys are to be performed by actual field survey by a registered land surveyor and verified on site by a registered arborist or forester. Both professionals must verify the contents by seal or signature, whichever applies.

(8) The requirement for a tree survey may be waived by the department for areas 50 feet or more outside the construction zone. If waived, a statement indicating predominant species and estimated number and size of trees in this area will be required. The area to remain undisturbed shall be snowfenced prior to any activity.

(c) The superimposed tree survey shall include all of the above information and shall bear the following additional information.

(1) Excluding single-family residential units in a preliminary plan, the location of all proposed structures and improvements which shall require submission of a superimposed tree survey before issuance of a building permit, unless such submission is waived by the department pursuant to subsection (c)(5) below. No existing structures are to be shown.

(2) All trees that are to be removed, to remain, or to be relocated shall be shown on the plan.

(3) The total number of trees on site, the total number of trees to be removed, and the total number of replacement trees required to be planted on site shall be indicated on the plan in table form.

(4) The proposed location of relocated trees shall be indicated on the plan, together with a statement as to how such trees are to be protected and/or stored during land clearance and construction and how they are to be maintained after construction.

(5) The proposed grade at the base of each tree shall be indicated, using contour lines at two-foot intervals or spot grades.

(6) A statement showing how trees to remain are to be protected on a permanent basis, including the proposed use of tree wells, protective barriers, tunneling, or retaining walls, shall be included on the plan.

(7) The location of protective wood snowfence or similar sturdy stock material staked with metal stakes ten feet on center which will shield and protect trees, no closer than six feet from the trunk or at the drip line, whichever is greater, of all such trees or groups of trees.

(8) A statement indicating that trees to be removed shall be marked in the field with red paint or flags and inspected by the planning office prior to any trees being removed.

(d) For tracts of land ten acres or larger, a tree survey and superimposed tree survey meeting the conditions of subsection (c)(1) shall be submitted with an aerial photograph or copy thereof as suitable quality one inch equals 100 feet minimum.

(e) The department may, in lieu of submission of the tree survey or superimposed tree survey, conduct an on-site examination prior to construction, or waive certain provisions of subsections (c)(2) and (c)(3) above, under the following conditions:

(1) Where a permit is required to remove or relocate trees on single-family lots.

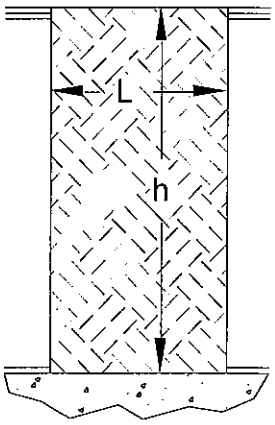
(2) Where a permit is required to remove fewer than three (3) trees.

(Ord. No. C-192-98, § 1, 10-6-98)

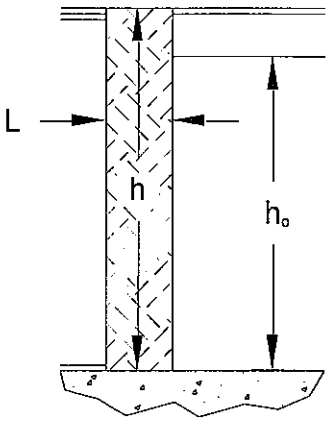
Minimum and Effective Lengths for Common Wall Bracing Methods

Intermittent Methods:

Method	Description		Maximum Opening Height (h_o)	Minimum Length Wall Height (h): 8'	9'	10'	11'	12'	Contrib. Length =	Notes
LIB	Let-In-Bracing		-	~4'-7"	~5'-2"	~5'-9"	NP	NP	L	Limited to top two stories and limited to low seismic regions.
WSP	Wood Structural Panel		-	4'-0"	4'-0"	4'-0"	4'-5"	4'-10"	L	3/8" minimum but is typically 7/16" OSB or 15/32" plywood.
				3'-6"	3'-6"	—	—	—	3'-0"	"Partial Credit" for narrow panels as describ. in Table R602.10.5.2 (SDC A-C only)
				3'-0"	—	—	—	—	2'-3"	
SFB	Structural Fiberboard Sheathing		-	4'-0"	4'-0"	4'-0"	4'-5"	4'-10"	L	Nails 3" on-center at panel edges and 6" on-center at intermediate supports.
				3'-6"	3'-6"	—	—	—	3'-0"	"Partial Credit" for narrow panels as describ. in Table R602.10.5/2 (SDC A-C only)
				3'-0"	—	—	—	—	2'-3"	
GB	Gypsum Board	Double Sided	-	4'-0"	4'-0"	4'-0"	4'-5"	4'-10"	L	Nails or screws at 7" on-center at panel edges.
		Single Sided	-	8'-0"	8'-0"	8'-0"	8'-10"	9'-8"	0.5 x L	
ABW	Alternate Braced Wall	SDC A-C	-	2'-4"	2'-8"	2'-10"	3'-2"	3'-6"	4'-0"	1,800-3,600 pound holdown required at each end (dependant on application). Additional construction requirements in Section R602.10.6.1
		SDC D_0-D_2	-	2'-8"	2'-8"	2'-10"	NP	NP	4'-0"	
PFH	Intermittent Portal Frame with Holdowns	Single-Story	-	1'-4"	1'-4"	1'-4"	NP	NP	4'-0"	3,500 pound embedded strap style holdown required at each end. Additional construction requirements in Section R602.10.6.2
		1st of Two-Story	-	2'-0"	2'-0"	2'-0"	NP	NP	4'-0"	
PFG	Intermittent Portal Frame at Garage		-	2'-0"	2'-3"	2'-6"	NP	NP	1.5 x L	Limited to SDC A-C. Additional limits and requirements in Section R602.10.6.3



