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PROPERTY INSPECTION REPORT

Prepared For: [redacted]
(Name of Client)

Concerning: [redacted]
(Address or Other Identification of Inspected Property)

By: Aaron D. Miller, ACI, CEI, CMI, CPI, CRI, MTI, RCI [redacted]

International Code Council (ICC) Residential

Combination Inspector 5082671-R5
International Code Council (ICC) Residential Building Inspector 5082671-B1
International Code Council (ICC) Residential Electrical Inspector 5082671-E1
International Code Council (ICC) Residential Mechanical Inspector 5082671-M1
International Code Council (ICC) Residential Plumbing Inspector 5082671-P1
American Society of Home Inspectors (ASHI) Certified Inspector No. 203652
National Association of Home Inspectors (NAHI) Certified Real Estate Inspector, CRI 200353
International Association of Certified Home Inspectors (INACHI), Certified Professional Inspector No. NACHI05060294
Master Inspector Certification Board, Board-Certified Master Inspector
Texas Professional Real Estate Inspectors Association (TPREIA) Master TPREIA Inspector (MTI)
Texas Real Estate Commission (TREC) Professional Inspector 4336
Texas Department of Agriculture, Structural Pest Control Service Registered Business No. 11379
Texas Department of Agriculture, Structural Pest Control Service Certified Applicator No. 40247
Exterior Design Institute (EDI/EIMA) EIFS Third Party Inspector and Moisture Analyst (CEI) MA TX-29
Post-Tensioning Institute Level One Certificate for Unbonded Prestressed Post-Tensioned Concrete Installer No. 320054833
AAMA InstallationMasters Certified Window and Door Installer
CertainTeed® Master Shingle Applicator
Building Officials Association of Texas (BOAT)
Texas Residential Construction Commission, Legacy
City of Garland, Texas Unified Building Standards Commission Member
North American Deck and Railing Association (NADRA), Member
Master Deck Professional Certification, NADRA
AAMA Door and Window Installation Master Certification

(Name and License Number of Inspector) (Date)

PURPOSE, LIMITATIONS AND INSPECTOR / CLIENT RESPONSIBILITIES

This property inspection report may include an inspection agreement (contract), addenda, and other information related to property conditions. If any item or comment is unclear, you should ask the inspector to clarify the findings. It is important that you carefully read ALL of this information.

This inspection is subject to the rules ("Rules") of the Texas Real Estate Commission ("TREC"), which can be found at www.trec.texas.gov.

The TREC Standards of Practice (Sections 535.227-535.233 of the Rules) are the minimum standards for inspections by TREC licensed inspectors. An inspection addresses only those components and conditions that are present, visible, and accessible at the time of the inspection. While there may be other parts, components or systems present, only those items specifically noted as being inspected were inspected. The inspector is NOT required to turn on decommissioned equipment, systems, and utility services or apply an open flame or light a pilot to operate any appliance. The inspector is NOT required to climb over obstacles, move furnishings or stored items. The inspection report may address issues that are code-based or may refer to a particular code; however, this is NOT a code compliance inspection and does NOT verify compliance with manufacturer's installation instructions. The inspection does NOT imply insurability or warrantability of the structure or its components. Although some safety issues may be addressed in this report, this inspection is NOT a safety/code inspection, and the inspector is NOT required to identify all potential hazards.

In this report, the inspector shall indicate, by checking the appropriate boxes on the form, whether each item was inspected, not inspected, not present or deficient and explain the findings in the corresponding section in the body of the report form. The inspector must check the Deficient (D) box if a condition exists that adversely and materially affects the performance of a system or component or constitutes a hazard to life, limb or property as specified by the TREC Standards of Practice. General deficiencies include inoperability, material distress, water penetration, damage, deterioration, missing components, and unsuitable installation. Comments may be provided by the inspector whether or not an item is deemed deficient. The inspector is not required to prioritize or emphasize the importance of one deficiency over another.

Some items reported may be considered life-safety upgrades to the property. For more information, refer to Texas Real Estate Consumer Notice Concerning Recognized Hazards or Deficiencies below.

THIS PROPERTY INSPECTION IS NOT A TECHNICALLY EXHAUSTIVE INSPECTION OF THE STRUCTURE, SYSTEMS OR COMPONENTS. The inspection may not reveal all deficiencies. A real estate inspection helps to reduce some of the risk involved in purchasing a home, but it cannot eliminate these risks, nor can the inspection anticipate future events or changes in performance due to changes in use or occupancy. It is recommended that you obtain as much information as is available about this property, including any seller's disclosures, previous inspection reports, engineering reports, building/remodeling permits, and reports performed for or by relocation companies, municipal inspection departments, lenders, insurers, and appraisers. You should also attempt to determine whether repairs, renovation, remodeling, additions, or other such activities have taken place at this property. It is not the inspector's responsibility to confirm that information obtained from these sources is complete or accurate or that this inspection is consistent with the opinions expressed in previous or future reports.

ITEMS IDENTIFIED IN THE REPORT DO NOT OBLIGATE ANY PARTY TO MAKE REPAIRS OR TAKE OTHER ACTIONS, NOR IS THE PURCHASER REQUIRED TO REQUEST THAT THE SELLER TAKE ANY ACTION. When a deficiency is reported, it is the client's responsibility to obtain further evaluations and/or cost estimates from qualified service professionals. Any such follow-up should take place prior to the expiration of any time limitations such as option periods.

Evaluations by qualified tradesmen may lead to the discovery of additional deficiencies which may involve additional repair costs. Failure to address deficiencies or comments noted in this report may lead to further damage of the structure or systems and add to the original repair costs. The inspector is not required to provide follow-up services to verify that proper repairs have been made.

Property conditions change with time and use. For example, mechanical devices can fail at any time, plumbing gaskets and seals may crack if the appliance or plumbing fixture is not used often, roof leaks can occur at any time regardless of the apparent condition of the roof, and the performance of the structure and the systems may change due to changes in use or occupancy, effects of weather, etc. These changes or repairs made to the structure after the inspection may render information contained herein obsolete or invalid. This report is provided for the specific benefit of

the client named above and is based on observations at the time of the inspection. If you did not hire the inspector yourself, reliance on this report may provide incomplete or outdated information. Repairs, professional opinions or additional inspection reports may affect the meaning of the information in this report. It is recommended that you hire a licensed inspector to perform an inspection to meet your specific needs and to provide you with current information concerning this property.

TEXAS REAL ESTATE CONSUMER NOTICE CONCERNING HAZARDS OR DEFICIENCIES

Each year, Texans sustain property damage and are injured by accidents in the home. While some accidents may not be avoidable, many other accidents, injuries, and deaths may be avoided through the identification and repair of certain hazardous conditions. Examples of such hazards include:

- malfunctioning, improperly installed, or missing ground fault circuit protection (GFCI) devices for electrical receptacles in garages, bathrooms, kitchens, and exterior areas;
- malfunctioning arc fault protection (AFCI) devices;
- ordinary glass in locations where modern construction techniques call for safety glass;
- malfunctioning or lack of fire safety features such as smoke alarms, fire-rated doors in certain locations, and functional emergency escape and rescue openings in bedrooms;
- malfunctioning carbon monoxide alarms;
- excessive spacing between balusters on stairways and porches;
- improperly installed appliances;
- improperly installed or defective safety devices; and
- lack of electrical bonding and grounding; and
- lack of bonding on gas piping, including corrugated stainless steel tubing (CSST.

To ensure that consumers are informed of hazards such as these, the Texas Real Estate Commission (TREC) has adopted Standards of Practice requiring licensed inspectors to report these conditions as “Deficient” when performing an inspection for a buyer or seller, if they can be reasonably determined.

These conditions may not have violated building codes or common practices at the time of the construction of the home, or they may have been “grandfathered” because they were present prior to the adoption of codes prohibiting such conditions. While the TREC Standards of Practice do not require inspectors to perform a code compliance inspection, TREC considers the potential for injury or property loss from the hazards addressed in the Standards of Practice to be significant enough to warrant this notice.

Contract forms developed by TREC for use by its real estate licensees also inform the buyer of the right to have the home inspected and can provide an option clause permitting the buyer to terminate the contract within a specified time. Neither the Standards of Practice nor the TREC contract forms require a seller to remedy conditions revealed by an inspection. The decision to correct a hazard or any deficiency identified in an inspection report is left to the parties to the contract for the sale or purchase of the home.

INFORMATION INCLUDED UNDER “ADDITIONAL INFORMATION PROVIDED BY INSPECTOR”, OR PROVIDED AS AN ATTACHMENT WITH THE STANDARD FORM, IS NOT REQUIRED BY THE COMMISSION AND MAY CONTAIN CONTRACTUAL TERMS BETWEEN THE INSPECTOR AND YOU, AS THE CLIENT. THE COMMISSION DOES NOT REGULATE CONTRACTUAL TERMS BETWEEN PARTIES. IF YOU DO NOT UNDERSTAND THE EFFECT OF ANY CONTRACTUAL TERM CONTAINED IN THIS SECTION OR ANY ATTACHMENTS, CONSULT AN ATTORNEY.

ADDITIONAL INFORMATION PROVIDED BY INSPECTOR

“Under current law, TREC’s (the Texas Real Estate Commission’s) jurisdiction extends to any inspection of real property performed in anticipation of a purchase or sale of real estate. This includes any inspection in connection with the anticipated purchase of real estate from a builder, including phase inspections (but not the inspection of a structure being constructed on land already owned by the homeowner-to-be). Likewise, any inspection performed for an owner in anticipation of selling falls under TREC’s jurisdiction, regardless of whether there is a specific buyer in mind at the time of the inspection.” – Devon Bijansky, Deputy General Counsel, Texas Real Estate Commission.

Additional attachments provided by Texas Inspector that make this inspection report complete are listed but not limited to the following: Property Inspection Agreement, Embedded Links to Additional Information of Systems, Addenda, Information Attached or Provided under Separate Cover, but not Paginated, et al. These contain crucial, pertinent information and the client is strongly urged to treat them as such. Failure to do so will result in a curtailed understanding of the property condition.

The digital pictures in this report are a random sampling of the conditions or damages in a representative number of areas chosen and should not be considered to show all of the conditions, damages or deficiencies observed. There will be some conditions, damages or deficiencies not represented with digital imaging. All such images remain the property of the Inspector.

The use of "special tools" is at the discretion of the inspector in order to form opinions as he sees fit in certain instances.

Any suggestions, and recommendations we may provide within our report regarding hazardous and/or unsatisfactory conditions should immediately be brought to the attention of a qualified licensed contractor or specialist to provide you with a full in-depth evaluation to determine if additional areas of concern exist within the building's components, or systems, and furnish a written cost estimate for corrective work or replacement that may be suggested within our report. It is strongly recommended that a competent, bonded, and insured State- or City-Licensed Contractor perform all corrective work.

This is NOT a wood-destroying insect report and is not intended to convey information regarding wood-destroying organisms. This is also NOT a mold report and is not intended to convey information regarding the presence of mold in the structure. For either of these opinions and reports you are strongly urged to consult with a person licensed by the appropriate agency to conduct these investigations prior to the end of any time periods associated with the purchase of this home.

You are strongly urged to obtain a C.L.U.E. report on this home in an attempt to discover what, if any, insurance damage claims have been filed on this property, prior to closing escrow on this property. See: https://personalreports.lexisnexis.com/

You are strongly urged to ascertain if any hail damages may have been incurred by this property in the past by referring to:

http://weathersource.com/zip-code-historical-weather
http://www.nws.noaa.gov/climate/

You are strongly urged to locate, acquire, read and thoroughly understand all documentation pertinent to the construction, remodeling, maintenance and repair of this property including, but not limited to: design drawings, engineering documents, geo-technical testing documents, building inspection permits, surveys, appraisals, seller's disclosure statements, maintenance schedules, mechanical appliance and systems owner's manuals, history of wood-destroying insect activity and treatment reports, et al., prior to the end of any time periods associated with the sale or purchase of this property.

You are strongly urged to verify that all of the items indicated as in need of repair in this report have been properly repaired prior to the end of any time periods associated with the sale or purchase of this property. Additionally, you are strongly urged to have the current owner of the property complete a new and updated Seller's Disclosure of Property Condition form: http://www.trec.state.tx.us/pdf/contracts/OP-H.pdf , immediately once the property has been vacated.

The Texas residential real estate resale contract states that the home is being purchased in as-is condition. While it is true that many, if not all, home buyers may negotiate sales prices based upon the condition of the home, ascertaining repair and remodeling costs of the properties inspected lies outside the scope of a general home inspection. In order to obtain the most accurate and realistic repair costs you are strongly urged to consult with a licensed tradesperson or general contractor in the area in which the home is located. Other possible sources for repair costs can be found using publications such as the current version of RSMeans Contractor's Pricing Guide: Residential Repair & Remodeling. Alternately, you can find a wealth of information regarding repair and remodeling costs at websites like http://www.homewyse.com/ .

This report does not constitute a repair list nor is it in any way intended to be used as such. This inspector provides neither repair lists nor summary reports. It is up to the buyer and his agent to make all decisions regarding the negotiation of repairs on this property. Visual inspections are considered the start of a due diligence process by the buyer and not the final or end of due diligence. Prior to closing escrow, you are strongly urged to require the seller of this property to update the seller's disclosure form once the property has been completely vacated to reflect any issues that may have occurred since the date of this inspection or that were obscured by furnishings, stored items, etc.

IMPORTANT INFORMATION REGARDING THE FOLLOWING SYSTEMS AND MATERIALS CONDITION DESIGNATIONS REQUIRED BY THE TEXAS REAL ESTATE COMMISSION

The definition of Deficient provided by the TREC is as follows: "Deficient - Reported as having one or more deficiencies." Additionally, "Deficiency" is: A condition that, in the inspectors reasonable opinion, adversely and materially affects the performance of a system or component or constitutes a hazard to life, limb, or property as specified by these standards of practice. General deficiencies include but are not limited to inoperability, material distress, water penetration, damage, deterioration, missing parts, and unsuitable installation."

Therefore, the definition of "deficiency" by the TREC is a statutory definition (as published in the Texas Register) and any other definition of "deficient" or "deficiency" would be moot to the inspector in regard to semantics. The previous "In Need of Repair" designation of parts, components and systems historically used up to Feb. 1, 2009, has been replaced by "Deficient" (or "Deficiencies") through statutory change BUT DO NOT EXCLUDE OR DIRECT ANY INTERPRETATION, INTENT OR ACTION OF ANY BUYER EXPECTATIONS OR BUYER DUE DILIGENCE. According to the TREC, the term "deficiency" better describes the broad category of issues in which repair, replacement, or an upgrade is recommended. The "D" ("Deficiency") box on the inspection report should be used just like the ("R") ("Not Functioning or In Need of Repair") box that has been used in the past. It is not the intent of this inspector to interpret or define the terms "deficient" or "deficiency" outside the statutory definition and requirement. If you have a question you are strongly urged to consult with a real estate attorney regarding the definition(s) of "deficient" and "deficiency" as soon as possible during your option period. The responsibility to make a decision as to further analysis, repair, replace or update any item, material or system based upon the Inspector's reasonable opinion or designation of "Deficient" is solely yours. According to the TREC, "the ultimate decision what to do with the reported information, such as making recommended repairs or to simply "live with" a reported deficiency, is a decision to be made by the person for whom the report is prepared". The principle of "caveat emptor" (let the buyer beware) should not be circumvented. (The idea that buyers take responsibility for the condition of the items they purchase and should examine them before purchase. This is especially true for items that are not covered under a strict warranty. See, e.g., SEC v. Zandford, 535 U.S. 813 (2002)). Therefore, visual inspections following the state inspection standards are considered the beginning of a due diligence process by the client and not considered the final or end of due diligence. Sole reliance on this limited visual inspection to purchase property is neither recommended nor prudent. A comprehensive inspection with qualified specialists is available and explained in the first contact.

NOTICE TO BUILDERS AND MUNICIPAL INSPECTORS IN THE EVENT OF INTERIM INSPECTIONS

This report format is being used as a convenience to the buyer client and any agents involved in the sale/purchase of this house. If the inspection is a pre-pour or pre-drywall inspection the TREC Inspector SOP does not apply and was not followed. All interim inspections are performed referencing the building, energy, and electrical codes adopted by the municipality and/or the state of Texas, to include local amendments. Do not attempt to inform the client that this inspector was referencing some other, unrelated set of standards.

In the event of a final inspection where the new home is substantially completed the state of Texas requires that the inspector adhere to the minimal TREC Inspector SOP. This inspector does so and exceeds that standard by referencing the building, energy, and electrical codes adopted by the municipality and/or the state of Texas, to include local amendments. Do not attempt to inform the client that this inspector was referencing some other, unrelated set of standards.

The codes referenced in this report are:
2018 IRC and Local Amendments
2018 IECC and Local Amendments
2017 NEC and Local Amendments (All installation after 11/1/20 must be to 2020 NEC as per TDLR)

I=Inspected **NI=Not Inspected** **NP=Not Present** **D=Deficiency**

I	NI	NP	D	Inspection Item

I. STRUCTURAL SYSTEMS

☑ ☐ ☐ ☐ **A. Foundations**

Type of Foundation(s): Structurally Supported Post-Tensioned Monolithic Slab (Piered Slab)(Assumed Not Verified in Absence of Foundation Plans)

Note: Specific Limitations. There is no single formal universally accepted standard for residential building foundation performance. Even if there were, an opinion of the performance of any foundation would necessarily require several pieces of information that are typically not available to the inspector, e.g. a new construction elevation baseline survey on the date that the foundation construction was originally substantially completed, et al. Simply put: an opinion on the performance of a foundation cannot feasibly be based upon a one-time visual inspection of the structure. One cannot extrapolate long-term trends from a short-term sample of facts. This is a report of first impression of what was visible and recognized by the inspector on the date and time of this inspection. The foundation performance opinion stated below neither in any way addresses future foundation movement or settlement, nor does it certify floors to be level. Should you have present or future concerns regarding the foundation's condition, you are strongly advised to consult with a licensed Professional Structural Engineer for further evaluation.

Though the TREC requires inspectors to identify the exact type of foundation of the building being inspected, this is often not practically feasible, e.g. in the case of parged post-tensioned slabs-on-ground, post-tensioned structurally supported slabs, and proprietary engineered systems such as suspended foundations, et al. The type of foundation reported will be reported based solely on the visual cues available and the inspector's experience in the field. No warranty is expressed or implied regarding the accuracy of this assessment.

For additional information on foundations go to:

http://www.texasinspector.com/files/Foundation-Book-for-Buyers.pdf

Method of Inspection: The Inspector performed a visual inspection of interior and exterior walls and visible grade beams. There are many limits inherent in this visual inspection as the Inspector does not move private property, furniture or lift carpeting and padding to look for cracks, and does not use any specialized measuring devices (e.g. elevation surveying equipment) to establish relative elevations. These practices are beyond the bounds of the standards of practice. The condition of concealed or covered floors is specifically excluded from the inspection standards and report.

In the presence or absence of any visible defects, the Inspector may not recommend that you consult with a structural engineer or a foundation contractor, but this should not deter you from seeking the opinion of any such expert prior to continuance under your personal responsibility of due diligence. This is a report of first impression of what was visible and accessible by the inspector on the date and time of this inspection. The foundation performance opinion stated below neither in any way addresses future foundation movement or settlement, nor does it certify floors to be level. Should you have present or future concerns regarding the foundation's condition, you are strongly advised to consult with a licensed Professional Structural Engineer for further evaluation.

Type of Inspection: Visual Inspection of the Accessible Exterior
Grounds for Departure: N/A

Comments:

FOUNDATION

The foundation does not appear to be in need of immediate remedial underpinning based upon a visual inspection.

This house appears to be constructed on a structurally-supported slab foundation. Many foundations of this design are built with carton forms or cardboard void boxes which remain in place after the foundation is poured. This material disintegrates over time creating a condition conducive to the attraction of termites. If this is the case, you are strongly urged to consult with a professional certified pesticide applicator for remedial options prior to closing escrow on this home.

SPECIFIC LIMITATIONS: The condition of the edge of the slab foundation could not be ascertained in areas where the adjacent decks, patios, porches, sidewalks, soil level, stored items, slab edge parging or vegetation obscured it.

NOTE: Be aware that home inspectors in Texas are presently required by the Texas Real Estate Commission to render an opinion on the performance of foundations. This requirement is both incredibly unreasonable and impossible to meet. The performance of any foundation requires a beginning point of reference with which to compare the current state of the foundation. In the absence of a complete foundation elevation survey at the time of the foundation's construction, an opinion on the performance of a foundation is specious at best. **WE DO NOT RECOMMEND THAT YOU RELY SOLELY UPON THE OPINION STATED HEREIN REGARDING FOUNDATION PERFORMANCE.**

FOUNDATION DESIGN INFORMATION

The Texas Engineering Practice Act requires all Texas homes built on expansive soil to have engineered slabs. The ability of the foundation to withstand the forces of expansive soils where expansive soils are present can neither be determined nor opined by a limited visual inspection. That determination is an act and process of engineering which is beyond the scope of this inspection and the state inspection standards of practice. If you have a question, concern or suspected failure contact the certifying designer/engineer of record.

SOIL TYPE AND SUITABILITY

See the USGS soil type and use information provided to you in a separate report along with this inspection report for more information regarding the type of soil on your lot and the suitability of the soil type for construction of reinforced slab-on-ground foundations.

CONSTRUCTION DOCUMENTS (PLANS)

"R106 A complete set of construction documents (building plans) was not on site as required by: IRC R 106.3.1 Approval of construction documents. When the building official issues a permit, the construction documents shall be approved in writing or by a stamp which states "REVIEWED FOR CODE COMPLIANCE." One set of construction documents so reviewed shall be retained by the building official. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection. . .", and,
"R323.3.6 Construction documents. The construction documents shall include documentation that is prepared and sealed by a registered design professional that the design and methods of construction to be used meet the applicable criteria of this section."

"This section provides the minimum requirements for construction documents that an applicant must provide along with the permit application form for the application package to be considered complete. Construction documents are not just a set of drawings. Construction documents are the entire set of all submitted forms and information necessary to accurately communicate the scope of the construction. The submittals may include written special

inspection and structural observation programs, construction drawings and details, reports, calculations, specifications, shop drawings, manufacturer's installation instructions, site plans and other graphic and written forms that will describe the proposed work in detail."

While it may be true that the IRC allows the building official a certain amount of latitude, in R104.1, to interpret the code for the purpose of clarification, it does not obviate his responsibility to insure that the intent and letter of the code is enforced.

"R104.1 General. The building official is hereby authorized and directed to enforce the provisions of this code. The building official shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in conformance with the intent and purpose of this code. ***Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code."***

IRC Commentary: The building official is appointed by the legislative body of the jurisdiction to serve as the employee with the authority and responsibility for the proper administration of the code enforcement agency. The building official establishes policies and procedures that will clarify, and not nullify, the applications of the code. The development of those policies and procedures should not be simply for the convenience of the jurisdiction's employees but should be viewed as a way to effectively communicate to all interested parties involved in the construction process how the department will process applications, review construction documents, make inspections, approve projects, and determine and clarify the application of the code provisions. Properly developed, these policies and procedures can make the code enforcement department more predictable for those who are regulated and will also establish improved code compliance and public relations.

When interpretation of the code is needed, the building official is the one individual of the jurisdiction with the legal authority to interpret the code and determine how the provisions should be applied, in both general and specific cases. Some departments formalize the interpretation process and require the person with a question to submit their question in writing. Departments are encouraged to develop policies for both formal (written) and informal (verbal) requests for code interpretations. ***Any such interpretations must be in conformance with the intent and letter of the code and may not waive any requirements.*** It may be necessary in some cases for the building official to write these code interpretations into the permit.

IMPORTANT: If your builder refuses to supply you with a set of plans for your house you are strongly advised to obtain them from the municipal building inspections department.

Below is from https://www.texasattorneygeneral.gov/sites/default/files/2018-06/PIA_handbook_2018_0.pdf

"If a copy of public information is requested, a governmental body must provide "a suitable copy . . . within a reasonable time after the date on which the copy is requested." However, the Act does not authorize the removal of an original copy of a public record from the office of a governmental body. If the requested records are copyrighted, the governmental body must comply with federal
copyright law.

Open Records Decision No. 660(1999) (Federal Copyright Act "may not be used to deny access to or copies of the information sought by the requestor under the Public Information Act," but a governmental body may place reasonable restrictions on use of copyrighted information consistent with rights of copyright owner)."

Also see: http://foift.org/resources/texas-public-information-act/

Get the plans as soon as you can. The city is only required to retain them for 180 days after the certificate of occupancy is issued or the final inspection is approved.

See also: **http://www.texasinspector.com/files/BOAT-Plans-on-Site.pdf**

MANUFACTURERS' INSTALLATION INSTRUCTIONS
A complete set of materials and systems manufacturers' installation instructions was not maintained on site during this inspection as required by IRC 106.1.2.

NEW HOME DOCUMENTATION
You are strongly urged to obtain the following documents from you builder or from the municipal building inspection department.

1) Geotechnical engineering reports and associated laboratory testing results to include, but not limited to, soil testing (e.g. standard penetration test reports, boring logs, et al.) and fill soil designations.
2) Site soil compaction certification letter.
3) Design firm engineering documents to include engineering drawings, engineer's notes, inspection reports, et al.
4) Post-tensioning materials documents, e.g. shipping invoices, tendon mill reports and certifications, et al.
5) Post-tensioning jack calibration and maintenance records for the equipment used on this site.
6) Post-tensioning tendon stressing logs.
7) Concrete plant, shipment and placement records.
8) Concrete slump test records.
9) Concrete core sample testing records.
10) Final grading certificate by a licensed civil engineer or surveyor.
11) Geotechnical engineer's soil compaction letter.
12) Engineer design and approval for all departures from building code-prescribed construction methods, as well as any alterations or repairs of any items of engineered design.
13) Engineering drawings and approval letters for all retaining walls.
14) Framing and MEP drawings.
15) Manuals for all mechanical equipment.
16) Manuals for all appliances.
17) Installation instructions for all proprietary building materials used.
18) Initial Foundation Elevation Survey
19) Proof of termite treatment on Texas Department of Agriculture-promulgated form.
20) HERS rater documentation.
21) All permits and inspection tags/reports from the municipality.
22) All reports from special inspectors.
23) Surveyor's documentation to include flood plain information.
24) Plumbing static pressure test results for the supply and DWV piping as well as gas piping.
25) Builder's warranty.

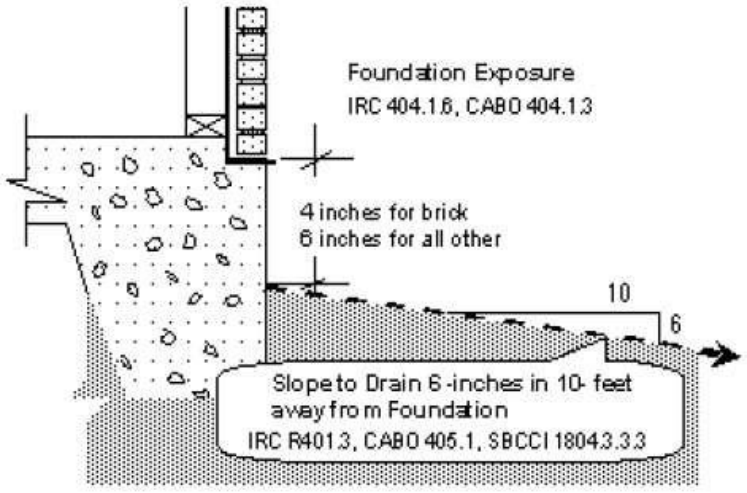
☑ ☐ ☐ ☑ **B. Grading and Drainage**

All residential lot drainage in the DFW area must be designed in accordance with the guidelines contained in the "Storm Water Management Design Manual" incorporating the City of Fort Worth Local Criteria Section and the North Central Texas Council of Governments (NCTCOG) integrated Storm Water Management (iSWM) Design Manual for Site Development. These standards were first promulgated in 2006, and are commonly referred to as I-SWIM Standards.

