CONTRACT DOCUMENTS

FOR

HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

June 15, 2015

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NOTICE TO BIDDERS

NOTICE TO BIDDERS

This bid is a re-bid of the Hurricane Irene Hazard Mitigation Grant Program for Elevation. Sealed bids may be hand-delivered to the Currituck County Historic Courthouse, 153 Courthouse Road, Suite G103, Currituck, NC 27929 or mailed to Currituck County Emergency Management, 153 Courthouse Road, Suite 122, Currituck, NC 27929 by 4:00 p.m. on June 25, 2015, for the following project:

Hurricane Irene Hazard Mitigation Grant Program for Elevation

The project includes the elevation of two residential structures in Currituck County.

Direct questions to:
Rebecca Christenbury
Currituck County Emergency Management
252-232-2115
Rebecca.Christenbury@CurrituckCountyNC.Gov

This will be an informal contract bid; therefore, bids will not be opened and read aloud at 4:00 p.m. on June 25, 2015. The bids will be evaluated and contract will be awarded in accordance with the statutory requirements. All bidders must meet the licensing requirements under Chapter 87 of the N.C. General Statutes. Small Business Entities, Women Owned Businesses and Minority Owned Businesses are encouraged to submit bids. The county reserves the right to reject any and all bids to accept such bids as appears in its judgement to be in the best interest of the County. The County reserves the right to waive any informality.

INSTRUCTIONS TO BIDDERS

INSTRUCTIONS TO BIDDERS

June 15, 2015

Scope of work shall include all materials and construction for the elevation of the residential structures located at 119 Creek Drive, Moyock, NC 27958 and 148 Simpson Road, Barco, NC 27917.

Notes:

- All bidders must meet any applicable licensing requirements under Chapter 87 of the N.C. General Statutes.
- Contractor is responsible for visiting the sites and understanding the scope of work.
- The Contractor will be given 120 days to complete the elevation of each property. A thirty (30) day lag time will be given between the Notice to Proceed on the first property and the second property for a total of 150 days to complete the elevation of both properties. The Notice to Proceed on the first property will begin on the date that the power meter is pulled at that property.
- An alternate bid shall be provided to place one (1) foot of select backfill under each house foundation. The County will decide if the alternate bid is awarded.
- If the Contractor must remove and dispose of decking at either site, it will be at the contractor's expense.
- If the Contractor must remove part of a sidewalk or driveway to complete the elevation process, the contractor shall include the repair of the sidewalk and/ or driveway as a project expense.
- The Contractor shall not be held responsible for exterior or interior repair resulting from normal damages that may occur during an elevation project (i.e. gaps in hardwood floors, doors that do not shut properly, etc.).
- Contractor is responsible for locating all utilities.
- The Contractor shall provide the following with the bid form:
    - A five percent (5%) bid bond is required (may be an official bank check or bid bond).
    - A comprehensive list of all sub-contractors whom will be employed during this project is required.
    - A copy of NC General Contractor's License
    - A copy of current liability insurance and workers' compensation coverage.
- The Contractor awarded the project will be required to:
    - Execute the Independent Contractor Agreement (sample attached)
    - Execute the E-Verify Statement (attached)
    - Provide a W-9 form
- Contractor must also provide a payment and performance bond equal to the amount of the accepted bid once the contractor has been approved for the project.
- Contractor must provide a signed "General Contractor Lien Waiver and Release" and "Subcontractor's Affidavit and Agreement Regarding Liens" from all subcontractors prior to receiving final payment. These forms are included in the contract documents.

Bids may be hand-delivered to the Currituck County Historic Courthouse, 153 Courthouse Road, Suite G103, Currituck, NC 27929 or mailed to Currituck County Emergency Management, 153 Courthouse Road, Suite 122, Currituck, NC 27929 by 4:00 p.m. on June 25, 2015. ALL BIDS ARE TO BE MARKED "Hurricane Irene Hazard Mitigation Grant Program for Elevation."

Any questions, problems or suggestions, please contact:

Rebecca Christenbury, Project Manager
Rebecca.Christenbury@CurrituckCountyNC.Gov
252-232-2115

BID FORM

BID FORM (page 1 of 2)

Hurricane Irene Hazard Mitigation Grant Program for Elevation

The Bidder agrees to perform all the work as shown on the Contract Documents, and to furnish all labor, tools, equipment, transportation, and all other incidentals necessary for completion of the "**Hurricane Irene Hazard Mitigation Grant Program for Elevation**."

In compliance with the Notice to Bidders, Instructions to Bidders, the Contract Documents which include the Independent Contractor's Agreement and the contract drawings and project specifications titled, "Hurricane Irene Hazard Mitigation Grant Program for Elevation," dated June 15, 2015, and all addenda issued to date, all of which are part of this proposal, the undersigned hereby proposes to furnish and install all materials, labor, and equipment called for by, and in strict accordance with, said Contract Documents, for the complete Scope of Work indicated:

Complete Scope of Work:

119 Creek Drive, Moyock, NC 27929

Demolition and removal of existing foundation cost: $_____

Elevation cost : $_____

Cost of construction of new foundation, retrofitting, steps, decks, and utility disconnect/reconnect: $_____

GRAND TOTAL: (Lump Sum) $_____

Write out total dollar amount in words: _____

Alternate Bid: Place one (1) foot of select back fill under the house foundation.
$_____

148 Simpson Road, Barco, NC 27917

Demolition and removal of existing foundation cost: $_____

Elevation cost : $_____

Cost of construction of new foundation, retrofitting, steps, decks, and utility disconnect/reconnect: $_____

GRAND TOTAL: (Lump Sum) $_____

Write out total dollar amount in words: _____

Alternate Bid: Place one (1) foot of select backfill under the house foundation.
$_____

BID FORM (page 2 of 2)

Hurricane Irene Hazard Mitigation Grant Program for Elevation

- The bid amount shall be shown in both words and figures. In case of discrepancy, the amount in words shall govern.
- The above prices shall include labor, materials, overhead, profit, insurance, bonds, taxes, site repair, clean-up, etc., to cover the finished work of the several kinds called for.
- The Bidder agrees that this bid shall be valid and may not be withdrawn for a period of 60 calendar days after the scheduled closing time for receiving bids.

Bidder has examined copies of all Bidding Documents and the following Addenda (receipt of all which is hereby acknowledged):

Addendum Date:	Addendum Number:
_____	_____
_____	_____
_____	_____
_____	_____

Respectfully submitted this _____ day of _____, 2015.

_____	_____
Name of Firm	Contractors License No.
_____	_____
Signature	Telephone No.
_____	_____
Printed Name and Title	Fax No.

Address

Address

Email Address

INDEPENDENT CONTRACTOR'S AGREEMENT (SAMPLE)

INDEPENDENT CONTRACTOR AGREEMENT (SAMPLE)

THIS AGREEMENT is made the _____ day of _____, 2015 between the **County of Currituck** (hereinafter "County") and _____[Contractor], (hereinafter "Contractor").

RECITALS

County is a body corporate and politic of the State of North Carolina with the duties and powers set forth in Chapter 153A of the North Carolina General Statutes.

Contractor represents that it is duly qualified to perform business, and otherwise to transact business in North Carolina.

IT IS THEREFORE AGREED as follows:

1. Scope of Work. Contractor agrees to perform the following services for County: Elevate two residential structures for the Hurricane Irene Hazard Mitigation Grant Program (HMGP) for Elevation located at the addresses listed below:

119 Creek Drive, Moyock, NC, 27958; and
148 Simpson Road, Barco, NC 27917

as outlined in the Contract Documents "Hurricane Irene Hazard Mitigation Grant Program (HMGP) for Elevation", dated June 15, 2015 (hereinafter "the Services").

2. Compensation. Contractor will be paid for its Services by County as follows:

_____**[here, specify compensation arrangement including payment method and frequency.]**

3. Contractor's Freedom to Contract. Contractor may employ assistants at its sole expense and discretion as may be necessary to fulfill Contractor's obligations under this Agreement. Contractor agrees that anyone to whom it delegates any or all of the Services called

for by this contract will be competent, qualified and capable of performing the work without any supervision, contact or assistance by County's employees. Any such assistant will be employed only by Contractor, and will not be an employee of the County while performing services under this contract.

4. Expenses. County shall not be liable to Contractor for any expenses which Contractor incurs, nor shall Contractor be liable to County for office help or expenses. Contractor shall have no authority to bind County by any promise or representation, unless specifically authorized by the County Manager in writing to do so.

5. Term. This Agreement may be terminated by either party at any time upon 7 days written notice to the other party. Upon the termination of this Agreement, Contractor shall prepare and provide to County a list of all pending unfinished business involving Contractor. Contracted Services under the terms of this agreement shall terminate upon completion of the Services which shall in no event exceed 150 days for completion of the Services.

6. Nature of Relationship. Contractor understands that it is an independent contractor and is not an employee, subcontractor, agent, servant, partner nor joint venturer of County. Contractor understands that it has the right to use its best judgment and efforts to fulfill the terms and obligations of this Agreement. Contractor further understands and acknowledges the following:

a. That it will receive no compensation other than as outlined in this Agreement and is not subject to nor eligible for any benefits which may be offered by County to its employees, such as vacation pay, sick leave, insurance coverage or retirement plan participation.

b. Its Services provided in accordance with this Agreement are an independent calling or occupation.

c. Contractor is expected to use its own skill, judgment and expertise to fulfill the obligations of this Agreement, and is not supervised, directed or controlled by County as to the means or methods it should employ.

d. Contract is not required to perform tasks in any particular order or sequence.

e. Contractor needs no training from County as to how to fulfill its duties and responsibilities.

f. Contractor may determine its own daily schedule and those of its own employees or servants without prior approval of County.

g. Contractor is not required to devote any particular percentage of its time or resources to perform the Services required hereunder.

h. Contractor furnishes its own equipment and supplies and is expected to maintain its business office somewhere other than at the County's office.

i. To the extent Contractor must procure or maintain any insurance, license, certification or trade membership, it must do so at its own cost.

j. This Agreement shall not prevent Contractor from performing other services for other parties. Contractor may engage in other business endeavors or projects of any kind or nature.

7. Taxes. Contractor assumes exclusive liability for payment of all federal, state or other governmental division taxes and contributions for social security, Medicare/Medicaid, etc., now or hereafter required, incurred or assessed by law. Contractors providing equipment, materials, parts or supplies shall provide a breakdown of labor, materials, parts or supplies and

sales tax by County or a sales tax report approved by the County Finance Department with the invoice. Contractor agrees to indemnify and hold harmless the County from any claims for taxes as described in this Section.

8. Insurance. Contractor understands and agrees that neither it nor its employees are subject to workers' compensation or general liability coverage maintained by the County for its employees. Contractor agrees to procure and maintain workers' compensation insurance coverage for the benefit of contractor's employees or subcontractors and to procure general liability insurance listing the County as an additional insured at all times relevant to this Agreement. Contractor shall provide to County upon request a valid and current certificate of workers' compensation and general liability insurance. In the event Contractor shall fail at any time to have in force and effect insurance as required by this Section, Contractor agrees to indemnify and hold harmless County for (1) any premium paid by County to maintain insurance coverage applicable to Contractor and/or its employees or subcontractors; (2) any worker's compensation benefits paid by County as a result of Contractor's failure to comply with this Section; and (3) any amounts paid by County for general liability claims as a result of Contractor's failure to comply with this Section.

9. Indemnity. Contractor shall and does hereby agree to indemnify, save harmless and defend County from the payment of any sum or sums of money to any person whomsoever on account of claims or suits growing out of injuries to persons, including death, or damage to property caused by Contractor, its employees, agents or subcontractors in any way attributable to the performance of the Services, including (but without limiting the generality of the foregoing), all claims for service, labor performed, materials furnished, provisions and supplies, injuries to person or damage to property, liens, garnishments, attachments, claims, suits, costs, attorneys'

fees, costs of investigation and of defense. It is the intention of this paragraph to hold the Contractor responsible for the payment of any and all claims, suits, or liens, of any nature and character, in any way attributable to or asserted against County or against Contractor and County, or which the County may be required to pay. In the event the liability of the Contractor shall arise by reason of the sole negligence of County and/or the sole negligence of County's employees, agents or servants, then and only then, Contractor shall not be liable under the provisions of this paragraph.

10. Arbitration. Any controversy or claim arising out of, or relating to this Agreement, or its breach, shall be settled by arbitration in Currituck County, North Carolina in accordance with the provisions of the North Carolina Revised Uniform Arbitration Act, (the "Act"). The parties to this Agreement understand that this arbitration provision shall expressly apply to this Agreement in accordance with the Act. Judgment upon the award rendered may be entered and enforced in any court of competent jurisdiction.

11. Notices. Any notice, request or report given by one party to the other shall be in writing, deposited in the United States Mail (postage prepaid) or hand delivered and properly addressed as follows:

If the notice is to County:
Rebecca Christenbury
153 Courthouse Road, Suite 122
Currituck, NC 27929

If the notice is to Contractor:
_____
_____
_____

(Or such other person or address as Contractor shall have designated by due notice to County).

12. Non-Waiver. Nothing set forth herein is intended nor shall be construed as a waiver of any immunity available to County, its governing board or employees.

13. Headings. The headings, subheadings and captions in this Agreement and in any exhibit hereto are for reference purposes only and shall not affect the meaning or interpretation of this Agreement.

14. Amendments. This Agreement may not be amended except by written instrument duly executed by or on behalf of all of the parties hereto.

15. Complete Agreement. This Agreement constitutes the entire Agreement between County and Contractor pertaining to its subject matter and supersedes all prior and contemporaneous negotiations, agreements and understandings of either or both parties in connection therewith.

16. Governing Law. The validity, interpretation and performance of this Agreement and of its provisions shall be governed by the laws of the State of North Carolina.

The undersigned have read the entire Agreement and accept the terms and conditions as shown by their signatures below.

ATTEST:	COUNTY OF CURRITUCK
By:_____ Clerk to the Board of Commissioners	By: _____(SEAL)
	CUT AND PASTE THE APPLICABLE SIGNATURE LINE FROM LAST PAGE IN THIS SPACE

Independent Contractor carries and will provide County with a Certificate of Insurance for:

Workers' Compensation	Yes	No
General Liability	Yes	No

This instrument has been preaudited in the manner
required by the Local Government Budget and Fiscal Control Act.

_____

Sandra Hill
Finance Officer

CUT AND PASTE APPROPRIATE SIGNATURE LINES INTO THE CONTRACT – DO NOT ATTACH THIS PAGE TO THE CONTRACT

If Sole Proprietor or Independent Contractor – use this signature line

CONTRACTOR

By: _____(SEAL)
John Doe

If Corporation – use this signature line
You can verify the corporation name by going to http://www.secretary.state.nc.us/corporations/ and doing a corporation name search

Attest:

By:_____
Mary Doe, Secretary
or
Vice President/Secretary/Treasurer

(Affix Corporate Seal)

NAME OF CORPORATION

By:_____(SEAL)
John Doe, President

If a LLC or a PLLC(Limited Liability Company) – use this signature line
You can verify the company name by using the same Secretary of State website as above

NAME OF LLC

By:_____(SEAL)

E-VERIFY FORM

County of Currituck E-Verify Affidavit

STATE OF NORTH CAROLINA

AFFIDAVIT:

COUNTY OF CURRITUCK E-VERIFY COMPLIANCE

****

I, _____(the individual attesting below), being duly authorized by and on behalf of _____ (the entity bidding on project hereinafter "Employer") after first being duly sworn hereby swears or affirms as follows:

1. Employer understands that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-25(5).

2. Employer understands that Employers Must Use E-Verify. Each employer, after hiring an employee to work in the United States, shall verify the work authorization of the employee through E-Verify in accordance with NCGS§64-26(a).

3. Employer is a person, business entity, or other organization that transacts business in this State and that employs 25 or more employees in this State. (mark Yes or No)

a. YES _____, or

b. NO _____

4. Employer's subcontractors comply with E-Verify, and if Employer is the winning bidder on this project, Employer will ensure compliance by providing the County with an E-Verify Compliance Affidavit for any subcontractors current or subsequently hired by Employer.

This ____ day of _____, 20_____.

Signature of Affiant: _____

Print or Type Name: _____
Contractor: _____
State of _____ County of _____
Signed and sworn to (or affirmed) before me, this the _____ day of _____, 20__.

_____
Notary Public
My Commission Expires:

_____(Affix Official/Notarial Seal)

GENERAL CONTRACTOR LIEN WAIVER AND RELEASE

GENERAL CONTRACTOR LIEN WAIVER AND RELEASE

STATE OF NORTH CAROLINA

COUNTY OF CURRITUCK

This agreement, made and entered into this ____ day of _____, 20___, by the undersigned:

W I T N E S S E T H:

That whereas the undersigned has done certain work or furnished certain materials as general contractor in connection with work at on property located at _____(the "Property"):

And whereas _____, as general contractor has been paid in full for all labor performed or materials furnished in the work on the Property or satisfactory arrangements have been made for payment.

Now, therefore, in consideration of the sum of one dollar the undersigned for himself, themselves or itself does hereby release and forever waive and discharge any and all demands, claims, liens or rights of lien upon the premises in their favor as laborers, mechanics, materialmen, contractors or subcontractors for materials furnished or labor performed in the work on the Property.

In Testimony Whereof, _____ as general contractor, for himself, themselves or itself, has executed this lien waiver and release under seal the day and year first above written.

_____(SEAL)

SWORN TO AND SUBSCRIBED before me this _____ day of _____, 20 ___.

_____ My Commission Expires: _____
Notary Public

_____
Printed Name

SUBCONTRACTOR'S AFFIDAVIT AND AGREEMENT REGARDING LIENS

STATE OF NORTH CAROLINA

COUNTY OF _____

SUBCONTRACTOR'S AFFIDAVIT AND AGREEMENT REGARDING LIENS

TO: _____ (the "General Contractor").

RE: Property located at _____.(the "Property")

BRIEF DESCRIPTION OF LABOR OR SERVICES PERFORMED OR MATERIALS SUPPLIED:

_____

On _____, 20___, before me personally appeared _____, Subcontractor, to me personally known, who, being duly sworn on their oaths, did say as follows:

The undersigned is a subcontractor or other party furnishing labor, services or materials, as indicated above, in the construction or repair of Improvements upon the Property briefly described above.

In consideration of valuable consideration received by the undersigned and other benefits accruing to the undersigned, in order to procure the conveyance of said Property and/or the making of one or more loans on said Property, the undersigned does hereby waive any Chapter 44A Lien on the Property. This waiver is absolute and is in favor of the General Contractor, the Owner of said Property, its insureds, lenders, and their successors and assigns. The undersigned warrants that the undersigned has not assigned its Chapter 44A Liens and the undersigned has the right to execute this Waiver. The undersigned waives and has not assigned any other rights the undersigned has in the Property. The undersigned warrants that the undersigned, and all parties contracted with or employed by the undersigned, have been paid in full, except as follows:

_____

_____

For purposes of this instrument:

"Chapter 44A Lien" means any lien or right to a lien or alleged right to a lien for the furnishing of labor, services or materials pursuant to Article 2 of Chapter 44A of the North Carolina General Statutes or any replacement or modification thereof.

"Improvement" means improvement as defined in the statutes referred to in the above definition of "Chapter 44A Lien."

It is understood and agreed that the undersigned's signature hereto is for all services rendered, work done and material furnished heretofore and hereafter by the undersigned, and are not understood to be only for a particular item.

SUBCONTRACTOR:

Name of Company: _____

By: _____(SEAL)

Name and Title of person signing: _____

SWORN TO AND SUBSCRIBED before me this _____ day of _____, 20 ___.

_____ My Commission Expires: _____
Notary Public

_____
Printed Name

GENERAL SHEETS

GENERAL NOTES

GENERAL

THESE NOTES ARE GENERAL AND APPLY TO THE ENTIRE PROJECT EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE.

STRUCTURAL DIMENSIONS CONTROLLED BY OR RELATED TO MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE COORDINATED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. BOLT SIZES, TYPES, AND PATTERNS SHALL BE VERIFIED WITH THE MANUFACTURER. ALL BOLT PATTERNS SHALL BE TEMPLATED TO INSURE ACCURACY OF PLACEMENT.

MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT DRAWINGS, SHALL BE PROVIDED FOR PRIOR TO PLACING CONCRETE.

STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL, HYDROSTATIC, AND BACKFILL LOADS ON THE COMPLETED STRUCTURES. THE STRUCTURES HAVE NOT BEEN DESIGNED TO RESIST THESE LOADS WHILE ONLY PARTIALLY CONSTRUCTED. DURING CONSTRUCTION, THE STRUCTURES SHALL BE PROTECTED FROM ALL CONSTRUCTION LOADS BY BRACING AND BALANCING UNTIL ALL STRUCTURAL ELEMENTS ARE IN PLACE, AND ALL CONCRETE HAS REACHED THE SPECIFIED 28 DAY COMPRESSIVE STRENGTH. OVERLOADING OF ANY STRUCTURAL ELEMENT IS PROHIBITED.

UNLESS OTHERWISE SHOWN, ON ALL STRUCTURAL DRAWINGS THE FINISHED GRADE AROUND STRUCTURES IS SHOWN THUS [redacted] INDICATING EITHER GROUND SURFACE, TOP OF CONCRETE SLAB, OR AC PAVEMENT. FOR DETAILS OF FINISH SURFACES SEE CIVIL AND ARCHITECTURAL DRAWINGS.

STRUCTURAL STEEL

STEEL CONSTRUCTION SHALL CONFORM TO THE SPECIFICATIONS AND STANDARDS AS CONTAINED IN THE LATEST EDITION OF THE LRFD MANUAL OF STEEL CONSTRUCTION.