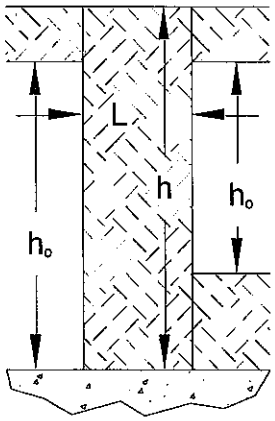
Intermittent Methods



Portal Frame Methods

Continuous Methods:

Method	Description	Maximum Opening Height (h_o)	Minimum Length Wall Height (h): 8'	9'	10'	11'	12'	Contrib. Length =	Notes
CS-WSP	Continuous Sheathing - Wood Structural Panel	5'-4"	2'-0"	2'-3"	2'-6"	2'-9"	3'-0"	L	Minimum 24" panel in corner or 800 pound holdown on BWP end nearest corner.
		6'-8"	2-7"	2'-9"	2'-6"	3'-1"	3'-4"		
		h	4'-0"	4'-6"	5'-0"	5'-6"	6'-3"		
CS-G	Continuous Sheathing - Wood Structural Panel Adjacent to Garage Opening	10'-0"	2'-0"	2'-3"	2'-6"	NP	NP	L	Limited to supporting roof only above with a maximum dead load of 3 psf. Applies to one wall of a garage only.
CS-PF	Continuous Sheathing - Portal Frame	9'-0"	1'-4"	1'-6"	1'-8"	NP	NP	1.5 x L (SDC A-C)	See construction requirements in Section R602.10.6.4

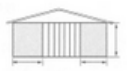


Continuous Sheathing Method

R602.10.4 Construction Methods for Braced Wall Panels

Intermittent and continuously sheathed *braced wall panels* shall be constructed in accordance with this section and the methods listed in Table R602.10.4.