Comments:

GRADING

The grading around the perimter of the foundation must be improved to promote the flow of storm water away from the house. Grading specifications are spelled out clearly in International Residential Code (IRC) R401.3, "*Surface drainage shall be diverted to a storm sewer or other approved point of collection so as to not create a hazard. Lots shall be graded so as to drain surface water away from foundation walls. The grade away from foundation walls shall fall a minimum of 6 inches (152 mm) within the first 10 feet (3048*)". This is equivalent to the 5% grade required by the foundation design firm's engineer. ***FAILURE TO MAKE THESE IMPROVEMENTS MAY EFFECTIVELY VOID YOUR FOUNDATION WARRANTY!***



R 401.3 is not the only place in the code requiring this drainage provision. R506.1, and R 403.1.8 instruct builders slab-on-grade residential buildings on expansive clay soils to adhere to an even stricter commercial building code, that of the International Building Code 1805.8.2, "*Slab-on-ground foundations. Slab-on-ground, mat or raft foundations on expansive soils shall be designed and constructed in accordance with WRI/CRSI Design of Slab-on-Ground Foundations or PTI Design and Construction of Post-Tensioned Slabs-On-Ground.*" PTI Design is the Post-Tensioning Institute of which this inspector is both a member and a Level 1

Certificate holder. The home you are buying is built on an unbonded post-tensioned slab-on-grade foundation and must adhere to these specifications. The Post-Tensioning Institute's *Construction and Maintenance Procedures Manual for Post-Tensioned Slab-On-Grade Construction,* echoes this requirement.

Additionally, the engineer responsible for the foundation design specifies in the shop drawings and general notes therein what the grading should be in relation to this particular foundation. Industry standards again underscore the need for theses improvements. Yards shall have grades and swales that provide for proper drainage away from the home in accordance with the Code or other governmental regulations. If the grades or swales fail to meet the industry standards, the builder shall take such action as is necessary to bring the variance within the standard.

NOTE: The municipality's plat drainage requirements can exceed those set forth by the IRC, i.e. require more than a 6" drop in elevation in the first 10' out from the perimeter of the foundation, but cannot be less stringent. The surveyor responsible for the final lot survey has no authority to approve lot drainage that is not code-compliant, as per IRC 105.8 "Responsibility. It shall be the duty of every person who performs work for the installation or repair of building, structure, electrical, gas, mechanical or plumbing systems, for which this code is applicable, to comply with this code.."

See: http://www.texasinspector.com/files/Drainage-Improvement-Primer.pdf

It is crucial that you understand that water ponding around the foundation perimeter will cause potential heaving of the soil far in excess of that predicted in the geotechnical report upon which the design of this foundation is predicated. This will lead to differential movement and foundation distress.

DRAINAGE

The builder has installed two perched drainage planes where water draining will be trapped between the driveway and the foundation. This must be improved in order to prevent excess moisture from accumulating in the soil adjacent to the foundation.

Perched drainage planes.

SOIL

The soil level on the north side and at the west side of the patio is too high in relation to the foundation elevation. IRC R404.1.6 requires a minimum of 4" clearance from grade to the bottom row of bricks or stone and 6" minimum clearance from grade to the bottom row of any other exterior cladding.

R404.1.6 Height above finished grade. Concrete and masonry foundation walls shall extend above the finished grade adjacent to the foundation at all points a minimum of 4 inches (102 mm) where masonry veneer is used and a minimum of 6 inches (152 mm) elsewhere. The

minimum distance above adjacent grade to which the foundation must be extended provides termite protection and minimizes the chance of decay resulting from moisture migrating to the wood framing. A reduced foundation extension is permitted when masonry veneer is used.

Water is destructive. It can flow through fissures in the soil, rise under hydrostatic pressure or capillary action, and even find a path through solid surfaces, and few structures may be immune to its power. Grading and drainage are probably the most significant aspects of a property, simply because of the direct and indirect damage that moisture can have on structures. More damage has probably resulted from moisture and expansive soils than from most natural disasters, and for this reason we are particularly diligent when we evaluate site conditions. In fact, we compare all sites to an ideal.

In short, the ideal foundation placed on expansive and contractive earth will have soils that slope away from the house [ref: R401.3 and the typical on grade foundation design], and the interior floors will be at least 4-6 inches higher than the exterior grade [ref: R404.1.6]. Also, the residence will have gutters and downspouts that discharge into area drains with catch basins that carry water away to hard surfaces. If a property does not meet this ideal, we will not endorse it, even though there may be no readily visible evidence of moisture intrusion, and recommend that you consult with a qualified grading and drainage contractor or geotechnical engineer.

Additionally, grading and drainage cannot be adequately inspected under a visual inspection unless done so in a hard rain. We have discovered evidence of moisture intrusion inside homes when it was raining that would not have been apparent otherwise. Grading and drainage that does not measure up to this ideal condition is more likely to affect foundation performance, exacerbate water ponding and allow moisture intrusion into any hairline cracks that may be present in the foundation. Also, in conjunction with the cellulose materials found in most modern homes, moisture can facilitate the growth of biological organisms that can compromise building materials and produce microorganism like substances that can have an adverse affect on health; and encourage wood-destroying insects.

WARNING:
Proper lot and adjacent municipal drainage provisions are absolutely necessary to insure proper foundation performance. This includes all areas that will be paved; cut and fill slopes; channel, swales, detention basins including completed outlet structures, terraces, berms, and other drainage facilities as indicated on the plans and as specified in the adopted building codes. This also includes all drainage facilities and final stabilization measures as required by the approved plans and as specified in the adopted building codes. It is important to note that your builder's 10-year structural warranty will be voided if the grading and drainage of the lot are not properly installed and maintained.

NOTE: All grading and drainage elevation measurements were observed using a Technidea Zip Level Pro precision altimeter leveling instrument which was calibrated onsite per the manufacturer's instructions. This level is easily as accurate as any surveyor's transit over distances encountered on residential lots.

☑ ☐ ☐ ☑ **C. Roof Covering Materials**
Types of Roof Covering: Asphalt Composition Roofing Material – Tab Shingles Over Roof Sheathing

Standing-Seam Roofing Material
Viewed From: Viewed With Binoculars
Grounds for Departure: Roof Edge Inaccessible with 17' Ladder
Roof Pitch > 6/12

Note: Specific Limitations. The Inspector is not required to and does not physically walk on roof surfaces. All roof surfaces will be inspected from a ladder at the edge of the roof (if the inspector deems this safe using a 16-ft. ladder), and through the use of binoculars while standing on the ground. The Inspector is not required to determine or report the age or life expectancy of any roof coverings. Roofs that cannot be accessed directly by the inspector may have defects that are not visible from the ground or roof's edge. There are different roof types and materials and different methods of installing them, but all have limited warranties and most, if not all, eventually leak. Every roof is only as good as its waterproof membrane, which is concealed and cannot be examined without removing the material, and this is true of almost every type of roof. The roof covering opinion stated below in no way addresses the property's insurability. This report neither addresses future roof leaks nor does it certify that the roof is leak-free. The report does not constitute a warranty either expressed or implied regarding roof leakage. The Texas Inspection Standards of Practice for property inspections is not designed for the purpose of underwriting or insurability. The Inspector is not allowed by state law to issue warranties. It is unreasonable to expect that it can be ascertained if a roof leaks under any weather conditions based upon a limited visual inspection during a one-time site visit. You are strongly advised to consult with a shingle or roof covering manufacturer-certified roofing contractor for further in-depth evaluations during every conceivable weather condition prior to the end of any time periods associated with the sale or purchase of this property.

You are strongly urged to have an adjustor from your homeowner's insurance carrier inspect and verify that this roof meets their current underwriting criteria prior to the end of any time periods associated with the sale or purchase of this property.

Comments:

SLOPED ROOFING

Due to the recent and ongoing hail storm in the general vicinity you are strongly urged to have the builder provide you with an affidavit from his insurance company's adjustor stating that they have inspected the roof and found no hail damage. You should repeat this process with your own insurer prior to closing escrow on this home.

FLASHINGS

CHIMNEY IN VALLEY

The southwest chimney has been located in the center of a valley. A pipe, vent, fireplace or other object designed to penetrate the roof shall not be located within the area of roof valley centerline without proper "cricketing" or other code-approved water diversion methods. If a pipe, vent, fireplace or other object designed to penetrate the roof is not correctly located as provided in the performance standard stated in this subsection, the builder shall take such action as is necessary to bring the variance within the standard.

Chimney in valley.

In the Steep Slope Roofing and Waterproofing Manual published by the National Roofing Contractors Association it states that "A valley is created at the downslope intersection of two sloping roof planes. Water runoff from the portions of roof areas sloping into a valley flows toward and along the valley. Because of the volume of water and the lower slope along a valley line, such an area is especially vulnerable to leakage. A clear, unobstructed drainage path is desired in valleys so the valley can carry water away quickly and perform successfully for the service life of a roof system." And additionally, "To prevent leakage, it is important with all types of valley construction to avoid placing fasteners and penetrations near the center of a valley."

All roofing manufacturers adhere to NRCA recommendations in their installation instructions. The IRC in turn requires that roofing materials be installed in accordance with these instructions in IRC 102.4, 903.1, an 904.1.

Further, a cricket or saddle flashing is required by IRC 903.2.2 to be installed on the uphill side of any chimney chase that exceeds 30" in width. Even though any one side of this chimney may not exceed 30" in width, the uphill two sides of the chase present themselves to water draining from above. A cricket flashing is required.

LEAD VENT FLASHING

The lead flashing for the plumbing vents that penetrate the roof surface is folded over into the top of the vent(s) and is obstructing the vent openings. This is not allowed by IRC 2606.1. Repair is required. See Plumbing Section for details.

GUTTERS/DOWNSPOUTS

Downspouts and gutter sections that discharge onto the roof should be extended to discharge directly into the gutters below. This condition, if left unattended, can result in premature deterioration of the roofing under the end of the downspout.
See:
https://www.gaf.ca/Warranties_Technical_Documents/Steep_Slope_Technical_Advisory_Bulle

tins/English_Bulletins/Damage_to_Shingles_from_Gutter_and_Downspout_Runoff_Steep_Slope_Technical_Point_TAB_R_2011_150.pdf

Gutter sections and spouts must not drain on roof.

☑ ☐ ☐ ☑ **D. Roof Structures and Attics**

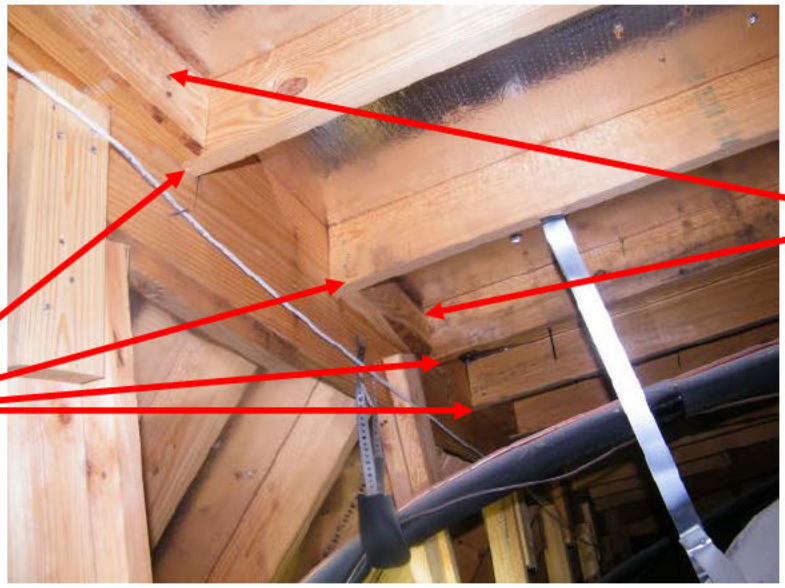
Viewed From: Entered Attic and Performed a Visual Inspection of the Accessible Portions of the Attic
Grounds for Departure: >10" of Insulation
Approximate Average Depth of Insulation: 14 inches
Approximate Average Thickness of Vertical Insulation: N/A - Foam in Stud Bays
Attic Ventilation Type: Roof Vents Static
Soffit Vents
Insulation Types: Blown-In Fiberglass

Comments:

ROOF STRUCTURE

RAFTERS

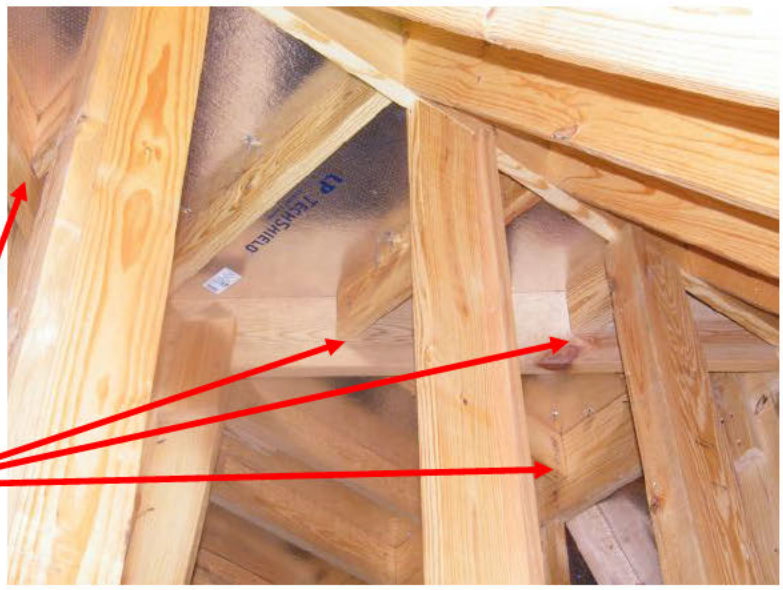
The low slope roof rafters and ceiling joists visible in the lower west and upper northeast attic areas must be supported on each end by a top plate, ledger trip or joist hanger as per IRC 502.6.2. This is also a requirement in the National Design Standard, which is a referenced standard in the International Residential Code. NDS 2.3.1.2 Bearing Joists shall bear directly on beams, girders, ledgers, or load-bearing walls or be supported by hangers or framing anchors. Joist bearing shall be in accordance with the requirements of Table 2.7C.



I=Inspected NI=Not Inspected NP=Not Present D=Deficiency

I	NI	NP	D	Inspection Item

Joist hangers required.



Joist hangers required.

If you are told that "pressure blocking" or "power blocking" takes the place of joist hangers, your builder is supplying you with anecdotal information.

The applicable code is the 2015 International Residential Code. In that publication we find:

R104.1 General. The building official is hereby authorized and directed to enforce the provisions of this code. The building official shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in conformance with the intent and purpose of this code. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

The only approved alternative framing methods are:

R301.1.1 Alternative provisions. As an alternative to the requirements in Section R301.1, the following standards are permitted subject to the limitations of this code and the limitations therein. Where engineered design is used in conjunction with these standards, the design shall comply with the International Building Code.
1. AF&PA Wood Frame Construction Manual (WFCM).

In the WFCM it states:

Regarding the sawn lumber joists 2.3.1.2:

2.3.1.2 Bearing
Joists shall bear directly on beams, girders, ledgers, or loadbearing walls or be supported by hangers or framing anchors. Joist bearing shall be in accordance with the requirements of Table 2.7C.

Regarding the engineered BCI-Joists:

2.3.2.2 Bearing
I-joists shall bear directly on beams, girders, ledgers, or loadbearing walls or be supported by hangers (see Figures 2.4a-c, 2.5a-c, and 2.7). Required I-joist bearing capacity shall be in accordance with 2.3.2.1.

Pressure blocking, while mentioned in the WFCM is only approved to achieve resistance to end rotation of the joists. It is not intended to, nor will it, provide support for the joist's load-bearing capacity.

This is a common misunderstanding in the home building business that has been carried down from one generation to the next. The fact that it is a popular technique does not make it correct and certainly does not achieve code compliance.

Joist hangers provide both for support of the joist and prevention of end rotation. Joist hangers are inexpensive. I find it difficult to understand why your framer, the builder, or the municipal official would want to pose specious arguments in order to save a couple of dollars. And yes, they are all required to adhere to the letter of the code:

IRC R105.8 Responsibility. It shall be the duty of every person who performs work for the installation or repair of building, structure, electrical, gas, mechanical or plumbing systems, for which this code is applicable, to comply with this code.

This is one of several code provisions that emphasize the required compliance for every aspect of the project. Although the permit holder is designated as having the primary responsibility for overall code compliance, it is the responsibility of each and every person working on the job to adhere to the requirements of the code.

ATTIC INSULATION / VENTILATION
An energy code compliance certificate was not observed at this property as required by IECC 401.3: Certificate. A permanent certificate shall be posted on or in the electrical distribution panel. The certificate shall be completed by the builder or registered design professional. The certificate shall list the predominant R-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawl space wall and/or floor) and ducts outside conditioned

spaces; U-factors for fenestration; and the solar heat gain coefficient (SHGC) of fenestration. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the type and efficiency of heating, cooling and service water heating equipment.

SPECIFIC LIMITATIONS: The presence or absence of insulation cannot be confirmed beneath the attic flooring.

SPECIFIC LIMITATIONS: In most, if not all, attics the insulation covers the tops of the ceiling joists. This inspector does not walk on insulated ceiling joists or relocate insulation to gain proper footing. As such, the attic is inspected solely from floored areas such as equipment service floors, or flooring provided for storage. Necessarily, some portions of the attic were inaccessible. These areas were not inspected. All systems and materials located in these inaccessible areas are excluded from this report.

☑ ☐ ☐ ☑ **E. Walls (Interior and Exterior)**

Note: Specific Limitations. The Inspector is not required to determine the condition of interior wall coverings except as they pertain to structural performance or moisture penetration; identify obvious damaged wall coverings or determine the conditions of paints, stains or other surface coatings whether interior or exterior; determine the condition of built-in cabinets or shelves; inspect for the presence of safety glass where the glazing is not clearly labeled as such; or determine the presence, extent or type of vapor barriers or insulation in any walls.

Furnishings, personal items and stored items are not moved by the Inspector during the inspection. If areas are inaccessible or obstructed you are strongly urged to have the house professionally re-inspected once the furnishings and/or stored items have been removed and prior to closing escrow.

Exterior Wall Claddings: Portland Cement Stucco

Fiber-cement Trim

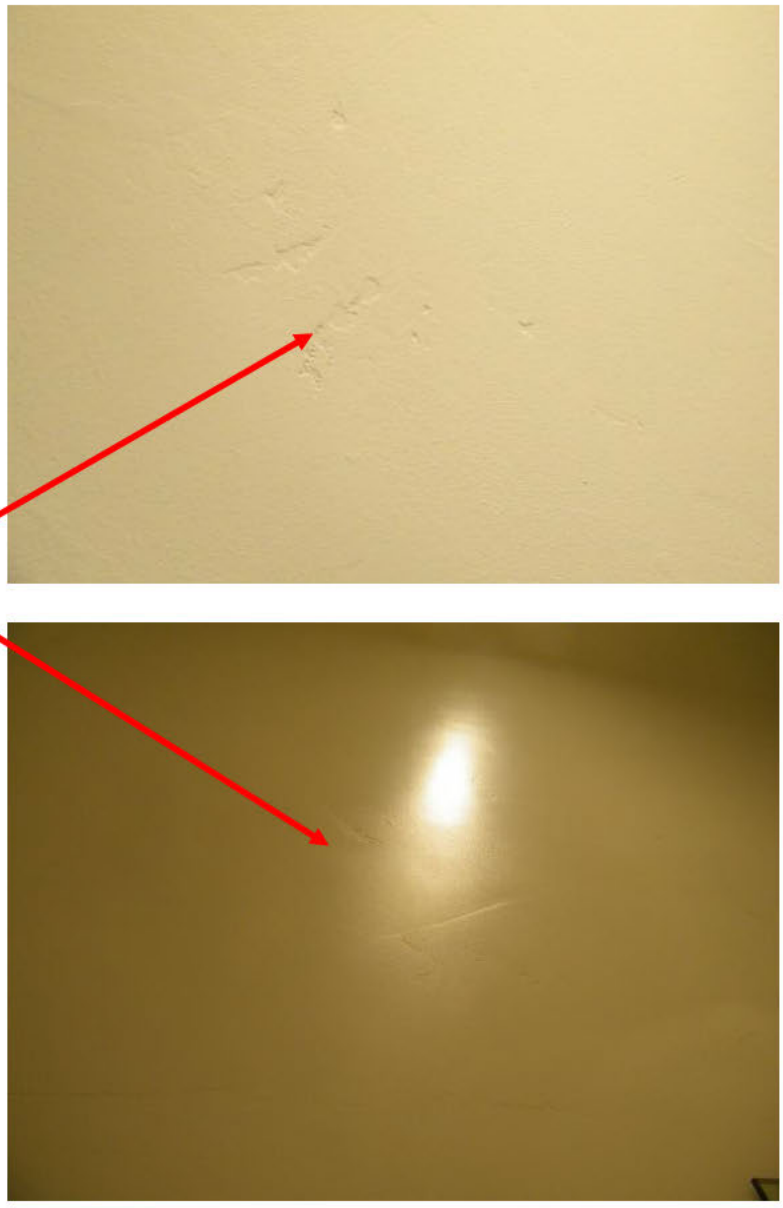
Wood Trim

Interior Wall Claddings: Drywall

Comments:

INTERIOR WALLS

It appears that a level 5 drywall finish was attempted. It does not rise to this level in many locations. See:
https://www.usg.com/content/dam/USG_Marketing_Communications/canada/product_promotional_materials/finished_assets/cgc-construction-handbook-ch05-finishing-drywall-systems-can-en.pdf

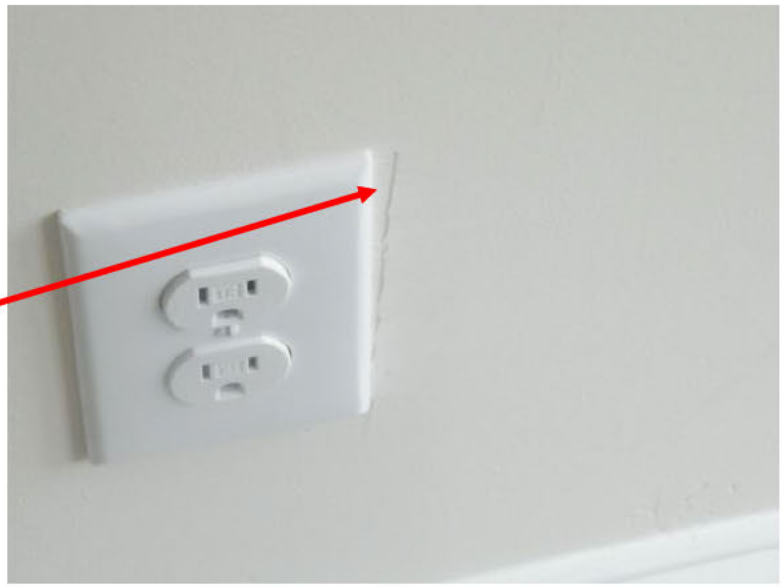


Not level 5 compliant.

I=Inspected NI=Not Inspected NP=Not Present D=Deficiency

I	NI	NP	D	Inspection Item

Not level 5 compliant.



Not level 5 compliant.

EXTERIOR WALLS
AIR SEALING
The perimeter of the jamb for the door to the southeast attic must be air sealed. All walls must be air-sealed as per 2018 IECC Table 402.4.1.1. A continuous air barrier shall be installed in the building envelope.

Air seal frame of attic doors.

SHEATHING

The sheathing panels that are present have not been installed in accordance with the manufacturer's installation instructions and APA standards in that the panels have not been spaced 1/8" apart from one another. This requires improvement as per IRC 102.4 and 604.3.

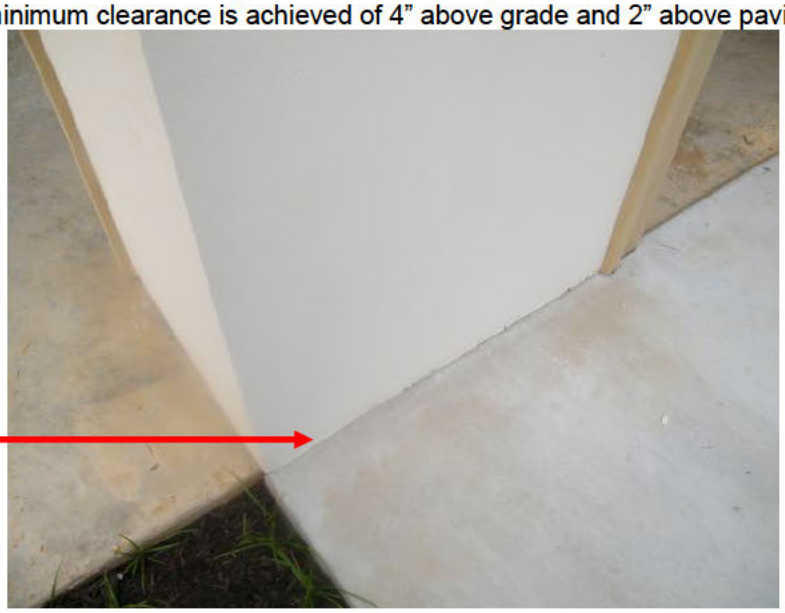
All panel edges of the OSB sheathing require blocking as per the sheathing manufacturer, APA, and IRC 102.4. Failure to block these sheathing panels also weakens the wall diaphragm required by the wall bracing sections of the IRC 602.108.

OSB not spaced 1/8" or supported by framing.

SIDING/TRIM

STUCCO

The stucco system in various locations on the north side and at the west side of the patio is installed too close to grade and flatwork as per IRC R703.6.2.1. This requires repair so that a minimum clearance is achieved of 4" above grade and 2" above paving.



Stucco too close to masonry at front porch.


Stucco too close to grade.


Stucco too close to patio.

Stucco too close to grade.

Stucco below grade.

I=Inspected NI=Not Inspected NP=Not Present D=Deficiency

I	NI	NP	D	Inspection Item

Stucco below grade.

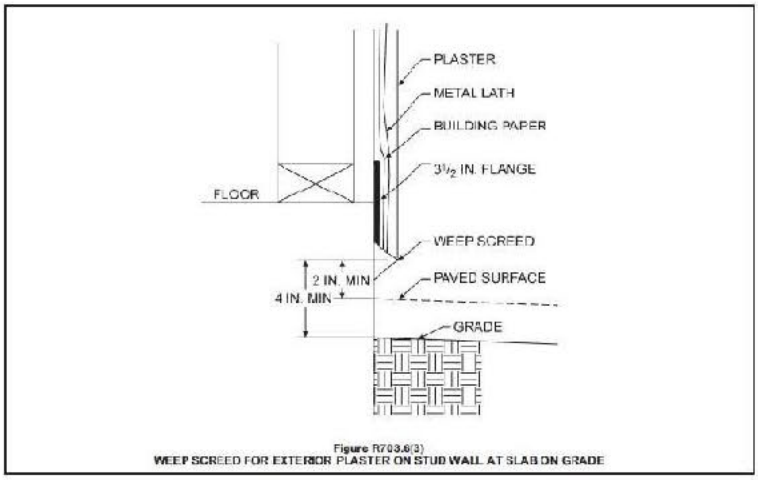
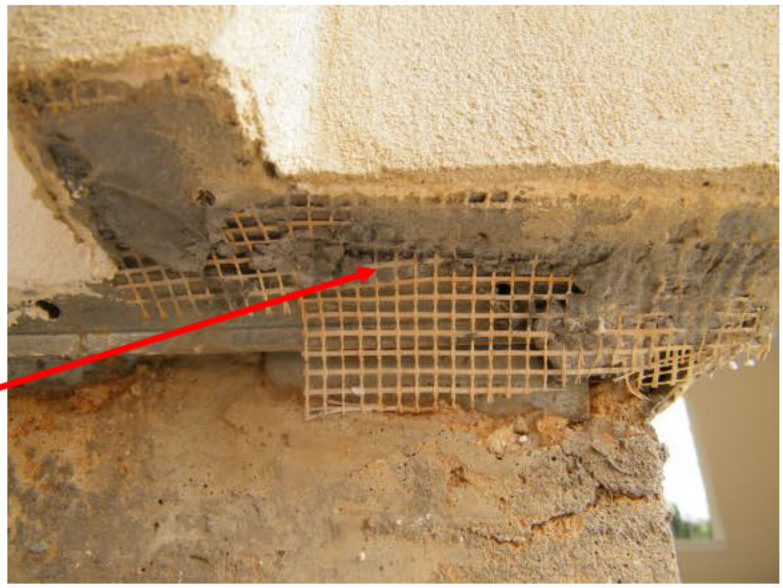


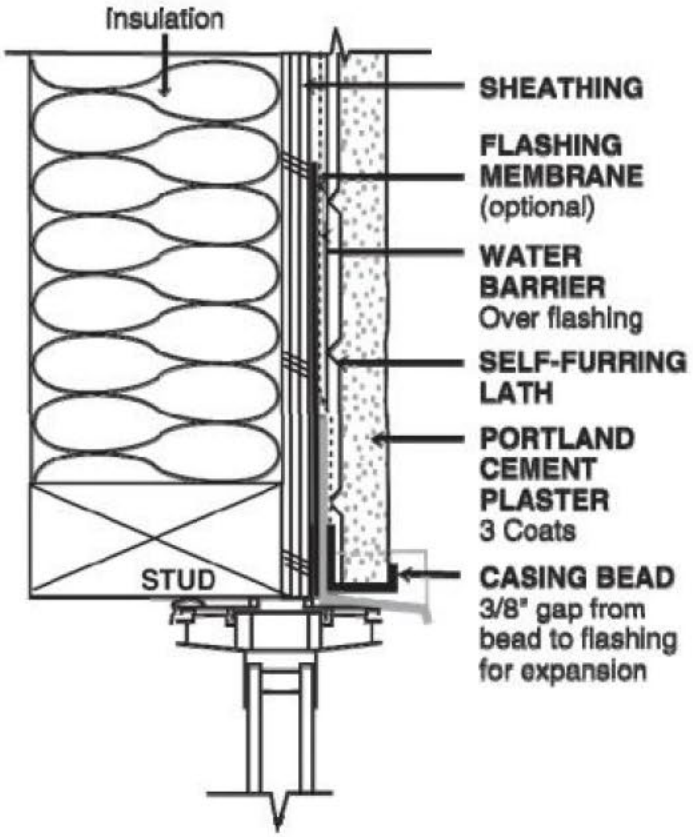
Figure R703.6(3)
WEEP SCREED FOR EXTERIOR PLASTER ON STUD WALL AT SLAB ON GRADE

The bottom edges of the expanded polystyrene door trim must be backwrapped with mesh and coated with the stucco finish coat in all locations. This is required by IRC 703.6.