STRUCTURAL WIDE FLANGE SHAPES SHALL BE STEEL MEETING ASTM A-992 SPECIFICATIONS.

OTHER SHAPES, BARS, PLATES AND SHEETS SHALL BE OF STEEL MEETING ASTM A-36 SPECIFICATIONS.

PIPE, PIPE COLUMNS, AND BOLLARDS SHALL BE OF STEEL MEETING ASTM A-53, TYPE E OR S, GRADE B STANDARD WEIGHT, UNO

HSS SHALL BE OF STEEL MEETING ASTM A-500 GRADE B.

STEEL JOISTS, BEAMS, AND GIRDERS SHALL NOT BE RELOCATED WITHOUT APPROVAL BY THE ENGINEER.

ALL WELDING SHALL BE BY THE SHIELDED ARC METHOD AND SHALL CONFORM TO AWS CODE FOR ARC AND GAS WELDING IN BUILDING CONSTRUCTION. QUALIFICATIONS OF WELDERS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS FOR STANDARD QUALIFICATION PROCEDURE OF THE AWS.

CONCRETE (EXCEPT PRECAST CONCRETE)

UNLESS OTHERWISE NOTED OR SPECIFIED, ALL STRUCTURAL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI IN 28 DAYS.

REINFORCEMENT STEEL SHALL BE DEFORMED BARS CONFORMING IN QUALITY TO THE REQUIREMENTS OF ASTM A-615, "SPECIFICATIONS FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT", GRADE 60

ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS, UNLESS OTHERWISE INDICATED, SHALL BE IN ACCORDANCE WITH ACI-315, "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", LATEST EDITION.

TOLERANCES IN PLACING REINFORCEMENT SHALL BE:

Ê 3/8 INCH FOR MEMBERS WITH D </= 8 INCHES
Ê 1/2 INCH FOR MEMBERS WITH D > 8 INCHES

ALL CONSTRUCTION JOINTS, SHALL BE ROUGH AND THOROUGHLY CLEANED FOR BOND.

LOCATION OF ALL CONSTRUCTION JOINTS SHALL BE AS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER.

DOWELS, PIPE AND OTHER INSTALLED MATERIALS AND ACCESSORIES SHALL BE HELD SECURELY IN POSITION.

VERTICAL REINFORCEMENT FOR CONCRETE OR MASONRY SHALL BE SPLICED WITH DOWEL BARS OF THE SAME SIZE AND SPACING FROM THE FOUNDATION USING A STANDARD SPLICE LENGTH UNLESS INDICATED OTHERWISE.

ALL GROUT SHALL BE NON-SHRINK GROUT, UNLESS INDICATED OTHERWISE.

DOWELS SHALL BE WIRED OR OTHERWISE HELD IN POSITION. THEY SHALL NOT BE SHOVED INTO FRESHLY PLACED CONCRETE.

UNLESS OTHERWISE INDICATED ON THE DRAWINGS, LAPS OF REINFORCEMENT SHALL BE PER THE MOST RECENT EDITION OF ACI 318

ALL ITEMS EMBEDDED IN CONCRETE SHALL BE SPACED ON CENTER AT LEAST 4 TIMES THEIR OUTSIDE DIMENSION. THE OUTSIDE DIMENSION SHALL NOT EXCEED ONE THIRD OF THE MEMBER THICKNESS

ELECTRICAL CONDUIT EMBEDDED IN CONCRETE SHALL NOT BE SPACED CLOSER THAN 3 OUTSIDE DIAMETERS ON CENTER.

UNLESS OTHERWISE SHOWN ON THE DRAWINGS CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOWS:

FOR CONCRETE PLACED AGAINST EARTH SEE CONSTRUCTION JOINT DETAILS FOR THIN SLABS-ON-GRADE. BOTTOM COVER MAY BE LESS THAN 3" IF SO INDICATED	3"
FOR SURFACES IN CONTACT WITH WATER OR WEATHER AND FORMED SURFACES IN CONTACT WITH EARTH	2"
FOR CONCRETE NOT EXPOSED TO WEATHER, OR IN CONTACT WITH WATER OR EARTH	1½"

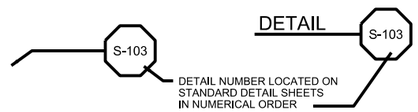
STRUCTURAL STANDARD DETAILS

DETAILS ON GS SHEETS ARE PART OF KHE'S STRUCTURAL STANDARD DETAILS.

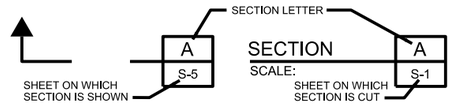
THESE DETAILS ARE TO BE USED WHEN REFERRED TO OR WHEN NO OTHER MORE RESTRICTIVE OR DIFFERENT DETAILS ARE INDICATED ON THE DRAWINGS.

DETAILS NOT PERTAINING TO THE PROJECT ARE MARKED THUS [redacted]

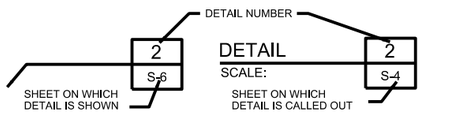
STRUCTURAL STANDARD DETAIL CALLOUT



SECTION CALLOUT



DETAIL CALLOUT



ALL FOOTINGS SHALL BEAR ON UNDISTURBED OR ENGINEERED FILL CAPABLE OF SUPPORTING THE IMPOSED LOAD PER R403.1

CONTRACTOR SHALL VERIFY ALL DETAILS AND DIMENSIONS PRIOR TO ANY CONSTRUCTION. ANY DISCREPANCY SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER ASAP.

ALL CONCRETE FOOTINGS SHALL BE 3500 PSI @ 28 DAYS.

FOUNDATION DESIGN IS BASED ON A SOIL BEARING CAPACITY OF 1500 PSF. CONTACTOR SHALL NOTIFY ENGINEER IF THERE ARE ANY SOIL BEARING CAPACITY ISSUES.

ALL FLOOR JOISTS ON DECK AND CANTILEVER SHALL BE 2X8@16" OC UNO.

CONTRACTOR SHALL PROVIDE DOUBLE JOISTS BELOW ALL PARTITIONS RUNNING PARALLEL TO JOIST SPAN. PROVIDE ONE ROW OF SOLID CROSS BRIDGING AT MID JOIST SPANS OVER 8'-0" IN LENGTH.

ALL FASTENERS SHALL BE HOT DIPPED GALVANIZED UNO.

ALL EXTERIOR WOOD SHALL BE PRESSURE TREATED UNO.

MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS (PSF):

ROOF:	20
EXTERIOR BALCONIES:	60
DECKS:	40
ATTICS WITHOUT STORAGE:	10
ATTICS WITH STORAGE:	20
ROOM OTHER THAN SLEEPING ROOMS:	40
SLEEPING ROOMS:	30
STAIRS:	40
GUARDRAILS AND HANDRAILS:	200 LB PT. LOAD AT TOP

HOUSE LIFTING

1. ENGINEER'S SEAL APPLIES ONLY TO FOUNDATION STRUCTURAL SYSTEM AND COMPONENTS UNLESS OTHERWISE SPECIFIED. ENGINEER'S SEAL DOES NOT CERTIFY DIMENSIONAL ACCURACY.
2. ALL CONSTRUCTION TO COMFORM TO THE LATEST REQUIREMENTS OF THE 2012 NC BUILDING CODE AND NC STATE RESIDENTIAL CODE FOR 1 & 2 FAMILY DWELLING WITH SPECIAL CONSIDERATION GIVEN TO CHAPTER 44 REGARDING HIGH WIND ZONES PLUS ALL LOCAL CODES AND REGULATIONS.
3. ALL FRAMING TO BE SPF #2 (OR EQUAL) UNLESS OTHERWISE SPECIFIED.
4. PRESUMPTIVE SOIL BEARING CAPACITY ASSUMED TO BE 2,000 POUNDS PER SQUARE FOOT. CONTRACTOR SHALL NOTIFY ENGINEER IN THE EVENT THAT SOIL CONDITIONS DIFFER.
5. ALL UTILITIES (BURIED AND EXPOSED) INCLUDING HVAC, ELECTRICAL, PLUMBING, ETC, AND ASSOCIATED CONDUITS, PIPES, ETC, ARE NOT SHOWN ON THE DRAWINGS. CONTRACTOR SHALL LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL DISCONNECT ALL UTILITIES PRIOR TO CONSTRUCTION AND RECONNECT PER ALL APPLICABLE CODES AFTER STRUCTURE HAS BEEN RAISED TO ITS FINAL ELEVATION.
6. THE AREA OF THE HOUSE WITH A CRAWL SPACE SHALL BE BE RAISED AT AN ELEVATION IMMEDIATELY BELOW THE FLOOR JOISTS AND FLOOR GIRDERS. THE FLOOR GIRDERS SHALL BE SUPPORTED AT A SUFFICIENT SPACING TO AVOID ANY DAMAGE TO THE HOUSE DURING THE LIFTING PROCESS. THE PERIMETER BRICK CURTAIN WALL SURROUNDING THE CRAWL SPACE AND BELOW THE FLOOR JOISTS AND GIRDERS SHALL BE DEMOLISHED, REMOVED AND REPLACED WITH NEW CMU BLOCK. THE BRICK ABOVE THIS FLOOR JOIST AND FLOOR GIRDER ELEVATION SHALL BE SUPPORTED AND SEPARATED FROM THE LOWER PORTION. AFTER THE HOUSE HAS BEEN RAISED TO ITS FINAL ELEVATION THE VERTICAL GAP BETWEEN THE UPPER BRICK EXTERIOR CURTAIN WALL AND THE GROUND SHALL BE FILLED WITH 8X16X8 CMU BLOCK FOUNDED ON A CONCRETE FOOTING. WHILE THE EXISTING FOOTING MAY BE SUFFICIENT FOR THE NEW CMU BLOCK WALL (ENGINEER TO INSPECT) THE CONTRACTOR SHALL ASSUME A COMPLETELY NEW PERIMETER SPREAD FOOTING IS REQUIRED UNDER ALL THE NEW CMU BLOCK AS SHOWN ON THE CONTACT DRAWINGS. CONTACTOR SHALL ASSUME ALL INTERIOR PIER FOUNDATIONS ARE ADEQUATE AND ONLY REQUIRE ELEVATION AS SHOWN ON THE CONTRACT DRAWINGS.
7. THE GARAGES HAVE NO CRAWL SPACES. THE GARAGE WALLS ARE SUPPORTED BY A SLAB ON GRADE. THE BASE OF THESE WALLS SHALL BE SUPPORTED AND DETACHED FROM THE SLAB ON GRADE AND RAISED WITH THE MAIN PORTION OF THE HOUSE SO AS TO KEEP THE MAIN ROOF AND WALLS INTACT BEFORE, DURING AND AFTER THE LIFTING PROCESS. NEW CMU BLOCK SHALL BE PLACED UNDER THE RAISED WOOD GARAGE WALLS AND ON TOP OF THE GARAGE SLAB ON GRADE.
8. THESE DOCUMENTS DO NOT INSTRUCT THE LIFTING CONTRACTOR AS TO HOW OR WHERE (SUPPORT LOCATIONS) THE HOUSE SHALL BE RAISED. THE LIFT CONTRACTOR SHALL COME TO THE SITE AND EXAMINE THE HOUSE TO DETERMINE THE MOST APPROPRIATE LIFTING STRATEGY.
9. ALL LIFTING PROCEDURES AND METHODS SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL CODES INCLUDING OSHAL AND FEMA.
10. EVERY HOUSE SHALL CONTAIN NEW FLOOD VENTS IN THE FOUNDATION WALLS. THERE SHALL BE A MINIMUM OF TWO FLOOD VENTS ON EACH SIDE OF EVERY HOUSE. EACH FLOOD VENT SHALL BE A MINIMUM OF 8" TALL X 16" WIDE. THE BASE OF EVERY FLOOD VENT SHALL BE NO MORE THAN 1' ABOVE FINISHED GRADE. THERE SHALL BE A MINIMUM OF 1 SQ-IN OF FLOOD VENTS PER SQ-FT OF ENCLOSED HOUSE SPACE.
11. CONTRACTOR SHALL IDENTIFY ALL FIREPLACES AND ANY OTHER STRUCTURES WHICH MAY BE SEPARATELY SUPPORTED FROM THE HOUSE FOUNDATION. CARE SHALL BE TAKEN TO LIFT THE FIREPLACE AT 148 SIMPSON WITH THE HOUSE. THE FIREPLACE AT 119 CREEK WILL NOT BE LIFTED WITH THE HOUSE.
12. REFER TO THE FEASIBILITY STUDY FOR EACH HOUSE FOR ADDITIONAL INFORMATION.
13. LANDSCAPING REPAIRS AND/OR IMPROVEMENTS TO LANDSCAPING, SIDEWALKS AND DRIVEWAYS ARE NOT HMA ELIGIBLE EXPENSES. ANY DAMAGE INCURRED AS A RESULT OF THE ELEVATION PROCESS TO LANDSCAPING, SIDEWALKS OR DRIVEWAYS SHALL BE THE RESPONSIBILITY OF THE HOMEOWNER AND/OR THE CONTRACTOR.
14. THE PARTICIPANT AGREES THAT IF THE PARTICIPANT IS CONCERNED ABOUT ANY DAMAGE TO THE FOLLOWING ITEMS, THAT THE PARTICIPANT MAY REMOVE THEM PRIOR TO THE START OF CONSTRUCTION:
A. SHRUBBERY, PLANTS, TREES, FLOWERS OR ANY FLORA PLANTED BY THE PARTICIPANT OR GROWING WILD. LAWNS WILL BE DRIVEN ON BY MACHINERY AND TRUCKS. WHEN THE STRUCTURE HAS BEEN RESET ON NEW FOUNDATION, AREA(S) DAMAGED AROUND THE STRUCTURE WILL BE GRADED TO PREVENT WATER FROM PONDING AROUND OR NEAR THE NEW FOUNDATION. THERE WILL ALSO BE FILL ADDED UNDER THE NEW FOUNDATION TO PREVENT WATER PONDING AND TO PROMOTE POSITIVE DRAINING. NO RE-SEEDING OR LAWN MAINTENANCE WILL BE PERFORMED UNDER THIS PROJECT.
B. LAWN ITEMS AND DECORATIONS.
C. FENCING: ANY FENCING THAT IS IN THE WAY OF CONSTRUCTION WILL BE TAKEN DOWN, BUT NOT REINSTALLED BY THE CONTRACTOR, AND STORED ON A PORTION OF THE PROPERTY THAT WILL NOT BE INVOLVED IN THE CONSTRUCTION AREA. IT IS RECOMMENDED THAT THE PARTICIPANT REMOVE ANY FENCING PRIOR TO THE PROJECT BEGINNING UNLESS OTHERWISE DISCUSSED BY THE PROJECT MANAGER. IF THE PARTICIPANT IS UNABLE TO DO SO, THE CONTRACTOR WILL REMOVE THE FENCING. ANY DAMAGES ARE THE RESPONSIBILITY OF THE PARTICIPANT.
15. THE PARTICIPANT AGREES THAT WHEN THE STRUCTURE IS VACATED FOR ELEVATION THAT THE PARTICIPANT WILL NOTIFY THE PHONE COMPANY AND CABLE COMPANY TO DISCONNECT SERVICES TO THE STRUCTURE. THESE TWO (2) UTILITIES ARE THE RESPONSIBILITY OF THE PARTICIPANT. ALL OTHER UTILITIES INCLUDING ELECTRICAL, WATER, GAS, ETC., WILL BE DISCONNECTED AT THE DIRECTION OF THE CONTRACTOR OF THIS PROJECT AND WILL BE RECONNECTED PRIOR TO THE PARTICIPANT MOVING BACK INTO THE STRUCTURE.

MASONRY

CONCRETE BLOCK MASONRY SHALL BE NORMAL WEIGHT, HOLLOW UNITS CONFORMING TO ASTM C 90. SIZE OF UNITS, COLOR AND TEXTURE SHALL BE PER THE SPECIFICATIONS.

GROUT ALL CELLS OF CONCRETE BLOCK MASONRY UNLESS OTHERWISE NOTED ON DRAWINGS.

UNLESS OTHERWISE INDICATED, LAPS OF REINFORCEMENT IN CMU SHALL BE AS SHOWN ON DETAIL S-415.

MORTAR SHALL BE IN ACCORDANCE WITH ASTM C 270, TYPE S, AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 1800 PSI.

GROUT SHALL BE IN ACCORDANCE WITH ASTM C 476 , AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI.

THE COMBINED MASONRY ASSEMBLAGE COMPRESSIVE STRENGTH AT 28 DAYS SHALL BE A MINIMUM OF f'm = 1500 PSI.

REINFORCEMENT SHALL BE TIED OR OTHERWISE SECURED IN POSITION PRIOR TO GROUTING.

ALL HORIZONTAL AND VERTICAL REINFORCEMENT SHALL BE CONTINUOUS OVER THE FULL EXTENT OF THE WALL WITH STANDARD SPLICES LOCATED AS NEEDED. WHERE IT IS NECESSARY TO INTERRUPT AN INDIVIDUAL BAR, AN EQUAL SIZED BAR SHALL BE LOCATED AS CLOSE AS POSSIBLE AND SHALL EXTEND A MINIMUM OF ONE SPLICE LENGTH BEYOND EACH SIDE OF THE INTERRUPTION.

SPECIAL INSPECTION REQUIRED.

WOOD FRAMING

FOR FRAMING AROUND OPENINGS IN WOOD ROOF SEE S-606 AND S-607

NAILING AND FASTENERS SHALL BE PER IBC TABLE 2304.9.1 UNLESS INDICATED OTHERWISE

ALL EDGES OF PLYWOOD SHALL BE BLOCKED

CODE INFO

IRC 2009 W/ 2012 NORTH CAROLINA RESIDENTIAL CODE

ANY CODE INFORMATION OR QUESTIONS SHALL BE RESOLVED WITH THE LOCAL MUNICIPALITY. ANY LOAD CALCULATIONS OR DEVIATIONS FROM THESE DRAWINGS SHALL HAVE PRIOR APPROVAL OF THE ENGINEER AND LOCAL MUNICIPALITY.

LUMBER GRADE:
PER 502.1 AND 602.1 ALL LOAD BEARING DIMENSION LUMBER FOR STUDS, PLATES, HEADERS, JOISTS, BEAMS AND GIRDERS SHALL BE IDENTIFIED BY A GRADE MARK OF A LUMBER GRADING OR INSPECTION AGENCY THAT HAS BEEN APPROVED BY AN ACCREDITATION BODY THAT COMPLIES WITH DOC PS 20.

WIND LOAD:
120 MPH PER F301.2 (4)

EXPOSURE:
CATEGORY C PER IRC SECT. R301.2.1.4

STUD SIZE AND SPACING:
R602.3.1 PER TABLE 602.3(5) ALL STUDS SHALL BE 2X4 NOMINAL @ 16" OC MAX UP TO 10'-0" IN LENGTH. ALL WALLS OVER 10'-0" IN LENGTH/HEIGHT SHALL BE 2X6 NOMINAL STUDS @ 16" OC.

PILING DEPTH:
ALL PILINGS SHALL BE EMBEDED A MINIMUM OF 8' INTO UNDISTURBED SOIL.

BOLTING/STRAPPING:
BOLTING AND STRAPPING OF WOOD PILINGS SHALL COMPLY WITH R4603.6.

EXTERIOR WOOD/PLASTIC COMPOSITE DECK BOARDS:
R502.1.7 EXTERIOR WOOD/COMPOSITE DECK BOARDS SHALL COMPLY W/ SECTION R317.4 AND SHALL BE INSTALLED PER R502.2.2.4.

DECK ATTACHMENT:
DECK ATTACHMENTS SHALL CONFORM TO AM104.1 & TABLE 1040.1.

DECK BRACING:
ALL HAUNCH BRACES SHALL CONFORM TO AM109.1.1/AM109.1.2 & AM109.1.3
X-BRACING SHALL CONFORM W/ AM109.1.4.

JOIST SPANS: SEE AM106.1
DECKS PER SECTIONS R502.3.1(2)&R502.3.3(1) 2009 IRC BASED ON A DEAD LOAD OF 10PSF AND LIVE LOAD OF 40PSF.

GIRDER SPANS: SEE AM105.1 & R502.5
FOR ALLOWABLE GIRDER SPANS FOR TREATED WOOD GIRDERS SHALL NOT EXCEED THE MAX SPAN PER IRC R502.5 (1) AND IRC R502.5 (2).

BEARING:
THE ENDS OF EACH JOIST, BEAM OR GIRDER SHALL HAVE NOT LESS THAN 1.5 INCHES OF BEARING ON WOOD OR METAL AND NOT LESS THAN 3 INCHES ON MASONRY OR CONCRETE EXCEPT WHERE SUPPORTED BY A 1X4 RIBBON STRIP AND NAILED TO THE ADJACENT STUD OR BY THE USE OF AN APPROVED JOIST HANGER PER 502.6.

FASTENING/NAILING: REFER TO R502.9 & R4605.5a
FLOOR FRAMING SHALL BE NAILED IN ACCORDANCE W/ R602.3(1)

STAIR FLIGHT: AS PER 1009.6
A FLIGHT OF STAIRS SHALL NOT HAVE A VERTICAL RISE OF GREATER THAN 12'-0" BETWEEN FLOOR LEVELS OR LANDINGS.

STAIRWAY ILLUMINATION: AS PER R311.7.8
ALL STAIRWAYS SHALL BE PROVIDED ILLUMINATION IN ACCORDANCE W/ SECTION R303.6.

HANDRAILS/GUARDRAILS: AS PER R 312.2
REQUIRED GUADS AT ALL OPEN-SIDED WALKING SURFACES INCLUDING STAIRS, BALCONIES OR LANDINGS SHALL BE A MINIMUM HEIGHT OF 36" VERTICALLY ABOVE ADJACENT WALKING SURFACE, ADJACENT FIXED SEATING OR LINE CONNECTING THE LEADING EDGE OF TREADS.