TABLE R602.10.4
BRACING METHODS

METHODS, MATERIAL		MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA[a]	
				Fasteners	**Spacing**
Intermittent Bracing Method	**LIB** Let-in-bracing	1 x 4 wood or approved metal straps at 45° to 60° angles for maximum 16″ stud spacing		Wood: 2-8d common nails or 3-8d ($2^1/_2$″ long x 0.113″ dia.) nails	Wood: per stud and top and bottom plates
				Metal strap: per manufacturer	Metal: per manufacturer
	DWB Diagonal wood boards	$^3/_4$″(1″ nominal) for maximum 24″ stud spacing		2-8d ($2^1/_2$″ long x 0.113″ dia.) nails or 2-$1^3/_4$″ long staples	Per stud
	WSP Wood structural panel (See Section R604)	$^3/_8$"		Exterior sheathing per Table R602.3(3)	6″ edges 12″ field
				Interior sheathing per Table R602.3(1) or R602.3(2)	Varies by fastener
	BV-WSP[e]Wood structural panels with stone or masonry veneer (See Section R602.10.6.5)	$^7/_{16}$″	See Figure R602.10.6.5	8d common ($2^1/_2$" x 0.131) nails	4″ at panel edges 12″ at intermediate supports 4″ at braced wall panel end posts
	SFB Structural fiberboard sheathing	$^1/_2$″ or $^{25}/_{32}$″ for maximum 16″ stud spacing		$1^1/_2$″ long x 0.12″ dia. (for $^1/_2$″ thick sheathing) $1^3/_4$″ long x 0.12″ dia. (for $^{25}/_{32}$″ thick sheathing) galvanized roofing nails or 8d common ($2^1/_2$″ long x 0.131″dia.) nails	3″ edges 6″ field
	GB Gypsum board	$^1/_2$″		Nails or screws per Table R602.3(1) for exterior locations	For all braced wall panel locations: 7″ edges (including top and bottom plates) 7″ field
				Nails or screws per Table R702.3.5 for interior locations	
	PBS Particleboard sheathing (See Section R605)	$^3/_8$" or $^1/_2$" for maximum 16″ stud spacing		For $^3/_8$″, 6d common ($2^1/_2$″ long x 0.113″ dia.) nails For $^1/_2$″, 8d common ($2^1/_2$″ long x 0.131″ dia.) nails	3″ edges 6″ field
	PCP Portland cement plaster	See Section R703.6 for maximum 16″ stud spacing		$1^1/_2$″ long, 11 gage, $^7/_{16}$″ dia. head nails or $^7/_8$″ long, 16 gage staples	6″ o.c. on all framing members
	HPS Hardboard panel siding	$^7/_{16}$″ for maximum 16″ stud spacing		0.092" dia., 0.225″ dia. head nails with length to accommodate $1^1/_2$″ penetration into studs	4″ edges 8″ field
	ABW Alternate braced wall	$^3/_8$″		See Section R602.10.6.1	See Section R602.10.6.1
	PFH Portal frame with hold-downs	$^3/_8$″		See Section R602.10.6.2	See Section R602.10.6.2
	PFG Portal frame at garage	$^7/_{16}$″		See Section R602.10.6.3	See Section R602.10.6.3

					
Continuous Sheathing Methods	**CS-WSP** Continuously sheathed wood structural panel	$^3/_8$″		Exterior sheathing per Table R602.3(3)	6″ edges 12″ field
				Interior sheathing per Table R602.3(1) or R602.3(2)	Varies by fastener
	CS-G[b,c] Continuously sheathed wood structural panel adjacent to garage openings	$^3/_8$"		See Method CS-WSP	See Method CS-WSP
	CS-PF Continuously sheathed portal frame	$^7/_{16}$″		See Section R602.10.6.4	See Section R602.10.6.4
	CS-SFB[d] Continuously sheathed structural fiberboard	$^1/_2$″ or $^{25}/_{32}$″ for maximum 16″ stud spacing		$1^1/_2$″ long x 0.12″ dia. (for $^1/_2$" thick sheathing) $1^3/_4$″ long x 0.12″ dia. (for $^{25}/_{32}$″ thick sheathing) galvanized roofing nails or 8d common ($2^1/_2$″ long x 0.131″ dia.) nails	3″ edges 6″ field

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.0175 rad, 1 pound per square foot = 47.8 N/m^2, 1 mile per hour = 0.447 m/s.

a. Adhesive attachment of wall sheathing, including Method GB, shall not be permitted in Seismic Design Categories C, D_0, D_1 and D_2.

b. Applies to panels next to garage door opening where supporting gable end wall or roof load only. Shall only be used on one wall of the garage. In Seismic Design Categories D_0, D_1 and D_2 roof covering dead load shall not exceed 3 psf.

c. Garage openings adjacent to a Method CS-G panel shall be provided with a header in accordance with Table R602.7(1). A full-height clear opening shall not be permitted adjacent to a Method CS-G panel.

d. Method CS-SFB does not apply in Seismic Design Categories D_0, D_1 and D_2.

e. Method applies to detached one- and two-family dwellings in Seismic Design Categories D_0 through D_2 only.

R602.10.4.1 Mixing Methods

Mixing of bracing methods shall be permitted as follows:

1. Mixing intermittent bracing and continuous sheathing methods from story to story shall be permitted.
2. Mixing intermittent bracing methods from *braced wall line* to *braced wall line* within a story shall be permitted. In regions within Seismic Design Categories A, B and C or where the ultimate design wind speed is less than or equal to 130 mph (58m/s), mixing of intermittent bracing and continuous sheathing methods from braced wall line to braced wall line within a story shall be permitted.
3. Mixing intermittent bracing methods along a *braced wall line* shall be permitted in Seismic Design Categories A and B, and detached dwellings in Seismic Design Category C, provided the length of required bracing in accordance with Table R602.10.3(1) or R602.10.3(3) is the highest value of all intermittent bracing methods used.
4. Mixing of continuous sheathing methods CS-WSP, CS-G and CS-PF along a *braced wall line* shall be permitted. Intermittent methods ABW, PFH and PFG shall be permitted to be used along a *braced wall line* with continuous sheathed methods.
5. In Seismic Design Categories A and B, and for detached one- and two-family dwellings in Seismic Design Category C, mixing of intermittent bracing methods along the interior portion of a *braced wall line* with continuous sheathing methods CS-WSP, CS-G and CS-PF along the exterior portion of the same braced wall line shall be permitted. The length of required bracing shall be the highest value of all intermittent bracing methods used in accordance with Table R602.10.3(1) or R602.10.3(3) as adjusted by Tables R602.10.3(2) and R602.10.3(4), respectively. The requirements of Section R602.10.7 shall apply to each end of the continuously sheathed portion of the braced wall line.