Back wrap bottoms of EPS door trim.

No header flashings are installed above the window and door openings in the stucco cladding as required by IRC 703.8, ASTM E-2112, and AAMA 2400.



All junctions of the stucco cladding with dissimilar materials, e.g. trim, wood, et al., must be sealed with a low modulus sealant designed for this purpose and approved by the system manufacturer.

GARAGE WALLS

The access panel door for the fire-suppression sprinkler system in the west wall of the main garage does not meet the requirement for a fire separation. Lack of proper firestopping at utility penetrations in the garage walls voids the fire rating required by IRC R309.2: Separation required. The garage shall be separated from the residence and its attic area by not less than ½-inch (12.7 mm) gypsum board applied to the garage side. board or equivalent.

Not fire-separation compliant.

The 3/4" panel door does not have the equivalent flame- and smoke-spread rating as does 1/2" drywall. 3/4" plywood is rated at 120-140 while 1/2" drywall is rated at 10-15.

☑ ☐ ☐ ☑ **F. Ceilings and Floors**

Note: Specific Limitations. The Inspector is not required to determine the condition of interior ceiling or floor coverings except as they pertain to structural performance or moisture penetration; identify obvious damaged ceiling or floor coverings or determine the conditions of paints, stains, vinyls, ceramics, woods, carpets, marbles, stones or other surface coatings whether interior or exterior; or determine the presence of or damage from animal urine or other substances to ceilings or floors.

Ceiling Claddings: Drywall

Floor Coverings: Carpet

Tile (Stone and Porcelain)

Comments:

CARPET

Carpet reducer strip is needed in the doorway of the second floor northeast hall bathroom and at the heads of the main stairs.

Transition strip needed.

The carpet in the game room is incompletely installed at the elevator door.

Carpet incompletely installed.

SPECIFIC LIMITATIONS: Some tiles in the tile floors of this house may exhibit a hollow sound when being walked upon or tapped. Floor tile is typically bonded to the concrete slab surface with what is called thin-set cement or mortar. This material does an excellent job of binding the tile to the slab surface if it is applied properly. The key is for the both the slab concrete slab surface and the underside of the tile to be clean and free of any contaminants. During the course of normal construction operations, the slab surface will get material on it that prevents a good, permanent bond. If it is not thoroughly cleaned the tile may eventually come loose.

Occasionally, a floor will sound hollow even when the tile is well bonded. This can occur when a mortar bed method is used and the mortar has delaminated from the supporting layer or when the subfloor itself is not sufficiently thick or well attached. Other systems that intentionally separate the tile layer from the substrate (such as the mortar bed with a cleavage membrane (slip sheet, or isolation membrane) system like the Tile Council of America Handbook detail F111 should be closely examined to ascertain if hollow sounds necessarily imply that the tile is not bonded.

While a tile floor with hollow spots is not ideal, it does not necessarily mean that floor failure is imminent. On the contrary, over concrete if there is no significant deflection in the floor; grout and gravity will help keep the floor in place (as long as there are sufficient movement joints in the tile and minimal shear forces). Over wood, floor failure is more likely - movement in the subfloor could cause grout to break away from the tile, compounding the instability of the flooring.

Some contractors have tried to inject epoxy to re-bond tile without reinstalling it. While this may work in a small area, it is not practical over a large area. Further, any repair that does not address the cause of the failure may not last very long.

In summary, this problem is almost always a bonding failure issue and not a foundation movement issue. Visual inspections cannot predict adequacy of hard tile bonding to foundations. It is beyond the scope of this inspection to forensically test each individual tile in any given house for hollow sounds or to determine the causes for these hollow sounds. If you are concerned about hollow sounding tile you are strongly urged to consult with a certified ceramic tile specialist prior to the end of any time periods associated with the sale of this property.

☑ ☐ ☐ ☑ **G. Doors (Interior and Exterior)**

Comments:

INTERIOR DOORS

The doors in the pantry, southeast hall bathroom, southeast bedroom, and second floor northeast bedroom closet are hinge-bound and requires adjustment as per the manufacturer, IRC 102.4 and 609.1.

All missing doorstops require replacement, e.g. at the master bathroom laundry closet and bathroom that opens to the patio. The hinge pin-mounted doorstops have dented the door trim in many locations, e.g. in the laundry room. You are urged to replace these with a different type such as: https://www.amazon.com/Nuk3y-Saver-Residential-Hinges-Nickel/dp/B00N9JXUC4/ref=asc_df_B00N9JXUC4/?tag=hyprod-20&linkCode=df0&hvadid=167148637601&hvpos=&hvnetw=g&hvrand=3799662504824512360&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9026815&hvtargid=pla-313281533966&psc=1

Stops damage trim.

The spring hinges on the mirrored door in the north side of the master closet require adjustment.

The strike jamb is split on the door to the second floor southeast hall bathroom due to failure of the installer to pre-drill the screw holes.

The strike plate mortises are oversized at many of the interior doors.

EXTERIOR DOORS

The doorknob is missing from the door leading from the southeast hallway to the driveway.

WEATHERSTRIP

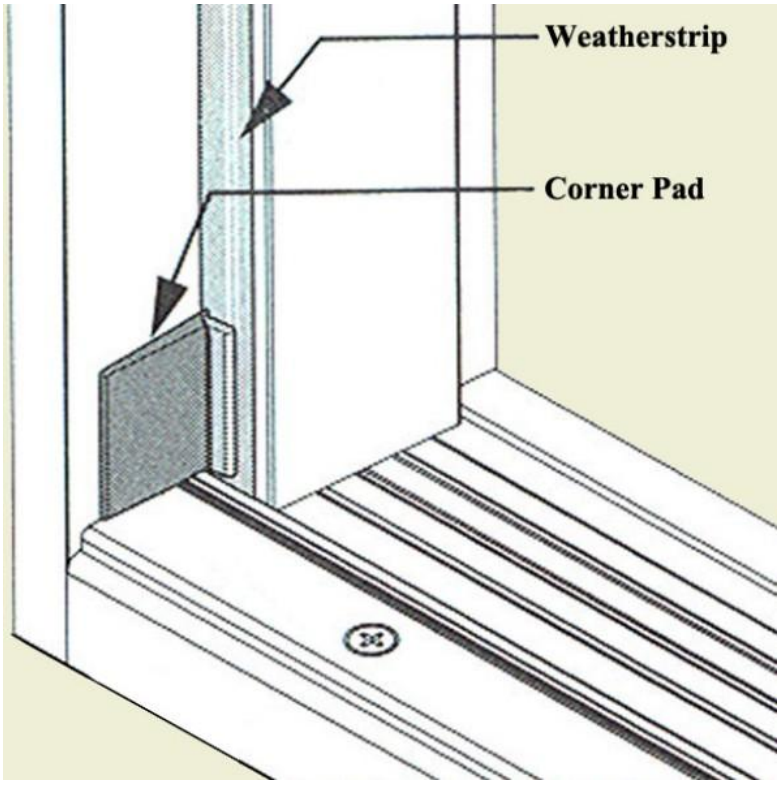
Weather-stripping material is damaged at the door from the family room to the patio and requires replacement.

THRESHOLD SUPPORT

Additional support must be added beneath the thresholds of the exterior swing doors as per the manufacturer's installation instructions, IRC 102.4 and 609.1. If the support is wood it must be of a naturally decay-resistant species or pressure-treated as per IRC 319.1.

CORNER SEAL PADS

The corner seal pads are missing from the strike and/or hinge jamb bottoms of the exterior doors. These require replacement to complete the door weather stripping as per the door manufacturer, IRC 102.4 and 609.1, as well as IECC 402.4. TRhese fit securely behind the bottom of the side jamb weatherstrip pieces to help block potential pathways where wind and wind-driven water can infiltrate the bottom of the door system



GARAGE DOORS

The garage overhead doors are required by Underwriter's Laboratories 325, the Consumer Products Safety Commission, ANSI/DASMA 116-18 (7), and most importantly, by the garage door manufacturer to have a minimum of one lift handle on both sides of each door. This requires repair as per IRC 309.6: R309.6 Automatic garage door openers. Automatic garage door openers, if provided, shall be listed in accordance with UL 325. Meeting the operation requirements is not just a good idea or a best practice; it is a mandatory part of the industry's UL 325 standard and is also established as part of U.S. federal law according to the U.S. Consumer Product Safety Commission (CPSC) rule (16 CFR Part 1211). Your builder's company policy and/or your municipality's bulding inspector's specious opinion notwithstanding, this is a Federal law.

The door between the garage and the interior of the house should be adjusted to be self-closing as per IRC 302.5.1.

Additional support must be added beneath the threshold of the door from the main house to the garage as per the manufacturer's installation instructions and IRC 102.4. If the support is wood it must be of a naturally decay-resistant species or pressure-treated as per IRC 319.1.




Support thresholds.

☑ ☐ ☐ ☑ **H. Windows**

Note: Specific Limitations. The Inspector is not required to inspect or comment on the presence or condition of storm windows, awnings, shutters, or other security devices or systems. Only readily accessible windows are checked for operation during this inspection. "Failed thermal pane seals" (in actuality, failed desiccant inserts) in insulated glass windows are not always readily visually detectable. The visible moisture between panes in a "failed seal" situation may be apparent or not due to variations in atmospheric conditions. Windows are reported as they are observed at the time of the inspection only. No attempt to quantify the number of defective windows is made. No warranty is implied. If you have present or future concerns regarding the integrity of "thermal pane seals", it is strongly suggested that you consult with a Professional Fenestration Specialist for further evaluation. See the addendum at the end of this report regarding this issue.

The AAMA- certified windows cannot be determined at this stage of construction to be flashed and installed in accordance with the manufacturer's installation instructions and AAMA 2400 or ASTM E211-012 to prevent water penetration. ***You are strongly urged to have these windows professionally leak tested in strict accordance with either AAMA 502-08, Voluntary Specification for Field Testing of Newly Installed Fenestration Products, or ASTM E1105.-15, Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference, and/or AAMA 502-08, Voluntary Specification for Field Testing of Newly Installed Fenestration Products, prior to the end of any time periods associated with the purchase of this home.***

Note: Windows that are closer than 18 inches to the floor pose a safety hazard, especially upstairs windows that are low to the floor. We strongly recommend that all windows in these areas be upgraded to double paned windows that are constructed with tempered safety glass.

Window Types: Fixed Pane

Casement
Glazing Types: Double Glazed
Comments:

WINDOWS

Operable windows in the house were observed to have sills less than 24"" above the interior floor and greater than 72" above grade. These windows must not open more than 4" as per IRC 612.2. Appendix J offers relief in the form of fall-prevention devices—such as screens or gates that meet ASTM test standard F 2090—placed in front of an opening. The provision also allows control devices that prevent windows from opening more than 4 inches. Approved devices can block the fall of a child under 5, yet can also be removed easily for egress by someone smarter than a 5 year old. They are the only code-compliant methods—that is, short of building a new deck outside the window to reduce the fall height to less than the 6-foot maximum allowed by the IRC for windows (replacement or new) with open sill heights below 24 inches.

Pella casement windows have the option for a window opening control device (WOCD). This device is designed to assist in protection against accidental falls by children five (5) years old and younger.

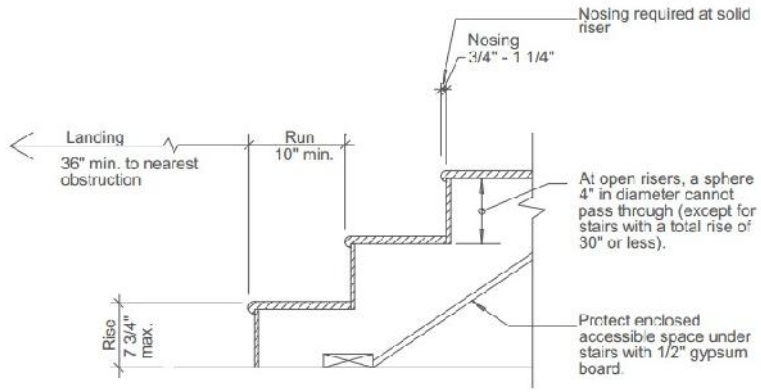
When properly installed and engaged, there shall be no space at the maximum open position of a window sash which would permit a rigid 4" (102mm) diameter sphere to pass through the opening. Failure to correctly install and engage the WOCD may result in falls or injury. Window must be unlocked and the WOCD disengaged to allow for emergency exit. This window control device is not a substitute for attentive supervision of young children. Tested to ASTM F2090.

☑ ☐ ☐ ☑ **I. Stairways (Interior and Exterior)**

Comments:

STAIRWAYS

The back or northeast stair treads require nosings. R311.5.3.3 Profile. The radius of curvature at the leading edge of the tread shall be no greater than 9/16 inch (14 mm). A nosing not less than 3/4 inch (19 mm) but not more than 11/4 inch (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 inch (9.5 mm) between two stories, including the nosing at the level of floors and landings. Beveling of nosing shall not exceed 1/2 inch (12.7 mm). Risers shall be vertical or sloped from the underside of the leading edge of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.



Typical Stair Section
R311.7

GUARDS

Some of the ornamental ironwork in the stair guards protrudes exposing sharp edges that may injure pedestrians using the main stairs.

☑ ☐ ☐ ☐ **J. Fireplaces and Chimneys**

Note: Specific Limitations. The Inspector is not required to inspect or comment on the adequacy of the draft or performance of a chimney, or chimney structures located more than eight (8) feet above any accessible roofline. The Inspector does not remove chimney caps or cap flashings. The interiors of flues are not inspected except visually from the vantage point of the firebox, when accessible. Freestanding wood burning stoves are beyond the scope of this inspection. Should you have present or future concerns regarding fireplaces, draft performance, inaccessible chimney structures or freestanding wood burning stoves, consult with a Professional Chimney Sweep for further evaluation.

Fireplace Types: Gas Log Only Unit – Gas Appliances
Chimney Types: Metal

Comments:

FIREPLACES

The fireplaces and chimneys appeared to be in satisfactory condition.

☑ ☐ ☐ ☑ **K. Porches, Balconies, Decks, and Carports**

Note: Specific Limitations. The Inspector is not required to inspect or report on detached structures or waterfront structures and equipment (e.g. detached garages, buildings, barns, storage areas, boathouses, boat docks, bulkheads, seawalls, et al.).

Comments:

BALCONIES
The north and south balconies are significantly cracked. Repair is required.

Rear balcony cracked.

Front balcony cracked.

SPECIFIC LIMITATIONS: It is infeasible to ascertain the presence, type, and condition of the balcony pan flashing material. To do so would require extensive, destructive forensic investigation that is well beyond the scope of a visual inspection. You are strongly urged to have the surface of this balcony tested with a moisture meter designed for the type of surface covering present by a professional in the building envelope moisture intrusion field prior to the end of any time periods associated with the purchase of this home.

DRIVEWAY
The east edge of the driveway is damaged and requires repair as per industry standards.

PORCHES
The stone walking surface assumed to be intended for the front porch has not been installed.

☐ ☑ ☑ ☐ **L. Other**

Comments:

N/A

II. ELECTRICAL SYSTEMS

☑ ☐ ☐ ☑ **A. Service Entrance and Panels**

Note: Specific Limitations. The Inspector is not required to determine the service capacity amperage or voltage or the capacity of the electrical system relative to present or future use or requirements; conduct voltage drop calculations; determine the accuracy of breaker labeling; or determine the insurability of the property. The Inspector does not test any electrical or lighting systems not directly mounted on or attached to the house.

SPECIFIC LIMITATION: TREC regulation 535.229(b)(3)(E)(iii) requires the inspector to identify bonding deficiencies. This is not practically feasible to accomplish within the scope of a visual inspection and/or without the use of special tools. You are strongly urged to hire a licensed electrician to verify the bonding of all metal structures within the house that are likely to become energized, prior to the end of any time periods associated with the purchase of this home.

Type of Service: Underground

Size of Service: 120/240 Volt Main Service

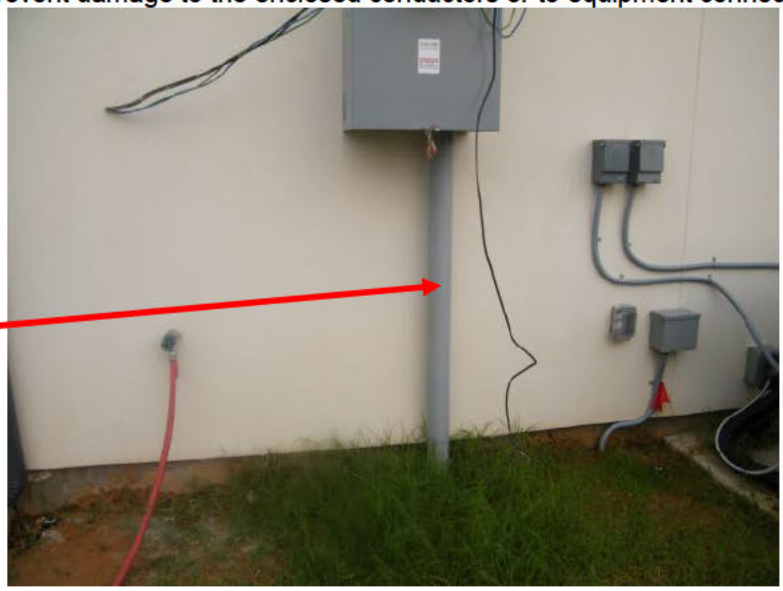
Type of Grounding: Copper (Where Observed)

Ufer Connection (Where Observed)

Main Distribution Panelboard Location: Garage Interior Wall

Panel Rating: Main Service Rating 600 Amps
Grounds for Departure: N/A
Disconnect Type: Breakers
Comments:

SERVICE/ENTRANCE
A (meter) slip riser is required in the electrical service conduit as per NEC 300.5(J) Earth Movement. Where direct-buried conductors, raceways, or cables are subject to movement by settlement or frost, direct-buried conductors, raceways, or cables shall be arranged so as to prevent damage to the enclosed conductors or to equipment connected to the raceways.



Your builder. municipal inspector, or even a representative of the electric utility company may attempt to convince you that the slip riser is not required. This is not the case.

The utility company is not immune from NEC requirements on residential service installations, so the fact that your particular utility company does not abide by the code does not obviate any party's responsibility to comply with the code that is adopted by the municipality - and the state of Texas.

Many utility companies operate on the false assumption that they are bound only by the regulations as set forth by the National Electrical Safety Code, and not the National Electrical Code published by the NFPA. This is not the case.

The NEC in Section 90-2(b)(5) states that this Code does not cover "Installations…under the exclusive control of electric utilities for the purpose of communications, metering, generation, control, transformation, transmission or distribution of electric energy. Such installations shall be located in buildings used exclusively by utilities for such purposes; outdoors on property owned or leased by utility; or on or along public highways, streets, roads, etc.; or outdoors on private property by established rights such as easements."

Slip risers are specifically required in the installation manuals published by the major electric utility companies throughout the nation. The largest local provider, Oncor, covers this in their publication here (see page 31):

https://www.oncor.com/EN/Documents/About%20Oncor/Construction%20Development/Complete%20Electric%20Service%20Guidelines%20Book.pdf

The native soil type report that I provided during the initial pre-drywall inspection is attached. It clearly indicates that this house is located in an area of expansive soil. Within a few years the soil will either pull the conduit loose from the meter socket or pull the meter socket off the wall. In an attempt to save $30 your builder is setting you up for a future repair costing hundreds.

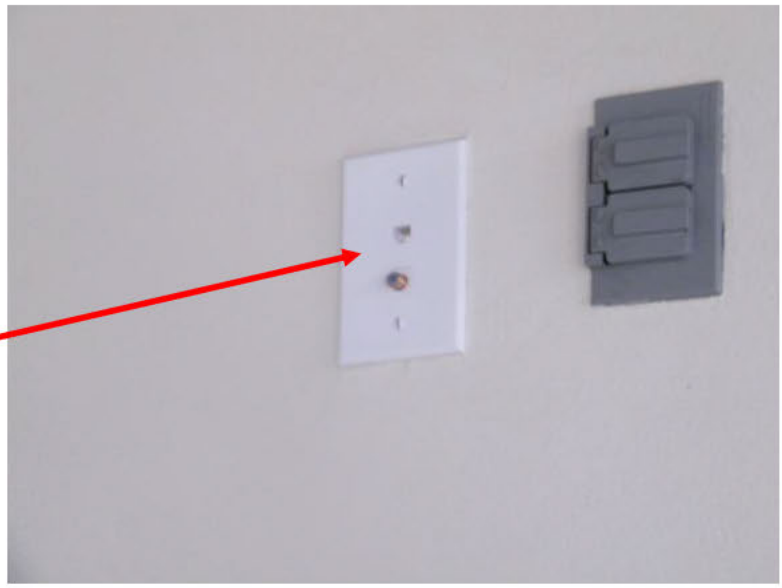
☑ ☐ ☐ ☑ **B. Branch Circuits, Connected Devices, and Fixtures**

Type of Wiring: Copper (Where Observed)
Comments:

COMMUNICATIONS WIRING

Fiber optic cables were observed to be incorrectly installed in contact with the stucco. This is not allowed by NEC 720.24, Note No. 3. Also see ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling; ANSI/NECA/FOA 301-2009, Standard for Installing and Testing Fiber Optic Cables; and other ANSI-approved installation standards.

The communications cable outlet and cover plate (audio/visual jack wall plate assembly) at the patio are not listed or labeled for use in damp or wet locations as required by NEC 314.15 Damp or Wet Locations In damp or wet locations, boxes, conduit bodies, and fittings shall be placed or equipped so as to prevent moisture from entering or accumulating within the box, conduit body, or fitting. Boxes, conduit bodies, and fittings installed in wet locations shall be listed for use in wet locations.



From the NEC Article 1 Definitions

Location, Damp. Locations protected from weather and not subject to saturation with water or other liquids but subject to moderate degrees of moisture.

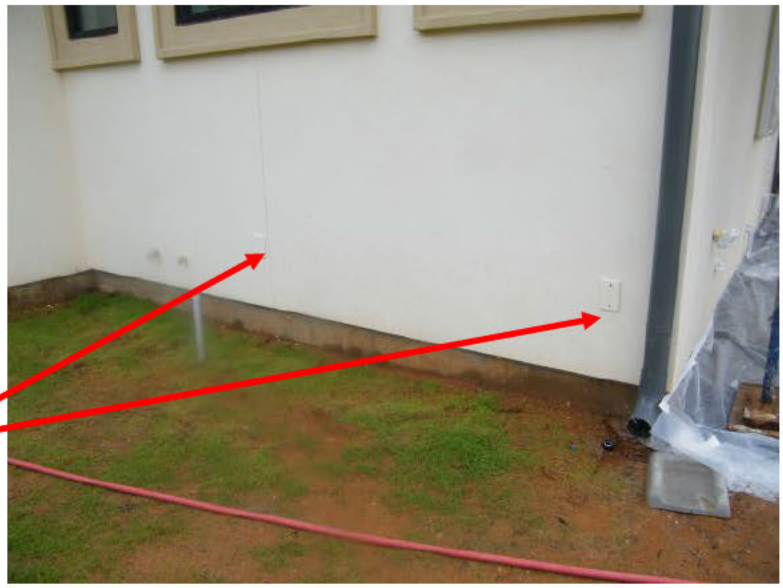
Examples of such locations include partially protected locations under canopies, marquees, roofed open porches, and like locations, and interior locations subject to moderate degrees of moisture, such as some basements, some barns, and some cold-storage warehouses.

Telephone, cable TV and radio, and broadband communication cables must be installed in a neat and workmanlike manner and must be protected from physical damage during normal use of the building as per NEC 100.3(B), 800.18, 800.24 and ANSI/NECA/BISCI 568-2001.

NOTE: Some uninformed builders and municipal inspectors wrongly believe that communications cabling is not covered by the codes adopted in their municipalities. This is definitely not the case. When the National Electrical Code is adopted by a municipality it is adopted as is with few, if any amendments. Unless your municipality has amended their code to remove all mention of optical fiber cables, communications cables, coaxial cables, class 2 and 3 cables, and power-limited fire alarm cables, then they are subject to the requirements as set forth by the NEC.

JUNCTION BOX COVER PLATES

All exterior junction boxes must be fitted with listed and labeled rain tight cover plates, in order to protect the wire connections as per NEC 314.15(A): 314.15 Damp or Wet Locations. In damp or wet locations, boxes, conduit bodies, and fittings shall be placed or equipped so as to prevent moisture from entering or accumulating within the box, conduit body, or fitting. Boxes, conduit bodies, and fittings installed in wet locations shall be listed for use in wet locations.



Weatherproof cover plates required in all locations outside.

NEC Article 100 defines the term weatherproof as “constructed or protected so that exposure to the weather does not interfere with successful operation.” Rainproof, raintight, or watertight equipment can fulfill the requirements of this definition where varying weather conditions other than wetness, such as snow, ice, dust, or temperature extremes, are not a factor.

The interior listed blank junction box cover plates being used are not UV resistant plastic and are not intended for use in damp or wet locations.

RECEPTACLES

While not a code requirement, common sense would dictate the need for an electrical receptacle at the makeup countertop in the west wall of the master closet.

The purpose of the 220 volt receptacle in the main floor southeast ensuite bathroom closet is unknown.

It is also suggested that you drill holes in the desktops in their various locations for insertion of electrical cables from computers, etc. These can be finished out with grommets made for this purpose.

SPECIFIC LIMITATIONS: Electrical receptacles or switches that have been child-proofed, are inaccessible using a 17 ft. ladder, were in use during the inspection, were observed to be significantly damaged, or were obstructed by furnishings or stored items were not inspected. You are strongly urged to have these devices inspected by a licensed master electrician prior to purchasing the home.

SPECIFIC LIMITATIONS: The floor receptacles in the living and family rooms were masked by the contractor polishing the floors. These were not tested.

SWIMMING POOLS

Any electrical receptacle(s) within 20 feet of the swimming pool are required to be a ground fault circuit interrupter protected.

FIXTURES (LUMINAIRES)

The light fixture (luminaire) to the west of the main front porch arch is not installed level and requires improvement NEC 110.12: 110.12 Mechanical Execution of Work. Electrical equipment shall be installed in a neat and workmanlike manner.

FPN: Accepted industry practices are described in ANSI/NECA 1-2006, Standard Practices for Good Workmanship in Electrical Contracting, and other ANSI-approved installation standards.

Fixture not level.

All exterior light fixtures (luminaires) must be sealed where they meet the brick veneer or the siding as per NEC 410.10(A).

SWITCHES

Switches in the northwest corner of the master bathroom and in the game room do not appear to operate anything. Further investigation is required.

DOORBELL

There is no doorbell button (switch) present.

SMOKE DETECTORS

The smoke detector in the main floor southeast bedroom is located too close to a supply air opening. NFPA 72 A.17.7.4.1 Detectors should not be located in a direct airflow or closer than 36 in. (910 mm) from an air supply diffuser or return air opening. Supply or return sources larger than those commonly found in residential and small commercial establishments can require greater clearance to smoke detectors. Similarly, smoke detectors should be located farther away from high velocity air supplies. See B.4.10.

