

**Bloomington Historic Preservation Commission, Zoom Virtual
Meeting, Thursday June 11, 2020, 5:00 P.M. AGENDA**

I. CALL TO ORDER

II. ROLL CALL

III. APPROVAL OF MINUTES

IV. CERTIFICATES OF APPROPRIATENESS

Commission Review

A. COA 20-20 (Continuation)

325 S. Rogers Street (Prospect Hill Historic District)

Petitioner: Josh Kelley

Install fencing around home.

V. DEMOLITION DELAY

Commission Review

A. Demo Delay 20-13

126 E. Ridgeview Dr.

Petitioner: Carol Damon

Full demolition

VI. NEW BUSINESS

A. Annex Project (3rd and Grant)

B. Rose Hill Cemetery Fountain Base

C. Johnson Creamery Stack Inspection Report

VII. OLD BUSINESS

VIII. COMMISSIONER COMMENTS

IX. PUBLIC COMMENTS

X. ANNOUNCEMENTS

XII. ADJOURNMENT

*Auxiliary aids for people with disabilities are available upon request with adequate notice. Please call
812-349-3429 or email, human.rights@bloomington.in.gov.*

Next meeting date is June 25, 2020 at 5:00 P.M. in the McCloskey Room. **Posted:** 6/5/2020

COA: 20-20

Address: 325 S. Rogers Street

Petitioner: Lynn & Teri Yohn

Parcel #: 53-08-05-101-009.000-009

Rating: Contributing

Structure; Queen Anne c. 1890



Background: Located in the Prospect Hill Historic District, this Queen Anne style home is known as the William Fulwider House. The petitioner selling the property and a potential buyer has listed approval of this fence petition as a condition to the sale.

Request:

1. Install 4' wrought iron fence around front yard and sides of the house. Fence will be stained natural wood color. A 8' privacy fence (vertical orientation) will be constructed around backyard and rear alley. See diagram and pictures in packet for more details.

Guidelines: Prospect Hill Historic District Design Guidelines, pg. 6

1. Back yard fences are appropriate to the Prospect Hill Local Historic District. Acceptable designs include slat-style (vertical board), picket, lattice, or wrought iron
2. In general it (a new fence) should begin no farther forward than a point midway between the front and rear facades of the house.
3. Front yard fences are not generally characteristic of the Prospect Hill Local Historic District and are discouraged.

COA: 20-20

Staff Comments:

1. The material of the 4' fence section (wrought iron) is appropriate according to the guidelines and will not obstruct the view of the historic home from the public right of way.
2. The wooden privacy fence in the backyard meets the standards in height, material, and style.
3. The current proposal allows the petitioners to enter the fenced in portion of the yard from their house.
4. The guidelines state that "In general it (a new fence) should begin no farther forward than a point midway between the front and rear facades of the house". While the western fence section starts behind the front building wall, it is still in front of the midway between front and rear facades.

Staff Recommendation: APPROVAL of COA 20-20

Revised Fence Diagram



Demo Delay: 20-13
Commission Decision

Address: 126 E. Ridgeview Dr.

Petitioner: Carole Damon

Parcel Number: 53-08-16-204-004.000-009

Property is Contributing

Structure; Ranch c. 1955



Background: Located in the Sunny Slopes neighborhood, this is an economy-size (minimal) Ranch style home that features a 6-lite window in the front.

Request: Full demolition.

Guidelines: According to the demolition delay ordinance, BHPC has 90 days to review the demolition permit application from the time it is forwarded to the Commission for review.

Recommendation: Staff recommends releasing **Demo Delay 20-13** unless new information comes out about the building that makes it historically significant at the local level. There is certainly an architectural theme present in the neighborhood that sees several variations and imitations of one or two styles and forms.

P&T
Received
05/20/2020

C20-187
(New Construction)

1 of 2

RESIDENTIAL PERMIT APPLICATION "One & Two Family Residence"

MONROE COUNTY BUILDING DEPARTMENT
501 N. Morton St RM 220-B, Bloomington, Indiana 47404
Phone Number: (812) 349-2580 FAX: (812) 349-2967

APPLICATION MUST BE FILLED OUT COMPLETELY; PLEASE PRINT

Parcel No. 53-08-16-204-04 Subdivision Sunny Slopes Lot No. 7
Project Address 126 E Ridgeview Dr City Bloomington Zip Code 47401
Township Perry Section No. 16

Property Owners Name Estate of Ann F. Damon Phone No. 812 360-1828
Property Owners Address 800 W Baywood Dr City Bloomington Zip Code 47403

Applicants Name Carole Damon Phone No. 812 360 1828
Applicants Address 800 W Baywood Dr City Bloomington Zip Code 47403

General Contractor Self Phone No. 812 360 1828

Please check applicable boxes and fill in blanks as required:

Proposed Work: ☒ New Construction ☐ Addition ☐ Remodel (area) _____ Other (explain) _____
Rental: ☒ Yes ☐ No Flood Plain: ☐ Yes ☒ No Sink Holes: ☐ Yes ☒ No Watershed: ☐ Yes ☒ No
Building use (i.e. personal residence, duplex, storage bldg., barn, garage, etc., (explain) rental

future retirement house for me
Total number of bedrooms 3 Number of residential units 1 Estimated construction cost (census) 160,000
Total Square Footage of proposed structure 3400
First floor square footage 1200 Garage/Carport square footage 2400 Attached ☒ Detached ☐
Second floor square footage 1200 Covered Deck(s)/Porch(s) square footage 24
Third floor square footage 0 Other Floor square footage (explain) _____
Basement square footage 1200 Grading area (area of soil disruption) 1680 sq ft
Elevated deck (>30") square footage 120

Driveway Permit No. NA ☐ State of Indiana ☐ Monroe County ☐ City of Bloomington
Wastewater system to be connected to: ☒ City of Bloomington Sewer ☐ Other sanitary system
Septic System: Permit no. _____ Number of bedrooms on permit _____

The applicant hereby certifies and agrees as follows: (1) I am authorized to make application. (2) I have read this application and attest that the information furnished is correct, including that contained in plans. (3) If there is any misrepresentation in this application, or associated documents, Monroe County may revoke any permit or Certificate of Occupancy issued based upon this misinformation. (4) I agree to comply with all Monroe County Ordinances, permit conditions and State statutes which regulate building construction, use, occupancy and site development. (5) I grant and will request Monroe County Officials to enter onto the property listed on this application for the purpose of inspecting the work permitted by this application and posting notices. (6) I will retain the Certificate of Occupancy in my records upon completion of the project. NOTE: Plans shall mean all site and construction plans and specifications, whether furnished prior to or subsequent to the application date. All plans furnished subsequent to application date constitute an amendment to the original application and must be specifically approved by the County with an appropriate endorsement and the signature of the approving official prior to plan implementation. The Permit is not valid, and work is not permitted until signed and issued by the agent of the Monroe County Building Department.

Signature of Applicant: Carole Damon Date: 3.24.2020

Email address CAROLE@bluemarble.net

08/26/2016/Bldg/Reviews/Forms

C - '18 Demo Delay

New Rental

For New Construction, Additions & Remodels:
Please check appropriate boxes and fill in all
required blanks: PRINT CLEARLY

FOUNDATION

- type(s): material:
- ☒ Basement ☒ Poured Concrete
- ☐ Crawl space ☐ Concrete Block
- ☐ Slab on Grade ☐ Other _____
- ☐ Other _____

GIRDER BEAM (floor beam(s)):

- ☐ Metal Size _____
- ☒ Manufactured wood Size 5 1/4 x 14
- ☐ Wood Species _____ Grade _____
- Size 2 - 2" x _____
- 3 - 2" x _____
- 4 - 2" x _____

GIRDER BEAM SUPPORTS:

- ☒ Metal 3" steel pipe
- ☐ Wood column size _____
- ☐ Concrete size _____
- ☐ Masonry size _____
- Spacing on center _____

FLOOR JOIST SYSTEM - HOUSE:

- ☐ Steel size _____
- ☒ Manufactured "T" joist size 11 7/8
- ☐ Wood Size _____ Species _____
- Grade _____ Spacing on center _____

FLOOR JOIST SYSTEM - DECK:

- ☒ Wood size 2x10 Species Treated Pine
- ☐ Grade _____ Spacing on center _____

CEILING JOIST/ TRUSS SYSTEM:

- ☐ Joist or ☒ Truss
- Size 2x4
- ☐ Manufactured "T" Joist size _____
- ☐ Wood size _____
- Species _____
- Grade _____ Spacing on Center _____
- ☐ Other _____

ATTIC VENTILATION:

- ☒ Ridge Vent
- ☐ Gable Vents
- ☐ Roof Vents
- ☐ Soffit Vents
- ☐ Other (explain) _____

RAFTER / TRUSS SYSTEM 2 of 2

- ☐ Joist or ☒ Truss
- ☐ Steel size _____
- ☐ Manufactured "T" Joist size _____
- ☐ Wood size _____ Species _____
- Grade _____ Spacing on center _____

TOTAL # OF SLEEPING ROOMS: 3

(to include new and existing)

TOTAL # OF SMOKE ALARMS: 5

(Hardwired with Battery back up)

WATER HEATER:

- Quantity 1
- ☒ Gas B.T.U. input: 40,000
- ☐ Electric
- ☐ Other Energy: (explain) _____
- Location:
- ☐ Garage ☒ Basement
- ☐ Attic ☐ Crawl space
- ☐ Utility room ☐ Other explain _____

FURNACE SYSTEM:

- Quantity 1
- ☒ Gas B.T.U. input: 100,000
- ☐ Electric ☐ Geothermal _____
- ☐ Other energy: _____
- Location:
- ☐ Garage ☒ Basement
- ☐ Attic ☐ Crawl space
- ☐ Utility room ☐ Other explain _____

FIREPLACE:

- Quantity 1 Location(s) _____
- Type:
- ☐ Masonry or ☐ Factory Built
- Fuel source:
- ☐ Gas ☐ Wood

ELECTRIC SERVICE:

- Service Panel:
- Location Basement
- Size: ☐ 100 amp ☐ 400
- ☒ 200 amp ☐ Other _____

Sub Panel(s)

- Location(s) _____
- Size: ☐ 100 amp ☐ 400
- ☐ 200 amp ☐ Other _____

68392
pddx

P&T
Received
05/20/2020
C20-186
(Demolition)

Demolition Application

Monroe County Building Department
501 N. Morton St Rm 220-B, Bloomington, Indiana 47404
Phone Number (812) 349-2580 FAX: (812) 349-2967
<http://www.co.monroe.in.us/buildingdept.html>

Date: 3-24-2020

Project Address: 1216 E Ridgeway Dr. Bloomington IN 47401
Street City, State Zip

Township: Perry Section #: 16

Parcel Number 53-08-16-204-004-000-009

Subdivision: Sunny Slopes Lot #: 7
Applicant Name: Carole Damon Phone #: 8123601828

Property Owner Name: Estate of Ann F. Damon
Address: 800 W Baywood Dr. Bloomington IN 47403 Phone #: 8123601828
Street City, State & Zip

Contractor: (if applicable) Self
Phone #: _____

Type of Utilities Connected to this Structure

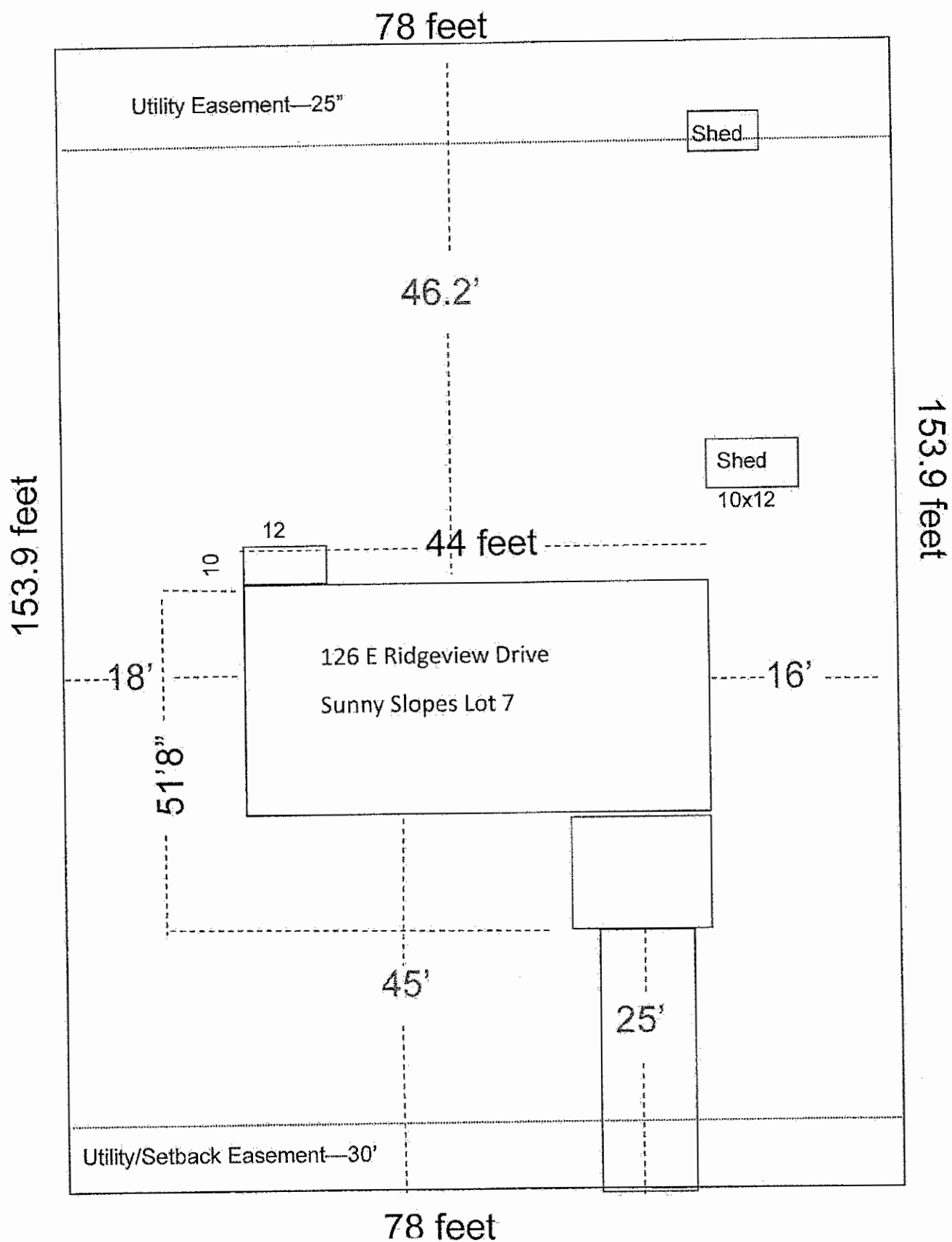
☒ Gas ☒ Electricity ☒ Septic/Sewer ☒ Water ☐ Other

WORK BEING PERFORMED:

Demo house and basement - basement
wall has collapsed from rains, three
remaining walls are compromised

The applicant hereby certifies and agrees as follows: (1) That applicant has read this application, and attests that the information that has been furnished is correct (2) If there is any misrepresentation in this application, Monroe County may revoke any permit issued in reliance upon such misrepresentation (3) Agrees to comply with all Monroe County ordinances and grant Monroe County officials the right to enter onto the property for the purpose of inspecting the work permitted & posting notices (4) Is authorized to make this application.

Signature [Signature]
Owner/Applicant



DAMON, ANN

Project - DAMON-SFR-126

Address - 126 RIDGEVIEW DR E

Parcel - 53-08-16-204-004.000-009

App # - 68392 Twp - PR-16

Ridgeview Drive

FILED

MAY 17 2018

Catherine Smith

Auditor Monroe County, Indiana

Ann F. Damon
126 E. Ridgeview Drive
Bloomington, IN 47401

2018006260 TRANSFER \$25.00
05/17/2018 12:51:32P 2 PGS
Eric Schmitz
Monroe County Recorder IN
Recorded as Presented



TRANSFER ON DEATH DEED

THIS INDENTURE WITNESSETH, that Ann F. Damon, an adult of legal age ("Grantor"), of Monroe County, Indiana, conveys and warrants upon Grantor's death to Thornton H. Damon, Jr., Jeffrey A. Damon and Carole A. Damon ("Primary Beneficiaries"), as joint tenants with full rights of survivorship, who are the children of Grantor, for no consideration and for estate planning purposes, the Grantor's interest in the following Real Estate located in Monroe County, Indiana:

Lot Number Seven (7) in Sunny Slopes Addition Number One, the same being a sub-division of a part of the East Half of the Northwest Quarter of Section Sixteen (16), Township Eight (8) North, Range One (1) West in Perry Township, Monroe County, Indiana

Real Estate Address: 126 E. Ridgeview Drive, Bloomington, IN 47401
State Parcel Number: 53-08-16-204-004.000-009
County Parcel Number: 015-07395-00

GRANTOR RECITATION: Ann F. Damon and Thornton H. Damon were husband and wife when they acquired title to the above-described Real Estate by Warranty Deed dated November 10, 1956, and recorded on November 13, 1956 in Deed Record Book 122, Page 1190 in the Office of the Recorder of Monroe County, Indiana. Their marital status continued unbroken until the death of Thornton H. Damon on February 16, 2005, thereby vesting title to the subject Real Estate solely in Ann F. Damon as surviving tenant by the entirety.