R602.10.4.2 Continuous Sheathing Methods

R602.10.5 Minimum Length of a Braced Wall Panel

The minimum length of a *braced wall panel* shall comply with Table R602.10.5. For Methods CS-WSP and CS-SFB, the minimum panel length shall be based on the adjacent clear opening height in accordance with Table R602.10.5 and Figure R602.10.5. Where a panel has an opening on either side of differing heights, the taller opening height shall be used to determine the panel length.

TABLE R602.10.5
MINIMUM LENGTH OF BRACED WALL PANELS

METHOD (See Table R602.10.4)		MINIMUM LENGTH[a] (inches)					CONTRIBUTING LENGTH (inches)
		Wall Height					
		8 feet	9 feet	10 feet	11 feet	12 feet	
DWB, WSP, SFB, PBS, PCP, HPS, BV-WSP		48	48	48	53	58	Actual[b]
GB		48	48	48	53	58	Double sided =Actual Single sided = 0.5 x Actual
LIB		55	62	69	NP	NP	Actual[b]
ABW	SDC A, B and C, ultimate design wind speed < 140 mph	28	32	34	38	42	48
	SDC D_0, D_1 and D_2, ultimate design wind speed < 140 mph	32	32	34	NP	NP	
PFH	Supporting roof only	16	16	16	18[c]	20[c]	48
	Supporting one story and roof	24	24	24	27[c]	29[c]	48
PFG		24	27	30	33[d]	36[d]	1.5 x Actual[b]
CS-G		24	27	30	33	36	Actual[b]
CS-PF	SDC A, B and C	16	18	20	22[e]	24[e]	1.5 x Actual[b]
	SDC D_0, D_1 and D_2	16	18	20	22[e]	24[e]	Actual[b]
CS-WSP, CS-SFB	Adjacent clear opening height (inches)						
	≤ 64	24	27	30	33	36	Actual[b]
	68	26	27	30	33	36	
	72	27	27	30	33	36	
	76	30	29	30	33	36	
	80	32	30	30	33	36	
	84	35	32	32	33	36	
	88	38	35	33	33	36	
	92	43	37	35	35	36	
	96	48	41	38	36	36	
	100	-	44	40	38	38	
	104	-	49	43	40	39	
	108	-	54	46	43	41	
	112	-	-	50	45	43	
	116	-	-	55	48	45	

120	-	-	60	52	48
124	-	-	-	56	51
128	-	-	-	61	54
132	-	-	-	66	58
136	-	-	-	-	62
140	-	-	-	-	66
144	-	-	-	-	72

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.
NP = Not Permitted.

a. Linear interpolation shall be permitted.

b. Use the actual length where it is greater than or equal to the minimum length.

c. Maximum header height for PFH is 10 feet in accordance with Figure R602.10.6.2, but wall height shall be permitted to be increased to 12 feet with pony wall.

d. Maximum opening height for PFG is 10 feet in accordance with Figure R602.10.6.3, but wall height shall be permitted to be increased to 12 feet with pony wall.

e. Maximum opening height for CS-PF is 10 feet in accordance with Figure R602.10.6.4, but wall height shall be permitted to be increased to 12 feet with pony wall.