6-12-2015

REV	DATE	BY	DESCRIPTION

SCALE: NTS

WARNING: 0 ½ 1 — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

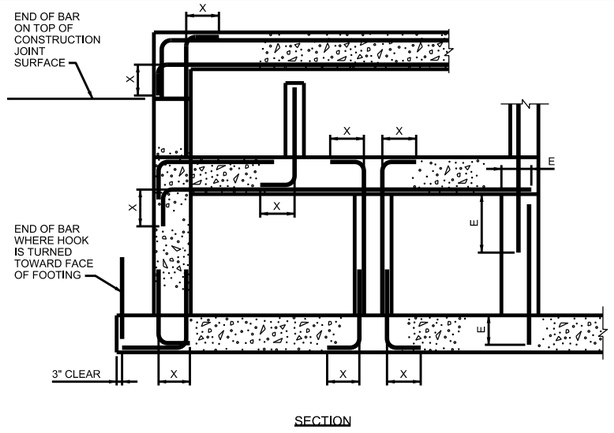
DESIGNED B. CROOK
DRAWN B. CROOK
CHECKED B. CROOK

KITTY HAWK ENGINEERING, PLLC
2036 CREEK RD
KITTY HAWK, NC 27949
252-655-1056

HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

GENERAL NOTES

SHEET
GS-1
1010961



SECTION

LENGTH (*)			
BAR SIZE	HOOK X	LAP	EMBEDMENT E
#3	6"	16" (21")	12" (16")
#4	8"	16" (21")	12" (16")
#5	10"	20" (26")	15" (20")
#6	12"	28" (37")	22" (28")
#7	14"	48" (62")	37" (48")
#8	16"	62" (81")	48" (62")
#9	19"	79" (102")	61" (79")
#10	22"	100" (130")	77" (100")
#11	24"	123" (160")	95" (123")

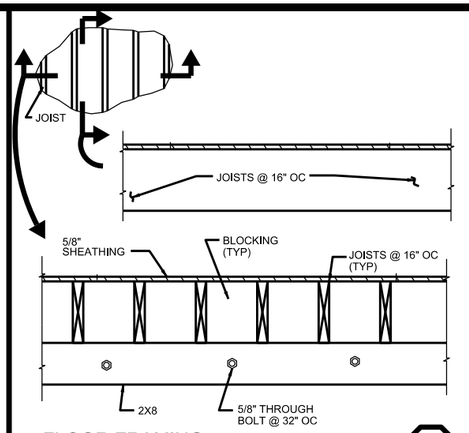
* USE LENGTH IN PARENTHESIS FOR WALL HORIZONTAL REBARS AND SLAB BARS WITH 12" OR MORE OF FRESH CONCRETE UNDERNEATH

NOTES:

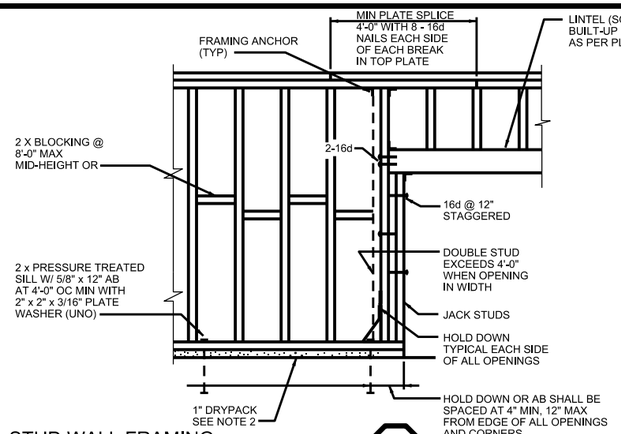
1. USE LAP LENGTHS AS DETERMINED FROM THESE TABLES UNLESS SHOWN OTHERWISE.
2. THE TABLES SHOWN ARE FOR f'c=4000psi, fy=60,000psi, 1.5" MIN CONCRETE COVER AND 3" MIN BAR SPACING.
3. MULTIPLY THE LAP AND E SHOWN IN THESE TABLES BY 1.5 FOR EPOXY COATED REINFORCING.
4. WHEN BARS OF DIFFERENT SIZES ARE LAP SPLICED, LAP LENGTH SHALL BE THE LARGER OF:

   EMBEDMENT LENGTH OF LARGER BAR
   LAP LENGTH OF SMALLER BAR
5. UNLESS NOTED OTHERWISE USE REBAR COUPLERS FOR SPLICES OF #11 AND LARGER BARS.
6. ALL DOWEL BARS SHALL EXTEND AN EMBEDMENT LENGTH E INTO ANOTHER MEMBER OR ACROSS A CONSTRUCTION JOINT UNLESS SHOWN TO SPLICE WITH OTHER BARS OR TO EXTEND TO THE FAR FACE OF THE MEMBER AND END WITH A STANDARD HOOK.

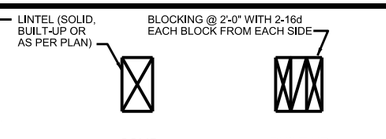
STANDARD 90° BAR HOOKS, EMBEDMENT LENGTHS AND LAP LENGTHS — S-143



FLOOR FRAMING — S-601



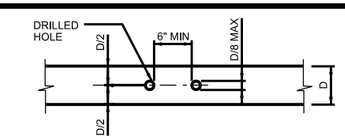
STUD WALL FRAMING — S-602

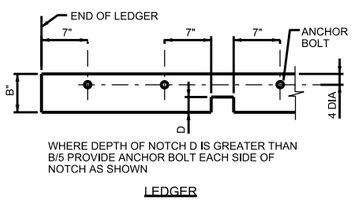


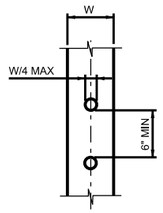
LINTEL SCHEDULE		
SOLID	BUILT-UP	SPAN
4 x 6	2 - 2 x 6	UP TO 6'-0"
4 x 8	2 - 2 x 8	6'-0" TO 8'-0"
4 x 10	2 - 2 x 10	8'-0" TO 10'-0"

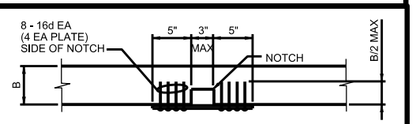
NOTES:

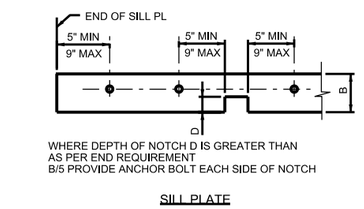
1. INSTALL STRAP DIAGONAL BRACE @ 25'-0" AND AT EACH END IN ALL WALLS NOT PLYWOOD SHEATHED. MAX SLOPE OF DIAGONAL SHALL BE TWO VERTICALTO ONE HORIZONTAL.
2. WHERE TROWELED SURFACE IS LEVEL (1/8" MAX IN 4'-0") DRYPACK IS NOT REQUIRED.
3. FOR HOLES & NOTCHING SEE S-603.



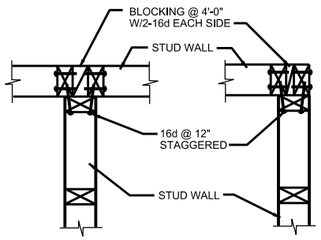








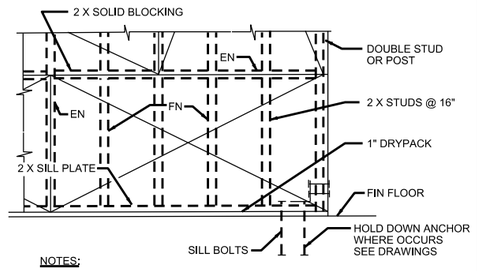
WOOD FRAMING: HOLES AND NOTCHING — REV 060408 — S-603



PLAN AT PARTITION

PLAN AT CORNER

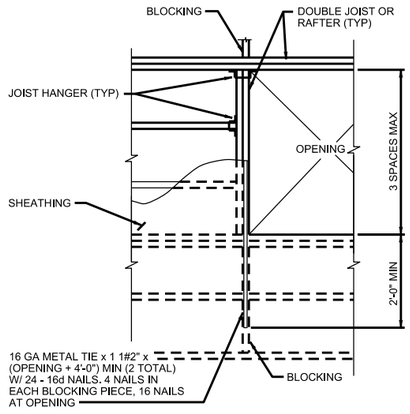
WOOD FRAMING AT WALL INTERSECTIONS — S-604



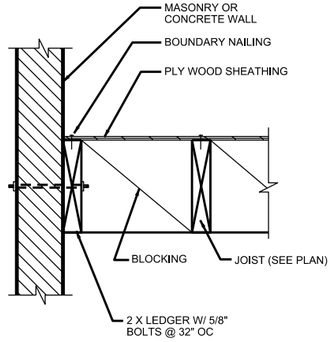
NOTES:

1. EDGE NAILING (EN) AT ALL EDGES OF ALL PLYWOOD SHEETS, MINIMUM EDGE NAILING WITH 10d NAILS @ 6" OC (UNO).
2. FIELD NAILING (FN) @ 12", NAILS SAME SIZE AS EDGE NAILS.
3. MIN EDGE DISTANCE FOR NAILS SHALL BE 3/8".
4. FACE GRAIN MAY BE HORIZONTAL OR VERTICAL.
5. SEE PLAN FOR LOCATION OF PLYWOOD SHEATHING.

PLYWOOD SHEATHING - WALLS — S-605



OPENING IN HORIZONTAL WOOD FRAMING — S-606



LEDGER CONNECTION — S-620

NORTH CAROLINA PROFESSIONAL SEAL 027540 ENGINEER BARRETT C. CROOK

6-12-2015

REV	DATE	BY	DESCRIPTION

SCALE: NTS

WARNING: IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED B. CROOK
DRAWN B. CROOK
CHECKED B. CROOK

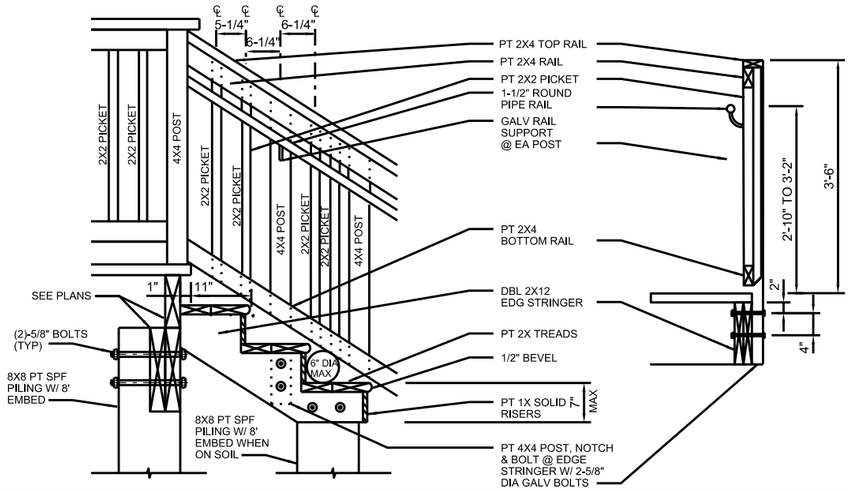
KITTY HAWK ENGINEERING, PLLC
2036 CREEK RD
KITTY HAWK, NC 27949
252-655-1056

HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

STANDARD DETAILS - I

SHEET GS-2

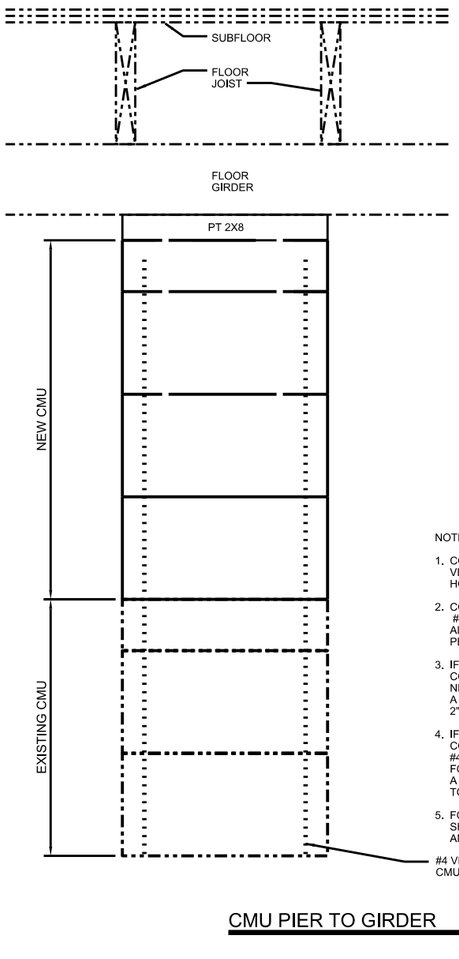
1010961



NOTES:

1. PICKETS ATTACHED TO TOP AND BOTTOM 2 X MEMBERS WITH (2)-#8 GALV WOOD SCREWS. PICKETS SHALL BE SPACED SO AS TO NOT ALLOW A 2" SPHERE TO PASS BETWEEN PICKETS AND/OR POSTS.
2. BOTTOM RAIL AT STAIRS SHALL BE SET AS TO NOT ALLOW A 6" DIA SPHERE TO PASS THROUGH.
3. ALL STAIRWWAYS SHALL BE A MIN OF 36" WIDE ABOVE REQUIREED HANDRAIL HEIGHT AND BELOW REQUIRED HEAD ROOM HEIGHT PER R311.5. PICKETS/ CLOSURES SHALL BE SPACED AS NOT TO ALLOW PASSAGE OF A SPHERE 4" IN DIAMETER.
4. HANDRAIL HEIGHT: 34" MIN AND 38" MAX MEASURED VERTICALLY FROM NOSING OF TREADS ON AT LEAST ONE SIDE OF STAIRWAY PER R311.7.7.1
5. HAND GRIP SHALL HAVE A CIRCULAR CROSS SECTION OF 1-1/4" MIN TO 2-3/4" MAX AND SET A MIN OF 1-1/2" OFF ADJACENT POST OR CAP RAILING AS PER R317.7.3
6. GUARDRAILS SHALL BE INSTALLED AT PORCHES, BALCONIES AND RAISED FLOOR SURFACES LOCATED MORE THAN 30" ABOVE THE FLOOR OR GRADE BELOW. GUARDS SHALL BE NOT LESS THAN 36" IN HEIGHT. GUARDS ON THE OPEN SIDE OF STAIRS WITH A TOTAL RISE OF MORE THAN 30" ABOVE THE FLOOR OR GRADE BELOW SHALL HAVE GUARDS NOT LESS THAN 34" IN HEIGHT AS MEASURED VERTICALLY FROM THE NOSINGS OF THE TREADS.
7. ALL STAIR TREADS AND LANDINGS SHALL BE ILLUMINATED BY ARTIFICAL LIGHT. ACTIVIATION SHALL BE LOCATED AT THE INTERIOR OF THE HOUSE, HOWEVER, MOTION DETECTORS AND TIMES SWITCHES ARE ACCEPTABLE.
8. ALL STAIRWAYS SHALL BE A MINIMUM OF 36" CLEAR WIDTH.
9. USE 4X4 SIMPSON EZ POST BASE AT BASE OF STEPS WHEN SITTING ON CONCRETE. OTHERWISE, USE 8X8 PT W/ 8' EMBED WHEN RESTING ON GROUND

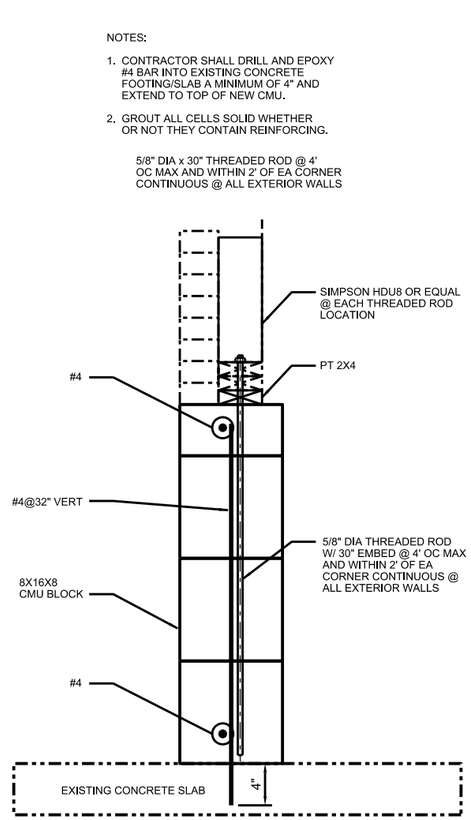
STAIRS AND RAILINGS — S-650



NOTES:

1. CONTRACTOR SHALL AVOID VERTICAL REBAR WHEN DRILLING HOLES FOR 1/2" THREADED RODS
2. CONTRACTOR SHALL PLACE A NEW #4 VERTICAL BAR IN EACH CMU CELL. ALL CMU CELLS SHALLL BE GROUTED PER GS-1.
3. IF CMU CELL ALREADY CONTAINS GROUT CONTRACTOR SHALL DRILL & EPOXY A NEW #4 BAR INTO EXISTING GROUT A MINIMUM OF 12" AND EXTEND TO WITHIN 2" OF TOP OF NEW CMU PIER.
4. IF CMU CELLS HAVE NO GROUT CONTRACTOR SHALL DRILL AND EPOXY #4 BAR INTO EXISTING CONCRETE FOOTING AT BASE OF CMU BLOCKS A MINIMUM OF 6", EXTEND REBAR TO TOP OF NEW CMU PIER AND GROUT CELLS
5. FOR PURPOSES OF PRICING CONTRACTOR SHALL ASSUME CMU CELLS ARE HOLLOW AND REQUIRE REINFORCING AND GROUT.

CMU PIER TO GIRDER — S-499



NOTES:

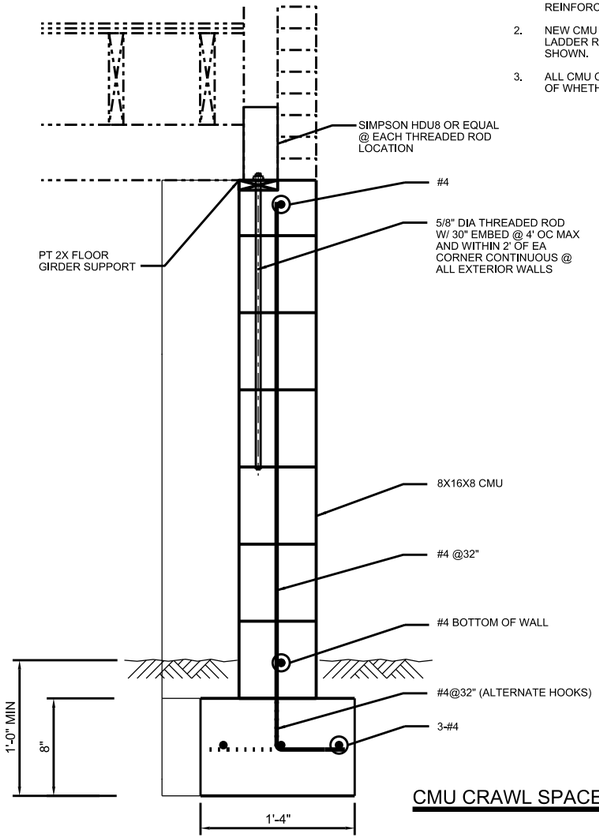
1. CONTRACTOR SHALL DRILL AND EPOXY #4 BAR INTO EXISTING CONCRETE FOOTING/SLAB A MINIMUM OF 4" AND EXTEND TO TOP OF NEW CMU.
2. GROUT ALL CELLS SOLID WHETHER OR NOT THEY CONTAIN REINFORCING.

5/8" DIA x 30" THREADED ROD @ 4' OC MAX AND WITHIN 2' OF EA CORNER CONTINUOUS @ ALL EXTERIOR WALLS

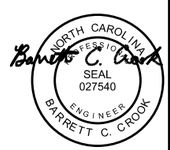
CMU TO CONCRETE SLAB — S-479

NOTES:

1. THE EXISTING PERIMETER HOUSE FOOTINGS SUPPORTING THE EXISTING BRICK SIDING WILL BE EVALUATED BY THE ENGINEER DURING CONSTRUCTION. FOR PURPOSES OF BIDDING AND PRICING CONTRACTOR SHALL ASSUME A NEW 8" THICK X 16" WIDE STRUCTURAL (3500 PSI) CONCRETE FOOTING IS REQUIRED AROUND THE ENTIRE PERIMTER OF EACH HOUSE UNDER THE NEW EXTERIOR CMU CRAWL SPACE WALL. THE BASE OF THE PERIMETER SPREAD FOOTING SHALL BE A MINIMUM OF 12" BELOW GRADE. REINFORCING SHALL BE AS SHOWN.
2. NEW CMU PERMITER WALL SHALL HAVE HORIZONTAL LADDER REINFORCING @ 16" OC IN ADDITION TO REINF SHOWN.
3. ALL CMU CELLS SHALL BE GROUTED SOLID REGARDLESS OF WHETHER OR NOT THEY CONTAIN VERTICAL REINFORCING.



