QUALITY CONTROL CHECKLISTS FOR WINDSTORM DESIGN AND CONSTRUCTION REVIEWS OF BUILDINGS

by

The Structural Committee

of

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PREFACE

The mission of the Foundation Performance Association (FPA) may be found at www.foundationperformance.org. To accomplish the "documents" portion of the mission, the Structural Committee was formed in 1999 for the purpose of assembling the information available in the industry on a selected subject, and compiling it into a document, which is then made available to the public.

This document was written by the Structural Committee's FPA-SC-21-0 ad hoc subcommittee and has been peer reviewed by the Foundation Performance Association (FPA) membership and other select professionals familiar with the subject. This document is published as "Quality Control Checklists for Windstorm Design and Construction Reviews of Buildings", Document No. FPA-SC-21 Revision 0 (i.e., FPA-SC-21-0) on August 3, 2018, and is made freely available to the public at www.foundationperformance.org so all may have access to its information. To help ensure this document remains as current as possible, it may be periodically updated under the same document number but with higher revision numbers such at 1, 2, etc.

The Structural Committee is a standing committee of the Foundation Performance Association. During the time of writing this document, the Structural Committee was chaired by Ron Kelm and 45 to 60 members were active on the committee. The Structural Committee sanctioned this paper on January 26, 2011, and formed an ad hoc subcommittee to write this document with Michael Skoller and Ken Sherman as co-chairs, and provided oversight reviews of the subcommittee throughout this document's development, peer review and publication. The subcommittee's chairs and members are listed on the cover sheet of this document and are considered this document's co-authors.

Future suggestions for improvement of this document shall be directed to the current chair of the Structural Committee. If sufficient comments to warrant a revision are received, the Structural Committee may form a new subcommittee to revise this document. If the revised document passes the Structural Committee's oversight review and the FPA's peer review, it will be published on the FPA website, superseding the previous revision.

This document is based on experience gathered by consultants working primarily in the southeast Texas area. The intended audiences for the use of this document are engineers and their staff performing wind design in the United States and construction observations in Texas. The included checklists can aid the engineer in complying with the structural provisions of the applicable building codes, particularly those engineers designing and/or providing construction observations of residential and other low-rise buildings. This document is especially applicable in designated high wind areas, such as those specified by the Texas Department of Insurance (TDI).

This document was created with generously donated time in an effort to advance the knowledge, performance, and standards of engineering, construction, and repairs related to foundations, soils, and structures. The text in this document represents the opinions of a majority of the subcommittee members and may not necessarily reflect the opinions of every subcommittee member, Structural Committee member, or FPA member at the time of, or since, this document's publication. The FPA and its members make no warranty regarding the accuracy of the information contained herein and will not be liable for any damages, including consequential damages, resulting from the use of this

document. Each project should be investigated for its individual characteristics to permit appropriate application of the material contained herein.

Please refer to the FPA's website at www.foundationperformance.org for other information pertaining to this publication and other FPA publications.

1.0 INTRODUCTION

The need for this paper is due to the uncertainty as to what is required in the design of buildings and other structures in high wind areas, and especially the quality control construction reviews intended to mitigate wind damage that are commonly known as “windstorm inspections”. This document is not a building code and is not intended to be used as the only source for performing high wind design and construction reviews. The focus of this paper is on checklists for wind-resistance design and onsite construction reviews, but some checklists for flood-resistance design are also provided.

The document is intended to provide key information and references from adopted codes and standards to an engineer who is performing high wind design and construction reviews. The document also provides guidance and background information so the design engineer can make informed decisions on design and review items. The intent is also to provide design/construction review checklists that give the engineer a list of items and categories of items that should be common to all high wind design and construction reviews.

For wind design code compliance, the engineer should follow the building code and building code amendment requirements as adopted by the local government or authority having jurisdiction over issuance of the building permit. The engineer should obtain documentation from the local building official to indicate which building codes, code amendments and site wind speed design parameters are in effect for the building that is being designed.

In all cases, the engineer should determine the applicability of the building code (e.g. 2015 International Building Code [9], Section 102 Applicability, Paragraph 102.1 General, and Paragraphs 102.4 Referenced codes and standards). It should be noted on the plans that in the event of a discrepancy between the plans, specifications and applicable codes and ordinances, the more stringent provision shall apply. All referenced standards, manuals and publications referenced herein shall be the latest applicable edition at the time this document is used. Of necessity, since the IBC building code edition and standards adopted by most local governments is more recent than the IBC building code and standards adopted by TDI, this often involves comparing provisions from different code editions and standards and using some judgment to determine the most stringent requirements.

1.1 TEXAS WINDSTORM INSURANCE ASSOCIATION

Following is a chronology of building requirements for windstorm insurance eligibility along the Texas Gulf Coast through the Texas Windstorm Insurance Association (TWIA), formerly known as the Texas Catastrophe Property Insurance Association (TCPIA):

a. From 1971 through December 31, 1987: The Texas Legislature formed the TCPIA in 1971 as a mechanism for creating a state-mandated risk-sharing program called “wind pool” to serve as an insurer of last resort. The TCPIA developed its own building code, which took effect June 29, 1971.

b. In 1987, the Texas Legislature passed HB 2012, which enacted the requirement to mitigate losses to structures due to hurricanes along the Texas Gulf Coast, and the windstorm inspection process through the Texas Department of Insurance (TDI) began on January 1, 1988.

c. From June 1, 1989, through August 31, 1998: The Windstorm Resistant Construction Guide developed by the Texas Department of Insurance (TDI) was used and separated the coastal area into two zones.
    - The zones were defined as the area seaward of the Intracoastal Waterway and inland of the Intracoastal Waterway.
    - The Windstorm Resistant Construction Guide provided a significant amount of prescriptive detail concerning a wide range of wind-resistant construction issues.
    - Provisions were based on the design wind loads in the 1973 edition of the Standard Building Code (SBC).
    - Buildings could be insured by TCPIA if they were built according to the guidelines, which primarily targeted residential construction, or if designed by a professional engineer to meet the requirements of the 1973 SBC.

d. From September 1, 1998, to January 31, 2003: The TWIA Building Code for Windstorm Resistant Construction was adopted and used by TDI to establish eligibility for wind pool insurance.
    - This was a prescriptive document developed by TDI and was based on the wind load provisions developed by the American Society of Civil Engineers (ASCE) as published in their standard ASCE 7-93, “Minimum Design Loads for Buildings and Other Structures” [6]. It included prescriptive requirements for the construction of wood and masonry structures.
    - The TWIA regulations divided the coastal counties into 3 zones:
        - Seaward, Inland I, and Inland II.
    - Applications:
        - The TWIA Building Code for Windstorm Resistant Construction applied to Inland I and Seaward zones;
        - The TDI Windstorm Resistant Construction Guide applied to the Inland II zone.
    - The basic design wind speeds used for the Seaward and Inland zones in the TWIA Building Code for Windstorm Resistant Construction are fastest-mile wind speeds of 100 mph and 95 mph, respectively.
    - The TWIA Building Code for Windstorm Resistant Construction provisions included requirements for windborne debris protection of all exterior openings, and the component and cladding loads were based on the requirements of the ASCE 7-93 standard.
        - The windborne debris protection requirements were only applied to homes built in the zone located seaward of the Intracoastal Waterway. However, TDI required protection of all exterior openings (doors, windows, garage doors and skylights) regardless of whether the exterior opening had glazing.

e. Beginning February 1, 1999, TDI windstorm inspections were required to be performed by Texas licensed professional engineers who were appointed by TDI as qualified inspectors.

f. From February 1, 2003, to December 31, 2004, TDI adopted the 2000 International Residential Code (IRC) [9] and the 2000 International Building Code (IBC) with Texas modifications to strengthen some provisions as the basis for eligibility of homes and

buildings for wind pool insurance coverage. The 2000 IRC and 2000 IBC reference ASCE 7-98 for their wind load provisions.

g. From January 1, 2005 to December 31, 2007, TDI adopted the 2003 IRC and 2003 IBC with Texas modifications to strengthen some provisions as the basis for eligibility of homes and buildings for wind pool insurance coverage. The 2003 IRC and IBC reference ASCE 7-02 for their wind load provisions.

h. Since January 1, 2008, TDI has adopted the 2006 IRC and IBC with Texas modifications [1] to strengthen some provisions as the basis for eligibility of homes and buildings for wind pool insurance coverage. The 2006 IRC and IBC reference ASCE 7-05 [6] for their wind load provisions.

i. Since 2003, TDI adopted 3-sec gust design wind speeds of 110 mph for the Inland II Zone, 120 mph for the Inland I Zone, and 130 mph for the Seaward Zone.

j. In 2011, the Texas Legislature passed HB 3, which required the Texas Board of Professional Engineers (TBPE) to establish a system by December 31, 2011, to place Texas licensed engineers who are eligible to perform windstorm inspections on a "Roster of Qualified Engineers", commonly called the TBPE windstorm roster.

k. Beginning January 1, 2013, Texas licensed engineers had to be on the TBPE windstorm roster in order for TDI to appoint a Texas licensed engineer as a qualified inspector.

l. On June 19, 2015, the Texas Legislature passed HB 2439, which eliminated the requirement for TBPE to maintain the windstorm roster and required TDI to be exclusively responsible for establishing and maintaining a list of appointed qualified inspectors. Effective January 1, 2017, the windstorm inspectors appointed by the TBPE before January 1, 2017, must have:
    - Reapplied by December 31, 2016, to TDI using application form (AQI-1) to maintain their TDI appointment status.
    - Attended a TDI Windstorm Orientation webinar by March 31, 2017.

m. Beginning January 1, 2017, engineers seeking TDI appointment as a new qualified windstorm inspector must:
    - Attend a TDI Windstorm Orientation webinar.
    - Complete and submit form AQI-1 to TDI.

n. In their February/March 2018 Windstorm Newsletter, TDI clarified that the ASCE 7-10 equivalent design wind speeds for Risk Category II structures that are comparable to their required ASCE 7-05 based wind speeds are 143 mph for the Inland II Zone, 155 mph for the Inland I Zone, and 168 mph for the Seaward Zone. TDI indicated that these equivalent wind speeds are required to be used for Risk Category II structures if it is decided to use the ASCE 7-10 design provisions because, for example, a local building department specifies a more recent edition of the IBC and IRC codes than the edition adopted by TDI. Similar ASCE 7-10 equivalent design wind speeds can be derived for Risk Category I, II, and IV structures.

1.2 DOCUMENT APPLICABILITY

TDI supplied the initial draft of the checklists contained in this document. TDI developed those checklists as a method for outlining items that should be common to all high wind designs with the intent of using them to determine if the field construction is in accordance with those items. Therefore, since the early TDI documents were written primarily to focus on wind-resistance design of low-rise wood frame structures, which is where most of the construction problems were observed after hurricane damage, this document is also applicable mostly to wood frame structures and associated structural components. However, portions of this document have been extended to include masonry, light-gage steel, and other light-frame construction materials, as well as wind design considerations for exterior architectural and mechanical components. This document may also be used as a guide for wind-resistance design of other types of structures and components. Since hurricanes usually result in flooding as well as high winds, flood-resistance design considerations are provided in the appendices.

1.3 DOCUMENT CONTENTS

This document includes the following sections and appendices: Section 2 contains a glossary of commonly used terms; Section 3 consists of checklists to use during the design phase; Section 4 contains quality control checklists for use during construction; Section 5 includes a list of literature referenced in this document; Appendix I consists of elevation and flood abbreviations and definitions; and Appendix II provides sources when designing for floods and floodwater currents.

2.0 GLOSSARY

The following definitions were taken from, in whole, summary or part, from the following documents:

- Wood Frame Construction Manual [15], definitions from Section 1.3
- ASCE 7, American Society of Civil Engineers [6]
- International Building Code (IBC) [9]
- International Residential Code (IRC) [10]
- The American Iron and Steel Institute AISI S100 (North American Specification for the Design of Cold-Formed Steel Structural Members) and AISI S240 (North American Standard for Cold-Formed Steel Structural Framing), current editions [3]
- Metal Building Systems Manual Glossary, definitions from Chapter X

Anchoring System (Hold-down, Tie-Down, Anchor) - A primary framing connection device, typically load-rated greater than anchor bolts/rods, used to provide major overturning restraint by resisting uplift of the ends of shear walls. Most primary anchoring systems either connect shear wall end stud-groups or posts (sometimes called chords) with deep masonry foundation anchors or connect stud-groups or posts to other deep foundation members such as pilings. Upper level shear walls may also connect to lower shear walls and finally into foundation systems. Bottom/sill plate bolts or “J-Bolts” may not be considered to be anchors that resist overturning, but can be considered to resist sliding. Alternatives to “J-Bolts” are available.

Aspect Ratio, Diaphragm - The ratio of building length dimension (L) to the building width (W) computed as L/W.

Aspect Ratio, Shear Wall - The ratio of the plate-to-plate Shear Wall height (H) to shear wall segment width (W), computed as H/W, typically a maximum of 3.5, but under certain circumstances may be larger.

Autoclave Aerated Concrete (AAC) - AAC covers a class of autoclave and non-autoclaved light weight (35 to 65 pcf) Portland cement concrete based pre-engineered and pre-formed building products. AAC can be a stackable block, an insulating veneer panel, or a steel reinforced floor panel. Most commonly, AAC consists of blocks that are connected either with a thin set adhesive mortar or are dry stacked. Cores (3” to 4” diameter) are filled with rebar reinforced concrete. The surface is typically finished with a veneer (stucco, plaster, brick, stone, or siding).

Beam - A structural framing member supporting other structural framing member(s).

Beam System - A relatively new term describing a structural grouping of the same type of joists or rafters being used in some structural design programs. Beam systems can be in shapes such as rectangular or triangular, etc., and can be flat (ceiling joists) or angled (vaulted ceiling or roof rafters).

Blocking - Member that provides edge support for sheathing or provides load path continuity such as below offset walls, offset floors, and between cantilever members.

Boundary Element - Diaphragm and shear wall boundary members to which diaphragms transfer forces. Boundary elements include chords and collectors at diaphragm and shear wall perimeters, interior openings, discontinuities, and re-entrant corners.

Boundary Members - Stiffened members connecting to portions of wall and diaphragm sections strengthened by longitudinal and transverse reinforcement or anchorage. Boundary members include chords and drag struts at diaphragm and shear wall perimeters, roof structures, interior openings, discontinuities, and reentrant corners.

Brace - A vertical or inclined piece of framing lumber applied to wall, floor, or roof structure to stiffen or support the structure. Used in attics to brace gable wall ends, and on walls as temporary bracing until framing has been completed.

Building, Open - Classification: Refer to ASCE 7-05, Chapter C6 and/or ASCE 7-10, Chapter 26.2 Definitions [6].

Building, Closed - Classification: Refer to ASCE 7-05, Chapter C6 and/or ASCE 7-10 and ASCE 7-16, Chapter 26.2 Definitions [6].

Building, Partially Open - Classification: Refer to ASCE 7-05, Chapter C6 and/or ASCE 7-10 and ASCE 7-16, Chapter 26.2 Definitions [6].

Cantilever - The unsupported length of a structural member that extends beyond a support.

Cantilevered Member - A structural member with one or more cantilevered ends that typically utilizes its full-length stiffness to provide moment resistance against a cantilevered load.

Chord - A diaphragm boundary element that resists axial forces due to diaphragm flexure. Typical examples of chords in light-frame construction are top plates, rim-boards, and shear wall end stud-groups or posts.

CMU - Concrete Masonry Units, precast in uniform sizes.

COBRA - The Coastal Barrier Resources Act (COBRA) of 1982 and later amendments, removed the Federal government from financial involvement associated with building and development in undeveloped portions of designated coastal barriers (including the Great Lakes). These areas were mapped and designated as Coastal Barrier Resources System units or "otherwise" protected areas. They are colloquially called COBRA zones. COBRA banned the sale of NFIP flood insurance for structures built or substantially improved on or after a specified date. For the initial COBRA designation, this date is October 1, 1983. For all subsequent designations, this date is the date the COBRA zone was identified. COBRA zones and their identification dates are shown on Flood Insurance Rate Maps (FIRMs). TDI does not offer windstorm insurance in COBRA areas after June 11, 2003.

Collar Tie - A horizontal or near horizontal structural framing member typically located in the upper third of the rafter run connecting two opposing rafters together.