SUBJECT TO THE FOLLOWING:

1. Subject to the restrictions, conditions, covenants and provisions contained in the recorded plat of Sunny Slopes Addition Number One as shown in Plat Book #4, page 67 recorded in the Office of the Recorder of Monroe County, Indiana.
2. Subject to and together with all public highways and rights-of-way, all other covenants, conditions, restrictions, easements, liens and encumbrances of record, and all taxes and assessments.

IN WITNESS WHEREOF, Grantor has executed this Transfer on Death Deed this 16th day of May, 2018.

Ann F. Damon
Ann F. Damon

STATE OF INDIANA, COUNTY OF MONROE, SS:

Before me, a Notary Public in and for said County and State, this 16th day of May, 2018,
at which time Ann F. Damon personally appeared and acknowledged the execution of the above and foregoing
Transfer on Death Deed to be a voluntary act and deed.

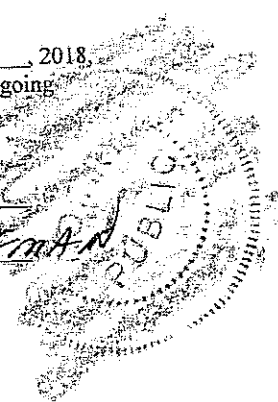
My Commission Expires:

January 8, 2022

Sarah R. Kaufman
Notary Public

Printed Name: Sarah R. Kaufman

Residing in Monroe County, Indiana



I affirm, under the penalties for perjury, that I have taken reasonable care to
redact each Social Security Number in this document, unless required by law.

vs Greg Lauer

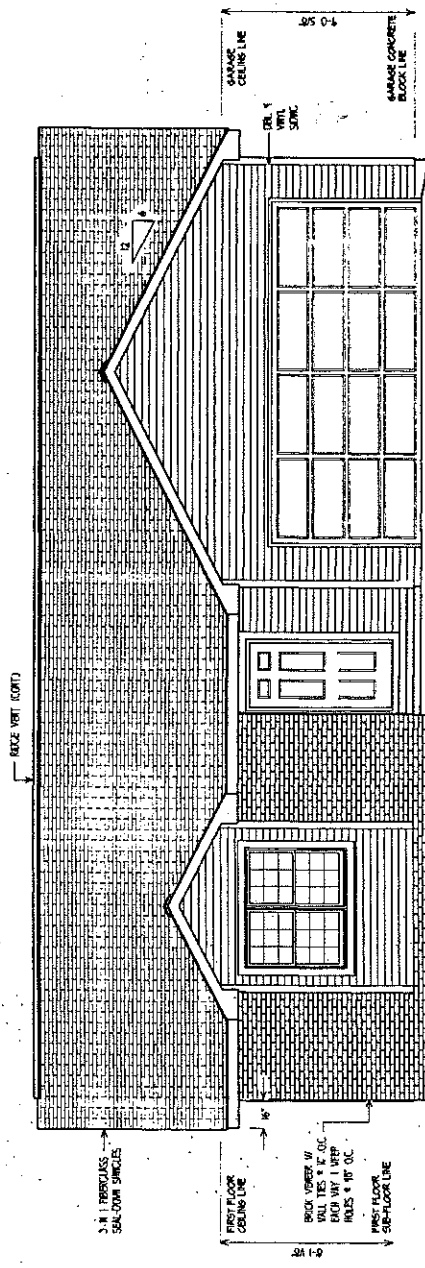
Greg Lauer

This Instrument Prepared By: Gregory Scott Lauer, Attorney at Law, Bloomington, IN

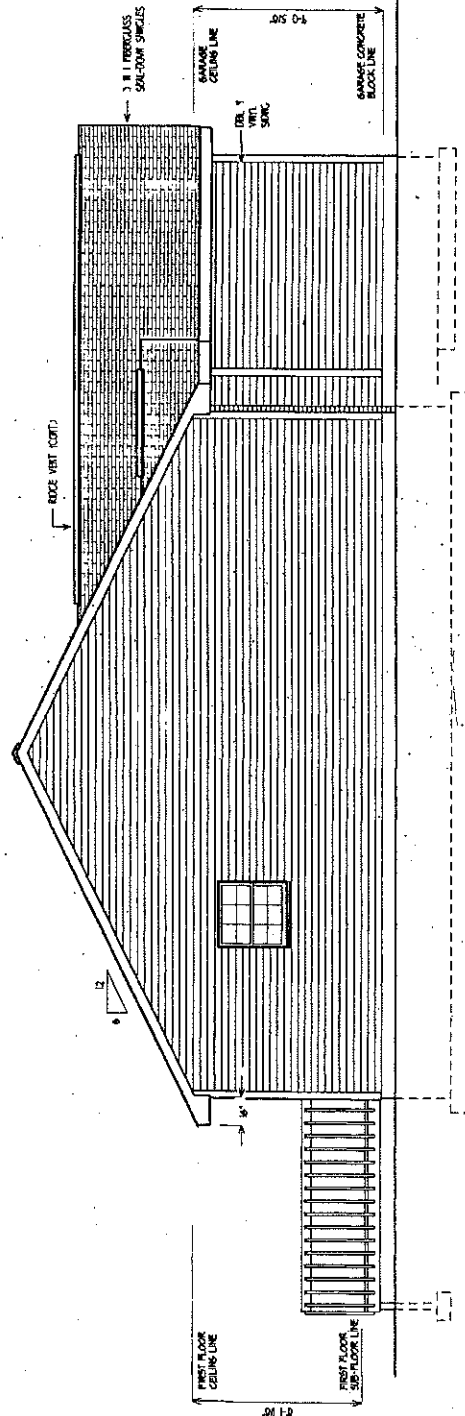
This Instrument was prepared at the request of Grantor or the Grantor's representatives and is
based solely on information provided by Grantor or the Grantor's representatives and without
examination for accuracy of said information and the Preparer assumes no responsibility or liability
for errors, inaccuracies or omissions in this Instrument as a result of the information provided by
Grantor or the Grantor's representatives which disclaimer is accepted by Grantor and/or the Grantor's
representatives by way of Grantor's execution of this Instrument.

NOTE: OWNER HAS BEEN ADVISED OF THE LIMITATIONS OF THIS DRAWING. THE ARCHITECT ASSUMES NO RESPONSIBILITY FOR ANY DAMAGES, INJURY, LOSS OF LIFE OR PROPERTY, OR ANY OTHER CONSEQUENCES OF ANY TYPE, ARISING FROM THE USE OF THIS DRAWING. THE ARCHITECT'S LIABILITY IS LIMITED TO THE PROFESSIONAL FEES AND COSTS OF THE ARCHITECT'S PROFESSIONAL LIABILITY INSURANCE. THE ARCHITECT'S LIABILITY DOES NOT EXTEND TO THE DESIGN OF THE BUILDING OR TO THE BUILDING'S PERFORMANCE. THE ARCHITECT'S LIABILITY IS LIMITED TO THE PROFESSIONAL FEES AND COSTS OF THE ARCHITECT'S PROFESSIONAL LIABILITY INSURANCE. THE ARCHITECT'S LIABILITY DOES NOT EXTEND TO THE DESIGN OF THE BUILDING OR TO THE BUILDING'S PERFORMANCE.

1200



FRONT ELEVATION



LEFT SIDE ELEVATION

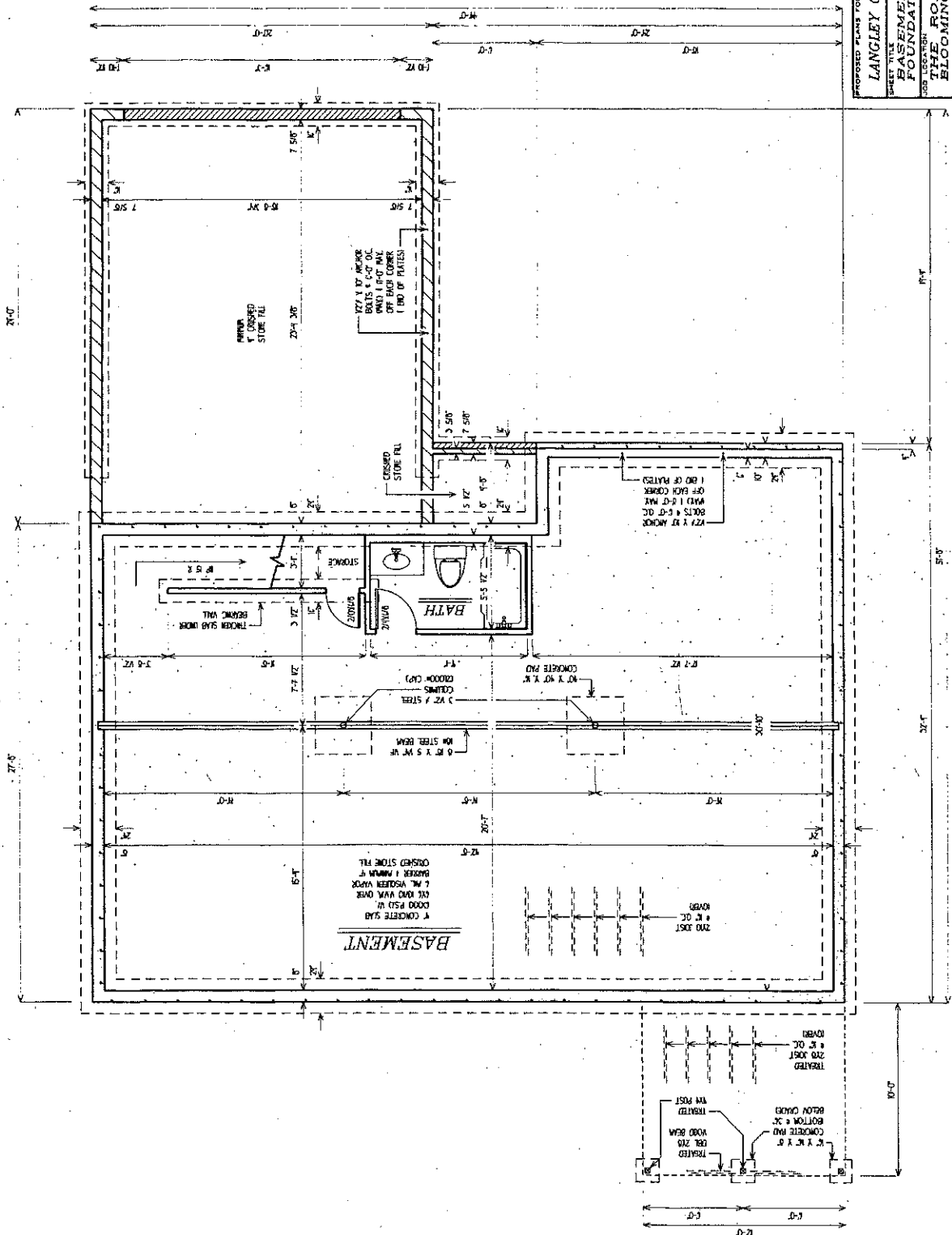


PROPOSED PLANS FOR		PHONE	
LANGLEY CONSTRUCTION CO.			
SHEET FILE	SCALE	DRAWN BY	DATE
ROBIN ELEVATIONS	1/4"=1'-0"	REVIEWED	
JOB LOCATION		DRAWING NUMBER	
		008	
DATE	APPROVED BY		
APRIL 99			

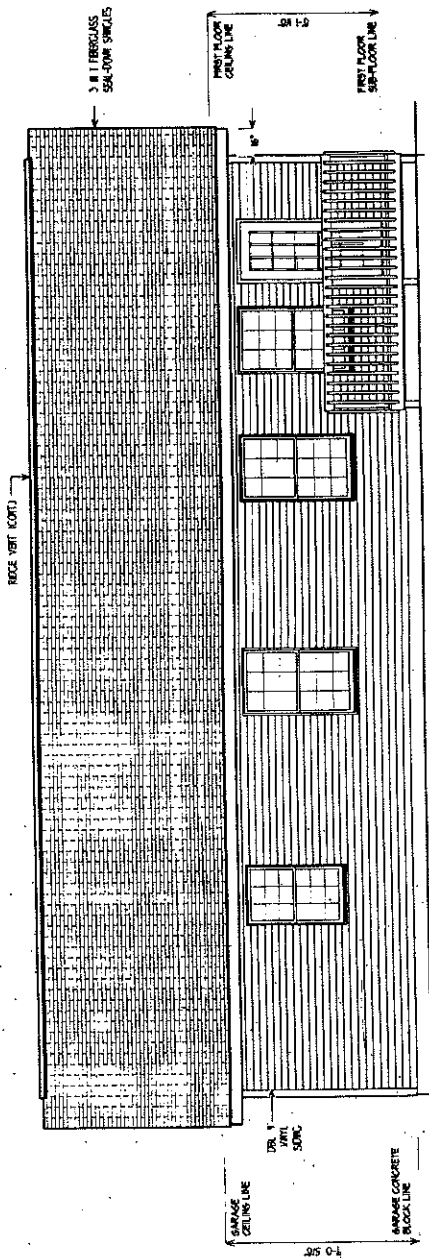
NOTE: GREAT CARE HAS BEEN TAKEN
IN THE PREPARATION OF THESE PLANS TO ASSURE
THAT THEY ARE CORRECT. HOWEVER, THE BUILDING MATERIALS
AND THE WORKMANSHIP OF THE CONTRACTOR ARE
ENTIRELY BEYOND THE CONTROL OF THE ARCHITECT.
FAILURE TO FOLLOW ANY INSTRUCTIONS OR
RECOMMENDATIONS OF THE ARCHITECT MAY
RESULT IN DAMAGE TO THE BUILDING. IT IS
RECOMMENDED THAT YOU CONSULT
WITH THE ARCHITECT BEFORE ANY
CHANGES ARE MADE TO THE PLANS.
BUILDING OFFICIALS SHOULD BE NOTIFIED
BEFORE ANY CHANGES ARE MADE.



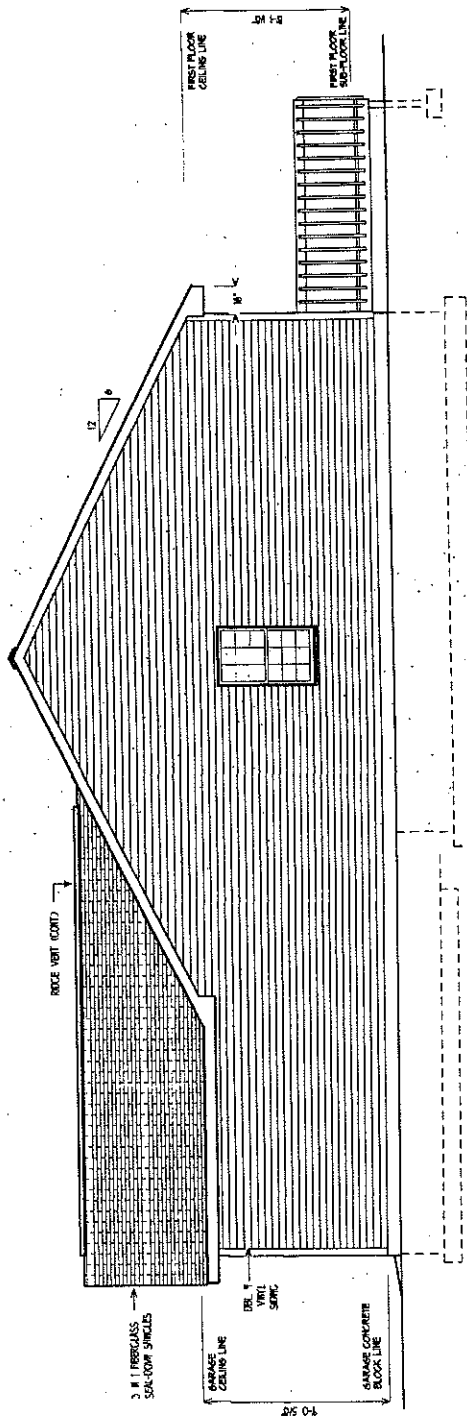
PROPOSED PLANS FOR		PHONE
LANGLEY CONSTRUCTION CO.		360-5363
SHEET NO. 1		DRAWN BY DON BURNETTE
FOUNDATION PLAN		REVISED
JOB LOCATION		THE ROBIN, INDIANA
DATE		AUG. 02
APPROVED BY		0001



NOTE: ROYAL LANE HAS ASSUMED THE
DESIGN OF THIS PLANS TO ASSURE
ACCURACY. ROYAL LANE GROUP, INC. ASSUMES
NO RESPONSIBILITY FOR ANY DAMAGES
OR LOSSES OF ANY KIND, INCLUDING
IN ANY JURISDICTIONS, INCLUDING, BUT
NOT LIMITED TO, THE STATE OF TEXAS.
IT IS RECOMMENDED THAT YOU CONSULT
AN ARCHITECT OR ENGINEER OF YOUR
CHOICE BEFORE ANY CONSTRUCTION
OR REVISIONS ARE MADE TO THIS
DRAWING.