CMU CRAWL SPACE WALL & FOOTING — S-489



6-12-2015

REV	DATE	BY	DESCRIPTION

SCALE: NTS

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DESIGNED B. CROOK
DRAWN B. CROOK
CHECKED B. CROOK

KITTY HAWK ENGINEERING, PLLC
2036 CREEK RD
KITTY HAWK, NC 27949
252-655-1056

HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

STANDARD DETAILS - II

SHEET GS-3

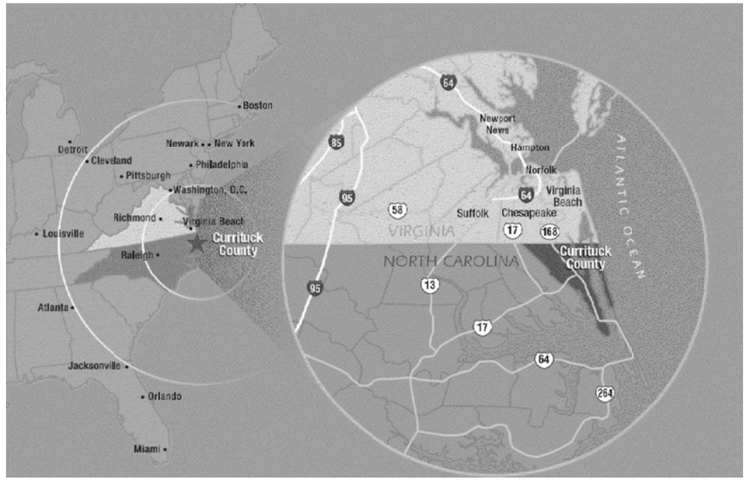
1010961

119 CREEK DRIVE

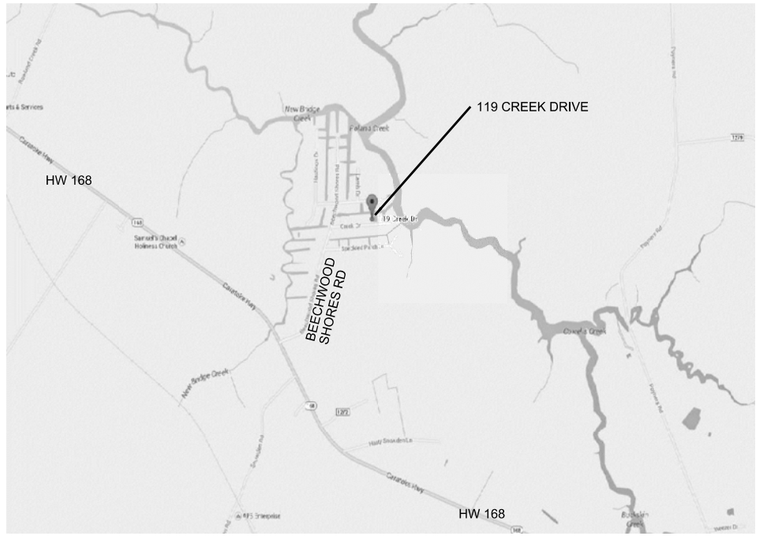
CONSTRUCTION DRAWINGS

AND

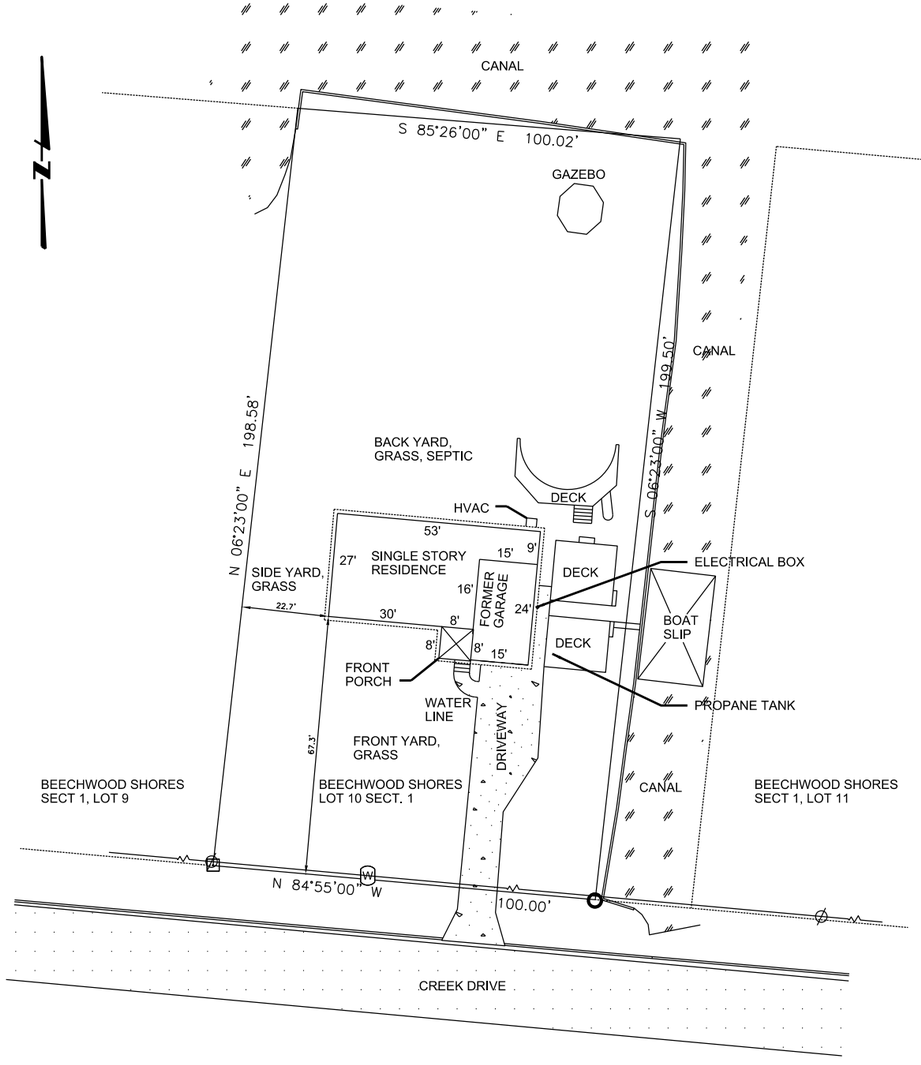
FEASIBILITY STUDY



AREA MAP



VICINITY MAP



SITE PLAN

GENERAL SHEET NOTES

SUBJECT PROPERTY:	
LOT:	10
SECTION:	1
SUBDIVISION #:	31
SUBDIVISION NAME:	BEECHWOOD SHORES
TOWNSHIP #:	40
TOWNSHIP NAME:	CRAWFORD TOWNSHIP
COUNTY:	CURRITUCK COUNTY
STATE:	NC
BOOK:	10
PAGE:	E/48
MAP BOOK/PLAT CAB:	2
MAP PAGE/PLAT SLIDE:	132
STREET ADDRESS:	119 CREEK DRIVE MOYOCK, NC 27958
PARCEL ID NUMBER:	132F-000-0023-0000
GLOBAL PIN:	8050-33-4561
LOT AREA:	19.897 SQ-FT
FEMA DATA:	COMMUNITY,CURRITUCK COUNTY
CID:	370078
MAP NUMBER:	3720898600
EFFECTIVE DATE:	12-16-2005
FIRM ZONE:	AE
FLOOD ZONES SUBJECT TO CHANGE BY FEMA	
LAND:	
COUNTY SOIL TYPE:	SUITABLE
LINE NUMBER:	1
LAND TYPE:	F-FRONT FOOT
LAND CODE:	19-CANAL FRONT
SQUARE FEET:	19,897 SQ-FT
ACRES:	0.46
LOT FRONT FOOTAGE:	100
LOT DEPTH:	200
LAND VALUE:	48,000
SUBJECT PROPERTY ZONING:	SFO
(SINGLE FAMILY RESIDENTIAL OUTER BANKS)	
EXISTING DEVELOPMENT:	3 BEDROOM
RESIDENTIAL DWELLING (SINGLE FAMILY)	
WOOD/MASONRY FRAME STRUCTURE ON MASONRY	
STORIES:	1
ATTIC:	0
EXTERIOR WALL:	7-BRICK
STYLE:	1-RANCH
ASSESSED VALUE:	85,520
YEAR BUILT:	1970
LIVING AREA:	1,551
EFFECTIVE YEAR:	1990
BEDROOMS:	3
FULL BATHS:	1
HALF BATHS:	1
TOTAL FIXTURES:	7
FOUNDATION:	2-CRAWL/PIERS
HEAT:	3-CENTRAL NO A/C
HEATING TYPE FUEL:	3-ELECTRIC
HEATING SYSTEM:	1-WARM AIR
PHYSICAL CONDITION:	A-AVERAGE
FIREPLACE STACKS:	1
MAIN BUILDING:	1191 SQ-FT
1 STORY MASONRY:	360 SQ-FT
OPEN MASONRY PORCH:	64 SQ-FT
ASSESSED VALUES:	
LAND VALUE:	48,000
BUILDING VALUE:	118,200
TOTAL VALUE:	166,200
==========	
TAXABLE TOTAL VALUE:	166,200

REV	DATE	BY	DESCRIPTION

SCALE 1"=20'

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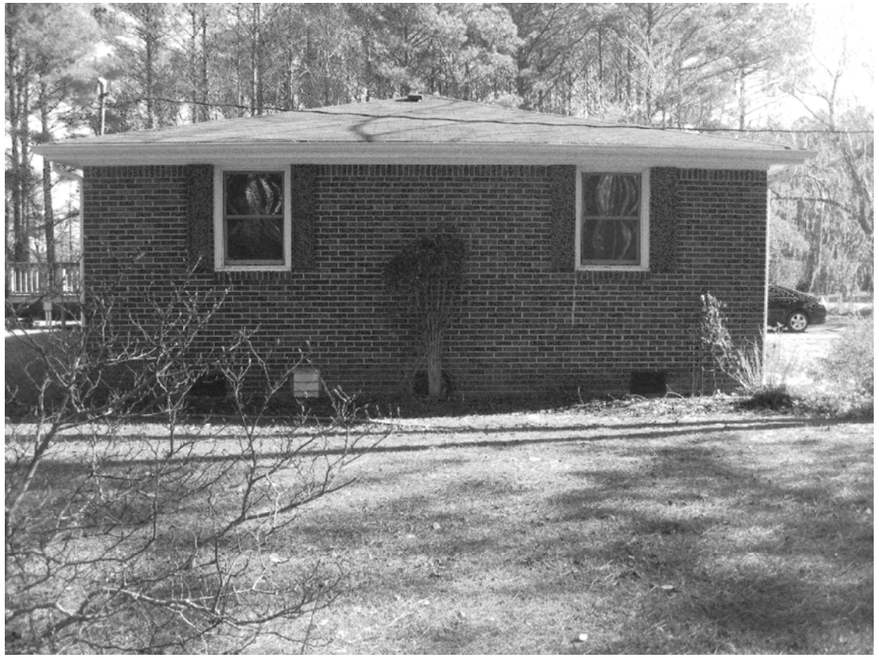
HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

119 CREEK DRIVE
MOYOCK, NC 27958
SITE PLAN

SHEET C-1

1010961

SOUTH ELEVATION



WEST ELEVATION

GENERAL SHEET NOTES

1. THE HOUSE WALLS, ROOF AND MAIN FLOOR WILL BE RAISED 4'-0". A BAND OF 8X8X16 CMU BLOCK WILL FILL THE GAP BETWEEN THE GROUND AND THE NEW FLOOR JOIST/GIRDER ELEVATION/BOTTOM OF EXTERIOR BRICK CURTAIN WALL. SEE FEASIBILITY STUDY FOR EXAMPLE PHOTO.

2. THE FORMER GARAGE HAS BEEN CONVERTED TO A LIVING SPACE. A NEW ELEVATED WOOD FLOOR WILL BE CONSTRUCTED IN THE CONVERTED GARAGE IN ORDER TO RAISE THIS LIVING AREA ABOVE THE DFE. THE CONTRACTOR HAS THE OPTION OF REUSING THE EXISTING WALLS AND PLACING THEM ON THE NEW ELEVATED WOOD FLOOR AND CEILING OR CONSTRUCTING NEW WALLS IN THE SAME PLAN VIEW LOCATIONS AS THE EXISTING WALLS. ATTACHEMENTS AND FASTENERS AT THE TOP AND BOTTOM OF THE NEW OR EXISTING WALLS SHALL MEET ALL APPLICABLE CODES AND BE PER S-602, S-603 AND S-604.

3. THE FRONT SLIDING GLASS DOOR OPENING WILL INCREASE IN HEIGHT 4'-0" AS A RESULT OF THE HOUSE LIFT. A 4'-0" TALL WALL OF CMU BLOCKS SHALL BE PLACED BELOW THE NEW RAISED SLIDING GLASS DOOR.

4. THE FRONT PORCH WILL HAVE NEW ACCCESS STAIRS AND A LANDING. THE EXISTING FRONT PORCH STEP AND LANDING SHALL BE DEMOLISHED.

5. THERE WILL BE A NEW SET OF STEPS AND LANDING ON THE SIDE OF THE GARAGE.

NORTHWEST ELEVATION

EAST ELEVATION

NORTH CAROLINA PROFESSIONAL SEAL 027540 ENGINEER BARRETT C. CROOK

Barrett C. Crook

6-12-2015

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KITTY HAWK, NC 27949
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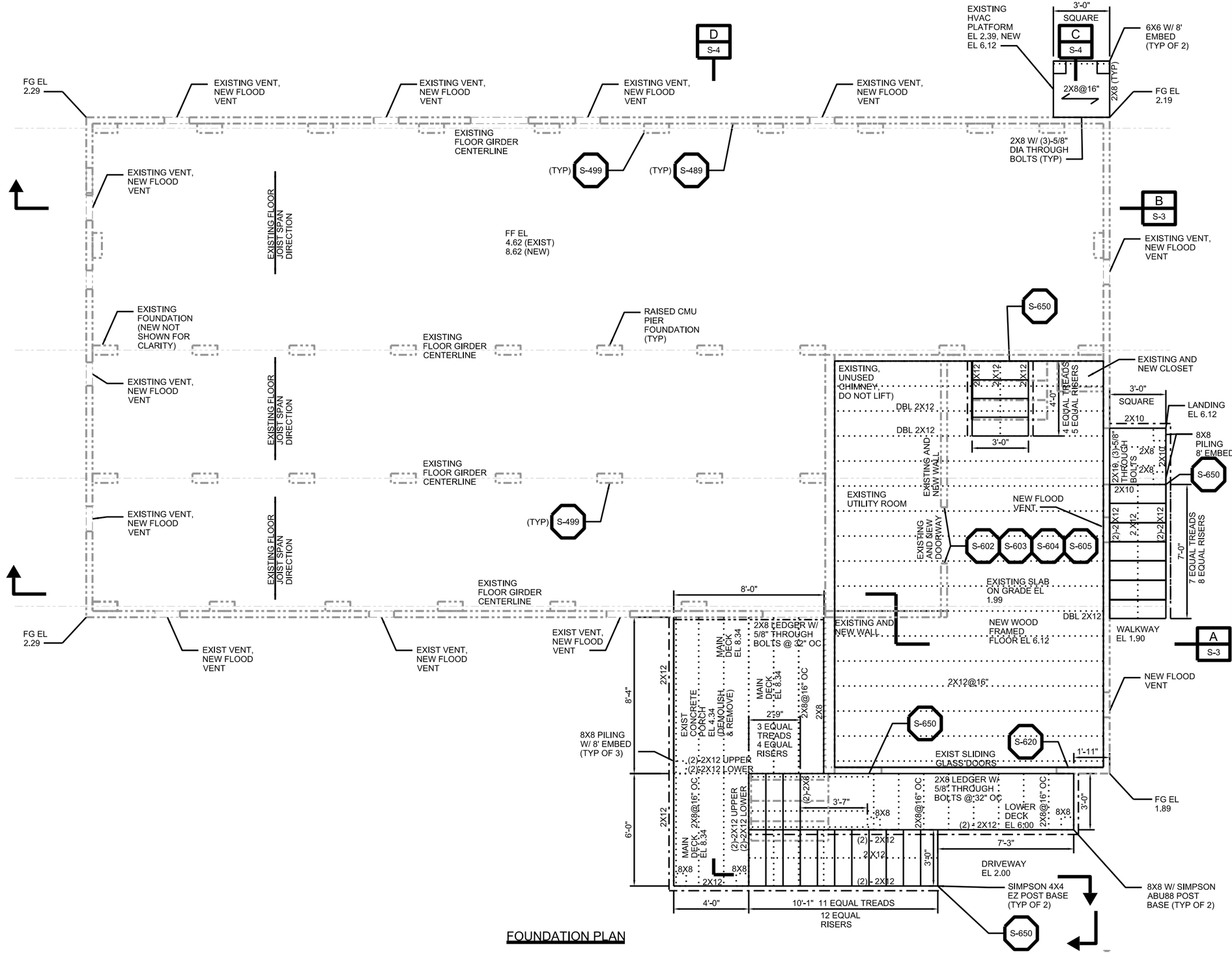
HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

119 CREEK DRIVE
MOYOCK, NC 27958
ELEVATIONS

SHEET
S-1
1010961



FOUNDATION PLAN

GENERAL NOTES

1. BASE FLOOD ELEVATION: 5.0 FEET
   FLOOD ZONE: AE
   FREEBOARD REQUIREMENT: 1.0 FOOT
   DESIGN FLOOD ELEVATION: 6.0 FEET
   EXISTING FIRST FLOOR ELEVATION: 4.62 FEET
   NEW FIRST FLOOR ELEVATION: 8.62 FEET
   FLOOR AND ROOF HEIGHT INCREASE: 4.00 FEET

2. FLOOD VENTS:
   HOUSE ENCLOSED AREA: 1580 SQ-FT
   FLOOD VENT AREA REQUIRED: 1580 SQ-IN
   AREA OF ONE FLOOD VENT: 128 SQ-IN
   MIN. NUMBER OF FLOOD VENTS REQ'D: 13
   ALL OF THE EXISTING CRAWL SPACE VENTS SHALL BE CONVERTED TO FLOOD VENTS. TWO ADDITIONAL FLOOD VENTS SHALL BE PROVIDED ON THE EAST SIDE OF THE CONVERTED GARAGE AREA UNDER THE NEW WOOD FRAMED ELEVATED FLOOR AS NOTED ON THE DRAWINGS.

3. THE CONVERTED GARAGE CONCRETE FINISHED FLOOR ELEVATION IS APPROXIMATELY 1.99. THIS AREA CURRENTLY HAS AN APPROXIMATE 7'-6" CEILING. THE CEILING WILL BE RAISED WITH THE WALLS 4'-0". AFTER LIFTING, A NEW FLOOR WILL BE CONSTRUCTED IN THE CONVERTED GARAGE WITH AN ELEVATION OF 6.12 WILL RESULT IN A ROOM HEIGHT OF ROUGHLY 7'-6".

4. THERE IS AN EXISTING, UNUSED AND ABANDONED CHIMNEY. THE BASE OF THIS CHIMENY IS HIDDEN BEHIND WALLS IN THE REMODELED GARAGE. THIS MASONRY WILL NOT BE LIFTED WITH THE HOUSE. THE CONTRACTOR SHALL SEPARATE ALL ELEMENTS OF THE CHIMNEY FROM THE HOUSE PRIOR TO LIFTING. AFTER THE 4'-0" HOUSE LIFT THE ROOF LINE WILL BE ABOVE THE TOP OF THE CHIMNEY. THE ROOF OPENING SHALL BE FRAMED WITH (2)-2X6'S, SHEATHING, ROOFING PAPER AND SHINGLES TO MATCH EXISTING.

5. CONTRACTOR SHALL REMOVE ALL FLOOR COVERING FROM THE EXISTING CONVERTED GARAGE INCLUDING ALL CARPET. FLOOR SHALL BE STRIPPED DOWN TO ONLY THE CONCRETE SLAB.

6. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO START OF WORK.

7. THE BASE OF ALL NEW STAIRS SHALL BE ALIGNED WITH EXISTING CONCRETE WALKWAYS OR DRIVEWAYS. CONTRACTOR SHALL NOTIFY THE ENGINEER AND FIELD ADJUST STAIR LOCATIONS WHERE AND IF NECESSARY.