Components & Cladding (C&C) - Component and cladding members are defined in Section 6.2 of ASCE 7-05 [6] and Section 26.1.2.2 of ASCE 7-10 [6] as elements of the building envelope that do not qualify as part of the Main Wind-Force Resisting System (MWFRS). Component and cladding pressures are applied normal to their surfaces and are positive and negative in value. Positive pressures act towards the exterior surface and negative pressures act away. The magnitude of the component and cladding pressures is dependent on mean roof height, effective wind area and proximity of the component to the corner of the roof or wall. Examples of C&C members include individual wall studs, individual rafters, Pre-Engineered Metal Building purlins and girts, roof sheathing attachment, solar arrays, siding, masonry, EIFS stucco/exterior plaster, windows, doors, roof appurtenances, louvers and sheathing. Also related to this topic, see Main Wind-Force Resisting System and Effective Wind Area.

Continuous Load Path - The interconnection of structural framing elements of the lateral and vertical force-resisting systems that transfers the load to the foundation.

Cricket - A small roof structure of single or double slope placed at the junction of larger surfaces that meet at an angle for the purpose of diverting drainage.

Designated Catastrophe Areas (TDI Zone) - The Texas Department of Insurance (TDI) has established its own design criteria different from the above-mentioned codes (See Wind Speed Contour). TDI has established coastal counties in Texas as “Designated Catastrophe Areas” or “Texas First Tier Coastal Counties” and has established its own designations and criteria that supersede other building codes. TDI has designated 3 zones along the Texas Gulf Coast that have different adopted design wind speeds. The wind speeds represented by lines on zone maps produced by TDI and divided in 10-miles-per-hour increments are defined by roadways and county lines within the Texas First Tier Coastal Counties.

Diaphragm - A diaphragm is a horizontal or sloped system acting as a thin flat beam used to transfer lateral forces to the vertical MWFRS resisting elements such as shear walls, portal frames, etc. Typical examples of diaphragms are roof sheathing, floor sheathing, and ceiling sheathing.

> **Flexible Diaphragm -** Flexible diaphragms distribute lateral forces between the shear walls or lateral support members at a given floor based on tributary areas assigned to each shear wall. Wood and steel structural panel diaphragms supported by structural panel shear walls are permitted to be idealized as flexible. Flexible diaphragms are considered to be incapable of resisting torsional moments, meaning they only distribute lateral loads to shear walls or other vertical MWFRS elements parallel to the load direction. A diaphragm must be classified and designed as being rigid in order to have a cantilevered diaphragm portion or an open front (such as a garage) per Section 2305.2.5 of the 2006 IBC [9]. Most conventional light-frame low-rise structures such as considered in this document typically have flexible diaphragms. Rules for determining whether a diaphragm may be idealized as flexible or rigid are defined in Section 12.3.1.1 of ASCE 7-10 and ASCE 7-16.
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> **Rigid Diaphragm -** A diaphragm is rigid for the purpose of distribution of shear forces and torsional moments at a given floor when the lateral deformation of the diaphragm is less than or equal to two times the average story drift (average story deflection). Rigid Diaphragms distribute the story lateral load between the supporting shear walls based on the relative shear

wall stiffness of the shear walls. Rigid diaphragms are considered to be capable of distributing lateral loads parallel and perpendicular to the direction of load. Shear wall and diaphragm deflection analysis is required to determine the deflections needed to define a diaphragm as rigid.

Semi-Rigid Diaphragm - Unless a diaphragm can be idealized as either flexible or rigid, it must be considered to be semi-rigid (i.e. having a stiffness somewhere in between a flexible or rigid diaphragm), and the structural analysis of the MWFRS must explicitly include consideration of the stiffness of the diaphragm, which typically involves modeling the stiffness of the diaphragm in a 3-dimensional structural analysis computer model. Similar to rigid diaphragms, the analysis of semi-rigid diaphragms must consider inherent and code-required accidental torsion effects.

Diaphragm Boundary - A location where shear is transferred into or out of the diaphragm element. Transfer is either to a boundary element or to another force-resisting element.

Diaphragm Deflection - Deformation of a diaphragm resulting from lateral load. Diaphragm deflection is computed according to empirical equations such as specified in Section 2305.2 of the 2015 IBC [9] or Section 4.2.2 of SDPWS-2015 [4]. For wood structures, the calculated deflection of a diaphragm may be multiplied by 2.5 in order to determine the unblocked deflection according to APA - The Engineered Wood Association [5] TT-064B June 2013 technical paper.

Blocked Diaphragm - In light-frame construction, a diaphragm that has all sheathing panel edges supported on and fastened to framing members or blocking.

Drag Strut (Collector, Tie, Diaphragm Strut) - A horizontal structural element, such as a beam, rafter, top chord of a truss or blocking, in line with a shear wall or other vertical MWFRS element, which collects and transfers diaphragm lateral shear forces to the vertical lateral force-resisting element.

Drift - Drift is the lateral deflection of the vertical lateral load-resisting elements that provide lateral support to a diaphragm.

Effective Wind Area, Components and Cladding - The area for which a component or cladding wind pressure is being determined. In general, the larger the tributary area, the lower the design wind pressure will be. Based upon the ASCE 7 [6] Method I for calculating wind pressures on components and cladding, the tributary area shall be based on a minimum area of 10 square feet. This selected pressure value would be used for fastener calculations or the design of other components that have small tributary wind surface areas.

Elevations, Flood-Related - See Appendix I for Elevation and Flood related abbreviations and definitions.

Exposure, Terrain - Exposure category is an empirical term that considers the effects of free flow wind speed measured at a height of 10 meters (33 feet) above grade adjusted to a given height based on the surface roughness upwind of a structure. A certain upwind length of obstruction or open area is required to develop the wind speed profile for a given exposure category. Exposure category is defined in more detail in the IBC [9], IRC [10] and ASCE 7 [6].

Fascia / Fascia Board - A board made of wood or other material installed horizontally to close the space between the ends of rafters at a roof eave, or installed parallel to rafters at a roof gable end as a finish material. Fascia boards span the gap between rafters, can act as roof drip edge, or may be used to support rain gutters.

> **Sub-Fascia -** A roof edge structural member, typically made of 1-1/2" dimensional lumber, nailed under a 1-1/2" overhang of roof decking and into the rafter ends typically used to provide a stronger base for gutter attachments and a smooth surface for the fascia in case the cut ends of the rafters are not well aligned. Sub-Fascia may also be added for architectural purposes. Fascia finish boards are attached to Sub-Fascia members.

Flood - See Appendix I for Elevation and Flood related abbreviations and definitions.

Gable / Gable Wall - The portion of a wall between two or more edges of a roof that can occur on any side of a structure or at a dormer face. Gables are typically vertical and triangular, but can take on any geometric shape such as trapezoidal, rectangular, circular, or “Dutch-gable”, etc., depending on how the adjacent roof edges extend to the roof peak. A gable wall or gable end more commonly refers to the entire wall, including the upper gable section and the wall below it. In house construction, the gable is the portion of the wall above the eave line of a double-sloped roof.

Girder - A beam member that primarily supports other beams.

Girt - A horizontal structural member that is attached to sidewall or endwall columns and transfers wind loads to the columns and supports any lightweight cladding materials that may be used in Pre-Engineered Metal Buildings.

Header - A beam installed above openings to carry loads across the opening.

Hip - The inverted V-shaped intersection of two non-planar sloping roof surfaces of a hip (or hipped) roof section.

Hurricane Prone Regions - Defined in ASCE 7-05 [6] as the U.S. Atlantic Ocean and Gulf of Mexico coasts (and various islands) where the basic wind speed is greater than 90 mph. Defined in ASCE 7-10 and ASCE 7-16 [6] as the U.S. Atlantic Ocean and Gulf of Mexico coasts (and various islands) where the basic wind speed for Risk Category II buildings is greater than 115 mph. The Texas Department of Insurance (TDI) defines the Hurricane Prone Regions as the entire Designated Catastrophe Area indicated on their windstorm design wind speed maps of the Texas Gulf Coast.

Insulated Concrete Form (ICF) - ICF covers a class of pre-engineered building products that use a pre-formed insulated material as a form for constructing reinforced concrete walls. Most commonly, ICFs consist of interlocking blocks that are stacked and filled with rebar reinforced concrete. The

surface insulating material is finished with a veneer (stucco, brick, stone, siding, plaster, or gypsum board). ICF can also refer to insulated floor systems, roof system, and panel systems.

Jack Beam - A beam used to support another beam, rafter or truss and eliminate a column support.

Joist (Ceiling, Floor, Roof) - A repetitive parallel horizontal or near horizontal structural framing member that supports floor, ceiling, attic, or roof loads. Floor joists support floor and wall loads. Ceiling joists support ceiling, attic, and sometimes portions of roof loads. Ceiling joist systems are sometimes architecturally framed in stepped or sloped-stepped shapes referred to as “coffered”. A series of nearly horizontal roof rafters supporting a roof deck load are also called roof joists. Joist systems are sometimes referred to as 'beam-systems' in design software.

> **I-Joist -** A common type of engineered lumber member consisting of a wood top and bottom “flange” made of laminated veneer lumber (LVL) or finger-jointed sawn lumber connected by an engineered wood “web” panel such as plywood or oriented strand board (OSB).
>
> **Open Web Joist -** A class of engineered structural joist or rafter components constructed from wood, steel, or a combination of both. Trusses are designed to carry higher loads while also allowing MEP penetrations of specific sizes and designated locations. Metal based members include welded “bar joists” and cold-formed/stamped steel joists. Trusses are typically pre-fabricated.

Load Paths - Complete and continuous paths consisting of an assemblage of structural members and connections that transfer loads applied to the building superstructure walls, roof, and floors down to the building foundation and supporting ground and may include components that provide resistance against uplift and overturning forces.

> **Lateral -** Lateral loads such as horizontal wind pressures and seismic loads are transferred to the foundation along lateral load-resisting paths consisting primarily of wall framing members, horizontal diaphragms, bracing, and vertical shear walls/frames that ensure lateral stability.
>
> **Vertical** - Vertical loads such as gravity (dead weight), live, snow, and vertical wind pressures and seismic loads are transferred along vertical load-resisting paths consisting primarily of floor and roof framing members, columns, and walls.

Main Wind Force Resisting Systems (MWFRS) - Main Wind Force Resisting Systems generally are large structural assemblies that receive loads from wind pressures spread out over large surface areas and from more than one surface. Examples of assemblies that are designed using MWFRS pressures are diaphragms, shear walls, portal frames, holddown connections, shear transfer connections, and roof framing anchorage to walls (straps and framing connectors). When determining wind pressures on MWFRS components, it is important to be mindful that MWFRS design pressures were derived with the intent that they be used for the design of MWFRS components that resist forces from combined wind pressures acting over large surface areas that vary in intensity from their peak values that are used for the design of components and cladding. For example, ASCE 7-10 and ASCE 7-16 Commentary Section C26.2 indicates that individual members of roof trusses should be designed for C&C pressures whereas the end anchorage of long-span roof

trusses may be designed for MWFRS pressures. Similarly, it may be appropriate to use MWFRS pressures for the end anchorage design of relatively short span roof trusses that are spaced close together (e.g. 10-ft-span trusses spaced at 2-ft on center).

Mean Roof Height - The distance from the ground to a point midway between the roof eave and the roof peak is referred to as the Mean Roof Height. If the roof slope is less than 10 degrees (approximately a 2:12 pitch), then the roof eave height may be used as the Mean Roof Height per ASCE 7.

Performance Category, Plywood - A nominal plywood thickness. The actual thickness of the plywood has a minimum and maximum value. Plywood may be sanded, unsanded, touch sanded or overlaid.

Plate, Bottom - A horizontal member attached to the bottom of a frame wall and connected to a floor system or foundation. This plate is often called a Sill, Mudsill or Sole plate when attached to a concrete foundation. A Bottom Plate may consist of single members or double members with lapped joints.

Plate, Mudsill or Sole - A wood foundation member, usually a pressure treated member, fastened to the concrete foundation and on which other framing members can be attached. Also see Plate, Bottom.

Plate, Top - A horizontal wood member attached to the top of a wood frame wall that supports floor, ceiling and/or roof members. Top plates shall be doubled unless “in-line” framing (i.e., framing having vertical stud and horizontal joist framing members aligned) is used with appropriate lateral ties at intersections and corners. Double top plates must be lapped (i.e., the end joints must be offset) per the prescriptive code or for specific design loads. For wind design, top plates may function as the chords of the roof or floor diaphragm and are designed to carry the tension and compression forces from the diaphragm.

Portal Frame - A rigid frame consisting of connected beams and columns designed to develop the full moment capacity of the smallest connected member. Connections should have adequate stiffness and strength capacity to justify the design assumption of no relative rotation between the connected ends of the beam and column.

Portal Frame, Wood - Narrow wall segments that are designed or tested with an aspect ratio larger than the maximum allowed for shear wall panels, that are rigidly or semi-rigidly attached to a header beam and covered with a wood structural diaphragm panel attached with closely spaced fasteners. By rigidly attaching the wall segment to the header beam, a fixed connection is created at the top of the wall segment providing extra capacity to the wall segment to aid in lateral force resistance. For wood portal frame design values see the APA - The Engineered Wood Association document TT-100, current version (www.apawood.org) [5].

Pre-Engineered Metal Building - A metal building system comprised of an integrated set of components and assemblies, including but not limited to rigid frames typically made of tapered built-up structural steel members, secondary members that are cold-formed steel purlins or steel

joists, and metal sheeting cladding components, specifically designed to support and transfer loads and provide a complete or partial building shell.

Prescriptive Codes and Standards - Prescriptive codes such as the IRC [10] provide construction methods that allow a structure to be constructed without the involvement of an engineer. If a structure meets the limitations assumed by the document and is constructed in accordance with the provisions of the document, then it is deemed to comply with that code. Prescriptive documents are based on common construction practices and engineering. Prescriptive codes have well-defined limitations and applicability. Structures or portions of structures that have geometries, climatic considerations, or construction materials that are not addressed by the prescriptive code must be designed in accordance with accepted engineering practices. Accepted engineering practice is best defined in adopted standards and codes as they usually reflect known failure mechanisms and damage assessments. In all cases where an engineered design is required, rational analysis should be performed. Where engineering judgment is used, that judgment should be supportable by rational engineering analysis that follows accepted engineering standards.

- Per IRC [10] R301.2.1.1, 2009 edition and earlier, prescriptive design is NOT allowed for regions where the basic wind speeds (3-second gust) from Figure R301.2(4) equal or exceed 100 mph (45 m/s) *in hurricane-prone regions*, or 110 mph (49 m/s) elsewhere.
- Per IRC [10] R301.2.1.1, 2012 and 2015 editions, prescriptive design is NOT allowed for regions where the basic wind speeds (3-second gust) from Figure R301.2(4)A equal or exceed 110 mph (49 m/s).
- Note: TDI currently requires windstorm inspections for all structures located in the Designated Catastrophe Areas during the building construction phase. The windstorm inspector must be an Appointed Qualified Inspector (AQI) appointed by TDI who is a TBPE registered engineer. The AQI must certify that the construction meets the TDI adopted codes regardless of whether the building was designed by prescriptive methods or by an engineer.

Purlin - A roof framing member used to transfer gravity forces to other elements of the vertical gravity force-resisting system.

> **In Framed Buildings -** A horizontal structural member of any material attached under and perpendicular to a sloping rafter system to shorten the rafter total free span. Purlins for wood rafter support should be braced at nominal 4-ft centers at less than 45 degrees off vertical to load bearing walls, beams, multiple joists, or to a strongback located on a joist system. Wood purlin braces over 8 ft. in length must be tee-braced and/or engineered.
>
> **In Pre-Engineered Metal Buildings -** A repetitive horizontal structural member that supports roof covering and transfers loads to rigid frame rafters or girders.

Rafter - A horizontal or sloped structural framing member that supports roof loads.

> **In Framed Buildings -** A repetitive parallel horizontal or sloped structural framing member that follows the sloping roof surface and supports loads transferred through roof decking planks or sheathing.

Jack Rafter - A rafter located near a hip or valley of a roof that spans from the top wall plate or ridge board to the hip or valley rafter. A Hip Jack Rafter spans from a top wall plate up to a hip rafter and a Valley Jack Rafter spans downward from a ridge board to a valley rafter.