BACK ELEVATION



RIGHT SIDE ELEVATION



PROPOSED PLANS FOR	LANGLEY CONSTRUCTION CO.	PHONE	
SHEET TITLE	ROBIN ELEVATIONS	SCALE	1/4"=1'-0"
DESIGNER		DATE	APRIL 99
DATE	APRIL 99	APPROVED BY	
DRAWING NUMBER	001		

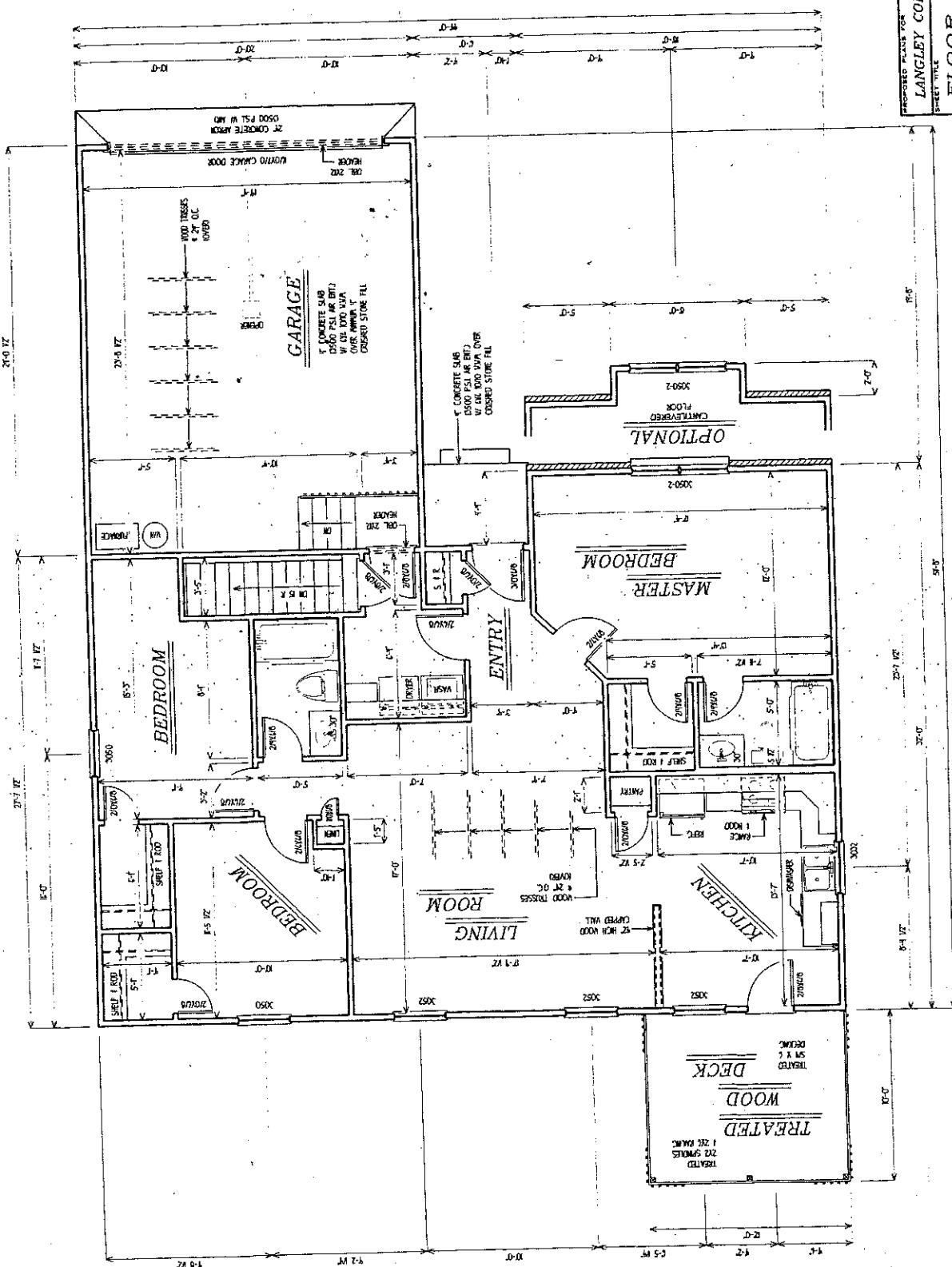
NOTE: FIRST ONE HAS CODE WHO
 INDICATION OF THESE PLANS TO ASSURE
 ACCURACY OF THE BUILDING MATERIALS
 DISTRIBUTION ASSURES NO REPRESENTATION
 FOR ANY PART OF THE PLANS. THE
 PARTIES, DUE TO ANY NEGLIGENCE,
 OR OTHERWISE, THE DISTRIBUTOR, THE
 ARCHITECT OR ENGINEER, YOUR
 BUILDING OFFICIALS PRIOR TO START
 OF CONSTRUCTION.

NOTE:

ALL EXTERIOR WALLS 4" THICKNESS
 CON. STUDS 16" O.C. W/ 1/2" SHEATHING
 ALL INTERIOR WALLS 5/8" THICKNESS
 UNLESS NOTED OTHERWISE
 ALL WINDOWS & PATIO DOORS IN THIS
 PROJECT TO BE PRIMO VINT.
 TOTAL LIVING AREA 1215 SQ. FT.



PROPOSED PLANS FOR	LANGLEY CONSTRUCTION CO.	PHONE	360-5963
SHEET TITLE	FLOOR PLAN	SCALE	1/4" = 1'-0"
DRAWN BY	JOHN BUNNETTE	REVISIONS	
DATE	AUG. 02	APPROVED BY	
LOCATION	THE ROBIN	DRAWING NUMBER	00E1
	BLOOMINGTON, INDIANA		





Inspection Report



140'-10" Radial Brick Chimney Johnson's Creamery 400 West 7th Street - Bloomington, IN

Prepared For:


Orion
REAL ESTATE AND
PROPERTY MANAGEMENT
400 West 7th Street #106
Bloomington, IN 47404

Prepared By:


R & P
INDUSTRIAL
CHIMNEY CO.
INCORPORATED
April 6, 2020

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Inspection of Johnson's Creamery Chimney – Bloomington, IN

Report Summary

On April 6, 2020, a representative from R+P Industrial Chimney Company performed an inspection of the Johnson's Creamery chimney at 400 West 7th Street in Bloomington, Indiana. The purpose of the inspection was to examine the condition of the chimney and determine if any immediate maintenance work was required to bring it up to sound capacity. The chimney possessed a noticeable lean of the upper elevations and had not been thoroughly inspected for several years.

Chimney Description

A General Arrangement sketch showing key dimensions is presented in Appendix A. A description of the brick chimney is given below.

Configuration	Chimney height:	140'-10" (top of foundation to top of steel roof)
	Total height:	141'-3" (top of grade to top of steel roof)
	Geometry:	Round (shale) radial brick
	Top diameters:	7'-0" (outside) / 5'-9" (inside)
	Base diameters:	14'-1½" (outside-measured) / 11'-2½" (inside-estimated)
	Wall thickness:	7½" (top – measured) / 17" (base – estimated)
	Remaining wall thicknesses:	See Appendix A drawing
Inner Brick Liner	Height:	38' (spans from 11'-6" to ±49'-6")
	Support condition:	Corbel supported near 9' level
	Wall thickness:	4" radial brick (full height)
Duct Opening	Size / sill / orientation:	3'-6" x 6'-10" / sill 13'-10", south side
		Duct transitions to ±3'-6" square 6' from chimney
Appurtenances	Roof cover:	¼" steel plate supported atop five 4" I – beams
	Exterior step irons:	None
	Interior step irons:	Northeast side (full height)
	Tension bands:	Thirty-seven 3½" x ⅜" bands (various spacing)
	Lightning protection:	3 air terminals (SW, NE and E sides)
		Upper and midheight encircling cables
		1 full height downlead cable (northeast side)
		1 partial height downlead (southwest side, 32' to top)
	Cleanout opening:	Original 2'x3' cast iron door replaced with grating
Existing Antenna	Number of levels/quantity:	1 level (three sets of 3 antenna 120° apart)
	Elevation / orientation:	(3) 9' antenna centered 120' (S, NW, NE)
		(2) sets of 5' antenna centered 120'-9" (SE, W, NE)

Chimney History

The chimney was built in the 1940's. Past modifications (some dates unknown) are listed below:

- lowering the chimney from an unknown height to its current height.
- repointing of nearly all exterior joints and random partial brick replacement.
- installation of the 3" thick cement cap and steel roof (2001).
- installation of the 37 exterior tension bands.
- installation of the 1 level of cellular antenna.
- Installation of the vertical enclosure for coaxial cables (south side below duct).
- removal of the cleanout door and installation of grating section.

Inspection Procedure

A visual inspection of the exterior was performed from grade and a crane-suspended manbasket. The condition of brick faces, mortar joints, steel roof, exterior bands, lightning protection components, cellular antennas, breeching duct and cleanout door were inspected. Areas showing cracked or open mortar joints, damage to appurtenances or local defects were noted and photographed. From the top of the chimney, the uppermost interior surfaces were inspected and photographed. The remaining interior surfaces were inspected by lowering a camera for the full height of the chimney. All photographs are presented in Appendix C.

Inspection Findings

Steel Roof

The ¼" thick steel roof plate and five, 4" deep support beams were secure and in good condition. With the exception of the weathered paint of the roof plate, no concerns were identified. The plate measured 7'-2" in diameter and overhung the vertical curb plate by approximately 1". Connection welds of the curb plate to roof plate appeared sound and no open gaps or defects along welds were noticed. Very few areas of rust were seen along the five support beams. A small hole was cut into and then patched to allow for the internal inspection. Photos 1 - 40 show the roof with the patch plate.

Lightning Protection System

All lightning protection air terminals, encircling cables and downlead cables were continuous and except for a few loose anchors along downlead cables, components were secure. The three air terminals, upper encircling cable and upper 15' of the southwest downlead cable were lead-covered and appeared to be the most recently installed components. Lead coating along each of these items was cracked and local areas dislodged. At the connection of the northeast downlead to the upper encircling cable, several strands were broken, but most of the cable remained connected. At the 32'-7" level, the southwest downlead cable traverses around the chimney and connects to the northeast downlead cable. Near grade, the northeast downlead is spliced to a grounding cable projecting from the soil. Photos xx – 10 show the condition of components at the top of the chimney.

Exterior Tension Bands

The chimney possessed a total of thirty-seven exterior bands. The range of elevations of all bands is shown on the Appendix A drawing. All bands measured 3½" wide by ¾" thick and possessed a coat of prime paint. Local areas of surface rust existed along many of the bands, but no areas were severely deteriorated. Silicone caulking remained along only local regions of a few random bands. A description of the bands is given below.

- The lowermost band is at the 33'-4" level and possessed welded splices.
- The next four bands spanned between the 49'-8" and 37'-6" levels and possessed bolted splice connections. The bands were installed prior to 2001. A similar band previously dislodged from the 45' level and was not replaced.
- The next twenty-seven bands spanned between the 126'-0" and 54'-8" levels and possessed welded splice connections. The bands were installed at various times between 2001 and approximately 2010.
- The uppermost five bands spanned between the 139'-2" and 128'-8" levels and possessed bolted splice connections. The bands were installed prior to 2001.

Inspection Findings (cont'd)

Chimney Exterior

The exterior condition of the chimney ranged from good to poor. Numerous generations of repointing work were evident over the full height of the chimney. The age of the most recent work appeared more than 10 years old. Since the exterior condition varied with elevation, the regions are broken down into the below sections.

- 140'-10" (top) to 126'-0" – With the exception of the significant lean to the southeast direction, the overall condition of this region was good. Only one spalled brick face was identified, and the majority of mortar joints appeared sound. Photos 19 and 20 show the one local areas of concern were mortar is missing from several joints and the one spalled brick exists. Past repairs to thin cracks were also identified in this 15' region. Photos 13 – 20 show this region.
- 126'-0" to 115'-0" (region of cellular antenna) – The exterior condition of this region ranged from fair to poor. Several spalled bricks existed on the southwest side and quality of the most recent repointing work was somewhat crude. It appeared the repointing work was performed with the antennas and RRU units in place, which most likely prevented proper grinding of joints before being refilled. Photos 21 – 24 show this region.
- 115'-0" to 40'-0" – The overall condition of this region was poor. Numerous spalled bricks, loose brick faces, bulged regions, dislodged mortar and cracked mortar were identified. The loose brick faces (Photos 31 and 39) were in danger of falling to grade. The highest levels of damage existed on the northeast side between the 80' and 70' levels (Photos 37 – 40) and on the south side at the 41' level (Photos 45 – 46). Based on visual observations, the lean of the upper elevations initiates near the 75' level. Photos 25 – 47 show this region.
- 40'-0" to grade – With the exception of a few local areas of spalled brick and thin cracks, the overall condition of this region was good. No structural concerns were identified throughout the extended walls surrounding the breaching duct opening or cleanout opening. Photos 48 – 66 show this region.

Existing Cellular Antennas and Support Bands

The condition of antennas, RRU's support components and coaxial attachments throughout the one level of antennas appeared good. When viewed from grade and the manbasket, no obvious defects or deteriorated components were seen throughout any of the numerous antennas or support components. Photos 23 – 24 show the antennas and support components.

Breeching Ducts (Horizontal and Vertical)

Local to the entrance of the chimney, no concerns were identified with the thin gage horizontal duct or its connection to the chimney. The condition of the vertical duct used to conceal coaxial cables was also good. Photos 56 – 58 show these components.

Cleanout Door

The original cast iron cleanout door at the bottom of the northeast side had been replaced with a section of steel grating firmly attached to the door frame. The sill region of the frame was eroded from past leakage, but the frame was secure. The brickwork surrounding the frame filling the original construction opening was in good condition. Photos 66 – 67 show the cleanout opening and surrounding wall.

Projecting Concrete Foundation

Upper surfaces of the concrete foundation were eroded on the west and north sides. The masonry wall did not fully bear on the concrete along the east side, but the concrete in this region remained in good condition. Photos 52 – 65 show the projecting foundation.

Inspection Findings (cont'd)

Chimney Interior

The interior condition of the chimney varied from good to poor. Like exterior surfaces, descriptions of each region are described below.

- Cement cap (3" thick) – When viewed from the interior, the condition of the cement cap atop the brick wall was good. The cement appeared sound for the full perimeter of the wall and was providing support for the five beams on the underside of the roof. Photos 5 – 8 show the cement cap atop the brick wall.
- 140'-2" (top of brick) to 128'-0" – The interior condition of this region was good. All mortar joints throughout this region appeared to have been repointed and no concerns (spalling, cracking) with any brick faces were identified. The age of the repointing work was difficult to determine since the chimney possessed a full roof. Photos 5 – 12 show the interior condition of this region.
- 128'-0" to 100'-0" – The interior condition of this region was fair. Mortar joints were slightly recessed ($\frac{1}{4}$ " to $\frac{1}{2}$ " deep) and only a few spalled brick faces were identified. No obvious or immediate concerns were seen local to any of the cored holes at the cellular antenna level used for coaxial cable penetrations.
- 100'-0" to 49'-0" – The interior condition of this region varied from poor to fair. Numerous spalled brick faces were identified, with the highest percentage of spalling occurring near the 70' level (10% of faces spalled). The interior condition of mortar joints was deteriorated as most joints were recessed ($\pm\frac{1}{2}$ ").
- 49'-0" (top of inner liner) to 11'-6" (corbel support for liner) – The interior condition of the inner liner wall was good. The upper 15' appeared to be 4" thick ribbed-faced brick laid in stretcher courses. The lower 20' appeared to be radial brick of unknown thickness. No obvious or significant concerns (cracks, bulges, spalling, recessed joints) were identified in any region of the liner wall or the corbelled courses supported atop the outer wall near the 11'-6" level.
- 11'-6" to grade – With the exception of remaining buildup or possibly refractory material, no interior concerns were seen through the lower elevations of the outer structural wall. Photo 68 shows the east and southeast sides of the interior.
- Top of floor – Approximately 8" of debris and spalled brick faces remained in the base of the chimney. Photos 69 – 70 show the accumulated debris.

Interior Step Irons

For the full height of the chimney, construction (step) irons existed on the northeast side spaced approximately 15" on center. All of the interior rungs appeared severely deteriorated and several were bent over. The interior rungs should not be used for support of personnel or equipment.