NORTH CAROLINA PROFESSIONAL SEAL 027540 ENGINEER BARRETT C. CROOK
6-12-2015

REV	DATE	BY	DESCRIPTION

SCALE 3/8"=1'-0"

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CHECKED B. CROOK

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252-655-1056

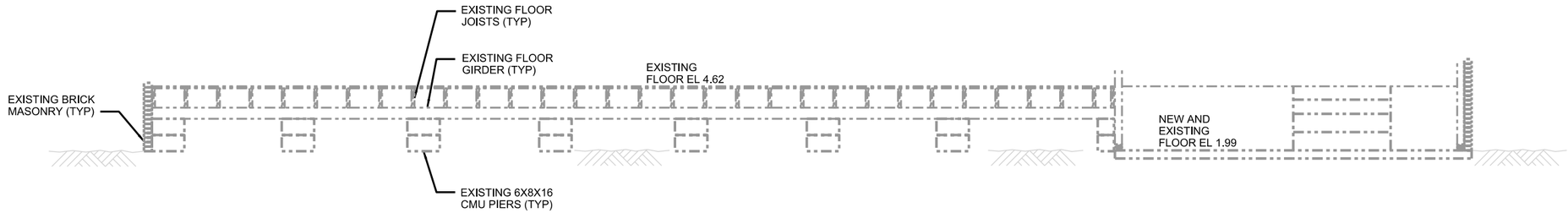
HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

119 CREEK DRIVE
MOYOCK, NC 27958
FOUNDATION PLAN

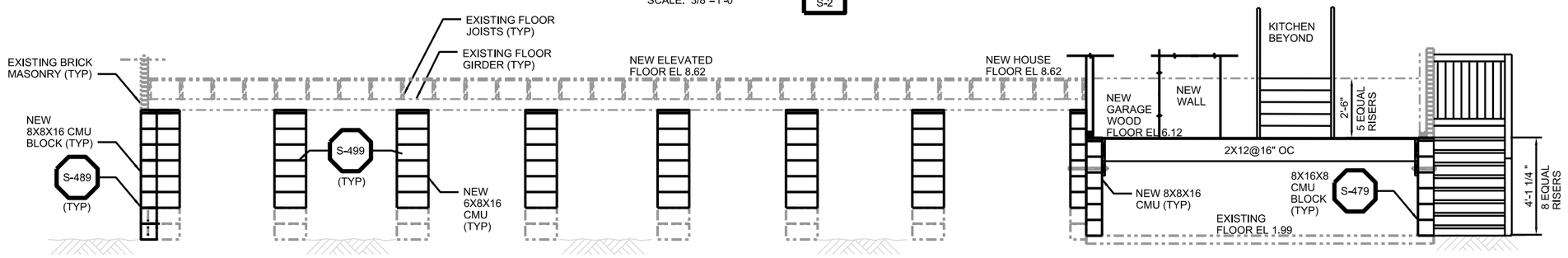
SHEET S-2
1010961

GENERAL SHEET NOTES

1. CONTRACTOR SHALL TAKE CARE NOT TO UNDERMINE THE EXISTING FOUNDATION/ FOOTINGS

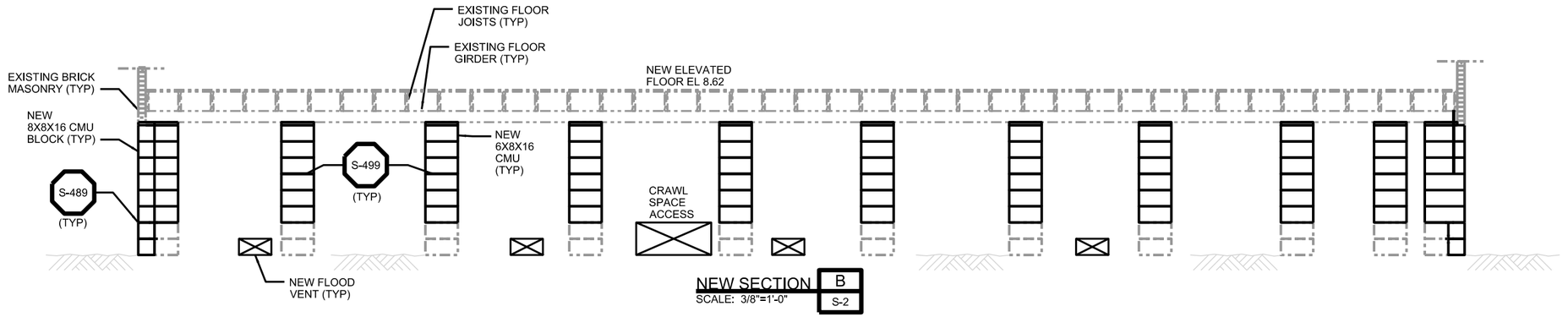


EXISTING SECTION A
SCALE: 3/8"=1'-0"
S-2



NEW SECTION A
SCALE: 3/8"=1'-0"
S-2

EXISTING SECTION B
SCALE: 3/8"=1'-0"
S-2



NEW SECTION B
SCALE: 3/8"=1'-0"
S-2

NORTH CAROLINA PROFESSIONAL SEAL 027540 ENGINEER BARRETT C. CROOK
6-12-2015

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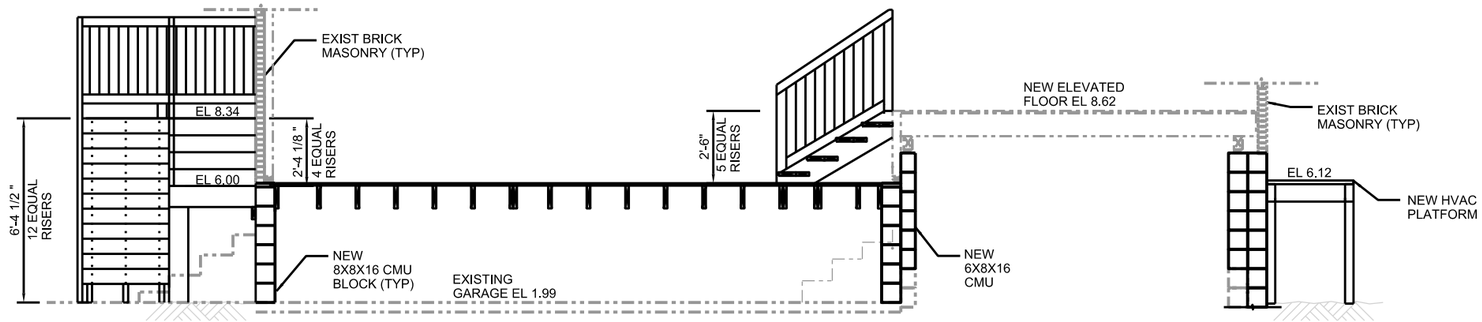
HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

119 CREEK DRIVE
MOYOCK, NC 27958
SECTIONS AND DETAILS - I

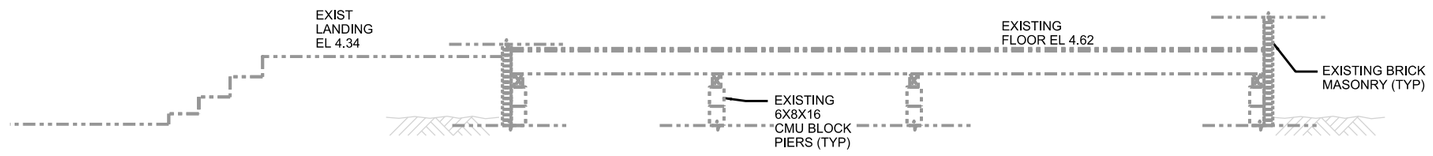
SHEET S-3

1010961

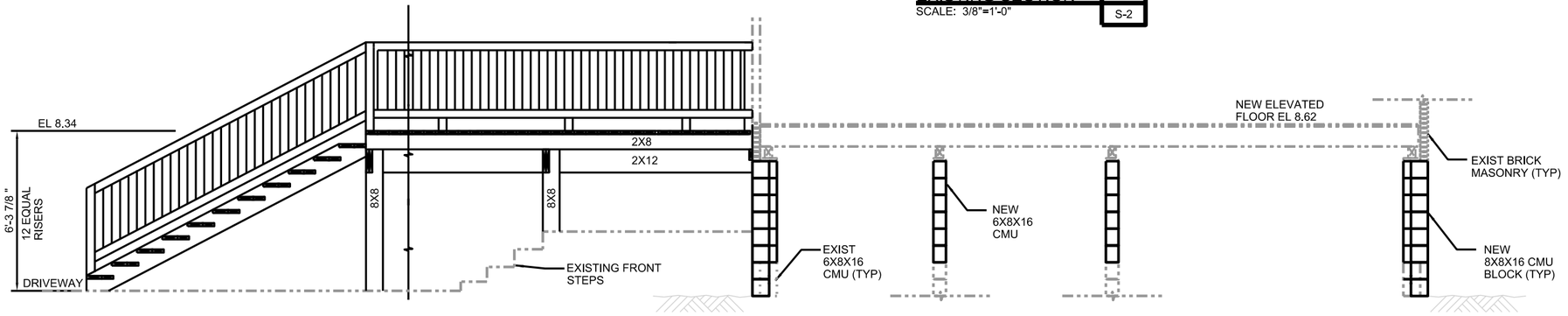
EXISTING SECTION C / S-2
SCALE: 3/8"=1'-0"



NEW SECTION C / S-2
SCALE: 3/8"=1'-0"



EXISTING SECTION D / S-2
SCALE: 3/8"=1'-0"



NEW SECTION D / S-2
SCALE: 3/8"=1'-0"

NORTH CAROLINA PROFESSIONAL SEAL 027540 ENGINEER BARRETT C. CROOK
Barrett C. Crook
6-12-2015

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HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

119 CREEK DRIVE
MOYOCK, NC 27958
SECTIONS AND DETAILS - II

SHEET S-4
1010961

KITTY HAWK ENGINEERING
CIVIL AND STRUCTURAL

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kittyhawk@kittyhawkengineering.com
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HIHGMP-FEASIBILITY STUDY

119 CREEK DRIVE, MOYOCK, NC 27958

Executive Summary

On August 28, 2011, NC Governor Beverly Perdue requested a major disaster declaration due to Hurricane Irene during the period of August 25 to September 1, 2011. The Governor requested a declaration for Individual Assistance for seven counties and Hazard Mitigation statewide. During the period of August 28-30, 2011, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary. On

August 31, 2011, President Obama declared that a major disaster exists in the State of North Carolina. This declaration made Individual Assistance requested by the Governor available to affected individuals and households in Beaufort, Carteret, Craven, Dare, Hyde, Pamlico, and Tyrrell Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

After a Presidential declaration, FEMA provides HMGP funds for States to administer grant programs that support local hazard mitigation planning and long-term hazard mitigation measures to reduce the loss of life and damages to improved property from natural disasters.

The home at 119 Creek Drive in Moyock, NC has been identified as a candidate to receive Hurricane Irene Hazard Mitigation Grant Program Funds. These Funds are to be used to elevate the house to better protect it from future flood damage. This feasibility study explores this process.

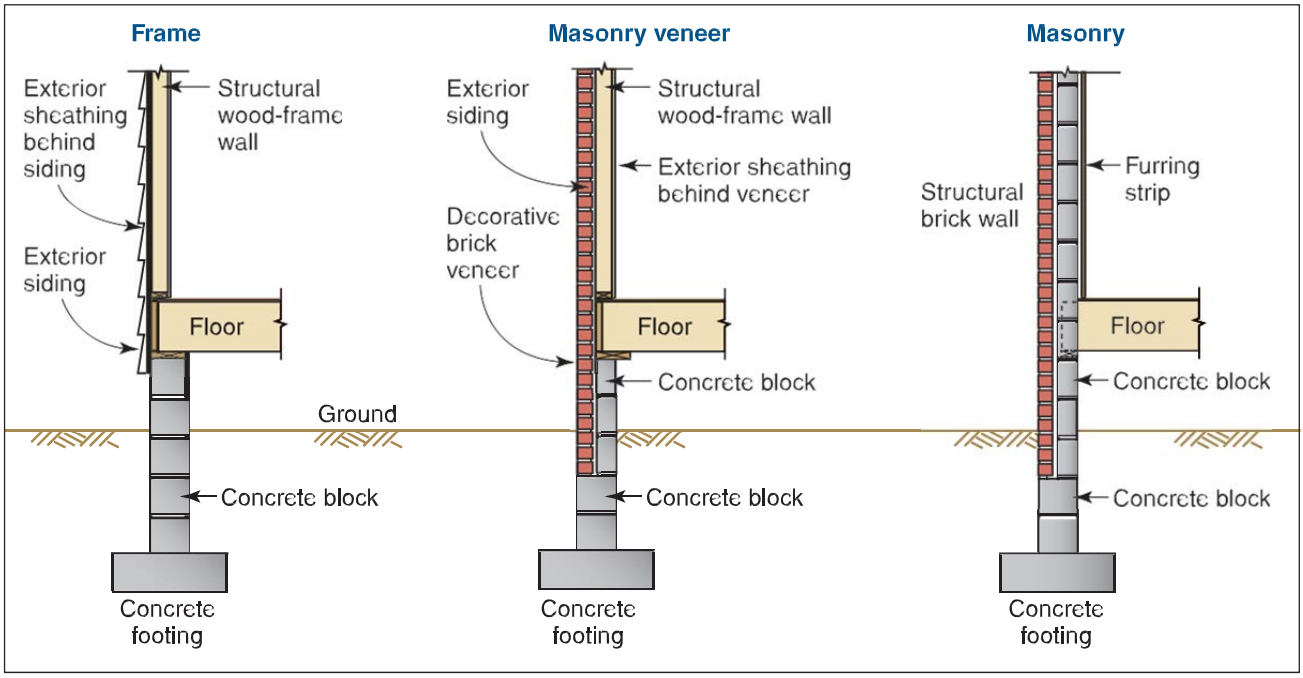
Considerations

Amount of Elevation

The amount of elevation required is determined by the Flood Protection Elevation or FPE. The FPE is the Base Flood Elevation or BFE + Freeboard. Freeboard is the vertical distance or height required above the BFE. For this project in Currituck County the Freeboard requirement is 1.00 feet. The house must be elevated so that the lowest floor in the house is at or above the FPE. This does not include uninhabited garages.

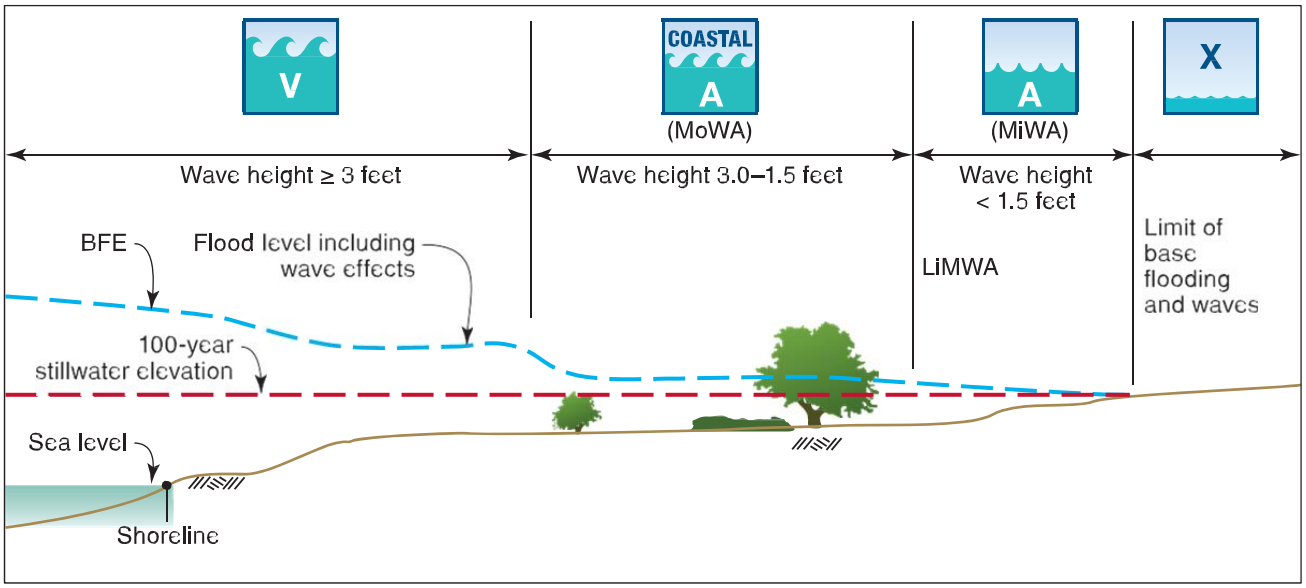
Existing Foundation

In general, the most economical approach to elevating a house is to use as much of the existing foundation as possible. Although some elevation methods do not allow this approach, most do. The ability of the existing foundation to support the loads that will be imposed by the elevated house and, as discussed in the next section, the loads expected to result from flooding and other hazards at the site will be investigated. If changes must be made to the foundation to increase its strength and stability, they can be made as part of the retrofitting project but they can increase both the cost of the project and the time required to complete it. The type of foundation on which the house was originally built (basement, crawlspace, slab-on-grade, piers, posts, pilings) also can affect the elevation process.



Hazards

Because so many elevation techniques are available, elevating is practical for almost any flood situation, but the flooding conditions and other hazards at the house site must be examined so that the most suitable technique can be determined. Regardless of the elevation technique used, the foundation of the elevated house must be able to withstand, at a minimum, the expected loads from hydrostatic pressure, hydrodynamic pressure, and debris impact. It must also be able to resist undermining by any expected erosion and scour. If elevating a house in an area subject to high winds, earthquakes, or other hazards, a design professional must determine whether the elevated house, including its foundation, will be able to withstand all of the horizontal and vertical forces expected to act on it. In making this determination, the design professional must consider a number of factors, including the structure and condition of the house, the soil conditions at the site, the proposed elevation technique, and the hazards at the site. The conclusion may be that additional modifications must be made during the retrofitting project.



Access

Elevating a house usually requires that new means of access be provided. For example, if entry doors were originally at ground level, new staircases will have to be built. When an attached garage is elevated, providing access for vehicles may require changes to portions of the lot, such as building a new, elevated driveway on earth fill that ties into high ground elsewhere. The need to provide new means of access is often the main objection that homeowners have to elevating.

House Size, Design, and Shape

In general, the larger the house and the more complex its design and shape, the more difficult it will be to lift on jacks. Multistory houses are more difficult to stabilize during the lifting process and as the dimensions and weight of a house increase, so do the required numbers of jacks and other pieces of lifting equipment. Exterior wall coverings such as stucco and brick veneer complicate the lifting process because they must either be removed or braced so that they will stay in place when the house is lifted. Houses with simpler square or rectangular shapes are easier to lift than those with attached garages, porches, wings, or additions, which often must be detached and lifted separately, especially if they are built on separate foundations. Before a house is lifted, a design professional must inspect it to verify its structural soundness. All the structural members and their connections must be able to withstand the stresses imposed by the lifting process. Lifting an unsound house can lead to potentially expensive damage.

Utilities
Before a house is elevated, all utility lines (water, sewer, gas, electric, telephone, etc.) must be disconnected. At the end of the project, the lines will be reconnected. All service equipment outside the house, such as air conditioning and heat pump compressors and gas and electric meters, shall be elevated to the FPE.

Obstructions
Decks, porch landings and any other items physically attached to the house but not being elevated must be detached and removed to the extent of allowing safe access for the house lifting equipment and personnel.

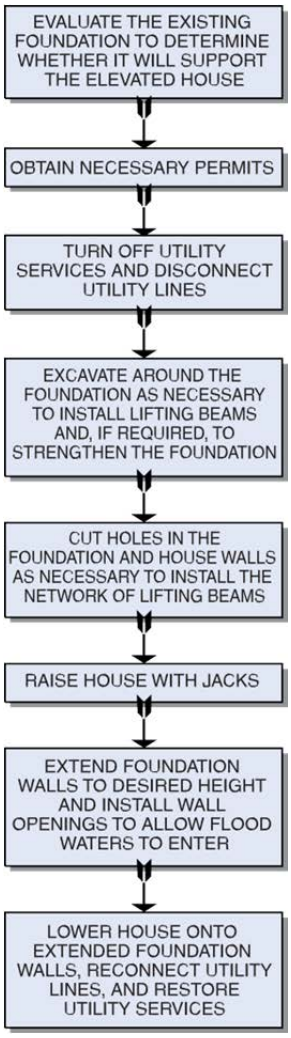
Soils
The elevated house will weigh more than it does prior to the project because of the increased crawl space, pier and garage wall heights. As a result, the soils will experience a higher loading or pressure. Unfortunately, as-built or construction drawings are needed in order to accurately determine the house foundation's capacity. This information is usually not available so educated guesses, soil bearing capacities and visual inspections are required to determine if the foundation is adequate for the new loads.

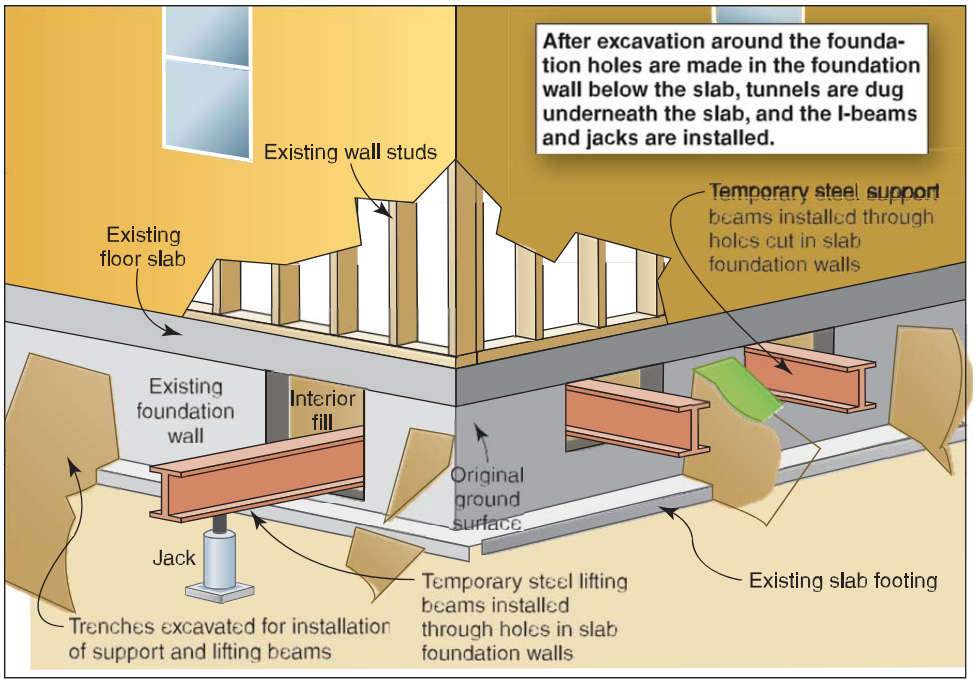
The Process

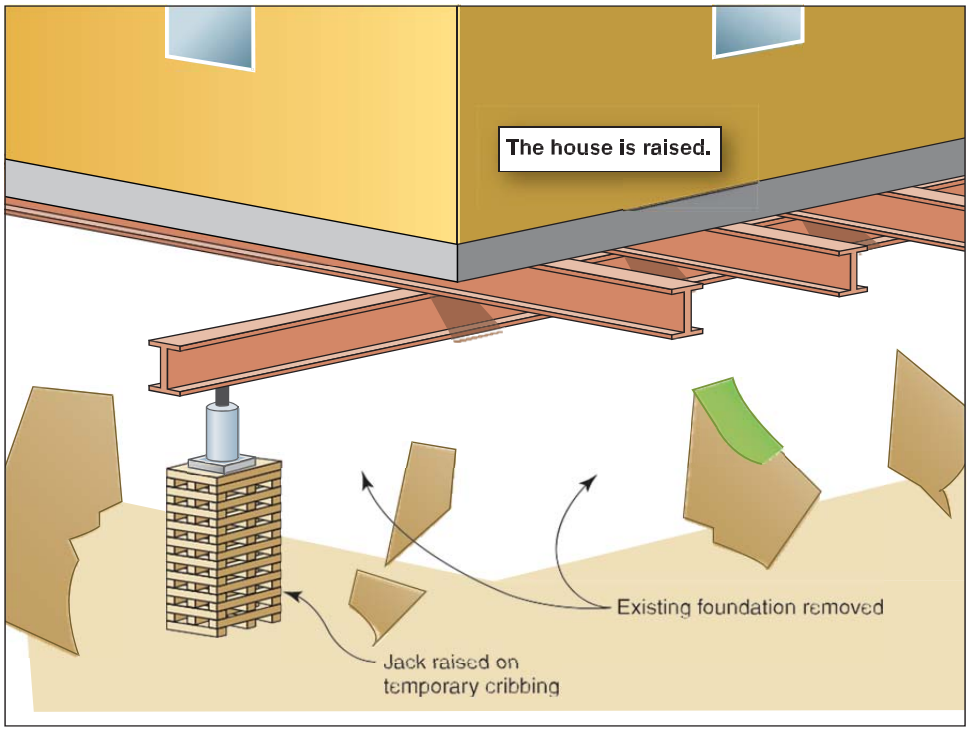
Frame, masonry veneer, and masonry houses can all be elevated on extended foundation walls. The technique used for houses on basement and crawlspace foundations differs from that used for houses on slab-on-grade foundations.