Common Rafter – A rafter that extends from the top plate of the wall to the ridge board typically at right angles to both members.

Hip Rafter - A rafter located along a hip intersection of two non-planar sloping roof surfaces that supports the upper ends of the hip jack rafters that span vertically along each sloping surface.

Valley Rafter - A rafter located along a valley intersection of two non-planar sloping roof surfaces that supports the lower ends of the valley jack rafters that span vertically along each sloping surface.

In Pre-Engineered Metal Buildings - A main beam or girder supporting the roof system that is typically part of a rigid tapered frame or other vertical load carrying system.

Roof, Mono-Slope - A roof with a single slope in one direction.

Roof, Pitched - A roof with one or more sloping surfaces, such as a hipped, gable or mono-sloped roof.

Rafter Tie - A horizontal structural framing member located in the lower third of the attic space that ties opposed sloped rafters together in order to resist the outward thrust component at the top of the supporting wall resulting from gravity roof loads.

Rafter Overhang (Eave) - The horizontal projection of a rafter measured from the outside face of the wall to the outside end of the rafter or fascia board. Rafter overhangs must be designed to resist upward wind pressures applied to the lower soffit and eave top surfaces, and the uplift load must be transferred from the overhang framing to the adjacent wall studs.

Rafter Tail - The portion of a rafter that extends outward past the supporting wall to form the eaves.

Rake Overhang - The horizontal projection of a gable roof measured from the outside face of a gable endwall to the outside edge of the roof or fascia board. Rake overhangs must be designed to resist upward wind pressures applied to the lower soffit and top roof surfaces, and the uplift load must be transferred from the overhang framing to the gable wall studs.

Ridge - The horizontal line formed by the adjoining top edges of two opposite sloping roof surfaces.

Ridge Beam - A structural member used at the ridge of a roof to support the upper ends of roof rafters and transfer roof loads to vertical wall or column supports.

Ridge Board or Plate - A non-structural member used at the ridge of a roof to provide a common nailing surface and point of bearing for opposing roof rafters.

Ridge Strap - A metal connector across the ridge that anchors opposing rafters together to resist end reactions from wind uplift. These reactions may also be resisted with a properly designed Collar Tie (Rafter Tie) for each rafter.

Ridge Vent - A continuous opening located above the ridge beam or ridge board allowing the venting air flow to take place.

Roof Span - The horizontal distance between the outside of exterior walls supporting the roof/ceiling or truss assembly. The roof span is typically twice the common total rafter span for a roof.

Roofing:

Flashing Requirements - Properly flash all penetrations, valleys and roof edges in accordance to the wind zone the structure is located.

Classification - Shingles are recommended to be minimum ASTM D 3161 Class F; or ASTM D 7158 /ASTM D 6381/UL 2390 - Class H.

- For 120 MPH 3 second gust areas use ASTM D 3161 Class F; or ASTM D 7158 /ASTM D 6381/UL 2390 - Class G or H,
- For 130 MPH 3 second gust areas use ASTM D 3161 Class F; or ASTM D 6381 Class H; or UL 2390 Class H; or ASTM D 7158 Class H. This testing must be printed on the roof packaging.

Starter Rows - Use starter row shingle or adhesive sealant installed in accordance with the manufacturer's recommendation.

Cap Shingles - Use an approved ridge cap shingle.

Roofing Nails - Refer to Section 3.5 for corrosion requirements.

Roofing and Vent Edges - All vent edges and roof edges such as gable ends should have adhesive strip shingles or have additional adhesive caulk applied under the roof shingle edges. Use only 110 MPH 3 second gust rated ridge vents/turbo-vents for 110 MPH 3 second gust & below. Ridge Vents are typically not rated for 120 & 130 MPH 3 second gust.

Setback - The offset distance of a wall on a floor system, measured from the supporting towards mid-span of the floor system.

Shear Wall - Vertical diaphragm capable of transferring lateral forces to the structure below.

Shear Wall Design Methods:

Force Transfer Around Openings - A Shear Wall where framing and connections around the openings are designed to transfer the shear force around the opening. Each Wall Pier at the side and top of an opening must meet the appropriate aspect ratio for the material being used and have sufficient capacity to resist the lateral load. Design for force transfer shall be based on rational analysis. Detailing of boundary elements around the opening shall be provided. The 3 common methods in use for analyzing the shear transfer around openings are the drag strut analogy, cantilevered beam analogy and coupled beam analogy. Also see Section 2305.3.8 of the 2006 IBC (no longer referenced in the 2012 and 2015 IBC [9], but is referenced in SDPWS [4]).

Perforated Shear Wall - A shear wall composed of shear wall segments with overturning restraint provided at each end of the shear wall, but which does not require special connections for force transfer around wall openings. Shear Wall capacities are typically reduced, and hold-down reactions increased to account for the holes in the wall by using the Shear Resistance Adjustment Factor. A perforated shear wall line must have a wall segment at each end that meets the aspect ratio for the material being used.

Segmented Shear Wall - Full height shear wall segments that each meets the aspect ratio and, each has full end restraint against overturning with no openings in between.

Shear Wall Line Offset - Shear Walls which are not centerline offset by more than 4 feet horizontally from any other shear wall may be considered in the same shear wall line. The out-to-out offset of the two outside walls is limited to 8 feet.

SIP - See Structural Insulated Panel.

Skylight - A roof accessory to admit light, normally mounted on a curbed framed opening. Also see Translucent Light Panels.

Slab-On-Grade (Slab-On-Ground), **Slab-On-Fill -** The concrete slab that serves as the floor for the first story, upon which the first story framed walls are connected and anchored. The foundation is supported on a prepared subgrade per the geotechnical report's recommendations.

Soffit - A horizontal closure panel located at the underside of a rafter overhang, roof eave, or other horizontal projecting architectural feature such as a porch roof, patio cover, or staircase.

Span (Simple) - The distance between the centerline of two supports.

Story - The portion of a structure included between the upper structural surface of a floor and the upper structural surface of the next higher floor or roof.

Stringer - For a raised floor foundation, stringer beams support floor joist members or floor beams. Typically, wood frame stringers are bolted on one or both sides of a notched foundation piling.

Stringer, Stair - A longitudinal inclined beam supporting stairs.

Strongback - A horizontal dimensional lumber T- or L-shaped assembly used to laterally brace ceiling joists, in lieu of blocking, or designed to distribute loads from purlin braces to multiple joists.

Structural Insulated Panel (SIP) - A factory built, engineered, and tested structural sandwich panel assembly used for roof, wall, and floor systems typically built in core thicknesses that match dimensional lumber. SIPs normally consist of two nominal 7/16" structural wood oriented strand panels laminated to an insulated foam expanded or extruded polystyrene or polyurethane core panel. Structural Insulated Panel systems were adopted into the IRC [10] on May 22, 2007 (2007 IRC Supplement Section R614). SIP manufacturers provide load and span tables for each SIP thickness and spline connection type.

Structural Panels or Sheathing - Structural panels are fastened over framing assemblies consisting of plates, studs, joists, rafters, columns, or beams and will transfer loads to these framing components. Structural panels may be manufactured using wood, cement, steel, fiber, plastic foam based, and will normally be stamped with a rating based on testing. "Sheathing" describes wall coverings, and "Decking" describes floor and roof coverings.

Structural Panel, Sheathing, or Decking:

> **Structural Panels, Oriented Strand Board, Wood** - Structural sheathing constructed from layers of oriented wood fibers compressed with a moisture resistant adhesive. Often used as an alternative to plywood.
>
> **Structural Panels, Plywood** - Structural wooden panel consisting of three or more continuous wood veneer layers set with the direction of the grain alternating.

Stud, Cripple - A cripple stud is a repetitive vertical member under or over an opening.

Stud, Jack (Trimmer, Header) - A vertical element which does not span the full height of the wall and traditionally supports the vertical reactions (gravity and wind uplift) of a header or beam. King Studs are usually immediately adjacent and fastened to the jack studs.

Stud, King - A full-story repetitive vertical structural element of wall assemblies that transfers vertical and/or lateral loads to the Top and Bottom Plates.

Terrain - A term for topography defining a physical geometry of the land features in which a structure is erected.

Translucent Light Panels - Panels used to admit light through roofs. Also see Skylights.

Tributary Area - The structural geometric area that applies loads to the structural element for the loading analysis.

Truss, Roof - A pre-engineered roofing component that typically combines the functions of both roof rafters and ceiling joists into a single preassembled structural roofing element. Roof trusses are commonly triangular in shape but can be designed in virtually any shape or slope.

Valley - The V-shaped intersection of two non-planar sloping roof surfaces at the intersection of two different rectangular building sections that have hip or gable roofs.

Vertical Floor Offset - The distance between two adjoining floor assemblies which do not lie in the same horizontal plane.

Vertical Wall Offset - The distance between two adjoining exterior wall assemblies which do not lie in the same vertical plane.

Wall, Balloon Framed – Continuous vertical framing for more than one floor. Examples include stairwells, parapets and framed chimney chases.

Wall, Knee (Pony Wall, Half Wall) - A wall normally framed above other walls that may or may not be load bearing. This wall type is used under railings or landings, as an added brace under rafters, or as an extension above the top plate.

Wall, Stem - A short load bearing wall (concrete, block, or wood framed) typically used in raised floor construction. An example of this wall type is under the house between the foundation and floor joists or subfloor beams. Also called crawl space walls.

Wall Pier - The section of wall between openings, typically a narrow Shear Wall.

Wind Bent - See Portal Frame.

Wind-borne Debris Region -

- ASCE 7-05 [06] (section 6.2) - Locations “Within 1 mile of the coastal mean high water line where the basic wind speed is equal to or greater than 110 mph and in Hawaii,” or “In areas where the basic wind speed is equal to or greater than 120 mph.”
- ASCE 7-10 [06] (section 26.10.3.1) - Locations “Within 1 mi of the coastal mean high water line where the basic wind speed is equal to or greater than 130 mph (58 m/s),” or “In areas where the basic wind speed is equal to or greater than 140 mph (63 m/s).”

Wind Speed Contour - The difference in wind speeds represented by lines on maps produced in the IBC [09], IRC [10] and ASCE 7 [06] and divided in 10 mph increments.

Window Sill Plate - A horizontal framing member below a wall opening.

Wood Structural Panel - See Structural Panel

Wooden Wind Anchors (Lollipops) - 2x members used to attach piling-supported floor beams to floor joists with corrosion resistant fasteners and can be considered in lieu of galvanized or stainless

steel sheet metal connectors in severe exposures where corrosion damage may require yearly inspection of sheet metal connectors.

COMMON PLAN ABBREVIATIONS:

AWB: Above Wall Below
DB: Drop Beam

BBE: Beam By Engineer
BLK: Blocking
CANT: Cantilever
EOR: Engineer Of Record

FB: Flush Beam
FRB: For Roof Bracing
GL: Glulam

HB: Header Beam
HG: Hanger

HM: Hip Member
LAS: Limited Attic Storage
NAS: No Attic Storage
RB: Ridge Beam or Roof Beam

RM: Roof Member

RT: Roof Truss

OE: Or Equal, Or Equivalent
UNO: Unless Noted Otherwise (On Plans)

UON: Unless Otherwise Noted (On Plans)

UWA: Under Wall Above

VM: Valley Member

3.0 WINDSTORM DESIGN CHECKLIST

THE PDF VERSION OF THIS DOCUMENT IS A FILLABLE FORM. THIS FILLABLE FORM MAY NOT WORK PROPERLY ON ALL COMPUTERS AND TABLETS. IT IS RECOMMENDED THAT THE CURRENT VERSION OF ADOBE ACROBAT READER BE DOWNLOADED ON YOUR DEVICE. IN ADDITION, SOME USERS MAY HAVE TO INSTALL ADOBE FILL & SIGN ON THEIR TABLETS.

3.1 DESIGN SECTION: PROJECT INFORMATION AND LOCATION

Date: _____; Project #: _____; Client's Name: _____; ☐Client's Name Unknown
Project Address (make sure address is correct on TDI forms): _____;
City _____, Zip Code _____, County _____, Legal Description: Lot _____, Block _____, Section _____,
Tract or Subdivision _____.
☐Inside City Limits; ☐Outside City Limits
Structure is located in: ☐Inland II, ☐Inland I, ☐Seaward, ☐Other _____.
Is the structure located in a Coastal Barrier Resource Zone (COBRA): ☐Yes, ☐No (not insurable after June 11, 2003 in Texas)

Owner: Name: _____, Telephone No.: _____,Fax No.: _____,
Mailing Address: _____, City: _____, Zip Code: _____
Builder/Contractor (at time of construction):_____, Telephone No.: _____,Fax No.:_____,
Mailing Address: _____, City: _____, Zip Code: _____
Structural Design firm: _____, Engineer: _____, Telephone No.: _____,Fax No.: _____,
Mailing Address: _____, City: _____, Zip Code: _____;
E-Mail Address: _____.

Structure Type: ☐Commercial, ☐Residential Dwelling, ☐Duplex, ☐Garage Attached by Breezeway, ☐Detached Garage, ☐Condominium (# of Units: _____), ☐Townhouse (# of Units _____), ☐Apartments (# of Units: _____, ☐Farm & Ranch, ☐ Pre-Engineered Metal Building, ☐Other (Specify):_____.

Type of Design:
☐Entire Building (Type) _____;
☐Entire Re-Roof (Type) _____; ☐Re-Decking;
☐Partial Re-Roof (Type) _____; ☐Re-Decking; ☐Alteration (Type) _____; ☐Repair (Type) _____;
☐Mechanical Only (Type) _____; ☐Foundation Only (Type) _____; ☐Addition (Type) _____;
☐Retrofit of Existing Openings_____,

3.2 DESIGN SECTION: BASIC WIND LOAD INFORMATION

BUILDING EXPOSURE CATEGORY: ☐B ☐C ☐D
Note: The Texas Department of Insurance in most cases suggests using Exposure C
Enclosure Type: ☐Enclosed; ☐Open; ☐Partially Enclosed

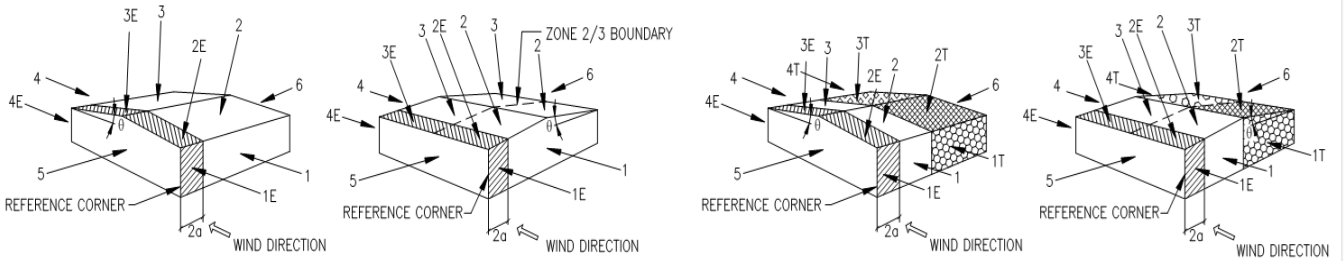
WIND LOAD STANDARD
☐ASCE 7-_____Edition
☐Wood Frame Construction Manual, _____Edition
☐Code IBC, _____Year
☐Code IRC, _____Year
☐SSTD−10 (99) / ICC−600
☐City or County Code Required
☐IRC, Cold Formed Steel Provisions
☐Prescriptive Design (refer to TDI Texas revisions)

☐Other _____.
To assist in determining the ASCE 7 comparative wind speeds, see the Applied Technology Council's website at https://hazards.atcouncil.org.