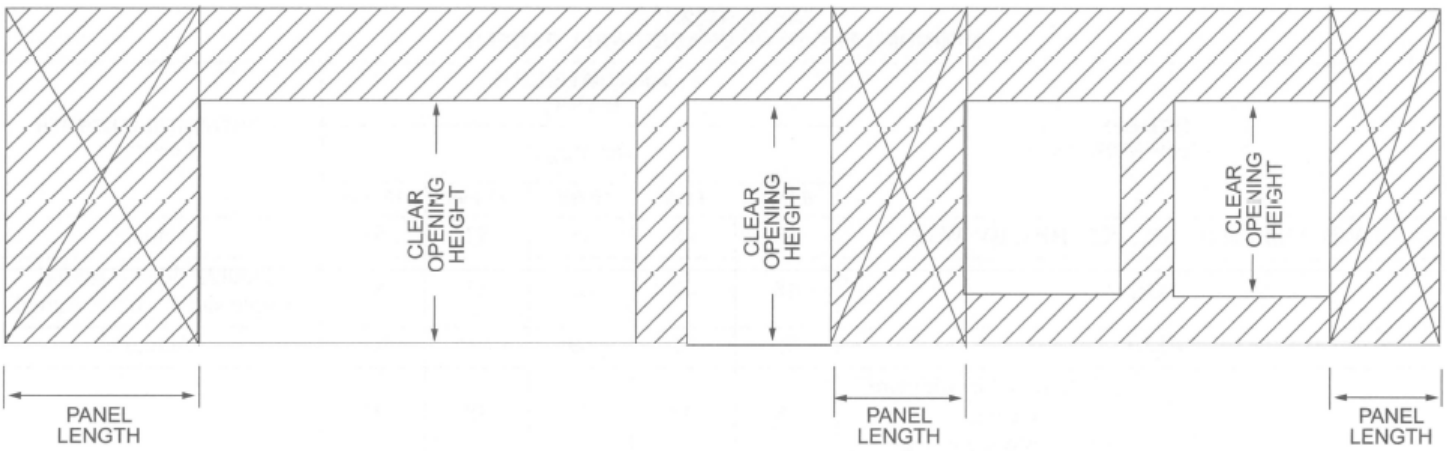


FIGURE R602.10.5
BRACED WALL PANELS WITH CONTINUOUS SHEATHING

R602.10.5.1 Contributing Length

For purposes of computing the required length of bracing in Tables R602.10.3(1) and R602.10.3(3), the contributing length of each *braced wall panel* shall be as specified in Table R602.10.5.

R602.10.5.2 Partial Credit

For Methods DWB, WSP, SFB, PBS, PCP and HPS in Seismic Design Categories A, B and C, panels between 36 inches and 48 inches (914 mm and 1219 mm)) in length shall be considered a *braced wall panel* and shall be permitted to partially contribute toward the required length of bracing in Tables R602.10.3(1) and R602.10.3(3), and the contributing length shall be determined from Table R602.10.5.2.

TABLE R602.10.5.2
PARTIAL CREDIT FOR BRACED WALL PANELS LESS THAN 48 INCHES IN ACTUAL LENGTH

ACTUAL LENGTH OF BRACED WALL PANEL	CONTRIBUTING LENGTH OF BRACED WALL PANEL (inches)[a]

(inches)	8-foot Wall Height	9-foot Wall Height
48	48	48
42	36	36
36	27	N/A

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
N/A = Not Applicable.

a. Linear interpolation shall be permitted.

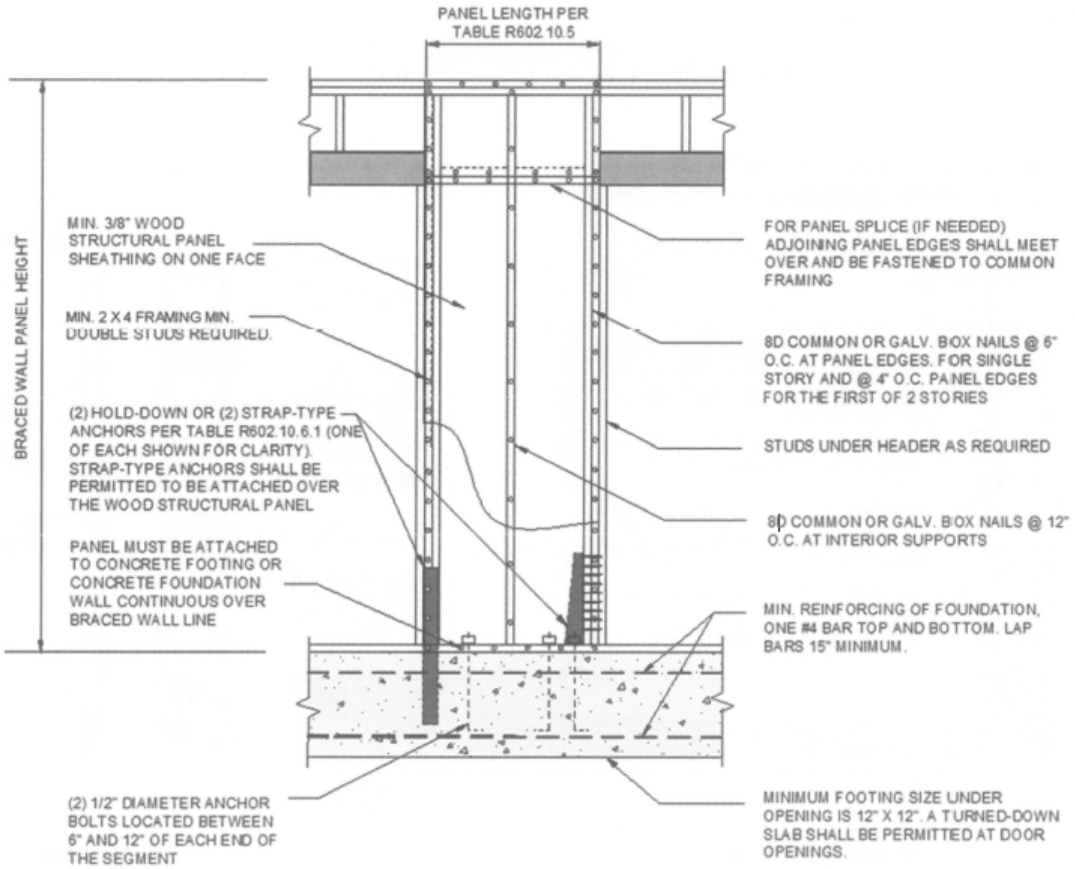
R602.10.6.1 Method ABW: Alternate Braced Wall Panels