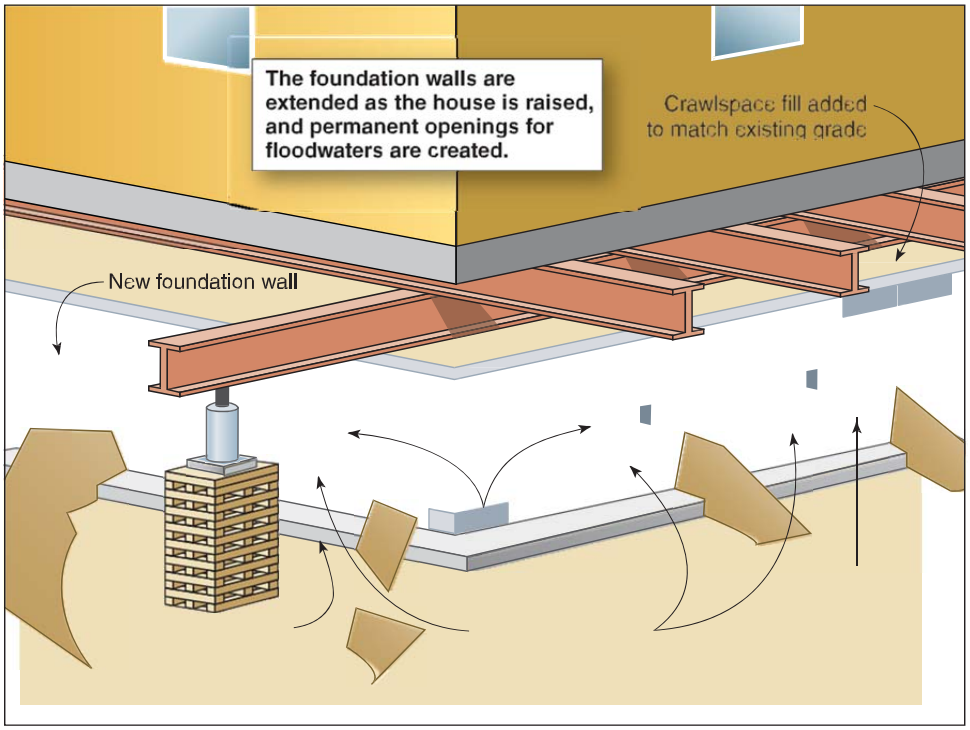
Crawlspace Foundations
The elevation process is the same for frame, masonry veneer, and masonry houses on basement and crawlspace foundations. Figures 5-4a through 5-4d illustrate the process. First, holes are made at intervals in the foundation wall so that a series of steel I-beams can be installed at critical points under the floor framing (see Figure 5-4a). If the foundation walls are made of concrete blocks, the lifting contractor can remove individual blocks to create the required holes. The I-beams are placed so that they run perpendicular to the floor joists. A second set of beams is then placed below and perpendicular to the first set (see Figure 5-4a). The two sets of beams extend the width and length of the house and form a cradle that supports the house as it is being raised. In Figure 5-4a, the foundation walls are shown as extending far enough above the ground surface to provide easy access to the area below the floor framing. In some houses, however, the foundation walls will not be this high. To lift such a house, the contractor must first dig trenches at intervals around the foundation. The I-beams are then lowered into the trenches and inserted below the floor framing. The contractor may also have to dig holes for the lifting jacks, as shown in the figure. The number of jacks needed will depend on the size, shape, and type of house being lifted.

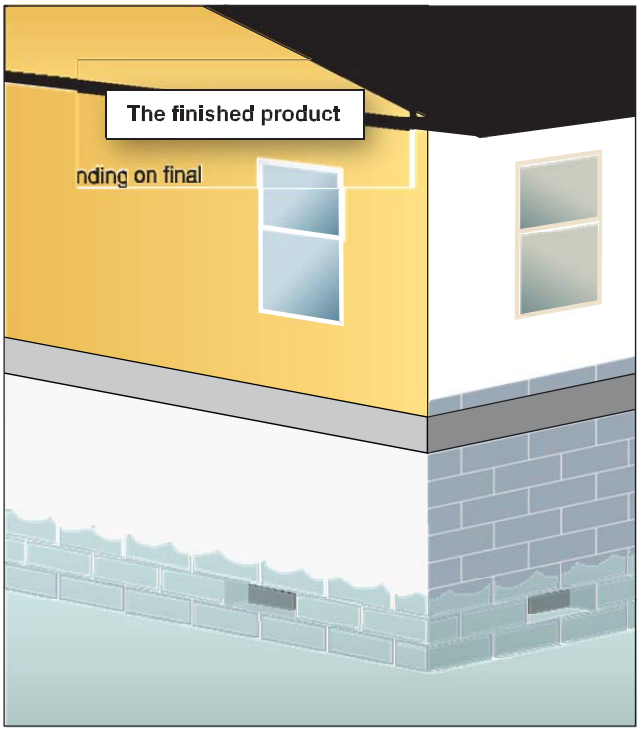
PROCESS:
Elevating on Extended
Foundation Walls


EVALUATE THE EXISTING FOUNDATION TO DETERMINE WHETHER IT WILL SUPPORT THE ELEVATED HOUSE
OBTAIN NECESSARY PERMITS
TURN OFF UTILITY SERVICES AND DISCONNECT UTILITY LINES
EXCAVATE AROUND THE FOUNDATION AS NECESSARY TO INSTALL LIFTING BEAMS AND, IF REQUIRED, TO STRENGTHEN THE FOUNDATION
CUT HOLES IN THE FOUNDATION AND HOUSE WALLS AS NECESSARY TO INSTALL THE NETWORK OF LIFTING BEAMS
RAISE HOUSE WITH JACKS
EXTEND FOUNDATION WALLS TO DESIRED HEIGHT AND INSTALL WALL OPENINGS TO ALLOW FLOOD WATERS TO ENTER
LOWER HOUSE ONTO EXTENDED FOUNDATION WALLS, RECONNECT UTILITY LINES, AND RESTORE UTILITY SERVICES


After excavation around the foundation holes are made in the foundation wall below the slab, tunnels are dug underneath the slab, and the I-beams and jacks are installed.
Existing wall studs
Existing floor slab
Temporary steel support beams installed through holes cut in slab foundation walls
Existing foundation wall
Interior fill
Original ground surface
Jack
Temporary steel lifting beams installed through holes in slab foundation walls
Existing slab footing
Trenches excavated for installation of support and lifting beams


The house is raised.
Existing foundation removed
Jack raised on
temporary cribbing


The foundation walls are
extended as the house is raised,
and permanent openings for
floodwaters are created.
Crawlspace fill added
to match existing grade
New foundation wall



Findings and Recommendations

Amount of Elevation

The Base Flood Elevation or BFE is 5.00 feet. The freeboard requirement is 1 foot. As a result, the Design Flood Elevation or DFE is 6.00 feet. The house is located in an AE flood zone. Based on this information the lowest finished floor elevation in the house shall be no lower than 6.00 feet. The house main floor elevation is 4.62 feet. The converted garage floor living area has an elevation of 1.99 feet. The former garage has been converted to a living space. This presents an obstacle when elevating the house to the DFE of 6.00 feet. There will be insufficient headroom in the converted garage if the main house floor is only raised to the DFE. A new wood floor in the converted garage at the DFE will result in insufficient ceiling height to meet code because the main house and roof only need to be raised 1.50 feet while the new converted garage floor needs to be raised 4.00 feet. As a result, the house will be raised 4.00 feet. A new wood floor will be constructed in the converted garage and will permit this area to meet code as a habitable space maintaining at least 7 feet of ceiling height. This requires new access stairs and a landing on the side of the house into the converted garage along with new access stairs from the new converted garage wood floor up into the main house floor.

Existing Foundation

The most economical approach to elevating this house is to use as much of the existing foundation as possible. The ability of the existing foundation to support the loads that will be imposed by the elevated house and, as discussed in the next section, the loads expected to result from flooding and other hazards at the site will be investigated but are not expected to represent a serious hurdle. If changes must be made to the foundation to increase its strength and stability, they will be made as part of the retrofitting project but they can increase both the cost of the project and the time required to complete it. The home has a crawlspace foundation type which is not expected to negatively affect the elevation process.

Hazards

The flooding conditions and other hazards at the house site will be examined and the foundation of the elevated house will be able to withstand, at a minimum, the expected loads from hydrostatic pressure, hydrodynamic pressure, and debris impact. It will also be able to resist undermining by any expected erosion and scour. Flood vents will be added to the foundation walls to comply with code requirements and minimize hydrostatic loading. In addition, high winds, earthquakes, or other hazards will be checked by a design professional to verify that the elevated house, including its foundation, will be able to withstand all of the horizontal and vertical forces expected to act on it. In making this determination, the design professional will consider a number of factors, including the structure and condition of the house, the soil conditions at the site, the proposed elevation technique, and the hazards at the site. No significant foundation or house modifications are expected but, if necessary, will be made during the retrofitting project.

Access

New wood steps and landings (where required) will be provided for foot traffic access into and out of the home. For example, exterior doors originally at one level will have new stairs and landings (where required). The attached garage and slab on grade foundation will not be elevated as this cost is not covered by the HIHMGP. However, since the garage is a converted living space the living space will be maintained. A new wood-framed floor will be constructed on top of the garage slab at or above the FPE. New access steps and landings (where required) will be provided in the following locations:

1. At the front door (both options A and B)

2. At the East side rear of the house next to the garage (only option A)

3. Front converted garage into house (options A and B)

House Size, Design, and Shape

Fortunately, this house is relatively simple in terms of being a single story and regular rectangular shape so it will be relatively simple to lift on jacks. The exterior wall coverings such as the brick does complicate the lifting process because they must braced so that they will stay in place when the house is lifted. The house has been inspected by a design professional and it appears structurally sound, however, there are some significant cracks in the brick masonry visible from the outside. Care shall be taken to minimize further cracking and the expansion of the existing cracks. All the structural members and their connections should be able to withstand the stresses imposed by the lifting process, however, lifting a house, a sound or unsound house, can always lead to potentially expensive damage and is always associated with unknowns during the preparation, lifting and settling process. While this is not anticipated it is always a possibility.

Utilities

Before a house is elevated, all utility lines (water, sewer, gas, electric, telephone, etc.) will be disconnected. At the end of the project, the lines will be reconnected. All service equipment outside the house, such as air conditioning and heat pump compressors and gas and electric meters, will be elevated to the FPE.

Obstacles

There are several sizable decks on the East and North sides of the house. However, since they are not connected to the house and set back from the house several feet they are not expected to significantly interfere with the house lifting equipment. Some portion of the decks may need to be temporarily relocated depending on the house lifters equipment and safe access for personnel.

There is an existing but abandoned fireplace and chimney. It is no longer used. The chimney can be seen in the phot below extending up through the attic and the roof.

Soils

The elevated house will weigh more than it does prior to the project because of the increased crawl space and garage wall heights. As a result, the soils will experience a higher loading or pressure. The soils in this area are classified as poor by Currituck County's soil map. However, given the relatively small amount of additional loading and the relatively good condition of the house for its age no foundation remediation measures in addition to the standard height increases and code requirements are expected.

Post-Elevation

The photo below is an example of a house after it has been raised. The CMU blocks around the base represent the vertical increase in height for the home. The brick masonry above the CMU blocks is the original wall siding and supported by the CMU blocks. The new wood stairs and landing provide access for the front door.

Costs

There are two types of house lifting services that you may get estimates or quotes for. The first is just the actual house lift. This is the cost for a reputable house raising company to come in, lift your home, and put it back on its foundation. The second type, what you really need and what is being provided for you, is the full service house lift. This includes the lift, as well as all of the general contracting duties that are associated with preparing the house for the lift and putting it all back together again.

A full-service turn-key house lifting estimate includes all of the following:

- Permits
- Initial Survey and Drawing
- Pre Lift Elevation Certificate
- Sewer Disconnect and Cap

- Water Disconnect and Cap
- HVAC Disconnect and Cap
- Electric Severance Letter, Disconnect and Cap
- Structural Engineering Design and Drawings
- Set Up Temporary Electric Pole and/or Electric Generator (if necessary)
- Pump Water Out of Crawl Space (if necessary)
- Severing of Foundation Anchors
- Detach Shower, Decks, Porches, etc.
- Install Jacks; Preliminary Lift; Install Steel
- Raise Heated and Cooled Living Space a minimum of 1.00 feet above FEMA BFE to the FPE
- Demolish and Remove Parts of Existing Foundation
- Shoring (where and if necessary)
- Raise Fireplace and Chimney (depending on fireplace size, cost and house lifting contractor recommendation)
- House Supported and Secured on Crib Stacks
- New Continuous Perimeter Block CMU Installed
- Interior Foundation Piers Raised
- Install New Concrete CMU Block Foundation
- Install New CMU Perimeter Foundation Blocks
- Install Foundation Tie Down Straps
- Install new pressure treated 2x plates
- Lower House
- Fasten Foundation Strapping to Plates
- Install Hurricane Ties on Perimeter, connecting plates to floor joists
- New HVAC Platform, HVAC Raised and Reconnected
- Install Flood Vents in Perimeter CMU Block Foundation Walls
- Construct New Access Stairs
- Finish Work Including Carpentry and Painting
- Dumpster for Debris and Concrete Removal
- Debris and Concrete Removal
- Water Reconnect
- Sewer Reconnect
- Electric Service Reconnect
- Survey
- Post Lift Elevation Certificate

Additional Items for 119 Creek Drive:

- New Elevated Floor in Converted Garage

Conclusion

No significant or serious issues are expected during the lifting process. The house appears structurally sound but masonry is brittle and the older the masonry is the more brittle it can be. Wood, by its very nature, is more flexible than masonry and mortar. As a result, routine flexing or movement in wood members which result in no visible or structural issues in the wood itself may result in and be reflected by masonry or mortar cracking. This tends to be aesthetic in nature and can be patched as has already been done in several locations around the exterior of the house. The existing cracks are likely the result of routine foundation settling.

The garage has been converted into a habitable living space. A new wood floor will be constructed in the garage above the DFE at elevation 6.12. This requires raising the house 4 feet in order to meet ceiling height requirements in the converted garage with the new floor.

Sincerely,

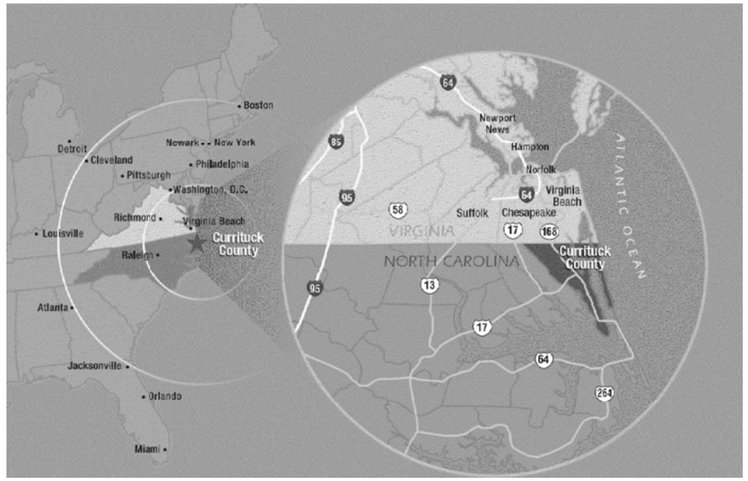
Barrett C. Crook, PE, LEED AP
Kitty Hawk Engineering, PLLC
2036 Creek Rd
Kitty Hawk, NC 27949
252-655-1056
barrettcrook@kittyhawkengineering.com
www.kittyhawkengineering.com
NC License P-1281

148 SIMPSON DRIVE

CONSTRUCTION DRAWINGS

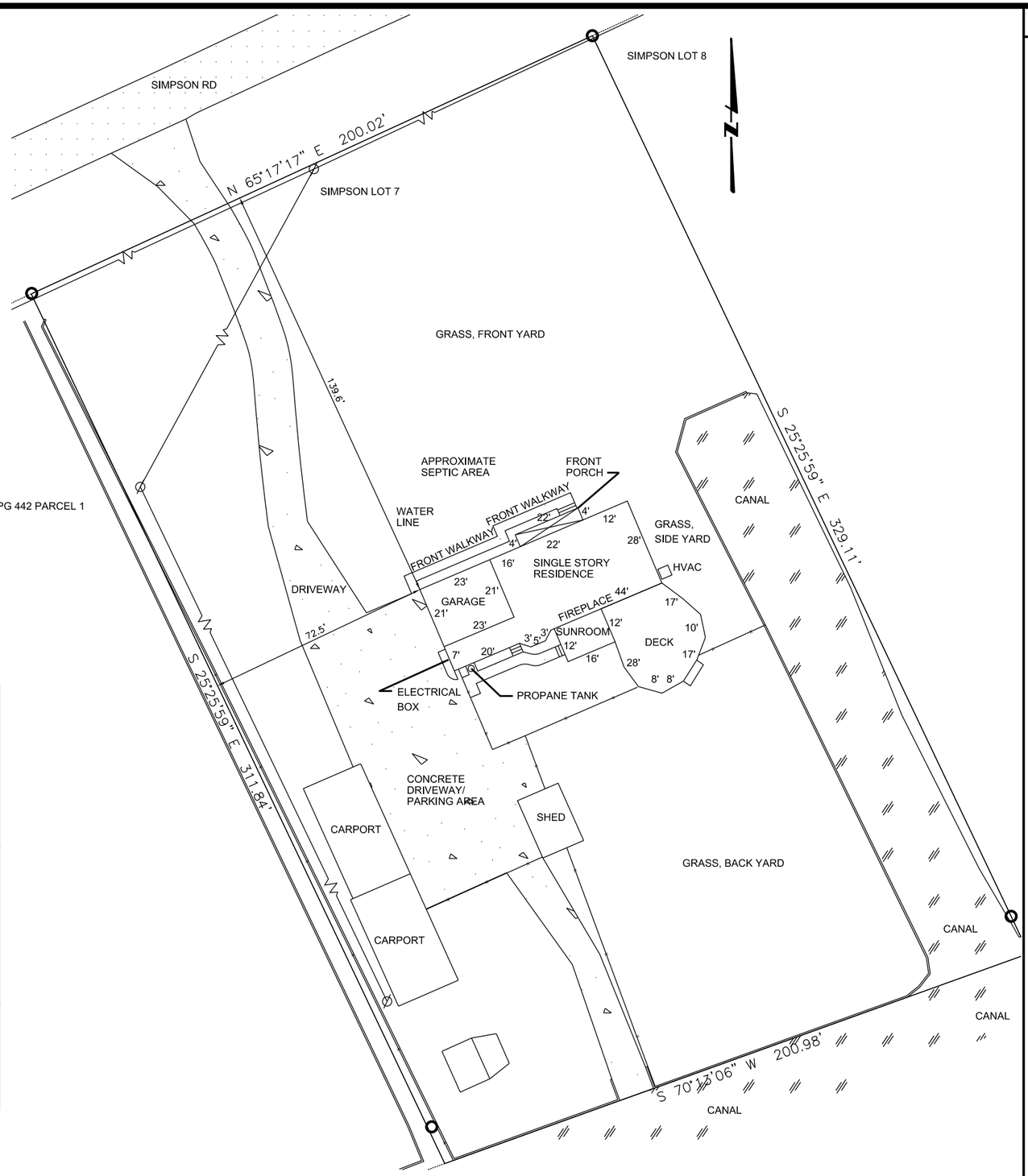
AND

FEASIBILITY STUDY



AREA MAP

VICINITY MAP



SITE PLAN

GENERAL SHEET NOTES

SUBJECT PROPERTY:	
LOT:	7
TOWNSHIP #:	40
TOWNSHIP NAME:	CRAWFORD
COUNTY:	CURRITUCK COUNTY
STATE:	NC
BOOK:	276
PAGE:	167
STREET ADDRESS:	148 SIMPSON RD BARCO, NC 27917
PARCEL ID NUMBER:	006900000170000
GLOBAL PIN:	8997-13-4189
LOT AREA:	64,096 SQ-FT
FEMA DATA:	CURRITUCK COUNTY
CID:	370078
PANEL:	8986
MAP NUMBER:	3720898600J
EFFECTIVE DATE:	12-16-2005
FIRM ZONE:	AE
FLOOD ZONES SUBJECT TO CHANGE BY FEMA	
LAND:	
CURRITUCK SOIL CLASS:	UNSUITABLE
LINE NUMBER:	1
LAND TYPE:	A-ACREAGE
LAND CODE:	19-CANAL FRONT
AREA:	43,560 SQ-FT
ACRES:	1.00
LOT FRONT FOOTAGE:	N/A
LOT DEPTH:	317
LAND VALUE:	$121,125
USE VALUE FLAG:	N
LINE NUMBER:	2
LAND TYPE:	A-ACREAGE
LAND CODE:	91-OPENLAND
AREA:	21,780 SQ-FT
ACRES:	0.50
LAND VALUE:	$6,650
SUBJECT PROPERTY ZONING: (SINGLE FAMILY RESIDENTIAL OUTER BANKS)	SFO
EXISTING DEVELOPMENT:	3 BEDROOM RESIDENTIAL DWELLING (SINGLE FAMILY) WOOD/MASONRY FRAME STRUCTURE ON MASONRY
STORIES:	1
ATTIC:	0
EXTERIOR WALL:	7-BRICK
STYLE:	1-RANCH
ASSESSED VALUE:	119,580
YEAR BUILT:	1977
LIVING AREA:	1,768
BEDROOMS:	3
FULL BATHS:	2
HALF BATHS:	0
TOTAL FIXTURES:	8
FOUNDATION:	2-CRAWL/PIERS
HEAT:	3-CENTRAL WITH A/C
HEATING TYPE FUEL:	3-ELECTRIC
HEATING SYSTEM:	1-WARM AIR
PHYSICAL CONDITION:	A-AVERAGE
FIREPLACE OPENINGS:	1
FIREPLACE STACKS:	1
MAIN BUILDING:	1575 SQ-FT
OPEN MASONRY PORCH:	88 SQ-FT
ENCLOSED FRAME PORCH:	192 SQ-FT
MASONRY GARAGE/ATTIC:	483 SQ-FT
WOOD DECK	793 SQ-FT
ASSESSED VALUES:	
LAND VALUE:	127,800
BUILDING VALUE:	149,000
TOTAL VALUE:	276,800
==========	
TAXABLE TOTAL VALUE:	276,800