Support of Coaxial Cables

It appeared two bundles of hanging coaxial cables for the 120' level antennas were supported by chains secured to the underside of the steel roof. The two chains were located in the southwest and southeast quadrants. The condition of the chains appeared good. Photos 10 – 12 show the chains.

Conclusions / Repair Actions

The condition of the chimney varied over the height of the chimney with regions ranging from good condition (lower 40' and upper 15') to poor (115' to 40' levels). One of the most prominent features of the chimney is its significant curvature of the upper elevations in the southeast direction. It was estimated the top of the chimney was "leaning" nearly 18" out of plumb. Based on visual observations, the curvature initiated near the 70' level, but the lower elevations possessed minor levels of displacement.

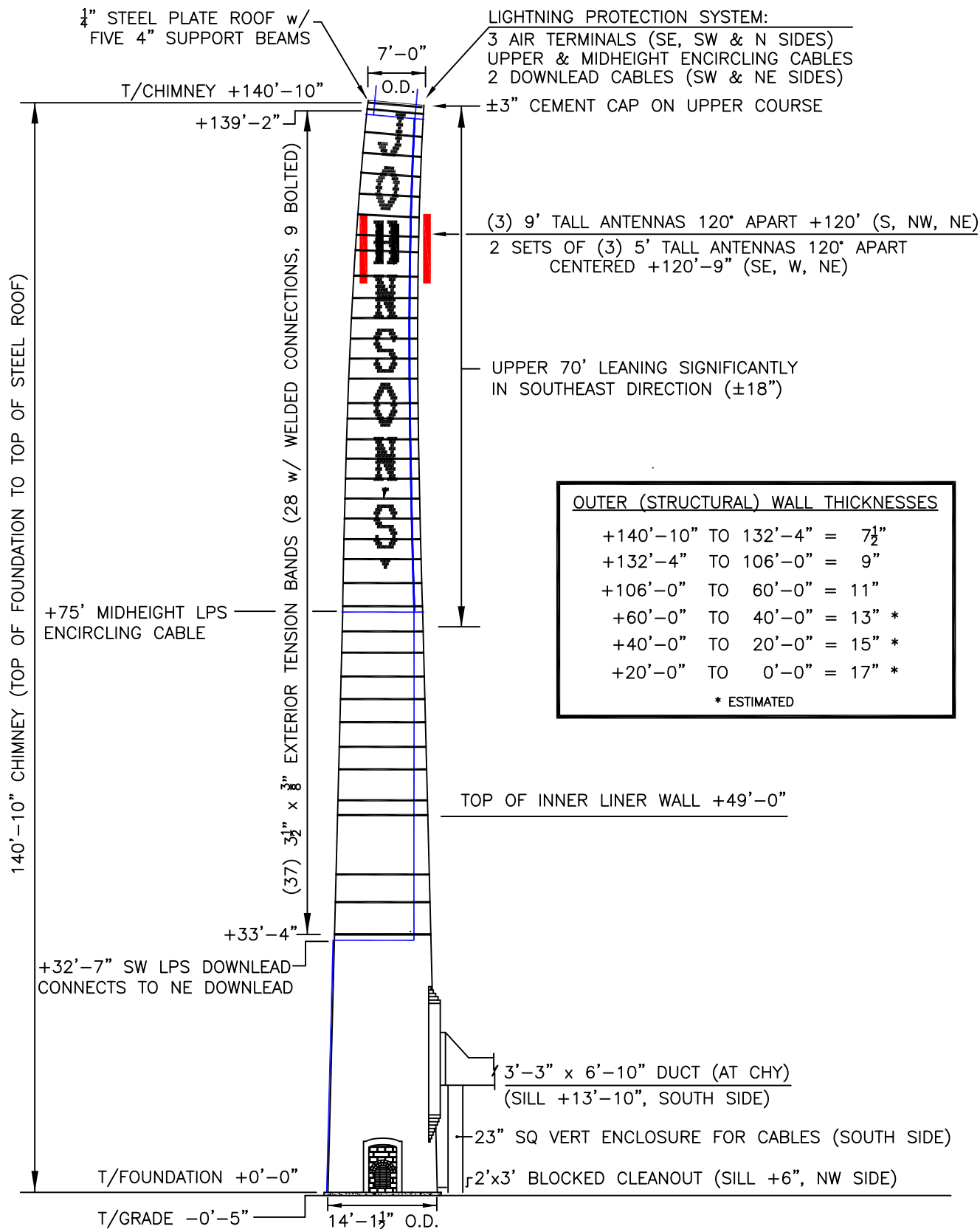
Based on the April 2020 inspection findings, it can be concluded that the significant lean is a result of moisture infiltration and freeze-thaw cycles within the masonry wall. The added drag load caused by wind loads on the significant number of cellular antennas at the 120' level and a substandard inspection and repair routines are also underlying causes of the lean.

Since no original drawings of the chimney were located, wall thickness in the lower elevations were estimated based on radial brick chimneys of similar heights and configurations. Wall thicknesses in the upper elevations were based on measurements and elevations where changes in thickness occurred. Calculations in Appendix B show that under full wind load, no (or nearly zero) tensile stresses exist over the full height of the chimney if it were plumb and no lean existed (Page B-2). However, when the $P \cdot \Delta$ forces are introduced due to the eccentricity of the upper 70', tensile stresses reach nearly 30% of allowable values. Although these resulting tensile loads are still reasonable low, the lack of continued maintenance and repairs to mortar joints have allowed cracking, spalling and bulging of regions to go unrestricted for many years. It is concluded that due to the existing lean of the uppermost 70' and the poor exterior and interior condition of the masonry wall between the 115' and 40' levels, repairs and possible reconfiguring of the chimney are warranted. All repair recommendations are listed below.

1. ***Demolish the uppermost 15' feet of the chimney.*** Due to additional overturning loads caused by the leaning region, the top 15' of the chimney should be demolished. If the original height of the chimney is needed for aesthetic or historical reasons, then alternate designs including replacing with fiberglass, steel or narrow brick should be considered.
2. ***Install a new 5" high reinforced concrete cap and roof.*** A reinforced concrete cap and full roof (with 18" square hinged hatch and air vents) should be installed at the top. The cap should be 5" high, span the full width of the wall, possess two #3 reinforcing bars and dowels around the perimeter to secure the new cap to the top of the brick wall. The roof should be of wood or steel construction.
3. ***Install new lightning protection system.*** New UL approved, lightning protection system components consisting of three air terminals, an upper encircling cable and two full-height downlead cables should be installed. Lead-covered is not required.
4. ***Repoint 100% of the exterior above the 40' level.*** All mortar joints in the 85' high region above the 40' level of the remaining chimney should be raked or cut out to a depth of 1" or until sound material is reached. Joints should be flushed with water or compressed air prior to installing new ASTM C270, Type N mortar. All significantly cracked and spalled bricks in this region should be removed and replaced in-kind.
5. ***Install a waterproofing coating over the entire exterior.*** After repairs are completed, all exterior surfaces should be covered with a clear waterproofing coating.
6. ***Install a gunite lining on the interior between the 100' and 49' levels.*** Install a 1/2" to 3/4" thick flashcoat layer of gunite (calcium aluminate material) to the 51' region above the inner liner wall. All recessed mortar joints should be filled and regions of spalled or dislodged brick faces filled out prior to the flashcoat thickness being installed. All interior surfaces should be sandblasted prior to installing the gunite.
7. ***Install a blanking plate at the duct opening.*** A blanking plate allowing the coaxial cables to pass, but fills the 3'x6' opening, should be installed at the chimney entrance.
8. ***Remove the debris and flyash from the base of the chimney.*** Prior to performing any interior work, the 8" of debris should be removed from the base of the chimney and cleaned out again after all sandblasting and gunite work is completed.

Appendix A

General Arrangement Drawing



CHIMNEY DIMENSIONS

DRAWING DOES NOT REFLECT EXACT ORIENTATION

Appendix B

Brick Stress Analysis

Project : Johnson's Creamery - Chimney Analysis
 Location : Bloomington, Indiana
 Description : 140'-10" x 14'-1 1/2" ϕ Radial Brick Chimney

File : 02320-2
 Date : 4/9/20
 Page : B-1

BRICK CHIMNEY GEOMETRY & WIND LOADING

ELEV	I.D.	(D)	SHELL	TARGET	(A)	(I)	(G)	(W)	(V)	(M)	(a)
(ft.)	(ft.)	(ft.)	WALL	WALL	AREA	Inertia	Weight	Wind Press	Shear	Moment	Eccent Dist
			(in.)	(in.)	(ft ²)	(ft ⁴)	(tons)	(psf)	(tons)	(ft-tons)	(ft.)
141	5.75	7.00	7.50	0.0	12.5	64.2					
140	5.80	7.05	7.50	0.0	12.6	65.7	1	15.0	0.1	0.0	0.04
136	6.00	7.25	7.50	0.0	13.0	72.1	4	15.0	0.3	0.7	0.18
130	6.06	7.56	9.00	0.0	16.0	94.0	8	15.0	0.6	3.3	0.39
125	6.31	7.81	9.00	0.0	16.6	104.7	13	15.0	0.9	7.0	0.53
120	6.56	8.06	9.00	0.0	17.2	116.3	18	27.3	1.4	12.8	0.70
115	6.81	8.31	9.00	0.0	17.8	128.7	23	27.3	2.0	21.3	0.91
110	7.07	8.57	9.00	0.0	18.4	141.9	29	15.0	2.3	32.1	1.11
106	7.27	8.77	9.00	0.0	18.9	153.2	33	15.0	2.6	41.8	1.26
100	7.24	9.07	11.00	0.0	23.5	197.7	40	15.0	3.0	58.4	1.46
96	7.44	9.27	11.00	0.0	24.1	212.6	46	14.0	3.2	70.8	1.55
92	7.64	9.48	11.00	0.0	24.6	228.3	51	14.0	3.5	84.2	1.64
88	7.84	9.68	11.00	0.0	25.2	244.8	57	14.0	3.8	98.7	1.72
84	8.05	9.88	11.00	0.0	25.8	262.0	63	14.0	4.0	114.2	1.80
80	8.25	10.08	11.00	0.0	26.4	280.0	70	14.0	4.3	130.9	1.88
76	8.45	10.28	11.00	0.0	27.0	298.8	76	14.0	4.6	148.7	1.96
72	8.65	10.49	11.00	0.0	27.6	318.4	82	14.0	4.9	167.6	2.03
68	8.86	10.69	11.00	0.0	28.1	338.9	89	13.0	5.2	187.7	2.11
64	9.06	10.89	11.00	0.0	28.7	360.2	96	13.0	5.4	208.9	2.18
60	9.26	11.09	11.00	0.0	29.3	382.4	103	13.0	5.7	231.2	2.25
56	9.13	11.30	13.00	0.0	34.8	458.1	110	13.0	6.0	254.7	2.32
52	9.33	11.50	13.00	0.0	35.4	485.7	118	13.0	6.3	279.4	2.37
50	9.43	11.60	13.00	4.0	35.8	499.8	122	13.0	6.5	292.1	2.39
48	9.53	11.70	13.00	4.0	36.1	514.3	127	13.0	6.6	305.2	2.41
44	9.73	11.90	13.00	4.0	36.8	544.0	135	13.0	6.9	332.3	2.46
40	9.60	12.10	15.00	4.0	42.6	635.9	144	13.0	7.2	360.6	2.50
36	9.81	12.31	15.00	4.0	43.4	671.8	154	12.0	7.5	390.1	2.53
32	10.01	12.51	15.00	4.0	44.2	709.0	165	12.0	7.8	420.8	2.55
28	10.21	12.71	15.00	4.0	45.0	747.6	175	12.0	8.1	452.7	2.58
24	10.41	12.91	15.00	4.0	45.8	787.5	186	12.0	8.4	485.8	2.61
21	10.56	13.06	15.00	4.0	46.4	818.4	194	12.0	8.7	511.4	2.63
20	10.61	13.11	15.00	4.0	46.6	828.9	197	12.0	8.7	520.1	2.64
16	10.48	13.32	17.00	4.0	53.0	950.7	208	10.0	9.0	555.7	2.67
14	10.58	13.42	17.00	4.0	53.4	974.9	215	10.0	9.1	573.8	2.67
12	10.69	13.52	17.00	4.0	53.9	999.5	221	10.0	9.3	592.2	2.68
10	10.79	13.62	17.00	4.0	54.3	1024.6	260	10.0	9.4	610.9	2.35
8	10.89	13.72	17.00	0.0	54.8	1050.0	266	10.0	9.5	629.9	2.37
6	10.99	13.82	17.00	0.0	55.2	1075.9	273	10.0	9.7	649.1	2.38
4	11.09	13.92	17.00	0.0	55.7	1102.1	279	10.0	9.8	668.6	2.39
2	11.19	14.02	17.00	0.0	56.1	1128.8	286	10.0	10.0	688.4	2.41
0	11.29	14.12	17.00	0.0	56.6	1156.0	293	10.0	10.1	708.5	2.42

TOTAL WEIGHT = 292.7 tons
BASE SHEAR = 10.1 tons
BASE MOMENT = 708 ft-tons

Project : Johnson's Creamery - Chimney Analysis
 Location : Bloomington, Indiana
 Description : 140'-10" x 14'-1 1/2" ϕ Radial Brick Chimney

File : 02320-2
 Date : 4/9/20
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BRICK STRESSES & SAFETY FACTORS - NO P*DELTA FROM LEAN

ELEV	I.D.	(D) O.D.	(k) 1 st Kern	(e) 2 nd Kern	Compress Stress (S') (tons/ft ²)	Tensile Stress (S'') (tons/ft ²)	Max Comp Stress (S''') (tons/ft ²)	Allow S'' Tens Stress (tons/ft ²)	Allow S'' ' Comp Stress (tons/ft ²)	2/3 Moment of Stability (ft-tons)	Safety Factor vs Moment of Stab. >1.0	All Design Criteria Met (ok / fail)
141	5.75	7.00										
140	5.80	7.05	1.48	2.54	0.1	0.1	0.1	-2.0	15.0	2	67.0	ok
136	6.00	7.25	1.53	2.62	0.3	0.3	0.3	-2.0	15.0	9	13.7	ok
130	6.06	7.56	1.55	2.69	0.7	0.4	0.7	-2.0	15.0	21	6.5	ok
125	6.31	7.81	1.61	2.79	1.1	0.5	1.1	-2.0	15.0	35	4.9	ok
120	6.56	8.06	1.68	2.89	1.5	0.6	1.5	-2.0	15.0	49	3.8	ok
115	6.81	8.31	1.74	2.99	2.0	0.6	2.0	-2.0	15.0	65	3.0	ok
110	7.07	8.57	1.80	3.09	2.5	0.6	2.5	-2.0	15.0	82	2.6	ok
106	7.27	8.77	1.85	3.17	3.0	0.6	3.0	-2.0	15.0	97	2.3	ok
100	7.24	9.07	1.86	3.23	3.0	0.4	3.0	-2.0	15.0	121	2.1	ok
96	7.44	9.27	1.91	3.31	3.4	0.4	3.4	-2.0	15.0	141	2.0	ok
92	7.64	9.48	1.96	3.39	3.8	0.3	3.8	-2.0	15.0	162	1.9	ok
88	7.84	9.68	2.00	3.47	4.2	0.3	4.2	-2.0	15.0	185	1.9	ok
84	8.05	9.88	2.05	3.54	4.6	0.3	4.6	-2.0	15.0	209	1.8	ok
80	8.25	10.08	2.10	3.62	5.0	0.3	5.0	-2.0	15.0	234	1.8	ok
76	8.45	10.28	2.15	3.70	5.4	0.3	5.4	-2.0	15.0	260	1.8	ok
72	8.65	10.49	2.20	3.78	5.7	0.2	5.7	-2.0	15.0	288	1.7	ok
68	8.86	10.69	2.25	3.86	6.1	0.2	6.1	-2.0	15.0	317	1.7	ok
64	9.06	10.89	2.30	3.94	6.5	0.2	6.5	-2.0	15.0	348	1.7	ok
60	9.26	11.09	2.35	4.02	6.9	0.1	6.9	-2.0	15.0	380	1.6	ok
56	9.13	11.30	2.33	4.04	6.3	0.0	6.3	-2.0	15.0	413	1.6	ok
52	9.33	11.50	2.38	4.12	6.6	0.0	6.6	-2.0	15.0	453	1.6	ok
50	9.43	11.60	2.41	4.16	6.8	0.0	6.8	-2.0	15.0	473	1.6	ok
48	9.53	11.70	2.43	4.20	7.0	0.0	7.0	-2.0	15.0	494	1.6	ok
44	9.73	11.90	2.48	4.28	7.3	0.0	7.3	-2.0	15.0	537	1.6	ok
40	9.60	12.10	2.47	4.30	6.8	-0.1	6.8	-2.0	15.0	582	1.6	ok
36	9.81	12.31	2.51	4.38	7.1	0.0	7.1	-2.0	15.0	633	1.6	ok
32	10.01	12.51	2.56	4.46	7.4	0.0	7.4	-2.0	15.0	687	1.6	ok
28	10.21	12.71	2.61	4.54	7.7	0.0	7.7	-2.0	15.0	743	1.6	ok
24	10.41	12.91	2.66	4.61	8.0	0.1	8.0	-2.0	15.0	802	1.7	ok
21	10.56	13.06	2.70	4.67	8.3	0.1	8.3	-2.0	15.0	847	1.7	ok
20	10.61	13.11	2.71	4.69	8.3	0.1	8.3	-2.0	15.0	862	1.7	ok
16	10.48	13.32	2.70	4.72	7.8	0.0	7.8	-2.0	15.0	925	1.7	ok
14	10.58	13.42	2.72	4.76	8.0	0.1	8.0	-2.0	15.0	961	1.7	ok
12	10.69	13.52	2.75	4.80	8.1	0.1	8.1	-2.0	15.0	997	1.7	ok
10	10.79	13.62	2.77	4.83	8.8	0.7	8.8	-2.0	15.0	1179	1.9	ok
8	10.89	13.72	2.79	4.87	9.0	0.7	9.0	-2.0	15.0	1218	1.9	ok
6	10.99	13.82	2.82	4.91	9.1	0.8	9.1	-2.0	15.0	1257	1.9	ok
4	11.09	13.92	2.84	4.95	9.2	0.8	9.2	-2.0	15.0	1297	1.9	ok
2	11.19	14.02	2.87	4.99	9.4	0.8	9.4	-2.0	15.0	1337	1.9	ok
0	11.29	14.12	2.89	5.03	9.5	0.8	9.5	-2.0	15.0	1379	1.9	ok