☐ASCE 7-05 _____mph 3-second gust basic wind speed _____Importance factor BUILDING CATEGORY: ☐ I ☐ II ☐ III ☐ IV WINDBORNE DEBRIS PROTECTION REQ'MENTS: ☐Not Required (less than or equal to 110 mph, Inland II) ☐Glazed openings (120 mph, Inland I) ☐All Openings (130 mph, Seaward per Texas Revisions) suggests using Exposure C	☐ASCE 7-10 & ASCE 7-16 _____ mph 3-second gust basic wind speed _____ Exposure Category _____Risk Category _____ MRI (Mean Risk Interval) WINDBORNE DEBRIS PROTECTION REQ'MENTS: ☐*Wind Zone 1* – 130 mph ≤basic wind speed < 140 mph ☐*Wind Zone 2* – 140 mph ≤ basic wind speed < 150 mph at greater than one mile from the coastline. ☐*Wind Zone 3* - basic wind speed ≥ 150 mph, or basic wind speed ≥ 140 mph and within one mile of the coastline ☐Other _____,

3.3 DESIGN SECTION: WIND PRESSURES

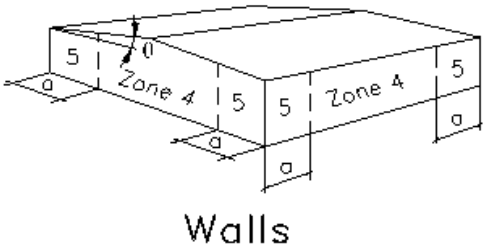
MWFRS EXTERIOR PRESSURES:
"a" Width:_____ feet Per ASCE 7 [06]: 10% of least horizontal dimension or 0.4*Mean Roof Height (except that eave height shall be used for roof angles <10º), whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 in).
Height _____': Pressure _____psf
Height _____': Pressure _____psf Zone 2 Width: _____'
Height _____': Pressure _____psf Zone 3 Width: _____'
See Zones per ASCE 7 [06] below:



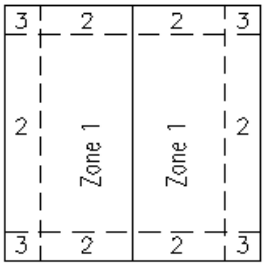
C&C PRESSURES:
"a" Width: _____' Per ASCE 7 [06]: 10% of least horizontal dimension or 0.4*Mean Roof Height (except that eave height shall be used for roof angles <10º), whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft
_____' Wide x _____' High, _____ Zone: Pressure _____psf
_____' Wide x _____' High, _____ Zone: Pressure _____psf
_____' Wide x _____' High, _____ Zone: Pressure _____psf
_____' Wide x _____' High, _____ Zone: Pressure _____psf

OVERHANG PRESSURES:
_____' Wide x _____' High, _____Zone: Pressure _____psf

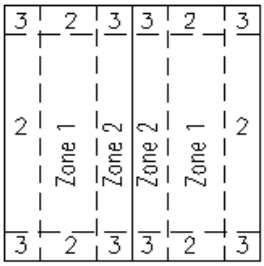
See Zones per ASCE 7-05 & ASCE 7-10 below:



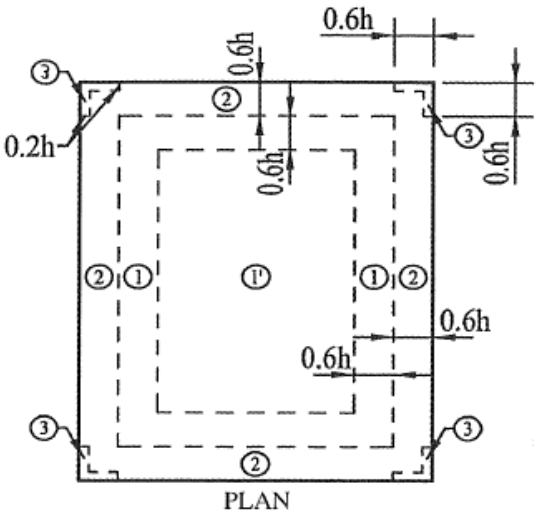
Walls

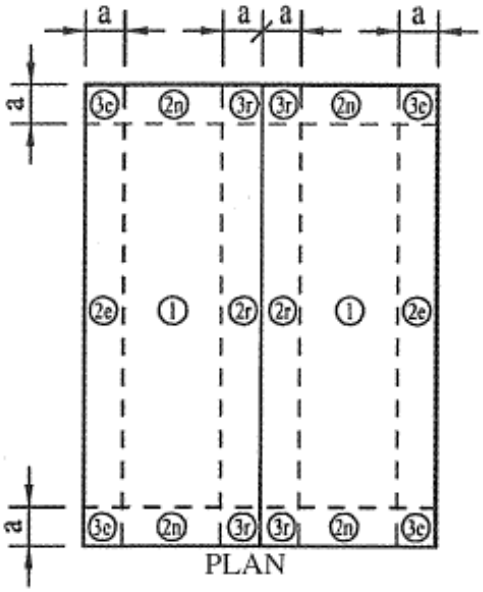


Roof $\theta \leq 7°$



Roof $\theta > 7°$





3.4 DESIGN SECTION: GEOMETRY

ROOF SLOPE: _____:12 Min; _____:12 Max
HIGHEST RIDGE HEIGHT: _____feet; HIGHEST EAVE HEIGHT: _____feet
MEAN ROOF HEIGHT (average of the eave and ridge): _____feet
BUILDING DIMENSIONS: Section A: _____feet x _____feet; Section B: _____feet x _____feet; Section C: _____feet x _____feet
ROOF SPANS:
Section A: Max Front to Back: _____feet; Section A: Max Left to Right: _____feet
Section B: Max Front to Back: _____feet; Section B: Max Left to Right: _____feet
Section C: Max Front to Back: _____feet; Section C: Max Left to Right: _____feet

NUMBER OF STORIES: _____
WALL HEIGHT (feet): _____(Bottom of Lowest Horizontal Structural Member); _____ (Top of Finished Floor); _____ (1st floor); _____ (2nd floor); _____(3rd floor); Other_____.
OVERHANGS: Eaves _____"; Gables _____"; Cantilevers _____"

☐Irregularly Shaped Building
Additional Comments_____.

3.5 DESIGN SECTION: FRAMING - GENERAL

CONSTRUCTION METHOD: ☐Wood; ☐Masonry; ☐Concrete/ICF; ☐Steel, Cold-Formed; ☐Steel, Structural Steel; ☐SIP;
☐Other_____.

FLOOR FRAMING SYSTEM:
☐Dimensional Lumber; ☐Wood Trusses; ☐Wood I-Joists; ☐Cold-formed Steel Joists; ☐Bar Joists;
Other, specify _____.
Floor framing depth _____"; Floor decking type _____ and nominal thickness _____";
Member Material Specification/Description _____.

INTERIOR WALL STUDS:
☐WOOD: Height _____, Size_____, Spacing _____", Species _____, Grade _____
☐COLD-FORMED STEEL: Height _____, Size _____, Spacing _____", F_y _____ksi, Thickness _____mils
☐OTHER, DESCRIBE: _____.

EXTERIOR WALL STUDS:
☐WOOD: Height _____, Size _____, Spacing _____", Species _____, Grade _____
☐COLD-FORMED STEEL: Height _____, Size _____, Spacing _____", F_y _____ksi, Thickness _____mils
☐OTHER, DESCRIBE: _____.
☐COLD-FORMED STEEL GIRTS: Height _____, Size _____, Spacing _____", F_y _____ksi, Thickness _____mils

ROOF FRAMING:
☐ RAFTERS WOOD: Projected Span _____, Size _____, Spacing _____", Species _____, Grade _____
☐ RAFTERS COLD-FORMED STEEL: Height _____, Size _____, Spacing _____", F_y _____ksi, Thickness _____mils
☐ TRUSSES, ☐Wood Trusses, ☐ Cold-Form Steel Trusses
☐ PRE-ENGINEERED METAL BUILDING PURLINS:Height _____, Size _____, Spacing _____", F_y _____ksi, Thickness _____mils

ROOF DECKING:
☐ Wood, Roof decking: ☐ Plywood, Performance Category _____";☐OSB, Performance Category _____";
Other _____ thickness _____";
☐ Cold-Formed Steel, Roof Deck: Type _____, Thickness _____gauge, Description _____

ROOFING SYSTEM (refer to components and cladding for more information):
☐ Composition Shingles; ☐ Metal; ☐ Membrane; ☐ Tile

MISCELLANEOUS: Sub-fascia for roof edge nailing Size _____, Spacing _____";
☐Exposed rafter tails (no fascia members); ☐Support for rafters at hips for exposed rafter tails;
☐Spliced rafter tails – designed; ☐Pitch change at the eave overhang designed, if applicable;
☐Rafters nailed to ceiling joists with (_____) _____d nails; or ☐Raised Plate;
Gable overhang construction ☐Brackets, ☐Outlookers, Span _____, Member Size _____, Spacing _____";
Type of gable end wall bracing _____; ☐Detail on plans
Strong-backs or bridging/blocking for attic joists: Size _____, Spacing _____"
☐Ballooned framing at 2 story areas/stairs;
If not ballooned, describe wind load transfer mechanism _____;
Describe Chimney framing method / bracing _____; ☐Balloon Framed chimney studs;
Describe Dormer framing method / bracing _____;
Sill design under window (or other openings) assemblies _____, Transfer to king studs _____;
Header design over window (or other openings) assemblies _____; Transfer to king studs _____;
☐Top plate/stud penetrations addressed;
End zone (A) stud and rafter spacing _____" on center; ☐ or doubled
☐Architecturally thick exterior stud walls designed to resist lateral/torsional buckling

FASTENERS:
Corrosion resistance for metal connectors and fasteners in open areas (see Texas IRC revisions Section R325 for additional information):

☐ Seaward:
- ☐ Stainless steel per ASTM A167;
- ☐ Hot dipped galvanized after fabrication per ASTM A123 or ASTM A153;
- ☐ Hot dipped galvanized or galvannealed before fabrication per ASTM A653.

☐ Inland I: code approved:
- ☐ Stainless steel per ASTM A167;
- ☐ Hot dipped galvanized after fabrication per ASTM A123 or ASTM A153;
- ☐ Hot dipped galvanized or galvannealed before fabrication per ASTM A653;
- ☐ Hot-dip galvanized or electrogalvanized per ASTM A641;
- ☐ Mechanically deposited zinc coatings per ASTM B695;
- ☐ Or electrodeposited zinc coatings per ASTM B633;
- ☐ Exception: One-half inch diameter or greater steel bolts, ☐ Galvanized anchor bolts.

Corrosion resistance for metal connectors and fasteners in vented or enclosed areas (see Texas IRC revisions Section R325 for additional information):

☐ Seaward:
- ☐ Stainless steel per ASTM A167;
- ☐ Hot dipped galvanized after fabrication per ASTM A123 or ASTM A153;
- ☐ Hot dipped galvanized or galvannealed before fabrication per ASTM A653;
- ☐ Hot-dip galvanized or electrogalvanized per ASTM A64;
- ☐ Mechanically deposited zinc coatings ASTM B695;
- ☐ Electrodeposited zinc coatings per ASTM B633;
- ☐ Exception: One-half inch diameter or greater steel bolts, ☐ Galvanized anchor bolts.

☐ Inland I:
- ☐ Stainless steel per ASTM A167;
- ☐ Hot dipped galvanized after fabrication per ASTM A123 or ASTM A153;
- ☐ Hot dipped galvanized or galvannealed before fabrication per ASTM A653;
- ☐ Hot-dip galvanized or electrogalvanized per ASTM A641;
- ☐ Mechanically deposited zinc coatings per ASTM B695;
- ☐ Electrodeposited zinc coatings per ASTM B633;
- ☐ Epoxy-coated per ASTM A899;
- ☐ Exception: One-half inch diameter or greater steel bolts, ☐ Galvanized anchor bolts.

Additional Comments: _____.

3.6 DESIGN SECTION: FRAMING – UPLIFT

Roof: ☐ Roof decking designed for uplift pressures; ☐ Rafter or Roof Truss to double top plate; Member spacing _____" on center; ☐ Rake overhang outlookers to raking double top plate _____" on center; Rafter splices: ☐ Strapped to support members; ☐ Lap nailed together with(_____) _____d nails;

Interior Rafter Bracing Strapping: ☐ Rafter to Purlins; ☐ Purlin to Supporting Member; ☐ Supporting Member to interior supporting studs; ☐ Interior stud wall to sill plate; ☐ Interior sill plate to foundation with anchor bolts or ☐ powder-actuated fasteners; Hips, Valleys and Ridge Strapping: ☐ Rafter strapping over hip member _____" on center; ☐ Rafter strapping under valley member _____" on center; ☐ Strapping over the ridge _____" on center; Collar ties _____" on center

Exterior Wall Strapping: ☐ Double top plate to studs _____" on center (or) ☐ Rafter/Roof Truss directly to Studs _____" on center); ☐ Stud to Stud (floor-to-floor) _____" on center; ☐ Stud to Sill Plate _____" on center; ☐ Sill plate to foundation _____" on center; ☐ Framing connectors, which are installed at the top of a stud, are installed at the bottom of each stud and vice-versa

☐ Structural Wood Panels are designed for combined shear and uplift from wind (refer to APA document SR-101c [5]) _____" Edge Nailing

Beam Strapping (exterior beam or Cathedral Ceiling): ☐Rafter or Roof Truss to roof beams; ☐Roof beams to columns; ☐Columns to floor beam; ☐Floor beam to columns; ☐Columns to foundation

Header Strapping: ☐Upper cripple studs down to header; ☐Header to trimmer studs

Anchor Bolts: Diameter _____", Grade _____; Length _____" (10" single sill plate or 12" for double sill plate) Embedment _____"; Spacing _____"; Anchor bolt capacity _____; ☐Washer size 2"x2" square washers, Other _____, Washer thickness _____;
☐Mud Sill Strapping, Spacing _____"

☐Uplift Rod Tie-Down System; ☐Design of transfer of uplift loads though double top plates to rod tie-down system

3.7 DESIGN SECTION: FRAMING - LATERAL

ROOF DIAPHRAGMS: Diaphragm Panel Orientation: _____;
Type: ☐Plywood, Performance Category _____"; ☐OSB, Performance Category _____"; ☐Solid Lumber Thickness _____";
☐other _____, Thickness _____"; Roof panel edges: ☐Blocked, ☐Unblocked, ☐Partially Blocked;
Roof Member Spacing _____" on center; ☐Nails or ☐Screws; Fastener size _____ and Type _____
Edge spacing parallel to load _____" on center; Edge spacing perpendicular to load _____" on center; Field spacing _____" on center; Chord size _____, Spacing _____" on center and Type _____; Aspect Ratio _____; Load transfer method from Diaphragm to Shear Wall _____.

FLOOR DIAPHRAGMS: Diaphragm Panel Orientation: _____; Type: ☐Plywood, Performance Category _____"; ☐OSB, Performance Category _____"; ☐Solid Lumber, Thickness _____"; Other _____.
Thickness _____"; Aspect Ratio _____; ☐Rigid (deflection calculations required for vertical shear elements in order to determine relative stiffness for diaphragm load distribution) (or) ☐Flexible; Floor panel edges: ☐Blocked; ☐Unblocked; Floor Member Spacing _____" on center; ☐Nails or ☐Screws; Fastener size _____ and Type _____; Edge spacing parallel to load _____" on center; Edge spacing perpendicular to load _____" on center; Field spacing _____" on center; Diaphragm Chord size _____, Spacing _____" on center and Type _____;
☐Diaphragm Deflection Calculations

Openings in Floor Panel Diaphragms addressed: ☐Yes or ☐No;
☐ Redistribution of Shear Loads from offset Shear Walls above;
☐Diaphragm Deflection Calculations Load transfer method from Diaphragm to Shear Wall _____;Load transfer method from Diaphragm to dropped floor and openings _____; Wall top plate splice offset: Minimum dimension _____; offset splice nailing _____d nails _____" on center

☐SHEARWALLS
☐Blocked, ☐Unblocked; Type: ☐Plywood; ☐OSB; ☐Other _____;
Framing Member Spacing _____" on center; ☐Nails or ☐Screws; Fastener size _____ and Type _____; Edge spacing _____" on center; Field spacing _____" on center;
Maximum Aspect ratio _____; ☐Out-of-Plane offset (Maximum 4'-0"); Drag Struts: ☐Yes or ☐No;
Holddowns at Shear Wall ends: ☐Yes or ☐No;
Anchors for Interior Shear Walls Addressed: ☐Yes or ☐No;
☐Redistribution of Shear Loads from Shear Walls above;
Lateral Deflections Calculated: ☐Yes or ☐No;
☐Hold down load calculated and holddown specified; ☐Holddowns transfer load to floor below and to foundation

WOOD SHEAR WALL ANALYSIS METHOD (IBC 2006 2305.3; (no longer referenced in the 2012 and 2015 IBC) [9]:
☐Segmented (Non-Perforated); ☐Perforated; or ☐Force-transfer, ☐strapping across openings;
☐Overturning of building envelope addressed

3.8 DESIGN SECTION: COMPONENTS & CLADDING

☐The roof and C&C zone pressures are on the plans per Section 3.3

See panel attachment in Section 4.8. Since the design engineer may not be the windstorm engineer, the roof covering is in the quality control section and is designed from the wind pressures provided on the plans. The pressures for the design are provided in Section 3.3.