SPECIFIC LIMITATIONS: It is generally infeasible for the inspector to ascertain the presence or appropriateness of ceiling fan mounting boxes or brackets. You are strongly urged to have a manufacturer's representative and a licensed master electrician inspect and assess these installations.

SPECIFIC LIMITATIONS: The AFCI breakers in this house were not tested or inspected for operation due to the house being occupied by at least 40 workers. Testing of AFCI breakers with electronic equipment attached to the circuits can cause damage to the equipment. You are strongly urged to have these AFCI breakers inspected for proper operation once all equipment has been removed from the circuits and prior to closing escrow on this home.

III. HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS

☑ ☐ ☐ ☐ **A. Heating Equipment**

Type of Systems: Central Forced Air Furnaces
Energy Sources: Gas

Note: Specific Limitations. The system fan, burner and heat exchanger were not readily accessible for inspection without disassembly of the unit. Because we do not disassemble equipment the condition of the system interior is unknown. If the system does not have a documented history of regular (annual) cleaning and maintenance since its installation, servicing by a licensed professional HVAC technician is required. Heat pumps are not operated at an ambient temperature of 60 degrees F. or more and are never operated in emergency mode. ***WARNING: This inspection will likely not meet the underwriting requirements of a home warranty (residential service contract) company. Many of these companies have been known to decline coverage due to subjective and often specious code compliance and maintenance arguments. You are strongly advised to ask your "home warranty" (residential service contract) provider to assure that the system***

meets their underwriting requirements prior to contracting for their services or closing escrow on the property. Failure to do so may result in future claim denial.

Comments:

FURNACES

The heating systems appear to be in satisfactory condition.

☑ ☐ ☐ ☑ **B. Cooling Equipment**

Type of Systems: Central Forced Air Compressed Gas Split Systems

Note: Specific Limitations. The system fan and evaporator coil was not readily accessible for inspection without disassembly of the unit. Because we do not disassemble equipment the condition of the system interior is unknown. If the system does not have a documented history of regular cleaning and maintenance since its installation, servicing by a licensed professional HVAC technician is required. Previous repairs to the system may have resulted in mismatching of the condenser and evaporator units. You are strongly advised to have an HVAC technician inspect this system and verify that it has been installed in strict accordance with the manufacturer's installation instructions and the Air Conditioning Contractors of America (ACCA) Manuals D, J, and S, prior to closing escrow on this home. ***WARNING: This inspection will likely not meet the underwriting requirements of a home warranty (residential service contract) company. Many of these companies have been known to decline coverage due to subjective and often specious code compliance and maintenance arguments. You are strongly advised to ask your "home warranty" (residential service contract) provider to assure that the system meets their underwriting requirements prior to contracting for their services or closing escrow on the property. Failure to do so may result in future claim denial.***

Comments:

AIR CONDITIONER UNITS

Primary condensate drain and/or auxiliary pan float switches are installed. In order to prevent compressor damage due to short cycling hard start kits should be installed on these units.

NOTE: One of the condenser units was being installed at the time of this inspection. It is assumed to be for the unfinished room above the main garage. You are strongly urged to have this unit professionally inspected once it has been installed and prior to the end of any time periods associated with the purchase of this home.

☑ ☐ ☐ ☑ **C. Duct System, Chases, and Vents**

Comments:

SUPPLY AIR DUCTWORK

TOTAL EXTERNAL STATIC PRESSURE TESTING

Manometer pitot tube holes were not observed. These must drilled for a Total External Static Pressure Test (TESP) to be performed by the installer across the heat and cooling equipment which is for comparing the total external static pressure with each equipment rated static

pressure (typically found on the equipment nameplate). This verifies the proper the installation of the equipment, ducts and air flow. The typical fan in a residential application is rated for a maximum pressure of 0.5 inch of water column (wc). Most fans can't deliver the needed airflow for heating or cooling operation when measured pressure exceeds this rating. If total external static pressure is excessive, the result is low fan airflow. Static pressure differentials can decrease the life of a blower fan. See: ACCA Quality Standards 9-2016; ANSI/ACCA 5 - HVAC Quality Installation Verification Protocols. Failure to follow the requirements in the ACCA Standards can increase annual energy consumption by 30% or more and exacerbate a negative effect on system performance and operation. See also: http://www.rses.org/assets/rses_journal/1114_Static.pdf

HVAC systems must be designed using AACA Manual J (calculation to determine the heat loss and heat gain for each room under peak (worst-case conditions) and AACA Manual S (proper equipment selection calculation). In our experience, AACA Manual D (duct design calculation of room-by-room heat loss and heat gain numbers supplied by the Manual J calculations) AACA Manual T (room to room loads and cfm requirements) are commonly not done as required. See: http://www.energyvanguard.com/blog-building-science-HERS-BPI/bid/29237/HVAC-Design-Done-Right-Manual-J-S-T-D

You are strongly urged to have this system further evaluated by the HVAC engineer of your choosing prior to the end of any time periods associated with the purchase of this home.

SPECIFIC LIMITATIONS: Not all ducts or gas appliance vents were accessible or visible during this inspection. Ducts and gas appliance vents in inaccessible areas of the attic, those concealed by insulation or stored items, and those enclosed in chases, walls, et al. were not inspected. You are strongly urged to have a licensed HVAC technician or engineer conduct a thorough duct pressure test to insure that all ducts are properly sealed and functional prior to purchasing the home.

IV. PLUMBING SYSTEM

☑ ☐ ☐ ☑ **A. Plumbing Supply, Distribution Systems and Fixtures**

Location of water meter: Street or Front of Property
Location of main water supply valve: Garage Interior Wall
Static water pressure reading: 70 psi
Type of Supply Piping Where Visible: PEX (Where Observed)
Gas Meter Location: Street or Front of Property
Type of Gas Piping: Threaded Steel (Where Observed)
Type of Gas: Natural (Assumed not Verified)

Note: Specific limitations. A visual inspection by a home inspector does not address slab leaks as per the Texas Administrative Code, Title 22, Part 33, Chapter 535, Subchapter R, Rule *535.227(b)(3)(A)(iv) General Limitations. This inspector is not required to inspect anything buried, hidden, latent, or concealed. These are plumbing leaks which occur either in or under the concrete foundation. Slab leaks can only be discovered and ascertained by a licensed plumber using specialized tools and skills. Because they are a common problem in the North Central Texas* ***area you are strongly urged to have the supply and drain piping of this house leak tested by a licensed master plumber prior to the end of any time periods associated with the sale or purchase of this home.***

Slab leaks can occur in your home's potable water line or in your outgoing sanitary sewer line; both of which may be embedded in or under the foundation of the building. Leaks in either set of lines can cause large amounts of damage to the foundation and each has its own list of

causes, some are shared. Slab leaks in the potable water line can potentially be more destructive because the supply water is under pressure. It runs through or under the concrete slab, then to the water heater where copper pipes split off and carry water to all the hot and cold water fixtures in your house.

There are four main causes of slab leaks in a houses incoming water lines. Chemistry is the first, either the chemical interaction between copper water pipes or the water running though them (copper pipe is very susceptible to pinhole leaks caused by the chemical composition of your water), or electrolysis from the copper pipe coming into contact with soil. The second is that due to the foundation shifting (because of poor design or installation, or a change in the moisture of the expansive clay soil) and pull your pipes apart. The third is water pressure that is too high (the diameter of the pipes installed may be too small) will corrode copper pipe. Leaks will also form at points where the pipes bend or change direction. The fourth cause may just be poor craftsmanship or workmanship: inferior plumbing supplies or materials (e.g. pipes, soldering) or a plumber that rushes or isn't experienced. It could also be a kinked line (a piece of pipe with an imperfection) or nicked by another (non-plumbing) workman, such as those that pour the concrete.

Unlike those in incoming water lines which will continuously leak because of the continuous flow and pressure, slab leaks in sanitary sewer lines only leak when a toilet is flushed, someone takes a shower or bath, or faucet is turned on. There are four main causes of slab leaks in sanitary sewer lines. The first is a crack or break in the cast iron, galvanized steel, or PVC sewer pipes, caused by shifting of the foundation. The second is, in the case of cast iron or galvanized steel pipes, parts of the pipe may be exposed to soil, sand, or gravel which are porous to water -this can lead to rusting. The third cause is the chemicals, solvents, and cleaning solutions that are poured down the drain which interact and corrode the metal pipes. The fourth cause is poor craftsmanship or workmanship, inferior plumbing supplies or materials, or a plumber that rushes or isn't experienced.

Your homeowners insurance is not likely to cover slab leaks. This sort of coverage varies from company to company. Even if they do, they will not usually cover all of the expenses to make the necessary repairs.

There are essentially two methods for making these kinds of repairs. The traditional method involves finding the leaks and then cutting or breaking out the concrete slab in order to make the repairs and afterwards repairing the concrete. This is a tremendously invasive and expensive procedure that, depending on the number of leaks involved and the size of the house, can cost anywhere from $20K - $50K.

The latest method on the scene involves lining the piping with food grade epoxy. This is a nearly non-invasive procedure. The cost is also less than the traditional methods, but will still be in the $10K - $15K range.

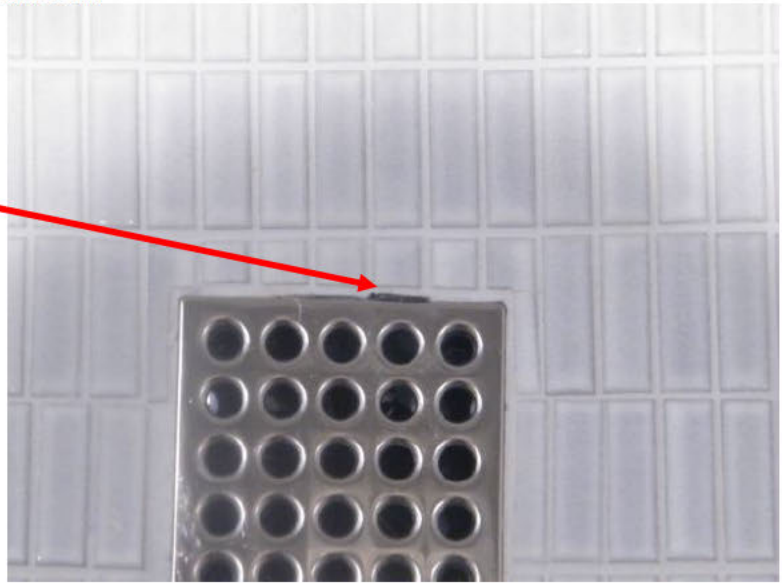
In addition to the expense and inconvenience of the actual leak repairs, slab leaks are a leading cause of foundation damage.

Comments:

WATER FIXTURES
SHOWER DOOR STOP
A stop is required at the shower door in the main floor northeast bathroom to prevent breakage where it strikes the adjacent towel hooks in the open position.

Install stop to prevent door breakage.

GROUT
The grout is incompletely installed at the drain grate in the second floor northeast ensuite bathroom.



Improve grout here.

MASTER BATHTUB

The master bathtub has not been caulked where it meet the floor tiles as required by IRC P2705.1(3) : P2705.1 General. The installation of fixtures shall conform to the following: 3. Where fixtures come in contact with walls and floors, the contact area shall be watertight. Caulking here will prevent dirt buildup, insect access and leakage in the event of wax ring damage in the future.

Caulk prevents a fouling area. If mop water, bathtub water, or less pleasant bathroom liquids get underneath the bathtub, there is no way to clean them up. Caulking around the base of the toilet will prevent this from happening.

Caulk also helps to keep the bathtub secured to the floor. Bathtubs that are caulked at the floor are rarely loose.

STEAM SHOWER ENCLOSURE

The ceiling should be sloped at least 2" minimum per foot (50 mm per 300 mm) to prevent water from dripping on steam room occupants (per Tile Council of North America and Marble Institute recommendations). See also: https://laticrete.com/~/media/support-and-downloads/technical-datasheets/tds172.ashx?la=en

POT FILLER IN KITCHEN

The pot filler installed above the cooktop in the kitchen is not code-compliant. Common sense also (should) dictate that a water supply fixture in the interior of a home must have a proper drain receptor. While this imprudent installation is not covered in the International Residential Code (probably due to the authors' inability to anticipate such nonsense), it is strictly prohibited by the International Plumbing Code.

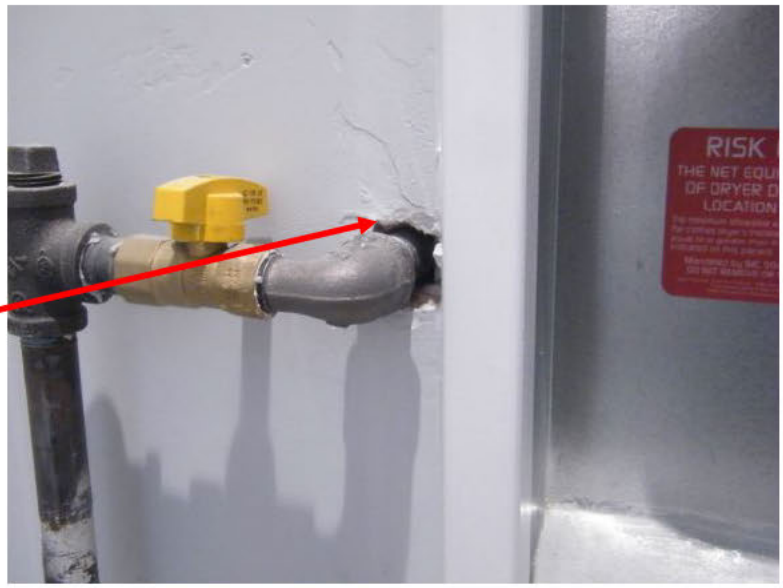
IRC P2601.1 Scope. The provisions of this chapter shall govern the installation of plumbing not specifically covered in other chapters applicable to plumbing systems. The installation of plumbing, appliances, equipment and systems not addressed by this code shall comply with the applicable provisions of the International Plumbing Code.

IPC 301.2 System installation. Plumbing shall be installed with due regard to preservation of the strength of structural members and prevention of damage to walls, and other surfaces through fixture usage.

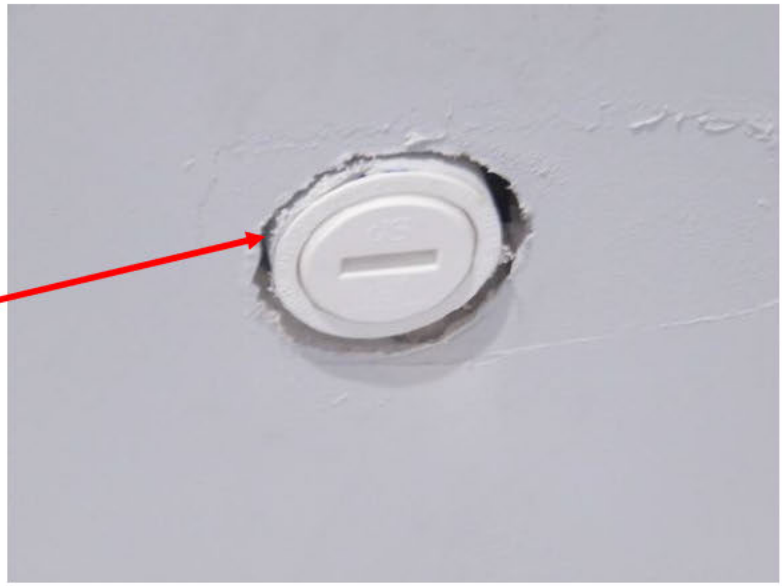
IPC 301.3 All plumbing fixtures used to receive or discharge liquid wastes shall be directly connected to the sanitary drainage system of the building in accordance with the requirements of this code.

ESCUTCHEON PLATES

An escutcheon plate is required at the penetration of the gas pipe in the east wall of the master bathroom laundry closet. Also seal around the plumbing cleanout in this wall.



Add escutcheon plate.



Seal around cleanout.

☑ ☐ ☐ ☐ **B. Drains, Wastes, and Vents**

Type of Sewer System: Public Sewer System (Assumed but not verified)
Type of Sewer (DWV) Piping: PVC (Where Observed)

Note: Specific Limitations: Plumbing fixture overflow devices, integral or site-plumbed, are not tested. These are typically not accessible. Even when accessible, if improperly installed or configured, damage may occur to the property during testing. The TREC SOP for inspectors does not provide for inspection techniques that will cause damage to the property as reasonably determined by the inspector. You are strongly urged to have these tested by a

licensed master plumber prior to the end of any time periods associated with the purchase of this home.

Comments:

DRAIN/WASTE / VENT (DWV)
The lead flashing for the plumbing vent piping that penetrates the roof surface is folded over into the top of the vent(s) and is obstructing the vent opening. This is not allowed by IRC 2606.1. Repair is required.

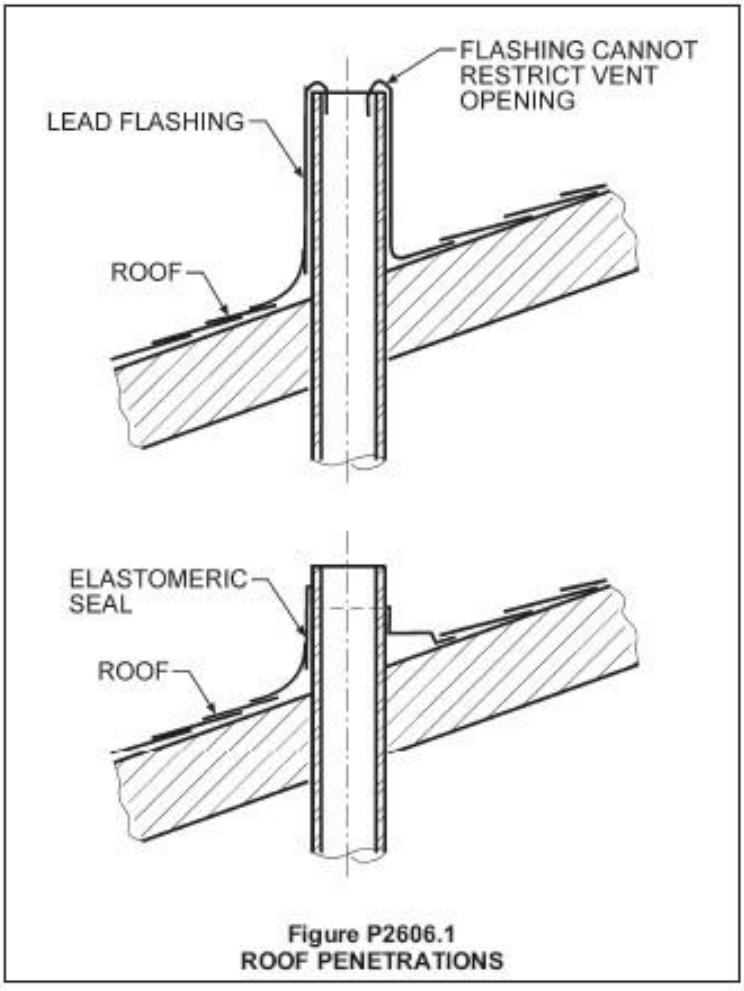


Figure P2606.1
ROOF PENETRATIONS

☑ ☐ ☐ ☐ **C. Water Heating Equipment**
Energy Sources: Gas
Capacity: N/A - Tankless
Comments:

WATER HEATER

The water heating equipment appears to be in satisfactory condition.

LOCATION/PROTECTION
Water heaters should NEVER be installed outside the building in North Central Texas. They are then subject to freezing and possible damage. While most units are equipped with internal mechanisms that protect the units themselves from freezing, the piping and valves connected to them are subject to freeze.

Your builder may tell you that you can just leave the water running at the faucets during cold weather. This is mythology. If your plumbing freezes during the North Central Texas winters it must, of course, be an "act of god" for which your builder cannot be held responsible. This is just more bullshit. The supply piping and water heater require insulation in order to protect them from freeze damage as per IRC P2603.6 and/or the PEX manufacturer. P2603.6 Freezing. In localities having a winter design temperature of 32°F (0°C) or lower as shown in Table R301.2(1) of this code ***(NOTE: Southlake lies in a climatic design winter temperature area of 22° F., i.e. it freezes every Winter - who knew?)***, a water, soil or waste pipe shall not be installed outside of a building, in exterior walls, in attics or crawl spaces, or in any other place subjected to freezing temperature unless adequate provision is made to protect it from freezing by insulation or heat or both. Water service pipe shall be installed not less than 12 inches (305 mm) deep and not less than 6 inches (152 mm) below the frost line.

COMMENTARY: Water, soil or waste pipes must be protected from freezing, whether installed inside or outside the building. Where pipe installation occurs in an exterior wall or unheated space, such as a crawl space or attic, adequate protection must be provided in the form of insulation or heat or both. Where the temperature of the air surrounding the insulation remains low for a significant period, insulation alone will not provide adequate protection from freezing without the addition of heat. In such conditions, the water in the pipe will freeze regardless of the amount of insulation used. Conditions differ significantly between occupied and unoccupied buildings because of heat added in occupied buildings for the comfort of the occupants. When a building remains vacant for an extended period, heat from another source must be supplied to offset heat loss.

Where piping is not directly adjacent to heated spaces in a building, electric resistance heat tapes or cables can be used to supply heat to the piping. Some types of heat tapes should not be used on piping in concealed spaces as the tapes can burn out and require replacement. Plastic piping requires self-limiting type heat tape to prevent overheating of the pipe.

Hose bibbs, wall hydrants, and tankless water heaters located on the exterior wall must be protected from freezing when installed in areas subject to freezing temperatures. This protection can be accomplished by installing devices such as freezeproof hose bibbs that locate the valve seat within the heated space and allow residual water within the hydrant to drain after the valve is closed.

In areas with cold Winter weather builders must exercise care in installing tankless water heaters on exterior walls. Even water heaters installed indoors could be prone to cold weather complications. Most manufacturer warranty's do not cover damage caused by freezing.

However, many manufacturers, such as Rinnai and Rheem have built-in some type of freeze protection which allows the unit to protect itself when temperatures fall below freezing.

Rinnai tankless water heaters have two lines of defense to protect them from cold weather and prevent freezing. The primary protection for a Rinnai heater, is the addition of ceramic heaters which are placed on the heat exchanger and other internal parts, as well as water lines. These ceramic heaters fire-up when the temperature drops into the low 30's and prevent the internal parts from freezing.

If the ceramic heaters fail for any reason, or the temperature drops too fast, a secondary freeze protection method is also built-in. This system utilizes a sensor inside the unit which determines if the tankless is below freezing. If the sensor is triggered it'll automatically turn the unit on for a few seconds and continue to cycle the heater on-and-off until the threat of freezing has past.

Both of these methods provide freeze protection to the Rinnai unit as long as both electrical power and gas is available to the unit. Be sure to check your owners manual for details on your specific tankless.

But, even with built-in freeze protection, if you ever lose power your tankless will be left defenseless to the cold temperatures and could freeze without proper insulation.

Installing a set of freeze protection solenoid valves is an excellent way to give you peace of mind during the cold winter weather. These valves automatically drain the water from your tankless unit if there's ever a power outage.

Freeze protection solenoid valves are sometimes called drain down solenoid valves or "normally open" drain down solenoid valves. They're designed to always be open and require an electrical current to keep the valve closed. When there's a power outage, the valves automatically open and release the water within the tankless water heater.

SUGGESTION: Install a whole house generator. The Texas power grid is unreliable.

CLEANING TANKLESS WATER HEATERS
All tankless water heaters must be cleaned on a regular basis, in most cases annually. This should be done by a plumber. If you choose to do it yourself, follow the manufacturer's instructions. See: https://www.youtube.com/watch?v=8-ts7XuvS48

☐ ☑ ☑ ☐ **D. Hydro-Massage Therapy Equipment**
Comments:

There is no hydro-massage therapy equipment present.

☐ ☑ ☑ ☐ **E. Other**
Comments:

N/A

V. APPLIANCES

Note: Specific Limitations. It is both generally infeasible and not required by the TREC for the inspector to be qualified to inspect appliances to manufacturers' installation or performance standards.

Important Information: Any type of appliance past its manufacturer's limited warranty is likely to fail soon. The length of a warranty may indicate the appliance's quality or lack thereof. Appliances are not immune to failure without notice. Most major kitchen appliances come with a one-year warranty.

☑ ☐ ☐ ☐ **A Dishwashers**

Comments:

DISHWASHERS

The dishwashers appeared to be in satisfactory condition.

☑ ☐ ☐ ☐ **B. Food Waste Disposers**

Comments:

FOOD WASTE DISPOSERS

The food waste disposers appeared to be in satisfactory condition.

☑ ☐ ☐ ☑ **C. Range Hood and Exhaust Systems**

Type of Unit: Updraft Vented

Comments:

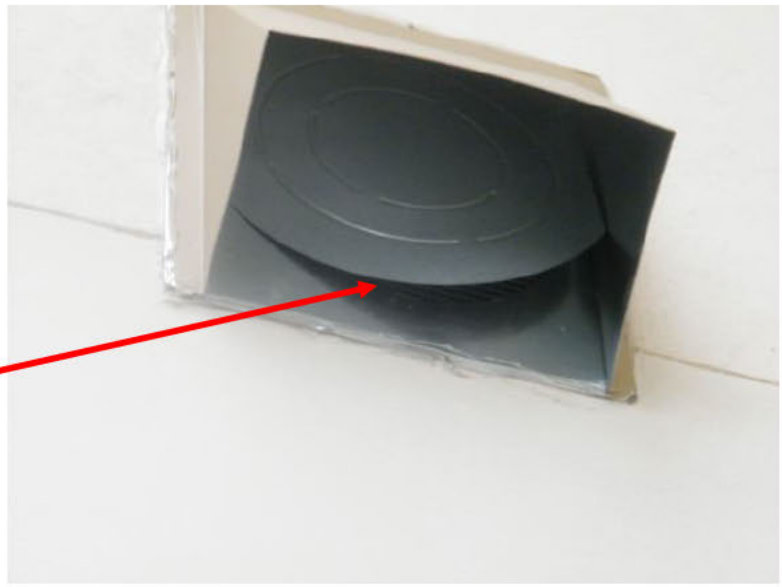
RANGE HOOD UNIT 1 - BACK KITCHEN

This unit is not mounted level as required by NEC 110.12: Mechanical Execution of Work. Electrical equipment shall be installed in a neat and workmanlike manner.
FPN: Accepted industry practices are described in ANSI/NECA 1-2006, Standard Practices for Good Workmanship in Electrical Contracting, and other ANSI-approved installation standards.

RANGE HOOD UNIT 2 - MAIN KITCHEN

The airflow of this unit appears to exceed 600 CFM. IRC M1503.4 Makeup air required. Exhaust hood systems capable of exhausting in excess of 600 cubic feet per minute (0.19 m3/s) shall be provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.

The exterior damper for this unit does not close completely when the unit is not in operation.



The terminus of the range hood vent duct is required to be equipped with a fully-closing, functional, backdraft damper as per the manufacturer's installation instructions, IRC 102.4 and IRC M1503.1 General. Range hoods shall discharge to the outdoors through a single-wall duct. The duct serving the hood shall have a smooth interior surface, shall be air tight and shall be equipped with a backdraft damper. Ducts serving range hoods shall not terminate in an attic or crawl space or areas inside the building.

This is also a requirement of 2015 IECC R403.6.

☑ ☐ ☐ ☐ **D. Ranges, Cooktops, and Ovens**

Comments:

GAS RANGES
The gas ranges appeared to be in satisfactory condition.

SUGGESTION: You are strongly urged to have a backsplash installed behind the gas range in the back kitchen for ease of cleaning and normal sanitation.

☑ ☐ ☐ ☐ **E. Microwave Ovens**

Comments:

MICROWAVE OVENS
The microwave cooking equipment appears to be in satisfactory condition.

☑ ☐ ☐ ☐ **F. Mechanical Exhaust Vents and Bathroom Heaters**

Comments:

BATHROOM EXHAUST FANS
The bathroom exhaust fans appear to be in satisfactory condition.

☑ ☐ ☐ ☑ **G. Garage Door Operators**

Comments:

GARAGE DOOR OPERATORS
The DASMA-required warning labels and tags were not posted as required. This is hazardous and posting of the labels prior to the end of any time periods associated with the purchase of this home is strongly urged. See: https://www.dasma.com/wp-content/uploads/pubs/TechDataSheets/CommercialResidential/TDS172.pdf

SPECIFIC LIMITATIONS: Some garage vehicle door automatic operators (automatic openers) are equipped with downward force resistance-sensing auto-reversing capabilities and some may also incorporate upward force resistance-sensing auto-reversing capabilities as well. When downward force and/or upward force resistance-sensing auto-reversing capabilities are provided, they can reduce the potential for both personal injury and damage to personal property.