Method ABW *braced wall panels* shall be constructed in accordance with Figure R602.10.6.1. The hold-down force shall be in accordance with Table R602.10.6.1.

TABLE R602.10.6.1
MINIMUM HOLD-DOWN FORCES FOR METHOD ABW BRACED WALL PANELS

SEISMIC DESIGN CATEGORY AND WIND SPEED	SUPPORTING/STORY	HOLD-DOWN FORCE (pounds)				
		Height of Braced Wall Panel				
		8 feet	9 feet	10 feet	11 feet	12 feet
SDC A, B and C Ultimate design wind speed < 140 mph	One story	1,800	1,800	1,800	2,000	2,200
	First of two stories	3,000	3,000	3,000	3,300	3,600
SDC D_0, D_1 and D_2 Ultimate design wind speed < 140 mph	One story	1,800	1,800	1,800	NP	NP
	First of two stories	3,000	3,000	3,000	NP	NP

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.45 N, 1 mile per hour = 0.447 m/s.
NP = Not Permitted.

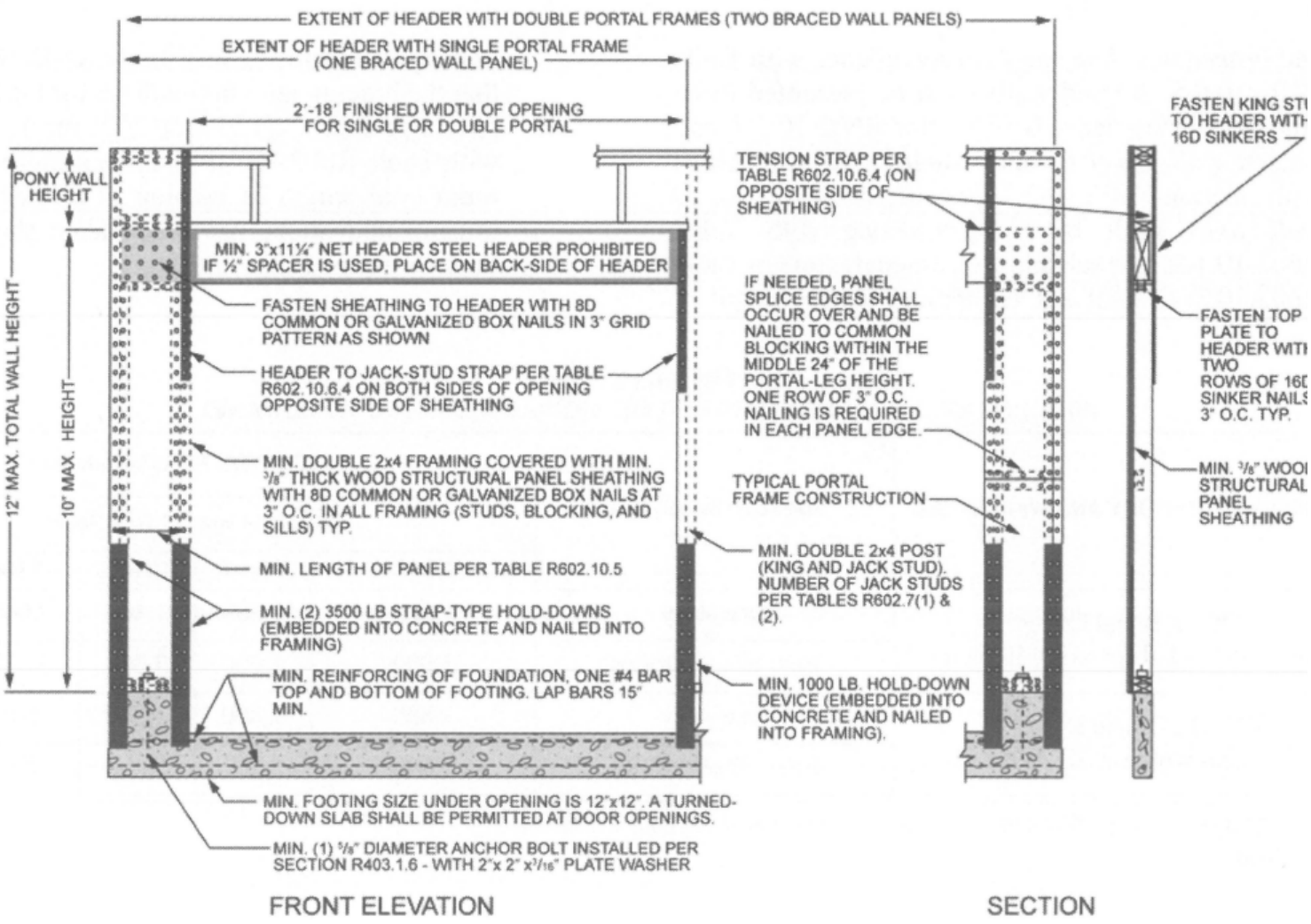