3.9 DESIGN SECTION: FOUNDATION

GENERAL INFORMATION
☐Concrete: 28 day strength _____psi; Vapor Retarder: _____, Manufacturer, _____mil thickness, _____grams, _____permeance; _____ lbs/in tensile strength, ☐ Minimum concrete cover specified

FOUNDATION TYPE
1. ☐SLAB-ON-GROUND WITH CONVENTIONAL STEEL REINFORCING
Grade beams: Depth _____" x Width _____", Stirrups #_____ @ _____ o.c., Steel (_____) #_____ bars Top & Bottom
Corner Bars: #_____ bars _____' x _____' Top & Bottom at ☐corners, at ☐tee intersections;
Slab: _____"Thick, #_____bars at _____" o.c.e.w., Chair: _____" Height, _____" Spacing

2. ☐POST-TENSIONED SLAB-ON-GROUND
Grade beams: Depth _____" x Width _____", Cables: ☐Draped in beam; If yes, How many in each beam _____;
Prestress _____psi;
Slab: _____" Thick, Chair: _____"Height, _____"Spacing

3. ☐STRUCTURALLY ISOLATED FOUNDATIONS (CRAWL SPACE & VOID FORMS)
☐Grade beams: Depth _____" x Width _____"., Stirrups #_____ @ _____, Steel (_____) #_____ bars Top & Bottom; Slab: _____"Thickness, #_____bars at _____" o.c.e.w., Chair: _____"Height, _____"Spacing
Void Space Material:_____" deep void forms; ☐Cardboard Forms, ☐Metal Forms, ☐Plastic Forms,
☐Other Forms, Describe _____.

☐Crawl Space: Clearance _____", ☐Treated material for wood joists less than 18" above grade; ☐Treated material for wood girders less than 12" above grade;
☐ Cold-Formed Steel Structural Members per plans
☐Treated material located below the Base Flood Elevation (BFE);
☐Holddown to beam detail
Floor framing depth _____"; Floor decking type _____ and nominal thickness _____";
Member Material Specification/Description _____.

4. ☐SPREAD FOOTINGS
Footings: Depth _____" x Width _____". Embedment _____" below grade (12" minimum); Stirrups #_____ @ _____; Steel (_____) #_____ bars Top & Bottom; Footing type: ☐Strip, ☐Isolated

5. ☐PILE FOUNDATIONS (For Pilings subject to wave action or scour see Appendix II and see Appendix I for Elevation And Flood Abbreviations And Definitions)

Elevation of Bottom of Beams/Stringers: _____', Floor Elevation: _____', BFE: _____', Design FE: _____'
Lowest Adjacent Grade; _____';
Pile Penetration Depth_____'; ☐Piling spacing, size and penetration meets local codes; Beams or stringers attached to pilings method: ☐Bolt size _____" diam.; Number per piling _____; ☐Other_____.
Pile Design Load _____ Kips
PILE TYPE:

☐Timber: ☐Square _____"; ☐Round _____" (☐Uniform; ☐Tapered); Species _____, Grade _____;
☐Other: Describe _____;
Treatment type: ☐CCA-C, ☐ACQ-D, ☐CBA-A or ☐CA-B;
☐Steel: ☐H Section _____" x _____lbs./ft.; ☐Pipe _____" dia. Wall Thickness _____in;
☐Precast Concrete: ☐Square _____"; ☐Round _____in, quantity vertical reinforcement _____,
size vertical reinforcement #_____bars, Size horizontal reinforcement #_____bars,
Spacing horizontal reinforcement _____" on center, Strength _____psi
☐Prestressed Concrete: ☐Square_____", ☐Round _____", Tendons _____, Size _____", Stress _____psi
☐Other: Describe_____.

☐Knee braces; ☐Other type of lateral brace _____.
☐Less than 200' from vegetation line then use 4' x 4' Fibercrete (per FEMA P-55 Coastal Construction Manual)

6. ☐POST FOUNDATIONS

Post Type (holes filled with concrete/non driven pile):
☐Timber: ☐Square _____", ☐Round _____", Species _____Grade _____; Treatment type: ☐CCA-C, ☐ACQ-D, ☐CBA-A or ☐CA-B; Species _____; Grade _____; Post Depth _____feet
Concrete Encasement ☐Diameter _____, Height _____, Strength _____, Reinforcing: _____ Vertical: #_____ bars;
Stirrups #_____ @ _____ o.c., #_____ bars
☐Foundation designed to resist lateral and uplift forces

7. ☐DRILLED PIER FOUNDATIONS
☐Foundation designed to resist lateral and uplift forces

3.10 DESIGN SECTION: WAVE ACTION AND FLOOD

See Appendix I for Elevation and Flood Abbreviations and definitions and Appendix II for flood design references.
Flood Zone_____

☐"A" Zone, ☐ For structures located in an "A" zone, all C&C should be designed in conformance with the applicable wind pressures.
☐"V" Zone, ☐"VE" Zone, ☐ For structures located in an "V" or "VE" zone exceptions exist for breakaway walls. The breakaway walls should be designed to breakaway only if the water pressures are greater than the MWFRS wind pressures.

4.0 WINDSTORM QUALITY CONTROL (QC) ONSITE CHECKLIST

THE PDF VERSION OF THIS DOCUMENT IS A FILLABLE FORM. THIS FILLABLE FORM MAY NOT WORK PROPERLY ON ALL COMPUTERS AND TABLETS. IT IS RECOMMENDED THAT THE CURRENT VERSION OF ADOBE ACROBAT READER BE DOWNLOADED ON YOUR DEVICE. IN ADDITION, SOME USERS MAY HAVE TO INSTALL ADOBE FILL & SIGN ON THEIR TABLETS.

4.1 QC SECTION: PROJECT INFORMATION AND LOCATION

Date: _____; Project #: _____; Client's Name: _____; ☐Client's Name Unknown
Project Address (make sure address is correct on TDI forms): _____;
City _____, Zip Code _____, County _____, Legal Description: Lot _____, Block _____, Section _____,
Tract or Subdivision _____.
☐Inside City Limits; ☐Outside City Limits
Structure is located in: ☐Inland II, ☐Inland I, ☐Seaward, ☐Other _____,

Owner: Name: _____, Telephone No.: _____,Fax No.: _____,
Mailing Address: _____, City: _____, Zip Code: _____
Builder/Contractor (at time of construction):_____, Telephone No.: _____,Fax No.: _____,
Mailing Address: _____, City: _____, Zip Code: _____
Structural Design firm: _____, Engineer: _____, Telephone No.: _____,Fax No.: _____,
Mailing Address: _____, City: _____, Zip Code: _____;
E-Mail Address: _____.

Structure Type: ☐Commercial, ☐Residential Dwelling, ☐Duplex, ☐Garage Attached by Breezeway, ☐Detached Garage, ☐Condominium (# of Units: _____), ☐Townhouse (# of Units _____), ☐Apartments (# of Units: _____, ☐Farm & Ranch, ☐ Pre-Engineered Metal Building, ☐Other (Specify):_____.

Type of Inspection:
☐Entire Building (Type) _____; ☐Entire Re-Roof (Type) _____; ☐Re-Decking;
☐Partial Re-Roof (Type) _____; ☐Re-Decking; ☐Alteration (Type) _____; ☐Repair (Type) _____;
☐Mechanical Only (Type) _____; ☐Foundation Only (Type) _____; ☐Addition (Type) _____;
☐Retrofit of Existing Openings _____,

☐Yes, ☐No The building a Pre-Engineered Metal Building AND have an International Accreditation Service quality certification AC472 part C (engineering) and/or parts A, and B (fabrication). See http://www.mbma.com for additional information.

QC TRIP LOG

Trip #1 - Date: _____,	Trip #10 - Date: _____,	Trip #19 - Date: _____,
Trip #2 - Date: _____,	Trip #11 - Date: _____,	Trip #20 - Date: _____,
Trip #3 - Date: _____,	Trip #12 - Date: _____,	Trip #21 - Date: _____,
Trip #4 - Date: _____,	Trip #13 - Date: _____,	Trip #22 - Date: _____,
Trip #5 - Date: _____,	Trip #14 - Date: _____,	Trip #23 - Date: _____,
Trip #6 - Date: _____,	Trip #15 - Date: _____,	Trip #24 - Date: _____,
Trip #7 - Date: _____,	Trip #16 - Date: _____,	Trip #25 - Date: _____,
Trip #8 - Date: _____,	Trip #17 - Date: _____,	Trip #26 - Date: _____,
Trip #9 - Date: _____,	Trip #18 - Date: _____,	Trip #27 - Date: _____,

Note: the number of trips will vary with each project

4.2 QC SECTION: BASIC WIND LOAD INFORMATION

WIND LOAD STANDARD

☐Code IBC, _____Year; ☐Code IRC, _____Year, ☐Other, Describe _____.

BUILDING EXPOSURE CATEGORY: ☐B ☐C ☐D

☐Prescriptive Design

☐ASCE 7-05 _____mph 3-second gust basic wind speed _____Exposure Category _____Importance factor BUILDING CATEGORY: ☐ I ☐ II ☐ III ☐ IV WINDBORNE DEBRIS PROTECTION REQ'MENTS: ☐Not Required (less than or equal to 110 mph, Inland II) ☐Glazed openings (120 mph, Inland I) ☐All Openings (130 mph, Seaward per Texas Revisions) suggests using Exposure C	☐ASCE 7-10 & ASCE 7-16 _____ mph 3-second gust basic wind speed _____ Exposure Category _____Risk Category _____ MRI (Mean Risk Interval) WINDBORNE DEBRIS PROTECTION REQ'MENTS: ☐*Wind Zone 1* – 130 mph ≤basic wind speed < 140 mph ☐*Wind Zone 2* – 140 mph ≤ basic wind speed < 150 mph at greater than one mile from the coastline. ☐*Wind Zone 3* - basic wind speed ≥ 150 mph, or basic wind speed ≥ 140 mph and within one mile of the coastline ☐Other _____,

4.3 QC SECTION: COMPONENTS AND CLADDING WIND PRESSURES

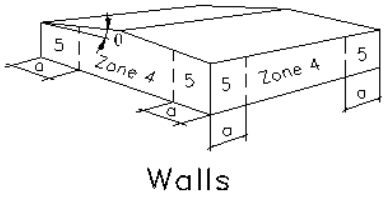
C&C ROOF PRESSURES (from Engineered Plans):

Zone 1: Pressure _____psf
Zone 2: Pressure _____psf Zone 2 Width: _____feet
Zone 3: Pressure _____psf Zone 3 Width: _____feet

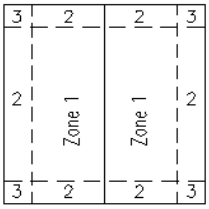
C&C EXTERIOR WALL OPENING PRESSURES:

Zone 5 "a" Width: _____feet Per ASCE 7 [06] (3 feet is the minimum)
_____' Wide x _____' High, Area _____ft², _____ Zone: Controlling Pressure _____psf (+/-)
_____' Wide x _____' High, Area _____ft², _____ Zone: Controlling Pressure _____psf (+/-)
_____' Wide x _____' High, Area _____ft², _____ Zone: Controlling Pressure _____psf (+/-)
_____' Wide x _____' High, Area _____ft², _____ Zone: Controlling Pressure _____psf (+/-)
_____' Wide x _____' High, Area _____ft², _____ Zone: Controlling Pressure _____psf (+/-)

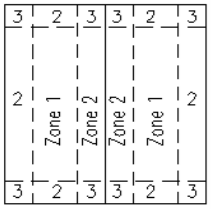
See Zones per ASCE 7-05 & ASCE 7-10 below:



Walls

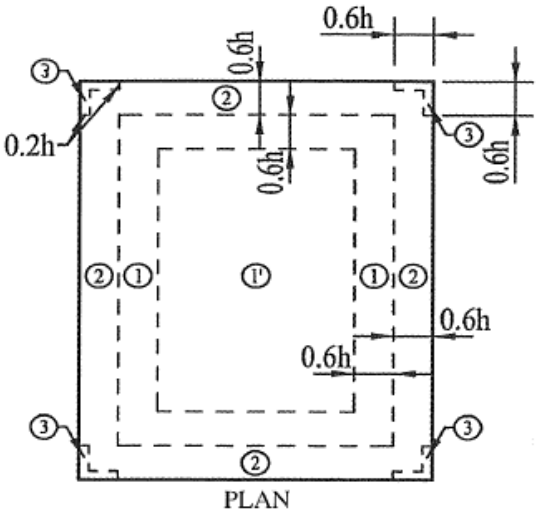


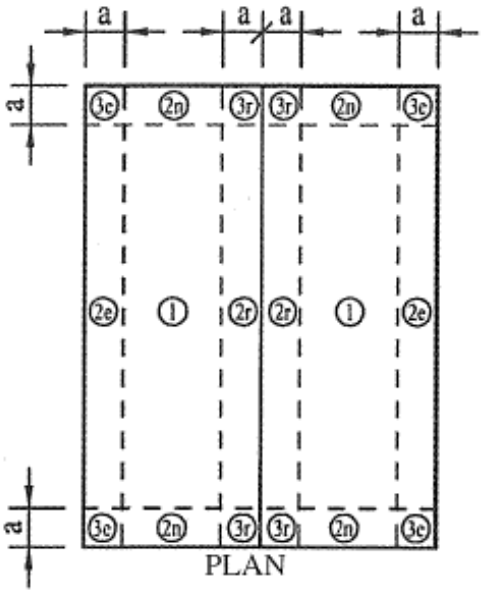
Roof $0 \leq 7°$



Roof $0 > 7°$

See Zones per ASCE 7-16 below:





4.4 QC SECTION: GEOMETRY

ROOF SLOPE: _____:12 Min; _____:12 Max
HIGHEST RIDGE HEIGHT: _____feet; HIGHEST EAVE HEIGHT: _____feet
BUILDING DIMENSIONS: Section A: _____feet x _____feet; Section B: _____feet x _____feet; Section C: _____feet x _____feet
ROOF SPANS:
Section A: Max Front to Back: _____feet; Section A: Max Left to Right: _____feet
Section B: Max Front to Back: _____feet; Section B: Max Left to Right: _____feet
Section C: Max Front to Back: _____feet; Section C: Max Left to Right: _____feet

NUMBER OF STORIES: _____
WALL HEIGHT (feet): _____ (Bottom of Lowest Horizontal Structural Member) Trip #:_____;
_____ (Top of Finished Floor) Trip #:_____; _____(1st floor) _____ Trip #:_____; (2nd floor) _____, Trip #:_____;
(3rd floor) _____, Trip #:_____; Other _____, Trip #:_____
OVERHANGS: Eaves _____"; Gables _____"; Cantilevers _____", Trip #:_____

☐Irregularly Shaped Building
Additional Comments _____.

4.5 QC SECTION: FRAMING - GENERAL REVIEW

****NOTE: Enter the trip number of when the review occurred****

CONSTRUCTION METHOD: ☐Wood; ☐Masonry; ☐Concrete/ICF; ☐Steel, Cold-Formed; ☐Steel, Structural Steel; ☐SIP;
☐Other _____.