However, due to the potential for personal injury and for damage to garage door components, automatic operator components, and to both real and personal property, any evaluation of garage vehicle door automatic operators for any resistance-sensing auto-reversing capabilities is specifically excluded in this inspection and report. If photoelectric obstruction-sensing auto-reversing devices are present, they will be evaluated for their height above the garage floor and to determine whether they will reverse the downward movement of the garage door upon sensing an obstruction.

The United States Consumer Product Safety Commission (CPSC) recommends that any automatic operator which does not have resistance-sensing auto-reversing capabilities be disconnected from its power supply and replaced immediately with a new unit which conforms to or exceeds current requirements for automatic operator; therefore, it is recommended that measures be taken as soon as possible to determine if such capabilities are incorporated into automatic operators.

This information may be determined by the presence of visible adjustment controls for resistance sensing auto-reversing capabilities on the automatic operator unit, by obtaining the manufacturer's literature for the operator, or by contacting the manufacturer, the manufacturer's distributor, or a qualified garage door automatic operator service technician.

If it is determined that resistance-sensing auto-reversing capability is incorporated into an automatic operator, it is recommended that a qualified garage door automatic operator service technician be retained to evaluate the automatic operator for proper adjustment and function of such resistance-sensing auto-reversing functions.

Additional information regarding garage vehicle door automatic operators can be found at: https://www.dasma.com/technical-data-sheets/#commercial-residential-garage-doors

NOTE: As per the CPSC, a force activated door sensor of a door system installed according to the installation instructions shall actuate when the door applies a 15 pound (66.7 N) or less force in the down or closing direction and when the door applies a 25 pound (111.2 N) or less force in the up or opening direction. For a force activated door sensor intended to be used in an operator intended for use only on a sectional door, the force is to be applied by the door against the longitudinal edge of a 17⁄8 (47.6 mm) diameter cylinder placed across the door so that the axis is perpendicular to the plane of the door.

The client is strongly urged to have the garage door opener(s) and safety features thoroughly tested by a licensed contractor who is a Certified Residential Door Systems Technician intimately familiar with the information published by UL, DASMA, and the Consumer Products Safety Commission regarding residential garage overhead doors and operators, prior to the end of any time periods associated with the purchase or sale of this home.

☑ ☐ ☐ ☐ **H. Dryer Exhaust Systems**

Comments:

SPECIFIC LIMITATIONS: We cannot and do not remove clothes dryers that block access to the dryer duct and we are unable to view inside the duct as to its condition. If the terminus of the duct is at the roofline we are usually unable to ascertain if the terminus roof cap has a gravity damper or ascertain the condition of said damper.

The dryer duct run vertical up a concealed wall was not observed with a placard (sign or label) stating the length of the dryer duct as required by IRC 1502.4.5: “Length identification. Where the exhaust duct is concealed within the building construction, the equivalent length of the exhaust duct shall be identified on a permanent label or tag. The label or tag shall be located within 6 feet (1829mm) of the exhaust duct connection.”

You are strongly urged to have this dryer duct professionally serviced by an HVAC contractor who installs, services, and cleans dryer ducts prior to the end of any time periods associated with the purchase of this home. Failure to do so may result in lint-induced fire.

DRYER VENTS (DUCTS)

The dryer vents appeared to be in satisfactory condition.

☑ ☐ ☐ ☑ **I. Other**

Comments:

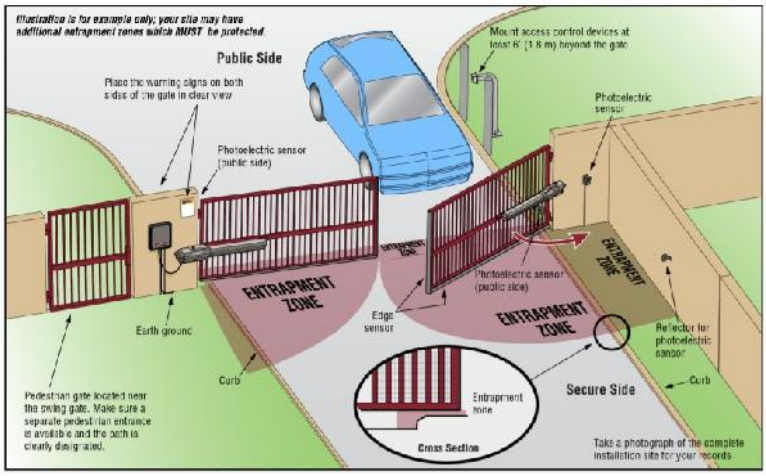
REFRIGERATOR – KITCHEN
This unit appeared to be in satisfactory condition.

REFRIGERATOR – MASTER SUITE
This unit appeared to be in satisfactory condition.

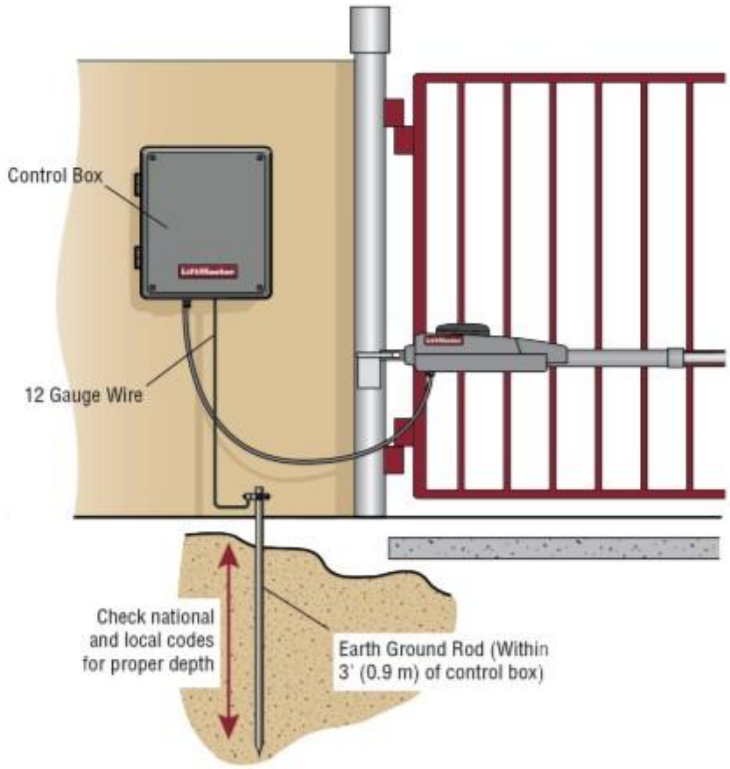
REFRIGERATOR – OUTDOOR KITCHEN
This unit appeared to be in satisfactory condition.

WINE CHILLER - KITCHEN
This unit appeared to be in satisfactory condition.

DRIVE GATE OPERATOR – SWING TYPE
VEHICULAR GATE OPERATOR
The vehicular gate operator is not installed in strict accordance with the manufacturer's installation instructions, 2016 UL325, ASTM F2200 or IRC 102.4. Signs of this improper installation include, but are not limited to a lack of sensors of both sides of the gate and a lack of entrapment signage where required. This gate is unsafe as is and should not be used until it has been brought into minimum safety requirements.



A ground rod and grounding conductor or surge protector is required by most manufacturers at the unit by UL, and the NEC. UL 991 explains lightning protection and the installation of a ground rod placed near the stationary portion of remote sensitive electronic equipment. Proper grounding gives an electrical charge, such as from electrical static or a near lightning strike, a path from which to dissipate its energy safely into the earth. Without this path, the intense energy generated by the lightning could be directed toward the gate operator. Although nothing can absorb the energy of a direct lightning strike, proper grounding can protect the gate operator in most cases.



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ELEVATOR
This unit appeared to be in satisfactory condition other than the cabin telephone is yet to be made operational.

NOTE: This inspector is not a licensed elevator inspector. You are strongly urged to have this unit inspected by the installing contractor once construction is completed and prior to closing escrow on this home.

STEAM GENERATOR
The ceiling should be sloped at least 2" minimum per foot (50 mm per 300 mm) to prevent water from dripping on steam room occupants (per Tile Council of North America and Marble Institute recommendations). See also: https://laticrete.com/~/media/support-and-downloads/technical-datasheets/tds172.ashx?la=en

UNFINISHED AREAS
The room above the main garage was being taped and bedded at the time of this inspection. No electrical equipment has been installed. This room was not inspected. All materials and

systems within this room are specifically excluded from this report. You are strongly urged to have this room inspected prior to the end of any time periods associated with the purchase of this home.

VI. OPTIONAL SYSTEMS

☑ ☐ ☐ ☑ **A. Landscape Irrigation (Sprinkler) Systems**

Type of Inspection: Visual and Operation of Irrigation System via Manual Controls
Grounds for Departure: Backflow Device was not Inspected for Proper Installation or Operation. In accordance with state law, Texas Water Code Chapter 37, Title 30 Texas Administrative Code, Chapter 30 and Chapter 290, a person who repairs or tests the installation or operation of backflow prevention assemblies must hold a license issued by the TCEQ. This inspector holds no such license.

Comments:

LAWN SPRINKLER SYSTEM
A sprinkler head has been damaged by vehicular traffic at the interior radius of the driveway on the north side of the house.

Head damaged by vehicle.

The sprinkler heads were observed to be wetting impervious surfaces during operation. Texas law mandates that sprinklers not spray impervious surfaces in TAC Title 30, 344.62(3)(g) Irrigation systems shall not spray water over surfaces made of concrete, asphalt, brick, wood, stones set with mortar, or any other impervious material, such as, but not limited to, walls, fences, sidewalks, streets, etc.

The sprinkler heads were observed to be located closer than 4 inches from hardscape. This requires improvement as per Texas state law TAC Title 30, 344.62(a)(2) New irrigation systems shall not utilize above-ground spray emission devices in landscapes that are less than 48 inches not including the impervious surfaces in either length or width and which contain impervious pedestrian or vehicular traffic surfaces along two or more perimeters. If pop-up sprays or rotary sprinkler heads are used in a new irrigation system, the sprinkler heads must direct flow away from any adjacent surface and shall not be installed closer than

four inches from a hardscape, such as, but not limited to, a building foundation, fence, concrete, asphalt, pavers, or stones set with mortar.

<4" to hardscape.

The required plan for the sprinkler zone placement is not present as required by state of Texas statute 30 TAC 344.63(4), Completion of Irrigation System Installation. Upon completion of the irrigation system, the irrigator or irrigation technician who provided supervision for the on-site installation shall be required to complete four items: (4) The irrigation plan indicating the actual installation of the system must be provided to the irrigation system's owner or owner representative.

Beginning January 1, 2009, newly installed irrigation system owners will be provided with a drawing that shows the actual installation of the irrigation system. The drawing will provide valuable information when maintaining, altering, repairing or servicing your irrigation system.

SPECIFIC LIMITATIONS: Drip irrigation systems, whether a part of the automated or manually-operated landscape irrigation system are not inspected. The reason should be obvious: they are located entirely underground, not visible and not accessible.

SPECIFIC LIMITATIONS: Spray coverage for the irrigation system was not verified as part of this inspection. Coverage should be monitored for the system and adjusted accordingly to ensure even watering of the landscaping.

ADDENDUM: NEW HOME REPORT OVERVIEW

If you've come away from the reading of this report regarding your new home with a feeling of surprise or disappointment due to the number of items marked as "deficient", please consider the following:

Because homebuilders in the State of Texas are not licensed there is little or no governmental oversight of their building practices. The local municipal building inspectors are more often than not overworked and underpaid municipal employees. They haven't the available time to perform thorough inspections of houses as they are being

constructed. It is often the case that they are not certified code inspectors. This results in a situation where the minimal building code standards are never fully met. Another way of stating this would be: In our many years of inspection experience and after inspecting several thousand houses, we have never – N-E-V-E-R – seen a house in the 16-county area comprising the D/FW Metroplex that is, in our opinion, fully in compliance with existing codes. This statement includes houses in all price ranges, of all ages, of all different designs, and by all builders.

This house is no exception. It is not the ideal house. The ideal house would be located on the ideal site that has non-expansive, non-compressive, non-subsiding soil, and a solid substrate that is relatively close to the surface and fully capable of supporting the structure indefinitely. It would have a complete set of roof gutters, area drains, soil that is properly graded away from the foundation, and a significant difference between the elevation of the finish grade and interior floors. The site would be fully irrigated, with no shrubs, trees or swimming pools within 25 feet of the foundation. This house would, of course, be constructed of quality, time-proven materials in both strict compliance with the minimal building standards set forth in the latest versions of the International Residential Code and the National Electrical Code and all materials manufacturer's installation instructions. Additionally, the house would be built in accordance with a multitude of other references and standards in existence that specify best practice scenarios for all facets of residential constructions. (A comprehensive list of these publications is available on request.) The lot and structure would have been both mechanically outfitted and chemically treated with all available options to prevent wood destroying insect activity. For an existing home, the residence would have been meticulously maintained by the homeowners through the services of licensed and qualified professionals in every field.

ADDENDUM: Building Code Compliance

Anyone who tells you that the "(Fill in Your City) Building Code" for single-family residential buildings is not the International Residential Code is either ignorant of the facts or being deceptive.

If your builder tells you that you cannot have the house inspected he is either ignorant of the facts or being deceptive. You have a legal right under the Texas Business and Commerce Code to have the property inspected by your agent prior to purchasing it. See http://www.statutes.legis.state.tx.us/Docs/BC/htm/BC.2.htm

Sec. 2.513. BUYER'S RIGHT TO INSPECTION OF GOODS. (a) Unless otherwise agreed and subject to Subsection (c), where goods are tendered or delivered or identified to the contract for sale, the buyer has a right before payment or acceptance to inspect them at any reasonable place and time and in any reasonable manner. When the seller is required or authorized to send the goods to the buyer, the inspection may be after their arrival.

Further, the International Code Council's, Legal Aspects of Code Administration, admonishes home buyers that: ". . .it is up to the purchaser to determine the soundness of the building prior to the finalization of the purchase or to hire a professional inspector"

NOTE: It is important to understand that merely because the municipality has permitted an installation does not make it code compliant. R105.4 Validity of permit. The issuance or granting of a permit shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of any other ordinance of the jurisdiction. Permits presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid. The issuance of a permit based on construction documents and other data shall not prevent the building official from requiring the correction of errors in the construction documents and other data. The building official is also authorized to prevent occupancy or use of a structure where in violation of this code or of any other ordinances of this jurisdiction.

Additionally, everyone working on a project is required to adhere strictly to the code, regardless of what the building official has to say. IRC 105.8 Responsibility. It shall be the duty of every person who performs work for the installation or repair of building, structure, electrical, gas, mechanical or plumbing systems, for which this code is applicable, to comply with this code.

The municipality and the municipal inspector are required to enforce the adopted codes and can be held liable by Texas law if they do not as per the Texas Tort Claims Act, Title 5, Governmental Liability, Section 101.0215 which reads in part:
"Sec. 101.0215. LIABILITY OF A MUNICIPALITY. (a) A municipality is liable under this chapter for damages arising from its governmental functions, which are those functions that are enjoined on a municipality by law and are given it by the state as part of the state's sovereignty, to be exercised by the municipality in the interest of the general public, including but not limited to:
(28) building codes and inspection"

An individual who wishes to file a complaint against a registered municipal code enforcement officer or a code enforcement officer in training may write to:

https://www.tdlr.texas.gov/complaints/ComplaintForm.aspx?strRadiobutton=Code%20Enforcement%20Officers
Having said all that, we should add this: *We are not the Building Police*. Home inspectors in the state of Texas have no authority to compel full compliance with the prevailing building codes. They have no legal basis on which to enforce their opinions. Only a building official for a municipality has that enforcement authority and may direct code compliance. Additionally, we are not interpreting the building code. That is a solely a matter for the Authority Having Jurisdiction, i.e. the municipality in question. However, we always find discrepancies between what the municipal inspectors allow and stated code requirements, and feel that juxtaposing these two allows our clients to make a fully informed decision regarding the condition of the home they are buying.

When confronted with the facts many builders will fall back on any number of different logical fallacies as arguments. These are specious and of no importance. Your inspector was professional enough to provide you with the facts in this written report and to justify and support each comment with building code and industry regulation citations. If your builder disagrees with anything in this report you should insist that he responds in kind: in writing, on his company letterhead, and support each matter of contingency with the applicable building code, industry standard, manufacturers' installation instructions, et al. citation. If he cannot, he is merely providing you with so much hot air, distorting the facts to support his theories, and wasting your time.

Also bring the municipal inspector into the discussion by scheduling a meeting between you, the builder, and the chief building inspector of your city. Provide each of the two a copy of my report. Ask them to illustrate to you in writing on company and city letterhead where in the adopted building code the report is wrong. If they are unwilling to do so this should raise a huge red flag.

ADDENDUM: THE CONSTRUCTION BOARD OF APPEALS

Once you have attempted to persuade your builder to address the issues listed in this report as deficient, and should he be reluctant to make the necessary repairs, how should you proceed? First, request that the builder meet you at the building site along with the Chief Building Official (CBO) of your municipality. Have both the builder and the CBO illustrate to you *in writing in the applicable building code* where it is stated that the items in question do not need to be improved. If they cannot do so, then any decision that they make regarding the content of this report is purely subjective and specious. While they may not be purposely misleading you, they have just agreed upon a ***different kind of truth***.

If the CBO rules in the builder's favor without producing adequate supporting documentation, you then should take your case to the municipal Construction Board of Appeals. Each municipality is required to form such a board as per International Residential Code R112, which says in part:

SECTION R112

BOARD OF APPEALS

R112.1 General.

In order to hear and decide appeals of orders, decisions or determinations made by the building official relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The building official shall be an ex officio member of said board but shall have no vote on any matter before the board. The board of appeals shall be appointed by the governing body and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business, and shall render all decisions and findings in writing to the appellant with a duplicate copy to the building official.

R112.2 Limitations on authority.

An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply, or an equally good or better form of construction is proposed. The board shall have no authority to waive requirements of this code.

R112.3 Qualifications.

The board of appeals shall consist of members who are qualified by experience and training to pass on matters pertaining to building construction and are not employees of the jurisdiction.

R112.4 Administration.

The building official shall take immediate action in accordance with the decision of the board.

In the event that the Board of Appeals rules in the Building Official's favor you still have the ability to appeal this decision in the applicable district court.

ADDENDUM: RADON INFORMATION

EPA Radon Risk Information

Fifty-five percent of our exposure to natural sources of radiation usually comes from radon. Radon is a colorless, tasteless, and odorless gas that comes from the decay of uranium found in nearly all soils. Levels of radon vary throughout the country. Radon is found all over the United States and scientists estimate that nearly one out of every 15 homes in this country has radon levels above recommended action levels.

Radon usually moves from the ground up and migrates into homes and other buildings through cracks and other holes in their foundations. The buildings trap radon inside, where it accumulates and may become a health hazard if the building is not properly ventilated.

When you breathe air containing a large amount of radon, the radiation can damage your lungs and eventually cause lung cancer. Scientists believe that radon is the second leading cause of lung cancer in the United States. It is estimated that 7,000 to 30,000 Americans die each year from radon-induced lung cancer. Only smoking causes more lung cancer deaths and smokers exposed to radon are at higher risk than nonsmokers. Testing your home is the only way to know if you and your family are at risk from radon.

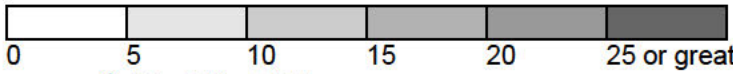
Testing for Radon

Should you have your home tested, use the chart below to compare your radon test results with the EPA guideline. The higher a home's radon level, the greater the health risk to you and your family.

Report Identification: [redacted]

I=Inspected	NI=Not Inspected	NP=Not Present	D=Deficiency

I	NI	NP	D	Inspection Item



↑ 4.0 pCi/L - EPA RECOMMENDED ACTION GUIDELINE

↑ 1.3 pCi/L - Average indoor radon concentration

↑ 0.4 pCi/L - Average outdoor radon concentration

The U.S. Environmental Protection Agency (EPA) and the Surgeon General Strongly recommend taking further action when the home's radon test results are 4.0 pCi/L or greater. The concentration of radon in the home is measured in picocuries per liter of air (pCi/L). Radon levels less than 4.0 pCi/L still pose some risk and in many cases may be reduced. If the radon level in your home is between 2.0 and 4.0 pCi/L, EPA recommends that you consider fixing your home. The national average indoor radon level is about 1.3 pCi/L. The higher a home's radon level, the greater the health risk to you and your family. Smokers and former smokers are at especially high risk. There are straightforward ways to fix a home's radon problem that are not too costly. Even homes with very high levels can be reduced to below 4.0 pCi/L. EPA recommends that you use an EPA or State-approved contractor trained to fix radon problems.

What do radon test results mean?

If your radon level is below 4 pCi/L, you do not need to take action.

If you radon level is 4 pCi/L or greater, use the following charts to determine what your test results mean. Depending upon the type of test(s) you took, you will have to either test again or fix the home.

NOTE: All tests should meet EPA technical protocols.

Chart 1: Radon Test Conducted Outside Real Estate Transaction

Type of Test(s)	If Radon Level Is 4.0 pCi/L or Greater
Single Short-Term Test	Test Again*
Average of Short-Term Tests	Fix The Home
One Long-Term Test	Fix The Home

* If your first short term test is several times greater that 4.0 pCi/L - for example, about 10.0 pCi/L or higher - you should take a second short-term test immediately.

Chart 1: Radon Test Conducted During a Real Estate Transaction (Buying or Selling a Home)

Type of Test(s)	If Radon Level Is 4.0 pCi/L or Greater
Single Active Short-Term Test (this test requires a machine)	Fix The Home
Average of 2 Passive Short-Term Tests* (these tests do not require machines)	Fix The Home
One Long-Term Test	Fix The Home

* Use two passive short-term tests and average the results.

What should I do after testing?

If your radon level is 4.0 pCi/L or greater, you can call your state radon office to obtain more information, including a list of EPA or State-approved radon contractors who can fix or can help you develop a plan for fixing the radon problem. Reduction methods can be as simple as sealing cracks in floors and walls or as complex as installing systems that use pipes and fans to draw radon out of the building.

EPA has a National Radon Program to inform the public about radon risks, train radon mitigation contractors, provide grants for state radon programs, and develop standards for radon-resistant buildings. EPA works with health organizations, state radon programs, and other federal agencies to make the program as effective as possible.

For more information about radon, its risks and what you can do to protect yourself, call 1-800-SOS-RADON and request a free copy of EPA's *A Citizen's Guide to Radon*. You may also call the Radon Fix-It Line at 1-800-644-6999 between noon and 8pm Monday through Friday, EST/EDT, for information and assistance. This toll-free line is operated by Consumer Federation of America, a nonprofit consumer organization.

NOTE FROM AARON: And it does not just come from the ground. Do you have or are you considering purchasing granite counter tops? Watch this: http://www.youtube.com/watch?v=lD0ln4zxMK0&feature=email

Also See: https://candysdirt.com/2019/02/28/higher-radon-levels-found-in-some-north-texas-homes-neighborhoods-fracking-to-blame/

ADDENDUM: MOLD AND MOISTURE

Many homes have excessive moisture issues that might lead to mold growth, but the ability to detect the presence of mold is beyond the scope of this inspection. If you are concerned about the presence of mold you are strongly urged to consult with a qualified professional microbiologist, mycologist or mold inspector prior to purchasing this home.

Remember this:

Mold has been around since the beginning of time. Mold needs moisture to grow; if you don't have moisture, you don't have mold.

Translation: Treat all moisture problems, water damages, and condensation issues in the same manner as you would a fire. Most mold problems are caused by a lack of urgency for a moisture problem.

Mold begins to grow in wetted building materials as soon as 48 hours. It is vital that the material be dried as quickly as possible.

Fix the leaks, or source of water, don't ignore, or delay, but fix right away.

Read this for our company's opinion on the mold issue: http://forensic-applications.com/moulds/habits.html

Read all of these as well:

http://www.dshs.state.tx.us/mold/

http://www.epa.gov/mold/

http://www.cdc.gov/mold/

http://www.cdc.gov/mold/cleanup.htm

http://health.uconn.edu/occupational-environmental/academics-and-research/cph-new/hitec-ii-project/work-environment/indoor-air-quality/

Mold assessment must be performed by a licensed technician and must be abated by a licensed abatement company. See: https://www.tdlr.texas.gov/mld/mld.htm

Texans' Worries About Mold Are Way Out Of Hand

By Gailen D. Marshall, director of the Division of Allergy & Clinical Immunology at the University of Texas Medical School at Houston

What do these things have in common: wine, penicillin, cheese, beer and mushrooms? Can't guess? Here is a big hint: It also is the latest dubious health scare costing Texas consumers millions of dollars in higher insurance premiums and needless home "health" testing, and it is being used as a get-rich-quick scheme for some personal injury lawyers. Ah, now you know – it is called mold.

So how did this very common type of fungus, present in all sorts of good things we use on a daily basis and ever present in our environment, grow into a major consumer crisis? The answer may surprise you.

As a board-certified allergist-immunologist, I have taught, done research and seen patients with a variety of immune-based medical conditions for 14 years. In the past several years, my clinical office has become increasingly populated by very frightened, sometimes angry individuals. They believe, or have been told, they have "toxic mold disease." But do they really?

First, let's examine some facts about mold. There are many different kinds of mold – at least 10,000 common types. Mold is everywhere, because it simply requires a source of water, sugar and oxygen along with a friendly surface to thrive and grow. In places where a lot of water is in the air itself (like Texas), mold easily finds comfortable growth sites and is especially prosperous.

Is mold harmful to people? Can molds cause memory loss, fatigue or brain damage? For most people, the answer is a resounding, and hopefully reassuring, "no!" The world is filled with mold – we breathe it, we eat it, and we drink it every day with no ill effects. Some people do develop allergies and experience symptoms of asthma or hay fever when exposed to some mold spores. There also are a few mold-related diseases that can be serious, but those are rare. So what about the "experts" who claim to diagnose all sorts of mold-related illnesses such as memory loss or learning disabilities? There is no proof to support those claims.

Still, even though health risks may be vastly exaggerated, most people would rather not have excess, visible mold in their homes. If there is a lot of mold, it looks bad, and it has an unpleasant odor. But removing mold is relatively simple. If you have mold, you have excess moisture, and that needs to be eliminated, whether it is a roof leak, a shower leak or condensation. Often, the mold simply can be cleaned off and won't return if the moisture is removed. (more)

Should you pay for a "mold test"? No. The nation's most reputable experts, including the Centers for Disease Control and Prevention and the reigning mold expert from Harvard's School of Public Health, don't support most home mold testing. If you see or smell mold in your home, clean it up and stop the source of water. It is that simple.

Should you panic? To me, this is the most important issue of all. You need to react to mold based on the facts, not on the hysteria and hype you may have heard or read. The mold scare already is having a troubling effect on the Texas economy and on individual lives. Texas insurance rates already are more than double the national average and are continuing to rise based in large part on mold-related claims. Moreover, families are being moved out of their homes by testers and remediators and having their lives disrupted – most for no legitimate reason whatsoever.

The bottom line is this: If you are ill, see a physician. If he thinks you may have mold allergies, ask to be tested by a reputable specialist who has the credentials to provide calm, reliable medical information – then follow your doctor's direction for treatment. Don't be afraid to discuss with him why he thinks mold is causing your problems.

If you see or smell mold in your home, simply clean it up and plug the water leak. If you need an expert to help, find a reputable person or company trained in moisture management to find and fix the water source. And perhaps most important, if someone comes to you to try to assess blame for the mold "exposure," ask yourself whether you want the aggravation, expense and frustration associated with trying to get compensated for the everyday risks associated with living on our planet.

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ADDENDUM: EMF

Typical residential exposures, not close to operating appliances or household wiring, are about 1 mG. A milligauss (mG) is the unit of magnetic field intensity.

Intensity is considered to be related to the potential for risk. Exposure intensity decreases as distance from power lines increases. If there is a risk, then increased distance from power lines would be expected to reduce risk.

Other factors may contribute to exposure intensity in a residence. A magnetic field exposure measurement is best way to assess the exposure situation. Many power companies provide this service.