Project : Johnson's Creamery - Chimney Analysis
 Location : Bloomington, Indiana
 Description : 140'-10" x 14'-1 1/2" ϕ Radial Brick Chimney

File : 02320-2
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BRICK CHIMNEY GEOMETRY & WIND LOADING

ELEV	I.D.	(D) O.D.	SHELL WALL	TARGET WALL	(A) AREA	(I) Inertia	(G) Weight	(W) Wind Press	(V) Shear	(M) Moment	(a) Eccent Dist	C.G. Lean Dist
<u>(ft.)</u>	<u>(ft.)</u>	<u>(ft.)</u>	<u>(in.)</u>	<u>(in.)</u>	<u>(ft²)</u>	<u>(ft⁴)</u>	<u>(tons)</u>	<u>(psf)</u>	<u>(tons)</u>	<u>(ft-tons)</u>	<u>(ft.)</u>	<u>(ft.)</u>
141	5.75	7.00	7.50	0.0	12.5	64.2						
140	5.80	7.05	7.50	0.0	12.6	65.7	1	15.0	0.1	0.0	0.04	1.48
136	6.00	7.25	7.50	0.0	13.0	72.1	4	15.0	0.3	0.7	0.18	1.40
130	6.06	7.56	9.00	0.0	16.0	94.0	8	15.0	0.6	3.3	0.39	1.27
125	6.31	7.81	9.00	0.0	16.6	104.7	13	15.0	0.9	7.0	0.53	1.17
120	6.56	8.06	9.00	0.0	17.2	116.3	18	27.3	1.4	12.8	0.70	1.06
115	6.81	8.31	9.00	0.0	17.8	128.7	23	27.3	2.0	21.3	0.91	0.96
110	7.07	8.57	9.00	0.0	18.4	141.9	29	15.0	2.3	32.1	1.11	0.85
106	7.27	8.77	9.00	0.0	18.9	153.2	33	15.0	2.6	41.8	1.26	0.77
100	7.24	9.07	11.00	0.0	23.5	197.7	40	15.0	3.0	58.4	1.46	0.65
96	7.44	9.27	11.00	0.0	24.1	212.6	46	14.0	3.2	70.8	1.55	0.56
92	7.64	9.48	11.00	0.0	24.6	228.3	51	14.0	3.5	84.2	1.64	0.48
88	7.84	9.68	11.00	0.0	25.2	244.8	57	14.0	3.8	98.7	1.72	0.40
84	8.05	9.88	11.00	0.0	25.8	262.0	63	14.0	4.0	114.2	1.80	0.31
80	8.25	10.08	11.00	0.0	26.4	280.0	70	14.0	4.3	130.9	1.88	0.23
76	8.45	10.28	11.00	0.0	27.0	298.8	76	14.0	4.6	148.7	1.96	0.15
72	8.65	10.49	11.00	0.0	27.6	318.4	82	14.0	4.9	220.6	2.68	
68	8.86	10.69	11.00	0.0	28.1	338.9	89	13.0	5.2	240.7	2.70	
64	9.06	10.89	11.00	0.0	28.7	360.2	96	13.0	5.4	261.9	2.74	
60	9.26	11.09	11.00	0.0	29.3	382.4	103	13.0	5.7	284.2	2.77	
56	9.13	11.30	13.00	0.0	34.8	458.1	110	13.0	6.0	307.7	2.81	
52	9.33	11.50	13.00	0.0	35.4	485.7	118	13.0	6.3	332.4	2.82	
50	9.43	11.60	13.00	4.0	35.8	499.8	122	13.0	6.5	345.1	2.82	
48	9.53	11.70	13.00	4.0	36.1	514.3	127	13.0	6.6	358.2	2.83	
44	9.73	11.90	13.00	4.0	36.8	544.0	135	13.0	6.9	385.3	2.85	
40	9.60	12.10	15.00	4.0	42.6	635.9	144	13.0	7.2	413.6	2.87	
36	9.81	12.31	15.00	4.0	43.4	671.8	154	12.0	7.5	443.1	2.87	
32	10.01	12.51	15.00	4.0	44.2	709.0	165	12.0	7.8	473.8	2.88	
28	10.21	12.71	15.00	4.0	45.0	747.6	175	12.0	8.1	505.7	2.88	
24	10.41	12.91	15.00	4.0	45.8	787.5	186	12.0	8.4	538.8	2.89	
21	10.56	13.06	15.00	4.0	46.4	818.4	194	12.0	8.7	564.4	2.90	
20	10.61	13.11	15.00	4.0	46.6	828.9	197	12.0	8.7	573.1	2.91	
16	10.48	13.32	17.00	4.0	53.0	950.7	208	10.0	9.0	608.7	2.92	
14	10.58	13.42	17.00	4.0	53.4	974.9	215	10.0	9.1	626.8	2.92	
12	10.69	13.52	17.00	4.0	53.9	999.5	221	10.0	9.3	645.2	2.92	
10	10.79	13.62	17.00	4.0	54.3	1024.6	260	10.0	9.4	663.9	2.56	
8	10.89	13.72	17.00	0.0	54.8	1050.0	266	10.0	9.5	682.9	2.57	
6	10.99	13.82	17.00	0.0	55.2	1075.9	273	10.0	9.7	702.1	2.57	
4	11.09	13.92	17.00	0.0	55.7	1102.1	279	10.0	9.8	721.6	2.58	
2	11.19	14.02	17.00	0.0	56.1	1128.8	286	10.0	10.0	741.4	2.59	
0	11.29	14.12	17.00	0.0	56.6	1156.0	293	10.0	10.1	761.5	2.60	

TOTAL WEIGHT = 292.7 tons
BASE SHEAR = 10.1 tons
BASE MOMENT = 761 ft-tons

Project : Johnson's Creamery - Chimney Analysis
 Location : Bloomington, Indiana
 Description : 140'-10" x 14'-1 1/2" ϕ Radial Brick Chimney

File : 02320-2
 Date : 4/9/20
 Page : B-4

BRICK STRESSES & SAFETY FACTORS - WITH P*DELTA FROM LEAN

ELEV	(D) I.D.	(D) O.D.	(k) 1 st Kern	(e) 2 nd Kern	Compress Stress (S')	Tensile Stress (S'')	Max Comp Stress (S''')	Allow S'' Tens Stress	Allow S''' Comp Stress	2/3 Moment of Stability	Safety Factor vs Moment	All Design Criteria Met
(ft.)	(ft.)	(ft.)	(ft.)	(ft.)	(tons/ft ²)	(tons/ft ²)	(tons/ft ²)	(tons/ft ²)	(tons/ft ²)	(ft-tons)	of Stab. >1.0	(ok / fail)
141	5.75	7.00										
140	5.80	7.05	1.48	2.54	0.1	0.1	0.1	-2.0	15.0	2	67.0	ok
136	6.00	7.25	1.53	2.62	0.3	0.3	0.3	-2.0	15.0	9	13.7	ok
130	6.06	7.56	1.55	2.69	0.7	0.4	0.7	-2.0	15.0	21	6.5	ok
125	6.31	7.81	1.61	2.79	1.1	0.5	1.1	-2.0	15.0	35	4.9	ok
120	6.56	8.06	1.68	2.89	1.5	0.6	1.5	-2.0	15.0	49	3.8	ok
115	6.81	8.31	1.74	2.99	2.0	0.6	2.0	-2.0	15.0	65	3.0	ok
110	7.07	8.57	1.80	3.09	2.5	0.6	2.5	-2.0	15.0	82	2.6	ok
106	7.27	8.77	1.85	3.17	3.0	0.6	3.0	-2.0	15.0	97	2.3	ok
100	7.24	9.07	1.86	3.23	3.0	0.4	3.0	-2.0	15.0	121	2.1	ok
96	7.44	9.27	1.91	3.31	3.4	0.4	3.4	-2.0	15.0	141	2.0	ok
92	7.64	9.48	1.96	3.39	3.8	0.3	3.8	-2.0	15.0	162	1.9	ok
88	7.84	9.68	2.00	3.47	4.2	0.3	4.2	-2.0	15.0	185	1.9	ok
84	8.05	9.88	2.05	3.54	4.6	0.3	4.6	-2.0	15.0	209	1.8	ok
80	8.25	10.08	2.10	3.62	5.0	0.3	5.0	-2.0	15.0	234	1.8	ok
76	8.45	10.28	2.15	3.70	5.4	0.3	5.4	-2.0	15.0	260	1.8	ok
72	8.65	10.49	2.20	3.78	6.6	-0.6	6.6	-2.0	15.0	288	1.3	ok
68	8.86	10.69	2.25	3.86	7.0	-0.6	7.0	-2.0	15.0	317	1.3	ok
64	9.06	10.89	2.30	3.94	7.3	-0.6	7.3	-2.0	15.0	348	1.3	ok
60	9.26	11.09	2.35	4.02	7.6	-0.6	7.7	-2.0	15.0	380	1.3	ok
56	9.13	11.30	2.33	4.04	6.9	-0.6	7.0	-2.0	15.0	413	1.3	ok
52	9.33	11.50	2.38	4.12	7.3	-0.6	7.3	-2.0	15.0	453	1.4	ok
50	9.43	11.60	2.41	4.16	7.4	-0.6	7.5	-2.0	15.0	473	1.4	ok
48	9.53	11.70	2.43	4.20	7.6	-0.6	7.6	-2.0	15.0	494	1.4	ok
44	9.73	11.90	2.48	4.28	7.9	-0.5	7.9	-2.0	15.0	537	1.4	ok
40	9.60	12.10	2.47	4.30	7.3	-0.6	7.3	-2.0	15.0	582	1.4	ok
36	9.81	12.31	2.51	4.38	7.6	-0.5	7.6	-2.0	15.0	633	1.4	ok
32	10.01	12.51	2.56	4.46	7.9	-0.5	7.9	-2.0	15.0	687	1.5	ok
28	10.21	12.71	2.61	4.54	8.2	-0.4	8.2	-2.0	15.0	743	1.5	ok
24	10.41	12.91	2.66	4.61	8.5	-0.4	8.5	-2.0	15.0	802	1.5	ok
21	10.56	13.06	2.70	4.67	8.7	-0.3	8.7	-2.0	15.0	847	1.5	ok
20	10.61	13.11	2.71	4.69	8.8	-0.3	8.8	-2.0	15.0	862	1.5	ok
16	10.48	13.32	2.70	4.72	8.2	-0.3	8.2	-2.0	15.0	925	1.5	ok
14	10.58	13.42	2.72	4.76	8.3	-0.3	8.3	-2.0	15.0	961	1.5	ok
12	10.69	13.52	2.75	4.80	8.5	-0.3	8.5	-2.0	15.0	997	1.5	ok
10	10.79	13.62	2.77	4.83	9.2	0.4	9.2	-2.0	15.0	1179	1.8	ok
8	10.89	13.72	2.79	4.87	9.3	0.4	9.3	-2.0	15.0	1218	1.8	ok
6	10.99	13.82	2.82	4.91	9.4	0.4	9.4	-2.0	15.0	1257	1.8	ok
4	11.09	13.92	2.84	4.95	9.6	0.5	9.6	-2.0	15.0	1297	1.8	ok
2	11.19	14.02	2.87	4.99	9.7	0.5	9.7	-2.0	15.0	1337	1.8	ok
0	11.29	14.12	2.89	5.03	9.8	0.5	9.8	-2.0	15.0	1379	1.8	ok

Appendix C

Inspection Photographs



Photo 1. Good condition of the steel roof atop the chimney. Note only the weathered paint. The patch plate was recently installed.



Photo 2. Good condition of the encircling plate and connections to the upper band. Note the slope ($\pm 4^\circ$) of the top of the chimney due to the lean toward the southeast direction.



Photo 3. Good condition of the roof plate underside and 4" deep support beam (north side). Also note the good condition of the 3" thick cement cap atop the uppermost course.



Photo 4. Good condition of the roof plate underside and 4" deep support beam (near center of roof).



Photo 5. Good interior condition of the cap, brick faces and mortar joints (upper courses of north side). Mortar joints in the upper elevations appeared repointed. No concerns were identified.



Photo 6. Good interior condition of the cap, brick faces and mortar joints (upper courses of south side). Note the good condition of the $\pm 3"$ cement cap atop the brick wall.



Photo 7. Good interior condition of the cap, brick faces and mortar joints (upper courses of east side).
Note the good condition of the ± 3 " cement cap atop the brick wall.



Photo 8. Good interior condition of the cap, brick faces and mortar joints (upper courses of west side).
Note the good condition of the ± 3 " cement cap atop the brick wall.



Photo 9. Good interior condition of the upper elevations looking down from the roof (north side). Mortar joints in the uppermost $\pm 15'$ appeared to have been repointed.



Photo 10. Good interior condition of the upper elevations looking down from the roof (south side). Mortar joints in the uppermost $\pm 15'$ appeared to have been repointed.



Photo 11. Good interior condition of the upper elevations looking down from the roof. Mortar joints in the uppermost $\pm 15'$ appeared to have been repointed.



Photo 12. Good interior condition local to the 132' level shelf (wall thickness change). Mortar joints below the 125' level were in fair condition as open and cracked joints were identified.



Photo 13. Overall good exterior condition of the upper elevations of the south side. Mortar joints appeared repointed within the past 15 years. LPS cables, bands and roof were secure.

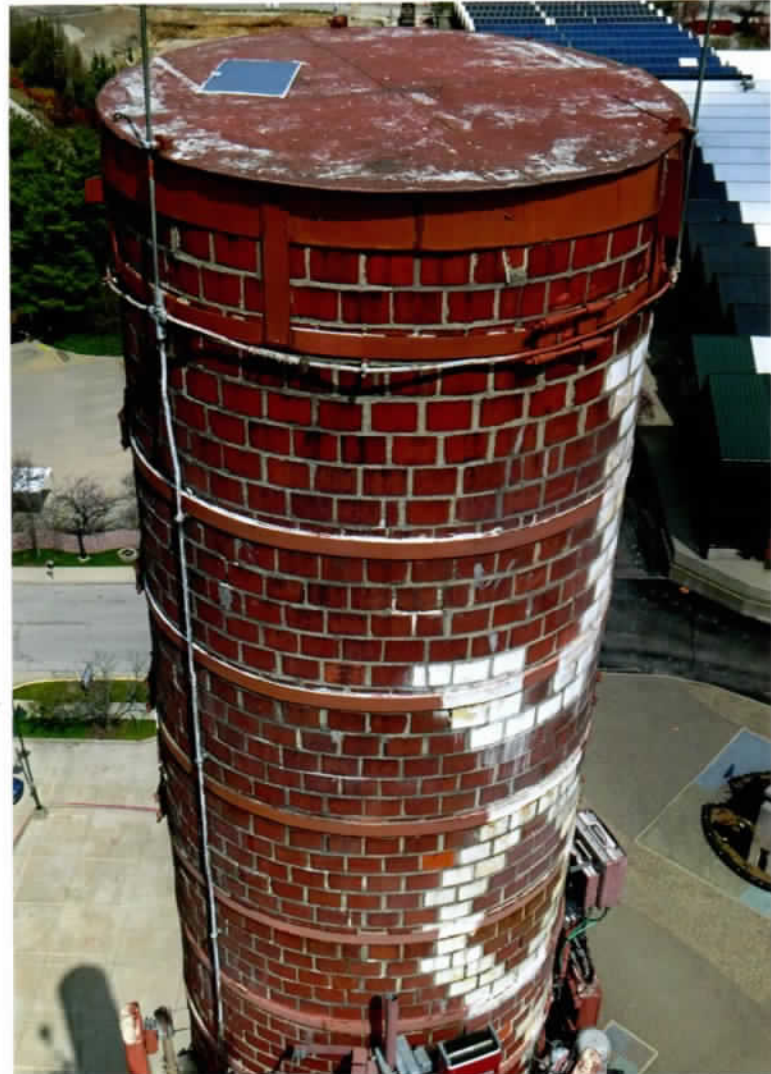


Photo 14.
Overall good exterior condition of the south side above the 126' level. Mortar joints appeared to have been repointed within the past 15 years and no immediate concerns were identified in this region. The lightning protection components and exterior bands were secure.