FLOOR FRAMING SYSTEM:
☐Dimensional Lumber; ☐Wood Trusses; ☐Wood I-Joists; ☐Cold-formed Steel Joists; ☐Bar Joists;
Other, specify _____; Trip #:_____
Trusses: ☐Floor Trusses: ☐ Truss layout sheet, ☐ Truss calculation sheets; Trip #:_____
Floor framing depth _____"; Floor decking Performance Category _____"; & Member Material Specification/Description _____;
Trip #:_____

INTERIOR WALL STUDS:
☐WOOD: Height _____, Size _____, Spacing _____", Species _____, Grade _____; Trip #:_____
☐COLD-FORMED STEEL: Height _____, Size _____, Spacing _____", F_y _____ksi, Thickness _____mils; Trip #:_____
☐OTHER, DESCRIBE: _____; Trip #:_____

EXTERIOR WALL STUDS:
☐WOOD: Height _____, Size _____, Spacing _____", Species _____", Grade _____; Trip #:_____
☐COLD-FORMED STEEL: Height _____, Size _____, Spacing _____", F_y _____ksi, Thickness _____mils; Trip #:_____
☐OTHER, DESCRIBE:_____; Trip #:_____

ROOF:
☐ TRUSSES; ☐Roof Truss layout sheet; ☐Roof Truss calculation sheets/drawing; ☐Bridging per Truss Plans; Trip #:_____
☐COLD-FORMED STEEL: Span _____, Size _____, Spacing _____", F_y _____ksi, Thickness _____mils; Trip #:_____
☐WOOD: Projected Span _____', Size _____, Spacing _____", Species _____, Grade _____; Trip #:_____
Strong-backs or bridging for attic joists: Size_____, Spacing_____",
Sub-fascia for roof edge nailing Size _____, Spacing _____"; Trip #:_____
☐Exposed rafter tails (no fascia members); ☐Support for rafters at hips; Trip #:_____
☐Spliced rafter tails per plans; ☐Pitch change at the eave overhang per plans; Trip #:_____
☐Rafters nailed to ceiling joists with (_____) _____d nails; ☐Raised Plate per notes or detail; Trip #:_____
Roof decking Performance Category _____" & Material Specification_____; Trip #:_____
Gable overhang construction per plans ☐Yes; ☐No; Trip #:_____
Gable end wall bracing per plans ☐Yes; ☐No; Trip #:_____
Roof slopes are approximately per plans: ☐Yes; ☐No, Explain_____; Trip #:_____
End zone ("a") rafter spacing _____" on center; Trip #:_____

MISCELLANEOUS: Type of gable end wall bracing _____, ☐Installed per detail on plans
☐Ballooned framing at 2 story areas/stairs; If not ballooned,
Describe wind load transfer mechanism_____; Trip #:_____
Describe Chimney framing method / bracing _____; ☐Balloon Framed chimney studs; Trip #:_____
Describe Dormer framing method / bracing _____; Trip #:_____
☐Sill design under window assemblies per plans _____ Transfer to king studs _____; Trip #:_____
☐Header design over window assemblies per plans _____, Transfer to king studs _____; Trip #:_____
☐Top plate/stud penetrations addressed: ☐Yes or ☐No;_____; Trip #:_____
End zone ("a") stud spacing _____" on center; Trip #:_____
☐Strong-backs or bridging/blocking for attic joists
☐Chimney framing per plans; ☐Balloon Framed chimney studs; Trip #:_____
☐Dormer framing per plans; Trip #:_____
☐Sill and header to king stud connection per plans for all openings; Trip #:_____
☐End zone (A) stud and rafter spacing per plans; Trip #:_____
☐Architecturally thick exterior stud walls per plans; Trip #:_____

FASTENERS:
Corrosion resistance for metal connectors and fasteners in open areas (see Texas IRC revisions Section R325 for additional information):

☐Seaward:
- ☐Stainless steel per ASTM A167; Trip #:_____
- ☐Hot dipped galvanized after fabrication per ASTM A123 or ASTM A153; Trip #:_____
- ☐Hot dipped galvanized or galvannealed before fabrication per ASTM A653; Trip #:_____

☐Inland I: code approved:
- ☐Stainless steel per ASTM A167; Trip #:_____
- ☐Hot dipped galvanized after fabrication per ASTM A123 or ASTM A153; Trip #:_____
- ☐Hot dipped galvanized or galvannealed before fabrication per ASTM A653; Trip #:_____
- ☐Hot-dip galvanized or electrogalvanized per ASTM A641; Trip #:_____
- ☐Mechanically deposited zinc coatings per ASTM B695; Trip #:_____
- ☐Or electrodeposited zinc coatings per ASTM B633; Trip #:_____
- ☐Exception: One-half inch diameter or greater steel bolts, ☐ Galvanized anchor bolts; Trip #:_____

Corrosion resistance for metal connectors and fasteners in vented or enclosed areas (see Texas IRC revisions Section R325 for additional information):

☐Seaward:
- ☐Stainless steel per ASTM A167; Trip #:_____
- ☐Hot dipped galvanized after fabrication per ASTM A123 or ASTM A153; Trip #:_____
- ☐Hot dipped galvanized or galvannealed before fabrication per ASTM A653; Trip #:_____
- ☐Hot-dip galvanized or electrogalvanized per ASTM A64; Trip #:_____
- ☐Mechanically deposited zinc coatings ASTM B695; Trip #:_____
- ☐Electrodeposited zinc coatings per ASTM B633; Trip #:_____
- ☐Exception: One-half inch diameter or greater steel bolts, ☐ Galvanized anchor bolts; Trip #:_____

☐Inland I:
- ☐Stainless steel per ASTM A167; Trip #:_____
- ☐Hot dipped galvanized after fabrication per ASTM A123 or ASTM A153; Trip #:_____
- ☐Hot dipped galvanized or galvannealed before fabrication per ASTM A653; Trip #:_____
- ☐Hot-dip galvanized or electrogalvanized per ASTM A641; Trip #:_____
- ☐Mechanically deposited zinc coatings per ASTM B695; Trip #:_____
- ☐Electrodeposited zinc coatings per ASTM B633; Trip #:_____
- ☐Epoxy-coated per ASTM A899; Trip #:_____
- ☐Exception: One-half inch diameter or greater steel bolts, ☐ Galvanized anchor bolts; Trip #:_____

Additional Comments _____.
☐Additional anchor bolts added when sill plate is spliced.

4.6 QC SECTION: FRAMING - UPLIFT REVIEW

Roof: ☐Roof decking nailed per plans; ☐Rafter or Roof Truss to double top plate; ☐Strap installed over Roof Truss; Member spacing _____" on center; ☐Rake overhang outlookers to raking double top plate _____" on center; Rafter splices: ☐Strapped to support; ☐Lap nailed together with(_____) _____d nails; Trip #:_____

Interior Rafter Bracing Strapping: ☐Rafter to Purlins; ☐Purlin to Supporting Member; ☐Supporting Member to interior supporting studs or beams; ☐Interior stud wall to sill plate; ☐Interior sill plate to foundation with anchor bolts or ☐powder-actuated fasteners; Trip #:_____

Hips, Valleys and Ridge Strapping: ☐Rafter strapping over hip member _____" on center; ☐Rafter strapping under valley member _____" on center; ☐Strapping over the ridge _____" on center; Collar ties _____" on center ; Trip #:_____

Exterior Wall Strapping: ☐Double top plate to studs _____" on center (or) ☐Rafter/Roof Truss directly to Studs _____" on center);

☐Stud to Stud (floor-to-floor) _____" on center (or ☐Sheathing Used as Strap _____" Edge Nailing); ☐Stud to Sill Plate _____" on center; ☐Sill plate to foundation _____" on center; ☐Framing connectors, which are installed at the top of a stud, are installed at the bottom of each stud and vice-versa; ☐ Structural Wood Panels are designed for combined shear and uplift from wind _____" Edge Nailing; Trip #:_____

Beam Strapping (exterior beam or Cathedral Ceiling): ☐Rafter or Roof Truss to roof beams; ☐Roof beams to columns; ☐ Columns to floor beam; ☐Floor beam to columns; ☐Columns to foundation; Trip #:_____

Header Strapping: ☐Upper cripple studs down to header; ☐Header to trimmer studs; Trip #:_____

Anchor Bolts: Diameter _____", Grade _____; Length _____ (10" single sill plate or 12" for double sill plate) Embedment _____"; Spacing _____"; Anchor bolt capacity_____; ☐Washer size 2"x2" square washers, Other _____, Washer thickness _____; ☐Mud Sill Strapping, Spacing _____"; Trip #:_____

Uplift Rod Tie-Down System☐: Rod size:_____"; ☐Transfer uplift load though double top plates to rod tie-down system per plans; Trip #:_____

4.7 QC SECTION: FRAMING - LATERAL REVIEW

ROOF DIAPHRAGMS: Diaphragm Panel Orientation: _____;
Type: ☐Plywood, Performance Category _____"; ☐OSB, Performance Category _____"; ☐Solid Lumber, ☐Thickness _____"; ☐other _____; Roof panel edges: ☐Blocked, ☐Unblocked, ☐Partially Blocked, Trip #:_____;
☐Roof Member Spacing _____" on center per plans; ☐Nails or ☐Screws; Fastener size _____ and Type _____;
☐Diaphragm Edge spacing per plans, Trip #:_____; Zone 1 ☐Edge spacing per plans; ☐Zone 2 Edge spacing per plans;
☐Zone 3 Edge spacing per plans; ☐Field spacing per plans, Trip #:_____;
☐Edge attachment at hips, ridges and valleys; ☐Corrosion resistant fasteners per Section 4.5
☐No Overdriven Nails

FLOOR DIAPHRAGMS: Diaphragm Panel Orientation: _____; Type: ☐Plywood, Performance Category _____"; ☐OSB, Performance Category _____";☐Solid Lumber, Thickness _____"; Other _____, Thickness _____" Trip #:_____;
Floor panel edges: ☐Blocked; ☐Unblocked; Floor Member Spacing _____" on center; ☐Nails or ☐Screws; Fastener size _____ and Type _____;☐ Parallel spacing per plans; ☐Perpendicular spacing per plans; ☐Field spacing per plans; ☐Diaphragm Chord fastener size _____, Spacing _____" on center and Type _____ per plans; ☐Corrosion resistant fasteners per Section 4.5
Wall top plate splice offset (distance between butt joints): _____ feet; offset splice nailing _____d nails _____" on center
☐No Overdriven Nails

☐ SHEAR WALLS
Trip #:_____
☐Blocked, ☐Unblocked; Type: ☐Plywood, Performance Category _____"; ☐OSB, Performance Category _____";
☐Other _____, Thickness _____"; ☐Framing Member Spacing _____" on center per plans;
☐Nails or ☐Screws; Fastener size _____ and Type _____, ☐Edge Spacing per plans; ☐Field Nailing per plans;
☐Corrosion resistant fasteners per Section 4.5;
☐Out-of-Plane offset (Maximum 4'-0"); Diaphragm nailed to Drag Struts per plans: ☐Yes or ☐No;

☐Holddown manufacturer and part number per plans; ☐Holddown and holddown-embedded bolts installed per plans, Attachment method: ☐Screws, ☐Nails, ☐Bolts; ☐Holddown attached quantity of studs per plans; ☐Stud pack nailed together per plans and code; Trip #:_____
☐Drywall Shear Walls: ☐Nails or ☐Screws; Fastener size _____ and Type _____ per plans; Trip #:_____

☐Anchors for Shear Walls
☐No Overdriven Nails; Trip #:_____

☐ Additional Comments: _____.

4.8 QC SECTION - COMPONENTS & CLADDING, MECHANICAL EQUIPMENT & WINDBORNE DEBRIS PROTECTION OF GLAZED OPENINGS

4.8.1 Roofing:

GENERAL INFORMATION (Check all that apply)
☐Residential ☐Commercial ☐Institutional ☐Agricultural ☐Carport ☐Patio Cover
☐Walkable (Flat or Low Slope and accessible), ☐Not Walkable (Steep or Inaccessible)
☐Hip, ☐Gable, ☐Shed, ☐Mono-slope, ☐Parapet, ☐Roof Deck/Balcony
☐Skylights, ☐Clerestory, ☐Chimney, ☐Solar Array (Current/ Future), ☐MEP Equipment
☐Composition Shingles, ☐Metal Shingles, ☐ Pre-Engineered Metal Building Panels, ☐Concrete/Ceramic Tile,
☐Membrane/Built-Up
☐Corrosion resistant fasteners per Section 4.5
☐No ponding
Substrate deck material _____.

C&C ROOF PRESSURES:
Zone 1: Pressure _____ psf
Zone 2: Pressure _____ psf Zone 2 Width: _____ feet
Zone 3: Pressure _____ psf Zone 3 Width: _____ feet
Roof Slope: _____
☐Galvanized, ☐Stainless;
☐Fastener Corrosion Resistance per Section 4.5

Type:
☐Shingles _____, Trip #:_____, Manufacturer _____; ☐Class F ASTM D3161 rating _____ mph, ☐Class G or ☐Class H ASTM D 6381, D7158/UL 2390 rating _____mph; ☐UL2218 Impact resistant shingle (Seaward)
☐Nailing – ☐4 per shingle ☐6 per shingle for high wind applications and high roof slopes per manufacturer requirements on wrapper, ☐Other: _____type nails, _____" long, _____" penetration into decking, ☐Overlay

☐Roof Underlayment Type, Trip #:_____:☐Felt _____# weight, ☐Synthetic, ☐Other _____:
_____" End Laps; _____" Side Laps Roofing Underlayment ; Valley material: ☐Metal, ☐Double felt, ☐Peel and Stick,
☐Other _____,
Layer: ☐Double at slopes between 2:12 and 4:12
☐Nails not overdriven; Length of nails _____", ☐Nails pulled to verify length; ☐Nails flush
☐Nails minimum ¾" embedment or ☐¼" penetration through roofing substrate; ☐Nails in nail line; ☐Ridge cap shingle nailed in the nail line; ☐First course shingle glued to bottom shingle (starter course); ☐First course and starter course butt joints are offset

☐Ridge And Roof Vents: Manufacturer _____, TDI product evaluation _____;☐3" long nails for shingles through ridge vent; Trip #:_____

☐Felt under eave metal at gable rake; ☐Felt over edge metal at eaves; Trip #:_____
☐Valleys: ☐Open over visible flashing, ☐Closed Cut/Tapered Cut, ☐Woven; Trip #:_____

☐Modified Bitumen, Roll-Type, Manufacturer _____, TDI product evaluation _____, Assembly # _____,
☐Rigid Insulation;☐UL2218 Impact resistant rating (Seaward); Trip #:_____
Fastener type _____; Fastener Size _____; Trip #:_____
Number of rows in field of the sheet: Zone 1 _____, Zone 2 _____, Zone 3 _____; Trip #:_____
Fastener spacing in each row: Zone 1 _____", Zone 2 _____", Zone 3 _____"; Trip #:_____

☐Built-up (No gravel or stone ballast allowed), Trip #:_____: ☐Rigid Insulation; TDI product evaluation _____,
Assembly #_____, _____ # Plies per plans; ☐Rigid Insulation;

☐Single Ply Membrane, Trip #:_____;
☐TPO, ☐EPDM, ☐PVC, ☐Other _____; TDI product evaluation _____, Assembly Number _____;
Factory Mutual System _____; Manufacturer_____; Sheet width_____;

☐Rigid Insulation Sheet: Type_____,Width _____; Fastener Brand _____; Fastener Type_____; Size_____;
Length_____; plate_____; Plate type_____; Fasteners per board_____; Trip #:_____

Single Ply Attachment: Trip #:_____;
☐Mechanical: Fastener Brand _____; Fastener Type_____; Size_____; Length_____; Plate_____; Plate type_____;
Spacing of rows: Zone 1 _____", Zone 2 _____", Zone 3 _____";
Fastener spacing in each row: Zone 1 _____", Zone 2 _____", Zone 3 _____";
☐Adhesive: Brand _____; ☐Fully Adhered; ☐Strips; Strip Spacing _____";
☐Heat bonded to insulation board fastener plates;
Spacing of rows: Zone 1 _____", Zone 2 _____", Zone 3 _____";
Fastener spacing in each row: Zone 1 _____", Zone 2 _____", Zone 3 _____";

☐Tile: Trip #:_____: Manufacturer _____, TDI product evaluation_____, _____" thick roof deck;
Type: ☐Clay, ☐Concrete, ☐Slate, ☐Composite;
Profile: ☐Low, ☐Medium, ☐High
☐Underlayment: ☐felt: _____weight; ☐other: _____Brand; _____Type;
Tile Attachment: ☐ directly to deck ☐ to battens
☐ Batten: Batten size _____; Pressure Treated: ☐Yes, ☐No; Fastener size_____; spacing _____" on center;
☐ Tile: Fastener type _____; size_____; number per tile_____; ☐nose clip;_____
Adhesive Brand_____; Adhesive Paddy Size _____; TDI product evaluation_____,
☐ Instructions on engineering drawings for tile installation

☐Spray-on Polyurethane Foam (SPF): Trip #:_____: TDI product evaluation_____,
Brand_____; Foam Thickness_____
☐Liquid applied Roofing; Trip #:_____: TDI product evaluation_____,
☐Other: _____.