So far,EPA has not issued an official statement on the issue of EMF exposure and health risk. However, other credible organizations have evaluated information about exposure and effects and have come to conclusions about risk. The conclusions of two of these assessments follow.

In June , 2001, an expert scientific working group of the International Agency for Research on Cancer (IARC), a World Health Organization agency, concluded that ELF magnetic fields are possibly carcinogenic to humans, based on consistent statistical associations of high level residential magnetic fields with a doubling of risk of childhood leukemia. Analyses of data from a number of well-conducted studies show a fairly consistent statistical association between a doubling of risk of childhood leukemia and power-frequency (50 or 60 Hz) residential extremely-low frequency (ELF) magnetic field strengths above 0.4 microTesla (4 milligauss). No consistent evidence was found that childhood exposures to ELF electric or magnetic fields are associated with brain tumours or any other kinds of solid tumors. The epidemiological studies included in the IARC evaluation found that children who are exposed to residential (ELF) magnetic fields less than 0.3 to 0.4 microTesla (3 to 4 milligauss) have no increased risk for leukemia. No consistent evidence was found that residential or occupational exposures of adults to ELF magnetic fields increase risk for any kind of cancer.

In addition, an assessment of health effects from exposure to ELF electric and magnetic fields (EMFs) by an expert working group, organized by the National Institute of Environmental Health Sciences (NIEHS)/National Institutes of Health, found that that EMFs are possible carcinogens for children exposed to EMFs at home (June 1998) based on epidemiological studies of residential exposure and childhood leukemia. The NIEHS working group also concluded that the results of in animal, cellular, and mechanistic studies do not confirm or refute the finding of the epidemiological studies. The NIEHS Working Group Report is available on the EMFRAPID Program website, http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm

ADDENDUM: Foundation Design on Expansive Soils

Designing foundations to perform as intended on the undulating expansive clay soils of North Central Texas is an exacting task. It is estimated by the International Association of Foundation Drilling that these types of soils are responsible for $12.5 billion of damages throughout the country each year. Because of this, extreme care must be taken in both the design and construction of such foundations in order to prevent poor performance and failure. The degree of care required is such that the applicable building code, the International Residential Code, defers to the more restrictive International Building Code, usually reserved for commercial structures.

Along with the regulating organizations specified by the design engineer, each of these regulations requires thorough documentation of the procedures outlined for the design and construction of foundations. Engineered systems designed to withstand extraordinary building site conditions also require extraordinary attention to detail in their design, documentation and implementation. Clear and concise communication between the designer, the geotechnical engineer, the builder, the materials suppliers, and the contractors involved in the construction is imperative. This communication is necessarily required to be accurately recorded so that the construction process can be clearly understood and executed by everyone from the designer to the contractors in the field.

SOILS

Because the expansive clay soil is at the heart of the matter the pertinent building codes and the regulations of the other organizations referenced therein require thorough site-specific soil (geotechnical) testing in order to ascertain the bearing strength and other properties of the soil so that the foundation is designed accordingly. These tests require, among others, soil boring, sampling, and laboratory testing by a licensed professional geotechnical engineer. The requirements for detailed documentation of this process are spelled out in great detail in the many different applicable regulations.

The Wire Reinforcement Institute (WRI) states in part, “It is considered imperative that a soils investigation be made on any site on which a design is to (be) prepared. For a small site with one structure, the minimum is obviously one test boring, which should be made where the worst soil condition is anticipated; i.e., where fill is located, or where the worst clay is suspected. If it is not obvious, then more than one test hole is indicated. In no case should a design be attempted without an adequate soils investigation of the site. For large sites with large structures or more than one structure, several test holes must be used. In planning the investigation, plan for the worst.”, and “The ultimate performance of a slab reflects how well the soil analysis was done. Slab design is only as good as the soil data on which it is based.”

SOIL COMPACTION

The geotechnical engineer is also required to oversee the removal of any existing structures or vegetation from and specify any fill soils required to be added to any given site. Removal of underground structures and vegetation results in voids in the grade which must be filled with soil that is both tested and approved by a geotechnical engineer.

The fill soils must also be compacted in order to approximate the consistency of the adjacent undisturbed or native soils. This compaction is also required to be both specified, overseen, and documented by the geotechnical engineer.

FOUNDATION REINFORCEMENT

The foundation itself must adhere to myriad specifications in order to withstand the movement of the soil upon which it is built and to properly maintain the structure which it carries. Concrete’s natural lack of tensile strength is overcome by the addition of reinforcement. In order to overcome the extreme bending which is experienced in expansive soils the prestressed post-tensioning method of reinforcement, in which tensile steel cables are put under enormous stress after concrete curing to produce a clamping load, was developed and is used in most residential construction in the North Central Texas area. This system consists of a number of components which are required to be designed and specified by a licensed professional engineer.

The Post-Tensioning Institute regulates the design and construction of post-tensioned foundations and requires exacting oversight of the process as well as full documentation of every stage of the project from the design, to the list of components to their prescriptive installation instructions in order to ensure conformance with the engineer's specifications and the eventual performance of the structure. This oversight and documentation includes, but is not limited to, inspection and reporting at every stage of construction, detailed materials lists and invoices, stressing equipment calibration logs, tendon stressing logs, etc.

CONCRETE

The final stage in the construction of the foundation is the placement of the concrete. This process also requires painstaking oversight and documentation in order to achieve the desired results. Concrete is produced through a chemical process called hydration which requires extremely exact measurement and mixing of the various materials of which it is composed. All along the route from the design engineer's specification to the concrete plant batch master to the cement truck to the placement in the forms by the concrete contractor this building material must be closely observed, tested and documented. These tests and documentation include, but are not limited to logs kept by the concrete plant, the concrete truck driver and the placement contractor, as well as slump tests and core sampling. All of these procedures are intended to ensure the quality of the concrete and its performance over time.

CONCLUSION

On any construction project the collection and maintenance of thorough documentation is imperative to ensure building code compliance, proper construction and adequate performance of the structure over time. Without this documentation the materials employed and the steps taken during construction cannot be ascertained and the structure cannot reasonably be depended on to serve its intended function. **You are strongly urged to obtain all required documentation pertaining to the design and construction of this foundation prior to closing escrow on this home.**

ADDENDUM: Property Owner Site Consideration for Foundation Performance

Construction and Maintenance

The performance of residential structures built on ground supported concrete foundations depend not only on proper design and construction, but also on proper foundation environment maintenance performed by the occupant or owner of the property. Many residential foundations have experienced problems as a result of improper installation, maintenance or alterations of the drainage system and landscaping.

A properly designed and constructed foundation may still experience distress from soils which undergo volume changes caused by non-climatic moisture sources such as leaking pipes or irrigation.

Initial site grading shall provide positive drainage away from the foundation perimeter. The site drainage plan developed by the civil engineer should be maintained during the design life of the structure. Positive drainage, to prevent water from ponding next to foundations, is imperative in minimizing soil related foundation problems. Drainage or other discharge channels should be kept clear at all times of all debris in order to allow water discharge away from the building footprint.

The most commonly used technique for positive drainage is grading away from the foundation to promote rapid runoff and to avoid ponding water near the foundation. Poor drainage or ponding water can cause a change in soil moisture content, resulting in swelling of the supporting soils, causing foundation movements. Recommendation for positive

drainage is 3% to 5% slope for a minimum distance of 10 feet from the edge of the foundation. Berming of landscape beds, while visually appealing, can create a damming effect between the berm and the foundation that may prevent water from draining away. Special attention must be paid to these areas by providing additional precautions, such as area drains. Area drains must be checked periodically to ensure that they are functional.

Should the site drainage be inadequate, properly compacted select fill material can be provided to reestablish positive drainage. The builder can be contacted to obtain information from the geotechnical engineer's report regarding the type of select fill material and the degree of compaction necessary to provide adequate drainage. Proper compaction is required to minimize subgrade settlements near the foundations and to prevent subsequent ponding of surface water.

Improper fill materials and/or compaction may result in the appearance of positive drainage; however, the drainage may not be effective as in the case of permeable sands placed on top of an expansive clay layer that is not sloped away from the foundation. If the reestablishment of positive drainage is not possible, and alternate area drain system may be provided.

Foundation design for sites with greater than 9% slope should insure that ground water is not trapped on the cut (uphill) side of the foundation and that the drainage provided to remove this water from around the structure is far enough away, (minimum 5 feet from the edge of the structure) as to prevent the undermining of the foundation by the water flow. This drainage can also minimize the seepage through backfills into adjacent basement walls.

Subsurface drains may be used to control a rising water table, groundwater, underground streams, and surface water penetrating through pervious, fissured or highly permeable soil; however, drains cannot stop the migration of moisture into the soil beneath the foundation. Moisture barriers, while expensive, can be effective if placed near the edge of the foundation to minimize moisture migration. The geotechnical engineer can recommend the proper depth for a moisture barrier system depending upon the type of soil and the climatic conditions prevalent in the area where the foundation is constructed.

Roof drains should be tied into the area drainage system (where present) or direct water away from the foundations. Property owners should also be aware of the potential hazard of leaky swimming pools, irrigation systems, or plumbing. A noticeable increase in monthly water bills can indicate a problem that should be corrected immediately.

It is important to note that consistent moisture content of the supporting soils is the key to proper foundation performance. In areas where silt or sandy material is present, excessive water can cause the soil to loose bearing capacity. In areas where expansive clays are present, excessive water can increase swelling and insufficient moisture will cause the shrinkage of the supporting soils.

The following is a list of items to be considered when planning proper foundation maintenance:

(1) Maintain positive drainage away from the foundation and install drainpipes (if applicable). Never allow water to pond near or against the foundation.
(2) Replace and compact any loose fill adjacent to the foundation with native soil; do not use sand or a granular material.
(3) Check gutters and downspouts to be sure that they are clear and that the water is discharged away from the foundation area.
(4) Avoid seasonal drying around the perimeter of the foundation.
(5) Existing vegetation near the foundation typically draws added water from the adjacent soil towards the foundation, thus causing added soil movement.

The objective of a proper maintenance program is to maintain as near constant moisture content as possible for the soil around the perimeter and under the foundation.

It is recommended that all property owners conduct a yearly survey of their foundation and perform any maintenance necessary to improve drainage and prevent ponding of water adjacent to these structures. This is especially important

during the first ten (10) years after construction because this is usually the time when the most severe adjustment between the new foundation and its support soil occurs.

Property owners should also be made aware of the precautions that are to be taken when modifying or cutting holes in foundation slabs reinforced with unbonded post-tensioning tendons. An expert should only ever accomplish this.

Landscaping

Ground supported slabs constructed using proper foundation design, construction techniques and adequate drainage systems can still experience distress if the site slope, type of vegetation, surrounding landscape and irrigation water supply is not properly selected and maintained. One of the most critical aspects of landscaping is the continuous maintenance of properly designed slopes. Installing flowerbeds or shrubs next to the foundation and keeping the area flooded will result in localized swelling. This expansion may result in added edge lift of the foundation system.

It is recommended that initial landscaping or hardscape be done on all sides and that drainage away from the foundation be provided and maintained. Partial landscaping on one side of the foundation may result in swelling on the landscaped side due to added non-climatic irrigation water. This can cause differential movements resulting in non-serviceable slabs or foundations.

Landscaping is often overlooked by property owners as an area that may contribute to possible foundation problems. When planning flowerbeds or locations of trees and shrubs, consideration must be given to the effect that vegetation may have on existing drainage patterns. Landscaping should be installed so as to avoid water ponding or standing at any location around the perimeter of the foundation. Positive drainage away from all foundations and off the property is critical to the performance of any slab foundation supported on the ground. Landscaping and ground cover can help prevent erosion and, if properly maintained, protect the ground from loss of moisture.

Caution must also be taken when new patios and fences are installed. Water must at all times drain away from such structures and follow the drainage pattern previously established. Remember that any changes in the exterior layout of the property, flowerbeds, decks, patios, fences, trees and shrubs, must be planned such that positive drainage away from any foundation structure and off the property is provided at all times.

Sprinkler systems are beneficial in maintaining uniform moisture content in the soils that surround the foundation slab; however, they should be placed around the entire perimeter of the foundation. Precautions, such as the proper backfilling of excavations form the sprinkler lines, location of valve boxes a minimum of five feet (5') away from the foundation edge, monitoring for leaks and setting controls so that a uniform amount of water is achieved for all areas are important factors to consider if a sprinkler system is to be beneficial.

Trees located near a foundation can be a potential contributing factor to foundation distress. Experience has shown that the presence of or the removal of large trees that are in close proximity to residential foundations can cause long-term problems. Depending on the type of tree, proximity to the edge of the foundation and its size, vertical movements in the foundation by as much as 3 – 5 inches are not uncommon.

This problem can be aggravated in most areas by cyclic wet and dry seasons; however, the condition will be most severe during extreme droughts. Trees that require large amounts of water or that have large surface roof systems such as willow, elm or oak are the most detrimental to foundation performance. It is recommended that trees not be planted closer than half of the anticipated canopy diameter of the mature tree or 20 feet from the edge of the foundation, whichever is the larger distance. Existing trees that are closer than this should be thoroughly soaked at least twice each week during dry periods and once each week during periods of moderate rainfall. Close monitoring of the surface root system may indicate that more frequent watering is required. Root barriers are effective in protecting foundation while preserving the beauty of mature trees. The system should be placed adjacent to the foundation, be constructed of monolithic concrete or other impermeable solid material, be a minimum of36 inches deep and extend the full length of the tree canopy. Whether the barrier will be truly permanent is questionable because the roots may be able to grow around or under the trench; however, it should at least increase the time it takes for the roots to grow back. In all cases you should check first with a certified arborists before installing root barriers.

In areas with expansive soil conditions, the root systems of trees and large bushes tend to dry up the soil. When they are removed, soil swelling or heaving of the soil may occur. Studies have shown that this swelling can last as long as 20 years depending on the size and extent of the root system. Foundations that are built in heavily wooded areas on expansive clay soil should be designed with this anticipated vertical expansion considered. Alternatively, the site can be left alone for several years after removal of the trees and/or large bushes to allow the moisture of the desiccated area to stabilize; however, this option is not generally considered practical. Tree removal can be safely accomplished provided that the tree is no older than any part of the house since the subsequent heave can only return the foundation to its original level. There is no advantage to staged reduction in the size of the tree; therefore, if a tree is to be removed, it should be removed completely at the earliest possible opportunity. When a tree is older than the foundation, it is not considered advisable to remove the tree because of the danger of inducing damaging heave, unless the foundation was designed for the total computed vertical movement. This process does not occur for foundations built on non-expansive sandy soil conditions.

If the anticipated heave caused by the removal of a tree is too large, some kind of pruning, such as crown thinning or crown reduction can be considered. Pollarding, where most of the branches are removed and the height of the main trunk is reduced, though often mistakenly specified, is not a viable option. Most published advise links the height of the tree to the likelihood of damage when in fact it is the leaf area that is most important; therefore, crown thinning or reduction in which some branches are shortened or removed is the preferred method. Pruning should be done in such a way as to minimize future growth while maintaining shape and without leaving the tree vulnerable to disease. I all cases this should be done by a qualified arborists (preferable), or a tree surgeon or landscaping contractor under the supervision of an arborist. In some cases there may be some opposition to the removal or reduction of size of an offending tree. The property owner, a neighbor, local authorities or a Tree Preservation Order may require that alternate methods, such as root barriers, be utilized. In this case, the property owner needs to be made aware of the risk of property damage that can result from leaving the tree.

Every property owner should conduct a yearly survey of the foundation and perform any preventative maintenance necessary to improve drainage and minimize the effects of landscaping and existing vegetation on the foundation. Special attention is important during the first 10 years after the foundation is constructed as this is the time of the most severe adjustment between the new construction and the environment; however, this condition can change yearly for the life of the foundation.

ADDENDUM: CARBON MONOXIDE INFORMATION

What is carbon monoxide (CO) and how is it produced in the home?

CO is a colorless, odorless, toxic gas. It is produced by the incomplete combustion of solid, liquid and gaseous fuels. Appliances fueled with gas, oil, kerosene, or wood may produce CO. If such appliances ar not installed, maintained, and used properly, CO may accumulate to dangerous levels.

What are the symptoms of CO poisoning and why are these symptoms particularly dangerous?

Breathing CO causes symptoms such as headaches, dizziness, and weakness in healthy people. CO also causes sleepiness, nausea, vomiting, confusion and disorientation. At very high levels, it causes loss of consciousness and death.

This is particularly dangerous because CO effects often are not recognized. CO is odorless and some of the symptoms of CO poisoning are similar to the flu or other common illnesses.

Are some people more affected by exposure to CO than others?

CO exposures especially affect unborn babies, infants, and people with anemia or a history of heart disease. Breathing low levels of the chemical can cause fatigue and increase chest pain in people with chronic heart disease.

How many people die from CO poisoning each year?

In 1989, the most recent year for which statistics are available, thee were about 220 deaths from CO poisoning associated with gas-fired appliances, about 30 CO deaths associated with solid-fueled appliances (including charcoal grills), and about 45 CO deaths associated with liquid- fueled heaters.

How many people are poisoned from CO each year?

Nearly 5,000 people in the United States are treated in hospital emergency rooms for CO poisoning; this number is believed to be an underestimate because many people with CO symptoms mistake the symptoms for the flu or are misdiagnosed and never get treated.

How can production of dangerous levels of CO be prevented?

Dangerous levels of CO can be prevented by proper appliance maintenance, installation, and use:

Maintenance:

- A qualified service technician should check your home's central and room heating appliances (including water heaters and gas dryers) annually. The technician should look at the electrical and mechanical components of appliances, such as thermostat controls and automatic safety devices.
- Chimneys and flues should be checked for blockages, corrosion, and loose connections.
- Individual appliances should be serviced regularly. Kerosene and gas space heaters (vented and unvented) should be cleaned and inspected to insure proper operation.
- CPSC recommends finding a reputable service company in the phone book or asking your utility company to suggest a qualified service technician.

Installation:

- Proper installation is critical to the safe operation of combustion appliances. All new appliances have installation instructions that should be followed exactly. Local building codes should be followed as well.
- Vented appliances should be vented properly, according to manufacturer's instructions.
- Adequate combustion air should be provided to assure complete combustion.
- All combustion appliances should be installed by professionals.

Appliance Use:

Follow manufacturer's directions for safe operation.

- Make sure the room where an unvented gas or kerosene space heater is used is well ventilated; doors leading to another room should be open to insure proper ventilation.
- Never use an unvented combustion heater overnight or in a room where you are sleeping.

Are there signs that might indicate improper appliance operation?

Yes, these are:

- Decreasing hot water supply
- Furnace unable to heat house or runs constantly
- Sooting, especially on appliances
- Unfamiliar or burning odor
- Increased condensation inside windows

Are there visible signs that might indicate a CO problem?

Yes, these are:

- Improper connections on vents and chimneys
- Visible rust or stains on vents and chimneys
- An appliance that makes unusual sounds or emits an unusual smell
- An appliance that keeps shutting off (Many new appliances have safety components attached that prevent operation if an unsafe condition exists. If an appliance stops operating, it may be because a safety device is preventing a dangerous condition. Therefore, don't try to operate an appliance that keeps shutting off; call a service person instead.)

Are there other ways to prevent CO poisoning?

Yes, these are:

- Never use a range or oven to heat the living areas of the home
- Never use a charcoal grill or hibachi in the home
- Never keep a car running in an attached garage

Can Carbon Monoxide be detected?

Yes, carbon monoxide can be detected with CO detectors that meet the requirements of Underwriters Laboratories (UL) standard 2034.

Since the toxic effect of CO is dependent upon both CO concentration and length of exposure, long-term exposure to a low concentration can produce effects similar to short term exposure to a high concentration.

Detectors should measure both high CO concentrations over short periods of time and low CO concentrations over long periods of time - the effects of CO can be cumulative over time. The detectors also sound an alarm before the level of CO in a person's blood would become crippling. CO detectors that meet the UL 2034 standard currently cost between $35 and $80.

Where should the detector be installed?

CO gases distribute evenly and fairly quickly throughout the house; therefore, a CO detector should be installed on the wall or ceiling in sleeping area/s but outside individual bedrooms to alert occupants who are sleeping.

Aren't there safety devices already on some appliances? And if so, why is a CO detector needed?

Vent safety shutoff systems have been required on furnaces and vented heaters sine the late 1980s. They protect against blocked or disconnected vents or chimneys. Oxygen depletion sensors (ODS) have also been installed on unvented gas space heaters since the 1980s. ODS protect against the production of CO caused by insufficient oxygen for proper combustion. These devices (ODSs and vent safety shutoff systems) are not a substitute for regular professional servicing, and many older, potentially CO-producing appliances may not have such devices. Therefore, a CO detector is still important in any home as another line of defense.

Are there other CO detectors that are less expensive?

There are inexpensive cardboard or plastic detectors that change color and do not sound an alarm and have a limited useful life. They require the occupant to look at the device to determine if CO is present. CO concentrations can build up rapidly while occupants are asleep, and these devices would not sound an alarm to wake them.

For additional information, write to the U.S. Consumer Product Safety Commission, Washington, D.C., 20207, call the toll-free hotline at 1-800-638-2772, or visit: https://www.cpsc.gov/Safety-Education/Safety-Education-Centers/Carbon-Monoxide-Information-Center/CO-Alarms

https://www.tdi.texas.gov/fire/fmcoalarms.html

ADDENDUM – HVAC Systems

Residential heating and air conditioning systems are almost without exception improperly designed and installed. In fact, most builders do not have the systems professionally designed. In reality, little thought is given to the proper installation of the system in your home which will use the most energy. Though the information on proper installation has been readily available to builders and contractors for decades, it is rarely heeded. The result is that the heating, cooling and ventilating systems in most homes are very inefficient and unnecessarily costly to operate.

At a minimum your system should be designed by a licensed professional HVAC engineer and installed by a licensed HVAC contractor in strict accordance with the American Society of Heating, Refrigerating and Air-Conditioning Engineers' specifications as set forth in ASHRAE Manual J, Residential Load Calculation; Manual S,

Residential Equipment Selection; and Manual D, Residential Duct Systems. Because the design and installation of a home's heating and cooling system requires the efforts of several different specialists beginning with the system design by an HVAC engineer and ending with the proper installation by a licensed HVAC contractor, it is beyond the scope of this inspection to ascertain with a great degree of accuracy its correct design, installation and performance.

Critical issues that must be properly addressed on most existing systems, but cannot be addressed within the scope of a general home inspection, are:

(1) Verification of proper airflow in the system
(2) Verification of proper refrigerant charge.
(3) Verification of properly sealed ducts.

Air handler and furnace units should be installed in conditioned air, that is, they should be installed within the interior of the home, such as in an interior closet. Common installations in unconditioned attics and crawl spaces do not allow for optimum performance and can prematurely age systems.

The use of flexible ductwork is widespread, but not suggested. Smooth sheet metal ducts are required for optimal performance and durability.

Load calculations should be performed for each room of the house, instead, when practiced at all, of the common whole house calculation approach.

You are strongly urged to have your new or existing home's HVAC system further analyzed by a licensed professional HVAC engineer who can provide you with remedial options.

ADDENDUM: Clothes Dryer Ducts

The decrease in efficiency due to friction losses in an excessively long dryer duct system will reduce the system's ability to convey the warm, moist air from the dryer to the exterior duct outlet. This will require the clothes dryer to be operated for longer periods to dry clothes. The reduced air flow velocity and greater potential for condensation in excessively long dryer duct systems may also initiate a cycle of lint build-up inside and along the developed length of the duct which, in turn, will restrict air flow through the duct and create an additional load on the dryer. Clothes dryer lint is extremely flammable. Lint accumulation around clothes dryer heating elements or burners creates a very real fire hazard. Therefore, not only does an excessively long and/or restricted dryer duct reduce the serviceable life of the appliance, it also increases the potential for ignition of dryer lint.

An excessively long dryer duct system for exhausting an electric dryer can result in overheating of the dryer and an increased potential for a fire to occur in the appliance. In a dryer duct system exhausting a gas-fired dryer an excessively long dryer duct system can lead to corrosion of the duct, back-drafting of or leaking of combustion by-products, and an increased potential for the introduction of CO (carbon monoxide) into the air in the interior of the home. It may also create an increased potential for a fire to occur in the appliance. Since dryer lint is extremely flammable, if it cannot be properly exhausted and it builds up around and inside the dryer, the potential for a fire at the appliance is increased.

It is often not practically feasible for an inspector to determine with any degree of accuracy the configuration of dryer ducts enclosed in walls and ceilings, or covered with insulation in attics. Additionally, different dryer models have different venting requirements. You are strongly urged to have this dryer ducting system inspected by an HVAC technician to determine if it is adequate for use with your particular model of clothes dryer.

See: https://www.cpsc.gov/s3fs-public/5022.pdf

ADDENDUM: Warning Concerning Roof and Wall Sheathing with Integral Radiant Barriers – Radiant Barrier Sheathing (RBS)

Evidence suggests that house fires can be caused by the aluminum foil in radiant barrier sheathing (RBS) becoming energized by electricity from various sources. These include, but are not limited to contact by damaged electrical cables or fixtures with the RBS, contact of gas- and wood-fueled appliance vents with the RBS, HVAC ducts, and lightning, which is apparently attracted to the RBS.

You are strongly urged to insure that all electrical wiring and fixtures are not in direct contact with the RBS and to have a lightning arrester system designed and installed, in strict accordance with the latest published version of NFPA 780 Standard for The Installation of Lightning Protection Systems and NEC 250.106, by a licensed master electrician or licensed professional electrical engineer with extensive experience in the design and installation of residential lightning arrester systems on your home prior to the end of any time periods associated with the purchase of the home. This also applies if you already own the home whether for occupancy or other purposes. This is critical and represents a very real fire and life safety issue that requires immediate improvement.

See:

https://www.propertycasualty360.com/2012/06/12/subrogation-and-lightning-induced-radiant-barrier/?slreturn=20200008115000

http://lightning.org/

http://www.tlpinc.com/services/residential-light-commercial-systems.html

https://www.astm.org/Standards/C1743.htm

ADDENDUM: GROUND FAULT CIRCUIT INTERRUPTER (GFCI) DEVICES

I have received quite a few questions about grounded circuits and ground fault circuit interrupters. The normal home circuits have a hot leg, usually a dark color wire, black, blue, red (anything except green); a neutral leg, usually a white or light grey wire and, in a grounded circuit, a green grounding wire. To better understand how it works, imagine electrons running along the hot wire into the appliance providing energy then along the white wire back to the power company's pole, where it is grounded. Electricity runs along the wires trying to go back to the ground. Naturally, the electricity will seek the shortest path with the least resistance to ground. When you come in contact with a live wire, you become the white current carrying wire to the ground. The electric current runs through your body, "short circuits" your heart and causes ventricular fibrillation and death. The green ground wire is there to provide a second shorter path to ground, with less resistance than the white wire provides. It also provides a constant path for the appliance, improving safety over a two-wire ungrounded system. Technology has provided us with GFCI (ground fault circuit interrupters) to break the circuit. GFCIs contain a small current transformer. The circuit conductors pass through the transformer, creating equal magnetic fields that balance. If the circuits become different, the transformer amplifies the difference and sends a signal to a solid-state control circuit that activates a trip mechanism to break the circuit. At one-fourth of a milliamp, you can feel the current. At 8 milliamps, death can occur if the duration is longer than 15 percent of the heart's cycle. At 10 milliamps, you can't let go, and respiratory paralysis can occur. At 30 milliamps, you go into ventricular fibrillation and death. Remember, we are talking about milliamps. The branch circuits in your home are 15 or 20 amps. When a home is inspected, the certified home inspector should test all GFCI (ground fault circuit

interrupter circuits) not only for correct polarity and that they trip, but also that they trip below 8 milliamps and within milliseconds. Having the advanced equipment to thoroughly and accurately test your circuits can save lives.

WARNING: Sever electric shock or death can occur if a person touches the energized (line or hot) conductor and neutral conductor at the same time, even if the circuit is GFCI protected. This is because the current transformer within the GFCI protection device doesn't sense any imbalance between the departing and returning current. Therefore, the switching contacts remain closed.

When a GFCI protection device fails, the switching contacts remain closed and the device continues to provide power—providing no GFCI protection.

A new study from the Leviton Institute, the educational and training arm of Leviton Manufacturing, has found that a high percentage of ground fault circuit interrupters (GFCIs) installed in homes didn't work when they were tested, and might not protect people from an electrical ground fault.