For SI: 1 inch = 25.4 mm.

FIGURE R602.10.6.1
METHOD ABW-ALTERNATE BRACED WALL PANEL

R602.10.6.2 Method PFH: Portal Frame With Hold-Downs

Method PFH *braced wall panels* shall be constructed in accordance with Figure R602.10.6.2.



For SI: 1 inch = 25.4 mm, 1 foot= 304.8 mm.

FIGURE R602.10.6.2
METHOD PFH — PORT AL FRAME WITH HOLD-DOWNS

R602.10.6.4 Method CS-PF: Continuously Sheathed Portal Frame

Continuously sheathed portal frame *braced wall panels* shall be constructed in accordance with Figure R602.10.6.4 and Table R602.10.6.4. The number of continuously sheathed portal frame panels in a single *braced wall line* shall not exceed four.

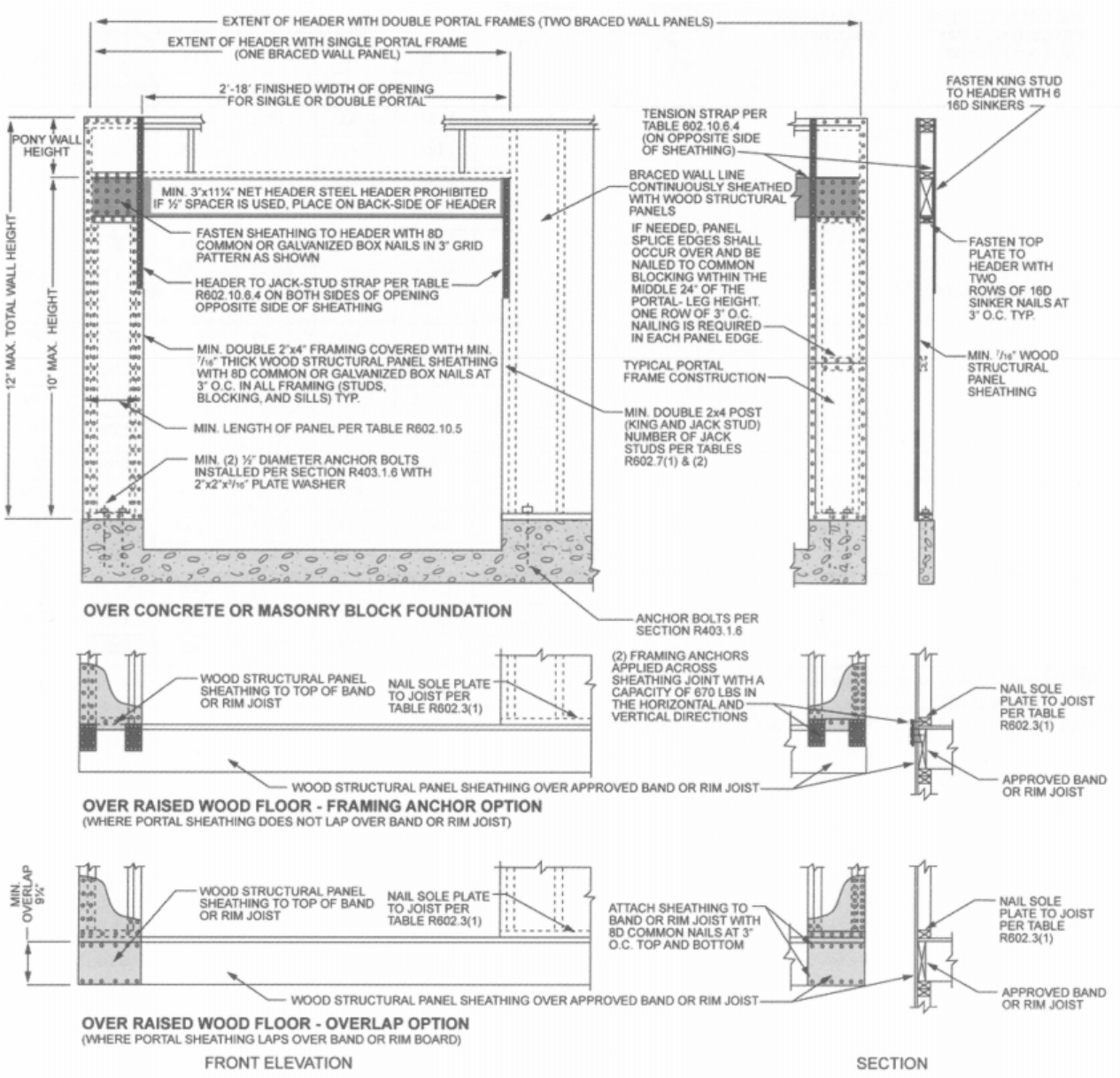
TABLE R602.10.6.4
TENSION STRAP CAPACITY FOR RESISTING WIND PRESSURES PERPENDICULAR TO METHODS PFH, PFG AND CS-PF BRACED WALL PANELS