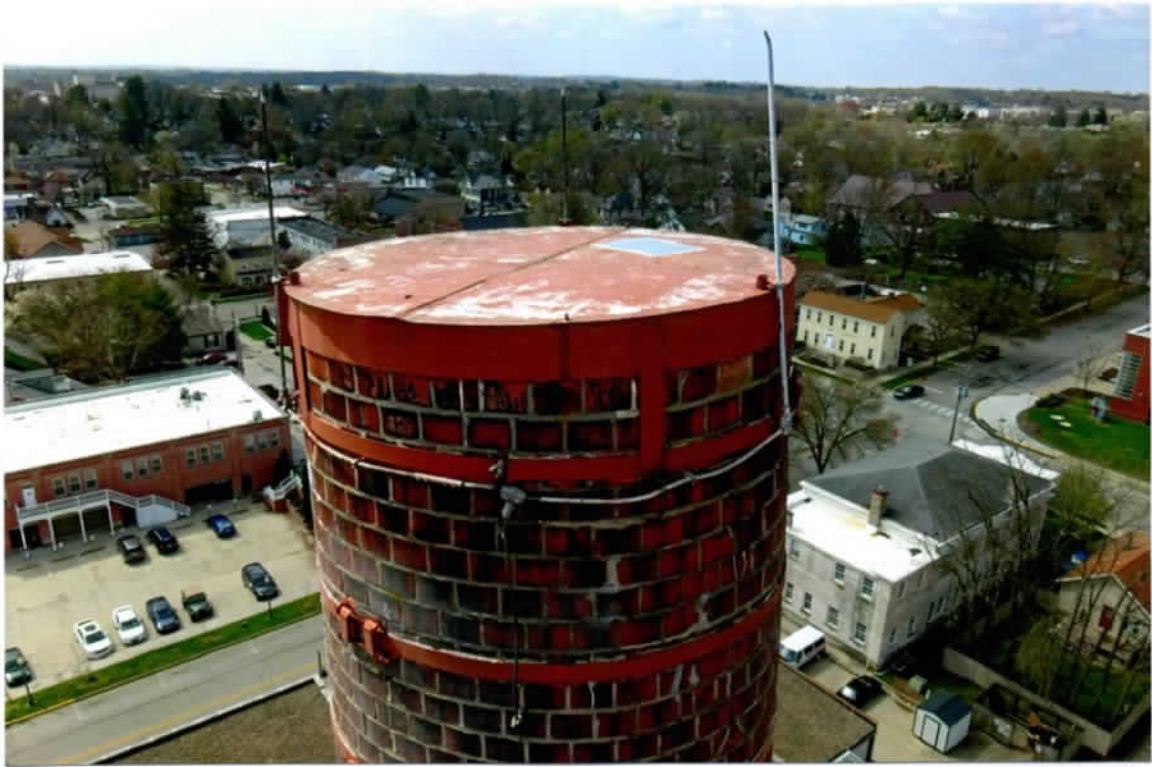


Photo 15. Overall good exterior condition of the upper elevations of the northeast side. Mortar joints appeared repointed within the past 15 years. LPS cables, bands and roof were secure.



Photo 16.
Overall good exterior condition of the northeast side above the 126' level. Mortar joints appeared to have been repointed within the past 15 years and no immediate concerns were identified in this region. The lightning protection components and exterior bands were secure.



Photo 17. Good condition of the roof plate (looking from west side).
Note only the weathered paint. The roof plate and support beams on the underside were secure.

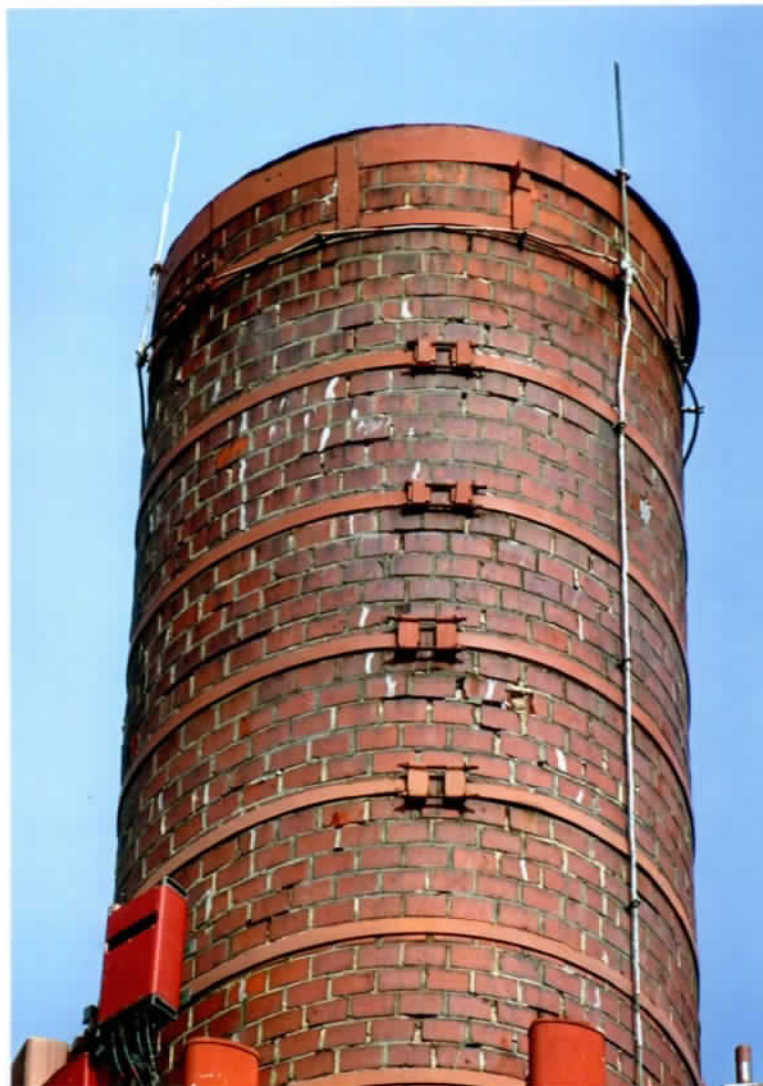


Photo 18.
Overall good exterior condition of the west side above the 126' level. One region of concern was identified near the 130' level (see next page). The lightning protection components and exterior bands were secure.

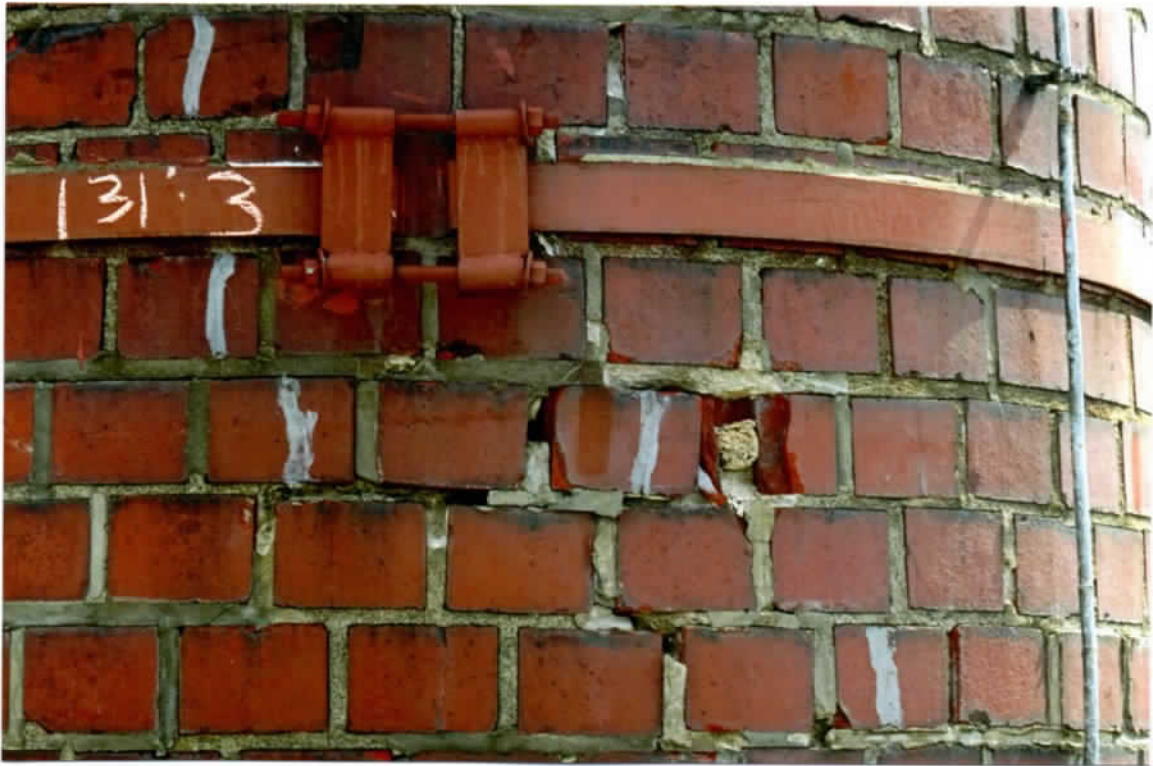


Photo 19. Local area of cracked and spalled bricks and dislodged mortar (130' level, west side). Mortar joints below the damaged region were cracked and partially dislodged.



Photo 20. Close-up of the cracked and spalled bricks and dislodged mortar (130' level, west side).

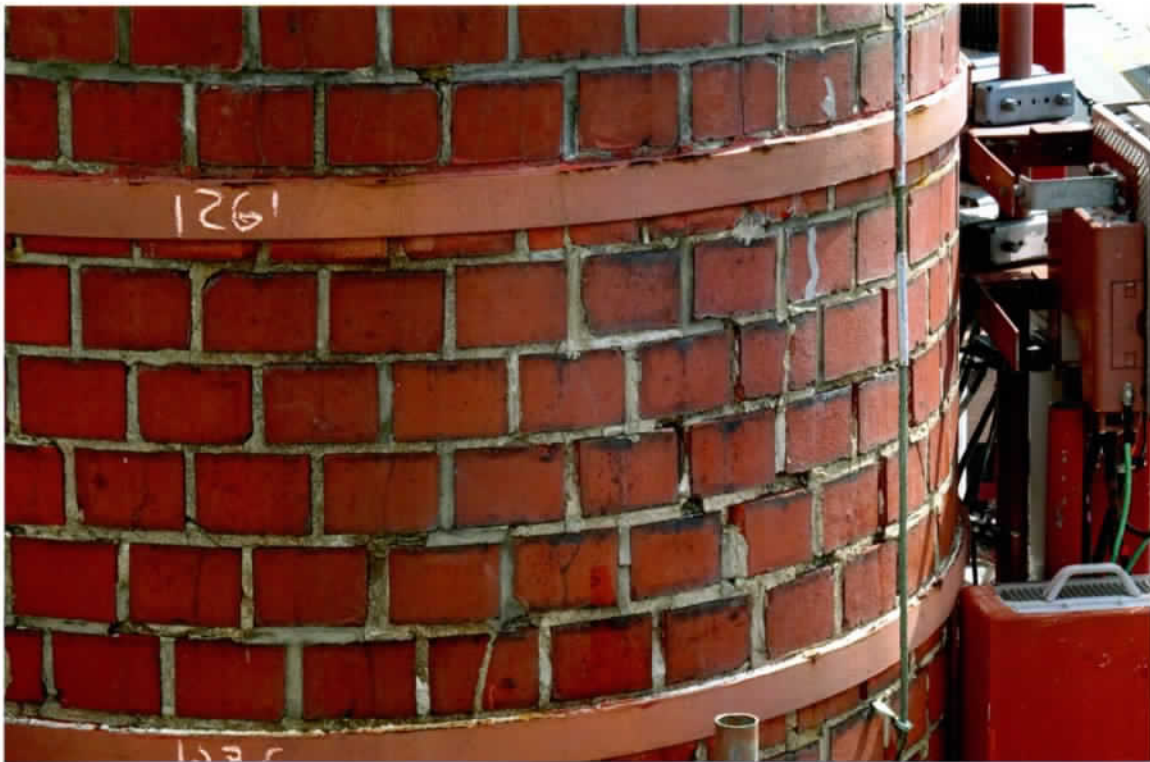


Photo 21. Local area of cracked and dislodged mortar (124'-6" level, southwest side). The overall condition of brick faces in this region remained sound.

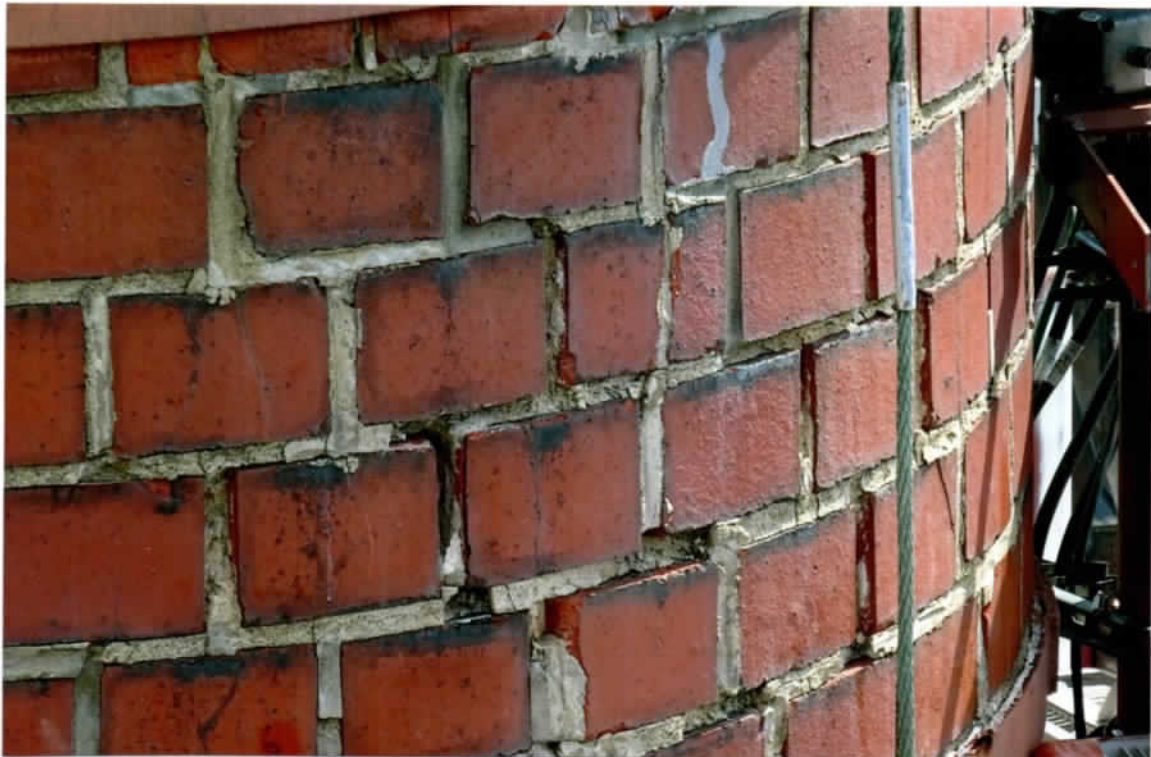


Photo 22. Close-up of the cracked and dislodged mortar (124'-6" level, southwest side).