A ground-fault can occur when current leaks from an electrical circuit, for example, through damaged wiring or a defective appliance. GFCIs are designed to detect ground faults and shut down the circuit if they occur. The GFCI Circuit Breaker Field Study, sponsored by The Leviton Institute, reviewed data from 13,380 building inspections and found that on average, 15% of GFCIs were inoperative when tested. The study found a much higher incidence of failure in areas where lightning is prevalent. In those regions, as many as 58.2% of GFCIs were found to be inoperative.
"GFCIs don't last forever," said Steve Campolo, lead investigator in the study. "Voltage surges from lightning, utility switching and other sources all take their toll on the devices. That's why Underwriters Laboratories requires that GFCIs be tested monthly." The results from the study additionally suggest that many homeowners either aren't testing the devices or are ignoring the results.

Traditional GFCI designs may compound the problem. For example, most GFCIs will continue to deliver power even if ground-fault protection has been compromised. "It's natural for users to assume that all is well if the GFCI is still delivering power," Campolo said. New "lockout-action" GFCI receptacles now coming on the market offer greater protection. If the GFCI is tripped, it can't be reset unless it's working properly.

The study used data collected by home inspectors who met membership requirements of the American Society of Home Inspectors. The Leviton Institute is the educational arm of The Leviton Manufacturing Co., Little Neck, N.Y. Its mission is to educate consumers, specifiers and others about the benefits of today's electrical wiring devices and systems and to promote the safe use of electrical devices in the home. Leviton Manufacturing Co. offers a wide variety of industrial, commercial and residential wiring products and offers its distributor customers a full range of training, education, marketing, merchandising and other customer-driven support programs. Equipped with the latest in R&D and design and testing facilities, Leviton continually introduces high-quality devices that set the pace of progress in the industry.

For more information, contact Leviton Manufacturing Co., Inc., 59-25 Little Neck Parkway, Little Neck, N.Y., 11362-2591; Phone: (800) 323-8920; Tech Line: (800) 824-3005; Fax: (800) 832-9538.

These failures were primarily attributed to damage from short circuits and voltage surges (lightning and other transients) to the metal oxide varistors (MOVs) used for built-in surge suppression. In areas of high lightning activity (such as Southwest Florida), the failure rate for GFCI circuit breakers was more than 57%.

For these reasons the manufacturers of GFCI devices recommend that the devices be tested every 30 days.

1. Visually inspect the device for obvious defects and broken parts (***do not continue if the device is broken!***).

2. Press the reset button (or check for voltage at the device) to determine if it is tripped.

3. If device was found in a tripped state (no voltage, or you hear or feel a "click" when you press the reset button), be suspicious - ground fault protection may be inoperative when voltage is present after the device is reset - DO NOT USE until you complete the following test sequence!
4. Press the test button and observe that the device trips (hear or feel a "click").
5. Verify no voltage at the outlet (a voltage meter, load device, or trouble light will work).
6. Press the reset button and verify that power is restored.

If the device fails to respond in the expected manner at any stage of the test, then it should not be used. Call an electrician to replace the device.

http://www.cpsc.gov/cpscpub/pubs/099.pdf

http://www.leviton.com/OA_HTML/SectionDisplay.jsp?section=42316&minisite=10251

ADDENDUM: ARC FAULT CIRCUIT INTERRUPTER (AFCI) DEVICES

THE AFCI
The “AFCI” is an arc fault circuit interrupter. AFCIs are newly developed electrical devices designed to protect against fires caused by arcing faults in the home electrical wiring.

THE FIRE PROBLEM
Annually, over 40,000 fires are attributed to home electrical wiring. These fires result in over 350 deaths and over 1,400 injuries each year1. Arcing faults are one of the major causes of these fires. When unwanted arcing occurs, it generates high temperatures that can ignite nearby combustibles such as wood, paper, and carpets. Arcing faults often occur in damaged or deteriorated wires and cords. Some causes of damaged and deteriorated wiring include puncturing of wire insulation from picture hanging or cable staples, poorly installed outlets or switches, cords caught in doors or under furniture, furniture pushed against plugs in an outlet, natural aging, and cord exposure to heat vents and sunlight.

HOW THE AFCI WORKS
Conventional circuit breakers only respond to overloads and short circuits; so they do not protect against arcing conditions that produce erratic current flow. An AFCI is selective so that normal arcs do not cause it to trip.

The AFCI circuitry continuously monitors current flow through the AFCI. AFCIs use unique current sensing circuitry to discriminate between normal and unwanted arcing conditions. Once an unwanted arcing condition is detected, the control circuitry in the Ault, Singh, and Smith, “*1996 Residential Fire Loss Estimates*”, October 1998, U.S. Consumer Product Safety Commission, Directorate for Epidemiology and Health Sciences.

AFCI trips the internal contacts, thus de-energizing the circuit and reducing the potential for a fire to occur. An AFCI should not trip during normal arcing conditions, which can occur when a switch is opened or a plug is pulled from a receptacle.

Presently, AFCIs are designed into conventional circuit breakers combining traditional overload and short-circuit protection with arc fault protection. AFCI circuit breakers (AFCIs) have a test button and look similar to ground fault circuit interrupter (GFCI) circuit breakers. Some designs combine GFCI and AFCI protection. Additional AFCI design configurations are anticipated in the near future.

It is important to note that AFCIs are designed to mitigate the effects of arcing faults but cannot eliminate them completely. In some cases, the initial arc may cause ignition prior to detection and circuit interruption by the AFCI.

The AFCI circuit breaker serves a dual purpose – not only will it shut off electricity in the event of an “arcing fault”, but it will also trip when a short circuit or an overload occurs. The AFCI circuit breaker provides protection for the branch circuit wiring and limited protection for power cords and extension cords. Single-pole, 15- and 20- ampere AFCI circuit breakers are presently available.

WHERE AFCIs SHOULD BE USED

The 1999 edition of the National Electrical Code, the model code for electrical wiring adopted by many local jurisdictions, requires AFCIs for receptacle outlets in bedrooms, effective January 1, 2002. Although the requirement is limited to only certain circuits in new residential construction, AFCIs should be considered for added protection in other circuits and for existing homes as well. Older homes with aging and deteriorating wiring systems can especially benefit from the added protection of AFCIs. AFCIs should also be considered whenever adding or upgrading a panel box while using existing branch circuit conductors.

INSTALLING AFCIs

AFCI circuit breakers should be installed by a qualified electrician. The installer should follow the instructions accompanying the device and the panel box. In homes equipped with conventional circuit breakers rather than fuses, an AFCI circuit breaker may be installed in the panel box in place of the conventional circuit breaker to add arc protection to a branch circuit. Homes with fuses are limited to receptacle or portable-type AFCIs, which are expected to be available in the near future, or AFCI circuit breakers can be added in separate panel boxes next to the fuse panel box.

TESTING AN AFCI

AFCIs should be tested after installation to make sure they are working properly and protecting the circuit. Subsequently, AFCIs should be tested once a month to make sure they are working properly and providing protection from fires initiated by arcing faults. A test button is located on the front of the device. The user should follow the instructions accompanying the device. If the device does not trip when tested, the AFCI is defective and should be replaced.

AFCIs vs. GFCIs

The AFCI should not be confused with the GFCI or ground fault circuit interrupter. The GFCI is designed to protect people from severe or fatal electric shocks while the AFCI protects against fires caused by arcing faults. The GFCI also can protect against some electrical fires by detecting arcing and other faults to ground but cannot detect hazardous across-the-line arcing faults that can cause fires.

A ground fault is an unintentional electric path diverting current to ground. Ground faults occur when current leaks from a circuit. How the current leaks is very important. If a person’s body provides a path to ground for this leakage, the person could be injured, burned, severely shocked, or electrocuted.

The National Electrical Code requires GFCI protection for receptacles located outdoors; in bathrooms, garages, kitchens, crawl spaces and unfinished basements; and at certain locations such as near swimming pools. A combination AFCI and GFCI can be used to satisfy the NEC requirement for GFCI protection only if specifically marked as a combination device.

NUISANCE TRIPPING

Another argument against the use of AFCIs is over the issue of nuisance tripping. However, consistent findings throughout the AFCI implementation process have revealed that the majority of the nuisance trip issues are related to

installation problems specifically the wiring practices of some electricians. Specific examples include reversing neutral and ground wires, shared neutral wiring on single-pole circuits, and ground wires touching neutral wires.

Electrical contractors have been very active in providing information about these types of wiring problems. Many contractors indicate that the initial installation issues associated with wiring errors have disappeared as the installers become more familiar with the installation and operation of AFCIs.

One common misconception is that AFCIs are not tested for nuisance tripping on real-world products and circuits. Between all of the AFCI manufacturers' products, there are now millions of operating hours with AFCIs (both in field tests and in new and existing homes) that showcase the successful performance of AFCIs in protecting new and old appliances. These tests include the new combination AFCI.

Nuisance tripping is a random occurrence that is practically infeasible for a home inspector to discover in the course of a one-time visual inspection of a property. If you are experiencing nuisance tripping of you AFCI breakers, contact a licensed electrician to do a thorough evaluation of the installation and make repairs or replacements as he deems necessary.

https://www.cpsc.gov/s3fs-public/5133%281%29.pdf

ADDENDUM: Warning Concerning Utility Lines Near Roof Decks

The Roofing Contractors Association of Texas has issued the following warning to persons who have service lines installed in proximity to the underside of roof decks:

CAUTION: ACCIDENTAL PUNCTURING OF SERVICE LINES INSTALLED NEAR THE UNDERSIDE OF ROOF DECKS MAY POSE A RISK OF GAS LEAKS, ELECTRIC SHOCK, WIRING SHORTS, FIRE HAZARDS, CABLE AND SATELLITE RECEPTION PROBLEMS, WATER AND HVAC CONDENSATE LEAKS. ROOFING INSTALLERS ARE NOT ABLE TO SEE THROUGH PLYWOOD OR OTHER TYPES OF ROOF DECKING TO CHECK FOR IMPROPERLY-INSTALLED SERVICE LINES.

The International Residential Code requires that service lines such as plumbing, electrical, water, condensate, cable, satellite, gas lines (including freon and other refrigerants) as well as other service lines be installed where they are not likely to be hit by nails. Roofers nailing through a plywood deck are unable to see or to know that one of these lines might be installed in an unsuitable way or in an unsuitable area since they are not visible even with the roofing material removed from the deck.

The IRC calls for installing these type lines far enough away from surfaces that may be subject to nailing to prevent nails from reaching them. In the rare cases where space limitations do not permit enough space, the lines are supposed to then be installed with appropriate "nail shields" that will divert nails to one side or the other of a line.

In the vast majority of the cases where a puncture occurs, lines have been found to be improperly "tucked" or 'nested' into an area near the junction of a rafter and the roof deck. This is an improper installation of the line in most cases since a rafter is 5 ¼ inches in height where it meets the decking. The proper place for the line to have been run and secured is at least 2 ½ inches below the roof deck or about halfway in between the bottom and top edges of the rafter. Those lines could also be installed underneath the rafter and moved slightly upward where the rafter meets a top plate.

Nails that secure roofing to plywood decking are REQUIRED to penetrate that sheathing PAST the point of the nail so they MUST be nailed all the way through the plywood until part of the straight shank of the nail is exposed. This is a

must for proper fastening of the roofing material. In the case of open soffits, an exception can be made for cosmetic reasons that might splinter tongue and groove wood that shows on the exterior of the home but inside the attic, this exception is not allowed unless the nail penetrates at least ¾ of an inch into SOLID sheathing (not recommended for plywood).

Fires can also result from nails penetrating electrical lines and junction boxes that are hidden by decking but that are installed in inappropriate places where nails might be used. These service lines and junction boxes should always be positioned in areas where there is little likelihood of nails ever reaching them. Just as wiring in walls is not run at the height that would make it vulnerable to nails used to hang pictures or other decorations inside the home, similar care should be taken in both new construction and in adding rooms during a remodeling project.

By far, the biggest reason causing the accidental and unavoidable puncturing of freon and coolant lines is in the tendency of the original installer of the line to want to “nest” the line in the corner between the decking and the rafter. Some installers then secure it there by nailing a nail halfway into the rafter and then bending it over the line to “trap” the line in that corner. The correct positioning should be to affix the line halfway down the rafter’s height and to clip it in place there where there is no risk of future nail puncture during roof replacement or other expected construction activities.

If you suspect that your freon line or any other type of line has been run incorrectly, contact a licensed professional and ask him to look at the line’s location and to move it away from the roof deck if it has been installed near the decking, in the corner created by the rafter and the decking or has been run in any other place that is in danger of being hit by the normal nailing associated with re-roofing or other types of remodeling projects.

ADDENDUM: TAMPER-RESISTANT ELECTRICAL RECEPTACLES

What are tamper-resistant electrical receptacles and what is the new requirement?

The 2008 National Electrical Code® (NEC®) will require new and renovated dwellings to have tamper-resistant (TR) receptacles. These receptacles have spring-loaded shutters that close off the contact openings, or slots, of the receptacles. When a plug is inserted into the receptacle, both springs are compressed and the shutters then open, allowing for the metal prongs to make contact to create an electrical circuit. Because both springs must be compressed at the same time, the shutters do not open when a child attempts to insert an object into only one contact opening, and there is no contact with electricity. Tamper- resistant receptacles are an important next step to making the home a safer place for children.

Why require tamper-resistant electrical receptacles?

Each year, approximately 2,400 children suffer severe shock and burns when they stick items into the slots of electrical receptacles. It is estimated that there are six to 12 child fatalities a year related to this.

If homeowners do not have children, are TR receptacles required?

Yes. Owners or tenants of homes and apartments change frequently. In addition, exposure to electrical shock and burn accidents are not limited to a child’s own home. Children visit homes of relatives and friends who don’t have children of their own. This requirement ensures all new homes and apartments are safe for children, whether the home is their own or they are there on a temporary basis.

Do TR receptacles require greater insertion strength than standard receptacles?

TR receptacles require comparable force to other receptacles. The insertion force may vary depending on the newness of the device to the shape or style of the plug being inserted.

Are TR receptacles costly?

No. The projected cost of a TR receptacle adds about $0.50 to the cost of an unprotected receptacle. Based on current statistics, the average home has about 75 receptacles resulting in an overall added cost of under $40. This amount may vary slightly based on the type and style of TR receptacle used. This minimal increase in cost buys a significant increase in electrical safety for children.

Shouldn't people accept responsibility for their children and teach their children not to stick items in receptacles?

Accidents involving children and receptacles cannot be blamed entirely on poor parenting. They involve people who look away for a moment, only to face undue tragedy and pain as the result of a child's curiosity. The NEC's mission is to provide electrical safety in the home. TR receptacles are a simple and easy way to protect children from serious injuries that continue to happen every year.

Why are TR receptacles preferred over products such as receptacles with caps or with sliding receptacle covers?

Receptacle caps may be lost and also may be a choking hazard for some ages. Children can learn to defeat sliding receptacle covers when they watch their parents. TR receptacles provide security against the insertion of objects other than cord plugs into the energized parts.

What is the NEC?

The NEC is the National Electrical Code. The NEC's mission is to provide practical safeguards from the hazards that arise from using electricity. It is the most widely adopted safety code in the United States and the world, and it is the benchmark for safe electrical installations. The NEC is an evolving document, developed through an open consensus process. A new edition is issued every three years.

For more information, visit:

https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Top-fire-causes/Electrical/Tamper-resistant-electrical-receptacles

https://www.youtube.com/watch?v=9mXr9tMx7wI

ADDENDUM: Lightning and Surge Arrester Systems

Lightning creates voltage surges in all of the following ways. Lightning can directly strike on your house. It can hit the overhead power line which enters your house, the transformer that feeds the underground power line, or a main power line that is blocks away from your home. Lightning can come into contact with branch circuitry wiring in the walls of your house. It can strike an object near your home such as a tree or the ground itself and cause a surge. Damaging voltage surges can even be created by cloud to cloud lightning in the vicinity of your home. A sufficiently charged cloud passing over your home can similarly induce a voltage surge.

Voltage surges can also be caused by standard on and off switching activities of electric motors or pieces of equipment like air conditioner, freezer or refrigerator compressors. These types of surges can be created by large motorized equipment at a neighboring building, or by a business or manufacturing facility some distance from your house. These also occur during voltage dips and spikes in the power supply coming from the utility company. These surges are dangerous and usually silent. They can occur with little or no warning.

When a voltage surge is created, it seeks to equalize itself and it wants to do it as quickly as possible. These things seemingly have little patience. The surges will do whatever it takes to equalize or neutralize themselves, even if it means short-circuiting all of your expensive electronic equipment.

The method of providing optimal protection for your equipment is rather simple. Create a path for the voltage surge (electricity) to get to and into the ground outside your house as quickly as possible. This is, in most cases, a very straightforward task.

The first step is easy. Create a proper grounding system for your household electrical system. The majority of homes do not have a proper grounding system. Many homes have a single grounding rod and /or a metallic underground water pipe which are part of the electrical grounding system. In most cases, this is inadequate. The reason can be easily explained. Imagine placing a two-inch fire hose into your kitchen sink and opening the nozzle to the fully on position. I seriously doubt that the drain in your sink could handle this amount of water. Your grounding system would react in precisely the same way to a immense voltage surge. Just as the water splashes out of the sink, the electricity jumps from the grounding system and looks for other places to go. Frequently it looks for the delicate microchips in your pricey electronic devices. They offer a path of least resistance.

Voltage surges desire to be directed to the grounding system, and when they do, they would like to get into the ground around your house as quickly as possible. You can accomplish this by driving numerous grounding rods into undisturbed soil around your house. These rods must be Underwriter's Laboratories (UL)-approved and connected by a continuous heavy gauge solid copper wire which is welded to each grounding rod. This solid copper wire starts on the grounding buss bar inside of your electrical panel and ends at the last grounding rod. You should avoid using clamps. Over time, the connection at the clamp can corrode or loosen, thus creating tremendous resistance. This will act as a hindrance to the electricity attempting to enter into the ground around your home.

The grounding rods should be at least six feet apart from one another, and more widely spaced is preferable. They should be located in soil which readily accepts electricity. Moist clay soils such as are found through most of the DFW Metroplex are very desirable. Rocky, sandy, or soils with gravel generally have high resistance factors. Electricity has difficulty dissipating into these media. Resistance readings must be in the range of 10 to 30 ohms. The lower the better.

The second step in household surge protection is to install a lightning arrester (surge protector) inside of your electric service panel. These devices can be extremely successful in intercepting large voltage surges which travel in the electric power lines. These devices capture the voltage surges and 'bleed' them off to the grounding wire which we just mentioned. If for some reason you do not have a large enough grounding conductor (wire), or enough or properly spaced ground rods, the arrester cannot perform as intended. It must be able to send the surge rapidly to the ground outside of your house. Almost every manufacturer of circuit breakers makes one to fit inside their panel. If not, there are many on the market that can easily be installed in the wall adjacent to the distribution panel. They must be installed by a licensed professional electrician in order to insure that the warranty they carry is not voided.

The final step in this plan is to install 'point of use' surge suppression devices. Often you will see these called 'transient voltage surge suppressors'. These are your last line of defense. They are capable of only stopping the leftover voltage surge which got past the grounding system and the lightning arrester. They cannot protect your electronic devices alone or unaided. They must be used in conjunction with the grounding system and the lightning arresters. You are strongly urged not to be lulled into a false sense of security if you merely use one of these devices!

The 'point of use' surge suppression devices are available in various levels of quality. Some are much better than others. What differentiates them are several aspects. Generally speaking, you look to see how fast their clamping speed is. This is their response time. Also, look to see the limit of a voltage surge they will suppress. Be certain that the device has a 500 volt maximum UL rated suppression level. Insure that if it has an indicator, either visual or audio (preferably both), which lets you know if it is not working. The superior units offer both, in case you install the device out of sight. Observe if it offers a variety of modes with respect to protection. For example, does the device offer protection for surges which occur between the 'hot' and neutral, between 'hot' and ground, as well as between neutral and ground. There is a major difference! Check to see if it monitors the normal sine waves of regular household current. Surges can cause irregularities in these wave patterns. Good transient surge suppression devices 'dispose of' these voltage spikes. Finally, check the joule rating. Attempt to locate a device which has a joule rating of 140 or more.

Electrical supply houses, both brick and mortar and online often are the best place to look for these high quality devices.

Some devices can also protect your communications equipment at the same time. This is quite important for those individuals who have computer modems. Massive voltage surges can come across phone lines as well. These surges can enter your computer through the telephone line. Don't forget to protect this line as well. Also, be sure the telephone ground wire is tied to the upgraded electrical grounding system.

An added layer of protection would be the installation of a lightning arrester system. Secondary class lightning arrestors are designed to protect most homes and businesses from lightning strikes, and are required by most electrical codes, according to, Inc., an electrical power protection company.

These arrestors cause high voltage overages to go to ground, though they do not remove all the over voltage from a surge. Secondary class arrestors offer the least amount of protection to electrical systems, and typically do not protect solid state technology, or anything that has a microprocessor. They should be used in conjunction with the devices listed above.

You are strongly advised to consult with a licensed master electrician or licensed professional electrical engineer prior to embarking on improvement of your home's grounding system.

See:

http://www.arresterworks.com/pdf_file/what_is_an_arrester.pdf

ADDENDUM: ANTI-SCALD DEVICES

Many well-meaning organizations tell consumers to lower the thermostat on their boilers to below 120° F. 30% of all burns treated in hospital emergency rooms are related to scalding which can occur at higher temperatures. The elderly and babies are especially vulnerable. It is estimated that up to 24,000 children younger than 14 are burned by scalding ever year. Some of these victims' injuries result in death.

With statistics like that, lowering the water temperature in water heaters sounds like a no-brainer. Luke warm water can't burn anyone, and it even conserves energy. Unfortunately, Legionella bacteria thrive at 120 º F. If you want to keep your hot water tank safe from this bacterium the water has to be at least 140 º F.

Water is a very legitimate safety issue. Water heated more than 120 F can scald a person, resulting in emergency rooms treatments. If water is really hot, it doesn't take more than a second or two for a person to get a burn that will scar them for the rest of their life.

Many new homes have pressure-balancing systems that should eliminate this problem. Unfortunately, a majority of us have older houses with systems that do not have these safeguards. The dilemma is that we have to keep people from being scalded, yet retain the ability to have scalding hot water when needed. It doesn't matter if you are young or old, if you are going to use water heated above 114 degrees F, some type of anti-scalding device should be retrofitted into every home.

- About 112,000 people are scalded every year.
- 90% of all scald injuries occur in the bathroom.
- Tap water scald injuries are the second most common cause of serious burn injuries in all age groups.
- The disabled and the elderly have delayed reactions to sudden rise in water temperature.

- With assisted bathing, temperature changes are not felt by the person controlling them.

- Bathers may be left unattended for extended periods of time, even though they are unable to change the water temperature.

All worldwide safety organizations recommend anti-scald devices. We strongly urge the installation of these devices.

ADDENDUM: PEX Supply Plumbing

PEX (cross-linked Polyethylene) water pipes were observed in this home. This piping system is specifically excluded from this report, though active leaks observed will be reported. Use of PEX water pipes are relatively new in local construction and are developed with an eye towards the affordable housing end of the spectrum (as opposed to copper) and it is critical that they be installed in strict accordance with the manufacturer's requirements and all applicable standards/codes/specifications or pipe/connector failure and leaks will occur. Some of these requirements include proper PEX connection installation, insuring the crimping tool used for installing the connectors is properly adjusted, supporting and strapping the PEX pipe, the location of the PEX pipe, proper allowance for expansion and contraction, proper bend radius, use of protective sleeves/bushings, properly designed holes where the PEX penetrates wood or particle board, not exceeding certain levels of chlorine in the water, labeling and testing. There are several methods of connecting PEX, all of which involve mechanical fittings. There are two approved standard specifications for PEX connections: ASTM F 1807 and ASTM F 1960. Both reference mechanical insert fittings. The crimp fittings specified in ASTM F1807 are the most widely used. Other fitting systems, including insert and outside diameter compression fittings, are also available. PEX cannot be joined by solvent cement or heat fusion methods. It is also disclosed that a class action has been filed concerning the use of certain PEX fittings.

A licensed and properly trained plumber must verify the PEX installation complies with the manufacturer's requirements and all other applicable standards/codes/specifications in addition to using crimp check gauges and any other specialized tools to verify the connections. Addition of chemicals into the water either from water softeners or the municipal utility must be approved by the PEX manufacturer.

Recommendation: Water Quality: If you plan to move into a new home plumbed with PEX tubing, or have recently done so, and if you are concerned about the possibility of chemicals entering the drinking water, you might want to flush all the lines daily for 1-2 minutes for the first 3-6 months and perhaps once a week for the next 6-12 months. Another helpful approach is to install a reverse osmosis water purification system for drinking water and ice makers. Both flushing and reverse osmosis are recommended. [ref: Vanguard Piping Systems and Zurn PEX]

Contamination of Drinking Water

The PEX EIR found that methyl tertiary-butyl ether (MTBE) and tert-Butyl alcohol can leach from PEX in amounts that exceed taste, odor and health guidelines set by the State of California for drinking water. The PEX EIR found that PEX pipes can initially leach as much as 290 ppb of MTBE. The California Department of Public Health and the California Office of Health Hazard Assessment have established a drinking water taste and odor standard of 5 ppb for MTBE and a drinking water public health goal and maximum contaminant level of 13 ppb.

The PEX EIR also found that PEX can leach ethyl tertiary butyl ether (ETBE), a chemical in the same family as MTBE, in amounts exceeding 100 ppb. An expert toxicologist report commissioned as part of the PEX EIR found that the leaching of ETBE from PEX pipe could contribute to taste and odor impacts, and could potentially lead to adverse health effects.

The PEX EIR found that PEX pipe is susceptible to permeation by outside contaminants such as pesticides, oil, gasoline, benzene and termiticides.

Numerous studies and articles submitted to the State of California comparing potable water pipe materials, including variants of PEX, polybutylene, polypropylene, CPVC, copper and steel, have found that PEX displayed the strongest biofilm formation and the strongest initial promotion of the growth of Legionella bacteria.

California's January 2009 approval of PEX relies upon the less-protective PEX chlorine resistance standard ASTM F2023, instead of the much superior NSF P171 standard. ASTM F2023 only assures an adjusted lifetime of 25 years, while the NSF P171 standard assures a 40 year adjusted lifetime. At least one reputable PEX manufacturer (Lubrizol Advanced Materials, Inc.) has questioned the adequacy of this standard since it only results in "an expected service life of 25 years, five years less than the traditional home loan."

Even short term exposure to sunlight can dramatically reduce the resistance of PEX to chlorine and result in premature rupture of the pipe. Studies show just a one-week exposure to sunlight may reduce the chlorine resistance lifetime of some PEX pipes by half; with a two week exposure completely depleting PEX of any chlorine resistance.

Lack of Recyclability

Because it is a thermoset plastic, PEX cannot be melted down and reused. A 2005 report by the San Francisco Department of the Environment found that PEX was the only type of plastic piping that no plastic recycler would accept. Copper pipe generally contains around 70% recycled material and has almost a 100% recycling rate.

Toxic Smoke

PEX produces toxic smoke when burned in building fires.

Rodent Damage
PEX in attics or elsewhere is highly susceptible to damage by rodents.

Lack of UV Resistance
PEX formulations vary, but most cannot be exposed to UV for more than 60 days; some as long as 6 months. After these periods the plastic begins to deteriorate, leaching hazardous chemicals into the water. Every ventilated attic subjects the PEX installed their to at least some indirect UV.

NOTICE: You are strongly urged to have this plumbing supply piping inspected by a licensed plumber and a manufacturer's representative to insure materials integrity and proper installation prior to the end of any time periods, such as option periods, loan lock periods, close of escrow, et al.

SPECIFIC LIMITATIONS: Pipes within walls, under attic insulation, under the foundation or other areas concealed from ready visibility are unknown and cannot be reported upon and are specifically excluded as to function and leakage. Home plumbing systems must be constantly monitored for leaks. [Nails in plumbing lines can rust through in a short period of time or a year, poor mechanical connections can come loose under pressure and use, etc. New built properties or older properties are not immune from flooding due to unforeseen and non-visible plumbing defects] Pipes inside walls, underground or hidden from view are unknown and not inspected. No other representation is made. The sellers or occupants will obviously have a more intimate knowledge and experience of the home than we could possible hope to have during our limited one-time visit so it is recommended that you review the seller disclosure or ask for disclosure under your personal responsibility of due diligence.

https://www.pexuniverse.com/problems-pex-pipe-and-how-prevent-and-fix-them

https://www.plasticpipefailure.com/pex-problems

https://www.classaction.org/pex-plumbing-lawsuit

ADDENDUM: AUTOMATIC WATER SHUT-OFF DEVICES

Automatic water shutoff devices are available that constantly monitor all water coming into the home and detect any unusual flow to help minimize flood or leak damages. Described by Popular Science as “the circuit breaker for your home’s plumbing system,” the FloLogic System™ is an automatic water shutoff system that constantly monitors all water coming into the home and detects any unusual flow. If water flow exceeds a preset limit, the System automatically shuts off the water and sounds an alarm. The System does all of this from a single point in the water main, serving as a first line of defense against water damage.