REV	DATE	BY	DESCRIPTION

SCALE 1"=20'

WARNING 0 ½ 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED B. CROOK
DRAWN B. CROOK
CHECKED B. CROOK

KITTY HAWK ENGINEERING, PLLC
2036 CREEK RD
KITTY HAWK, NC 27949
252-655-1056

HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

148 SIMPSON RD
BARCO, NC 27917
SITE PLAN

SHEET C-2

1010961

NORTH ELEVATION

WEST ELEVATION

SOUTH ELEVATION

NORTHEAST ELEVATION

GENERAL SHEET NOTES

1. THE HOUSE WALLS, ROOF AND MAIN FLOOR WILL BE RAISED 2'-6". A BAND OF 8X8X16 CMU BLOCK WILL FILL THE GAP BETWEEN THE GROUND AND THE NEW FLOOR JOIST/GIRDER ELEVATION/BOTTOM OF EXTERIOR BRICK CURTAIN WALL. SEE FEASIBILITY STUDY FOR EXAMPLE PHOTO.

2. THE GARAGE DOOR OPENING WILL INCREASE IN HEIGHT 2'-6" AS A RESULT OF THE HOUSE LIFT. A 2'-6" DEEP WOOD FRAME SPANNING THE WIDTH OF THE GARAGE DOOR OPENING WITH VINYL SIDING WILL BE CONSTRUCTED AT THE TOP OF THE GARAGE DOOR OPENING IN ORDER TO MAINTAIN THE GARAGE DOOR OPENING DIMENSIONS. THE GARAGE DOOR FRAMEWORK SHALL BE ADJUSTED APPROPRIATELY TO ALLOW CONTINUED OPERATION OF THE GARAGE DOOR.

3. A NEW , ELEVATED WOOD FRAME FLOOR WILL BE BUILT IN THE SUNROOM. THE SUN ROOM WALLS AND ROOF WILL BE ELEVATED WITH THE MAIN HOUSE WALLS AND ROOF. WOOD FRAMING AND VINYL SIDING WILL FILL THE VERTICAL GAP AT THE BASE OF THE SUNROOM WINDOWS.

4. NEW WOOD FRAME ACCESS STAIRS AND RAILINGS WILL BE PROVIDED AT THE FRONT PORCH, GARAGE, SUN ROOM AND ADJACENT BACK DOOR.

5. THE CHIMNEY, MANTLE, FIREPLACE, FIREPLACE FOUNDATION, ETC. SHALL BE RAISED WITH THE HOUSE.

NORTH CAROLINA PROFESSIONAL SEAL 027540 ENGINEER BARRETT C. CROOK

Barrett C. Crook

6-12-2015

REV	DATE	BY	DESCRIPTION

SCALE: NTS

WARNING: 0 ½ 1 — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED B. CROOK
DRAWN B. CROOK
CHECKED B. CROOK

.

KITTY HAWK ENGINEERING, PLLC
2036 CREEK RD
KITTY HAWK, NC 27949
252-655-1056

HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

148 SIMPSON DRIVE
BARCO, NC 27917
ELEVATIONS

SHEET S-5

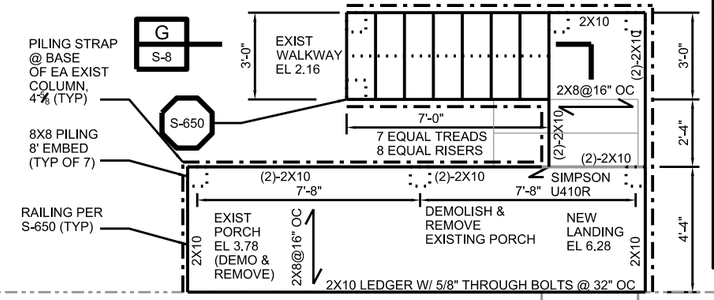
1010961

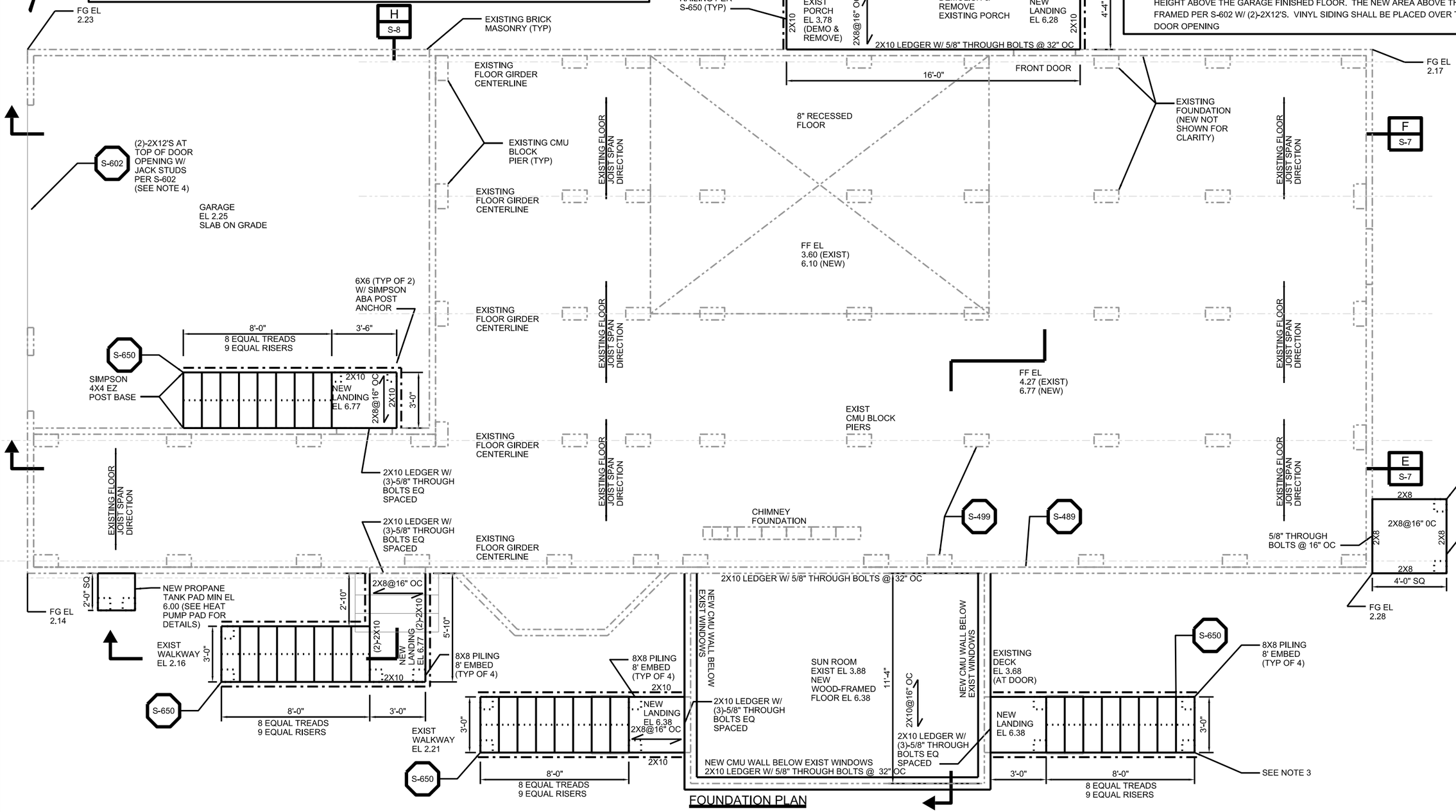
GENERAL SHEET NOTES

1.	BASE FLOOD ELEVATION:	5.00 FEET	2. FLOOD VENTS:
	FLOOD ZONE:	AE	HOUSE ENCLOSED AREA:1610 SQ-FT
	FREEBOARD REQUIREMENT:	1.00 FEET	FLOOD VENT AREA REQUIRED:1610 SQ-IN
	DESIGN FLOOD ELEVATION:	6.00 FEET	AREA OF ONE FLOOD VENT:128 SQ-IN
	EXISTING MAIN FIRST FLOOR ELEVATION:	4.27 FEET	MIN. NUMBER OF FLOOD VENTS REQ'D:13
	NEW MAIN FIRST FLOOR ELEVATION:	6.77 FEET	A MINIMUM OF 13 FLOOD VENTS SHALL BE PROVIDED.
	EXISTING RECESSED FIRST FLOOR ELEVATION:	3.60 FEET	CONTRACTOR SHALL LOCATE AS NECESSARY, EVENLY
	NEW RECESSED FIRST FLOOR ELEVATION:	6.10 FEET	SPACED ON EVERY WALL, 3 MINIMUM FOR NORTH,
	MAIN FLOOR AND ROOF HEIGHT INCREASE:	2.50 FEET	EAST AND SOUTH WALLS.

GENERAL NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO WORK
2. THE BASE OF ALL STAIRS SHALL BE ALIGNED WITH EXISTING CONCRETE WALKWAYS. CONTRACTOR SHALL NOTIFY THE ENGINEER AND FIELD ADJUST STAIR LOCATIONS WHERE AND IF NECESSARY.
3. THERE IS AN EXISTING DECK IN THIS AREA. THE DECK WILL BE DEMOLISHED FOR THE HOUSE LIFT. STAIRS ARE REQUIRED AT THE SUNROOM DOOR UNTIL A NEW DECK IS CONSTRUCTED BY THE HOMEOWNER.
4. THE GARAGE DOOR SUPPORTS SHALL BE LOWERED AFTER THE HOUSE LIFT TO REMAIN THE SAME HEIGHT ABOVE THE GARAGE FINISHED FLOOR. THE NEW AREA ABOVE THE GARAGE DOOR SHALL BE FRAMED PER S-602 W/ (2)-2X12'S. VINYL SIDING SHALL BE PLACED OVER THE FRONT OF THE GARAGE DOOR OPENING





FOUNDATION PLAN

Barrett C. Crook
NORTH CAROLINA PROFESSIONAL SEAL 027540 ENGINEER BARRETT C. CROOK
6-12-2015

REV	DATE	BY	DESCRIPTION

SCALE 3/8"=1'-0"

WARNING: IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED B. CROOK
DRAWN B. CROOK
CHECKED B. CROOK

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KITTY HAWK, NC 27949
252-655-1056

HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

148 SIMPSON ROAD
BARCO, NC 27917
PLAN

SHEET S-6

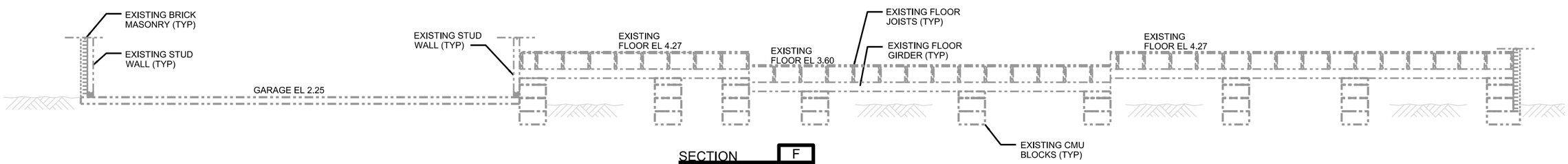
1010961

GENERAL SHEET NOTES

1. CONTRACTOR SHALL TAKE CARE NOT TO UNDERMINE EXISTING HOUSE FOOTINGS/FOUNDATION.

SECTION E / S-6
SCALE: 3/8"=1'-0"

NEW SECTION E / S-6
SCALE: 3/8"=1'-0"



SECTION F / S-6
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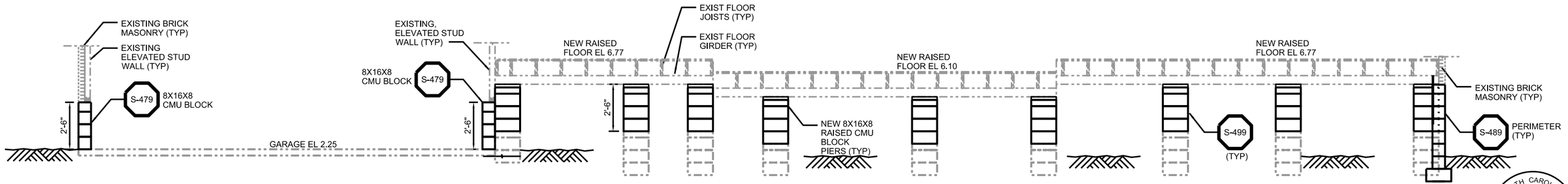

NEW SECTION F / S-6
SCALE: 3/8"=1'-0"

NORTH CAROLINA PROFESSIONAL SEAL 027540 ENGINEER BARRETT C. CROOK

Barrett C. Crook

6-12-2015

REV	DATE	BY	DESCRIPTION

SCALE: AS NOTED

WARNING: 0 ½ 1 — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

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CHECKED B. CROOK

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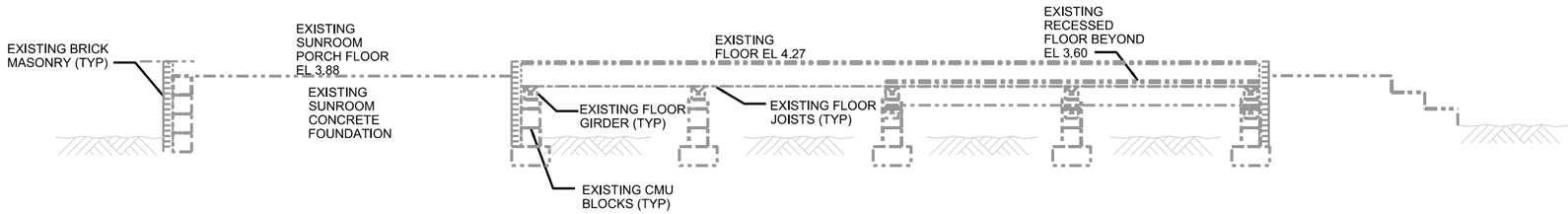
HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

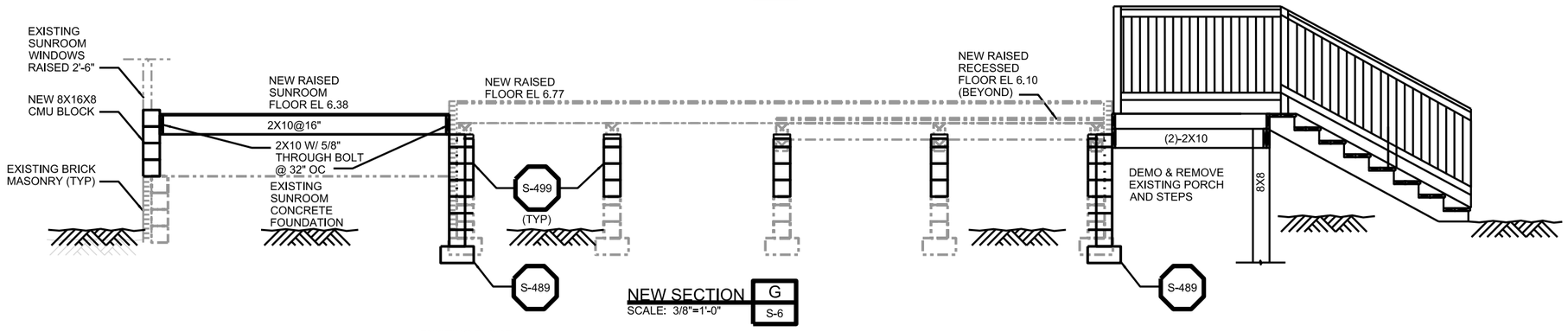
148 SIMPSON ROAD
BARCO, NC 27917
SECTIONS AND DETAILS - I

SHEET S-7

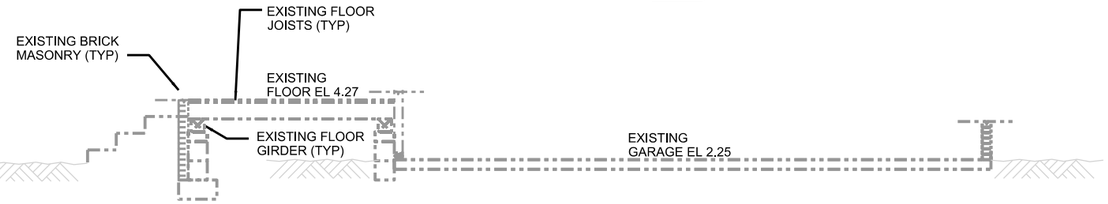
1010961



SECTION G / S-6
SCALE: 3/8"=1'-0"



NEW SECTION G / S-6
SCALE: 3/8"=1'-0"



SECTION H / S-6
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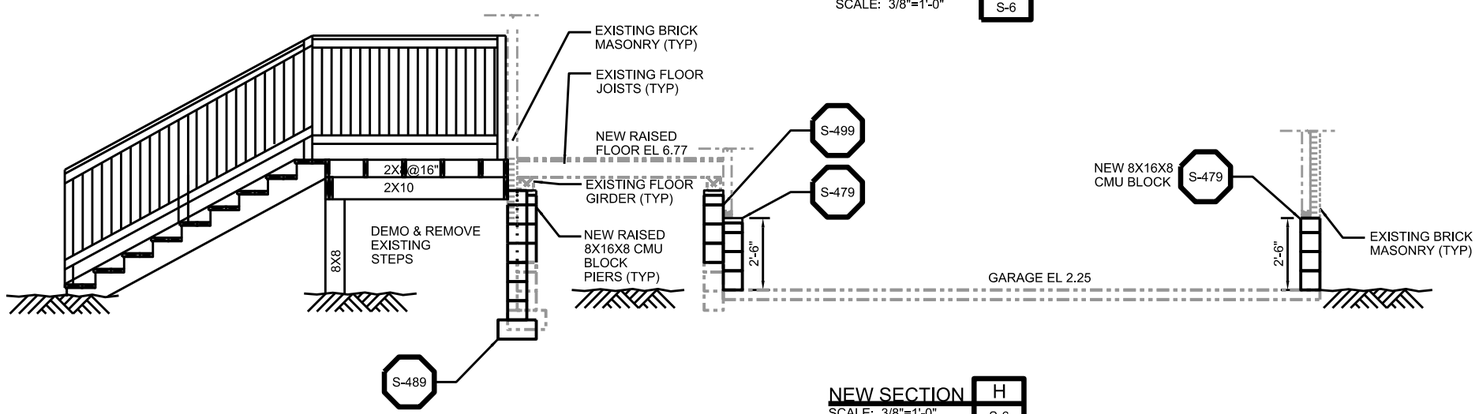

NEW SECTION H / S-6
SCALE: 3/8"=1'-0"

NORTH CAROLINA PROFESSIONAL SEAL 027540 ENGINEER BARRETT C. CROOK
Barrett C. Crook
6-12-2015

REV	DATE	BY	DESCRIPTION

SCALE 3/8"=1'-0"

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HURRICANE IRENE HAZARD MITIGATION GRANT PROGRAM (HMGP) FOR ELEVATION

148 SIMPSON ROAD
BARCO, NC 27917
SECTIONS AND DETAILS - II

SHEET S-8
1010961

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HIHGMP-FEASIBILITY STUDY

148 SIMPSON, BARCO, NC 27917

Executive Summary

On August 28, 2011, NC Governor Beverly Perdue requested a major disaster declaration due to Hurricane Irene during the period of August 25 to September 1, 2011. The Governor requested a declaration for Individual Assistance for seven counties and Hazard Mitigation statewide. During the period of August 28-30, 2011, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary. On

August 31, 2011, President Obama declared that a major disaster exists in the State of North Carolina. This declaration made Individual Assistance requested by the Governor available to affected individuals and households in Beaufort, Carteret, Craven, Dare, Hyde, Pamlico, and Tyrrell Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.