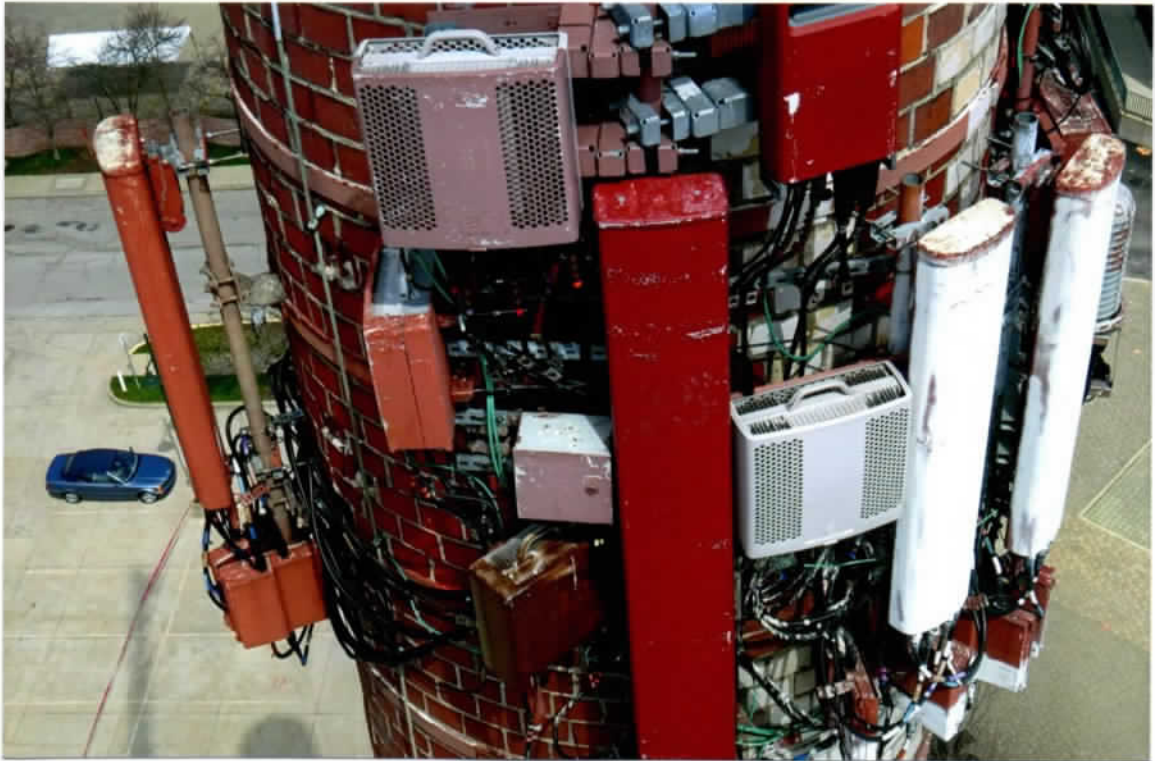


Photo 23. Good condition of the existing antennas and RRF units (south side). Nearly all components were supported by three exterior bands (123'-6", 121'-6" and 118'-4" levels).



Photo 24. Good condition of the existing antennas and RRF units (northeast side). Nearly all components were supported by three exterior bands (123'-6", 121'-6" and 118'-4" levels).

Photo 25.

Fair exterior condition of the south side between the 122' and 108' levels. Mortar joints were weathered and local areas of cracked and dislodged mortar were identified. The lightning protection downlead cable and exterior bands were secure.



Photo 26.

Fair exterior condition of the south side between the 110' and 100' levels. Mortar joints were weathered and local areas of cracked and dislodged mortar were identified. The lightning protection downlead cable and exterior bands were secure.

Photo 27.

Fair exterior condition of the west side between the 120' and 100' levels. Mortar joints were weathered and local areas of cracked and dislodged mortar were identified. The lightning protection downlead cable and exterior bands were secure.

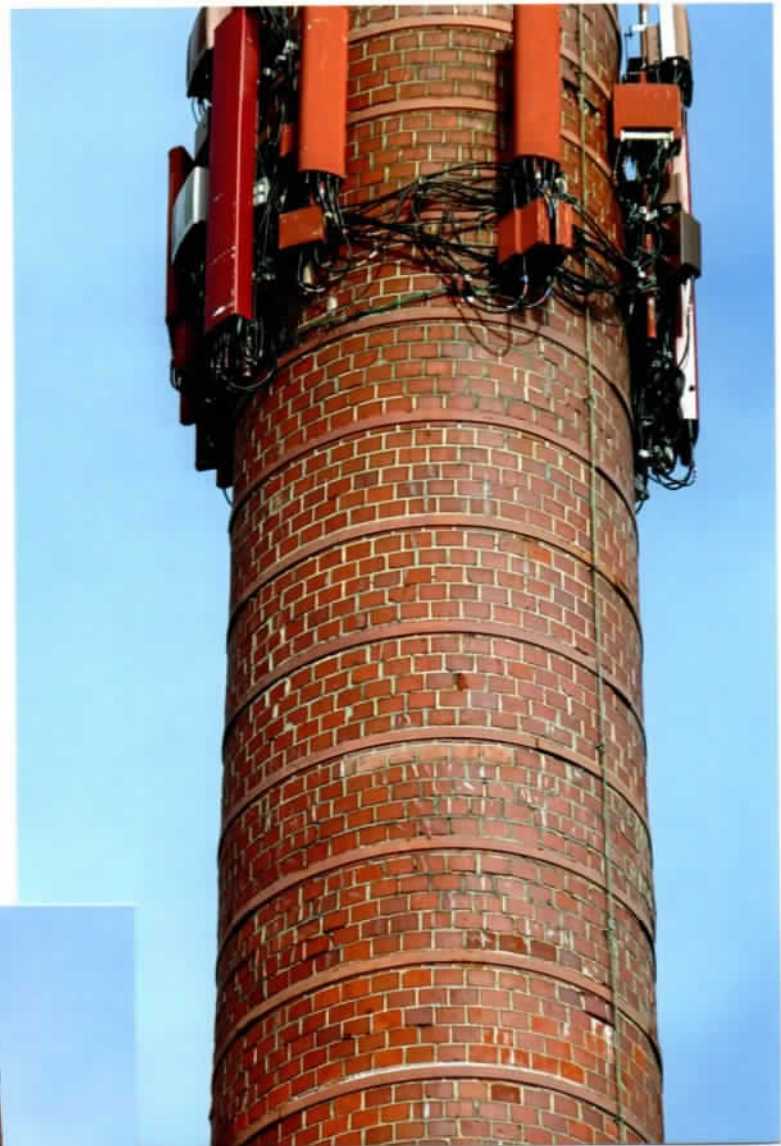


Photo 28.

Poor exterior condition of the west side between the 88' and 60' levels. Numerous areas of cracked and spalled bricks were identified. Mortar joints were also in poor condition from water infiltration and freeze-thaw cycles. The lightning protection downlead cable and exterior bands were secure.



Photo 29. Local area of cracked and spalled brick faces (89' level, southwest side). Numerous generations of repointing work were identified in this region.



Photo 30. Local area of cracked and spalled brick faces (83' level, southwest side). Note the past repairs to replace several bricks near the upper band.

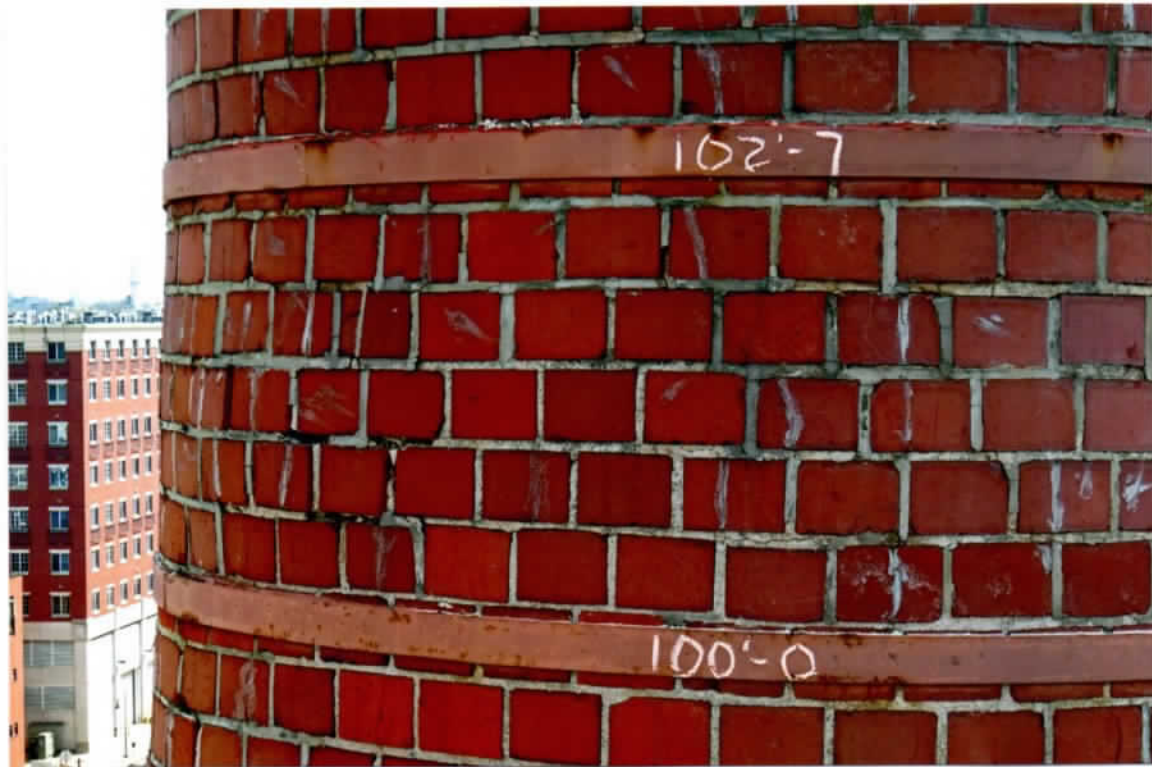


Photo 31. Local area of bulged brick and severely eroded mortar joints (101' level, northwest side). Several brick faces were partially dislodged.



Photo 32. Close-up of the bulged region with eroded joints (101' level, northwest side).

Photo 33.

Fair exterior condition of the south side between the 95' and 75' levels. Three spalled faces existed below the 89'-8" level band. Note the past crack repairs and brick replacement. The download cable and bands were secure.

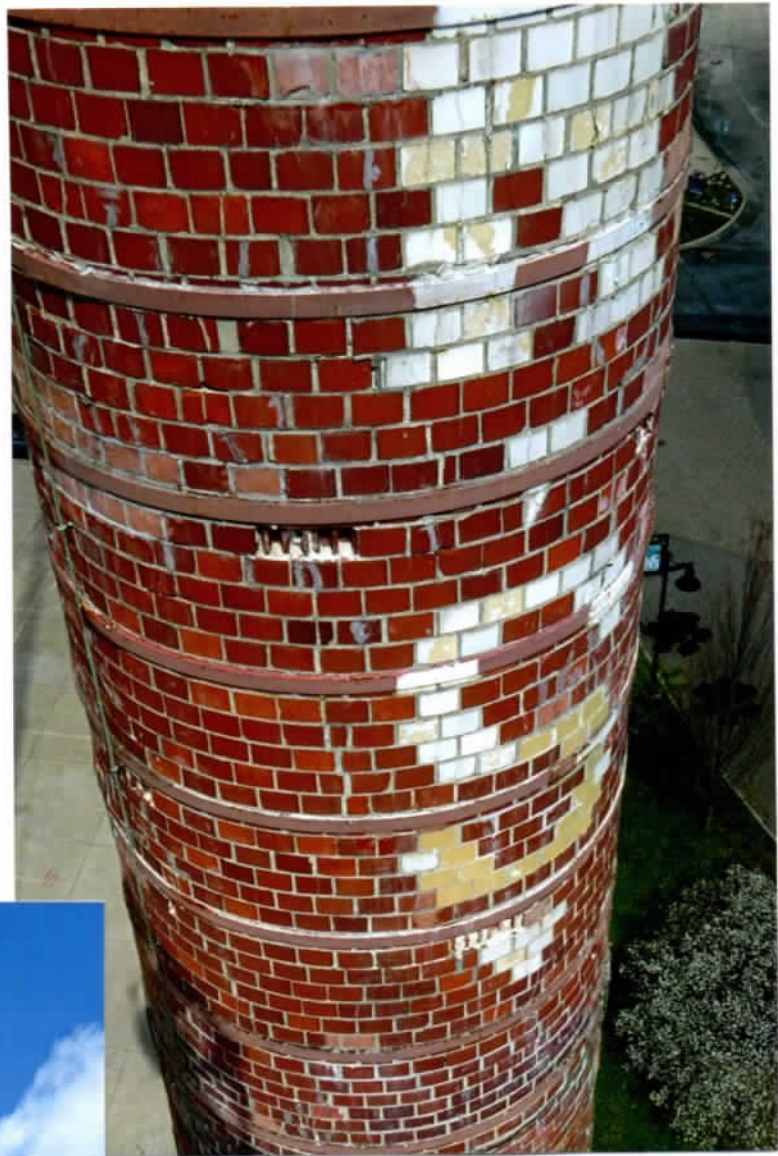


Photo 34.

Fair exterior condition of the south side between the 86' and 74' levels. Two spalled faces existed below the 81'-10" level band. Note the past crack repairs. The download cable and bands were secure.



Photo 35. Close-up of the spalled brick faces in the course below the 89'-8" level band, south side.



Photo 36. Close-up of the spalled brick faces and eroded mortar joints in the course below the 81'-10" level band, southwest side.



Photo 37. Local area of bulged and spalled bricks (80' level, northwest side). Several brick faces were partially dislodged.



Photo 38.
Poor exterior condition of the northwest side between the 80' and 73' levels. Mortar joints were cracked and partially dislodged in this region. The bands and midheight LPS encircling cable were secure.



Photo 39. Close-up of the spalled and partially dislodged brick faces near the 80' level, northwest side.

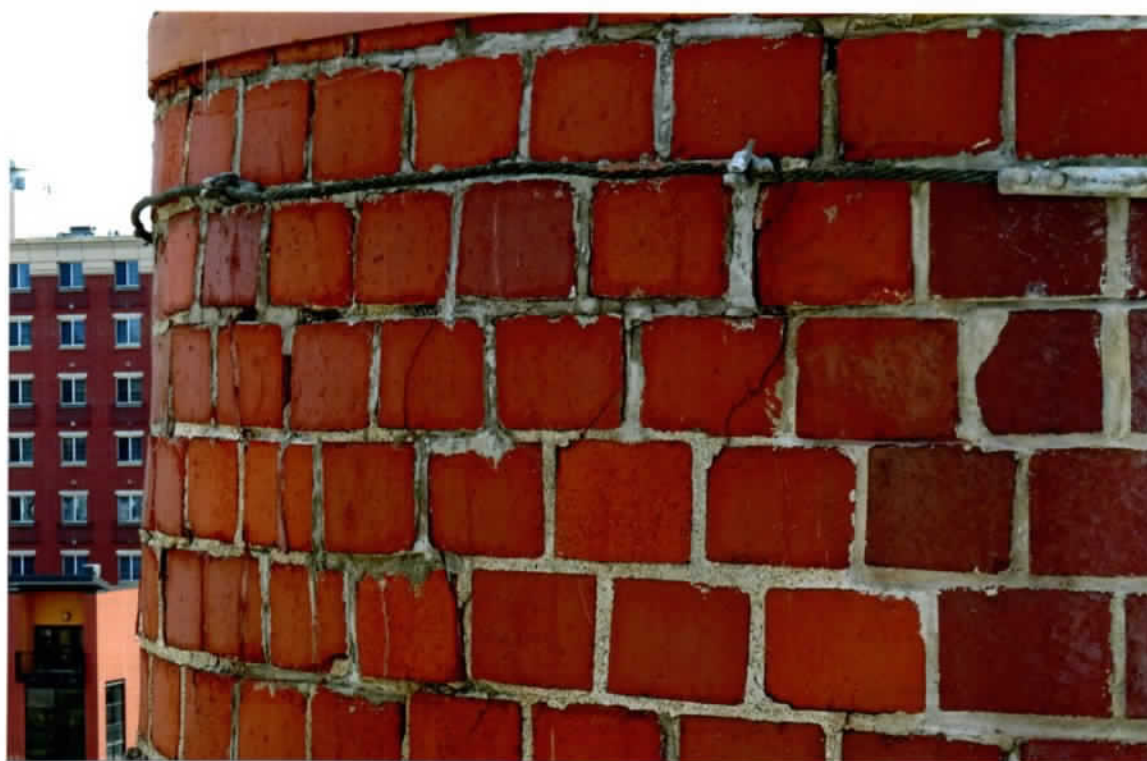


Photo 40. Close-up of the slightly bulged region of the northwest side near the 74' level. Mortar joints in this region were cracked and allowing moisture to enter the wall.



Photo 41. Fair exterior chimney of the south side between the 78' and 73' levels.
No spalled bricks existed in this region. All LPS cables were secure.