☐Formed Metal Panel, Trip #:_____: Product Evaluation _____, or other report #_____;
Panel type: ☐ Exposed fastener (screw down) panel, ☐ Standing Seam Roof panel (SSR)
Panel Manufacturer _____, Type/Profile _____, thickness _____Gauge,

Panel attachment Trip #:_____: ☐Pre-Engineered Metal Building purlins, ☐wood rafters, ☐to Wood Structural Panel decking, ☐SSR clip
Purlin/rafter Spacing _____ft.
For SSR are wind clamps used: ☐Yes or ☐No;

For exposed fastener panels: Fastener Type: ☐self-drilling to Pre-Engineered Metal Building purlin, Size_____, Spacing _____";
☐self-tapping at side laps (seams), Size_____, spacing _____";
Pre-Engineered Metal Buildings: End laps spliced over purlins: ☐Yes, ☐No, Lap Length _____", End Lap Fastener Spacing _____"
For concealed fastening system panels: SSR Clip type: ☐low, ☐high, ☐fixed, ☐floating/articulated
Fastener Corrosion resistance: ☐stainless, ☐painted, ☐plated, ☐galvanized, ☐
☐Other: _____.

☐Formed Metal Shingles, Shakes, and Tiles, Trip #:_____: TDI product evaluation _____,
Panel type: ☐Exposed fastener (screw down) panel, _____Panel Manufacturer, _____Type/Profile,
Thickness _____Gauge,

☐Re-roofing Trip #:_____: ☐Replace water soaked, deteriorated, nailable surface; ☐Two or more layers of existing roofing removed
Condition of existing roof covering_____.

☐ Parapet Wall Coping Trip #:_____: Manufacturer _____, TDI product evaluation_____,
Attachment method _____, Fastener type _____, Fastener size_____; spacing _____"

4.8.2 Windows and Storefront:

Trip #:_____
Calculated zone pressures from Engineered plans: Zone 4_____ psf Zone 5_____ psf
Window #_____; Size _____; Manufacturer ______________; Model or Series _____;TDI product evaluation ______________;
Assembly# ______________; Label pressure _____psf; Design pressure _____psf,
☐AAMA/NAMI Sticker is present and matches window type and size
Window #_____; Size _____; Manufacturer ______________; Model or Series _____;TDI product evaluation ______________;
Assembly# ______________; Label pressure _____psf; Design pressure _____psf,
☐AAMA/NAMI Sticker is present and matches window type and size
Window #_____; Size _____; Manufacturer ______________; Model or Series _____;TDI product evaluation ______________;
Assembly# ______________; Label pressure _____psf; Design pressure _____psf,
☐AAMA/NAMI Sticker is present and matches window type and size
Window #_____; Size _____; Manufacturer ______________; Model or Series _____;TDI product evaluation ______________;
Assembly# ______________; Label pressure _____psf; Design pressure _____psf,
☐AAMA/NAMI Sticker is present and matches window type and size
Mullions: ☐Yes or ☐No, Manufacturer ______________; Model or Series _____;TDI product evaluation ______________;
Assembly# ______________; Label pressure _____psf; Design pressure _____psf ,
☐AAMA/NAMI Sticker is present and matches window type and size
All above ratings meet or exceeds zone pressures: ☐Yes or ☐No; Trip #:_____:
Frame Material _____, Species _____, Grade _____, Trip #:_____:
Fasteners: Type: ☐Screw or ☐Nail, _____" Spacing, Head Size: _____, Shaft size: _____, Length: _____";
☐Galvanized, ☐Stainless;
☐Fastener Corrosion Resistance per Section 4.5
Impact Protection Provided (Seaward & Inland 1): ☐Yes per Section 4.8.4 or ☐No
Type: ☐Inherent design, ☐Plywood shutters, ☐other ____,
☐Installed per manufacturer's recommendations; Trip #:_____
☐**Storefront:** ☐ attachment in TDI matches type of building for this project; Anchorage method ____________________,
spacing of anchors to the building_____",

4.8.3 Doors and Storefront Doors:

Trip #:_____
Calculated zone pressures from Engineered plans: Zone 4_____ psf Zone 5_____ psf
Door #_____; Size _____; Manufacturer ______________; Model or Series _____; product evaluation ______________;
Assembly# ______________; Label pressure _____psf; Design pressure _____psf; Lockset: Manufacturer _____
; Model or Series _____, NAMI Sticker is present and matches door type and size;
Door #_____; Size _____; Manufacturer ______________; Model or Series _____; product evaluation ______________;
Assembly# ______________; Label pressure _____psf; Design pressure _____psf; Lockset: Manufacturer _____
; Model or Series _____, NAMI Sticker is present and matches door type and size;
Door #_____; Size _____; Manufacturer ______________; Model or Series _____; product evaluation ______________;
Assembly# ______________; Label pressure _____psf; Design pressure _____psf; Lockset: Manufacturer _____
; Model or Series _____, NAMI Sticker is present and matches door type and size;
Door #_____; Size _____; Manufacturer ______________; Model or Series _____; product evaluation ______________;
Assembly# ______________; Label pressure _____psf; Design pressure _____psf; Lockset: Manufacturer _____
; Model or Series _____, NAMI Sticker is present and matches door type and size;
Design pressure _____psf, NAMI Sticker is present and matches door type and size;
All above ratings meet or exceeds zone pressures: ☐Yes or ☐No; Trip #:_____;
Frame Material _____, Species _____, Grade _____, Trip #:_____;
Fasteners: Type: ☐Screw or ☐Nail, _____" Spacing, Head Size: _____, Shaft size: _____, Length: _____";
☐Galvanized, ☐Stainless;
☐Fastener Corrosion Resistance per Section 4.5
Impact Protection Provided (Seaward & Inland 1 for all glazed openings): ☐per Section 4.8.4
Type: ☐Inherent design, ☐Plywood shutters, ☐other____,
☐Installed per manufacturer's recommendations
☐**Storefront:** ☐ attachment in TDI matches type of building for this project; Anchorage method ______________, spacing of
anchors to the building_____" on center, ☐ Storefront Doors and Storefront refer to each other in the TDI document;

Note: Double glass storefront doors cannot have flush bolts per 2015 IBC unless building meets the allowed exceptions,
☐ Door locks, ☐ panic Device per TDI , ☐ Threshold per TDI, ☐ Hinges per TDI

4.8.4 Impact Protection (Inland 1 & Seaward areas):

Trip #:_____
Calculated zone pressures from Engineered plans: Zone 4 _____ psf Zone 5 _____ psf
Type: ☐Roll-up _____;☐Accordion _____;☐Corrugated _____;☐Bahama _____;☐Fabric _____; ☐Screen;
☐Other _____,
Size_____; Manufacturer _____; Model or Series _____; TDI product evaluation _____;Assembly# _____;
Label pressure _____psf; Design pressure_____psf;
Fasteners: Type: ☐Screw or ☐Nail, _____" Spacing, Head Size: _____ Shaft size: _____ Length: _____"; ☐Fastener Corrosion Resistance per Section 4.5

Note: Per TDI 2006 Texas Revisions to the 2006 IRC, Inland 1 areas require 15/32 plywood (NOT OSB) as wind born debris protection for all glazed openings, Seaward areas require 15/32 plywood (NOT OSB) as wind born debris protection for all openings (glazed or not, including for example solid door openings). Refer to current applicable TDI Product Evaluations for size and use limitations. Also refer to TDI's December 2014/January 2015 Windstorm Inspections Program/Engineering Services Program newsletter for additional information. (Note: SHU-89 is expired and should be not used).

Wood Structural Panels (must be plywood not OSB) Trip #:_____
Plan showing locations of panels: ☐Yes or ☐No;
☐TDI Product Evaluation No. _____;
Panels marked to match the plan: ☐Yes or ☐No;
Plywood, Performance Category _____"
Fasteners: Type: ☐Screw or ☐Nail, _____" Spacing, Head Size: _____ Shaft size: _____ Length: _____";
☐Galvanized, ☐Stainless;
☐ Fastener Corrosion Protection per Section 4.5
Storage location of panels and fasteners: _____.

4.8.5 Garage Doors:

Trip #:_____
Calculated zone pressures from Engineered plans: Zone 4 _____ psf Zone 5 _____ psf
Door # _____; Size _____; Manufacturer _____; Model or Series _____; TDI product evaluation _____
Assembly# _____; Manufacturers Drawing # _____; Label pressure _____psf;
Door # _____; Size _____; Manufacturer _____; Model or Series _____; TDI product evaluation _____
Assembly# _____; Manufacturers Drawing # _____; Label pressure _____psf;
Door # _____; Size _____; Manufacturer _____; Model or Series _____; product evaluation _____
Assembly# _____; Manufacturers Drawing # _____; Label pressure _____psf;

Door labels present: ☐Yes or ☐No

Allowable encroachment into Zone 5 per TDI and Manufacturer' drawings _____ft.; Actual encroachment into Zone 5 _____ft.

Fasteners: Type: ☐Screw or ☐Nail, _____" Spacing, Head Size: _____, Shaft size: _____, Length: _____";
☐Galvanized, ☐Stainless;
☐ Fastener Corrosion Resistance per Section 4.5

Impact Protection Required (Seaward Inland 1 for all glazed openings): ☐Yes or ☐No; Impact Protection Provided (Seaward):
☐Yes per Section 4.8.4 or ☐No
Type _____: ☐Inherent design (marked on label), ☐other_____.
☐Installed per manufacturer's recommendations

4.8.6 Skylights:

Trip #:_____
Calculated zone pressures from Engineered plans: Zone 1_____ psf Zone 2_____ psf Zone 3_____ psf
Skylight #_____; Size _____; Manufacturer _____; Model or Series _____; TDI product evaluation _____
Assembly# _____; Manufacturers Drawing # _____; Label pressure _____psf; Design pressure _____psf;
Skylight #_____; Size _____; Manufacturer _____; Model or Series _____; TDI product evaluation _____
Assembly# _____; Manufacturers Drawing # _____; Label pressure _____psf; Design pressure _____psf;
Skylight #_____; Size _____; Manufacturer _____; Model or Series _____; TDI product evaluation _____
Assembly# _____; Manufacturers Drawing # _____; Label pressure _____psf; Design pressure _____psf;

Fasteners: Type: ☐Screw or ☐Nail, _____" Spacing, Head Size: _____, Shaft size: _____, Length _____",
☐ Galvanized, ☐Stainless;
☐ Fastener Corrosion Resistance per Section 4.5

Impact Protection Provided (Seaward & Inland 1): ☐Yes per Section 4.8.4 or ☐No
Type: ☐Inherent design, ☐other_____.
☐Installed per manufacturer's recommendations

4.8.7 Siding:

Trip #:_____
Calculated zone pressures from Engineered plans: Zone 4 _____ psf Zone 5 _____ psf
Type of Siding: ☐Vinyl; ☐Fiber Cement; ☐Wood ;☐Other _____.
☐Board/Plank/Lap; Board width: _____"
☐Panel; Panel size: _____
☐Other _____.
Allowable exposure _____"; Actual Exposure _____";
Manufacturer _____; Model or Series _____;TDI product evaluation _____;
Assembly# _____; Label pressure _____psf; Design pressure _____psf; Fasteners: Type: ☐Screw or
☐Nail, _____" Spacing, Head Size: _____, Shaft size: _____, Length: _____";
☐Concealed or ☐Face Nailed (Exposed/open area fasteners)
Fastened into studs: ☐Yes or ☐No
Butt joints (splice) over studs and blocking: ☐Yes or ☐No
Fasteners Heads: ☐Flush; ☐Underdriven; ☐Overdriven (Not acceptable)
☐Galvanized, ☐Stainless;
☐Fastener Corrosion Resistance per Section 4.5

4.8.8 Brick, CMU or Stone Veneer (not lath applied):

Trip #:_____
Calculated zone pressures from Engineered plans: Zone 4 _____psf Zone 5 _____psf
Veneer: ☐Brick; ☐CMU, ☐Stone; ☐Autoclave Aerated Concrete,
Brick ties: Manufacturer _____, Model _____ ☐Galvanized; ☐Corrugated, ☐Minimum thickness 22 gauge, ☐Minimum width 7/8" or; ☐Wire, 9 gauge with 2" hook embedded in mortar (0.148" diameter)
☐Other _____, ☐Fastened into studs;
Spacing: Vertical (maximum 24" o.c.) : _____" Horizontal (maximum 24" o.c.): _____" (maximum coverage 2.67 sq. ft., e.g. 16" x 24") per IRC 2006 R703.7.4.1 and 2015 R703.8.4.1 [10]
Fasteners: Type: ☐Screw or ☐Nail, Head Size: _____, Shaft size: _____, Length: _____",
☐Galvanized, ☐Stainless
☐Fastener Corrosion Resistance per Section 4.5

4.8.9 EIFS:

Trip #:_____
Calculated zone pressures from Engineered plans: Zone 4 _____ Zone 5 _____
Manufacturer _____; TDI Product Evaluation No. _____;
Design rating _____ psf; ☐Rating Meets or Exceeds zone pressures
Substrate Type_____ Thickness_____";
Underlayment/Vapor Barrier: Type: _____;
Fasteners: Type: ☐Adhesive _____; ☐Screw or ☐Nail, Head Size: _____, Shaft size: _____, Length _____",
Spacing: Vertical _____" Horizontal _____"
☐Galvanized, ☐Stainless;
☐Fastener Corrosion Resistance per Section 4.5

4.8.10 Lath Applied Veneer (Stucco, Thin Stone, Thin Brick):

Trip #:_____
Calculated zone pressures from Engineered plans: Zone 4 _____ Zone 5 _____
Manufacturer _____; TDI Product Evaluation No. _____;
Design rating _____ psf;
Rating Meets or Exceeds zone pressures: ☐Yes or ☐No;
Substrate Type _____, Thickness _____";
Underlayment/Vapor Barrier: Type_____
Fasteners: Type: ☐Screw or ☐Nail, Head Size: _____ Shaft size: _____, Length _____",☐Galvanized, ☐Stainless
Spacing: Vertical _____" Horizontal _____"
☐Fastener Corrosion Resistance per Section 4.5
Type of Lath _____, Fasteners: Type: ☐Screw or ☐Nail, Head Size: _____ Shaft size: _____, Length _____",
☐Galvanized,
☐Stainless

4.8.11 Mechanical:

Trip #:_____
☐Condensing units anchored to adequately supported structure; Minimum weight of concrete pad _____ pounds;
☐Condensing units on engineered platform
Fasteners: Type: ☐Screw or ☐Nail, Head Size: _____, Shaft size: _____, Length _____",
☐Galvanized,
☐Stainless
☐Propane tanks anchored to adequately supported structure
☐Swimming pool equipment anchored to adequately supported structure
☐Roof mounted solar panels mechanically anchored per engineered design.
☐Ballasted arrays installed per engineered design. Note: Per TDI the ballasted attachment method is not an acceptable form of anchorage for solar panels must be a mechanical connection. The IBC codes though 2012 are silent for ballasted arrays resisting wind loads. Section 1607.12.5.4 of the 2015 IBC references ballasted photovoltaic panel systems. Section 1613.6 of the 2015 IBC allows roof mounted solar panels to be ballasted under certain conditions and resist the load combinations as specified in Section 1605. ☐Roof mounted satellite dishes and Antennae adequately attached. Per TDI the ballasted attachment method is not allowed. Roof mounted satellite dishes must be mechanically attached.
☐Roof mounted equipment, i.e., HVAC, Fans, Vents adequately attached Per TDI the ballasted attachment method not allowed. Roof mounted HVAC equipment must be mechanically attached.
☐Equipment Brand;_____, Serial Number:_____
☐Galvanized, ☐Stainless;
☐ Fastener Corrosion Resistance per Section 4.5

4.8.12 **Miscellaneous items:**

Trip #:_____
☐Signs; ☐Exterior mounted lights; ☐Other _____,
☐TDI Product Evaluation Report(s) used
☐ICC Product Evaluation Report(s) used
☐Dade County Notice of Acceptance used
☐Test Report(s) used
☐On-site testing
☐Galvanized, ☐Stainless;
☐Fastener Corrosion Resistance per Section 4.5

4.9 QC SECTION: FOUNDATION REVIEW APPLICABLE TO WINDSTORM

GENERAL INFORMATION
☐Concrete: Strength @ 28 days _____ psi; Vapor Retarder (polyethylene sheathing): _____Manufacturer,_____mil thickness, ☐Minimum concrete cover specified, ☐ Vapor Retarder adequately lapped, ☐properly taped with no tears or openings; ☐ Draped under beams
See FPA-SC-10-1 "Quality Control Checklists for Foundation Inspection of Residential and Other Low-Rise Buildings" for more thorough foundation checklists: http://www.foundationperformance.org/committee_papers.cfm.