The FloLogic System consists of a flow sensor and user interface that controls a motor-driven ball valve. The System can also be connected to any home security system, alerting your monitoring service when a leak is detected.

In the “Home” mode, the System is pre-programmed to allow up to 30 minutes of uninterrupted water flow before the shutoff valve is activated. The “Away” mode allows 30 seconds of uninterrupted flow. Both modes can easily be reprogrammed to correspond with your personal water use patterns. For information - http://www.flologic.com/Automatic-Water-Shutoff-System.html NOTE: This is merely an example, and not a product endorsement. We do not endorse products. Other brands are available.

DynaQuip Controls – WaterCop® Automatic Water Shutoff System

To order online please visit www.watercop.com

To order by phone call (800) 545-3636.

FirstSmart Sensor Corp. – FloodStopper™ System

Phone: (800) 660-1522 http://www.getfloodstop.com/

FloLogic, Inc. – The FloLogic System™

Call toll-free 1-877-FloLogic (1-877-356-5644) http://www.flologic.com/

GreenField Direct – PipeBurst Pro™

Phone: (800) 246-LEAK (5325) http://www.pipeburstpro.com/

E-mail: info@greenfielddirect.com

Water Security Solutions - Water Security Options & Guidance

Phone: (888) 356-5644 http://www.wssus.com/products/leak-alarm-water-shutoff

Clearing the confusion as multi-system suppliers and consultants for high rises and single family homes: WaterCop - FloLogic - Hydrocom - Leak Defense - Water Gard and more.

ADDENDUM: SEWER BACKFLOW DEVICES

Sanitary sewers work by the force and principal of gravity. So wastewater flows in the direction of the natural slope of the pipe. This is the main reason that the sewer mains owned and maintained by the city are typically located between 10′ and 15′ deep. In many areas they are much deeper than that. Sewer backflow can be triggered by a number of different situations, some examples follow:

A blockage (in either a private or city sewer pipe) caused by tree roots, construction mishaps, plumbing system deterioration, Insufficient capacity due to residential growth, cracks in the pipe(s), a back-pitched drain system, or a surcharge due to heavy rain or a large snow melt.

In a home plumbing system, blockages are often caused by accumulation of grease, hair, and any physical obstruction in the pipe. It may even include napkins, diapers, cigarette butts, toilet paper, construction debris, and more. When your sewer pipe is blocked, wastewater has no chance of flowing in the right direction, hence backflow. But the most serious and damage causing sewer backflow conditions occur when a public sewer system becomes surcharged.

SEWER SURCHARGE
Proper building and plumbing design can prevent backwater. If the backflow comes from your city sewer, the most common culprit is a flood or any massive amount of water either from rain or a snow melt. Failure of a sump pump can also possibly lead to sewer backflow, but nowhere near as severe as that of a public sewer surcharge. Because the backflow contains wastewater from many different unsanitary sources (after all, it is a public sewer), it does not only damage properties, but also create severe health hazards. You have no control over the functionality of a city sewer system, but you can prevent backflow by adding a sewer backflow valve device to your own plumbing system.

SEWER BACKFLOW VALVE DEVICES
There are three main types of sewer backflow valves. The price range to purchase and install can vary greatly, depending on the valve. And the effectiveness of the valve can likewise vary greatly. Each sewer backflow valve has its own attributes, which must be considered carefully before installation.

SEWER BACKWATER VALVES
Sewer Check Valve: As sewer valves go, a check valve is the least expensive, and the type most often installed. A check valve does not prevent backwater 100%, so it is ideal for short-term backups lasting less than a full day. Like all sewer valves, once the flapper closes, water use inside the building must be limited.

When a public sewer backup recedes, the check valve will automatically allow the waste water from your home to escape, and run out to the public sewer. A check valve should be cleaned once a year to ensure the flap opens and closes fully.

Automatic Flood Gate Valve: An automatic flood gate valve is the most sophisticated and 100% effective way to stop waste water and the damage associated with it. An automatic flood gate valve works on air pressure, and (as its name implies) is fully automatic. Once closed, its stainless steel knife edge stops backwater 100% over prolonged periods of time. Like all specialized plumbing devices, this device should be installed by none but Licensed Plumbers, with the manufacturers instructions followed closely.

If installed incorrectly not only will it not work properly, but the product warranty will be void. Because an automatic flood gate valve is larger than the typical sewer backwater valve (mainly due to the air chamber), the installation must be considered and planned out carefully.

Manual Sewer Gate Valve: A manual sewer valve, as its name implies, must be opened and closed manually. That means one must anticipate when a backwater condition will arise. And likewise, one must know when the backwater has receded. While a dependable device, the chance of misuse and backwater damage occurring regardless, make sit a device for only very particular situations.

You are strongly urged to have a licensed master plumber inspect you DWV plumbing system and recommend the right valve for you in order to prevent damage to your home at great expense to you.

ADDENDUM - FIRE SUPPRESSION SPRINKLER SYSTEM PIPING FAILURES

This house is equipped with a fire suppression sprinkler system with CPVC piping. There are multiple known causes for failure in these systems due to improper installation, etc. You are strongly urged to have this system thoroughly inspected by a licensed master plumber with significant experience in the installation of these systems as well as a licensed forensic engineer familiar with the defects in the installation of CPVC piping. Further, you are advised to have this installation carefully assessed by a representative of both the installation contractor and your homeowner's insurance carrier. All of these inspections must be done prior to the end of any time periods associated with the sale or purchase of this home.

https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Suppression/ossprinklers.pdf

http://www.businesswire.com/news/home/20151207006252/en/Colson-Hicks-Eidson-Siegfried-Rivera-File-Construction

ADDENDUM: SWIMMING POOLS AND SPAS

Specific Exclusion & Safety Warning: There is a swimming pool present that could prove dangerous to children, the mentally challenged or impaired as well as others. All individuals on the property should be monitored to prevent access to the pool area. A swimming pool safety fence and other appropriate safety devices were not observed. Safety drain covers, window and door alarms on doors and windows with access to pool, pool water alarms and/or covers, and self-closing/self-latching doors or gates (with latches 54 inches or higher above ground) are recommended to be installed as well as a perimeter fence around the pool deck under your personal responsibility of liability and due diligence.

Other safety items, components and requirements should be available from your pool inspector or the U.S. Consumer Product Safety Commission. The certified independent pool inspector you hire should check the equipment to assure proper electrical connections, installation and grounding in order to prevent electrocution. The pool light(s) and GFCI breaker(s) should be replaced now and periodically thereafter for increased safety.

This inspector is neither qualified nor certified to inspect swimming pools or their related equipment and no other representation is made. Swimming pool safety is a responsibility and duty of the owner of the property. Your certified pool inspector should explain the mechanical operation of the pool as well as the required maintenance. A safety vacuum release system (SVRS) and covers that comply with Virginia Graeme Baker Pool and Spa Safety Act / ASME/ANSI A112.19.8 (or later versions) is recommended if not present. A pool specialist who is intimately familiar with the International Swimming Pool and Spa Code should inspect and test this pool to assure it complies with all current entrapment safety related standards. An adult with lifeguard training should always actively supervise children

and other adults when they are in the pool/spa. Additionally an alarm should be installed if the water shows any amount if electrical current.

You are also strongly urged to obtain a copy of, read, and understand the latest version of the International Swimming Pool and Spa Code available from the International Code Council. https://codes.iccsafe.org/content/ISPSC2018P2

Swimming pools are inherently hazardous. It is your responsibility to insure that your pool is maintained to current safety standards and to monitor all individuals on the property at all times to insure their safety.

Unintentional Drownings: http://www.cdc.gov/HomeandRecreationalSafety/Water-Safety/waterinjuries-factsheet.html

ADDENDUM: Thermal Pane (Insulated Glass Unit) Fogging

The cause of fogging in thermal pane window units is not so much due to a loss of seal, as it is to a failure of desiccant placed within the units to absorb moisture. It is incorrect to think that there is a hermetic seal drawn on these windows. This is an impossibility (nature abhors a vacuum). So then, the seal that is initially accomplished is imperfect and leaks from the very beginning. That's right, they leak straight out of the factory. All of them leak. Thinking that thermal windows are not leaking is just plain mistaken thinking. It's a bit like thinking that a house in an area with known expansive soils has a stable foundation. Mythology.

As soon as a thermal pane unit leaves the shop, it is destined for failure. Moisture diffusion into a sealed unit is impossible to avoid and continuous. Manufacturers deal with this reality by loading absorption material, or "desiccant" (usually a silica gel or similar material), in the spacer bar construction of every unit. This material has one job - to bond with water molecules. The material comes in the form of beads, similar to those you find accompanying new leather and electronic products, or as a blended compound, often a black butyl or cork-like wafer.

Every insulated glass unit (IGU) has a finite capacity for how much water it can hold ("hide"). Over time, as moisture accumulates, the unit finally reaches a threshold saturation point, it becomes visible as condensation between the panes of glass (this is directly associated to the falling dew point between the panes of glass).

The options available for fogging IGUs are:

(1) Replacement of the thermal panes. This is the most expensive option. Prices vary greatly due to types and shapes of panes. Replacement costs begin at about $75 per small rectangular pane and rise sharply.

(2) Repair of the thermal panes. This option is about half as expensive as replacement. See:

http://windowmedics.com/defog.html

(3) Do nothing about the thermal panes. This is the most frugal option.

ADDENDUM: Native Subterranean Termites (*Reticulitermes spp.*)

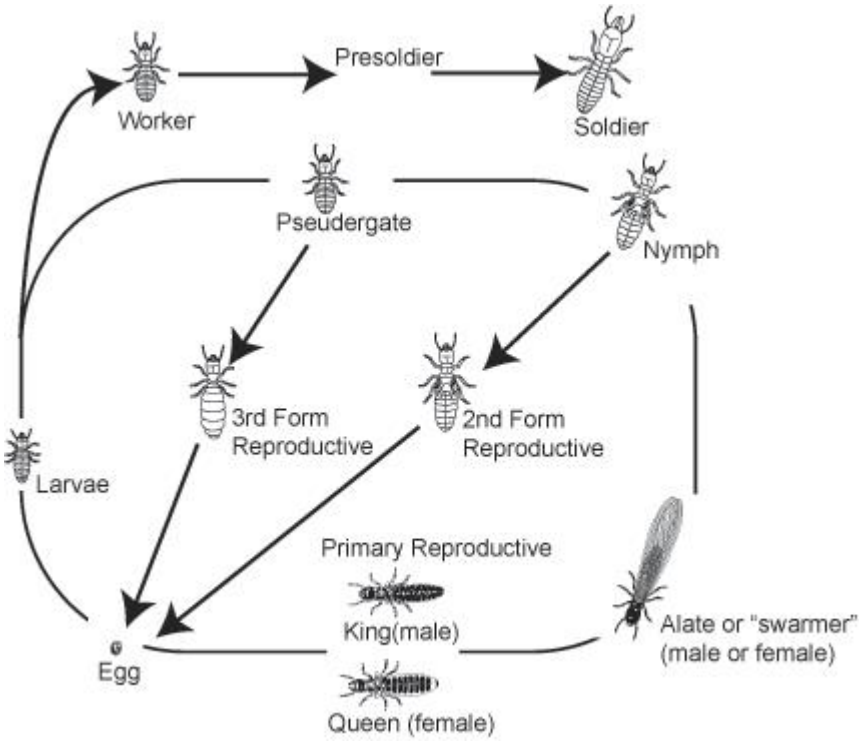
Subterranean termites are the most destructive insect pests of wood in the United States. They cause billions of dollars in damage each year and have a negative impact on a family's most valuable possession - the home.

In nature, subterranean termites are beneficial because they break down cellulose into usable nutrients. The biomass resulting from this process is recycled to the soil as humus. Subterranean termites are, therefore, considered important to our ecosystem.

Problems occur when termites attack the wooden elements of homes, businesses and warehouses built by humans. The presence of termites is often not readily noticed because their activity is hidden behind wallboards, siding or wood trim. Homeowners in all areas of Texas should watch for subterranean termites and take precautions against infestations. To minimize damage from termites, it is helpful to know the description, life cycle and signs of infestation of termites as well as preventive and control measures.

Identification

Subterranean termites are social insects that live in nests or colonies in the soil. They contain three forms or castes: reproductives, workers (pseudergates) and soldiers. Individuals of each caste have several stages: the egg; the larva that develops into a pseudergate and eventually into a brachypterous nymph or soldier; and the adult. There are three forms of adult reproductive termites including primary, secondary and tertiary.



Reproductive males and females can be winged (primary) or wingless (secondary or tertiary). Females of each can lay eggs and produce offspring. The bodies of winged primary reproductives, also called swarmers or alates, vary by species from coal black to pale yellow-brown. Wings may be pale or smoky gray to brown and have distinct vein patterns used in identification. Reticulitermes swarmer termites are about 1/4 to 3/8 inch long.

Secondary and tertiary reproductives live within the colony and are white to cream-colored. These termites form a backup for the primary queen and may replace her if she is injured or dies. These termites mate within the colony and

lay viable eggs. If supplementary reproductives and worker termites become isolated from the main colony, they can establish a new sub-colony.

Termite workers (pseudergates) make up the largest number of individuals within a colony and do all the work. They are wingless, white to creamy white and 1/4 to 3/8 inch long. They forage for food, feed the other castes, groom the queen and maintain and build tunnels and shelter tubes. Their mouthparts are very hard and adapted for chewing through wood or other cellulose materials. The worker caste is responsible for the damage that makes termites an economically important problem.

Soldiers resemble workers in color and general appearance, except they have well-developed brownish heads with strong mandibles or jaws. Soldiers defend the colony against invaders, primarily ants and other termites. They cannot forage for food or feed themselves, and they depend on the workers to care for them.

Ants and termites often swarm at about the same time of year but control measures for each differ greatly. It is therefore, important to be able to distinguish between swarming termites and ants.

Biology and habits

After 2 to 4 years a subterranean termite colony is mature and produces "swarmers" (winged primary reproductives). Termite swarmers leave the colony in large numbers during the spring and early summer. Swarming begins in South Texas in January and February; in the Panhandle region of Texas, swarms do not occur until April and May. Environmental factors such as heat, light, and moisture trigger the emergence of swarmers, with each species having its own set of requirements. The number of swarmers produced is proportional to the age and size of the colony.

Both male and female swarmers fly from the colony and travel short distances. Termites are weak fliers and must rely on wind currents to carry them to new habitats. Only a small percentage of swarmers survive to develop colonies; most fall prey to birds, toads, insects and other predators, and many die from dehydration or injury.

During the swarming process, males (kings) and females (queens) pair off using pheromones. Successful reproductive pairs land, lose their wings and seek cover under rocks or other moist materials. A pair will make a very small nest before mating. Initially, the new queen termite lays only a few eggs. The male remains with the female and helps care for developing eggs and the larva that hatch.

Eggs are not deposited continuously. In fact, only a few hundred are deposited during the first year. As the young queen grows larger, she lays more eggs. The king and queen care for the young larvae that hatch from the eggs because they cannot care for themselves. The larvae then molt into pseudergate workers, which in turn, can molt into presoldiers or brachypterous nymphs (with wing pads). These nymphs will eventually molt to become primary reproductives. The colony stabilizes when the queen reaches her maximum egg production. If the queen dies, supplemental reproductives take over the queen’s duties.

The maximum size of a termite colony depends on location, food availability and environmental conditions, especially temperature and moisture. Some colonies remain small; others contain up to several thousand individuals. New colonies form when groups of termites become isolated from the main colony and establish sub-colonies. This is called "colony splitting" or "budding." These sub-colonies may exist independently or reunite with the main colony.

Subterranean termites get their nutrition from wood and other material containing cellulose. Paper, cotton, burlap or other plant products often are actively consumed by termites. Sometimes termites will even tunnel into the dead heartwood or pith of living plants. Most species of subterranean termites cannot digest cellulose directly and depend

on single celled protozoans and bacteria living in their hindguts to help digest the cellulose. Digested cellulose is then shared with the developing larvae, other workers, soldiers and reproductives.

Termites are attracted to certain odors of wood-decaying fungi that make the wood more palatable and easier to penetrate. In some instances, the fungi provide a source of nitrogen in the termite diet.

Moisture is important to subterranean termites as they have very little resistance to dehydration. To survive, termites must maintain contact with the soil (their primary source of moisture) or other above-ground moisture sources, such as defective plumbing, leaky roofs, leaks from air conditioning condensers or poorly maintained gutters.

Subterranean termites also must protect themselves from temperature extremes and attack by ants and other insects. Termites that forage for food above ground protect themselves with shelter tubes or "mud tubes". Worker termites build shelter tubes from particles of soil or wood and bits of debris held together by salivary and fecal secretions. Mud tubes may be thinly constructed or can be large with thick walls to accommodate many termites moving vertically between the soil and their food source.

Subterranean termites also transport moist soil into the structures they infest. The presence of shelter tubes and mud within galleries is used to identify termite damaged wood. Shelter tubes are often used to bridge across masonry or other objects, allowing termites access to a food source (wood) above ground. Inspecting of structures for termite damage may identify these tubes which indicate an ongoing infestation.

Damage

Dead trees and brush provide a natural food source for foraging subterranean termites. When natural vegetation is cleared and houses are built, termites often switch to feeding on wooden structures. Termites enter buildings through wood that is in direct contact with the soil and by building shelter tubes over or through cracks in foundations. Any cellulose material in direct contact with the soil, such as trees, vines or plumbing fixtures, can serve as an avenue of infestation.

Signs of infestation

Active termite infestations can be difficult to detect. To find out if a home is infested, the structure should be checked for evidence of swarmers (including wings or dead termites in windows), mud tubes or damaged wood inside or around a structure

Swarmers: Generally, the first sign of infestation homeowners notice is swarming reproductives on windowsills or near indoor lights. Swarming termites inside the house usually indicate an active infestation in the structure. Termite wings may be found on windowsills or stuck to cobwebs indoors. Though swarmers outdoors are a natural phenomenon, they indicate that termites are present and may be attacking nearby structures.

Mud tubes: Mud shelter tubes on crawl space piers, utility penetrations or on foundation walls and slabs are a sign of termite infestation. Termite shelter tubes can blend in well with the soil or concrete, making them difficult to see. To make inspecting the home for termites easier, prune vegetation away from the house walls. The soil line should be several inches below the top of slabs or foundation walls. An inspector should look for mud tubes carefully along cracks, in corners or where the top of the foundation is close to the ground. A screwdriver is useful to break open suspected termite tubes and detect live termites.

Wood damage often is not found initially, but is positive indication of a current or past termite infestation. Wherever wood comes in contact with the soil there is a high risk for termite entry. Carefully examine any wood that thuds or sounds dull when struck by a screwdriver or hammer. Probing suspected areas with sharp instrument such as a screwdriver or an ice pick will often disclose termite galleries or damage.

Characteristics of damaged wood

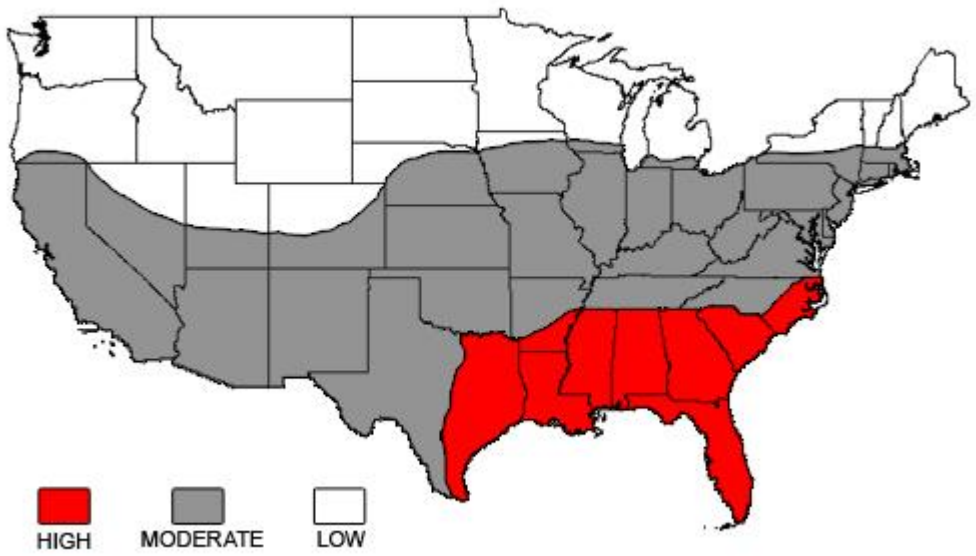
Subterranean termite damage is usually confined to the soft, spring-growth of wood. Termite tunnels and galleries tend to follow the wood grain and are lined with mud or may have a pale, spotted appearance resulting from soft fecal material plastered on tunnel surfaces. Moisture sources may cause wood decay and can encourage subterranean termite infestation. Deterioration caused by wood-destroying fungi can be confused with termite damage.

Distribution

Several species of subterranean termites are found in the United States; they live in every state except Alaska. Two major types of subterranean termites are commonly found in Texas. They are the native subterranean termite and Formosan subterranean termite, and both are serious threats to wooden structures.

Native subterranean termite species in the Genus *Reticulitermes* are found throughout the United States. Because they are so broadly distributed they are considered the most economically important.

The second and increasingly important termite is the introduced Formosan subterranean termite, Coptotermies formosanus. The Formosan termite is easily transported from one infested area to another in landscape timbers, railroad cross-timbers, mulch and wooden pallets. Isolated infestations of Formosan termites have been reported in many areas of the state.



Texas A&M University
Department of Entomology
Center for Urban & Structural Entomology

ADDENDUM: MAINTENANCE ADVICE

Upon Taking Ownership

After taking possession of a new home, there are some maintenance and safety issues that should be addressed immediately. The following checklist should help you undertake these improvements:

- ❑ ***Complete all of the improvements recommended in this inspection report.***
- ❑ Obtain, read, and completely familiarize yourself with the manufacturer's installation instructions, owner's manuals, and care manuals of all materials and systems of which this house is comprised. Do not assume that, because you have seen or owned similar systems or materials, that you are familiar with the proper operation and maintenance of those present in this house. Incomplete and/or improper understanding is imprudent and hazardous.
- ❑ Inquire of the previous owner regarding any alterations which have been made to the property during his/her ownership, or which he/she is aware of, and obtain all pertinent documentation, e.g. building permits, contractor invoices, et al.
- ❑ Change the locks on all exterior entrances, for improved security.
- ❑ Check that all windows and doors are secure. Improve window hardware as necessary. Security rods can be added to sliding windows and doors. Consideration could also be given to a security system.
- ❑ Install interconnected smoke detectors on each level of the home. Ensure that there is a smoke detector in and outside all sleeping areas. Replace batteries on any existing smoke detectors and test them. Make a note to replace batteries again in one year.
- ❑ Create a plan of action in the event of a fire in your home. Ensure that there is an operable window or door in every room of the house. Consult with your local fire department regarding fire safety issues and what to do in the event of fire.
- ❑ Examine driveways and walkways for trip hazards. Undertake repairs where necessary.
- ❑ Examine the interior of the home for trip hazards. Loose or torn carpeting and flooring should be repaired.
- ❑ Undertake improvements to all stairways, decks, porches and landings where there is a risk of falling or stumbling.
- ❑ Review your home inspection report for any items that require immediate improvement or further investigation. Address these areas as required.
- ❑ Install rain caps and vermin screens on all chimney flues, as necessary.
- ❑ Investigate and familiarize yourself with the location of the main shut-offs for the plumbing, heating and electrical systems. If you attended the home inspection, these items would have been pointed out to you. If not, they will be identified in this report.

Regular Maintenance

EVERY WEEK

- ❑ Check that the soil around the perimeter of the house is clinging tightly to the edge of the foundation. If there is any space between the soil and the concrete, the soil is too dry and you should increase the frequency with which you water. The foremost cause of foundation failure in the Metroplex is lack of soil moisture control and maintenance by homeowners. Periods of dry weather occur in all seasons. Inspect this item weekly.

EVERY MONTH

- ❑ Test all smoke alarms, as per NFPA, according to the system manufacturer's instructions.
- ❑ Check that fire extinguishers are fully charged and not out-of date. Re-charge or replace as necessary.
- ❑ Replace heating/cooling air filters.
- ❑ Inspect and clean humidifiers and electronic air cleaners.
- ❑ Test the Temperature and Pressure Relief Valve(s) on the Water Heater(s) for proper operation. Replace if defective.
- ❑ Clean gutters and downspouts. Ensure that downspouts are secure, and that the discharge of the downspouts is appropriate. Remove debris from window wells.
- ❑ Carefully inspect the condition of shower enclosures. Repair or replace deteriorated grout and caulk. Ensure that water is not escaping the enclosure during showering. Check below all plumbing fixtures for evidence of leakage.
- ❑ Repair or replace leaking faucets or showerheads.

- ❑ Secure loose toilets, or repair flush mechanisms that become troublesome.
- ❑ Operate all of the doors in the house to insure that none is sticking or binding at the jambs. Door frames out of square is an indication of excessive foundation movement.

SPRING AND FALL

- ❑ Examine the roof for evidence of damage to roof coverings, flashings and chimneys.
- ❑ Look in the attic (if accessible) to ensure that roof vents are not obstructed. Check for evidence of leakage, condensation or vermin activity. Level out insulation if needed.
- ❑ Trim back tree branches and shrubs to ensure that they are not in contact with the house.
- ❑ Inspect the exterior walls and foundation for evidence of damage, cracking or movement. Watch for bird nests or other vermin or insect activity.
- ❑ Survey the basement and/or crawl space walls for evidence of moisture seepage.
- ❑ Look at overhead wires coming to the house. They should be secure and clear of trees or other obstructions.
- ❑ Ensure that the grade of the land around the house encourages water to flow away from the foundation.
- ❑ Inspect all driveways, walkways, decks, porches, and landscape components for evidence of deterioration, movement or safety hazards.
- ❑ Clean windows and test their operation. Improve caulking and weather-stripping as necessary. Watch for evidence of rot in wood window frames. Paint and repair window sills and frames as necessary.
- ❑ Test all ground fault circuit interrupter (GFCI) and arc fault circuit interrupter (AFCI) devices, as identified in the inspection report. If these devices do not trip or reset properly, they should be replaced immediately.
- ❑ Shut off isolating valves for exterior hose bibs in the fall, if below freezing temperatures are anticipated. Also disconnect and store all water hoses during cold weather.
- ❑ Have a licensed pesticide applicator inspect for evidence of wood-destroying insect activity. Eliminate any wood/soil contact around the perimeter of the home.
- ❑ Test the overhead garage door opener, to ensure that the auto-reverse mechanism is responding properly. Clean and lubricate hinges, rollers and tracks on overhead doors.
- ❑ Replace or clean exhaust hood filters.
- ❑ Clean, inspect and/or service all appliances as per the manufacturer's recommendations.
- ❑ Have the heating, cooling and water heater systems cleaned and serviced.

ANNUALLY

- ❑ Replace smoke detector batteries.
- ❑ Have chimneys professionally inspected and cleaned. Ensure that rain caps and vermin screens are secured.
- ❑ Examine the electrical panels, wiring and electrical components for evidence of overheating. Ensure that all components are secure. Flip the breakers on and off to ensure that they are not sticky.
- ❑ If the house utilizes a well, check and service the pump and holding tank. Have the water quality tested. If the property has a septic system, have the tank inspected (and pumped as needed).
- ❑ Have the home inspected by a licensed wood-destroying insect specialist (Certified Applicator). Preventative treatments may be recommended in some cases.
- ❑ Have the water heater anode rods inspected by a licensed plumber once the unit(s) are out of warranty.
- ❑ Inspect all gas appliance vents as per the manufacturer's instructions.
- ❑ Have all backflow prevention devices professionally inspected as per Texas law.

I=Inspected NI=Not Inspected NP=Not Present D=Deficiency

I	NI	NP	D	Inspection Item

EVERY TWO YEARS

- ❑ Have the water heater anode rods inspected by a licensed plumber while the unit(s) are still under warranty.

EVERY THREE YEARS

- ❑ Remove, inspect and replace, if necessary, water heater temperature and pressure relief valves.