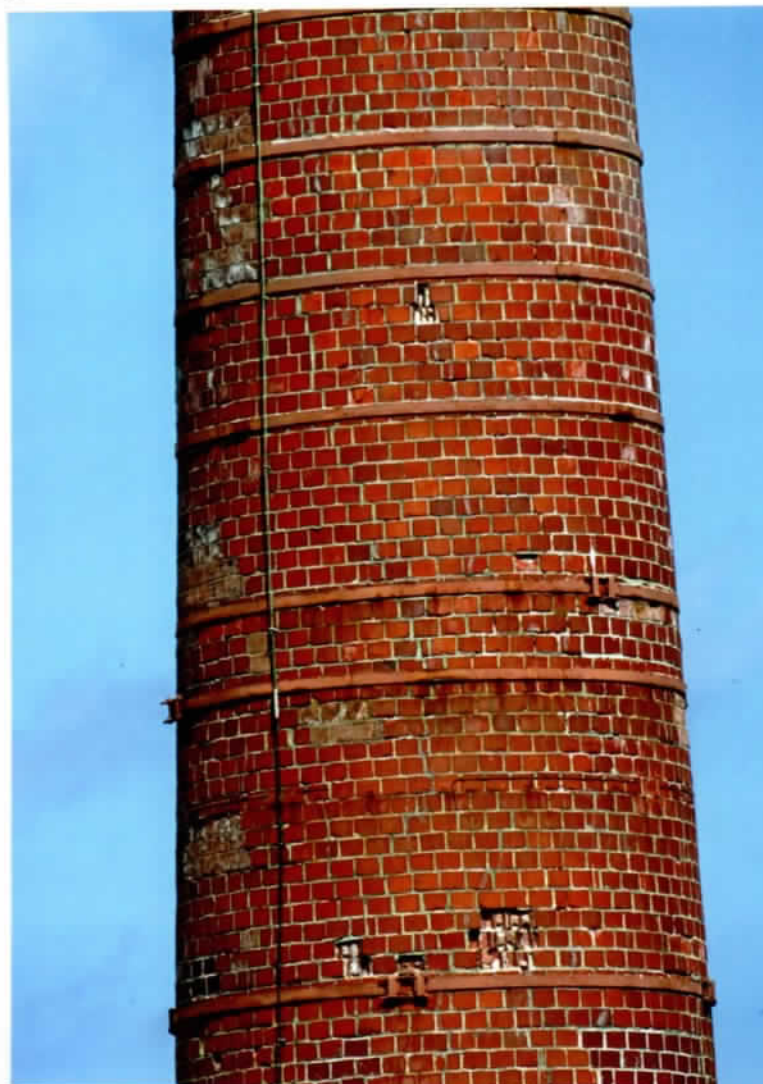


Photo 42.
Poor exterior chimney of the south side between the 60' and 40' levels. Note the numerous spalled and eroded brick faces. A band appeared to have previously dislodged from the 45' level.

Photo 43.

Poor exterior chimney of the south side between the 47' and 25' levels. Note the numerous spalled brick faces above the 41'-11" band. A band also appeared to have previously dislodged from the 45' level.

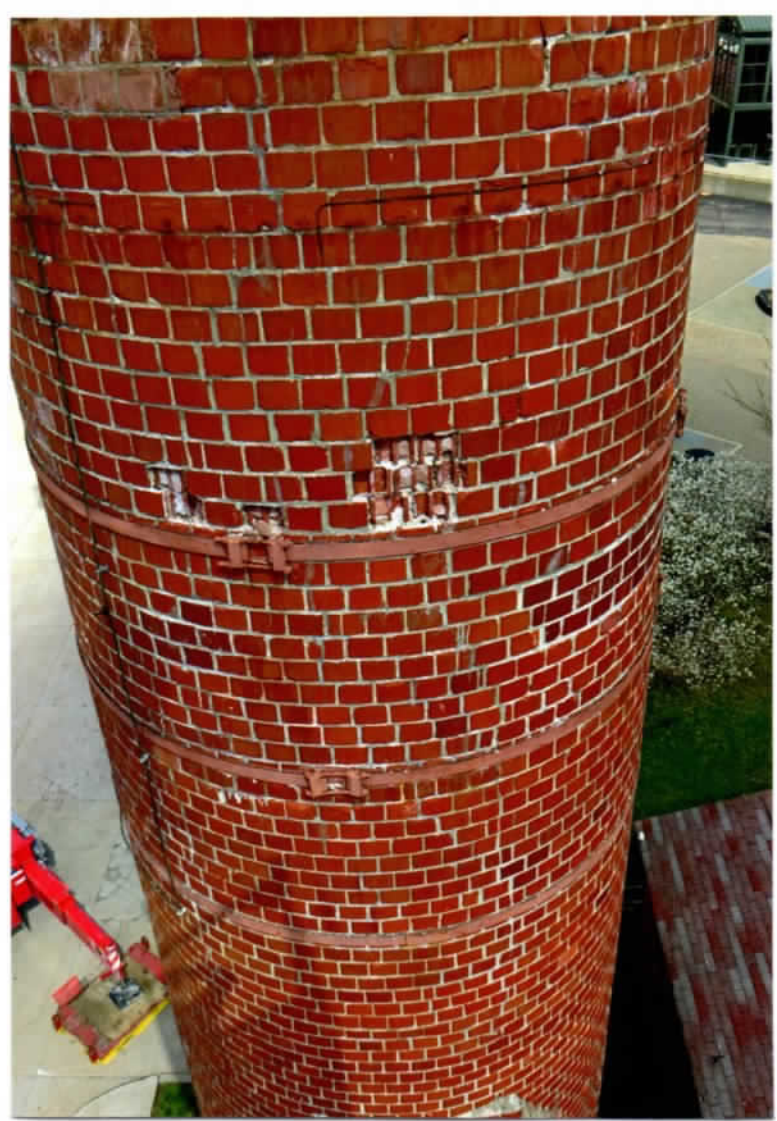


Photo 44. Close-up of the spalled brick faces below the 57'-7" level band, south side.



Photo 45. Poor exterior condition of the south side between the 49' and 41' levels. Note the numerous spalled and eroded brick faces.



Photo 46. Close-up of the spalled brick faces above the 41'-11" level band, south side.

Photo 47.

Fair exterior condition of the northeast side between the 60' and 40' levels. No significant concerns were seen in this region. The download cable and bands were secure.

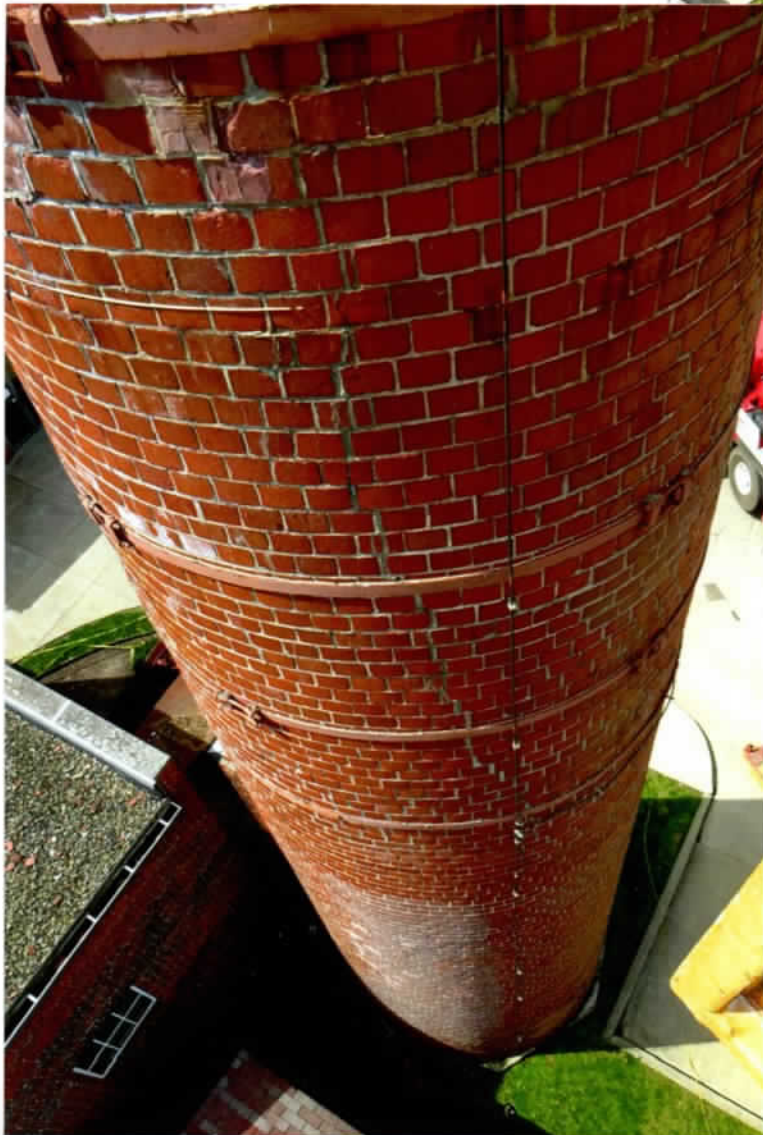
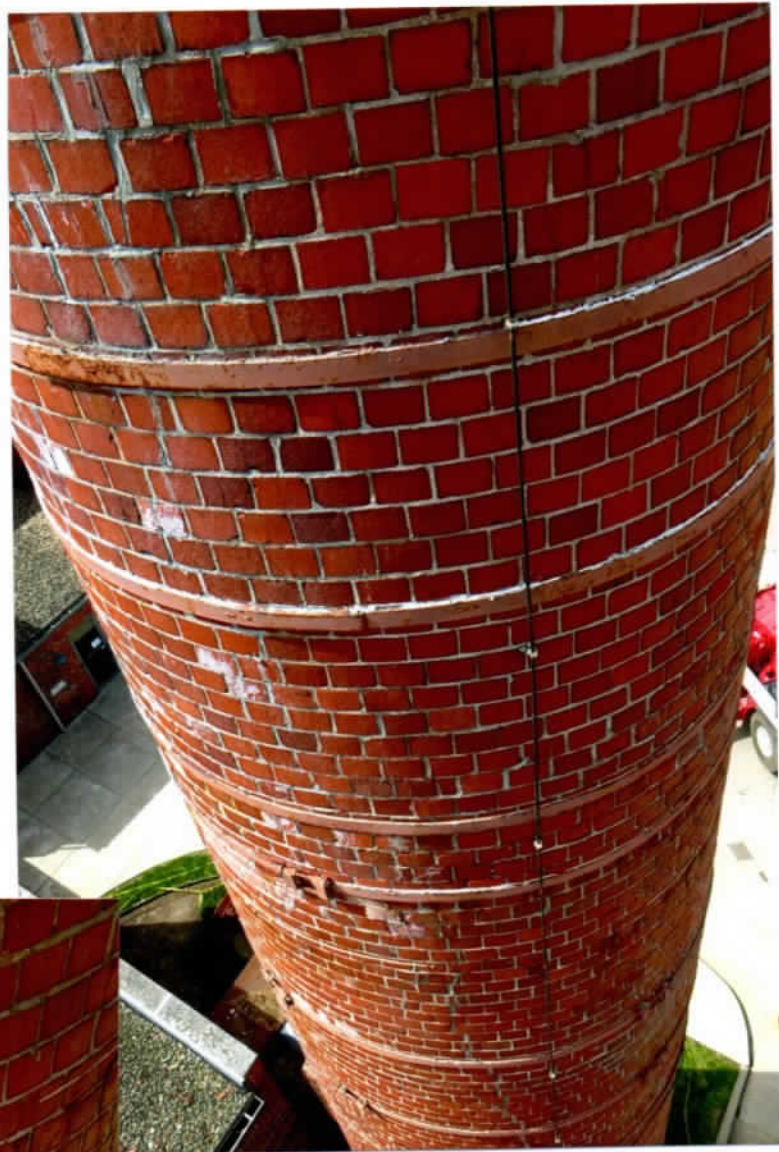


Photo 48.

Fair exterior condition of the northeast side between the 40' and 20' levels. No significant concerns were seen in this region. The download cable and bands were secure.

Photo 49.

Fair exterior condition of the north side between the 60' and 30' levels. No significant concerns were seen in this region. The download cables and bands were secure.



Photo 50.

Fair exterior condition of the lower 25' (north side). No significant concerns were seen in this region. The download cable appeared properly grounded at grade.

Photo 51.

Fair exterior condition of the lower 50' (west side). A few local areas of eroded bricks and deteriorated mortar existed, but no areas warranted immediate attention. The downlead cable and bands were secure.



Photo 52. Close-up of the spalled brick face above the 41'-11" level band, west side.



Photo 53. Close-up of the spalled brick face below the 41'-11" level band, west side.



Photo 54.
Overall good condition of the west side
between the 30' and 5' levels. No areas of
concern were identified.



Photo 55. Good condition of the corbelled courses above the extended wall surrounding the original breeching duct opening (south side between the 30' and 20' levels).



Photo 56.
Good condition of the extended wall surrounding the original breeching duct opening (lower south side). No concerns were identified along the entering duct.

Photo 57.

Good condition of the extended wall surrounding the original breeching duct opening (lower south side). No concerns were identified along the entering horizontal duct or vertical shaft containing coaxial cables servicing the cellular antenna.



Photo 58.

Good condition of the $\pm 2'$ square vertical enclosure containing coaxial cables servicing the cellular antenna. Note only staining on the brick chimney from past leakage at the duct sill.



Photo 59. Good exterior condition of the lower north side at grade. The concrete foundation below the brick chimney was slightly eroded.



Photo 60. Good exterior condition of the lower south side at grade. Note only staining on the brick chimney from past leakage at the duct sill.



Photo 61. Good exterior condition of the lower east side at grade. The brick chimney overhung the concrete foundation by several inches in this region.



Photo 62. Good exterior condition of the lower west side at grade. The concrete foundation below the brick chimney was slightly eroded.



Photo 63. Close-up of the eroded concrete along the top of the foundation (west side).

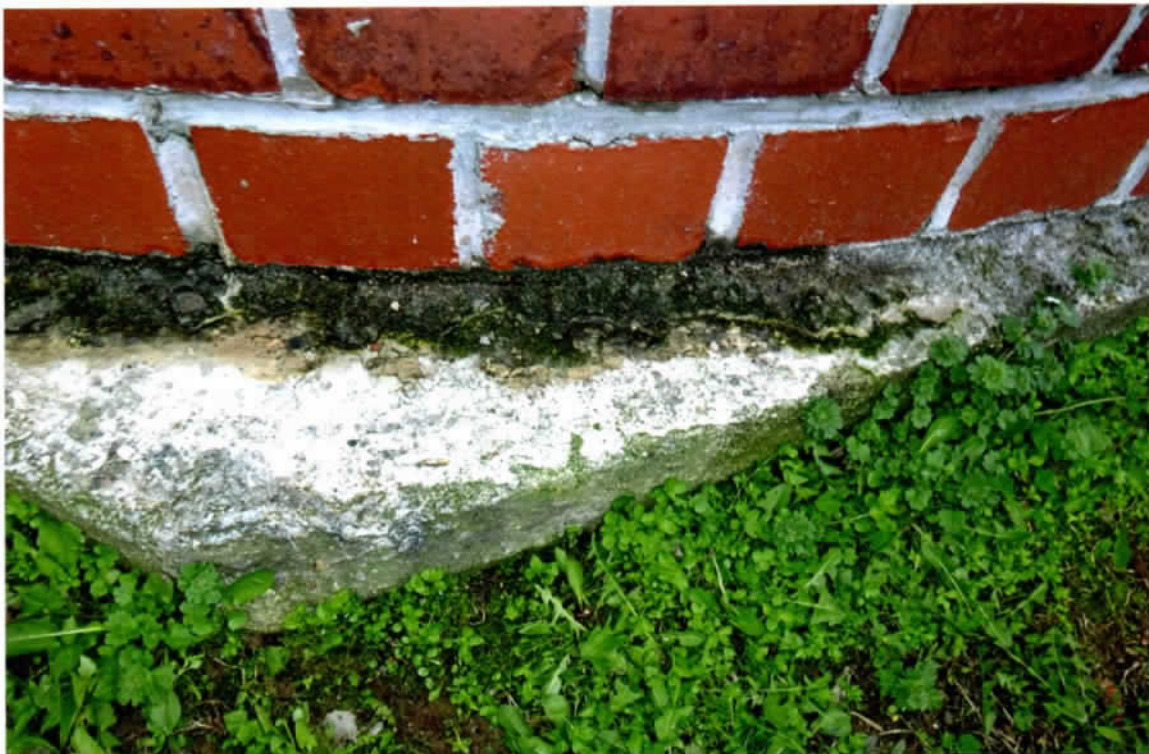


Photo 64. Close-up of the eroded concrete along the top of the foundation (north side).



Photo 65. Close-up of the brick chimney not bearing on the concrete foundation (east side). No concerns were seen with the concrete directly below the brick wall in this region.



Photo 66.
Overall good condition of the extended wall and closure wall at the original construction and cleanout opening. The steel grate was secured to the original cleanout door frame.

Photo 67.

Close-up of the section of steel grating secured within original cleanout door frame (base of northwest side). Brick faces along the sill of the frame were eroded.



Photo 68. Fair interior condition of the lower brick wall (east and southeast sides). No immediate concerns were seen throughout the lower elevations of the outer wall.



Photo 69. Approximately 8" of debris and brick faces in the chimney base near grade (north side).
Note the numerous brick faces in the debris.



Photo 70. Approximately 8" of debris and brick faces in the chimney base near grade (south side).
Note the numerous brick faces in the debris.