FOUNDATION TYPES

1. ☐SLAB-ON-GROUND WITH CONVENTIONAL STEEL REINFORCING, Trip #: _____
   Grade beams: Depth _____" x Width _____", Stirrups #_____ @ _____ o.c., Steel (_____) #_____ bars Top & Bottom
   Corner Bars: #_____ bars _____' x _____' Top & Bottom at ☐corners, at ☐tee intersections;
   Slab: _____" Thick, #_____bars at _____" o.c.e.w., Chair: _____" Height, _____" Spacing
   ☐Anchorage per plans

2. ☐POST-TENSIONED SLAB-ON-GROUND, Trip #: _____
   Grade beams: Depth _____" x Width_____", ☐Cables per plan, ☐Draped in beam; If yes, How many in each beam _____;
   Slab: _____" Thick, Chair: _____"Height, _____"Spacing
   ☐Anchorage per plans

3. ☐STRUCTURALLY ISOLATED FOUNDATIONS (CRAWL SPACE & VOID FORMS), Trip #: _____
   ☐Grade beams: Depth _____" x Width _____", Stirrups #_____ @ _____, Steel (_____) #_____ bars Top & Bottom; Slab: _____" Thickness, #_____bars at _____" o.c.e.w., Chair: _____"Height, _____" spacing
   ☐Anchorage per plans

   ☐Crawl Space: Clearance_____",
   ☐Treated material for wood joists less than 18" above grade; ☐Treated material for wood girders less than 12" above grade;
   ☐Treated material located below the Base Flood Elevation (BFE);
   ☐Beam to foundation connection per plans
   ☐Cold-Formed Steel Structural Members

4. ☐SPREAD FOOTINGS, Trip #: _____
   Footings: Depth _____" x Width _____". Embedment _____" below grade (12" minimum); Stirrups #_____ @ _____;Steel (_____) #_____ bars Top & Bottom; Footing type: ☐Strip, ☐Isolated
   ☐Beam to footing connection per plans
   ☐Anchorage per plans

5. ☐PILE FOUNDATIONS (For Pilings subject to wave action or scour see Appendix II and see Appendix I for Elevation And Flood Abbreviations And Definitions), Trip #: _____
   Pile Length _____feet; Pile Penetration Depth _____'; ☐Piling spacing, size per plans; Beams or stringers attached to pilings method: ☐Bolt size _____" diam.; Number per piling _____; ☐Other_____,
   Pile Installation method: ☐Driven; ☐Auger; ☐Jetting; ☐Vibratory
   PILE TYPE:
   ☐Timber: ☐Square _____"; ☐Round _____" (☐Uniform; ☐Tapered); Species _____, Grade _____;
   ☐Other: Describe _____;
   Treatment type: ☐CCA-C, ☐ACQ-D, ☐CBA-A or ☐CA-B;
   ☐Steel: ☐H Section _____". x _____lbs./ft.; ☐Pipe _____" dia. Wall Thickness _____";
   ☐Precast Concrete: ☐Square _____"; ☐Round _____";
   ☐Other: Describe _____,
   ☐Knee braces; ☐Other type of lateral brace _____,
   ☐Less than 200' from vegetation line then use 4' x 4' Fibercrete (per FEMA P-55 Coastal Construction Manual)

6. ☐POST FOUNDATIONS, Trip #: _____
   Post Type (holes filled with concrete/non driven pile):
   ☐Timber ☐Square _____", ☐Round _____", Species _____Grade _____; Treatment type: ☐CCA-C, ☐ACQ-D, ☐CBA-A or ☐CA-B; Species _____; Grade _____; Post Depth _____feet
   Concrete Encasement ☐Diameter _____, Depth _____, Strength _____, Reinforcing: _____ Vertical: #_____ bars;
   Stirrups #_____ @_____" o.c.

7. ☐DRILLED PIER FOUNDATIONS, Trip #: _____
   Depth _____" x Diameter _____", Stirrups #_____ @ _____ o.c., Steel (_____) #_____ bars, quantity of piers: _____
   Depth _____" x Diameter _____", Stirrups #_____ @ _____ o.c., Steel (_____) #_____ bars, quantity of piers: _____
   Depth _____" x Diameter _____", Stirrups #_____ @ _____ o.c., Steel (_____) #_____ bars, quantity of piers: _____

4.10 QC SECTION: WAVE ACTION AND FLOOD

See Appendix I for Elevation and Flood Abbreviations and definitions and Appendix II for flood design references.
Flood Zone_____

☐"A" Zone, ☐ For structures located in an "A" zone, all C&C should be constructed and inspected in conformance with the applicable wind pressures.
☐"V" Zone, ☐"VE" Zone, ☐ For structures located in an "V" or "VE" zone ,the breakaway walls should be constructed and inspected in conformance with the applicable wind pressures.

5.0 REFERENCE MATERIALS

1. 2006 Texas Revisions to the 2006 International Residential Code and 2006 Texas Revisions to the 2006 International Building Code, Texas Department of Insurance, available on http://www.tdi.texas.gov under the Windstorm/Building Codes and Downloads section.

2. AAMA/WDMA/CSA 101/I.S.2/A440-05, "Standard/Specification for Windows, Doors, and Unit Skylights," American Architectural Manufacturers Association, Window & Door Manufacturers Association, Canadian Standards Association.

3. AISI S100 (North American Specification for the Design of Cold-Formed Steel Structural Members) and AISI S240 (North American Standard for Cold-Formed Steel Structural Framing), American Iron and Steel Institute, 25 Massachusetts Ave., NW, Suite 800, Washington, DC 20001.

4. ANSI/AWC, SDPWS, "Special Design Provisions for Wind and Seismic with Commentary," American Wood Council, 222 Catoctin Circle SE, Suite 201, Leesburg, VA 20175.

5. APA – The Engineered Wood Association (formerly American Plywood Association), 7011 S. 19th Street, Tacoma, WA 98466-5333.

6. ASCE/SEI Standard 7, "Minimum Design Loads for Buildings and Other Structures," American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20191.

7. Guidelines for Hurricane Resistant Residential Construction, IBHS (Institute for Business & Home Safety), 2005.

8. Hurricane Resistant Residential Construction, Special Topics, ICC.

9. International Building Code, International Code Council, Washington, DC.

10. International Residential Code For One- and Two-Family Dwellings, International Code Council, Washington, DC.

11. Metal Building Systems Manual, Metal Building Manufacturers Association, 1300 Sumner Avenue, Cleveland, OH 44115.

12. Standard for Residential Construction in High-wind Regions, ICC 600-2008, ICC.

13. Standard for Hurricane Resistant Residential Construction, SSTD 10-99, SBCCI (Southern Building Code Congress International).

14. Texas Department of Insurance Windstorm Inspection Program website. The website can be accessed at the following link: http://www.tdi.texas.gov/wind/index.html.

15. Wood Frame Construction Manual For One- and Two-Family Dwellings, American Wood Council, 222 Catoctin Cir SE, Leesburg, VA 20175.

APPENDIX I: ELEVATION AND FLOOD ABBREVIATIONS AND DEFINITIONS

1. The following list contains common construction plan elevation abbreviations, followed by common and associated flood area abbreviations. The sources for these are:
   - FEMA Floodsmart Glossary,
   - Harris County Flood Control District Glossary,
   - Texas Department of Insurance Windstorm Resistant Construction Guide and,
   - AIA Glossary.
2. In special flood hazard areas (SFHA) plan elevations are given in decimal feet values referencing a zero Mean Sea Level (MSL) value.
3. Non-SFHA, preliminary, or estimated plan elevations may reference an approximate 'zero' value such as average site grade, or street curb, etc.

COMMON CONSTRUCTION ELEVATIONS (listed from low to high)

MSL - Mean Sea Level is the average of mean low tide and mean high tide.

OGE - Original Grade Elevation is an average of the site grade adjacent to a structure.

FGE - Finished Grade Elevation is the planned final landscaped grade adjacent to a structure.

LAG - Lowest Adjacent Grade is defined on a surveyor provided Elevation Certificate. LAG can also refer to the lowest approximate existing or original grade adjacent to a planned structure.

MGE - Mean Grade Elevation is the average grade elevation around a structure.

HAG - Highest Adjacent Grade is defined on a surveyor provided Elevation Certificate. HAG can also refer to the highest approximate existing or original grade adjacent to a planned structure.

BFE - Base Flood Elevation is the distance in decimal feet above MSL. The design BFE value for a site should be provided by a Surveyor. An estimate of a site BFE can come from FEMA Flood Maps.

VE Zone - BFE - Distance in decimal feet above MSL to the lowest horizontal structural element of the lowest floor (excluding the pilings or columns).

AE Zone - BFE - Distance in decimal feet above MSL to the lowest finished floor of the structure.

DFE - Design Flood Elevation is a project design value above the BFE. It may be specified by a community, or plan specified by a design engineer or architect.

ABFE - Advisory Base Flood Elevation: a new Base Flood Elevation for rebuilding when using most federal and state funds other than insurance.

LSM - Lowest Horizontal Structural Member. Used in any V Zone (V, VE) as the reference level to determine insurance rates. May be defined on a surveyor provided Elevation Certificate. It may also be specified by a community, or plan specified by a design engineer or architect.

FB - Freeboard, Height added above BFE

FF - Finished Floor. Used in any A Zone (A, AE, AH) as the reference level to determine insurance rates. FF must be higher than BFE listed in the community's map, or 2 feet higher than BFE if no number is locally specified. May be defined on a surveyor provided Elevation Certificate. It may also be specified by a community, or plan specified by a design engineer or architect.

RE - Roof Eave is the elevation of the wall plate supporting a roof.

MRE - Mean Roof Elevation is the mid-point design elevation of a roof section above grade, typically (RE+RR/2)+MGE.

RR - Roof Ridge is the elevation of the roof ridge or roof peak

FLOOD AREA SPECIFIC ABREVIATIONS

FIRM - Flood Insurance Rate Map
DFIRM - Digital Flood Insurance Rate Map
NFIP - National Flood Insurance Program
SFHA - Special Flood Hazard Area have a 1% flood chance/year, called a 100-year event. SFHA Zones are A, AO, AH, A1-A30, AE, V, VE, V1-V30
LiMWA - Limit of Moderate Wave Action. – New informational layer depicted on the FIRMs. The demarcation between Coastal AE and AE zones.
Coastal AE - Inside the LiMWA with wave heights of between 1.5' and 3.0'.
AE - Outside the LiMWA with wave heights up to 1.5'.
SFHA, Moderate - Have a 0.2% flood chance/year, called a 500-year event. Moderate SFHA Zones are B and 'X-Shaded'
SFHA, Minimal - Are higher than and outside of the 0.2% flood chance area with Zones C and X (unshaded)
V Zone - Coastal areas in 1% flood area with possibility of storm-induced waves. In additional to wind loads, V Zone designs must consider predicted wave height, floatation, and erosion or scour from flowing water. The local authority may define a DFE and other additional V Zone design certification requirements.
SWEL - Still Water Elevation Level is an area specific FEMA elevation value based on tides, geography, and storm surge (without waves)
MWL - Mean Water Level is an area specific FEMA elevation based on SWEL plus storm surge wave height predictions from wind driven storm water.
MLW - Mean Low Water (mean low tide) normally needed for design of structures located in coastal waters.
MHW - Mean High Water (mean high tide) normally needed for design of structures located in coastal waters.
MTL - Mean Tidal Level (average of MLW and MHW)

ADDITIONAL DEFINITIONS

Breakaway Walls - Breakaway walls must collapse under a specified pressure and not damage the structure. Consideration must be given to specific details when walling in the piles.

Breakaway Walls - Prescriptive Design Approach - allows the designer to design the elevated portion of the structure and foundation system without consideration of flood forces acting on the breakaway walls. This approach is only allowed for walls designed to have a safe loading resistance (allowable load) of not less than 10 and not more than 20 pounds per square foot (psf).

Breakaway Walls - Simplified Design Approach – is permitted for walls designed to have a safe loading resistance of more than 20 psf. A special certification is required for these walls, the process is simplified since these walls are designed to minimize flood loads to the elevated structures.

Breakaway Walls - Performance-based Design Approach - allows more detailing freedom for breakaway walls, but requires the designer to consider the combined effect of wind forces acting on the elevated portion of the structure, as well as wind and flood loads acting on the foundation system and the breakaway walls.

Vented Walls - A Zones - Permanently installed and vented enclosure walls below BFE intended to allow for the passage of water without adversely impacting the structure with hydrodynamic forces.

Flood Vents - Flood Vents have a certain cross-sectional flow area when rising water occurs. The required area is proportional to the area being vented.

MISCELLANEOUS SUPPORTING FOUNDATION VENT INFORMATION

CRAWL SPACE FLOOD VENT AND AIR VENT REQUIREMENTS

1. Flood Vents reduce crawl space hydrostatic pressure during a flooding event.
2. Air Vents are intended reduce crawl space moisture by exchanging humid air with drier outside air.
3. Crawl Space water drainage and air exchange can be done by the same devices.
4. Vents for flood water or air are designed by either the prescriptive or engineered method.

PRESCRIPTIVE BASIS OF VENT AREA REQUIREMENTS:

1. NFIP (National Flood Insurance Program) prescriptive basis requires 1 sq. in. of vertical vent open area per 1 sq. ft. of enclosed crawl space foundation space (unadjusted for obstructions).
2. The City of Houston (COH) Chapter 19, Guidelines Houston City Code Floodplain states the following: “Fully enclosed areas below the lowest floor that are used solely for parking, building access or storage in an area other than a basement and that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered architect or professional engineer licensed in the State of Texas or meet or exceed the following minimum criterion: have a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding, with the top of all such openings no higher than one foot above grade or BFE, whichever is lower. Openings may be equipped with screens, louvers, valves, or other coverings or devices, provided that they permit the automatic entry and exit of floodwaters.” (Reference 19-32 (8)) Chapter 19 with an effective date of February 1, 2009).
3. IRC R408 defines air ventilation of a crawl space volume to be minimum of 1 sf of vertical air vent area per 150 sf under-floor space, with one vent within 3 feet of each corner.
4. If the crawl space is sealed by a minimum of a 6 mil vapor barrier or other approved methods, the area can be reduced to minimum of 1 sf of vertical air vent area per 1500 sf under-floor space, but still with one vent within 3 feet of each corner.

ENGINEERED BASIS OF VENT AREA REQUIREMENTS:

ASCE 24 Section 2.6.2.2 defines installation and design criteria for engineered openings with equation $A_o = 0.033\ [1/C]\ R\ A_e$ where:

‘A_o’ = total net area of openings required ($in.^2$)
‘0.033’ = coefficient corresponding to a 5.0 factor of safety ($in.^2$ x hr/ft3)
‘C’ = opening coefficient (non-dimensional; see ASCE 24,Table 2-2).
‘R’ = Assume worst case rate of rise and fall (ft/hr) limit is 5 ft/hr.
‘A_e’= total enclosed area (ft^2)

APPENDIX II: FLOOD AND WAVE DESIGN

Flood and wave design is an important aspect of coastal design. However, the design is outside the scope of this paper. Engineers should consider the following sources for flood resistant construction design.

Sources:

1. FEMA Coastal Construction Manual P-55: http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=1671
    a. See calculator at http://www.fema.gov/media-library-data/20130726-1510-20490-4968/ccm_calculator_2011.pdf

2. Simpson Flood Resistant Construction Guide 'F-C-FLOODCON13' http://www.strongtie.com/ftp/fliers/F-C-FLOODCON13.pdf