MINIMUM WALL STUD FRAMING NOMINAL SIZE AND GRADE	MAXIMUM PONY WALL HEIGHT (feet)	MAXIMUM TOTAL WALL HEIGHT (feet)	MAXIMUM OPENING WIDTH (feet)	TENSION STRAP CAPACITY REQUIRED (pounds)[a,b]					
				Ultimate Design Wind Speed V_{ult} (mph)					
				110	115	130	110	115	130
				Exposure B			Exposure C		
2 x 4 No. 2 Grade	0	10	18	1,000	1,000	1,000	1,000	1,000	1,050
	1	10	9	1,000	1,000	1,000	1,000	1,000	1,750
			16	1,000	1,025	2,050	2,075	2,500	3,950
			18	1,000	1,275	2,375	2,400	2,850	DR
	2	10	9	1,000	1,000	1,475	1,500	1,875	3,125
			16	1,775	2,175	3,525	3,550	4,125	DR
			18	2,075	2,500	3,950	3,975	DR	DR
	2	12	9	1,150	1,500	2,650	2,675	3,175	DR
			16	2,875	3,375	DR	DR	DR	DR
			18	3,425	3,975	DR	DR	DR	DR
	4	12	9	2,275	2,750	DR	DR	DR	DR
			12	3,225	3,775	DR	DR	DR	DR
2 x 6 Stud Grade	2	12	9	1,000	1,000	1,700	1,700	2,025	3,050
			16	1,825	2,150	3,225	3,225	3,675	DR
			18	2,200	2,550	3,725	3,750	DR	DR
	4	12	9	1,450	1,750	2,700	2,725	3,125	DR
			16	2,050	2,400	DR	DR	DR	DR
			18	3,350	3,800	DR	DR	DR	DR

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. DR = Design Required.

b. Straps shall be installed in accordance with manufacturer's recommendations.



For SI: I inch= 25.4 mm, 1 foot= 304.8 mm

FIGURE R602.10.6.4

METHOD CS-PF—CONTINUOUSLY SHEATHED PORTAL FRAME PANEL CONSTRUCTION

2015 IECC Energy Efficiency Certificate

Insulation Rating	R-Value
Above-Grade Wall	21.00
Below-Grade Wall	10.00
Floor	0.00
Ceiling / Roof	38.00
Ductwork (unconditioned spaces):	_____

Glass & Door Rating	U-Factor	SHGC
Window	0.32	
Door	0.35	
Skylight	0.40	

Heating & Cooling Equipment	Efficiency
Heating System: _____	_____
Cooling System: _____	_____
Water Heater: _____	_____

Name: _____ **Date:** _____

Comments