After a Presidential declaration, FEMA provides HMGP funds for States to administer grant programs that support local hazard mitigation planning and long-term hazard mitigation measures to reduce the loss of life and damages to improved property from natural disasters.

The home at 148 Simpson Road in Moyock, NC has been identified as a candidate to receive Hurricane Irene Hazard Mitigation Grant Program Funds. These Funds are to be used to elevate the house to better protect it from future flood damage. This feasibility study explores this process.

Considerations

Amount of Elevation

The amount of elevation required is determined by the Flood Protection Elevation or FPE. The FPE is the Base Flood Elevation or BFE + Freeboard. Freeboard is the vertical distance or height required above the BFE. For this project in Currituck County the Freeboard requirement is 1.00 feet. The house must be elevated so that the lowest floor in the house is at or above the FPE. This does not include uninhabited garages.

Existing Foundation

In general, the most economical approach to elevating a house is to use as much of the existing foundation as possible. Although some elevation methods do not allow this approach, most do. The ability of the existing foundation to support the loads that will be imposed by the elevated house and, as discussed in the next section, the loads expected to result from flooding and other hazards at the site will be investigated. If changes must be made to the foundation to increase its strength and stability, they can be made as part of the retrofitting project but they can increase both the cost of the project and the time required to complete it. The type of foundation on which the house was originally built (basement, crawlspace, slab-on-grade, piers, posts, pilings) also can affect the elevation process.

Hazards

Because so many elevation techniques are available, elevating is practical for almost any flood situation, but the flooding conditions and other hazards at the house site must be examined so that the most suitable technique can be determined. Regardless of the elevation technique used, the foundation of the elevated house must be able to withstand, at a minimum, the expected loads from hydrostatic pressure, hydrodynamic pressure, and debris impact. It must also be able to resist undermining by any expected erosion and scour. If elevating a house in an area subject to high winds, earthquakes, or other hazards, a design professional must determine whether the elevated house, including its foundation, will be able to withstand all of the horizontal and vertical forces expected to act on it. In making this determination, the design professional must consider a number of factors, including the structure and condition of the house, the soil conditions at the site, the proposed elevation technique, and the hazards at the site. The conclusion may be that additional modifications must be made during the retrofitting project.

Access

Elevating a house usually requires that new means of access be provided. For example, if entry doors were originally at ground level, new staircases will have to be built. When an attached garage is elevated, providing access for vehicles may require changes to portions of the lot, such as building a new, elevated driveway on earth fill that ties into high ground elsewhere. The need to provide new means of access is often the main objection that homeowners have to elevating.

House Size, Design, and Shape

In general, the larger the house and the more complex its design and shape, the more difficult it will be to lift on jacks. Multistory houses are more difficult to stabilize during the lifting process and as the dimensions and weight of a house increase, so do the required numbers of jacks and other pieces of lifting equipment. Exterior wall coverings such as stucco and brick veneer complicate the lifting process because they must either be removed or braced so that they will stay in place when the house is lifted. Houses with simpler square or rectangular shapes are easier to lift than those with attached garages, porches, wings, or additions, which often must be detached and lifted separately, especially if they are built on separate foundations. Before a house is lifted, a design professional must inspect it to verify its structural soundness. All the structural members and their connections must be able to withstand the stresses imposed by the lifting process. Lifting an unsound house can lead to potentially expensive damage.

Utilities

Before a house is elevated, all utility lines (water, sewer, gas, electric, telephone, etc.) must be disconnected. At the end of the project, the lines will be reconnected. All service equipment outside the house, such as air conditioning and heat pump compressors and gas and electric meters, shall be elevated to the FPE.

Obstructions

Decks, porch landings and any other items physically attached to the house but not being elevated must be detached and removed to the extent of allowing safe access for the house lifting equipment and personnel. The size of the fireplace is a potential issue for lifting.

Soils

The elevated house will weigh more than it does prior to the project because of the increased crawl space, pier and garage wall heights. As a result, the soils will experience a higher loading or pressure. Unfortunately, as-built or construction drawings are needed in order to accurately determine the house foundation's capacity. This information is usually not available so educated guesses, soil bearing capacities and visual inspections are required to determine if the foundation is adequate for the new loads.

The Process

Frame, masonry veneer, and masonry houses can all be elevated on extended foundation walls. The technique used for houses on basement and crawlspace foundations differs from that used for houses on slab-on-grade foundations.

Crawlspace Foundations

The elevation process is the same for frame, masonry veneer, and masonry houses on basement and crawlspace foundations. Figures 5-4a through 5-4d illustrate the process. First, holes are made at intervals in the foundation wall so that a series of steel I-beams can be installed at critical points under the floor framing (see Figure 5-4a). If the foundation walls are made of concrete blocks, the lifting contractor can remove individual blocks to create the required holes. The I-beams are placed so that they run perpendicular to the floor joists. A second set of beams is then placed below and perpendicular to the first set (see Figure 5-4a). The two sets of beams extend the width and length of the house and form a cradle that supports the house as it is being raised. In Figure 5-4a, the foundation walls are shown as extending far enough above the ground surface to provide easy access to the area below the floor framing. In some houses, however, the foundation walls will not be this high. To lift such a house, the contractor must first dig trenches at intervals around the foundation. The I-beams are then lowered into the trenches and inserted below the floor framing. The contractor may also have to dig holes for the lifting jacks, as shown in the figure. The number of jacks needed will depend on the size, shape, and type of house being lifted.

PROCESS:
Elevating on Extended Foundation Walls

EVALUATE THE EXISTING FOUNDATION TO DETERMINE WHETHER IT WILL SUPPORT THE ELEVATED HOUSE

↓

OBTAIN NECESSARY PERMITS

↓

TURN OFF UTILITY SERVICES AND DISCONNECT UTILITY LINES

↓

EXCAVATE AROUND THE FOUNDATION AS NECESSARY TO INSTALL LIFTING BEAMS AND, IF REQUIRED, TO STRENGTHEN THE FOUNDATION

↓

CUT HOLES IN THE FOUNDATION AND HOUSE WALLS AS NECESSARY TO INSTALL THE NETWORK OF LIFTING BEAMS

↓

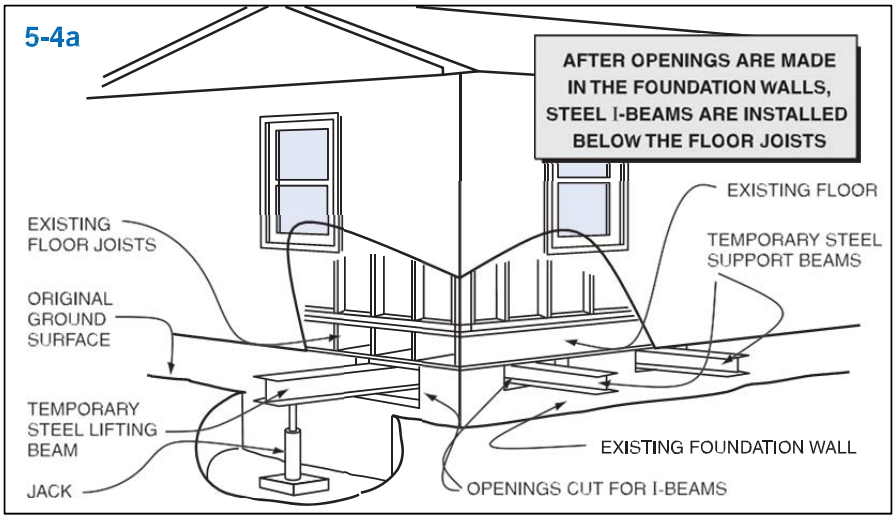
RAISE HOUSE WITH JACKS

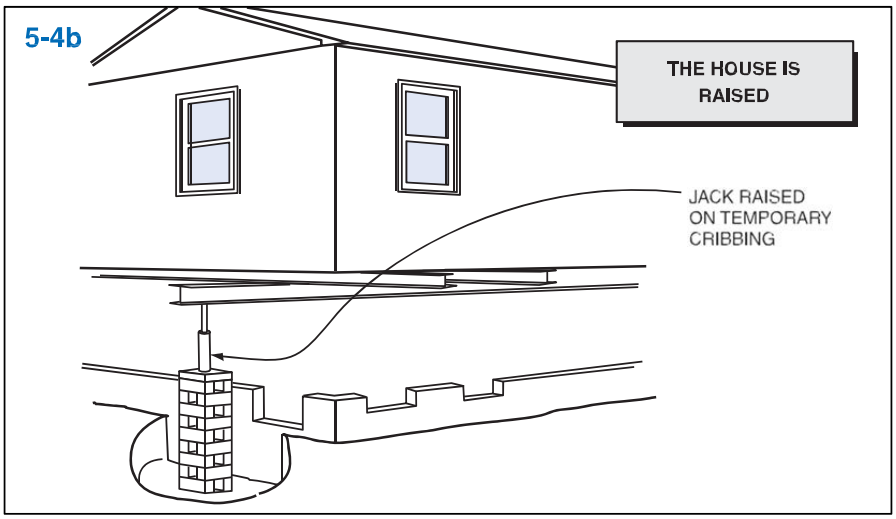
↓

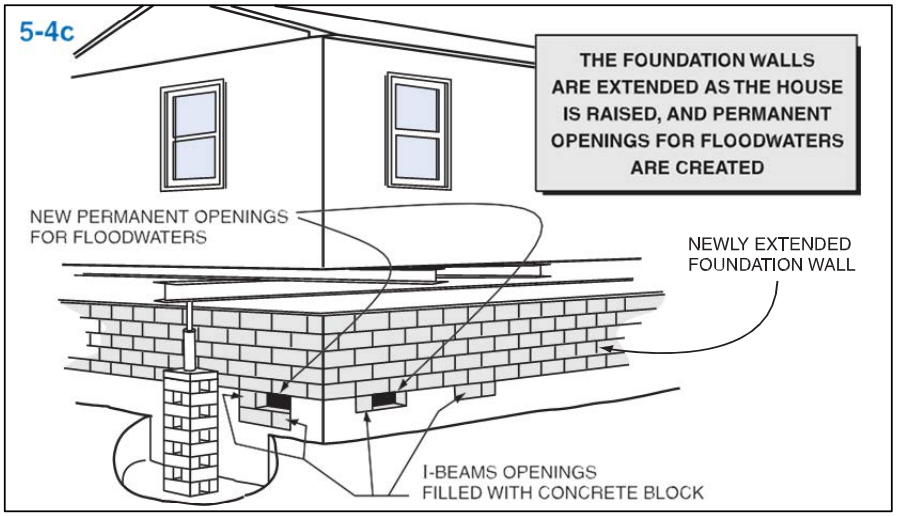
EXTEND FOUNDATION WALLS TO DESIRED HEIGHT AND INSTALL WALL OPENINGS TO ALLOW FLOOD WATERS TO ENTER

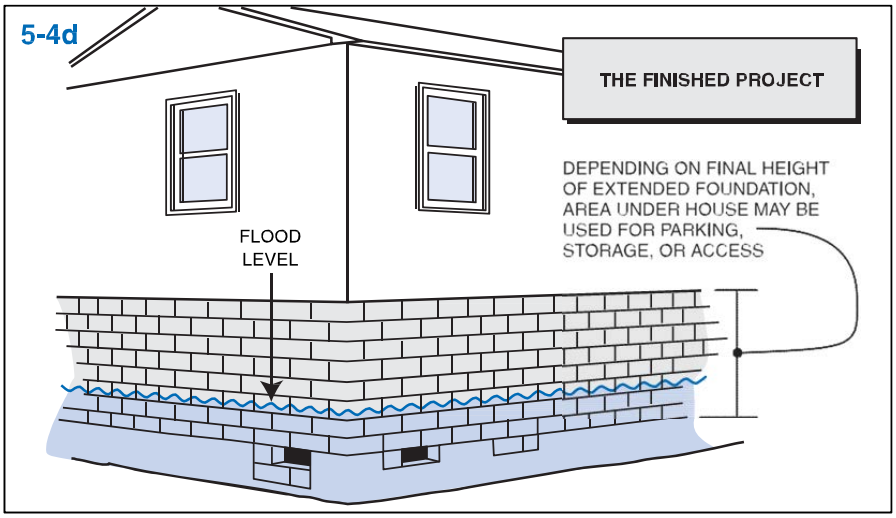
↓

LOWER HOUSE ONTO EXTENDED FOUNDATION WALLS, RECONNECT UTILITY LINES, AND RESTORE UTILITY SERVICES




5-4b
THE HOUSE IS RAISED
JACK RAISED ON TEMPORARY CRIBBING


5-4c
THE FOUNDATION WALLS ARE EXTENDED AS THE HOUSE IS RAISED, AND PERMANENT OPENINGS FOR FLOODWATERS ARE CREATED
NEW PERMANENT OPENINGS FOR FLOODWATERS
NEWLY EXTENDED FOUNDATION WALL
I-BEAMS OPENINGS FILLED WITH CONCRETE BLOCK


5-4d
THE FINISHED PROJECT
DEPENDING ON FINAL HEIGHT OF EXTENDED FOUNDATION, AREA UNDER HOUSE MAY BE USED FOR PARKING, STORAGE, OR ACCESS
FLOOD LEVEL

Findings and Recommendations

Amount of Elevation

The Base Flood Elevation or BFE is 5.0 feet. The freeboard requirement is 1.0 foot. As a result, the Flood Protection Elevation or FPE is 6.0 feet. The house is located in an AE flood zone. Based on this information the lowest finished floor elevation in the house shall be no lower than 6.0 feet. The main portion of this house has an 8" recessed or lowered floor area in the front-center portion of the house. In addition, the sun room/enclosed porch is also lowered below the main floor. As a result, these two areas will be raised up to no lower than 6.0 feet and the main portion of the house will be elevated even higher.

Existing Foundation

The most economical approach to elevating this house is to use as much of the existing foundation as possible. The ability of the existing foundation to support the loads that will be imposed by the elevated house and, as discussed in the next section, the loads expected to result from flooding and other hazards at the site will be investigated but are not expected to represent a serious hurdle. If changes must be made to the foundation to increase its strength and stability, they will be made as part of the retrofitting project but they can increase both the cost of the project and the time required to complete it. The home has a crawlspace foundation type which is not expected to negatively affect the elevation process.

Hazards

The flooding conditions and other hazards at the house site will be examined and the foundation of the elevated house will be able to withstand, at a minimum, the expected loads from hydrostatic pressure, hydrodynamic pressure, and debris impact. It will also be able to resist undermining by any expected erosion and scour. Flood vents will be added to the foundation walls to comply with code requirements and minimize hydrostatic loading. In addition, high winds, earthquakes, or other hazards will be checked by a design professional to verify that the elevated house, including its foundation, will be able to withstand all of the horizontal and vertical forces expected to act on it. In making this determination, the design professional will consider a number of factors, including the structure and condition of the house, the soil conditions at the site, the proposed elevation technique, and the hazards at the site. No significant foundation or house modifications are expected but, if necessary, will be made during the retrofitting project.

Access

New wood steps and landings (where required) will be provided for foot traffic access into and out of the home. For example, exterior doors originally at one level will have new stairs and landings (where required). However, the attached garage slab on grade foundation will not be elevated as this cost is not covered by the HIHMGP. New access steps and landings (where required) will be provided in the following locations:

1. In the garage into the house (crawl space access will be maintained)

2. At the front door

3. At the rear of the house behind the garage

4. At the sunroom/enclosed porch and opposite side of the sunroom porch

House Size, Design, and Shape

Fortunately, this house is relatively simple in terms of being a single story and regular rectangular shape so it will be relatively simple to lift on jacks. The exterior brick walls complicate the lifting process because they tend to be more brittle and subject to cracking. The house has been inspected by a design professional and it appears structurally sound, however, there are some significant cracks in the brick masonry visible from the outside. Care shall be taken to minimize further cracking and the expansion of the existing cracks. All the structural members and their connections should be able to withstand the stresses imposed by the lifting process, however, lifting a house, a sound or unsound house, can always lead to potentially expensive damage and is always associated with unknowns during the preparation, lifting and settling process. While this is not anticipated it is always a possibility.

Utilities

Before a house is elevated, all utility lines (water, sewer, gas, electric, telephone, etc.) will be disconnected. At the end of the project, the lines will be reconnected. All service equipment outside the house, such as air conditioning and heat pump compressors and gas and electric meters, will be elevated to the FPE.

Obstacles

There is a sizable deck connected to the back Eastern half of the house and the sunroom. This deck will interfere with the house lifting equipment and a significant portion of it must be removed in order to provide safe access.

There is also a small canal on the East side of the house. The lifting contractor will need to be careful not to overload the soil too close to this canal which could cause bulkhead failure.

The house septic system is located in the front of the house on the western-half of the front grass.

There is a large fireplace inside the house. The fireplace weighs a significant amount including the chimney and supporting foundation.

There is a structural steel wide flange I beam on the garage ceiling supporting the FROG or Family Room Over Garage.

The sunroom is a converted back porch with a concrete floor/foundation. This will not be lifted. Instead, a new elevated wood frame floor will be constructed above the FPE. The sunroom foundation will be separated from the main house foundation for the lifting process similar to the front porch.

Soils

The elevated house will weigh more than it does prior to the project because of the increased crawl space and garage wall heights. As a result, the soils will experience a higher loading or pressure. The soils in this area are classified as poor by Currituck County's soil map. However, given the relatively small amount of additional loading and the relatively good condition of the house for its age no foundation remediation measures in addition to the standard height increases and code requirements are expected.

Post-Elevation

The photo below is an example of a house after it has been raised. The CMU blocks around the base represent the vertical increase in height for the home. The brick masonry above the CMU blocks is the original wall siding and supported by the CMU blocks. The new wood stairs and landing provide access for the front door.

Costs

There are two types of house lifting services that you may get estimates or quotes for. The first is just the actual house lift. This is the cost for a reputable house raising company to come in, lift your home, and put it back on its foundation. The second type, what you really need and what is being provided for you, is the full service house lift. This includes the lift, as well as all of the general contracting duties that are associated with preparing the house for the lift and putting it all back together again.

A full-service turn-key house lifting estimate includes all of the following:

- Permits

- Initial Survey and Drawing
- Pre Lift Elevation Certificate
- Sewer Disconnect and Cap
- Water Disconnect and Cap
- HVAC Disconnect and Cap
- Electric Severance Letter, Disconnect and Cap
- Structural Engineering Design and Drawings
- Set Up Temporary Electric Pole and/or Electric Generator (if necessary)
- Pump Water Out of Crawl Space (if necessary)
- Severing of Foundation Anchors
- Detach Shower, Decks, Porches, etc.
- Install Jacks; Preliminary Lift; Install Steel
- Raise Heated and Cooled Living Space a minimum of 1.00 feet above FEMA BFE to the FPE
- Demolish and Remove Parts of Existing Foundation
- Shoring (where and if necessary)
- Raise Fireplace and Chimney (depending on fireplace size, cost and house lifting contractor recommendation)
- House Supported and Secured on Crib Stacks
- New Continuous Perimeter Block CMU Installed
- Interior Foundation Piers Raised
- Install New Concrete CMU Block Foundation
- Install New CMU Perimeter Foundation Blocks
- Install Foundation Tie Down Straps
- Install new pressure treated 2x plates
- Lower House
- Fasten Foundation Strapping to Plates
- Install Hurricane Ties on Perimeter, connecting plates to floor joists
- New HVAC Platform, HVAC Raised and Reconnected
- Install Flood Vents in Perimeter CMU Block Foundation Walls
- Construct New Access Stairs
- Finish Work Including Carpentry and Painting
- Dumpster for Debris and Concrete Removal
- Debris and Concrete Removal
- Water Reconnect
- Sewer Reconnect
- Electric Service Reconnect
- Survey
- Post Lift Elevation Certificate

Additional Items for 148 Simpson Rd:

- New Elevated Floor and Wall Framing Under Windows in Sun Room
- 2’-6” Wood Frame and Vinyl Siding at Top of Garage Door Opening

Conclusions

The most significant or serious issues expected during the lifting process are the chimney, fireplace, mantle, etc. and the glass walls/windows of the sunroom. Both of these areas will be potentially challenging to lift without adverse effects and add to the cost/schedule. The sunroom windows can be removed before the lift and replaced after the lift at the contractor's option. The fireplace, mantle, chimney, etc. may weigh in excess of 10,000 pounds. Knowing the precise weight, extent and depth of the fireplace foundation is impossible without excavation.

The house appears structurally sound but masonry is brittle and the older the masonry is the more brittle it can be. Wood, by its very nature, is more flexible than masonry and mortar. As a result, routine flexing or movement in wood members which result in no visible or structural issues in the wood itself may result in and be reflected by drywall, masonry and/or mortar cracking. This tends to be aesthetic in nature and can be patched as has already been done in several locations around the exterior of the house. The existing cracks are likely the result of routine foundation settling. The size of the fireplace, mantle and chimney and sunroom glass walls/windows present two significant obstacles which will be carefully considered and evaluated by the lifting contractor.

Sincerely,

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